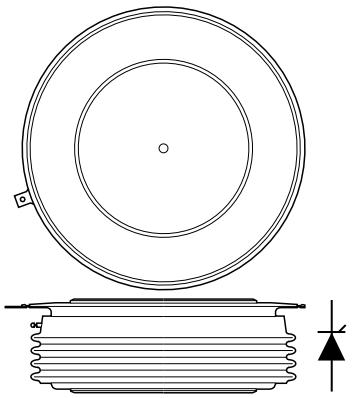
DCR1473SY

Phase Control Thyristor

Replaces August 2000 version, DS4652-4.1

DS4652-5.1 November 2002

PACKAGE OUTLINE



Outline type code: Y
See Package Details for further information.

Fig. 1 Package outline

KEY PARAMETERS

V_{DRM}	**1200V**
$I_{T(AV)}$	**4135A**
I_{TSM}	**64000A**
dVdt*	**1000V/µs**
dI/dt	**500A/µs**

***Higher dV/dt selections available**

VOLTAGE RATINGS

Part Number	Repetitive Peak Voltages V_{DRM} V_{RRM} V	Conditions
DCR1473SY12	1200	T_{vj} = 0˚ to 125˚C. I_{DRM} = I_{RRM} = 250mA. V_{DRM}, V_{RRM} = 10ms 1/2 sine. V_{DSM} & V_{RSM} = V_{DRM} & V_{RRM} + 100V respectively.

Lower voltage grades available.

ORDERING INFORMATION

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

If a lower voltage grade is required, then use V_{DRM}/100 for the grade required e.g.:

DCR1473SY08 for an 800V variant etc.

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

CURRENT RATING

T_{case} = 60˚C unless stated otherwise.

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	4135	A
$I_{T(RMS)}$	RMS value	-	6495	A
I_T	Continuous (direct) on-state current	-	5700	A
Single Side Cooled (Anode side)				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	2605	A
$I_{T(RMS)}$	RMS value	-	4090	A
I_T	Continuous (direct) on-state current	-	3290	A

CURRENT RATING

T_{case} = 80˚C unless stated otherwise.

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	3190	A
$I_{T(RMS)}$	RMS value	-	5010	A
I_T	Continuous (direct) on-state current	-	3950	A
Single Side Cooled (Anode side)				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	1966	A
$I_{T(RMS)}$	RMS value	-	3090	A
I_T	Continuous (direct) on-state current	-	2410	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; T_{case} = 125°C	51.0	kA
I^2t	I^2t for fusing	V_R = 50% V_{RRM} - 1/4 sine	13.1x 10^6	A^2s
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; T_{case} = 125°C	64.0	kA
I^2t	I^2t for fusing	V_R = 0	20.48 x 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	°C/W
		Single side cooled	Anode dc	-	0.019	°C/W
			Cathode dc	-	-	°C/W
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 43.0kN with mounting compound	Double side	-	0.002	°C/W
			Single side	-	0.004	°C/W
T_{vj}	Virtual junction temperature	On-state (conducting)		-	135	°C
		Reverse (blocking)		-	125	°C
T_{stg}	Storage temperature range			-55	125	°C
-	Clamping force			38.0	47.0	kN

DYNAMIC CHARACTERISTICS

Symbol	Parameter	Conditions		Max.	Units
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM}, T_{case} = 125°C		250	mA
dV/dt	Maximum linear rate of rise of off-state voltage	To 67% V_{DRM} T_j = 125°C, gate open circuit		1000	V/µs
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 1000A Gate source 20V, 10Ω t_r = 0.5µs to 1A, T_j = 125°C	Repetitive 50Hz	250	A/µs
			Non-repetitive	500	A/µs
$V_{T(TO)}$	Threshold voltage	At T_{vj} = 125°C		0.824	V
r_T	On-state slope resistance	At T_{vj} = 125°C		0.066	mΩ
t_{gd}	Delay time	V_D = 67% V_{DRM}, Gate source 30V, 15Ω t_r = 0.5µs, T_j = 25°C		2.0	µs

