



# DCR1595SW

## Phase Control Thyristor

Replaces October 2000 version, DS4248-5.0

DS4248-6.1 July 2001

### FEATURES

- Double Side Cooling
- High Surge Capability

### APPLICATIONS

- High Power Drives
- High Voltage Power Supplies
- DC Motor Control
- Welding
- Battery Chargers

### KEY PARAMETERS

$V_{DRM}$		<b>4200V</b>
$I_{T(AV)}$	<b>(max)</b>	<b>3020A</b>
$I_{TSM}$	<b>(max)</b>	<b>53750A</b>
$dV/dt^*$		<b>1000V/<math>\mu</math>s</b>
$dI/dt$		<b>400A/<math>\mu</math>s</b>

\* Higher  $dV/dt$  selections available

### VOLTAGE RATINGS

### ORDERING INFORMATION

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

For example:

**DCR1595SW38**

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
<b>Double Side Cooled</b>				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	3020	A
$I_{T(RMS)}$	RMS value	-	4745	A
$I_T$	Continuous (direct) on-state current	-	4370	A
<b>Single Side Cooled</b>				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	1975	A
$I_{T(RMS)}$	RMS value	-	3105	A
$I_T$	Continuous (direct) on-state current	-	2650	A

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

Symbol	Parameter	Test Conditions	Max.	Units
<b>Double Side Cooled</b>				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	2380	A
$I_{T(RMS)}$	RMS value	-	3735	A
$I_T$	Continuous (direct) on-state current	-	3360	A
<b>Single Side Cooled</b>				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	1530	A
$I_{T(RMS)}$	RMS value	-	2405	A
$I_T$	Continuous (direct) on-state current	-	1996	A



## SURGE RATINGS

Symbol	Parameter	Test Conditions	Min.	Max.	Units	
$I_{RRM}/I_{RRM}$	Peak reverse and off-state current	At $V_{RRM}/V_{DRM}$ , $T_{case} = 125^{\circ}C$	-	400	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/ $\mu$ s	
dl/dt	Rate of rise of on-state current	From 67% $V_{DRM}$ to $2 \times I_{T(AV)}$	Repetitive 50Hz	-	200	A/ $\mu$ s
		Gate source 30V, 10 $\Omega$ , $t_r < 0.5\mu$ s, $T_j = 125^{\circ}C$	Non-repetitive	-	400	A/ $\mu$ s
$V_{T(TO)}$	Threshold voltage	At $T_{vj} = 125^{\circ}C$	-		V	
$r_T$	On-state slope resistance	At $T_{vj} = 125^{\circ}C$	-	1.03	m $\Omega$	
$t_{gd}$	Delay time	$V_D = 67\% V_{DRM}$ , gate source 30V, 15 $\Omega$ $t_r = 0.5\mu$ s, $T_j = 25^{\circ}C$	0.5	0.19 2	$\mu$ s	
$t_q$	Turn-off time	$I_T = 5000A$ , $t_p = 3.5ms$ , $T_j = 125^{\circ}C$ , $V_R = 900V$ , $dI_{RR}/dt = 4A/\mu$ s, $V_{DR} = 67\% V_{DRM}$ , $dV_{DR}/dt = 20V/\mu$ s linear	550	1000	$\mu$ s	
$I_L$	Latching current	$T_j = 25^{\circ}C$ , $V_D = 5V$	220	1000	mA	
$I_H$	Holding current	$T_j = 25^{\circ}C$ , $R_{G-K} = \infty$ , $I_{TM} = 500A$ , $I_T = 5A$	50	250	mA	



