



aR gR

high speed fuses for semiconductors

RAPIDPLUS



RAPIDPLUS

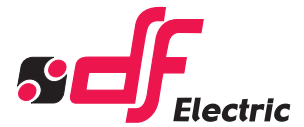
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aR HIGH SPEED FOR SEMICONDUCTOR FUSES
gR HIGH SPEED FOR SEMICONDUCTOR FUSES



RAPIDPLUS

HIGH SPEED FUSES FOR SEMICONDUCTORS



aR SEMICONDUCTOR FUSES

Cylindrical high speed fuse links are intended for the protection of semiconductor devices. The melting elements are specially designed to obtain low values of I^2t , reduced arc voltages and to maintain unalterable the electrical characteristics. Wide range of rated currents. Made of ceramic tube with high withstand to internal pressure and thermal shock, that allow a high breaking capacity in a reduced physical space. Contacts caps are made of silver plated copper.

www.df-sa.es/rapidplus/aR/

	I _n (A)	REFERENCE		U (V AC)	BREAKING CAPACITY (kA)	PACKING
		WITHOUT STRIKER	WITH STRIKER			
10x38	4	491113	–	690	100	10
	6	491115	–	690	100	10
	8	491120	–	690	100	10
	10	491125	–	690	100	10
	12	491130	–	690	100	10
	16	491135	–	690	100	10
	20	491140	–	690	100	10
	25	491145	–	690	100	10
	32	491155	–	690	100	10



491125

700 VDC - BREAKING CAPACITY 30 KA

14x51	4	491215	–	690	100	10
	6	491225	–	690	100	10
	8	491230	491730	690	100	10
	10	491235	491735	690	100	10
	12	491237	491737	690	100	10
	16	491241	491741	690	100	10
	20	491245	491745	690	100	10
	25	491250	491750	690	100	10
	32	491260	491760	690	100	10
	40	491265	491765	690	100	10
	50	491270	491770	690	100	10



491215

700 VDC - BREAKING CAPACITY 30 KA

22x58	20	491300	491800	690	100	10
	25	491305	491805	690	100	10
	32	491310	491810	690	100	10
	40	491315	491815	690	100	10
	50	491320	491820	690	100	10
	63	491325	491825	690	100	10
	80	491330	491830	690	100	10
	100	491335	491835	690	100	10



491355

700 VDC - BREAKING CAPACITY 30 KA

STANDARDS

IEC 60269-1
IEC 60269-4
EN 60269-1
EN 60269-4

APPROVALS

Cd-Pb FREE
RoHS compliant

TECHNICAL

DIMENSIONS AND TECHNICAL DATA

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TECHNICAL

I-t AND CUT-OFF CHARACTERISTICS

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TECHNICAL

RAPIDPLUS FUSES IN PMC, PMF & PMX MODULAR FUSE HOLDERS

PAGE 12

COMPATIBLE

PMF MODULAR FUSE HOLDERS

SEE CYLINDRICAL

COMPATIBLE

PMX MODULAR FUSE HOLDERS

SEE CYLINDRICAL

COMPATIBLE

BAC OPEN FUSE BASES

SEE CYLINDRICAL

RAPIDPLUS

HIGH SPEED FUSES FOR SEMICONDUCTORS



gR SEMICONDUCTOR FUSES

Cylindrical high speed fuse-links intended for the optimum protection of semiconductor devices (thyristors, triacs, diodes, rectifiers, static relays, etc). gR class allows protection in whole range of over-currents, overloads as well as short-circuits, protecting semiconductor devices and conductors and other switchgear installations. Typical applications comprise protection in rectifiers, UPS, converters, motor drives, soft starters and inverters. Melting elements are specially designed to obtain low I^2t values, reduced arc voltages and an adequate selective coordination with upstream fuse-links. Wide range of rated currents and striker versions for use in fuse bases with micro-switch. Made of ceramic tube with high withstand to internal pressure and thermal shock, that allow a high breaking capacity in a reduced physical space. Contacts caps are made of silver plated copper.

www.df-sa.es/rapidplus/gR/

	I _n (A)	REFERENCE		U (V AC)	BREAKING CAPACITY (kA)	PACKING
		WITHOUT STRIKER	WITH STRIKER			
10x38	4	492003	–	690	100	10
	6	492004	–	690	100	10
	8	492005	–	690	100	10
	10	492006	–	690	100	10
	12	492007	–	690	100	10
	16	492008	–	690	100	10
	20	492009	–	690	100	10
	25	492010	–	690	100	10
	32	492011	–	690	100	10

440 VDC - BREAKING CAPACITY 30 KA



492006

	I _n (A)	REFERENCE		U (V AC)	BREAKING CAPACITY (kA)	PACKING
		WITHOUT STRIKER	WITH STRIKER			
14x51	4	492014	–	690	100	10
	6	492015	–	690	100	10
	8	492016	492116	690	100	10
	10	492017	492117	690	100	10
	12	492018	492118	690	100	10
	16	492019	492119	690	100	10
	20	492020	492120	690	100	10
	25	492021	492121	690	100	10
	32	492022	492122	690	100	10
	40	492023	492123	690	100	10
	50	492024	492124	690	100	10

