MP02XX130 Series

Dual Diode Modules

Replaces January 2000 version, DS5100-4.0

DS5100-5.0 July 2002

FEATURES

- Dual Device Module
- Electrically Isolated Package
- Pressure Contact Construction
- International Standard Footprint
- Alumina (non-toxic) Isolation Medium

KEY PARAMETERS

V_{RRM}	**2500V**
I_{FSM}	**2200A**
$I_{F(AV)(per\ arm)}$	**130A**
V_{isol}	**3000V**

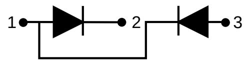
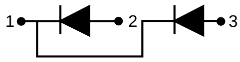
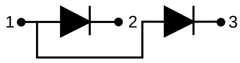
Code	Circuit
HB	
G	
GN	

Fig.1 Circuit diagrams

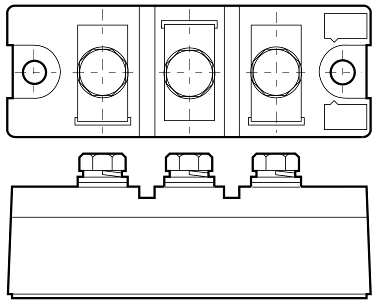
APPLICATIONS

- Rectifier Bridges
- DC Power Supplies
- Plating Rectifiers
- Traction Systems

VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages V_{DRM} V_{RRM}	Conditions
MP02XX130-25	2500	T_{vj} = 150°C
MP02XX130-24	2400	$I_{DRM} = I_{RRM}$ = 30mA
MP02XX130-22	2200	V_{DSM} & V_{RSM} =
MP02XX130-20	2000	V_{DRM} & V_{RRM} + 100V
MP02XX130-18	1800	respectively

Lower voltage grades available.



Module type code: MP02.
For further information see Package Details.

Fig. 2 Electrical connections - (not to scale)

ORDERING INFORMATION

Order As:

MP02HB130-25 or **MP02HB130-24** or **MP02HB130-22** or **MP02HB130-20** or **MP02HB130-18**

MP02G130-25 or **MP02G130-24** or **MP02G130-22** or **MP02G130-20** or **MP02G130-18**

MP02GN130-25 or **MP02GN130-24** or **MP02GN130-22** or **MP02GN130-20** or **MP02GN130-18**

Note: When ordering, please use the complete part number.

ABSOLUTE MAXIMUM RATINGS - PER ARM

Stresses above those listed under 'Absolute Maximum Ratings' may cause permanent damage to the device. In extreme conditions, as with all semiconductors, this may include potentially hazardous rupture of the package. Appropriate safety precautions should always be followed. Exposure to Absolute Maximum Ratings may affect device reliability.

Symbol	Parameter	Test Conditions		Max.	Units
$I_{F(AV)}$	Mean forward current	Half wave resistive load	T_{case} = 75˚C	130	A
			T_{case} = 85˚C	116	A
$I_{F(RMS)}$	RMS value	T_{case} = 75˚C		204	A
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine, T_j = 150˚C		2.2	kA
I^2t	I^2t for fusing	V_R = 0		24.2x 10^3	A^2s
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine, T_j = 150˚C		1.76	kA
I^2t	I^2t for fusing	V_R = 50% V_{DRM}		15.49 x 10^3	A^2s
V_{isol}	Isolation voltage	Commoned terminals to base plate. AC RMS, 1 min, 50Hz		3000	V

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Test Conditions	Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case	dc	-	0.37	˚C/kW
	(per thyristor or diode)	Half wave	-	0.38	˚C/kW
		3 Phase	-	0.39	˚C/kW
$R_{th(c-hs)}$	Thermal resistance - case to heatsink (per thyristor or diode)	Mounting torque = 6Nm with mounting compound	-	0.07	˚C/kW
T_{vj}	Virtual junction temperature	Reverse (blocking)	-	150	˚C
T_{stg}	Storage temperature range	-	–40	150	˚C
-	Screw torque	Mounting - M6	-	6 (55)	Nm (lb.ins)
		Electrical connections - M6	-	5 (44)	Nm (lb.ins)
-	Weight (nominal)	-	-	350	g

DYNAMIC CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Max.	Units
I_{RRM}	Peak reverse current	At V_{RRM}, T_j = 150˚C	-	30	mA
V_{TO}	Threshold voltage	At T_{vj} = 150˚C. See note 1	-	1.1	V
r_T	Forward slope resistance	At T_{vj} = 150˚C. See note 1	-	1.3	mΩ

Note 1: The data given in this datasheet with regard to forward voltage drop is for calculation of the power dissipation in the semiconductor elements only. Forward voltage drops measured at the power terminals of the module will be in excess of these figures due to the impedance of the busbar from the terminal to the semiconductor.

