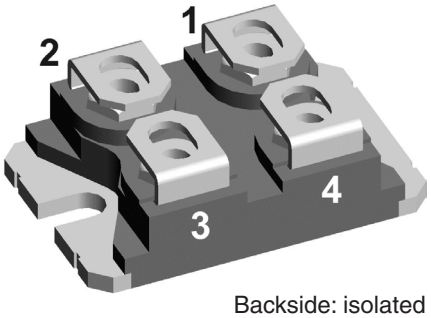
# SiC Schottky Diode

$V_{RRM}$ = 650 V
$I_{FAV}$ = 2x 80 A

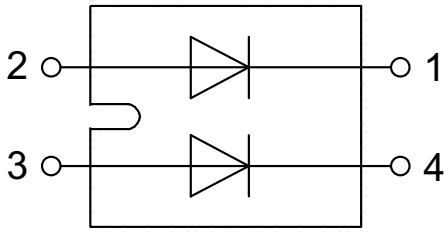
## Ultra fast switching
## Zero reverse recovery

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°C

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

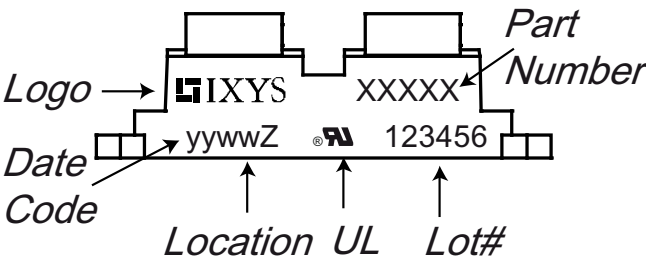
**Package:** SOT-227B (minibloc)
- Isolation Voltage: 2500 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate with Aluminium nitride isolation for low thermal resistance
- Advanced power cycling

| SiC Diode | | | | Ratings | | | |
|---|---|---|---|---|---|---|---|
| **Symbol** | **Definitions** | **Conditions** | | **min.** | **typ.** | **max.** | |
| $V_{RSM}$ | *max. non-repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 650 | V |
| $V_{RRM}$ | *max. repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 650 | V |
| $I_R$ | *reverse current* | $V_R = V_{RRM}$ | $T_{VJ}$ = 25°C | | 0.1 | 1.0 | mA |
| | | | $T_{VJ}$ = 175°C | | 0.4 | 2.0 | mA |
| $V_F$ | *forward voltage* | $I_F$ = 50 A | $T_{VJ}$ = 25°C | | 1.25 | | V |
| | | $I_F$ = 100 A | | | 1.55 | 1.85 | V |
| | | $I_F$ = 50 A | $T_{VJ}$ = 175°C | | 1.35 | | V |
| | | $I_F$ = 100 A | | | 1.9 | 2.3 | V |
| $I_{FAV}$ | *average forward current* | $T_C$ = 75°C, rectangular, d = 0.5 | $T_{VJ}$ = 175°C | | | 80 | A |
| | | $T_C$ = 100°C, rectangular, d = 0.5 | | | | 67 | A |
| $I_{F25}$ | *forward current* | based on typ. $V_{F0}$ and $r_F$ | $T_C$ = 25°C | | | 134 | A |
| $I_{F80}$ | | | $T_C$ = 80°C | | | 101 | A |
| $I_{F100}$ | | | $T_C$ = 100°C | | | 87 | A |
| $I_{FSM}$ | *max forward surge current* | t = 10 ms,half sine (50 Hz) | $T_{VJ}$ = 25°C | | | 650 | A |
| | | $t_P$ = 10 µs, pulse; $V_R$ = 0V | | | | 3200 | A |
| $V_{F0}$ | *threshold voltage* | *for power loss calculation* | $T_{VJ}$ = 125°C | | 0.83 | | V |
| | | | 175°C | | 0.77 | | V |
| $r_F$ | *slope resistance* | | $T_{VJ}$ = 125°C | | 9.5 | | mΩ |
| | | | 175°C | | 11.3 | | mΩ |
| $Q_C$ | *total capacitive charge* | $V_R$ = 400 V, $I_F$ = 100A | $T_{VJ}$ = 25°C | | 220 | | nC |
| C | *total capacitance* | $V_R$ = 0 V, f = 1 MHz | $T_{VJ}$ = 25°C | | 3950 | | pF |
| | | $V_R$ = 200 V, f = 1 MHz | $T_{VJ}$ = 25°C | | 400 | | pF |
| | | $V_R$ = 400 V, f = 1 MHz | $T_{VJ}$ = 25°C | | 360 | | 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 |
| **Weight** | | | | 30 | | g |
| $M_D$ | *mounting torque* [1] | 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* | $I_{ISOL} \leq 1$ mA; 50/60 Hz t = 1 sec.<br>t = 1 minute | 3000<br>2500 | | | V<br>V |
| $C_P$ | *coupling capacity per switch* | between shorted terminals of one diode and back side metallization | | 20 | | pF |

