

### APPLICATIONS

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

### KEY PARAMETERS

|             |               |
|-------------|---------------|
| $V_{DRM}$   | 4800V         |
| $I_{T(AV)}$ | 1088A         |
| $I_{TSM}$   | 15000A        |
| $dV/dt^*$   | 300V/ $\mu$ s |
| $di/dt$     | 200A/ $\mu$ s |

\*Higher dV/dt selections available

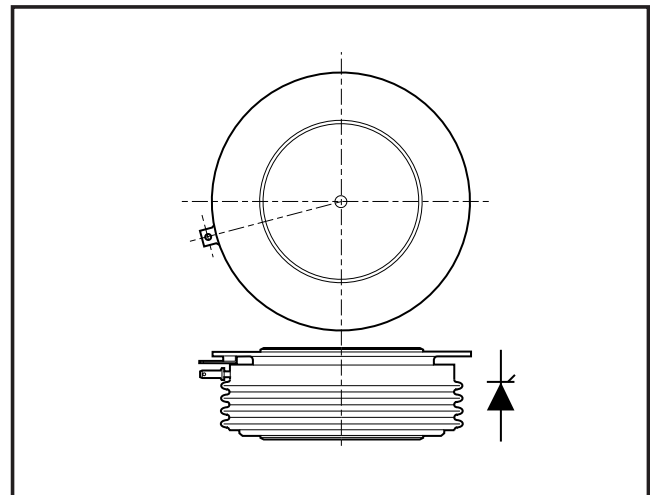
### FEATURES

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

### VOLTAGE RATINGS

| Type Number | Repetitive Peak Voltages<br>$V_{DRM}$ $V_{RRM}$<br>V | Conditions  |
|-------------|--|---|
| DCR1279SD48 | 4800   | $T_{vj} = 0^\circ$ to $125^\circ$ C,<br>$I_{DRM} = I_{RRM} = 150$ mA,<br>$V_{DRM}$ , $V_{RRM}$ $t_p = 10$ ms,<br>$V_{DSM}$ & $V_{RSM} =$<br>$V_{DRM}$ & $V_{RRM} + 100$ V<br>respectively |
| DCR1279SD47 | 4700   |   |
| DCR1279SD46 | 4600   |   |
| DCR1279SD45 | 4500   |   |
| DCR1279SD44 | 4400   |   |

Lower voltage grades available.



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

### CURRENT RATINGS

$T_{case} = 60^\circ$  C unless stated otherwise.

| Symbol                                 | Parameter                            | Conditions                | Max. | Units |
|--|--------------------------------------|---------------------------|------|-------|
| <b>Double Side Cooled</b>              |                                      |                           |      |       |
| $I_{T(AV)}$                            | Mean on-state current                | Half wave resistive load, | 1088 | A     |
| $I_{T(RMS)}$                           | RMS value                            | -                         | 1709 | A     |
| $I_T$                                  | Continuous (direct) on-state current | -                         | 1574 | A     |
| <b>Single Side Cooled (Anode side)</b> |                                      |                           |      |       |
| $I_{T(AV)}$                            | Mean on-state current                | Half wave resistive load  | 762  | A     |
| $I_{T(RMS)}$                           | RMS value                            | -                         | 1197 | A     |
| $I_T$                                  | Continuous (direct) on-state current | -                         | 1034 | A     |

# DCR1279SD

## CURRENT RATINGS

$T_{case} = 80^{\circ}\text{C}$  unless stated otherwise.

| Symbol                                 | Parameter                            | Conditions                | Max. | Units |
|--|--------------------------------------|---------------------------|------|-------|
| <b>Double Side Cooled</b>              |                                      |                           |      |       |
| $I_{T(AV)}$                            | Mean on-state current                | Half wave resistive load, | 860  | A     |
| $I_{T(RMS)}$                           | RMS value                            | -                         | 1350 | A     |
| $I_T$                                  | Continuous (direct) on-state current | -                         | 1055 | A     |
| <b>Single Side Cooled (Anode side)</b> |                                      |                           |      |       |
| $I_{T(AV)}$                            | Mean on-state current                | Half wave resistive load  | 590  | A     |
| $I_{T(RMS)}$                           | RMS value                            | -                         | 930  | A     |
| $I_T$                                  | Continuous (direct) on-state current | -                         | 860  | A     |

