MP03 XX 440 Series

Dual Diode Modules

Supersedes October 1992 version, 1.0

DS5106-2.0 December 1998

FEATURES

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

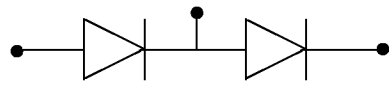
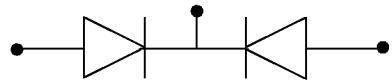
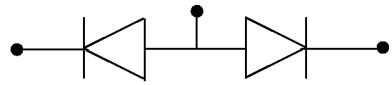
KEY PARAMETERS

V_{RRM}	2100V
I_{FSM}	11250A
$I_{F(AV)}$(per arm)	440A
V_{isol}	2500V

APPLICATIONS

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

CIRCUIT OPTIONS

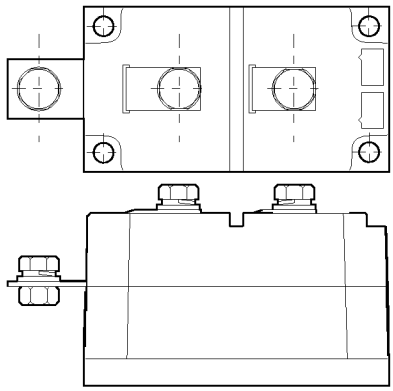
Code	Circuit
HB	
G	
GN	

VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages V_{RRM}	Conditions
MP03/440 - 21	2100	T_{vj} = 150°C
MP03/440 - 20	2000	I_{RM} = 30mA
MP03/440 - 18	1800	$V_{RSM} = V_{RRM} + 100V$
MP03/440 - 16	1600	respectively

Lower voltage grades available. For full description of part number see "Ordering Instructions" on page 3.

PACKAGE OUTLINE



Module type code: MP03.

For further outline information turn to page 9.

CURRENT RATINGS - PER ARM

Symbol	Parameter	Conditions		Max.	Units
$I_{F(AV)}$	Mean forward current	Halfwave, resistive load	T_{case} = 75°C	440	A
			T_{case} = 85°C	390	A
			$T_{heatsink}$ = 75°C	340	A
			$T_{heatsink}$ = 85°C	300	A
$I_{F(RMS)}$	RMS value	T_{case} = 75°C		690	A

SURGE RATINGS - PER ARM

Symbol	Parameter	Conditions		Max.	Units
I_{FSM}	Surge (non-repetitive) on-state current	10ms half sine; T_j = 150°C	V_R = 0	11250	A
			V_R = 50% V_{RRM}	9000	A
I^2t	I^2t for fusing	10ms half sine; T_j = 150°C	V_R = 0	630000	A^2s
			V_R = 50% V_{RRM}	405000	A^2s

THERMAL & MECHANICAL RATINGS

Symbol	Parameter	Conditions	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case per Diode	dc	0.12	°C/W
		halfwave	0.13	°C/W
		3 phase	0.14	°C/W
$R_{th(c-hs)}$	Thermal resistance - case to heatsink per Diode	Mounting torque = 5Nm with mounting compound	0.05	°C/W
T_{vj}	Virtual junction temperature		150	°C
T_{sto}	Storage temperature range		-40 to 150	°C
V_{isol}	Isolation voltage	Commoned terminals to base plate AC RMS, 1min, 50Hz	2.5	kV

CHARACTERISTICS

Symbol	Parameter	Conditions	Max.	Units
V_{FM}	Forward voltage	At 1000A , T_{case} = 25°C	1.29	V
I_{RM}	Peak reverse current	At V_{RRM}, T_j = 150°C	30	mA
V_{TO}	Threshold voltage	At T_{vj} = 150°C	0.94	V
r_T	On-state slope resistance	At T_{vj} = 150°C	0.32	mΩ

ORDERING INSTRUCTIONS

Part number is made up as follows:

MP03 HB 440 - 18

MP = Pressure contact module
03 = Outline type
HB = Circuit configuration code (see "circuit options" - front page)
440 = Nominal average current rating at T_{case} = 75°C
18 = V_{RRM}/100

Examples:

MP03HB440 - 21
MP03G440 - 16
MP03GN440 - 18

Note: Prefered type is HB configuration. G and GN types are available for specific applications, only when requested.

