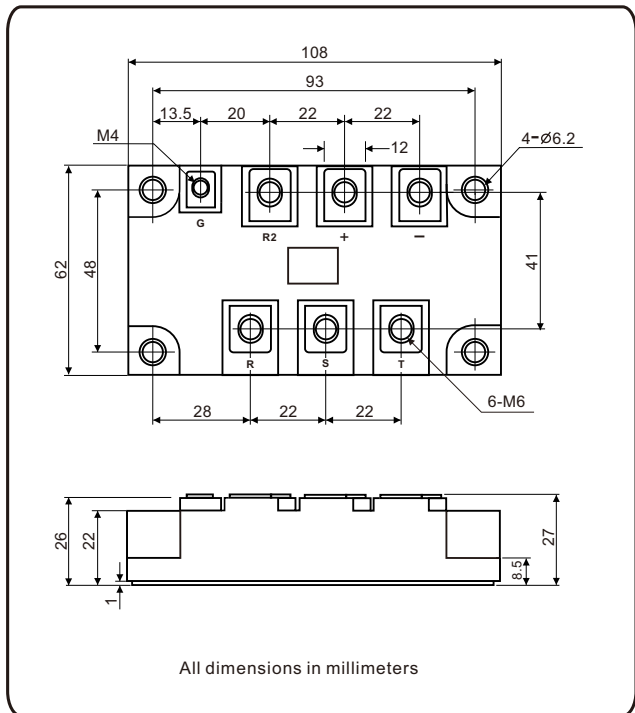


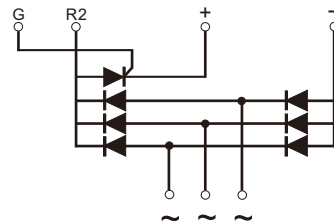
Three-Phase Bridge + Thyristor, 150A

MTPT15008 Thru MTPT15016



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



Applications

- Inverter for AC or DC motor control
- Current stabilized 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: 470g (16.6 ozs)

PRIMARY CHARACTERISTICS

$I_{F(AV)}$	150A
V_{RRM}	800V to 1600V
I_{FSM}/I_{TSM}	1800A/1500A
I_R	20 μ A
V_{FM}/V_{TM}	1.4V/1.6V
$T_{J \max.}$	150°C

⊙ Maximum Ratings for Diodes

MAJOR RATINGS AND CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)					
PARAMETER	SYMBOL	MTPT150			UNIT
		08	12	16	
Maximum repetitive peak reverse voltage	V_{RRM}	800	1200	1600	V
Peak reverse non-repetitive voltage	V_{RSM}	900	1300	1700	V
Output DC current three-phase full wave, $T_c = 100^\circ\text{C}$	I_O	150			A
Peak forward surge current single sine-wave superimposed on rated load	I_{FSM}	1800			A
Rating (non-repetitive, for t greater than 1 ms and less than 8.3 ms) for fusing	I^2t	16200			A^2s
Operating junction temperature range	T_J	-40 to 150			$^\circ\text{C}$
Storage temperature range	T_{STG}	-40 to 125			$^\circ\text{C}$
Thermal Impedance, junction to case	R_{thJC}	0.14			$^\circ\text{C}/\text{W}$
Thermal Impedance, case to heatsink	R_{thCS}	0.10			$^\circ\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS	SYMBOL	MTPT150			UNIT
			08	12	16	
Maximum instantaneous forward drop per diode	$I_F = 150\text{A}$	V_F	1.4			V
Maximum reverse DC current at rated DC blocking voltage per diode	$T_A = 25^\circ\text{C}$	I_R	20			μA
	$T_A = 150^\circ\text{C}$		10			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		150	A
				90	$^\circ\text{C}$
Maximum peak, one-cycle, on-state non-repetitive surge current	I_{TSM}	t = 10 ms	No voltage reappplied	1500	A
		t = 8.3 ms		1570	
		t = 10 ms	100% V_{RRM} reappplied	1260	
		t = 8.3 ms		1319	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reappplied	11.25	kA^2s
		t = 8.3 ms		10.23	
		t = 10 ms	100% V_{RRM} reappplied	7.94	
		t = 8.3 ms		7.22	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reappplied		112.5	$\text{kA}^2\sqrt{\text{s}}$
Maximum on-state voltage drop	V_{TM}	$I_{TM} = 450\text{A}$, $T_J = 25^\circ\text{C}$, 180° conduction		1.60	V
Maximum holding current	I_H	Anode supply = 6 V, initial $I_T = 30\text{A}$, $T_J = 25^\circ\text{C}$		200	mA
Maximum latching current	I_L	Anode supply = 6 V Gate pulse: 10 V, 100 μs , $T_J = 25^\circ\text{C}$		400	