440 VDC - BREAKING CAPACITY 30 KA



492014

	I _n (A)	REFERENCE		U (V AC)	BREAKING CAPACITY (kA)	PACKING
		WITHOUT STRIKER	WITH STRIKER			
22x58	20	492033	492133	690	100	10
	25	492034	492134	690	100	10
	32	492035	492135	690	100	10
	40	492036	492136	690	100	10
	50	492037	492137	690	100	10
	63	492038	492138	690	100	10
	80	492039	492139	690	100	10
	100	492040	492140	690	100	10

440 VDC - BREAKING CAPACITY 30 KA



492040

STANDARDS IEC 60269-1 IEC 60269-4 EN 60269-1 EN 60269-4	APPROVALS Cd-Pb FREE RoHS compliant RECYCLED
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TECHNICAL DIMENSIONS AND TECHNICAL DATA PAGE 08
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TECHNICAL t-I AND CUT-OFF CHARACTERISTICS PAGE 11
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TECHNICAL RAPIDPLUS FUSES IN PMC, PMF & PMX MODULAR FUSE HOLDERS PAGE 12

COMPATIBLE PMF MODULAR FUSE HOLDERS SEE CYLINDRICAL

COMPATIBLE PMX MODULAR FUSE HOLDERS SEE CYLINDRICAL

COMPATIBLE BAC OPEN FUSE BASES SEE CYLINDRICAL

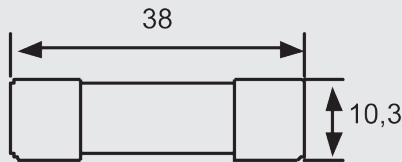
RAPIDPLUS

HIGH SPEED FUSES FOR SEMICONDUCTORS

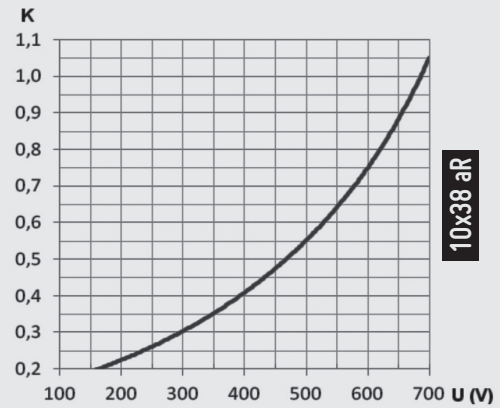


TECHNICAL
aR SEMICONDUCTOR FUSES
DIMENSIONS & TECHNICAL DATA

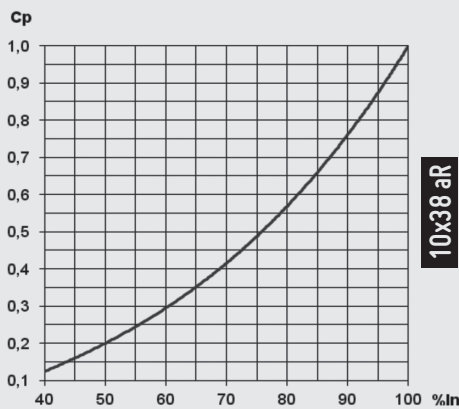
10x38



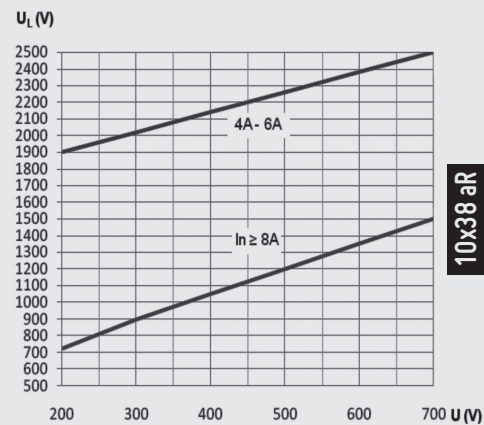
I^2t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



I_n (A)	I^2t Prearcing (A ² s)	Operating I^2t @ 690 V (A ² s)	Power loss $0.8 \cdot I_n$ (W)	Power loss I_n (W)
4	4,9	10	0,97	1,69
6	14,0	28	1,40	2,46
8	3,0	24	0,91	1,52
10	4,7	38	1,23	2,07
12	6,8	54	1,53	2,62
16	12,0	96	2,11	3,72
20	18,8	150	2,57	4,50
25	48,0	384	2,60	4,55
32	75,0	600	3,65	6,65

I^2t Total clearing (K)

The total clearing I^2t at rated voltage and at power factor of 0,15 are given in the electrical characteristics. For other voltages, the clearing I^2t is found by multiplying by correction factor, K, given as a function of applied working voltage, Eg (RMS).

