

DCR1674SZ

PHASE CONTROL THYRISTOR

APPLICATIONS

- High Power Drives.
- High Voltage Power Supplies.
- DC Motor Control.

KEY PARAMETERS

| | |
|-------------|--------------------------------|
| V_{DRM} | 4200V |
| $I_{T(AV)}$ | 3200A |
| I_{TSM} | 67000A |
| dV/dt^* | 1000V/μs |
| di/dt | 150A/μs |

*Higher dV/dt selections available

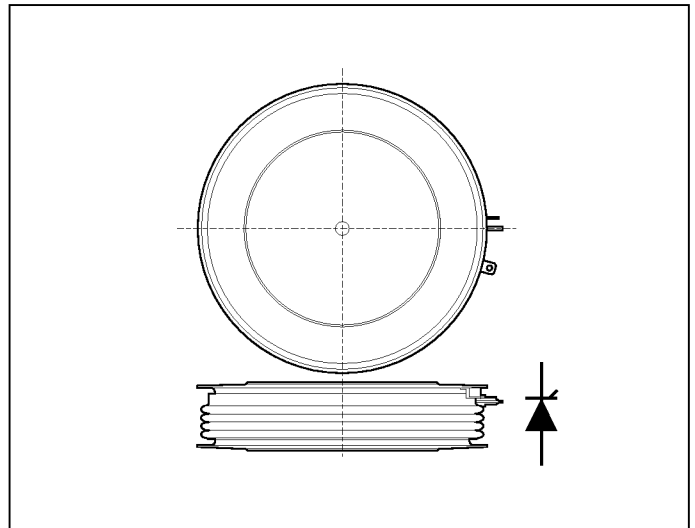
FEATURES

- Double Side Cooling.
- High Surge Capability.
- High Mean Current.
- Fatigue Free.

VOLTAGE RATINGS

| Type Number | Repetitive Peak Voltages V_{DRM} V_{RRM} V | Conditions |
|-------------|--|--|
| DCR1674SZ42 | 4200 | $T_{vj} = 0^\circ$ to 125° C, $I_{DRM} = I_{RRM} = 500$ mA, $V_{DRM}, V_{RRM} t_p = 10$ ms, V_{DSM} & $V_{RSM} =$ V_{DRM} & $V_{RRM} + 100$ V Respectively |
| DCR1674SZ41 | 4100 | |
| DCR1674SZ40 | 4000 | |
| DCR1674SZ39 | 3900 | |
| DCR1674SZ38 | 3800 | |

Lower voltage grades available.



Outline type code: Z. See package outline for further information.

CURRENT RATINGS

| Symbol | Parameter | Conditions | Max. | Units |
|--|--------------------------------------|---|------|-------|
| Double Side Cooled | | | | |
| $I_{T(AV)}$ | Mean on-state current | Half wave resistive load, $T_{case} = 80^\circ$ C | 3200 | A |
| $I_{T(RMS)}$ | RMS value | $T_{case} = 80^\circ$ C | 5030 | A |
| I_T | Continuous (direct) on-state current | $T_{case} = 80^\circ$ C | 4460 | A |
| Single Side Cooled (Anode side) | | | | |
| $I_{T(AV)}$ | Mean on-state current | Half wave resistive load, $T_{case} = 80^\circ$ C | 2050 | A |
| $I_{T(RMS)}$ | RMS value | $T_{case} = 80^\circ$ C | 3200 | A |
| I_T | Continuous (direct) on-state current | $T_{case} = 80^\circ$ C | 2650 | A |

DCR1674SZ

SURGE RATINGS

| Symbol | Parameter | Conditions | Max. | Units |
|-----------|---|---|--------------------|------------------|
| I_{TSM} | Surge (non-repetitive) on-state current | 10ms half sine; $T_{case} = 125^{\circ}C$ | 53.0 | kA |
| I^2t | I^2t for fusing | $V_R = 50\% V_{RRM}$ - 1/4 sine | 14.0×10^6 | A ² s |
| I_{TSM} | Surge (non-repetitive) on-state current | 10ms half sine; $T_{case} = 125^{\circ}C$ | 67.0 | kA |
| I^2t | I^2t for fusing | $V_R = 0$ | 22.4×10^6 | A ² s |

