

**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 <sub>DRM</sub> /V <sub>RRM</sub> (V)	V <sub>RSM</sub> (V)
DCR604SE1414	1400	1500
DCR604SE1616	1600	1700
DCR604SE2121	2100	2200



**CURRENT RATINGS**

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

Symbol	Parameter	Conditions	Max.	Units
<b>Double Side Cooled</b>				
I <sub>T(AV)</sub>	Mean on-state current	Half wave resistive load	706	A
I <sub>T(RMS)</sub>	RMS value	-	1109	A
I <sub>T</sub>	Continuous (direct) on-state current	-	995	A
<b>Single Side Cooled (Anode side)</b>				
I <sub>T(AV)</sub>	Mean on-state current	Half wave resistive load	487	A
I <sub>T(RMS)</sub>	RMS value	-	766	A
I <sub>T</sub>	Continuous (direct) on-state current	-	646	A

**CURRENT RATINGS**

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

Symbol	Parameter	Conditions	Max.	Units
<b>Double Side Cooled</b>				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	562	A
$I_{T(RMS)}$	RMS value	-	882	A
$I_T$	Continuous (direct) on-state current	-	770	A
<b>Single Side Cooled (Anode side)</b>				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	380	A
$I_{T(RMS)}$	RMS value	-	595	A
$I_T$	Continuous (direct) on-state current	-	480	A

**SURGE RATINGS**

Symbol	Parameter	Conditions	Max.	Units
$I_{TSM}$	Surge (non-repetitive) on-state current	10ms half sine; $T_{case} = 125^{\circ}C$	6.5	kA
$I^2t$	$I^2t$ for fusing	$V_R = 50\% V_{RRM} - 1/4$ sine	$0.21 \times 10^6$	A <sup>2</sup> s
$I_{TSM}$	Surge (non-repetitive) on-state current	10ms half sine; $T_{case} = 125^{\circ}C$	8.1	kA
$I^2t$	$I^2t$ for fusing	$V_R = 0$	$0.33 \times 10^6$	A <sup>2</sup> s

**THERMAL AND MECHANICAL DATA**

Symbol	Parameter	Conditions	Min.	Max.	Units	
$R_{th(j-c)}$	Thermal resistance - junction to case	Double side cooled	dc	-	0.041	$^{\circ}C/W$
		Single side cooled	Anode dc	-	0.074	$^{\circ}C/W$
			Cathode dc	-	0.092	$^{\circ}C/W$
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 8.0kN with mounting compound	Double side	-	0.018	$^{\circ}C/W$
			Single side	-	0.036	$^{\circ}C/W$
$T_{vj}$	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		7.2	8.8	kN	

