

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
DCR3710V14	1400	$T_{vj} = -40^{\circ}\text{C to } 125^{\circ}\text{C}$, $I_{DRM} = I_{RRM} = 300\text{mA}$, $V_{DRM}, V_{RRM} t_p = 10\text{ms}$, $V_{DSM} \& V_{RSM} =$ $V_{DRM} \& V_{RRM} + 100\text{V}$ respectively
DCR3710V12	1200	
DCR3710V10	1000	
DCR3710V08	800	
DCR3710V06	600	

Lower voltage grades available.

KEY PARAMETERS

V_{DRM}	1400 V
$I_{T(AV)}$	3710 A
I_{TSM}	60000 A
dV/dt^*	1000 V/ μs
dI/dt	200 A/ μs

* Higher dV/dt selections available

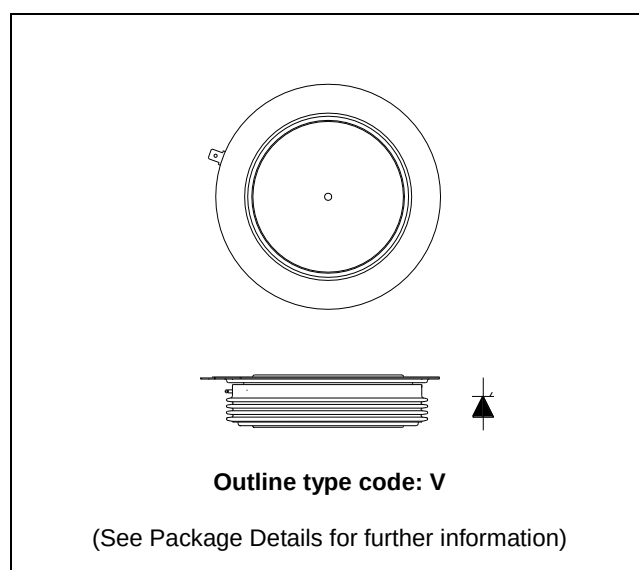


Fig. 1 Package outline

ORDERING INFORMATION

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

For example:

DCR3710V14

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

CURRENT RATINGS

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

Symbol	Parameter	Test Conditions	Max.	Units
Double Side Cooled				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	3710	A
$I_{T(RMS)}$	RMS value	-	5820	A
I_T	Continuous (direct) on-state current	-	5250	A

SURGE RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 125^{\circ}\text{C}$ $V_R = 0$	60.0	kA
I^2t	I^2t for fusing		18.00	MA^2s

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Test Conditions		Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance – junction to case	Double side cooled	DC	-	0.01	$^{\circ}\text{C/W}$
$R_{th(c-h)}$	Thermal resistance – case to heatsink	Double side cooled	DC	-	0.003	$^{\circ}\text{C/W}$
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			50	62	kN

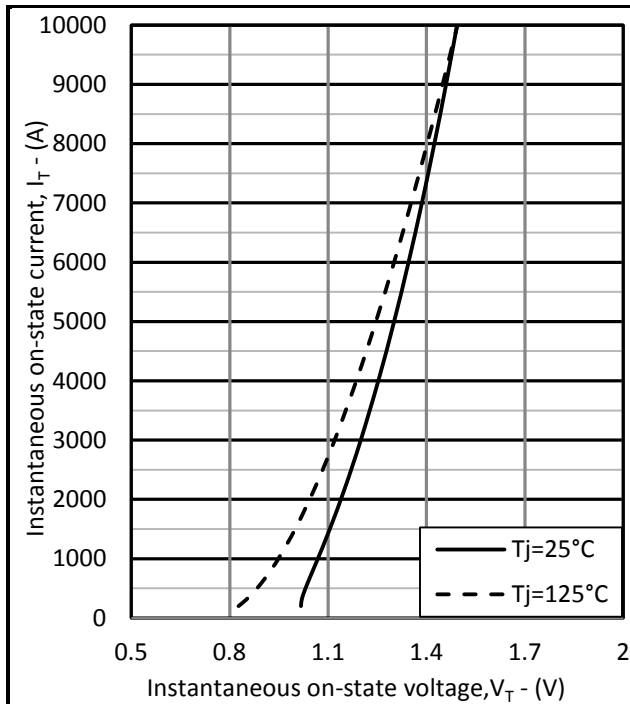
DYNAMIC CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Max.	Units
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM} , $T_{case} = 125^{\circ}C$		-	300	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/ μs
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 5000A	Repetitive 50Hz	-	200	A/ μs
		Gate source 30V, 10 Ω , $t_r < 0.5\mu s$, $T_j = 125^{\circ}C$	Non-repetitive	-	1000	A/ μs
V_T	On-state voltage	$I_T = 3000A$, $T_{case} = 125^{\circ}C$			1.12	V
$V_{T(TO)}$	Threshold	$T_{case} = 125^{\circ}C$		-	0.83	V
r_T	On-state slope resistance	$T_{case} = 125^{\circ}C$		-	0.092	m Ω
t_{gd}	Delay time	$V_D = 67\% V_{DRM}$, gate source 30V, 10 Ω $t_r = 0.5\mu s$, $T_j = 25^{\circ}C$		-	3.0	μs
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}		-	300	μs
Q_S	Stored charge	$I_T = 4000A$, $t_p = 1000\mu s$, $T_j = 125^{\circ}C$, $dI/dt = 10A/\mu s$,		-	2600	μC
I_{RR}	Reverse recovery current			-	170	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

