

FEATURES

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

APPLICATIONS

- Motor Control
- Controlled Rectifier Bridges
- Heater Control
- AC Phase Control

KEY PARAMETERS

V_{DRM}	1600V
I_{TSM}	6800A
$I_{T(AV)}$ (per arm)	175A
V_{isol}	3000V

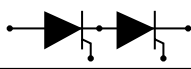
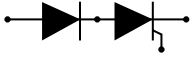
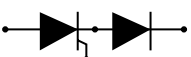
Code	Circuit
HBT	
HBP	
HBN	

Fig.1 Circuit diagrams

VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages		Conditions
	V_{DRM}	V_{RRM}	
MP02X175-16	1600		$T_{vj} = 125^{\circ}C$
MP02X175-14	1400		$I_{DRM} = I_{RRM} = 30mA$
MP02X175-12	1200		$V_{DSM} \& V_{RSM} =$
MP02X175-10	1000		$V_{DRM} \& V_{RRM} + 100V$ respectively

Lower voltage grades available.

ORDERING INFORMATION

Order As:

MP02HBT175-16 or **MP02HBT175-14** or **MP02HBT175-12** or **MP02HBT175-10**

MP02HBP175-16 or **MP02HBP175-14** or **MP02HBP175-12** or **MP02HBP175-10**

MP02HBN175-16 or **MP02HBN175-14** or **MP02HBN175-12** or **MP02HBN175-10**

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

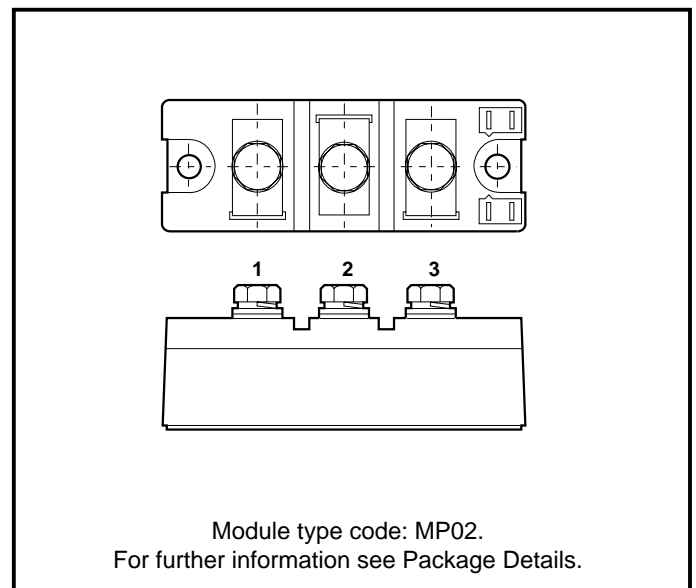


Fig. 2 Electrical connections - (not to scale)

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	
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	$T_{case} = 75^{\circ}C$	175	A
			$T_{case} = 85^{\circ}C$	150	A
$I_{T(RMS)}$	RMS value	$T_{case} = 75^{\circ}C$	275	A	
I_{TSM}	Surge (non-repetitive) on-current	10ms half sine, $T_j = 125^{\circ}C$	6.8	kA	
I^2t	I^2t for fusing	$V_R = 0$	231×10^3	A ² s	
I_{TSM}	Surge (non-repetitive) on-current	10ms half sine, $T_j = 125^{\circ}C$	5.5	kA	
I^2t	I^2t for fusing	$V_R = 50\% V_{DRM}$	150×10^3	A ² s	
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 (per thyristor or diode)	dc	-	0.19	$^{\circ}C/kW$
		Half wave	-	0.20	$^{\circ}C/kW$
		3 Phase	-	0.21	$^{\circ}C/kW$
$R_{th(c-hs)}$	Thermal resistance - case to heatsink (per thyristor or diode)	Mounting torque = 5Nm with mounting compound	-	0.07	$^{\circ}C/kW$
T_{vj}	Virtual junction temperature	Reverse (blocking)	-	125	$^{\circ}C$
T_{stg}	Storage temperature range	-	-40	125	$^{\circ}C$
-	Screw torque	Mounting - M6	-	6 (55)	Nm (lb.ins)
-		Electrical connections - M6	-	5 (44)	Nm (lb.ins)
-	Weight (nominal)	-	-	350	g

