

FEATURES

- Double Side Cooling
- High Surge Capability
- High Mean Current
- Fatigue Free

TYPICAL APPLICATIONS

- High Power Drives
- High Voltage Power Supplies
- DC Motor Control

TECHNICAL DATA

DEVICE TYPE	V_{DRM}/V_{RRM} (V)	V_{RSM} (V)
DCR504ST1212	1200	1300
DCR504ST1414	1400	1500
DCR504ST1616	1600	1700



CURRENT RATINGS

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

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	456	A
$I_{T(RMS)}$	RMS value	-	717	A
I_T	Continuous (direct) on-state current	-	655	A
Single Side Cooled (Anode side)				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	322	A
$I_{T(RMS)}$	RMS value	-	505	A
I_T	Continuous (direct) on-state current	-	425	A

CURRENT RATINGS

$T_{case} = 80^{\circ}C$ unless stated otherwise

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	355	A
$I_{T(RMS)}$	RMS value	-	557	A
I_T	Continuous (direct) on-state current	-	495	A
Single Side Cooled (Anode side)				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	248	A
$I_{T(RMS)}$	RMS value	-	390	A
I_T	Continuous (direct) on-state current	-	310	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; $T_{case} = 125^{\circ}C$	5.5	kA
I^2t	I^2t for fusing	$V_R = 50\% V_{RRM}$ - 1/4 sine	150×10^3	A^2s
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; $T_{case} = 125^{\circ}C$	6.8	kA
I^2t	I^2t for fusing	$V_R = 0$	231×10^3	A^2s

THERMAL AND MECHANICAL DATA

Symbol	Parameter	Conditions	Min.	Max.	Units	
$R_{th(j-c)}$	Thermal resistance - junction to case	Double side cooled	dc	-	0.063	$^{\circ}C/W$
		Single side cooled	Anode dc	-	0.11	$^{\circ}C/W$
			Cathode dc	-	0.147	$^{\circ}C/W$
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 4.5kN with mounting compound	Double side	-	0.02	$^{\circ}C/W$
			Single side	-	0.04	$^{\circ}C/W$
T_{vj}	Virtual junction temperature	On-state (conducting)	-	135	$^{\circ}C$	
		Reverse (blocking)	-	125	$^{\circ}C$	
T_{stg}	Storage temperature range		-55	125	$^{\circ}C$	
-	Clamping force		4.0	5.0	kN	

Symbol	Parameter	Conditions	Typ.	Max.	Units	
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At $V_{RRM}/V_{DRM}, T_{case} = 125^{\circ}C$	-	30	mA	
dV/dt	Maximum linear rate of rise of off-state voltage	To 67% $V_{DRM}, T_j = 125^{\circ}C$. Gate open circuit.	-	1000	V/ μ s	
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 700A Gate source 10V, 5 Ω $t_r \leq 0.5\mu$ s, $T_j = 125^{\circ}C$	Repetitive 50Hz	-	350	A/ μ s
			Non-repetitive	-	700	A/ μ s
V_o	Threshold voltage	At $T_{vj} = 125^{\circ}C$	-	1.05	V	
R_o	On-state slope resistance	At $T_{vj} = 125^{\circ}C$	-	0.8	m Ω	
t_{gd}	Delay time	$V_D = 67\% V_{DRM}$, Gate source 20V, 10 Ω $dI_G/dt = 20A/\mu$ s, $T_j = 25^{\circ}C$	-	0.8	μ s	
I_L	Latching current	$T_j = 25^{\circ}C, V_D = 10V$	-	200	mA	
I_H	Holding current	$T_j = 25^{\circ}C, R_{g-k} = \infty$	-	30	mA	
t_q	Turn-off time	$I_T = 300A, t_p = 1ms, T_j = 125^{\circ}C,$ $V_R = 50V, dI_{RR}/dt = 20A/\mu$ s, $V_{DR} = 67\% V_{DRM}, dV_{DR}/dt = 20V/\mu$ s linear.	300	-	μ s	

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Conditions	Max.	Units
V_{GT}	Gate trigger voltage	$V_{DRM} = 5V, T_{case} = 25^{\circ}C$	3.0	V
I_{GT}	Gate trigger current	$V_{DRM} = 5V, T_{case} = 25^{\circ}C$	150	mA
V_{GD}	Gate non-trigger voltage	At 67% $V_{DRM}, T_{case} = 125^{\circ}C$	0.25	V
V_{FGM}	Peak forward gate voltage	Anode positive with respect to cathode	30	V
V_{FGN}	Peak forward gate voltage	Anode negative with respect to cathode	0.25	V
V_{RGM}	Peak reverse gate voltage		5	V
I_{FGM}	Peak forward gate current	Anode positive with respect to cathode	10	A
P_{GM}	Peak gate power	See table, gate characteristics curve	100	W
$P_{G(AV)}$	Mean gate power		5	W

