

Replaces July 2000 version, DS5107-3.3

DS5107-4.0 October 2001

### FEATURES

- Double Side Cooling
- High Surge Capability
- Avalanche Capability

### APPLICATIONS

- Freewheel Diode
- Rectification

### VOLTAGE RATINGS

Type Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Conditions
DSZ412SE44	4400	$V_{RSM} = V_{RRM} + 100V$

Lower voltage grades available

### ORDERING INFORMATION

Order as:

**DSZ412SE44**

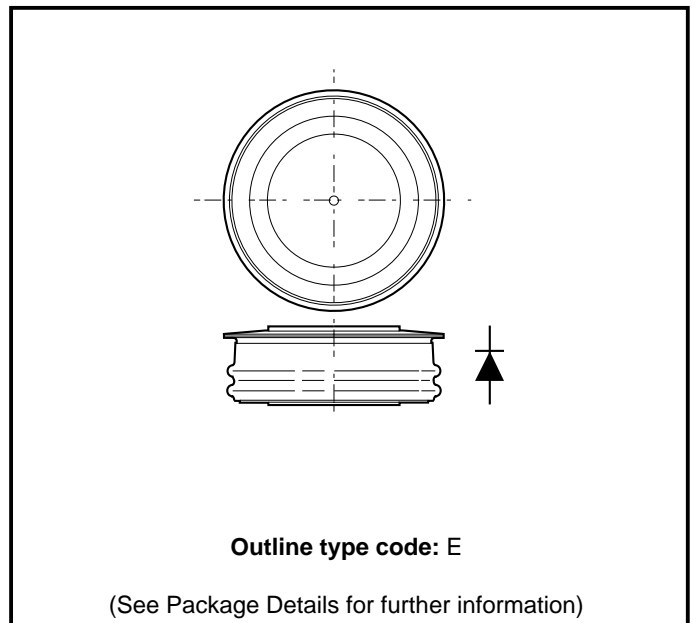
Note: Please use the complete part number when ordering and quote this number in any future correspondence relating to your order.

### KEY PARAMETERS

$V_{RRM}$  **4400V**

$I_{F(AV)}$  **219A**

$I_{FSM}$  **1500A**



**Fig. 1 Package outline**

## CURRENT RATINGS

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

Symbol	Parameter	Conditions	Max.	Units
<b>Double Side Cooled</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	219	A
$I_{F(RMS)}$	RMS value	-	344	A
$I_F$	Continuous (direct) forward current	-	333	A
<b>Single Side Cooled (Anode side)</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	132	A
$I_{F(RMS)}$	RMS value	-	207	A
$I_F$	Continuous (direct) forward current	-	181	A

## CURRENT RATINGS

$T_{Heatsink} = 55^{\circ}\text{C}$  unless otherwise stated

Symbol	Parameter	Conditions	Max.	Units
<b>Double Side Cooled</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, $T_{Heatsink} = 55^{\circ}\text{C}$	230	A
$I_{F(RMS)}$	RMS value	$T_{Heatsink} = 55^{\circ}\text{C}$	360	A
$I_F$	Continuous (direct) forward current	$T_{Heatsink} = 55^{\circ}\text{C}$	345	A
<b>Single Side Cooled (Anode side)</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, $T_{Heatsink} = 55^{\circ}\text{C}$	140	A
$I_{F(RMS)}$	RMS value	$T_{Heatsink} = 55^{\circ}\text{C}$	220	A
$I_F$	Continuous (direct) forward current	$T_{Heatsink} = 55^{\circ}\text{C}$	195	A