THERMAL AND MECHANICAL DATA

| Symbol | Parameter | Conditions | Min. | Max. | Units | |
|---------------|---------------------------------------|---|-------------|------|--------|------|
| $R_{th(j-c)}$ | Thermal resistance - junction to case | Double side cooled | dc | - | 0.0065 | °C/W |
| | | Single side cooled | Anode dc | - | 0.013 | °C/W |
| | | | Cathode dc | - | 0.013 | °C/W |
| $R_{th(c-h)}$ | Thermal resistance - case to heatsink | Clamping force 83.0kN with mounting compound | Double side | - | 0.001 | °C/W |
| | | | Single side | - | 0.002 | °C/W |
| T_{vj} | Virtual junction temperature | On-state (conducting) | - | 135 | °C | |
| | | Reverse (blocking) | - | 125 | °C | |
| T_{slg} | Storage temperature range | | -55 | 125 | °C | |
| - | Clamping force | | 74.0 | 91.0 | kN | |

DYNAMIC CHARACTERISTICS

| Symbol | Parameter | Conditions | Typ. | Max. | Units | |
|-------------------|--|---|-----------------|-------|------------|------------|
| I_{RRM}/I_{DRM} | Peak reverse and off-state current | At V_{RRM}/V_{DRM} , $T_{case} = 125^{\circ}C$ | - | 500 | mA | |
| dV/dt | Maximum linear rate of rise of off-state voltage | To 67% V_{DRM} , $T_j = 125^{\circ}C$, gate open circuit. | - | 1000 | V/ μ s | |
| dI/dt | Rate of rise of on-state current | From 67% V_{DRM} to 1100A Gate source 1A $t_r = 0.5\mu$ s, $T_j = 125^{\circ}C$ | Repetitive 50Hz | - | 150 | A/ μ s |
| | | | Non-repetitive | - | 300 | A/ μ s |
| $V_{T(TO)}$ | Threshold voltage | At $T_{vj} = 125^{\circ}C$ | - | 0.95 | V | |
| r_T | On-state slope resistance | At $T_{vj} = 125^{\circ}C$ | - | 0.138 | m Ω | |
| t_{gd} | Delay time | $V_D = 67\% V_{DRM}$, Gate source 20V, 10 Ω $t_r = 0.5\mu$ s, $T_j = 25^{\circ}C$ | - | 2.5 | μ s | |
| t_q | Turn-off time | $I_T = 5000A$, $t_p = 3ms$, $T_j = 125^{\circ}C$, $V_R = 200V$, $dI_{RR}/dt = -5A/\mu$ s, $V_{DR} = 67\% V_{DRM}$, $dV_{DR}/dt = 20V/\mu$ s linear | - | 900 | μ s | |
| I_L | Latching current | $T_j = 25^{\circ}C$, $V_D = 5V$ | - | 650 | mA | |
| I_H | Holding current | $T_j = 25^{\circ}C$, $R_{g-k} = \infty$ | - | 220 | mA | |

GATE TRIGGER CHARACTERISTICS AND RATINGS

| Symbol | Parameter | Conditions | Max. | Units |
|-------------|---------------------------|---|------|-------|
| V_{GT} | Gate trigger voltage | $V_{DRM} = 5V$, $T_{case} = 25^{\circ}C$ | 3.5 | V |
| I_{GT} | Gate trigger current | $V_{DRM} = 5V$, $T_{case} = 25^{\circ}C$ | 500 | mA |
| V_{GD} | Gate non-trigger voltage | At V_{DRM} , $T_{case} = 125^{\circ}C$ | 0.25 | V |
| V_{FGM} | Peak forward gate voltage | Anode positive with respect to cathode | 30 | V |
| V_{FGN} | Peak forward gate voltage | Anode negative with respect to cathode | 0.25 | V |
| V_{RGM} | Peak reverse gate voltage | | 5 | V |
| I_{FGM} | Peak forward gate current | Anode positive with respect to cathode | 30 | A |
| P_{GM} | Peak gate power | See table, fig.4 | 150 | W |
| $P_{G(AV)}$ | Mean gate power | | 10 | W |