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

BLOCKING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum peak reverse and off-state leakage current	I_{RRM} I_{DRM}	$T_J = 125\text{ }^\circ\text{C}$		25	mA
RMS isolation Voltage	V_{ISO}	50 Hz, circuit to base, all terminals shorted, $25\text{ }^\circ\text{C}$, 60s		3000	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}	$t_p \leq 5\text{ ms}$, $T_J = T_J$ maximum		10	W
Maximum average gate power	$P_{G(AV)}$	$f = 50\text{ Hz}$, $T_J = T_J$ maximum		3	
Maximum peak gate current	I_{GM}	$t_p \leq 5\text{ ms}$, $T_J = T_J$ maximum		3	A
Maximum peak negative gate voltage	$-V_{GT}$			10	V
Maximum required DC gate voltage to trigger	V_{GT}	$T_J = 25\text{ }^\circ\text{C}$	Anode supply = 6V, resistive load; $R_a = 1\ \Omega$	3	mA
Maximum required DC gate current to trigger	I_{GT}			150	
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	$T_J = 125\text{ }^\circ\text{C}$, $V_D = 0.5V_{DRM}$, $I_G = 100\text{ mA}$ $di_G/dt = 0.1\text{ A}/\mu\text{s}$		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	$^\circ\text{C}$
Maximum thermal resistance, junction to case per junction	R_{thJC}	DC operation		0.18	$^\circ\text{C}/\text{W}$
Typical thermal resistance, case to heatsink per module	R_{thCS}	Mounting surface, smooth , flat and greased		0.10	
Mounting torque $\pm 10\%$ to heatsink, M6 to terminal, M6/M4		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.		5	N.m
				5 / 2	
Approximate weight				470	g
				16.6	oz.