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_{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. Using a torque wrench, slowly tighten the recommended fixing bolts at each end, rotating each in turn no more than 1/4 of a revolution at a time. Continue until the required torque of 5Nm (44lb.ins) is reached 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.

Curves

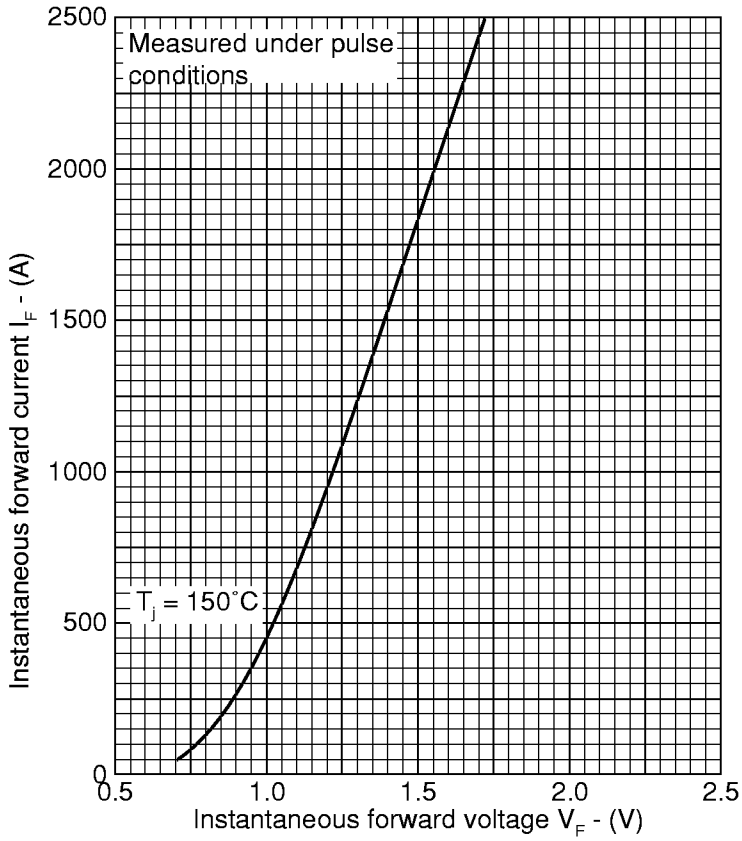


FIG. 1 MAXIMUM (LIMIT) FORWARD CHARACTERISTICS

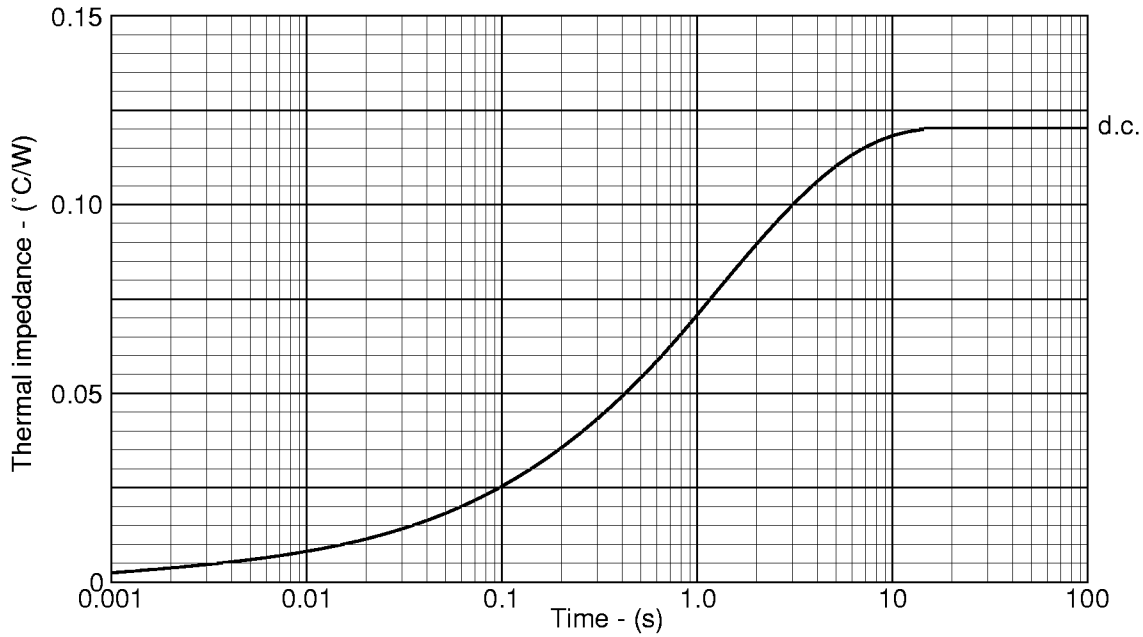


FIG. 2 TRANSIENT THERMAL IMPEDANCE (DC) PER DIODE - (DC)

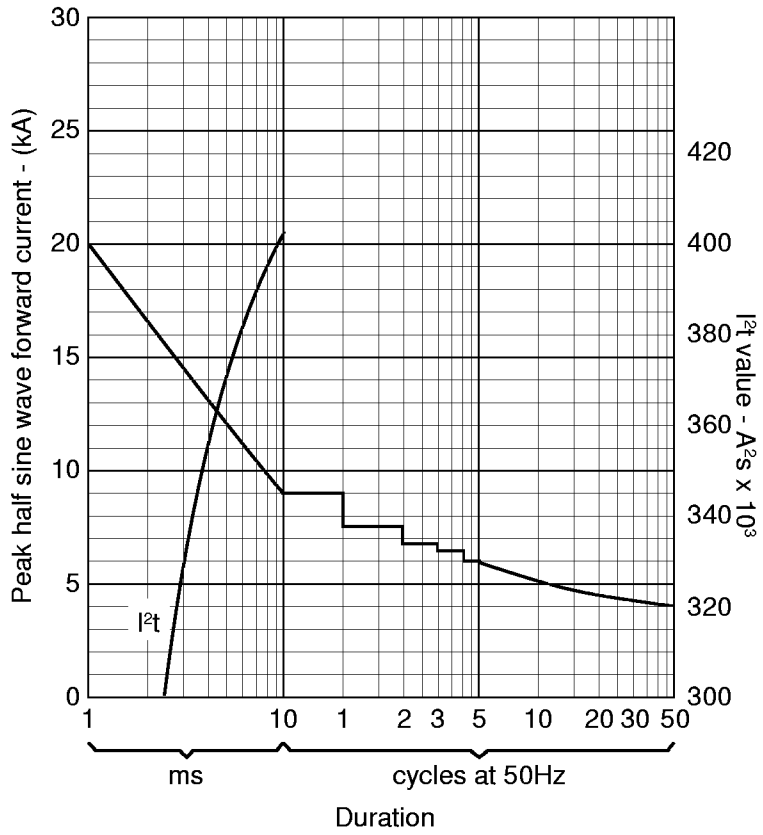


FIG. 3 SURGE (NON-REPETITIVE) FORWARD CURRENT vs TIME (WITH 50% V_{RRM} T_{case} = 150˚C)