 **V_{TM} EQUATION**

$$V_{TM} = A + B \ln(I_T) + C \cdot I_T + D \cdot \sqrt{I_T}$$

Where $A = 0.725858$

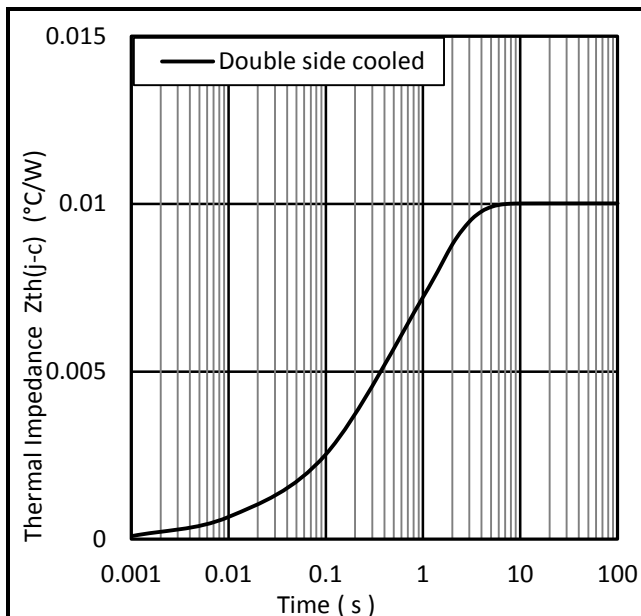
$B = 0.002144$

$C = 0.00001338$

$D = 0.00615$

These values are valid for $T_j = 125^\circ\text{C}$

Fig.2 Maximum & minimum on-state characteristics



$$R_{thjc}(t) = \sum_{i=1}^n R_{thi} \cdot \left(1 - e^{-\frac{t}{\tau_i}} \right)$$

i	τ_i (s)	R_{thi} ($^\circ\text{C/kW}$)
1	1.23	6.22
2	0.235	2.465
3	0.061	0.723
4	0.0092	0.607

Fig.3 Maximum (limit) transient thermal impedance – junction to case ($^\circ\text{C/W}$)