Power loose(Cp)

Watts loss at rated current are given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated value. The correction factor Cp, is given as a function of the RMS load current Ib in % of the rated current.

Arc voltage (UL)

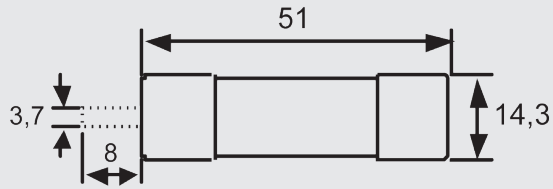
This curve gives the peak arc voltage, UL, wich may appear across the fuse during its operation as a function of the applied working voltage, Eg (RMS) at a power factor of 0,15.

RAPIDPLUS

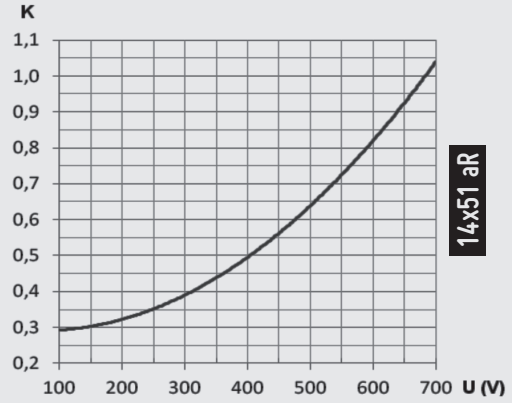
HIGH SPEED FUSES FOR SEMICONDUCTORS

TECHNICAL
aR SEMICONDUCTOR FUSES
DIMENSIONS & TECHNICAL DATA

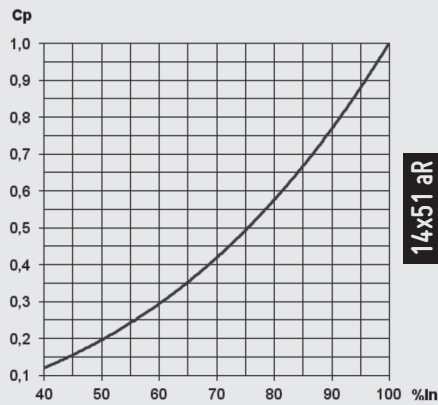
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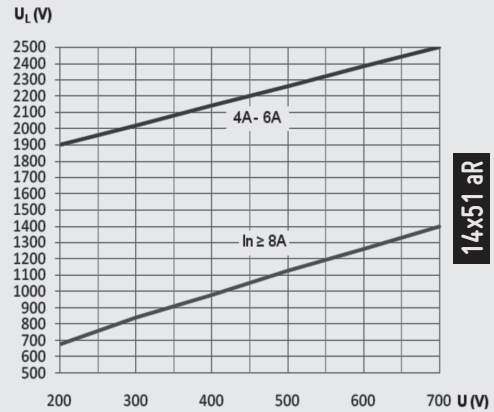
I^2t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



I_n (A)	I^2t Prearcing (A ² s)	Operating I^2t @ 690 V (A ² s)	Power loss $0.8 \cdot I_n$ (W)	Power loss I_n (W)
4	5,6	14	1,32	2,28
6	16,0	40	1,80	3,18
8	4,1	23	1,01	1,69
10	6,3	37	1,39	2,36
12	9,1	53	1,63	2,78
16	12,4	72	2,43	4,16
20	20,6	119	3,04	5,43
25	36,6	211	3,75	6,11
32	82,3	475	3,92	7,17
40	146,3	844	4,52	8,15
50	260,0	1500	5,60	10,6

