

**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
DCR860D18	1800	$T_{vj} = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$ , $I_{DRM} = I_{RRM} = 50\text{mA}$ , $V_{DRM}, V_{RRM} t_p = 10\text{ms}$ , $V_{DSM} \& V_{RSM} =$ $V_{DRM} \& V_{RRM} + 100\text{V}$ respectively
DCR860D16	1600	
DCR860D14	1400	
DCR860D12	1200	

Lower voltage grades available.

**ORDERING INFORMATION**

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

For example:

**DCR860D18**

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

**KEY PARAMETERS**

$V_{DRM}$	<b>1800 V</b>
$I_{T(AV)}$	<b>860 A</b>
$I_{TSM}$	<b>11500 A</b>
$dV/dt^*$	<b>1000 V/<math>\mu\text{s}</math></b>
$dI/dt$	<b>200 A/<math>\mu\text{s}</math></b>

\* Higher  $dV/dt$  selections available

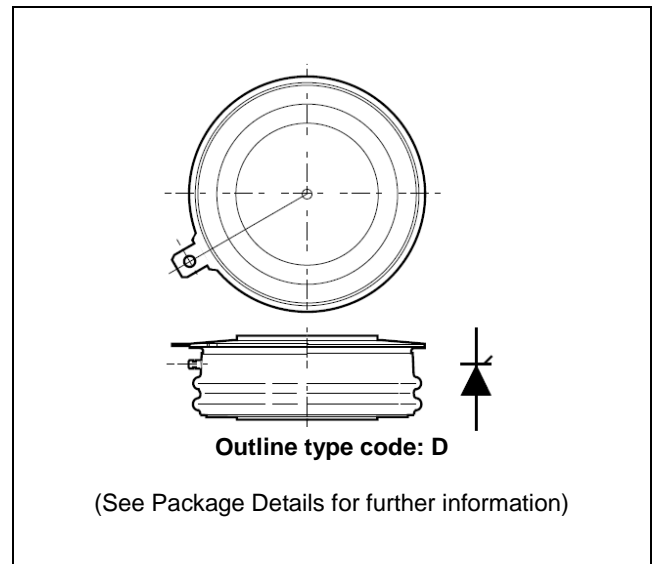


Fig. 1 Package outline

## CURRENT RATINGS

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

Symbol	Parameter	Test 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	-	1220	A

## SURGE RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
$I_{TSM}$	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 125^{\circ}\text{C}$	11.5	kA
$I^2t$	$I^2t$ for fusing	$V_R = 0$	0.661	$\text{MA}^2\text{s}$

## 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	$^{\circ}\text{C/W}$
$R_{th(c-h)}$	Thermal resistance – case to heatsink	Double side cooled      DC	-	0.01	$^{\circ}\text{C/W}$
$T_{vj}$	Virtual junction temperature	Blocking $V_{DRM} / V_{RRM}$	-	125	$^{\circ}\text{C}$
$T_{stg}$	Storage temperature range		-40	140	$^{\circ}\text{C}$
$F_m$	Clamping force		8	12	kN

## DYNAMIC CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Max.	Units	
$I_{RRM}/I_{DRM}$	Peak reverse and off-state current	At $V_{RRM}/V_{DRM}$ , $T_{case} = 125^{\circ}C$	-	50	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/ $\mu$ s	
$dI/dt$	Rate of rise of on-state current	From 67% $V_{DRM}$ to 1000A	Repetitive 50Hz	-	200	A/ $\mu$ s
		Gate source 30V, 10 $\Omega$ , $t_r < 0.5\mu$ s, $T_j = 125^{\circ}C$	Non-repetitive	-	1000	A/ $\mu$ s
$V_T$	On-state voltage	$I_T = 1500A$ , $T_{case} = 125^{\circ}C$		1.65	V	
$V_{T(TO)}$	Threshold voltage	$T_{case} = 125^{\circ}C$	-	0.90	V	
$r_T$	On-state slope resistance	$T_{case} = 125^{\circ}C$	-	0.50	m $\Omega$	
$t_{gd}$	Delay time	$V_D = 67\% V_{DRM}$ , gate source 30V, 10 $\Omega$ $t_r = 0.5\mu$ s, $T_j = 25^{\circ}C$	-	3.0	$\mu$ s	
$t_q$	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% $V_{DRM}$	-	150	$\mu$ s	
$Q_S$	Stored charge	$I_T = 1000A$ , $t_p = 1000\mu$ s, $T_j = 125^{\circ}C$ , $dI/dt = 10A/\mu$ s,	-	1500	$\mu$ C	
$I_{RR}$	Reverse recovery current		-	105	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% $V_{DRM}$ , $T_{case} = 125^{\circ}C$	0.3	V
$I_{GT}$	Gate trigger current	$V_{DRM} = 5V$ , $T_{case} = 25^{\circ}C$	300	mA
$I_{GD}$	Gate non-trigger current	At 40% $V_{DRM}$ , $T_{case} = 125^{\circ}C$	20	mA