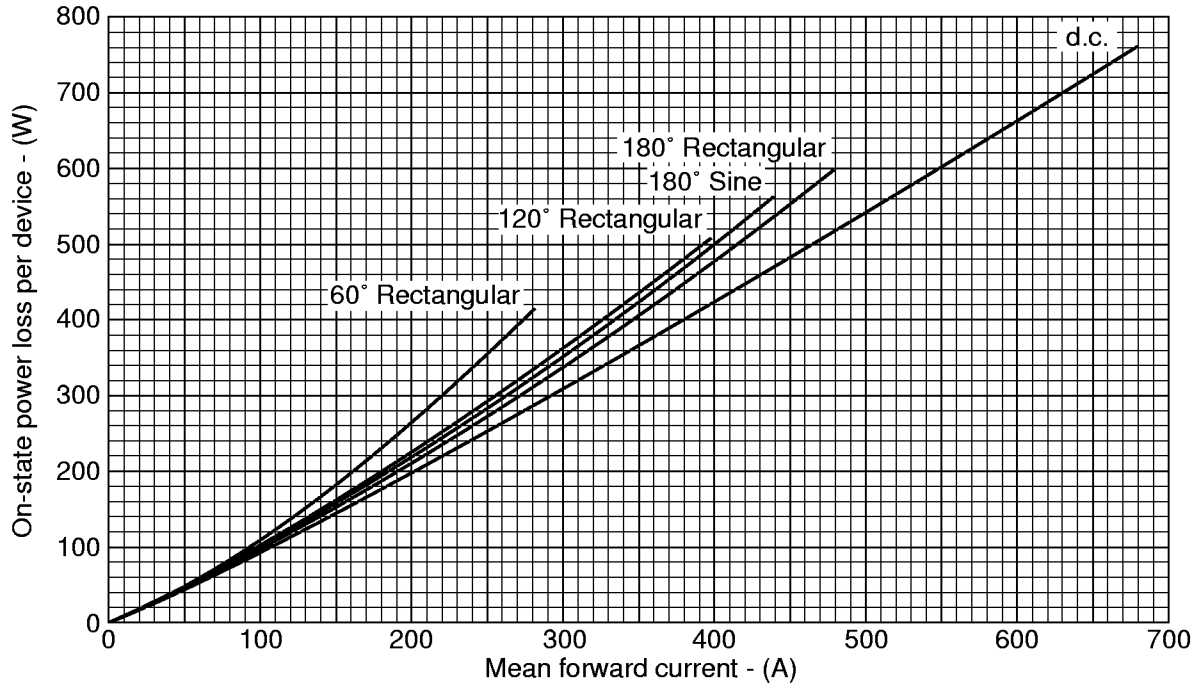


FIG. 4 ON-STATE POWER LOSS PER ARM vs FORWARD CURRENT AT VARIOUS CONDUCTION ANGLES, 50/60Hz.

