

## SCD88

### Power Rectifier Diodes



#### FEATURES

- High surge current capability
- Stud cathode and stud anode version
- Leaded version available
- Types up to 1600 V  $V_{RRM}$
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level

#### TYPICAL APPLICATIONS

- Battery chargers
- Converters
- Power supplies
- Machine tool controls
- Welding

| Parameters       | SCD88       |              | Units            |
|------------------|-------------|--------------|------------------|
|                  | 10 to 120   | 140 to 160   |                  |
| $I_{F(AV)}$      | 85          | 85           | A                |
| @ $T_C$          | 140         | 110          | °C               |
| $I_{F(RMS)}$     | 133         |              | A                |
| $I_{FSM}$ @ 50Hz | 1700        |              | A                |
| @ 60Hz           | 1800        |              | A                |
| $I^2t$ @ 50Hz    | 14500       |              | A <sup>2</sup> s |
| @ 60Hz           | 13500       |              | A <sup>2</sup> s |
| $V_{RRM}$ range  | 100 to 1200 | 1400 to 1600 | V                |
| $T_J$ range      | - 65 to 180 | - 65 to 150  | °C               |

#### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER           | TEST CONDITIONS | SCD88       |             | UNITS            |
|---------------------|-----------------|-------------|-------------|------------------|
|                     |                 | 10 TO 120   | 140/160     |                  |
| I <sub>F(AV)</sub>  |                 | 85          |             | A                |
|                     | T <sub>C</sub>  | 140         | 110         | °C               |
| I <sub>F(RMS)</sub> |                 | 133         |             | A                |
| I <sub>FSM</sub>    | 50 Hz           | 1700        |             | A                |
|                     | 60 Hz           | 1800        |             |                  |
| I <sup>2</sup> t    | 50 Hz           | 14 500      |             | A <sup>2</sup> s |
|                     | 60 Hz           | 13 500      |             |                  |
| V <sub>RRM</sub>    | Range           | 100 to 1200 | 1400/1600   | V                |
| T <sub>J</sub>      |                 | - 65 to 180 | - 65 to 150 | °C               |

#### VOLTAGE RATINGS

| TYPE NUMBER | VOLTAGE CODE | $V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE<br>V | $V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE<br>V | $I_{RRM}$ MAXIMUM AT $T_J = T_J$ MAXIMUM<br>mA |
|-------------|--------------|----------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------|
| SCD88       | 10           | 100                                                      | 200                                                          | 9                                              |
|             | 20           | 200                                                      | 300                                                          |                                                |
|             | 40           | 400                                                      | 500                                                          |                                                |
|             | 60           | 600                                                      | 700                                                          |                                                |
|             | 80           | 800                                                      | 900                                                          |                                                |
|             | 100          | 1000                                                     | 1100                                                         |                                                |
|             | 120          | 1200                                                     | 1300                                                         |                                                |
|             | 140          | 1400                                                     | 1500                                                         | 4.5                                            |
|             | 160          | 1600                                                     | 1700                                                         |                                                |