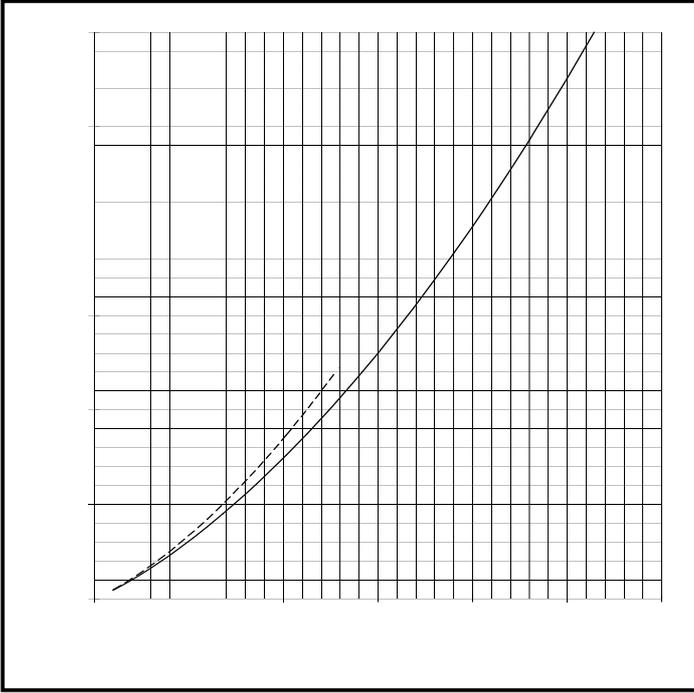
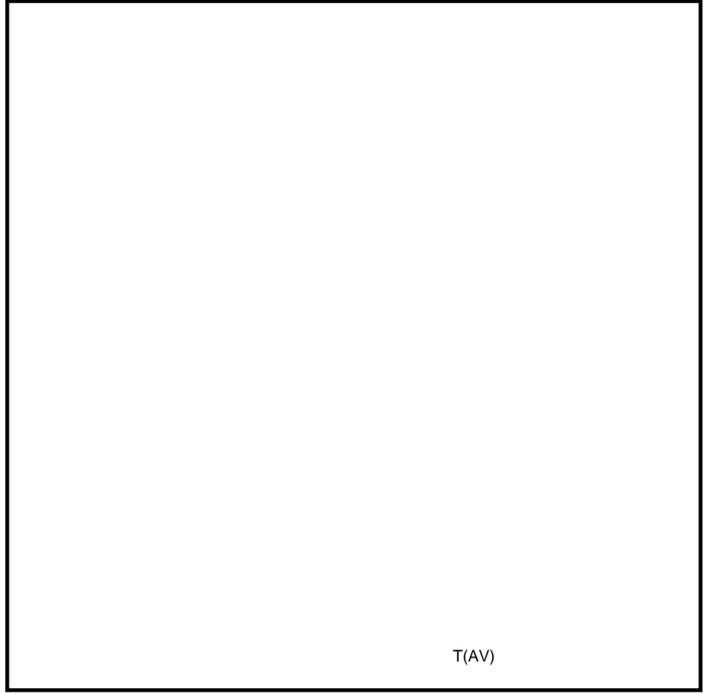


Fig.4 Sine wave power dissipation



T(AV)

