

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
DCR1710F18	1800	$T_{vj} = -40^{\circ}\text{C}$ to 125°C , $I_{DRM} = I_{RRM} = 150\text{mA}$, $V_{DRM}, V_{RRM} t_p = 10\text{ms}$, $V_{DSM} \& V_{RSM} =$ $V_{DRM} \& V_{RRM} + 100\text{V}$ respectively
DCR1710F16	1600	
DCR1710F14	1400	
DCR1710F12	1200	

Lower voltage grades available.

KEY PARAMETERS

V_{DRM}	1800 V
$I_{T(AV)}$	1710 A
I_{TSM}	25000 A
dV/dt^*	1000 V/ μs
dI/dt	200 A/ μs

* Higher dV/dt selections available

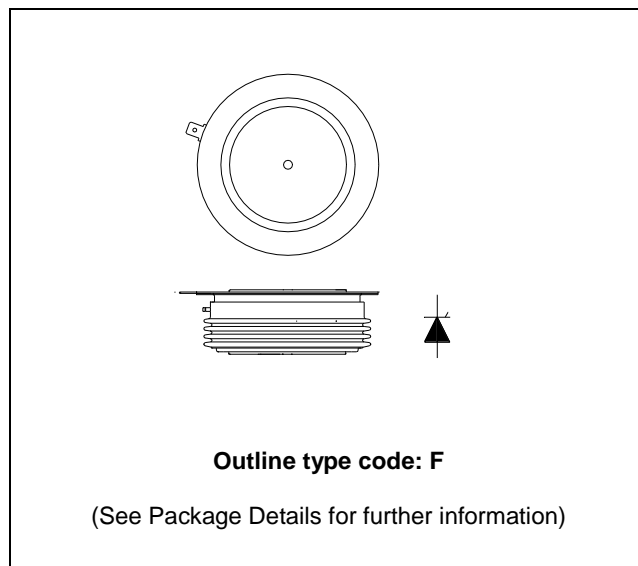


Fig. 1 Package outline

ORDERING INFORMATION

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

For example:

DCR1710F18

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	1710	A
$I_{T(RMS)}$	RMS value	-	2680	A
I_T	Continuous (direct) on-state current	-	2420	A

SURGE RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 125^{\circ}\text{C}$ $V_R = 0$	25.0	kA
I^2t	I^2t for fusing		3.13	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	-	0.02	$^{\circ}\text{C/W}$
$R_{th(c-h)}$	Thermal resistance – case to heatsink	Double side cooled DC	-	0.005	$^{\circ}\text{C/W}$
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		18	26	kN

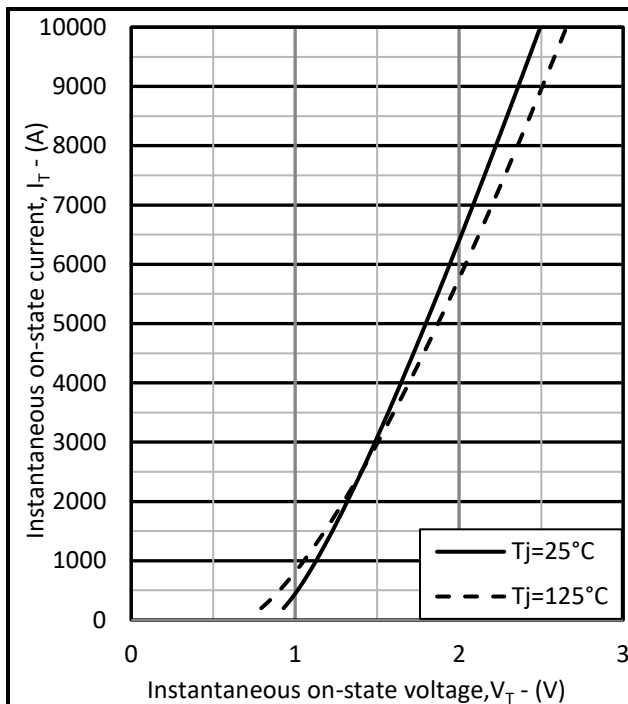
DYNAMIC CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Max.	Units
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM} , $T_{case} = 125^{\circ}C$		-	150	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 2000A	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	$I_T = 1500A$, $T_{case} = 125^{\circ}C$			1.18	V
$V_{T(TO)}$	Threshold voltage	$T_{case} = 125^{\circ}C$		-	0.88	V
r_T	On-state slope resistance	$T_{case} = 125^{\circ}C$		-	0.20	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}		-	250	μs
Q_S	Stored charge	$I_T = 2000A$, $t_p = 1000\mu s$, $T_j = 125^{\circ}C$, $dI/dt = 10A/\mu s$,		-	2500	μC
I_{RR}	Reverse recovery current			-	150	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 $A = 0.74902$

