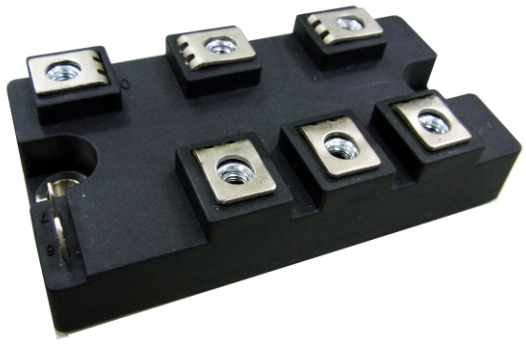
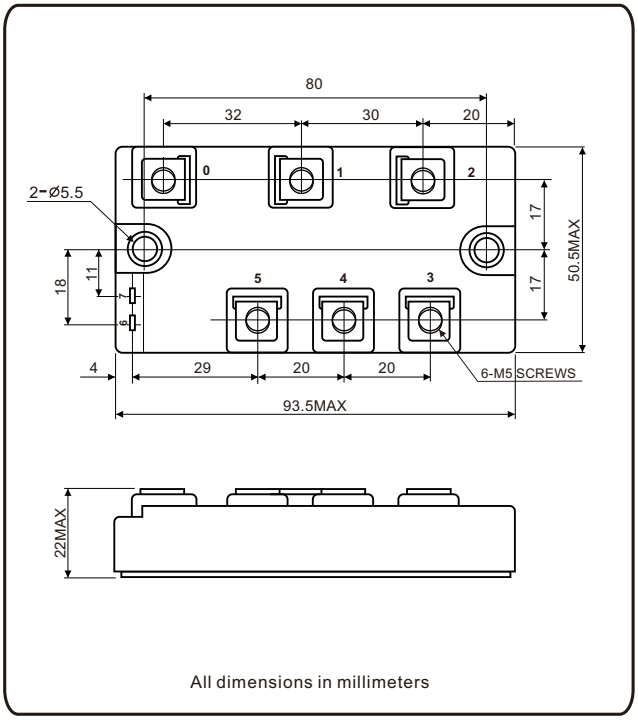
Three-Phase Bridge + Thyristor, 75A

MTPT7508 Thru MTPT7516

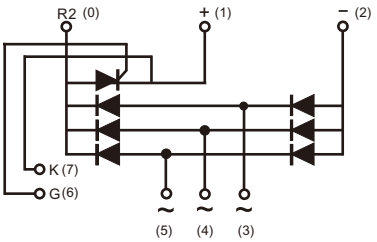




FEATURES

- UL recognition file number E320098
- Three-phase bridge and a thyristor
- High surge current capability
- Low thermal resistance
- Compliant to RoHS
- Isolation voltage up to 2500V
- Glass passivated chip junction

RoHS COMPLIANT



Applications

- Inverter for AC or DC motor control
- Current stablilzed power supply
- Switching power supply

ADVANTAGE

- International standard package
  Epoxy meets UL 94 V-O flammability rating
- Small volume, light weight
- Small thermal resistance
- Weight: 210g (7.4 ozs)

PRIMARY CHARACTERRISTICS	
$I_{F(AV)}$	75A
V_{RRM}	800V to 1600V
I_{FSM}/I_{TSM}	750A/920A
I_R	20 μA
V_{FM}/V_{TM}	1.3V/1.6V
$T_{J\ max.}$	150°C

◎ Maximum Ratings for Diodes

MAJOR RATINGS AND CHARACTERISTICS (T_A = 25°C unless otherwise noted)					
PARAMETER	SYMBOL	MTPT75			UNIT
		08	12	16	
Maximum repetitive peak reverse voltage	V_{RRM}/V_{RRM}	800	1200	1600	V
Peak reverse non-repetitive voltage	V_{RSM}	900	1300	1700	V
Output DC current three-phase full wave, T_c = 100°C	I_O	75			A
Peak forward surge current single sine-wave superimposed on rated load	I_{FSM}	750			A
Rating (non-repetitive, for t greater than 1 ms and less than 8.3 ms) for fusing	I^2t	2810			A^2s
Operating junction temperature range	T_J	-40 to 150			°C
Storage temperature range	T_{STG}	-40 to 125			°C
Thermal Impedance, junction to case	R_{thJC}	0.25			°C/W
Thermal Impedance, case to heatsink	R_{thCS}	0.10			°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)						
PARAMETER	TEST CONDITIONS	SYMBOL	MTPT75			UNIT
			08	12	16	
Maximum instantaneous forward drop per diode	I_F = 75A	V_F	1.3			V
Maximum reverse DC current at rated DC blocking voltage per diod	T_A = 25°C	I_R	20			μA
	T_A = 150°C		6			mA

