

### 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
DCR5790M28	2800	$T_{vj} = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$ , $I_{DRM} = I_{RRM} = 400\text{mA}$ , $V_{DRM}, V_{RRM} t_p = 10\text{ms}$ , $V_{DSM} \ \& \ V_{RSM} =$ $V_{DRM} \ \& \ V_{RRM} + 100\text{V}$ respectively
DCR5790M26	2600	
DCR5790M24	2400	
DCR5790M22	2200	

Lower voltage grades available.

### ORDERING INFORMATION

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

For example:

#### DCR5790M28

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>2800 V</b>
$I_{T(AV)}$	<b>5790 A</b>
$I_{TSM}$	<b>75000 A</b>
$dV/dt^*$	<b>1000 V/<math>\mu\text{s}</math></b>
$dI/dt$	<b>250 A/<math>\mu\text{s}</math></b>

\* Higher  $dV/dt$  selections available

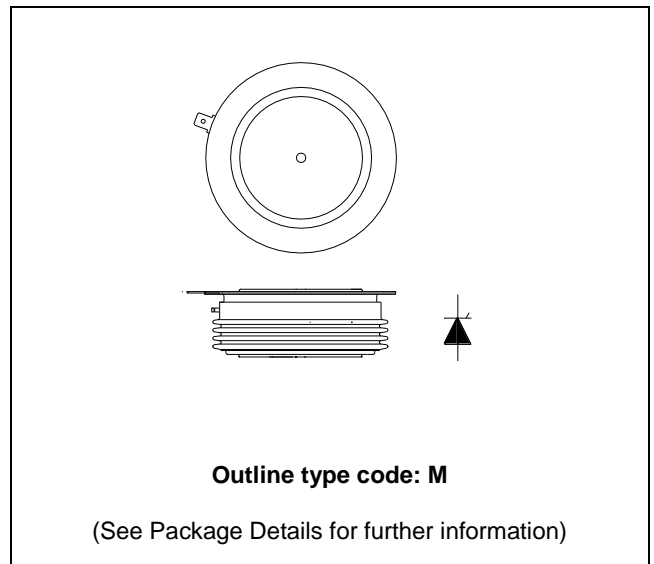


Fig. 1 Package outline

**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	5790	A
I <sub>T(RMS)</sub>	RMS value	-	9090	A
I <sub>T</sub>	Continuous (direct) on-state current	-	8310	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	75.0	kA
I <sup>2</sup> t	I <sup>2</sup> t for fusing	V <sub>R</sub> = 0	28.10	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	-	0.005	°C/W
R <sub>th(c-h)</sub>	Thermal resistance – case to heatsink	Double side cooled	-	0.0015	°C/W
T <sub>vj</sub>	Virtual junction temperature	Blocking V <sub>DRM</sub> / V <sub>RDM</sub>	-40	125	°C
T <sub>stg</sub>	Storage temperature range		-40	140	°C
F <sub>m</sub>	Clamping force		80	100	kN

