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0603 THICK FILM SURFACE MOUNT (.0625W)

Features:

- Wraparound termination with nickel barrier

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.0	SR1-0603-000	27	SR1-0603-027	430	SR1-0603-143	6.8K	SR1-0603-268	110K	SR1-0603-411
1.0	SR1-0603-1D0	30	SR1-0603-030	470	SR1-0603-147	7.5K	SR1-0603-275	120K	SR1-0603-412
2.0	SR1-0603-2D0	33	SR1-0603-033	510	SR1-0603-151	8.2K	SR1-0603-282	130K	SR1-0603-413
2.2	SR1-0603-2D2	36	SR1-0603-036	560	SR1-0603-156	9.1K	SR1-0603-291	150K	SR1-0603-415
2.4	SR1-0603-2D4	39	SR1-0603-039	620	SR1-0603-162	10K	SR1-0603-310	160K	SR1-0603-416
2.7	SR1-0603-2D7	43	SR1-0603-043	680	SR1-0603-168	11K	SR1-0603-311	180K	SR1-0603-418
3.0	SR1-0603-3D0	47	SR1-0603-047	750	SR1-0603-175	12K	SR1-0603-312	200K	SR1-0603-420
3.3	SR1-0603-3D3	51	SR1-0603-051	820	SR1-0603-182	13K	SR1-0603-313	220K	SR1-0603-422
3.6	SR1-0603-3D6	56	SR1-0603-056	910	SR1-0603-191	15K	SR1-0603-315	240K	SR1-0603-424
3.9	SR1-0603-3D9	62	SR1-0603-062	1K	SR1-0603-210	16K	SR1-0603-316	270K	SR1-0603-427
4.3	SR1-0603-4D3	68	SR1-0603-068	1.1K	SR1-0603-211	18K	SR1-0603-318	300K	SR1-0603-430
4.7	SR1-0603-4D7	75	SR1-0603-075	1.2K	SR1-0603-212	20K	SR1-0603-320	330K	SR1-0603-433
5.1	SR1-0603-5D1	82	SR1-0603-082	1.3K	SR1-0603-213	22K	SR1-0603-322	360K	SR1-0603-436
5.6	SR1-0603-5D6	91	SR1-0603-091	1.5K	SR1-0603-215	24K	SR1-0603-324	390K	SR1-0603-439
6.2	SR1-0603-6D2	100	SR1-0603-110	1.6K	SR1-0603-216	27K	SR1-0603-327	430K	SR1-0603-443
6.8	SR1-0603-6D8	110	SR1-0603-111	1.8K	SR1-0603-218	30K	SR1-0603-330	470K	SR1-0603-447
7.5	SR1-0603-7D5	120	SR1-0603-112	2K	SR1-0603-220	33K	SR1-0603-333	510K	SR1-0603-451
8.2	SR1-0603-8D2	130	SR1-0603-113	2.2K	SR1-0603-222	36K	SR1-0603-336	560K	SR1-0603-456
9.1	SR1-0603-9D1	150	SR1-0603-115	2.4K	SR1-0603-224	39K	SR1-0603-339	620K	SR1-0603-462
10	SR1-0603-010	160	SR1-0603-116	2.7K	SR1-0603-227	43K	SR1-0603-343	680K	SR1-0603-468
11	SR1-0603-011	180	SR1-0603-118	3K	SR1-0603-230	47K	SR1-0603-347	750K	SR1-0603-475
12	SR1-0603-012	200	SR1-0603-120	3.3K	SR1-0603-233	51K	SR1-0603-351	820K	SR1-0603-482
13	SR1-0603-013	220	SR1-0603-122	3.6K	SR1-0603-236	56K	SR1-0603-356	910K	SR1-0603-491
15	SR1-0603-015	240	SR1-0603-124	3.9K	SR1-0603-239	62K	SR1-0603-362	1M	SR1-0603-510
16	SR1-0603-016	270	SR1-0603-127	4.3K	SR1-0603-243	68K	SR1-0603-368	10M	SR1-0603-610
18	SR1-0603-018	300	SR1-0603-130	4.7K	SR1-0603-247	75K	SR1-0603-375		
20	SR1-0603-020	330	SR1-0603-133	5.1K	SR1-0603-251	82K	SR1-0603-382		
22	SR1-0603-022	360	SR1-0603-136	5.6K	SR1-0603-256	91K	SR1-0603-391		
24	SR1-0603-024	390	SR1-0603-139	6.2K	SR1-0603-262	100K	SR1-0603-410		

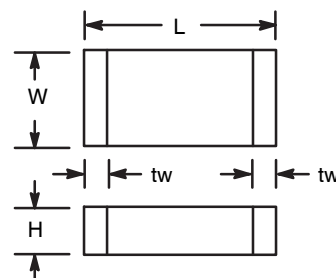
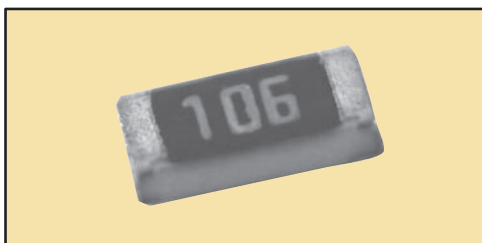
SPECIFICATIONS

Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating temperature (T _{opr})	Temperature Coefficient (PPM/°C)
SR1-0603-000 thru SR1-0603-610	0.0 to 10M	5	50	-55 ° to +155°C	200

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Width (W)	Thickness (H)	Terminal Width (tw)
SR1-0603-000 thru SR1-0603-610	0.061 (1.55)	0.031 (0.80)	0.016 (0.40)	0.010 (0.25)



0805 THICK FILM SURFACE MOUNT (100mW)

Features:

- Wraparound termination with nickel barrier

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.0	SR1-0805-000	27	SR1-0805-027	430	SR1-0805-143	6.8K	SR1-0805-268	110K	SR1-0805-411
1.0	SR1-0805-1D0	30	SR1-0805-030	470	SR1-0805-147	7.5K	SR1-0805-275	120K	SR1-0805-412
2.0	SR1-0805-2D0	33	SR1-0805-033	510	SR1-0805-151	8.2K	SR1-0805-282	130K	SR1-0805-413
2.2	SR1-0805-2D2	36	SR1-0805-036	560	SR1-0805-156	9.1K	SR1-0805-291	150K	SR1-0805-415
2.4	SR1-0805-2D4	39	SR1-0805-039	620	SR1-0805-162	10K	SR1-0805-310	160K	SR1-0805-416
2.7	SR1-0805-2D7	43	SR1-0805-043	680	SR1-0805-168	11K	SR1-0805-311	180K	SR1-0805-418
3.0	SR1-0805-3D0	47	SR1-0805-047	750	SR1-0805-175	12K	SR1-0805-312	200K	SR1-0805-420
3.3	SR1-0805-3D3	51	SR1-0805-051	820	SR1-0805-182	13K	SR1-0805-313	220K	SR1-0805-422
3.6	SR1-0805-3D6	56	SR1-0805-056	910	SR1-0805-191	15K	SR1-0805-315	240K	SR1-0805-424
3.9	SR1-0805-3D9	62	SR1-0805-062	1K	SR1-0805-210	16K	SR1-0805-316	270K	SR1-0805-427
4.3	SR1-0805-4D3	68	SR1-0805-068	1.1K	SR1-0805-211	18K	SR1-0805-318	300K	SR1-0805-430
4.7	SR1-0805-4D7	75	SR1-0805-075	1.2K	SR1-0805-212	20K	SR1-0805-320	330K	SR1-0805-433
5.1	SR1-0805-5D1	82	SR1-0805-082	1.3K	SR1-0805-213	22K	SR1-0805-322	360K	SR1-0805-436
5.6	SR1-0805-5D6	91	SR1-0805-091	1.5K	SR1-0805-215	24K	SR1-0805-324	390K	SR1-0805-439
6.2	SR1-0805-6D2	100	SR1-0805-110	1.6K	SR1-0805-216	27K	SR1-0805-327	430K	SR1-0805-443
6.8	SR1-0805-6D8	110	SR1-0805-111	1.8K	SR1-0805-218	30K	SR1-0805-330	470K	SR1-0805-447
7.5	SR1-0805-7D5	120	SR1-0805-112	2K	SR1-0805-220	33K	SR1-0805-333	510K	SR1-0805-451
8.2	SR1-0805-8D2	130	SR1-0805-113	2.2K	SR1-0805-222	36K	SR1-0805-336	560K	SR1-0805-456
9.1	SR1-0805-9D1	150	SR1-0805-115	2.4K	SR1-0805-224	39K	SR1-0805-339	620K	SR1-0805-462
10	SR1-0805-010	160	SR1-0805-116	2.7K	SR1-0805-227	43K	SR1-0805-343	680K	SR1-0805-468
11	SR1-0805-011	180	SR1-0805-118	3K	SR1-0805-230	47K	SR1-0805-347	750K	SR1-0805-475
12	SR1-0805-012	200	SR1-0805-120	3.3K	SR1-0805-233	51K	SR1-0805-351	820K	SR1-0805-482
13	SR1-0805-013	220	SR1-0805-122	3.6K	SR1-0805-236	56K	SR1-0805-356	910K	SR1-0805-491
15	SR1-0805-015	240	SR1-0805-124	3.9K	SR1-0805-239	62K	SR1-0805-362	1M	SR1-0805-510
16	SR1-0805-016	270	SR1-0805-127	4.3K	SR1-0805-243	68K	SR1-0805-368	10M	SR1-0805-610
18	SR1-0805-018	300	SR1-0805-130	4.7K	SR1-0805-247	75K	SR1-0805-375		
20	SR1-0805-020	330	SR1-0805-133	5.1K	SR1-0805-251	82K	SR1-0805-382		
22	SR1-0805-022	360	SR1-0805-136	5.6K	SR1-0805-256	91K	SR1-0805-391		
24	SR1-0805-024	390	SR1-0805-139	6.2K	SR1-0805-262	100K	SR1-0805-410		

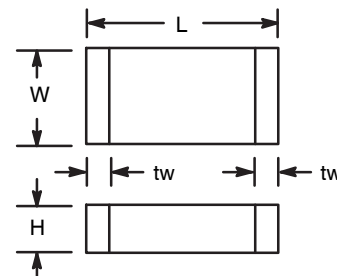
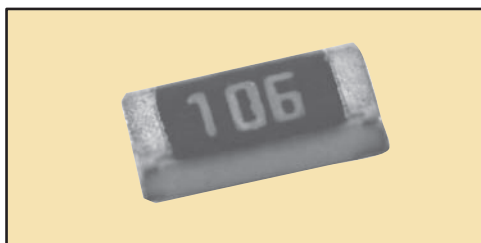
SPECIFICATIONS

Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating temperature (T _{opr})	Temperature Coefficient (PPM/°C)
SR1-0805-000 thru SR1-0805-610	0.0 to 10M	5	150	-55 ° to +155°C	200

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Width (W)	Thickness (H)	Terminal Width (tw)
SR1-0805-000 thru SR1-0805-610	0.079 (2.0)	0.050 (1.25)	0.020 (0.50)	0.016 (0.40)



1206 THICK FILM SURFACE MOUNT (250mW)

Features:

- Wraparound termination with nickel barrier

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.0	SR1-1206-000	27	SR1-1206-027	430	SR1-1206-143	6.8K	SR1-1206-268	110K	SR1-1206-411
1.0	SR1-1206-1D0	30	SR1-1206-030	470	SR1-1206-147	7.5K	SR1-1206-275	120K	SR1-1206-412
2.0	SR1-1206-2D0	33	SR1-1206-033	510	SR1-1206-151	8.2K	SR1-1206-282	130K	SR1-1206-413
2.2	SR1-1206-2D2	36	SR1-1206-036	560	SR1-1206-156	9.1K	SR1-1206-291	150K	SR1-1206-415
2.4	SR1-1206-2D4	39	SR1-1206-039	620	SR1-1206-162	10K	SR1-1206-310	160K	SR1-1206-416
2.7	SR1-1206-2D7	43	SR1-1206-043	680	SR1-1206-168	11K	SR1-1206-311	180K	SR1-1206-418
3.0	SR1-1206-3D0	47	SR1-1206-047	750	SR1-1206-175	12K	SR1-1206-312	200K	SR1-1206-420
3.3	SR1-1206-3D3	51	SR1-1206-051	820	SR1-1206-182	13K	SR1-1206-313	220K	SR1-1206-422
3.6	SR1-1206-3D6	56	SR1-1206-056	910	SR1-1206-191	15K	SR1-1206-315	240K	SR1-1206-424
3.9	SR1-1206-3D9	62	SR1-1206-062	1K	SR1-1206-210	16K	SR1-1206-316	270K	SR1-1206-427
4.3	SR1-1206-4D3	68	SR1-1206-068	1.1K	SR1-1206-211	18K	SR1-1206-318	300K	SR1-1206-430
4.7	SR1-1206-4D7	75	SR1-1206-075	1.2K	SR1-1206-212	20K	SR1-1206-320	330K	SR1-1206-433
5.1	SR1-1206-5D1	82	SR1-1206-082	1.3K	SR1-1206-213	22K	SR1-1206-322	360K	SR1-1206-436
5.6	SR1-1206-5D6	91	SR1-1206-091	1.5K	SR1-1206-215	24K	SR1-1206-324	390K	SR1-1206-439
6.2	SR1-1206-6D2	100	SR1-1206-110	1.6K	SR1-1206-216	27K	SR1-1206-327	430K	SR1-1206-443
6.8	SR1-1206-6D8	110	SR1-1206-111	1.8K	SR1-1206-218	30K	SR1-1206-330	470K	SR1-1206-447
7.5	SR1-1206-7D5	120	SR1-1206-112	2K	SR1-1206-220	33K	SR1-1206-333	510K	SR1-1206-451
8.2	SR1-1206-8D2	130	SR1-1206-113	2.2K	SR1-1206-222	36K	SR1-1206-336	560K	SR1-1206-456
9.1	SR1-1206-9D1	150	SR1-1206-115	2.4K	SR1-1206-224	39K	SR1-1206-339	620K	SR1-1206-462
10	SR1-1206-010	160	SR1-1206-116	2.7K	SR1-1206-227	43K	SR1-1206-343	680K	SR1-1206-468
11	SR1-1206-011	180	SR1-1206-118	3K	SR1-1206-230	47K	SR1-1206-347	750K	SR1-1206-475
12	SR1-1206-012	200	SR1-1206-120	3.3K	SR1-1206-233	51K	SR1-1206-351	820K	SR1-1206-482
13	SR1-1206-013	220	SR1-1206-122	3.6K	SR1-1206-236	56K	SR1-1206-356	910K	SR1-1206-491
15	SR1-1206-015	240	SR1-1206-124	3.9K	SR1-1206-239	62K	SR1-1206-362	1M	SR1-1206-510
16	SR1-1206-016	270	SR1-1206-127	4.3K	SR1-1206-243	68K	SR1-1206-368	10M	SR1-1206-610
18	SR1-1206-018	300	SR1-1206-130	4.7K	SR1-1206-247	75K	SR1-1206-375		
20	SR1-1206-020	330	SR1-1206-133	5.1K	SR1-1206-251	82K	SR1-1206-382		
22	SR1-1206-022	360	SR1-1206-136	5.6K	SR1-1206-256	91K	SR1-1206-391		
24	SR1-1206-024	390	SR1-1206-139	6.2K	SR1-1206-262	100K	SR1-1206-410		

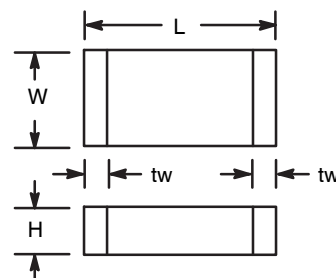
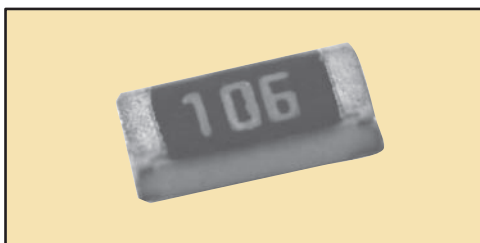
SPECIFICATIONS

Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating temperature (T _{opp})	Temperature Coefficient (PPM/°C)
SR1-1206-000 thru SR1-1206-610	0.0 to 10M	5	200	-55 ° to +155°C	200

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Width (W)	Thickness (H)	Terminal Width (tw)
SR1-1206-000 thru SR1-1206-610	0.126 (3.2)	0.061 (1.55)	0.024 (0.61)	0.020 (0.51)



SURFACE MOUNT POWER WIREWOUND

Features:

- All welded construction
- Molded encapsulation
- Wrap around solderable terminals

1 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.10	SMR1D10	0.50	SMR1D50	1.0	SMR11D0	10	SMR1010	100	SMR1110
0.25	SMR1D25								

2 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.10	SMR2D10	0.50	SMR2D50	1.0	SMR21D0	10	SMR2010	100	SMR2110
0.25	SMR2D25								

4 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.01	SMR4D01	0.10	SMR4D10	0.50	SMR4D50	10	SMR4010	100	SMR4110
0.05	SMR4D05	0.25	SMR4D25	1.0	SMR41D0				

SPECIFICATIONS

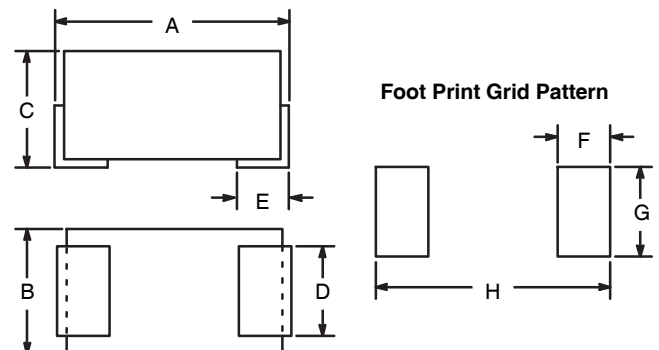
Electrical Characteristics

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
SMR1 & SMR2 Series	0.10 to 0.50	5	$(P \times R)^{1/2}$	-65° to +275°C	±90
	1.0 to 10	5	$(P \times R)^{1/2}$	-65° to +275°C	±50
	100	5	$(P \times R)^{1/2}$	-65° to +275°C	±20
SMR4 Series	0.01 to 0.50	5	500	-55° to +275°C	±90
	1.0 to 10	5	500	-55° to +275°C	±50
	100	5	500	-55° to +275°C	±20

Mechanical* (inches (mm))

NTE Number	A	B	C	D	E	F	G	H
SMR1 Series	.250 (6.4)	.150 (3.8)	.110 (2.8)	.098 (2.5)	.045 (1.1)	.090 (2.3)	.115 (2.9)	.300 (7.6)
SMR2 Series	.445 (11.3)	.275 (7.0)	.162 (4.1)	.215 (5.5)	.100 (2.5)	.155 (3.9)	.230 (5.8)	.515 (13.1)
SMR4 Series	.832 (21.1)	.295 (7.4)	.286 (7.2)	.150 (3.8)	.190 (4.8)	.220 (5.6)	.250 (6.4)	.900 (22.9)

* These dimensions are for reference only, please consult the factory for actual size.



1/8 WATT METAL

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
2.2	EW2D2	15	EW015	100	EW110	680	EW168	4.7K	EW247	33K	EW333	220K	EW422
2.4	EW2D4	16	EW016	110	EW111	750	EW175	5.1K	EW251	36K	EW336	240K	EW424
2.7	EW2D7	18	EW018	120	EW112	820	EW182	5.6K	EW256	39K	EW339	270K	EW427
3.0	EW3D0	20	EW020	130	EW113	910	EW191	6.2K	EW262	43K	EW343	300K	EW430
3.3	EW3D3	22	EW022	150	EW115	1K	EW210	6.8K	EW268	47K	EW347	330K	EW433
3.6	EW3D6	24	EW024	160	EW116	1.1K	EW211	7.5K	EW275	51K	EW351	360K	EW436
3.9	EW3D9	27	EW027	180	EW118	1.2K	EW212	8.2K	EW282	56K	EW356	390K	EW439
4.3	EW4D3	30	EW030	200	EW120	1.3K	EW213	9.1K	EW291	62K	EW362	430K	EW443
4.7	EW4D7	33	EW033	220	EW122	1.5K	EW215	10K	EW310	68K	EW368	470K	EW447
5.1	EW5D1	36	EW036	240	EW124	1.6K	EW216	11K	EW311	75K	EW375	510K	EW451
5.6	EW5D6	39	EW039	270	EW127	1.8K	EW218	12K	EW312	82K	EW382	560K	EW456
6.2	EW6D2	43	EW043	300	EW130	2K	EW220	13K	EW313	91K	EW391	620K	EW462
6.8	EW6D8	47	EW047	330	EW133	2.2K	EW222	15K	EW315	100K	EW410	680K	EW468
7.5	EW7D5	51	EW051	360	EW136	2.4K	EW224	16K	EW316	110K	EW411	750K	EW475
8.2	EW8D2	56	EW056	390	EW139	2.7K	EW227	18K	EW318	120K	EW412	820K	EW482
9.1	EW9D1	62	EW062	430	EW143	3K	EW230	20K	EW320	130K	EW413	910K	EW491
10	EW010	68	EW068	470	EW147	3.3K	EW233	22K	EW322	150K	EW415	1M	EW510
11	EW011	75	EW075	510	EW151	3.6K	EW236	24K	EW324	160K	EW416		
12	EW012	82	EW082	560	EW156	3.9K	EW239	27K	EW327	180K	EW418		
13	EW013	91	EW091	620	EW162	4.3K	EW243	30K	EW330	200K	EW420		

SPECIFICATIONS

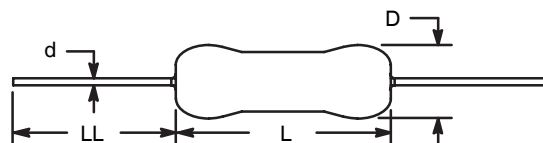
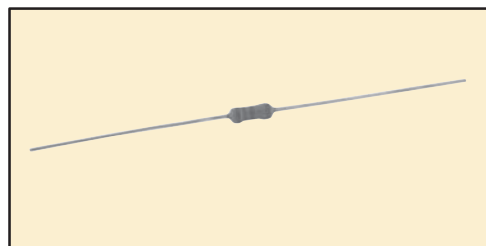
Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
EW2D2 thru EW510	2.2 to 1M	2	150	-55 ° to +155°C	200

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
EW2D2 thru EW510	0.146 (3.7)	0.063 (1.6)	0.016 (0.4)	1.180 (30.0)

* These dimensions are for reference only, please consult the factory for actual size.



1/4 WATT METAL

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
1.0	QW1D0	12	QW012	150	QW115	1.8K	QW218	22K	QW322	270K	QW427	3.3M	QW533
1.1	QW1D1	13	QW013	160	QW116	2K	QW220	24K	QW324	300K	QW430	3.6M	QW536
1.2	QW1D2	15	QW015	180	QW118	2.2K	QW222	27K	QW327	330K	QW433	3.9M	QW539
1.3	QW1D3	16	QW016	200	QW120	2.4K	QW224	30K	QW330	360K	QW436	4.3M	QW543
1.5	QW1D5	18	QW018	220	QW122	2.7K	QW227	33K	QW333	390K	QW439	4.7M	QW547
1.6	QW1D6	20	QW020	240	QW124	3K	QW230	36K	QW336	430K	QW443	5.1M	QW551
1.8	QW1D8	22	QW022	270	QW127	3.3K	QW233	39K	QW339	470K	QW447	5.6M	QW556
2.0	QW2D0	24	QW024	300	QW130	3.6K	QW236	43K	QW343	510K	QW451	6.2M	QW562
2.2	QW2D2	27	QW027	330	QW133	3.9K	QW239	47K	QW347	560K	QW456	6.8M	QW568
2.4	QW2D4	30	QW030	360	QW136	4.3K	QW243	51K	QW351	620K	QW462	7.5M	QW575
2.7	QW2D7	33	QW033	390	QW139	4.7K	QW247	56K	QW356	680K	QW468	8.2M	QW582
3.0	QW3D0	36	QW036	430	QW143	5.1K	QW251	62K	QW362	750K	QW475	9.1M	QW591
3.3	QW3D3	39	QW039	470	QW147	5.6K	QW256	68K	QW368	820K	QW482	10M	QW610
3.6	QW3D6	43	QW043	510	QW151	6.2K	QW262	75K	QW375	910K	QW491	11M	QW611
3.9	QW3D9	47	QW047	560	QW156	6.8K	QW268	82K	QW382	1M	QW510	12M	QW612
4.3	QW4D3	51	QW051	620	QW162	7.5K	QW275	91K	QW391	1.1M	QW511	13M	QW613
4.7	QW4D7	56	QW056	680	QW168	8.2K	QW282	100K	QW410	1.2M	QW512	15M	QW615
5.1	QW5D1	62	QW062	750	QW175	9.1K	QW291	110K	QW411	1.3M	QW513	16M	QW616
5.6	QW5D6	68	QW068	820	QW182	10K	QW310	120K	QW412	1.5M	QW515	18M	QW618
6.2	QW6D2	75	QW075	910	QW191	11K	QW311	130K	QW413	1.6M	QW516	20M	QW620
6.8	QW6D8	82	QW082	1K	QW210	12K	QW312	150K	QW415	1.8M	QW518	22M	QW622
7.5	QW7D5	91	QW091	1.1K	QW211	13K	QW313	160K	QW416	2.0M	QW520		
8.2	QW8D2	100	QW110	1.2K	QW212	15K	QW315	180K	QW418	2.2M	QW522		
9.1	QW9D1	110	QW111	1.3K	QW213	16K	QW316	200K	QW420	2.4M	QW524		
10	QW010	120	QW112	1.5K	QW215	18K	QW318	220K	QW422	2.7M	QW527		
11	QW011	130	QW113	1.6K	QW216	20K	QW320	240K	QW424	3.0M	QW530		

SPECIFICATIONS

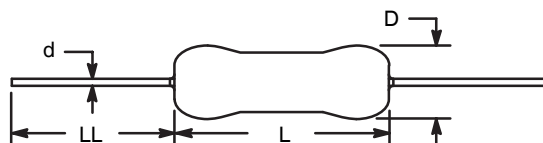
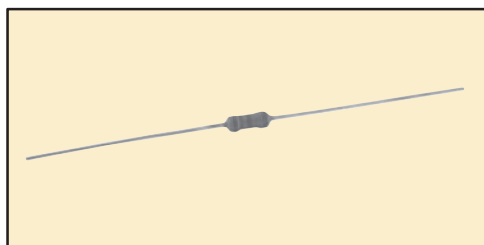
Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
QW1D0 thru QW9D1	1.0 to 9.1	5	250	-55 ° to +155°C	200
QW010 thru QW430	10 to 300K	2	250	-55 ° to +155°C	200
QW433 thru QW622	330K to 22M	2	250	-55 ° to +155°C	200

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
QW1D0 thru QW622	0.250 (6.5)	0.091 (2.3)	0.024 (0.60)	1.18 (30.0)

* These dimensions are for reference only, please consult the factory for actual size.