**SURGE RATINGS**

Symbol	Parameter	Conditions	Max.	Units
$I_{FRM}$	Repetitive peak forward current	Half sine $\phi = 30^\circ$ ; $T_{Heatsink} = 55^\circ\text{C}$	1990	A
$I^2t$	$I^2t$ for fusing	10ms; $T_j = 150^\circ\text{C}$	11250	A <sup>2</sup> s
		3ms; $T_j = 150^\circ\text{C}$	7250	A <sup>2</sup> s
$I_{FSM}$	Surge (non-repetitive) forward current	With 50% $V_{RRM}$ , $T_j = 150^\circ\text{C}$	1500	A
$P_{RSM}$	Non-repetitive peak avalanche power	10 $\mu$ s avalanche, $T_j = 150^\circ\text{C}$	10	kW

**THERMAL RATINGS AND MECHANICAL DATA**

Symbol	Parameter	Conditions	Min.	Max.	Units	
$R_{th(j-h)}$	Thermal resistance - junction to heatsink	Double side cooled Clamping force 3.0kN with mounting compound	dc	-	0.115	$^\circ\text{C/W}$
		Half-wave	-	0.129	$^\circ\text{C/W}$	
		3 phase	-	0.150	$^\circ\text{C/W}$	
$R_{th(j-h)}$	Thermal resistance - junction to heatsink	Single side cooled Clamping force 3.0kN with mounting compound	dc	-	0.270	$^\circ\text{C/W}$
		Half-wave	-	0.284	$^\circ\text{C/W}$	
		3 phase	-	0.305	$^\circ\text{C/W}$	
$T_{vj}$	Virtual junction temperature	Forward (conducting)	-	165	$^\circ\text{C}$	
		Reverse (blocking)	-	150	$^\circ\text{C}$	
$T_{stg}$	Storage temperature range		-55	150	$^\circ\text{C}$	
f	Frequency		10	400	Hz	
-	Clamping force		2.5	3.8	kN	

**CHARACTERISTICS**

Symbol	Parameter	Conditions	Min.	Max.	Units
$V_{FM}$	Forward voltage	At 300A peak, $T_{case} = 25^{\circ}C$	-	2.1	V
$I_{RM}$	Peak reverse current	At $V_{RRM}$ , $T_{case} = 150^{\circ}C$	-	20	mA
		At 50 % $V_{RRM}$ , $T_{case} = 150^{\circ}C$	1*	10*	mA
$V_{TO}$	Threshold voltage	At $T_{vj} = 150^{\circ}C$	-	1.12	V
$r_T$	Slope resistance	At $T_{vj} = 150^{\circ}C$	-	3.75	m $\Omega$

\*This selection for series sharing only upon request.

