

FEATURES

- Double Side Cooling
- High Surge Capability

APPLICATIONS

- High Power Drives
- High Voltage Power Supplies
- Static Switches

VOLTAGE RATINGS

| Part and Ordering Number | Repetitive Peak Voltages V_{DRM} and V_{RRM} V | Conditions |
|--------------------------|---|--|
| DCR780G30 | 3000 | $T_{vj} = -40^{\circ}\text{C}$ to 125°C , $I_{DRM} = I_{RRM} = 60\text{mA}$, $V_{DRM}, V_{RRM} t_p = 10\text{ms}$, $V_{DSM} \& V_{RSM} =$ $V_{DRM} \& V_{RRM} + 100\text{V}$ respectively |
| DCR780G28 | 2800 | |
| DCR780G26 | 2600 | |
| DCR780G24 | 2400 | |

Lower voltage grades available.

ORDERING INFORMATION

When ordering, select the required part number shown in the Voltage Ratings selection table.

For example:

DCR780G30

Note: Please use the complete part number when ordering and quote this number in any future correspondence relating to your order.

KEY PARAMETERS

| | |
|-------------|--|
| V_{DRM} | 3000 V |
| $I_{T(AV)}$ | 780 A |
| I_{TSM} | 10500 A |
| dV/dt^* | 1000 V/μs |
| dI/dt | 200 A/μs |

* Higher dV/dt selections available

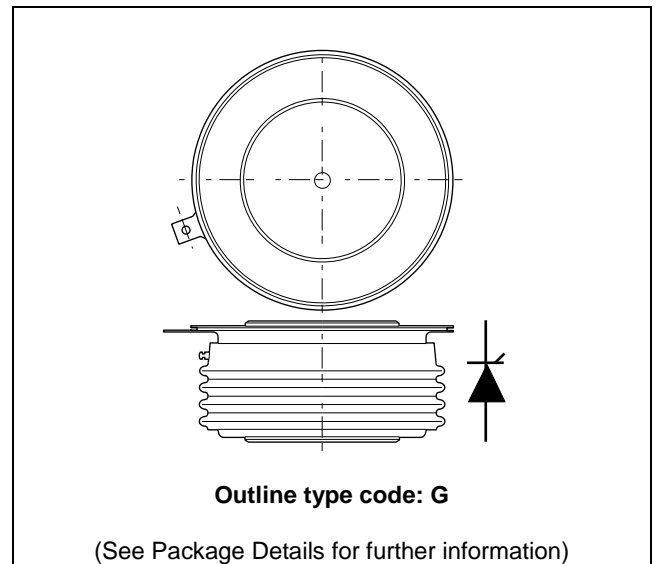


Fig. 1 Package outline

CURRENT RATINGS

T_{case} = 60°C unless stated otherwise

| Symbol | Parameter | Test Conditions | Max. | Units |
|---------------------------|--------------------------------------|--------------------------|------|-------|
| Double Side Cooled | | | | |
| I _{T(AV)} | Mean on-state current | Half wave resistive load | 780 | A |
| I _{T(RMS)} | RMS value | - | 1220 | A |
| I _T | Continuous (direct) on-state current | - | 1100 | A |

SURGE RATINGS

| Symbol | Parameter | Test Conditions | Max. | Units |
|------------------|---|---|-------|-------------------|
| I _{TSM} | Surge (non-repetitive) on-state current | 10ms half sine, T _{case} = 125°C | 10.5 | kA |
| I ² t | I ² t for fusing | V _R = 0 | 0.551 | MA ² s |

THERMAL AND MECHANICAL RATINGS

| Symbol | Parameter | Test Conditions | Min. | Max. | Units |
|----------------------|---------------------------------------|--|------|-------|-------|
| R _{th(j-c)} | Thermal resistance – junction to case | Double side cooled DC | - | 0.035 | °C/W |
| R _{th(c-h)} | Thermal resistance – case to heatsink | Double side cooled DC | - | 0.008 | °C/W |
| T _{vj} | Virtual junction temperature | Blocking V _{DRM} / V _{RRM} | - | 125 | °C |
| T _{stg} | Storage temperature range | | -40 | 140 | °C |
| F _m | Clamping force | | 12 | 18 | kN |

