# GeneSiC SEMICONDUCTOR

# GA060TH65

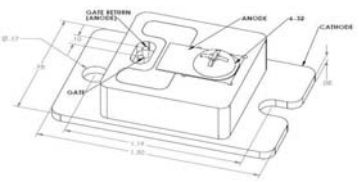
## Silicon Carbide Thyristor

| | | |
|---|---|---|
| $V_{FBM}$ | = | 6500 V |
| $I_{T(AVM)}$ | = | 60 A |
| $Q_{rr}$ | = | 2.95 µC |

### Features

- 6500 V Asymmetric SiC NPNP Thyristor
- 150 °C operating temperature
- Robust compact fully soldered package
- SOT-227 (ISOTOP) base plate form factor
- Fast turn on characteristics
- Lowest in class $Q_{rr}/I_{T(AVM)}$

### Package




### Applications

- Grid Tied Solar Inverters
- Wind Power Inverters
- HVDC Power Conversion
- Utility Scale Power Conversion
- Trigger Circuits/Ignition Circuits

### Maximum Ratings

| Parameter | Symbol | Conditions | Values | Unit |
|---|---|---|---|---|
| Repetitive peak forward voltage | $V_{FBM}$ | $T_j$ = 25 °C | 6500 | V |
| Repetitive peak reverse voltage | $V_{RBM}$ | $T_j$ = 25 °C | 50 | V |
| Maximum average on-state current | $I_{T(AVM)}$ | $T_C \leq$ 120 °C | 60 | A |
| RMS on-state current | $I_{T(RMS)}$ | $T_C \leq$ 120 °C | 104 | A |
| Non-repetitive peak on-state current | $I_{T,max}$ | $T_C$= 25 °C, $t_p$ = 2 us, D = 0.1 | tbd | A |
| Power dissipation | $P_{tot}$ | $T_C$= 25 °C | 919 | W |
| Operating and storage temperature | $T_j$, $T_{stg}$ | | -55 to 150 | °C |

### Electrical Characteristics

| Parameter | Symbol | Conditions | Values min. | Values typ. | Values max. | Unit |
|---|---|---|---|---|---|---|
| Maximum peak on state voltage | $V_{KA(ON)}$ | $I_K$ = -60 A, $T_j$ = 25 °C<br>$I_K$ = -60 A, $T_j$ = 150 °C | | -3.90<br>-3.70 | | V |
| Anode-cathode threshold voltage | $V_{KA(TO)}$ | $T_j$ = 25 °C (150 °C) | | -3.1(-2.8) | | V |
| Anode-cathode slope resistance | $R_{AK}$ | $T_j$ = 25 °C (150 °C), $I_K$ = -60 A | | 9.4(9.5) | | mΩ |
| Leakage current | $I_L$ | $V_{KA}$ = -6500 V, $V_{GA}$ = 0 V, $T_j$ = 25 °C<br>$V_{KA}$ = -6500 V, $V_{GA}$ = 0 V, $T_j$ = 150 °C | | 20<br>50 | | µA |
| Gate trigger current | $I_{GT}$ | $T_j$ = 25 °C, $t_P$ = 10 µs | | -100 | | mA |
| Holding current | $I_H$ | $T_j$ = 25 °C | | tbd | | mA |
| Rise time | $t_R$ | $I_G$ = -3 A, $V_{KA}$ = -2200 V | | 170 | | ns |
| Delay time | $t_D$ | $I_K$ = -60 A, $T_j$ = 25 °C | | 45 | | ns |
| Reverse recovery charge | $Q_{rr}$ | | | 2.95 | | µC |
| Recovered charge, 50% chord | $Q_{ra}$ | dI/dt = 360 A/us, $I_K$ = -60 A, $V_{KA}$ = 20 V | | 1.6 | | µC |
| Reverse recovery current | $I_{rm}$ | dV/dt(re-app) = -362 V/us, $T_j$ = 25 °C | | 15 | | A |
| Circuit commutated turn-off time | $t_q$ | | | 6.7 | | µs |

### Thermal Characteristics

| | | | | |
|---|---|---|---|---|
| Thermal resistance, junction - case | $R_{thJC}$ | | 0.136 | °C/W |