CURVES

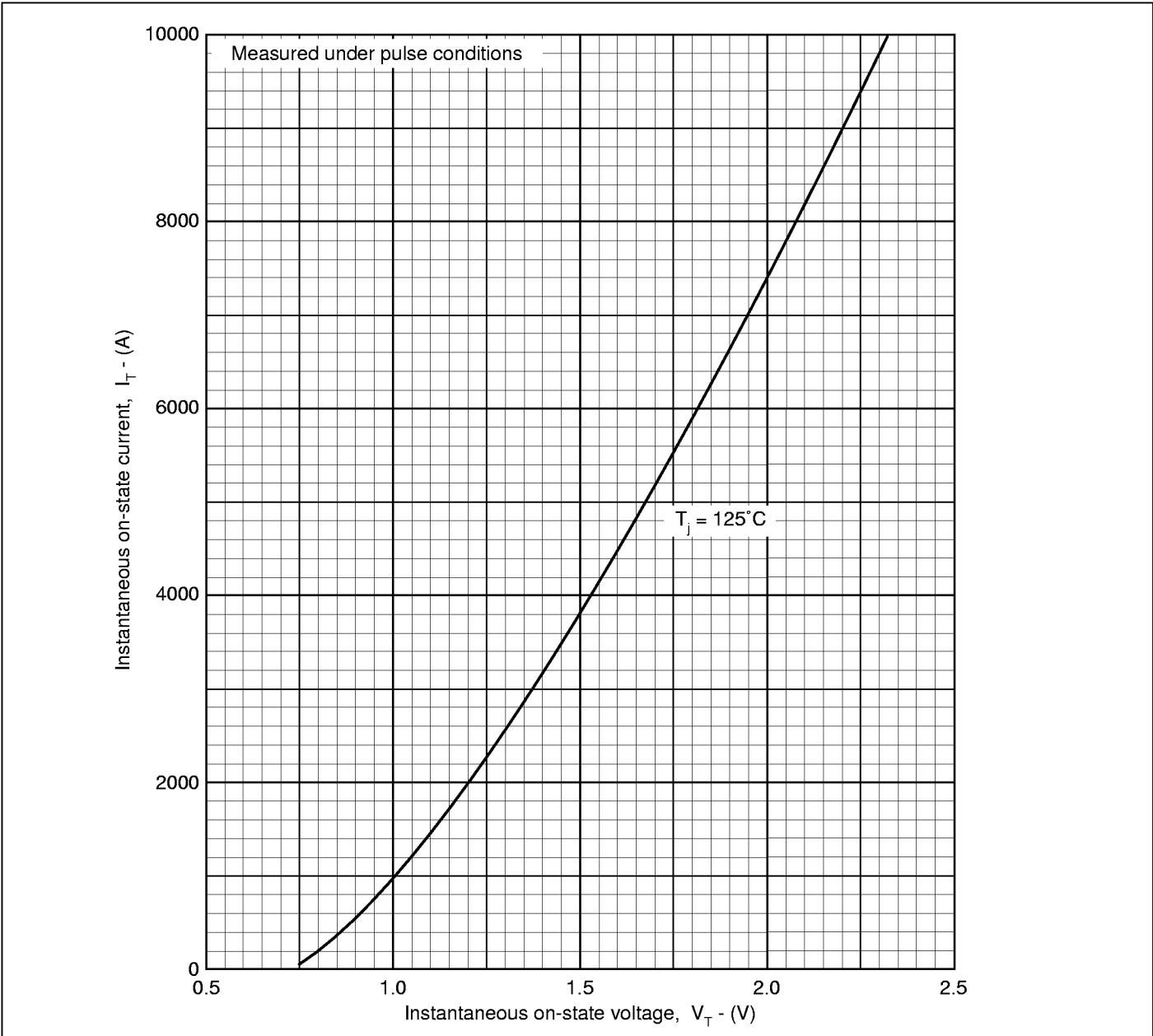


Fig.1 Maximum (limit) on-state characteristics

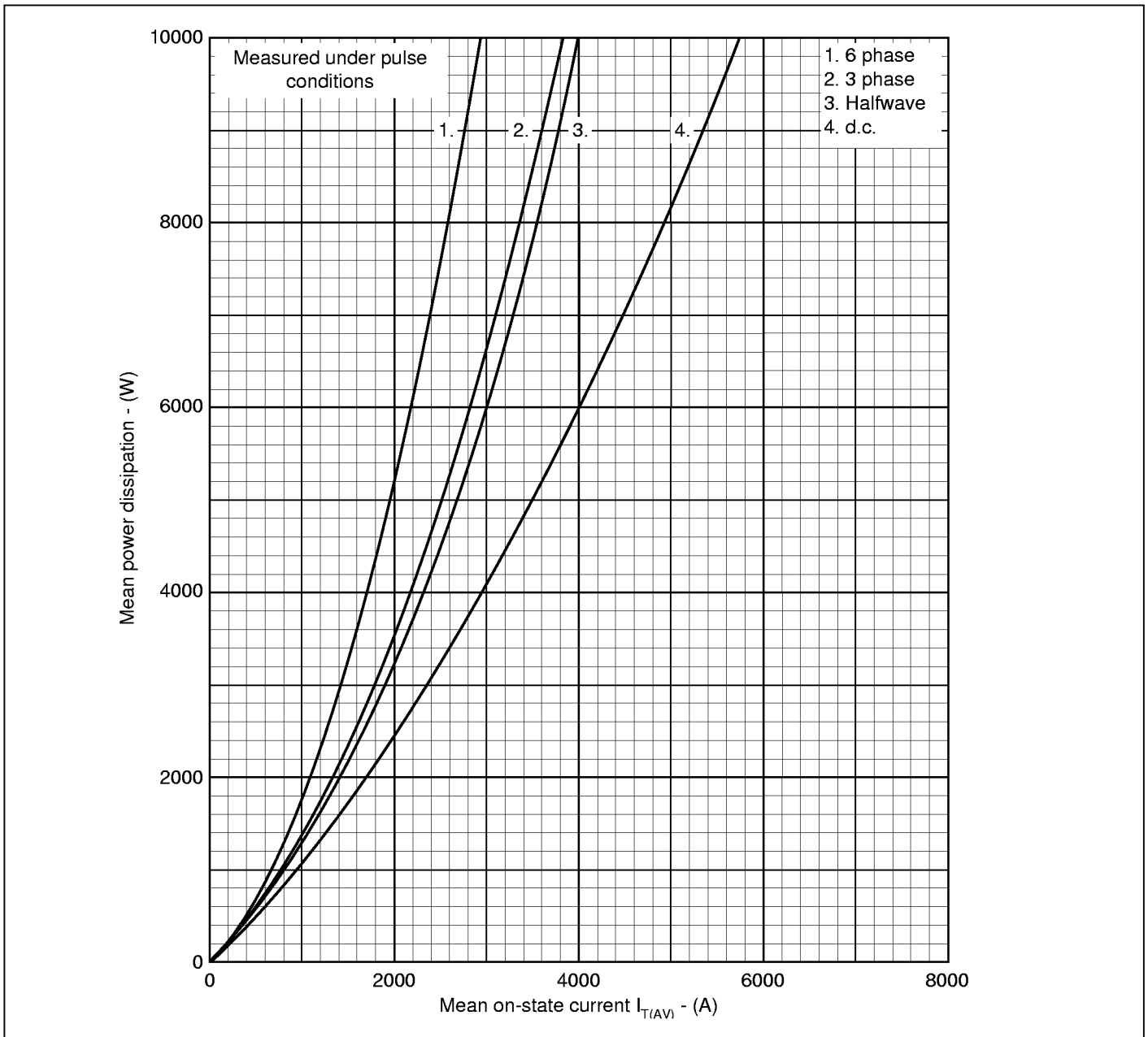