DYNAMIC CHARACTERISTICS - THYRISTOR

Symbol	Parameter	Test Conditions	Min.	Max.	Units	
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM} , $T_j = 125^\circ\text{C}$	-	30	mA	
dV/dt	Linear rate of rise of off-state voltage	To 67% V_{DRM} , $T_j = 125^\circ\text{C}$	-	1000	V/ μs	
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 500A, gate source 10V, 5 Ω , $t_r = 0.5\mu\text{s}$, $T_j = 125^\circ\text{C}$	Repetitive 50Hz	-	500	A/ μs
$V_{T(TO)}$	Threshold voltage	At $T_{vj} = 125^\circ\text{C}$. See note 1	-	1.05	V	
r_T	On-state slope resistance	At $T_{vj} = 125^\circ\text{C}$. See note 1	-	0.8	m Ω	

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.

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
V_{GT}	Gate trigger voltage	$V_{DRM} = 5\text{V}$, $T_{case} = 25^\circ\text{C}$	3.0	V
I_{GT}	Gate trigger current	$V_{DRM} = 5\text{V}$, $T_{case} = 25^\circ\text{C}$	150	mA
V_{GD}	Gate non-trigger voltage	$V_{DRM} = 5\text{V}$, $T_{case} = 25^\circ\text{C}$	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	10	A
P_{GM}	Peak gate power	See table fig. 5	100	W
$P_{G(AV)}$	Mean gate power	-	5	W