1/4 WATT METAL, 1% TOLERANCE

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
10.0	QW010BR	402	QW0402BR	3.48K	QW1348BR	18K	QW318BR	80.6K	QW2806BR
12.1	QW012D1BR	422	QW0422BR	3.65K	QW1365BR	18.2K	QW2182BR	84.5K	QW2845BR
15.0	QW015BR	432	QW0432BR	3.92K	QW1392BR	19.6K	QW2196BR	90.9K	QW2909BR
20.0	QW020BR	475	QW0475BR	4.02K	QW1402BR	20K	QW320BR	97.6K	QW2976BR
22.1	QW022D1BR	499	QW0499BR	4.32K	QW1432BR	22K	QW322BR	100K	QW3100BR
24.9	QW024D9BR	511	QW0511BR	4.64K	QW1464BR	22.1K	QW2221BR	105K	QW3105BR
27.4	QW027D4BR	523	QW0523BR	4.75K	QW1475BR	22.6K	QW2226BR	110K	QW3110BR
30.1	QW030D1BR	562	QW0562BR	4.99K	QW1499BR	23.2K	QW2232BR	121K	QW3121BR
33.2	QW033D2BR	681	QW0681BR	5.11K	QW1511BR	24K	QW324BR	124K	QW3124BR
34.8	QW034D8BR	732	QW0732BR	5.23K	QW1523BR	24.9K	QW2249BR	150K	QW3150BR
37.4	QW037D4BR	750	QW0750BR	5.36K	QW1536BR	25.5K	QW2255BR	158K	QW3158BR
39.2	QW039D2BR	806	QW0806BR	5.62K	QW1562BR	26.7K	QW2267BR	182K	QW3182BR
40.2	QW040D2BR	825	QW0825BR	6.04K	QW1604BR	27K	QW327BR	200K	QW3200BR
43.2	QW043D2BR	909	QW0909BR	6.19K	QW1619BR	27.4K	QW2274BR	221K	QW3221BR
45.3	QW045D3BR	1.0K	QW210BR	6.2K	QW262BR	28.7K	QW2287BR	226K	QW3226BR
47.5	QW047D5BR	1.05K	QW1105BR	6.34K	QW1634BR	30K	QW330BR	249K	QW3249BR
49.9	QW049D9BR	1.1K	QW211BR	6.81K	QW1681BR	30.1K	QW2301BR	267K	QW3267BR
51.1	QW051D1BR	1.21K	QW1121BR	6.98K	QW1698BR	30.9K	QW2309BR	274K	QW3274BR
56.2	QW056D2BR	1.24K	QW1124BR	7.5K	QW275BR	32.4K	QW2324BR	301K	QW3301BR
61.9	QW061D9BR	1.27K	QW1127BR	7.68K	QW1768BR	33K	QW333BR	348K	QW3348BR
75.0	QW075BR	1.4K	QW214BR	7.87K	QW1787BR	33.2K	QW2332BR	360K	QW3360BR
80.6	QW080D6BR	1.5K	QW215BR	8.06K	QW1806BR	34.8K	QW2348BR	390K	QW3390BR
90.9	QW090D9BR	1.54K	QW1154BR	8.2K	QW282BR	38.3K	QW2383BR	402K	QW3402BR
100	QW110BR	1.69K	QW1169BR	8.25K	QW1825BR	39.2K	QW2392BR	430K	QW3430BR
121	QW0121BR	1.82K	QW1182BR	8.8K	QW288BR	41.2K	QW2412BR	432K	QW3432BR
133	QW0133BR	2.0K	QW220BR	8.87K	QW1887BR	42.2K	QW2422BR	470K	QW3470BR
150	QW115BR	2.15K	QW1215BR	9.09K	QW1909BR	43.2K	QW2432BR	475K	QW3475BR
182	QW0182BR	2.21K	QW1221BR	9.1K	QW291BR	46.4K	QW2464BR	499K	QW3499BR
200	QW120BR	2.32K	QW1232BR	9.31K	QW1931BR	47.5K	QW2475BR	511K	QW3511BR
215	QW0215BR	2.37K	QW1237BR	10K	QW310BR	49.9K	QW2499BR	560K	QW3560BR
221	QW0221BR	2.49K	QW1249BR	10.5K	QW2105BR	51.1K	QW2511BR	562K	QW3562BR
232	QW0232BR	2.61K	QW1261BR	10.7K	QW2107BR	52.3K	QW2523BR	620K	QW3620BR
243	QW0243BR	2.74K	QW1274BR	11.3K	QW2113BR	54.9K	QW2549BR	750K	QW3750BR
249	QW0249BR	2.87K	QW1287BR	12.1K	QW2121BR	56.2K	QW2562BR	806K	QW3806BR
274	QW0274BR	2.94K	QW1294BR	13K	QW313BR	57.6K	QW2567BR	820K	QW3820BR
301	QW0301BR	3.01K	QW1301BR	13.3K	QW2133BR	66.5K	QW2665BR	909K	QW3909BR
316	QW0316BR	3.09K	QW1309BR	15K	QW315BR	68.1K	QW2681BR	910K	QW3910BR
332	QW0332BR	3.16K	QW1316BR	16K	QW316BR	69.8K	QW2698BR	1M	QW4100BR
348	QW0348BR	3.24K	QW1324BR	17.4K	QW2174BR	71.5K	QW2715BR		
392	QW0392BR	3.32K	QW1332BR	17.8K	QW2178BR	75K	QW375BR		

SPECIFICATIONS

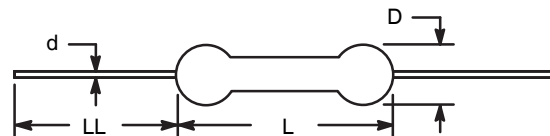
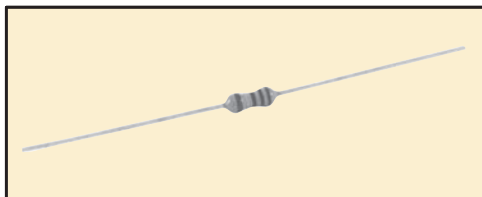
Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating temperature (T _{OP})	Temperature Coefficient (PPM/°C)
QW010BR thru QW4100BR	10 to 1M	1	250	-55° to +155°C	100

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
QW010BR thru QW4100BR	0.256 (6.5)	0.094 (2.4)	0.024 (0.6)	1.024 (26.0)

* These dimensions are for reference only, please consult the factory for actual size.



1/2 WATT METAL

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.10	HWD10	1.6	HW1D6	27	HW027	430	HW143	6.8K	HW268	110K	HW411	1.8M	HW518
0.11	HWD11	1.8	HW1D8	30	HW030	470	HW147	7.5K	HW275	120K	HW412	2M	HW520
0.12	HWD12	2.0	HW2D0	33	HW033	510	HW151	8.2K	HW282	130K	HW413	2.2M	HW522
0.13	HWD13	2.2	HW2D2	36	HW036	560	HW156	9.1K	HW291	150K	HW415	2.4M	HW524
0.15	HWD15	2.4	HW2D4	39	HW039	620	HW162	10K	HW310	160K	HW416	2.7M	HW527
0.16	HWD16	2.7	HW2D7	43	HW043	680	HW168	11K	HW311	180K	HW418	3M	HW530
0.18	HWD18	3.0	HW3D0	47	HW047	750	HW175	12K	HW312	200K	HW420	3.3M	HW533
0.20	HWD20	3.3	HW3D3	51	HW051	820	HW182	13K	HW313	220K	HW422	3.6M	HW536
0.22	HWD22	3.6	HW3D6	56	HW056	910	HW191	15K	HW315	240K	HW424	3.9M	HW539
0.24	HWD24	3.9	HW3D9	62	HW062	1K	HW210	16K	HW316	270K	HW427	4.3M	HW543
0.27	HWD27	4.3	HW4D3	68	HW068	1.1K	HW211	18K	HW318	300K	HW430	4.7M	HW547
0.30	HWD30	4.7	HW4D7	75	HW075	1.2K	HW212	20K	HW320	330K	HW433	5.1M	HW551
0.33	HWD33	5.1	HW5D1	82	HW082	1.3K	HW213	22K	HW322	360K	HW436	5.6M	HW556
0.36	HWD36	5.6	HW5D6	91	HW091	1.5K	HW215	24K	HW324	390K	HW439	6.2M	HW562
0.39	HWD39	6.2	HW6D2	100	HW110	1.6K	HW216	27K	HW327	430K	HW443	6.8M	HW568
0.43	HWD43	6.8	HW6D8	110	HW111	1.8K	HW218	30K	HW330	470K	HW447	7.5M	HW575
0.47	HWD47	7.5	HW7D5	120	HW112	2K	HW220	33K	HW333	510K	HW451	8.2M	HW582
0.51	HWD51	8.2	HW8D2	130	HW113	2.2K	HW222	36K	HW336	560K	HW456	9.1M	HW591
0.56	HWD56	9.1	HW9D1	150	HW115	2.4K	HW224	39K	HW339	620K	HW462	10M	HW610
0.62	HWD62	10	HW010	160	HW116	2.7K	HW227	43K	HW343	680K	HW468	11M	HW611
0.68	HWD68	11	HW011	180	HW118	3K	HW230	47K	HW347	750K	HW475	12M	HW612
0.75	HWD75	12	HW012	200	HW120	3.3K	HW233	51K	HW351	820K	HW482	13M	HW613
0.82	HWD82	13	HW013	220	HW122	3.6K	HW236	56K	HW356	910K	HW491	15M	HW615
0.91	HWD91	15	HW015	240	HW124	3.9K	HW239	62K	HW362	1M	HW510	16M	HW616
1.0	HW1D0	16	HW016	270	HW127	4.3K	HW243	68K	HW368	1.1M	HW511	18M	HW618
1.1	HW1D1	18	HW018	300	HW130	4.7K	HW247	75K	HW375	1.2M	HW512	20M	HW620
1.2	HW1D2	20	HW020	330	HW133	5.1K	HW251	82K	HW382	1.3M	HW513	22M	HW622
1.3	HW1D3	22	HW022	360	HW136	5.6K	HW256	91K	HW391	1.5M	HW515		
1.5	HW1D5	24	HW024	390	HW139	6.2K	HW262	100K	HW410	1.6M	HW516		

SPECIFICATIONS

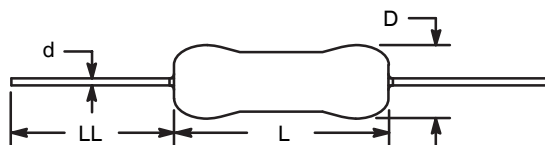
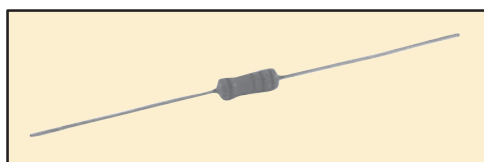
Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
HWD10 thru HW9D1	0.20 to 9.1	5	300	-55 ° to +155°C	100
HW010 thru HW510	10 to 1M	2	350	-55 ° to +155°C	200
HW511 thru HW622	1.1M to 22M	2	350	-55 ° to +155°C	200

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
HWD10 thru HW9D1	0.375 (9.5)	0.138 (3.5)	0.027 (0.7)	1.02 (26)
HW010 thru HW510	0.355 (9.02)	0.148 (3.76)	0.032 (0.81)	1.5 (38.1)
HW511 thru HW622	0.375 (9.5)	0.138 (3.5)	0.032 (0.81)	1.18 (30)

* These dimensions are for reference only, please consult the factory for actual size.



1 WATT METAL

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.10	1WD10	4.3	1W4D3	56	1W056	750	1W175	11K	1W311	150K	1W415	2M	1W520
0.12	1WD12	4.7	1W4D7	62	1W062	820	1W182	12K	1W312	160K	1W416	2.2M	1W522
0.15	1WD15	5.1	1W5D1	68	1W068	910	1W191	13K	1W313	180K	1W418	2.4M	1W524
0.18	1WD18	5.6	1W5D6	75	1W075	1K	1W210	15K	1W315	200K	1W420	2.7M	1W527
0.22	1WD22	6.2	1W6D2	82	1W082	1.1K	1W211	16K	1W316	220K	1W422	3M	1W530
0.27	1WD27	6.8	1W6D8	91	1W091	1.2K	1W212	18K	1W318	240K	1W424	3.3M	1W533
0.33	1WD33	7.5	1W7D5	100	1W110	1.3K	1W213	20K	1W320	270K	1W427	3.6M	1W536
0.39	1WD39	8.2	1W8D2	110	1W111	1.5K	1W215	22K	1W322	300K	1W430	3.9M	1W539
0.47	1WD47	9.1	1W9D1	120	1W112	1.6K	1W216	24K	1W324	330K	1W433	4.3M	1W543
0.56	1WD56	10	1W010	130	1W113	1.8K	1W218	27K	1W327	360K	1W436	4.7M	1W547
0.68	1WD68	11	1W011	150	1W115	2K	1W220	30K	1W330	390K	1W439	5.1M	1W551
0.82	1WD82	12	1W012	160	1W116	2.2K	1W222	33K	1W333	430K	1W443	5.6M	1W556
1.0	1W1D0	13	1W013	180	1W118	2.7K	1W227	36K	1W336	470K	1W447	6.2M	1W562
1.1	1W1D1	15	1W015	200	1W120	3K	1W230	39K	1W339	510K	1W451	6.8M	1W568
1.2	1W1D2	16	1W016	220	1W122	3.3K	1W233	43K	1W343	560K	1W456	7.5M	1W575
1.3	1W1D3	18	1W018	240	1W124	3.6K	1W236	47K	1W347	620K	1W462	8.2M	1W582
1.5	1W1D5	20	1W020	270	1W127	3.9K	1W239	51K	1W351	680K	1W468	9.1M	1W591
1.6	1W1D6	22	1W022	300	1W130	4.3K	1W243	56K	1W356	750K	1W475	10M	1W610
1.8	1W1D8	24	1W024	330	1W133	4.7K	1W247	62K	1W362	820K	1W482	11M	1W611
2.0	1W2D0	27	1W027	360	1W136	5.1K	1W251	68K	1W368	910K	1W491	12M	1W612
2.2	1W2D2	30	1W030	390	1W139	5.6K	1W256	75K	1W375	1M	1W510	13M	1W613
2.4	1W2D4	33	1W033	430	1W143	6.2K	1W262	82K	1W382	1.1M	1W511	15M	1W615
2.7	1W2D7	36	1W036	470	1W147	6.8K	1W268	91K	1W391	1.2M	1W512	16M	1W616
3.0	1W3D0	39	1W039	510	1W151	7.5K	1W275	100K	1W410	1.3M	1W513	18M	1W618
3.3	1W3D3	43	1W043	560	1W156	8.2K	1W282	110K	1W411	1.5M	1W515	20M	1W620
3.6	1W3D6	47	1W047	620	1W162	9.1K	1W291	120K	1W412	1.6M	1W516	22M	1W622
3.9	1W3D9	51	1W051	680	1W168	10K	1W310	130K	1W413	1.8M	1W518		

SPECIFICATIONS

Electrical Characteristics @ 70°C

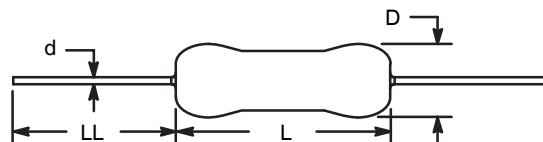
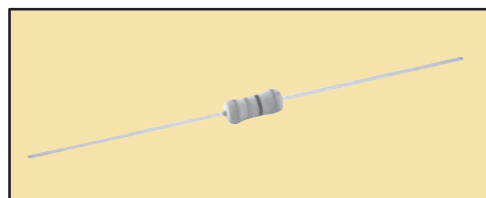
NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
1WD10 to 1W9D1	0.10 to 9.1	5	350	-55 ° to +200°C (Note)	200
1W010 to 1W510	10 to 1M	2	500	-55 ° to +200°C	200
1W511 to 1W622	1.1M to 22M	2	350	-55 ° to +200°C	200

Note: For values less than 0.2?, the Operating Temperature is -55 ° to +155°C.

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
1WD10 to 1W9D1	0.425 (10.8)	0.155 (3.9)	0.027 (0.7)	1.375 (35)
1W010 to 1W510	0.440 (11.8)	0.157 (4.0)	0.032 (0.83)	1.18 (30)
1W511 to 1W622	0.425 (10.8)	0.155 (3.9)	0.027 (0.7)	1.375 (35)

* These dimensions are for reference only, please consult the factory for actual size.



2 WATT METAL

0.10	2WD10	4.3	2W4D3	56	2W056	750	2W175	10K	2W310	130K	2W413	1.8M	2W518
0.12	2WD12	4.7	2W4D7	62	2W062	820	2W182	11K	2W311	150K	2W415	2M	2W520
0.15	2WD15	5.1	2W5D1	68	2W068	910	2W191	12K	2W312	160K	2W416	2.2M	2W522
0.18	2WD18	5.6	2W5D6	75	2W075	1K	2W210	13K	2W313	180K	2W418	2.4M	2W524
0.22	2WD22	6.2	2W6D2	82	2W082	1.1K	2W211	15K	2W315	200K	2W420	2.7M	2W527
0.27	2WD27	6.8	2W6D8	91	2W091	1.2K	2W212	16K	2W316	220K	2W422	3M	2W530
0.33	2WD33	7.5	2W7D5	100	2W110	1.3K	2W213	18K	2W318	240K	2W424	3.3M	2W533
0.39	2WD39	8.2	2W8D2	110	2W111	1.5K	2W215	20K	2W320	270K	2W427	3.6M	2W536
0.47	2WD47	9.1	2W9D1	120	2W112	1.6K	2W216	22K	2W322	300K	2W430	3.9M	2W539
0.56	2WD56	10	2W010	130	2W113	1.8K	2W218	24K	2W324	330K	2W433	4.3M	2W543
0.68	2WD68	11	2W011	150	2W115	2K	2W220	27K	2W327	360K	2W436	4.7M	2W547
0.82	2WD82	12	2W012	160	2W116	2.2K	2W222	30K	2W330	390K	2W439	5.1M	2W551
1.0	2W1D0	13	2W013	180	2W118	2.4K	2W224	33K	2W333	430K	2W443	5.6M	2W556
1.1	2W1D1	15	2W015	200	2W120	2.7K	2W227	36K	2W336	470K	2W447	6.2M	2W562
1.2	2W1D2	16	2W016	220	2W122	3K	2W230	39K	2W339	510K	2W451	6.8M	2W568
1.3	2W1D3	18	2W018	240	2W124	3.3K	2W233	43K	2W343	560K	2W456	7.5M	2W575
1.5	2W1D5	20	2W020	270	2W127	3.6K	2W236	47K	2W347	620K	2W462	8.2M	2W582
1.6	2W1D6	22	2W022	300	2W130	3.9K	2W239	51K	2W351	680K	2W468	9.1M	2W591
1.8	2W1D8	24	2W024	330	2W133	4.3K	2W243	56K	2W356	750K	2W475	10M	2W610
2.0	2W2D0	27	2W027	360	2W136	4.7K	2W247	62K	2W362	820K	2W482	11M	2W611
2.2	2W2D2	30	2W030	390	2W139	5.1K	2W251	68K	2W368	910K	2W491	12M	2W612
2.4	2W2D4	33	2W033	430	2W143	5.6K	2W256	75K	2W375	1M	2W510	13M	2W613
2.7	2W2D7	36	2W036	470	2W147	6.2K	2W262	82K	2W382	1.1M	2W511	15M	2W615
3.0	2W3D0	39	2W039	510	2W151	6.8K	2W268	91K	2W391	1.2M	2W512	16M	2W616
3.3	2W3D3	43	2W043	560	2W156	7.5K	2W275	100K	2W410	1.3M	2W513	18M	2W618
3.6	2W3D6	47	2W047	620	2W162	8.2K	2W282	110K	2W411	1.5M	2W515	20M	2W620
3.9	2W3D9	51	2W051	680	2W168	9.1K	2W291	120K	2W412	1.6M	2W516	22M	2W622

SPECIFICATIONS

Electrical Characteristics @ 70°C

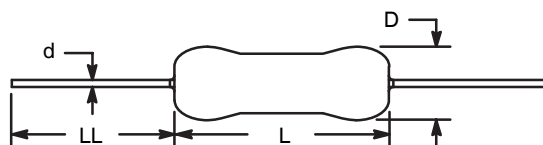
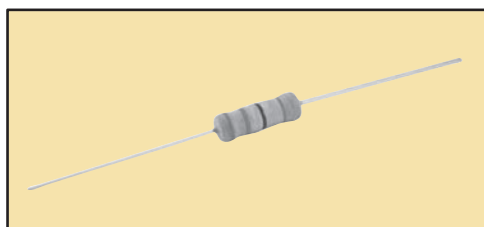
NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
2WD10 to 2W9D1	0.10 to 9.1	5	500	-55 ° to +200°C (Note)	200
2W010 to 2W511	10 to 1.1M	2	500	-55 ° to +200°C	200
2W512 to 2W622	1.2M to 22M	2	500	-55 ° to +200°C	200

Note: For values less than 0.2?, the Operating Temperature is -55 ° to +155°C.

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
2WD10 to 2W9D1	0.590 (15)	0.220 (5.6)	0.032 (.8)	1.5 (38)
2W010 to 2W622	0.610 (15.5)	0.220 (5.6)	0.032 (.8)	1.18 (30)

* These dimensions are for reference only, please consult the factory for actual size.



3 WATT METAL

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
1.0	3W1D0	6.8	3W6D8	47	3W047	330	3W133	2.2K	3W222	15K	3W315	100K	3W410
1.1	3W1D1	7.5	3W7D5	51	3W051	360	3W136	2.4K	3W224	16K	3W316	110K	3W411
1.2	3W1D2	8.2	3W8D2	56	3W056	390	3W139	2.7K	3W227	18K	3W318	120K	3W412
1.3	3W1D3	9.1	3W9D1	62	3W062	430	3W143	3K	3W230	20K	3W320	130K	3W413
1.5	3W1D5	10	3W010	68	3W068	470	3W147	3.3K	3W233	22K	3W322	150K	3W415
1.6	3W1D6	11	3W011	75	3W075	510	3W151	3.6K	3W236	24K	3W324	160K	3W416
1.8	3W1D8	12	3W012	82	3W082	560	3W156	3.9K	3W239	27K	3W327	180K	3W418
2.0	3W2D0	13	3W013	91	3W091	620	3W162	4.3K	3W243	30K	3W330	200K	3W420
2.2	3W2D2	15	3W015	100	3W110	680	3W168	4.7K	3W247	33K	3W333	220K	3W422
2.4	3W2D4	16	3W016	110	3W111	750	3W175	5.1K	3W251	36K	3W336	240K	3W424
2.7	3W2D7	18	3W018	120	3W112	820	3W182	5.6K	3W256	39K	3W339	270K	3W427
3.0	3W3D0	20	3W020	130	3W113	910	3W191	6.2K	3W262	43K	3W343	300K	3W430
3.3	3W3D3	22	3W022	150	3W115	1K	3W210	6.8K	3W268	47K	3W347	330K	3W433
3.6	3W3D6	24	3W024	160	3W116	1.1K	3W211	7.5K	3W275	51K	3W351	360K	3W436
3.9	3W3D9	27	3W027	180	3W118	1.2K	3W212	8.2K	3W282	56K	3W356	390K	3W439
4.3	3W4D3	30	3W030	200	3W120	1.3K	3W213	9.1K	3W291	62K	3W362	430K	3W443
4.7	3W4D7	33	3W033	220	3W122	1.5K	3W215	10K	3W310	68K	3W368	470K	3W447
5.1	3W5D1	36	3W036	240	3W124	1.6K	3W216	11K	3W311	75K	3W375	510K	3W451
5.6	3W5D6	39	3W039	270	3W127	1.8K	3W218	12K	3W312	82K	3W382		
6.2	3W6D2	43	3W043	300	3W130	2K	3W220	13K	3W313	91K	3W391		

SPECIFICATIONS

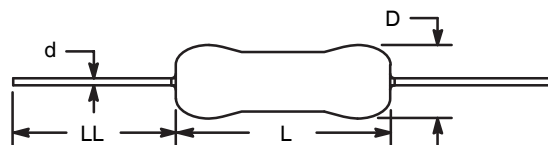
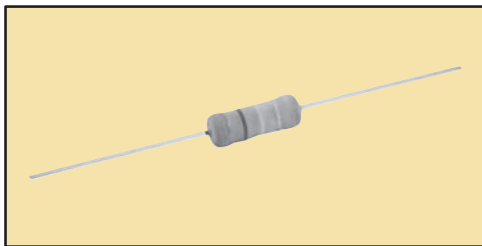
Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
3W1D0 to 3W451	1.0 to 510K	5	750	-55 ° to +200°C	200

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
3W1D0 to 3W451	0.965 (24.5)	0.354 (9.0)	0.032 (0.83)	1.18 (30.0)

* These dimensions are for reference only, please consult the factory for actual size.