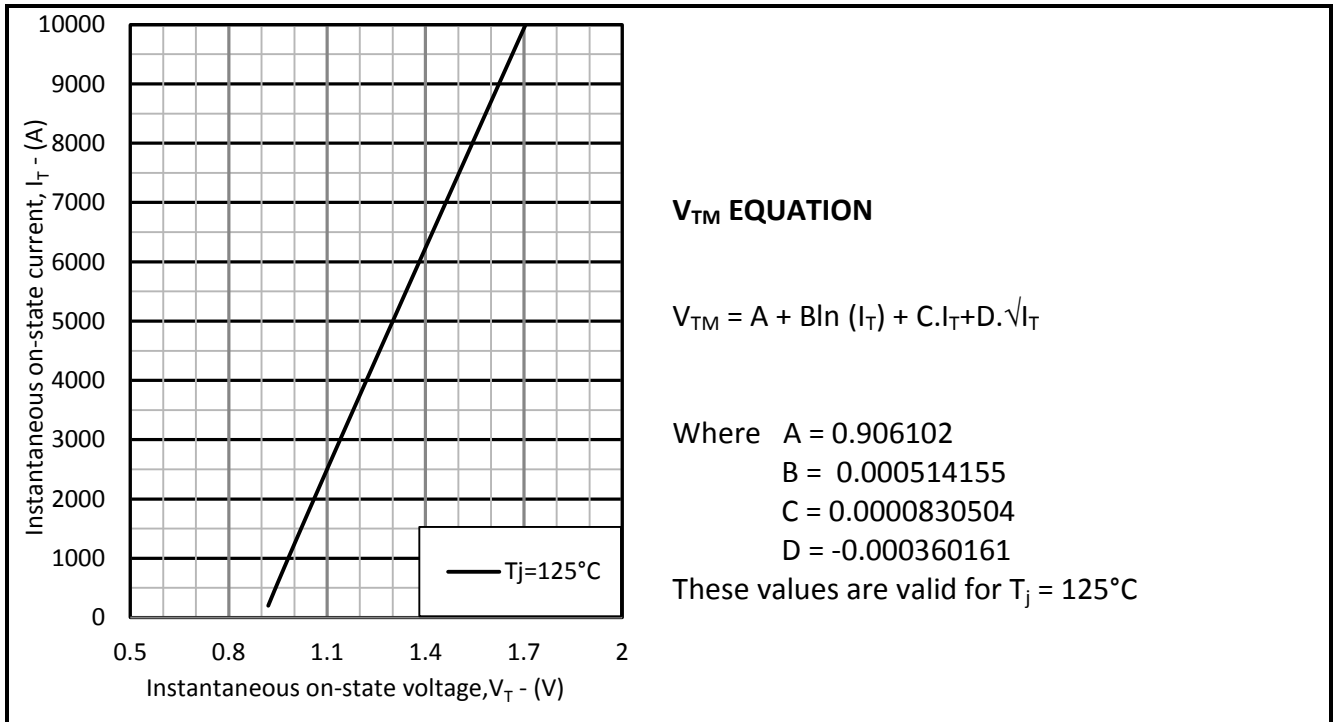
**DYNAMIC CHARACTERISTICS**

Symbol	Parameter	Test Conditions	Min.	Max.	Units	
$I_{RRM}/I_{DRM}$	Peak reverse and off-state current	At $V_{RRM}/V_{DRM}$ , $T_{case} = 125^{\circ}C$	-	400	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/ $\mu s$	
$dl/dt$	Rate of rise of on-state current	From 67% $V_{DRM}$ to 4000A Gate source 30V, 10 $\Omega$ , $t_r < 0.5\mu s$ , $T_j = 125^{\circ}C$	Repetitive 50Hz	-	250	A/ $\mu s$
			Non-repetitive	-	1000	A/ $\mu s$
$V_T$	On-state voltage	$I_T = 3000A$ , $T_{case} = 125^{\circ}C$		1.14	V	
$V_{T(TO)}$	Threshold voltage – Low level	$T_{case} = 125^{\circ}C$	-	0.90	V	
$r_T$	On-state slope resistance – Low level	$T_{case} = 125^{\circ}C$	-	0.080	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	$T_j = 125^{\circ}C$ , $V_R = 100V$ , $dl/dt = 1.5A/\mu s$ , $dV_{DR}/dt = 20V/\mu s$ linear to 67% $V_{DRM}$	-	600	$\mu s$	
$Q_S$	Stored charge	$I_T = 2000A$ , $t_p = 1000\mu s$ , $T_j = 125^{\circ}C$ , $dl/dt = 1.5A/\mu s$ ,	-	4000	$\mu C$	
$I_{RR}$	Reverse recovery current		-	100	A	
$I_L$	Latching current	$T_j = 25^{\circ}C$ ,	-	1	A	
$I_H$	Holding current	$T_j = 25^{\circ}C$ ,	-	200	mA	

