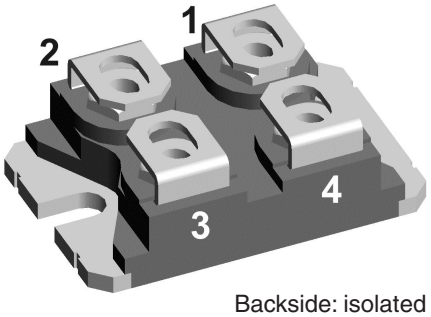
preliminary

# SiC Schottky Diode

$V_{RRM}$ = 1200 V
$I_{FAV}$ = 2x 25 A

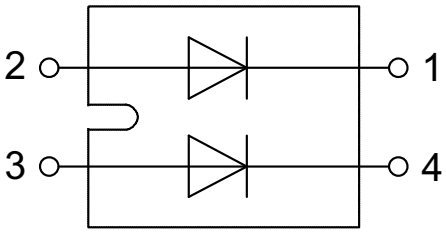
## Ultra fast switching
## Zero reverse recovery

Part number
**DCG45X1200NA**




Backside: isolated

UL pending




**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: 3000 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate with Aluminium nitride isolation for low thermal resistance
- Advanced power cycling

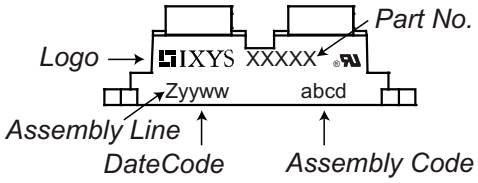
| SiC Diode (per leg) | | | | Ratings | | | |
|---|---|---|---|---|---|---|---|
| **Symbol** | **Definitions** | **Conditions** | | **min.** | **typ.** | **max.** | |
| $V_{RSM}$ | *max. non-repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 1200 | V |
| $V_{RRM}$ | *max. repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 1200 | V |
| $I_R$ | *reverse current* | $V_R = V_{RRM}$ | $T_{VJ}$ = 25°C | | 35 | 200 | µA |
| | | | $T_{VJ}$ = 175°C | | 65 | 400 | µA |
| $V_F$ | *forward voltage* | $I_F$ = 10 A | $T_{VJ}$ = 25°C | | | | V |
| | | $I_F$ = 20 A | | | 1.5 | 1.8 | V |
| | | $I_F$ = 10 A | $T_{VJ}$ = 175°C | | | | V |
| | | $I_F$ = 20 A | | | 2.2 | 3.0 | V |
| $I_{FAV}$ | *average forward current* | $T_C$ = 80°C | rectangular, d = 0.5 | | | 25 | A |
| | | $T_C$ = 100°C | $T_{VJ}$ = 175°C | | | 22 | A |
| $I_{F25}$ | *forward current* | based on typ. $V_{F0}$ and $r_F$ | $T_C$ = 25°C | | | 44 | A |
| $I_{F80}$ | | | $T_C$ = 80°C | | | 34 | A |
| $I_{F100}$ | | | $T_C$ = 100°C | | | 30 | A |
| $I_{FSM}$ | *max forward surge current* | t = 10 ms,half sine (50 Hz) | $T_{VJ}$ = 25°C | | | | A |
| | | $t_P$ = 10 µs, pulse | $V_R$ = 0V | | | 1150 | A |
| $V_{F0}$ | *threshold voltage* | *for power loss calculation* | $T_{VJ}$ = 125°C | | 0.80 | | V |
| | | | 175°C | | 0.73 | | V |
| $r_F$ | *slope resistance* | | $T_{VJ}$ = 125°C | | 57.0 | | mΩ |
| | | | 175°C | | 70.5 | | mΩ |
| $Q_C$ | *total capacitive charge* | $V_R$ = 800 V, $I_F$ = 20A | $T_{VJ}$ = 25°C | | 100 | | nC |
| | | dI/dt = 200 A/µs | | | | | |
| C | *total capacitance* | $V_R$ = 0 V | $T_{VJ}$ = 25°C, f = 1 MHz | | 1500 | | pF |
| | | $V_R$ = 400 V | | | 93 | | pF |
| | | $V_R$ = 800 V | | | 67 | | pF |
| $R_{thJC}$ | *thermal resistance junction to case* | | | | | 0.9 | K/W |
| $R_{thJH}$ | *thermal resistance junction to heatsink* | with heatsink compound; IXYS test setup | | | 1.05 | | K/W |