CURVES

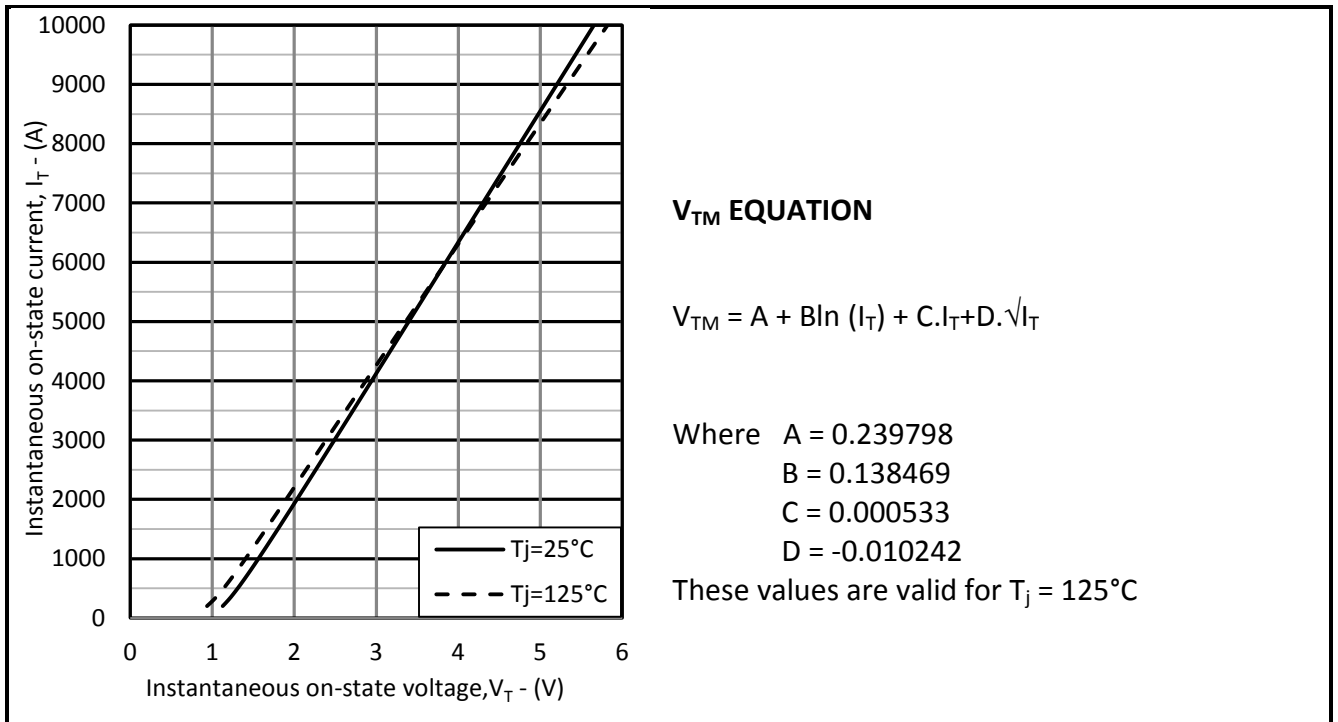


Fig.2 Maximum & minimum on-state characteristics