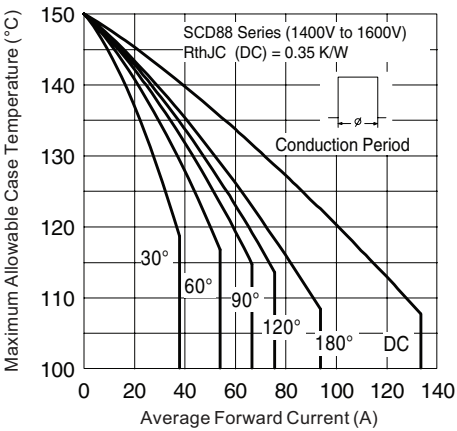
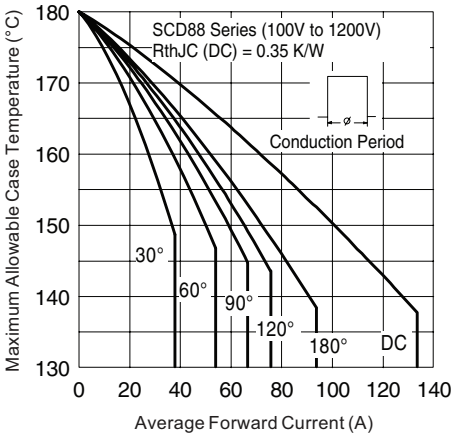
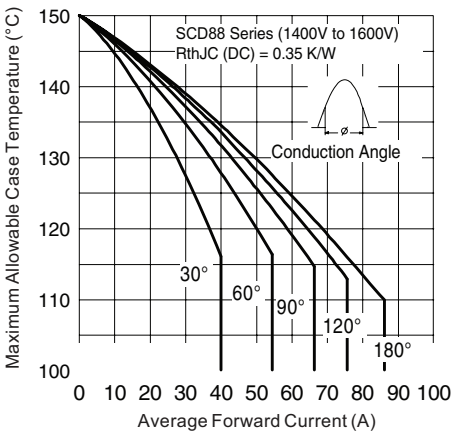
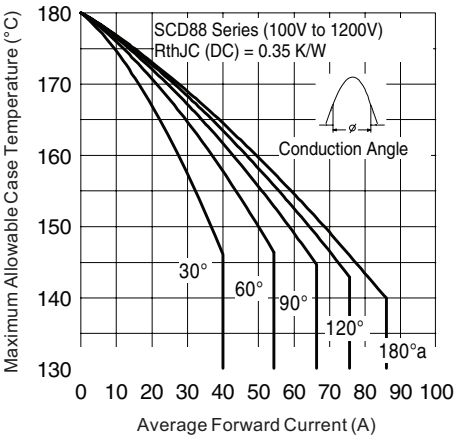
| FORWARD CONDUCTION                                            |                     |                                                                                           |                                  |                                                                       |           |         |                   |
|---------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------|-----------|---------|-------------------|
| PARAMETER                                                     | SYMBOL              | TEST CONDITIONS                                                                           |                                  |                                                                       | SCD88     |         | UNITS             |
|                                                               |                     |                                                                                           |                                  |                                                                       | 10 to 120 | 140/160 |                   |
| Maximum average forward current at case temperature           | I <sub>F(AV)</sub>  | 180° conduction, half sine wave                                                           |                                  |                                                                       | 85        |         | A                 |
|                                                               |                     |                                                                                           |                                  |                                                                       | 140       | 110     | °C                |
| Maximum RMS forward current                                   | I <sub>F(RMS)</sub> |                                                                                           |                                  |                                                                       | 133       |         | A                 |
| Maximum peak, one-cycle forward, non-repetitive surge current | I <sub>FSM</sub>    | t = 10 ms                                                                                 | No voltage reapplied             | Sinusoidal half wave, initial T <sub>J</sub> = T <sub>J</sub> maximum | 1700      |         | A                 |
|                                                               |                     | t = 8.3 ms                                                                                |                                  |                                                                       | 1800      |         |                   |
|                                                               |                     | t = 10 ms                                                                                 | 100 % V <sub>RRM</sub> reapplied |                                                                       | 1450      |         |                   |
|                                                               |                     | t = 8.3 ms                                                                                |                                  |                                                                       | 1500      |         |                   |
| Maximum I <sup>2</sup> t for fusing                           | I <sup>2</sup> t    | t = 10 ms                                                                                 | No voltage reapplied             |                                                                       | 14 500    |         | A <sup>2</sup> s  |
|                                                               |                     | t = 8.3 ms                                                                                |                                  |                                                                       | 13 500    |         |                   |
|                                                               |                     | t = 10 ms                                                                                 | 100 % V <sub>RRM</sub> reapplied |                                                                       | 10 500    |         |                   |
|                                                               |                     | t = 8.3 ms                                                                                |                                  |                                                                       | 9400      |         |                   |
| Maximum I <sup>2</sup> √t for fusing                          | I <sup>2</sup> √t   | t = 0.1 ms to 10 ms, no voltage reapplied                                                 |                                  |                                                                       | 16 000    |         | A <sup>2</sup> √s |
| Value of threshold voltage (up to 1200 V)                     | V <sub>F(TO)</sub>  | T <sub>J</sub> = T <sub>J</sub> maximum                                                   |                                  |                                                                       | 0.68      |         | V                 |
| Value of threshold voltage (for 1400 V, 1600 V)               |                     |                                                                                           |                                  |                                                                       | 0.69      |         |                   |
| Value of forward slope resistance (up to 1200 V)              | r <sub>f</sub>      | T <sub>J</sub> = T <sub>J</sub> maximum                                                   |                                  |                                                                       | 1.62      |         | mΩ                |
| Value of forward slope resistance (for 1400 V, 1600 V)        |                     |                                                                                           |                                  |                                                                       | 1.75      |         |                   |
| Maximum forward voltage drop                                  | V <sub>FM</sub>     | I <sub>pk</sub> = 267 A, T <sub>J</sub> = 25 °C, t <sub>p</sub> = 400 μs rectangular wave |                                  |                                                                       | 1.2       | 1.4     | V                 |