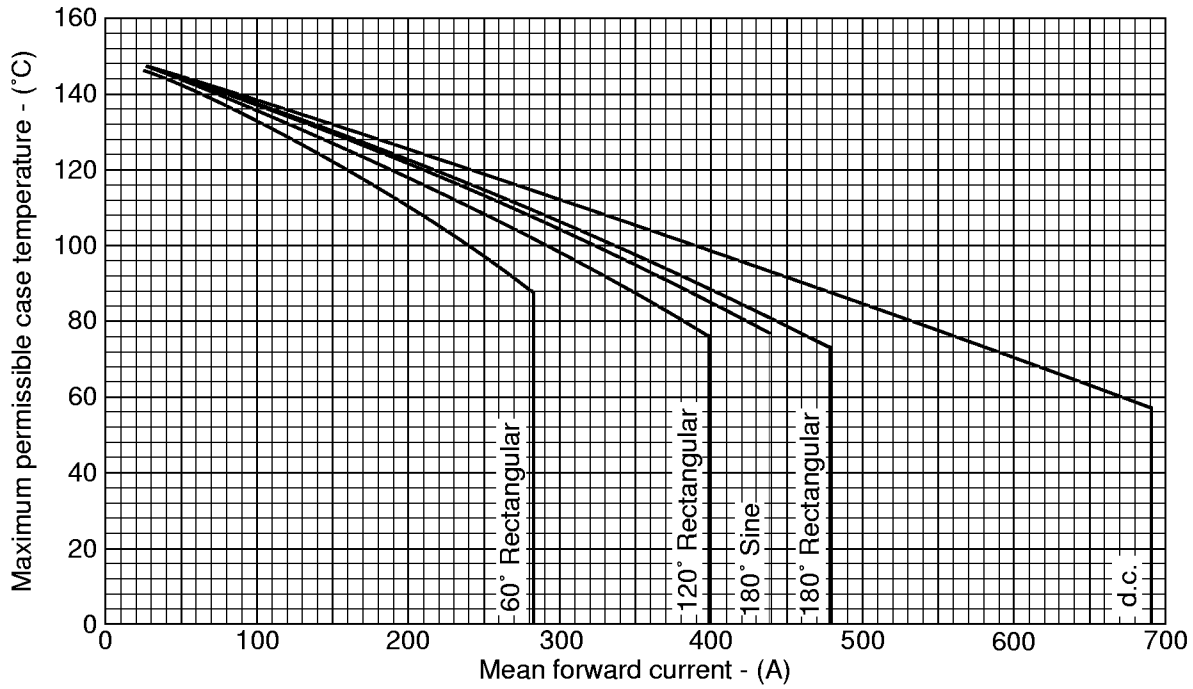


FIG. 5 MAXIMUM PERMISSIBLE CASE TEMPERATURE vs FORWARD CURRENT PER ARM AT VARIOUS CONDUCTION ANGLES, 50/60Hz.

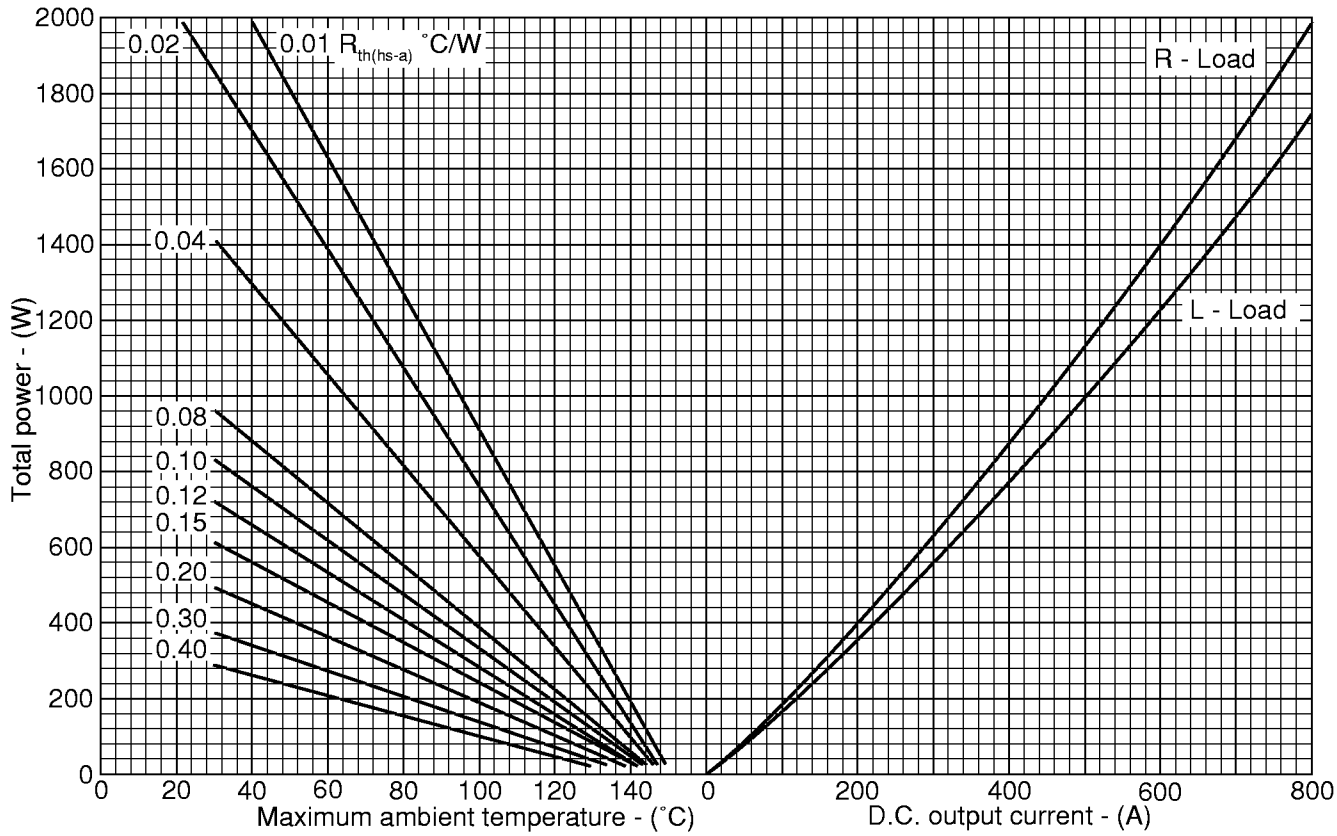


FIG. 6 50/60Hz SINGLE PHASE BRIDGE DC OUTPUT CURRENT vs POWER LOSS AND MAXIMUM PERMISSIBLE AMBIENT TEMPERATURE FOR VARIOUS VALUES OF HEATSINK THERMAL RESISTANCE.