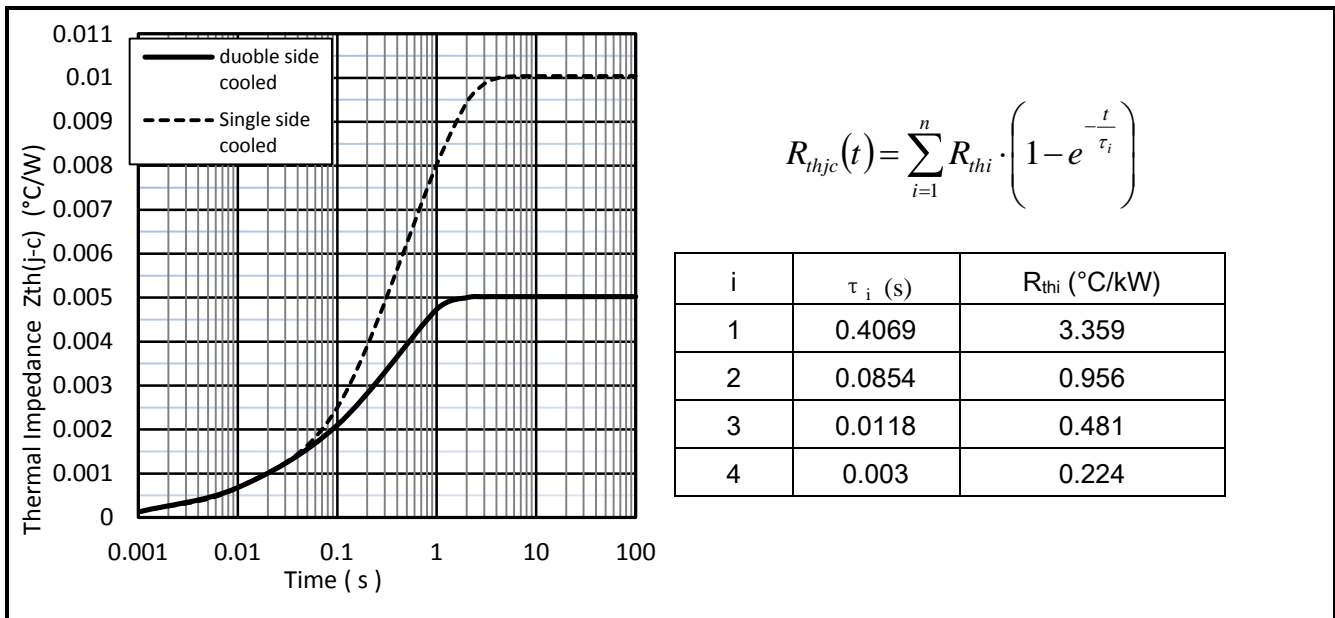
**GATE TRIGGER CHARACTERISTICS AND RATINGS**

