DYNEX SEMICONDUCTOR

MP03TT580

Dual Thyristor Water Cooled Welding Module

Preliminary Information

DS5429-1.1 June 2001

FEATURES

- Dual Device Module
- Electrically Isolated Package
- Pressure Contact Construction
- International Standard Footprint
- Alumina (Non Toxic) Isolation Medium
- Integral Water Cooled Heatsink

APPLICATIONS

- Welding

VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages V_{DRM} V_{RRM} V	Conditions
MP03TT580-18	1800	T_{vj} = 0° to 125°C, $I_{DRM} = I_{RRM}$ = 30mA $V_{DSM} = V_{RSM}$ = $V_{DRM} = V_{RRM}$ + 100V respectively
MP03TT580-17	1700	
MP03TT580-16	1600	
MP03TT580-15	1500	

Lower voltage grades available

ORDERING INFORMATION

Order As:

MP03TT580-XX W1	With 1/4 BSP connection
MP03TT580-XX W2	1/4 – 18 NPT connection
MP03TT580-XX W3	1/4 – 18 NPT connection
MP03TT580-XX W3A	1/4 – 18 NPT water connection thread
MP03TT580-XX W4	With 1/4 BSP connection

XX shown in the part number about represents V_{DRM}/100 selection required, e.g. MP03TT580-16-W3

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

Auxiliary gate and cathode leads can be ordered separately.

KEY PARAMETERS

V_{DRM}	**1800V**
$I_{LINE(cont.)}$	**600A**
$I_{LINE(20cy./50\%)}$	**1008A**
$I_{TSM(per\ arm)}$	**6800A**
V_{isol}	**3000V**

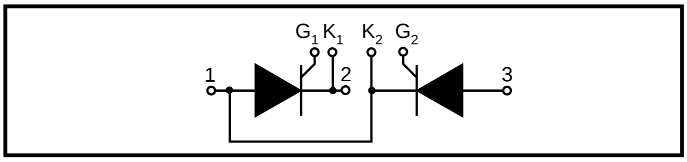
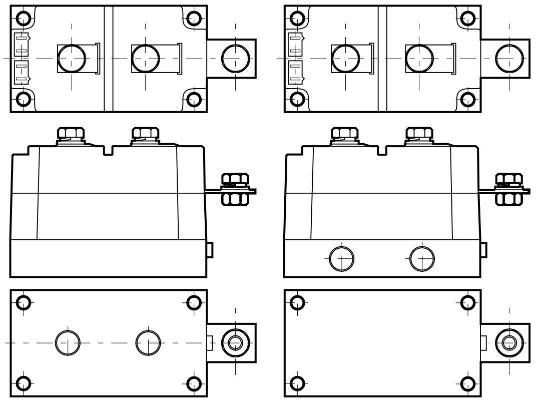
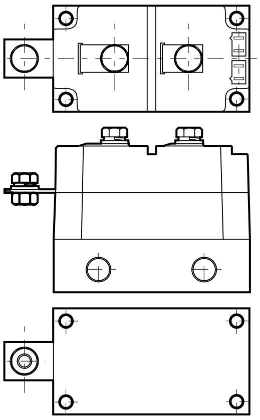


Fig. 1 Circuit diagram



Outline type code: MP03 - W1 or W2

Outline type code: MP03 - W3 or W4



Outline type code: MP03 - W3A

(See package details for further information)

Fig. 2 Electrical connections - (not to scale)

ABSOLUTE MAXIMUM CURRENT RATINGS

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_{LINE}	Max. controllable RMS line current - single phase	Continuous 50/60Hz 4.5 Ltr/min	$T_{water\ (in)}$ = 25˚C	600	A
			$T_{water\ (in)}$ = 40˚C	530	A
		20 cycles, 50% duty cycle 4.5 Ltr/min	$T_{water\ (in)}$ = 25˚C	1186	A
			$T_{water\ (in)}$ = 40˚C	1008	A
I_{TSM}	Surge (non-repetitive) on-current	10ms half sine, T_j = 125˚C V_R = 0		6.8	kA
I^2t	I^2t for fusing			231×10^3	A^2s
I_{TSM}	Surge (non-repetitive) on-current	10ms half sine, T_j = 125˚C V_R = 50% V_{DRM}		5.5	kA
I^2t	I^2t for fusing			150×10^3	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
$R_{th(j-w)}$	Thermal resistance - junction to water (per thyristor)	dc, 4.5 Ltr/min	-	0.24	˚C/kW
		Half wave, 4.5 Ltr/min	-	0.25	˚C/kW
		3 Phase, 4.5 Ltr/min	-	0.26	˚C/kW
T_{vj}	Virtual junction temperature	Reverse (blocking)	-	125	˚C
T_{stg}	Storage temperature range	-	–40	125	˚C
-	Screw torque	Mounting - M6	5(44)	-	Nm (lb.ins)
		Electrical connections - M4	8(70)	9(80)	Nm (lb.ins)
-	Weight (nominal)	-	-	Refer to drawings	g