### Mechanical Properties

| | | | | |
|---|---|---|---|---|
| Mounting torque for base | $M_b$ | Heat sink surface must be optically flat | 1.5 | Nm |
| Mounting torque for top | $M_t$ | | 1.3 | Nm |
| Weight | $W_t$ | | 30 | g |

1. Considering worst case $Z_{th}$ conditions

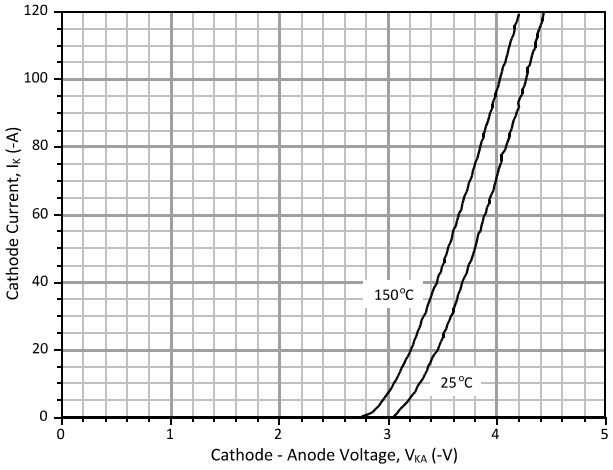



Figure 1: Typical On State Characteristics

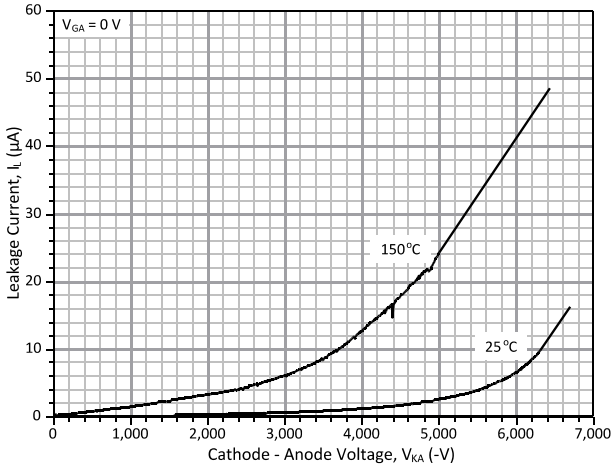



Figure 2: Typical Forward Blocking Characteristics

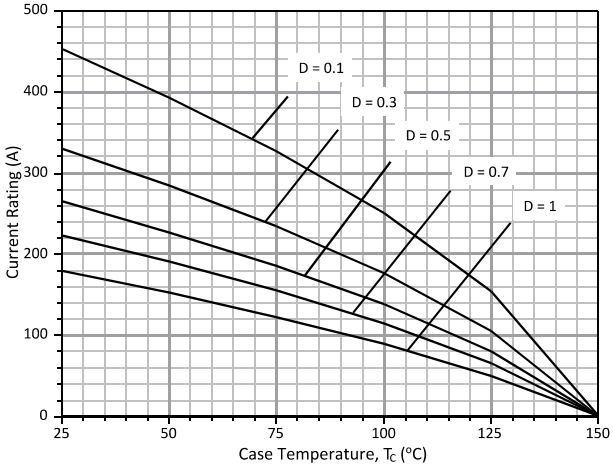



Figure 3: Typical Current Derating Curves (D = $t_P$/T, $t_P$ = 400 µs[1])