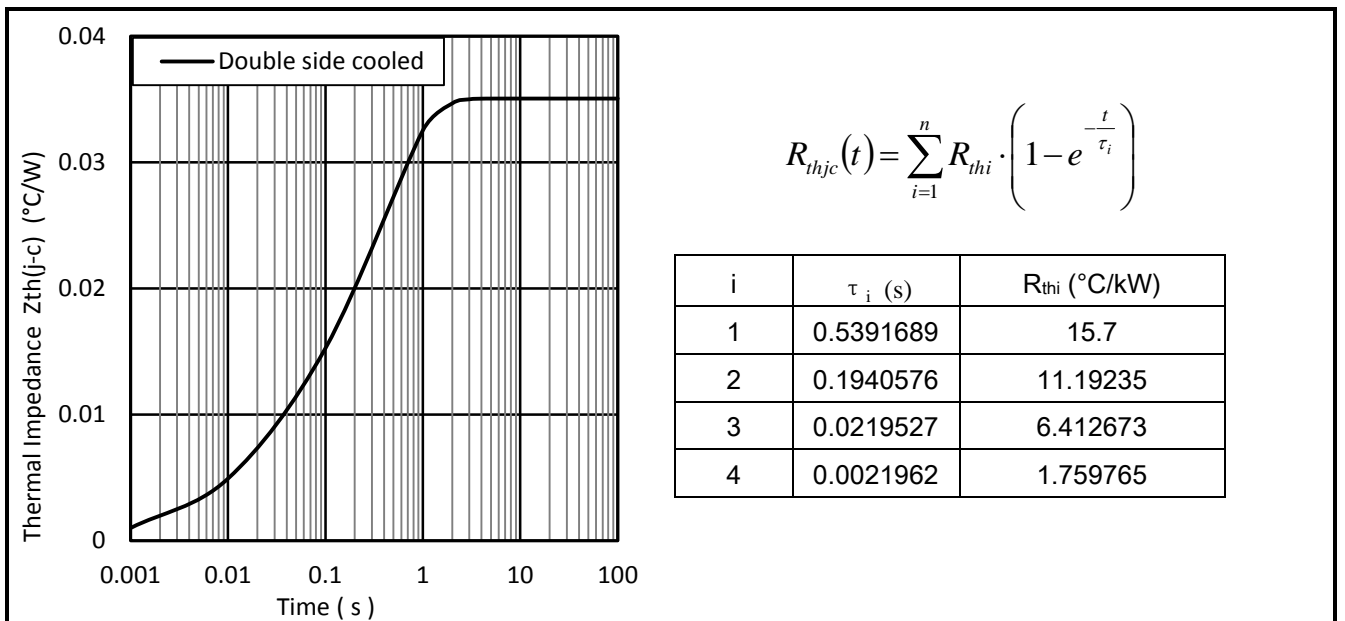


Fig.3 Maximum (limit) transient thermal impedance – junction to case (°C/W)