1 WATT & 2 WATT FUSIBLE POWER OXIDE

1 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
1.0	F1W1D0	2.0	F1W2D0	4.3	F1W4D3	9.1	F1W9D1	39	F1W039	180	F1W118	820	F1W182
1.1	F1W1D1	2.2	F1W2D2	4.7	F1W4D7	10	F1W010	47	F1W047	220	F1W122	1K	F1W210
1.2	F1W1D2	2.4	F1W2D4	5.1	F1W5D1	12	F1W012	56	F1W056	270	F1W127		
1.3	F1W1D3	2.7	F1W2D7	5.6	F1W5D6	15	F1W015	68	F1W068	330	F1W133		
1.4	F1W1D4	3.0	F1W3D0	6.2	F1W6D2	18	F1W018	82	F1W082	390	F1W139		
1.5	F1W1D5	3.3	F1W3D3	6.8	F1W6D8	22	F1W022	100	F1W110	470	F1W147		
1.6	F1W1D6	3.6	F1W3D6	7.5	F1W7D5	27	F1W027	120	F1W112	560	F1W156		
1.8	F1W1D8	3.9	F1W3D9	8.2	F1W8D2	33	F1W033	150	F1W115	680	F1W168		

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Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
F1W1D0 to F1W210	1.0 to 1K	5	300	-55 ° to +200°C	200

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
F1W1D0 to F1W210	0.375 (9.5)	0.135 (3.4)	0.027 (0.7)	1.3 (33)

* These dimensions are for reference only, please consult the factory for actual size.

2 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
1.0	F2W1D0	2.0	F2W2D0	4.3	F2W4D3	9.1	F2W9D1	39	F2W039	180	F2W118	820	F2W182
1.1	F2W1D1	2.2	F2W2D2	4.7	F2W4D7	10	F2W010	47	F2W047	220	F2W122	1K	F2W210
1.2	F2W1D2	2.4	F2W2D4	5.1	F2W5D1	12	F2W012	56	F2W056	270	F2W127		
1.3	F2W1D3	2.7	F2W2D7	5.6	F2W5D6	15	F2W015	68	F2W068	330	F2W133		
1.4	F2W1D4	3.0	F2W3D0	6.2	F2W6D2	18	F2W018	82	F2W082	390	F2W139		
1.5	F2W1D5	3.3	F2W3D3	6.8	F2W6D8	22	F2W022	100	F2W110	470	F2W147		
1.6	F2W1D6	3.6	F2W3D6	7.5	F2W7D5	27	F2W027	120	F2W112	560	F2W156		
1.8	F2W1D8	3.9	F2W3D9	8.2	F2W8D2	33	F2W033	150	F2W115	680	F2W168		

SPECIFICATIONS

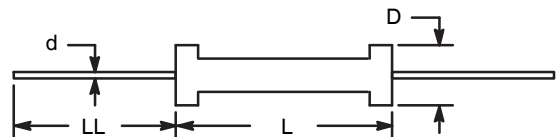
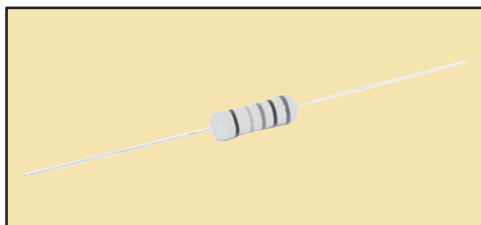
Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
F2W1D0 to F2W210	1.0 to 1K	5	300	-55 ° to +200°C	200

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
F2W1D0 to F2W210	0.450 (11.4)	0.162 (4.1)	0.027 (0.7)	1.3 (33)

* These dimensions are for reference only, please consult the factory for actual size.



1/4 WATT CARBON COMPOSITION

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
10	QWCC010	150	QWCC115	2.2K	QWCC222	33K	QWCC333	470K	QWCC447
12	QWCC012	180	QWCC118	2.7K	QWCC227	39K	QWCC339	560K	QWCC456
15	QWCC015	220	QWCC122	3.3K	QWCC233	47K	QWCC347	680K	QWCC468
18	QWCC018	270	QWCC127	3.9K	QWCC239	56K	QWCC356	820K	QWCC482
22	QWCC022	330	QWCC133	4.7K	QWCC247	68K	QWCC368	1M	QWCC510
27	QWCC027	390	QWCC139	5.6K	QWCC256	82K	QWCC382		
33	QWCC033	470	QWCC147	6.8K	QWCC268	100K	QWCC410		
39	QWCC039	560	QWCC156	8.2K	QWCC282	120K	QWCC412		
47	QWCC047	680	QWCC168	10K	QWCC310	150K	QWCC415		
56	QWCC056	820	QWCC182	12K	QWCC312	180K	QWCC418		
68	QWCC068	1K	QWCC210	15K	QWCC315	220K	QWCC422		
82	QWCC082	1.2K	QWCC212	18K	QWCC318	270K	QWCC427		
100	QWCC110	1.5K	QWCC215	22K	QWCC322	330K	QWCC433		
120	QWCC112	1.8K	QWCC218	27K	QWCC327	390K	QWCC439		

SPECIFICATIONS

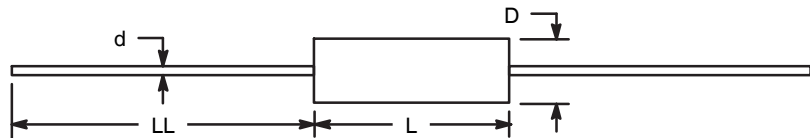
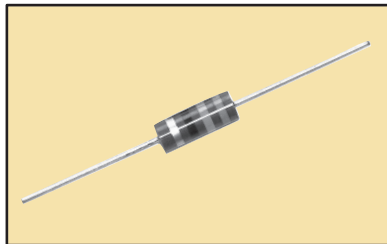
Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
QWCC010 thru QWCC510	10 to 1M	5	250	-55 ° to +150°C	±0.15%

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
QWCC010 thru QWCC510	0.250 (6.35)	0.090 (2.3)	0.024 (0.61)	1.000 (25.4)

* These dimensions are for reference only, please consult the factory for actual size.



1/2 WATT CARBON COMPOSITION

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
10	HWCC010	150	HWCC115	2.2K	HWCC222	33K	HWCC333	470K	HWCC447
12	HWCC012	180	HWCC118	2.7K	HWCC227	39K	HWCC339	560K	HWCC456
15	HWCC015	220	HWCC122	3.3K	HWCC233	47K	HWCC347	680K	HWCC468
18	HWCC018	270	HWCC127	3.9K	HWCC239	56K	HWCC356	820K	HWCC482
22	HWCC022	330	HWCC133	4.7K	HWCC247	68K	HWCC368	1M	HWCC510
27	HWCC027	390	HWCC139	5.6K	HWCC256	82K	HWCC382		
33	HWCC033	470	HWCC147	6.8K	HWCC268	100K	HWCC410		
39	HWCC039	560	HWCC156	8.2K	HWCC282	120K	HWCC412		
47	HWCC047	680	HWCC168	10K	HWCC310	150K	HWCC415		
56	HWCC056	820	HWCC182	12K	HWCC312	180K	HWCC418		
68	HWCC068	1K	HWCC210	15K	HWCC315	220K	HWCC422		
82	HWCC082	1.2K	HWCC212	18K	HWCC318	270K	HWCC427		
100	HWCC110	1.5K	HWCC215	22K	HWCC322	330K	HWCC433		
120	HWCC112	1.8K	HWCC218	27K	HWCC327	390K	HWCC439		

SPECIFICATIONS

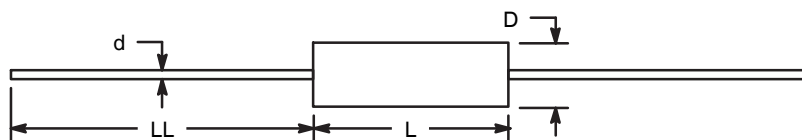
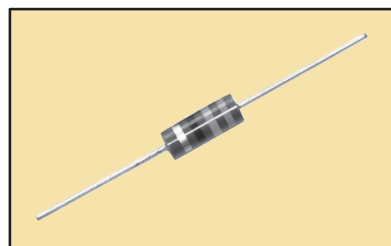
Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
HWCC010 thru HWCC510	10 to 1M	5	350	-55° to +150°C	±0.15%

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
HWCC010 thru HWCC510	0.375 (9.53)	0.140 (3.56)	0.028 (0.71)	1.000 (25.4)

* These dimensions are for reference only, please consult the factory for actual size.



1 WATT CARBON COMPOSITION

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
10	1WCC010	68	1WCC068	470	1WCC147	3.3K	1WCC233	22K	1WCC322
15	1WCC015	100	1WCC110	680	1WCC168	4.7K	1WCC247	33K	1WCC333
22	1WCC022	150	1WCC115	1K	1WCC210	6.8K	1WCC268	47K	1WCC347
33	1WCC033	220	1WCC122	1.5K	1WCC215	10K	1WCC310	68K	1WCC368
47	1WCC047	330	1WCC133	2.2K	1WCC222	15K	1WCC315		

SPECIFICATIONS

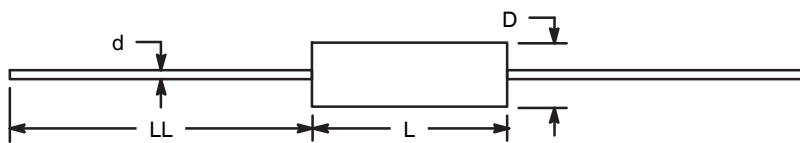
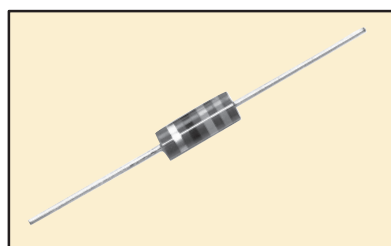
Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
1WCC010 thru 1WCC368	10 to 68K	10	500	-55 ° to +150°C	±0.15%

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
1WCC010 thru 1WCC368	0.562 (14.27)	0.225 (5.72)	0.036 (0.91)	1.000 (25.4)

* These dimensions are for reference only, please consult the factory for actual size.



VITREOUS FIXED WIREWOUND

Features:

- Vitreous enamel coating over steatite ceramic core with welded terminals

12 WATT

Value in Ohms	NTE Stock Number
10	12WF010
25	12WF025

Value in Ohms	NTE Stock Number
50	12WF050
100	12WF110

Value in Ohms	NTE Stock Number
250	12WF125
500	12WF150

Value in Ohms	NTE Stock Number
1K	12WF210
5K	12WF250

Value in Ohms	NTE Stock Number
10K	12WF310

25 WATT

Value in Ohms	NTE Stock Number
10	25WF010
25	25WF025

Value in Ohms	NTE Stock Number
50	25WF050
100	25WF110

Value in Ohms	NTE Stock Number
250	25WF125
500	25WF150

Value in Ohms	NTE Stock Number
1K	25WF210
5K	25WF250

Value in Ohms	NTE Stock Number
10K	25WF310

50 WATT

Value in Ohms	NTE Stock Number
10	50WF010
25	50WF025

Value in Ohms	NTE Stock Number
50	50WF050
100	50WF110

Value in Ohms	NTE Stock Number
250	50WF125
500	50WF150

Value in Ohms	NTE Stock Number
1K	50WF210
5K	50WF250

Value in Ohms	NTE Stock Number
10K	50WF310

100 WATT

Value in Ohms	NTE Stock Number
10	100WF010
25	100WF025

Value in Ohms	NTE Stock Number
50	100WF050
100	100WF110

Value in Ohms	NTE Stock Number
250	100WF125
500	100WF150

Value in Ohms	NTE Stock Number
1K	100WF210
5K	100WF250

Value in Ohms	NTE Stock Number
10K	100WF310

225 WATT

Value in Ohms	NTE Stock Number
10	225WF010
25	225WF025

Value in Ohms	NTE Stock Number
50	225WF050
100	225WF110

Value in Ohms	NTE Stock Number
250	225WF125
500	225WF150

Value in Ohms	NTE Stock Number
1K	225WF210
5K	225WF250

Value in Ohms	NTE Stock Number
10K	225WF310

SPECIFICATIONS

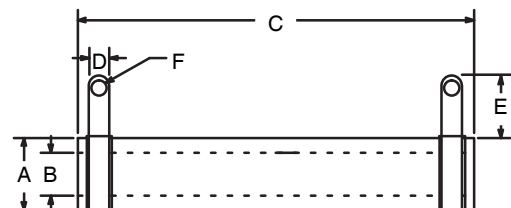
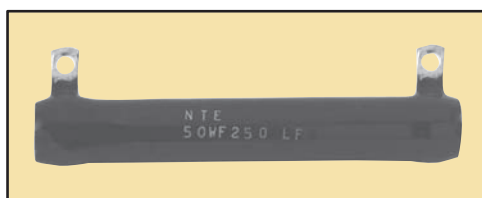
Electrical Characteristics

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
All Wattages	10	5	1000 VAC	+375°C Max	±400
All Wattages	25 to 10K	5	1000 VAC	+375°C Max	±260

Mechanical* (inches (mm))

NTE Number	A Typical	B ±.032 (±0.8)	C ±.032 (±0.8)	D Typical	E Typical	F Typical
12WF Series	.310 (7.9)	.190 (4.8)	1.750 (44.5)	.190 (4.8)	.440 (11.2)	.104 (2.6)
25WF Series	.560 (14.2)	.310 (7.9)	2.000 (50.8)	.250 (6.4)	.560 (14.2)	.166 (4.2)
50WF Series	.560 (14.2)	.310 (7.9)	4.000 (102.0)	.250 (6.4)	.560 (14.2)	.166 (4.2)
100WF Series	.750 (19.0)	.500 (12.7)	6.500 (165.0)	.250 (6.4)	.560 (14.2)	.166 (4.2)
225WF Series	1.130 (28.7)	.750 (19.0)	10.500 (267.0)	.310 (7.9)	.630 (16.0)	.196 (5.0)

* These dimensions are for reference only, please consult the factory for actual size.



VITREOUS ADJUSTABLE WIREWOUND

Features:

- Vitreous enamel coating over steatite ceramic core with welded terminals

12 WATT

Value in Ohms	NTE Stock Number
10	12WA010
25	12WA025

Value in Ohms	NTE Stock Number
50	12WA050
100	12WA110

Value in Ohms	NTE Stock Number
250	12WA125
500	12WA150

Value in Ohms	NTE Stock Number
1K	12WA210

Value in Ohms	NTE Stock Number
5K	12WA250

25 WATT

Value in Ohms	NTE Stock Number
10	25WA010
25	25WA025

Value in Ohms	NTE Stock Number
50	25WA050
100	25WA110

Value in Ohms	NTE Stock Number
250	25WA125
500	25WA150

Value in Ohms	NTE Stock Number
1K	25WA210
5K	25WA250

Value in Ohms	NTE Stock Number
10K	25WA310

50 WATT

Value in Ohms	NTE Stock Number
10	50WA010
25	50WA025

Value in Ohms	NTE Stock Number
50	50WA050
100	50WA110

Value in Ohms	NTE Stock Number
250	50WA125
500	50WA150

Value in Ohms	NTE Stock Number
1K	50WA210
5K	50WA250

Value in Ohms	NTE Stock Number
10K	50WA310

100 WATT

Value in Ohms	NTE Stock Number
10	100WA010
25	100WA025

Value in Ohms	NTE Stock Number
50	100WA050
100	100WA110

Value in Ohms	NTE Stock Number
250	100WA125
500	100WA150

Value in Ohms	NTE Stock Number
1K	100WA210
5K	100WA250

Value in Ohms	NTE Stock Number
10K	100WA310

225 WATT

Value in Ohms	NTE Stock Number
10	225WA010
25	225WA025

Value in Ohms	NTE Stock Number
50	225WA050
100	225WA110

Value in Ohms	NTE Stock Number
250	225WA125
500	225WA150

Value in Ohms	NTE Stock Number
1K	225WA210
5K	225WA250

Value in Ohms	NTE Stock Number
10K	225WA310

SPECIFICATIONS

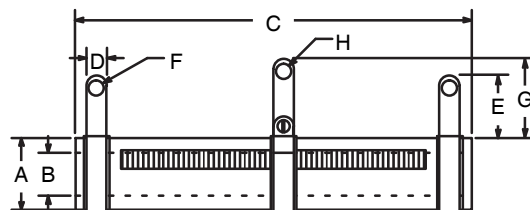
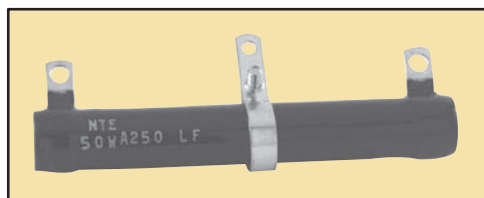
Electrical Characteristics

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
All Wattages	10	10	1000 VAC	+375°C Max	±400
All Wattages	25 to 10K	10	1000 VAC	+375°C Max	±260

Mechanical* (inches (mm))

NTE Number	A Typical	B ±.032 (±0.8)	C ±.032 (±0.8)	D ±.032 (±0.8)	E Typical	F Typical	G Typical	H Typical
12WA Series	.310 (7.9)	.190 (4.8)	1.750 (44.5)	.190 (4.8)	.440 (11.2)	.100 (2.5)	.500 (12.7)	.100 (2.5)
25WA Series	.560 (14.2)	.310 (7.9)	2.000 (50.8)	.250 (6.4)	.560 (14.2)	.170 (4.3)	.690 (17.5)	.170 (4.3)
50WA Series	.560 (14.2)	.310 (7.9)	4.000 (102.0)	.250 (6.4)	.560 (14.2)	.170 (4.3)	.690 (17.5)	.170 (4.3)
100WA Series	.750 (19.0)	.500 (12.7)	6.500 (165.0)	.250 (6.4)	.560 (14.2)	.170 (4.3)	.690 (17.5)	.170 (4.3)
225WA Series	1.130 (28.7)	.750 (19.0)	10.500 (267.0)	.310 (7.9)	.630 (16.0)	.200 (5.1)	.880 (22.4)	.170 (4.3)

* These dimensions are for reference only, please consult the factory for actual size.



300W VITREOUS EDGEWOUND

Features:

- Vitreous enamel coating over high quality steatite ceramic core
- Available in fixed (300WF Series) and adjustable (300WA Series) types

FIXED

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.5	300WFD50	5.0	300WF5D0	20	300WF020	50	300WF050
1.0	300WF1D0	10	300WF010	25	300WF025	100	300WF110

ADJUSTABLE

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.5	300WAD50	5.0	300WA5D0	20	300WA020	50	300WA050
1.0	300WA1D0	10	300WA010	25	300WA025	100	300WA110

SPECIFICATIONS

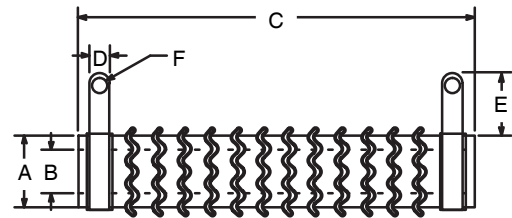
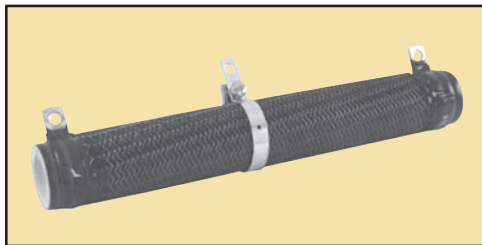
Electrical Characteristics

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
300WF & 300WA Series	0.5 to 100	10	1000 VAC	+375°C Max	±260

Mechanical* (inches (mm))

NTE Number	A Typical	B Typical	C Typical	D Typical	E Typical	F Typical
300WF & 300WA Series	1.130 (28.6)	.750 (19.0)	8.500 (215.9)	.310 (7.9)	.630 (15.9)	10-32

* These dimensions are for reference only, please consult the factory for actual size.



NOTE: 300WA Series contains third adjustable lead not shown.

1W & 3W SILICONE COATED WIREWOUND

Features:

- High Temperature Silicone Coating

1 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.10	1WRD10	0.25	1WRD25	1.0	1WR1D0	10	1WR010	250	1WR125
0.13	1WRD13	0.30	1WRD30	1.5	1WR1D5	15	1WR015	1K	1WR210
0.15	1WRD15	0.33	1WRD33	3.0	1WR3D0	50	1WR050		
0.20	1WRD20	0.50	1WRD50	5.0	1WR5D0	100	1WR110		

SPECIFICATIONS

Electrical Characteristics @ 25°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
1WRD10 to 1WRD50	0.10 to 0.50	5	(P x R) ^{1/2}	-65 ° to +250°C	±90
1WR1D0 to 1WR5D0	1.0 to 5.0	5	(P x R) ^{1/2}	-65 ° to +250°C	±50
1WR010 to 1WR210	10 to 1K	5	(P x R) ^{1/2}	-65 ° to +250°C	±30

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
1WRD10 to 1WR210	0.437 (11.1) Max	0.094 (2.39)	0.020 (0.508)	1.500 (38.1) Min

* These dimensions are for reference only, please consult the factory for actual size.

3 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.15	3WRD15	0.50	3WRD50	5.0	3WR5D0	100	3WR110	750	3WR175
0.20	3WRD20	1.0	3WR1D0	10	3WR010	150	3WR115	1K	3WR210
0.25	3WRD25	1.5	3WR1D5	15	3WR015	200	3WR120	1.2K	3WR212
0.30	3WRD30	2.0	3WR2D0	20	3WR020	250	3WR125	10K	3WR310
0.33	3WRD33	3.0	3WR3D0	25	3WR025	500	3WR150		

SPECIFICATIONS

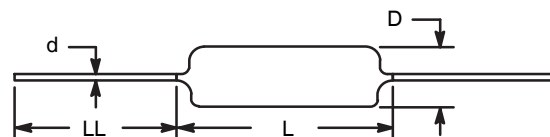
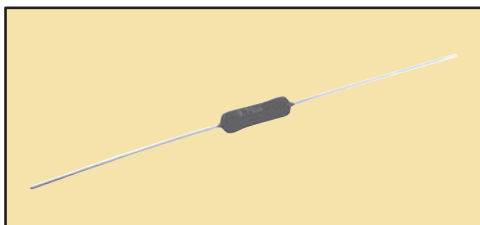
Electrical Characteristics @ 25°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
3WRD15 to 3WRD50	0.15 to 0.50	5	(P x R) ^{1/2}	-65 ° to +250°C	±90
3WR1D0 to 3WR5D0	1.0 to 5.0	5	(P x R) ^{1/2}	-65 ° to +250°C	±50
3WR010 to 3WR310	10 to 10K	5	(P x R) ^{1/2}	-65 ° to +250°C	±30

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
3WRD15 to 3WR310	0.622 (15.8) Max	0.188 (4.78)	0.032 (0.813)	1.500 (38.1) Min

* These dimensions are for reference only, please consult the factory for actual size.



5W & 10W SILICONE COATED WIREWOUND

Features:

- High Temperature Silicone Coating

5 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.10	5WRD10	4.0	5WR4D0	25	5WR025	270	5WR127	4.7K	5WR247
0.25	5WRD25	5.0	5WR5D0	30	5WR030	1.1K	5WR211	5.0K	5WR250
0.50	5WRD50	7.5	5WR7D5	40	5WR040	2.2K	5WR222	6.0K	5WR260
1.0	5WR1D0	10	5WR010	50	5WR050	2.7K	5WR227	10K	5WR310
1.5	5WR1D5	18	5WR018	100	5WR110	3.5K	5WR235	12.5K	5WR2125
2.0	5WR2D0	22	5WR022	150	5WR115	4.0K	5WR240	20K	5WR320

SPECIFICATIONS

Electrical Characteristics @ 25°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
5WRD10 to 5WRD50	0.10 to 0.50	5	(P x R) ^{1/2}	-65 ° to +250°C	±90
5WR1D0 to 5WR7D5	1.0 to 7.5	5	(P x R) ^{1/2}	-65 ° to +250°C	±50
5WR010 to 5WR320	10 to 20K	5	(P x R) ^{1/2}	-65 ° to +250°C	±30

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
5WRD10 to 5WR320	1.000 (25.4) Max	0.312 (7.92)	0.040 (1.02)	1.500 (38.1) Min

* These dimensions are for reference only, please consult the factory for actual size.

10 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.10	10WRD10	3.0	10WR3D0	50	10WR050	250	10WR125	2.5K	10WR225
0.50	10WRD50	10	10WR010	100	10WR110	500	10WR150	5K	10WR250
0.75	10WRD75	25	10WR025	200	10WR120	1K	10WR210	10K	10WR310
1.0	10WR1D0								

SPECIFICATIONS

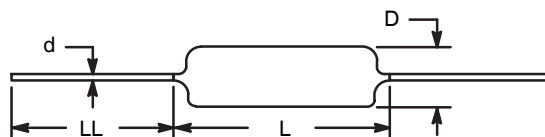
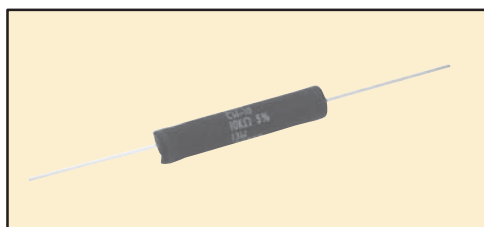
Electrical Characteristics @ 25°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
10WRD10 to 10WRD75	0.10 to 0.75	5	(P x R) ^{1/2}	-65 ° to +250°C	±90
10WR1D0 to 10WR3D0	1.0 to 3.0	5	(P x R) ^{1/2}	-65 ° to +250°C	±50
10WR010 to 10WR310	10 to 10K	5	(P x R) ^{1/2}	-65 ° to +250°C	±30

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Diameter (D)	Lead Diameter (d)	Lead Length (LL)
10WRD10 to 10WR310	1.875 (47.62) Max	0.375 (9.52)	0.040 (1.02)	1.500 (38.1) Min

* These dimensions are for reference only, please consult the factory for actual size.



