

FEATURES

- Wide current range
- High voltage ratings up to 4000 V
- High surge current capabilities
- Diffused junction
- Hockey PUK version

TYPICAL APPLICATIONS

- Converters
- Power supplies
- Machine tool controls
- High power drives
- Medium traction applications

TECHNICAL DATA

DEVICE TYPE	V_{RRM} (V)	V_{RSM} (V)
DS2106SY 3636	3600	3700
DS2106SY 3838	3800	3900
DS2106SY 4040	4000	4100



CURRENT RATINGS

$T_{case} = 75^{\circ}C$ unless otherwise stated

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	3830	A
$I_{F(RMS)}$	RMS value	-	6016	A
I_F	Continuous (direct) forward current	-	5597	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	2525	A
$I_{F(RMS)}$	RMS value	-	3966	A
I_F	Continuous (direct) forward current	-	3421	A

$T_{case} = 100^{\circ}\text{C}$ unless otherwise stated

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, $T_{case} = 100^{\circ}\text{C}$	2850	A
$I_{F(RMS)}$	RMS value	$T_{case} = 100^{\circ}\text{C}$	4475	A
I_F	Continuous (direct) forward current	$T_{case} = 100^{\circ}\text{C}$	4190	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, $T_{case} = 100^{\circ}\text{C}$	1920	A
$I_{F(RMS)}$	RMS value	$T_{case} = 100^{\circ}\text{C}$	3014	A
I_F	Continuous (direct) forward current	$T_{case} = 100^{\circ}\text{C}$	2500	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; $T_{case} = 150^{\circ}\text{C}$	50.0	kA
I^2t	I^2t for fusing	$V_R = 50\% V_{RRM} - 1/4$ sine	12.5×10^6	A^2s
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; $T_{case} = 150^{\circ}\text{C}$	62.5	kA
I^2t	I^2t for fusing	$V_R = 0$	1.96×10^6	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	-	0.0095	$^{\circ}\text{C}/\text{W}$
		Single side cooled	Anode dc	-	0.019	$^{\circ}\text{C}/\text{W}$
			Cathode dc	-	0.019	$^{\circ}\text{C}/\text{W}$
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 43.0kN with mounting compound	Double side	-	0.002	$^{\circ}\text{C}/\text{W}$
			Single side	-	0.004	$^{\circ}\text{C}/\text{W}$
T_{vj}	Virtual junction temperature	Forward (conducting)	-	160	$^{\circ}\text{C}$	
		Reverse (blocking)	-	150	$^{\circ}\text{C}$	
T_{stg}	Storage temperature range		-55	150	$^{\circ}\text{C}$	
-	Clamping force		38.0	47.0	kN	

CHARACTERISTICS

Symbol	Parameter	Conditions	Min.	Max.	Units
V_{FM}	Forward voltage	At 3000A peak, $T_{case} = 25^{\circ}C$	-	1.15	V
I_{RRM}	Peak reverse current	At V_{RRM} , $T_{case} = 150^{\circ}C$	-	250	mA
Q_S	Total stored charge	$I_F = 2000A$, $di_{RR}/dt = 3A/\mu s$	-	5000	μC
I_{rr}	Peak reverse recovery current	$T_{case} = 150^{\circ}C$, $V_R = 100V$	-	150	A
V_{TO}	Threshold voltage	At $T_{vj} = 150^{\circ}C$	-	0.75	V
r_T	Slope resistance	At $T_{vj} = 150^{\circ}C$	-	0.118	$m\Omega$