Fig.5 Sine wave power dissipation

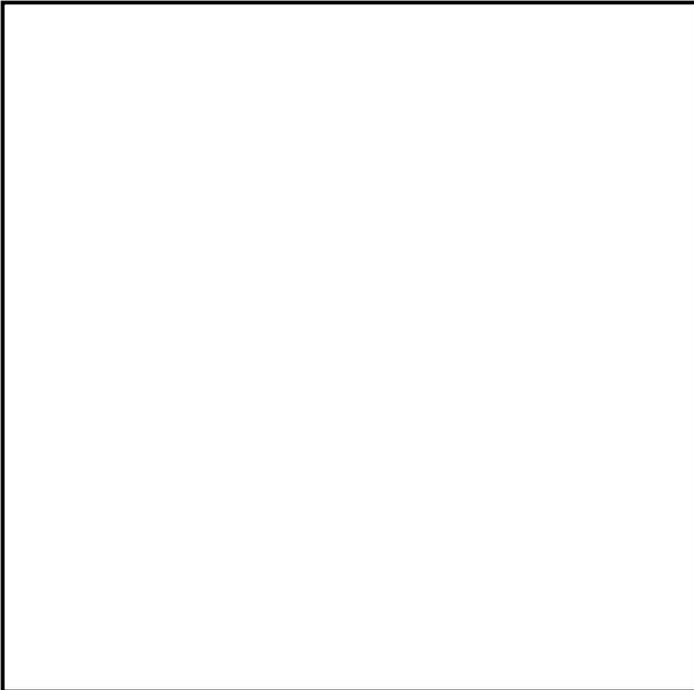
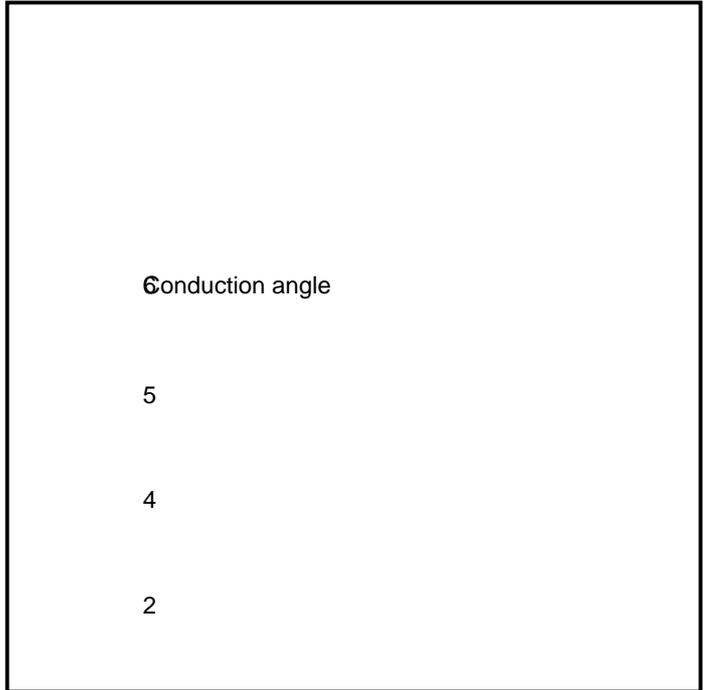


