MDFB51

Fast Recovery Diode

Replaces March 1999 version, DS4149-4.0 DS4148-5.0 January 2000

FEATURES

- Double side cooling
- High surge capability
- Low recovery charge

KEY PARAMETERS

V_{RRM}	2500V
$I_{F(AV)}$	2212A
I_{FSM}	24000A
Q_r	1000µC
t_{rr}	6.0µs

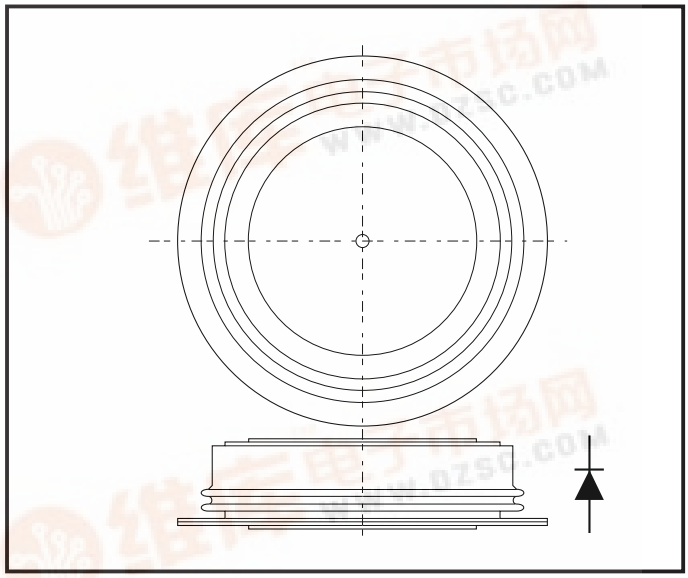
APPLICATIONS

- Freewheel Diode
- D.C. Motor Drives
- Welding
- High Frequency Rectification
- Power Supplies

VOLTAGE RATINGS

Type Number	Repetitive Peak Reverse Voltage V_{RRM} V	Conditions
MDFB51 25 MDFB51 24 MDFB51 22 MDFB51 20	2500 2400 2200 2000	$V_{RSM} = V_{RRM} + 100V$

Lower voltage grades available.



Outline type code: CB486.
See Package Details for further information.

CURRENT RATINGS

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, T_{case} = 65°C	2212	A
$I_{F(RMS)}$	RMS value	T_{case} = 65°C	3850	A
I_F	Continuous (direct) forward current	T_{case} = 65°C	3560	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, T_{case} = 65°C	1627	A
$I_{F(RMS)}$	RMS value	T_{case} = 65°C	2555	A
I_F	Continuous (direct) forward current	T_{case} = 65°C	2272	A

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SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; with 0% $V_{RRM,}$ T_j = 150°C	24.0	kA
I^2t	I^2t for fusing		2880×10^3	A^2s
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; with 50% $V_{RRM,}$ T_j = 150°C	19.2	kA
I^2t	I^2t for fusing		1843×10^3	A^2s

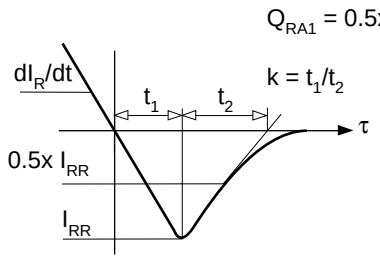
THERMAL AND MECHANICAL DATA

Symbol	Parameter	Conditions		Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case	Double side cooled	dc	-	0.011	°C/W
		Single side cooled	Anode dc	-	0.021	°C/W
			Cathode dc	-	0.023	°C/W
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 44.0kN with mounting compound	Double side	-	0.03	°C/W
			Single side	-	0.06	°C/W
T_{vj}	Virtual junction temperature	Foward (conducting)		-	150	°C
T_{stg}	Storage temperature range			–55	175	°C
-	Clamping force			40.0	44.0	kN