◎ Maximum Ratings for Thyristor

FORWARD CONDUCTION						
PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum average on-state current at case temperature	$I_{T(AV)}$	180° conduction, half sine wave ,50Hz			75	A
					85	°C
Maximum peak, one-cycle, on-state non-repetitive surge current	I_{TSM}	t = 10 ms	No voltage reapplied	Sine half wave, initial T_J = T_J maximum	920	A
		t = 8.3 ms			965	
		t = 10 ms	100%V_{RRM} reapplied		775	
		t = 8.3 ms			810	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		4230	A^2s
		t = 8.3 ms			3865	
		t = 10 ms	100%V_{RRM} reapplied		3005	
		t = 8.3 ms			2725	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied			42.3	$kA^2\sqrt{s}$
Maximum on-state voltage drop	V_{TM}	I_{TM} = 225A, T_J = 25 °C, 180° conduction			1.6	V
Maximum holding current	I_H	Anode supply = 6 V, initial I_T= 30 A, T_J = 25 °C			150	mA
Maximum latching current	I_L	Anode supply = 6 V Gate pulse: 10 V, 100 μs, T_J = 25 °C			400	

SWITCHING				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Typical delay time	t_d	T_J = 25 °C ,gate current = 1A dI_g/dt = 1 A/μs V_d = 0.67 V_{DRM}	1	μs
Typical rise time	t_r		2	
Typical tum-off time	t_q	I_{TM} = 300A ; dI/dt = 15 A/μs ; T_J = T_J maximum, V_R = 50V ; dV/dt = 20V/μs ; gate 0V ,100Ω	50 to 150	

BLOCKING				
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**VALUES**	**UNITS**
Maximum peak reverse and off-state leakage current	I_{RRM}, I_{DRM}	T_J = 125 °C	20	mA
RMS isolation Voltage	V_{ISO}	50 Hz, circuit to base, all terminals shorted, 25 ºC ,60s	2500	V
Critical rate of rise of off-state voltage	dV/dt	T_J = T_J maximum, exponential to 67 % rated V_{DRM}	500	V/µs

TRIGGERING					
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**VALUES**	**UNITS**
Maximum peak gate power	P_{GM}	$t_p \leq 5$ ms, T_J = T_J maximum		15	W
Maximum average gate power	$P_{G(AV)}$	f = 50 Hz, T_J = T_J maximum		5	
Maximum peak gate current	I_{GM}	$t_p \leq 5$ ms, T_J = T_J maximum		3	A
Maximum peak negative gate voltage	$-V_{GT}$			10	V
Maximum required DC gate voltage to trigger	V_{GT}	T_J = 25 °C	Anode supply = 6V, resistive load; R_a = 1 Ω	3	
Maximum required DC gate current to trigger	I_{GT}			150	mA
Maximum gate voltage that will not trigger	V_{GD}	T_J = T_J maximum, 67% V_{DRM} applied		0.25	V
Maximum gate current that will not trigger	I_{GD}			10	mA
Maximum rate of rise of turned-on current	dI/dt	T_J = 125ºC, V_D = 0.5V_{DRM}, I_G = 100 mA, dI_G/dt = 0.1 A/µs		150	A/µs

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**VALUES**	**UNITS**
junction operating and storage temperature range	T_J, T_{stg}		- 40 to 125	°C
Maximum thermal resistance, junction to case per junction	R_{thJC}	DC operation	0.40	°C/W
Typical thermal resistance, case to heatsink per module	R_{thCS}	Mounting surface, smooth , flat and greased	0.10	
Mounting torque ± 10 % — to heatsink, M5		A mounting compound is recommended and the torque should be rechecked after a period of about 3 hours to allow for the spread of the compound.	3	N.m
Mounting torque ± 10 % — to terminal, M5			3	
Approximate weight			210	g
			7.4	oz.

Device code

MTPT	75	16
①	②	③

1 - Module type : “MTPT” for 3Ø Bridge + Thyristor

2 - $I_{F(AV)}$ rating : "75" for 75A

3 - Voltage code : code x 100 = V_{RRM}

Fig.1 Power dissipation (For Diodes)