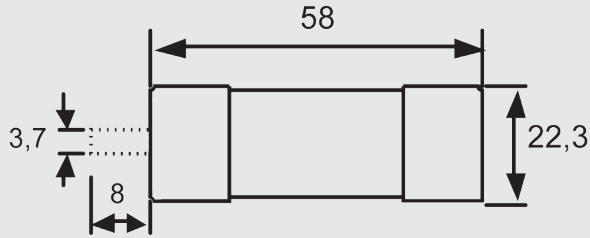
RAPIDPLUS

HIGH SPEED FUSES FOR SEMICONDUCTORS

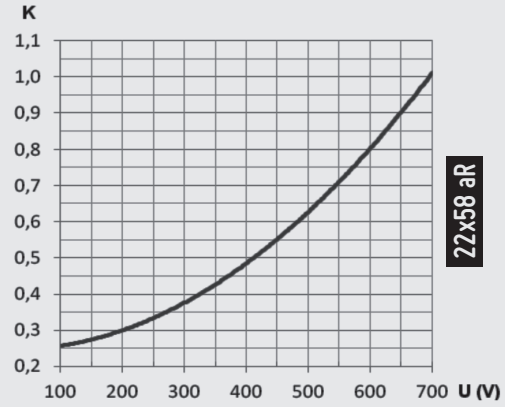


TECHNICAL
aR SEMICONDUCTOR FUSES
DIMENSIONS & TECHNICAL DATA

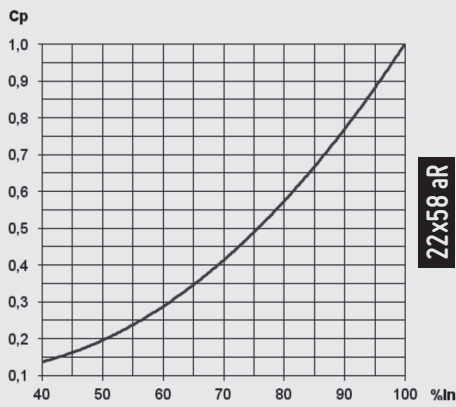
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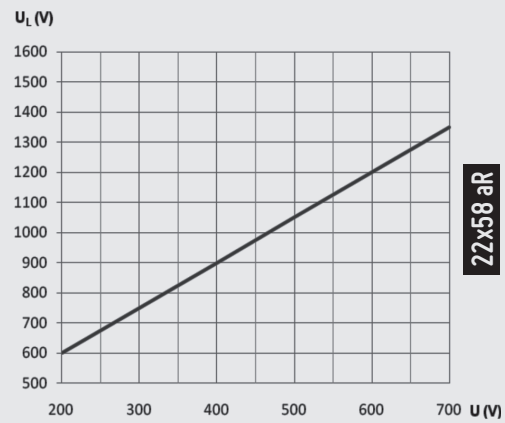
I^2t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



I_n (A)	I^2t Prearcing (A ² S)	Operating I^2t @ 690 V (A ² S)	Power loss $0.8 \cdot I_n$ (W)	Power loss I_n (W)
20	19	103	3,00	5,25
25	34	182	3,40	5,85
32	60	324	4,50	8,20
40	94	506	6,10	10,80
50	158	856	7,50	13,70
63	375	2025	7,70	14,00
80	634	3422	9,65	17,60
100	1500	8100	10,30	18,00

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HIGH SPEED FUSES FOR SEMICONDUCTORS



TECHNICAL

aR SEMICONDUCTOR FUSES

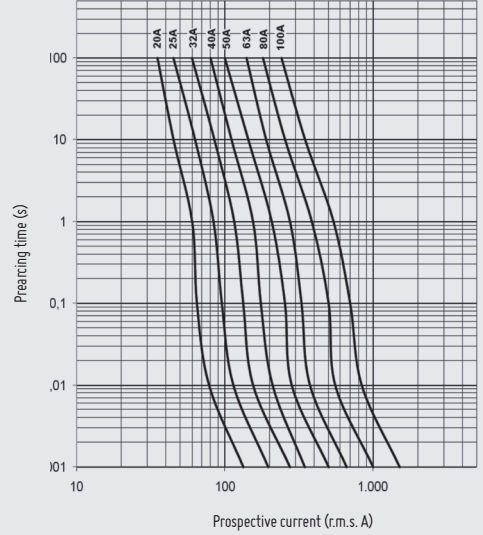
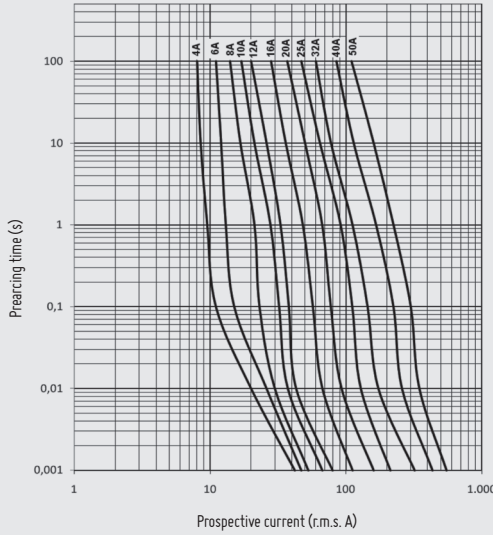
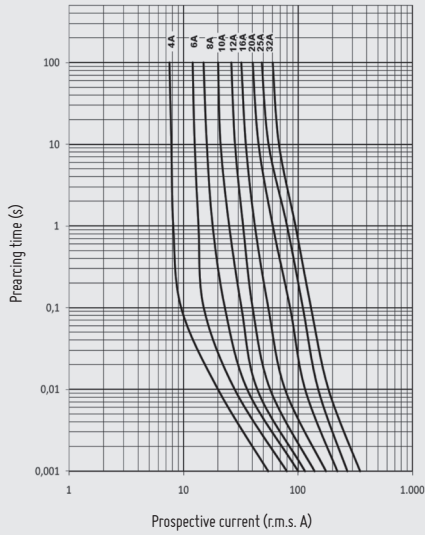
t-I CHARACTERISTICS

