

**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
DCR610D34	3400	$T_{vj} = -40^{\circ}\text{C}$ 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
DCR610D32	3200	
DCR610D30	3000	
DCR610D28	2800	
DCR610D26	2600	
DCR610D24	2400	

Lower voltage grades available.

**ORDERING INFORMATION**

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

For example:

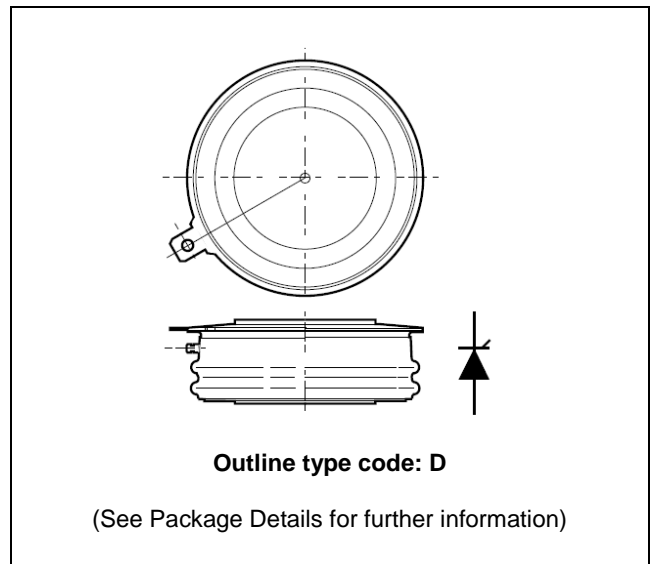
**DCR610D34**

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>3400 V</b>
$I_{T(AV)}$	<b>610 A</b>
$I_{TSM}$	<b>8000 A</b>
$dV/dt^*$	<b>1000 V/<math>\mu\text{s}</math></b>
$dI/dt$	<b>150 A/<math>\mu\text{s}</math></b>

\* Higher  $dV/dt$  selections available



**Fig. 1 Package outline**

**CURRENT RATINGS**

T<sub>case</sub> = 60°C unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
<b>Double Side Cooled</b>				
I <sub>T(AV)</sub>	Mean on-state current	Half wave resistive load	610	A
I <sub>T(RMS)</sub>	RMS value	-	960	A
I <sub>T</sub>	Continuous (direct) on-state current	-	860	A

**SURGE RATINGS**

Symbol	Parameter	Test Conditions	Max.	Units
I <sub>TSM</sub>	Surge (non-repetitive) on-state current	10ms half sine, T <sub>case</sub> = 125°C	8.0	kA
I <sup>2</sup> t	I <sup>2</sup> t for fusing	V <sub>R</sub> = 0	0.32	MA <sup>2</sup> s

**THERMAL AND MECHANICAL RATINGS**

Symbol	Parameter	Test Conditions	Min.	Max.	Units
R <sub>th(j-c)</sub>	Thermal resistance – junction to case	Double side cooled      DC	-	0.035	°C/W
R <sub>th(c-h)</sub>	Thermal resistance – case to heatsink	Double side cooled      DC	-	0.01	°C/W
T <sub>vj</sub>	Virtual junction temperature	Blocking V <sub>DRM</sub> / V <sub>RRM</sub>	-	125	°C
T <sub>stg</sub>	Storage temperature range		-40	140	°C
F <sub>m</sub>	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	-	150	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	$I_T = 1500A$ , $T_{case} = 125^{\circ}C$		2.78	V	
$V_{T(TO)}$	Threshold voltage	$T_{case} = 125^{\circ}C$	-	0.98	V	
$r_T$	On-state slope resistance	$T_{case} = 125^{\circ}C$	-	1.20	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	
$I_L$	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