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Conditions	Max.	Units
V_{GT}	Gate trigger voltage	V_{DRM} = 5V, T_{case} = 25°C	4.0	V
I_{GT}	Gate trigger current	V_{DRM} = 5V, T_{case} = 25°C	400	mA
V_{GD}	Gate non-trigger voltage	At V_{DRM} T_{case} = 125°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	30	A
$P_{G(PK)}$	Peak gate power	See Gate Characteristics curve/table	150	W
$P_{G(AV)}$	Mean gate power		10	W

CURVES

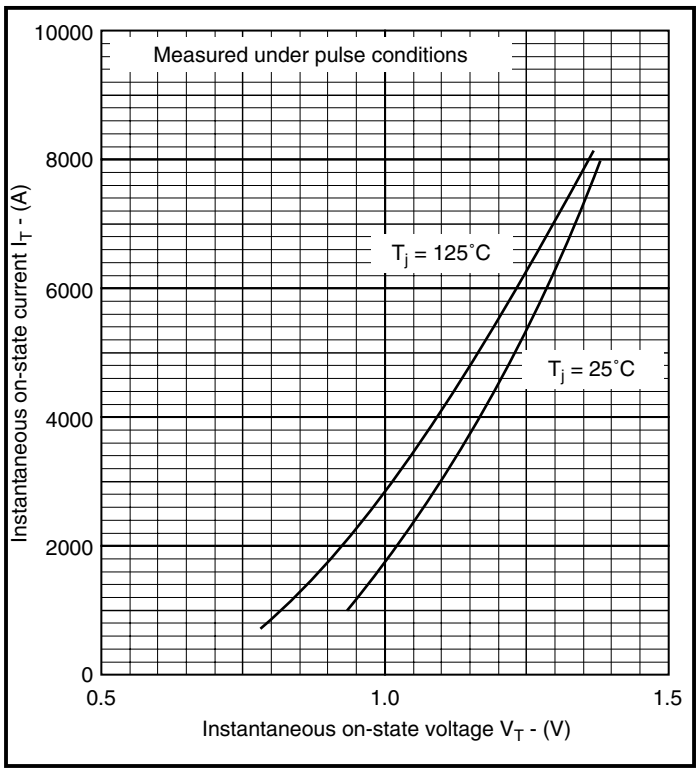