Fig.2 Dissipation curves

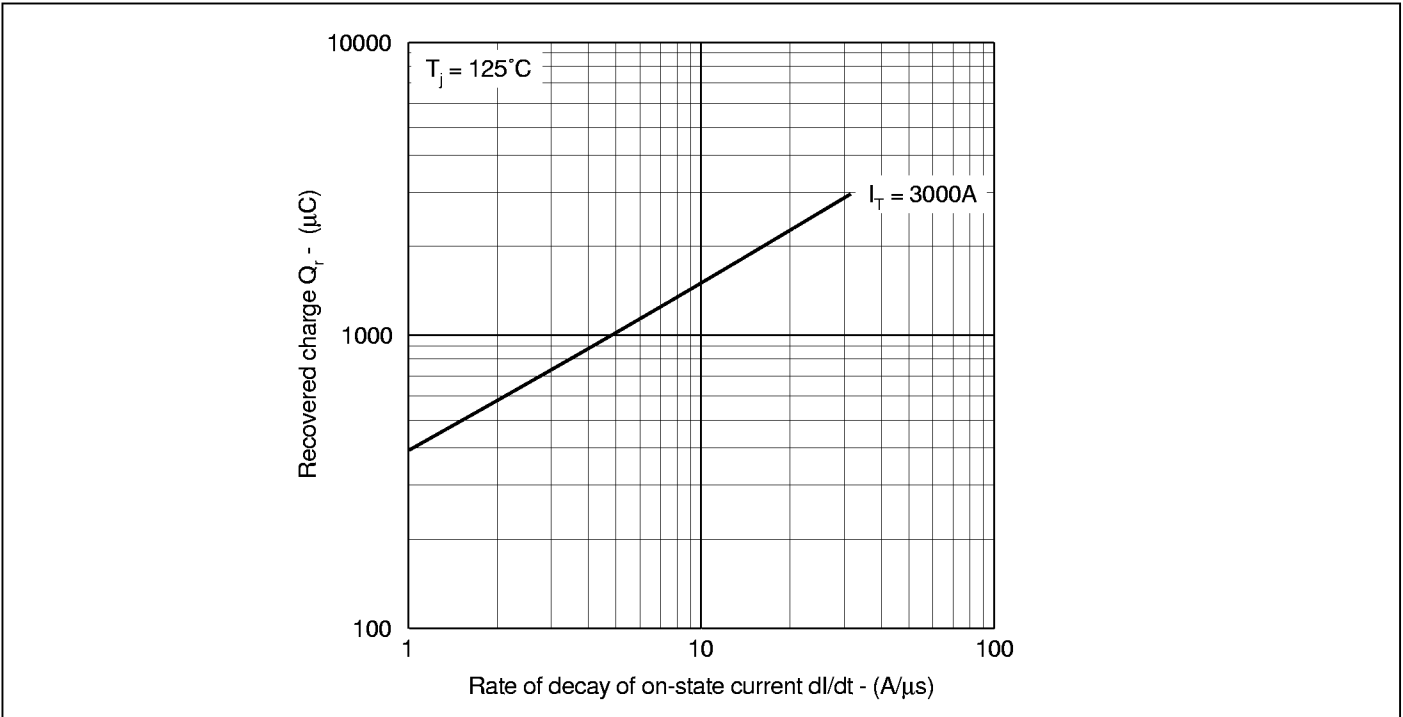


Fig.3 Stored charge

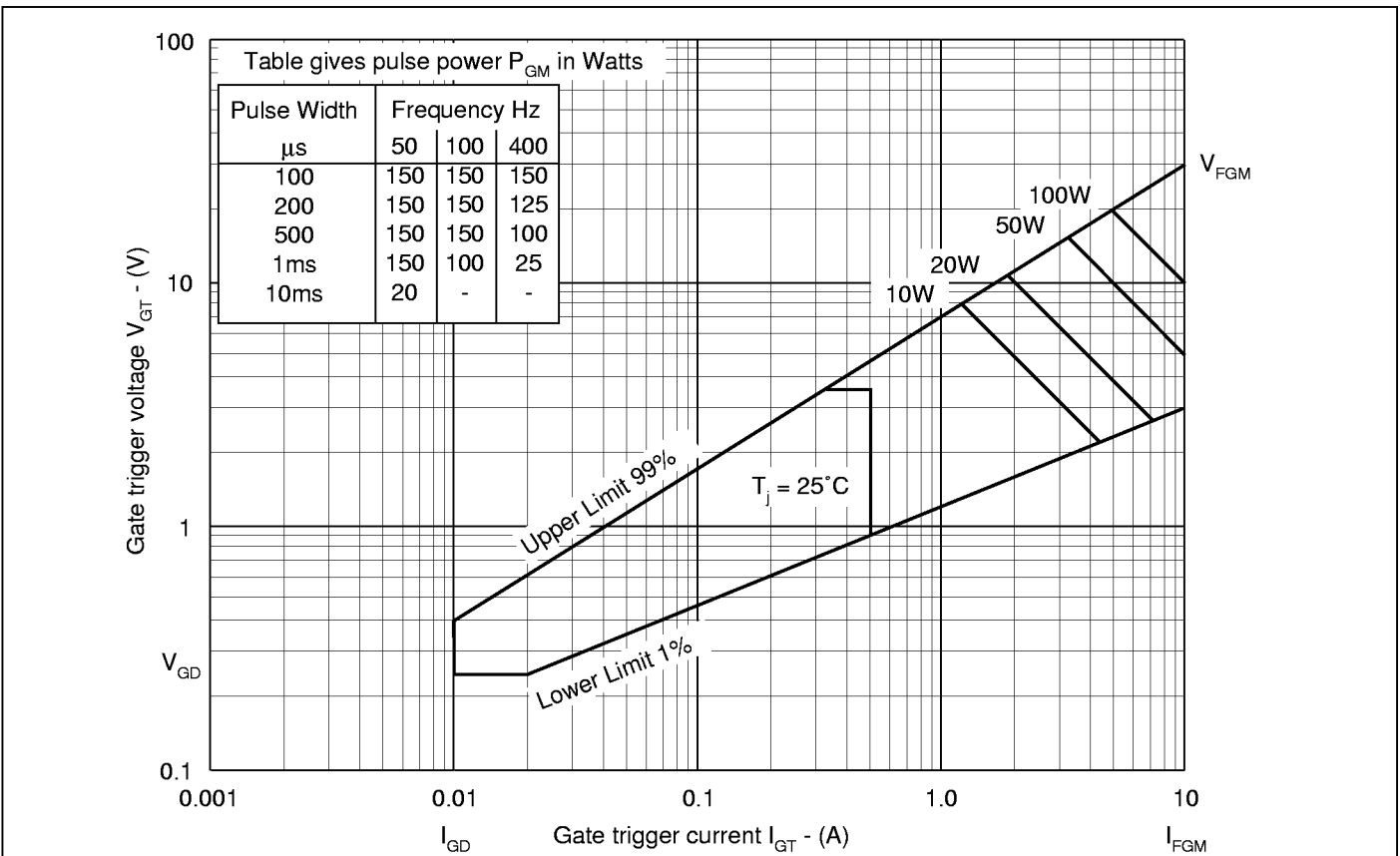


