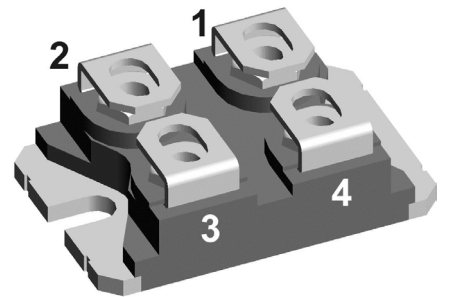


# SiC Schottky Diode

 $V_{RRM} = 650\text{ V}$   
 $I_{FAV} = 2 \times 80\text{ A}$ 

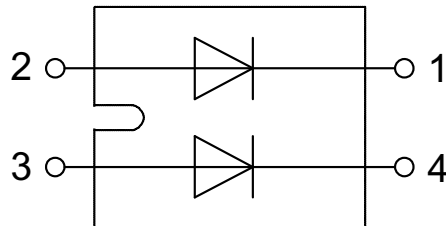
Ultra fast switching  
 Zero reverse recovery

Part number  
**DCG160X650NA**



Backside: isolated

 E72873



### Features / Advantages:

- Ultra fast switching
- Zero reverse recovery
- Zero forward recovery
- Temperature independent switching behavior
- Positive temperature coefficient of forward voltage
- $T_{VJM} = 175^{\circ}\text{C}$

### Applications:

- Solar inverter
- Uninterruptible power supply (UPS)
- Welding equipment
- Switched-mode power supplies
- Medical equipment
- High speed rectifier

### Package: SOT-227B (minibloc)

- Isolation Voltage: 2500 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate with Aluminium nitride isolation for low thermal resistance
- Advanced power cycling

### Disclaimer Notice

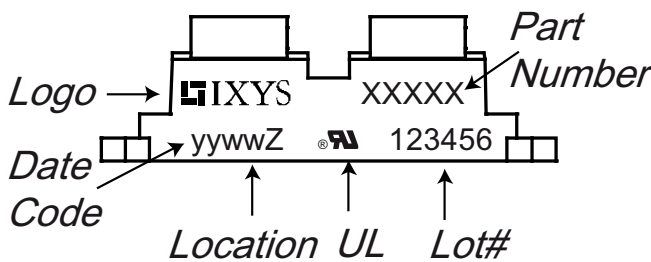
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| SiC Diode  |  |   |   | Ratings            |             |                          |
|------------|--|---|---|--------------------|-------------|--------------------------|
| Symbol     | Definitions                                  | Conditions  | min.  | typ.               | max.        |                          |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage |   |   |                    | 650         | V                        |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     |   |   |                    | 650         | V                        |
| $I_R$      | reverse current                              | $V_R = V_{RRM}$   |   | 0.1<br>0.4         | 1.0<br>2.0  | mA<br>mA                 |
| $V_F$      | forward voltage                              | $I_F = 50\text{ A}$<br>$I_F = 100\text{ A}$   | $T_{VJ} = 25^\circ\text{C}$                         | 1.25               |             | V                        |
|            |  |   |   | 1.55               | 1.85        | V                        |
|            |  | $I_F = 50\text{ A}$<br>$I_F = 100\text{ A}$   | $T_{VJ} = 175^\circ\text{C}$                        | 1.35               |             | V                        |
|            |  |   |   | 1.9                | 2.3         | V                        |
| $I_{FAV}$  | average forward current                      | $T_C = 75^\circ\text{C}$<br>$T_C = 100^\circ\text{C}$ } rectangular,<br>d = 0.5                             | $T_{VJ} = 175^\circ\text{C}$                        |                    | 80<br>67    | A<br>A                   |
| $I_{F25}$  | forward current                              | based on typ. $V_{F0}$ and $r_F$  | $T_C = 25^\circ\text{C}$                            |                    | 134         | A                        |
| $I_{F80}$  |  |   | $T_C = 80^\circ\text{C}$                            |                    | 101         | A                        |
| $I_{F100}$ |  |   | $T_C = 100^\circ\text{C}$                           |                    | 87          | A                        |
| $I_{FSM}$  | max forward surge current                    | t = 10 ms, half sine (50 Hz)<br>$t_p = 10\ \mu\text{s}$ , pulse; $V_R = 0\text{V}$                          | $T_{VJ} = 25^\circ\text{C}$                         |                    | 650<br>3200 | A<br>A                   |
| $V_{F0}$   | threshold voltage                            |   | $T_{VJ} = 125^\circ\text{C}$<br>$175^\circ\text{C}$ | 0.83<br>0.77       |             | V<br>V                   |
| $r_F$      | slope resistance                             | for power loss calculation  | $T_{VJ} = 125^\circ\text{C}$<br>$175^\circ\text{C}$ | 9.5<br>11.3        |             | m $\Omega$<br>m $\Omega$ |
| $Q_C$      | total capacitive charge                      | $V_R = 400\text{ V}$ , $I_F = 100\text{A}$  | $T_{VJ} = 25^\circ\text{C}$                         | 220                |             | nC                       |
| $C$        | total capacitance                            | $V_R = 0\text{ V}$<br>$V_R = 200\text{ V}$<br>$V_R = 400\text{ V}$ } f = 1 MHz; $T_{VJ} = 25^\circ\text{C}$ |   | 3950<br>400<br>360 |             | pF<br>pF<br>pF           |
| $R_{thJC}$ | thermal resistance junction to case          |   |   |                    | 0.49        | K/W                      |
| $R_{thJH}$ | thermal resistance junction to heatsink      | with heatsink compound; IXYS test setup   |   |                    | 0.62        | K/W                      |