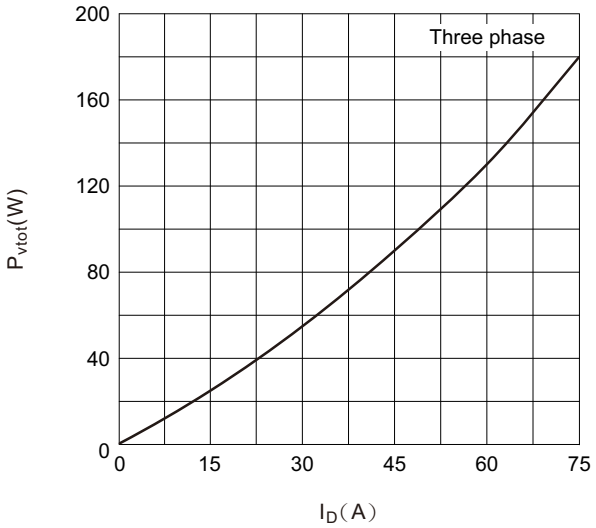


Fig.2 Forward current derating curve (For Diodes)

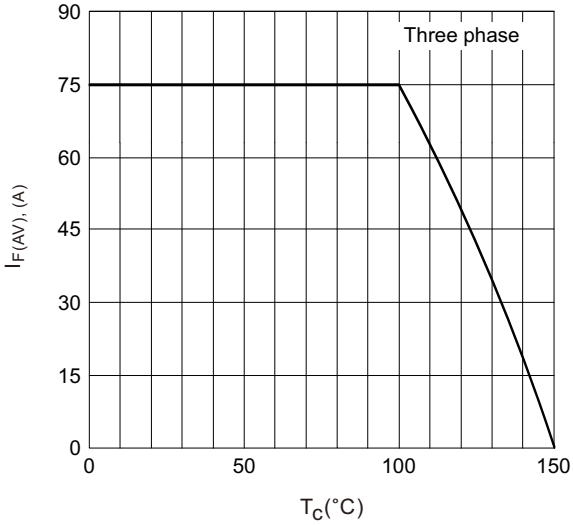


Fig.3 Transient thermal impedance (For Diodes)

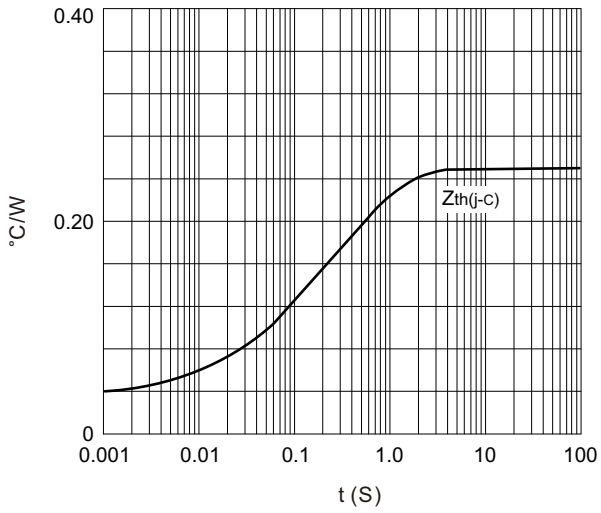


Fig.4 Max non-repetitive forward surge current (For Diodes)

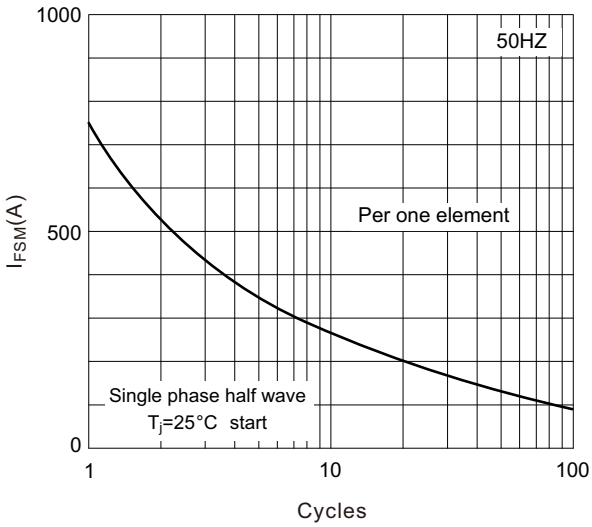


Fig.5 Forward characteristics (For Diodes)