DYNAMIC CHARACTERISTICS

| Symbol | Parameter | Test Conditions | Min. | Max. | Units | |
|-------------------|---|---|-----------------|------|------------|------------|
| I_{RRM}/I_{DRM} | Peak reverse and off-state current | At V_{RRM}/V_{DRM} , $T_{case} = 125^{\circ}C$ | - | 60 | mA | |
| dV/dt | Max. linear rate of rise of off-state voltage | To 67% V_{DRM} , $T_j = 125^{\circ}C$, gate open | 1000 | - | V/ μs | |
| di/dt | Rate of rise of on-state current | From 67% V_{DRM} to 1000A Gate source 30V, 10 Ω , $t_r < 0.5\mu s$, $T_j = 125^{\circ}C$ | Repetitive 50Hz | - | 200 | A/ μs |
| | | | Non-repetitive | - | 1000 | A/ μs |
| V_T | On-state voltage | $I_T = 1500A$, $T_{case} = 125^{\circ}C$ | | 1.90 | V | |
| $V_{T(TO)}$ | Threshold voltage – Low level | $T_{case} = 125^{\circ}C$ | - | 1.00 | V | |
| r_T | On-state slope resistance – Low level | $T_{case} = 125^{\circ}C$ | - | 0.60 | m Ω | |
| t_{gd} | Delay time | $V_D = 67\% V_{DRM}$, gate source 30V, 10 Ω $t_r = 0.5\mu s$, $T_j = 25^{\circ}C$ | - | 3.0 | μs | |
| t_q | Turn-off time | $T_j = 125^{\circ}C$, $V_R = 100V$, $di/dt = 10A/\mu s$, $dV_{DR}/dt = 20V/\mu s$ linear to 67% V_{DRM} | - | 400 | μs | |
| Q_S | Stored charge | $I_T = 1000A$, $t_p = 1000\mu s$, $T_j = 125^{\circ}C$, $di/dt = 10A/\mu s$, | - | 2400 | μC | |
| I_{RR} | Reverse recovery current | | - | 125 | A | |
| I_L | Latching current | $T_j = 25^{\circ}C$, | - | 1 | A | |
| I_H | Holding current | $T_j = 25^{\circ}C$, | - | 200 | mA | |

GATE TRIGGER CHARACTERISTICS AND RATINGS

| Symbol | Parameter | Test Conditions | Max. | Units |
|----------|--------------------------|--|------|-------|
| V_{GT} | Gate trigger voltage | $V_{DRM} = 5V$, $T_{case} = 25^{\circ}C$ | 3 | V |
| V_{GD} | Gate non-trigger voltage | At 40% V_{DRM} , $T_{case} = 125^{\circ}C$ | TBD | V |
| I_{GT} | Gate trigger current | $V_{DRM} = 5V$, $T_{case} = 25^{\circ}C$ | 300 | mA |
| I_{GD} | Gate non-trigger current | At 40% V_{DRM} , $T_{case} = 125^{\circ}C$ | TBD | mA |