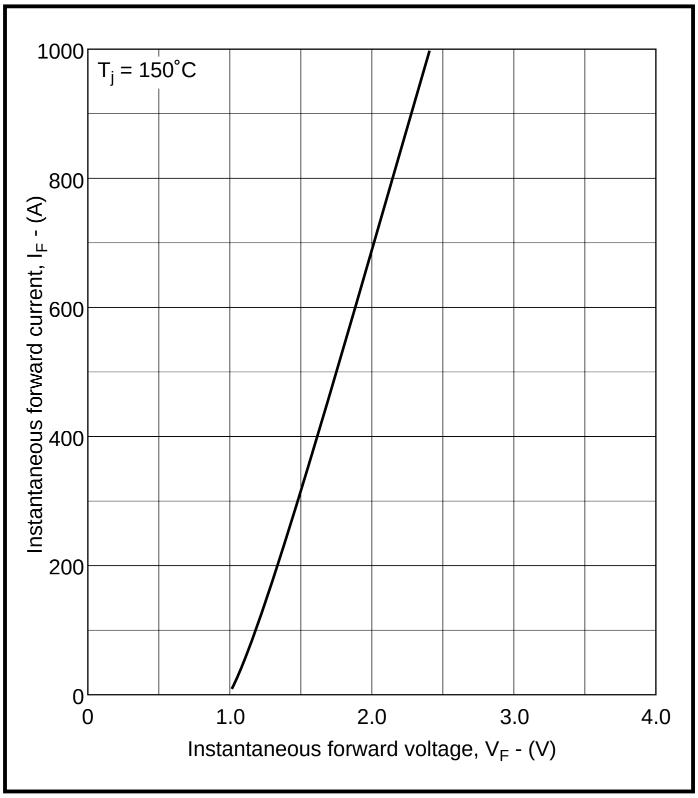


Fig. 3 Maximum (limit) forward characteristics

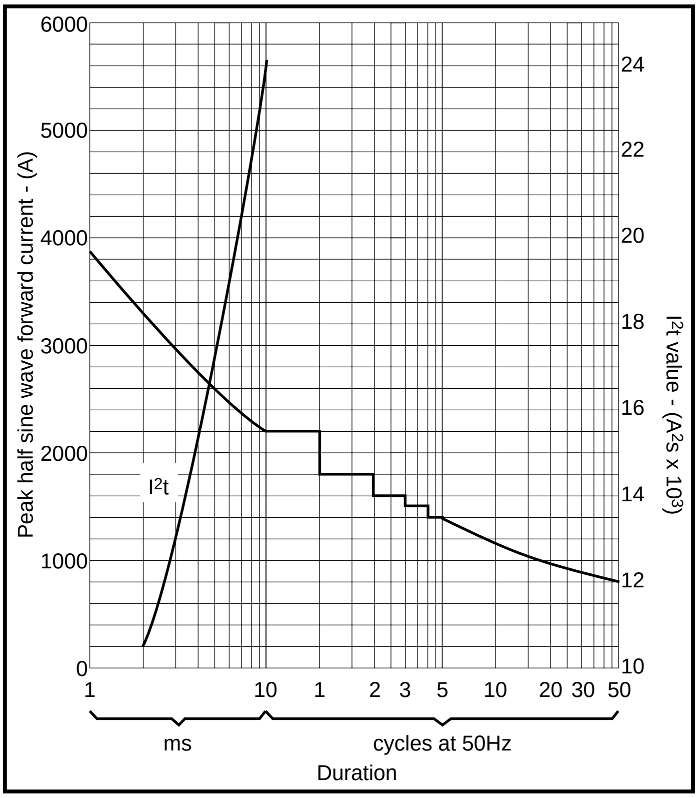


Fig. 4 Surge (non-repetitive) forward current vs time (With 50% V_{RRM} at T_{case} = 150˚C)

