



# MP03 XX 280 Series

## Dual Diode Modules

Replaces December 1998 version, DS5105-2.0

DS5105-3.0 January 2000

### FEATURES

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

### APPLICATIONS

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

### VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages $V_{RRM}$	Conditions
MP03/280 - 20	2000	$T_{vj} = 150^{\circ}C$
MP03/280 - 18	1800	$I_{RM} = 30mA$
MP03/280 - 16	1600	$V_{RSM} = V_{RRM} + 100V$
MP03/280 - 14	1400	respectively

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

### CURRENT RATINGS - PER ARM

Symbol	Parameter	Conditions	Max.	Units	
$I_{F(AV)}$	Mean forward current	Halfwave, resistive load	$T_{case} = 75^{\circ}C$	280	A
			$T_{case} = 85^{\circ}C$	252	A
			$T_{heatsink} = 75^{\circ}C$	241	A
			$T_{heatsink} = 85^{\circ}C$	215	A
$I_{F(RMS)}$	RMS value	$T_{case} = 75^{\circ}C$	440	A	

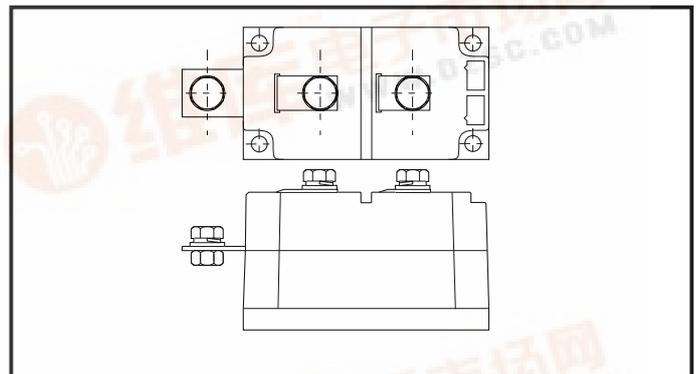
### KEY PARAMETERS

$V_{RRM}$	2000V
$I_{FSM}$	6000A
$I_{F(AV)}$ (per arm)	280A
$V_{isol}$	2500V

### CIRCUIT OPTIONS

Code	Circuit
HB	
G	
GN	

### PACKAGE OUTLINE



Module outline type code: MP03.  
See Package Details for further information.



## MP03 XX 280 Series

### Surge Ratings - Per Arm

Symbol	Parameter	Conditions	Max.	Units	
$I_{FSM}$	Surge (non-repetitive) on-state current	10ms half sine; $T_j = 150^\circ\text{C}$	$V_R = 0$	6000	A
			$V_R = 50\% V_{RRM}$	4800	A
$I^2t$	$I^2t$ for fusing	10ms half sine; $T_j = 150^\circ\text{C}$	$V_R = 0$	180000	$\text{A}^2\text{s}$
			$V_R = 50\% V_{RRM}$	115000	$\text{A}^2\text{s}$

### THERMAL & MECHANICAL RATINGS

Symbol	Parameter	Conditions	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case per Diode	dc	0.21	$^\circ\text{C}/\text{W}$
		halfwave	0.22	$^\circ\text{C}/\text{W}$
		3 phase	0.23	$^\circ\text{C}/\text{W}$
$R_{th(c-hs)}$	Thermal resistance - case to heatsink per Diode	Mounting torque = 5Nm with mounting compound	0.05	$^\circ\text{C}/\text{W}$
$T_{vj}$	Virtual junction temperature		150	$^\circ\text{C}$
$T_{sto}$	Storage temperature range		-40 to 150	$^\circ\text{C}$
$V_{isol}$	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 400A peak, $T_{case} = 25^\circ\text{C}$	1.1	V
$I_{RM}$	Peak reverse current	At $V_{RRM}$ , $T_j = 150^\circ\text{C}$	30	mA
$V_{TO}$	Threshold voltage	At $T_{vj} = 150^\circ\text{C}$	0.80	V
$r_T$	On-state slope resistance	At $T_{vj} = 150^\circ\text{C}$	0.6	$\text{m}\Omega$

## ORDERING INSTRUCTIONS

Part number is made up as follows:

MP03 HB 280 - 18

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

Examples:

MP03HB280 - 16  
MP03G280 - 20  
MP03GN280 - 18

Note: Preferred 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  $75^{\circ}C$  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 ( $32\mu in$ ) 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.