## SURGE RATINGS

| Symbol    | Parameter                               | Conditions                                       | Max.               | Units                |
|-----------|---|--|--------------------|----------------------|
| $I_{TSM}$ | Surge (non-repetitive) on-state current | 10ms half sine; $T_{case} = 125^{\circ}\text{C}$ | 12.0               | kA                   |
| $I^2t$    | $I^2t$ for fusing                       | $V_R = 50\% V_{RRM}$ - 1/4 sine                  | $0.72 \times 10^6$ | $\text{A}^2\text{s}$ |
| $I_{TSM}$ | Surge (non-repetitive) on-state current | 10ms half sine; $T_{case} = 125^{\circ}\text{C}$ | 15.0               | kA                   |
| $I^2t$    | $I^2t$ for fusing                       | $V_R = 0$  | $1.12 \times 10^6$ | $\text{A}^2\text{s}$ |

## THERMAL AND MECHANICAL DATA

| Symbol        | Parameter                             | Conditions                                   | Min.        | Max. | Units              |                      |
|---------------|---------------------------------------|--|-------------|------|--------------------|----------------------|
| $R_{th(j-c)}$ | Thermal resistance - junction to case | Double side cooled                           | dc          | -    | 0.020              | $^{\circ}\text{C/W}$ |
|               |                                       | Single side cooled                           | Anode dc    | -    | 0.036              | $^{\circ}\text{C/W}$ |
|               |                                       |  | Cathode dc  | -    | 0.044              | $^{\circ}\text{C/W}$ |
| $R_{th(c-h)}$ | Thermal resistance - case to heatsink | Clamping force 22.0kN with mounting compound | Double side | -    | 0.004              | $^{\circ}\text{C/W}$ |
|               |                                       |  | Single side | -    | 0.008              | $^{\circ}\text{C/W}$ |
| $T_{vj}$      | Virtual junction temperature          | On-state (conducting)                        |             | -    | 135                | $^{\circ}\text{C}$   |
|               |                                       | Reverse (blocking)                           |             | -    | 125                | $^{\circ}\text{C}$   |
| $T_{stg}$     | Storage temperature range             |  | -55         | 125  | $^{\circ}\text{C}$ |                      |
| -             | Clamping force                        |  | 22.0        | 24.0 | kN                 |                      |

## DYNAMIC CHARACTERISTICS

| Symbol            | Parameter  | Conditions   | Typ.            | Max.  | Units      |            |
|-------------------|--|--|-----------------|-------|------------|------------|
| $I_{RRM}/I_{DRM}$ | Peak reverse and off-state current               | At $V_{RRM}/V_{DRM}$ , $T_{case} = 125^{\circ}C$   | -               | 150   | mA         |            |
| dV/dt             | Maximum linear rate of rise of off-state voltage | To 67% $V_{DRM}$ , $T_j = 125^{\circ}C$ . Gate open circuit.   | -               | 300   | V/ $\mu s$ |            |
| di/dt             | Rate of rise of on-state current                 | From 67% $V_{DRM}$ to 1000A<br>Gate source 10V, 5 $\Omega$<br>$t_r \leq 0.5\mu s$ , $T_j = 125^{\circ}C$ | Repetitive 50Hz | -     | 100        | A/ $\mu s$ |
|                   |  |  | Non-repetitive  | -     | 200        | A/ $\mu s$ |
| $V_{T(TO)}$       | Threshold voltage                                | At $T_{vj} = 125^{\circ}C$   | -               | 1.14  | V          |            |
| $r_T$             | On-state slope resistance                        | At $T_{vj} = 125^{\circ}C$   | -               | 0.587 | m $\Omega$ |            |
| $t_{gd}$          | Delay time                                       | $V_D = 67\% V_{DRM}$ , Gate source 30V, 15 $\Omega$<br>$t_r = 0.5\mu s$ , $T_j = 25^{\circ}C$            | -               | 2.5   | $\mu s$    |            |
| $I_L$             | Latching current                                 | $T_j = 25^{\circ}C$ , $V_D = 5V$   | 300             | 1000  | mA         |            |
| $I_H$             | Holding current                                  | $T_j = 25^{\circ}C$ , $R_{g-k} = \infty$   | -               | 500   | mA         |            |