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

## Product Marking

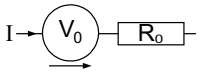



**Part description**

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

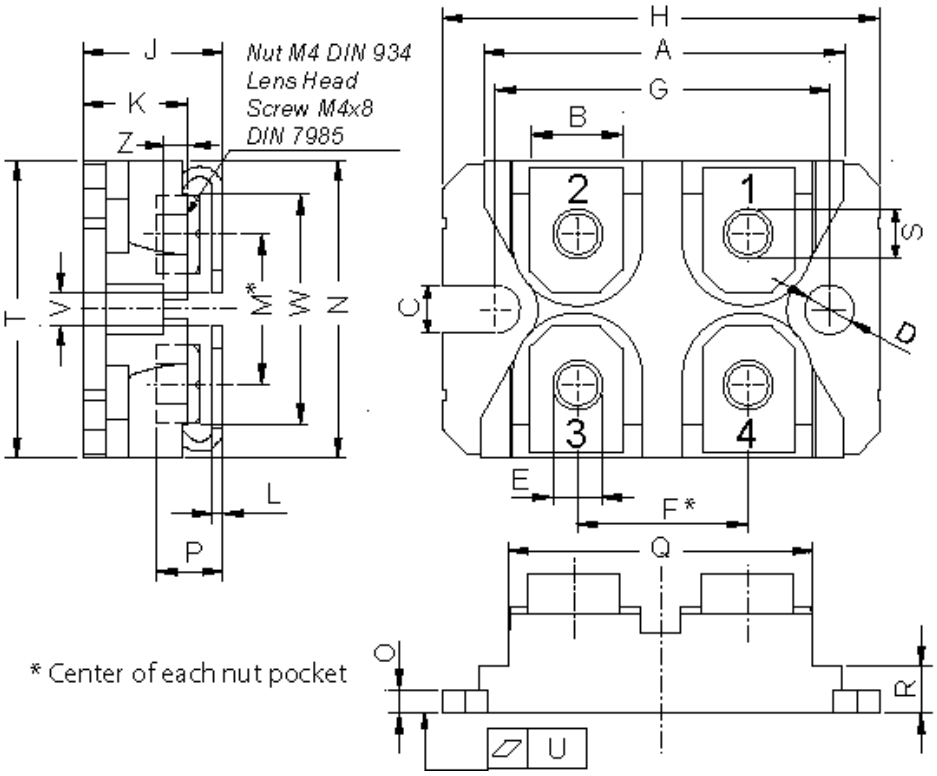
| Ordering | Part Name | Marking on Product | Delivering Mode | Base Qty | Ordering Code |
|---|---|---|---|---|---|
| Standard | DCG160X650NA | DCG160X650NA | Tube | 10 | DCG160X650NA |