5 WATT POWER WIREWOUND

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
.10	5WD10	.39	5WD39	1.2	5W1D2	6.8	5W6D8	56	5W056	470	5W147	3.9K	5W239
.12	5WD12	.43	5WD43	1.5	5W1D5	8.2	5W8D2	68	5W068	560	5W156	4.7K	5W247
.15	5WD15	.47	5WD47	1.8	5W1D8	10	5W010	82	5W082	680	5W168	5.6K	5W256
.18	5WD18	.51	5WD51	2.2	5W2D2	12	5W012	100	5W110	820	5W182	6.8K	5W268
.20	5WD20	.56	5WD56	2.7	5W2D7	15	5W015	120	5W112	1K	5W210	8.2K	5W282
.22	5WD22	.62	5WD62	3.3	5W3D3	18	5W018	150	5W115	1.2K	5W212	8.5K	5W285
.24	5WD24	.68	5WD68	3.9	5W3D9	22	5W022	180	5W118	1.5K	5W215	10K	5W310
.27	5WD27	.75	5WD75	4.7	5W4D7	27	5W027	220	5W122	1.8K	5W218	11K	5W311
.30	5WD30	.82	5WD82	5.0	5W5D0	33	5W033	270	5W127	2.2K	5W222	12K	5W312
.33	5WD33	.91	5WD91	5.1	5W5D1	39	5W039	330	5W133	2.7K	5W227	15K	5W315
.36	5WD36	1.0	5W1D0	5.6	5W5D6	47	5W047	390	5W139	3.3K	5W233		

SPECIFICATIONS

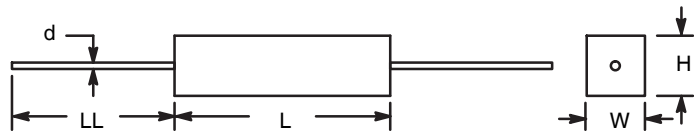
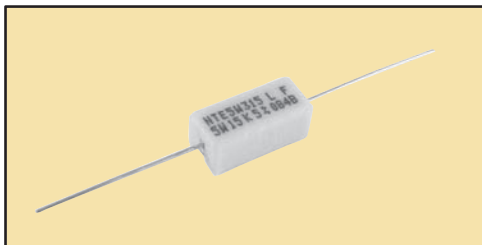
Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
5WD10 to 5W315	0.10 to 15K	5	550	-55 ° to +155°C	300

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Width/Height (W/H)	Lead Diameter (d)	Lead Length (LL)
5WD10 to 5W315	0.88 (22)	0.38 (9.65)	0.036 (0.80)	1.5 (38.1)

* These dimensions are for reference only, please consult the factory for actual size.



10 WATT POWER WIREWOUND

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
.10	10WD10	.43	10WD43	1.8	10W1D8	12	10W012	100	10W110	1K	10W210	10K	10W310
.12	10WD12	.47	10WD47	2.0	10W2D0	15	10W015	120	10W112	1.2K	10W212	11K	10W311
.15	10WD15	.51	10WD51	2.2	10W2D2	18	10W018	150	10W115	1.5K	10W215	12K	10W312
.18	10WD18	.56	10WD56	2.7	10W2D7	22	10W022	180	10W118	1.8K	10W218	15K	10W315
.20	10WD20	.62	10WD62	3.3	10W3D3	27	10W027	220	10W122	2.2K	10W222	18K	10W318
.22	10WD22	.68	10WD68	3.9	10W3D9	33	10W033	270	10W127	2.7K	10W227	22K	10W322
.24	10WD24	.75	10WD75	4.7	10W4D7	39	10W039	330	10W133	3.3K	10W233	27K	10W327
.27	10WD27	.82	10WD82	5.1	10W5D1	47	10W047	390	10W139	3.9K	10W239		
.30	10WD30	.91	10WD91	5.6	10W5D6	56	10W056	470	10W147	4.7K	10W247		
.33	10WD33	1.0	10W1D0	6.8	10W6D8	68	10W068	560	10W156	5.6K	10W256		
.36	10WD36	1.2	10W1D2	8.2	10W8D2	75	10W075	680	10W168	6.8K	10W268		
.39	10WD39	1.5	10W1D5	10	10W010	82	10W082	820	10W182	8.2K	10W282		

SPECIFICATIONS

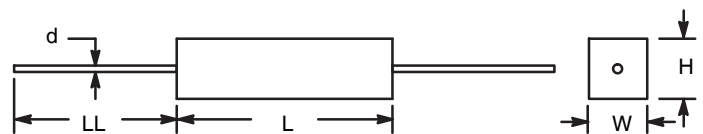
Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
10WD10 to 10W327	0.10 to 27K	5	550	-55 ° to +155°C	300

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Width/Height (W/H)	Lead Diameter (d)	Lead Length (LL)
10WD10 to 10W327	1.88 (48)	0.38 (9.65)	0.036 (0.80)	1.5 (38.1)

* These dimensions are for reference only, please consult the factory for actual size.



25 WATT POWER WIREWOUND

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
.20	25WD20	.51	25WD51	2.0	25W2D0	8.2	25W8D2	100	25W110	680	25W168	4.7K	25W247
.22	25WD22	.56	25WD56	2.2	25W2D2	10	25W010	120	25W112	820	25W182	5.6K	25W256
.24	25WD24	.62	25WD62	2.7	25W2D7	15	25W015	150	25W115	1K	25W210	6.8K	25W268
.27	25WD27	.68	25WD68	3.0	25W3D0	20	25W020	180	25W118	1.2K	25W212	8.2K	25W282
.30	25WD30	.75	25WD75	3.3	25W3D3	27	25W027	220	25W122	1.5K	25W215		
.33	25WD33	.82	25WD82	3.9	25W3D9	30	25W030	270	25W127	1.8K	25W218		
.36	25WD36	.91	25WD91	4.7	25W4D7	39	25W039	330	25W133	2.2K	25W222		
.39	25WD39	1.0	25W1D0	5.1	25W5D1	47	25W047	390	25W139	2.7K	25W227		
.43	25WD43	1.2	25W1D2	5.6	25W5D6	62	25W062	470	25W147	3.3K	25W233		
.47	25WD47	1.5	25W1D5	6.8	25W6D8	75	25W075	560	25W156	3.9K	25W239		

SPECIFICATIONS

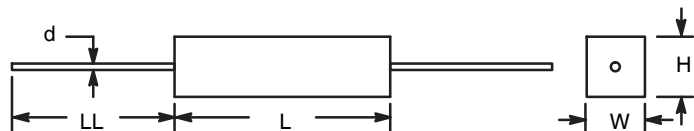
Electrical Characteristics @ 70°C

NTE Number	Resistance Range (Ohms)	Tolerance (%)	VOLTAGE (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
25WD20 to 25W282	0.20 to 8.2K	5	800	-55 ° to +155°C	300

Mechanical* (Typical, inches/mm)

NTE Number	Body Length (L)	Body Width/Height (W/H)	Lead Diameter (d)	Lead Length (LL)
25WD20 to 25W282	2.5 (63.5)	0.50 (12.5)	0.040 (1.0)	1.5 (38.1)

* These dimensions are for reference only, please consult the factory for actual size.



ALUMINUM HOUSED POWER WIREWOUND

5 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.05	5WMD05	4.0	5WM4D0	27	5WM027	75	5WM075	330	5WM133	2.0K	5WM220	15K	5WM315
0.1	5WMD10	5.0	5WM5D0	30	5WM030	100	5WM110	400	5WM140	2.5K	5WM225	20K	5WM320
0.2	5WMD20	10	5WM010	33	5WM033	120	5WM112	470	5WM147	3.0K	5WM230	25K	5WM325
0.5	5WMD50	12	5WM012	35	5WM035	150	5WM115	500	5WM150	3.3K	5WM233	30K	5WM330
1.0	5WM1D0	15	5WM015	40	5WM040	200	5WM120	560	5WM156	3.5K	5WM235	40K	5WM340
2.0	5WM2D0	16	5WM016	47	5WM047	250	5WM125	750	5WM175	4.0K	5WM240		
2.5	5WM2D5	20	5WM020	50	5WM050	270	5WM127	1.0K	5WM210	5.0K	5WM250		
3.0	5WM3D0	25	5WM025	60	5WM060	300	5WM130	1.5K	5WM215	10K	5WM310		

10 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.05	10WMD05	4.0	10WM4D0	27	10WM027	75	10WM075	330	10WM133	2.0K	10WM220	15K	10WM315
0.1	10WMD10	5.0	10WM5D0	30	10WM030	100	10WM110	400	10WM140	2.5K	10WM225	20K	10WM320
0.2	10WMD20	10	10WM010	33	10WM033	120	10WM112	470	10WM147	3.0K	10WM230	25K	10WM325
0.5	10WMD50	12	10WM012	35	10WM035	150	10WM115	500	10WM150	3.3K	10WM233	30K	10WM330
1.0	10WM1D0	15	10WM015	40	10WM040	200	10WM120	560	10WM156	3.5K	10WM235	40K	10WM340
2.0	10WM2D0	16	10WM016	47	10WM047	250	10WM125	750	10WM175	4.0K	10WM240		
2.5	10WM2D5	20	10WM020	50	10WM050	270	10WM127	1.0K	10WM210	5.0K	10WM250		
3.0	10WM3D0	25	10WM025	60	10WM060	300	10WM130	1.5K	10WM215	10K	10WM310		

SPECIFICATIONS

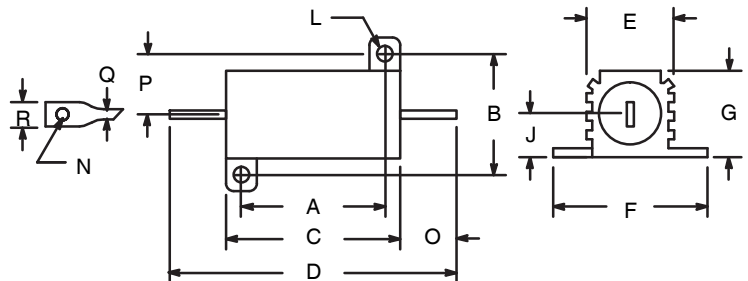
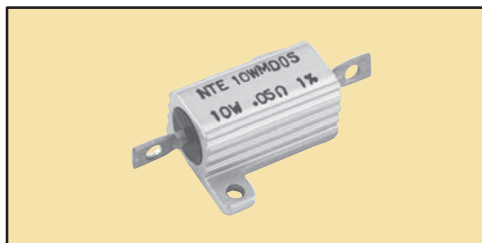
Electrical Characteristics

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
5WMD05 to 5WMD50	0.05 to 0.5	1	160	-55 ° to +275°C	90
5WM1D0 to 5WM010	1.0 to 10	1	160	-55 ° to +275°C	50
5WM012 to 5WM340	12 to 40K	1	160	-55 ° to +275°C	20
10WMD05 to 10WMD50	0.05 to 0.5	1	265	-55 ° to +275°C	90
10WM1D0 to 10WM010	1.0 to 10	1	265	-55 ° to +275°C	50
10WM012 to 10WM340	12 to 40K	1	265	-55 ° to +275°C	20

Mechanical* (Typical, inches)

NTE Number	A (±.005)	B (±.005)	C (±.031)	D (±.052)	E (±.015)	F (±.015)	G (±.015)	J (±.010)	L (±.005)	N (±.005)	O (±.062)	P (±.031)	Q (AWG)	R (±.032)
5WMD05 to 5WM340	.444	.490	.600	1.125	.334	.646	.320	.140	.093	.050	.266	.245	16	.085
10WMD05 to 10WM340	.562	.625	.750	1.375	.430	.800	.400	.190	.093	.086	.312	.312	12	.140

* These dimensions are for reference only, please consult the factory for actual size.



ALUMINUM HOUSED POWER WIREWOUND

25 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.05	25WMD05	4.0	25WM4D0	27	25WM027	75	25WM075	330	25WM133	2.0K	25WM220	15K	25WM315
0.1	25WMD10	5.0	25WM5D0	30	25WM030	100	25WM110	400	25WM140	2.5K	25WM225	20K	25WM320
0.2	25WMD20	10	25WM010	33	25WM033	120	25WM112	470	25WM147	3.0K	25WM230	25K	25WM325
0.5	25WMD50	12	25WM012	35	25WM035	150	25WM115	500	25WM150	3.3K	25WM233	30K	25WM330
1.0	25WM1D0	15	25WM015	40	25WM040	200	25WM120	560	25WM156	3.5K	25WM235	40K	25WM340
2.0	25WM2D0	16	25WM016	47	25WM047	250	25WM125	750	25WM175	4.0K	25WM240	50K	25WM350
2.5	25WM2D5	20	25WM020	50	25WM050	270	25WM127	1.0K	25WM210	5.0K	25WM250	75K	25WM375
3.0	25WM3D0	25	25WM025	60	25WM060	300	25WM130	1.5K	25WM215	10K	25WM310		

50 WATT

Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number	Value in Ohms	NTE Stock Number
0.05	50WMD05	4.0	50WM4D0	27	50WM027	75	50WM075	330	50WM133	2.0K	50WM220	15K	50WM315
0.1	50WMD10	5.0	50WM5D0	30	50WM030	100	50WM110	400	50WM140	2.5K	50WM225	20K	50WM320
0.2	50WMD20	10	50WM010	33	50WM033	120	50WM112	470	50WM147	3.0K	50WM230	25K	50WM325
0.5	50WMD50	12	50WM012	35	50WM035	150	50WM115	500	50WM150	3.3K	50WM233	30K	50WM330
1.0	50WM1D0	15	50WM015	40	50WM040	200	50WM120	560	50WM156	3.5K	50WM235	40K	50WM340
2.0	50WM2D0	16	50WM016	47	50WM047	250	50WM125	750	50WM175	4.0K	50WM240	50K	50WM350
2.5	50WM2D5	20	50WM020	50	50WM050	270	50WM127	1.0K	50WM210	5.0K	50WM250	75K	50WM375
3.0	50WM3D0	25	50WM025	60	50WM060	300	50WM130	1.5K	50WM215	10K	50WM310	100K	50WM410

SPECIFICATIONS

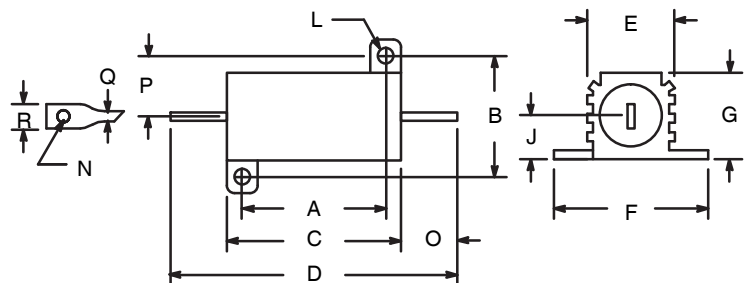
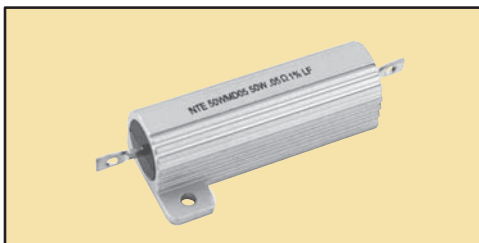
Electrical Characteristics

NTE Number	Resistance Range (Ohms)	Tolerance (%)	Voltage (Volts)	Operating Temperature (T _{opr})	Temperature Coefficient (PPM/°C)
25WMD05 to 25WMD50	0.05 to 0.5	1	550	-55 ° to +275°C	90
25WM1D0 to 25WM010	1.0 to 10	1	550	-55 ° to +275°C	50
25WM012 to 25WM375	12 to 75K	1	550	-55 ° to +275°C	20
50WMD05 to 50WMD50	0.05 to 0.5	1	1250	-55 ° to +275°C	90
50WM1D0 to 50WM010	1.0 to 10	1	1250	-55 ° to +275°C	50
50WM012 to 50WM410	12 to 100K	1	1250	-55 ° to +275°C	20

Mechanical* (Typical, inches)

NTE Number	A (±.005)	B (±.005)	C (±.031)	D (±.052)	E (±.015)	F (±.015)	G (±.015)	J (±.010)	L (±.005)	N (±.005)	O (±.062)	P (±.031)	Q (AWG)	R (±.032)
25WMD05 to 25WM375	.719	.781	1.062	1.938	.530	1.080	.560	.260	.125	.086	.438	.391	12	.140
50WMD05 to 50WM410	1.563	.844	1.968	2.781	.615	1.140	.615	.300	.125	.086	.438	.422	12	.140

* These dimensions are for reference only, please consult the factory for actual size.



PRE-PACKAGED RESISTOR KITS



Features:

- Each Kit Contains the Top 30 most popular resistors for group specified
- Cabinets stack together to build a component storage center
- One piece frame is lightweight and virtually unbreakable
- Keyhole slots for wall mounting
- Frame measures 9 1/8"W x 7 1/2"H x 6 1/2"D
- Contains 15 drawers, each divided in half

NTE Part No. RK-01						1/8W Resistors (Contains 6 of each)			
Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms
10	100	220	470	1.5K	2.2K	6.8K	20K	33K	220K
22	120	330	680	1.8K	3.3K	10K	22K	47K	330K
47	150	390	1K	2K	4.7K	15K	27K	100K	1M

NTE Part No. RK-02						1/4W Resistors (Contains 4 of each)			
Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms
1.0	22	75	150	390	680	1.5K	2.7K	8.2K	33K
10	47	100	220	470	1K	2K	3.3K	10K	47K
15	56	120	330	560	1.2K	2.2K	4.7K	22K	100K

PRE-PACKAGED RESISTOR KITS

NTE Part No. RK-03					1/2W Resistors (Contains 6 of each)				
Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms
1.0	10	47	150	470	1K	2.2K	4.7K	22K	220K
1.5	22	100	220	560	1.5K	3.3K	10K	47K	470K
2.2	33	120	330	680	1.8K	3.9K	15K	100K	1M

NTE Part No. RK-04					1W Resistors (Contains 4 of each)				
Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms
0.22	1.5	4.7	24	68	150	470	1.5K	4.7K	100K
0.47	2.0	10	33	100	220	510	2K	10K	220K
1.0	2.2	22	47	120	330	1K	2.2K	47K	1M

NTE Part No. RK-05					2W Resistors (Contains 2 of each)				
Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms
0.10	0.47	10	22	51	130	220	680	3.3K	18K
0.22	1.0	15	30	100	150	470	1K	5.6K	22K
0.33	4.7	20	47	120	200	560	1.5K	10K	100K

NTE Part No. RK-06					5W Resistors (Contains 2 of each)				
Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms
0.10	0.33	1.5	3.3	5.0	8.2	22	39	150	1K
0.22	0.47	2.2	3.9	5.1	10	27	47	220	4.7K
0.27	1.0	2.7	4.7	6.8	15	33	100	270	10K

NTE Part No. RK-07					10W Resistors (Contains 2 of each)				
Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms
0.33	2.0	3.3	5.1	10	22	47	150	330	3.3K
1.0	2.2	3.9	6.8	12	27	68	180	1K	4.7K
1.5	2.7	4.7	8.2	15	33	100	220	2.2K	10K

NTE Part No. RK-08					25W Resistors (Contains 1 of each)				
Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms
1.0	2.0	3.0	4.7	8.2	20	39	100	220	1K
1.2	2.2	3.3	5.1	10	27	47	150	270	1.2K
1.5	2.7	3.9	6.8	15	30	75	180	470	1.5K

ALUMINUM ELECTROLYTIC 6.3V to 100V

NEV, NEH SERIES

SUBMINIATURE

(NEV: Radial Lead, NEH: Axial Leads)

The NEV and NEH series subminiature aluminum electrolytic capacitors are especially suitable for applications requiring high capacitance, low cost, and very small size. In fact, you'll find these capacitors in some of the most demanding applications, from precision medical electronics and automobiles to the newest personal computers and disk drives.

They operate over a broad temperature range and are available in either blister pack or bulk.

RATINGS

Capacitance Range: 0.1 μ f to 22,000 μ f

Tolerance: $\pm 20\%$

Voltage Range: 6.3V to 100V

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:

-40 °C to +85 °C (-40 °F to +185 °F)

Leakage Current: $I \leq 0.01CV + 3\mu A$ (measured after 3 minutes of applied voltage)

I = Leakage Current (μA)

C = Nominal Capacitance (μf)

V = Rated Voltage (V)

Capacitance Tolerance (M): $\pm 20\%$

measured at +20 °C (+68 °F), 120Hz

Dissipation Factor: measured at +20 °C (+68 °F), 120Hz

Rated Voltage	6.3	10	16	25	35	50-80	100
0.1 μ f to 1000 μ f	0.24	0.2	0.17	0.15	0.12	0.10	0.08
1000 μ f to 22,000 μ f	Values above plus 0.02 for each 1000 μ f						

Impedance Ratio at Low Temperature: 120Hz

Comparison Z WV	6.3	10	16	25	35	50-100
Z @ -25 °C (-13 °F)/ Z @ +20 °C (+68 °F)	4	3	2	2	2	2
Z @ -40 °C (-40 °F)/ Z @ +20 °C (+68 °F)	8	6	4	4	4	4

Surge Voltage:

DC Rated Voltage	6.3	10	16	25	35	50	63	100
Surge Voltage	8	13	20	32	44	63	79	125

Load Life: 1000 \pm 12Hrs @ +85 °C (+185 °F),
at rated voltage

Leakage Current: Within values specified above

Dissipation Factor: Within $\pm 150\%$ of specified value

Capacitance Change Max: See Table

Rated Voltage	Capacitance Change Max
6.3V to 16V	Within $\pm 30\%$ of the initial value
25V to 100V	Within $\pm 20\%$ of the initial value

Shelf Life: 1000 Hrs @ +85 °C (+185 °F),
no voltage applied

Leakage Current: Within $\pm 200\%$ of specified value

Dissipation Factor: Within $\pm 150\%$ of specified value

Capacitance Change Max: Within $\pm 20\%$ of initial value

MECHANICAL SPECIFICATIONS

Lead Solderability:

Meets the requirements of MIL-STD 202, Method 208

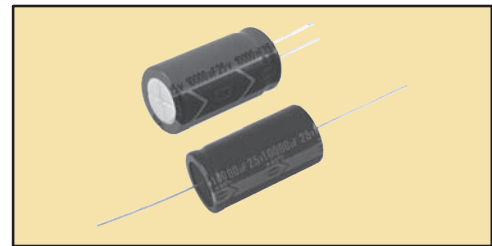
Marking:

Consists of series type, nominal capacitance, rated voltage, temperature range, anode and/or cathode identification, vendor identification.

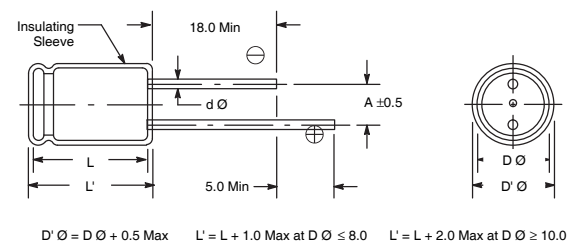
Recommended Cleaning Solvents:

Methanol, isopropanol ethanol, isobutanol, petroleum ether, propanol and/or commercial detergents. Halogenated hydrocarbon cleaning agents such as Freon (MF, TF, or TC), trichloroethylene, trichloroethane, or methylchloride are not recommended as they may damage the capacitor.

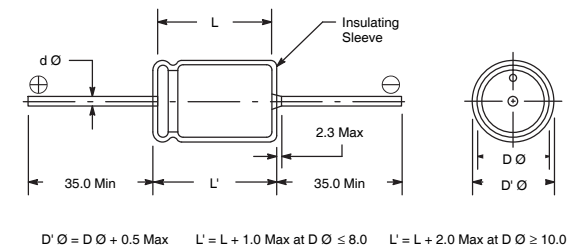
CASE SIZE AND DIMENSIONS:



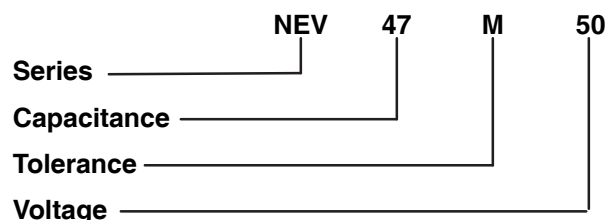
NEV SERIES



NEH SERIES (Insulating Bar = Negative)



ORDERING INFORMATION



ALUMINUM ELECTROLYTIC 6.3V to 100V

NEV, NEH SERIES

NEV Series (Radial Type) Dimensions: Diameter (D Ø) x Length (L): mm

Cap (µf) \ WV	6.3	10	16	25	35	50	63	100
0.10						5 x 11	5 x 11	5 x 11
0.15								5 x 11
0.22						5 x 11	5 x 11	5 x 11
0.33						5 x 11	5 x 11	5 x 11
0.47						5 x 11	5 x 11	5 x 11
0.56						5 x 11	5 x 11	
0.68								5 x 11
1.0						5 x 11	5 x 11	5 x 11
1.5							5 x 11	5 x 11
2.2						5 x 11	5 x 11	5 x 11
3.3						5 x 11	5 x 11	5 x 11
4.7						5 x 11	5 x 11	5 x 11
6.8						5 x 11	5 x 11	6.3 x 11
10						5 x 11	5 x 11	6.3 x 11
15					5 x 11	5 x 11	6.3 x 11	8 x 11.5
22				5 x 11	5 x 11	5 x 11	6.3 x 11	8 x 11.5
33			5 x 11	5 x 11	5 x 11	6.3 x 11	6.3 x 11	10 x 12.5
47		5 x 11	5 x 11	5 x 11	6.3 x 11	6.3 x 11	8 x 11.5	10 x 16
68		6.3 x 11	6.3 x 11	8 x 11.5	8 x 11.5	10 x 12.5	10 x 16	10 x 20
100		5 x 11	6.3 x 11	6.3 x 11	8 x 11	8 x 11	10 x 12.5	13 x 21
150	8 x 11.5	8 x 11.5	8.5 x 11	10 x 12	10 x 16	10 x 20	13 x 20	13 x 25
220	6.3 x 11	6.3 x 11	8 x 11.5	8 x 11.5	10 x 12.5	10 x 16	10 x 20	16 x 25
330	6.3 x 11	8 x 11.5	8 x 11.5	10 x 12.5	10 x 16	10 x 20	13 x 21	16 x 25
470	8 x 11	8 x 11.5	10 x 12.5	10 x 16	10 x 20	13 x 21	13 x 25	16 x 31.5
680	10 x 16	10 x 16	10 x 12.5	10 x 16	13 x 21	13 x 25	13 x 25	16 x 25
1000	10 x 12.5	10 x 16	10 x 20	13 x 21	13 x 25	16 x 25	16 x 31.5	18 x 40
1500	13 x 25	13 x 25	16 x 31.5	16 x 35.5	16 x 35.5			
2200	13 x 21	13 x 21	13 x 25	16 x 25	16 x 31.5	18 x 36	18 x 40	
3300	13 x 21	13 x 25	16 x 25	16 x 31.5	18 x 36	18 x 40	22 x 41	
4700	16 x 25	16 x 25	16 x 31.5	18 x 36	18 x 40	22 x 41		
6800	16 x 25	16 x 31.5	18 x 36	18 x 40	22 x 41			
10000	16 x 31.5	18 x 36	18 x 40	22 x 41				
22000		18 x 46						

* These dimensions are for reference only, please consult the factory for actual size.