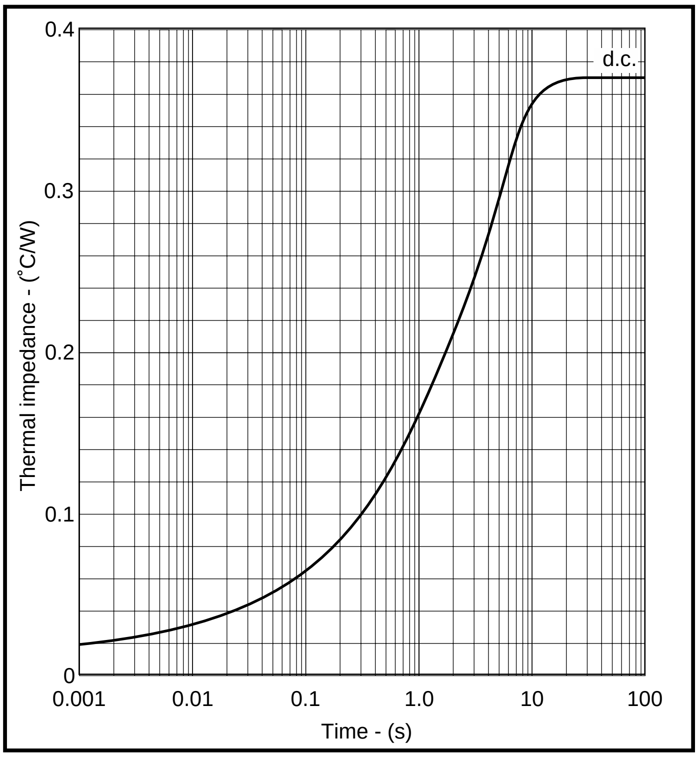


Fig. 5 Transient thermal impedance - dc (per diode)

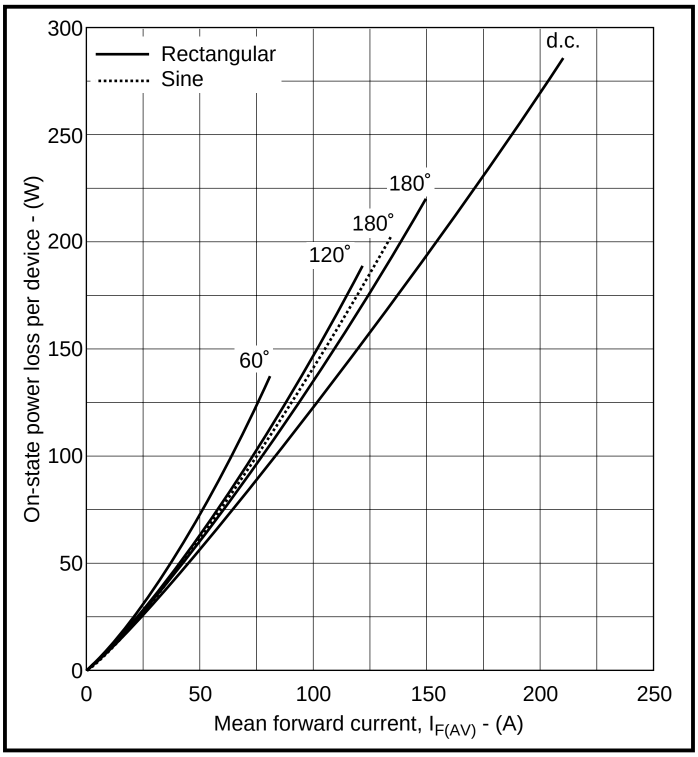


Fig. 6 On-state power loss per arm vs forward current at various conduction angles, 50/60Hz

