



semiconductor relay, 1-pole 3RF3 width 22.5 mm, 90 A 48-600 V / 24 V DC spring-loaded terminal for mounting on available cooling surfaces

|                                                           |                                                            |
|-----------------------------------------------------------|------------------------------------------------------------|
| product brand name                                        | SIRIUS                                                     |
| product designation                                       | solid-state relay                                          |
| product type designation                                  | 3RF31                                                      |
| manufacturer's article number                             |                                                            |
| • _1 of the accessories that can be ordered               | <a href="#">3RF3900-0WA88</a>                              |
| • _2 of the accessories that can be ordered               | <a href="#">3RF3900-0EA18</a>                              |
| product designation                                       |                                                            |
| • _1 of the accessories that can be ordered               | heat conducting foil                                       |
| • _2 of the accessories that can be ordered               | converter                                                  |
| General technical data                                    |                                                            |
| product function                                          | zero-point switching                                       |
| product feature                                           | high blocking voltage                                      |
| power loss [W] for rated value of the current             |                                                            |
| • at AC in hot operating state                            | 19 W                                                       |
| • at AC in hot operating state per pole                   | 19 W                                                       |
| • without load current share typical                      | 0.4 W                                                      |
| insulation voltage rated value                            | 600 V                                                      |
| surge voltage resistance of main circuit rated value      | 6 kV                                                       |
| protection class IP                                       | IP20                                                       |
| protection class IP on the front according to IEC 60529   | IP20                                                       |
| shock resistance according to IEC 60068-2-27              | 15g / 11 ms                                                |
| vibration resistance according to IEC 60068-2-6           | 2g                                                         |
| reference code according to IEC 81346-2                   | Q                                                          |
| Substance Prohibitance (Date)                             | 01/15/2024                                                 |
| SVHC substance name                                       | Lead - 7439-92-1<br>Lead monoxide (lead oxide) - 1317-36-8 |
| Net Weight                                                | 0.08 kg                                                    |
| Main circuit                                              |                                                            |
| number of poles for main current circuit                  | 1                                                          |
| number of NO contacts for main contacts                   | 1                                                          |
| number of NC contacts for main contacts                   | 0                                                          |
| type of voltage of the operating voltage                  | AC                                                         |
| operating voltage                                         |                                                            |
| • at AC                                                   |                                                            |
| — at 50 Hz rated value                                    | 48 ... 600 V                                               |
| — at 60 Hz rated value                                    | 48 ... 600 V                                               |
| operating frequency rated value                           | 50 ... 60 Hz                                               |
| relative symmetrical tolerance of the operating frequency | 10 %                                                       |
| operating range relative to the operating voltage at AC   |                                                            |