CURVES

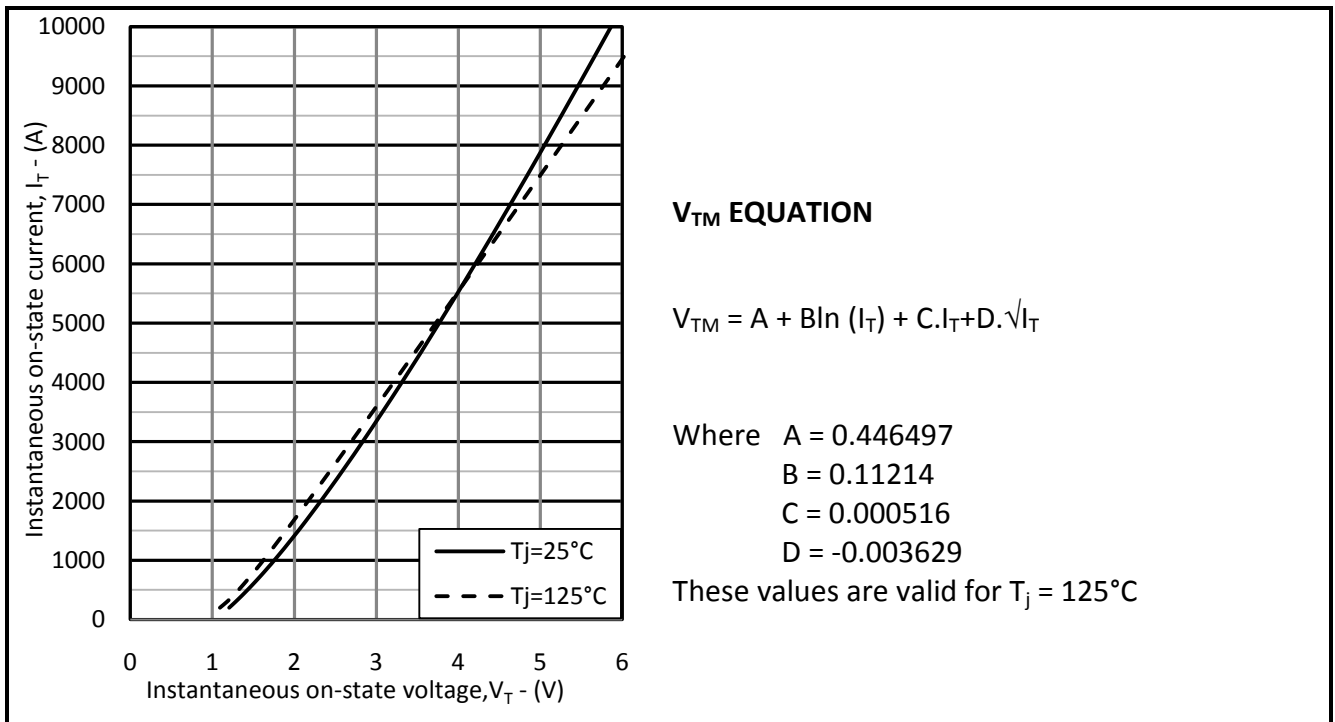


Fig.2 Maximum & minimum on-state characteristics

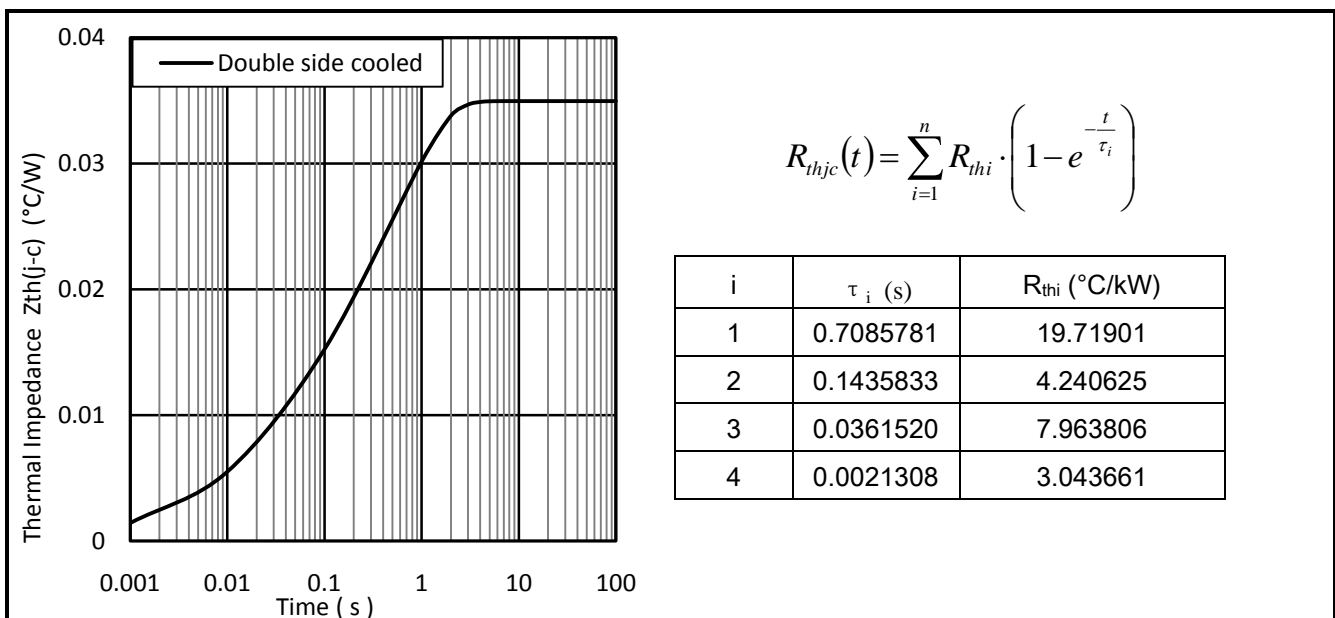


Fig.3 Maximum (limit) transient thermal impedance – junction to case (°C/W)