| Package Outlines SOT-227B (minibloc) |                               |   | Ratings      |      |            |          |
|--------------------------------------|-------------------------------|---|--------------|------|------------|----------|
| Symbol                               | Definitions                   | Conditions  | min.         | typ. | max.       | Unit     |
| $I_{RMS}$                            | RMS current                   | per terminal  |              |      | 100        | A        |
| $T_{stg}$                            | storage temperature           |   | -40          |      | 150        | °C       |
| $T_{op}$                             | operation temperature         |   | -40          |      | 150        | °C       |
| $T_{VJ}$                             | virtual junction temperature  |   | -40          |      | 175        | °C       |
| <b>Weight</b>                        |                               |   |              | 30   |            | g        |
| $M_D$                                | mounting torque <sup>1)</sup> | screws to heatsink<br>terminal connection screws                      |              |      | 1.5<br>1.3 | Nm<br>Nm |
| $d_{Spp}$                            | creepage distance on surface  | terminal to terminal  | 10.5         |      |            | mm       |
| $d_{Spb}$                            |                               | terminal to backside  | 8.5          |      |            | mm       |
| $d_{App}$                            | striking distance through air | terminal to terminal  | 3.2          |      |            | mm       |
| $d_{Apb}$                            |                               | terminal to backside  | 6.8          |      |            | mm       |
| $V_{ISOL}$                           | isolation voltage             | $I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}$                        | 3000<br>2500 |      |            | V<br>V   |
| $C_p$                                | coupling capacity per switch  | between shorted terminals of one diode<br>and back side metallization |              | 20   |            | pF       |

<sup>1)</sup> further information see application note IXAN0073 on [www.ixys.com/TechnicalSupport/appnotes.aspx](http://www.ixys.com/TechnicalSupport/appnotes.aspx) (General / Isolation, Mounting, Soldering, Cooling)

