

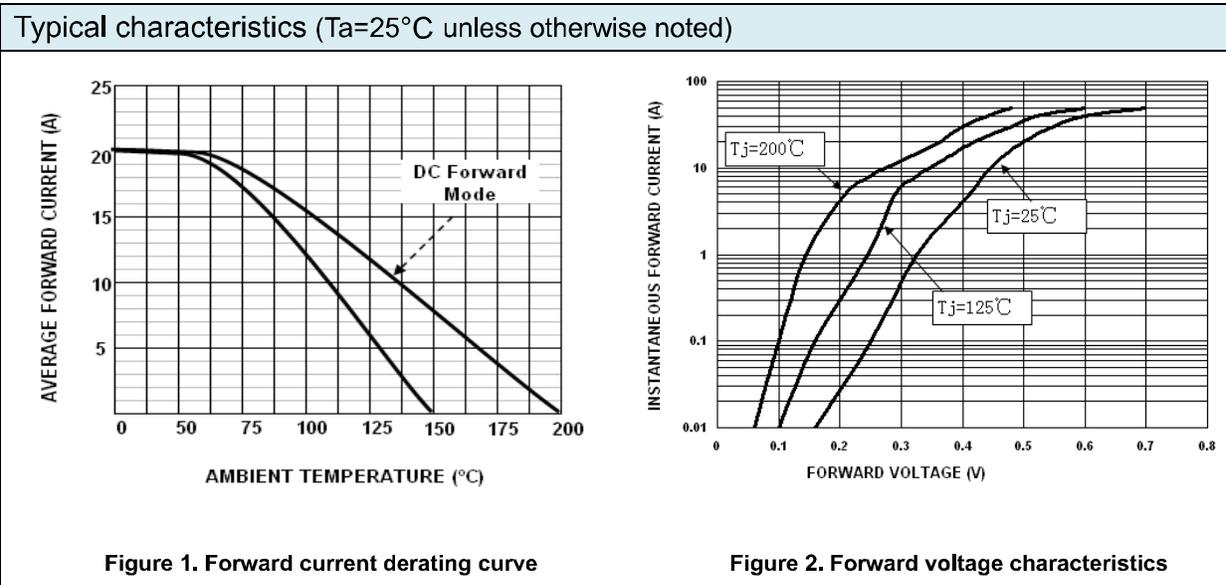
| <p><u>R-7</u></p> <br>  |                  | <p><b>Features</b></p> <ul style="list-style-type: none"> <li>• ROHS Compliant </li> <li>• Metal silicon junction, majority carrier conduction</li> <li>• Guard ring for stress protection</li> <li>• Low forward voltage drop</li> <li>• High forward surge capability</li> <li>• High current capability</li> <li>• Solder dip 260°C / 10S</li> </ul> |                  |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
|---|------------------|--|------------------|-----------|--------|-----------|------|--------------------------------------|-----------|------------|-------|--------------------------|-----------|--|--|--------------------------|----------|----|---|--|-------------|----|---|--|-----------|-----|---|--|--------|-----|------------------|--------------------------------|-------|------------|----|--|-------|-----|----|---------------------|-----------|------------|----|---|------------------|----|------|---|------------------|-----|------|
| <p><b>Primary characteristics</b></p> <table border="1"> <tr> <td><math>I_{F(AV)}</math></td> <td>20A</td> </tr> <tr> <td><math>V_{RRM}</math></td> <td>45V</td> </tr> <tr> <td><math>I_{FSM}</math></td> <td>350A</td> </tr> <tr> <td><math>V_F</math></td> <td>0.50V</td> </tr> <tr> <td><math>T_J</math> max.</td> <td>150°C</td> </tr> <tr> <td>DC forward mode</td> <td>200°C</td> </tr> </table>  |                  | $I_{F(AV)}$  | 20A              | $V_{RRM}$ | 45V    | $I_{FSM}$ | 350A | $V_F$                                | 0.50V     | $T_J$ max. | 150°C | DC forward mode          | 200°C     | <p><b>Applications</b></p> <p>Ideal for solar PV application such as by-pass diode</p> |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| $I_{F(AV)}$   | 20A              |  |                  |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| $V_{RRM}$   | 45V              |  |                  |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| $I_{FSM}$   | 350A             |  |                  |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| $V_F$   | 0.50V            |  |                  |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| $T_J$ max.  | 150°C            |  |                  |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| DC forward mode   | 200°C            |  |                  |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
|   |                  | <p><b>Mechanical data</b></p> <ul style="list-style-type: none"> <li>• Case: R-7 Axial-leaded, molded plastic</li> <li>• Epoxy meets UL 94 V-0 flammability rating</li> <li>• Terminals: Tin plated leads.</li> <li>• Polarity: As marked</li> <li>• Weight: 2.10 grams</li> </ul>   |                  |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| <p><b>Maximum rating (Ta=25°C unless otherwise noted)</b></p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Symbol</th> <th>SPSL2045</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>Max. repetitive peak reverse voltage</td> <td><math>V_{RRM}</math></td> <td>45</td> <td>V</td> </tr> <tr> <td>Max. RMS reverse voltage</td> <td><math>V_{RMS}</math></td> <td>31.5</td> <td></td> </tr> <tr> <td>Max. DC blocking voltage</td> <td><math>V_{DC}</math></td> <td>45</td> <td>V</td> </tr> <tr> <td>Max. average forward current (see Fig.1)</td> <td><math>I_{F(AV)}</math></td> <td>20</td> <td>A</td> </tr> <tr> <td>Non-repetitive peak forward surge current<br/>8.3ms single half-sine-wave</td> <td><math>I_{FSM}</math></td> <td>350</td> <td>A</td> </tr> <tr> <td>Rating for fusing, <math>1ms \leq t \leq 