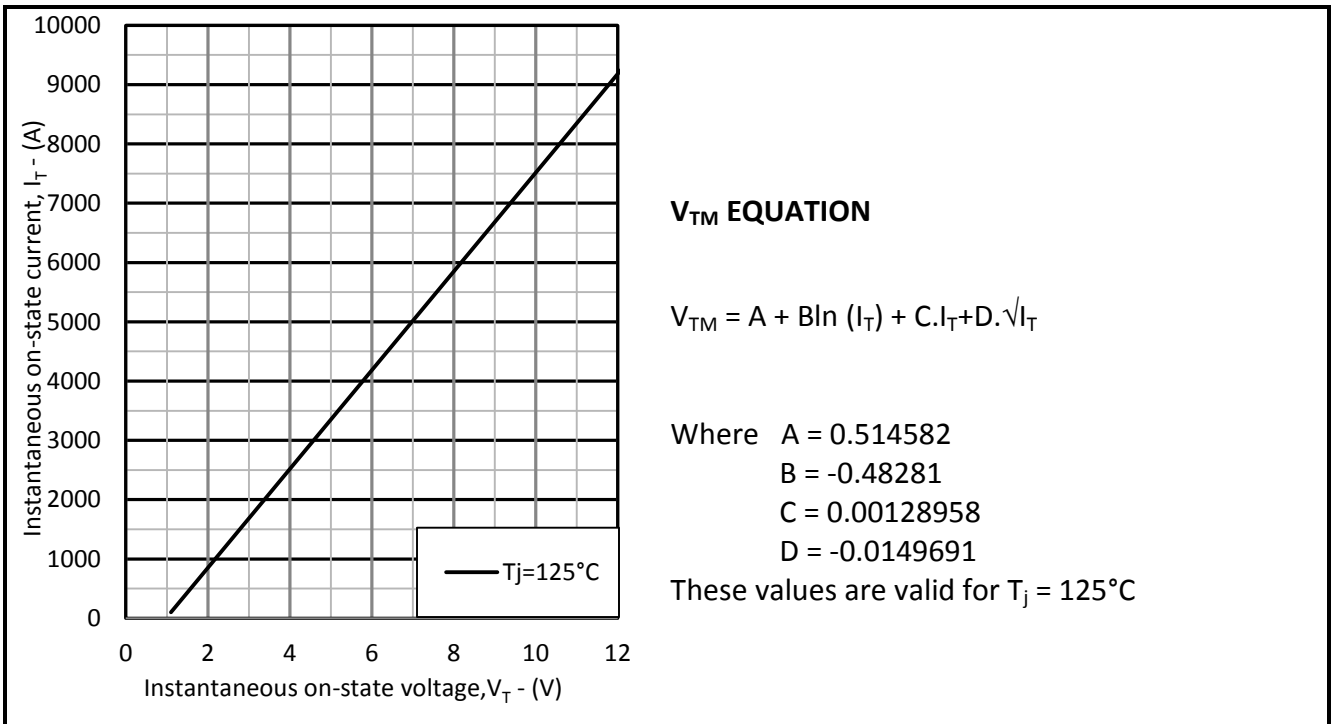


Fig.2 Maximum & minimum on-state characteristics