CHARACTERISTICS

Symbol	Parameter	Conditions	Typ.	Max.	Units
V_{FM}	Forward voltage	At 1500A peak, T_{case} = 25°C	-	1.6	V
I_{RRM}	Peak reverse current	At V_{RRM}, T_{case} = 150°C	-	100	mA
t_{rr}	Reverse recovery time	I_F = 1000A, di_{RR}/dt = 100A/µs T_{case} = 150°C, V_R = 100V	6.0	-	µs
Q_{RA1}	Recovered charge (50% chord)		-	1000	µC
I_{RM}	Reverse recovery current		-	400	A
K	Soft factor		1.8	-	-
V_{TO}	Threshold voltage	At T_{vj} = 150°C	-	1.1	V
r_T	Slope resistance	At T_{vj} = 150°C	-	0.3	mΩ
V_{FRM}	Forward recovery voltage	di/dt = 1000A/µs, T_j = 125°C	-	40	V

DEFINITION OF K FACTOR AND Q_{RA1}



CURVES

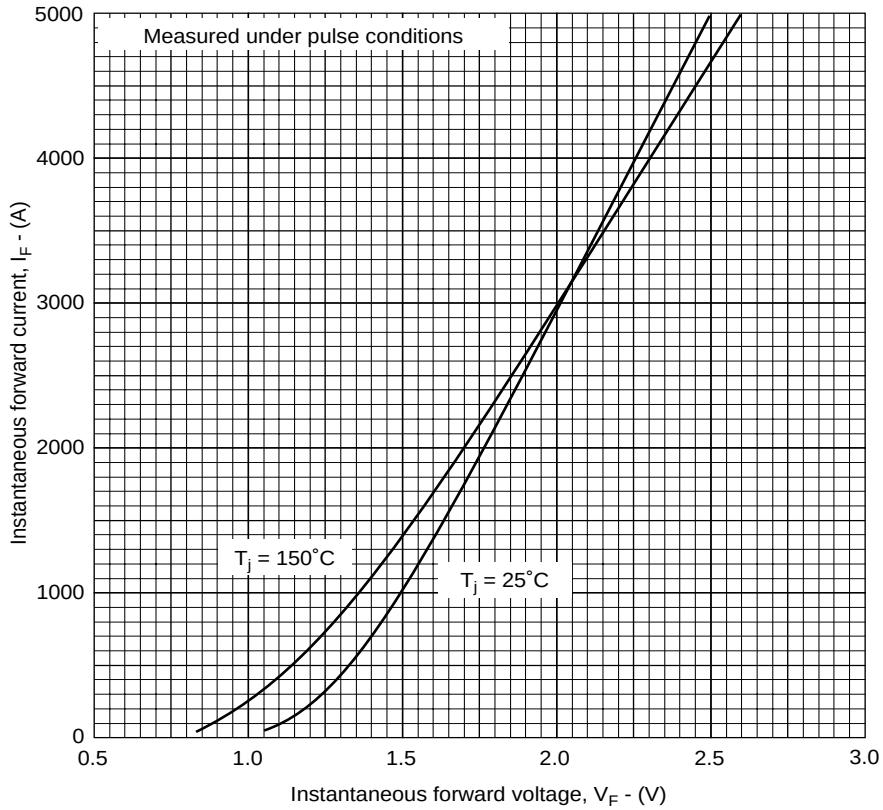


Figure 1 Maximim (limit) forward characteristics

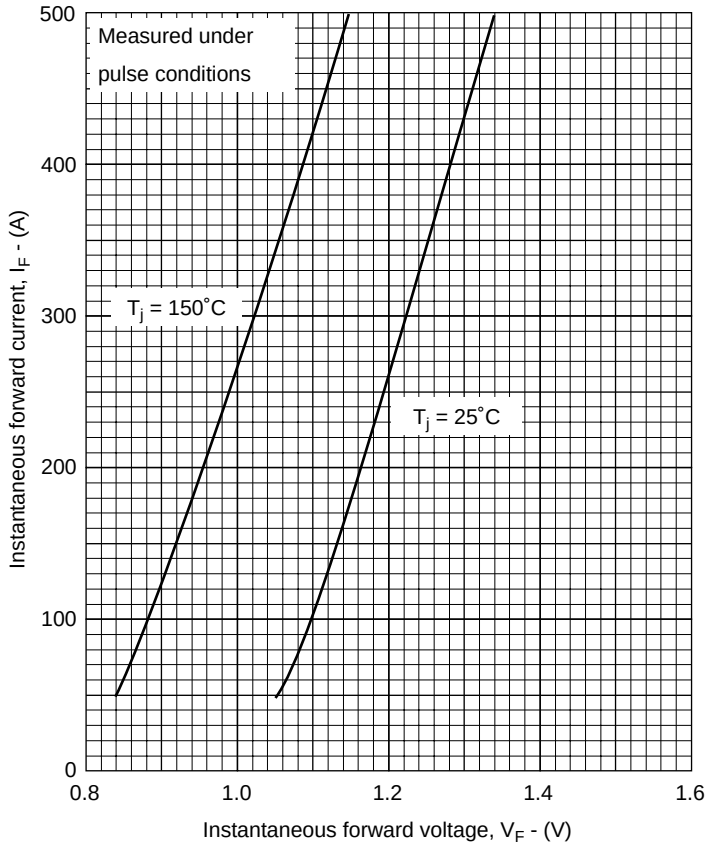


Figure 2 Maximim (limit) forward characteristics