8.3ms</math></td> <td><math>I^2t</math></td> <td>508</td> <td>A<sup>2</sup>S</td> </tr> <tr> <td>Operating junction temperature</td> <td><math>T_J</math></td> <td>-50 ~ +150</td> <td>°C</td> </tr> <tr> <td>Max. junction temperature in DC forward mode</td> <td><math>T_J</math></td> <td>200</td> <td>°C</td> </tr> <tr> <td>Storage temperature</td> <td><math>T_{STG}</math></td> <td>-50 ~ +150</td> <td>°C</td> </tr> <tr> <td>Thermal resistance junction to ambient<sup>(1)</sup></td> <td><math>R_{\theta J-A}</math></td> <td>10</td> <td>°C/W</td> </tr> <tr> <td>Thermal resistance junction to ambient<sup>(2)</sup></td> <td><math>R_{\theta J-L}</math></td> <td>2.1</td> <td>°C/W</td> </tr> </tbody> </table> |                  |  |                  | Parameter | Symbol | SPSL2045  | Unit | Max. repetitive peak reverse voltage | $V_{RRM}$ | 45         | V     | Max. RMS reverse voltage | $V_{RMS}$ | 31.5   |  | Max. DC blocking voltage | $V_{DC}$ | 45 | V | Max. average forward current (see Fig.1) | $I_{F(AV)}$ | 20 | A | Non-repetitive peak forward surge current<br>8.3ms single half-sine-wave | $I_{FSM}$ | 350 | A | Rating for fusing, $1ms \leq t \leq 8.3ms$ | $I^2t$ | 508 | A <sup>2</sup> S | Operating junction temperature | $T_J$ | -50 ~ +150 | °C | Max. junction temperature in DC forward mode | $T_J$ | 200 | °C | Storage temperature | $T_{STG}$ | -50 ~ +150 | °C | Thermal resistance junction to ambient <sup>(1)</sup> | $R_{\theta J-A}$ | 10 | °C/W | Thermal resistance junction to ambient <sup>(2)</sup> | $R_{\theta J-L}$ | 2.1 | °C/W |
| Parameter   | Symbol           | SPSL2045   | Unit             |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| Max. repetitive peak reverse voltage  | $V_{RRM}$        | 45   | V                |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| Max. RMS reverse voltage  | $V_{RMS}$        | 31.5   |                  |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| Max. DC blocking voltage  | $V_{DC}$         | 45   | V                |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| Max. average forward current (see Fig.1)  | $I_{F(AV)}$      | 20   | A                |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| Non-repetitive peak forward surge current<br>8.3ms single half-sine-wave  | $I_{FSM}$        | 350  | A                |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| Rating for fusing, $1ms \leq t \leq 8.3ms$  | $I^2t$           | 508  | A <sup>2</sup> S |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| Operating junction temperature  | $T_J$            | -50 ~ +150   | °C               |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| Max. junction temperature in DC forward mode  | $T_J$            | 200  | °C               |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| Storage temperature   | $T_{STG}$        | -50 ~ +150   | °C               |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| Thermal resistance junction to ambient <sup>(1)</sup>   | $R_{\theta J-A}$ | 10   | °C/W             |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |
| Thermal resistance junction to ambient <sup>(2)</sup>   | $R_{\theta J-L}$ | 2.1  | °C/W             |           |        |           |      |                                      |           |            |       |                          |           |  |  |                          |          |    |   |  |             |    |   |  |           |     |   |  |        |     |                  |                                |       |            |    |  |       |     |    |                     |           |            |    |   |                  |    |      |   |                  |     |      |

