df Electric

aR gR gS

high speed fuse links for semiconductors

RAPIDPLUS

sales@prom-elec.com / ООО ПРОМЭЛЕКТРОНИКА

NH00 gS
160 A
690 V~ 100 kA
Rapidplus
IEC/EN 60269-4
371075
RoHS COMPLIANT
Made in Spain
NH1 gS
280 A
690 V~ 100 kA
Rapidplus
IEC/EN 60269-4
371273
RoHS COMPLIANT
Made in Spain
NH2 gS
450 A
690 V~ 100 kA
Rapidplus
IEC/EN 60269-4
371387
RoHS COMPLIANT
Made in Spain
NH3 gS
630 A
690 V~ 100 kA
Rapidplus
IEC/EN 60269-4
371470
RoHS COMPLIANT
Made in Spain
Rapidplus
4A
690V~
10A
690V~
Rapidplus aR
100A
690V~

RAPIDPLUS

PAGE 04 | aR HIGH SPEED FUSE LINKS FOR SEMICONDUCTORS
PAGE 05 | gR HIGH SPEED FUSE LINKS FOR SEMICONDUCTORS
PAGE 06 | gS NH HIGH SPEED FUSE LINKS FOR SEMICONDUCTORS

RAPIDPLUS
HIGH SPEED FUSE LINKS FOR SEMICONDUCTORS

df Electric

aR SEMICONDUCTOR FUSE LINKS

RAPIDPLUS aR fuse links are intended to clearing short-circuits and have been designed and manufactured to have very low I^2t values as well as reduced arc voltages that guarantee an optimum protection of semiconductors. They have a very good cycling ability. **RAPIDPLUS aR** range comprise three sizes with dimensions 10x38, 14x51 and 22x58, with rated currents between 4A and 100A and a rated voltage of 690 V AC. Sizes 14x51 and 22x58 are available also with striker, for use in fuse bases with microswitch. Made of ceramic tubes with high withstand to internal pressure and thermal shock, and silver plated copper contacts. Typical application comprise protection of semiconductors (diodes, thyristors, triacs, etc) used in power rectifiers, UPS, converters, motor drives (AC and DC), soft starters, solid state relays, photovoltaic inverters, welding inverters and any application where it i necessary to protect semiconductor devices.

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

	I_n (A)	REFERENCE WITHOUT STRIKER	REFERENCE WITH STRIKER	U (V AC)	BREAKING CAPACITY (kA)	PACKING
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

700 VDC - BREAKING CAPACITY 30 KA

491125

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

700 VDC - BREAKING CAPACITY 30 KA

491215

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

700 VDC - BREAKING CAPACITY 30 KA

491355

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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t-I AND CUT-OFF CHARACTERISTICS
PAGE 07

TECHNICAL
RAPIDPLUS FUSES IN PMC, PMF & PMX MODULAR FUSE HOLDERS
PAGE 22

COMPATIBLE
PMF MODULAR FUSE HOLDERS
SEE CYLINDRICAL
www.df-sa.es/cylindrical/fuse-holders/pmf/

COMPATIBLE
PMX MODULAR FUSE HOLDERS
SEE CYLINDRICAL
www.df-sa.es/cylindrical/fuse-holders/pmx/

COMPATIBLE
BAC OPEN FUSE BASES
SEE CYLINDRICAL
www.df-sa.es/cylindrical/fuse-holders/bac/

RAPIDPLUS
HIGH SPEED FUSE LINKS FOR SEMICONDUCTORS

df Electric

gR SEMICONDUCTOR FUSE LINKS

RAPIDPLUS gR fuse links are capable to clearing all types of overcurrents, overloads as well as short-circuits, thus the fuse links protect semiconductors as well as cables and all switchgear of installation. **RAPIDPLUS gR** range comprise three sizes with dimensions 10x38, 14x51 and 22x58, with rated currents between 4A and 100A and a rated voltage of 690V AC. Sizes 14x51 and 22x58 are available also with striker, for use in fuse bases with microswitch. Typical application comprise protection of semiconductors (diodes, thyristors, triacs, etc) used in power rectifiers, UPS, converters, motor drives (AC and DC), soft starters, solid state relays, photovoltaic inverters, welding inverters and any application where it is necessary to protect semiconductor devices.

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

	I_n (A)	REFERENCE WITHOUT STRIKER	REFERENCE WITH STRIKER	U (V AC)	BREAKING CAPACITY (kA)	PACKING
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

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

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

TECHNICAL DIMENSIONS AND TECHNICAL DATA PAGE 11

TECHNICAL t-I AND CUT-OFF CHARACTERISTICS PAGE 11

TECHNICAL RAPIDPLUS FUSES IN PMC, PMF & PMX MODULAR FUSE HOLDERS PAGE 22

COMPATIBLE PMF MODULAR FUSE HOLDERS SEE CYLINDRICAL www.df-sa.es/cylindrical/fuse-holders/pmf/

COMPATIBLE PMX MODULAR FUSE HOLDERS SEE CYLINDRICAL www.df-sa.es/cylindrical/fuse-holders/pmx/

COMPATIBLE BAC OPEN FUSE BASES SEE CYLINDRICAL www.df-sa.es/cylindrical/fuse-holders/bac/

RAPIDPLUS
HIGH SPEED FUSE LINKS FOR SEMICONDUCTORS

df Electric

gS NH SEMICONDUCTOR FUSE LINKS NEW

RAPIDPLUS NH gS fuse links are capable to clearing all types of overcurrents, overloads as well as short-circuits, thus the fuse links protect semiconductors as well as cables and all switchgear of installation. They are optimized to have reduced power dissipations that allow the utilization of a wide range of fuse-bases and fuse-switch disconnectors. **RAPIDPLUS NH gS** range comprise five sizes NH000, NH00, NH1, NH2 and NH3 with rated currents between 20A and 630A and a rated voltage of 690V AC. Typical application comprise protection of semiconductors (diodes, thyristors, triacs, etc) used in power rectifiers, UPS, converters, motor drives, soft starters, solid state relays, photovoltaic inverters, welding inverters and any application where it is necessary to protect semiconductor devices.

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

	In (A)	REFERENCE	U (V AC)	BREAKING CAPACITY (kA)	PACKING
NH000	20	**371025**	690	100	3
	25	**371030**	690	100	3
	32	**371035**	690	100	3
	40	**371045**	690	100	3
	50	**371050**	690	100	3
	63	**371055**	690	100	3
	80	**371060**	690	100	3
	100	**371065**	690	100	3
NH00	125	**371070**	690	100	3
	160	**371075**	690	100	3
NH1	125	**371250**	690	100	3
	160	**371255**	690	100	3
	200	**371260**	690	100	3
	250	**371270**	690	100	3
	280	**371273**	690	100	3
NH2	250	**371360**	690	100	3
	315	**371370**	690	100	3
	355	**371375**	690	100	3
	400	**371380**	690	100	3
	450	**371387**	690	100	3
NH3	355	**371450**	690	100	1
	400	**371455**	690	100	1
	450	**371463**	690	100	1
	500	**371465**	690	100	1
	630	**371470**	690	100	1

440 VDC - BREAKING CAPACITY 30 KA

371075

371273

371378

371470

STANDARDS	APPROVALS
IEC 60269-1 IEC 60269-4 EN 60269-1 EN 60269-4	Cd-Pb FREE RoHS compliant