CURVES

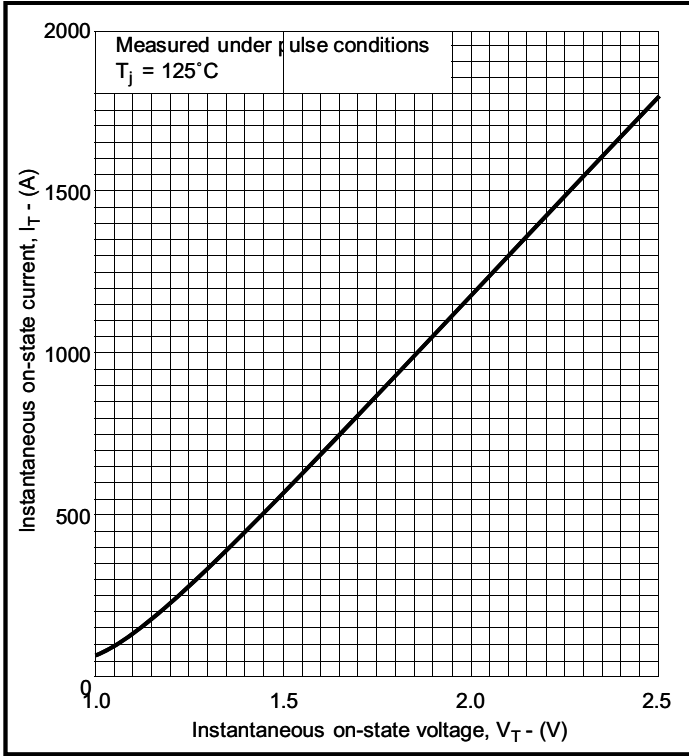


Fig.2 Maximum (limit) on-state characteristics

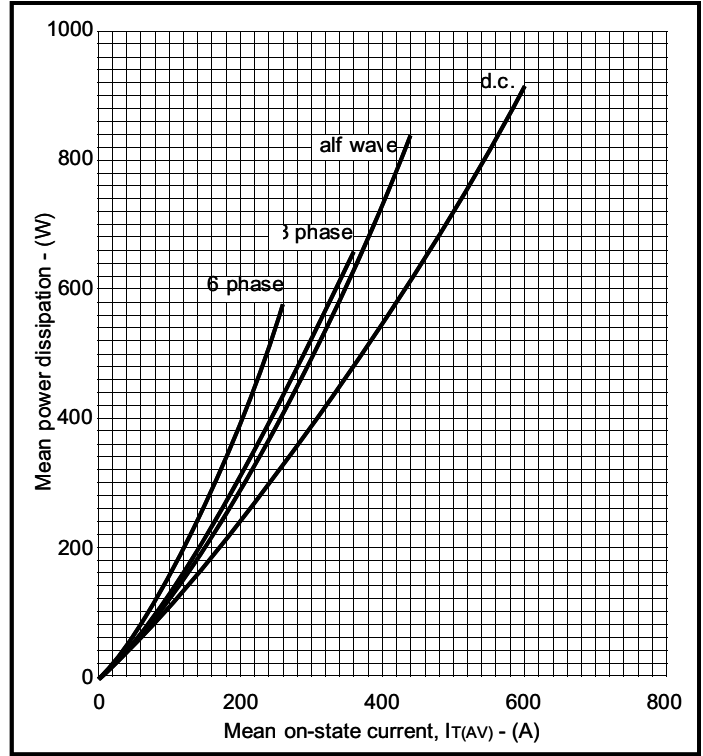


Fig.3 Dissipation curves

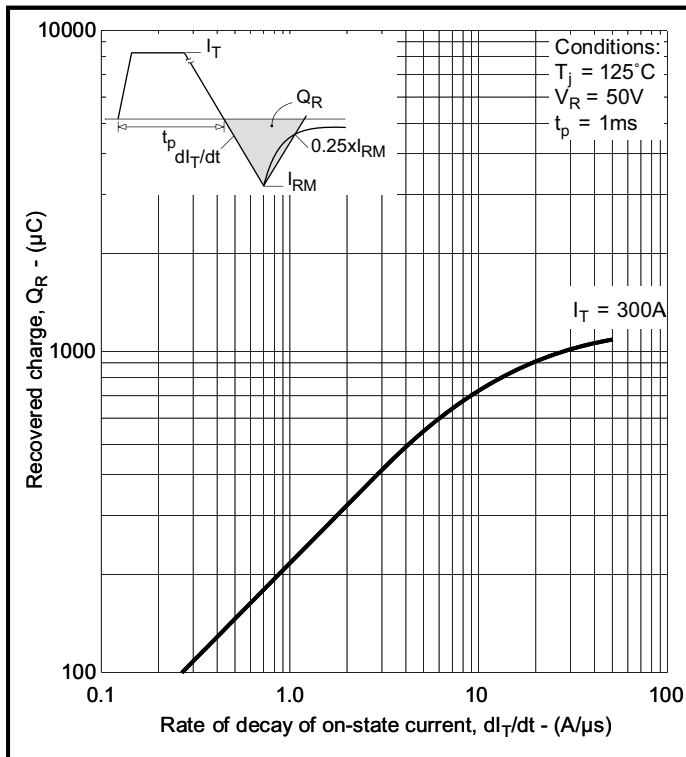


Fig.4 Recovered charge