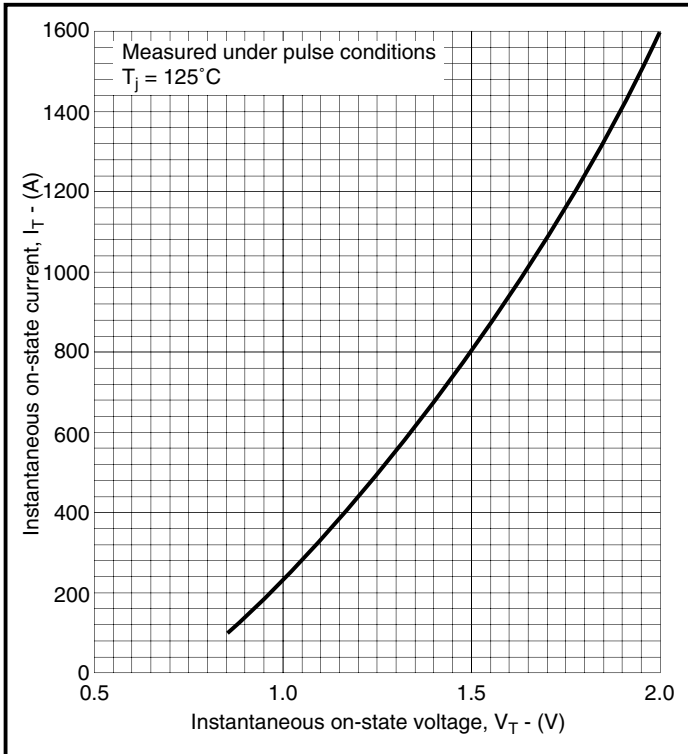
**DYNAMIC CHARACTERISTICS**

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/ $\mu$ s	
dI/dt	Rate of rise of on-state current	From 67% $V_{DRM}$ to 1100A Gate source 20V, 20 $\Omega$ $t_r \leq 0.5\mu$ s, $T_j = 125^{\circ}C$	Repetitive 50Hz	-	350	A/ $\mu$ s
			Non-repetitive	-	700	A/ $\mu$ s
$V_0$	Threshold voltage	At $T_{vj} = 125^{\circ}C$	-	0.93	V	
$R_0$	On-state slope resistance	At $T_{vj} = 125^{\circ}C$	-	0.667	m $\Omega$	
$t_{gd}$	Delay time	$V_D = 67\% V_{DRM}$ , Gate source 10V, 5 $\Omega$ $t_r = 0.5\mu$ s, $T_j = 25^{\circ}C$	-	1.5	$\mu$ s	
$I_L$	Latching current	$T_j = 25^{\circ}C$ , $V_D = 5V$	-	500	mA	
$I_H$	Holding current	$T_j = 25^{\circ}C$ , $V_D = 5V$	-	70	mA	
$t_q$	Turn-off time	$I_T = 500A$ , $t_p = 1ms$ , $T_j = 125^{\circ}C$ , $V_R = 50V$ , $dI_{RF}/dt = 20A/\mu$ s, $V_{DR} = 67\% V_{DRM}$ , $dV_{DR}/dt = 20V/\mu$ s linear	300	400	$\mu$ s	

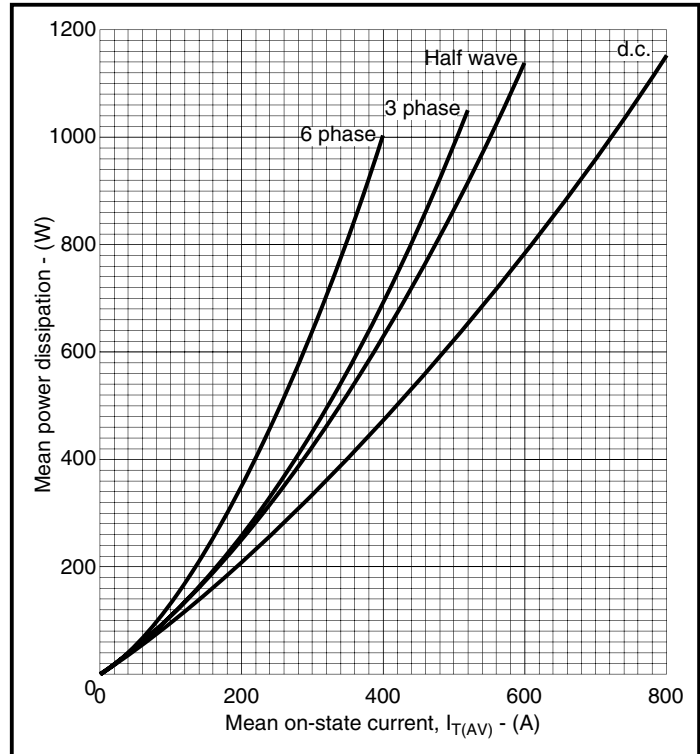
**GATE TRIGGER CHARACTERISTICS AND RATINGS**