TECHNICAL DIMENSIONS PAGE 15

TECHNICAL t-I CHARACTERISTICS PAGE 16

TECHNICAL CUT-OFF CHARACTERISTICS PAGE 17

TECHNICAL TECHNICAL DATA PAGE 18

COMPATIBLE ST 690V NH FUSE BASES SEE NH www.df-sa.es/nh/fusebases/st/

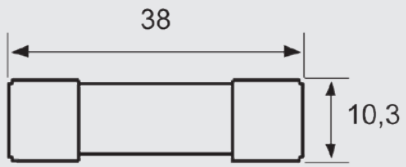
COMPATIBLE CR 690V NH FUSE BASES SEE NH www.df-sa.es/nh/fusebases/cr/

TECHNICAL

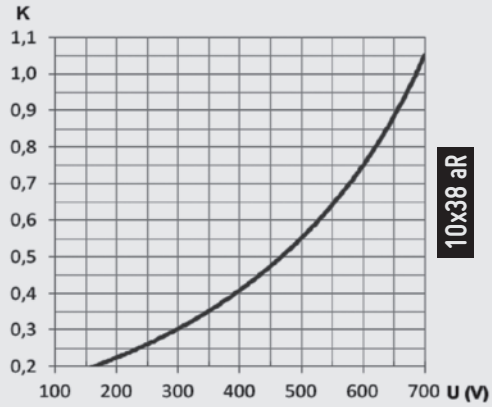
aR

SEMICONDUCTOR FUSE LINKS
DIMENSIONS & TECHNICAL DATA

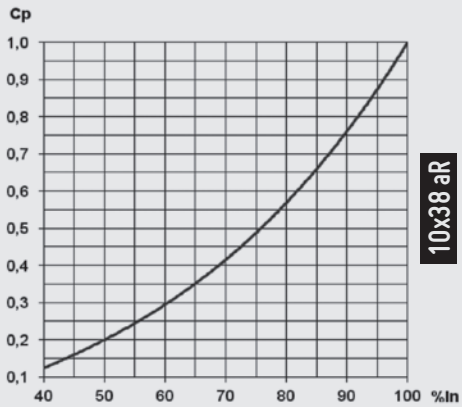
10x38



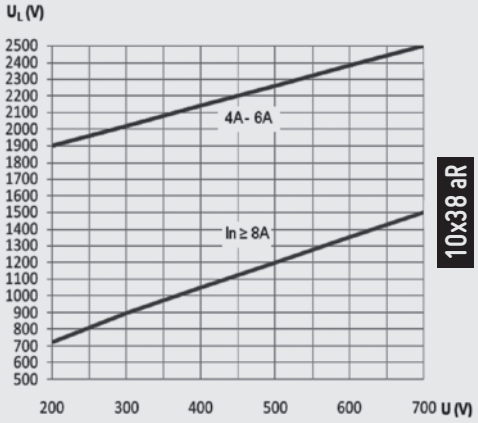
I²t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



I_n (A)	I^2t Prearcing (A^2S)	Operating I^2t @ 690 V (A^2S)	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 multipliying by correction factor, K, given as a function of applied working voltage, Eg (RMS).

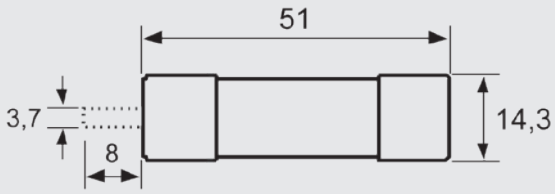
Power loose(Cp)
Watts loss at rated current are given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated value. The correction factor Cp, is given as a function of the RMS load current Ib in % of the rated current.

Arc voltage (U_L)
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.

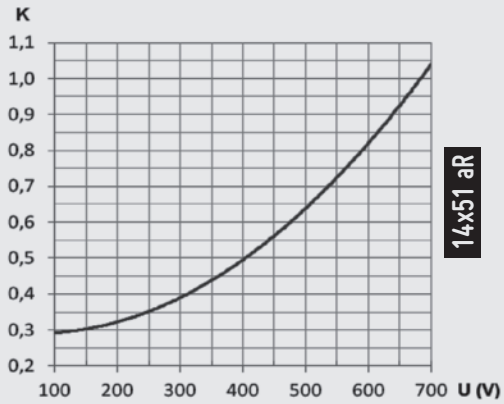
TECHNICAL

aR SEMICONDUCTOR FUSE LINKS
DIMENSIONS & TECHNICAL DATA

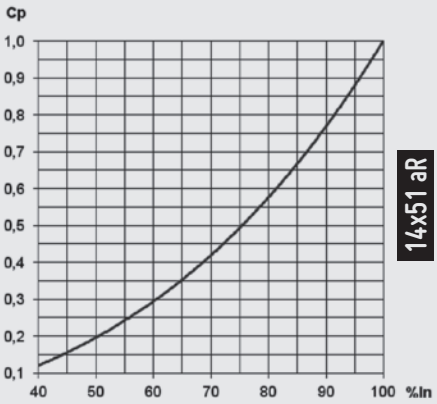
14x51



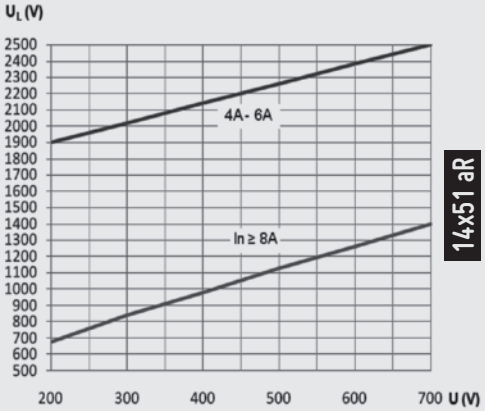
I²t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



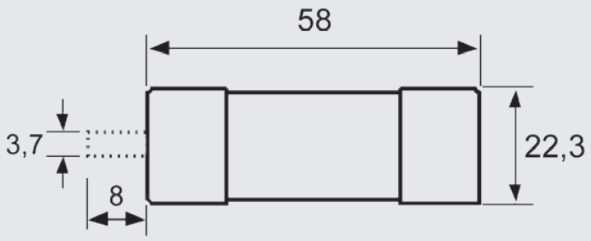
I_n (A)	I²t Prearcing (A^2S)	Operating I²t @ 690 V (A^2S)	Power loss $0.8 \cdot I_n$ (W)	Power loss I_n (W)
4	5,6	14	1,32	2,28
6	16,0	40	1,80	3,18
8	4,1	23	1,01	1,69
10	6,3	37	1,39	2,36
12	9,1	53	1,63	2,78
16	12,4	72	2,43	4,16
20	20,6	119	3,04	5,43
25	36,6	211	3,75	6,11
32	82,3	475	3,92	7,17
40	146,3	844	4,52	8,15
50	260,0	1500	5,60	10,6

TECHNICAL

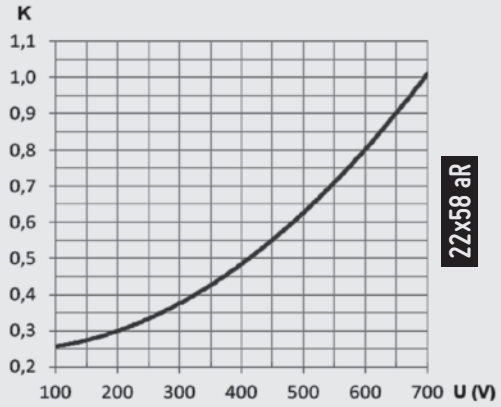
aR

SEMICONDUCTOR FUSE LINKS
DIMENSIONS & TECHNICAL DATA

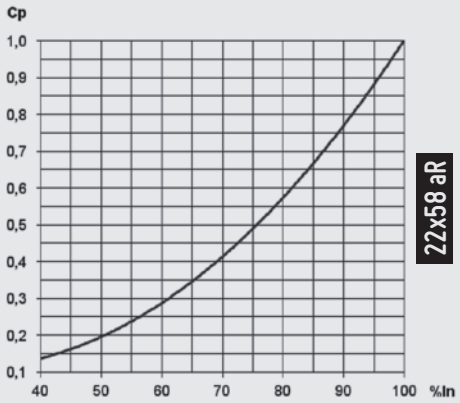
22x58



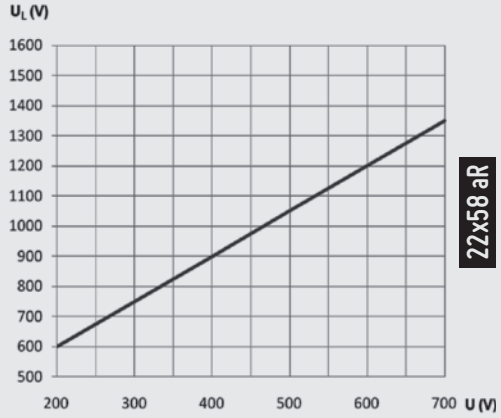
I²t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