## Product Marking

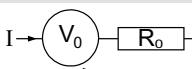


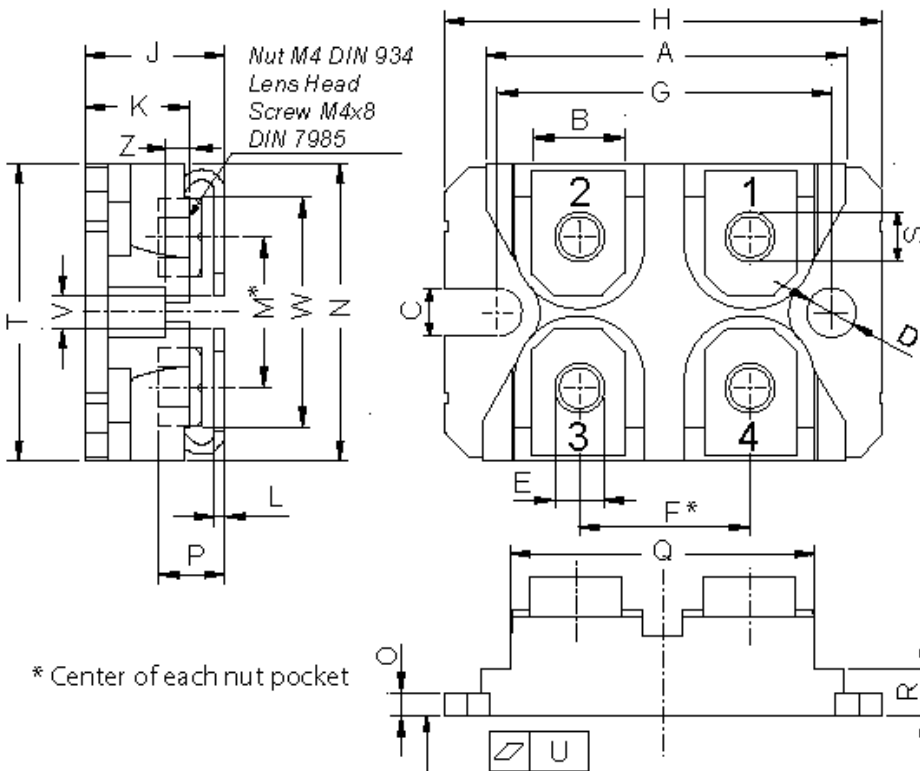
### Part description

D = Diode  
 C = SiC  
 G = Extreme fast  
 160 = Current Rating [A]  
 X = Parallel legs  
 650 = Reverse Voltage [V]  
 NA = SOT-227 (minibloc)

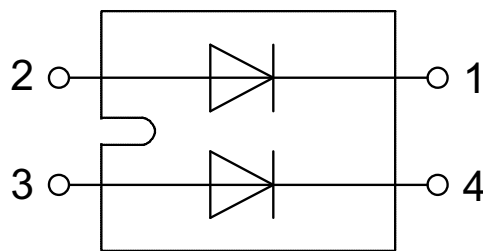
| Ordering | Part Name    | Marking on Product | Delivering Mode | Base Qty | Ordering Code |
|----------|--------------|--------------------|-----------------|----------|---------------|
| Standard | DCG160X650NA | DCG160X650NA       | Tube            | 10       | DCG160X650NA  |

### Equivalent Circuits for Simulation <sup>\*on die level</sup>

|  |                    | $T_{VJ} = 125^\circ\text{C}$ | $T_{VJ} = 175^\circ\text{C}$ |    |
|---|--------------------|------------------------------|------------------------------|----|
| $V_{0\max}$   | threshold voltage  | 0.83                         | 0.77                         | V  |
| $R_{0\max}$   | slope resistance * | 9.5                          | 11.3                         | mΩ |

**Outlines SOT-227B (minibloc)**


| Dim. | Millimeter |       | Inches |       |
|------|------------|-------|--------|-------|
|      | min        | max   | min    | max   |
| A    | 31.50      | 31.88 | 1.240  | 1.255 |
| B    | 7.80       | 8.20  | 0.307  | 0.323 |
| C    | 4.09       | 4.29  | 0.161  | 0.169 |
| D    | 4.09       | 4.29  | 0.161  | 0.169 |
| E    | 4.09       | 4.29  | 0.161  | 0.169 |
| F    | 14.91      | 15.11 | 0.587  | 0.595 |
| G    | 30.12      | 30.30 | 1.186  | 1.193 |
| H    | 37.80      | 38.23 | 1.488  | 1.505 |
| J    | 11.68      | 12.22 | 0.460  | 0.481 |
| K    | 8.92       | 9.60  | 0.351  | 0.378 |
| L    | 0.74       | 0.84  | 0.029  | 0.033 |
| M    | 12.50      | 13.10 | 0.492  | 0.516 |
| N    | 25.15      | 25.42 | 0.990  | 1.001 |
| O    | 1.95       | 2.13  | 0.077  | 0.084 |
| P    | 4.95       | 6.20  | 0.195  | 0.244 |
| Q    | 26.54      | 26.90 | 1.045  | 1.059 |
| R    | 3.94       | 4.42  | 0.155  | 0.167 |
| S    | 4.55       | 4.85  | 0.179  | 0.191 |
| T    | 24.59      | 25.25 | 0.968  | 0.994 |
| U    | -0.05      | 0.10  | -0.002 | 0.004 |
| V    | 3.20       | 5.50  | 0.126  | 0.217 |
| W    | 19.81      | 21.08 | 0.780  | 0.830 |
| Z    | 2.50       | 2.70  | 0.098  | 0.106 |