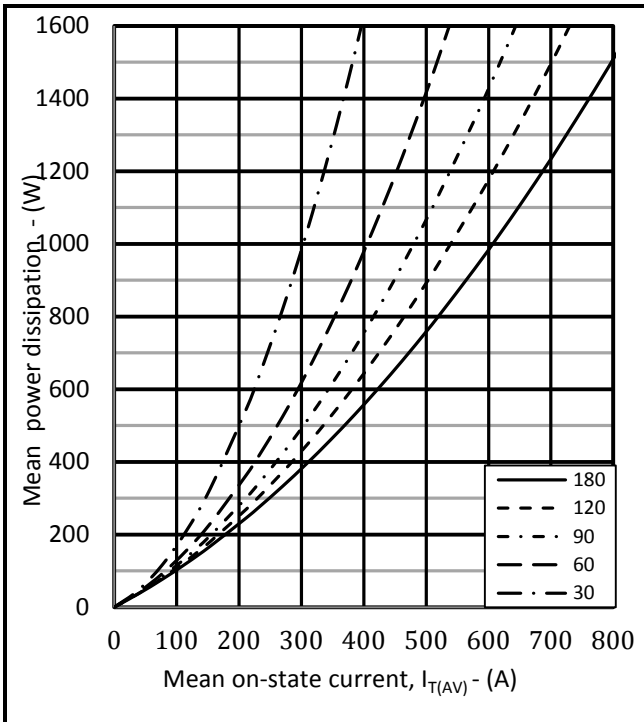


Fig.4 On-state power dissipation – sine wave

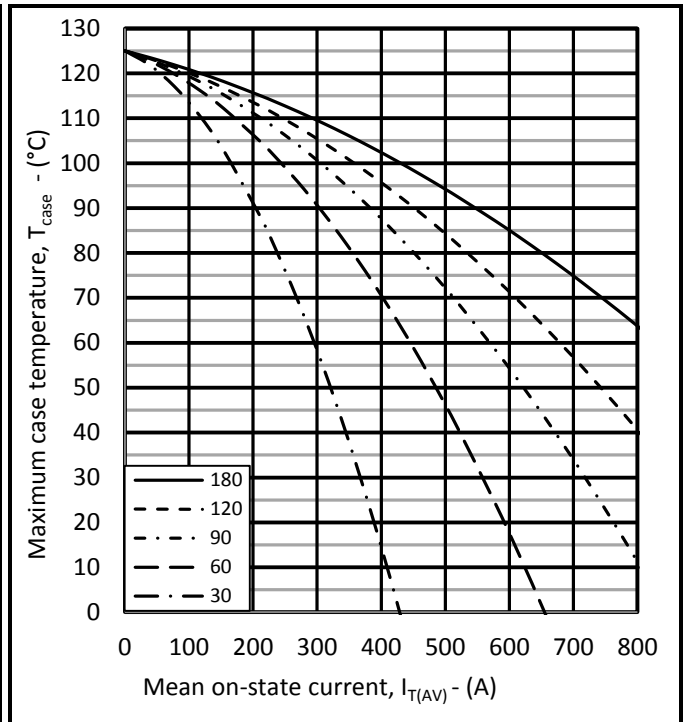


Fig.5 Maximum permissible case temperature, double side cooled – sine wave

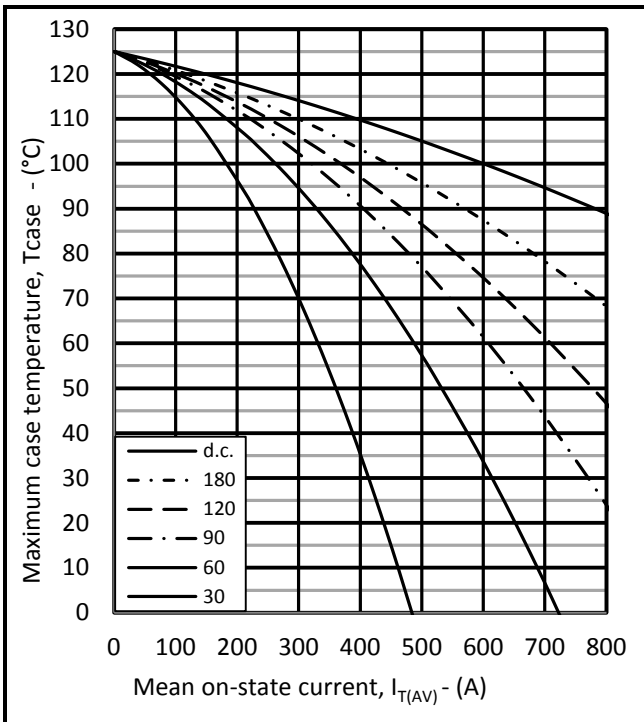


Fig.6 Maximum permissible case temperature, double side cooled – rectangular wave