10x38
14x51
22x58

10x38

14x51

22x58



TECHNICAL

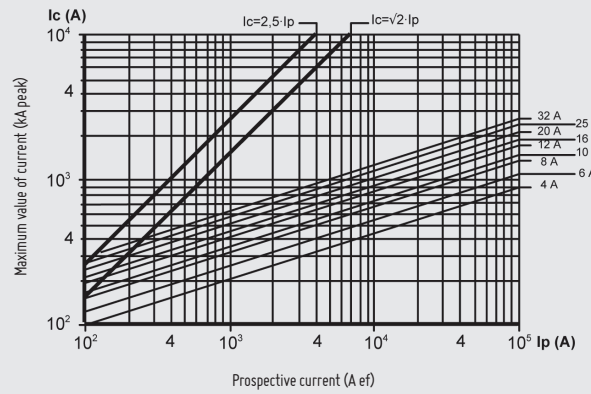
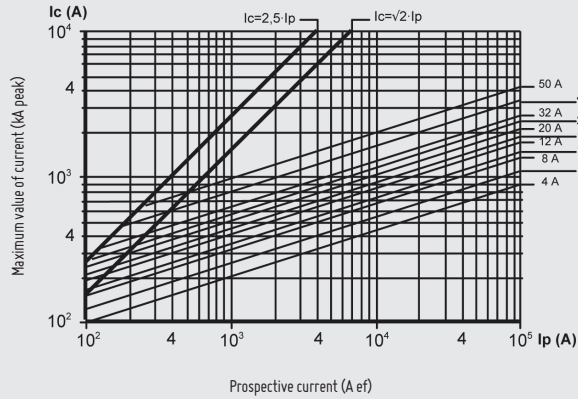
aR SEMICONDUCTOR FUSES

CUT-OFF CHARACTERISTICS

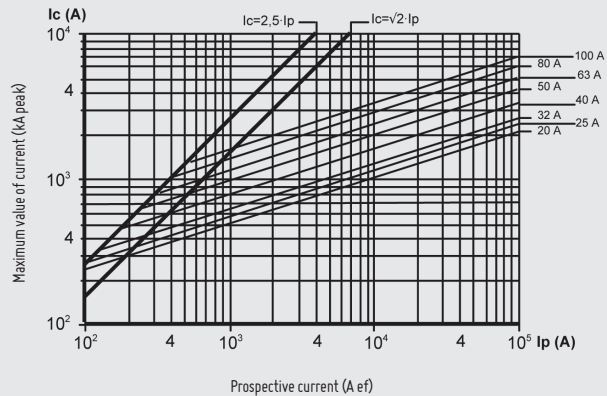
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22x58



RAPIDPLUS

HIGH SPEED FUSES FOR SEMICONDUCTORS

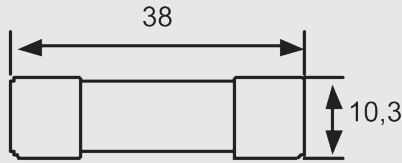


TECHNICAL

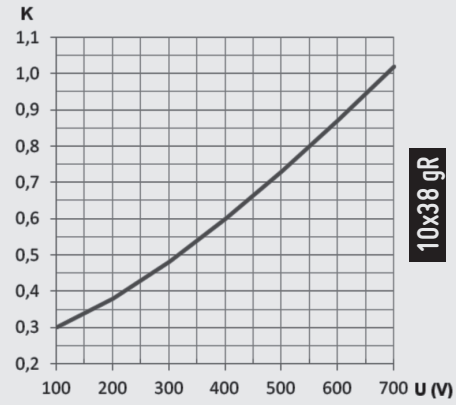
gR SEMICONDUCTOR FUSES

DIMENSIONS & TECHNICAL DATA

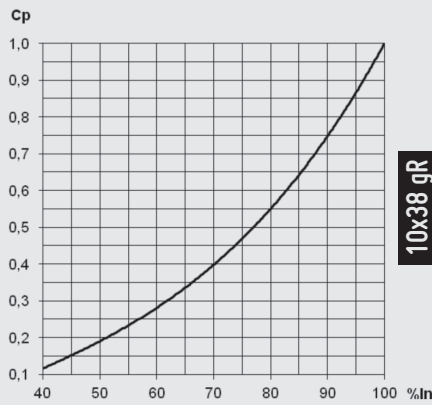
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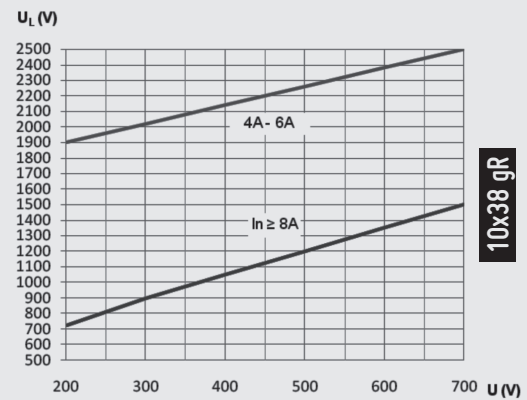
I²t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (U_i)