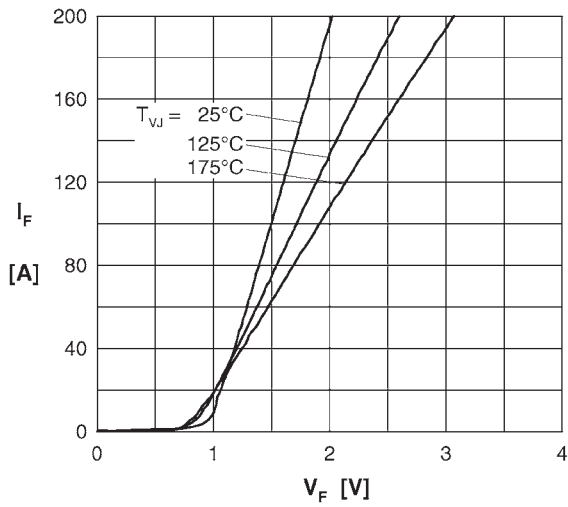
**SiC Diode (per leg)**


Fig. 1 Typ. forward characteristics

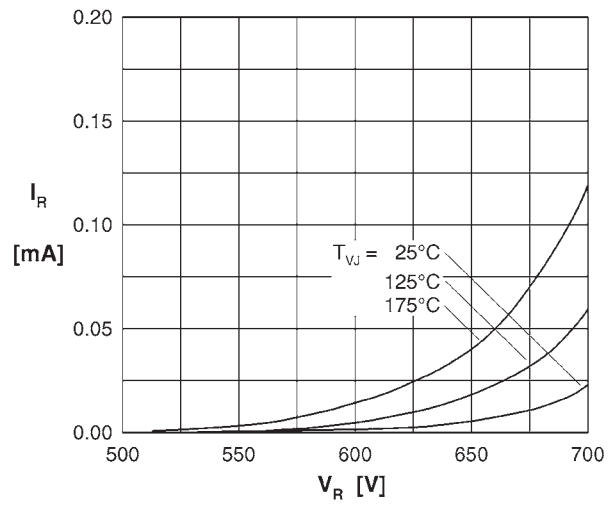


Fig. 2 Typ. reverse characteristics

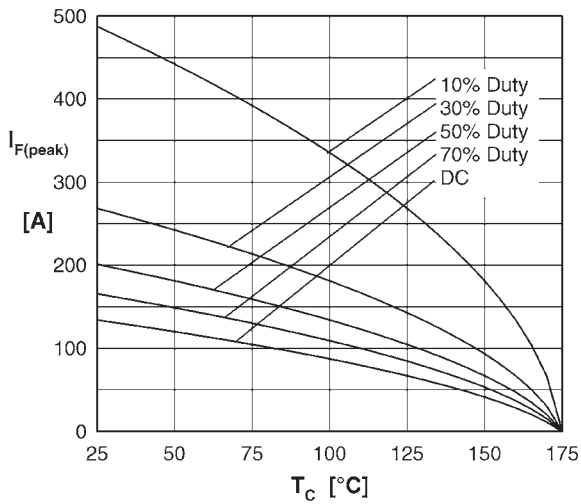


Fig. 3 Typ. current derating

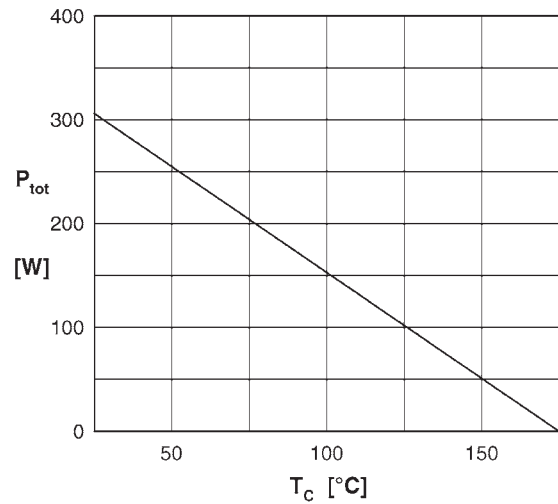