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

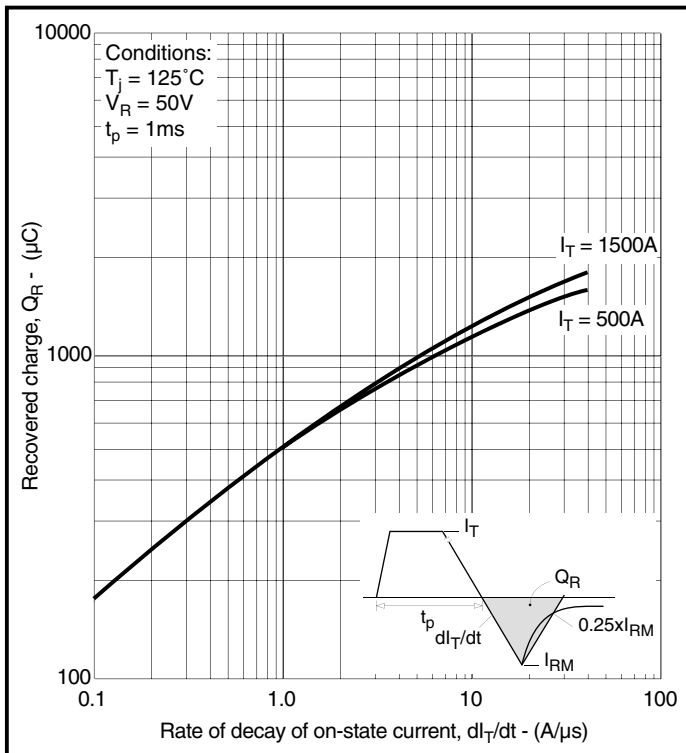
**CURVES**



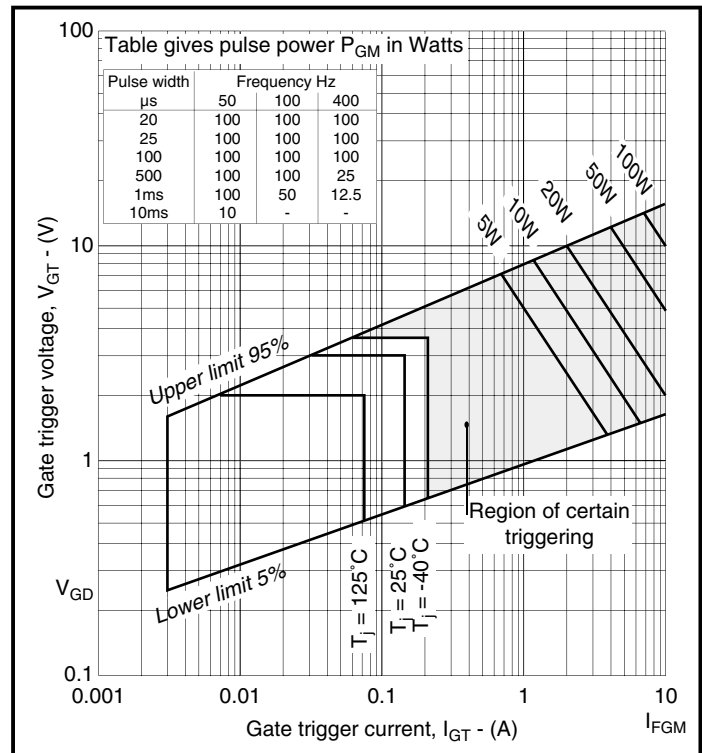
**Fig.2 Maximum (limit) on-state characteristics**