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| <ul style="list-style-type: none"> <li>• at 50 Hz</li> <li>• at 60 Hz</li> </ul>                                                                                                                                                                                                                                                            | 40 ... 660 V                                                                                                                  |
| <b>operational current rated value maximum</b>                                                                                                                                                                                                                                                                                              | 20 A                                                                                                                          |
| <b>operational current</b> <ul style="list-style-type: none"> <li>• at AC-1 at 400 V rated value</li> <li>• at AC-51 rated value</li> <li>• at AC-51 according to IEC 60947-4-3</li> <li>• according to UL 508 rated value</li> </ul>                                                                                                       | 20 A<br>20 A<br>20 A<br>20 A                                                                                                  |
| <b>rate of voltage rise at the thyristor for main contacts maximum permissible</b>                                                                                                                                                                                                                                                          | 1 000 V/μs                                                                                                                    |
| <b>blocking voltage at the thyristor for main contacts maximum permissible</b>                                                                                                                                                                                                                                                              | 1 600 V                                                                                                                       |
| <b>reverse current of the thyristor</b>                                                                                                                                                                                                                                                                                                     | 10 mA                                                                                                                         |
| <b>derating temperature</b>                                                                                                                                                                                                                                                                                                                 | 40 °C                                                                                                                         |
| <b>surge current resistance rated value</b>                                                                                                                                                                                                                                                                                                 | 1 300 A                                                                                                                       |
| <b>I<sup>2</sup>t value maximum</b>                                                                                                                                                                                                                                                                                                         | 8 000 A <sup>2</sup> ·s                                                                                                       |
| <b>Control circuit/ Control</b>                                                                                                                                                                                                                                                                                                             |                                                                                                                               |
| <b>type of voltage of the control supply voltage</b>                                                                                                                                                                                                                                                                                        | DC                                                                                                                            |
| <b>control supply voltage at DC</b>                                                                                                                                                                                                                                                                                                         | 15 ... 24 V                                                                                                                   |
| <b>control supply voltage 1 at DC rated value</b>                                                                                                                                                                                                                                                                                           | 24 V                                                                                                                          |
| <b>control supply voltage</b> <ul style="list-style-type: none"> <li>• at DC initial value for signal &lt;1&gt; detection</li> <li>• at DC full-scale value for signal&lt;0&gt; recognition</li> </ul>                                                                                                                                      | 15 V<br>5 V                                                                                                                   |
| <b>operating range factor control supply voltage rated value at DC</b> <ul style="list-style-type: none"> <li>• initial value</li> <li>• full-scale value</li> </ul>                                                                                                                                                                        | 0.63<br>1                                                                                                                     |
| <b>control current at minimum control supply voltage</b> <ul style="list-style-type: none"> <li>• at DC</li> </ul>                                                                                                                                                                                                                          | 13 mA                                                                                                                         |
| control current at DC rated value                                                                                                                                                                                                                                                                                                           | 15 mA                                                                                                                         |
| <b>ON-delay time</b>                                                                                                                                                                                                                                                                                                                        | 1 ms; additionally max. one half-wave                                                                                         |
| <b>OFF-delay time</b>                                                                                                                                                                                                                                                                                                                       | 1 ms; additionally max. one half-wave                                                                                         |
| <b>Auxiliary circuit</b>                                                                                                                                                                                                                                                                                                                    |                                                                                                                               |
| number of CO contacts for auxiliary contacts                                                                                                                                                                                                                                                                                                | 0                                                                                                                             |
| <b>Installation/ mounting/ dimensions</b>                                                                                                                                                                                                                                                                                                   |                                                                                                                               |
| fastening method side-by-side mounting                                                                                                                                                                                                                                                                                                      | Yes                                                                                                                           |
| <b>fastening method</b>                                                                                                                                                                                                                                                                                                                     | screw fixing                                                                                                                  |
| <b>design of the thread of the screw for securing the equipment</b>                                                                                                                                                                                                                                                                         | M4                                                                                                                            |
| <b>tightening torque of fixing screw maximum</b>                                                                                                                                                                                                                                                                                            | 1.5 N·m                                                                                                                       |
| <b>tightening torque [lbf·in] of fixing screw maximum</b>                                                                                                                                                                                                                                                                                   | 13 lbf·in                                                                                                                     |
| <b>height</b>                                                                                                                                                                                                                                                                                                                               | 85 mm                                                                                                                         |
| <b>width</b>                                                                                                                                                                                                                                                                                                                                | 22.5 mm                                                                                                                       |
| <b>depth</b>                                                                                                                                                                                                                                                                                                                                | 48 mm                                                                                                                         |
| <b>Connections/ Terminals</b>                                                                                                                                                                                                                                                                                                               |                                                                                                                               |
| <b>product component removable terminal for auxiliary and control circuit</b>                                                                                                                                                                                                                                                               | Yes                                                                                                                           |
| <b>type of electrical connection</b> <ul style="list-style-type: none"> <li>• for main current circuit</li> <li>• for auxiliary and control circuit</li> </ul>                                                                                                                                                                              | spring-loaded terminals<br>spring-loaded terminals                                                                            |
| <b>type of connectable conductor cross-sections</b> <ul style="list-style-type: none"> <li>• for main contacts <ul style="list-style-type: none"> <li>— solid</li> <li>— finely stranded with core end processing</li> <li>— finely stranded without core end processing</li> </ul> </li> <li>• for AWG cables for main contacts</li> </ul> | 2x (0.5 ... 2.5 mm <sup>2</sup> )<br>2x (0.5 ... 1.5 mm <sup>2</sup> )<br>2x (0.5 ... 2.5 mm <sup>2</sup> )<br>2x (18 ... 14) |
| <b>connectable conductor cross-section for main contacts</b> <ul style="list-style-type: none"> <li>• solid or stranded</li> <li>• finely stranded with core end processing</li> <li>• finely stranded without core end processing</li> </ul>                                                                                               | 0.5 ... 2.5 mm <sup>2</sup><br>0.5 ... 1.5 mm <sup>2</sup><br>0.5 ... 2.5 mm <sup>2</sup>                                     |