Fig. 2 Maximum (limit) on-state characteristics

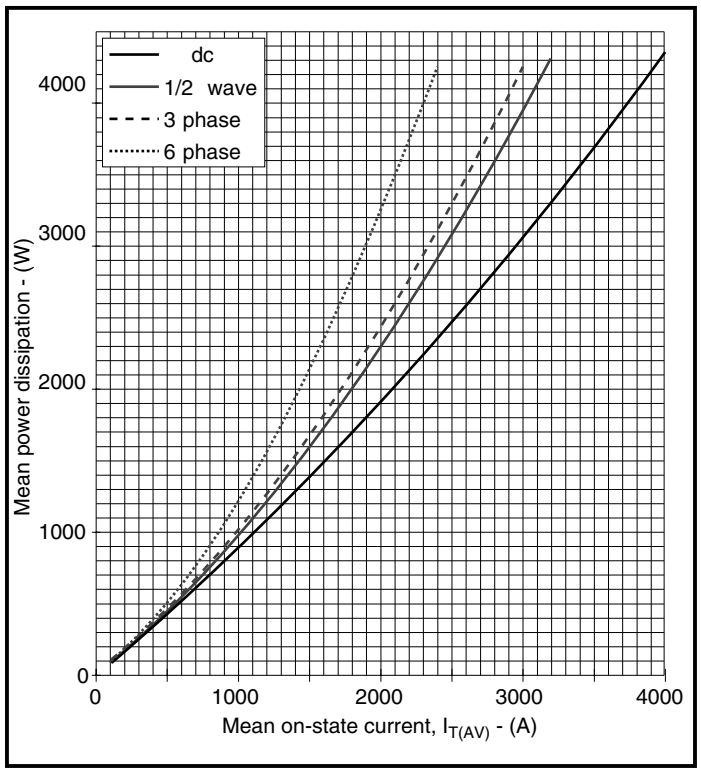


Fig. 3 Power dissipation curves

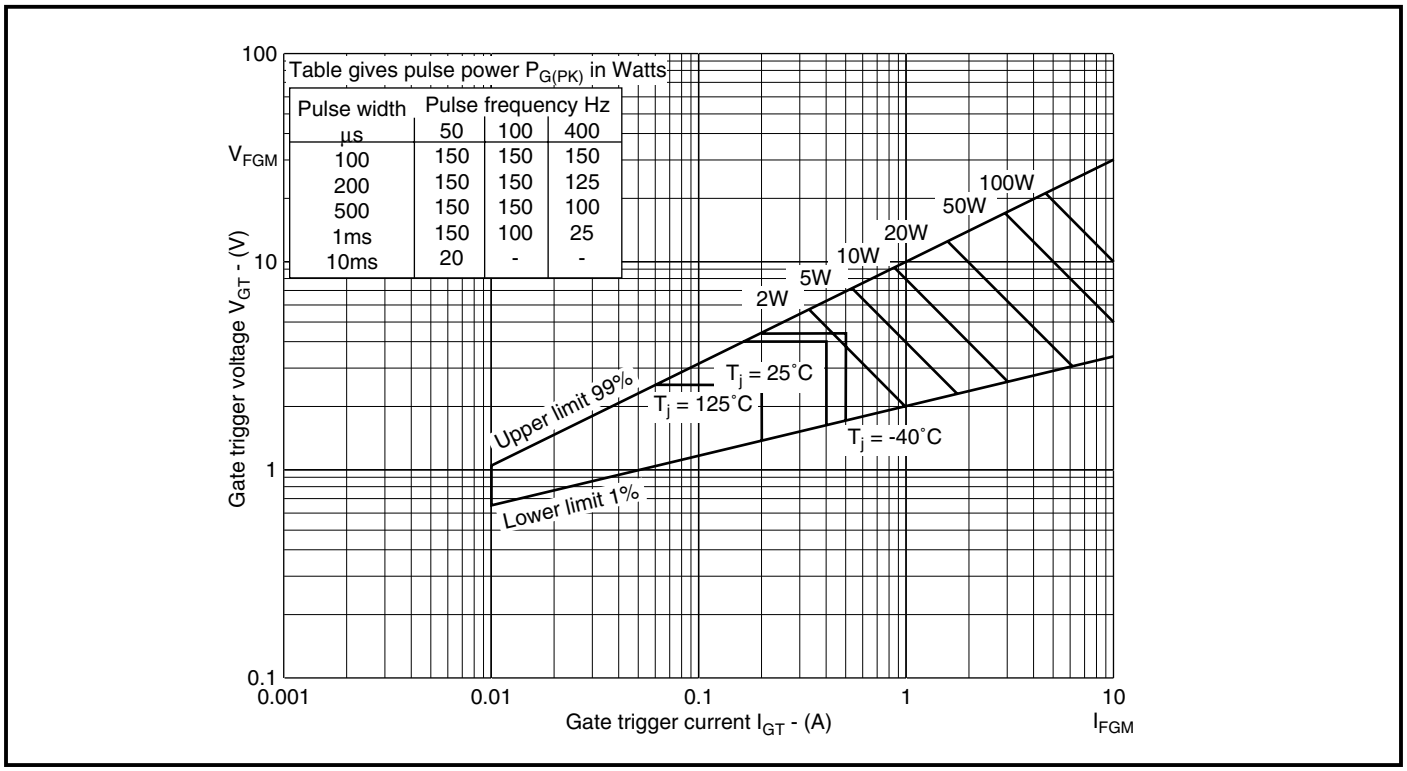
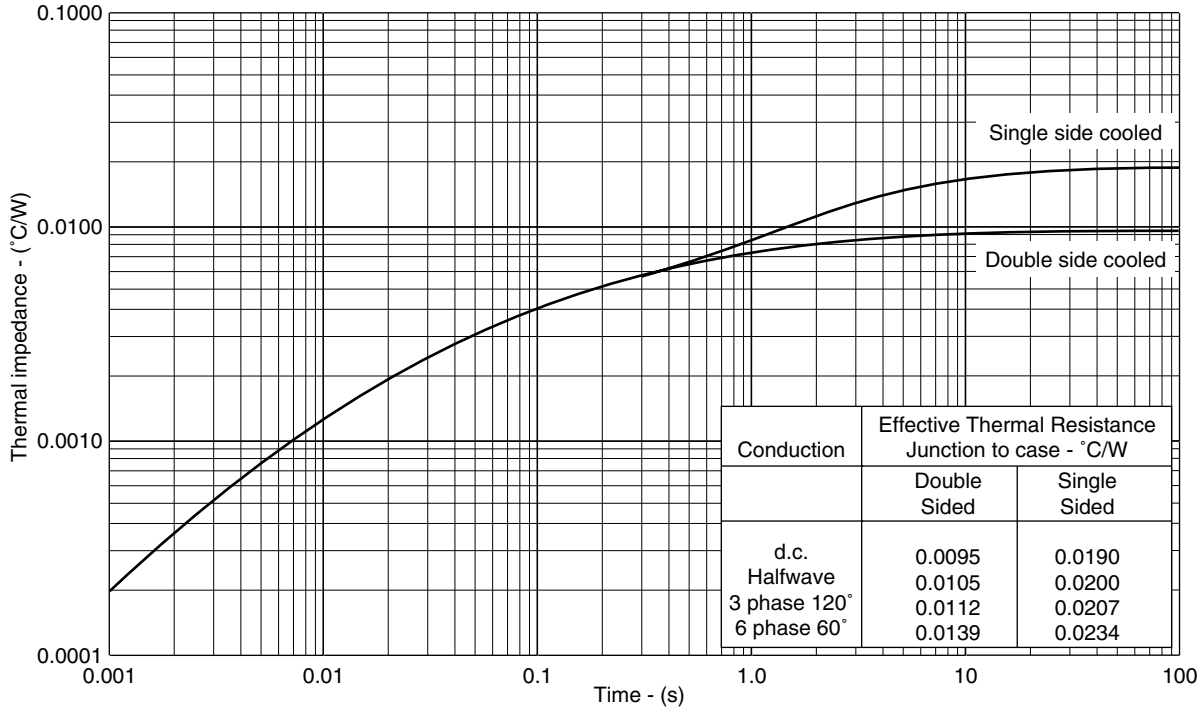