**CURVES**

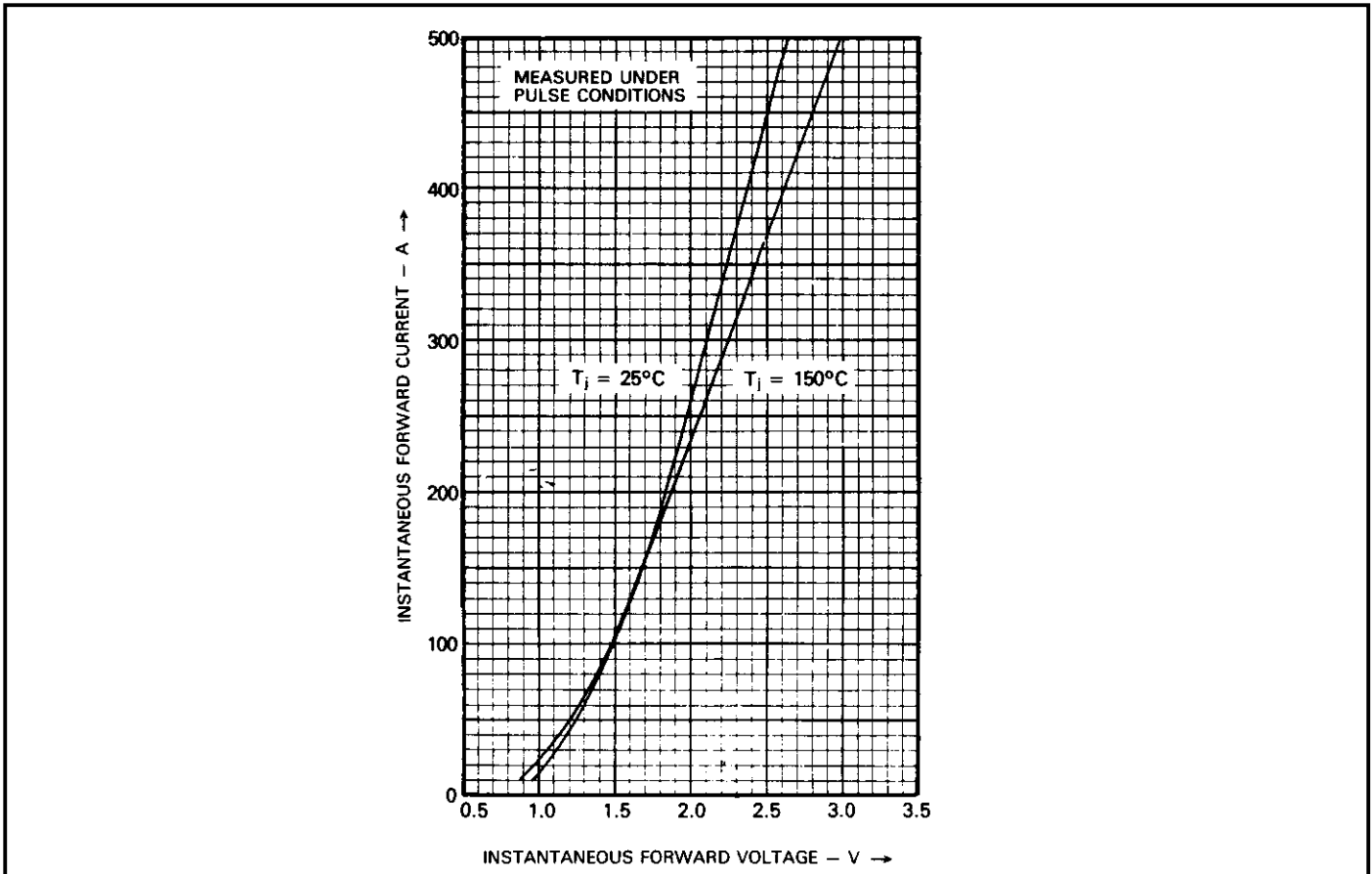


Fig.2 Maximum (limit) forward characteristics

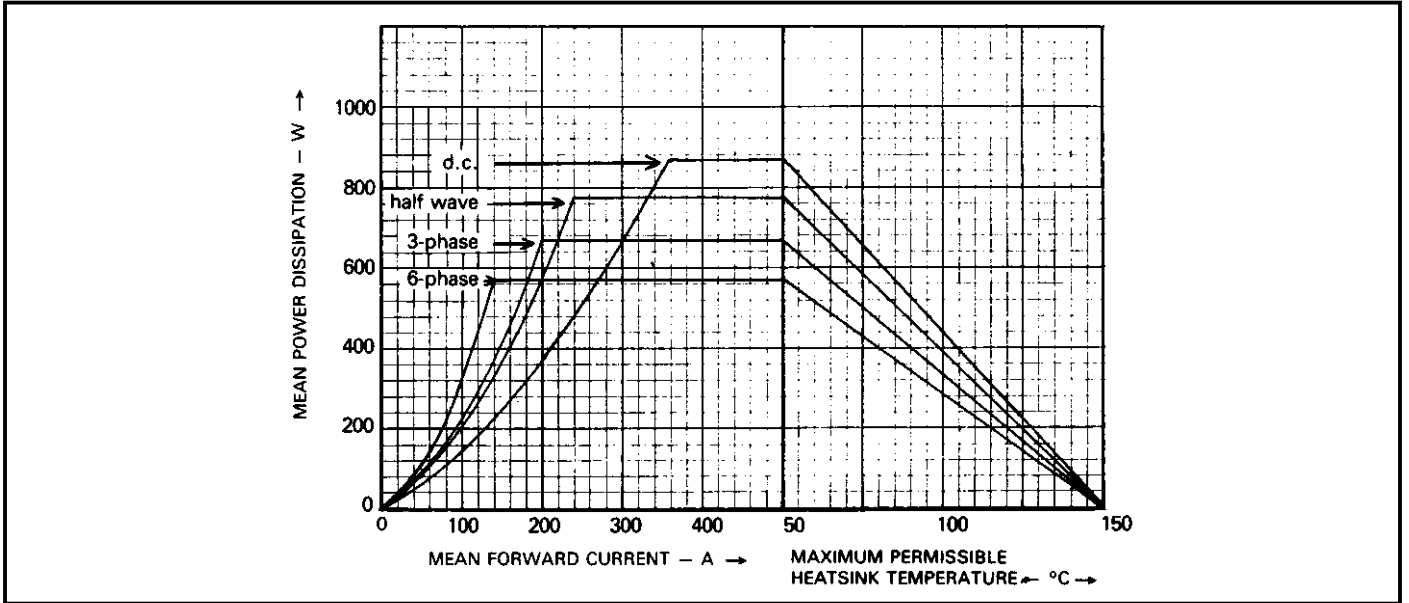