# MP03 XX 280 Series

## CURVES

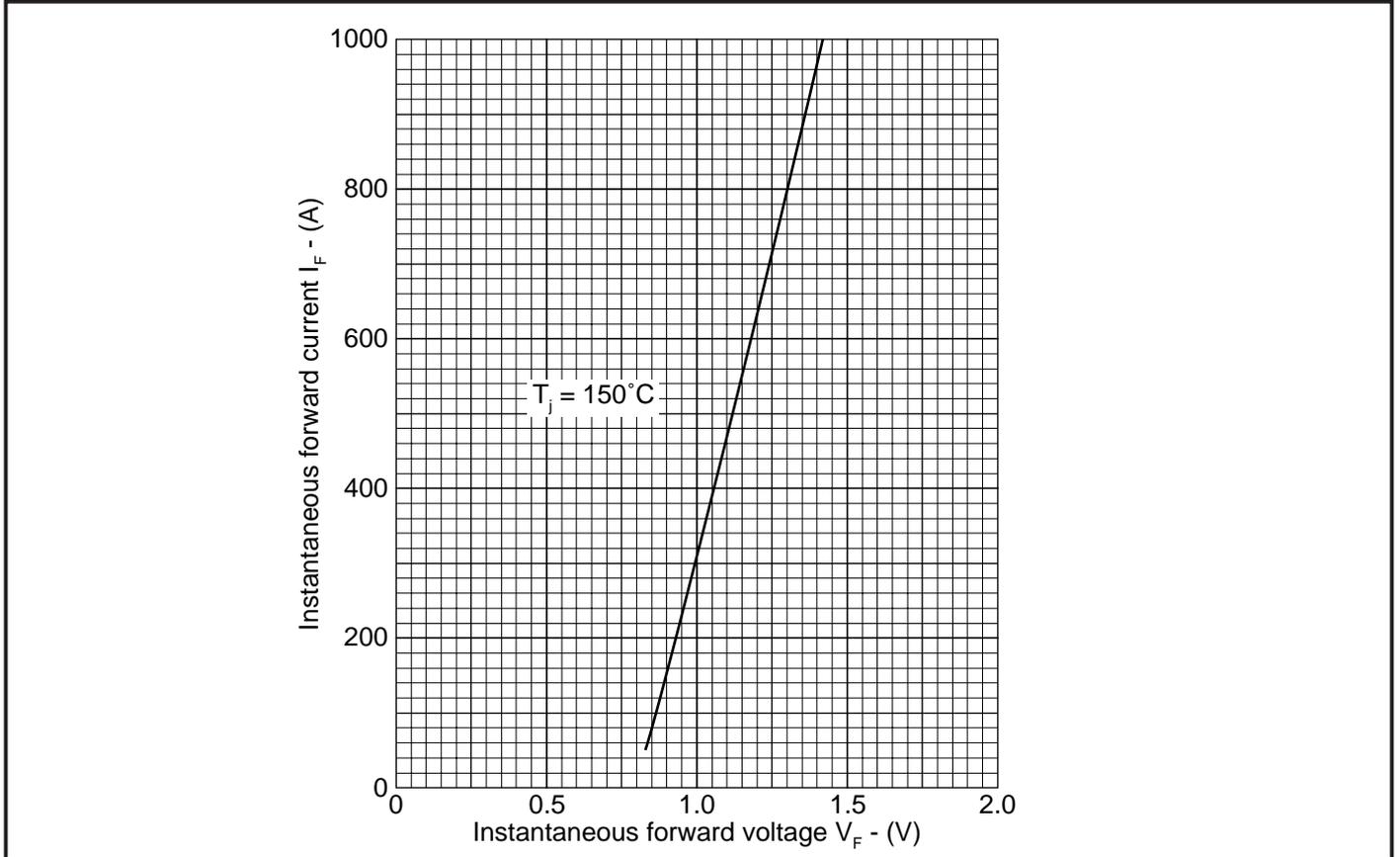


Fig. 1 Maximum (limit) forward characteristics (Per diode)