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| <b>type of connectable conductor cross-sections</b>                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                       |
| <ul style="list-style-type: none"> <li>• for auxiliary and control contacts <ul style="list-style-type: none"> <li>— solid</li> <li>— finely stranded with core end processing</li> <li>— finely stranded without core end processing</li> </ul> </li> <li>• for AWG cables for auxiliary and control contacts</li> </ul>               | 0.5 ... 1.5 mm <sup>2</sup><br>0.5 ... 2.5 mm <sup>2</sup><br>0.5 ... 2.5 mm <sup>2</sup><br>1x (20 ... 12)                                                                                                                           |
| <b>AWG number as coded connectable conductor cross section for main contacts</b>                                                                                                                                                                                                                                                        | 18 ... 14                                                                                                                                                                                                                             |
| <b>stripped length of the cable</b>                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                       |
| <ul style="list-style-type: none"> <li>• for main contacts</li> <li>• for auxiliary and control contacts</li> </ul>                                                                                                                                                                                                                     | 10 mm<br>10 mm                                                                                                                                                                                                                        |
| <b>Electrical Safety</b>                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                       |
| <b>protection class IP on the front according to IEC 60529</b>                                                                                                                                                                                                                                                                          | IP20                                                                                                                                                                                                                                  |
| <b>touch protection on the front according to IEC 60529</b>                                                                                                                                                                                                                                                                             | finger-safe, for vertical contact from the front                                                                                                                                                                                      |
| <b>Ambient conditions</b>                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                       |
| installation altitude at height above sea level maximum                                                                                                                                                                                                                                                                                 | 1 000 m                                                                                                                                                                                                                               |
| <b>ambient temperature</b>                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                       |
| <ul style="list-style-type: none"> <li>• during operation</li> <li>• during storage</li> </ul>                                                                                                                                                                                                                                          | -25 ... +60 °C<br>-55 ... +80 °C                                                                                                                                                                                                      |
| <b>Electromagnetic compatibility</b>                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                       |
| <b>conducted interference</b>                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                       |
| <ul style="list-style-type: none"> <li>• due to burst according to IEC 61000-4-4</li> <li>• due to conductor-earth surge according to IEC 61000-4-5</li> <li>• due to conductor-conductor surge according to IEC 61000-4-5</li> <li>• due to high-frequency radiation according to IEC 61000-4-6</li> </ul>                             | 2 kV / 5 kHz behavior criterion 2<br>2 kV behavior criterion 2<br>1 kV behavior criterion 2<br><br>140 dBuV in the frequency range 0.15 ... 80 MHz, behavior criterion 1                                                              |
| <b>field-based interference according to IEC 61000-4-3</b>                                                                                                                                                                                                                                                                              | 80 MHz ... 1 GHz 10 V/m, behavior criterion 1                                                                                                                                                                                         |
| <b>electrostatic discharge according to IEC 61000-4-2</b>                                                                                                                                                                                                                                                                               | 4 kV contact discharging / 8 kV air discharging, behavior criterion 2                                                                                                                                                                 |
| <b>conducted HF interference emissions according to CISPR11</b>                                                                                                                                                                                                                                                                         | Class A for industrial environment                                                                                                                                                                                                    |
| <b>field-bound HF interference emission according to CISPR11</b>                                                                                                                                                                                                                                                                        | Class B for the domestic, business and commercial environments                                                                                                                                                                        |
| <b>Short-circuit protection, design of the fuse link</b>                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                       |
| manufacturer's article number <ul style="list-style-type: none"> <li>• of gS fuse for semiconductor protection at NH design usable</li> <li>• of back-up R fuse link for semiconductor protection at NH design usable</li> <li>• of back-up R fuse link for semiconductor protection at cylindrical design 22 x 58 mm usable</li> </ul> | <a href="#">3NE1818-0: These fuses have a smaller rated current than the semiconductor relays</a><br><a href="#">3NE8021-1</a><br><br><a href="#">3NC2280: These fuses have a smaller rated current than the semiconductor relays</a> |
| manufacturer's article number of the gG fuse <ul style="list-style-type: none"> <li>• at NH design usable</li> </ul>                                                                                                                                                                                                                    | <a href="#">3NA6812-6: These fuses have a smaller rated current than the semiconductor relays</a>                                                                                                                                     |

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