Fig.3 Dissipation curves - double side cooled

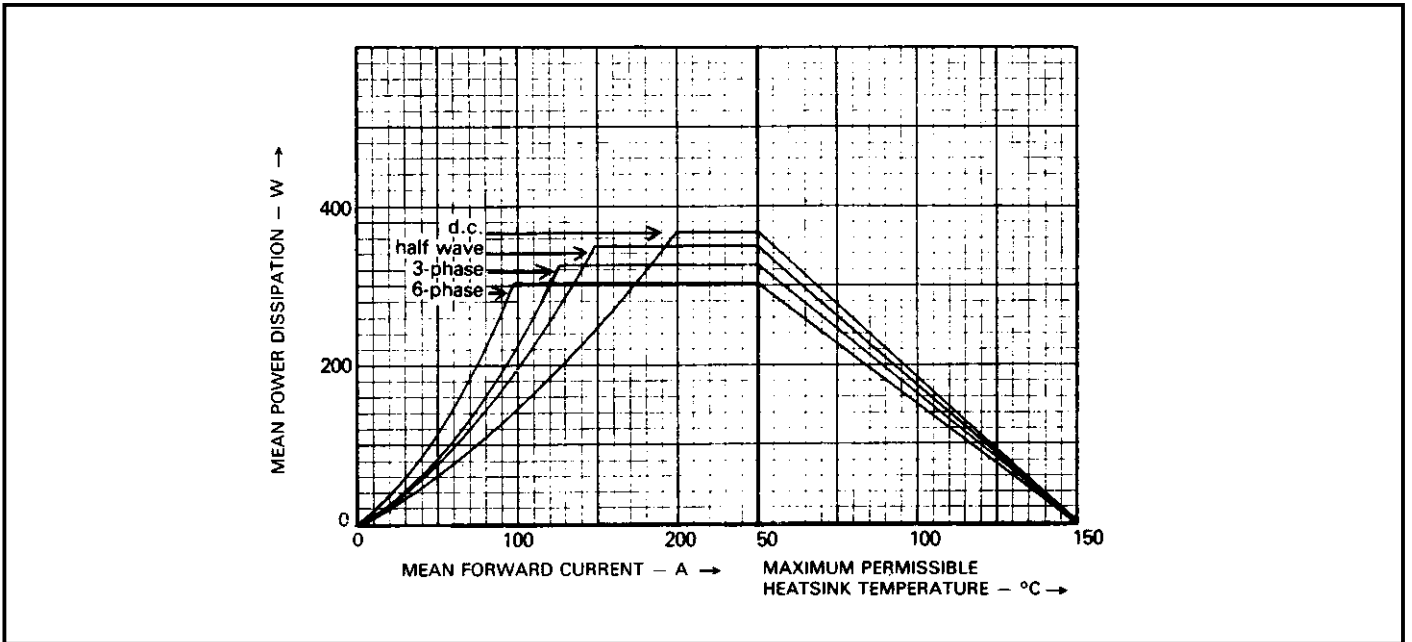


Fig.4 Dissipation curves - single side cooled