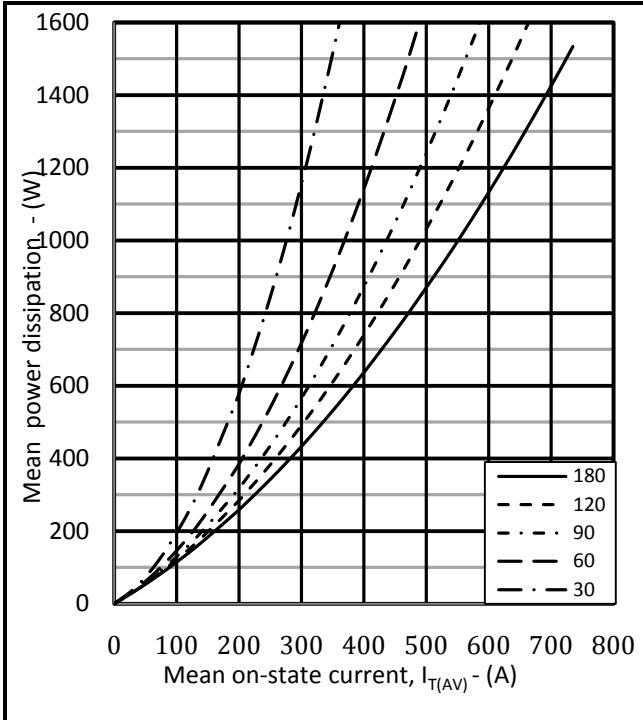


Fig.4 On-state power dissipation – sine wave

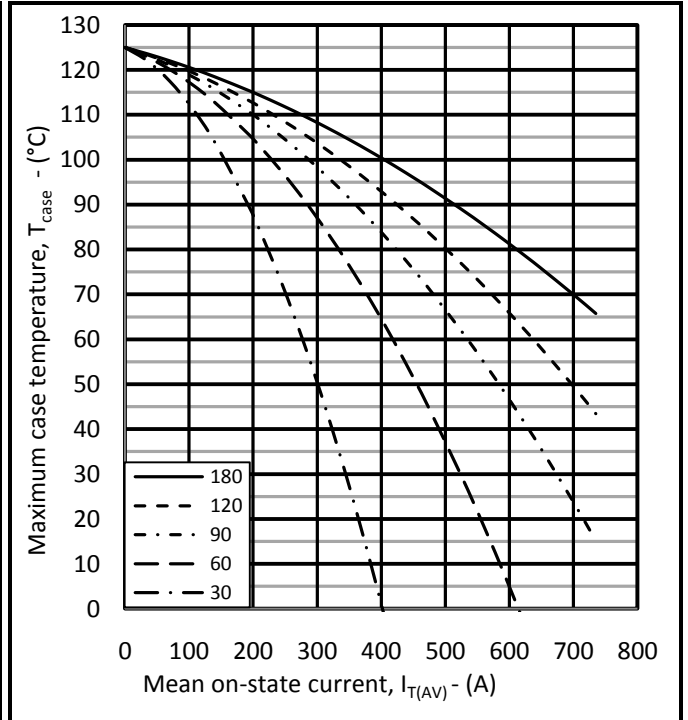


Fig.5 Maximum permissible case temperature, double side cooled – sine wave

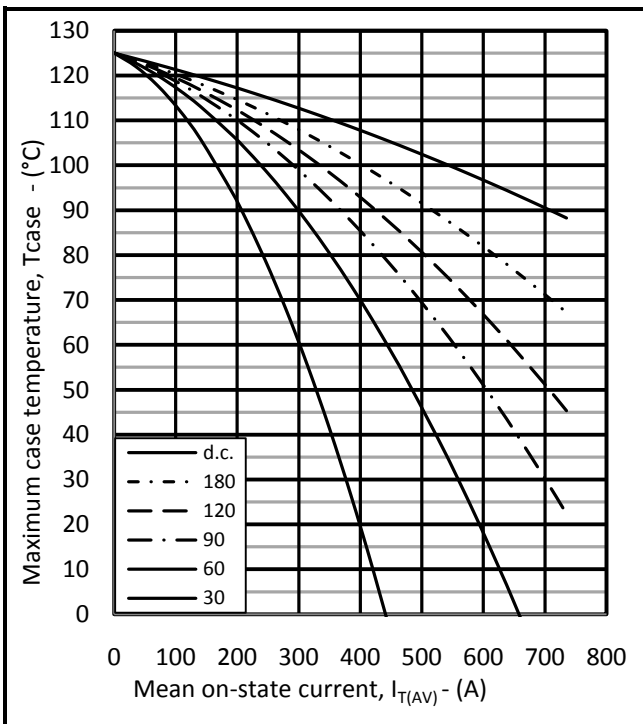


Fig.6 Maximum permissible case temperature, double side cooled – rectangular wave