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

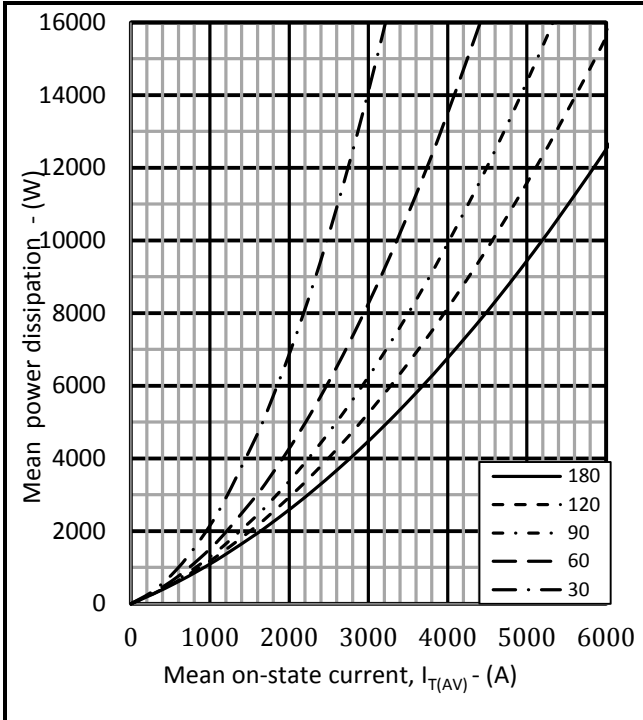
**CURVES**



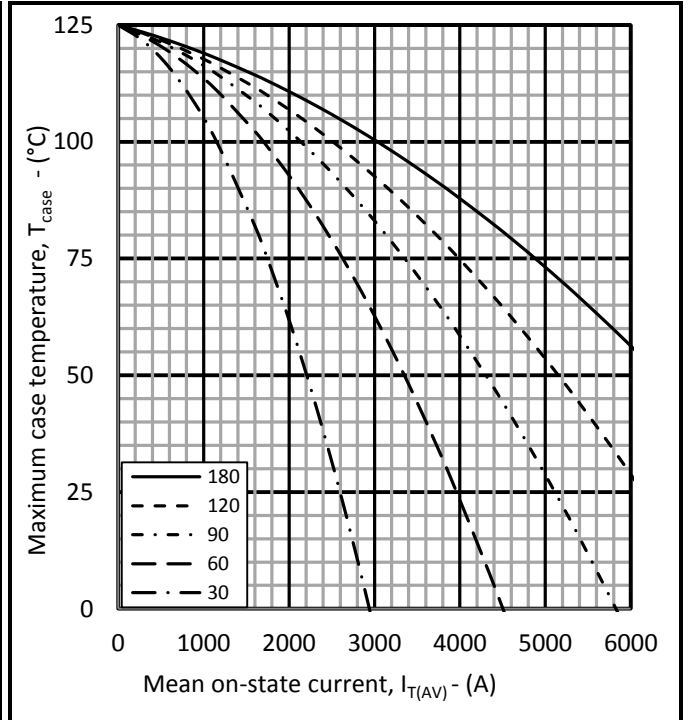
**Fig.2 Maximum & minimum on-state characteristics**



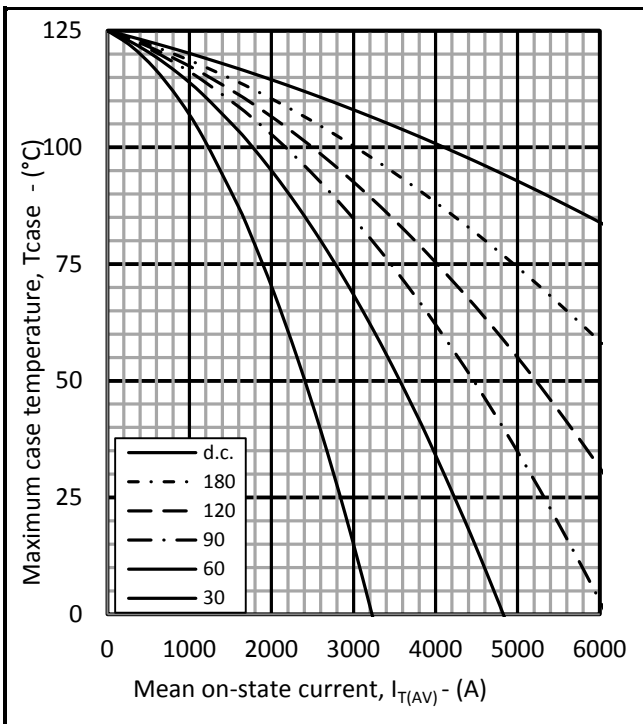
**Fig.3 Maximum (limit) transient thermal impedance – junction to case (°C/W)**