**Equivalent Circuits for Simulation** **on die level*

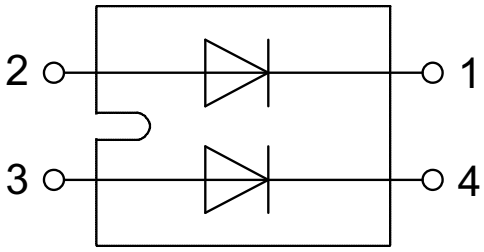



| | | $T_{VJ}$ = 125°C | $T_{VJ}$ = 175°C | |
|---|---|---|---|---|
| $V_{0\ max}$ | *threshold voltage* | 0.83 | 0.77 | V |
| $R_{0\ max}$ | *slope resistance* * | 9.5 | 11.3 | mΩ |

## 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)

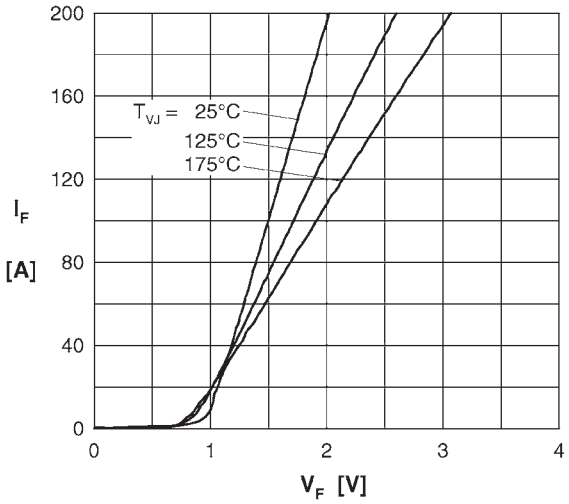



Fig. 1 Typ. forward characteristics

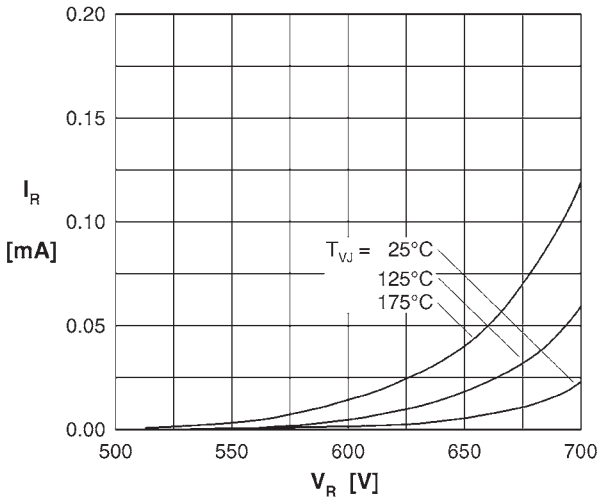



