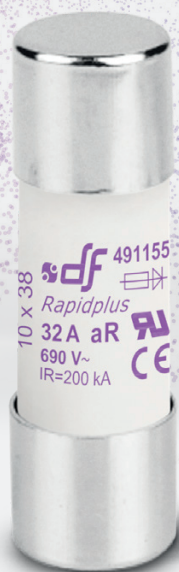


**Rapidplus®**



**PROTECTING  
THE WORLD**



# RAPIDPLUS

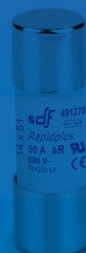
HIGH SPEED FUSE LINKS FOR SEMICONDUCTORS

## aR CYLINDRICAL

semiconductor protection  
fuse links



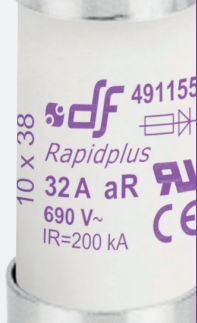
10x38



14x51



22x58



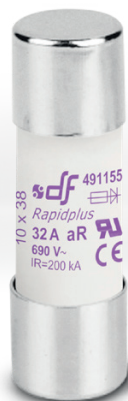
**RATED VOLTAGE**  
690V AC

**RATED CURRENT**  
1A...32A

**BREAKING CAPACITY**  
200kA

#### STANDARDS

IEC/EN 60269-1  
IEC/EN 60269-4  
UL248-1  
UL248-13



## Rapidplus®

### Cylindrical fuse links for semiconductors

RAPIDPLUS CYL aR fuse links are intended for 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.

The range comprises the following fuse links:

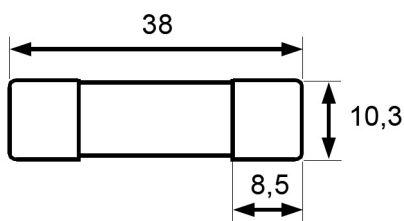
→ Size 10x38 690V AC 1A to 32A

Typical applications 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.

UL certification according to UL248 standard. UL file Nr. E477155.














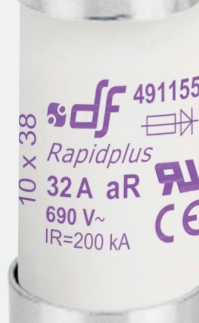
## Dimensions



Weight 8gr

## Range

$I_n$ (A)	REFERENCE	PACKING Uni /BOX
1	491105	10/100
2	491107 	10/100
3	491100 	10/100
4	491113 	10/100
6	491115 	10/100
8	491120 	10/100
10	491125 	10/100
12	491130 	10/100
16	491135 	10/100
20	491140 	10/100
25	491145 	10/100
32	491155 	10/100



## Technical data

Rated voltage	690V AC 700V DC (L/R=10ms)
Rated current	1A...32A
Rated breaking capacity	200kA @690V AC 30kA @700V DC
Utilization category	aR
Storage temperature	-40°C ... 90°C
Operating temperature *	-40°C ... 80°C

\* For ambient temperatures higher than 25°C it is necessary to apply a derating in maximum current.