NEV Series (Radial Type) Mechanical Specifications: mm

Outside Diameter (D Ø)	5	6.3	8	10	13	16	18	22
Lead Spacing (A)	2	2.5	3.5	5	5	7.5	7.5	10
Lead Diameter (d Ø)	0.5	0.6	0.6	0.6	0.6	0.8	0.8	1.0

* These dimensions are for reference only, please consult the factory for actual size.

ALUMINUM ELECTROLYTIC 6.3V to 100V

NEV, NEH SERIES

NEH Series (Axial Type) Dimensions: Diameter (D Ø) x Length (L): mm

Cap (µf) \ WV	6.3	10	16	25	35	50	63	100
0.10						5 x 12.5	5 x 12.5	5 x 12.5
0.22						5 x 12.5	5 x 12.5	5 x 12.5
0.33						5 x 12.5	5 x 12.5	5 x 12.5
0.47						5 x 12.5	5 x 12.5	5 x 12.5
0.68							5 x 12.5	
1.0						5 x 12.5	5 x 12.5	5 x 12.5
1.5							5 x 11	
2.2						5 x 12.5	5 x 12.5	5 x 12.5
3.3						5 x 12.5	5 x 12.5	5 x 12.5
4.7						5 x 12.5	5 x 12.5	5 x 12.5
6.8						5 x 11	6.3 x 11	
10				6.3 x 12.5	5 x 11	6.3 x 12.5	6.3 x 12.5	6.3 x 16
15			5 x 11	5 x 11	6.3 x 11	6.3 x 11	8 x 11.5	
22			5 x 11	6.3 x 12.5	6.3 x 12.5	6.3 x 16	8 x 16	8 x 20
33		5 x 12	6.3 x 12.5	6.3 x 12.5	6.3 x 16	8 x 16	8 x 16	8 x 20
47	5 x 11	6.3 x 12.5	6.3 x 12.5	6.3 x 16	8 x 16	8 x 16	8 x 20	10 x 20
68	6.3 x 11	6.3 x 11	8 x 11.5	8 x 16	8 x 16	10 x 12.5	10 x 16	
100	6.3 x 12.5	6.3 x 16	6.3 x 16	8 x 16	8 x 20	8 x 20	10 x 20	10 x 25
150	8 x 16	8 x 16	8 x 16	10 x 16	10 x 16	10 x 16	10 x 20	
220	8 x 16	8 x 16	8 x 16	8 x 20	10 x 20	10 x 20	10 x 25	13 x 25
330	8 x 16	8 x 16	8 x 20	10 x 20	10 x 20	13 x 25	13 x 25	13 x 35
470	8 x 16	8 x 20	10 x 20	10 x 20	10 x 25	13 x 25	13 x 30	16 x 30
680	10 x 16	10 x 20	10 x 20	10 x 25	13 x 25	13 x 30	16 x 30	16 x 30
1000	10 x 20	10 x 20	13 x 25	13 x 25	13 x 30	16 x 30	16 x 30	18 x 40
1500	13 x 25	13 x 25	13 x 20	16 x 31.5				
2200	10 x 25	13 x 25	13 x 30	16 x 25	16 x 30	18 x 40	22 x 40	
3300	13 x 25	13 x 30	16 x 30	16 x 30	16 x 40	22 x 40	22 x 50	
4700	16 x 30	16 x 30	16 x 40	18 x 40	22 x 40	22 x 50		
6800	16 x 30	16 x 40	18 x 40	22 x 40	22 x 50			
10000	16 x 30	18 x 40	22 x 40	22 x 50				
22000		25 x 50						

* These dimensions are for reference only, please consult the factory for actual size.

NEH Series (Axial Type) Mechanical Specifications: mm

Outside Diameter (D Ø)	5	6.3	8	10	13	16	18	22	25
Lead Diameter (d Ø)	0.6	0.6	0.6	0.6	0.8	0.8	0.8	0.8	0.8

* These dimensions are for reference only, please consult the factory for actual size.

ALUMINUM ELECTROLYTIC 160V to 450V

NEVH, NEHH SERIES

SUBMINIATURE HIGH VOLTAGE (NEVH: Radial Lead, NEHH: Axial Leads)

The NEVH and NEHH series subminiature aluminum electrolytic capacitors are ideal for polarized capacitor applications requiring small size, high capacitance, high voltage, low cost, and dependability over broad temperature ranges.

RATINGS

- Capacitance Range:** 1.0 μ f to 470 μ f
- Tolerance:** -10%, +75%
- Voltage Range:** 160V to 450V

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:

- For 160V and 250V:
-40 °C to +85°C (-40 °F to +185°F)
- For 350V and 450V:
-25 °C to +85°C (-13 °F to +185°F)

Leakage Current: $I \leq 0.02CV + 100\mu A$ (measured after 3 minutes of applied voltage)

- I = Leakage Current (μA)
- C = Nominal Capacitance (μf)
- V = Rated Voltage (V)

Capacitance Tolerance (M): at +20°C (+68°F), 120Hz

- Capacitance Values through 4.7 μ f -10% to +75%
- Capacitance Values above 4.7 μ f -10% to +50%

Dissipation Factor: at +20°C (+68°F), 120Hz

Rated Voltage	160, 250, and 350	450
1.0 μ f to 470 μ f	0.20	0.25

Impedance Ratio at Low Temperature: 120Hz

Comparison Z WV	160-250	350	450
Z @ -25 °C (-13 °F)/ Z @ +20°C (+68°F)	2	2	2
Z @ -40 °C (-40 °F)/ Z @ +20°C (+68°F)	4	-	-

Surge Voltage:

DC Rated Voltage	160	250	350	450
Surge Voltage	200	300	400	500

Load Life: 1000 \pm 12Hrs @ +85°C (+185°F), at rated voltage

- Leakage Current: Within values specified above
- Dissipation Factor: Within \pm 200% of specified value
- Capacitance Change Max: See Table

Rated Voltage	Capacitance Change Max
160V to 450V	Within 20% of the initial value

Shelf Life: 1000 Hrs @ +85°C (+185°F), no voltage applied

- Leakage Current: Within \pm 200% of specified value
- Dissipation Factor: Within \pm 150% of specified value
- Capacitance Change Max: Within \pm 20% of initial value

MECHANICAL SPECIFICATIONS

Lead Solderability:

Meets the requirements of MIL-STD 202, Method 208

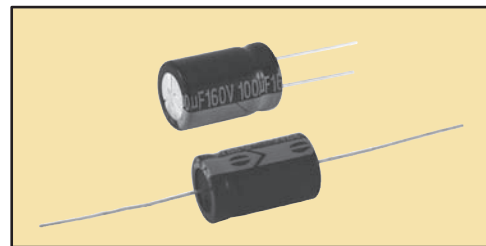
Marking:

Consists of series type, nominal capacitance, rated voltage, temperature range, anode and/or cathode identification, vendor identification.

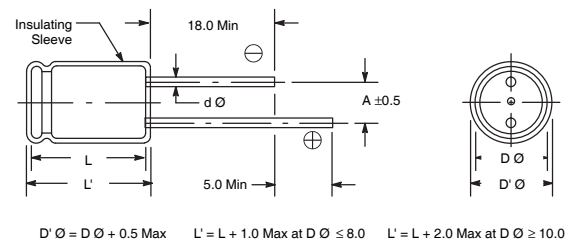
Recommended Cleaning Solvents:

Methanol, isopropanol ethanol, isobutanol, petroleum ether, propanol and/or commercial detergents. Halogenated hydrocarbon cleaning agents such as Freon (MF, TF, or TC), trichloroethylene, trichloroethane, or methylchloride are not recommended as they may damage the capacitor.

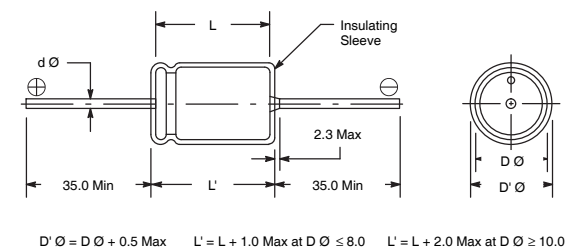
CASE SIZE AND DIMENSIONS:



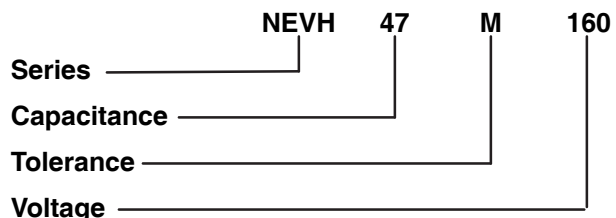
NEVH SERIES



NEHH SERIES (Insulating Bar = Negative)



ORDERING INFORMATION



ALUMINUM ELECTROLYTIC 160V to 450V

NEVH, NEHH SERIES

NEVH Series (Radial Type) Dimensions: Diameter (D Ø) x Length (L): mm

Cap (µf) \ WV	160	250	350	450
1.0	6.3 x 11	6.3 x 11	8 x 11.5	10 x 12.5
2.2	6.3 x 11	8 x 11.5	10 x 12.5	10 x 16
3.3	8 x 11.5	10 x 12.5	10 x 16	10 x 20
4.7	8 x 11.5	10 x 12.5	10 x 16	13 x 20
10	10 x 12.5	10 x 20	13 x 21	13 x 25
22	10 x 20	13 x 25	13 x 25	16 x 31.5
33	13 x 21	13 x 25	16 x 31.5	18 x 35.5
47	13 x 25	16 x 25	18 x 36	22 x 35
100	16 x 25	18 x 36	22 x 35	25 x 40
220	18 x 35			
330	22 x 35			
470	22 x 40			

* These dimensions are for reference only, please consult the factory for actual size.

NEVH Series (Radial Type) Mechanical Specifications: mm

Outside Diameter (D Ø)	6.3	8	10	13	16	18	22	25
Lead Spacing (A)	2.5	3.5	5	5	7.5	7.5	10	12.5
Lead Diameter (d Ø)	0.5	0.6	0.6	0.6	0.8	0.8	0.8	1.0

* These dimensions are for reference only, please consult the factory for actual size.

NEHH Series (Axial Type) Dimensions: Diameter (D Ø) x Length (L): mm

Cap (µf) \ WV	160	250	350	450
1.0	6.3 x 16	8 x 16	8 x 16	10 x 20
2.2	8 x 16	8 x 20	10 x 20	10 x 20
3.3	8 x 16	10 x 20	10 x 20	10 x 20
4.7	8 x 20	10 x 20	10 x 20	13 x 25
10	10 x 25	10 x 20	13 x 25	13 x 30
22	10 x 20	13 x 25	13 x 30	16 x 30
33	13 x 25	13 x 30	16 x 30	16 x 40
47	13 x 30	16 x 30	16 x 40	16 x 40
100	16 x 30	16 x 40	18 x 40	22 x 40
220	22 x 40			
330	25 x 52			
470	22 x 52			

* These dimensions are for reference only, please consult the factory for actual size.

NEHH Series (Axial Type) Mechanical Specifications: mm

Outside Diameter (D Ø)	6.3	8	10	13	16	18	22	25
Lead Diameter (d Ø)	0.6	0.6	0.6	0.8	0.8	0.8	0.8	0.8

* These dimensions are for reference only, please consult the factory for actual size.

NON-POLAR ALUMINUM ELECTROLYTIC

NPR, NPA (Non-Polarized) SERIES

SUBMINIATURE NON-POLARIZED (NPR: Radial Leads, NPA: Axial Leads)

The NPR and NPA Series subminiature aluminum electrolytic capacitors are especially designed for use in circuits whose polarity is reversed or unknown or in crossover networks which do not require tough characteristic requirements.

RATINGS

Capacitance Range: 0.47 μ f to 1000 μ f

Tolerance: $\pm 20\%$

Voltage Range: 16V to 100V

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:

-40 °C to +85°C (-40 °F to +185°F)

Leakage Current: $I \leq 0.002CV + 3\mu A$ (measured after 5 minutes of applied voltage)

I = Leakage Current (μA)

C = Nominal Capacitance (μf)

V = Rated Voltage (V)

Capacitance Tolerance (M): $\pm 20\%$
measured at 20°C (68°F), 120Hz

Dissipation Factor: measured at +20°C (+68°F), 120Hz

Rated Voltage	16	25	50	63	100
0.1 μ f to 1000 μ f	0.16	0.12	0.08	0.06	0.06

Impedance Ratio at Low Temperature: 120Hz

Comparison Z WV	16	25	50	63	100
Z @ -25 °C (-13 °F)/ Z @ +20°C (+68°F)	2	1.5	1.5	2	2
Z @ -40 °C (-40 °F)/ Z @ +20°C (+68°F)	3	2	2	4	4

Surge Voltage:

DC Rated Voltage	16	25	50	63	100
Surge Voltage	20	32	63	79	125

Load Life: 1000 \pm 12Hrs @ +85°C (+185°F),
at rated voltage

Leakage Current: Within values specified above

Dissipation Factor: Within $\pm 150\%$ of specified value

Capacitance Change Max: $\pm 15\%$ of initial value

Rated Voltage	Capacitance Change Max
160V to 450V	Within 30% of the initial value

Shelf Life: 1000 Hrs @ +85°C (+185°F),
no voltage applied

Leakage Current: Within values specified above

Dissipation Factor: Within $\pm 150\%$ of specified value

Capacitance Change Max: Within $\pm 15\%$ of initial value

MECHANICAL SPECIFICATIONS

Lead Solderability:

Meets the requirements of MIL-STD 202, Method 208

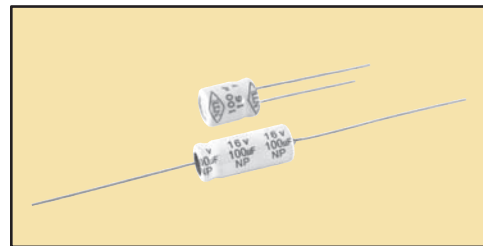
Marking:

Consists of series type, nominal capacitance, rated voltage, temperature range, anode and/or cathode identification, vendor identification.

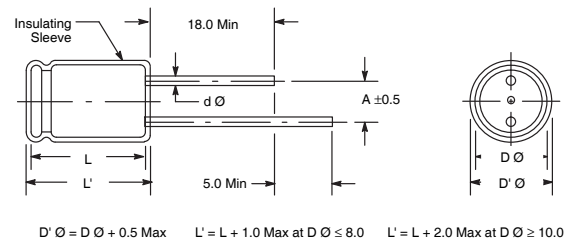
Recommended Cleaning Solvents:

Methanol, isopropanol ethanol, isobutanol, petroleum ether, propanol and/or commercial detergents. Halogenated hydrocarbon cleaning agents such as Freon (MF, TF, or TC), trichloroethylene, trichloroethane, or methylchloride are not recommended as they may damage the capacitor.

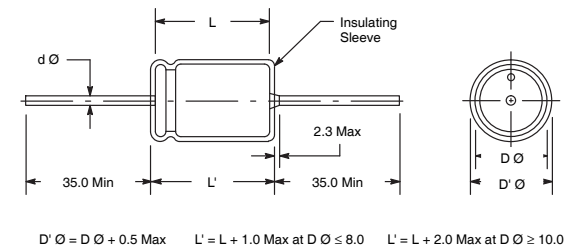
CASE SIZES AND DIMENSIONS:



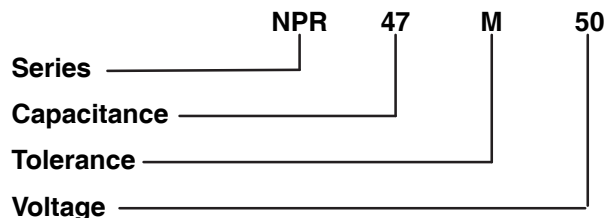
NPR SERIES



NPA SERIES



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NON-POLAR ALUMINUM ELECTROLYTIC

NPR, NPA (Non-Polarized) SERIES

NPR Series (Radial Type) Dimensions: Diameter (D Ø) x Length (L): mm

Rated Voltage (WV)	16	25	50	63	100
Surge Voltage (V)	20	32	63	79	125
Cap (µf)					
0.47			5 x 11		5 x 11
1.0			5 x 11	5 x 11	5 x 11
2.2			5 x 11	5 x 11	6 x 11
3.3			5 x 11	6 x 11	8 x 11.5
4.7		5 x 11	6 x 11	6 x 11	8 x 11.5
10	5 x 11	5 x 11	8 x 11.5	8 x 11.5	10 x 12.5
22	6 x 11	6 x 11	10 x 12.5	10 x 12.5	10 x 20
33	6 x 11	8 x 11.5	10 x 16	10 x 16	13 x 20
47	8 x 11.5	10 x 12.5	10 x 20	10 x 20	13 x 25
100	10 x 12.5	10 x 16	13 x 25	13 x 25	16 x 25
220	10 x 20	13 x 25	16 x 25	16 x 30	
330	13 x 20	13 x 25	16 x 30.5		
470	13 x 25	16 x 25			
1000	16 x 25	16 x 30.5			

* These dimensions are for reference only, please consult the factory for actual size.

NPR Series (Radial Type) Mechanical Specifications: mm

Outside Diameter (D Ø)	5	6	8	10	13	16
Lead Spacing (A)	2	2.5	3.5	5	5	7.5
Lead Diameter (d Ø)	0.5	0.6	0.6	0.6	0.6	0.8

* These dimensions are for reference only, please consult the factory for actual size.

NPA Series (Axial Type) Dimensions: Diameter (D Ø) x Length (L): mm

Rated Voltage (WV)	16	25	50	63	100
Surge Voltage (V)	20	32	63	79	125
Cap (µf)					
0.47			6 x 15		6 x 15
1.0			6 x 15	6 x 15	6 x 15
2.2			6 x 15	6 x 15	6 x 15
3.3			6 x 15	6 x 15	6 x 19
4.7			6 x 15	6 x 15	8 x 19
10		6 x 15	6 x 19	8 x 19	10 x 21
22	6 x 15	6 x 19	10 x 21	10 x 21	10 x 25
33	6 x 19	8 x 19	10 x 21	10 x 25	13 x 30
47	8 x 19	8 x 19	10 x 25	10 x 25	13 x 30
100	10 x 21	10 x 25	13 x 30	13 x 30	16 x 30
220	10 x 25	13 x 30	16 x 30	16 x 30	
330	10 x 30	13 x 30	16 x 41	16 x 41	
470	13 x 30	16 x 30			
1000	16 x 30				

* These dimensions are for reference only, please consult the factory for actual size.

NPA Series (Axial Type) Mechanical Specifications: mm

Outside Diameter (D Ø)	6	8	10	13	16
Lead Diameter (d Ø)	0.6	0.6	0.6	0.8	0.8

* These dimensions are for reference only, please consult the factory for actual size.

HIGH-FREQ ALUMINUM ELECTROLYTIC

HD SERIES

SUBMINIATURE (Radial Lead, Horizontal Deflection)

The NTE HD series of aluminum electrolytic non-polarized capacitors are designed specifically for horizontal deflection current correction where high frequency and high ripple current occur.

RATINGS

Capacitance Range: 1.0 μ f to 10 μ f
Tolerance: \pm 20%
Voltage Range: 25 Volts and 50 Volts

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:
 -25 °C to +85°C (-13 °F to +185°F)

Leakage Current: $I \leq 0.2CV$ (measured after 5 minutes of applied rated voltage)

I = Leakage Current (μ A)
 C = Nominal Capacitance (μ f)
 V = Rated Voltage (V)

Capacitance Tolerance: \pm 20% (M)
 measured at +20°C (+68°F), 1kHz

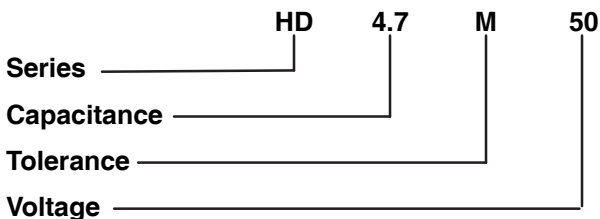
Load Life: 1000 Hrs @ 12V DC, +70°C (+158°F), at specified ripple current

Leakage Current: Initial specified value or less
 Dissipation Factor: < 200% of specified value
 Capacitance Change: Within \pm 15% of initial value

Shelf Life: 500 Hrs @ +85°C (+185°F), no voltage applied

Leakage Current: Initial specified value or less
 Dissipation Factor: < 200% of specified value
 Capacitance Change: Within \pm 15% of initial value

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MECHANICAL SPECIFICATIONS (Cont'd)

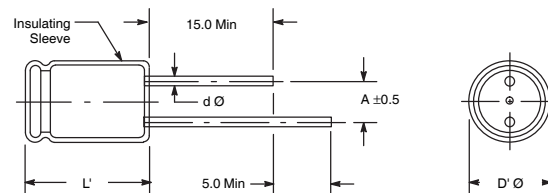
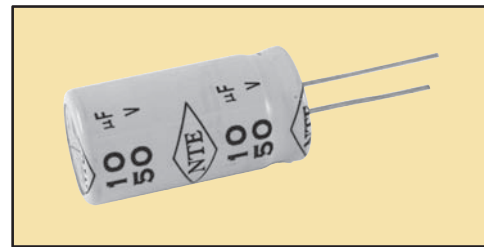
Marking:

Consists of series type, nominal capacitance, rated voltage, temperature range, anode and/or cathode identification, NTE identification.

Recommended Cleaning Solvents:

Methanol, isopropanol ethanol, isobutanol, petroleum ether, propanol and/or commercial detergents. Halogenated hydrocarbon cleaning agents such as Freon (MF, TF, or TC), trichloroethylene, trichloroethane, or methylchloride are not recommended as they may damage the capacitor.

CASE SIZE AND DIMENSIONS:



HD Series Dimensions:

Diameter (D Ø) x Length (L): mm

Capacitance (μ f)	25V and 50V	Ripple Current* (A_{p-p})
1.0	12.5 x 20	2.0
2.2	12.5 x 25	3.0
3.3	16 x 25	4.0
4.7	16 x 31.5	5.0
5.6	16 x 31.5	6.0
6.8	16 x 35.5	7.0
8.2	18 x 35.5	8.0
10.0	18 x 40	9.0

* Allowable ripple current @ 70°C, 12V DC, and 15.75kHz

MECHANICAL SPECIFICATIONS

Lead Solderability:

Meets the requirements of MIL-STD 202, Method 208

HD Mechanical Specs: Dimensions (mm)

Outside Diameter (D Ø)	12.5	16	18
Lead Spacing (A)	5.0	7.5	7.5
Lead Wire (d Ø)	0.6	0.8	0.8

+105°C ALUMINUM ELECTROLYTIC

VHT SERIES

SUBMINIATURE (Radial Lead, 105°C Max)

The NTE VHT series of aluminum electrolytic capacitors are designed for use in automotive, commercial, and industrial applications. These high temperature, radial lead capacitors are especially suitable for applications that require extended life and higher temperature operation.

RATINGS

Capacitance Range: 0.1μf to 4700μf

Tolerance: ±20%

Voltage Range: 16 to 250 Volts

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:

-40 °C to +105°C (-40 °F to +220.9°F)

Leakage Current:

6.3V to 100V: ≤ 0.01CV (+3μA)

160V to 250V: ≤ 0.03CV (+15μA)

Capacitance Tolerance: ±20% (M)
measured at +20°C (+68°F), 120Hz

High Temperature Load Test:

1000 Hrs @ +105°C (+220.9°F) and rated voltage

Ripple Current:

The ripple current multipliers (See Table) adjust the current to make the capacitors operating temperature the same for different ambient temperatures and ripple frequencies.

Temperature	45°C	55°C	65°C	75°C	85°C	95°C	105°C
Multiplier	1.5	1.46	1.32	1.17	1.0	0.79	0.5

Load Life: 1000 Hrs @ +105°C (+220.9°F),
no voltage applied

Shelf Life: 1000 Hrs @ +105°C (+220.9°F),
no voltage applied

MECHANICAL SPECIFICATIONS

Lead Solderability:

Meets the requirements of MIL-STD 202,
Method 208

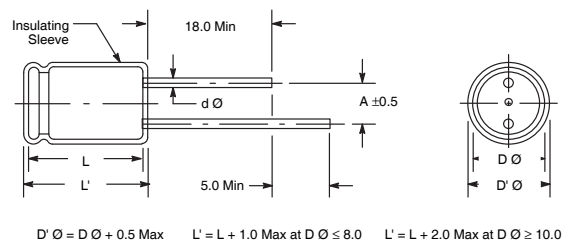
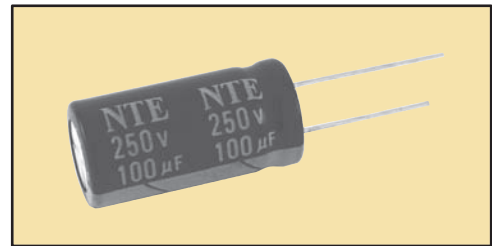
Marking:

Consists of series type, nominal capacitance, rated voltage, temperature range, anode and/or cathode identification, vendor identification.

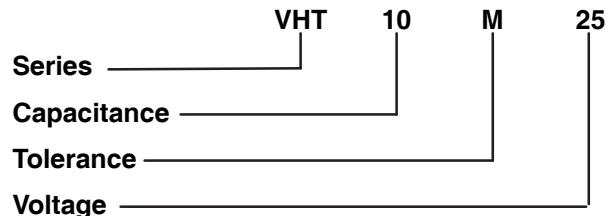
Recommended Cleaning Solvents:

Methanol, isopropanol ethanol, isobutanol, petroleum ether, propanol and/or commercial detergents. Halogenated hydrocarbon cleaning agents such as Freon (MF, TF, or TC), trichloroethylene, trichloroethane, or methylchloride are not recommended as they may damage the capacitor.

