



semiconductor relay, 1-pole 3RF3 width 22.5 mm, 90 A 24-230 V 110-230 V AC  
ring cable lug connection 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="#">3RF2900-3PA88</a>                              |
| • _2 of the accessories that can be ordered               | <a href="#">3RF3900-0WA88</a>                              |
| • _3 of the accessories that can be ordered               | <a href="#">3RF3990-0GA33</a>                              |
| product designation                                       |                                                            |
| • _1 of the accessories that can be ordered               | terminal cover                                             |
| • _2 of the accessories that can be ordered               | heat conducting foil                                       |
| General technical data                                    |                                                            |
| product function                                          | zero-point switching                                       |
| power loss [W] for rated value of the current             |                                                            |
| • at AC in hot operating state                            | 83 W                                                       |
| • at AC in hot operating state per pole                   | 83 W                                                       |
| • without load current share typical                      | 3.5 W                                                      |
| insulation voltage rated value                            | 600 V                                                      |
| surge voltage resistance of main circuit rated value      | 6 kV                                                       |
| protection class IP                                       | IP00                                                       |
| protection class IP on the front according to IEC 60529   | IP00                                                       |
| 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                                    | 24 ... 230 V                                               |
| — at 60 Hz rated value                                    | 24 ... 230 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   |                                                            |

