

# 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/](http://www.df-sa.es/rapidplus/gR/)

|              | $I_n$<br>(A) | REFERENCE       |              | U<br>(V AC) | BREAKING CAPACITY<br>(kA) | PACKING |
|--------------|--------------|-----------------|--------------|-------------|---------------------------|---------|
|              |              | WITHOUT STRIKER | WITH STRIKER |             |                           |         |
| <b>10x38</b> | 4            | <b>492003</b>   | –            | 690         | 100                       | 10      |
|              | 6            | <b>492004</b>   | –            | 690         | 100                       | 10      |
|              | 8            | <b>492005</b>   | –            | 690         | 100                       | 10      |
|              | 10           | <b>492006</b>   | –            | 690         | 100                       | 10      |
|              | 12           | <b>492007</b>   | –            | 690         | 100                       | 10      |
|              | 16           | <b>492008</b>   | –            | 690         | 100                       | 10      |
|              | 20           | <b>492009</b>   | –            | 690         | 100                       | 10      |
|              | 25           | <b>492010</b>   | –            | 690         | 100                       | 10      |
|              | 32           | <b>492011</b>   | –            | 690         | 100                       | 10      |

440 VDC - BREAKING CAPACITY 30 KA



492006

|              |               |               |               |     |     |    |
|--------------|---------------|---------------|---------------|-----|-----|----|
| <b>14x51</b> | 4             | <b>492014</b> | –             | 690 | 100 | 10 |
|              | 6             | <b>492015</b> | –             | 690 | 100 | 10 |
|              | 8             | <b>492016</b> | <b>492116</b> | 690 | 100 | 10 |
|              | 10            | <b>492017</b> | <b>492117</b> | 690 | 100 | 10 |
|              | 12            | <b>492018</b> | <b>492118</b> | 690 | 100 | 10 |
|              | 16            | <b>492019</b> | <b>492119</b> | 690 | 100 | 10 |
|              | 20            | <b>492020</b> | <b>492120</b> | 690 | 100 | 10 |
|              | 25            | <b>492021</b> | <b>492121</b> | 690 | 100 | 10 |
|              | 32            | <b>492022</b> | <b>492122</b> | 690 | 100 | 10 |
|              | 40            | <b>492023</b> | <b>492123</b> | 690 | 100 | 10 |
| 50           | <b>492024</b> | <b>492124</b> | 690           | 100 | 10  |    |

440 VDC - BREAKING CAPACITY 30 KA



492014

|              |     |               |               |     |     |    |
|--------------|-----|---------------|---------------|-----|-----|----|
| <b>22x58</b> | 20  | <b>492033</b> | <b>492133</b> | 690 | 100 | 10 |
|              | 25  | <b>492034</b> | <b>492134</b> | 690 | 100 | 10 |
|              | 32  | <b>492035</b> | <b>492135</b> | 690 | 100 | 10 |
|              | 40  | <b>492036</b> | <b>492136</b> | 690 | 100 | 10 |
|              | 50  | <b>492037</b> | <b>492137</b> | 690 | 100 | 10 |
|              | 63  | <b>492038</b> | <b>492138</b> | 690 | 100 | 10 |
|              | 80  | <b>492039</b> | <b>492139</b> | 690 | 100 | 10 |
|              | 100 | <b>492040</b> | <b>492140</b> | 690 | 100 | 10 |

440 VDC - BREAKING CAPACITY 30 KA



492040

|                                                                     |                                                          |
|---------------------------------------------------------------------|----------------------------------------------------------|
| STANDARDS<br>IEC 60269-1<br>IEC 60269-4<br>EN 60269-1<br>EN 60269-4 | APPROVALS<br>Cd-Pb<br>RoHS<br>compliant<br>REACH<br>SVHC |
|---------------------------------------------------------------------|----------------------------------------------------------|

|                                                                 |
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| TECHNICAL<br>DIMENSIONS AND<br>TECHNICAL DATA<br>PAGE <b>08</b> |
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| TECHNICAL<br>t-I AND CUT-OFF<br>CHARACTERISTICS<br>PAGE <b>11</b> |
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| TECHNICAL<br>RAPIDPLUS FUSES IN<br>PMC, PMF & PMX<br>MODULAR FUSE<br>HOLDERS<br>PAGE <b>12</b> |
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|                                                                 |
|-----------------------------------------------------------------|
| COMPATIBLE<br>PMF MODULAR<br>FUSE HOLDERS<br>SEE<br>CYLINDRICAL |
|-----------------------------------------------------------------|

|                                                                 |
|-----------------------------------------------------------------|
| COMPATIBLE<br>PMX MODULAR<br>FUSE HOLDERS<br>SEE<br>CYLINDRICAL |
|-----------------------------------------------------------------|

|                                                         |
|---------------------------------------------------------|
| COMPATIBLE<br>BAC OPEN FUSE BASES<br>SEE<br>CYLINDRICAL |
|---------------------------------------------------------|