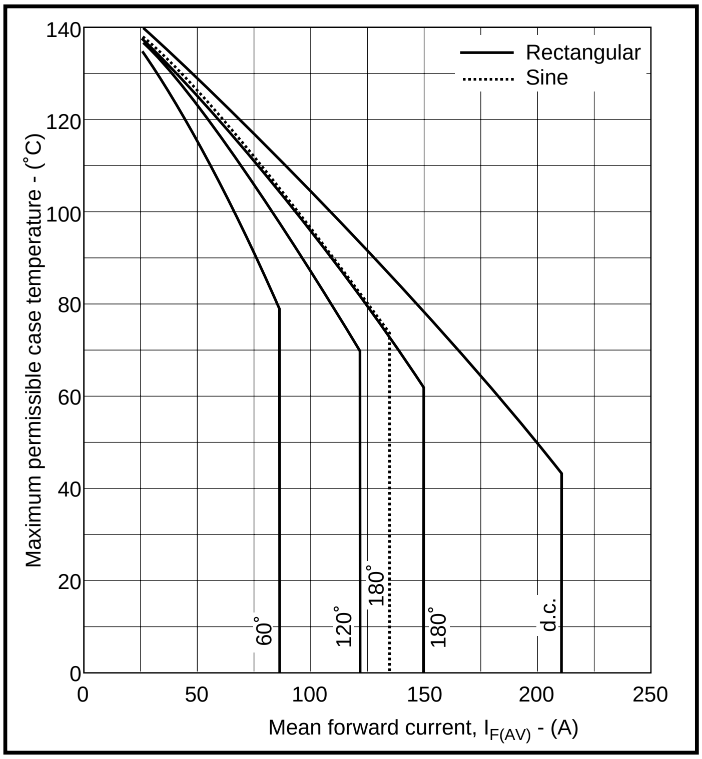


Fig. 7 Maximum permissible case temperature vs forward current per arm at various conduction angles, 50/60Hz

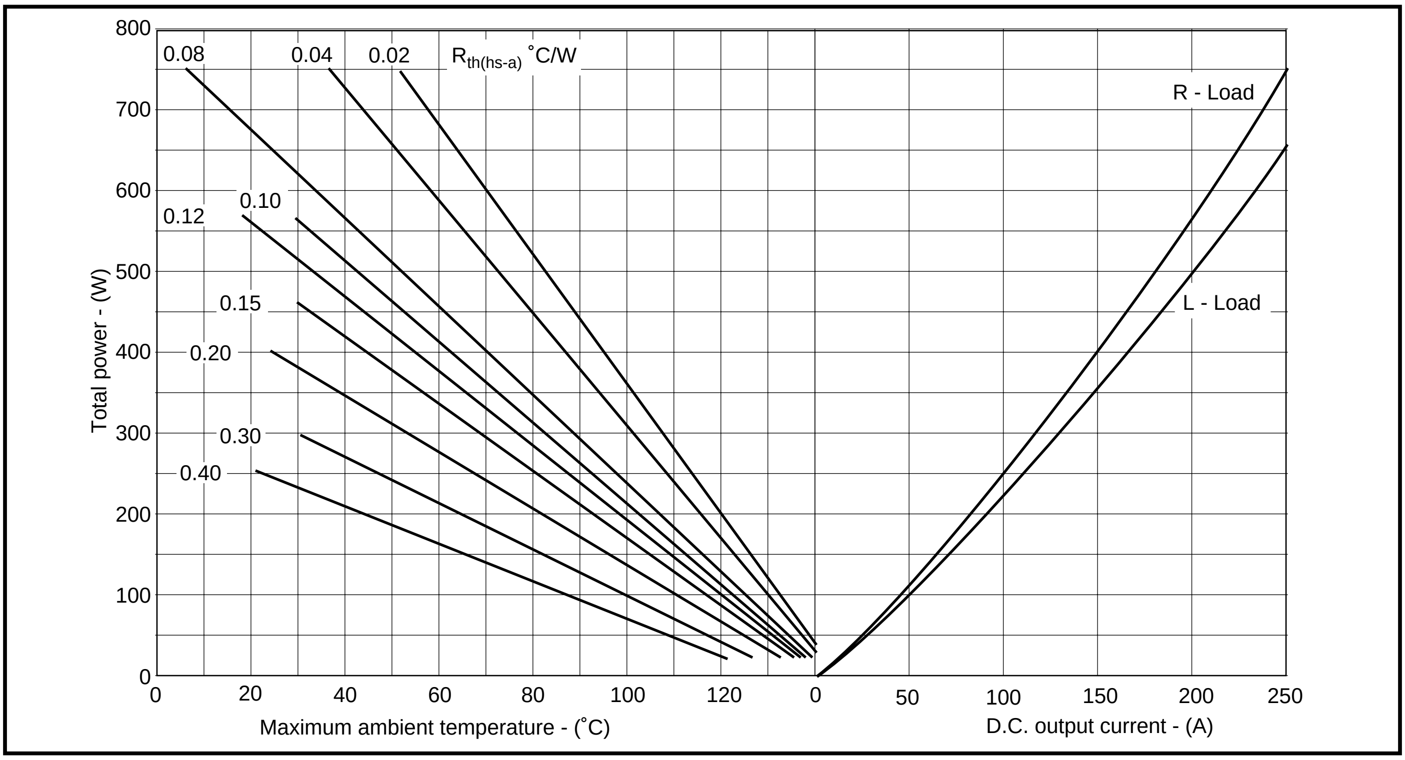


Fig. 8 50/60Hz single phase bridge dc output current vs power loss and maximum permissible ambient temperature for various values of heatsink thermal resistance.

