

APPLICATIONS

- Capacitor Discharge
- Pulse Power Applications

FEATURES

- The ACR300SG33 is a high voltage asymmetric thyristor which has exceptionally fast turn-on characteristics.

VOLTAGE RATINGS

Type Number	Repetitive Peak Off-state Voltage V_{DRM} V	Repetitive Peak Reverse Voltage V_{RRM} V
ACR300SG33	3300	20

Lower voltage grades available.

KEY PARAMETERS

V_{DRM} 3300V
 $I_{T(AV)}$ 660A
 I_{TSM} 6500A
 dV/dt 3000V/ μ s
 dI/dt 2000A/ μ s
 t_{on} 700ns

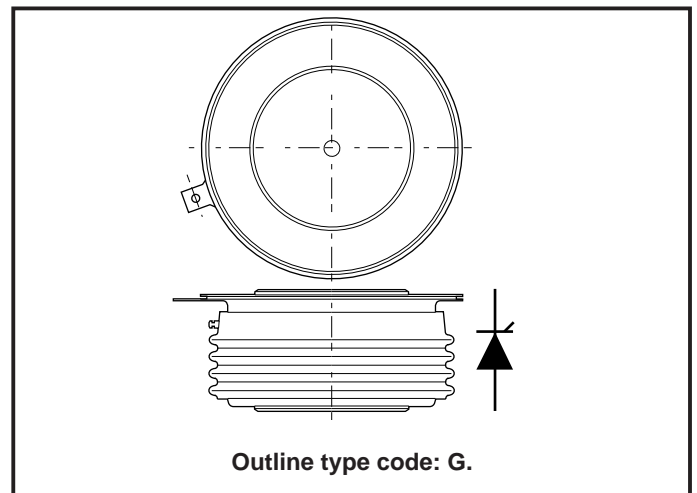


Fig. 1 See Package Details for further information

CURRENT RATINGS

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load, $T_{case} = 80^{\circ}C$	660	A
$I_{T(RMS)}$	RMS value	$T_{case} = 80^{\circ}C$	1040	A
I_T	Continuous (direct) on-state current	$T_{case} = 80^{\circ}C$	890	A
Single Side Cooled (Anode side)				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load, $T_{case} = 80^{\circ}C$	470	A
$I_{T(RMS)}$	RMS value	$T_{case} = 80^{\circ}C$	745	A
I_T	Continuous (direct) on-state current	$T_{case} = 80^{\circ}C$	570	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; $T_{case} = 125^{\circ}C$ $V_R = 0$	6	kA
I^2t	I^2t for fusing		180	kA^2s

THERMAL AND MECHANICAL DATA

Symbol	Parameter	Conditions		Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case	Double side cooled	dc	-	0.042	$^{\circ}C/W$
		Single side cooled	Anode dc	-	0.070	$^{\circ}C/W$
			Cathode dc	-	0.092	$^{\circ}C/W$
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 7.0kN 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)		-	150	$^{\circ}C$
		Reverse (blocking)		-	125	$^{\circ}C$
T_{stg}	Storage temperature range			-55	125	$^{\circ}C$
-	Clamping force			6.0	8.0	kN