| THERMAL AND MECHANICAL SPECIFICATIONS                    |                                   |                                                             |                 |             |                     |
|----------------------------------------------------------|-----------------------------------|-------------------------------------------------------------|-----------------|-------------|---------------------|
| PARAMETER                                                | SYMBOL                            | TEST CONDITIONS                                             | SCD88           |             | UNITS               |
|                                                          |                                   |                                                             | 10 to 120       | 140/160     |                     |
| Maximum junction operating and storage temperature range | T <sub>J</sub> , T <sub>Stg</sub> |                                                             | - 65 to 180     | - 65 to 150 | °C                  |
| Maximum thermal resistance, junction to case             | R <sub>thJC</sub>                 | DC operation                                                | 0.35            |             | K/W                 |
| Maximum thermal resistance, case to heatsink             | R <sub>thCS</sub>                 | Mounting surface, smooth, flat and greased                  | 0.25            |             |                     |
| Maximum shock <sup>(1)</sup>                             |                                   |                                                             | 1500            |             | g                   |
| Maximum constant vibration <sup>(1)</sup>                |                                   | 50 Hz                                                       | 20              |             |                     |
| Maximum constant acceleration <sup>(1)</sup>             |                                   | Stud outwards                                               | 5000            |             |                     |
| Maximum allowable mounting torque (+ 0 %, - 10 %)        |                                   | Not lubricated thread, tightening on nut <sup>(2)</sup>     | 3.4 (30)        |             | N · m<br>(lbf · in) |
|                                                          |                                   | Lubricated thread, tightening on nut <sup>(2)</sup>         | 2.3 (20)        |             |                     |
|                                                          |                                   | Not lubricated thread, tightening on hexagon <sup>(3)</sup> | 4.2 (37)        |             |                     |
|                                                          |                                   | Lubricated thread, tightening on hexagon <sup>(3)</sup>     | 3.2 (28)        |             |                     |
| Approximate weight                                       |                                   | Unleaded device                                             | 17              |             | g                   |
|                                                          |                                   |                                                             | 0.6             |             | oz.                 |
| Case style                                               |                                   | See dimensions - link at the end of datasheet               | DO-203AB (DO-5) |             |                     |

| $\Delta R_{thJC}$ CONDUCTION |                       |                        |                             |       |
|------------------------------|-----------------------|------------------------|-----------------------------|-------|
| CONDUCTION ANGLE             | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS             | UNITS |
| 180°                         | 0.10                  | 0.08                   | $T_J = T_J \text{ maximum}$ | K/W   |
| 120°                         | 0.11                  | 0.11                   |                             |       |
| 90°                          | 0.13                  | 0.13                   |                             |       |
| 60°                          | 0.17                  | 0.17                   |                             |       |
| 30°                          | 0.26                  | 0.26                   |                             |       |

**Note**

- The table above shows the increment of thermal resistance  $R_{thJC}$  when devices operate at different conduction angles than DC