Fig.6 Square wave power dissipation



Conduction angle

5

4

2

Fig.7 Square wave power dissipation05



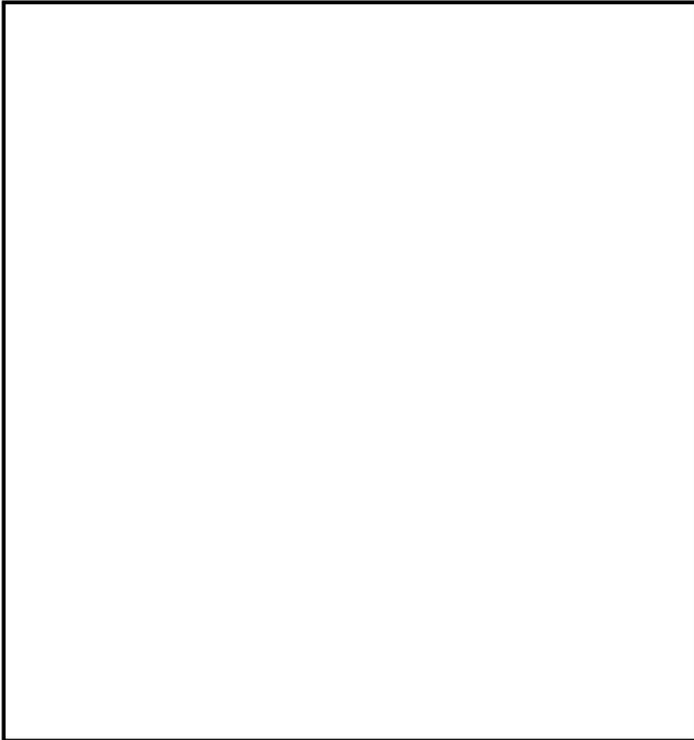


Fig.10 Stored charge

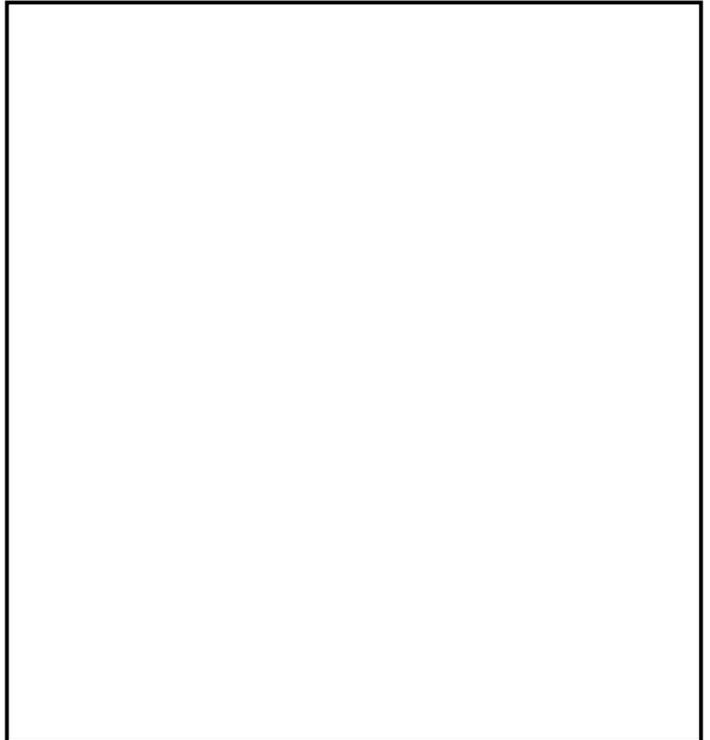


Fig.11 Surge (non-repetitive) on-state current vs time  
(with 50%  $V_{RRM}$  at  $T_{case} = 125^{\circ}C$ )

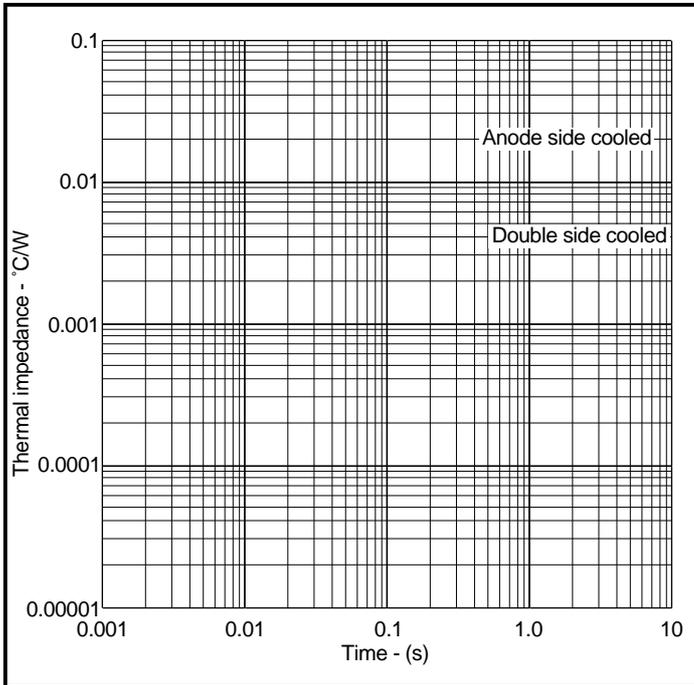


Fig.12 Maximum (limit) transient thermal impedance - junction to case ( $^{\circ}C/W$ )



## 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 and clamping systems in line with advances in device voltages 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 latest 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 includes a varied selection of pre-loaded clamps to suit all of our manufactured devices. Types available include cube clamps for single side cooling of 'T' 23mm and 'E' 30mm discs, and bar clamps right up to 83kN for our 'Z' 100mm thyristors and diodes.

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

The Power Assembly group has its own proprietary range of extruded aluminium heatsinks. They have been designed to optimise the performance of Dynex 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 service office.



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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.

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

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