|                                                                                                                                                                                                            |                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <ul style="list-style-type: none"> <li>• at 50 Hz</li> <li>• at 60 Hz</li> </ul>                                                                                                                           | 20 ... 253 V                           |
| <b>operational current rated value maximum</b>                                                                                                                                                             | 20 ... 253 V                           |
| <b>operational current</b>                                                                                                                                                                                 | 80 A                                   |
| <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> | 80 A                                   |
| <b>rate of voltage rise at the thyristor for main contacts maximum permissible</b>                                                                                                                         | 80 A                                   |
| <b>blocking voltage at the thyristor for main contacts maximum permissible</b>                                                                                                                             | 80 A                                   |
| <b>reverse current of the thyristor</b>                                                                                                                                                                    | 80 A                                   |
| <b>derating temperature</b>                                                                                                                                                                                | 1 000 V/μs                             |
| <b>surge current resistance rated value</b>                                                                                                                                                                | 800 V                                  |
| <b>I<sup>2</sup>t value maximum</b>                                                                                                                                                                        | 10 mA                                  |
| <b>Control circuit/ Control</b>                                                                                                                                                                            | 40 °C                                  |
| <b>type of voltage of the control supply voltage</b>                                                                                                                                                       | 1 300 A                                |
| <b>control supply voltage at AC</b>                                                                                                                                                                        | 8 000 A <sup>2</sup> ·s                |
| <ul style="list-style-type: none"> <li>• at 50 Hz</li> <li>• at 60 Hz</li> </ul>                                                                                                                           | AC                                     |
| <b>control supply voltage 1 at AC</b>                                                                                                                                                                      | 110 ... 230 V                          |
| <ul style="list-style-type: none"> <li>• at 50 Hz</li> <li>• at 60 Hz</li> </ul>                                                                                                                           | 110 ... 230 V                          |
| <b>control supply voltage frequency</b>                                                                                                                                                                    | 110 ... 230 V                          |
| <ul style="list-style-type: none"> <li>• 1 rated value</li> <li>• 2 rated value</li> </ul>                                                                                                                 | 110 ... 230 V                          |
| <b>control supply voltage at AC</b>                                                                                                                                                                        | 50 Hz                                  |
| <ul style="list-style-type: none"> <li>• at 50 Hz full-scale value for signal&lt;0&gt; recognition</li> <li>• at 60 Hz full-scale value for signal&lt;0&gt; recognition</li> </ul>                         | 60 Hz                                  |
| <b>control supply voltage</b>                                                                                                                                                                              | 40 V                                   |
| <ul style="list-style-type: none"> <li>• at AC initial value for signal &lt;1&gt; detection</li> </ul>                                                                                                     | 40 V                                   |
| <b>symmetrical line frequency tolerance</b>                                                                                                                                                                | 90 V                                   |
| <b>operating range factor control supply voltage rated value at AC at 50 Hz</b>                                                                                                                            | 5 Hz                                   |
| <ul style="list-style-type: none"> <li>• initial value</li> </ul>                                                                                                                                          | 0.82                                   |
| <b>operating range factor control supply voltage rated value at AC at 60 Hz</b>                                                                                                                            | 0.82                                   |
| <ul style="list-style-type: none"> <li>• initial value</li> </ul>                                                                                                                                          | 0.82                                   |
| <b>control current at minimum control supply voltage</b>                                                                                                                                                   | 2 mA                                   |
| <ul style="list-style-type: none"> <li>• at AC</li> </ul>                                                                                                                                                  | 15 mA                                  |
| <b>control current at AC rated value</b>                                                                                                                                                                   | 40 ms; additionally max. one half-wave |
| <b>ON-delay time</b>                                                                                                                                                                                       | 40 ms; additionally max. one half-wave |
| <b>OFF-delay time</b>                                                                                                                                                                                      | 40 ms; additionally max. one half-wave |
| <b>Auxiliary circuit</b>                                                                                                                                                                                   |                                        |
| <b>number of CO contacts for auxiliary contacts</b>                                                                                                                                                        | 0                                      |
| <b>Installation/ mounting/ dimensions</b>                                                                                                                                                                  |                                        |
| <b>fastening method side-by-side mounting</b>                                                                                                                                                              | 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>                                                                                                                                                                       |                                        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                           |
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| <ul style="list-style-type: none"> <li>• for main current circuit</li> <li>• for auxiliary and control circuit</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                    | Ring cable lug connection<br>screw-type terminals                                                                                                                                                                                                                                         |
| <b>type of connectable conductor cross-sections</b> <ul style="list-style-type: none"> <li>• for main contacts for JIS cable lug</li> <li>• for AWG cables for main contacts</li> <li>• for DIN cable lug for main contacts</li> </ul>                                                                                                                                                                                                                                                                                       | JIS C 2805 R 2-5, 5,5-5, 8-5, 14-5<br>1x (12 ... 4)<br>DIN 46234 -5-2,5, -5-6, -5-10, -5-16, -5-25                                                                                                                                                                                        |
| <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>                                                                                                                                                | 1x (0.5 ... 2.5 mm <sup>2</sup> ), 2x (0.5 ... 1 mm <sup>2</sup> )<br>1x (0.5 ... 2.5 mm <sup>2</sup> ), 2x (0.5 ... 1 mm <sup>2</sup> )<br>1x (0.5 ... 2.5 mm <sup>2</sup> ), 2x (0.5 ... 1 mm <sup>2</sup> )<br>1x (20 ... 12)                                                          |
| <b>AWG number as coded connectable conductor cross section for main contacts</b>                                                                                                                                                                                                                                                                                                                                                                                                                                             | 12 ... 4                                                                                                                                                                                                                                                                                  |
| <b>tightening torque</b> <ul style="list-style-type: none"> <li>• for main contacts with screw-type terminals</li> <li>• for auxiliary and control contacts with screw-type terminals</li> </ul>                                                                                                                                                                                                                                                                                                                             | 2 ... 2.5 N·m<br>0.5 ... 0.6 N·m                                                                                                                                                                                                                                                          |
| <b>tightening torque [lbf·in]</b> <ul style="list-style-type: none"> <li>• for main contacts with screw-type terminals</li> <li>• for auxiliary and control contacts with screw-type terminals</li> </ul>                                                                                                                                                                                                                                                                                                                    | 18 ... 22 lbf·in<br>4.5 ... 5.3 lbf·in                                                                                                                                                                                                                                                    |
| <b>design of the thread of the connection screw</b> <ul style="list-style-type: none"> <li>• for main contacts</li> <li>• of the auxiliary and control contacts</li> </ul>                                                                                                                                                                                                                                                                                                                                                   | M5<br>M3                                                                                                                                                                                                                                                                                  |
| <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>                                                                                                                                                                                                                                                                                                                                                                      | 7 mm<br>7 mm                                                                                                                                                                                                                                                                              |
| <b>Electrical Safety</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                           |
| <b>protection class IP on the front according to IEC 60529</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | IP00; IP20 with cover                                                                                                                                                                                                                                                                     |
| <b>touch protection on the front according to IEC 60529</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | finger-safe, for vertical contact from the front with cover                                                                                                                                                                                                                               |
| <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>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 full range R fuse link for semiconductor protection at NH design usable</li> <li>• of gS fuse for semiconductor protection at NH design usable</li> <li>• of full range R fuse link for semiconductor protection at cylindrical 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="#">3NE1021-2</a><br><a href="#">3NE1820-0; These fuses have a smaller rated current than the semiconductor relays</a><br><a href="#">5SE1363; These fuses have a smaller rated current than the semiconductor relays</a><br><a href="#">3NE8021-1</a><br><a href="#">3NC2200</a> |
| manufacturer's article number of the gG fuse                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                           |

- at NH design usable
- at cylindrical design 10 x 38 mm usable
- at cylindrical design 14 x 51 mm usable
- at cylindrical design 22 x 58 mm usable

[3NA6817: These fuses have a smaller rated current than the semiconductor relays](#)  
[3NW6012-1: These fuses have a smaller rated current than the semiconductor relays](#)  
[3NW6117-1: These fuses have a smaller rated current than the semiconductor relays](#)  
[3NW6217-1: These fuses have a smaller rated current than the semiconductor relays](#)

manufacturer's article number

- of DIAZED fuse usable
- of NEOZED fuse usable

[5SB4111: These fuses have a smaller rated current than the semiconductor relays](#)  
[5SE2335: These fuses have a smaller rated current than the semiconductor relays](#)

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