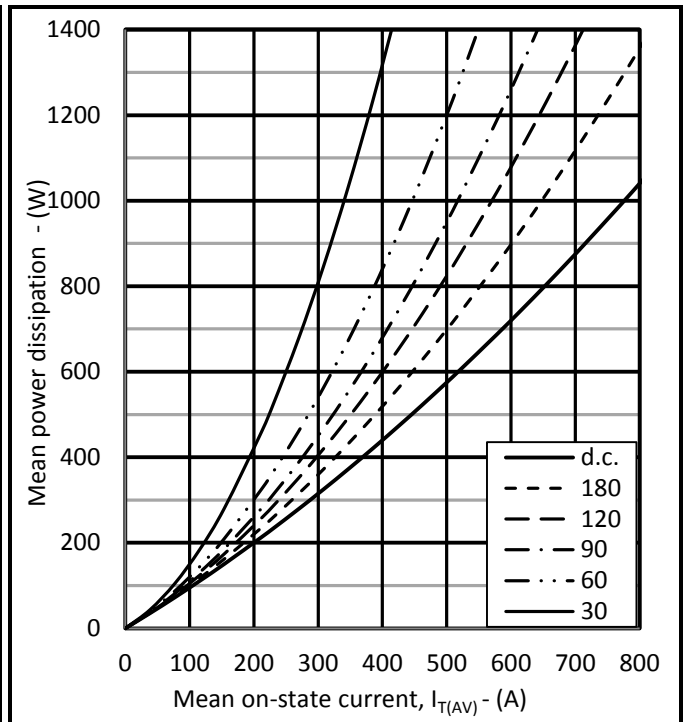


Fig.7 On-state power dissipation – rectangular wave

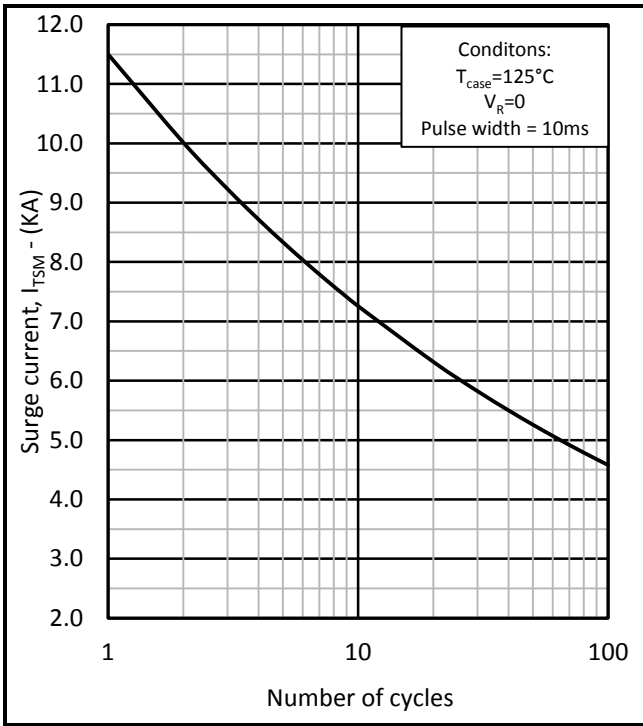


Fig.8 Multi-cycle surge current