I_n (A)	I²t Prearcing (A^2S)	Operating I²t @ 690 V (A^2S)	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

RAPIDPLUS
HIGH SPEED FUSE LINKS FOR SEMICONDUCTORS

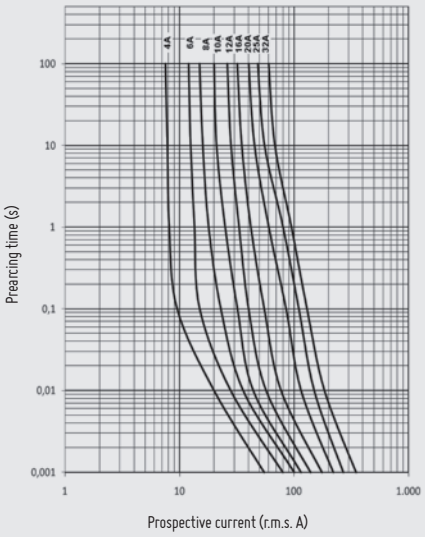
TECHNICAL

aR

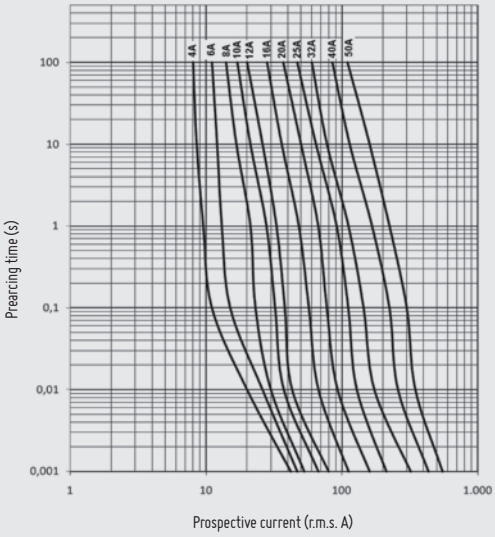
SEMICONDUCTOR FUSE LINKS
t-I CHARACTERISTICS

10x38
14x51
22x58

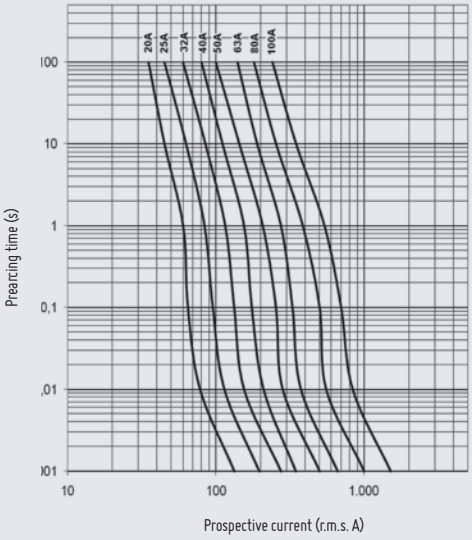
10x38



14x51



22x58



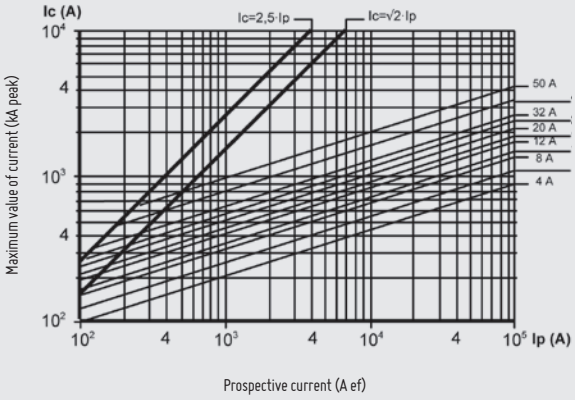
TECHNICAL

aR

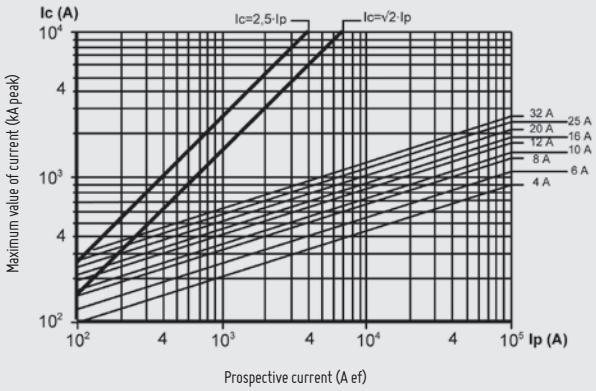
SEMICONDUCTOR FUSES
CUT-OFF CHARACTERISTICS

10x38
14x51
22x58

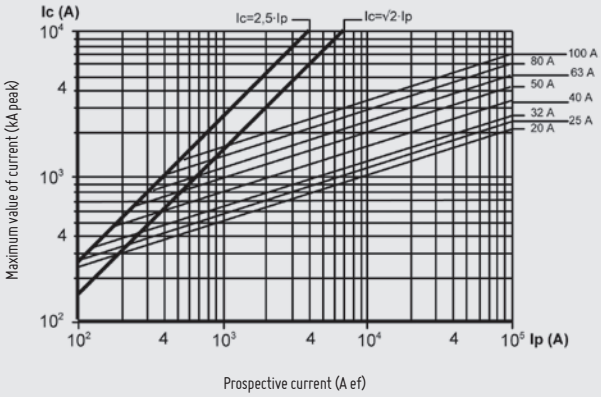
14x51



10x38



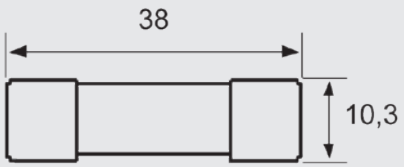
22x58



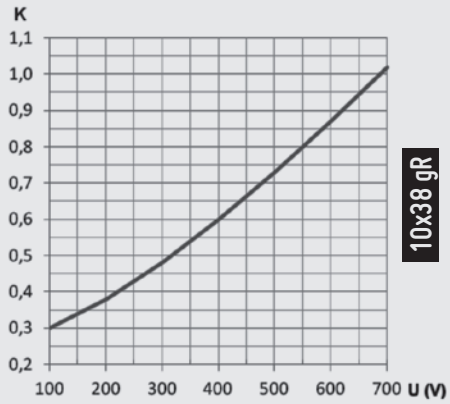
TECHNICAL

gR SEMICONDUCTOR FUSE LINKS
DIMENSIONS & TECHNICAL DATA

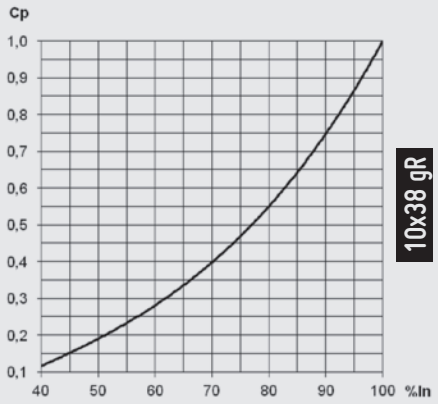
10x38



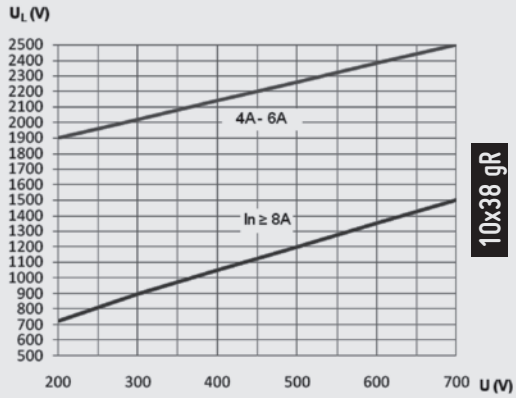
I²t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)