DYNAMIC CHARACTERISTICS

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˚C	-	300	mA
dV/dt	Linear rate of rise of off-state voltage	To 67% V_{DRM}, T_j = 125˚C	-	1000	V/µs
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 500A, gate source 10V, 5Ω t_r = 0.5µs, T_j = 125˚C	-	150	A/µs
$V_{T(TO)}$	Threshold voltage	At T_{vj} = 125˚C	-	0.98	V
r_T	On-state slope resistance	At T_{vj} = 125˚C	-	0.75	mΩ

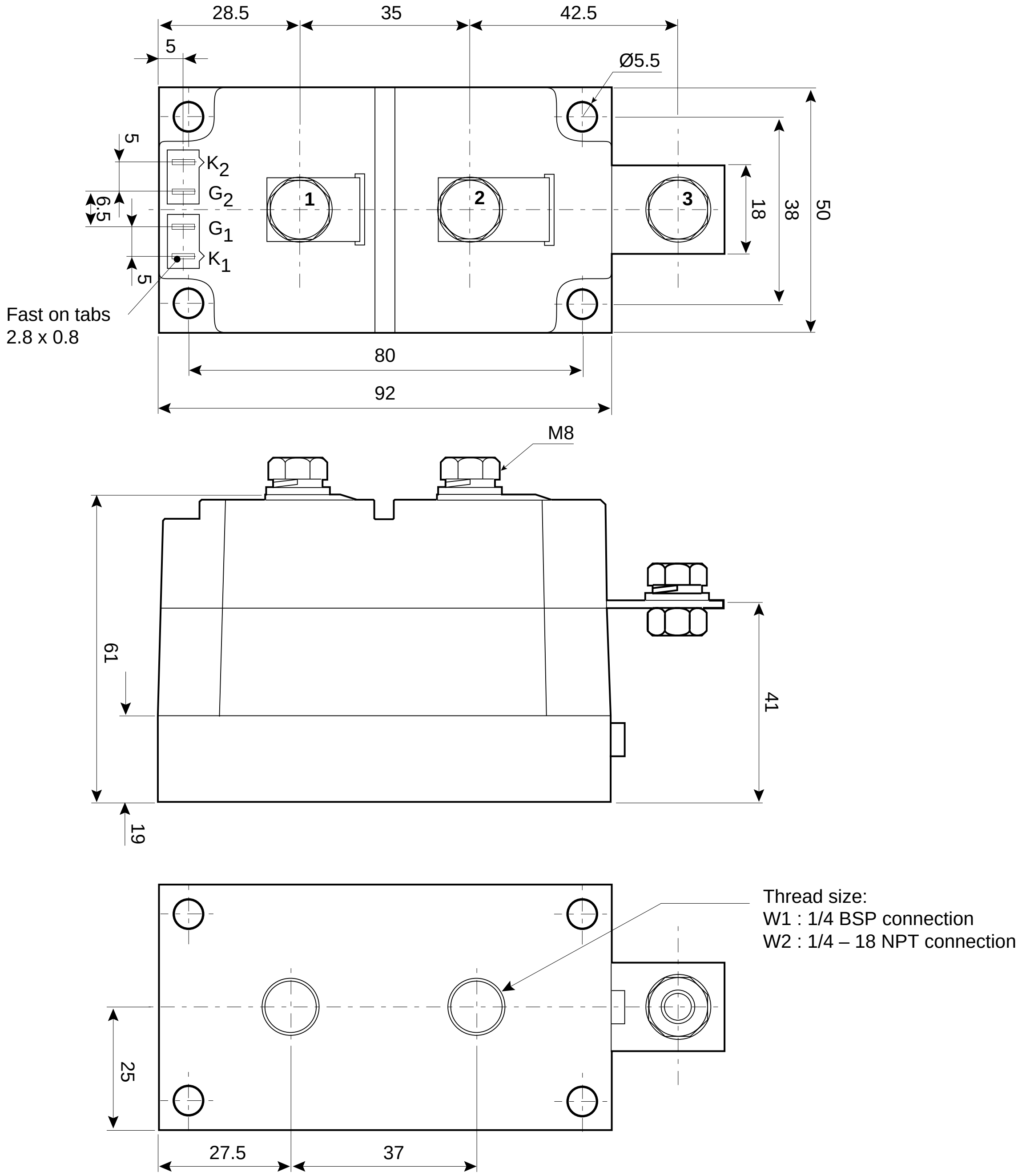
Note : The data given in this datasheet with regard to forward voltage drop is for calculation of the power dissipation in the semiconductor elements only. Forward voltage drops measured at the power terminals of the module will be in excess of these figures due to the impedance of the busbar from the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

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
V_{GT}	Gate trigger voltage	V_{DRM} = 5V, T_{case} = 25ºC	3	V
I_{GT}	Gate trigger current	V_{DRM} = 5V, T_{case} = 25ºC	150	mA
V_{GD}	Gate non-trigger voltage	At V_{DRM} T_{case} = 125ºC	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

PACKAGE DETAILS

For further package information, please contact Customer Services. All dimensions in mm, unless stated otherwise.
DO NOT SCALE.