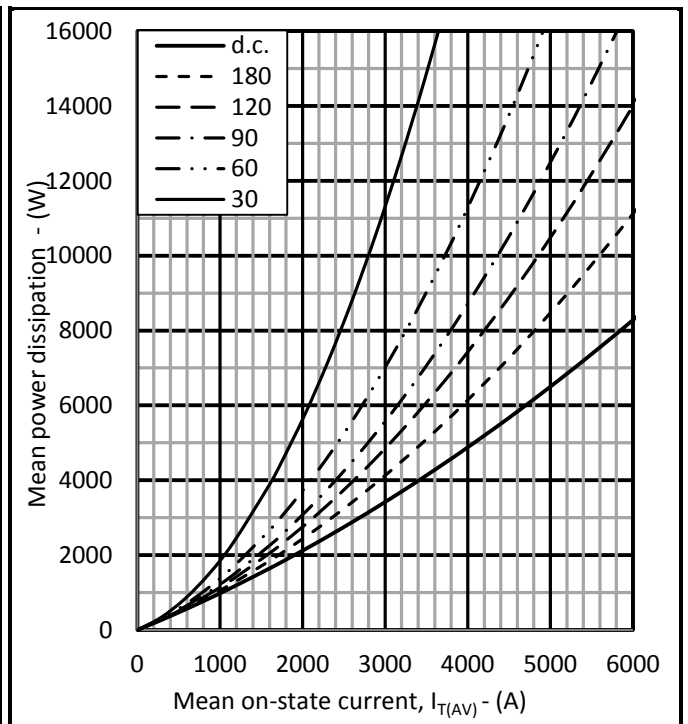
**Fig.4 On-state power dissipation – sine wave**



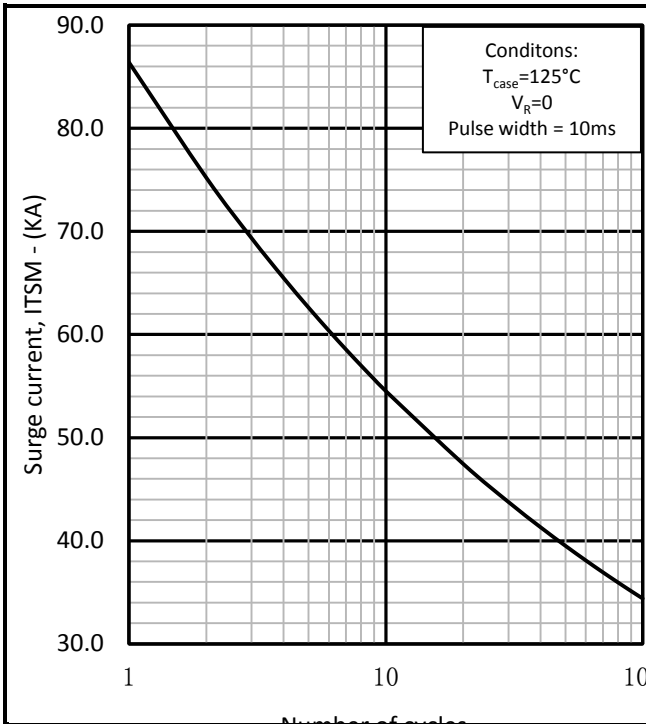
**Fig.5 Maximum permissible case temperature, double side cooled – sine wave**



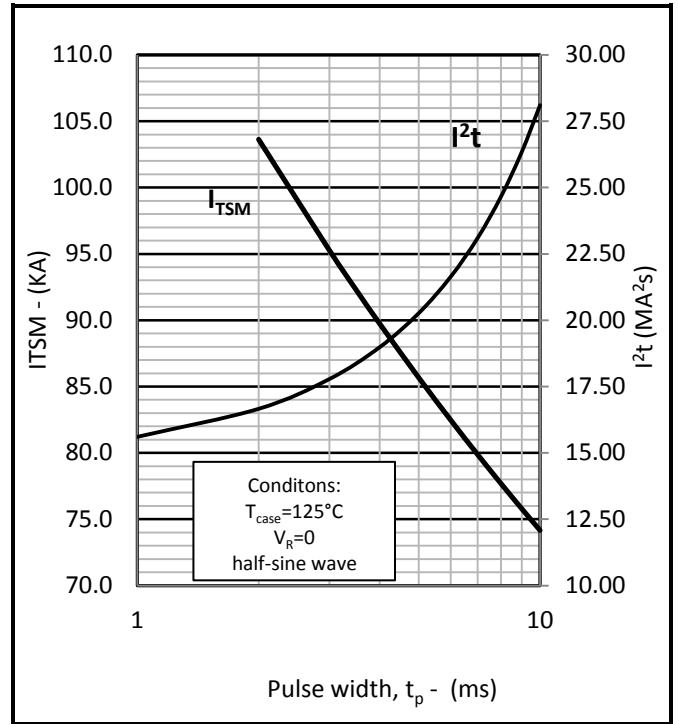
**Fig.6 Maximum permissible case temperature, double side cooled – rectangular wave**