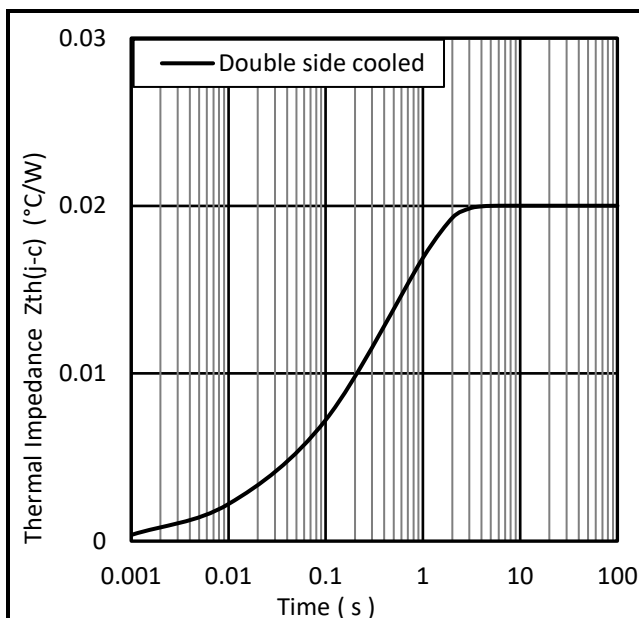
$B = -0.0330895$

$C = 0.000076813$

$D = 0.0144218$

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	0.6894	13.267
2	0.0872	4.05
3	0.0217	1.585
4	0.0043	1.102