preliminary

| 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 | | | | 1.5 | Nm |
| | | terminal connection screws | | | | 1.3 | 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* | t = 1 second | 50 / 60 Hz, RMS; $I_{ISOL} \leq 1$ mA | 3000 | | | V |
| | | t = 1 minute | | 2500 | | | V |
| $C_P$ | *coupling capacity per switch* | between shorted terminals of diodes and back side metallization | | | | | pF |

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

## Product Marking



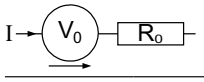

**Part description**

D = Diode
C = SiC
G = Extreme fast
45 = Current Rating [A]
X = Parallel legs
1200 = Reverse Voltage [V]
NA = SOT-227 (minibloc)

| Ordering | Part Name | Marking on Product | Delivering Mode | Base Qty | Ordering Code |
|---|---|---|---|---|---|
| Standard | DCG45X1200NA | DCG45X1200NA | Tube | 10 | 520708 |

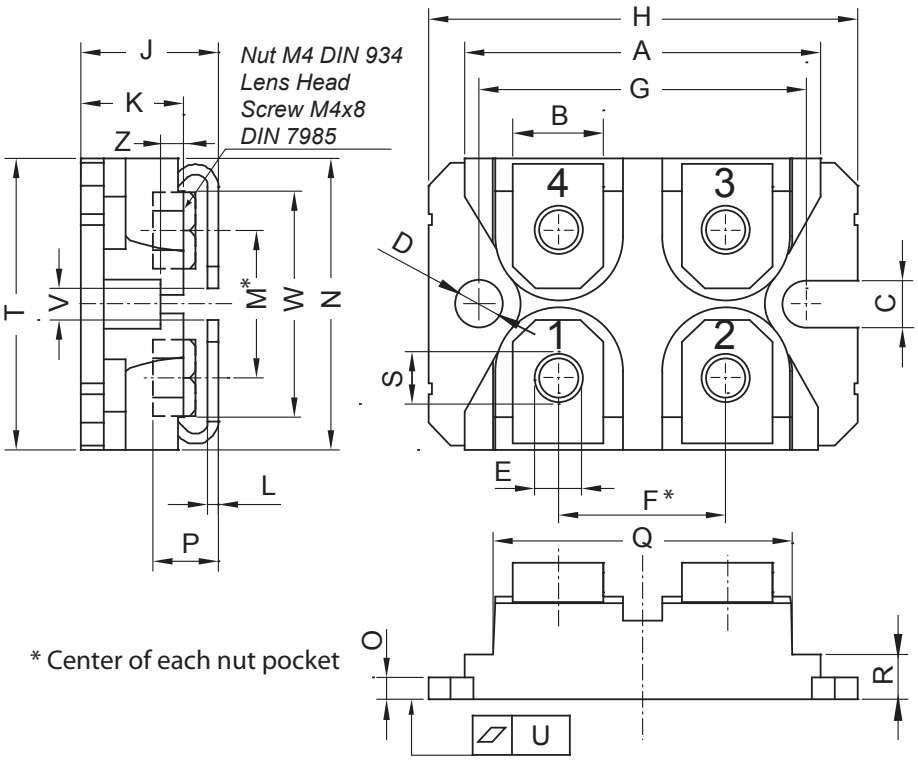
## Equivalent Circuits for Simulation

*on die level, typical



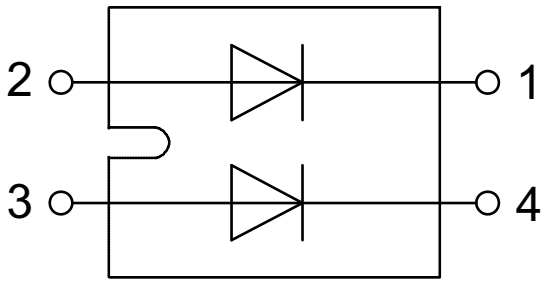

| | | $T_{VJ}$ = 125°C | $T_{VJ}$ = 175°C | |
|---|---|---|---|---|
| $V_{0\ max}$ | *threshold voltage* | 0.80 | 0.73 | V |
| $R_{0\ max}$ | *slope resistance* * | 57.0 | 70.5 | mΩ |