CURVES

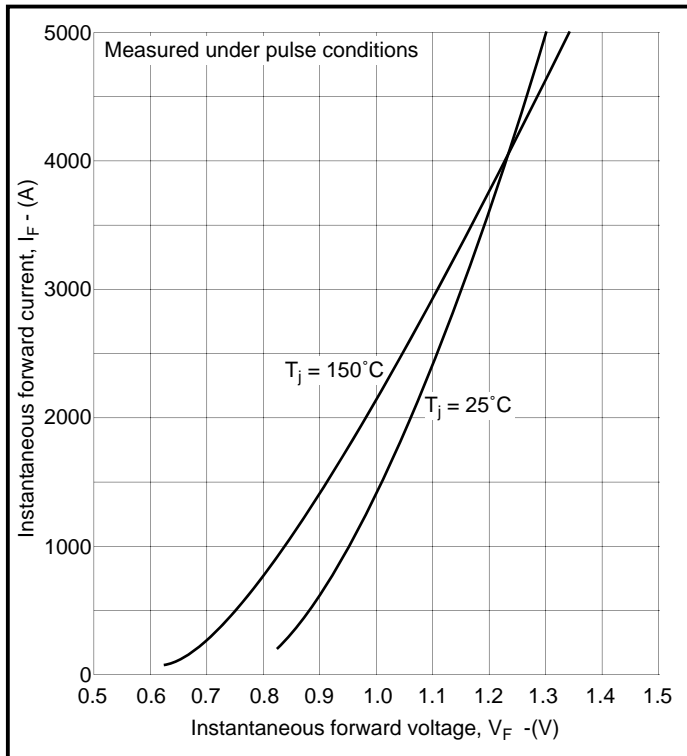


Fig.2 Maximum (limit) forward characteristics

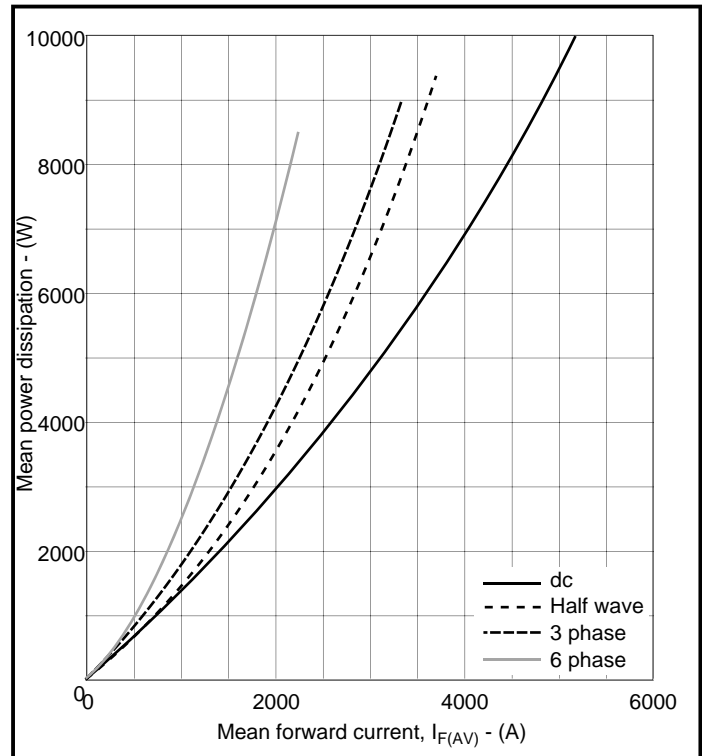


Fig.3 Dissipation curves

V_{FM} Equation:-

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

Where

$$A = -0.15357$$

$$B = 0.177571$$

$$C = 0.000179$$

$$D = -0.01294$$