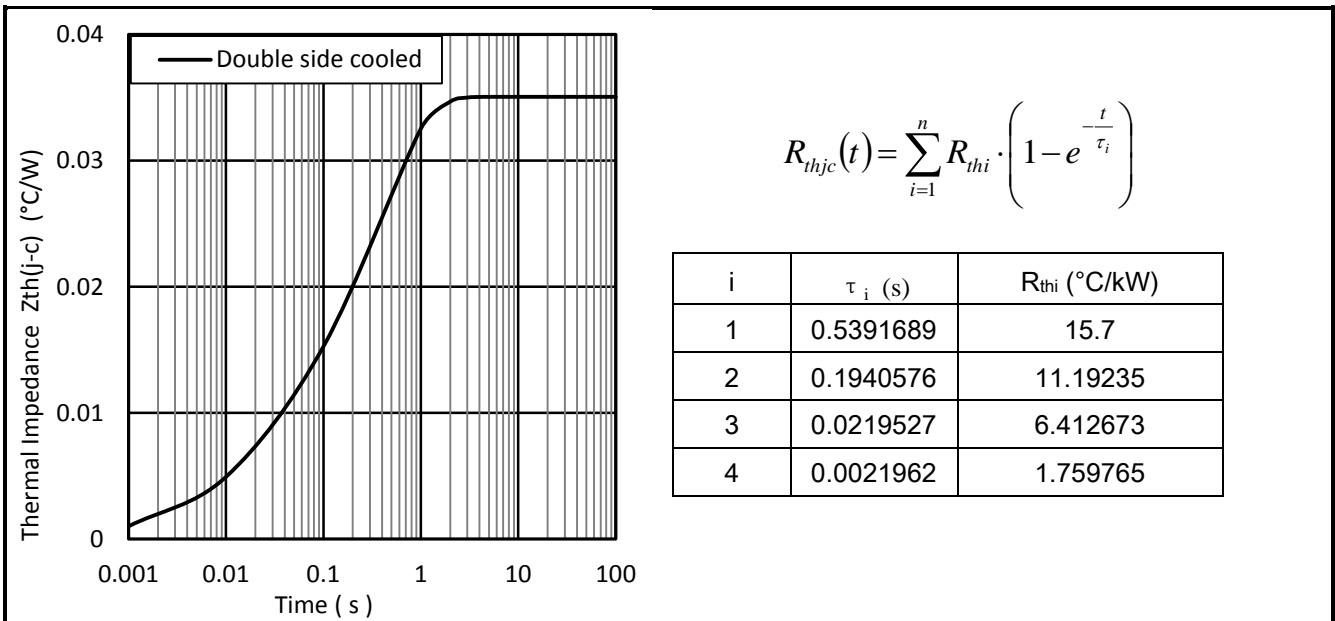


Fig.3 Maximum (limit) transient thermal impedance – junction to case (°C/W)