(Note: $R_{th(hs-a)}$ values given above are true heatsink thermal resistances to ambient and already account for $R_{th(c-hs)}$ module contact thermal).

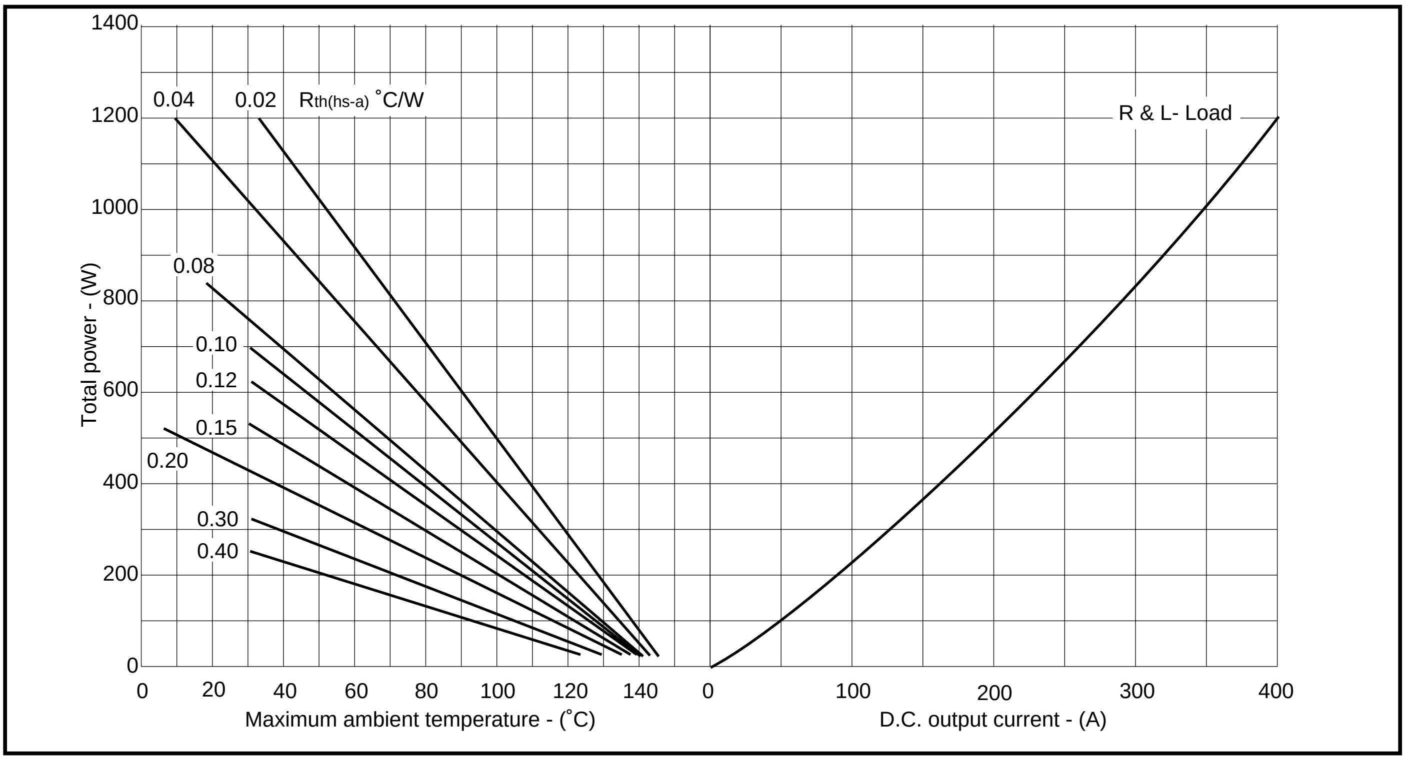
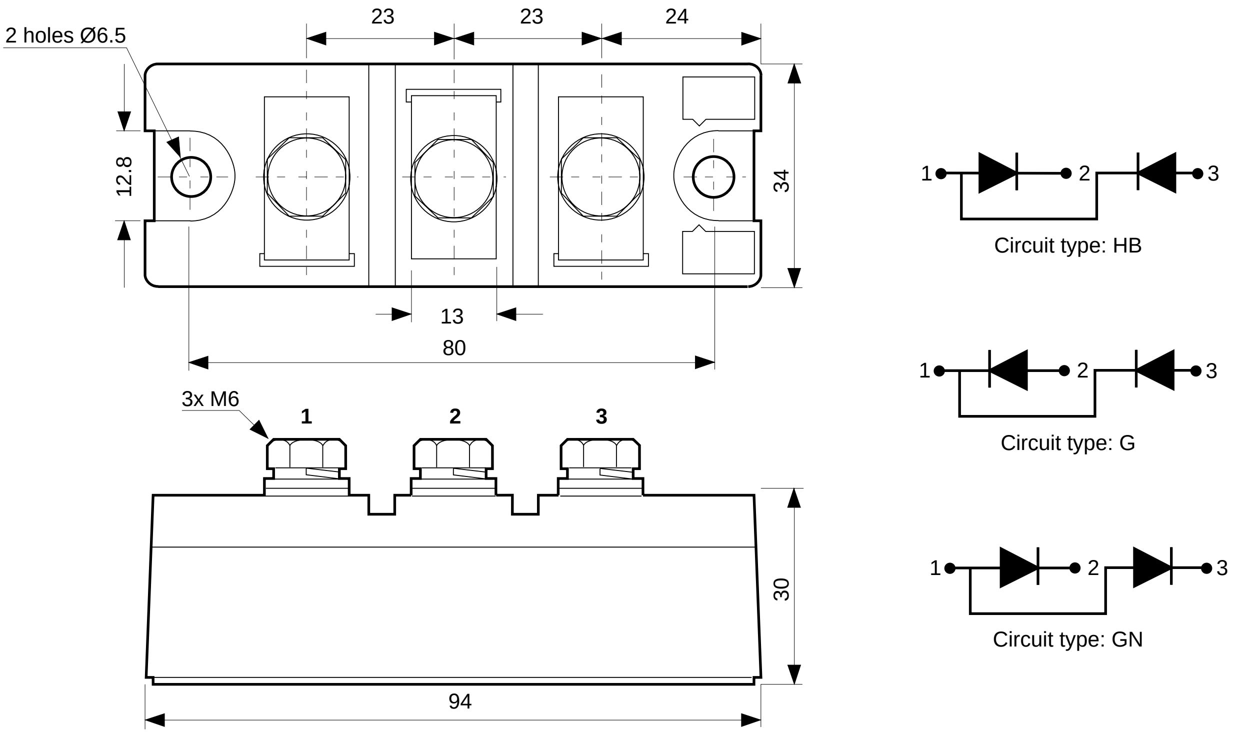