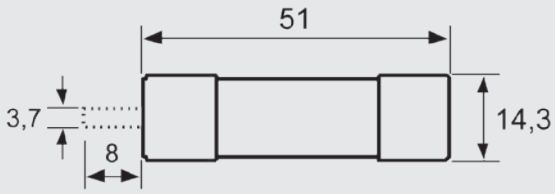


I_n (A)	I²t Prearcing (A²S)	Operating I²t @ 690 V (A²S)	Power loss 0.8 · I_n (W)	Power loss I_n (W)
4	5,6	17	1,13	2,05
6	16,0	48	1,56	3,00
8	4,3	38	0,97	1,68
10	6,6	59	1,20	2,09
12	9,6	84	1,69	2,99
16	17,0	150	2,31	4,27
20	23,5	200	2,86	5,35
25	60,2	512	2,94	5,52
32	94,0	800	3,82	7,43

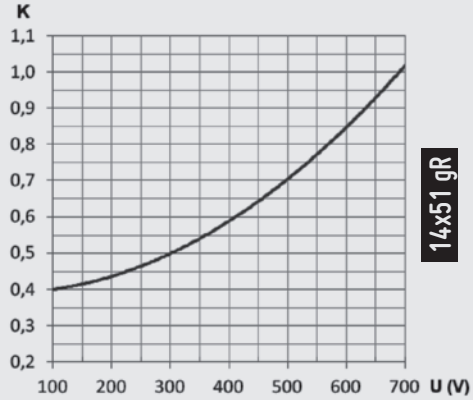
TECHNICAL

gR SEMICONDUCTOR FUSE LINKS
DIMENSIONS & TECHNICAL DATA

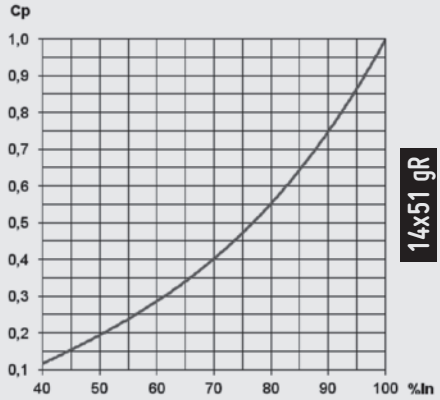
14x51



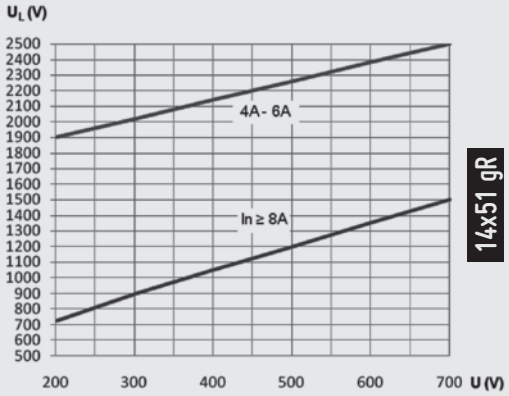
I²t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



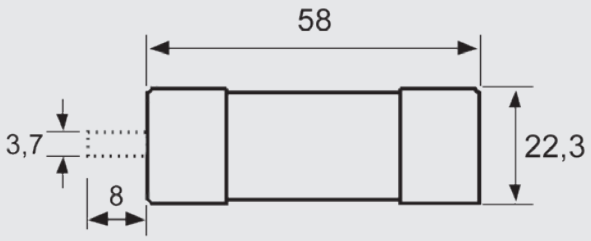
I_n (A)	I²t Prearcing (A²S)	Operating I²t @ 690 V (A²S)	Power loss 0.8 · I_n (W)	Power loss I_n (W)
4	5,6	17	1,56	2,94
6	16,0	48	2,25	4,20
8	3,8	30	1,18	2,00
10	5,9	47	1,41	2,52
12	8,4	68	1,95	3,54
16	15	120	2,67	4,83
20	27	170	2,91	5,40
25	53	333	3,38	6,00
32	108	679	3,72	6,93
40	211	1331	4,13	7,52
50	350	2200	5,36	9,80

TECHNICAL

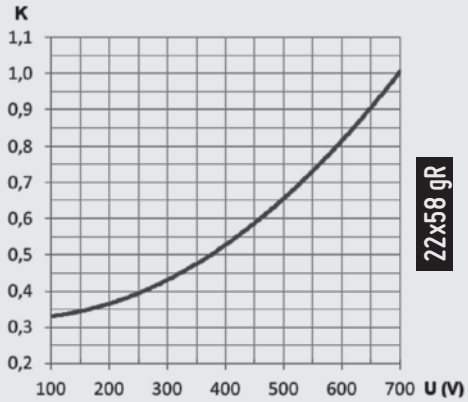
gR

SEMICONDUCTOR FUSE LINKS
DIMENSIONS & TECHNICAL DATA

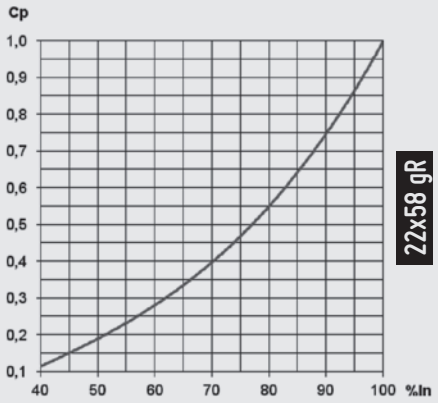
22x58



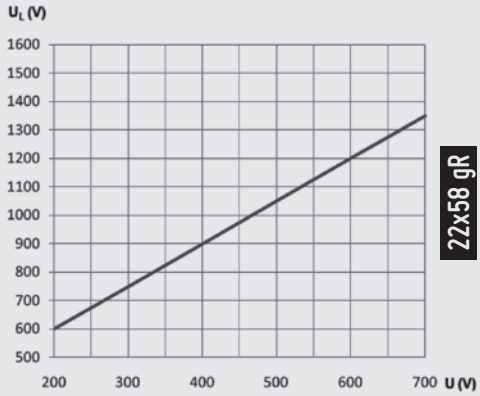
I²t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