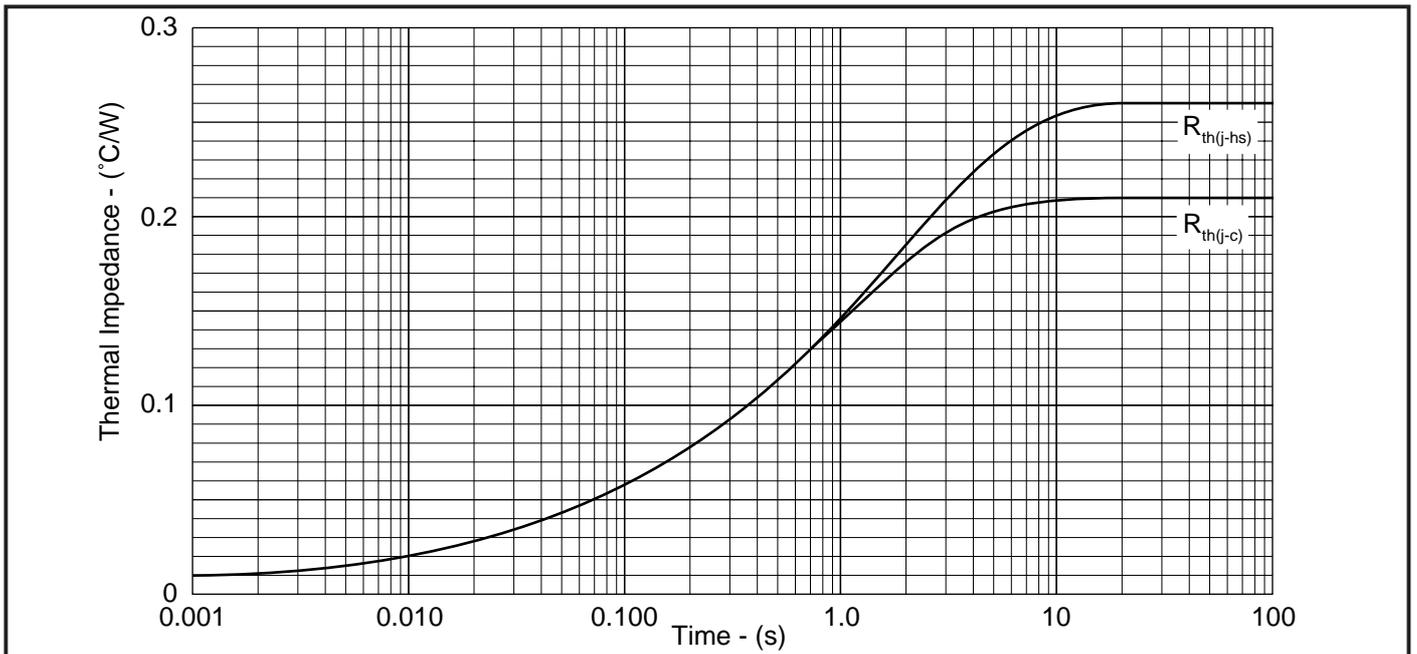


Fig. 2 Transient thermal impedance (DC) - (Per diode)