CASE SIZE AND DIMENSIONS:



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+105°C ALUMINUM ELECTROLYTIC

VHT SERIES

VHT Series Dimensions: Diameter (D Ø) x Length (L): mm

Cap (µf) \ WV	16	25	35	50	63	160	250
0.1				5 x 11			
0.22				5 x 11			
0.33				5 x 11			
0.47				5 x 11	5 x 11		
1.0				5 x 11	5 x 11	6 x 11	6 x 11
2.2				5 x 11	5 x 11	6 x 11	8 x 11.5
3.3				5 x 11	5 x 11	8 x 11.5	10 x 12.5
4.7		5 x 11	5 x 11	5 x 11	5 x 11	8 x 11.5	10 x 12.5
10	5 x 11	5 x 11	5 x 11	5 x 11	6 x 11	10 x 12.5	10 x 20
22	5 x 11	5 x 11	6 x 11	6 x 11	8 x 11.5	10 x 20	13 x 25
33	5 x 11	6 x 11	6 x 11	8 x 11.5	8 x 11.5	13 x 21	13 x 25
47	6 x 11	6 x 11	8 x 11.5	8 x 11.5	10 x 12.5	13 x 25	16 x 25
100	8 x 11.5	8 x 11.5	10 x 12.5	10 x 16	10 x 20	16 x 25	18 x 36
220	10 x 12.5	10 x 16	10 x 20	13 x 20	13 x 20		
330	10 x 16	10 x 20	13 x 20	13 x 20	13 x 25		
470	10 x 20	13 x 20	13 x 25	16 x 25	16 x 25		
1000	13 x 25	16 x 25	16 x 25	16 x 25	18 x 31.5		
2200	16 x 25	16 x 31.5	18 x 31.5				
3300	16 x 31.5	18 x 31.5					
4700	18 x 31.5						

* These dimensions are for reference only, please consult the factory for actual size.

VHT Mechanical Specs: Dimensions (mm)

Outside Diameter	D Ø	5.0	6.0	8.0	10.0	13.0	16.0	18.0
Lead Spacing	A	2.0	2.5	3.5	5.0		7.5	
Lead Wire	d Ø	0.5			0.6		0.65	0.8

* These dimensions are for reference only, please consult the factory for actual size.

SNAP-IN MOUNT ALUMINUM ELECTROLYTIC

SI SERIES

SUBMINIATURE (SI: Snap-in)

The SI Snap-in series subminiature aluminum electrolytic capacitors are especially suitable for applications requiring high capacitance, low cost, and very small size. In fact, you'll find these capacitors in some of the most demanding applications, from precision medical electronics and automobiles to the newest personal computers and disk drives.

They operate over a broad temperature range and are available in either blister pack or bulk.

RATINGS

Capacitance Range: 47 μ f to 33,000 μ f

Tolerance: $\pm 20\%$

Voltage Range: 16V to 450V

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:

-40 °C to +85°C (-40 °F to +185°F)

Leakage Current: $I \leq 3 \times \sqrt{CV}$ (measured after 5 minutes @ rated voltage and +20°C (+68°F))

I = Leakage Current (μ A)

C = Nominal Capacitance (μ f)

V = Rated Voltage (V)

Capacitance Tolerance (M): $\pm 20\%$
measured at +20°C (+68°F), 120Hz

Surge Voltage:

DC Rated Voltage	16	25	35	50	63	80
Surge Voltage	20	32	44	63	79	100

DC Rated Voltage	100	160	200	250	450
Surge Voltage	125	200	250	300	500

Load Life: 2000 \pm 12Hrs @ Max rated temperature and rated voltage

Leakage Current: Within values specified above

Dissipation Factor: Within $\pm 150\%$ of specified value

Shelf Life: 1000 \pm 6Hrs @ Max rated temperature, no voltage applied

Leakage Current: Within $\pm 200\%$ of specified value

Dissipation Factor: Within $\pm 150\%$ of specified value

Capacitance Change Max: Within $\pm 20\%$ of initial value

MECHANICAL SPECIFICATIONS

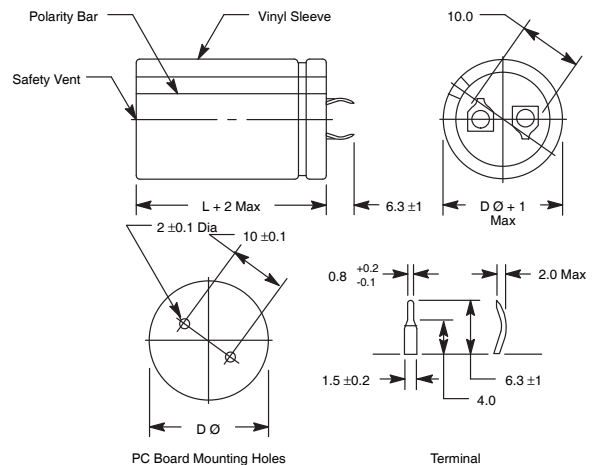
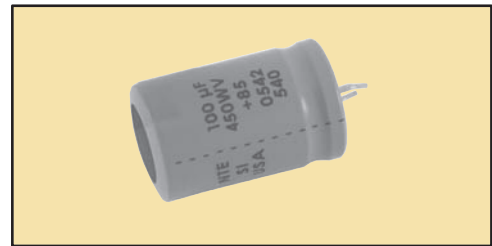
Marking:

Consists of series type, nominal capacitance, rated voltage, temperature range, anode and/or cathode identification, vendor identification.

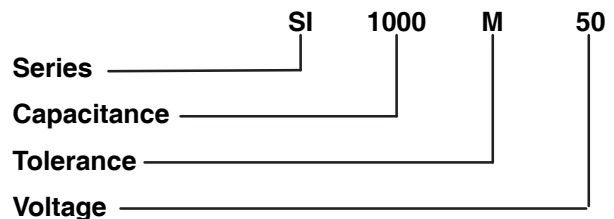
Recommended Cleaning Solvents:

Chlorofluorocarbon solvents used to remove flux from printed circuit boards can penetrate the capacitor end-seals, cause corrosion when voltage is applied and capacitor failure. Avoid halogenated solvents and consider these alternatives: Clean the capacitors with water/detergent or cleaning solvents free of halogen groups such as alcohol or terpene solution, or mount the capacitor after board cleaning.

CASE SIZE AND DIMENSIONS:



ORDERING INFORMATION



SNAP-IN MOUNT ALUMINUM ELECTROLYTIC

SI SERIES

SI Series Dimensions: Diameter (D Ø) x Length (L): mm

Cap (µf) \ WV	16	25	35	50	63	80	100	160	200	250	450
47											22 x 25
56											22 x 25
68											22 x 30
82											22 x 30
100									22 x 20	25 x 20	22 x 35
120											22 x 40
150									22 x 20	22 x 20	22 x 50
180											25 x 45
220								22 x 20	25 x 25	22 x 25	25 x 50
270									22 x 25		30 x 45
330								22 x 25	22 x 30	22 x 35	30 x 50
390									22 x 30		35 x 45
470								22 x 30	22 x 35	22 x 45	35 x 50
560							35 x 45	25 x 30	22 x 40	25 x 45	35 x 63
680								22 x 40	22 x 45	30 x 35	35 x 70
820								22 x 45	25 x 45	30 x 45	
1000			22 x 30	22 x 20		25 x 20	22 x 30	25 x 45	25 x 50	30 x 50	
1500	22 x 35					22 x 40	22 x 40		30 x 50		
2200		22 x 25	22 x 20	25 x 20	22 x 30	22 x 40	22 x 50				
2700				22 x 25		22 x 45					
3300	22 x 20	22 x 20	22 x 25	22 x 40	22 x 50	25 x 40	25 x 50				
3900		20 x 30		22 x 30		25 x 45					
4700	22 x 25	22 x 30	22 x 30	22 x 35	22 x 50	25 x 35	30 x 50				
5600		22 x 25		25 x 35		30 x 45	35 x 45				
6800	22 x 25	22 x 30	22 x 50	25 x 40	25 x 50	30 x 50					
8200		22 x 30		25 x 45		35 x 50					
10000	22 x 30	22 x 35	25 x 40	30 x 40	35 x 40	35 x 70					
12000				30 x 45	35 x 50						
15000	22 x 50	25 x 40		30 x 50							
18000				35 x 45							
22000	22 x 45	30 x 40	30 x 50								
33000	25 x 50										

* These dimensions are for reference only, please consult the factory for actual size.

105°C SNAP-IN ALUMINUM ELECTROLYTIC

SIT SERIES

SUBMINIATURE

(SIT: High Temperature Snap-in)

The SIT Snap-in series subminiature aluminum electrolytic capacitors are especially suitable for applications requiring high capacitance, low cost, and very small size. In fact, you'll find these capacitors in some of the most demanding applications, from precision medical electronics and automobiles to the newest personal computers and disk drives.

They operate over a broad temperature range and are available in either blister pack or bulk.

RATINGS

Capacitance Range: 100µf to 10,000µf

Tolerance: ±20%

Voltage Range: 50V to 250V

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:

-40 °C to +105°C (-40 °F to +221°F)

Leakage Current: $I \leq 3 \times \sqrt{CV}$ (measured after 5 minutes @ rated voltage and +20°C (+68°F))

I = Leakage Current (µA)

C = Nominal Capacitance (µf)

V = Rated Voltage (V)

Capacitance Tolerance (M): ±20%
measured at +20°C (+68°F), 120Hz

Surge Voltage:

DC Rated Voltage	50	200	250
Surge Voltage	63	250	300

Load Life: 2000 ±12Hrs @ Max rated temperature and rated voltage

Leakage Current: Within values specified above

Dissipation Factor: Within ±150% of specified value

Shelf Life: 1000 ±6Hrs @ Max rated temperature, no voltage applied

Leakage Current: Within ±200% of specified value

Dissipation Factor: Within ±150% of specified value

Capacitance Change Max: Within ±20% of initial value

MECHANICAL SPECIFICATIONS

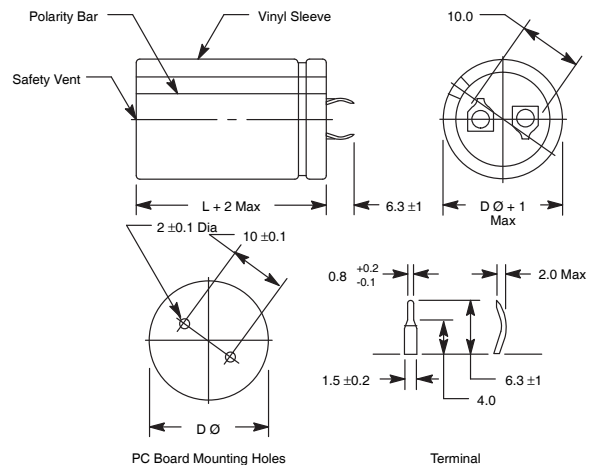
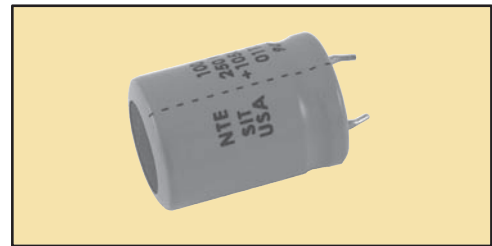
Marking:

Consists of series type, nominal capacitance, rated voltage, temperature range, anode and/or cathode identification, vendor identification.

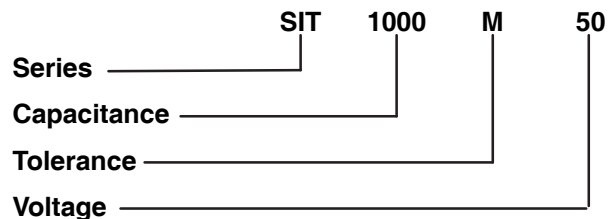
Recommended Cleaning Solvents:

Chlorofluorocarbon solvents used to remove flux from printed circuit boards can penetrate the capacitor end-seals, cause corrosion when voltage is applied and capacitor failure. Avoid halogenated solvents and consider these alternatives: Clean the capacitors with water/detergent or cleaning solvents free of halogen groups such as alcohol or terpene solution, or mount the capacitor after board cleaning.

CASE SIZE AND DIMENSIONS:



ORDERING INFORMATION



105°C SNAP-IN ALUMINUM ELECTROLYTIC

SIT SERIES

SIT Series Dimensions: Diameter (D Ø) x Length (L): mm

Cap (µf) \ WV	50	200	250
100		22 x 20	22 x 25
150		22 x 25	22 x 25
220		22 x 25	22 x 30
330		22 x 35	22 x 40
470		22 x 40	30 x 35
560		22 x 45	25 x 50
680	30 x 40	22 x 45	30 x 45
820		25 x 50	30 x 50
1000	22 x 25	30 x 45	35 x 45
1500		35 x 50	
2200	22 x 30		
3300	22 x 35		
4700	22 x 45		
6800	30 x 50		
8200	30 x 45		
10000	30 x 50		

* These dimensions are for reference only, please consult the factory for actual size.

SOLID TANTALUM

TD (Resin Dipped Radial) SERIES

SOLID TANTALUM

The TD series is a range of resin dipped tantalum capacitors designed for entertainment, commercial, and industrial equipment. They have sintered anodes and solid electrolyte. The epoxy resin housing is flame retardant with a limiting oxygen index in excess of 30 (ASTM-D-2863).

RATINGS

Capacitance Range: 0.1µf to 680µf

Tolerance: ±20%

Voltage Range: 6.3V to 50V

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:

-55 °C to +85°C (-67 °F to +185°F)

Capacitance Tolerance (M): ±20%
measured at +20°C (+68°F), 120Hz

Dissipation Factor: measured at +20°C (+68°F), 120Hz

Capacitance Range µf	0.1 - 1.5	2.2 - 6.8	10 - 68	100 - 680
	≤ 0.04	≤ 0.06	≤ 0.08	≤ 0.10

Surge Voltage:

DC Rated Voltage	6.3	10	16	20	25	35	50
Surge Voltage	8	13	20	26	33	46	65

MECHANICAL SPECIFICATIONS

Lead Solderability:

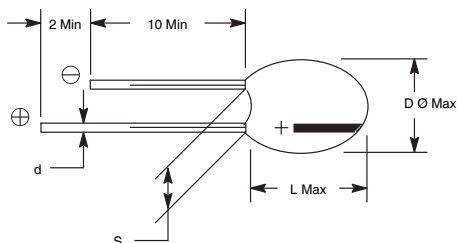
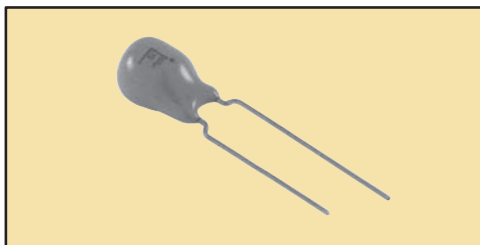
Meets the requirements of MIL-STD 202, Method 208

Marking:

Consists of capacitance, DC voltage, and polarity.

Recommended Cleaning Solvents:

Methanol, isopropanol ethanol, isobutanol, petroleum ether, propanol and/or commercial detergents. Halogenated hydrocarbon cleaning agents such as Freon (MF, TF, or TC), trichloroethylene, trichloroethane, or methylchloride are not recommended as they may damage the capacitor.



CAPACITANCE RANGE:

(Number denotes case size)

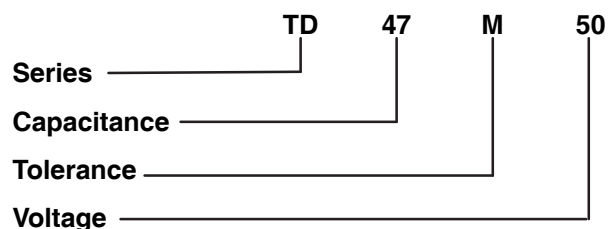
Rated Voltage (WV)	6.3	10	16	20	25	35	50
Surge Voltage (V)	8	13	20	26	33	46	65
Cap (µf)							
0.10						1	1
0.15						1	1
0.22						1	1
0.33						1	2
0.47						1	2
0.68						1	2
1.0				1	1	1	4
1.5			1	1	1	2	5
2.2		1	1	2	2	3	5
3.3	1	1	2	3	3	4	7
4.7	1	2	3	4	4	5	8
6.8	2	3	4	5	5	6	8
10.0	3	4	5	6	6	7	9
15.0	4	5	6	7	7	9	10
22.0	5	6	7	8	9	10	13
33.0	6	7	8	9	10	12	
47.0	7	8	10	11	12	14	
68.0	8	9	11	13	13		
100.0	9	11	13	13			
150.0	11	13	15				
220.0	12	14	15				
330.0	14	15					
470.0	15						
680.0	15						

TD Series Dimensions: mm

Diameter (D Ø) x Length (L)

Case Size	Diameter (D Ø)	Length (L)	Lead Wire (d)	Spacing (S)
1	4.50	8.50	0.50	2.54 ±0.51
2	4.50	9.00	0.50	
3	5.00	10.00	0.50	
4	5.00	10.50	0.50	
5	5.50	10.50	0.50	
6	6.00	11.50	0.50	
7	6.50	11.50	0.50	5.08 ±0.51
8	7.00	12.00	0.40	
9	8.00	13.00	0.50	
10	8.50	14.00	0.50	
11	9.00	14.00	0.50	
12	9.00	14.50	0.50	
13	9.00	16.00	0.50	
14	10.00	17.00	0.50	
15	10.00	18.50	0.50	

ORDERING INFORMATION



SURFACE MOUNT TANTALUM

SCT (Surface Mount) SERIES

SURFACE MOUNT TANTALUM

The SCT series is a molded solid tantalum chip capacitor designed to meet specifications worldwide. The SCT series includes EIA standard case sizes and ratings. These capacitors incorporate state-of-the-art construction allowing the use of modern high temperature soldering techniques.

FEATURES:

- Precision molded case with flat surface for vacuum pick-up
- Laser marking and bold videcon - readable polarity stripe
- Glue pad on underside for bonding to circuit board prior to soldering
- Encapsulate material satisfies the UL 94 VO flammability classification

RATINGS

Capacitance Range: 0.1 μ f to 150 μ f

Tolerance: $\pm 10\%$

Voltage Range: 6.3V to 50V

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:

-55 °C to +85°C (-67 °F to +185°F)

Capacitance Tolerance (K): $\pm 10\%$

MECHANICAL SPECIFICATIONS

Lead Solderability:

Meets the requirements of MIL-STD 202, Method 208

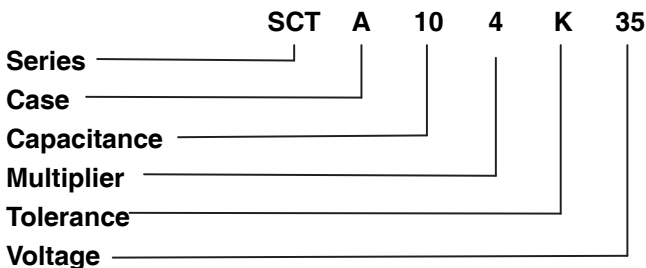
Marking:

Consists of capacitance, DC voltage, and polarity.

Resistance to Board Cleaning:

The use of high acidity fluxes must be avoided. The encapsulation and termination materials are resistant to immersion in boiling solvents such as: Freon TMS and TMC, Trichloroethane, Methylene Chloride, Isopropyl alcohol (IPA), etc., up to +50°C. If ultrasonic cleaning is to be applied in the final wash stages the application time should be less than 5 minutes with a maximum power density of 9mW/cc to avoid damage to terminations.

ORDERING INFORMATION



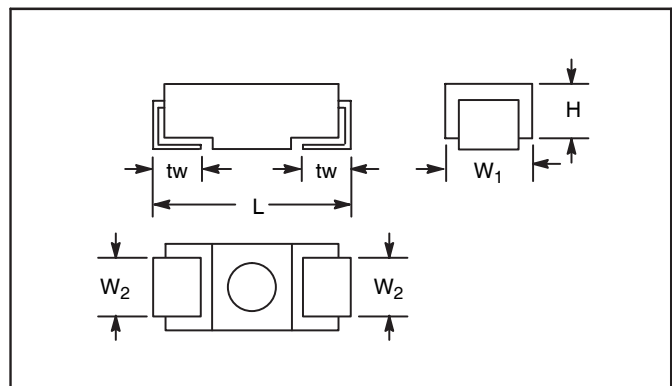
CAPACITANCE RANGE:

(Letter denotes case size)

Rated Voltage (WV)	6.3	10	16	20	25	35	50
Surge Voltage	8	13	20	26	32	46	65
Cap (μ f) \ / \ (V)							
0.10						A	
0.47					A		
1.0			A			B	C
1.5			A		B		
2.2		A	A	B		C	D
3.3	A		B				
4.7		A, B	B		C	D	
6.8	B		C	C		D	
10.0		B, C	B, C		D	D	
15.0		C	C	D	D		
22.0		C	D		D	H	
33.0	C		D		H		
47.0	C	D	D	H			
68.0	D			H			
100.0	D		H				
150.0	D	H					

SCT Series Dimensions: in (mm)

Case Size	L ± 0.2 (± 0.008)	W ₁ ± 0.2 (± 0.008)	W ₂ ± 0.1 (± 0.004)	H ± 0.2 (± 0.008)	tw ± 0.3 (± 0.012)
A	.126 (3.2)	.063 (1.6)	.047 (1.2)	.063 (1.6)	.031 (0.8)
B	.138 (3.5)	.110 (2.8)	.087 (2.2)	.075 (1.9)	.031 (0.8)
C	.236 (6.0)	.126 (3.2)	.087 (2.2)	.102 (2.6)	.051 (1.3)
D	.287 (7.3)	.169 (4.3)	.094 (2.4)	.114 (2.9)	.051 (1.3)
H	.287 (7.3)	.169 (4.3)	.094 (2.4)	.162 (4.1)	.051 (1.3)



50V CERAMIC DISC

89000 SERIES

The 89000 series is a range of insulated disc, monolithic fixed ceramic capacitors. They are most commonly used in consumer electronics and telecommunication equipment.

RATINGS

Capacitance Range: 1.0pf to 0.10 μ f (100,000pf)

Voltage: 50 Volts DC

Withstand Voltage: 150 Volts DC

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:

-25 °C to +85°C (-13 °F to +185°F)

Tolerance Range:

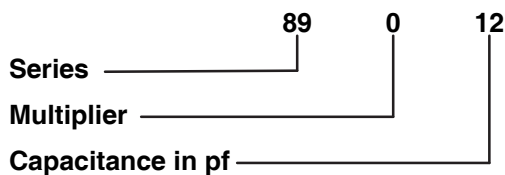
8901D0-89010	±0.5pf
89012-89312	±10%
89315	±20%
89322-89410	+80%, -20%

Temperature Coefficient:

8901D0-89110	- NPO (Stable)
89112-89310	- YSP (±10%)
89312-89315	- Y5R (±15%)
89322-89410	- Y5V (+30% - 80%)

Insulation Resistance: 10,000M Ω Min,
but, 5,000M Ω Min for capacitance over
0.020 μ f

ORDERING INFORMATION



Example: 8901D5 = 1.5pf
89012 = 12pf
89112 = 120pf

MARKING EXAMPLE

Example: 150pf = 151
1500pf = 152
0.015 μ f = 153

Figure 1



89000 Series Dimensions (Figure 2)

Cap pf	DØ mm	T mm	S mm	Cap pf	DØ mm	T mm	S mm
1.0pf	4	4	2.5	220pf	4	4	2.5
1.5pf	4	4	2.5	330pf	4	4	2.5
2.0pf	4	4	2.5	470pf	4	4	2.5
3.0pf	4	4	2.5	680pf	4	4	2.5
5.0pf	4	4	2.5	820pf	5	4	2.5
6.0pf	4	4	2.5	1000pf	5	4	2.5
7.0pf	4	4	2.5	1200pf	5	4	2.5
8.0pf	4	4	2.5	1500pf	5	4	2.5
10pf	4	4	2.5	2200pf	5	4	2.5
12pf	4	4	2.5	3300pf	8	4	5.1
15pf	4	4	2.5	4700pf	8	4	5.1
18pf	5	4	2.5	5600pf	9.5	4	5.1
22pf	5	4	2.5	6800pf	9.5	4	5.1
33pf	5	4	2.5	8200pf	10.5	3	5.1
39pf	6.3	4	5.1	0.01 μ f	12.5	3	5.1
47pf	6.3	4	5.1	0.012 μ f	6.3	4	5.1
56pf	6.3	4	5.1	0.015 μ f	6.3	4	5.1
68pf	8	4	5.1	0.022 μ f	8	4	5.1
82pf	8	4	5.1	0.047 μ f	12.5	4	5.1
100pf	8	4	5.1	0.068 μ f	12.25	3.25	7.5
120pf	4	4	2.5	0.10 μ f	7.3	3.25	4.5

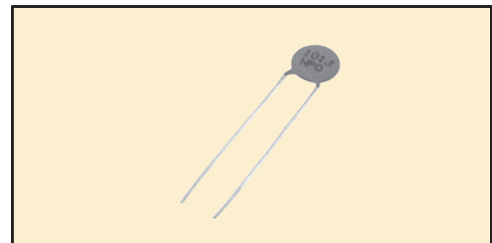
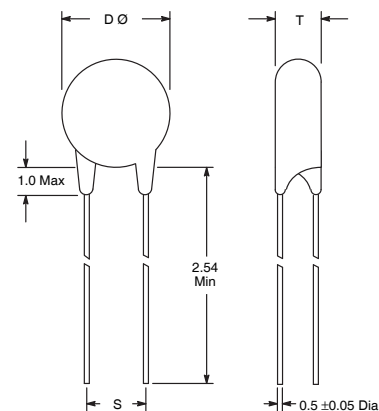


Figure 2



All dimensions are in mm

1000V CERAMIC DISC

90000 SERIES

The 90000 series is a range of insulated disc, monolithic fixed ceramic capacitors. They are most commonly used in consumer electronics and telecommunication equipment.