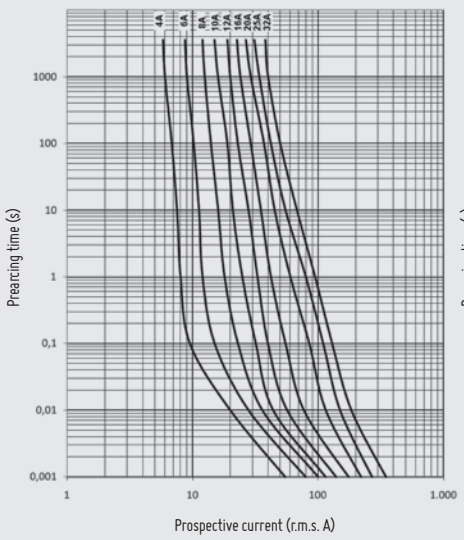
I_n (A)	I²t Prearcing (A^2S)	Operating I²t @ 690 V (A^2S)	Power loss $0.8 \cdot I_n$ (W)	Power loss I_n (W)
20	24	154	3,23	6,00
25	43	274	3,66	6,65
32	97	616	4,86	9,21
40	120	760	6,05	11,32
50	273	1362	6,26	11,85
63	516	2575	7,35	13,80
80	1092	5448	8,40	14,00
100	2065	10300	9,40	17,70

TECHNICAL

gR SEMICONDUCTOR FUSE LINKS
t-I CHARACTERISTICS

10x38
14x51
22x58

10x38



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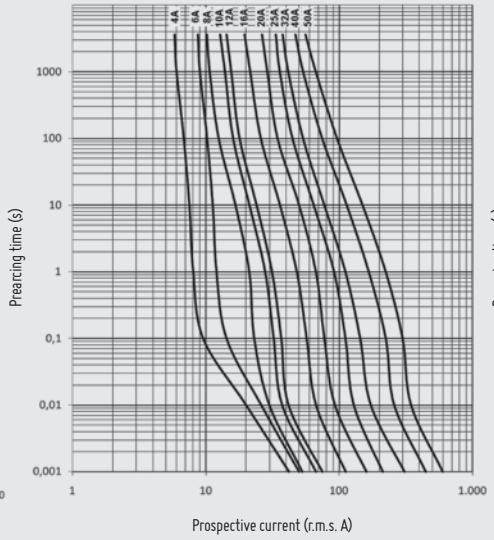

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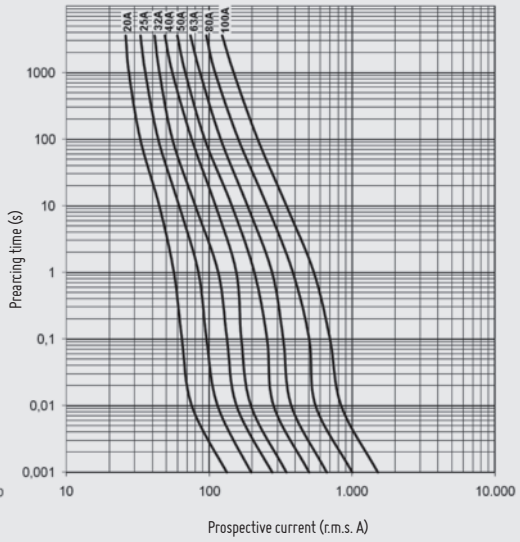
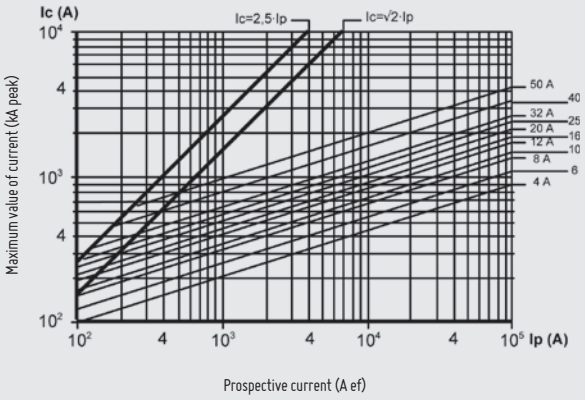


TECHNICAL

gR SEMICONDUCTOR FUSES
CUT-OFF CHARACTERISTICS

10x38
14x51
22x58

14x51



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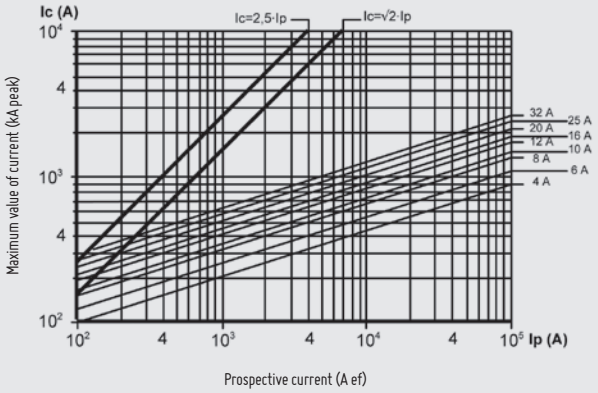

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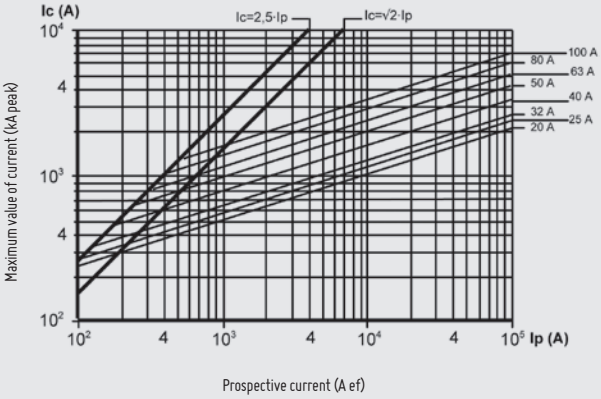


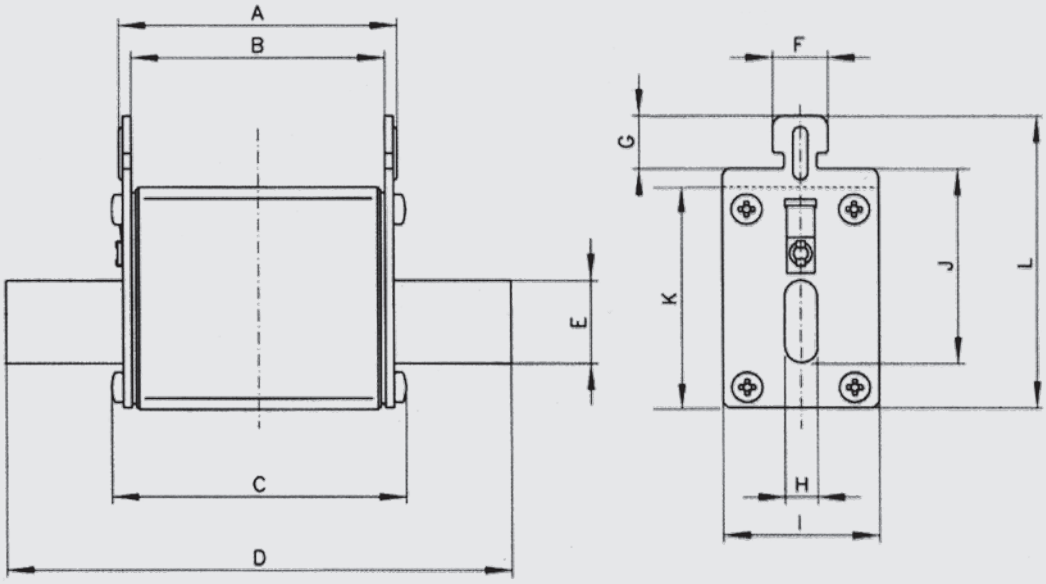
TECHNICAL

gS

SEMICONDUCTOR FUSE LINKS
DIMENSIONS

NH000
NH00
NH1

NH2
NH3



SIZE	A	B	C	D	E	F	G	H	I	J	K	L
NH000	49	45	52	78,5	15	10	9,5	6	21	35	40	53
NH00	49	44	52	78,5	15	10	9,5	6	29	35	47	59
NH1	68	62	71,5	135	20	10	9,5	6	39	40	52	64
NH2	68	62	71,5	150	25	10	9,5	6	53	48	60	72
NH3	68	62	73	150	32	10	9,5	6	70	60	75	87