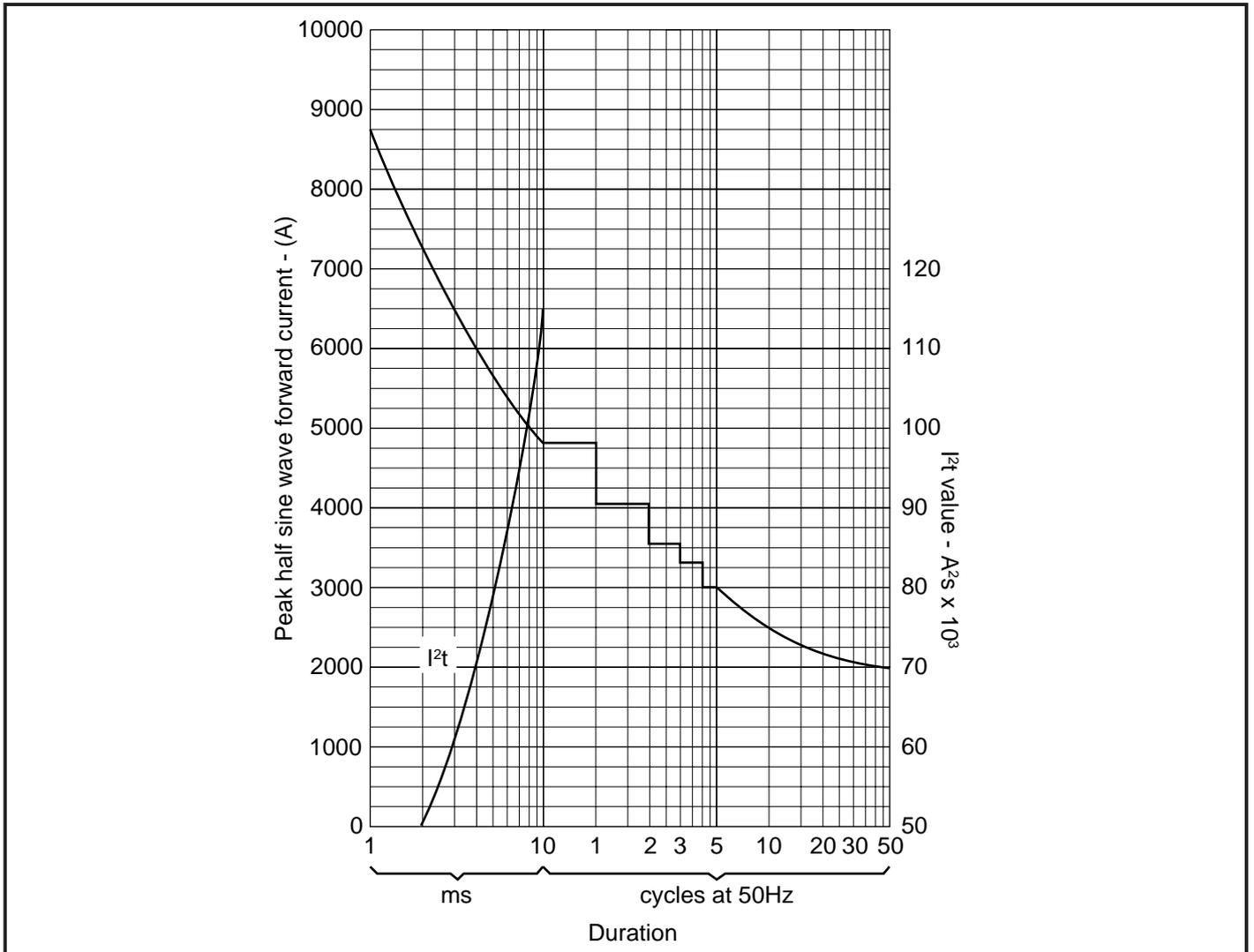


Fig. 3 Surge (non-repetitive) forward current vs time (with 0%  $V_{RRM}$ ,  $T_{case} = 150^\circ C$ )