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

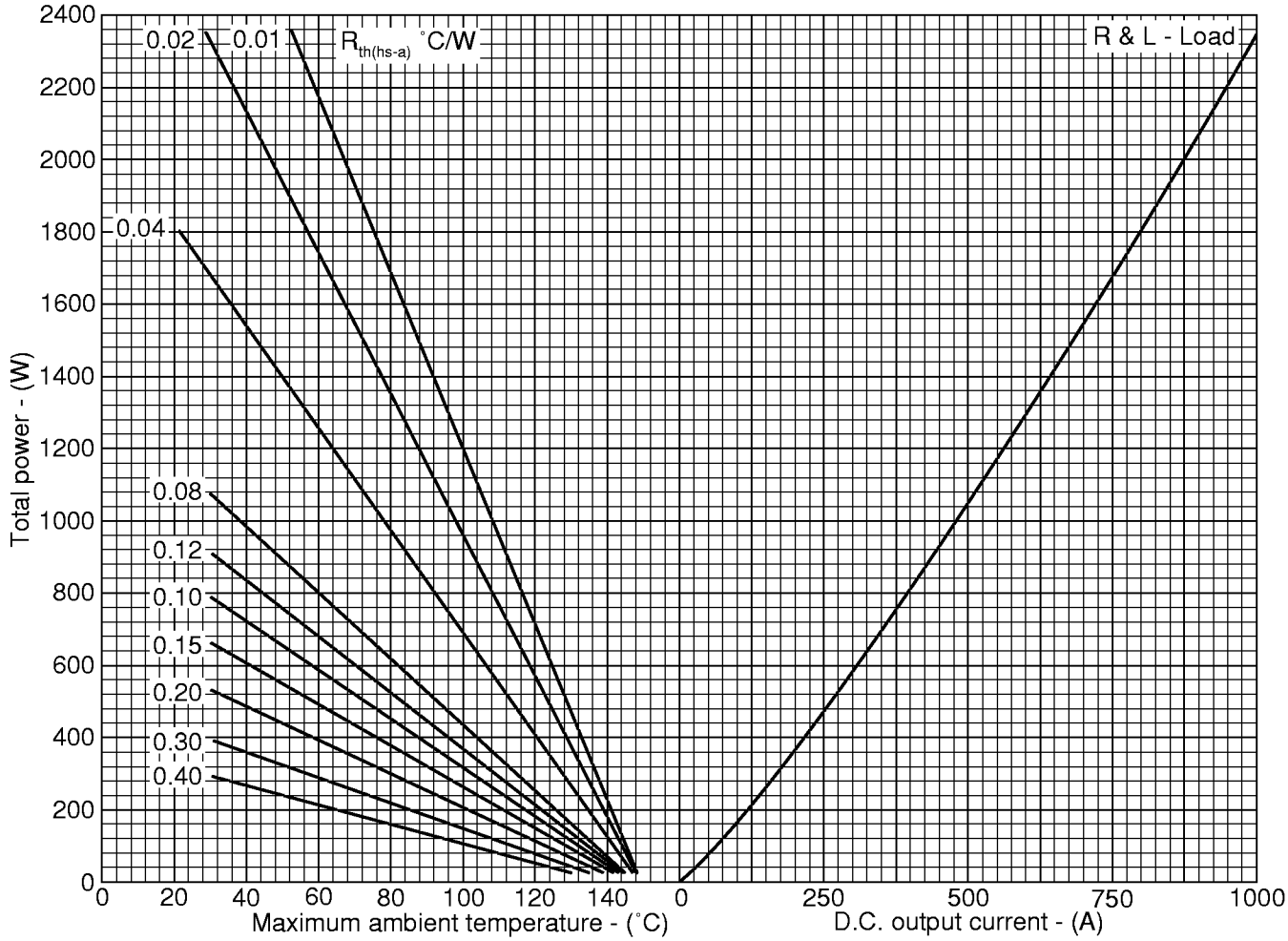
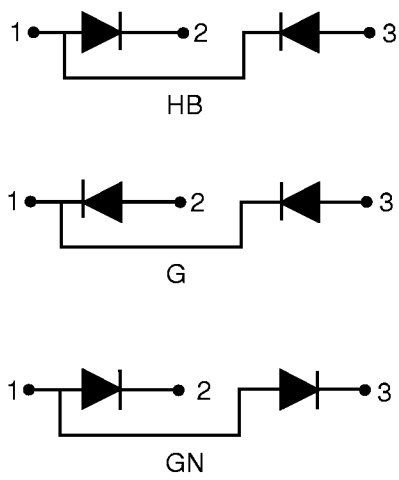