## Standards

IEC/EN 60269-1  
IEC/EN 60269-4  
UL248-1  
UL248-13  
RoHS Compliant



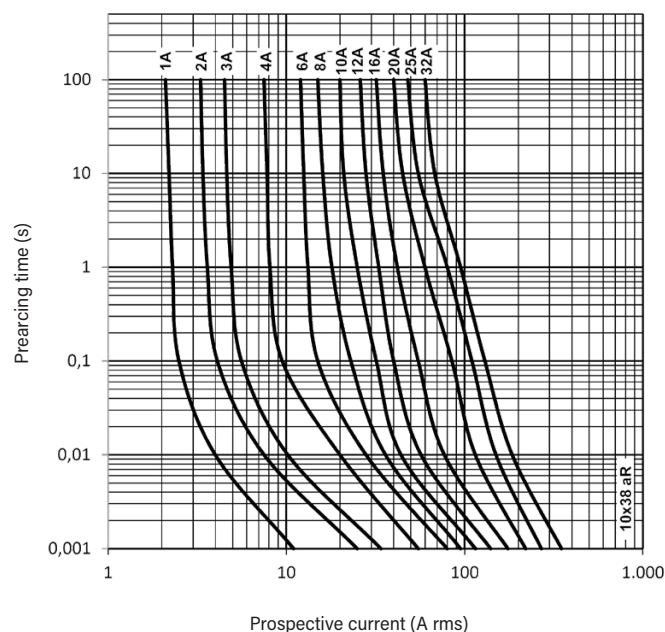
## Certifications



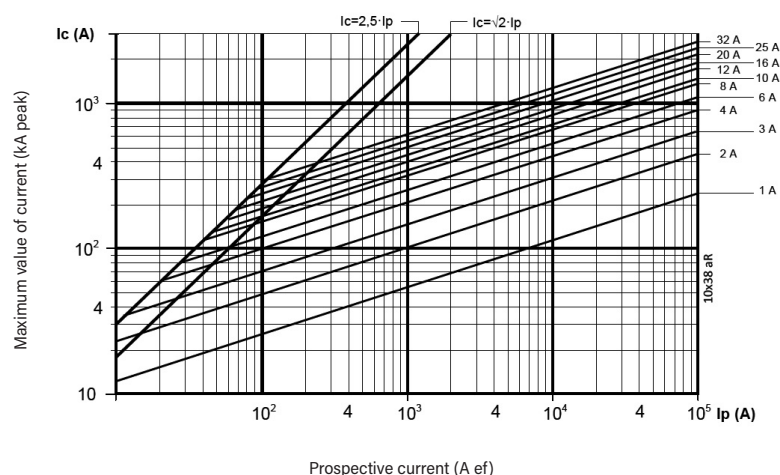
## Power dissipation

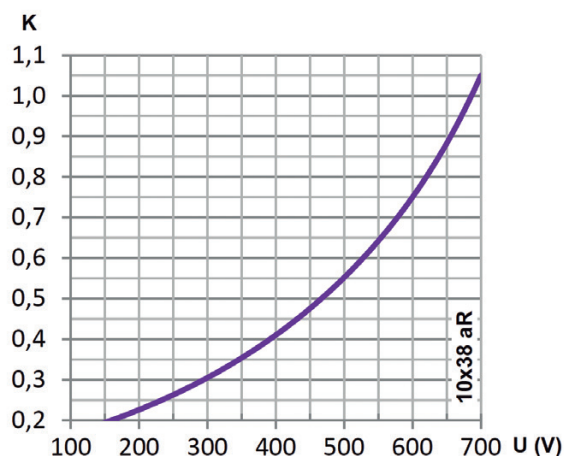
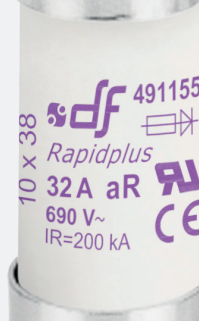
$I_n$ (A)	POWER DISSIPATION $I_n$ (W)	POWER DISSIPATION $0.8 \cdot I_n$ (W)	PREARcing $I^2t$ (A²S)	$I^2t$ 690V (A²S)
1	0,75	0,45	0,20	1,2
2	1,40	0,75	0,80	2,6
3	1,70	0,95	2,5	8,0
4	1,69	0,97	4,9	10
6	2,46	1,4	14,0	28
8	1,52	0,91	3,0	24
10	2,07	1,23	4,7	38
12	2,62	1,53	6,8	54
16	3,72	2,11	12,0	96
20	4,50	2,57	18,8	150
25	4,55	2,60	48,0	384
32	6,65	3,65	75,0	600

## t-I characteristics



## Cut-off characteristics

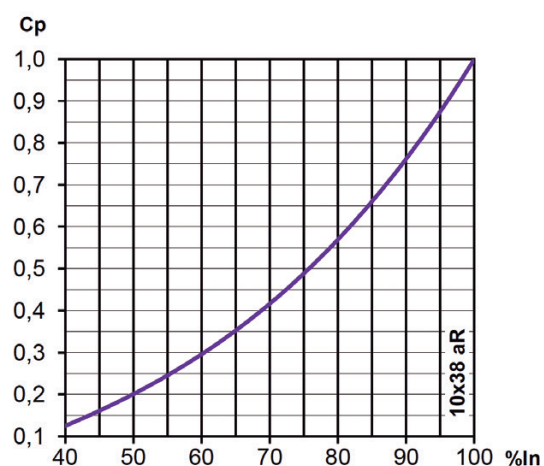




## I²t Correction factor

The total clearing  $I^2t$  at rated voltage and at power factor of 0,15 are given in the electrical characteristics.