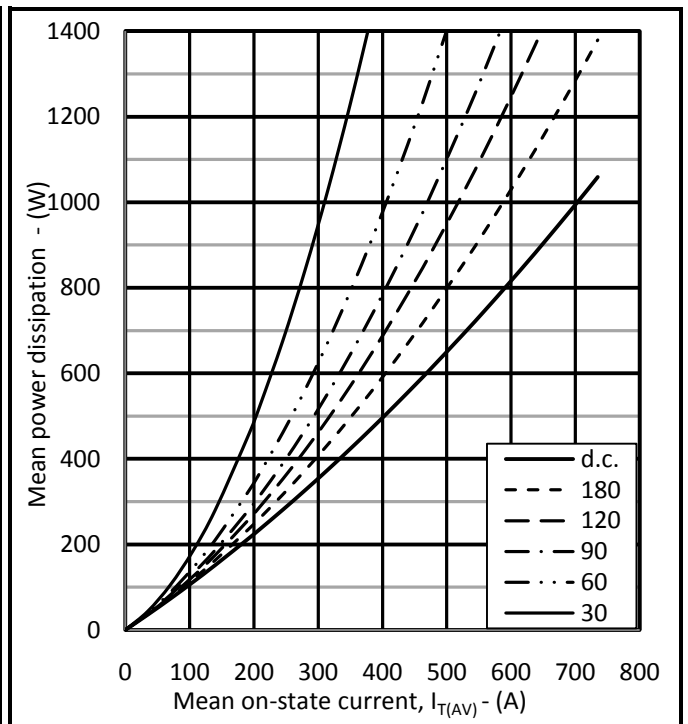


Fig.7 On-state power dissipation – rectangular wave

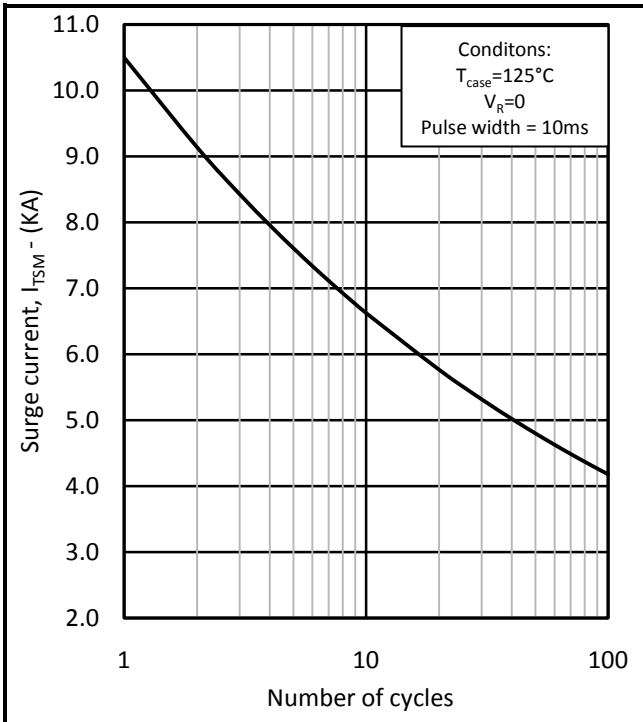


Fig.8 Multi-cycle surge current

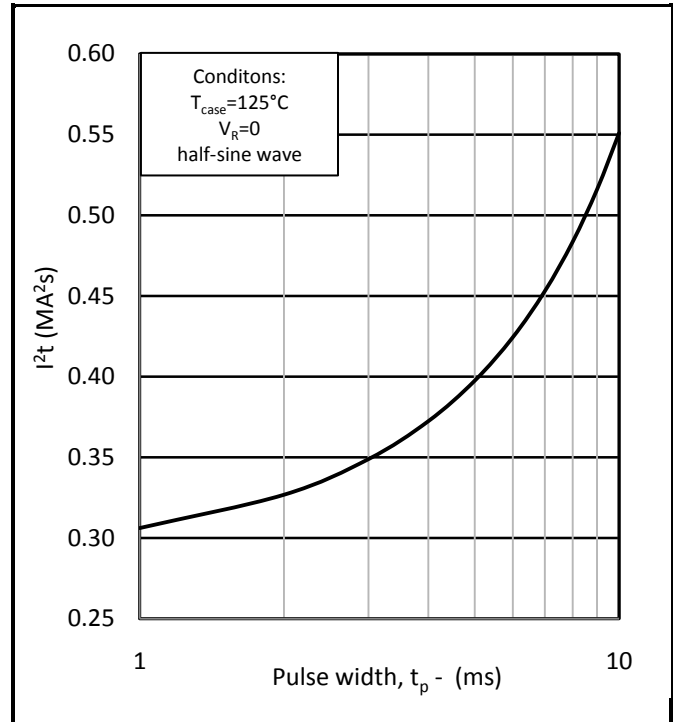