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

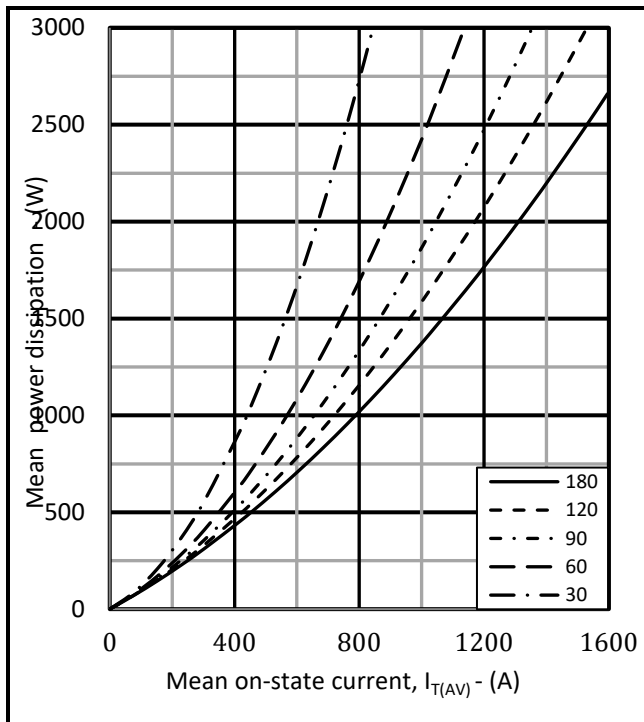


Fig.4 On-state power dissipation – sine wave

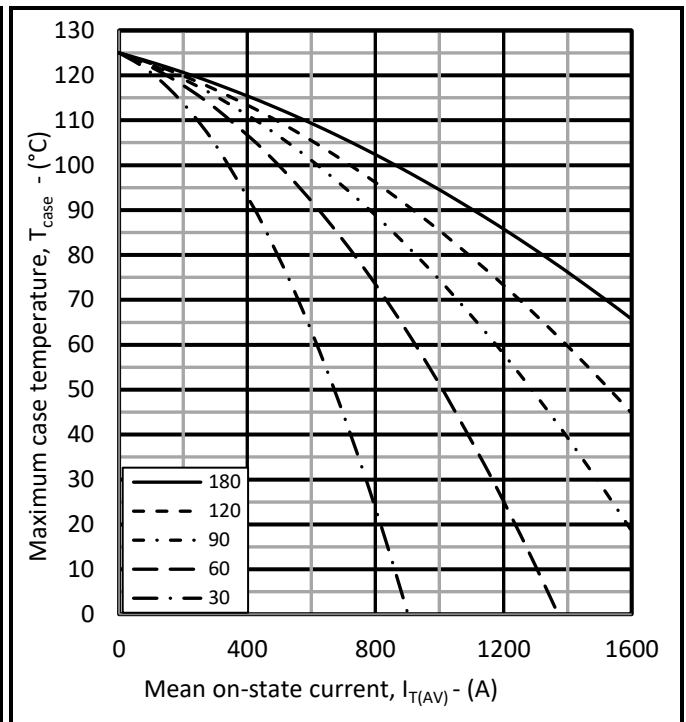


Fig.5 Maximum permissible case temperature, double side cooled – sine wave

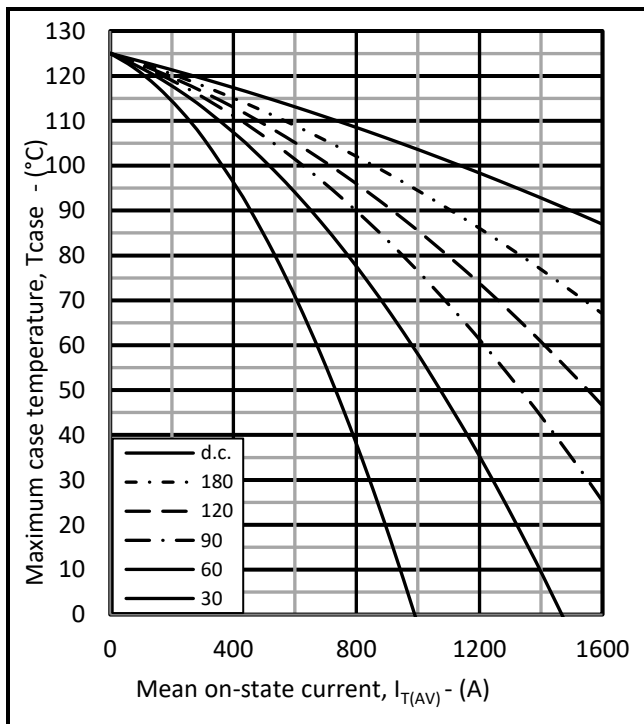


Fig.6 Maximum permissible case temperature, double side cooled – rectangular wave