TECHNICAL

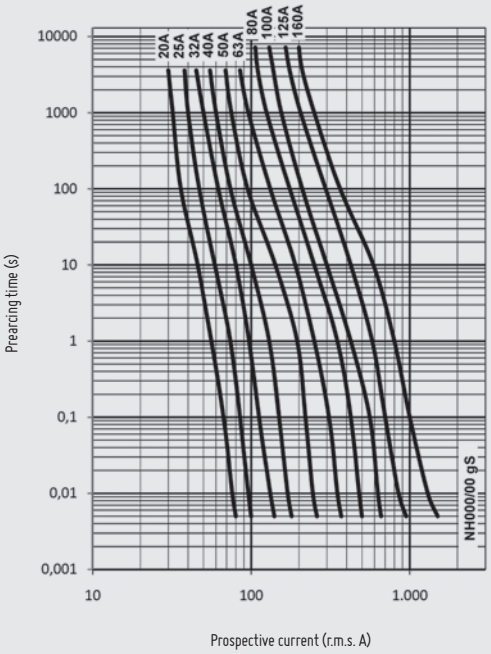
gS

SEMICONDUCTOR FUSE LINKS
t-I CHARACTERISTICS

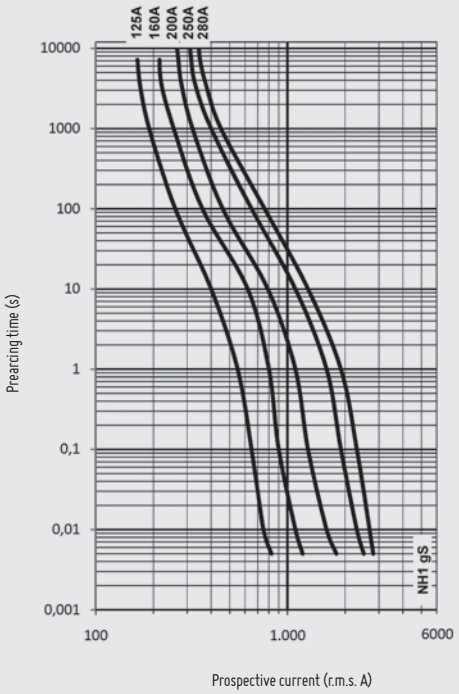
NH000
NH00
NH1

NH2
NH3

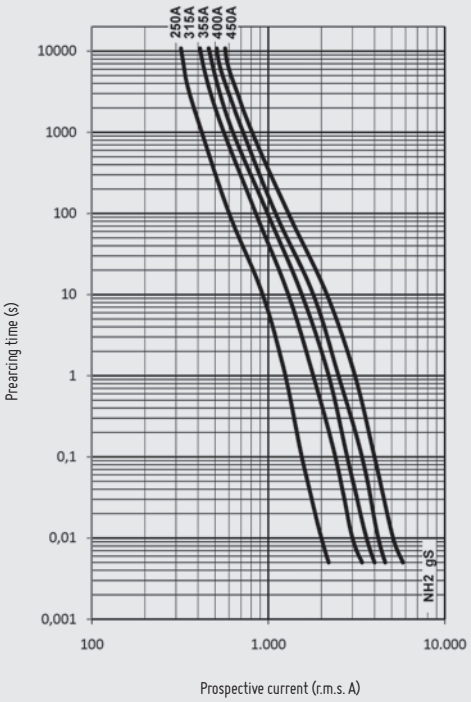
NH000 NH00



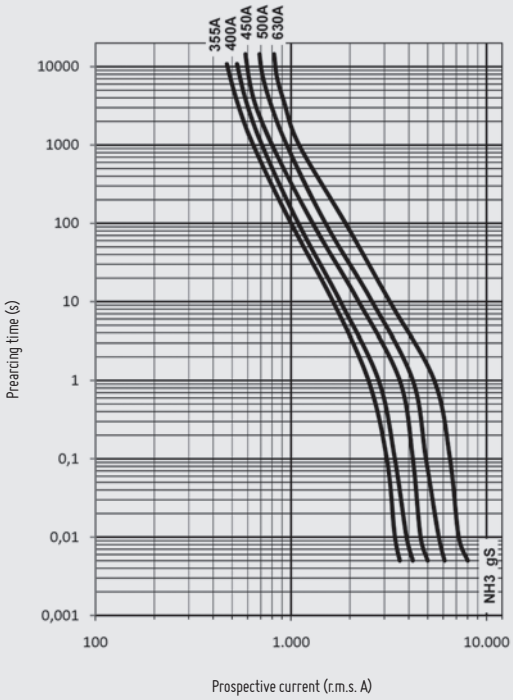
NH1



NH2



NH3



TECHNICAL

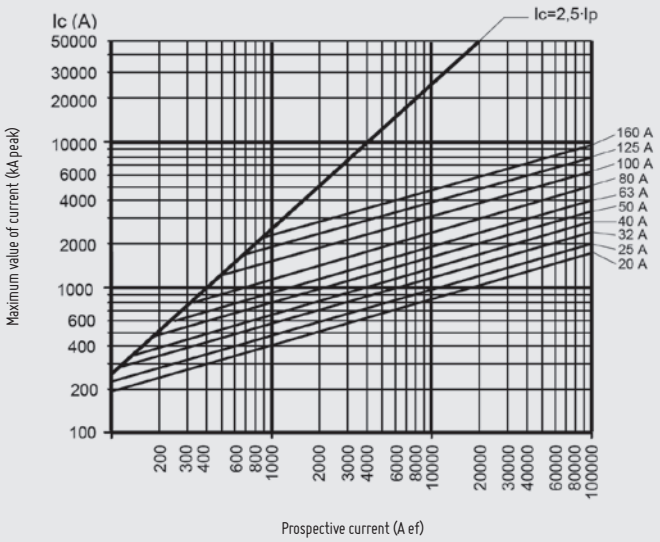
gS

SEMICONDUCTOR FUSE LINKS
CUT-OFF CHARACTERISTICS

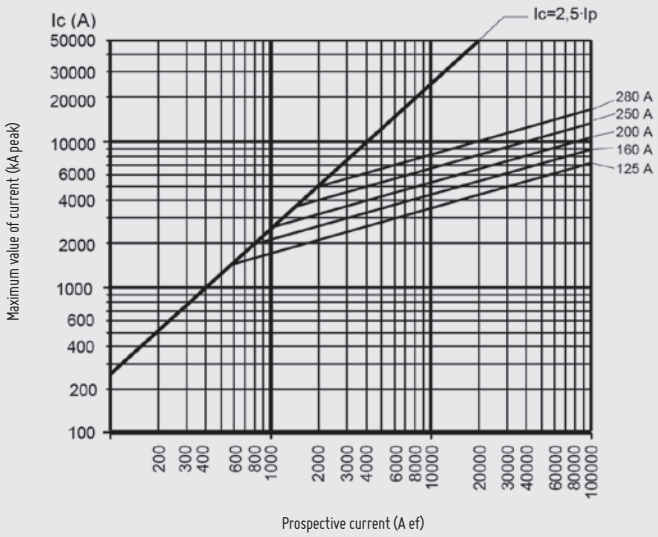
NH000
NH00
NH1

NH2
NH3

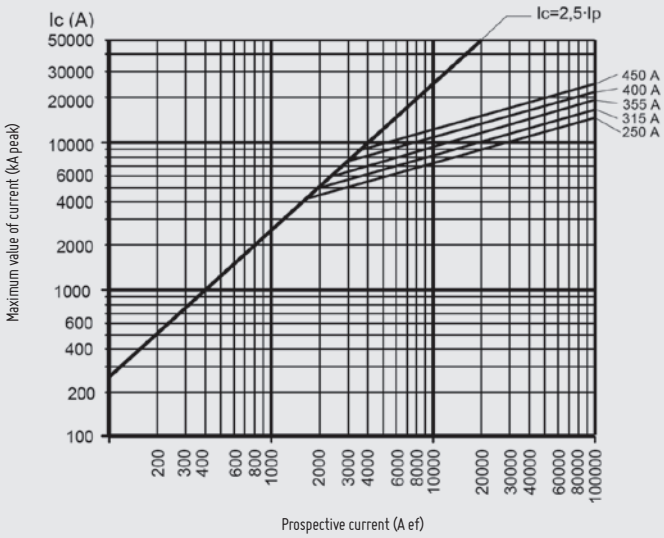
NH000 NH00



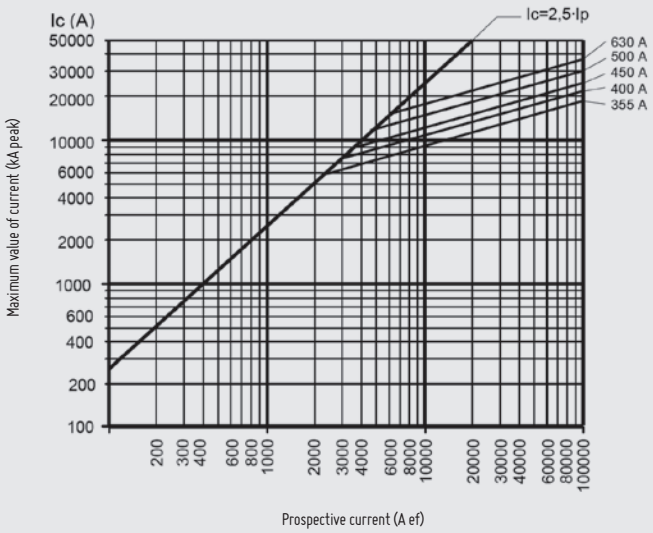
NH1



NH2



NH3



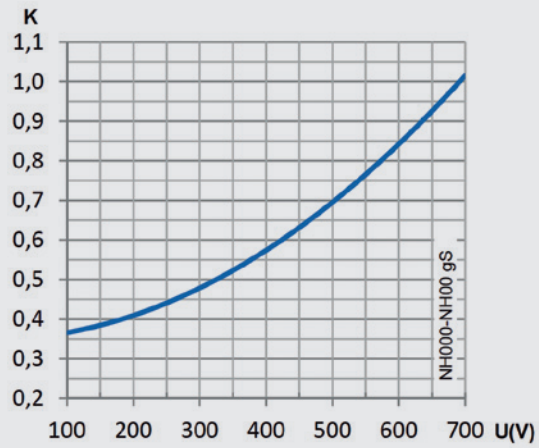
TECHNICAL

gS

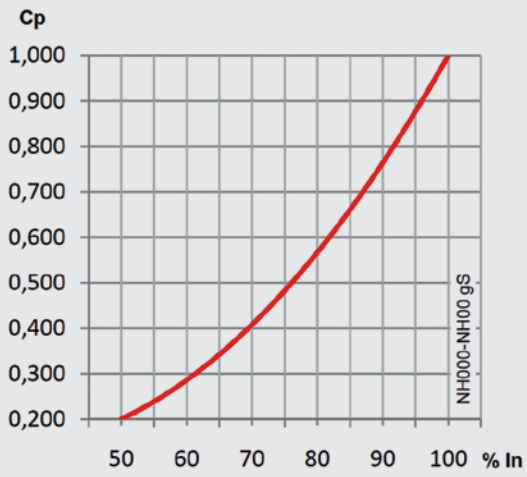
SEMICONDUCTOR FUSE LINKS
TECHNICAL DATA