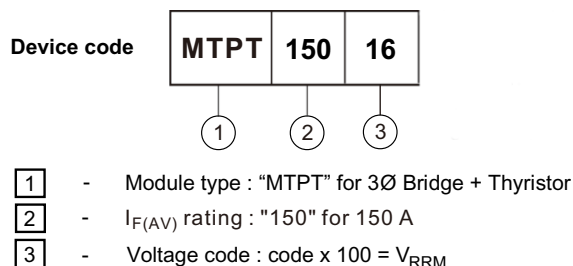


Fig.1 Power dissipation

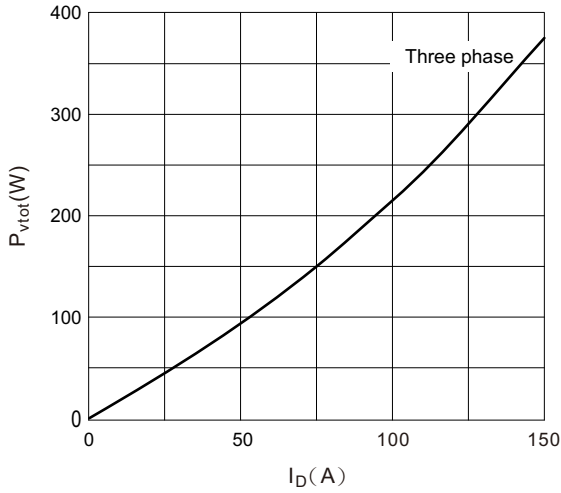


Fig.2 Forward current derating curve

Three phase

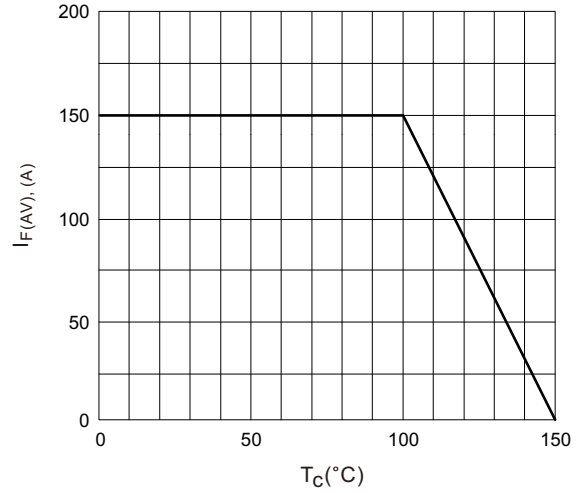


Fig.3 Transient thermal impedance

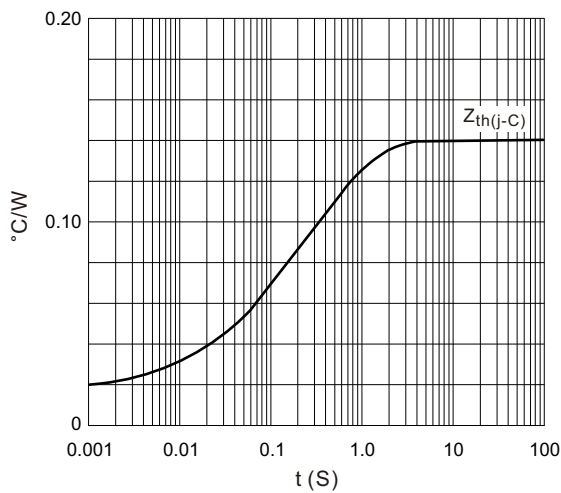


Fig.4 Max non-repetitive forward surge current

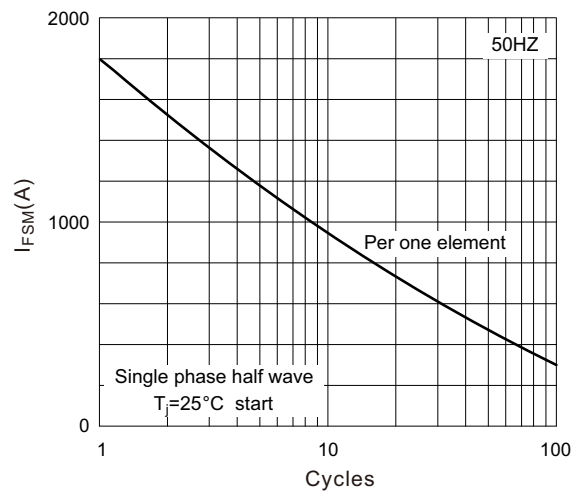


Fig.5 Forward characteristics