Note: (1) Leads are kept at ambient temperature at a distance of 10 mm from case

(2) Measured in 3mm distance from case - use for by bypass diodes test

| Maximum rating (Ta=25°C unless otherwise noted) |                       |                                  |                |      |      |      |      |
|---|-----------------------|----------------------------------|----------------|------|------|------|------|
| Parameter                                       | Test condition        |                                  | Symbol         | Min. | Typ. | Max. | Unit |
| Forward voltage drop <sup>(3)</sup>             | T <sub>J</sub> =25°C  | I <sub>F</sub> =5A               | V <sub>F</sub> | -    | 0.41 | 0.43 | V    |
|   | T <sub>J</sub> =125°C |                                  |                | -    | 0.29 | -    | V    |
|   | T <sub>J</sub> =200°C |                                  |                | -    | 0.21 | -    | V    |
|   | T <sub>J</sub> =25°C  | I <sub>F</sub> =8A               | V <sub>F</sub> | -    | 0.43 | 0.46 | V    |
|   | T <sub>J</sub> =125°C |                                  |                | -    | 0.33 | -    | V    |
|   | T <sub>J</sub> =200°C |                                  |                | -    | 0.25 | -    | V    |
|   | T <sub>J</sub> =25°C  | I <sub>F</sub> =12A              | V <sub>F</sub> | -    | 0.46 | -    | V    |
|   | T <sub>J</sub> =125°C |                                  |                | -    | 0.36 | -    | V    |
|   | T <sub>J</sub> =200°C |                                  |                | -    | 0.30 | -    | V    |
|   | T <sub>J</sub> =25°C  | I <sub>F</sub> =20A              | V <sub>F</sub> | -    | 0.50 | 0.55 | V    |
|   | T <sub>J</sub> =125°C |                                  |                | -    | 0.42 | -    | V    |
|   | T <sub>J</sub> =200°C |                                  |                | -    | 0.37 | -    | V    |
| Reverse leakage current                         | T <sub>J</sub> =25°C  | V <sub>R</sub> =V <sub>RRM</sub> | I <sub>R</sub> | -    | 0.04 | 0.5  | mA   |
|   | T <sub>J</sub> =100°C |                                  |                | -    | -    | 50.0 | mA   |

Note: (3) Pulse test with PW=300us, 1% duty cycle.



Typical characteristics (Ta=25°C unless otherwise noted)

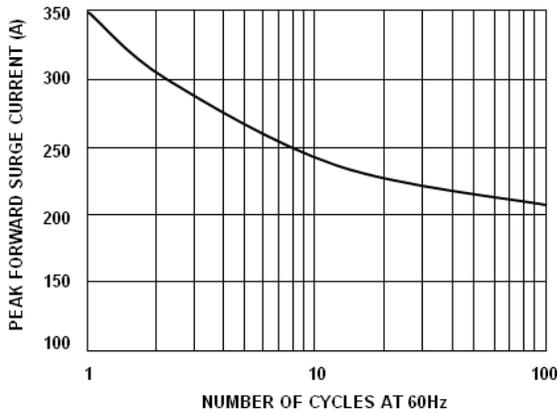


Figure 3. Non-repetitive surge current

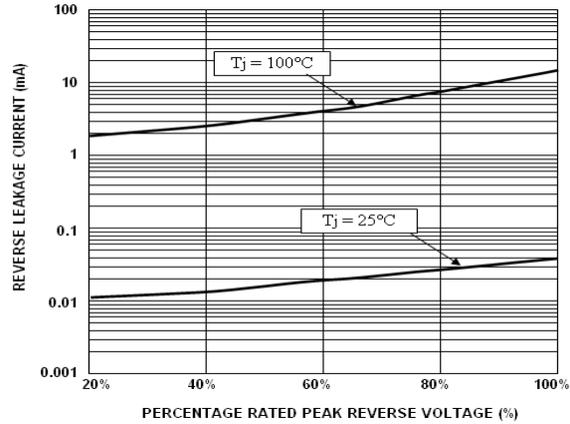
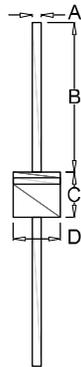


Figure 4. Reverse current characteristics

Package outline dimensions



| Dim. | Inches |       | Millimeters |      |
|------|--------|-------|-------------|------|
|      | Min.   | Max.  | Min.        | Max. |
| A    | 0.059  | 0.063 | 1.50        | 1.60 |
| B    | 1      |       | 25.40       |      |
| C    | 0.291  | 0.299 | 7.40        | 7.60 |
| D    | 0.311  | 0.319 | 7.90        | 8.10 |

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