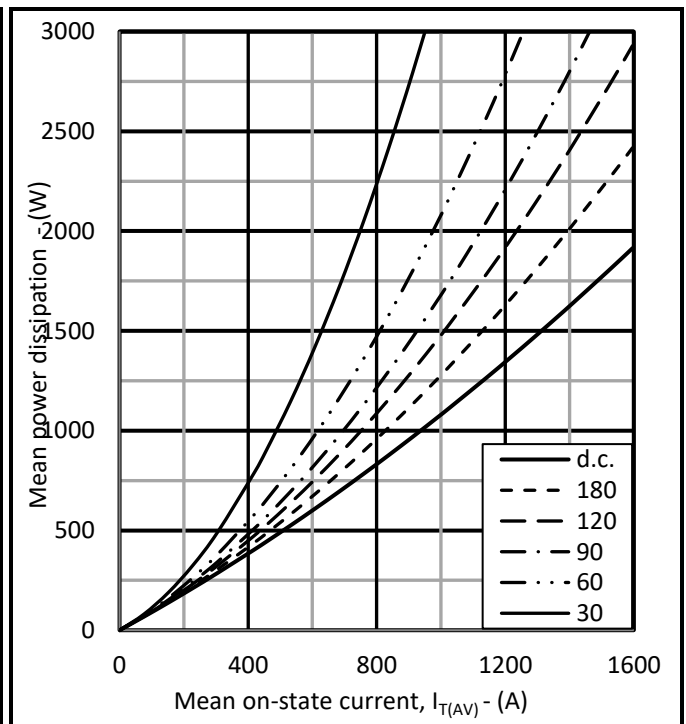


Fig.7 On-state power dissipation – rectangular wave

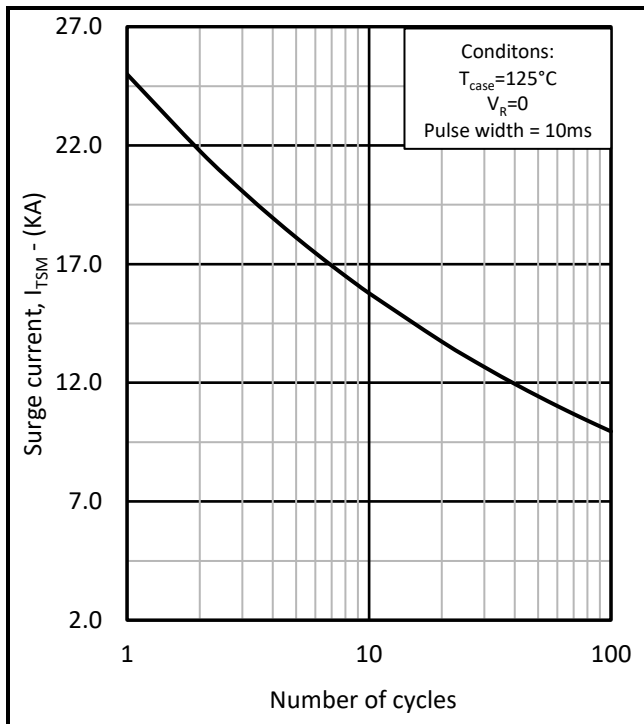