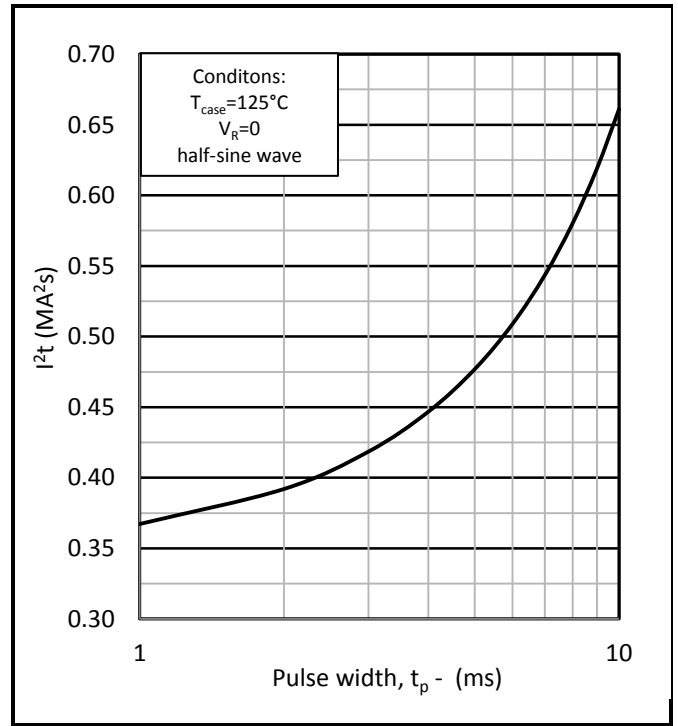


Fig.9 Single-cycle  $I^2t$

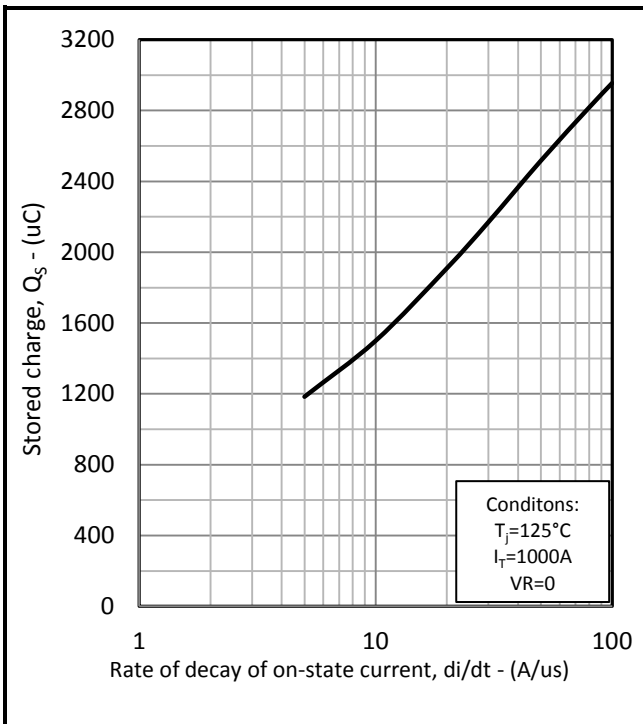


Fig.10 Stored charge vs  $di/dt$

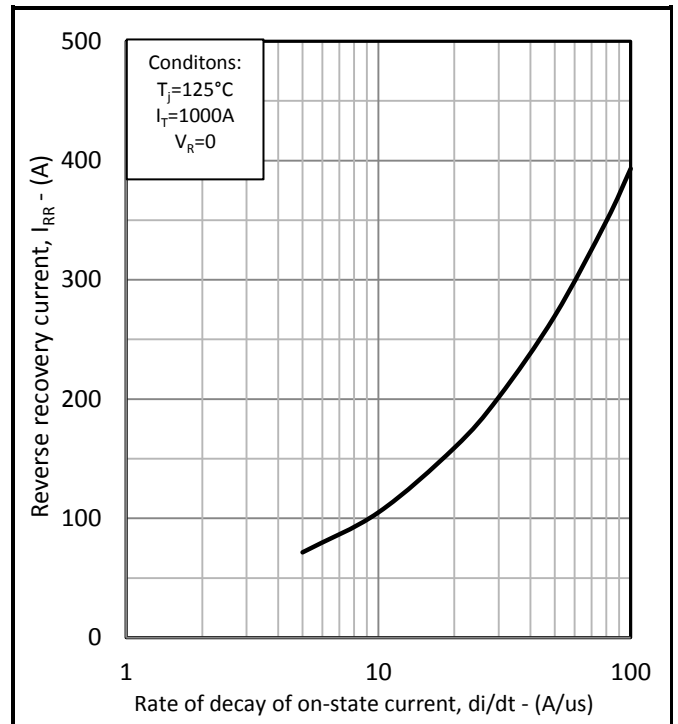