Fig.9 Single-cycle I^2t

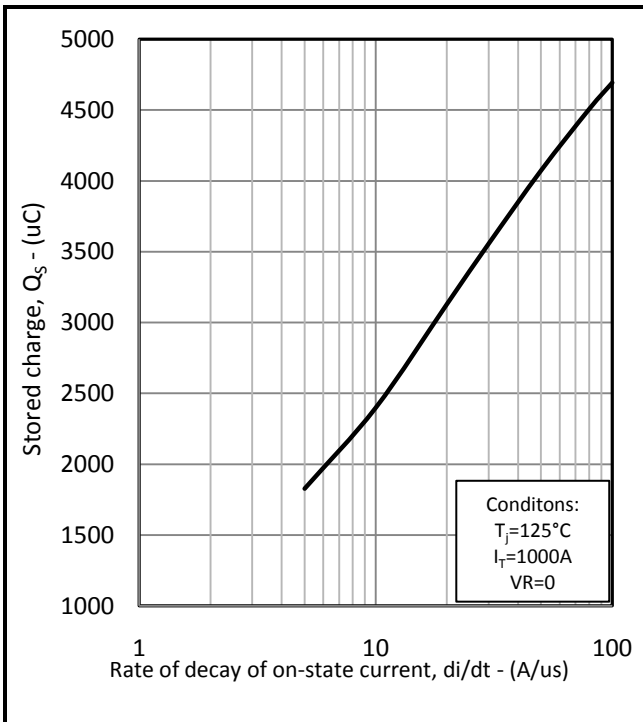


Fig.10 Stored charge vs di/dt

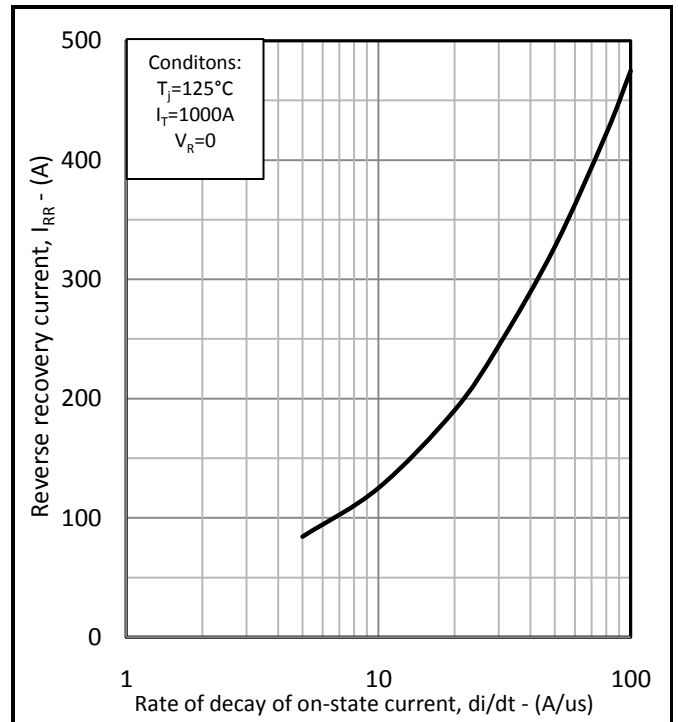


Fig.11 Reverse recovery current vs di/dt