**Fig.3 Dissipation curves**



**Fig.4 Recovered charge**



**Fig.5 Gate characteristics**

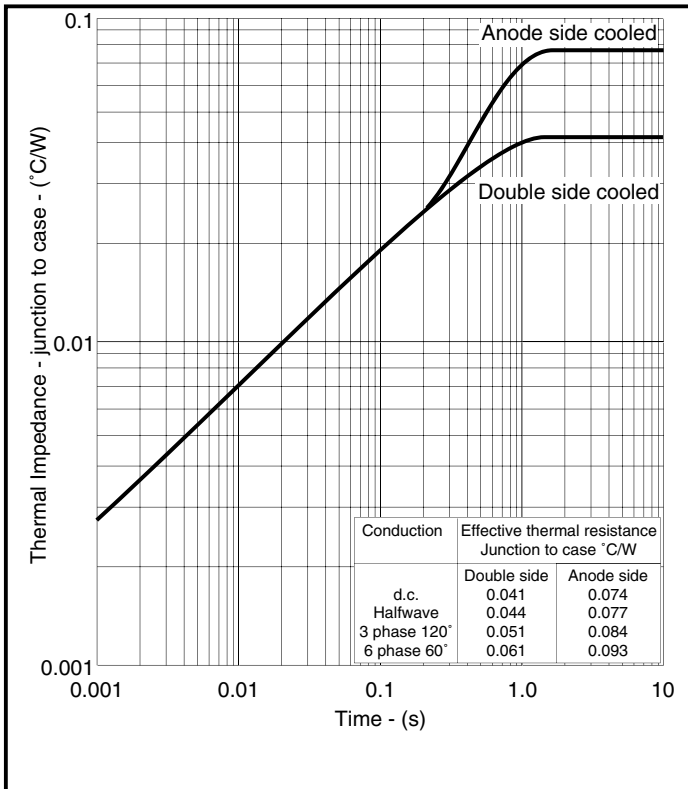


Fig.6 Maximum (limit) transient thermal impedance - junction to case

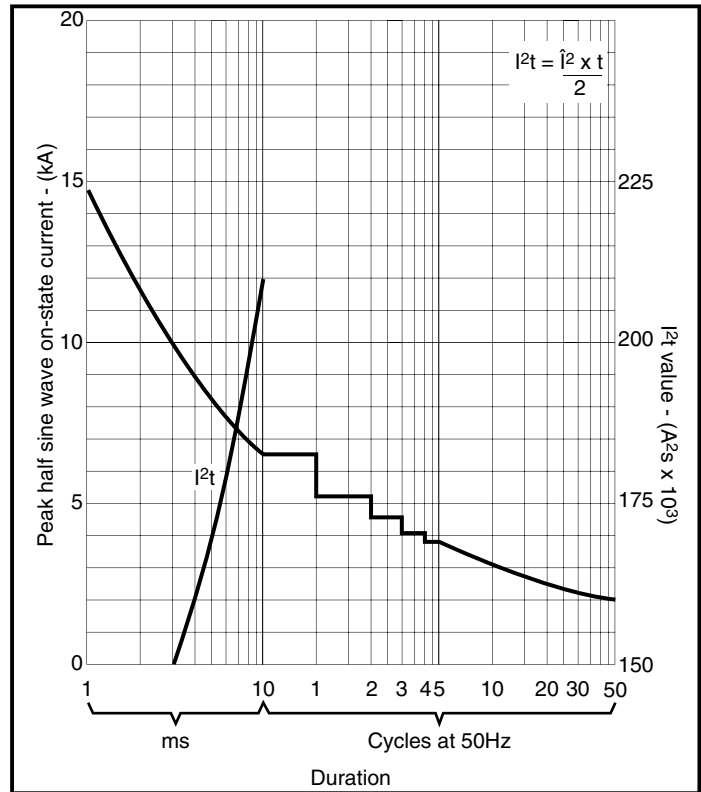
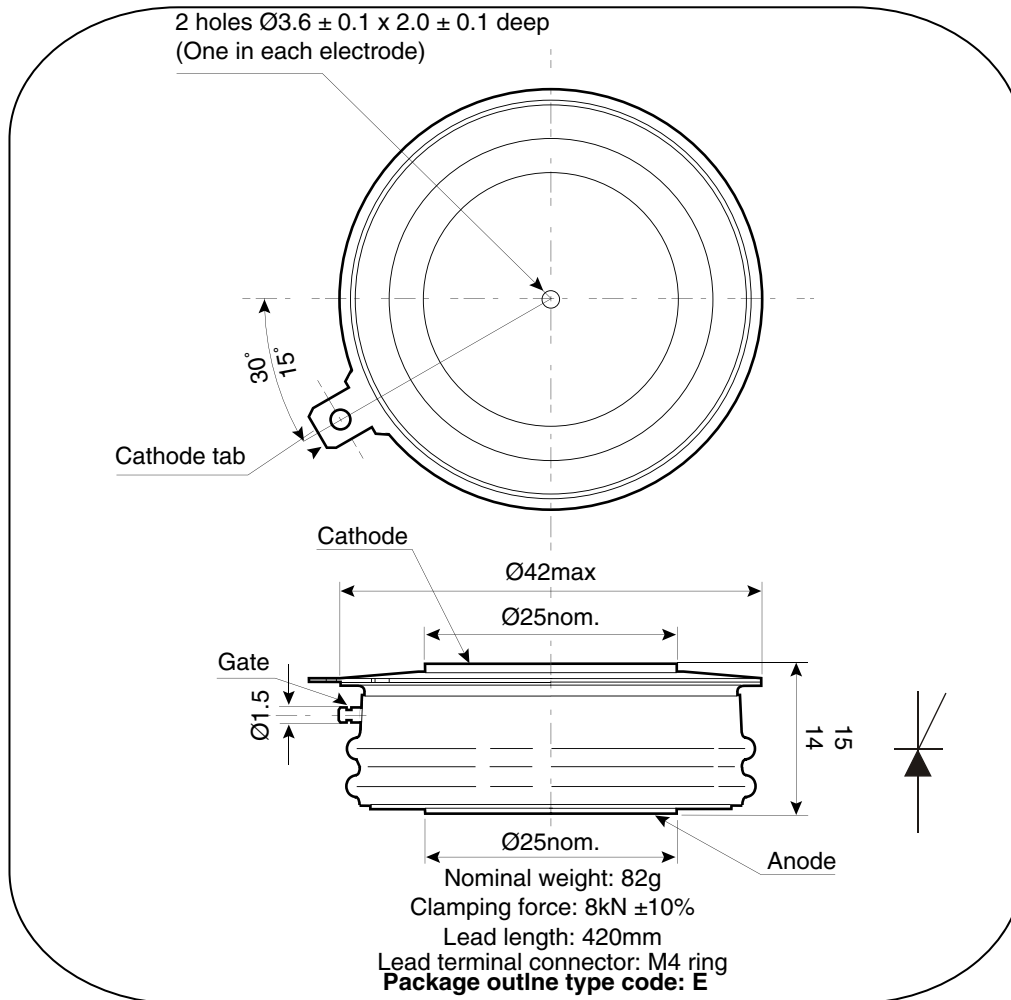


Fig.7 Surge (non-repetitive) on-state current vs time (with 50%  $V_{RRM}$  at  $T_{case} 125^\circ C$ )

**PACKAGE OUTLINE**



All dimensions are in mm.

**Insel Rectifiers (India) Pvt. Ltd.**

(An ISO 9001:2015, ISO 14001:2015 Certified Company)

Plot No 151, Udyog Kendra, Extn.-II, Ecotech-III, Greater Noida-201306

Toll Free No.: 1800 3070 9989, Fax : 011-27491404

E-mail : [insel@rectifierindia.com](mailto:insel@rectifierindia.com), [sales@rectifierindia.com](mailto:sales@rectifierindia.com)