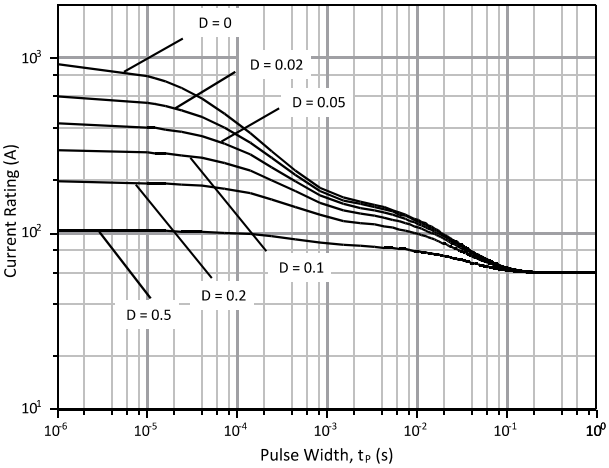



Figure 4: Typical Current Rating versus Pulse Duration Curves at $T_C$ = 120 °C

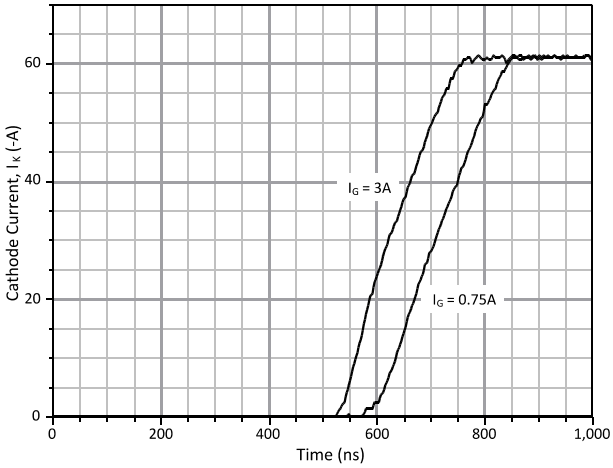



Figure 5: Typical Turn On Characteristics at 25 °C

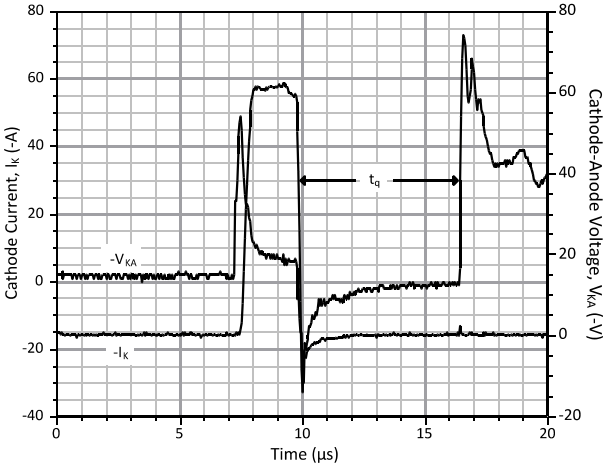



Figure 6: Typical Turn Off Characteristics at 25 °C

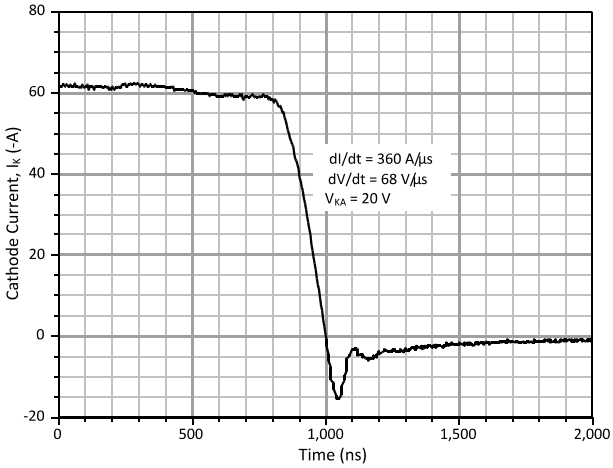



Figure 7: Typical Reverse Recovery Characteristics at 25 °C

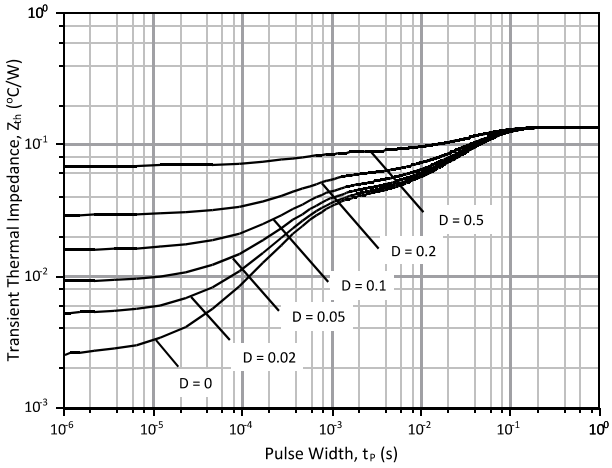



Figure 8: Typical Transient Thermal Impedance

| Revision History | | | |
|---|---|---|---|
| Date | Revision | Comments | Supersedes |
| 2010/11/10 | 1 | First generation release | |
| | | | |

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