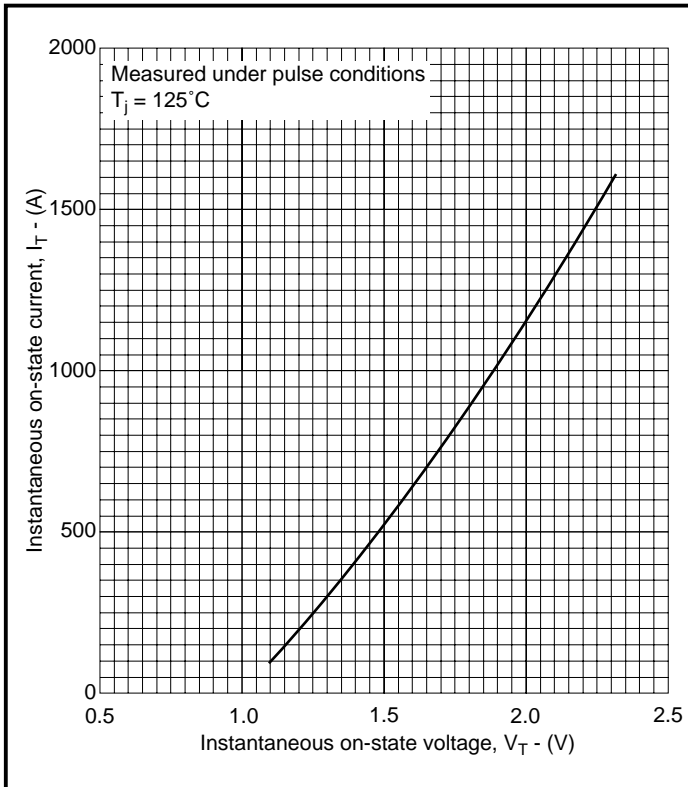


Fig. 3 Maximum (limit) on-state characteristics

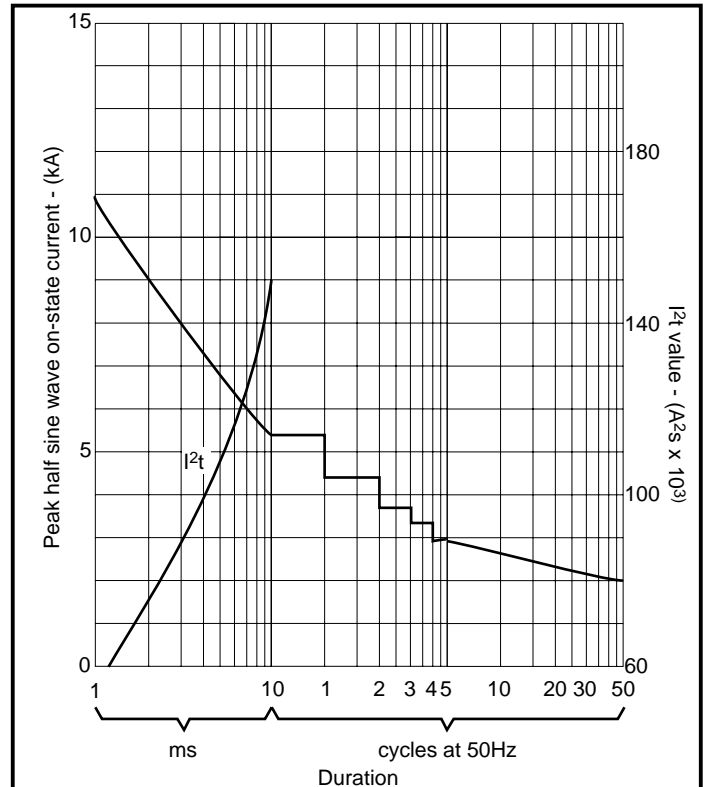


Fig. 4 Surge (non-repetitive) on-state current vs time (Thyristor or diode with 50% V_{RRM} at $T_{case} = 125^\circ\text{C}$)