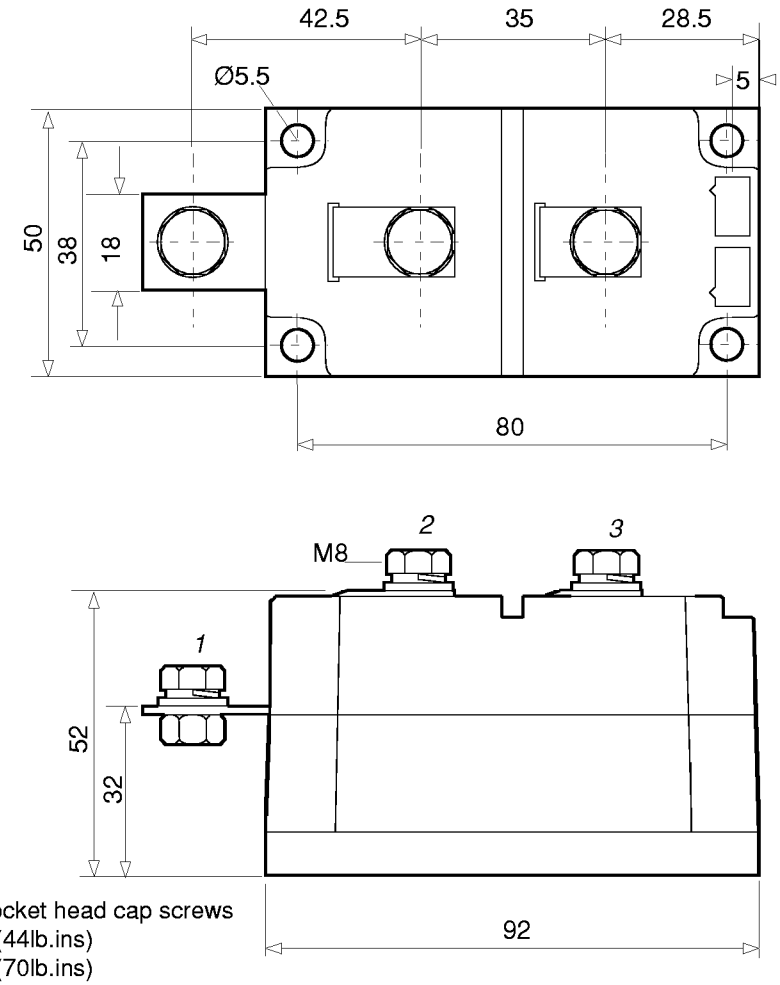
FIG. 7 50/60Hz 3 PHASE BRIDGE DC OUTPUT CURRENT vs POWER LOSS AND MAXIMUM PERMISSIBLE AMBIENT TEMPERATURE FOR VARIOUS VALUES OF HEATSINK THERMAL RESISTANCE.

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

OUTLINE - MP03

All Dimensions in mm (Unless stated otherwise)





Recommended fixings for mounting:	M5 socket head cap screws
Recommended mounting torque:	5Nm (44lb.ins)
Recommended torque, electrical connections:	8Nm (70lb.ins)
Maximum torque, electrical connections:	9Nm (80lb.ins)
Nominal weight:	950g

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