Fig.11 Reverse recovery current vs  $di/dt$

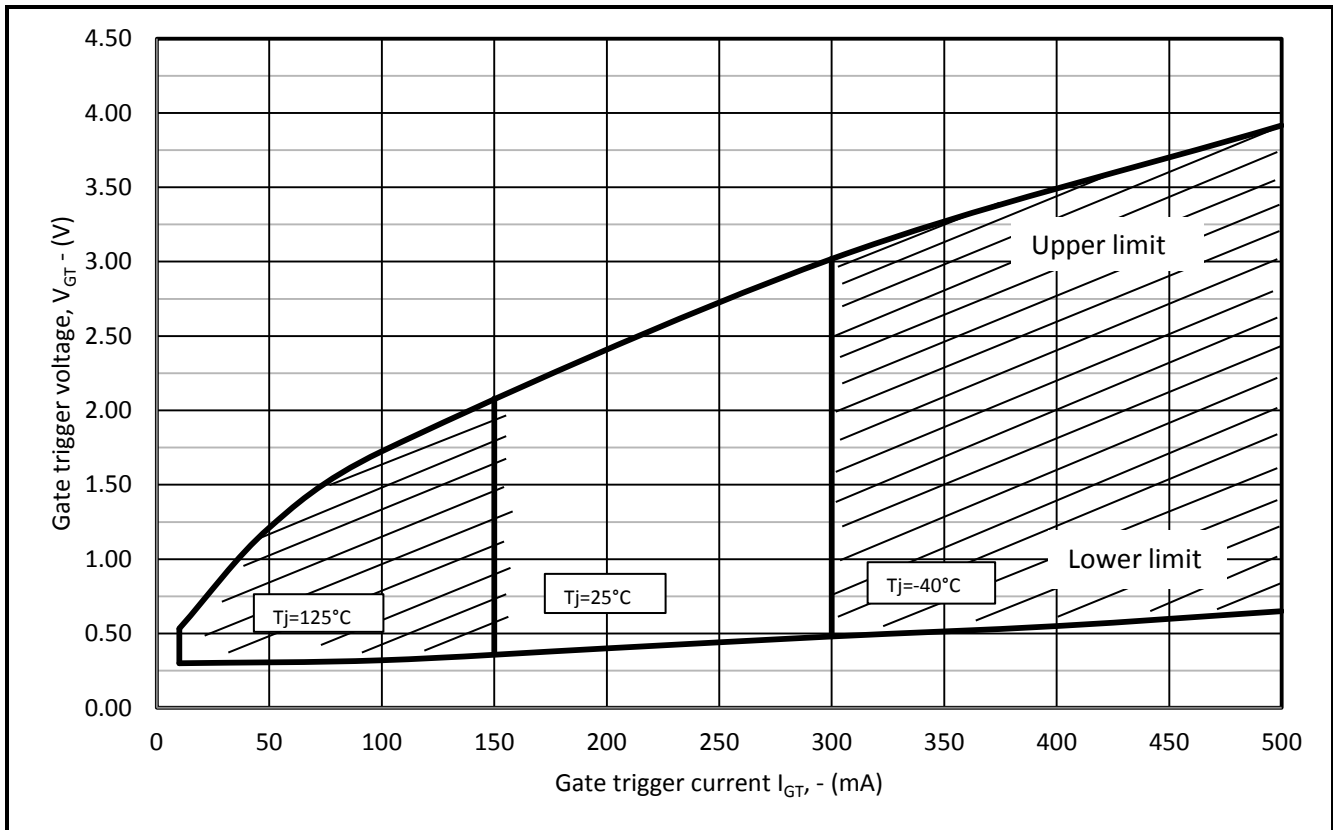


Fig.12 Gate characteristics

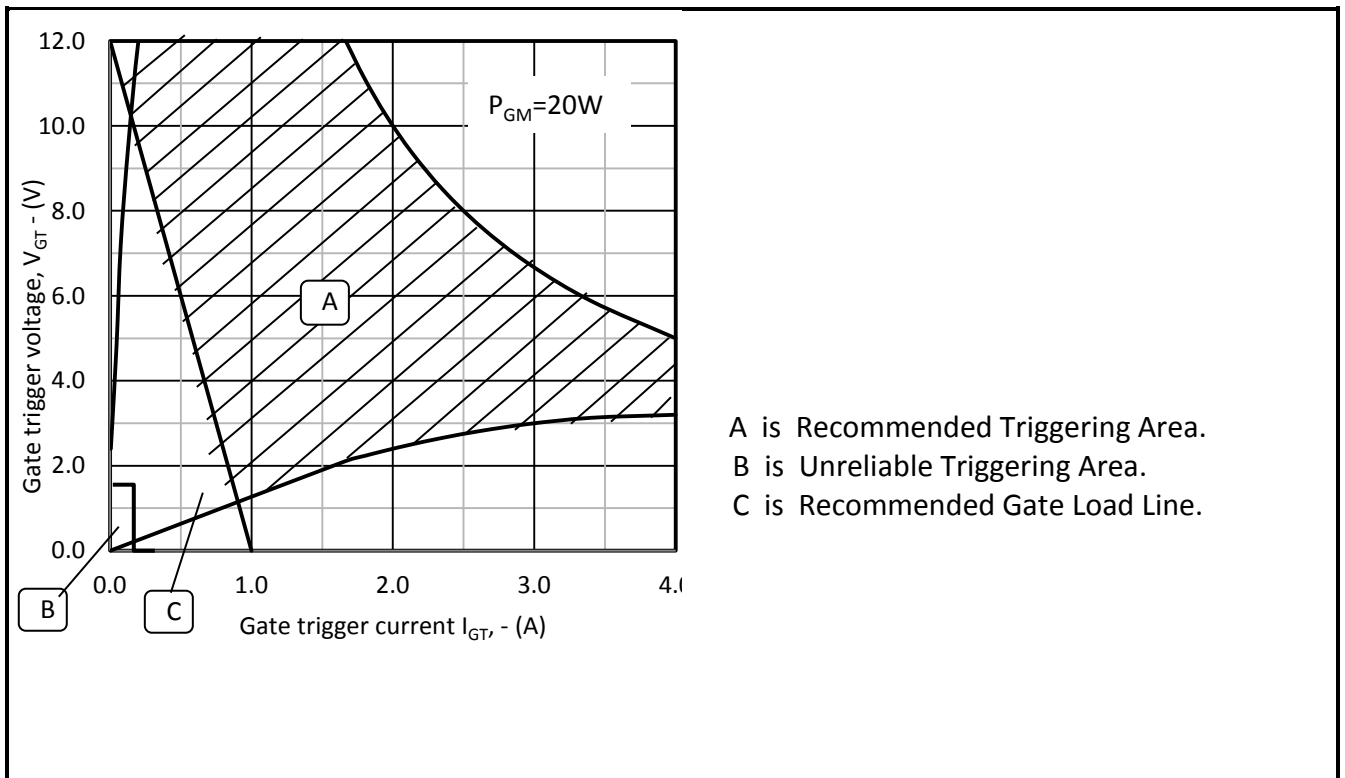


Fig.13 Gate characteristics