I _n (A)	I ² t Prearcing (A ² S)	Operating I ² t @ 690 V (A ² S)	Power loss 0.8 · I _n (W)	Power loss I _n (W)
4	5,6	17	1,13	2,05
6	16,0	48	1,56	3,00
8	4,3	38	0,97	1,68
10	6,6	59	1,20	2,09
12	9,6	84	1,69	2,99
16	17,0	150	2,31	4,27
20	23,5	200	2,86	5,35
25	60,2	512	2,94	5,52
32	94,0	800	3,82	7,43

RAPIDPLUS

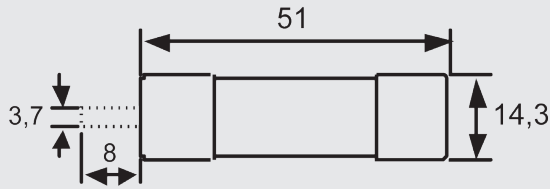
HIGH SPEED FUSES FOR SEMICONDUCTORS

TECHNICAL

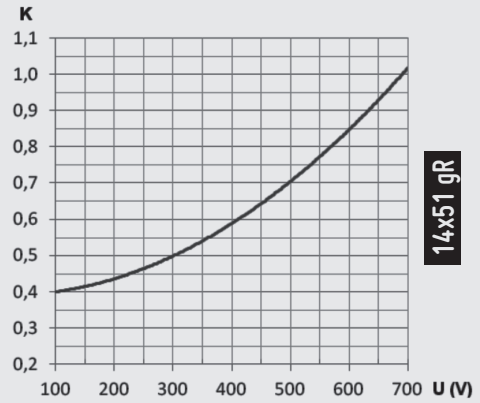
gR SEMICONDUCTOR FUSES

DIMENSIONS & TECHNICAL DATA

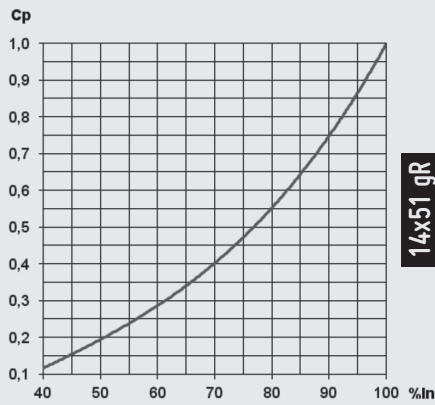
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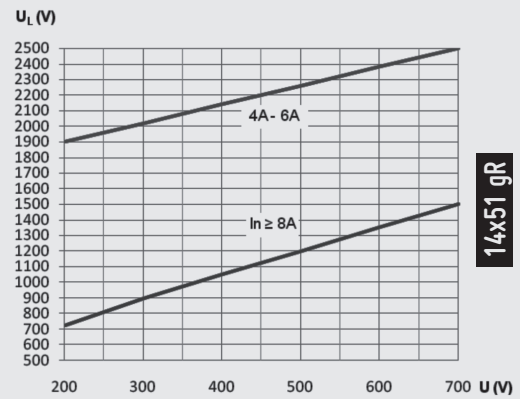
I^2t Correction Factor (K)



Correction Factor for Power Loss (C_p)



Peak Arc Voltage (U_L)



I_n (A)	I^2t Prearcing (A ² S)	Operating I^2t @ 690 V (A ² S)	Power loss $0.8 \cdot I_n$ (W)	Power loss I_n (W)
4	5,6	17	1,56	2,94
6	16,0	48	2,25	4,20
8	3,8	30	1,18	2,00
10	5,9	47	1,41	2,52
12	8,4	68	1,95	3,54
16	15	120	2,67	4,83
20	27	170	2,91	5,40
25	53	333	3,38	6,00
32	108	679	3,72	6,93
40	211	1331	4,13	7,52
50	350	2200	5,36	9,80