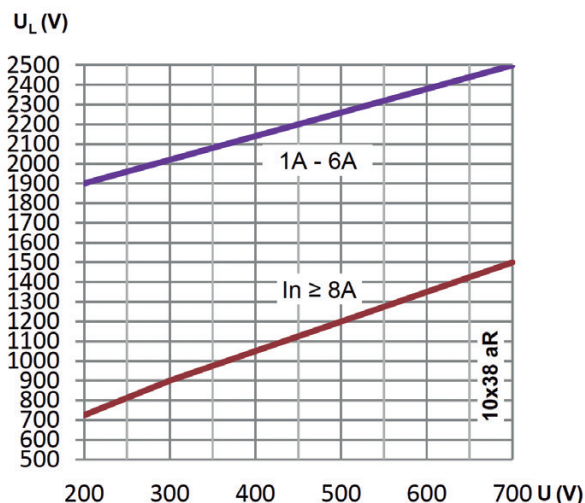
For other voltages, the clearing  $I^2t$  is found by multiplying by correction factor, K.



## Correction factor for power loss

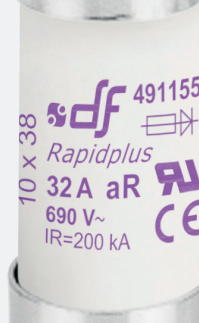
Watts loss at rated current are given in the electrical characteristics. The curve allows the calculation of the power losses at load currents lower than the rated value.

The correction factor  $C_p$ , is given as a function of the RMS load current  $I_b$  in % of the rated current.



## Peak arc voltage

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



## Use of Rapidplus® in PMX fuse holders

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.

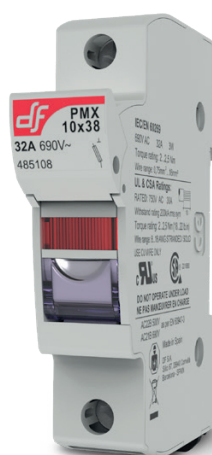
These maximum values allowed for the fuse links (gG/aM) are regulated by standards (IEC/EN60269-2). In the same way, this standards specify the minimum power acceptance for the fuse holders. This power acceptance is the power dissipated by the fuse links (converted in heat) that the fuse holder can accept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



RATED POWER ACCEPTANCE  
IEC/EN60269-2 **3W**

MAX. POWER ACCEPTANCE  
OF ELECTRIC FUSE HOLDERS **4W**

$I_n$ (A)	MAXIMUM CURRENT
1	1A
2	2A
3	3A
4	4A
6	6A
8	8A
10	10A
12	12A
16	15,5A
20	18A
25	22A
32	25A

## Use of Rapidplus® in BAC Open fuse bases

There are open type fuse bases (BAC) with high values of acceptable power disipations, where heat can be evacuated appropriately.



MAX. POWER ACCEPTANCE  
OF ELECTRIC FUSE HOLDERS **8W**



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The data reflected in this technical record are subject to the correct installation of the product in accordance with manufacturer's instructions, relevant installation standards and professional practices, maintained and used in applications for which they were made.

The products described in this document have been designed, developed and tested in accordance with specific standard. They are considered components that are integrated as part of installation, machine or equipment. The correct general operation of the referred product is responsibility of the manufacturer of the installation, machine or equipment.

DF ELECTRIC cannot guarantee the characteristics of an installation, machine or equipment that has been designed by a third party. Once a product has been selected, the user must verify that it is appropriate for its application, through the verifications and/or tests that it deems appropriate.

DF ELECTRIC retains the right to change the dimensions, specifications, materials or design of its products at any time with or without notice.



# PROTECTING THE WORLD