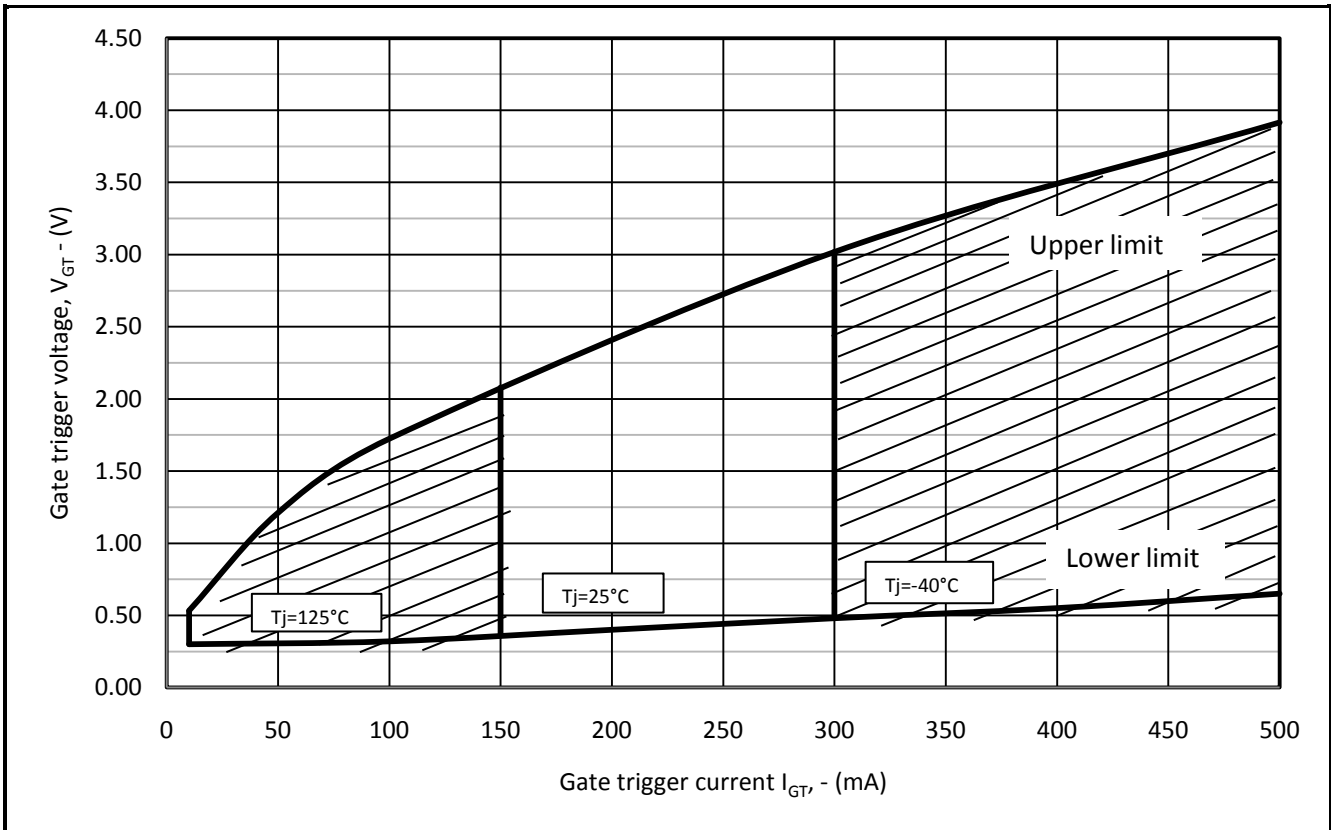
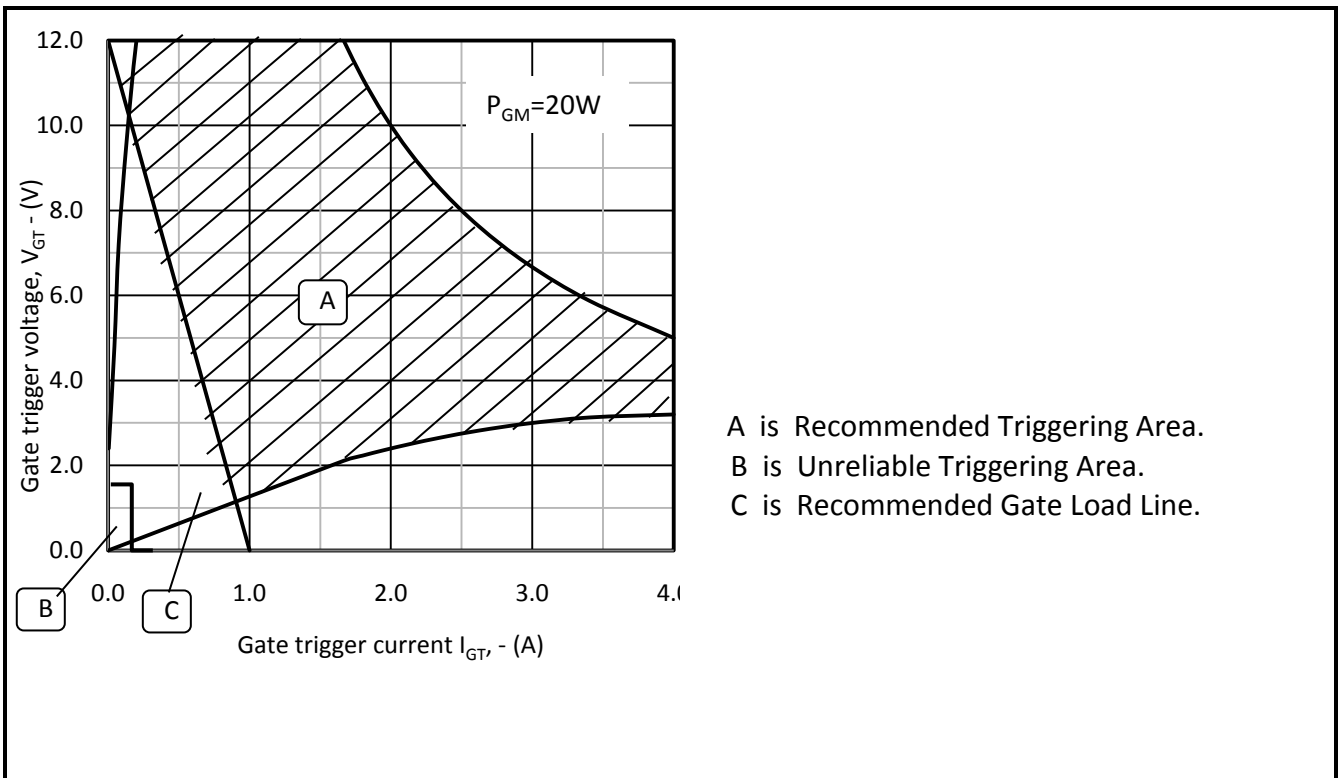


Fig.12 Gate characteristics



A is Recommended Triggering Area.
B is Unreliable Triggering Area.
C is Recommended Gate Load Line.