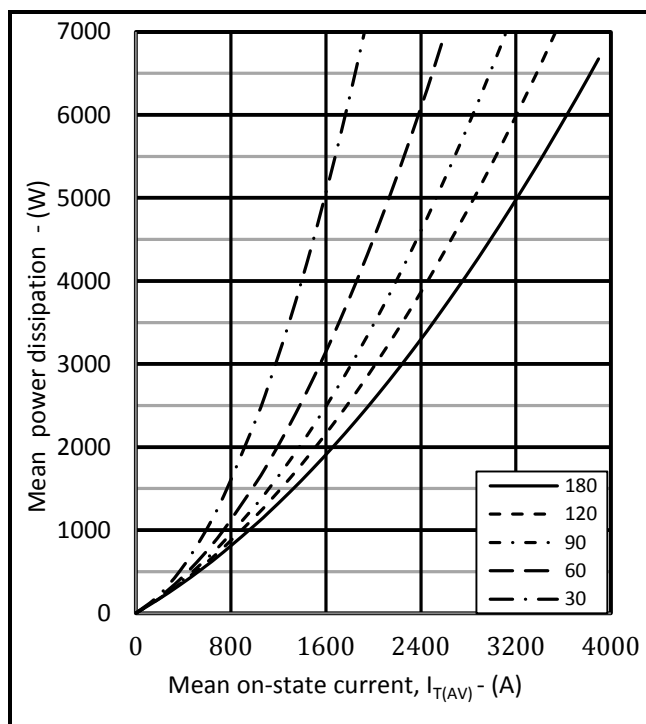


Fig.4 On-state power dissipation – sine wave

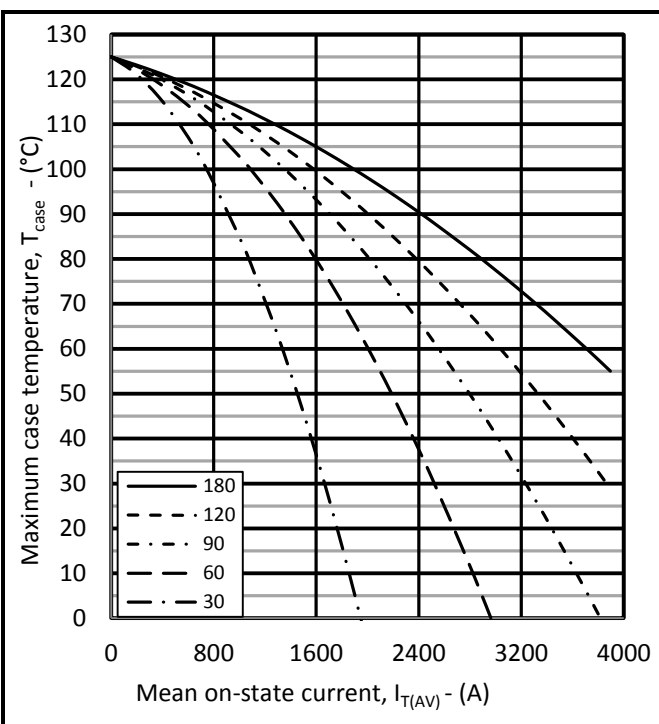


Fig.5 Maximum permissible case temperature, double side cooled – sine wave

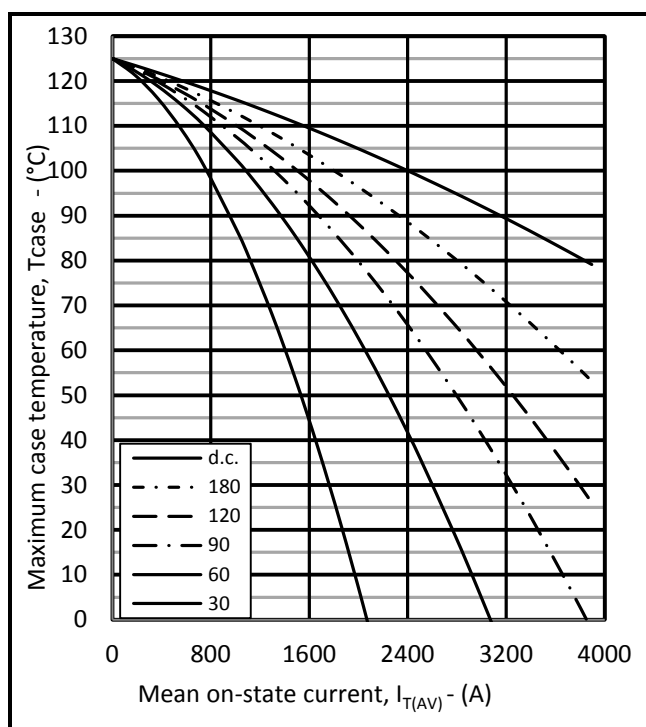


Fig.6 Maximum permissible case temperature, double side cooled – rectangular wave