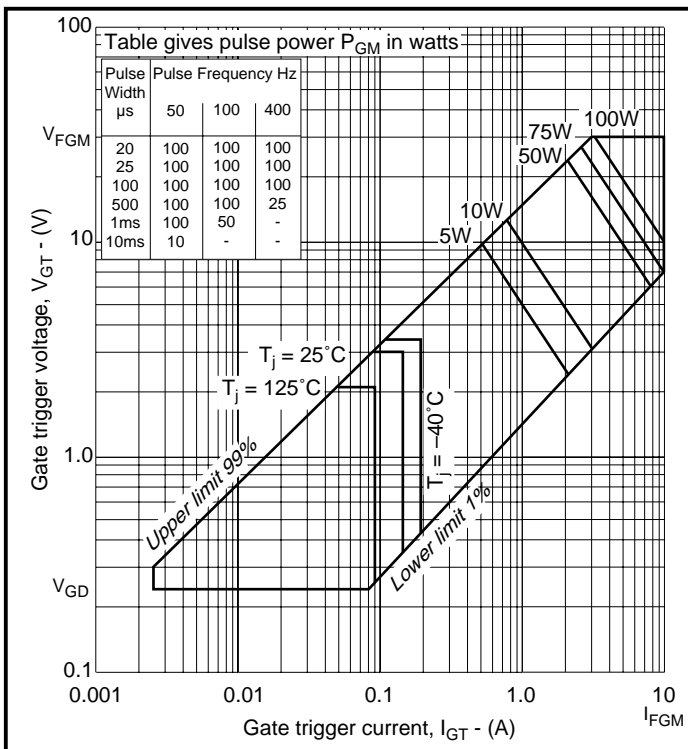


Fig. 5 Gate characteristics

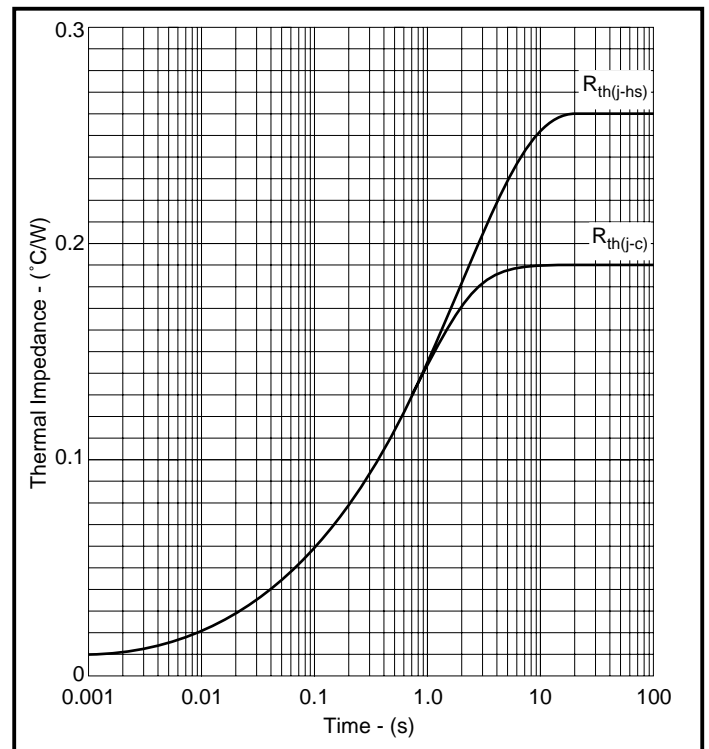


Fig. 6 Transient thermal impedance - dc

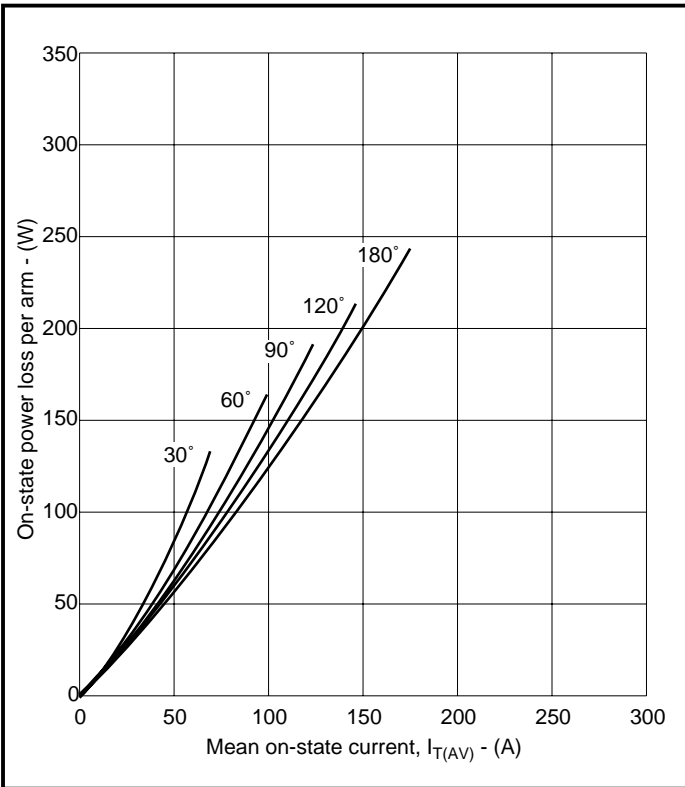


Fig. 7 On-state power loss per arm vs on-state current at specified conduction angles, sine wave 50/60Hz