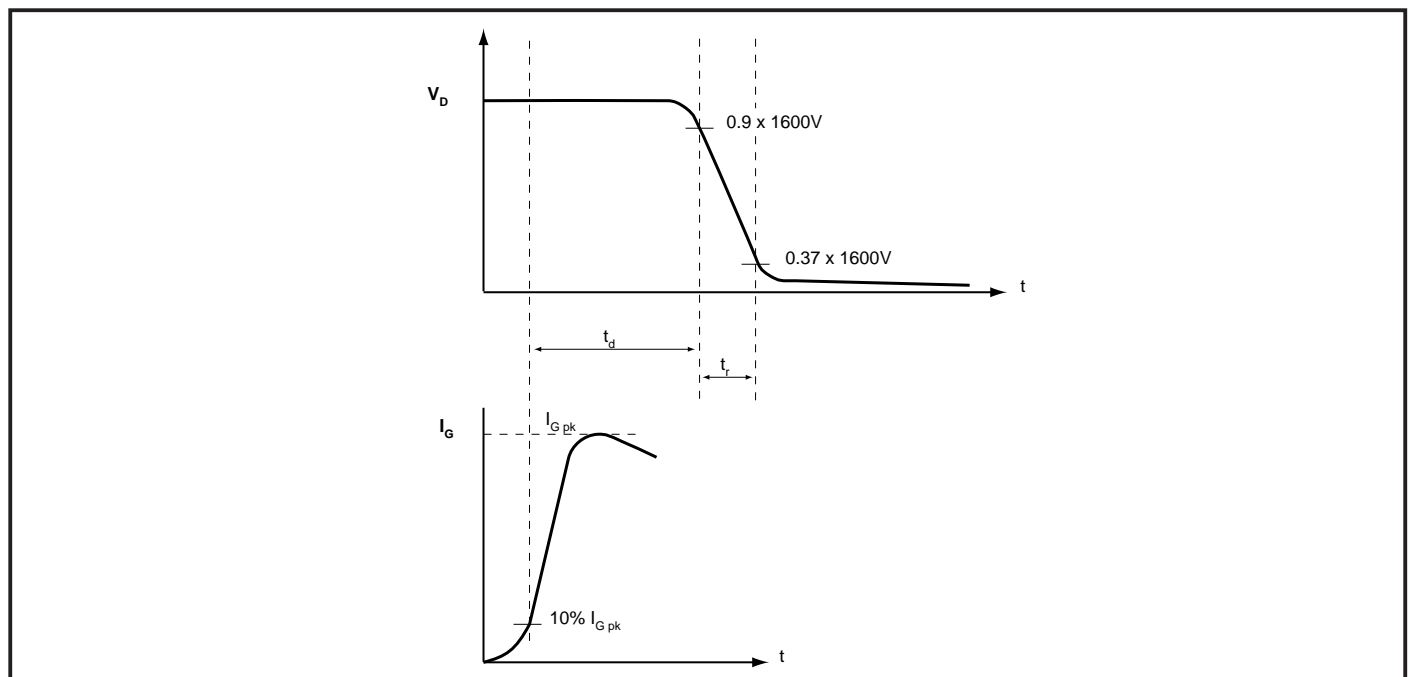


Fig.1 Turn-on time measurement

DYNAMIC CHARACTERISTICS

Symbol	Parameter	Conditions	Min.	Max.	Units	
V_{TM}	Maximum on-state voltage	At 1000A peak, $T_{case} = 25^{\circ}C$	-	2.0	V	
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM} , $T_{case} = 125^{\circ}C$	-	60	mA	
dV/dt	Linear rate of rise of off-state voltage	To $V_D = 2000V$, Gate open circuit, $T_j = 125^{\circ}C$	3000	-	V/ μ s	
dl/dt	Rate of rise of on-state current	From V_{DRM} to 125A Gate source 30V, 10 Ω Gate rise time = 100ns, $T_j = 125^{\circ}C$	-	2000	A/ μ s	
$V_{T(To)}$	Threshold voltage	At $T_{vj} = 125^{\circ}C$	-	1.19	V	
r_T	On-state slope resistance	At $T_{vj} = 125^{\circ}C$	-	0.81	m Ω	
I_L	Latching current	$V_D = 5V$, $T_j = 25^{\circ}C$	-	600	mA	
I_H	Holding current	$I_{TM} = 500A$, $I_T = 5A$, $T_j = 25^{\circ}C$	-	300	mA	
t_d	Delay time	$V_D = 3000V$ Gate source = 30V, 10 Ω Gate rise time = 100ns	$T_j = 25^{\circ}C$	-	350	ns
			$T_j = 70^{\circ}C$	-	-	ns
t_r	Rise time	See Fig.1. $T_j = 25 - 70^{\circ}C$.	-	50	ns	

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Conditions	Typ.	Max.	Units	
V_{GT}	Gate trigger voltage	$V_{DWM} = 12V$, $R_L = 6\Omega$, $T_{case} = 25^{\circ}C$	-	5	V	
I_{GT}	Gate trigger current	$V_{DWM} = 12V$, $R_L = 6\Omega$, $T_{case} = 25^{\circ}C$	-	500	mA	
V_{FGM}	Peak forward gate voltage	-	-	40	V	
V_{RGM}	Peak reverse gate voltage	-	-	10	V	
I_{FGM}	Peak forward gate current	-	-	20	A	
P_{GM}	Peak gate power	-	-	40	W	
$P_{G(AV)}$	Average gate power	Average time 10ms max	Forward	-	10	W

CURRENT CARRYING CAPABILITY AFTER CHIP SHORT CIRCUIT

In the event of a chip short-circuit due to excess anode-cathode voltage, the device will handle a high continuous RMS fault current without significant damage. Rating details are as follows:

Continuous current capability: 300A RMS, ac or dc in either direction.