these values are valid for $T_j = 125^{\circ}C$ for I_F 500A to 5000A

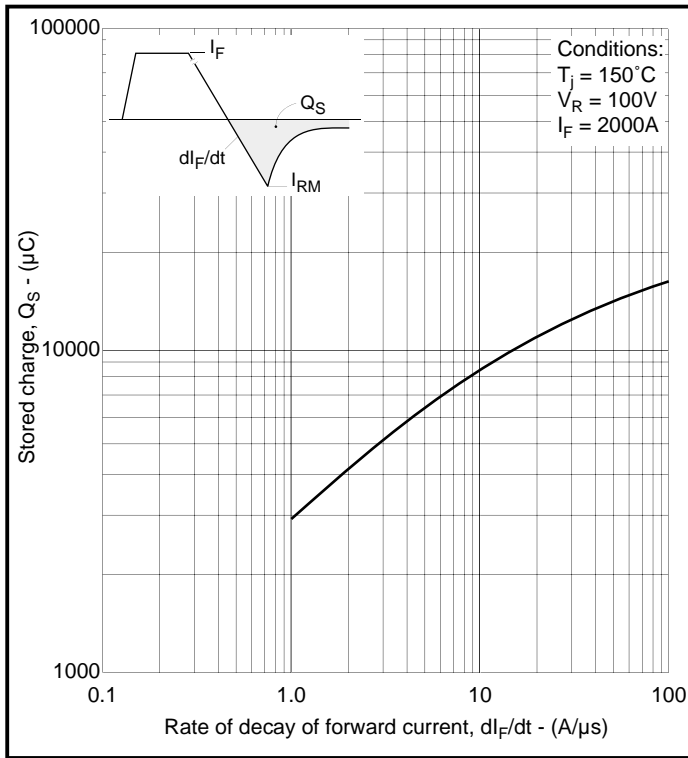


Fig.4 Total stored charge

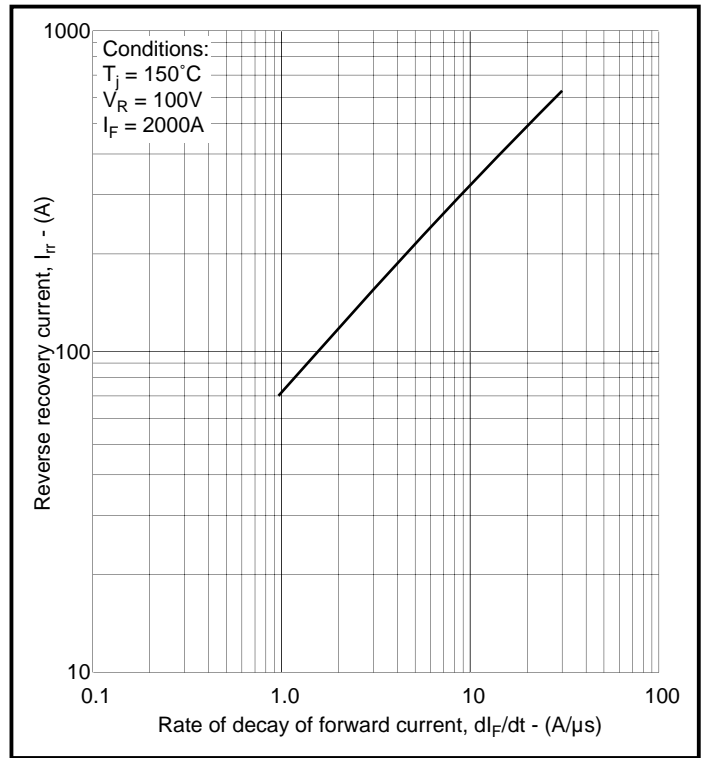


Fig.5 Maximum reverse recovery current

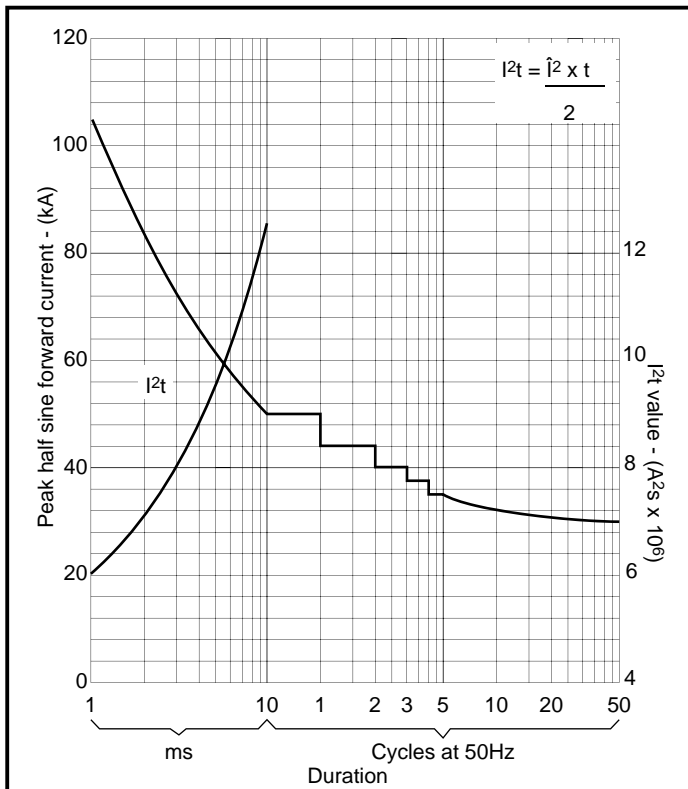


Fig.6 Surge (non-repetitive) forward current vs time (with 50% V_{RRM} at $T_{case} 150^\circ\text{C}$)