Fig. 2 Typ. reverse characteristics

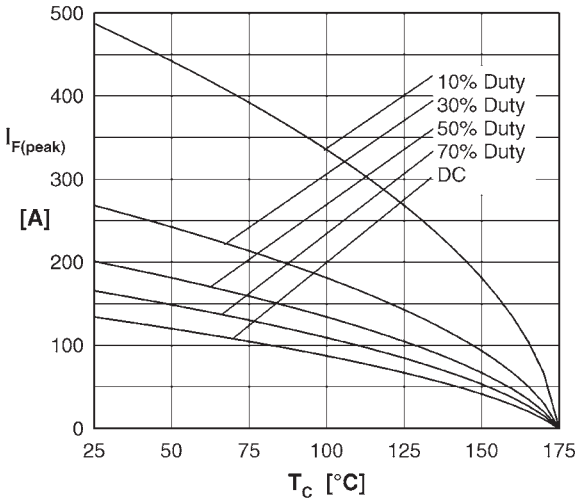



Fig. 3 Typ. current derating

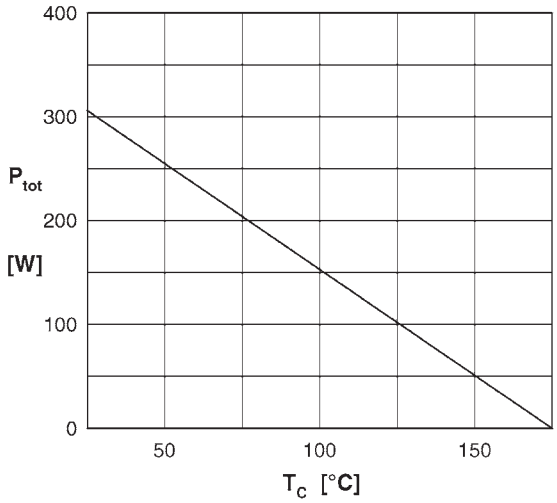



Fig. 4 Power derating

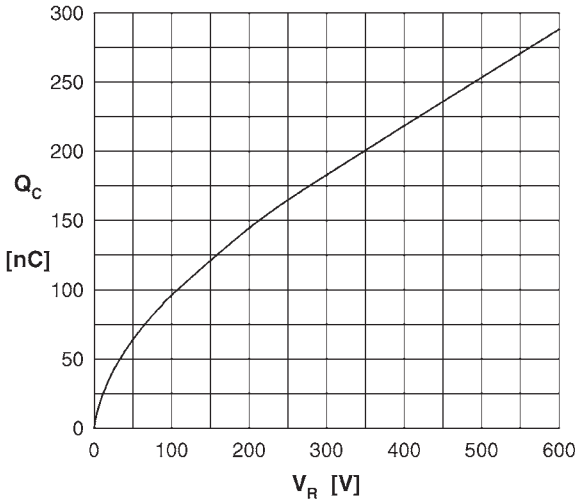



Fig. 5 Typ. recovery charge vs. reverse voltage

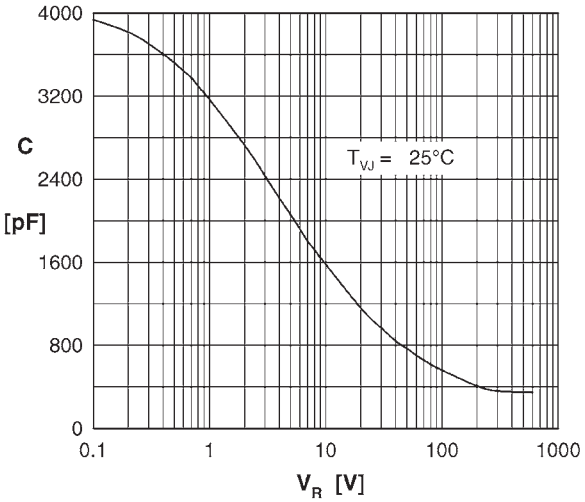



Fig. 6 Typ. junction capacitance vs. reverse Voltage

## SiC Diode (per leg)

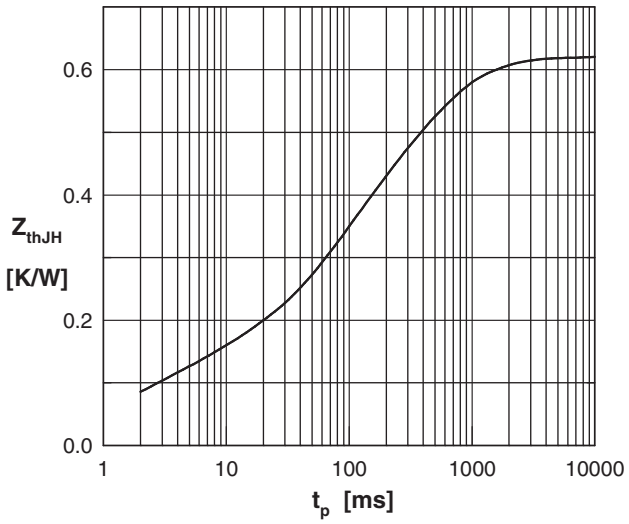



Fig. 7 Typ. transient thermal impedance