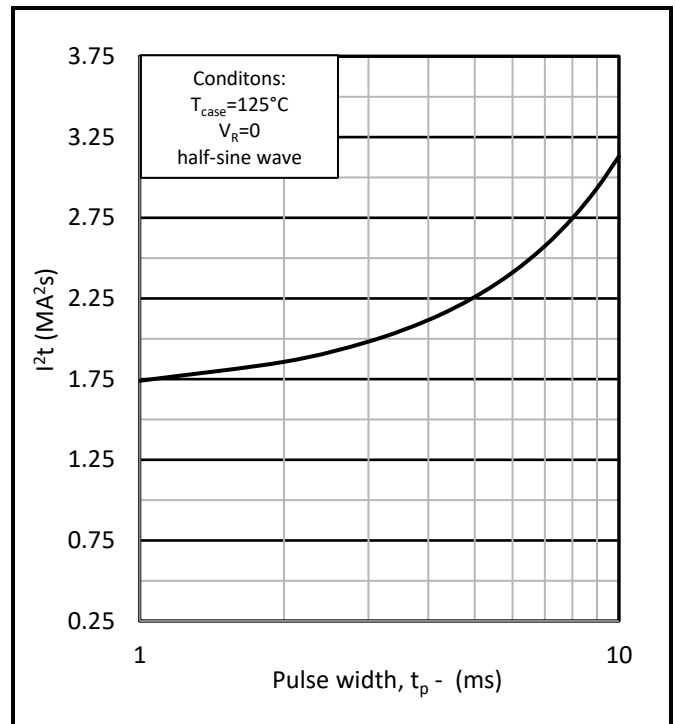
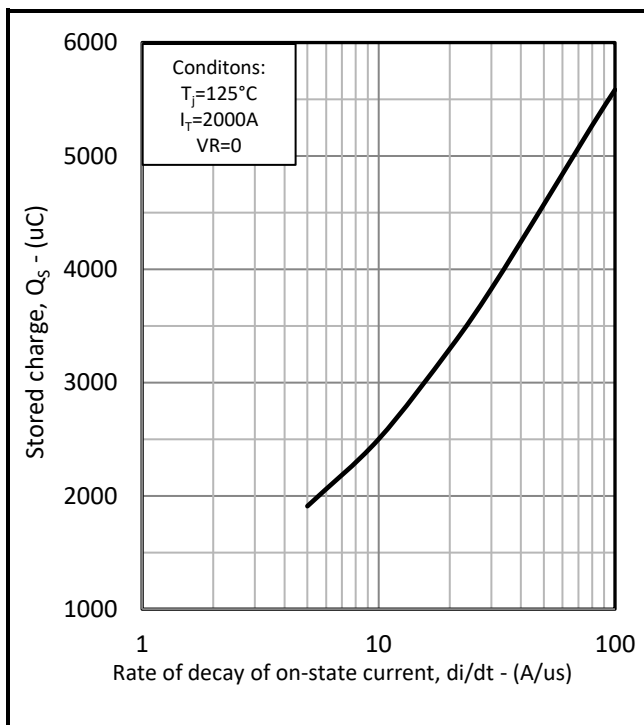
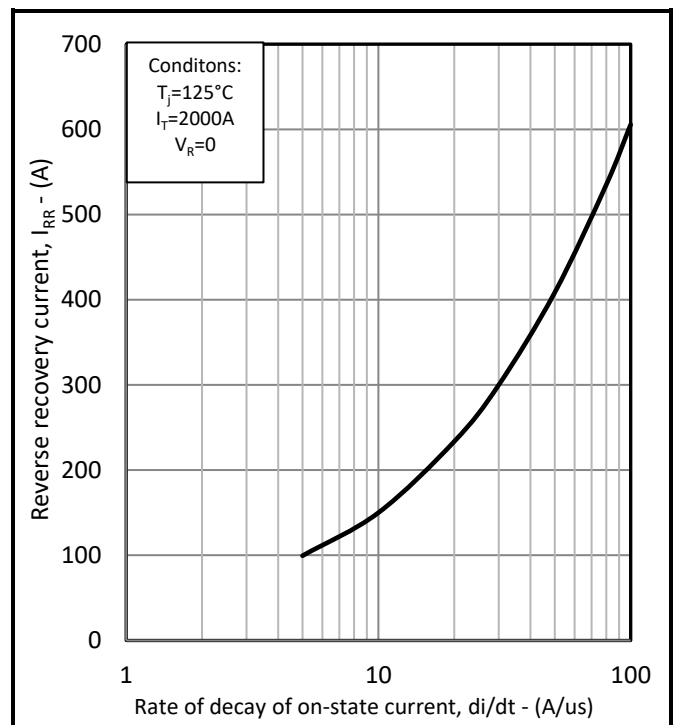