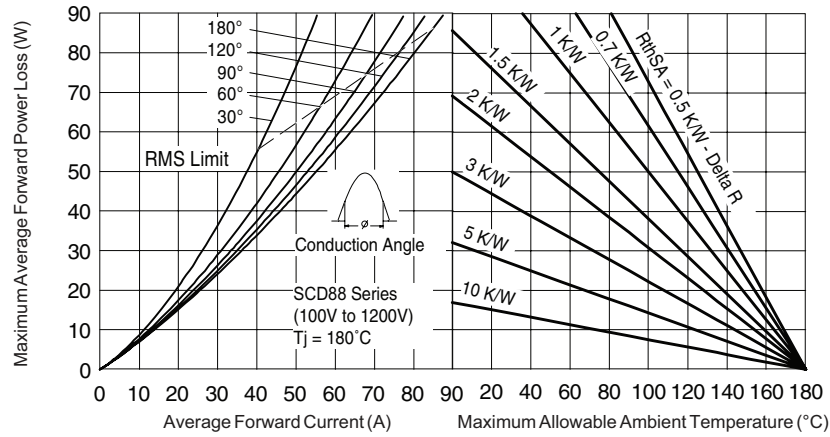


Fig. 5 - Forward Power Loss Characteristics

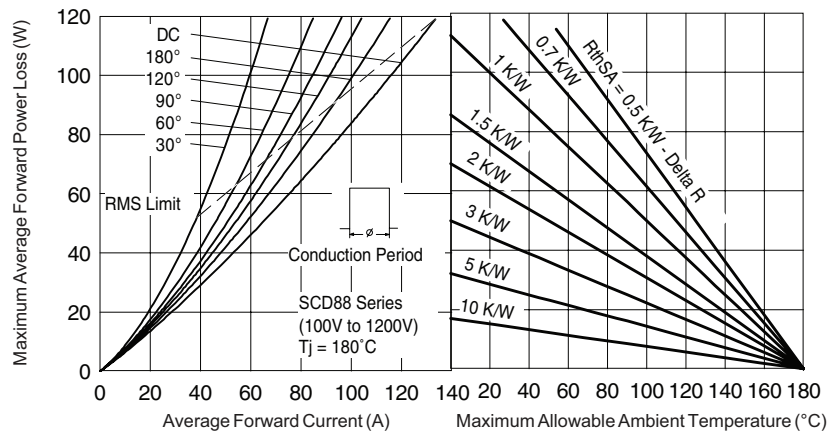


Fig. 6 - Forward Power Loss Characteristics

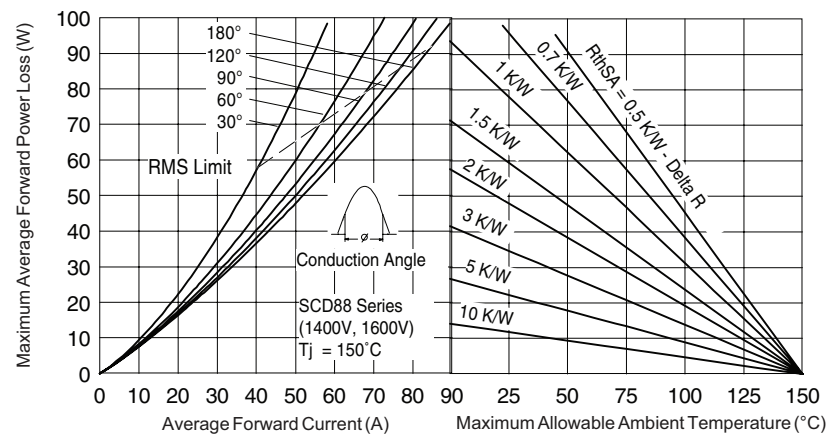


Fig. 7 - Forward Power Loss Characteristics

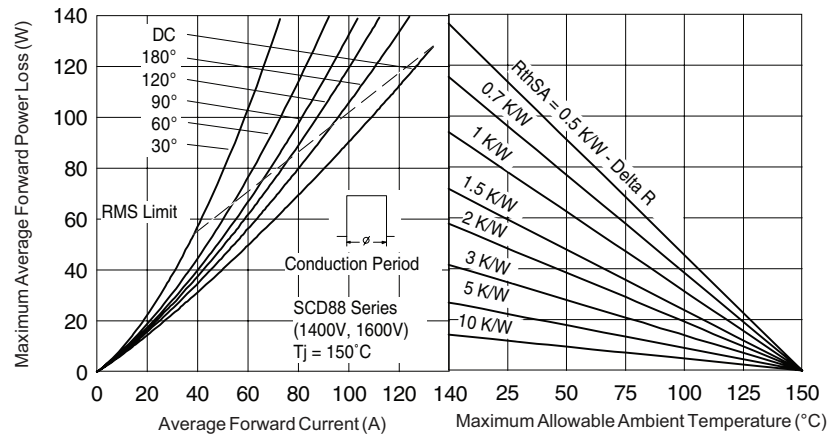


Fig. 8 - Forward Power Loss Characteristics

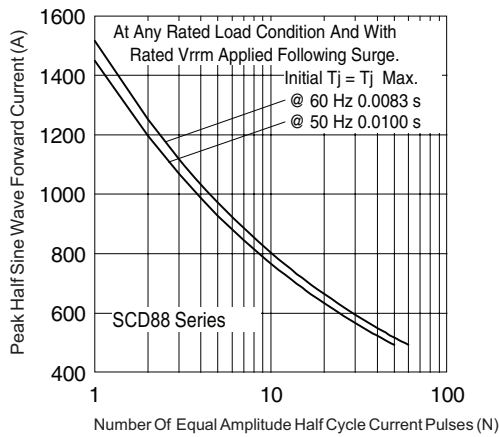


Fig. 9 - Maximum Non-Repetitive Surge Current