## GATE TRIGGER CHARACTERISTICS AND RATINGS

| Symbol      | Parameter                 | Conditions                                | Max. | Units |
|-------------|---------------------------|---|------|-------|
| $V_{GT}$    | Gate trigger voltage      | $V_{DRM} = 5V$ , $T_{case} = 25^{\circ}C$ | 4.0  | V     |
| $I_{GT}$    | Gate trigger current      | $V_{DRM} = 5V$ , $T_{case} = 25^{\circ}C$ | 400  | 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    | 10   | A     |
| $P_{GM}$    | Peak gate power           | See table, fig.4                          | 150  | W     |
| $P_{G(AV)}$ | Mean gate power           |   | 5    | W     |

CURVES

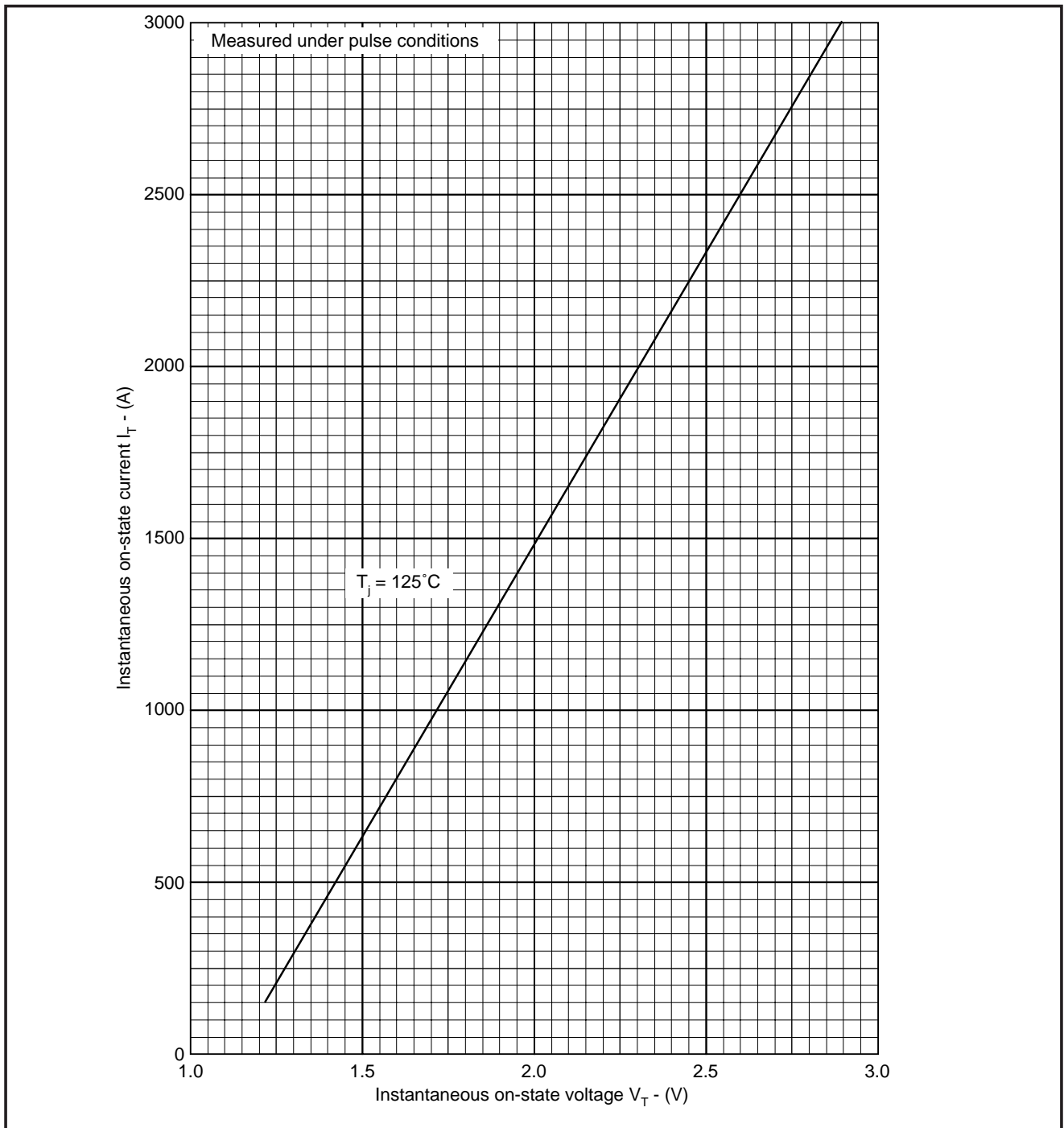