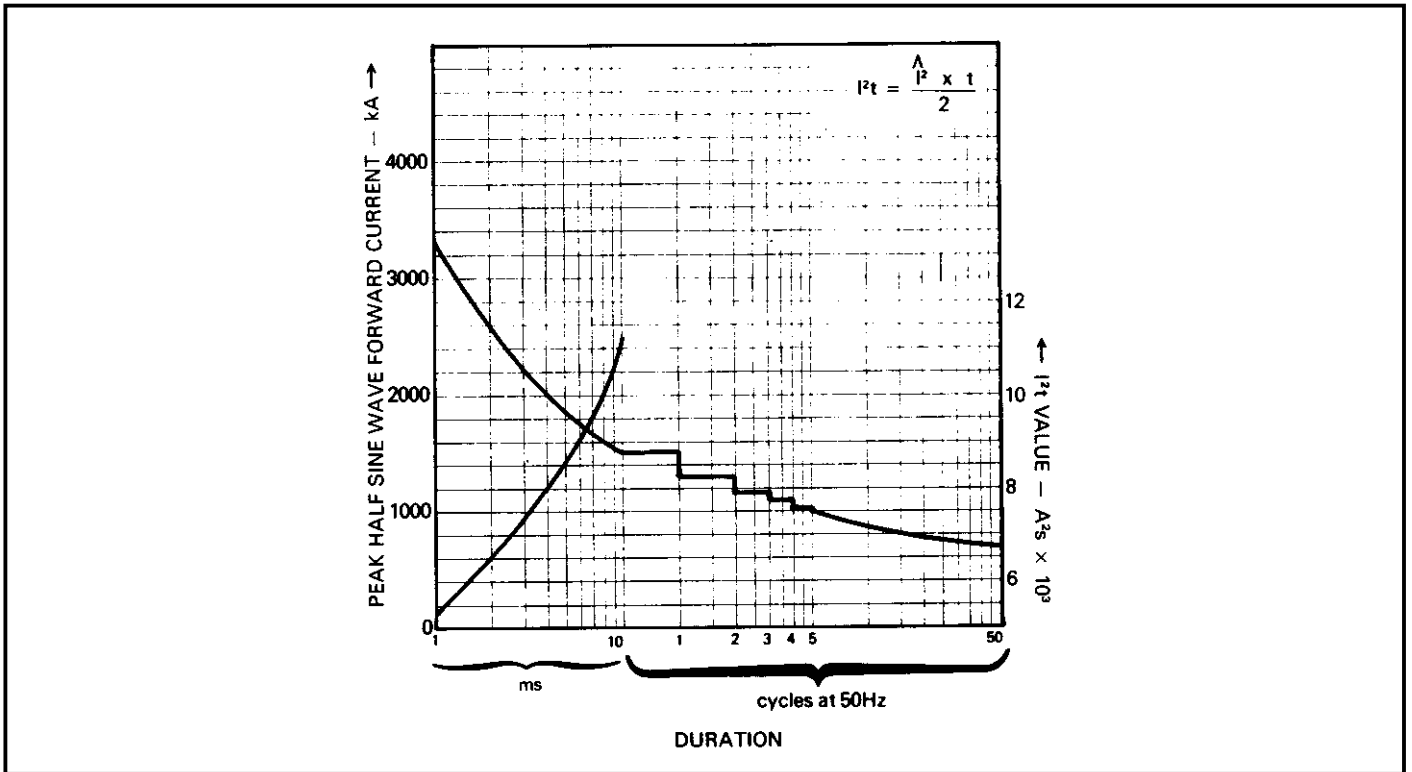


Fig.5 Surge (non-repetitive) forward current vs time (with 50%  $V_{RRM}$ ,  $T_{case} = 150^{\circ}C$ )