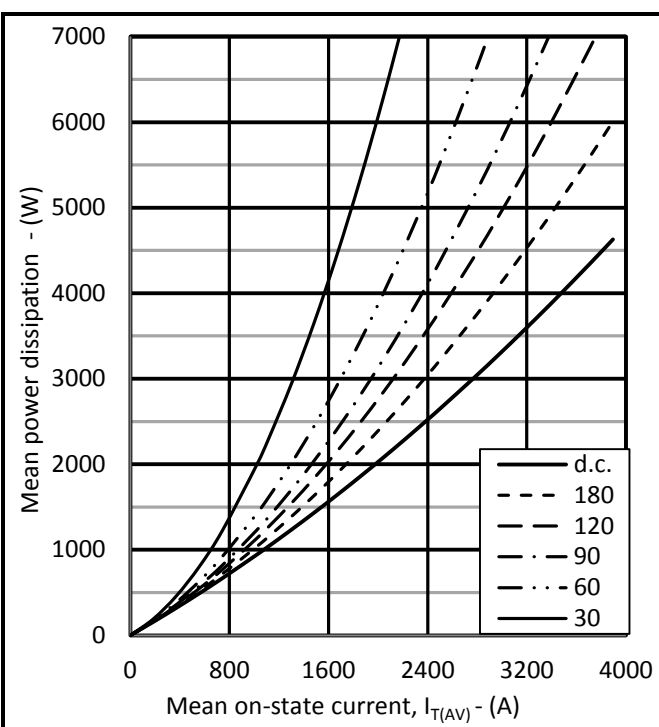


Fig.7 On-state power dissipation – rectangular wave

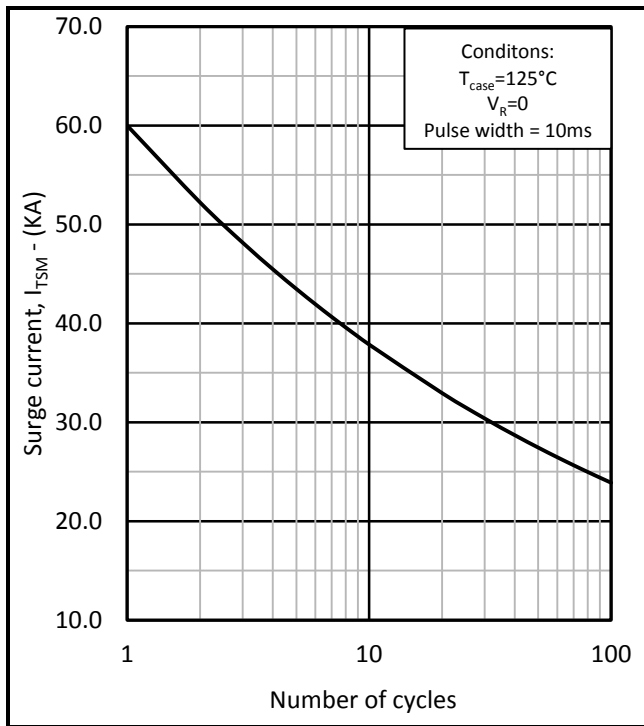
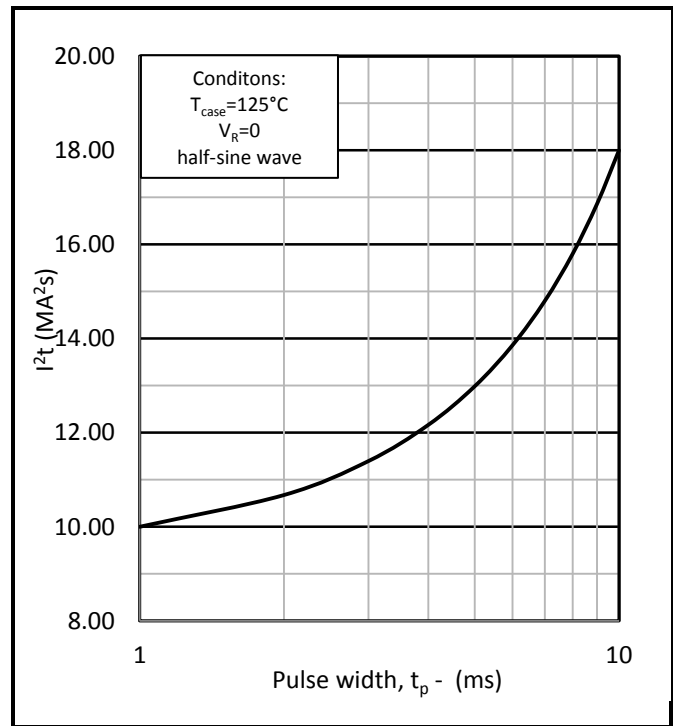