MP03 XX 280 Series

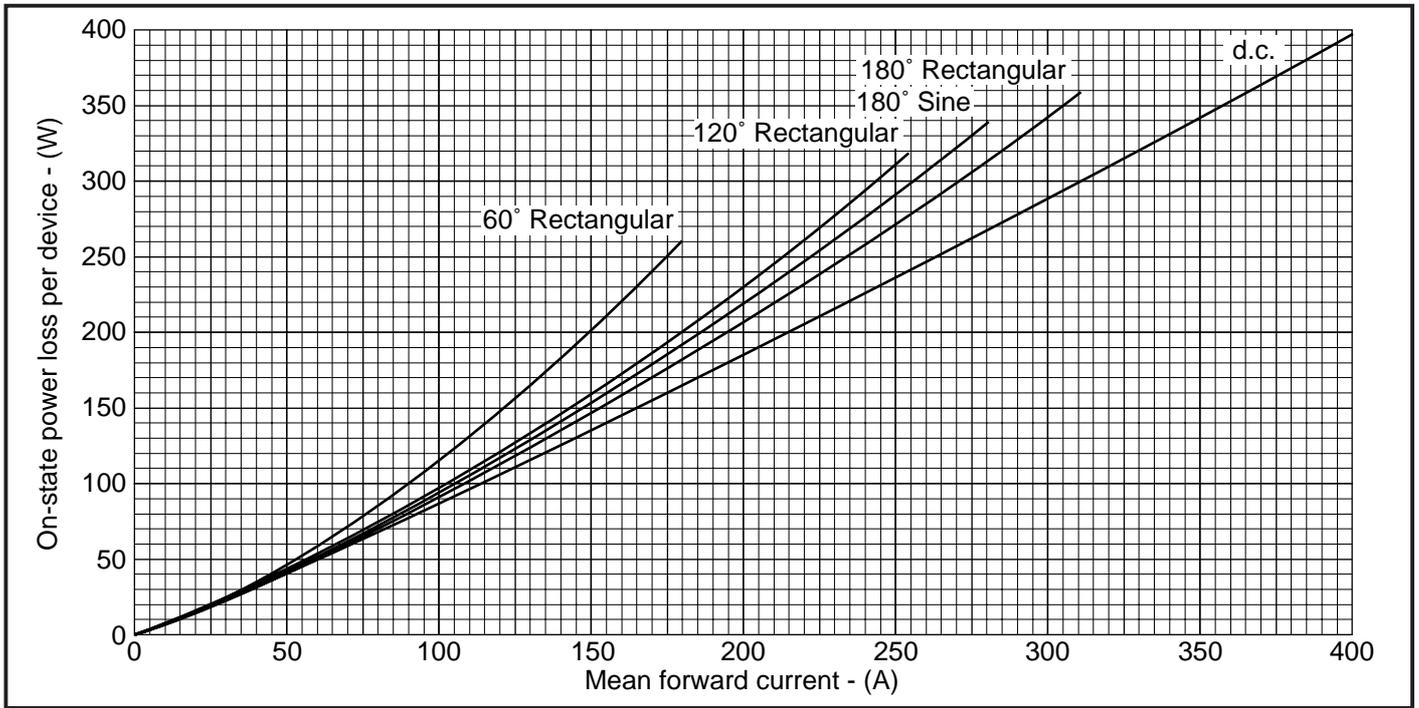


Fig. 4 On-state power loss per arm vs forward current at various conduction angles, 50/60Hz