Fig. 4 Gate characteristics



Conduction	Effective Thermal Resistance Junction to case - ˚C/W	
	Double Sided	Single Sided
d.c.	0.0095	0.0190
Halfwave	0.0105	0.0200
3 phase 120˚	0.0112	0.0207
6 phase 60˚	0.0139	0.0234

Fig. 5 Maximum (limit) transient thermal impedance - junction to case

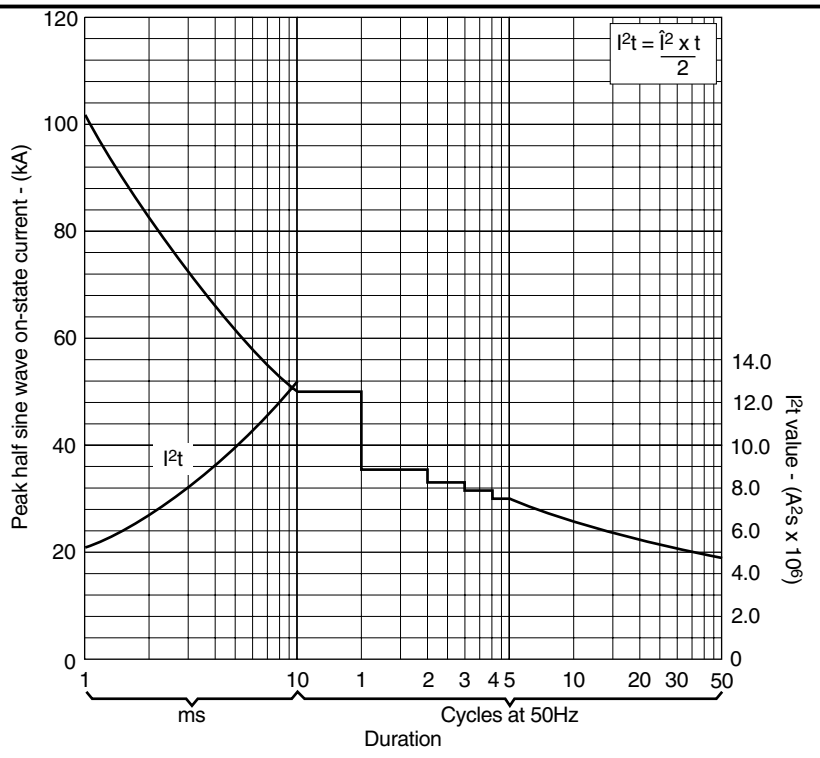
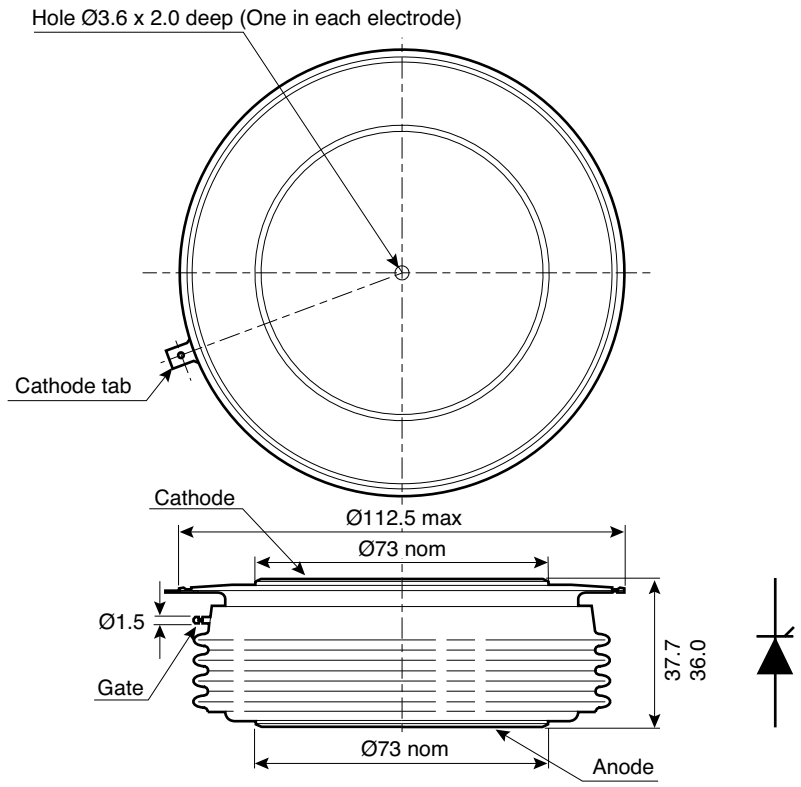


Fig. 6 Surge (non-repetitive) on-state current vs time (with 50% V_{RRM} at T_{case} = 125˚C)

PACKAGE DETAILS

For more information please contact Customer Services. All dimensions are stated in mm unless stated otherwise. DO NOT SCALE.



Nominal weight: 1600g
Clamping force: 43kN ±10%

Package outline type code: Y

Fig. 7 Package outline

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 offers 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).

HEATSINKS

The Power Assembly group has its own proprietary range of extruded aluminium heatsinks which 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 Services.

DYNEX SEMICONDUCTOR

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Target Information: This is the most tentative form of information and represents a very preliminary specification. No actual design work on the product has been started.

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.