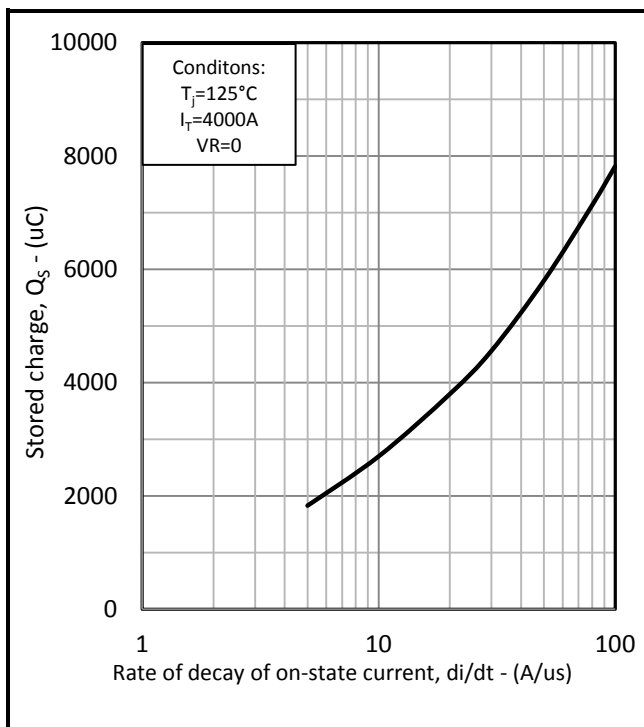
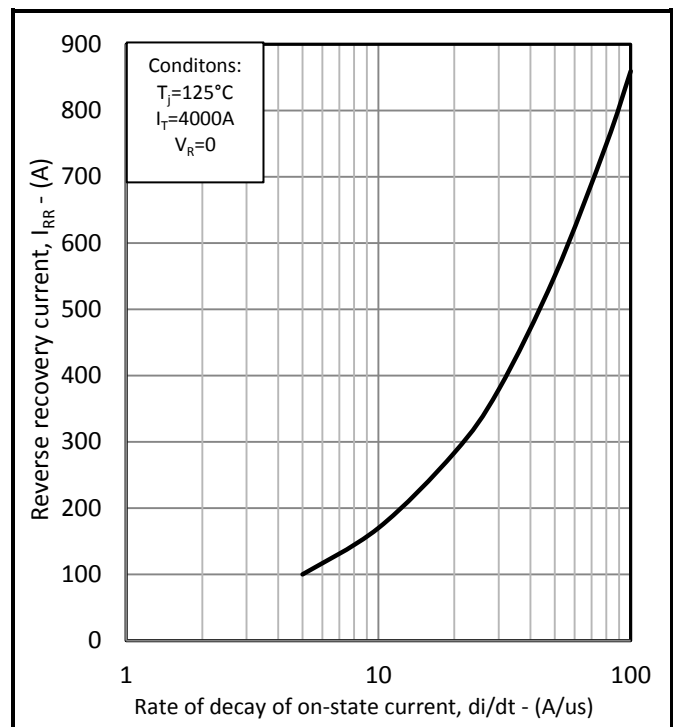


Fig.8 Multi-cycle surge current

Fig.9 Single-cycle I^2t Fig.10 Stored charge vs di/dt Fig.11 Reverse recovery current vs di/dt