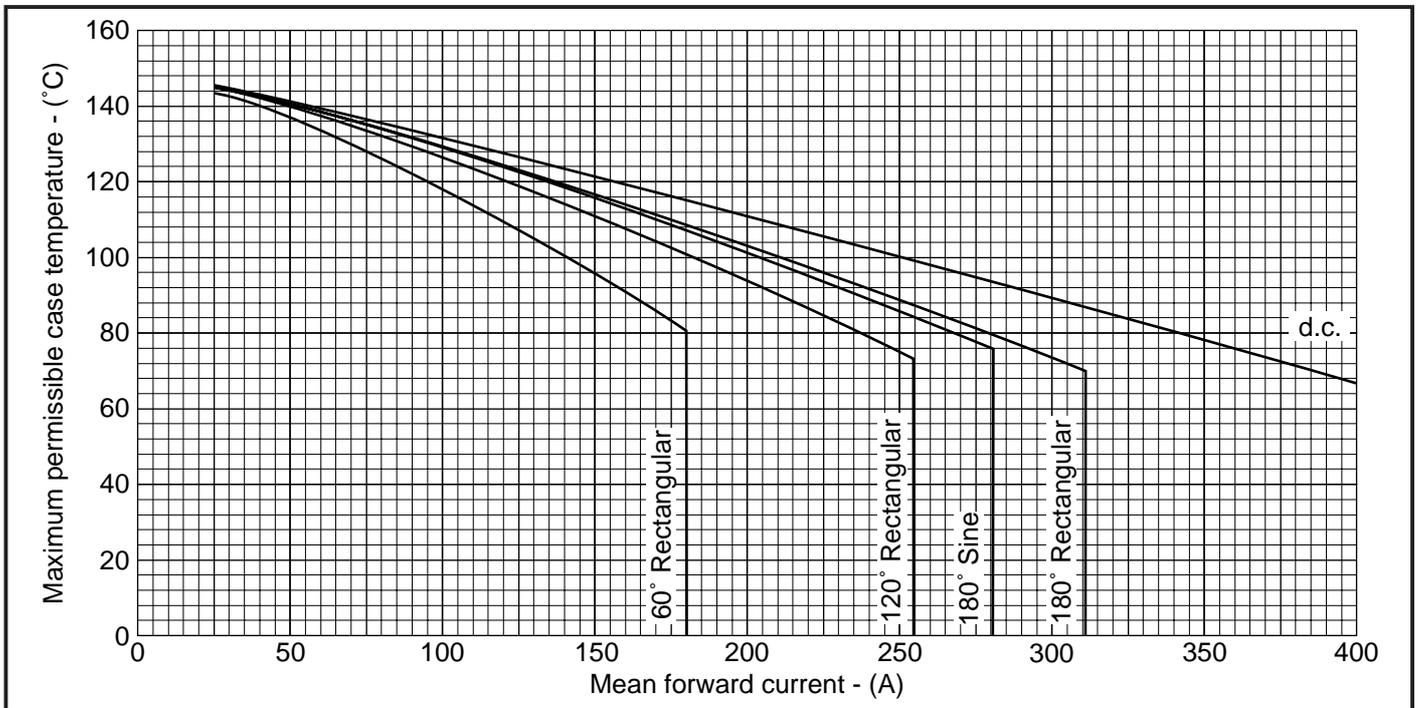


Fig. 5 Maximum permissible case temperature vs forward current per arm at various conduction angles, 50/60Hz

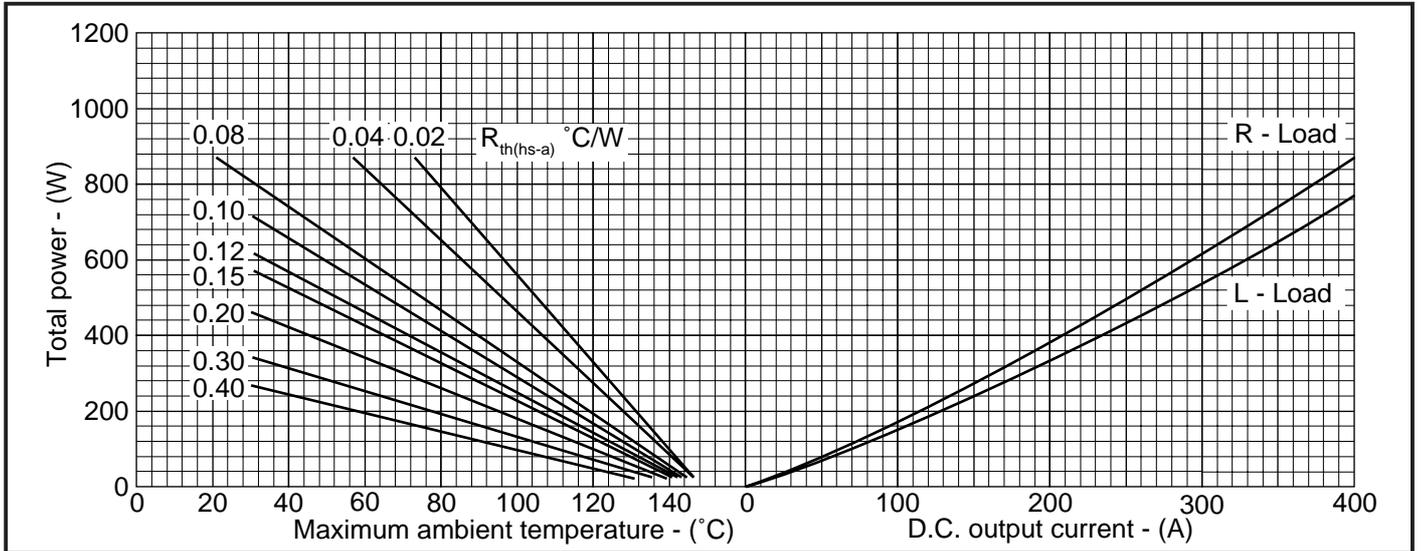


Fig. 6 50/60Hz single phase bridge dc output current vs power loss and maximum permissible ambient temperature for various values of heatsink thermal resistance.