Conditions:

1. Device single or double side cooled.
2. Case temperature to be held at 200 $^{\circ}C$ or less.
3. A suitable high temperature clamp to be used.
4. Chip fault site resistance assumed to be 3m $\Omega \pm 10\%$.

CURVES

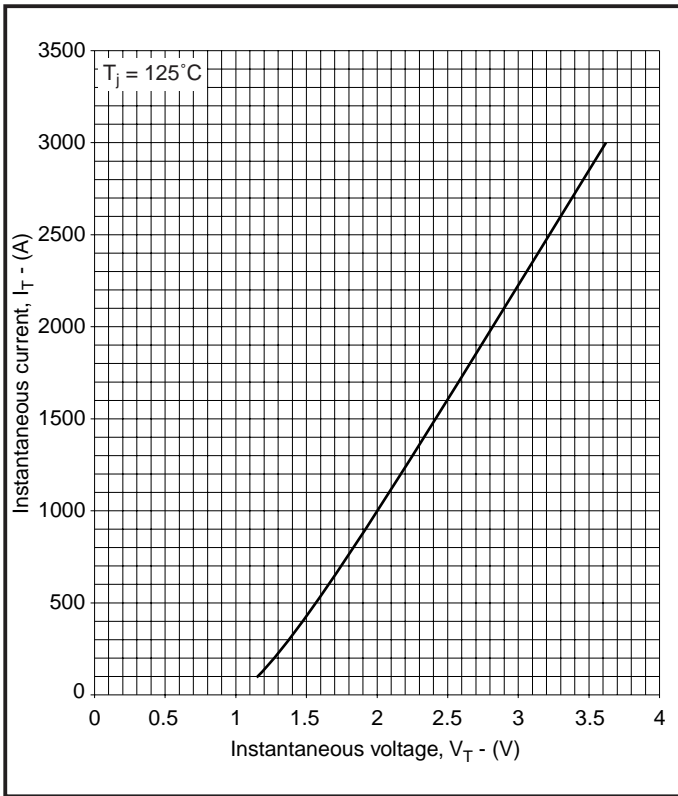


Fig.2 On-state characteristics

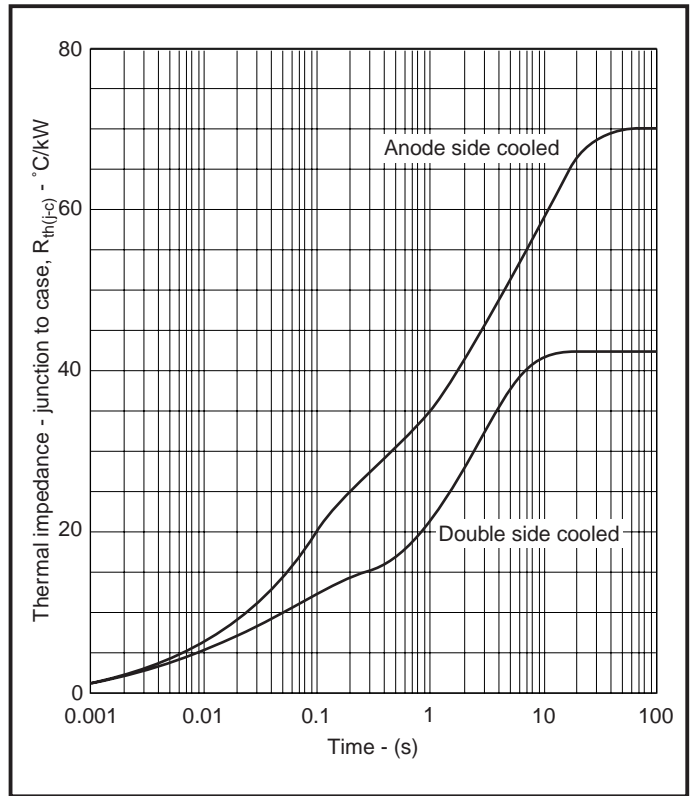


Fig.3 Transient thermal impedance - junction to case

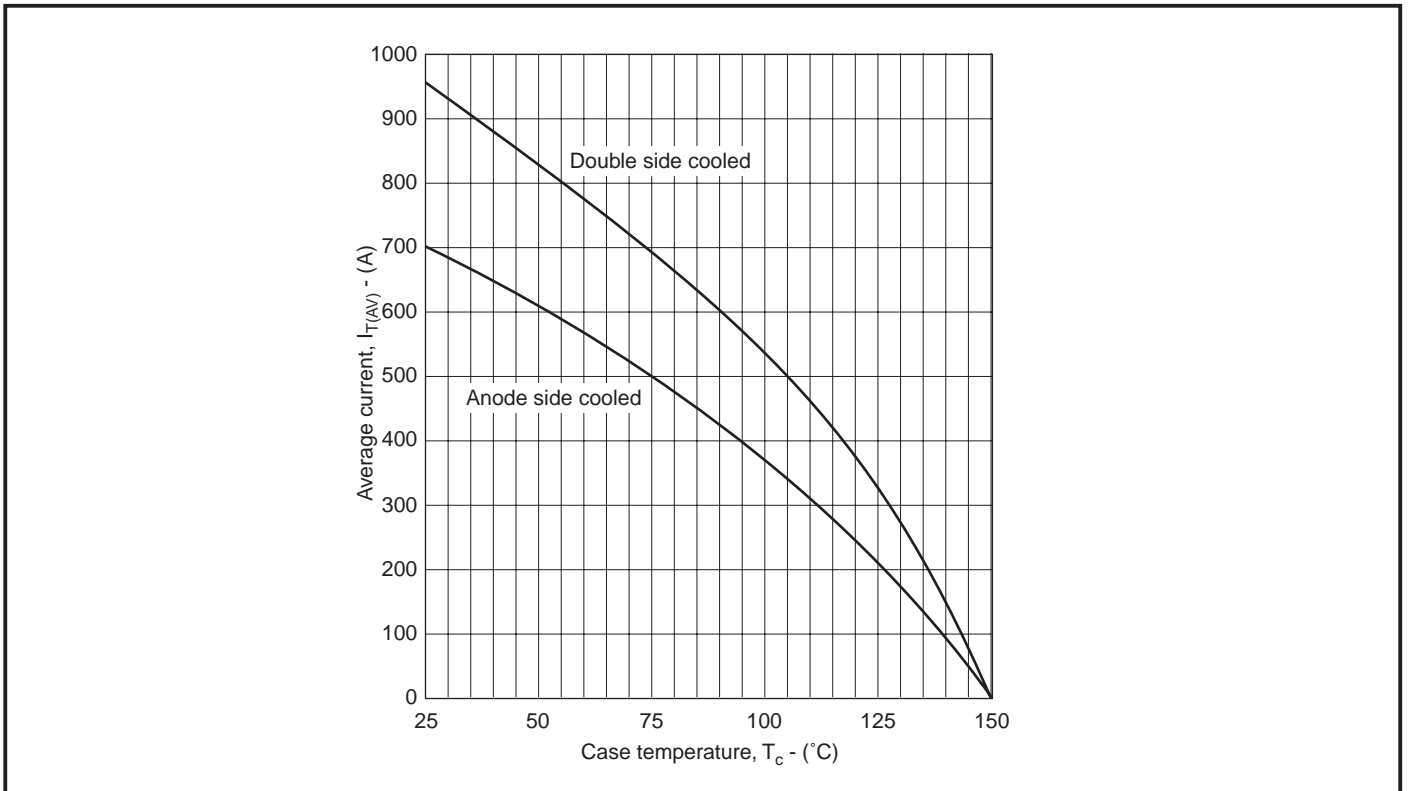
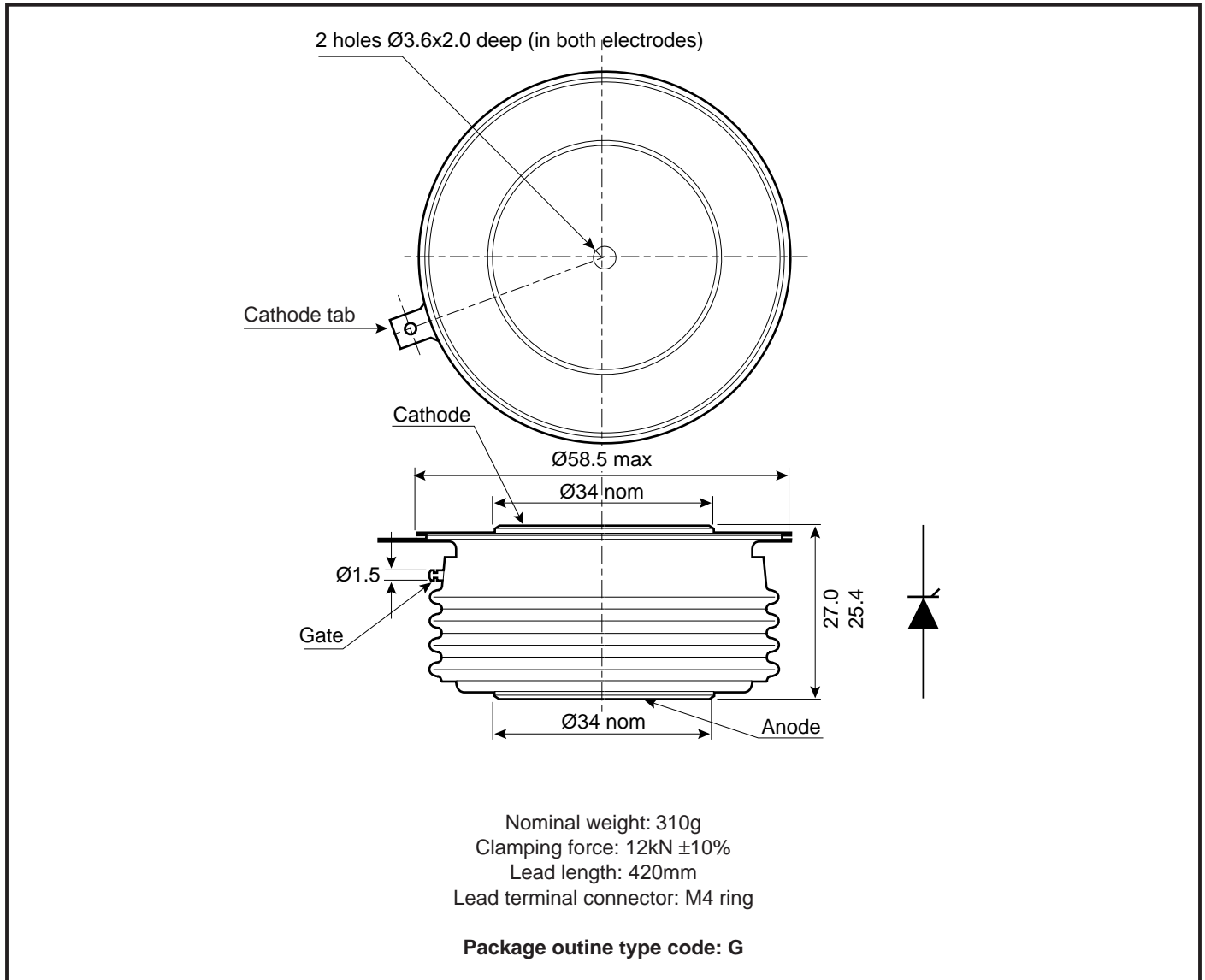