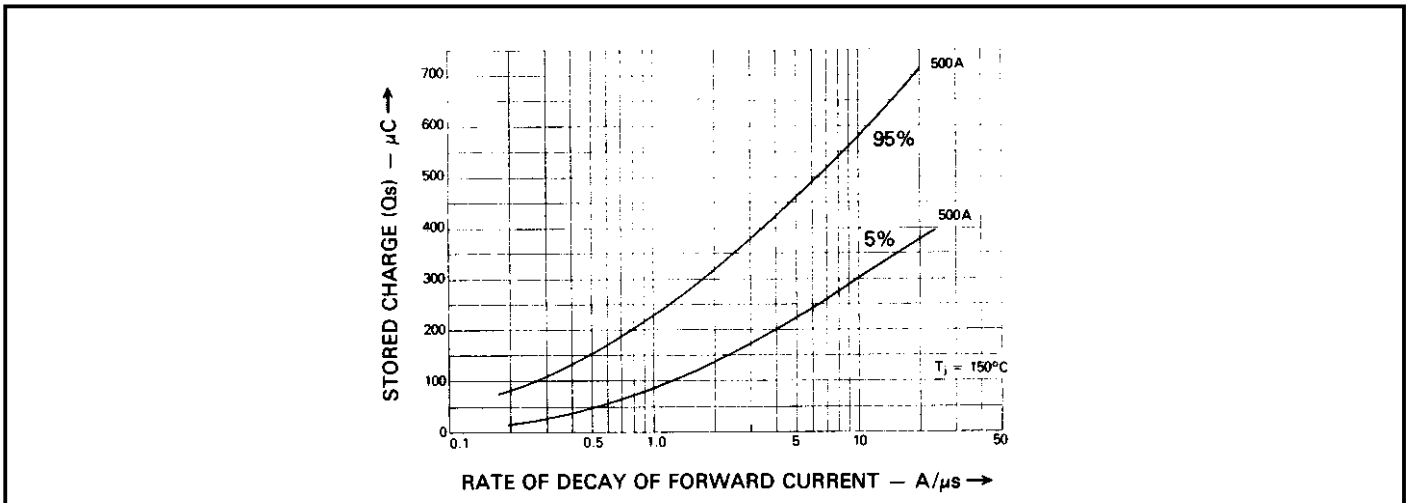
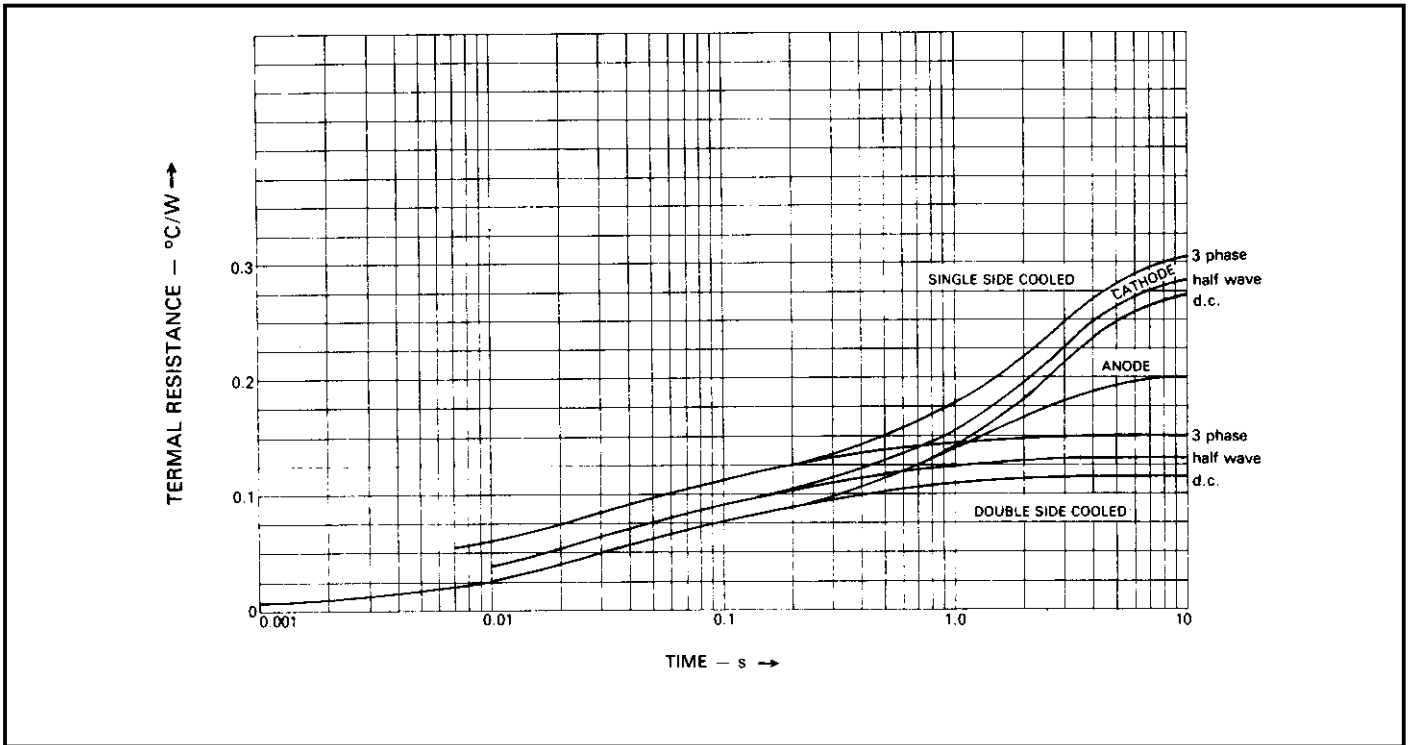