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




* Center of each nut pocket

| 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)

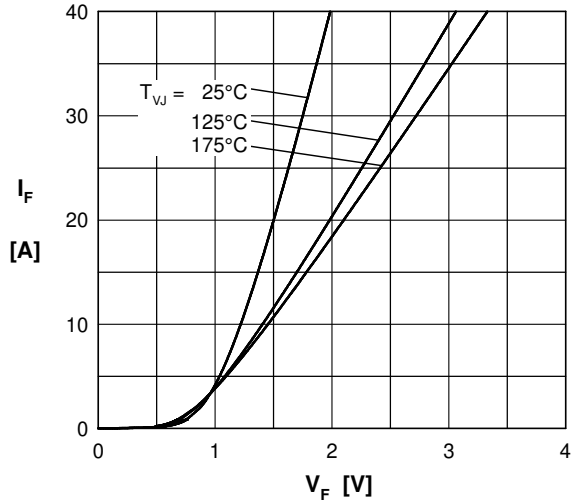



Fig. 1 Typ. forward characteristics.

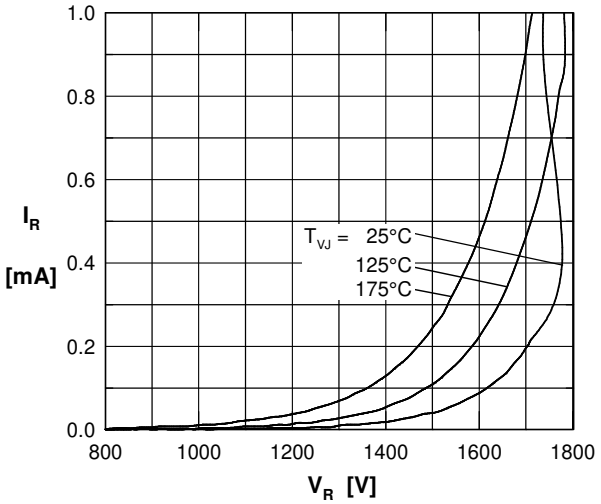



Fig. 2 Typ. reverse characteristics

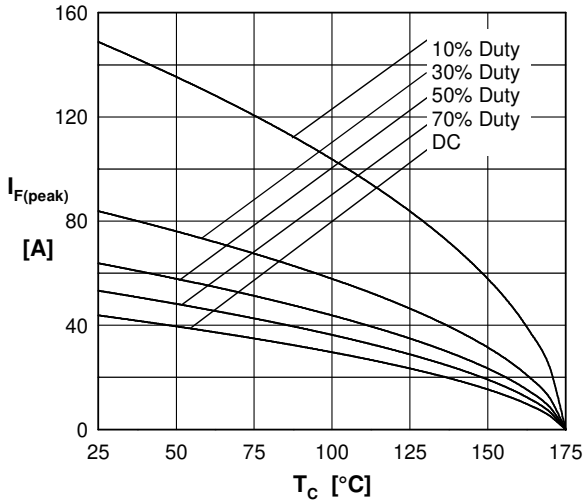



Fig. 3 Typ. current derating