Fig.13 Gate characteristics

PACKAGE DETAILS

For further package information, please contact Customer Services. All dimensions in mm, unless stated otherwise. DO NOT SCALE.

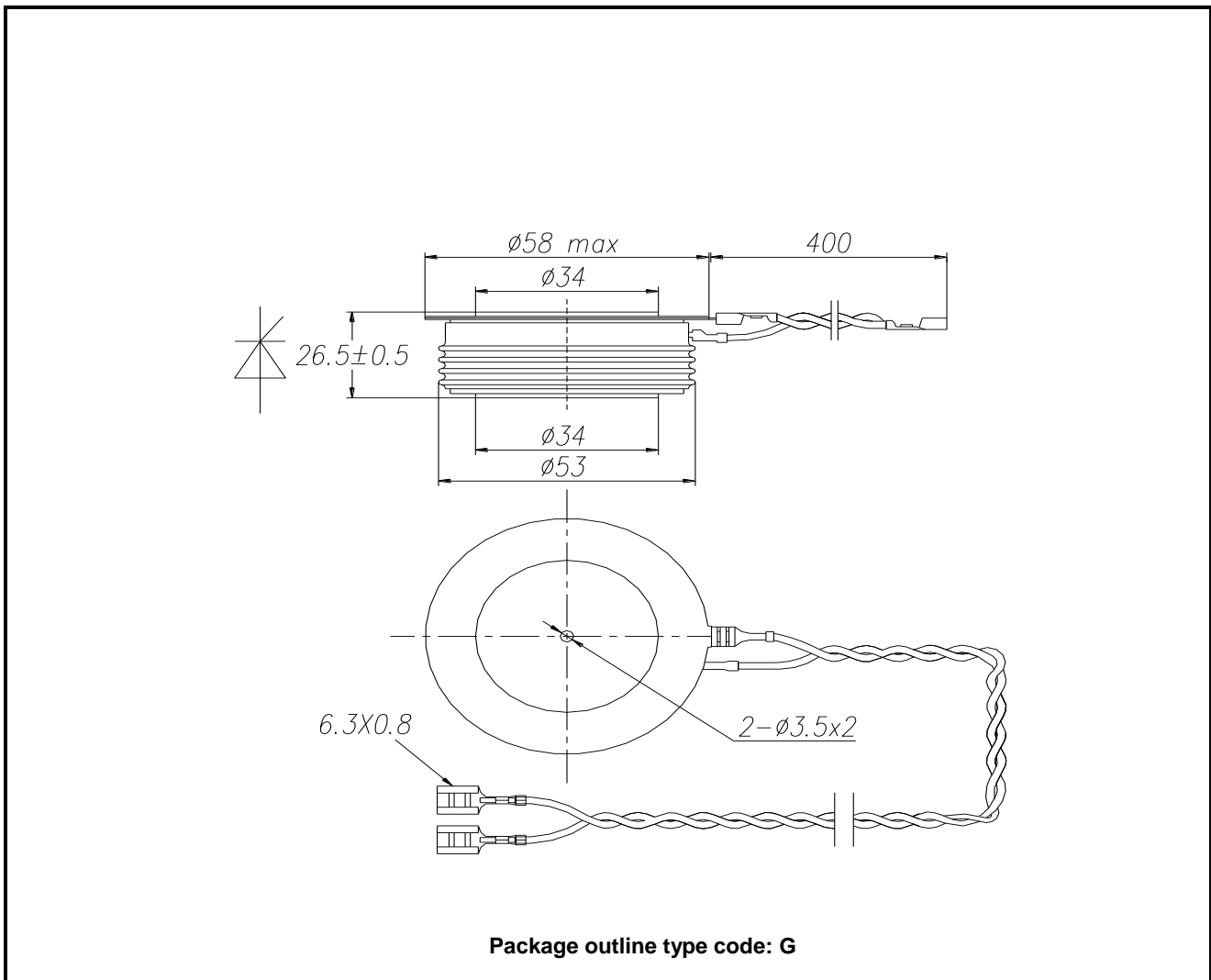


Fig.14 Package outline

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