Fig.4 Gate characteristics

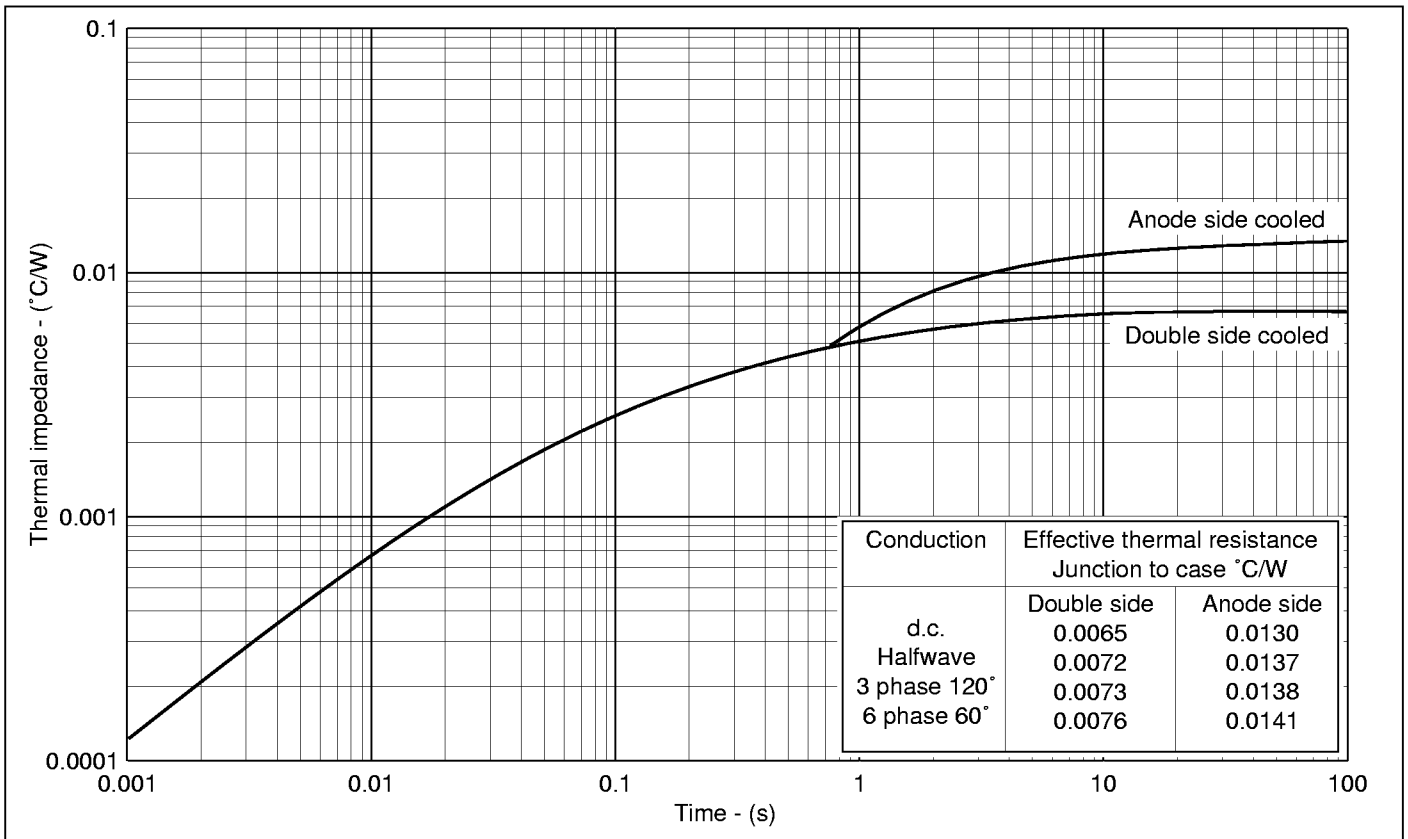


Fig.5 Maximum (limit) transient thermal impedance - junction to case