Fig.4 Average current rating vs temperature

PACKAGE DETAILS

For further package information, please contact your local Customer Service Centre. All dimensions in mm, unless stated otherwise. DO NOT SCALE.



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' 22mm 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.



<http://www.dynexsemi.com>

e-mail: power_solutions@dynexsemi.com

HEADQUARTERS OPERATIONS
DYNEX SEMICONDUCTOR LTD
 Doddington Road, Lincoln.
 Lincolnshire. LN6 3LF. United Kingdom.
 Tel: 00-44-(0)1522-500500
 Fax: 00-44-(0)1522-500550

DYNEX POWER INC.
 Unit 7 - 58 Antares Drive,
 Nepean, Ontario, Canada K2E 7W6.
 Tel: 613.723.7035
 Fax: 613.723.1518
 Toll Free: 1.888.33.DYNEX (39639)

CUSTOMER SERVICE CENTRES
Central Europe Tel: +33 (0)1 58 04 91 02. Fax: +33 (0)1 58 04 91 07
North America Tel: 011-800-5554-5554. Fax: 011-800-5444-5444
UK, Scandinavia & Rest Of World Tel: +44 (0)1522 500500. Fax: +44 (0)1522 500020

SALES OFFICES
Central Europe Tel: +33 (0)1 58 04 91 02. Fax: +33 (0)1 58 04 91 07
North America Tel: (613) 723-7035. Fax: (613) 723-1518. Toll Free: 1.888.33.DYNEX (39639) /
 Tel: (831) 440-1988. Fax: (831) 440-1989 / Tel: (949) 733-3005. Fax: (949) 733-2986.
UK, Scandinavia & Rest Of World Tel: +44 (0)1522 500500. Fax: +44 (0)1522 500020

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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.

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