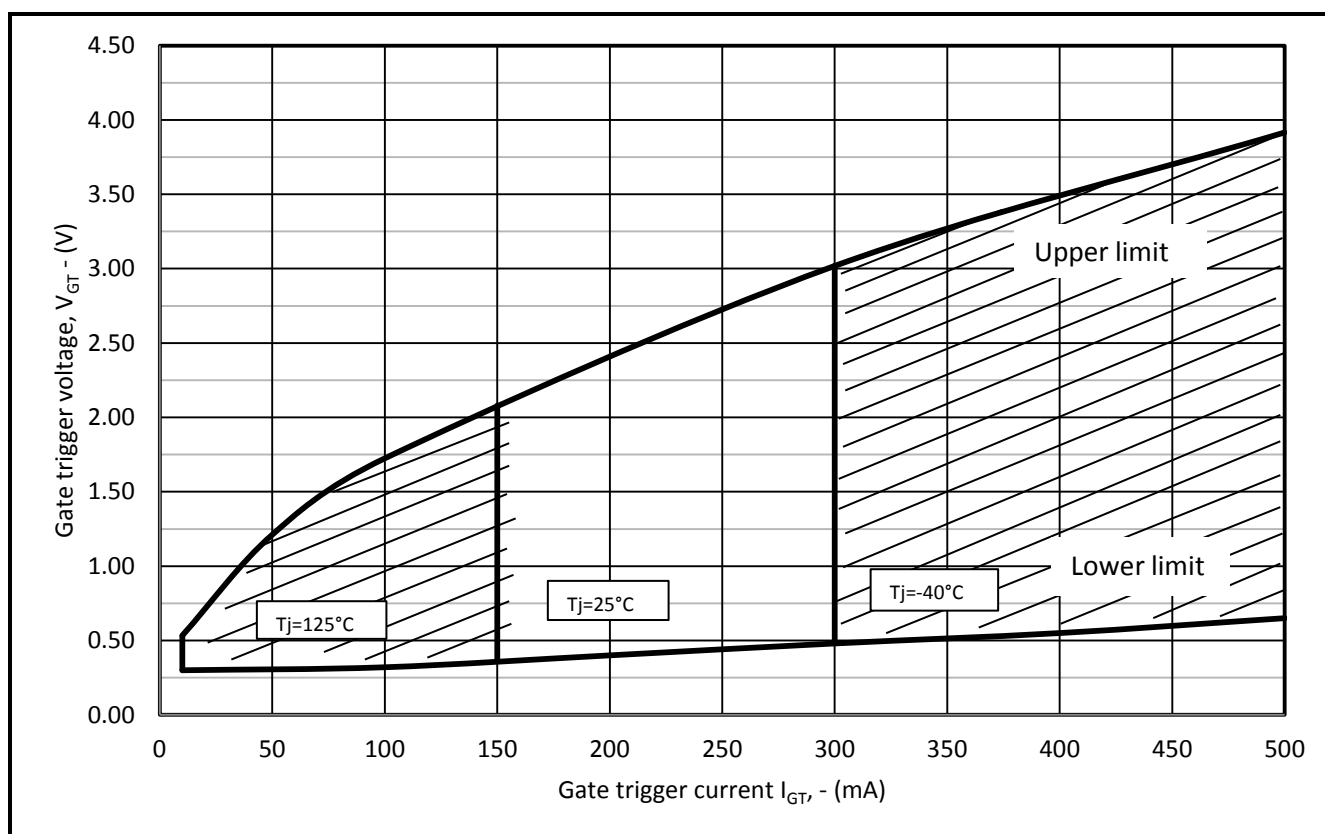


Fig.12 Gate characteristics

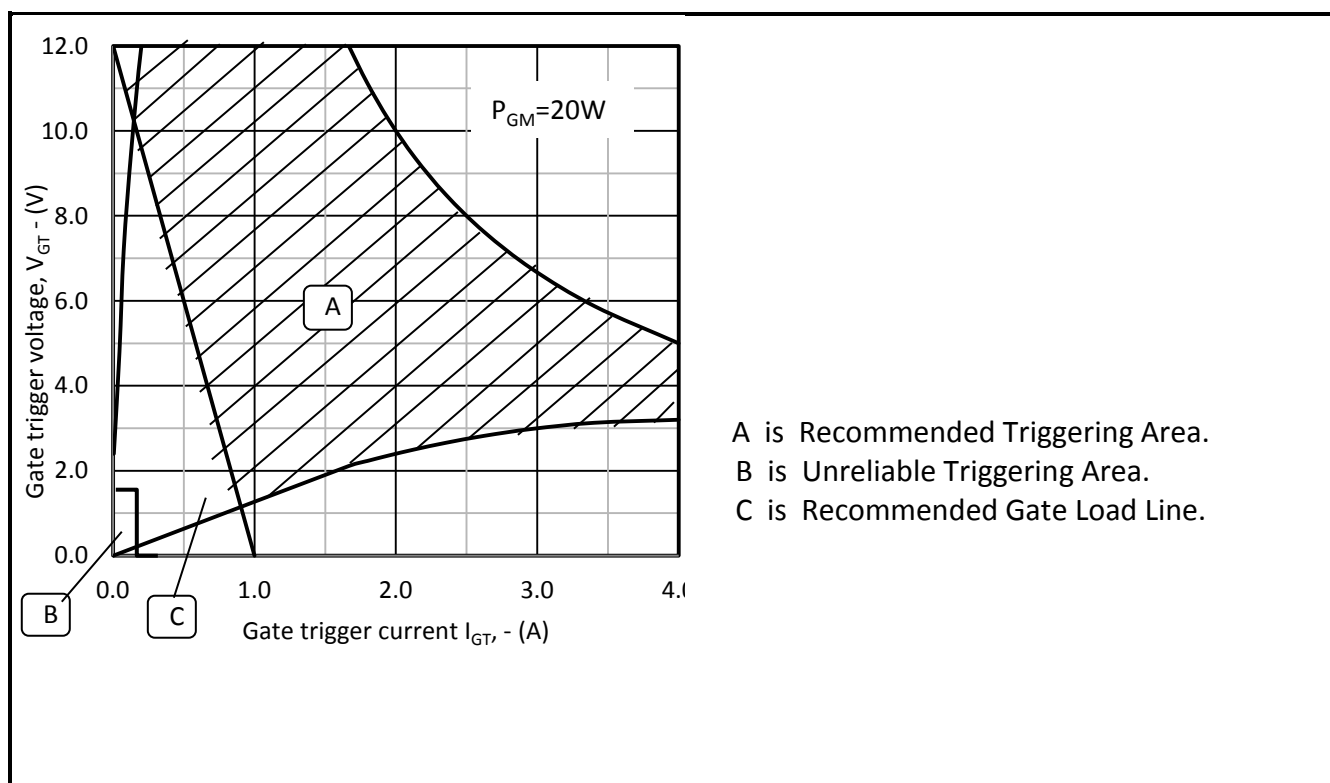
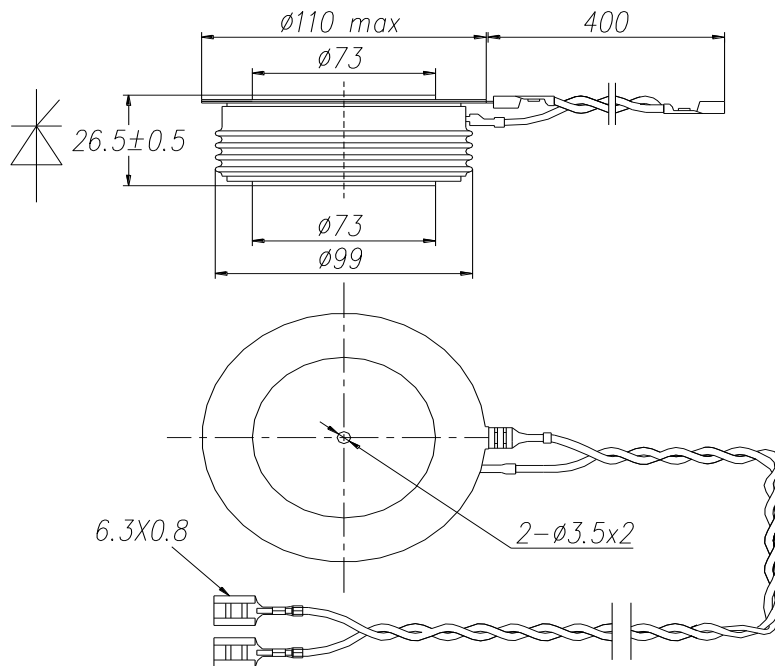


Fig.13 Gate characteristics

PACKAGE DETAILS

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



Package outline type code: V

Fig.14 Package outline

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