Fig.8 Multi-cycle surge current

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

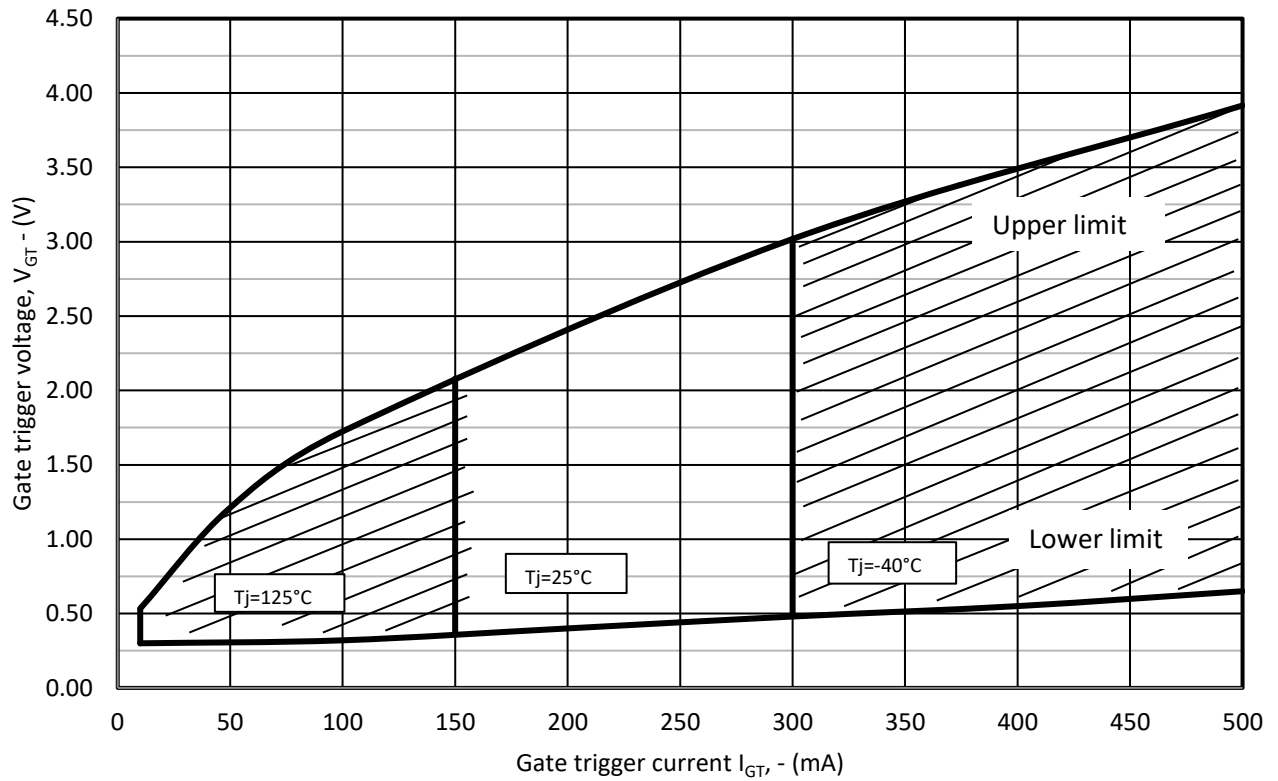
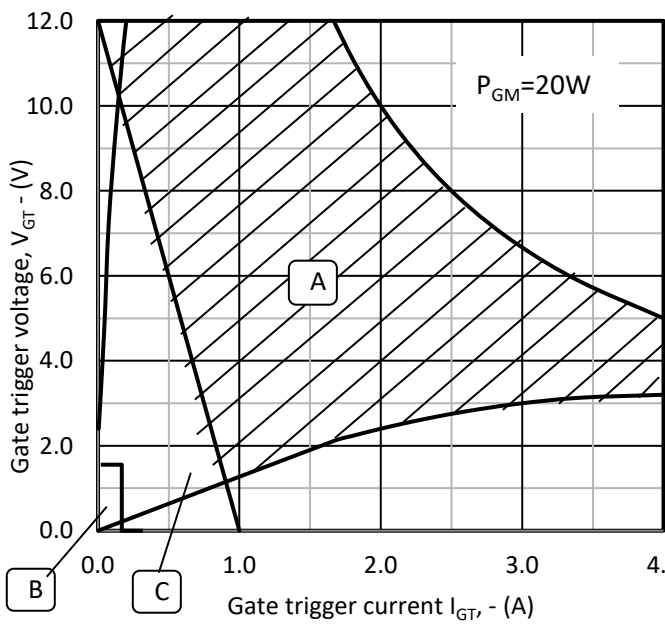


Fig.12 Gate characteristics

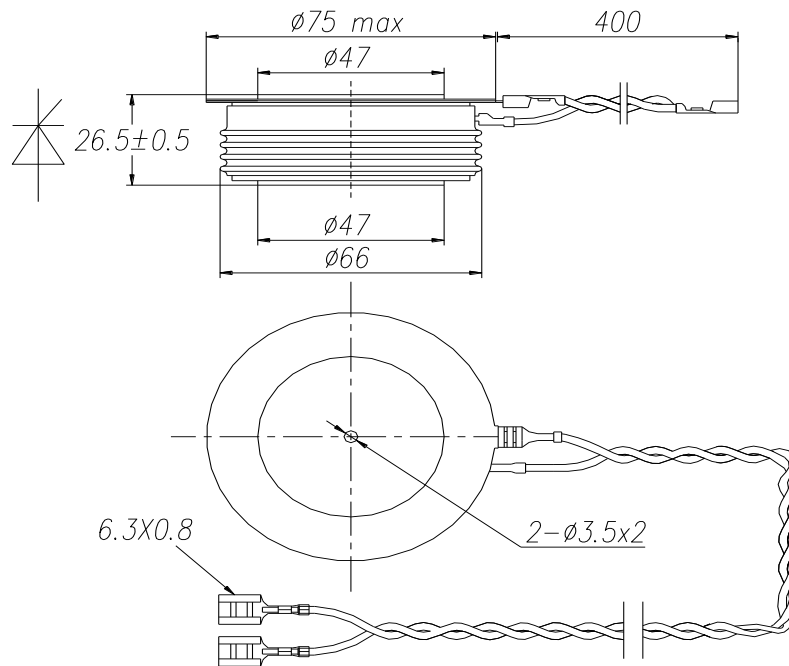


A is Recommended Triggering Area.
 B is Unreliable Triggering Area.
 C is Recommended Gate Load Line.

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: F

Fig.14 Package outline

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