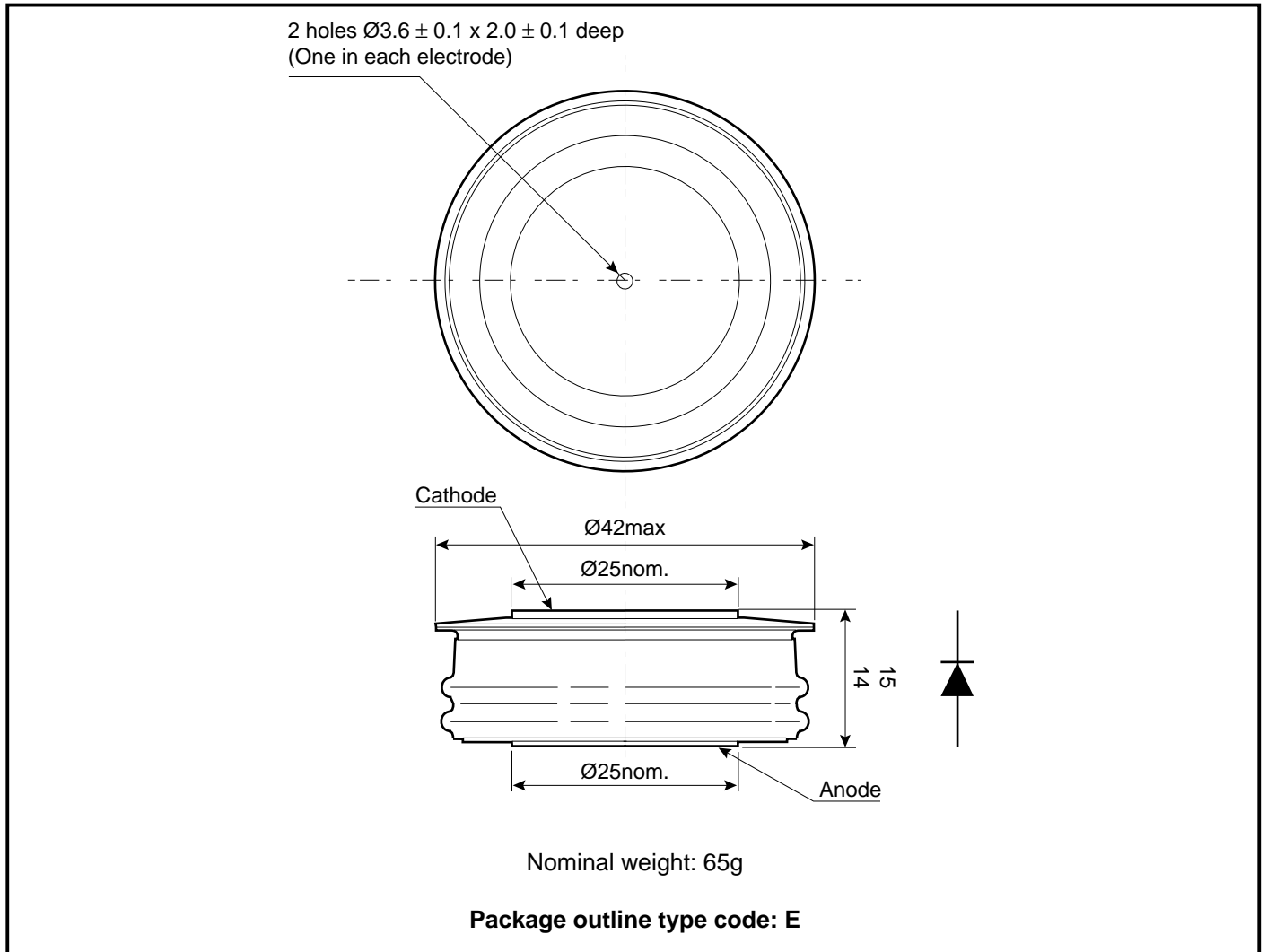
Fig.6 Stored charge



**Fig.7 Maximum (limit) transient thermal impedance**

**PACKAGE DETAILS**

For further package information, please visit our website or contact your nearest Customer Service Centre. All dimensions in mm, unless stated otherwise. DO NOT SCALE.



**Note:**

1. Package maybe supplied with pins and/or tags.



## POWER ASSEMBLY CAPABILITY

The Power Assembly group was set up to provide a support service for those customers requiring more than the basic semiconductor, and has developed a flexible range of heatsink / clamping systems in line with advances in device types and the voltage and current capability of our semiconductors.

We offer an extensive range of air and liquid cooled assemblies covering the full range of circuit designs in general use today. The Assembly group continues to offer high quality engineering support dedicated to designing new units to satisfy the growing needs of our customers.

Using the up to date CAD methods our team of design and applications engineers aim to provide the Power Assembly Complete solution (PACs).

## DEVICE CLAMPS

Disc devices require the correct clamping force to ensure their safe operation. The PACs range offers a varied selection of pre-loaded clamps to suit all of our manufactured devices. This include cube clamps for single side cooling of 'T' 22mm

Clamps are available for single or double side cooling, with high insulation versions for high voltage assemblies.

Please refer to our application note on device clamping, AN4839

## HEATSINKS

Power Assembly has its own proprietary range of extruded aluminium heatsinks. They have been designed to optimise the performance of our semiconductors. Data with respect to air natural, forced air and liquid cooling (with flow rates) is available on request.

For further information on device clamps, heatsinks and assemblies, please contact your nearest Sales Representative or Customer Services.



<http://www.dynexsemi.com>

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**Preliminary Information:** The product is in design and development. The datasheet represents the product as it is understood but details may change.

**Advance Information:** The product design is complete and final characterisation for volume production is well in hand.

**No Annotation:** The product parameters are fixed and the product is available to datasheet specification.

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