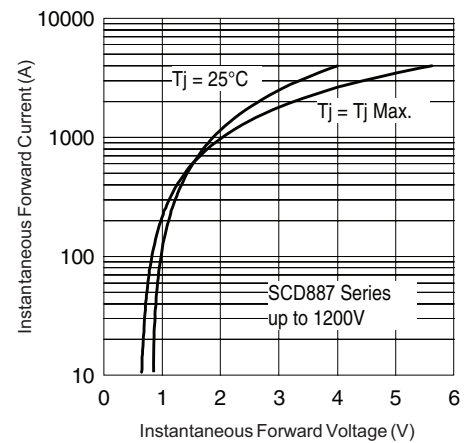


Fig. 11 - Forward Voltage Drop Characteristics (up to 1200 V)

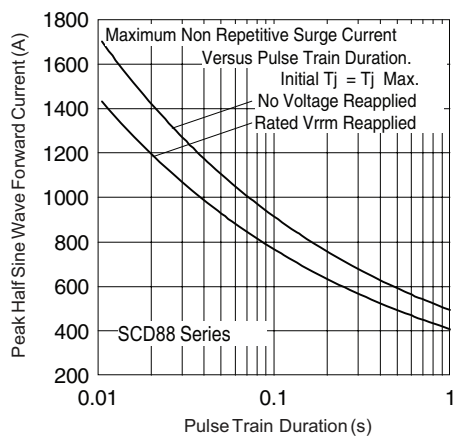


Fig. 10 - Maximum Non-Repetitive Surge Current

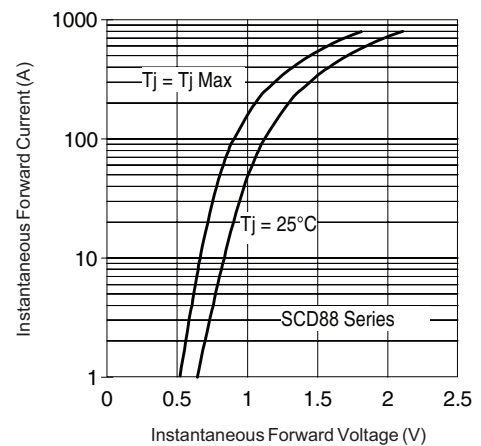
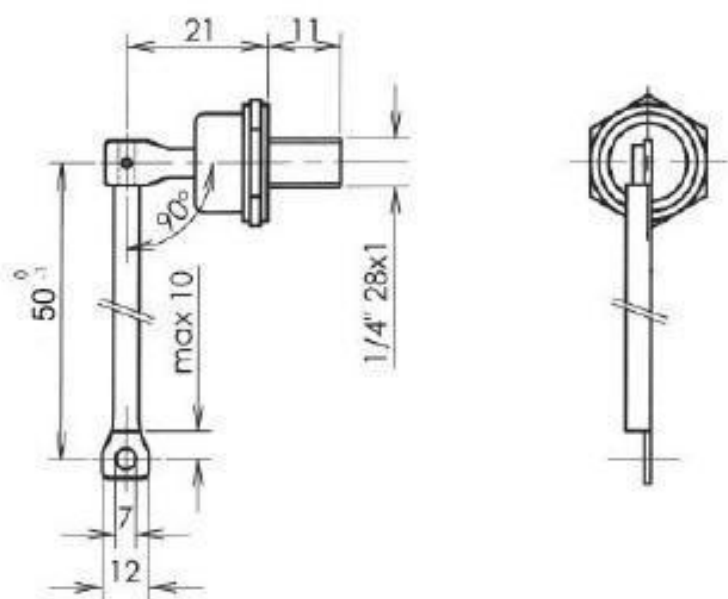
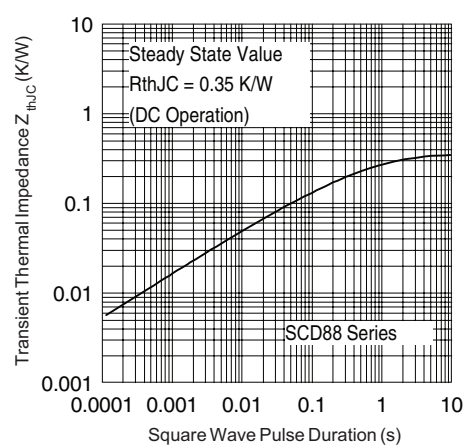


Fig. 12 - Forward Voltage Drop Characteristics (for 1400 V, 1600 V)



SCD88R A to stud



SCD88N K to stud