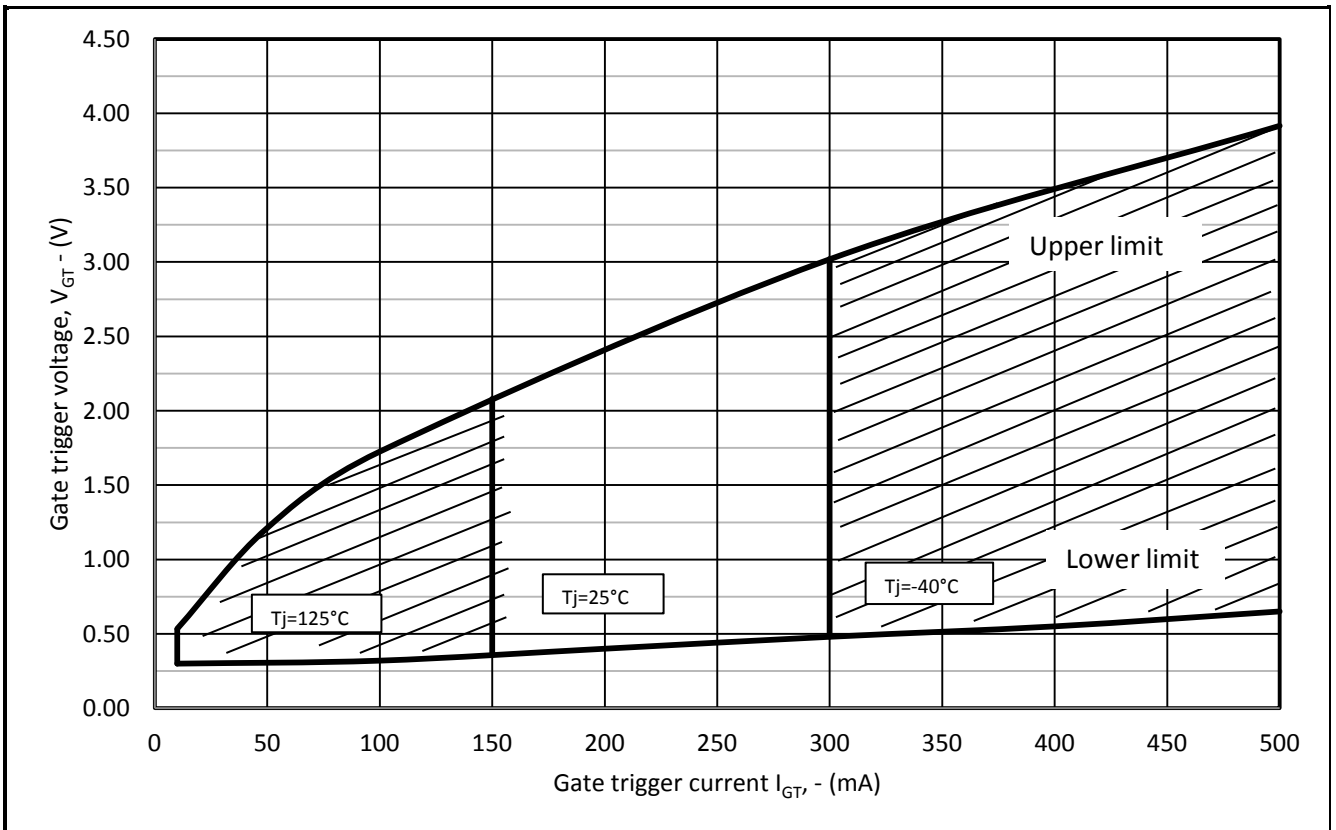
**Fig.7 On-state power dissipation – rectangular wave**