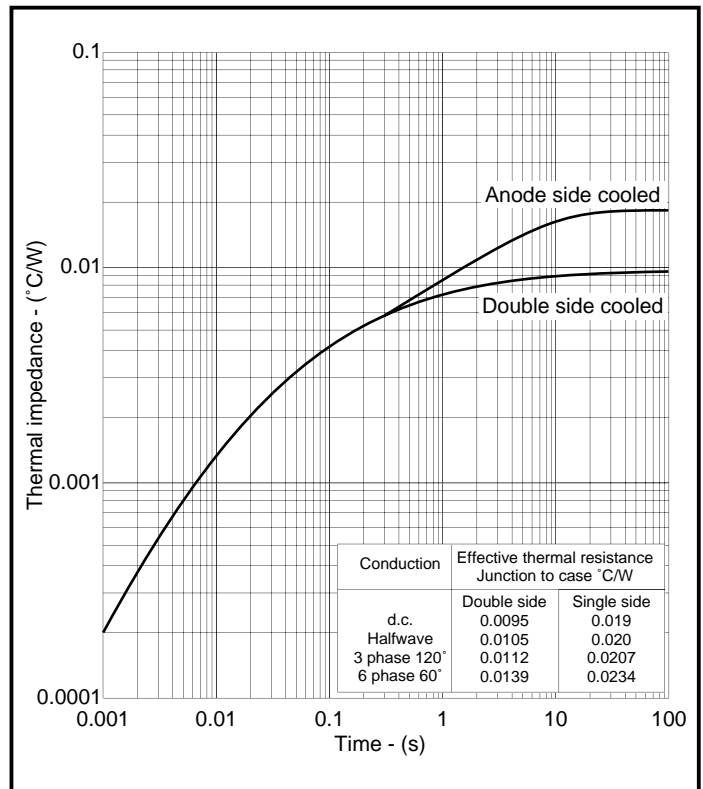
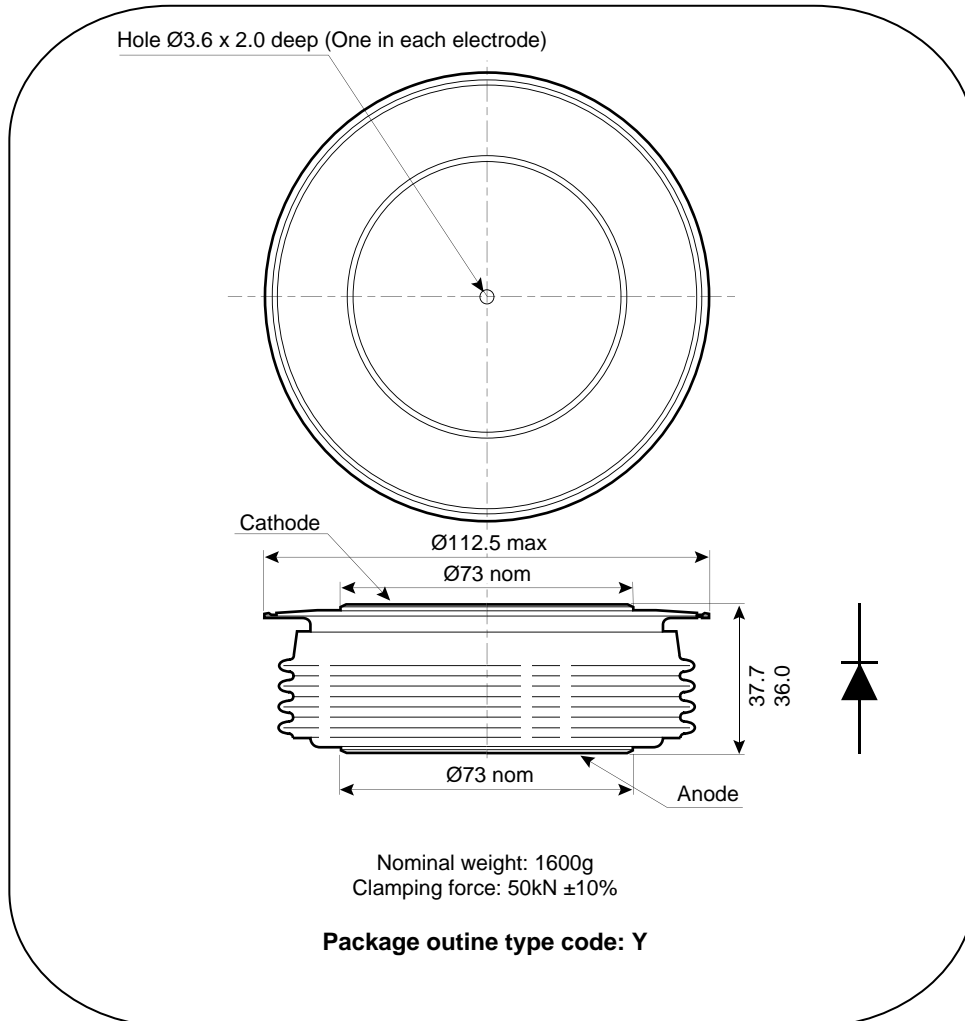


Fig.7 Maximum (limit) transient thermal impedance - junction to case

PACKAGE OUTLINE



All dimensions are in mm.

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