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

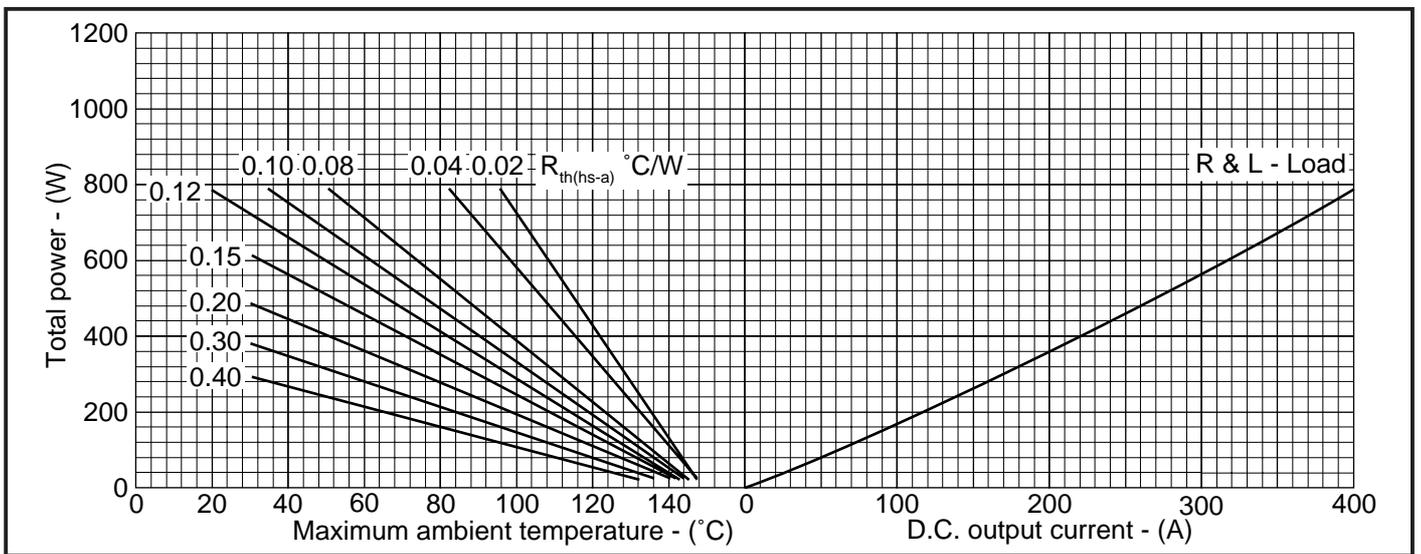


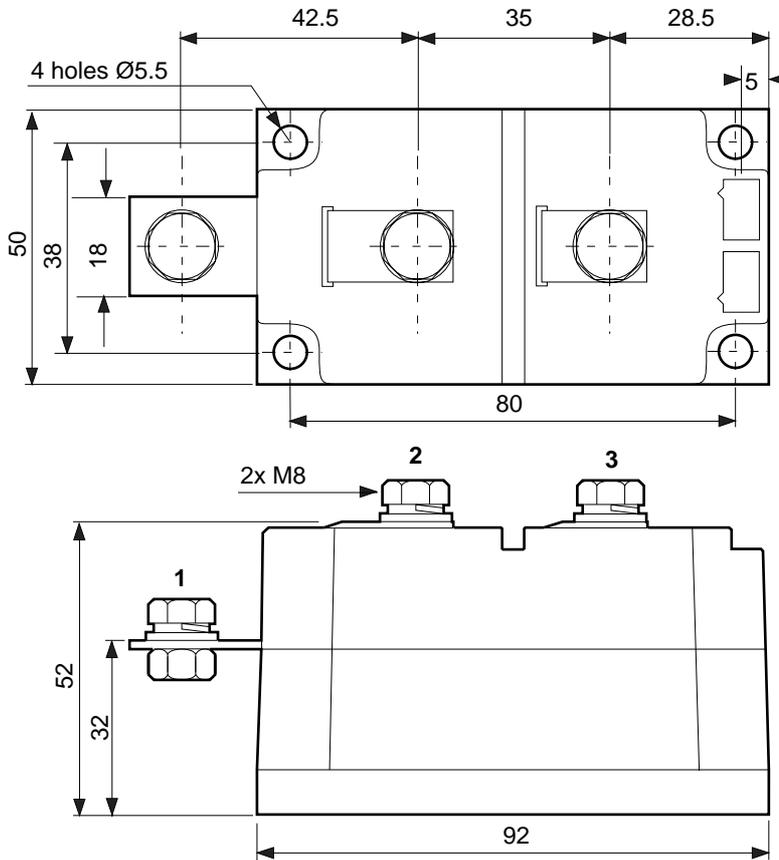
Fig. 7 50/60Hz 3-phase bridge dc output current vs power loss and maximum permissible ambient temperature for various values of heatsink thermal resistance.