# RAPIDPLUS

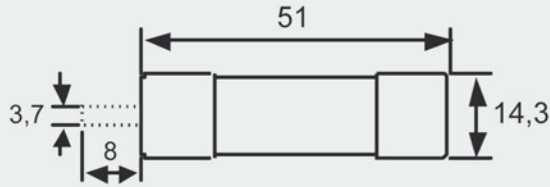
## HIGH SPEED FUSES FOR SEMICONDUCTORS

TECHNICAL

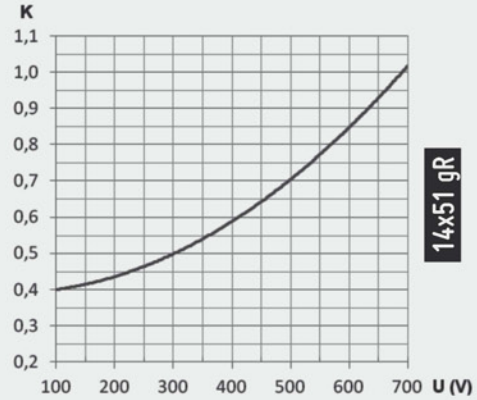
### gR SEMICONDUCTOR FUSES

#### DIMENSIONS & TECHNICAL DATA

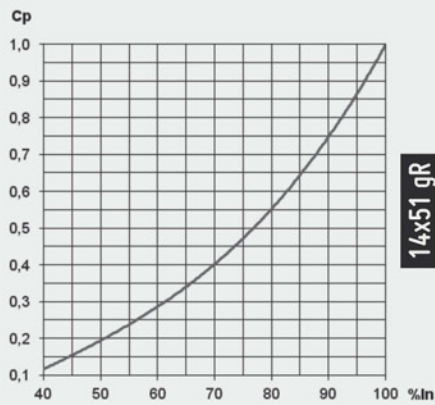
14x51



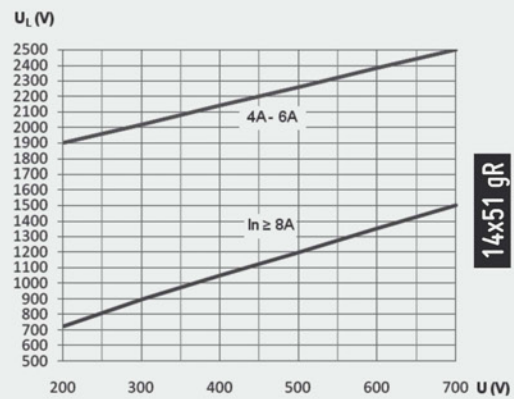
$I^2t$  Correction Factor (K)



Correction Factor for Power Loss (Cp)



Peak Arc Voltage (UL)



| $I_n$<br>(A) | $I^2t$ Prearcing<br>(A <sup>2</sup> S) | Operating $I^2t$ @ 690 V<br>(A <sup>2</sup> S) | Power loss $0.8 \cdot I_n$<br>(W) | Power loss $I_n$<br>(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