Fig.1 Maximum (limit) on-state characteristics

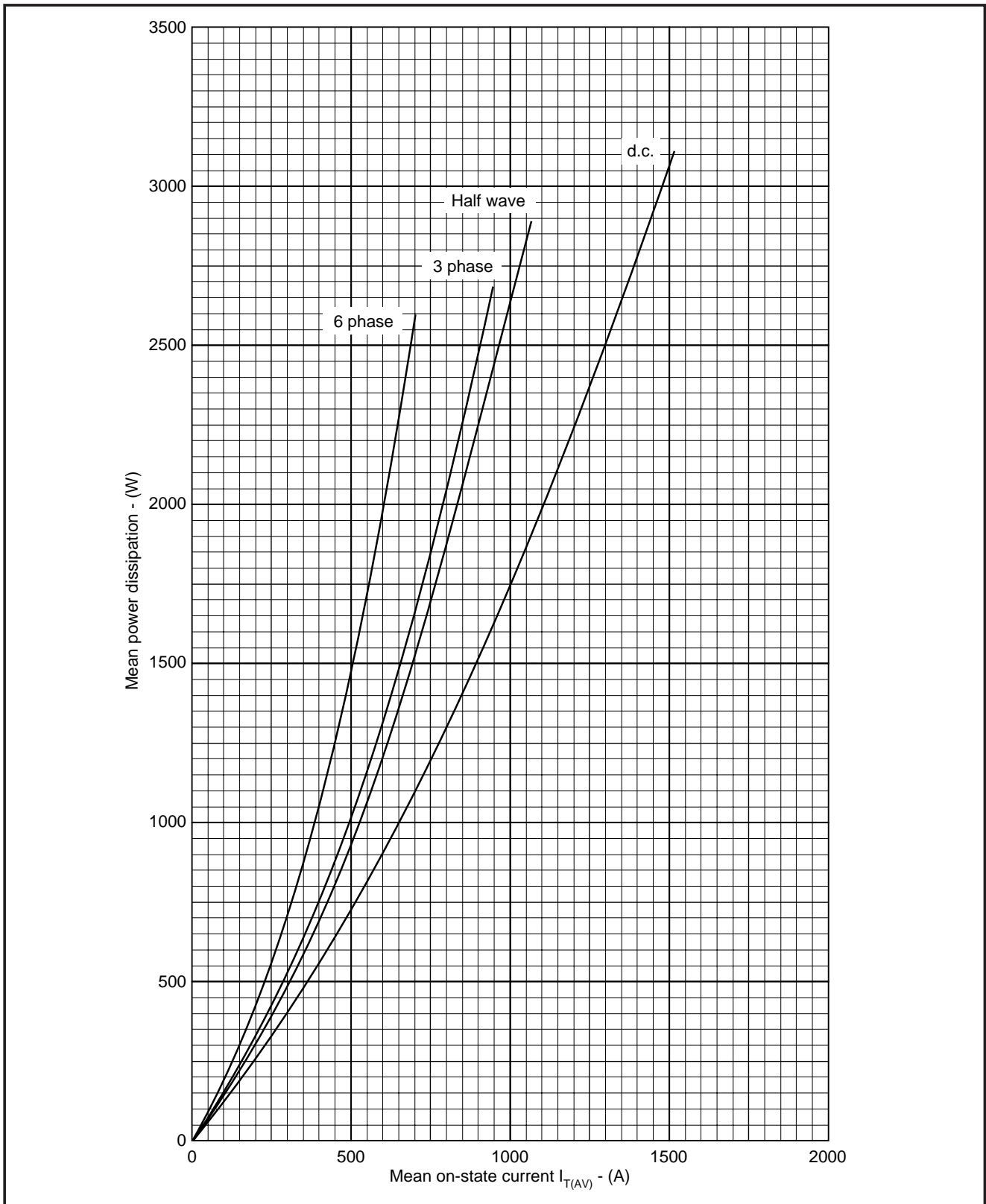


Fig.2 Dissipation curves

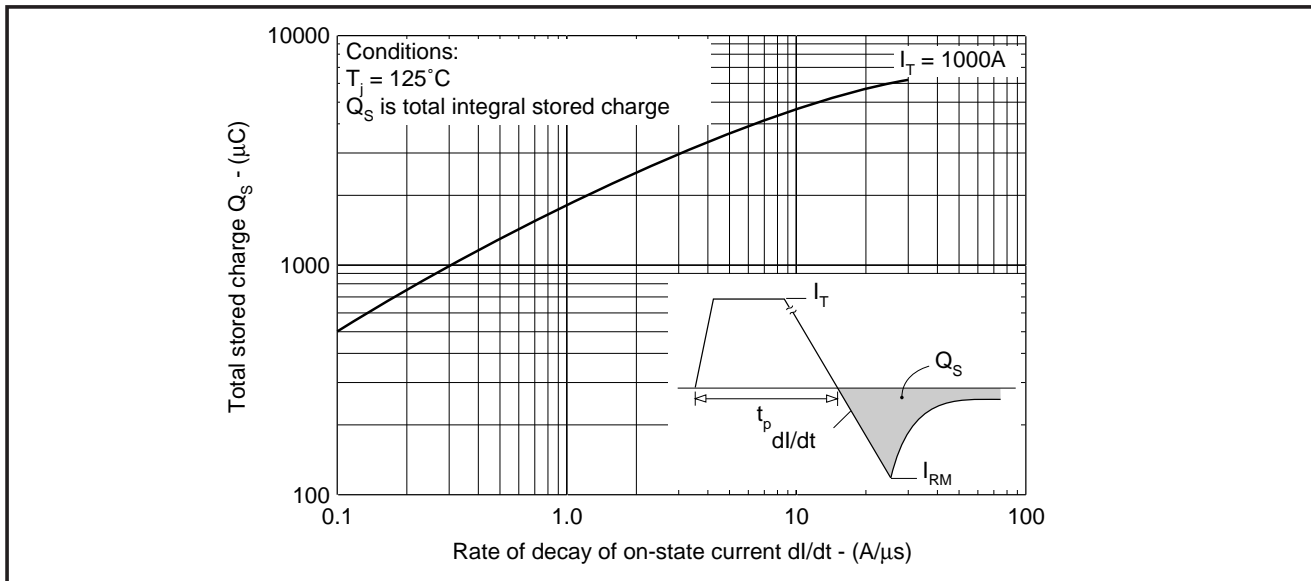


Fig.3 Stored charge

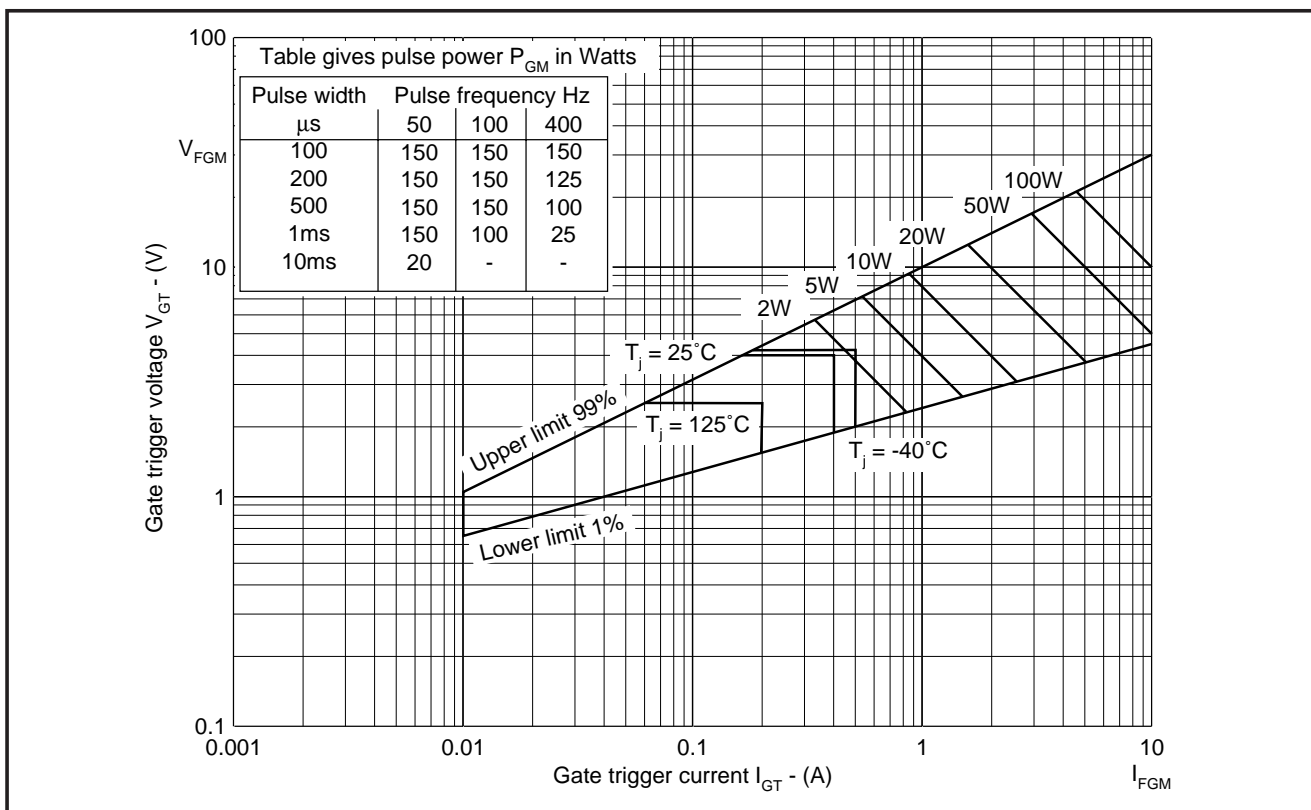