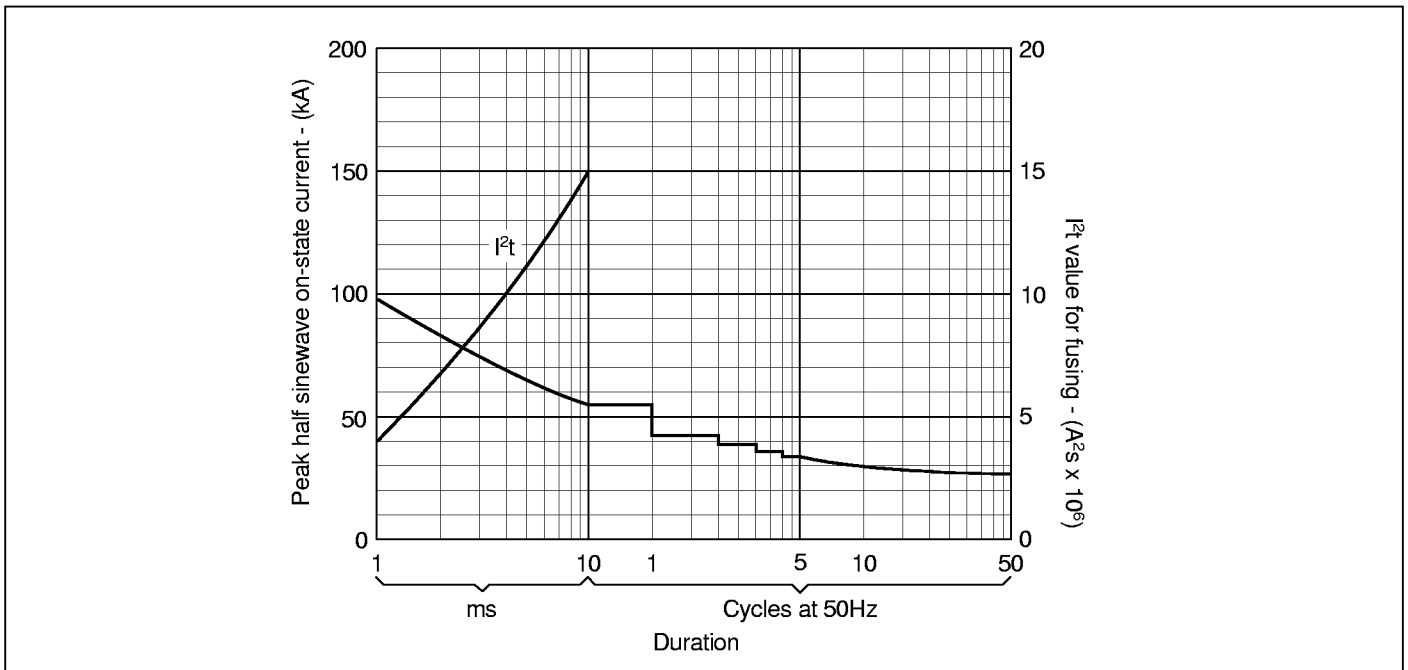
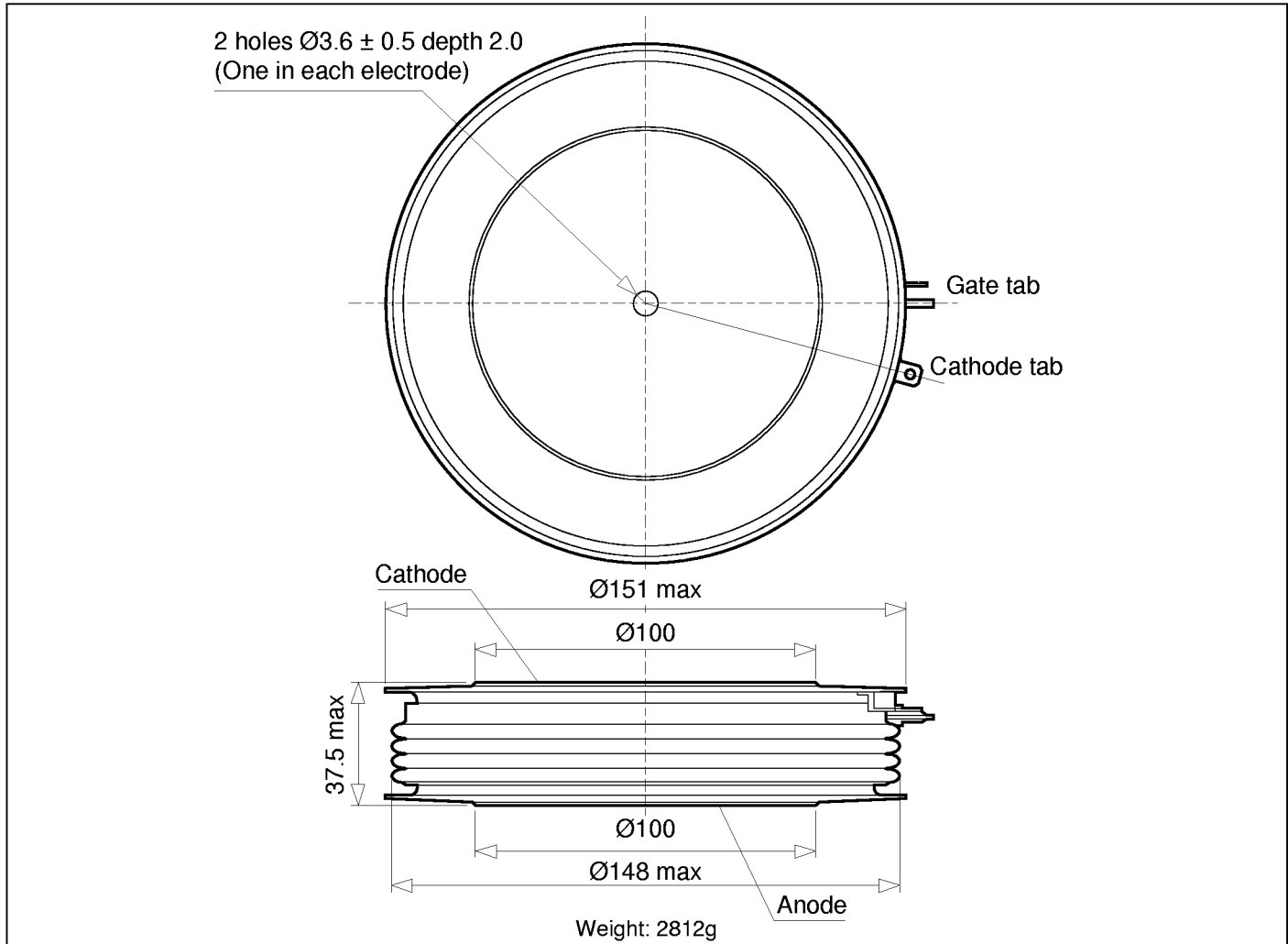


Fig.6 Surge (non-repetitive) on-state current vs time (with 50% V_{RRM} at $T_{case} 125^{\circ}C$)

DCR1674SZ

PACKAGE OUTLINE - Z

For further package information, please contact your local Customer Service Centre. All dimensions in mm, unless stated otherwise. DO NOT SCALE.



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