NH000
NH00

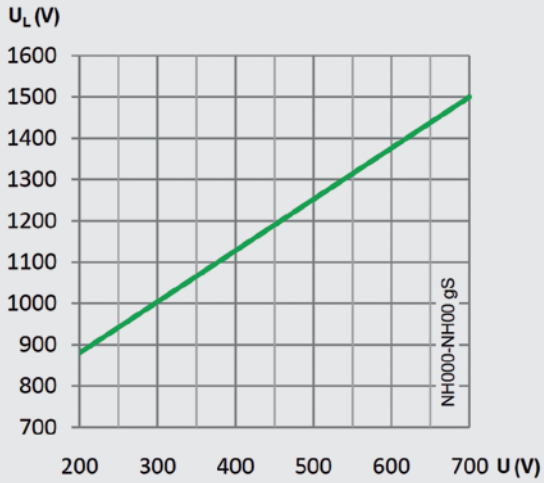
I²t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



	I_n (A)	I^2t Prearcing (A^2S)	Operating I^2t @ 690 V (A^2S)	Power loss $0.8 \cdot I_n$ (W)	Power loss I_n (W)
NH000	**20**	31	116	2,9	5,1
	25	49	181	3,2	5,6
	32	96	355	3,9	6,6
	40	196	724	4,2	7,2
	50	331	1.224	5,1	8,5
	63	782	2.897	5,3	9,1
	80	1.420	5.270	6,3	11,0
	100	2.130	7.880	7,6	13,3
NH00	**125**	3.380	11.550	8,3	14,7
	160	6.400	21.840	10,5	18,2

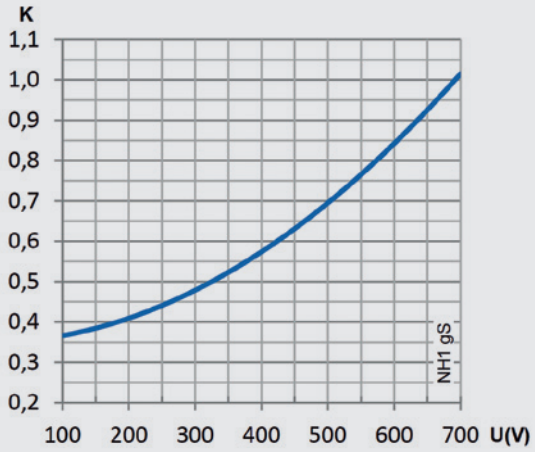
TECHNICAL

gS

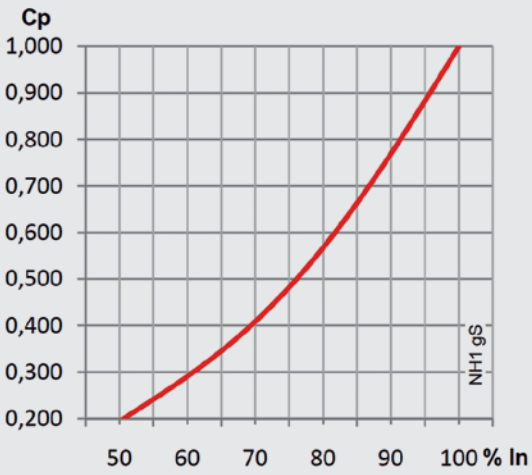
SEMICONDUCTOR FUSE LINKS
TECHNICAL DATA

NH1

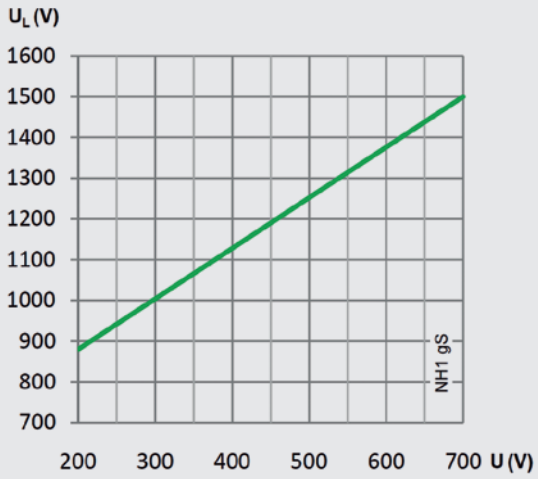
I²t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