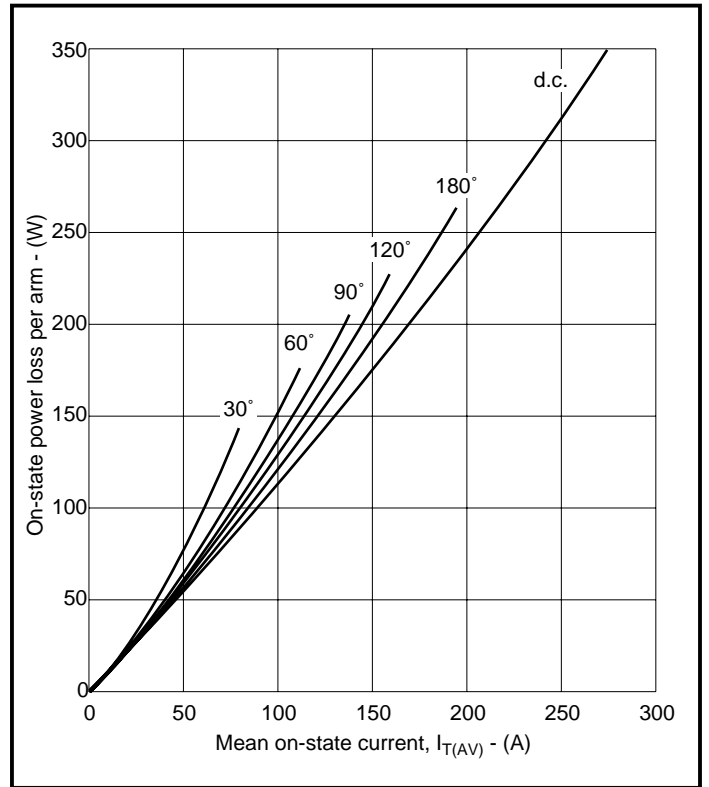


Fig. 8 On-state power loss per arm vs on-state current at specified conduction angles, square wave 50/60Hz

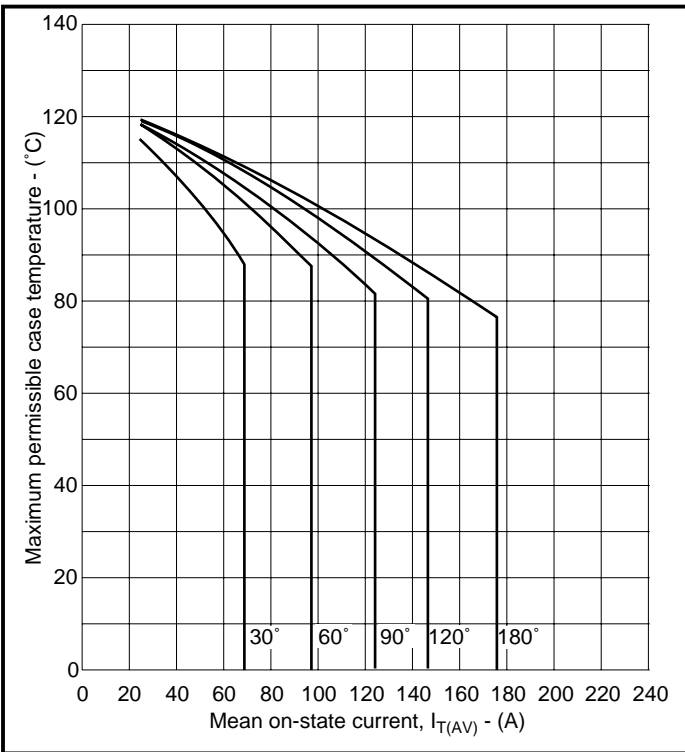


Fig. 9 Maximum permissible case temperature vs on-state current at specified conduction angles, sine wave 50/60Hz

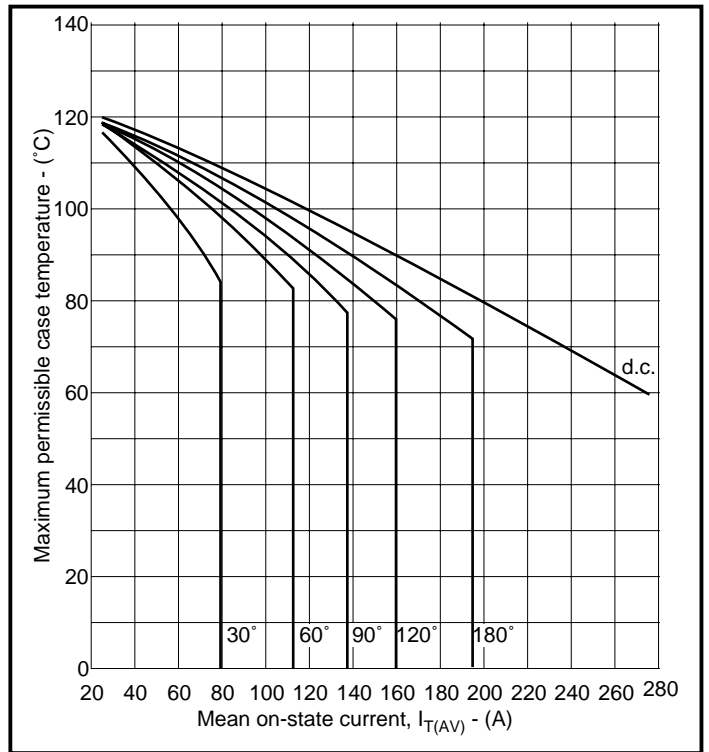


Fig. 10 Maximum permissible case temperature vs on-state current at specified conduction angles, square wave 50/60Hz