RATINGS

Capacitance Range: 1.0pf to 0.10 μ f (100,000pf)

Voltage: 1000 Volts DC

Withstand Voltage: 2500 Volts DC

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:

-25 °C to +85°C (-13 °F to +185°F)

Tolerance Range:

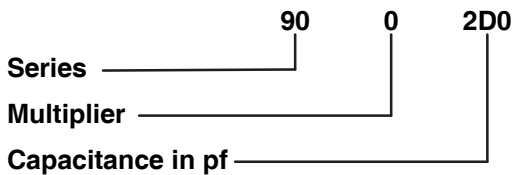
9001D0-9009D0	± 0.5 pf
90010-90210	$\pm 10\%$
90212-90220	+80%, -20%
90222	$\pm 20\%$
90227-90410	+80%, -20%

Temperature Coefficient:

9001D0-90091	-	SL
90110-90118	-	Y5F
90122-90210	-	Y5P
90212-90220	-	Z5V
90222	-	Z5U
90227-90410	-	Z5V

Insulation Resistance: 7500M Ω Min
measured after 1 Minute at rated voltage

ORDERING INFORMATION



Example: 9002D0 = 2.0pf
90220 = 2000pf
90347 = 0.047 μ f

MARKING EXAMPLE

Example: 2pf = 2
2000pf = 202
0.047 μ f = 473

Figure 1



90000 Series Dimensions (Figure 2)

Cap pf	D \varnothing mm	S mm	Cap pf	D \varnothing mm	S mm	Cap pf	D \varnothing mm	S mm
1.0pf	5	7.5	39pf	5	7.5	1500pf	5	7.5
2.0pf	6	7.5	47pf	5	7.5	1800pf	6	7.5
2.2pf	5	7.5	56pf	5	7.5	2000pf	6	7.5
2.7pf	5	7.5	62pf	5	7.5	2200pf	6	7.5
3.0pf	5	7.5	68pf	6	7.5	2700pf	7	7.5
3.3pf	6	7.5	75pf	6	7.5	3000pf	7	7.5
4.0pf	5	7.5	82pf	6	7.5	3300pf	7	7.5
4.7pf	5	7.5	91pf	6	7.5	3900pf	7	7.5
5.0pf	5	7.5	100pf	5	7.5	4300pf	7	7.5
5.6pf	5	7.5	120pf	5	7.5	4700pf	8	7.5
6.2pf	5	7.5	150pf	5	7.5	5000pf	8	7.5
6.8pf	5	7.5	180pf	5	7.5	5600pf	8.5	7.5
7.5pf	5	7.5	220pf	5	7.5	6800pf	10.5	7.5
8.0pf	6	7.5	270pf	6	7.5	7500pf	10.5	7.5
9.0pf	5	7.5	330pf	6	7.5	8200pf	10.5	7.5
10pf	5	7.5	390pf	6	7.5	0.01 μ f	10.5	7.5
12pf	5	7.5	430pf	6	7.5	0.015 μ f	10.5	7.5
13pf	5	7.5	470pf	5	7.5	0.020 μ f	11.0	7.5
15pf	5	7.5	500pf	6	7.5	0.022 μ f	13.5	8.5
18pf	5	7.5	560pf	6	7.5	0.030 μ f	13.5	8.5
20pf	5	7.5	680pf	6	7.5	0.033 μ f	13.5	8.5
22pf	5	7.5	750pf	6	7.5	0.036 μ f	13.5	8.5
24pf	6	7.5	820pf	6	7.5	0.047 μ f	16.5	10.5
27pf	5	7.5	910pf	6	7.5	0.050 μ f	16.5	10.5
30pf	5	7.5	1000pf	5	7.5	0.10 μ f	20.0	10.5
33pf	5	7.5	1200pf	5	7.5			

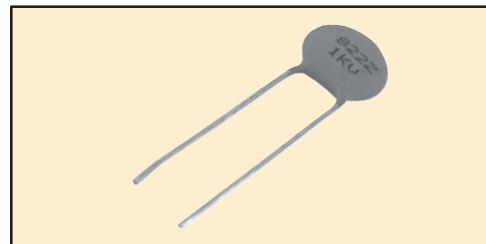
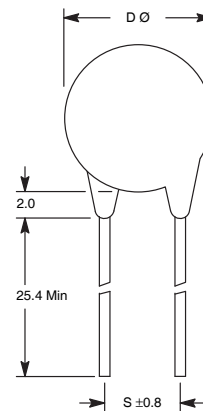


Figure 2.



All dimensions are in mm

MYLAR/POLYESTER FILM

MLR SERIES

The MLR series is a range of radial lead non-polarized polyester film (Mylar) capacitors dipped in a hard epoxy coating material to provide excellent protection against moisture. These devices are intended for general purpose DC applications.

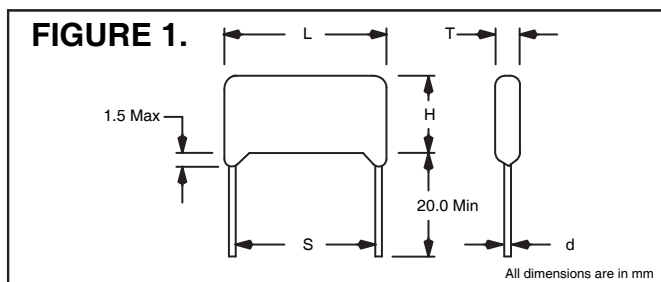
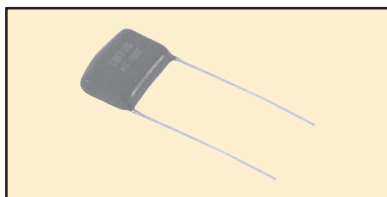
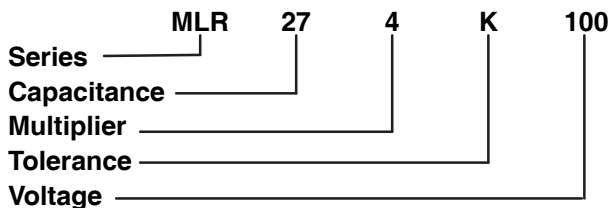
RATINGS

- Capacitance Range:** .001 μ f to 5.6 μ f
- Voltage Range:** 50V to 630V DC (35V to 250V AC)
- Tolerance:** \pm 10%
- Withstand Voltage:** 175%

PERFORMANCE SPECIFICATIONS

- Operating Temperature Range:**
-55 °C to +85°C (-67 °F to +185°F)
- Dissipation Factor:** 1% Max
- Capacitance Tolerance (K):** \pm 10%
measured @ +25°C (+77°F), 1kHz, for values up to and including 1 μ f
measured @ +25°C (+77°F), 120Hz, for values above 1 μ f
- Insulation Resistance:**
50V & 100V, .001 μ f - .1 μ f = 30,000M Ω Min
.12 μ f - 2.2 μ f = 10,000M Ω Min
250V, .01 μ f - 5.6 μ f = 10,000M Ω Min
400V, .0047 μ f - 4.0 μ f = 10,000M Ω Min
630V, .001 μ f - .008 μ f = 100,000M Ω Min
.01 μ f - 3.0 μ f = 10,000M Ω Min
- Life Test:** 1000Hrs @ +85°C (+185°F)
at 150% rated voltage

ORDERING INFORMATION



MECHANICAL SPECIFICATIONS (Figure 1) 50 Volt (35VAC) Series Dimensions (mm)

Cap μ f	Code	T	H	L	S	d
.001	102	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.0033	332	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.01	103	3.0	7.5	6.0	3.5 \pm 1.0	0.5
.012	123	3.0	9.0	6.0	3.5 \pm 1.0	0.5
.018	183	3.5	9.0	6.5	3.5 \pm 1.0	0.5
.027	273	4.0	9.5	6.5	3.5 \pm 1.0	0.5
.033	333	4.0	9.5	6.5	3.5 \pm 1.0	0.5
.039	393	4.5	9.5	7.5	5.0 \pm 1.5	0.5
.047	473	4.5	9.5	7.5	5.0 \pm 1.5	0.5
.1	104	5.5	10.5	9.0	5.0 \pm 1.5	0.5
.15	154	6.0	10.0	14.0	10.0 \pm 1.5	0.6
.27	274	6.0	11.0	14.0	10.0 \pm 1.5	0.6
.33	334	6.0	12.0	14.0	10.0 \pm 1.5	0.6
1.0	105	9.0	15.0	18.0	15.0 \pm 1.5	0.6

100 Volt (65VAC) Series Dimensions (mm)

Cap μ f	Code	T	H	L	S	d
.001	102	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.0012	122	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.0015	152	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.0018	182	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.002	202	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.0022	222	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.0027	272	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.0033	332	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.0039	392	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.0047	472	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.0056	562	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.0068	682	3.0	7.5	5.5	3.5 \pm 1.0	0.5
.0082	822	3.0	7.5	6.0	3.5 \pm 1.0	0.5
.01	103	3.0	7.5	6.0	3.5 \pm 1.0	0.5
.012	123	3.0	9.0	6.0	3.5 \pm 1.0	0.5
.015	153	3.0	9.0	6.0	3.5 \pm 1.0	0.5
.018	183	3.5	9.0	6.5	3.5 \pm 1.0	0.5
.022	223	3.5	9.0	6.5	3.5 \pm 1.0	0.5
.027	273	4.0	9.5	6.5	3.5 \pm 1.0	0.5
.033	333	4.0	9.5	6.5	3.5 \pm 1.0	0.5
.039	393	4.5	9.5	7.5	5.0 \pm 1.5	0.5
.047	473	4.5	9.5	7.5	5.0 \pm 1.5	0.5
.056	563	4.5	10.5	8.0	5.0 \pm 1.5	0.5
.068	683	4.5	10.5	8.0	5.0 \pm 1.5	0.5
.082	823	5.5	10.5	9.0	5.0 \pm 1.5	0.5
.1	104	5.5	10.5	9.0	5.0 \pm 1.5	0.5
.12	124	6.0	12.0	14.0	10.0 \pm 1.5	0.6
.15	154	6.0	10.0	14.0	10.0 \pm 1.5	0.6
.18	184	6.0	10.0	14.0	10.0 \pm 1.5	0.6
.22	224	6.0	10.0	14.0	10.0 \pm 1.5	0.6
.27	274	6.0	11.0	14.0	10.0 \pm 1.5	0.6
.33	334	6.0	12.0	14.0	10.0 \pm 1.5	0.6
.39	394	6.0	12.0	18.0	15.0 \pm 1.5	0.6
.47	474	6.0	12.0	18.0	15.0 \pm 1.5	0.6
.56	564	7.0	14.0	18.0	15.0 \pm 1.5	0.6
.68	684	7.0	14.0	18.0	15.0 \pm 1.5	0.6
.82	824	9.0	15.0	18.0	15.0 \pm 1.5	0.6
1.0	105	9.0	15.0	18.0	15.0 \pm 1.5	0.6
2.2	225	11.0	20.0	24.0	20.0 \pm 1.5	0.8

MYLAR/POLYESTER FILM

MLR SERIES

250 Volt (125VAC) Series Dimensions (mm)

Cap μ f	Code	T	H	L	S	d
.01	103	6.0	10.0	14.0	10 \pm 1.5	0.6
.015	153	6.0	10.0	14.0	10 \pm 1.5	0.6
.022	223	6.0	10.0	14.0	10 \pm 1.5	0.6
.027	273	6.0	10.0	14.0	10 \pm 1.5	0.6
.033	333	6.0	10.0	14.0	10 \pm 1.5	0.6
.047	473	6.0	10.0	14.0	10 \pm 1.5	0.6
.068	683	6.0	10.0	14.0	10 \pm 1.5	0.6
.082	823	7.0	10.0	14.0	10 \pm 1.5	0.6
.1	104	7.0	10.0	14.0	10 \pm 1.5	0.6
.12	124	7.0	11.0	14.0	10 \pm 1.5	0.6
.15	154	7.0	11.0	18.0	15 \pm 1.5	0.6
.18	184	7.0	12.0	18.0	15 \pm 1.5	0.6
.22	224	7.0	12.0	18.0	15 \pm 1.5	0.6
.27	274	7.0	13.0	18.0	15 \pm 1.5	0.6
.33	334	7.0	13.0	18.0	15 \pm 1.5	0.6
.39	394	8.0	15.0	18.0	15 \pm 1.5	0.8
.47	474	8.0	15.0	24.0	20 \pm 1.5	0.8
.56	564	9.0	15.5	24.0	20 \pm 1.5	0.8
.68	684	9.0	15.5	24.0	20 \pm 1.5	0.8
.82	824	10.0	17.0	24.0	20 \pm 1.5	0.8
1.0	105	10.0	17.0	24.0	20 \pm 1.5	0.8
1.2	125	10.0	19.5	24.0	20 \pm 1.5	0.8
1.5	155	10.0	19.5	31.0	27.5 \pm 1.5	0.8
1.8	185	11.0	20.0	31.0	27.5 \pm 1.5	0.8
2.2	225	13.0	22.0	31.0	27.5 \pm 1.5	0.8
3.3	335	16.0	26.0	31.0	27.5 \pm 1.5	0.8
4.7	475	16.0	26.0	35.0	27.5 \pm 1.5	0.8
5.6	565	16.0	26.0	35.0	27.5 \pm 1.5	0.8

400 Volt (200VAC) Series Dimensions (mm)

Cap μ f	Code	T	H	L	S	d
.0047	472	6.0	10.0	14.0	10 \pm 1.5	0.6
.01	103	6.0	10.0	14.0	10 \pm 1.5	0.6
.015	153	6.0	10.0	14.0	10 \pm 1.5	0.6
.022	223	6.0	10.0	14.0	10 \pm 1.5	0.6
.033	333	6.0	10.0	14.0	10 \pm 1.5	0.6
.047	473	8.0	11.0	14.0	10 \pm 1.5	0.6
.056	563	8.0	13.0	14.0	10 \pm 1.5	0.6
.068	683	6.0	13.0	18.0	15 \pm 1.5	0.6
.082	823	6.0	13.0	18.0	15 \pm 1.5	0.6
.1	104	6.0	13.0	18.0	15 \pm 1.5	0.6
.12	124	7.0	14.0	18.0	15 \pm 1.5	0.6
.15	154	7.0	14.0	18.0	15 \pm 1.5	0.6
.18	184	8.0	16.0	18.0	15 \pm 1.5	0.8
.22	224	8.0	16.0	24.0	20 \pm 1.5	0.8
.27	274	9.0	16.0	24.0	20 \pm 1.5	0.8
.33	334	9.0	16.0	24.0	20 \pm 1.5	0.8
.39	394	9.5	17.0	24.0	20 \pm 1.5	0.8
.47	474	10.0	18.0	24.0	20 \pm 1.5	0.8
.56	564	10.5	18.0	30.0	27.5 \pm 1.5	0.8
.68	684	10.5	18.0	30.0	27.5 \pm 1.5	0.8
.82	824	12.0	22.0	30.0	27.5 \pm 1.5	0.8
1.0	105	12.0	22.0	30.0	27.5 \pm 1.5	0.8
1.5	155	15.0	24.5	30.0	26.5 \pm 1.5	0.8
2.0	205	18.0	26.5	30.0	26.5 \pm 1.5	0.8
3.0	305	19.0	28.5	37.0	31 \pm 1.5	0.8
4.0	405	23.5	32.0	37.0	31 \pm 1.5	0.8

630 Volt (250VAC) Series Dimensions (mm)

Cap μ f	Code	T	H	L	S	d
.001	102	5.54	8.28	17.63	13.84 \pm 1.3	0.6
.0012	122	5.87	8.62	17.63	13.84 \pm 1.3	0.6
.0015	152	5.61	8.36	17.63	13.84 \pm 1.3	0.6
.0018	182	5.95	8.69	17.63	13.84 \pm 1.3	0.6
.0022	222	6.38	9.12	17.63	13.84 \pm 1.3	0.6
.0025	252	7.12	9.61	17.63	13.84 \pm 1.3	0.8
.0027	272	7.12	9.61	17.63	13.84 \pm 1.3	0.8
.003	302	6.38	9.55	17.63	13.84 \pm 1.3	0.8
.0033	332	6.38	9.55	17.63	13.84 \pm 1.3	0.8
.0039	392	6.76	9.94	17.63	13.84 \pm 1.3	0.8
.0047	472	7.20	10.39	17.63	13.84 \pm 1.3	0.8
.005	502	7.68	10.85	17.63	13.84 \pm 1.3	0.8
.0056	562	7.68	10.85	17.63	13.84 \pm 1.3	0.8
.0068	682	7.95	11.79	17.63	13.84 \pm 1.3	0.8
.0080	802	8.53	12.37	17.63	13.84 \pm 1.3	0.8
.01	103	6.00	10.00	14.00	10.00 \pm 1.5	0.6
.012	123	6.00	11.00	14.00	10.00 \pm 1.5	0.6
.015	153	6.50	11.50	14.00	10.00 \pm 1.5	0.6
.018	183	7.00	12.00	14.00	10.00 \pm 1.5	0.6
.022	223	7.00	12.50	14.00	10.00 \pm 1.5	0.6
.027	273	6.00	11.00	18.00	15.00 \pm 1.5	0.6
.033	333	7.00	12.00	18.00	15.00 \pm 1.5	0.6
.039	393	7.00	12.50	18.00	15.00 \pm 1.5	0.6
.047	473	7.50	12.50	18.00	15.00 \pm 1.5	0.6
.05	503	7.50	12.50	18.00	15.00 \pm 1.5	0.6
.056	563	8.50	14.50	18.00	15.00 \pm 1.5	0.6
.068	683	8.50	14.50	18.00	15.00 \pm 1.5	0.6
.082	823	9.00	15.50	18.00	15.00 \pm 1.5	0.8
.1	104	9.00	14.00	24.00	20.00 \pm 1.5	0.8
.12	124	10.00	17.00	24.00	20.00 \pm 1.5	0.8
.15	154	10.00	17.00	24.00	20.00 \pm 1.5	0.8
.18	184	11.00	20.00	24.00	20.00 \pm 1.5	0.8
.22	224	11.00	20.00	24.00	20.00 \pm 1.5	0.8
.25	254	11.00	20.00	24.00	20.00 \pm 1.5	0.8
.27	274	12.00	20.00	24.00	20.00 \pm 1.5	0.8
.33	334	11.00	20.00	24.00	27.50 \pm 1.5	0.8
.39	394	13.00	22.00	30.00	27.50 \pm 1.5	0.8
.47	474	13.00	22.00	30.00	27.50 \pm 1.5	0.8
.5	504	13.00	22.00	30.00	27.50 \pm 1.5	0.8
.56	564	14.00	23.00	31.00	27.50 \pm 1.5	0.8
.68	684	15.00	26.00	31.00	27.50 \pm 1.5	0.8
1.0	105	17.00	30.00	31.00	27.50 \pm 1.5	0.8
1.5	155	20.00	30.00	37.00	31.00 \pm 1.5	0.8
1.8	185	19.00	28.00	46.00	41.00 \pm 1.5	0.8
2.0	205	20.50	30.00	46.00	41.00 \pm 1.5	0.8
3.0	305	21.00	35.00	45.00	38.00 \pm 1.5	0.8

MOTOR RUN AC METALLIZED

MRC SERIES

370VAC Ratings and Dimensions @ 70° Case Temp.

NTE Type Number	Capacitance μF	Tolerance %	Case Dimensions - Inch (mm)		
			W	D	L
MRC370V2	2	5	2.16 (54.86)	1.31 (33.27)	2.18 (55.37)
MRC370V3	3	10	2.16 (54.86)	1.31 (33.27)	1.85 (46.99)
MRC370V4	4	10	2.16 (54.86)	1.31 (33.27)	1.85 (46.99)
MRC370V5	5	10	2.16 (54.86)	1.31 (33.27)	2.18 (55.37)
MRC370V6	6	10	2.16 (54.86)	1.31 (33.27)	2.15 (54.61)
MRC370V7R5	7.5	10	2.16 (54.86)	1.31 (33.27)	2.36 (59.94)
MRC370V10	10	5	2.16 (54.86)	1.31 (33.27)	2.88 (73.15)
MRC370V12R5	12.5	10	2.16 (54.86)	1.31 (33.27)	2.88 (73.15)
MRC370V15	15	5	2.87 (72.89)	1.87 (47.50)	2.95 (74.93)
MRC370V17R5	17.5	5	2.16 (54.86)	1.31 (33.27)	3.95 (100.33)
MRC370V20	20	5	2.87 (72.89)	1.87 (47.50)	2.95 (74.93)
MRC370V25	25	5	2.16 (54.86)	1.31 (33.27)	3.75 (95.25)
MRC370V30	30	5	2.87 (72.89)	1.87 (47.50)	3.03 (76.96)
MRC370V35	35	5	2.87 (72.89)	1.87 (47.50)	3.94 (100.08)
MRC370V40	40	5	2.89 (73.41)	1.85 (46.99)	3.94 (100.08)
MRC370V45	45	5	2.87 (72.89)	1.87 (47.50)	3.95 (100.33)
MRC370V50	50	5	2.87 (72.89)	1.87 (47.50)	3.94 (100.08)

440VAC Ratings and Dimensions @ 70° Case Temp.

NTE Type Number	Capacitance μF	Tolerance %	Case Dimensions - Inch (mm)		
			W	D	L
MRC440V2	2	10	2.16 (54.86)	1.31 (33.27)	1.85 (46.99)
MRC440V3	3	5	2.16 (54.86)	1.31 (33.27)	2.33 (59.18)
MRC440V4	4	10	2.16 (54.86)	1.31 (33.27)	2.23 (56.64)
MRC440V5	5	10	2.16 (54.86)	1.31 (33.27)	2.63 (66.80)
MRC440V6	6	10	2.16 (54.86)	1.31 (33.27)	2.63 (66.80)
MRC440V7R5	7.5	10	2.16 (54.86)	1.31 (33.27)	2.81 (71.37)
MRC440V10	10	5	2.87 (72.89)	1.87 (47.50)	2.95 (74.93)
MRC440V12R5	12.5	5	2.87 (72.89)	1.87 (47.50)	3.06 (77.72)
MRC440V15	15	5	2.87 (72.89)	1.87 (47.50)	3.03 (76.96)
MRC440V17R5	17.5	10	2.91 (73.91)	1.91 (48.51)	3.91 (99.31)
MRC440V20	20	5	2.87 (72.89)	1.87 (47.50)	2.95 (74.93)
MRC440V25	25	5	2.87 (72.89)	1.87 (47.50)	3.82 (97.03)
MRC440V30	30	5	2.87 (72.89)	1.87 (47.50)	3.94 (100.08)
MRC440V35	35	5	2.87 (72.89)	1.87 (47.50)	3.94 (100.08)
MRC440V40	40	5	2.87 (72.89)	1.87 (47.50)	4.92 (124.96)
MRC440V45	45	5	2.87 (72.89)	1.87 (47.50)	4.92 (124.96)
MRC440V50	50	5	2.87 (72.89)	1.87 (47.50)	3.94 (100.08)
MRC440V55	55	5	2.87 (72.89)	1.87 (47.50)	5.12 (130.05)
MRC440V60	60	5	2.87 (72.89)	1.87 (47.50)	5.12 (130.05)

MOTOR RUN HARDWARE

MRC SERIES

Universal Mounting Brackets with Spade Bolt

NTE Part Number	Fits Case Style
MRCH-01	A
MRCH-02	B
MRCH-03	C



Universal Mounting Brackets with Spade Foot

NTE Part Number	Fits Case Style
MRCH-04	A
MRCH-05	B
MRCH-06	C



Wrap Around Bracket

NTE Part Number	Fits Case Style
MRCH-07	A
MRCH-08	B
MRCH-09	C



Rubber Terminal Boot

MRCH-10 (For All Case Styles)



MOTOR START AC ELECTROLYTIC

MSC SERIES

The MSC Series is a range of AC electrolytic capacitors. These capacitors are most often used to provide the torque necessary to start AC motors and in other intermittent AC applications.

FEATURES:

- Two .250" Quick Connect terminals
- Round moisture and oil resistant plastic case
- 110VAC to 330VAC
- Quick disconnect terminals
- Recessed terminals
- Long life and high reliability

RATINGS

Capacitance Range:

110/125 Volts - 21 μ F to 1200 μ F

220/250 Volts - 21 μ F to 324 μ F

330 Volts - 21 μ F to 259 μ F

PERFORMANCE SPECIFICATIONS

Operating Temperature Range: -40 °C to +65°C

Power Factor: 10% Max.; 12% \leq 30 μ F

Operating Frequency: 47 - 60Hz

MOUNTING

Vertical mounting of the capacitor with the terminals up is recommended. However, horizontal mounting is acceptable providing the vent is located in the up position. Vertical mounting with the terminals down is not recommended because the capacitor life may be reduced and the operation of the pressure relief vent impaired.

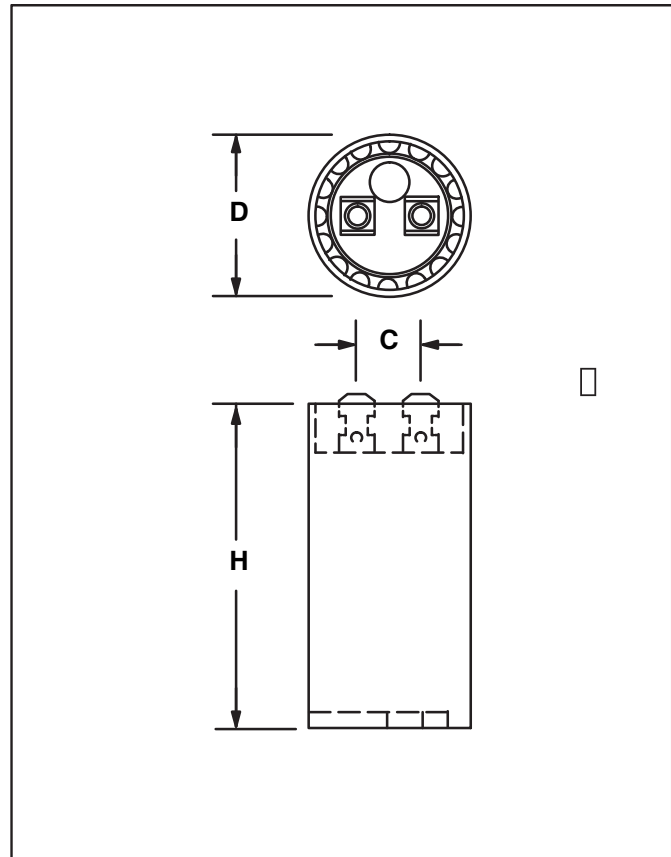
CLEANING

Solvent residues on the capacitors after cleaning may penetrate the seal and cause internal corrosion resulting in shortened life. Alcohol or water detergent cleaning is not usually harmful but halogenated cleaning solvents are not recommended and should be avoided.