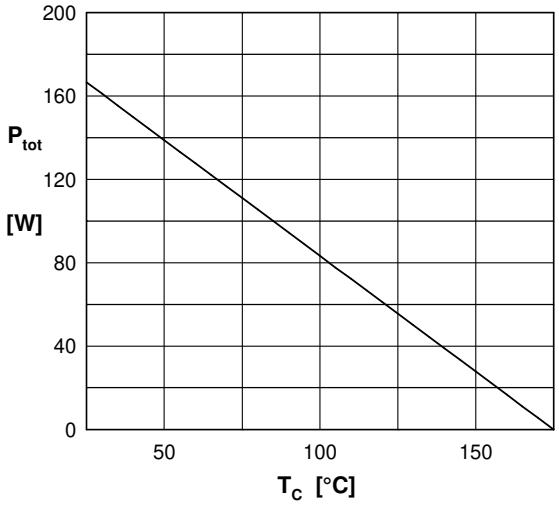



Fig. 4 Power derating

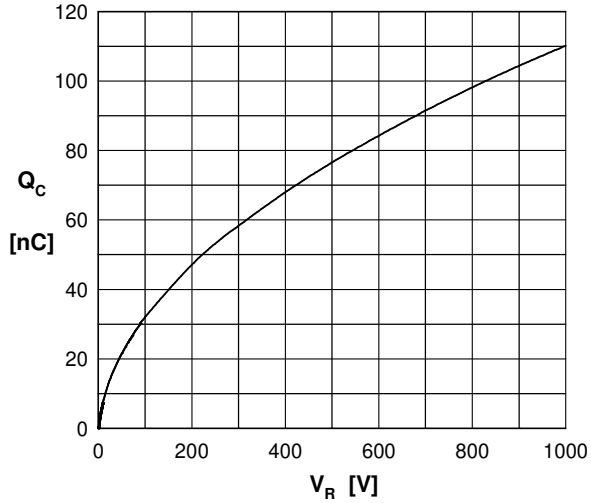



Fig. 5 Typ. recovery charge vs. reverse voltage

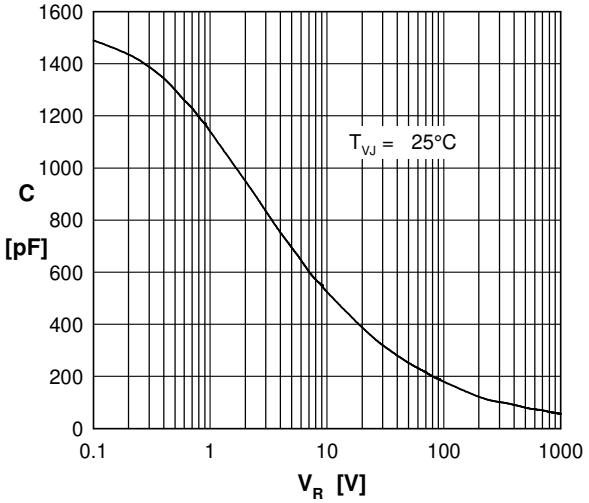



Fig. 6 Typ. junction capacitance vs. reverse Voltage

**SiC Diode (per leg)**

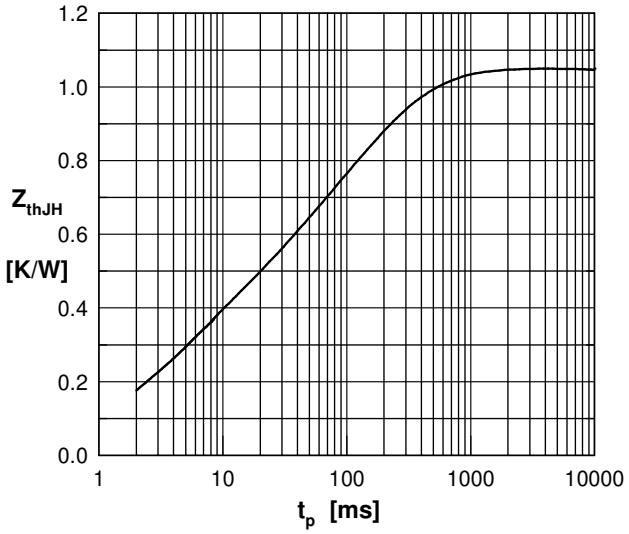



Fig. 7 Typ. transient thermal impedance

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