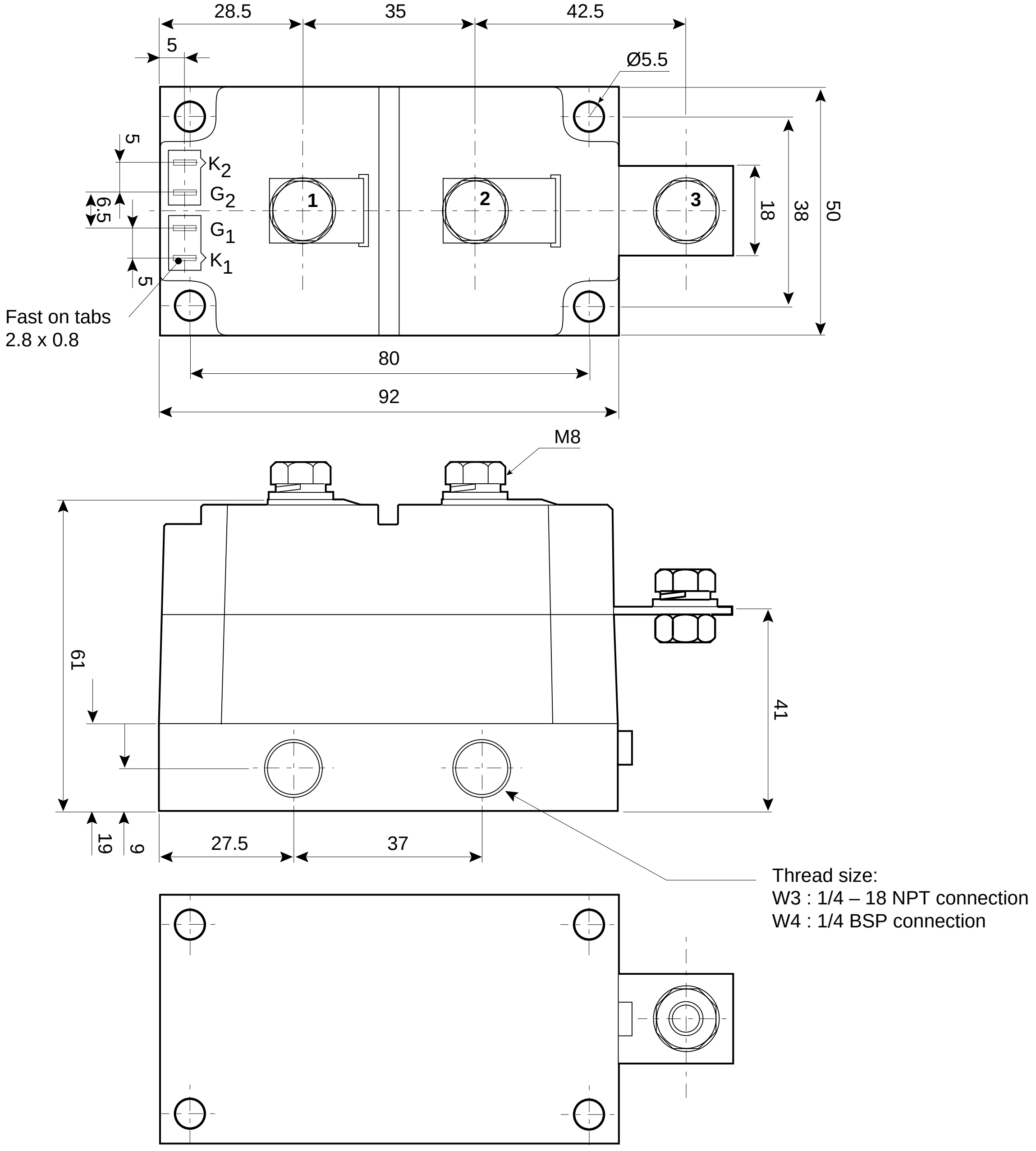


Recommended fixings for mounting: M5 socket head cap screws
Nominal weight: 1100g
Auxiliary gate/cathode leads not supplied as standard, but maybe purchased separately.