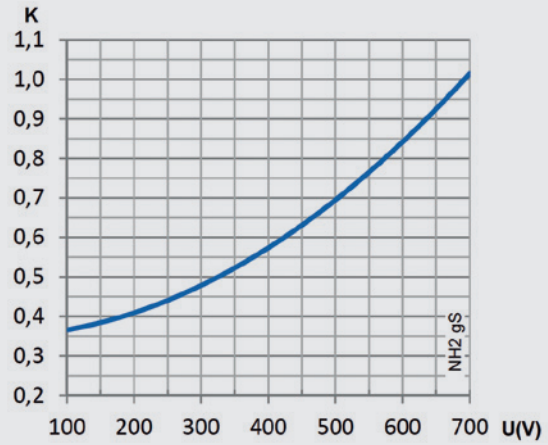
	I_n (A)	I^2t Prearcing (A^2S)	Operating I^2t @ 690 V (A^2S)	Power loss $0.8 \cdot I_n$ (W)	Power loss I_n (W)
NH1	**125**	3.800	11.680	10,7	19,7
	160	6.290	19.300	14,5	25,3
	200	13.120	40.280	16,1	28,6
	250	25.160	77.230	19,5	33,2
	280	37.590	115.370	20,1	35,7

TECHNICAL

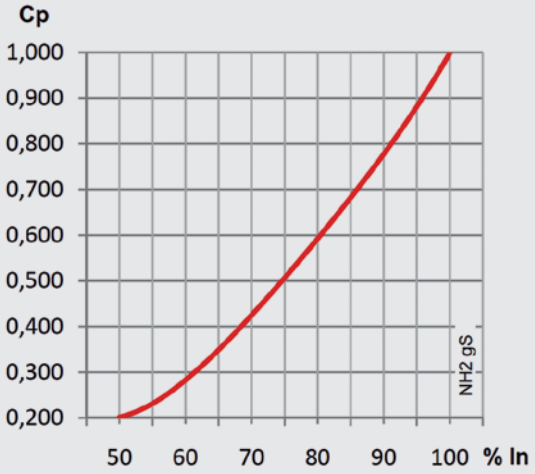
gS SEMICONDUCTOR FUSE LINKS
TECHNICAL DATA

NH2

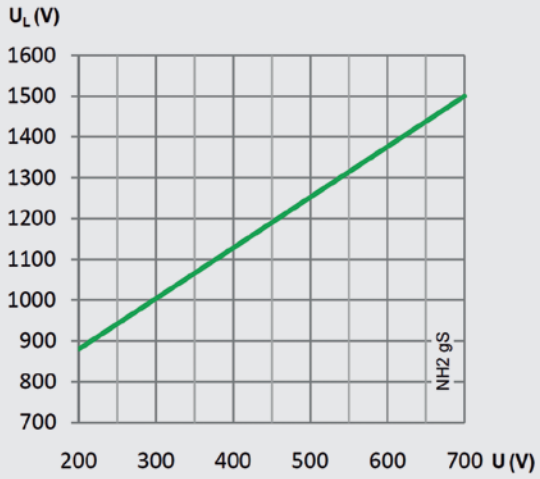
I²t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



	I_n (A)	I^2t Prearcing (A^2S)	Operating I^2t @ 690 V (A^2S)	Power loss $0.8 \cdot I_n$ (W)	Power loss I_n (W)
NH2	**250**	24.280	74.460	18,6	32,2
	315	50.660	155.360	20,8	35,8
	355	67.450	206.850	23,4	40,1
	400	100.770	309.000	24,4	42,6
	450	140.740	431.580	33,9	47,2

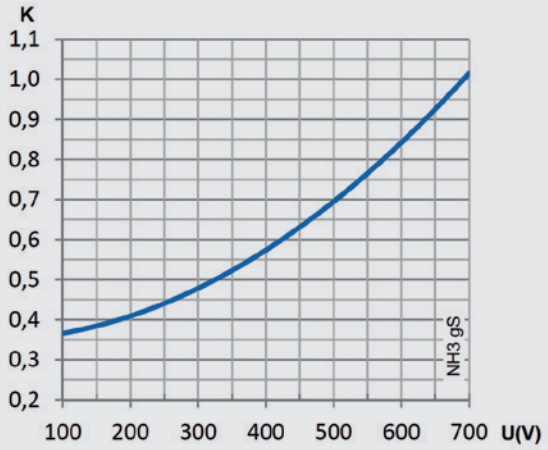
TECHNICAL

gS

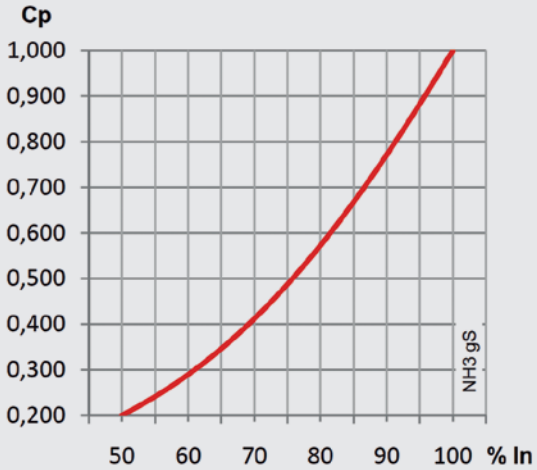
SEMICONDUCTOR FUSE LINKS
TECHNICAL DATA

NH3

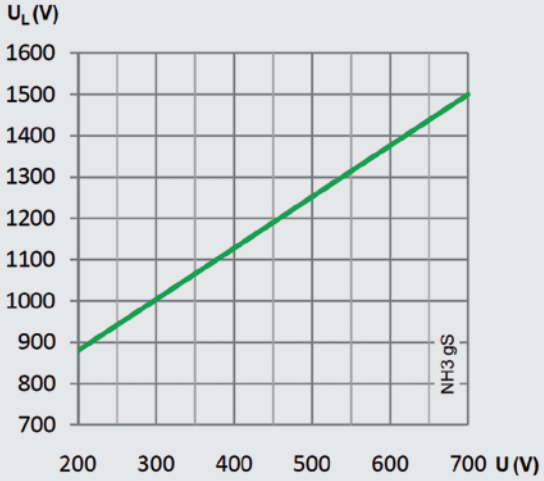
I²t Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



	I_n (A)	I^2t Prearcing (A^2S)	Operating I^2t @ 690 V (A^2S)	Power loss $0.8 \cdot I_n$ (W)	Power loss I_n (W)
NH3	**355**	54.240	151.700	22,7	39,6
	400	75.760	211.900	24,3	42,7
	450	114.770	320.970	26,3	46,0
	500	165.270	462.200	27,6	47,1
	630	303.060	847.570	34,3	60,4

TECHNICAL
aR
gR

SEMICONDUCTOR FUSE LINKS

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) that 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/PMX 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

df Electric

THE PROTECTION FORMULA

ELECTRONIC

CYLINDRICAL

PHOTOVOLTAIC

RAPIDPLUS

NH

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DOMESTIC

D & DO

TRANSFORMERS

eXperts in

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SILICI, 67-69
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