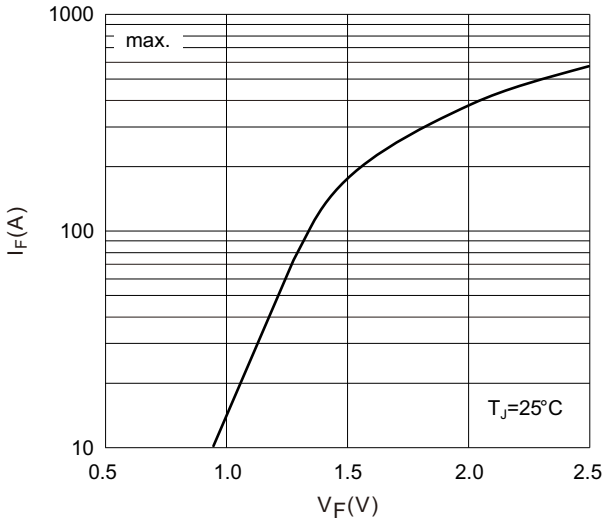


Fig.6 SCR power dissipation

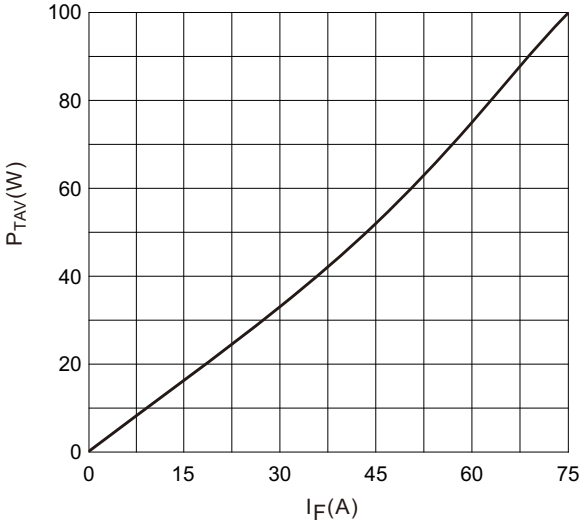


Fig.7 SCR forward current derating curve

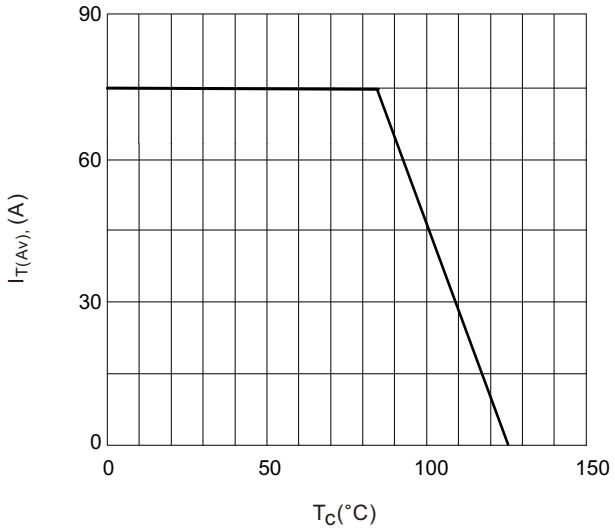


Fig.8 SCR transient thermal impedance

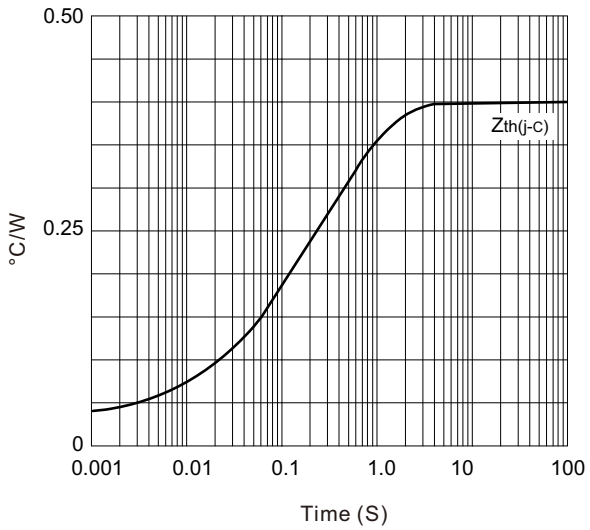


Fig.9 SCR forward characteristics

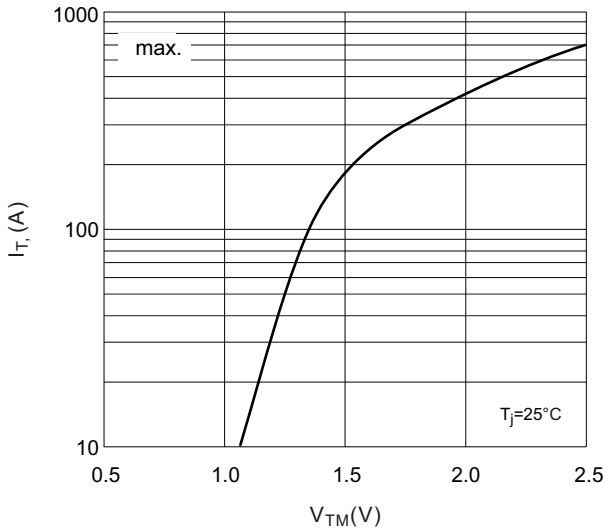


Fig.10 Gate trigger characteristics