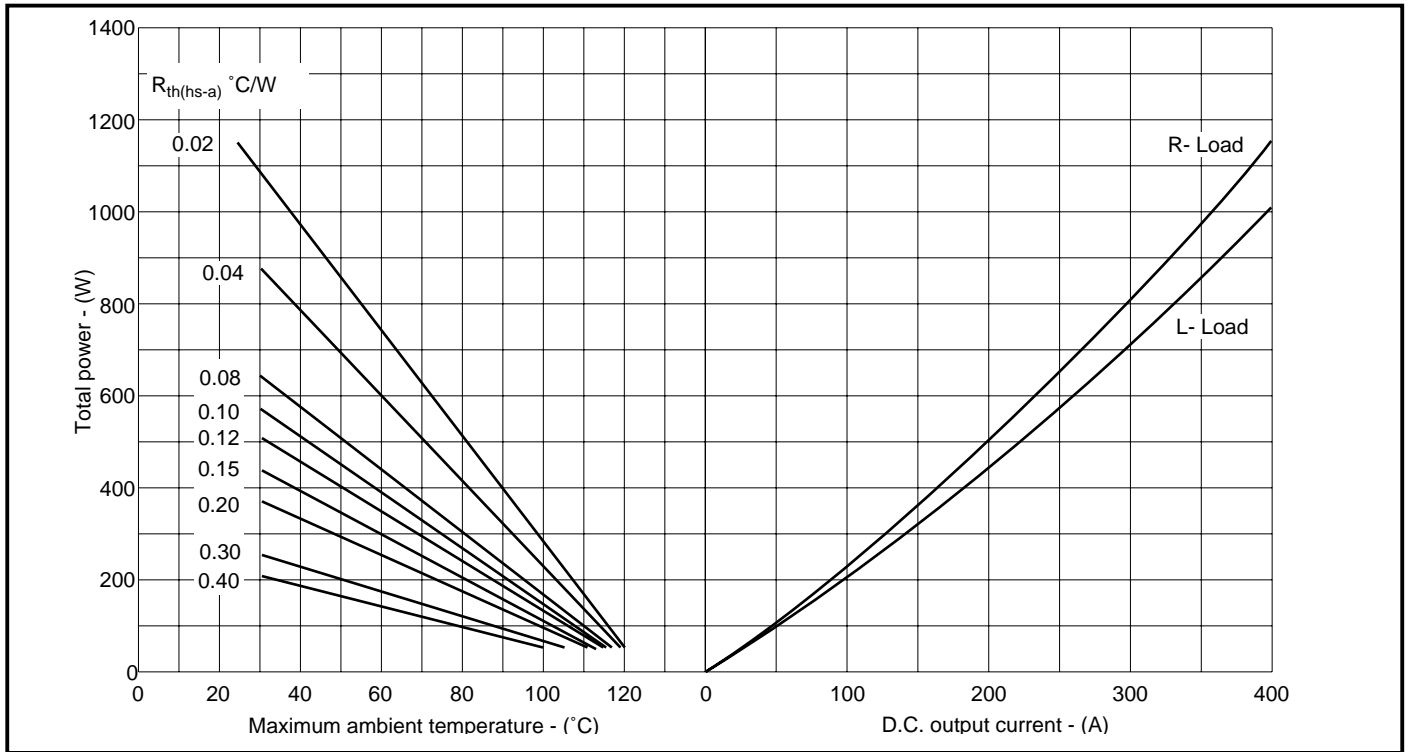


Fig. 11 50/60Hz single phase bridge dc output current vs power loss and maximum permissible ambient temperature for various values of heatsink thermal resistance

(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)