Module outline type code: MP03-W1 and W2

PACKAGE DETAILS

For further package information, please contact Customer Services. All dimensions in mm, unless stated otherwise.
DO NOT SCALE.



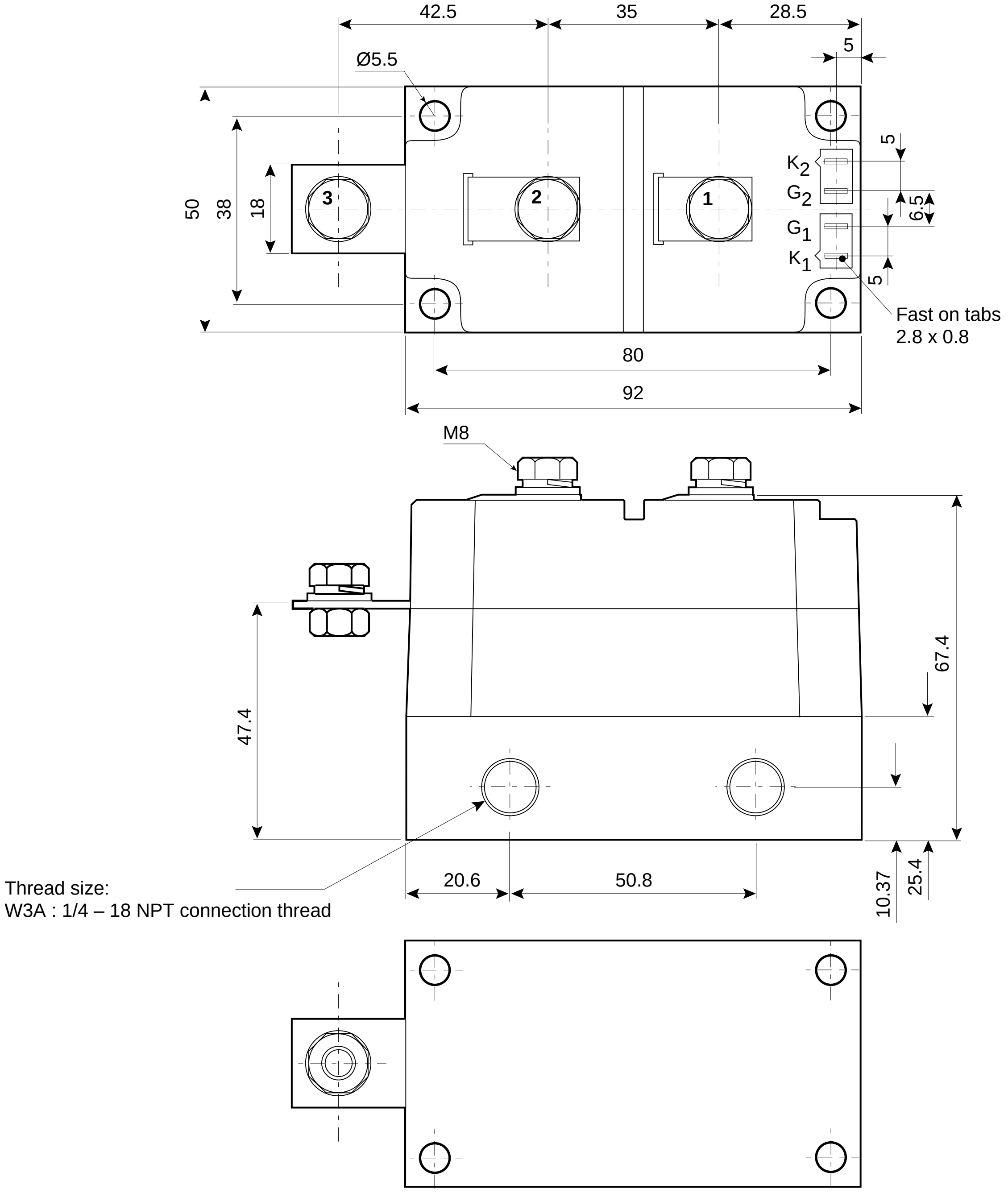
Thread size:
W3 : 1/4 – 18 NPT connection
W4 : 1/4 BSP connection

Recommended fixings for mounting: M5 socket head cap screws
Nominal weight: 1100g
Auxiliary gate/cathode leads not supplied as standard, but maybe purchased separately.

Module outline type code: MP03-W3 and W4

PACKAGE DETAILS

For further package information, please contact Customer Services. All dimensions in mm, unless stated otherwise.
DO NOT SCALE.



Recommended fixings for mounting: M5 socket head cap screws
Nominal weight: 1300g
Auxiliary gate/cathode leads not supplied as standard, but maybe purchased separately.

Module outline type code: MP03-W3A