Fig.4 Gate characteristics

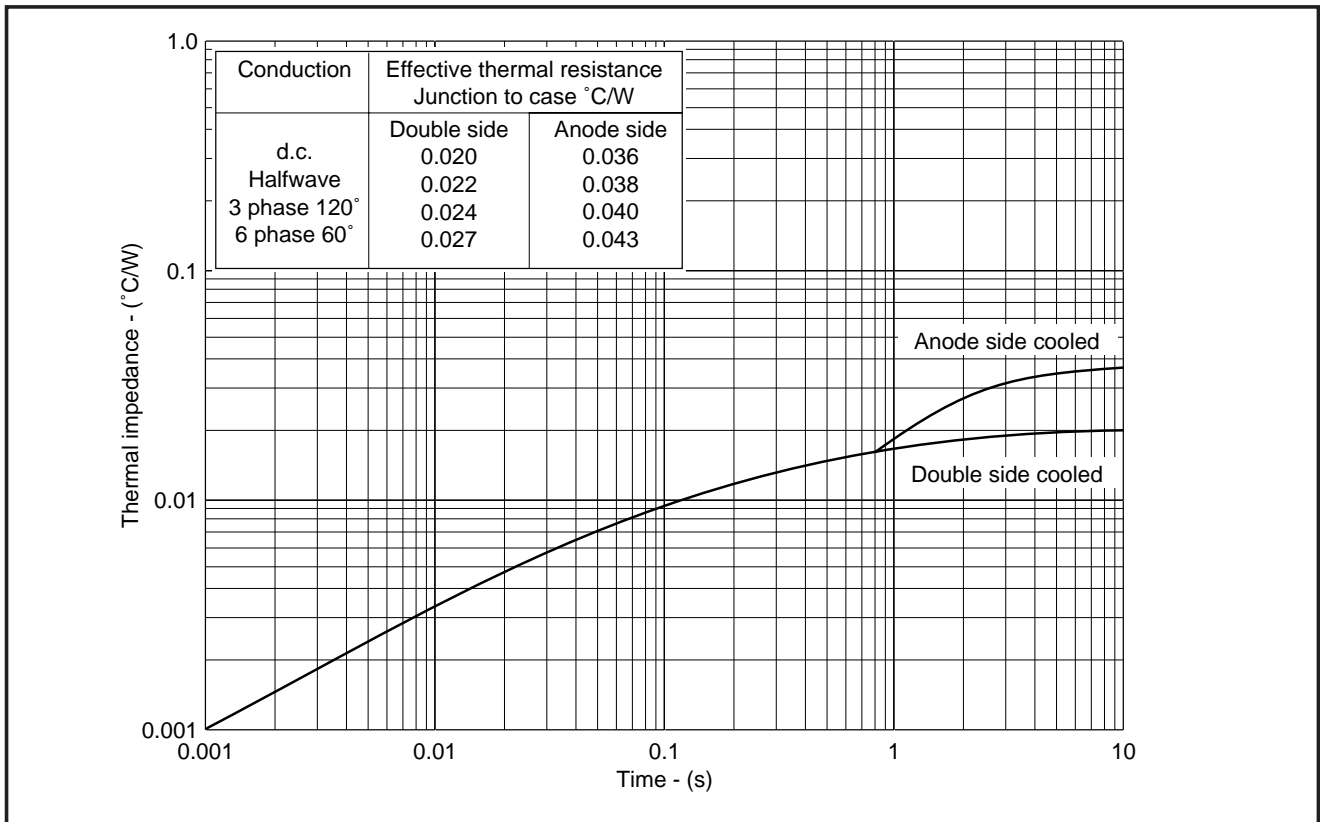


Fig.5 Maximum (limit) transient thermal impedance - junction to case

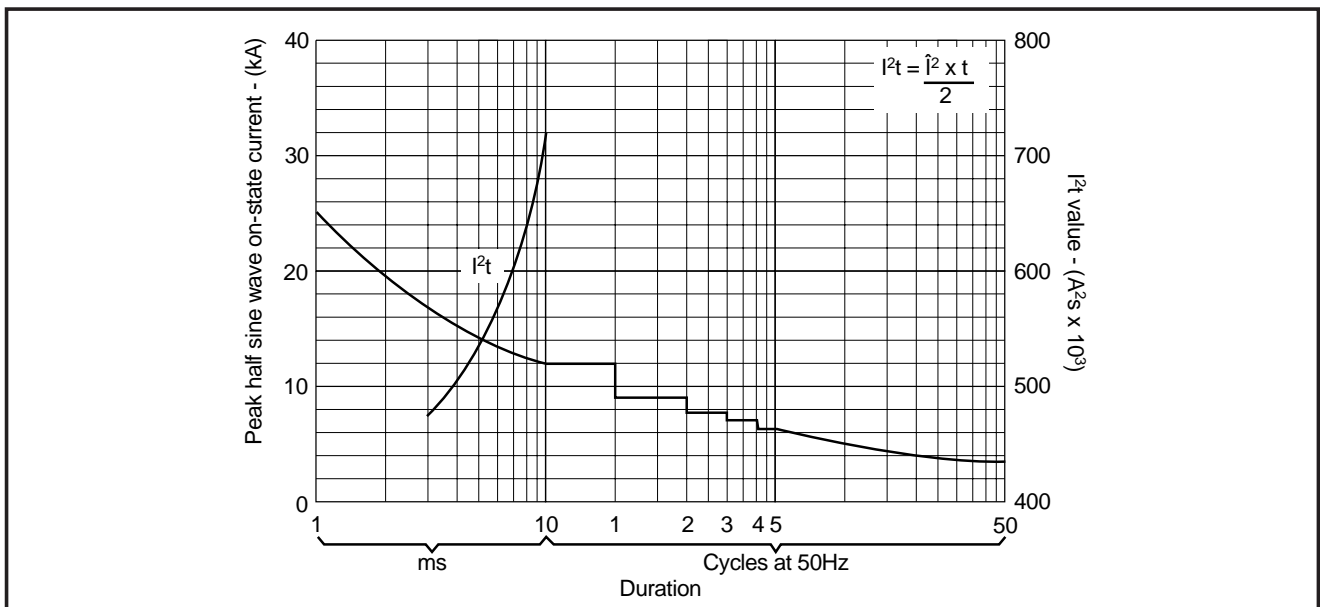
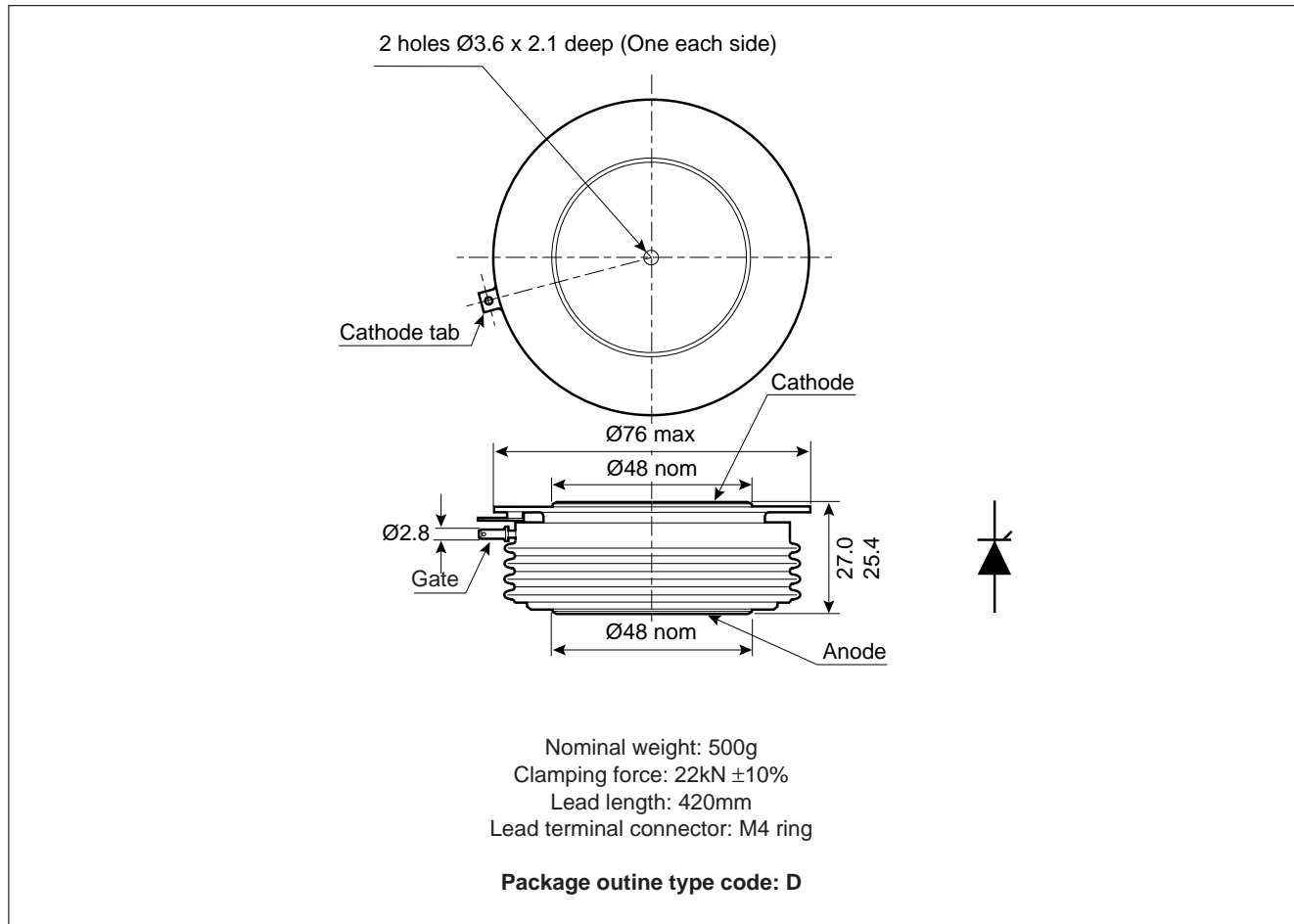