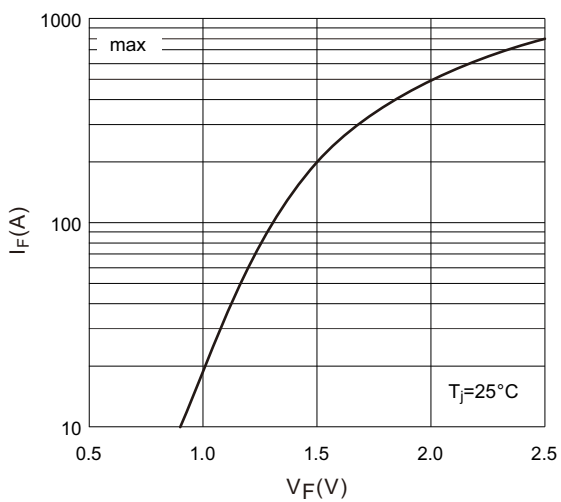


Fig.6 SCR power dissipation

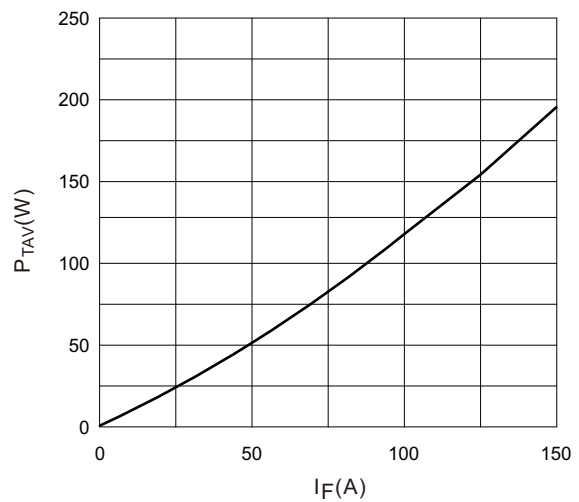


Fig.7 SCR forward current derating curve

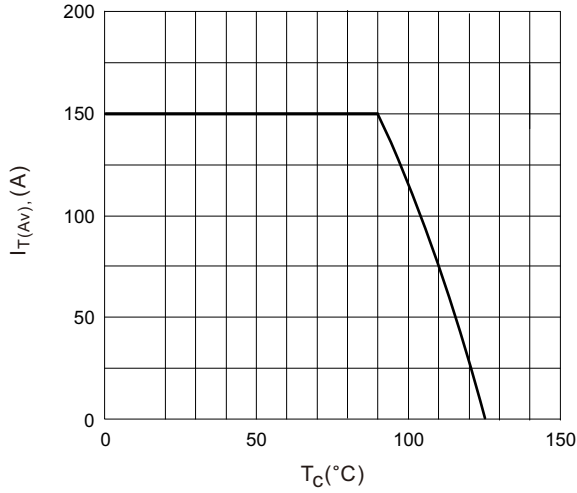


Fig.8 SCR transient thermal impedance

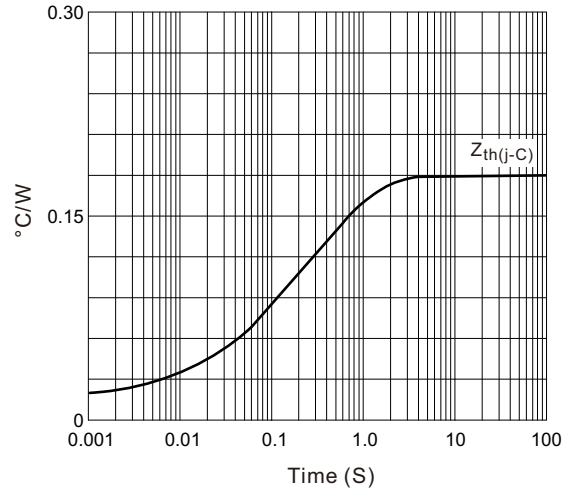


Fig.9 SCR forward characteristics

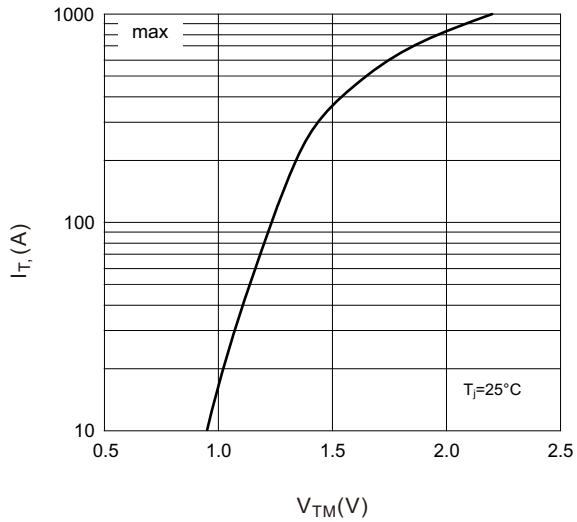


Fig.10 Gate trigger characteristics