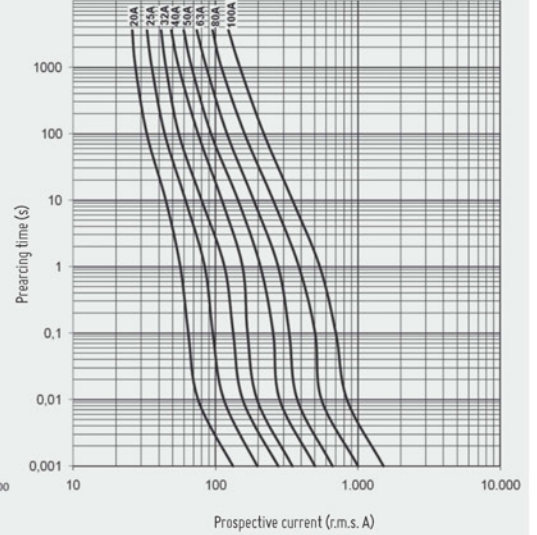
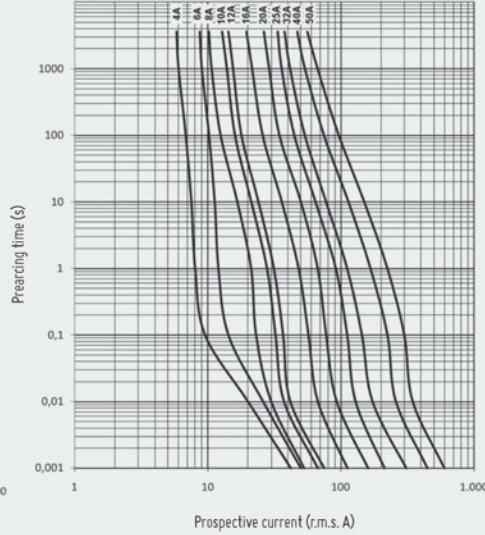
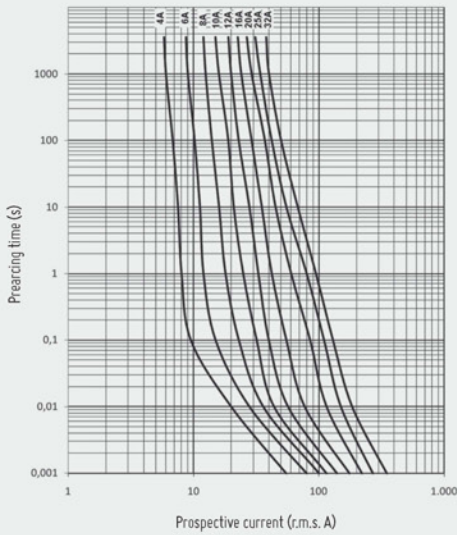
#### t-I CHARACTERISTICS

10x38  
14x51  
22x58

10x38

14x51

22x58



TECHNICAL

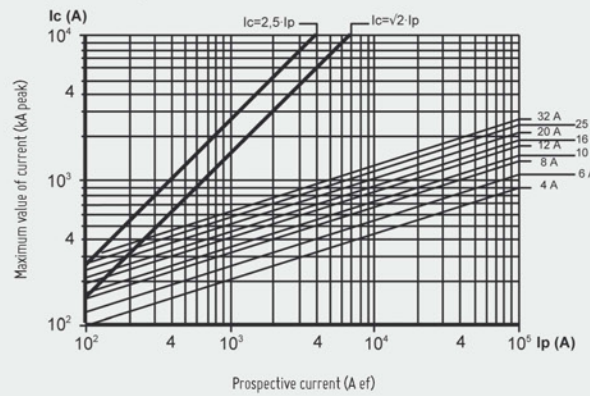
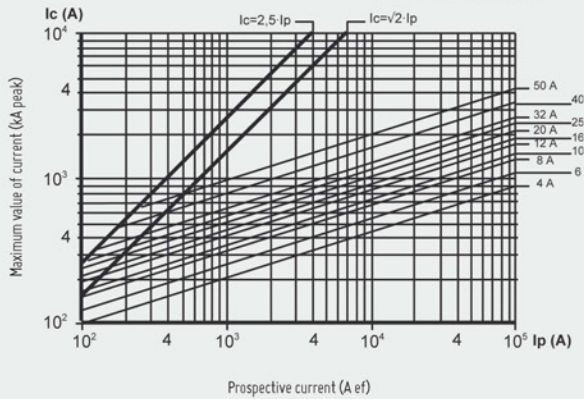
### gR SEMICONDUCTOR FUSES

#### CUT-OFF CHARACTERISTICS

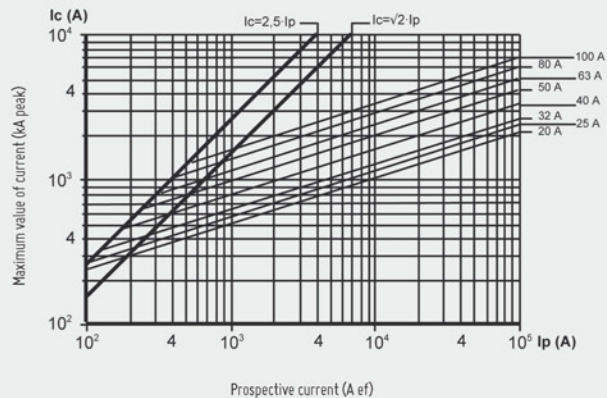
10x38  
14x51  
22x58

14x51

10x38



22x58



TECHNICAL

### aR SEMICONDUCTOR FUSES

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

### gR

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<br>IEC/EN60269-2-1 | MAX. POWER ACCEPATNCE<br>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                                              |