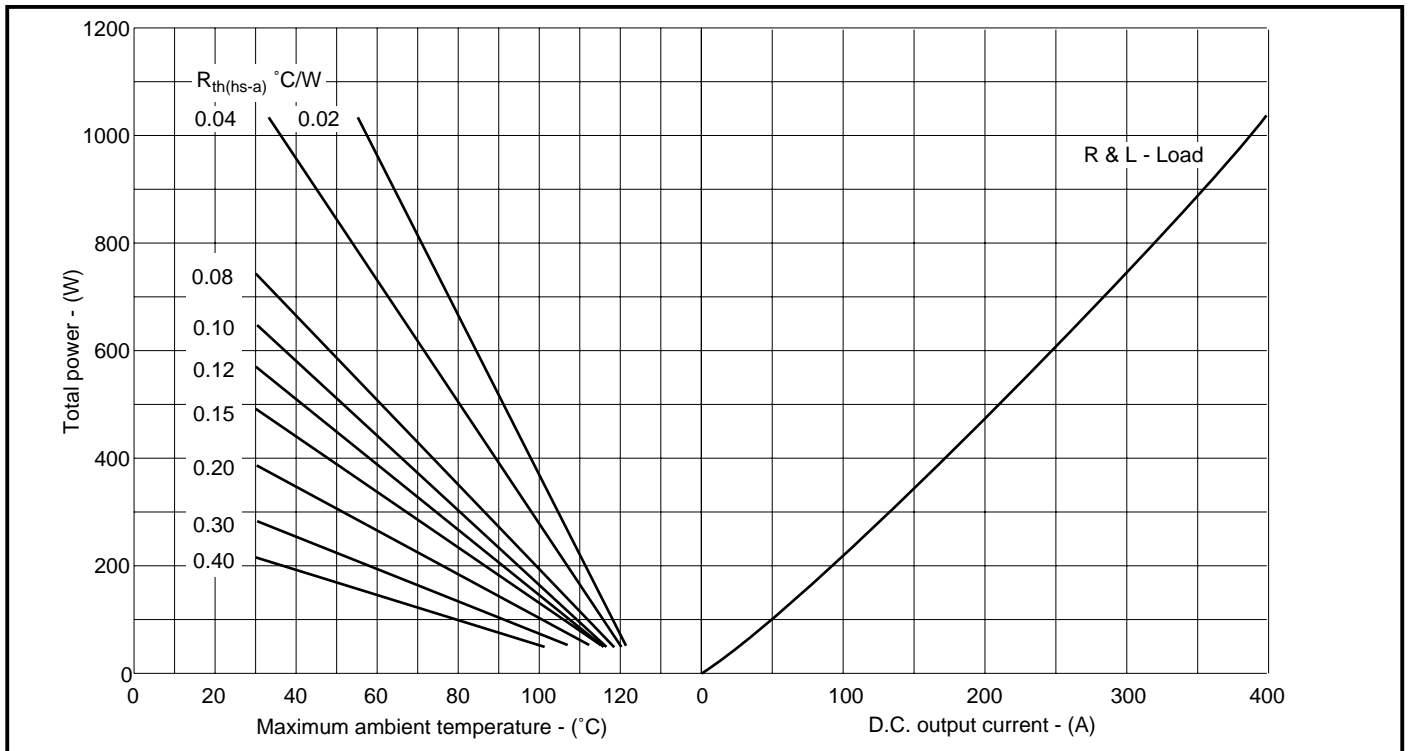


Fig. 12 50/60Hz 3- phase bridge dc output current vs power loss and maximum permissible ambient temperature for various values of heatsink thermal resistance

(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)

POWER ASSEMBLY CAPABILITY

The Power Assembly group provides support for those customers requiring more than the basic semiconductor switch. Using CAD design tools the group has developed a flexible range of heatsink / clamping systems in line with advances in device types and the voltage and current capability of Dynex semiconductors.

An extensive range of air and liquid cooled assemblies is available covering the range of circuit designs in general use today.

HEATSINKS

The Power Assembly group has a proprietary range of extruded aluminium heatsinks. These were 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.



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Preliminary Information: The product is in design and development. The datasheet represents the product as it is understood but details may change.

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