(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).

## MP03 XX 280 Series

### PACKAGE DETAILS

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



Recommended fixings for mounting:

Recommended mounting torque:

Recommended torque for electrical connections:

Maximum torque for electrical connections:

Nominal weight: 950g

M5 socket head cap screws.

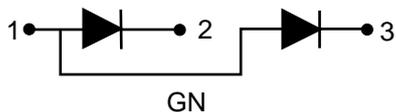
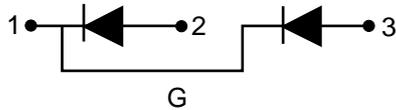
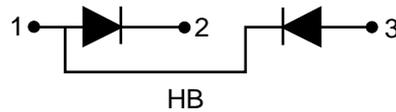
5Nm (44lb.ins)

8Nm (70lb.ins)

9Nm (80lb.ins)

**Module outline type code: MP03**

### CIRCUIT CONFIGURATIONS





<http://www.dynexsemi.com>

e-mail: [power\\_solutions@dynexsemi.com](mailto: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  
**France, Benelux, Italy and Spain** Tel: +33 (0)1 69 18 90 00. Fax: +33 (0)1 64 46 54 50  
**North America** Tel: 011-800-5554-5554. Fax: 011-800-5444-5444  
**UK, Germany, Scandinavia & Rest Of World** Tel: +44 (0)1522 500500. Fax: +44 (0)1522 500020

SALES OFFICES  
**France, Benelux, Italy and Spain** Tel: +33 (0)1 69 18 90 00. Fax: +33 (0)1 64 46 54 50  
**Germany** Tel: 07351 827723  
**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, Germany, Scandinavia & Rest Of World** Tel: +44 (0)1522 500500. Fax: +44 (0)1522 500020  
These offices are supported by Representatives and Distributors in many countries world-wide.  
© Dynex Semiconductor 2000 Publication No. DS5105-3 Issue No. 3.0 January 2000  
TECHNICAL DOCUMENTATION – NOT FOR RESALE. PRINTED IN UNITED KINGDOM

**Datasheet Annotations:**

Dynex Semiconductor annotate datasheets in the top right hand 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.

This publication is issued to provide information only which (unless agreed by the Company in writing) may not be used, applied or reproduced for any purpose nor form part of any order or contract nor to be regarded as a representation relating to the products or services concerned. No warranty or guarantee express or implied is made regarding the capability, performance or suitability of any product or service. The Company reserves the right to alter without prior notice the specification, design or price of any product or service. Information concerning possible methods of use is provided as a guide only and does not constitute any guarantee that such methods of use will be satisfactory in a specific piece of equipment. It is the user's responsibility to fully determine the performance and suitability of any equipment using such information and to ensure that any publication or data used is up to date and has not been superseded. These products are not suitable for use in any medical products whose failure to perform may result in significant injury or death to the user. All products and materials are sold and services provided subject to the Company's conditions of sale, which are available on request.

All brand names and product names used in this publication are trademarks, registered trademarks or trade names of their respective owners.