Fig. 4 Power derating

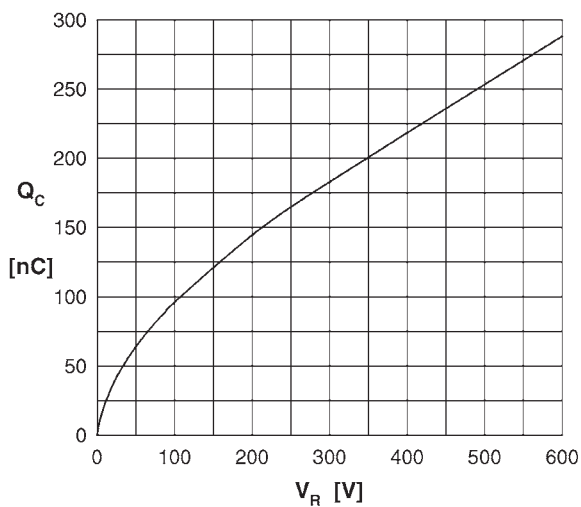


Fig. 5 Typ. recovery charge vs. reverse voltage

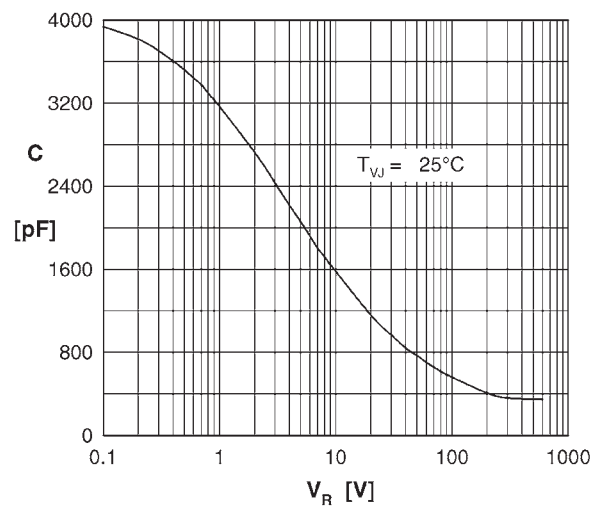


Fig. 6 Typ. junction capacitance vs. reverse Voltage

**SiC Diode (per leg)**

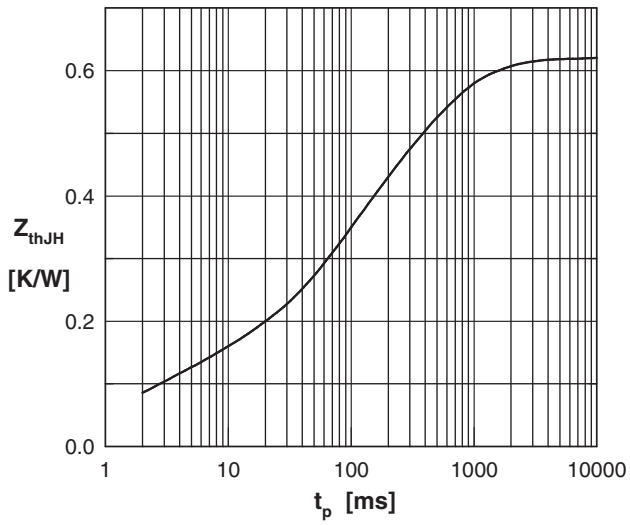


Fig. 7 Typ. transient thermal impedance