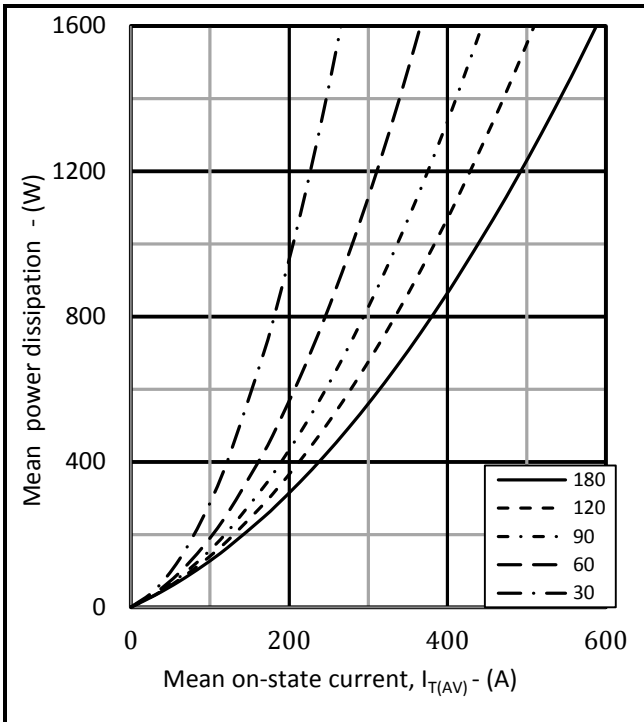


Fig.4 On-state power dissipation – sine wave

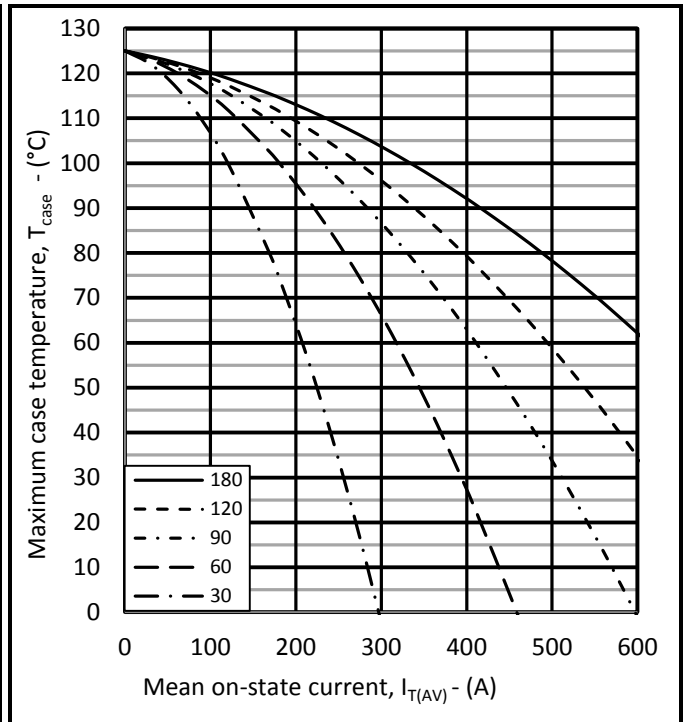


Fig.5 Maximum permissible case temperature, double side cooled – sine wave

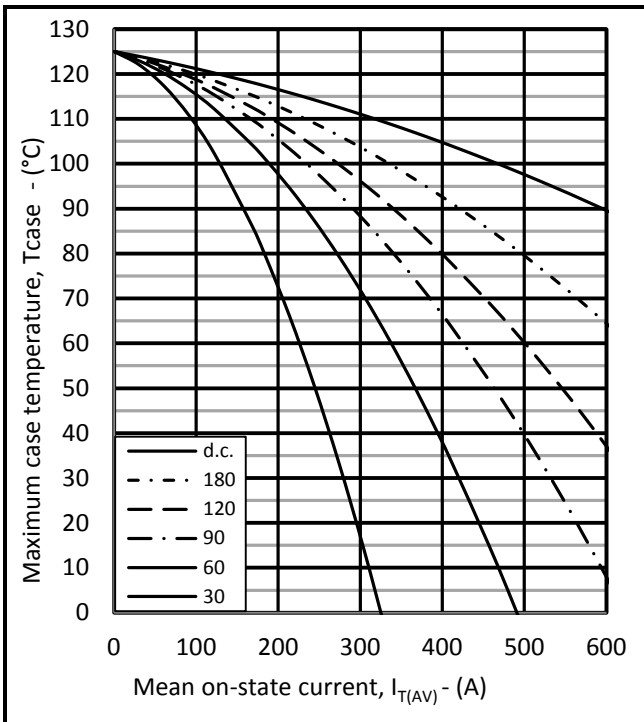


Fig.6 Maximum permissible case temperature, double side cooled – rectangular wave