**Fig.8 Multi-cycle surge current**



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



**Fig.10 Gate characteristics**

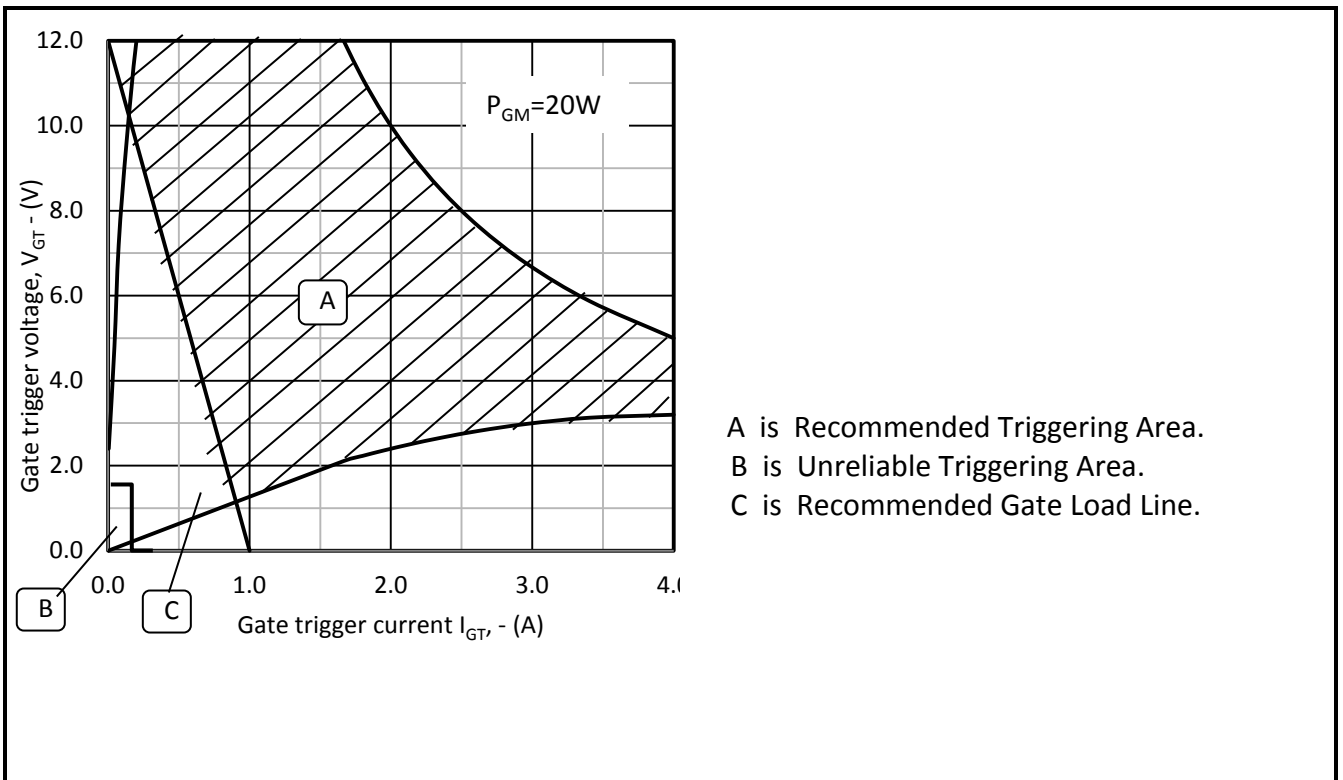
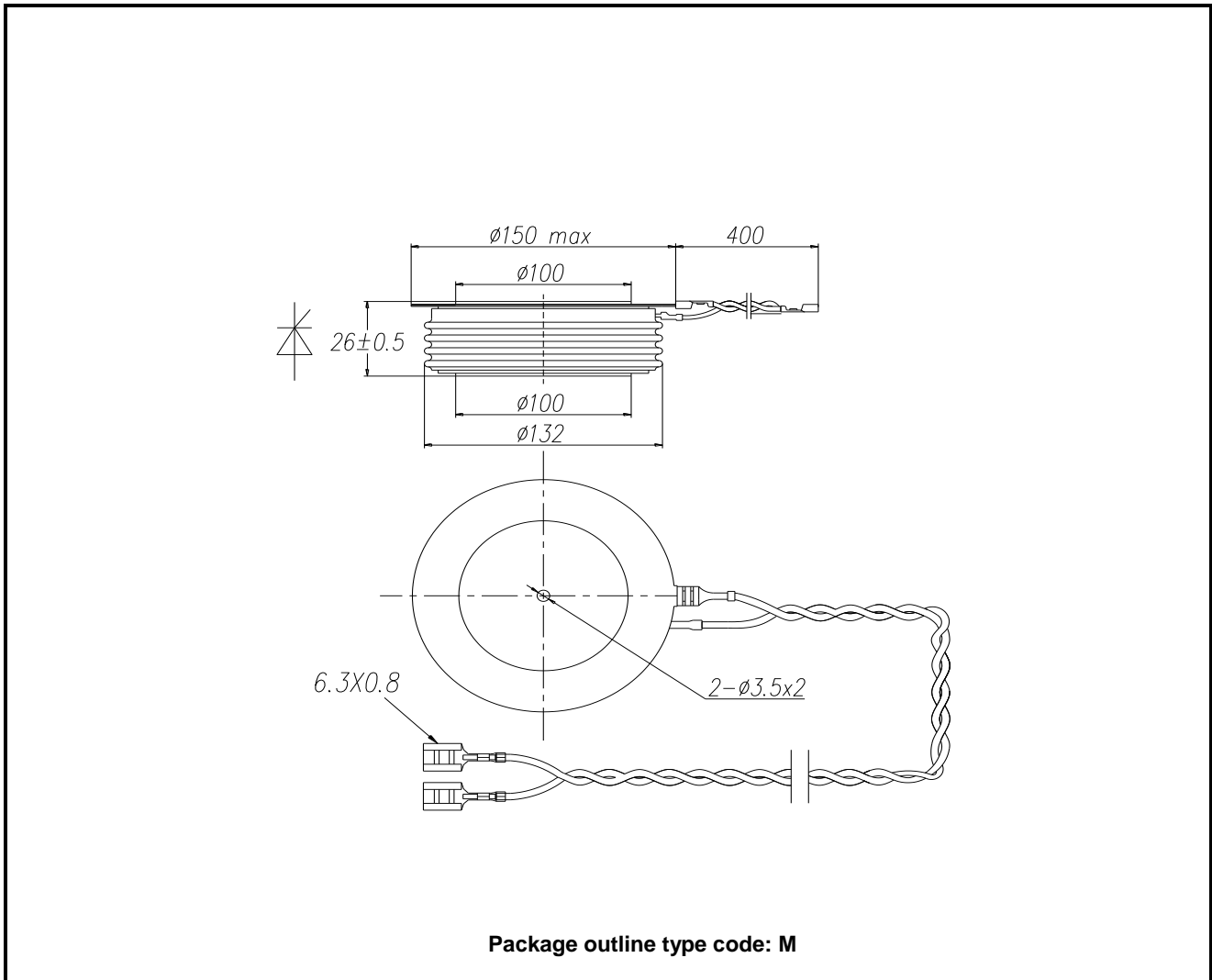


Fig.11 Gate characteristics

**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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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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