PACKAGE DETAILS

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

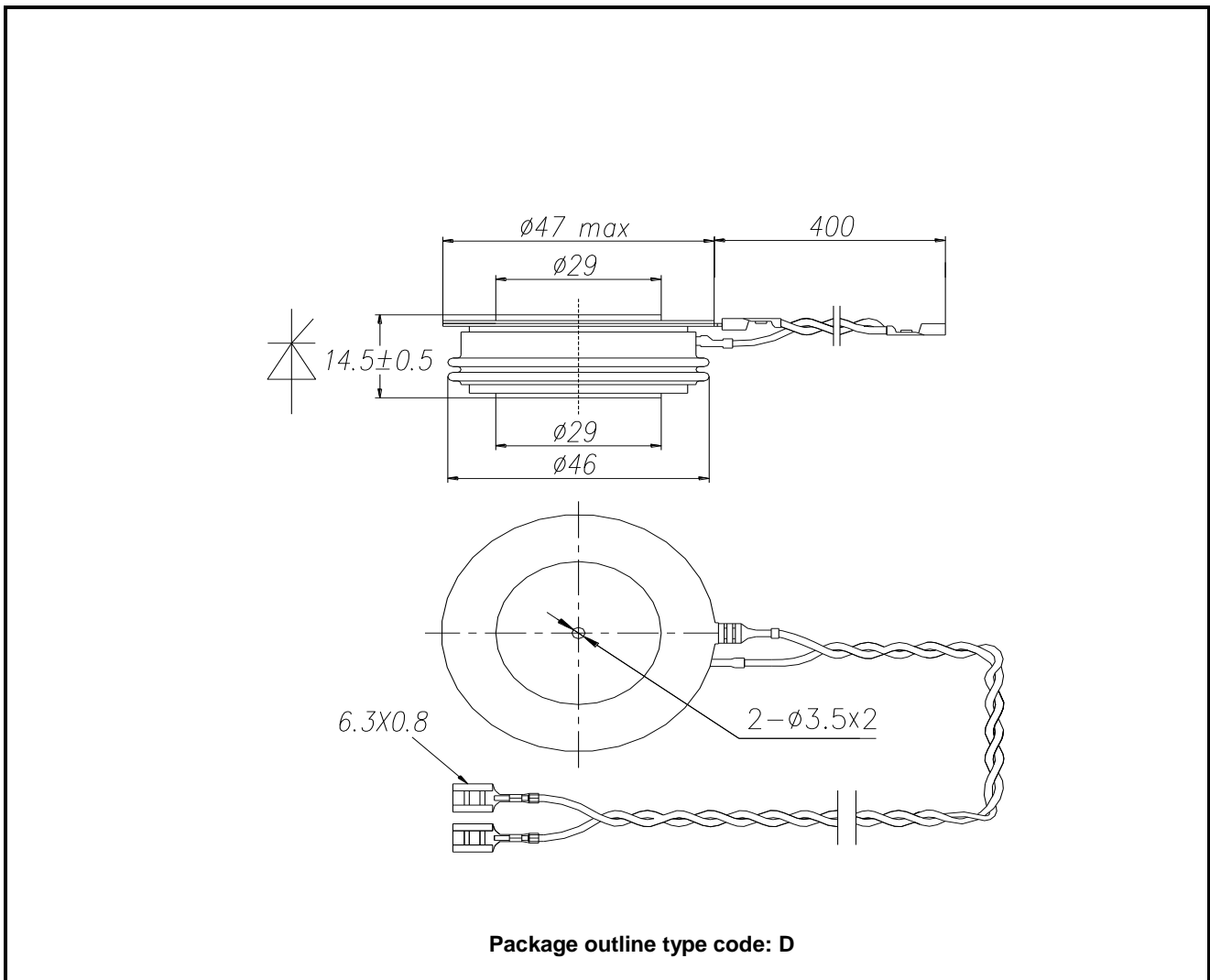


Fig.14 Package outline



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