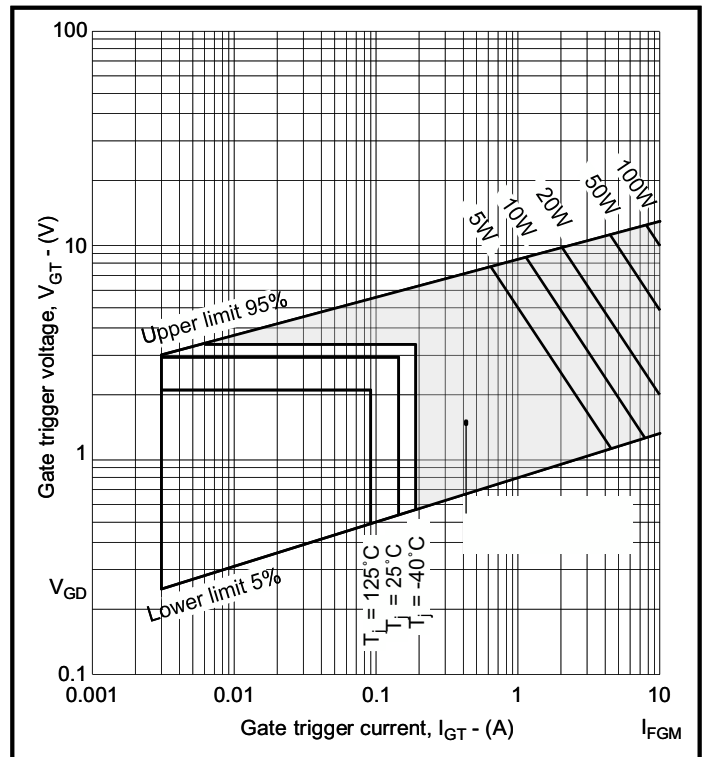


Fig.5 Gate characteristics

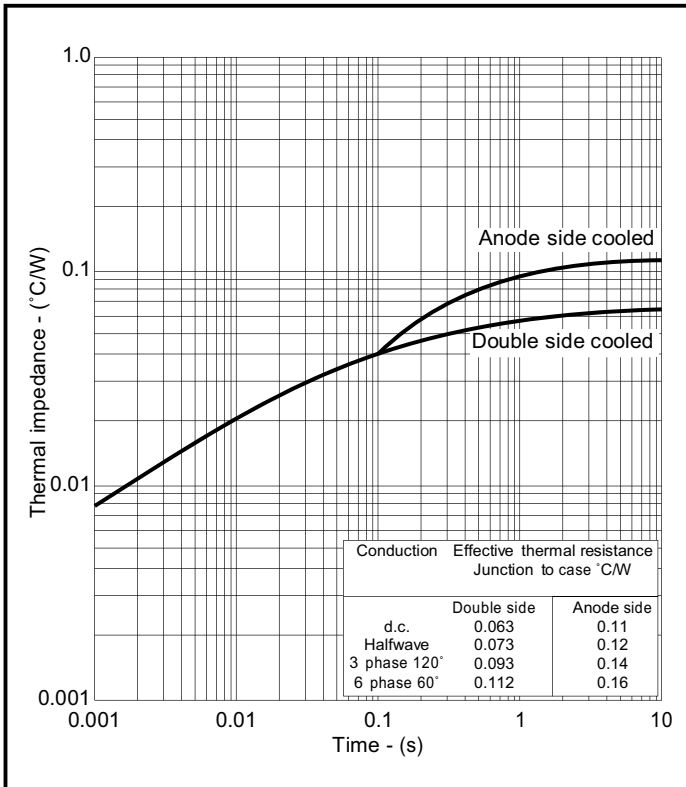


Fig.6 Maximum (limit) transient thermal impedance - junction to case

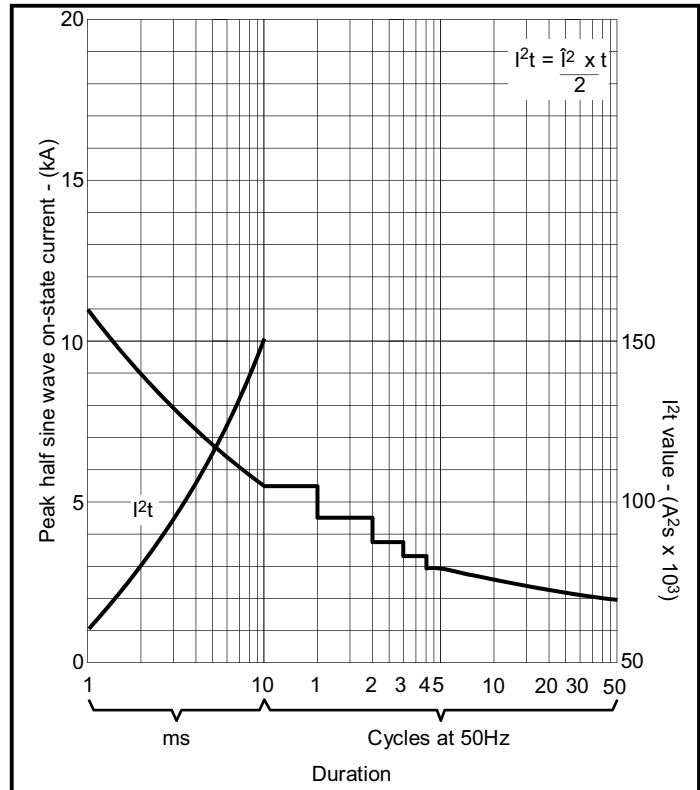