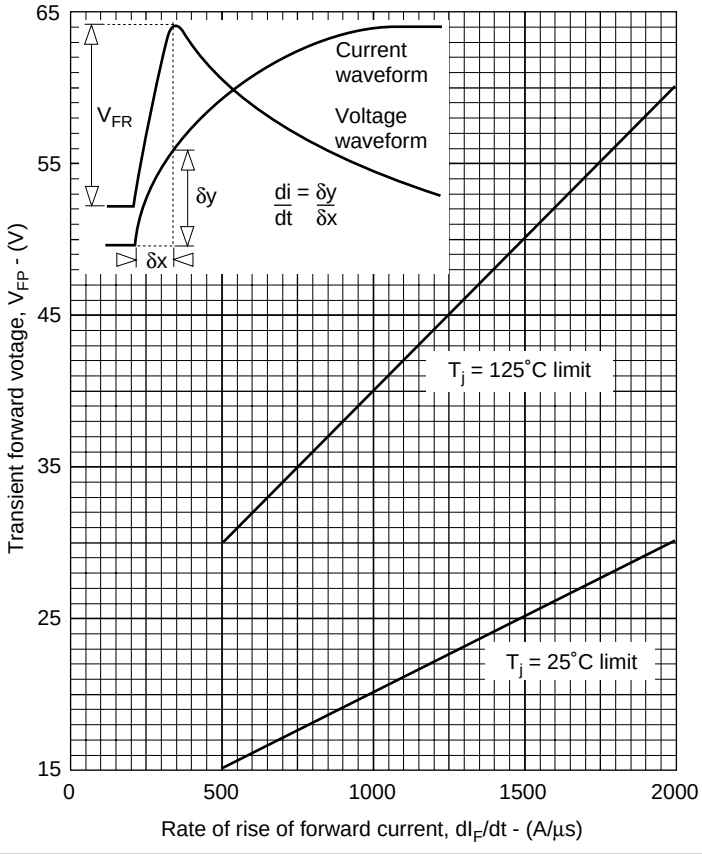


Figure 3 Transient forward voltage vs rate of rise of forward current

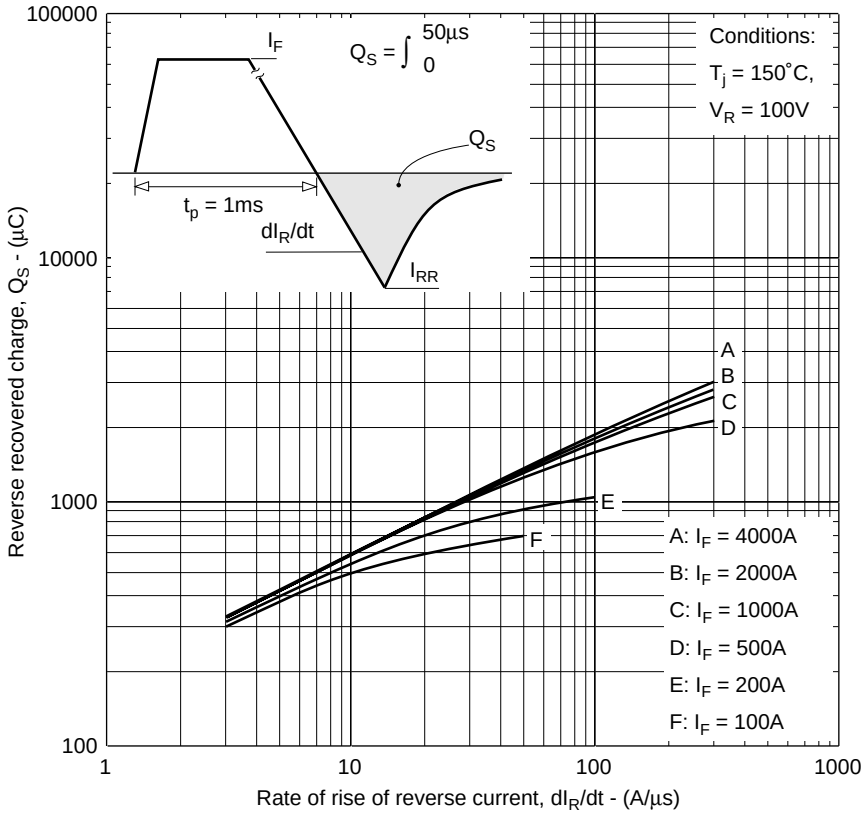


Figure 4 Recovered charge

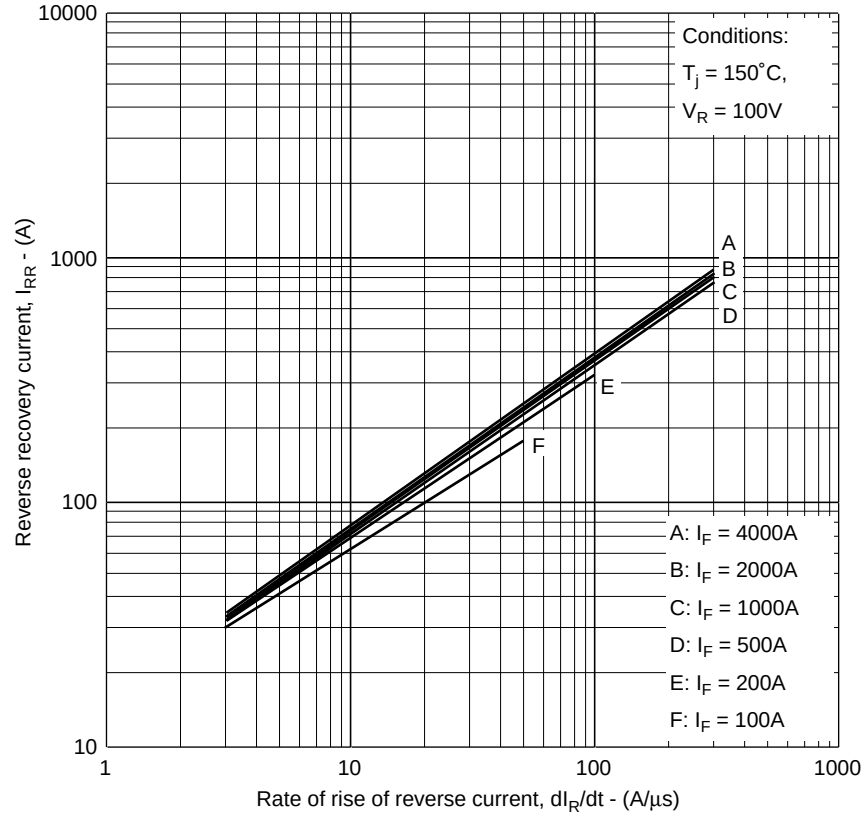


Figure 5 Maximum reverse recovery current vs rate of fall of forward current

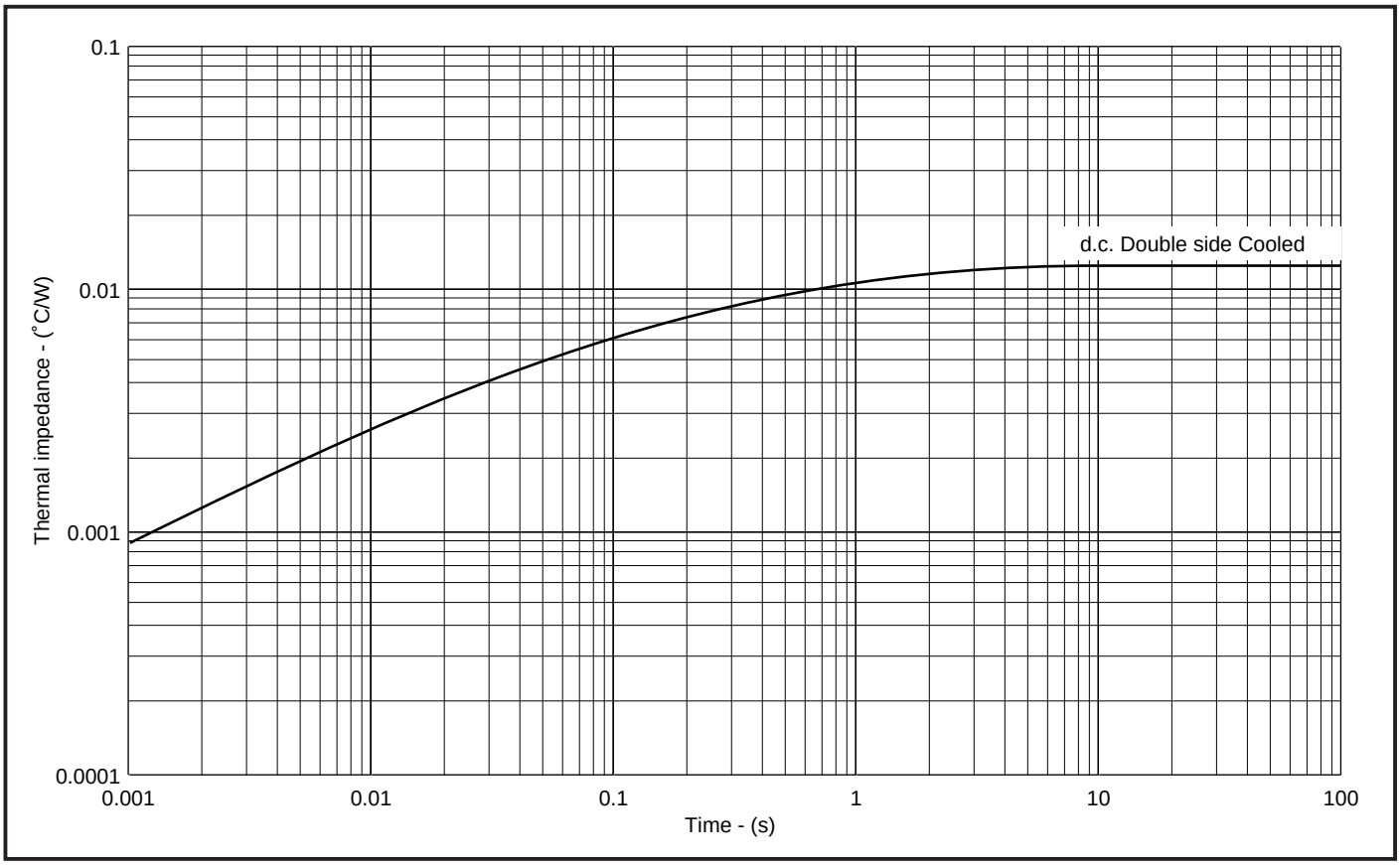
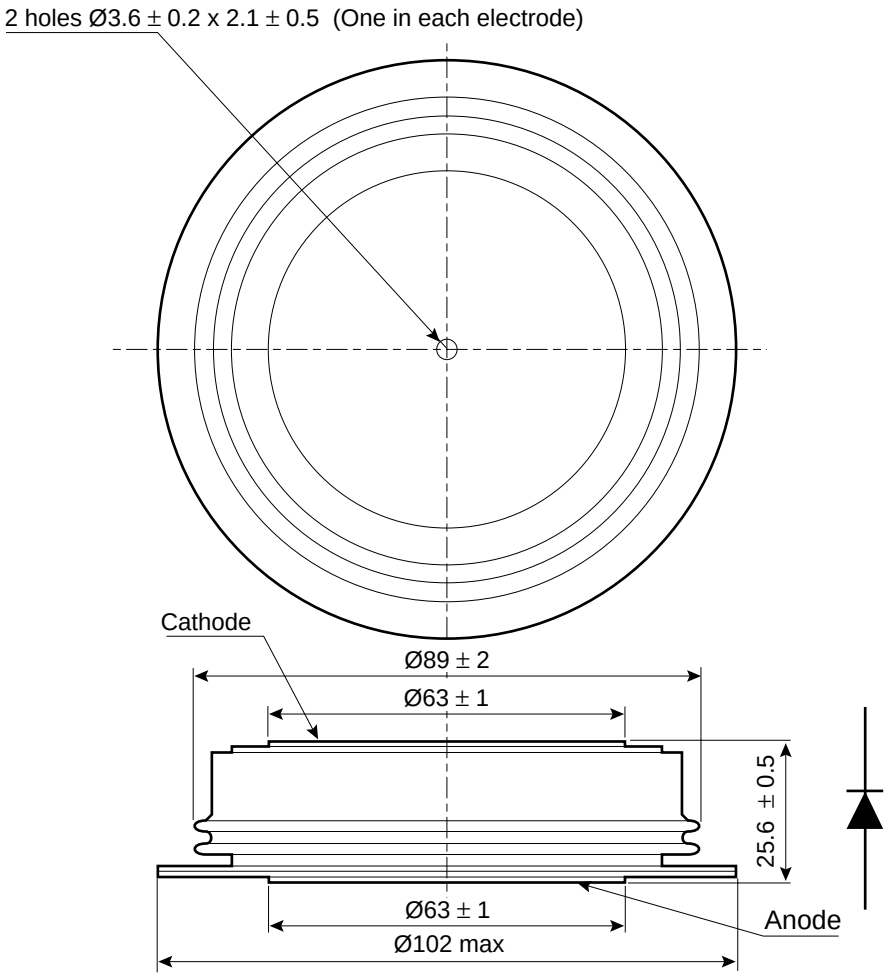


Figure 6 Maximum (limit) transient thermal impedance - junction to case

Package Details

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



Nominal weight: 1100g
Clamping force: 40kN ±10%

Package outine type code: CB486

ASSOCIATED PUBLICATIONS

Title	Application Note Number
Calculating the junction temperature or power semiconductors	AN4506
Recommendations for clamping power semiconductors	AN4839
Thyristor and diode measurement with a multi-meter	AN4853
Use of V_{TO}, r_T on-state characteristic	AN5001

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 it's own proprietary range of extruded aluminium heatsinks. They have been designed to optimise the performance or 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 the factory.

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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.