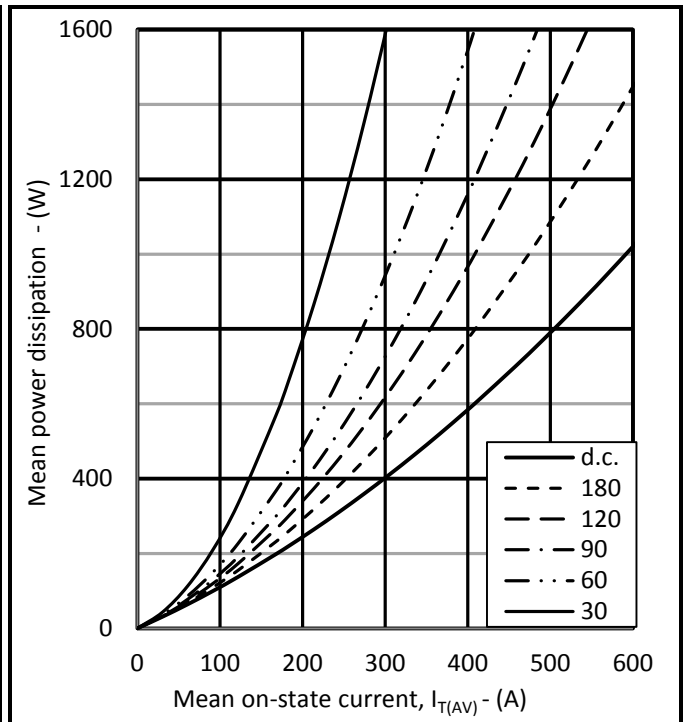


Fig.7 On-state power dissipation – rectangular wave

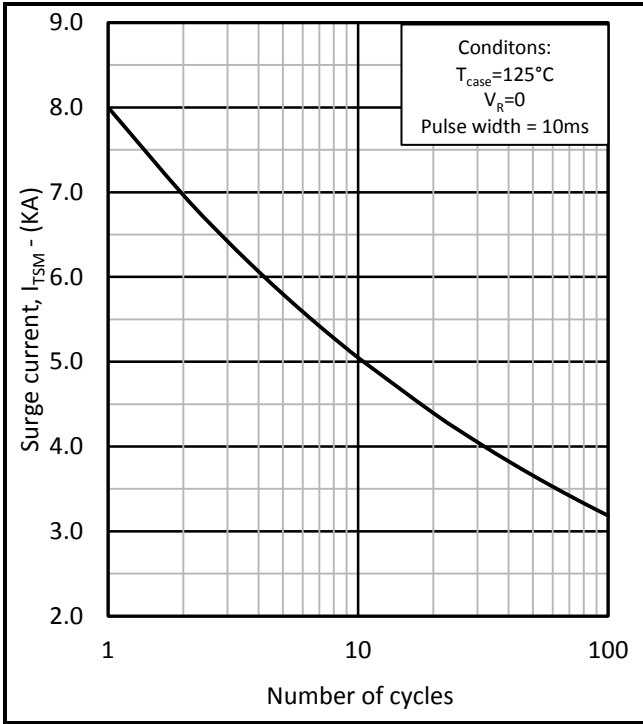


Fig.8 Multi-cycle surge current

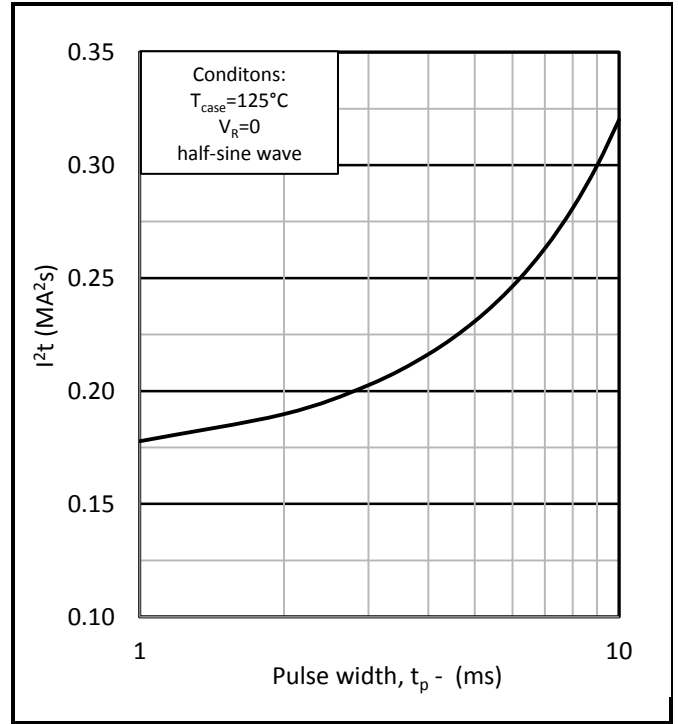


Fig.9 Single-cycle  $I^2t$

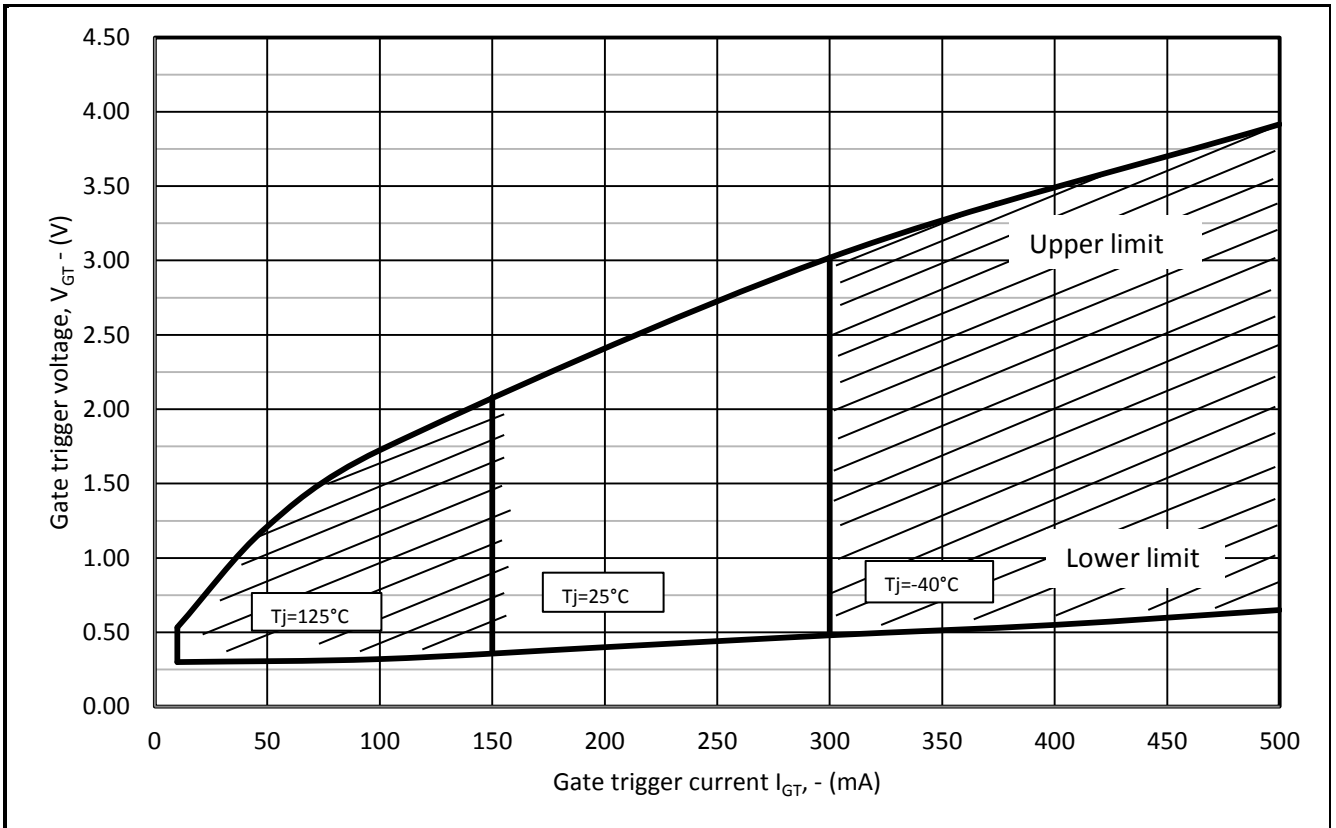


Fig.10 Gate characteristics

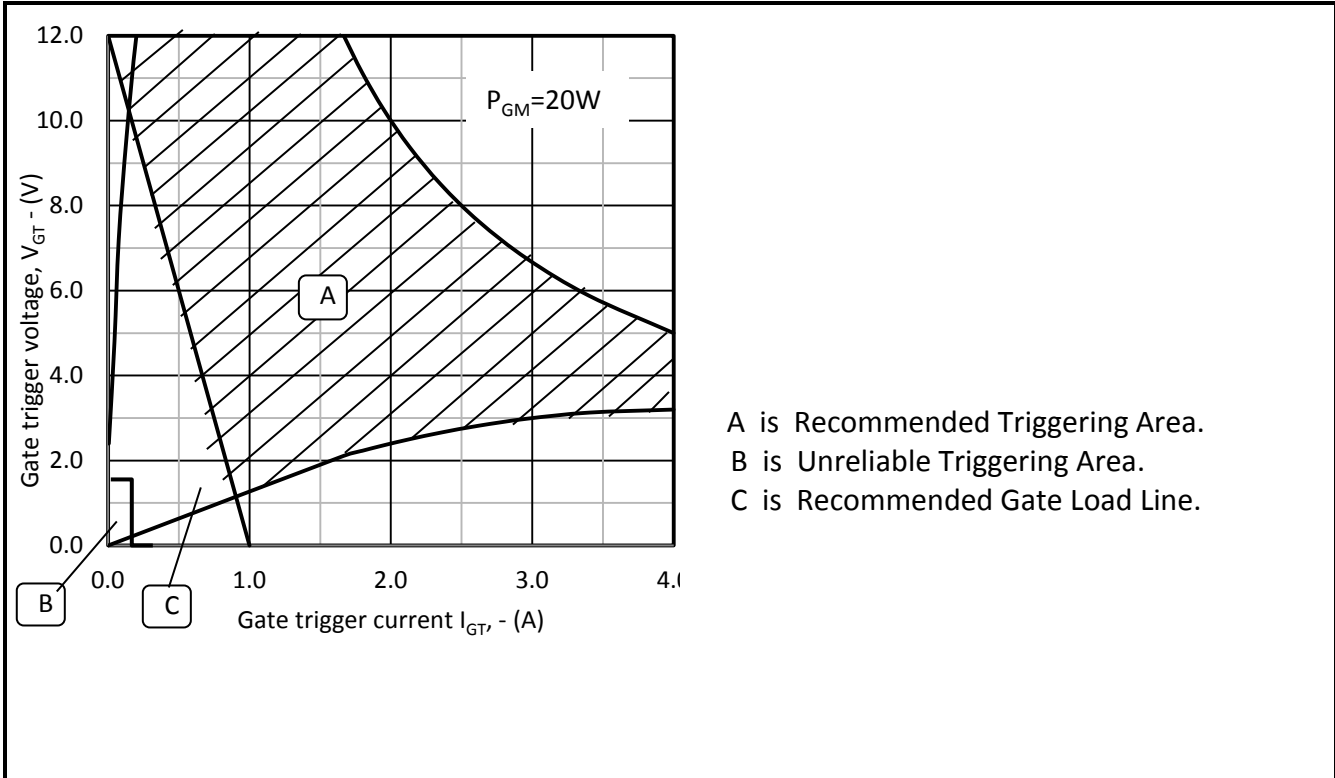


Fig.11 Gate characteristics

PACKAGE DETAILS

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

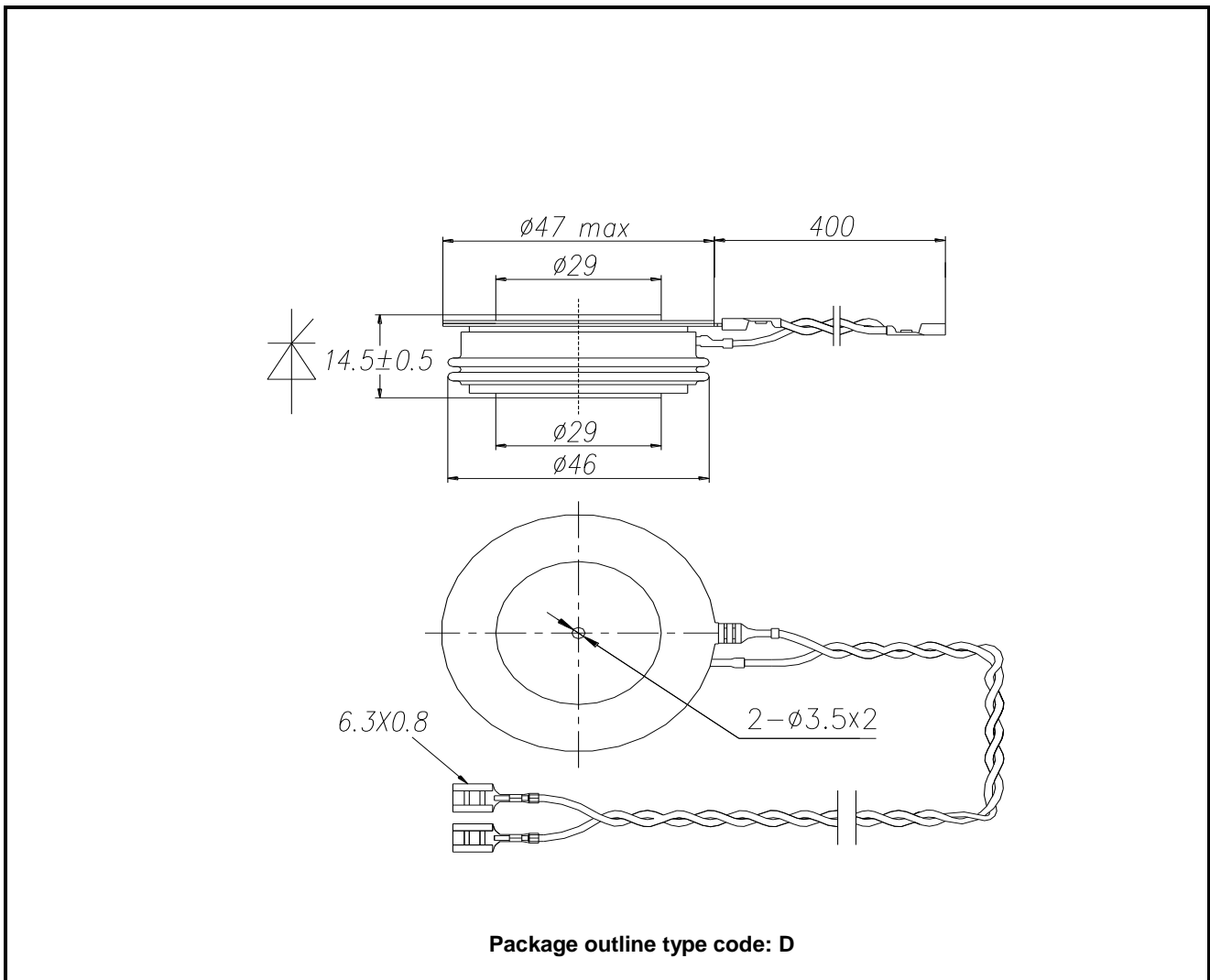


Fig.12 Package outline



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The products must not be touched when operating because there is a danger of electrocution or severe burning. Always use protective safety equipment such as appropriate shields for the product and wear safety glasses. Even when disconnected any electric charge remaining in the product must be discharged and allowed to cool before safe handling using protective gloves.

Extended exposure to conditions outside the product ratings may affect reliability leading to premature product failure. Use outside the product ratings is likely to cause permanent damage to the product. In extreme conditions, as with all semiconductors, this may include potentially hazardous rupture, a large current to flow or high voltage arcing, resulting in fire or explosion. Appropriate application design and safety precautions should always be followed to protect persons and property.

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<b>Target Information:</b>	This is the most tentative form of information and represents a very preliminary specification. No actual design work on the product has been started.
<b>Preliminary Information:</b>	The product design is complete and final characterisation for volume production is in progress. The datasheet represents the product as it is now understood but details may change.
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