RAPIDPLUS

HIGH SPEED FUSES FOR SEMICONDUCTORS

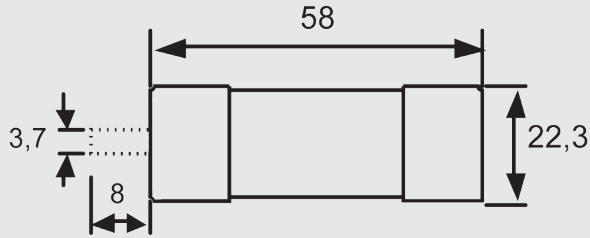


TECHNICAL

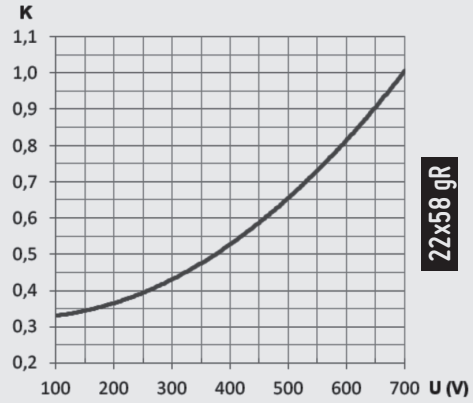
gR SEMICONDUCTOR FUSES

DIMENSIONS & TECHNICAL DATA

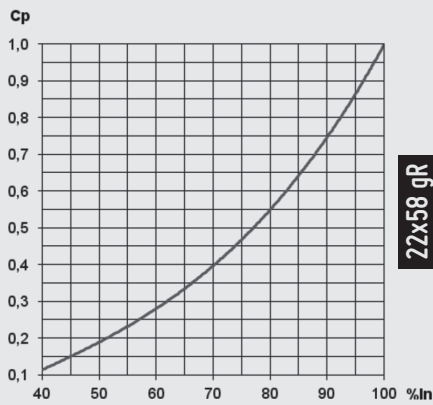
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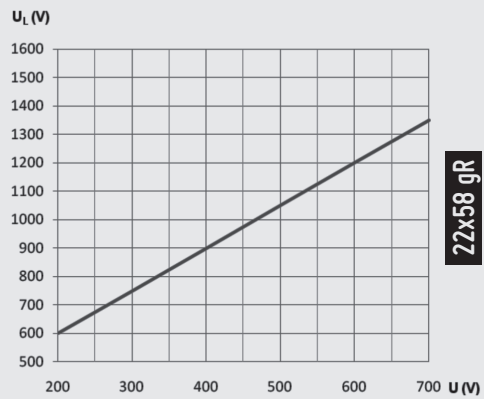
I²t Correction Factor (K)



Correction Factor for Power Loss (Cp)



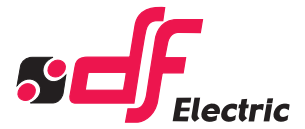
Peak Arc Voltage (UL)



I _n (A)	I ² t Prearcing (A ² S)	Operating I ² t @ 690 V (A ² S)	Power loss 0.8 · I _n (W)	Power loss I _n (W)
20	24	154	3,23	6,00
25	43	274	3,66	6,65
32	97	616	4,86	9,21
40	120	760	6,05	11,32
50	273	1362	6,26	11,85
63	516	2575	7,35	13,80
80	1092	5448	8,40	14,00
100	2065	10300	9,40	17,70

RAPIDPLUS

HIGH SPEED FUSES FOR SEMICONDUCTORS



TECHNICAL

gR SEMICONDUCTOR FUSES

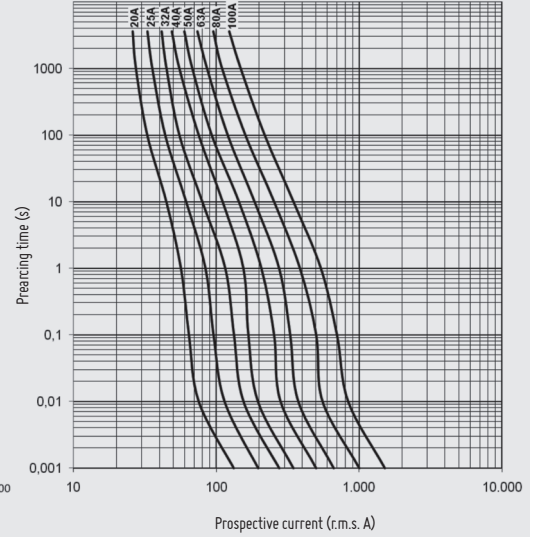
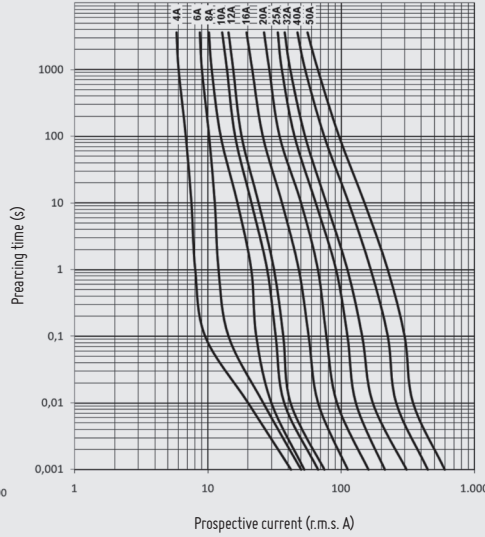
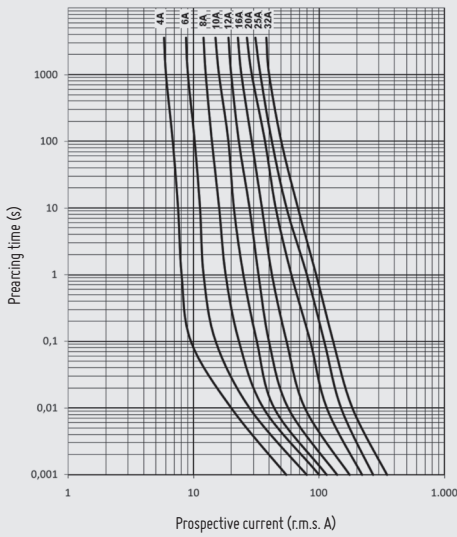
t-I CHARACTERISTICS