Fig.6 Surge (non-repetitive) on-state current vs time (with 50% V<sub>RRM</sub> at T<sub>case</sub> 125°C)

# DCR1279SD

## PACKAGE DETAILS

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



## ASSOCIATED PUBLICATIONS

| Title  | Application Note |
|--|------------------|
|  | Number           |
| Calculating the junction temperature or power semiconductors | AN4506           |
| Gate triggering and the use of gate characteristics          | AN4840           |
| Recommendations for clamping power semiconductors            | AN4839           |
| The effect of temperature on thyristor performance           | AN4870           |
| Thyristor and diode measurement with a multi-meter           | AN4853           |
| Turn-on performance of thyristors in parallel                | AN4999           |
| Use of $V_{TO}$ , $r_T$ on-state characteristic              | AN5001           |



## POWER ASSEMBLY CAPABILITY

The Power Assembly group was set up to provide a support service for those customers requiring more than the basic semiconductor, and has developed a flexible range of heatsink / clamping systems in line with advances in device types and the voltage and current capability of our semiconductors.

We offer an extensive range of air and liquid cooled assemblies covering the full range of circuit designs in general use today. The Assembly group continues to offer high quality engineering support dedicated to designing new units to satisfy the growing needs of our customers.

Using the up to date CAD methods our team of design and applications engineers aim to provide the Power Assembly Complete solution (PACs).

## DEVICE CLAMPS

Disc devices require the correct clamping force to ensure their safe operation. The PACs range offers a varied selection of pre-loaded clamps to suit all of our manufactured devices. This include cube clamps for single side cooling of 'T' 22mm

Clamps are available for single or double side cooling, with high insulation versions for high voltage assemblies.

Please refer to our application note on device clamping, AN4839

## HEATSINKS

Power Assembly has it's own proprietary range of extruded aluminium heatsinks. They have been designed to optimise the performance of our semiconductors. Data with respect to air natural, forced air and liquid cooling (with flow rates) is available on request.

For further information on device clamps, heatsinks and assemblies, please contact your nearest Sales Representative or the factory.



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