Fig. 7 50/60Hz 3- phase bridge dc output current vs power loss and maximum permissible ambient temperature for various values of heatsink thermal resistance.

(Note: $R_{th(hs-a)}$ values given above are true heatsink thermal resistances to ambient and already account for $R_{th(c-hs)}$ module contact thermal).

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.



Nominal weight: 350g
Recommended fixings for mounting: M6 socket head cap screws
Recommended mounting torque: 6Nm (55lb.ins)
Recommended torque for electrical connections: 5Nm (44lb.ins)
Maximum torque for electrical connections: 8Nm (70lb.ins)

Module outline type code: MP02

MOUNTING RECOMMENDATIONS

Adequate heatsinking is required to maintain the base temperature at 75°C if full rated current is to be achieved. Power dissipation may be calculated by use of $V_{T(TO)}$ and r_T information in accordance with standard formulae. We can provide assistance with calculations or choice of heatsink if required.

The heatsink surface must be smooth and flat; a surface finish of N6 (32µin) and a flatness within 0.05mm (0.002") are recommended.

Immediately prior to mounting, the heatsink surface should be lightly scrubbed with fine emery, Scotch Brite or a mild chemical etchant and then cleaned with a solvent to remove oxide build up and foreign material. Care should be taken to ensure no foreign particles remain.

An even coating of thermal compound (eg. Unial) should be applied to both the heatsink and module mounting surfaces. This should ideally be 0.05mm (0.002") per surface to ensure optimum thermal performance.

After application of thermal compound, place the module squarely over the mounting holes, (or 'T' slots) in the heatsink. Fit and finger tighten the recommended fixing bolts at each end. Using a torque wrench, continue to tighten the fixing bolts by rotating each bolt in turn no more than 1/4 of a revolution at a time, until the required torque of 6Nm (55lbs.ins) is reached on all bolts at both ends.

It is not acceptable to fully tighten one fixing bolt before starting to tighten the others. Such action may DAMAGE the module.

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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Dynex Semiconductor annotate datasheets in the top right hard corner of the front page, to indicate product status. The annotations are as follows:-

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.