10x38
14x51
22x58

10x38

14x51

22x58



TECHNICAL

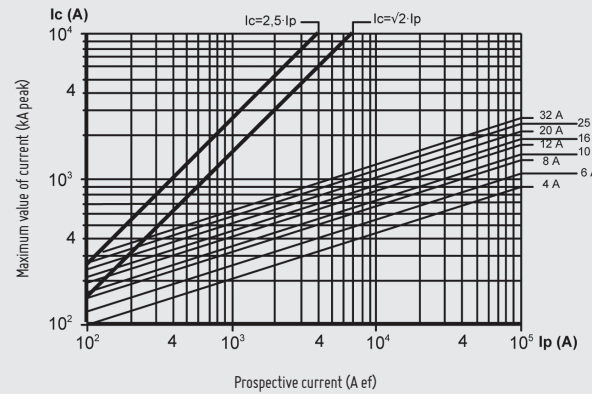
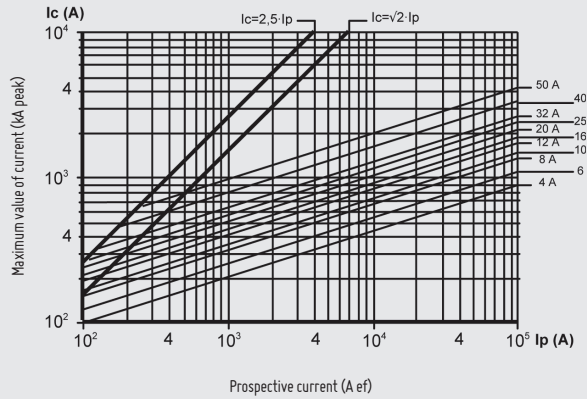
gR SEMICONDUCTOR FUSES

CUT-OFF CHARACTERISTICS

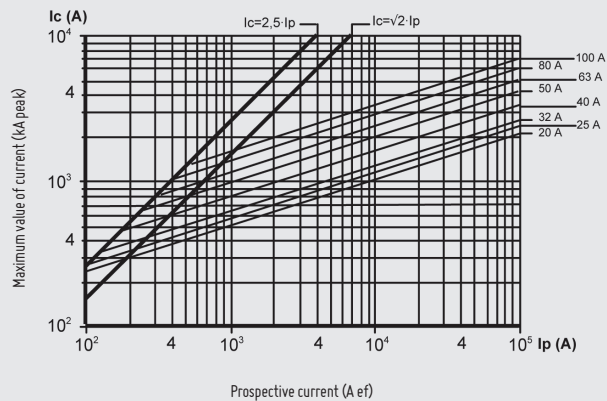
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14x51
22x58

10x38

14x51



22x58



TECHNICAL

aR
gR

SEMICONDUCTOR FUSES

USE OF SEMICONDUCTOR FUSE LINKS (RAPIDPLUS) IN PMC, PMF & PMX MODULAR FUSE HOLDERS AND BAC FUSE BASES

The modular fuse holders for cylindrical fuses have a rated power acceptance according to the maximum power dissipations allowed for the general use fuse links (gG) and back up fuse links.

These maximum values allowed for the fuse links (gG/aM) are regulated by standards (IEC/EN60269-2). In the same way, this standards specify the minimum power acceptance for the fuse holders. This power acceptance is the power dissipated by the fuse links (converted in heat) tha the fuse holder can accept with an acceptable increase of the temperature (values also regulated by standards).

The fuse links for protection of semiconductors **RAPIDPLUS** have a rated power dissipation (or power loss) higher than the gG or aM types, and for this reason there are some limitations for the application of these fuses in closed modular fuse holders.

It is necessary to check that the fuse links have a power diissipation not higher than the maximum value admissible of the fuse holder indicated by the manufacturer.

When it is no possible to use modular fuse holders the solution is the use of an open fuse base where the heat can be appropriately dissipated.

In the following table are indicated the maximum values of power acceptance for **DF ELECTRIC** fuse holders. These limits should never be exceeded:

FUSE HOLDER TYPE	RATED POWER ACCEPTANCE IEC/EN60269-2-1	MAX. POWER ACCEPATNCE DF ELECTRIC FUSE HOLDERS
PMC 10x38	3 W	4 W
PMF 10x38	3 W	4 W
PMX 14x51	5 W	6 W
PMX 22x58	9,5 W	12 W
BAC 10x38	–	8 W
BAC 14x51	–	12 W
BAC 22x58	–	20 W



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