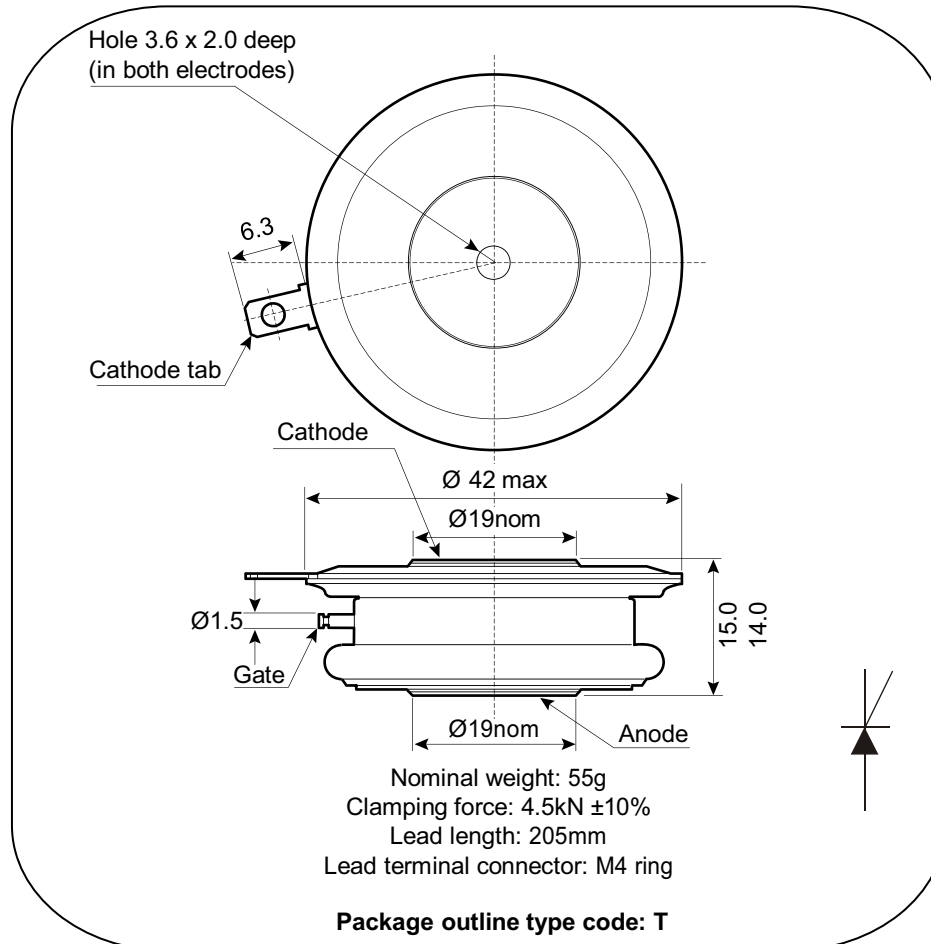


Fig.7 Surge (non-repetitive) on-state current vs time (with 50% V_{RRM} at $T_{case} 125^{\circ}\text{C}$)

PACKAGE OUTLINE



All dimensions are in mm.

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