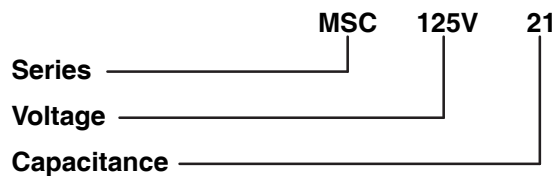
SAFETY

Because the watt-second value of these capacitors is high, precautions should be taken during the testing of these devices.

Discharge resistors should be specified when there is a possibility of a residual charge left on the capacitor or to protect contacts. Mis-application, such as exceeding design limits or applying continuous AC voltage, may result in destruction or explosion of capacitors.



ORDERING INFORMATION



MOTOR START AC ELECTROLYTIC

MSC SERIES

110/125VAC Ratings and Dimensions

NTE Type Number	Capacitance μF	Case Dimensions - Inch (mm)			Case Style
		D	H	C	
MSC125V21	21-25	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V25	25-30	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V30	30-36	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V36	36-43	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V43	43-52	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V53	53-64	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V72	72-86	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V88	88-106	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V108	108-130	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V124	124-149	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V145	145-174	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V161	161-193	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V189	189-227	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC125V216	216-259	1.438 (36.53)	3.38 (85.85)	0.50 (12.70)	F
MSC125V233	233-280	1.438 (36.53)	3.38 (85.85)	0.50 (12.70)	F
MSC125V270	270-324	1.438 (36.53)	3.38 (85.85)	0.50 (12.70)	F
MSC125V324	324-389	1.438 (36.53)	4.38 (111.25)	0.50 (12.70)	G
MSC125V340	340-408	1.810 (45.97)	3.38 (85.85)	0.63 (16.00)	H
MSC125V378	378-454	1.810 (45.97)	3.38 (85.85)	0.63 (16.00)	H
MSC125V400	400-480	1.810 (45.97)	3.38 (85.85)	0.63 (16.00)	H
MSC125V460	460-552	1.810 (45.97)	3.38 (85.85)	0.63 (16.00)	H
MSC125V540	540-648	1.810 (45.97)	3.38 (85.85)	0.63 (16.00)	H
MSC125V590	590-708	1.810 (45.97)	4.38 (111.25)	0.63 (16.00)	J
MSC125V829	829-995	1.810 (45.97)	4.38 (111.25)	0.63 (16.00)	J
MSC125V1000	1000-1200	2.060 (52.32)	4.38 (111.25)	0.88 (22.35)	K

220/250VAC Ratings and Dimensions

NTE Type Number	Capacitance μF	Case Dimensions - Inch (mm)			Case Style
		D	H	C	
MSC250V21	21-25	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC250V25	25-30	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC250V30	30-36	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC250V36	36-43	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC250V43	43-52	1.810 (45.97)	3.38 (85.85)	0.50 (12.70)	F
MSC250V53	53-64	1.810 (45.97)	3.38 (85.85)	0.50 (12.70)	F
MSC250V72	72-86	1.810 (45.97)	3.38 (85.85)	0.63 (16.00)	H
MSC250V88	88-106	1.810 (45.97)	3.38 (85.85)	0.63 (16.00)	H
MSC250V108	108-130	1.810 (45.97)	3.38 (85.85)	0.63 (16.00)	H
MSC250V124	124-149	1.810 (45.97)	4.38 (111.25)	0.63 (16.00)	J
MSC250V130	130-156	1.810 (45.97)	4.38 (111.25)	0.63 (16.00)	J
MSC250V145	145-174	1.810 (45.97)	4.38 (111.25)	0.63 (16.00)	J
MSC250V161	161-193	2.060 (52.32)	4.38 (111.25)	0.88 (22.35)	K
MSC250V189	189-227	2.060 (52.32)	4.38 (111.25)	0.88 (22.35)	K
MSC250V216	216-259	2.060 (52.32)	4.38 (111.25)	0.88 (22.35)	K
MSC250V233	233-280	2.060 (52.32)	4.38 (111.25)	0.88 (22.35)	K
MSC250V270	270-324	2.060 (52.32)	4.38 (111.25)	0.88 (22.35)	K

MOTOR START AC ELECTROLYTIC

MSC SERIES

330VAC Ratings and Dimensions

NTE Type Number	Capacitance μF	Case Dimensions - Inch (mm)			Case Style
		D	H	C	
MSC330V21	21-25	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	E
MSC330V25	25-30	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	F
MSC330V30	30-36	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	F
MSC330V36	36-43	1.438 (36.53)	2.75 (69.85)	0.50 (12.70)	F
MSC330V43	43-52	1.438 (36.53)	3.38 (85.85)	0.50 (12.70)	F
MSC330V53	53-64	1.810 (45.97)	3.38 (85.85)	0.63 (16.00)	H
MSC330V72	72-86	1.810 (45.97)	4.38 (111.25)	0.63 (16.00)	J
MSC330V88	88-106	1.810 (45.97)	4.38 (111.25)	0.63 (16.00)	J
MSC330V108	108-130	2.060 (52.32)	4.38 (111.25)	0.88 (22.35)	K
MSC330V124	124-149	2.560 (65.02)	4.38 (111.25)	0.88 (22.35)	K
MSC330V145	145-174	2.060 (52.32)	4.38 (111.25)	0.88 (22.35)	K
MSC330V161	161-193	2.560 (65.02)	4.38 (111.25)	0.88 (22.35)	L
MSC330V189	189-227	2.560 (65.02)	4.38 (111.25)	0.88 (22.35)	L
MSC330V216	216-259	2.560 (65.02)	4.38 (111.25)	0.88 (22.35)	L

MOTOR START HARDWARE

MSC SERIES

End Cap for On-Motor Mounting

Part Number	Diameter (inches)	Fits Case Style
MSCH-01	1.438	E, F, G
MSCH-02	1.810	H, J
MSCH-03	2.060	K
MSCH-04	2.560	L



End Cap for Off-Motor Mounting

Part Number	Diameter (inches)	Fits Case Style
MSCH-05	1.438	E, F, G
MSCH-06	1.810	H, J
MSCH-07	2.060	K
MSCH-08	2.560	L



Mounting Bracket

Part Number	Fits Case Style
MSCH-09	E, F
MSCH-10	H
MSCH-11	G, J, K, L



END CAP MOUNTING

When assembling directly to the motor frame, the wires are brought through the bracket hole and attached to the capacitor terminals. Types MSCH-01, 02, 03, and 04 end caps are then placed in position and the entire assembly snapped into place.

Off-motor mounting is similarly accomplished except the MSCH-05, 06, 07, and 08 end caps should be used to provide for leads emerging from the opposite side of the cap without going through the bracket hole.

Use NTE p/n 2W315, a 15k 2Watt bleeder resistor, for AC motor start applications to save the relay switch contacts and capacitor, particularly in capacitor start-run applications.

CEILING FAN SINGLE & DUAL VERSIONS

CFC SERIES

The CFC series is a range of metallized polyester film capacitors designed expressly for ceiling fan use. They are a self-healing flat capacitor winding with polyester film dielectric. They are mounted in a flame retardent plastic case with an epoxy resin end-seal. The CFC series are also used in other electric fans and in fluorescent lamps.

The NTE CFC series is available in 2 wire (single) and 3 wire (dual) capacitor versions.

FEATURES:

- Small size/light weight
- High Insulation resistance
- Small dissipation factor

RATINGS

Capacitance Range:

2 wire 125/250VAC - 1 μ fd to 6 μ fd

3 wire 125/250VAC - 2/4 μ fd to 6/14 μ fd

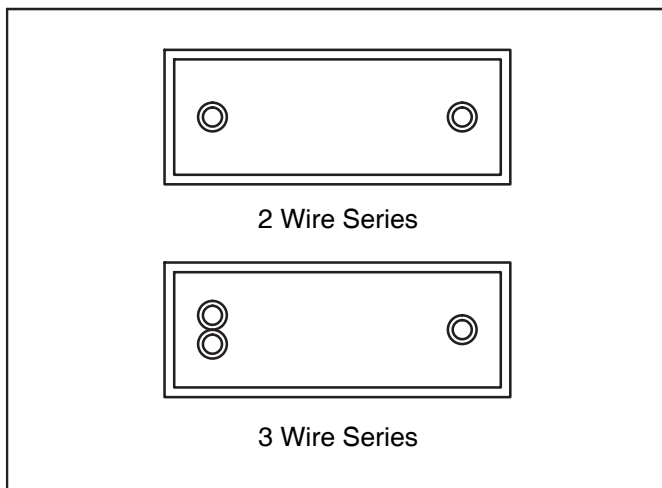
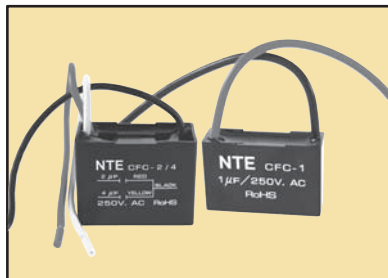
PERFORMANCE SPECIFICATIONS

Operating Temperature Range: -25 °C to +70°C

Insulation Resistance (at 20°C):

Between Terminals: $\geq 1000M\Omega$

Between Terminals and Case: $\geq 2000M\Omega$

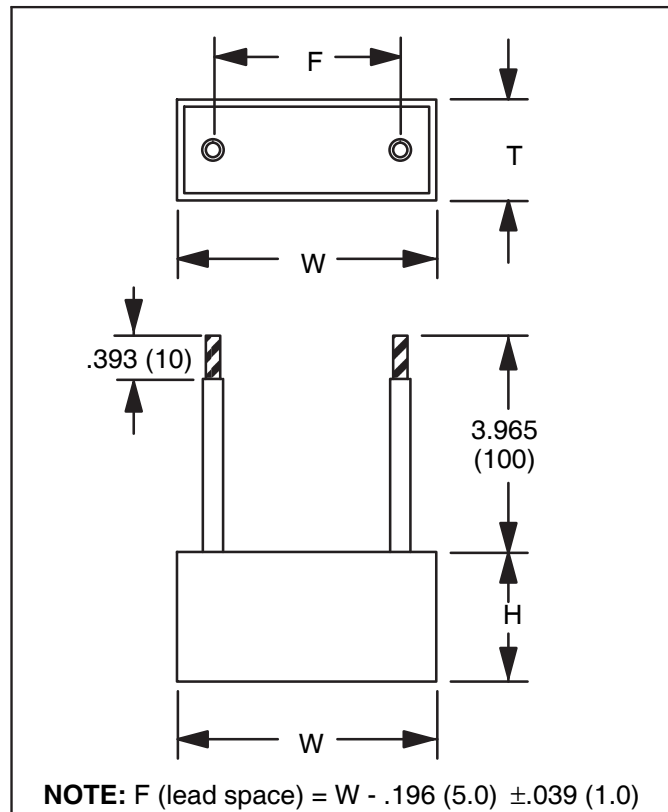


2 WIRE SERIES

NTE Type No.	Cap μ f	Case Dimensions - inch (mm)		
		W	H	T
CFC-1	1.0	1.260 (32)	.826 (21)	.413 (10.5)
CFC-2	2.0	1.260 (32)	.826 (21)	.413 (10.5)
CFC-3	3.0	1.260 (32)	.905 (23)	.512 (13)
CFC-4	4.0	1.535 (39)	.905 (23)	.512 (13)
CFC-5	5.0	1.535 (39)	.945 (24)	.590 (15)
CFC-6	6.0	1.535 (39)	1.020 (26)	.669 (17)

3 WIRE SERIES

NTE Type No.	Cap μ f	Case Dimensions - inch (mm)		
		W	H	T
CFC-2/4	2.0/4.0	1.535 (39)	1.141 (29)	.748 (19)
CFC-2/5.5	2.0/5.5	1.978 (50)	1.180 (30)	.787 (20)
CFC-3/6.5	3.0/6.5	2.017 (51)	1.258 (32)	.866 (22)
CFC-3.5/1.5	3.5/1.5	1.535 (39)	1.141 (29)	.748 (19)
CFC-5/8.2	5.0/8.2	2.017 (51)	1.574 (40)	1.180 (30)
CFC-6/14	6.0/14	2.017 (51)	1.574 (40)	1.180 (30)



MULTILAYER (MONOLYTHIC) CERAMIC

CML SERIES

The CML Series is a range of radial lead conformally coated non-polarized multilayer ceramic capacitors. These flame retardant capacitors are most commonly used for filtering, coupling, and bypass applications.

RATINGS

Capacitance Range: 10pf to 2.2uf
Voltage: 50VDC and 100VDC

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:

Z5U +10°C to +85°C
 X7R -55 °C to 125°C
 NPO -55 °C to 125°C

Tolerance Range:

CML103M50 - CML225M50 ±20%
 CML102K100 - CML105K100 ±10%
 CML100J100 - CML473J100 ±5%

Temperature Coefficient:

CML103M50 - CML225M50 Z5U (+22%, -56%)
 CML102K100 - CML105K100 X7R (±15%)
 CML100J100 - CML473J100 NPO (Stable)

ORDERING INFORMATION

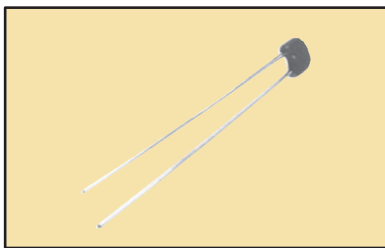
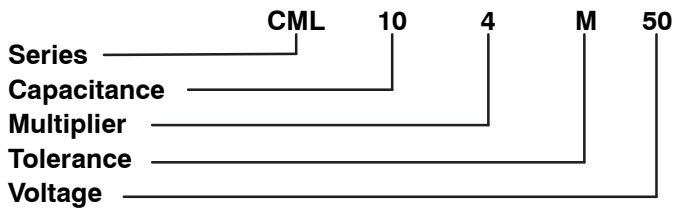
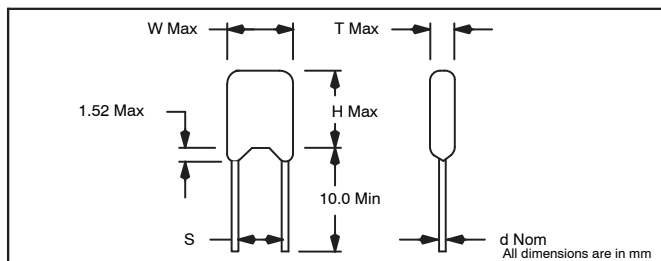


FIGURE 1



MECHANICAL SPECIFICATIONS (Figure 1)

50 Volt (Z5U) Series Dimensions (mm)

Cap μ f	T	H	W	S	d
.01	3.175	5.08	5.08	2.54	.508
.015	3.175	5.08	5.08	2.54	.508
.022	3.175	5.08	5.08	2.54	.508
.033	3.175	5.08	5.08	2.54	.508
.047	3.175	5.08	5.08	2.54	.508
.068	3.175	5.08	5.08	2.54	.508
.10	3.175	5.08	5.08	2.54	.508
.15	3.175	5.08	5.08	2.54	.508
.22	3.175	5.08	5.08	2.54	.508
.33	3.175	5.08	5.08	2.54	.508
.47	3.175	5.08	5.08	2.54	.508
.68	3.810	7.62	7.62	5.08	.508
1.0	3.810	7.62	7.62	5.08	.508
1.5	3.810	7.62	7.62	5.08	.508
2.2	3.810	7.62	7.62	5.08	.508

100 Volt (X7R) Series Dimensions (mm)

Cap μ f	T	H	W	S	d
.0010	3.175	5.08	5.08	2.54	.508
.0015	3.175	5.08	5.08	2.54	.508
.0022	3.175	5.08	5.08	2.54	.508
.0033	3.175	5.08	5.08	2.54	.508
.0047	3.175	5.08	5.08	2.54	.508
.0068	3.175	5.08	5.08	2.54	.508
.010	3.175	5.08	5.08	2.54	.508
.015	3.175	5.08	5.08	2.54	.508
.022	3.175	5.08	5.08	2.54	.508
.033	3.175	5.08	5.08	2.54	.508
.047	3.175	5.08	5.08	2.54	.508
.068	3.175	5.08	5.08	2.54	.508
.10	3.175	5.08	5.08	2.54	.508
.15	3.810	7.62	7.62	5.08	.508
.22	3.810	7.62	7.62	5.08	.508
.33	3.810	7.62	7.62	5.08	.508
.47	3.810	7.62	7.62	5.08	.508
.68	3.810	7.62	7.62	5.08	.508
1.0	3.810	7.62	7.62	5.08	.508

100 Volt (NPO) Series Dimensions (mm)

Cap pf	T	H	W	S	d
10.0	3.175	5.08	5.08	2.54	.508
15.0	3.175	5.08	5.08	2.54	.508
22.0	3.175	5.08	5.08	2.54	.508
33.0	3.175	5.08	5.08	2.54	.508
47.0	3.175	5.08	5.08	2.54	.508
68.0	3.175	5.08	5.08	2.54	.508
100.0	3.175	5.08	5.08	2.54	.508
150.0	3.175	5.08	5.08	2.54	.508
220.0	3.175	5.08	5.08	2.54	.508
330.0	3.175	5.08	5.08	2.54	.508
470.0	3.175	5.08	5.08	2.54	.508
680.0	3.175	5.08	5.08	2.54	.508
1000.0	3.175	5.08	5.08	2.54	.508
1500.0	3.175	5.08	5.08	2.54	.508
2200.0	3.175	5.08	5.08	2.54	.508
3300.0	3.175	5.08	5.08	2.54	.508
4700.0	3.175	5.08	5.08	2.54	.508
6800.0	3.810	7.62	7.62	5.08	.508
10000.0	3.810	7.62	7.62	5.08	.508
15000.0	3.810	7.62	7.62	5.08	.508
22000.0	3.810	7.62	7.62	5.08	.508
33000.0	3.810	7.62	7.62	5.08	.508
47000.0	3.810	7.62	7.62	5.08	.508

SURFACE MOUNT MULTILAYER CERAMIC

SMC (Surface Mount) SERIES

The SMC Series are ideally suited for thick-film hybrid circuit and automated surface mounting on any printed circuit board. The nickel barrier terminations consist of a nickel barrier layer over a silver metallization and then finished by an electroplated solder layer to ensure the terminations have good solderability.

RATINGS

Capacitance Range: 1.0pf to 1.0 μ f

Voltage: 50VDC

PERFORMANCE SPECIFICATIONS

Operating Temperature Range:

NPO - -55 ° to +125°C

X7R - -55 ° to +125°C

Z5U - +10 ° to +85°C

Y5V - -25 ° to +85°C

Tolerance Range:

C - $\pm 0.25\text{pF}$

J - $\pm 5\%$

K - $\pm 10\%$

Z - +80%, -20%

Temperature Coefficient:

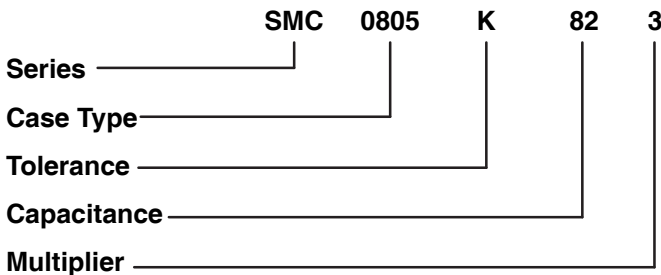
NPO - Stable

X7R - $\pm 15\%$

Z5U - +22%, -56%

Y5V - +22%, -82%

ORDERING INFORMATION



CAPACITANCE RANGE:

Capacitance

Cap	Temp. Coeff.	Cap	Temp. Coeff.	Cap	Temp. Coeff.
1.0pF	NPO	68.0pF	NPO	4700.0pF	X7R
1.2pF	NPO	82.0pF	NPO	5600.0pF	X7R
1.5pF	NPO	100.0pF	NPO	6800.0pF	X7R
1.8pF	NPO	120.0pF	NPO	8200.0pF	X7R
2.2pF	NPO	150.0pF	NPO	0.010 μ F	X7R
2.7pF	NPO	180.0pF	NPO	0.012 μ F	X7R
3.3pF	NPO	220.0pF	NPO	0.015 μ F	X7R
3.9pF	NPO	270.0pF	NPO	0.018 μ F	X7R
4.7pF	NPO	330.0pF	NPO	0.022 μ F	X7R
5.6pF	NPO	390.0pF	NPO	0.027 μ F	X7R
6.8pF	NPO	470.0pF	NPO	0.033 μ F	X7R
8.3pF	NPO	560.0pF	NPO	0.039 μ F	X7R
10.0pF	NPO	680.0pF	NPO	0.047 μ F	X7R
12.0pF	NPO	820.0pF	NPO	0.056 μ F	X7R
15.0pF	NPO	1000.0pF	NPO	0.068 μ F	X7R
18.0pF	NPO	1000.0pF	X7R	0.082 μ F	X7R
22.0pF	NPO	1200.0pF	X7R	0.1 μ F	X7R
27.0pF	NPO	1500.0pF	X7R	0.1 μ F	Z5U
30.0pF	NPO	1800.0pF	X7R	0.22 μ F	Z5U
33.0pF	NPO	2200.0pF	X7R	0.33 μ F	Y5V
39.0pF	NPO	2700.0pF	X7R	0.47 μ F	Y5V
47.0pF	NPO	3300.0pF	X7R	1.0 μ F	Y5V
56.0pF	NPO	3900.0pF	X7R	2.2 μ F	Y5V

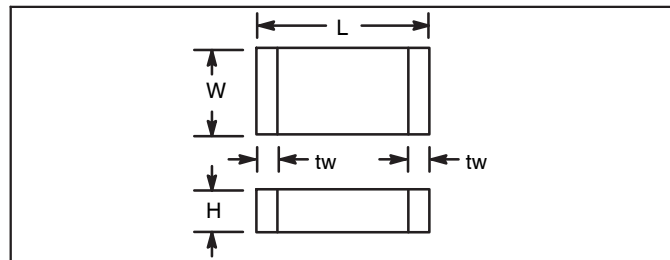
MECHANICAL SPECIFICATIONS (Figure 1)

Dimensions in (mm)

Case	L	W	H	tw
0805	.080 (2.0)	.050 (1.2)	.051 (1.3)	.020 (0.5)
1206	.126 (3.2)	.063 (1.6)	.031 (0.8)	.020 (0.5)



FIGURE 1



PRE-PACKAGED CAPACITOR KITS



CAPACITOR KITS

CK-01 -Aluminum Electrolytic
CK-02 -High Voltage Aluminum Electrolytic
CK-03 -Non-Polarized Aluminum Electrolytic
CK-04 -Tantalum

CK-05 - 50V Ceramic Disc
CK-06 - 1000V Ceramic Disc
CK-07 - Mylar/Film

Features:

- Each Kit Contains the Top 30 most popular resistors or capacitors for group specified
- Cabinets stack together to build a component storage center
- One piece frame is lightweight and virtually unbreakable
- Keyhole slots for wall mounting
- Frame measures 9 1/8"W x 7 1/2"H x 6 1/2"D
- Contains 15 drawers, each divided in half

The following pages list the values contained in each kit:

PRE-PACKAGED CAPACITOR KITS

CK-01 Aluminum Electrolytic Capacitors (Contains 2 of each) (All values are Radial Lead except where noted)

$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$
100/10*	47/25*	1000/25*	100/35*	0.33/50	2.2/50*	10/50*	100/50*	1000/50*	100/63*
220/16*	100/25*	10/35*	0.1/50	0.47/50	3.3/50*	22/50*	220/50*	22/63*	1000/63*
22/25*	220/25*	47/35*	0.22/50	1.0/50*	4.7/50*	47/50*	470/50*	47/63*	10/100*

* Denotes Axial Leads

CK-02 High Voltage Aluminum Electrolytic Capacitors (Contains 1 of each) (All values are Radial Lead except where noted)

$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$
1.0/160	4.7/160	33/160	100/160*	3.3/250	22/250	1.0/350	4.7/350*	47/350	4.7/450
2.2/160	10/160	47/160	1.0/250	4.7/250	33/250	2.2/350	10/350	100/350	10/450
3.3/160	22/160	100/160	2.2/250	10/250	47/250	3.3/350	33/350	1.0/450	10/450*

* Denotes Axial Leads

CK-03 Non-Polarized Aluminum Electrolytic Capacitors (Contains 2 of each) (All values are Radial Lead except where noted)

$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$
4.7/25	1.0/50*	3.3/50	4.7/50*	22/50	47/50*	2.2/100*	4.7/100	10/100*	33/100*
10/25	2.2/50	3.3/50*	10/50	22/50*	1.0/100*	3.3/100	4.7/100*	22/100*	47/100*
1.0/50	2.2/50*	4.7/50	10/50*	47/50	2.2/100	3.3/100*	10/100	33/100	100/100*

* Denotes Axial Leads

CK-04 Tantalum Capacitors (Contains 2 of each) (All values are Radial Lead)

$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$
10/10	10/16	1.0/25	10/25	0.22/35	1.0/35	4.7/35	22/35	0.33/50	2.2/50
2.2/16	22/16	2.2/25	22/25	0.47/35	2.2/35	6.8/35	0.1/50	0.47/50	4.7/50
4.7/16	10/20	4.7/25	0.1/35	0.68/35	3.3/35	10/35	0.22/50	1.0/50	10/50

CK-05 50V Ceramic Disc Capacitors (Contains 4 of each) (All values are Radial Lead)

pf	pf	pf	pf	pf	pf	pf	pf	pf	pf
1.0	6.0	15	33	56	100	470	1200	3300	22,000
2.0	10	18	39	68	120	680	1500	4700	47,000
5.0	12	22	47	82	330	1000	2200	10,000	100,000

CK-06 1000V Ceramic Disc Capacitors (Contains 4 of each) (All values are Radial Lead)

pf	pf	pf	pf	pf	pf	pf	pf	pf	pf
3.3	10	20	47	100	220	500	1000	4700	47,000
5.0	15	22	56	150	330	560	1500	5000	50,000
6.8	18	39	68	180	470	680	2200	10,000	100,000

CK-07 Mylar/Film Capacitors (Contains 1 of each) (All values are Radial Lead)

$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$	$\mu\text{f/Volts}$
.01/50	.01/100	.047/100	.47/100	.33/250	.01/400	.0033/630	.015/630	.05/630	.15/630
.1/50	.022/100	.1/100	.047/250	1.0/250	.1/400	.0047/630	.022/630	.068/630	.22/630
.001/100	.033/100	.22/100	.1/250	1.5/250	.001/630	.01/630	.047/630	.1/630	.47/630