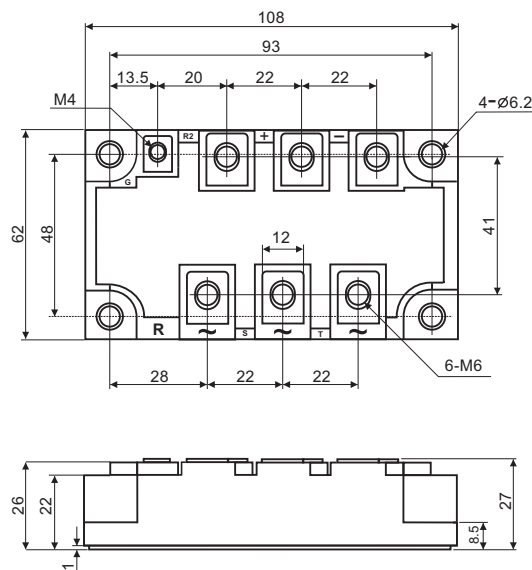


Three-Phase Bridge + Thyristor, 150A

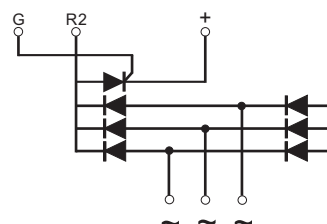
MTPT15008 Thru MTPT15016



All dimensions in millimeters

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



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}	1460A
I_R	20 μ A
V_{FM}/V_{TM}	1.3V
$T_J \text{ max.}$	150°C

Nell High Power Products

◎ 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}/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}	1460			A
Rating (non-repetitive, for t greater than 1 ms and less than 8.3 ms) for fusing	I^2t	10660			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}	0.07			$^\circ\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS (T _A = 25°C unless otherwise noted)						
PARAMETER	TEST CONDITIONS	SYMBOL	MTPT150			UNIT
			08	12	16	
Maximum instantaneous forward drop per diode	I _F = 150A	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		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	
					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	1460	A	
		t = 8.3 ms			1529		
Maximum I ² t for fusing	I ² t	t = 10 ms			100%V _{RRM} reapplied	10.7	kA ² s
		t = 8.3 ms				9.7	
		t = 10 ms	7.5				
		t = 8.3 ms	6.8				
Maximum I ² √t for fusing	I ² √t	t = 0.1 ms to 10 ms, no voltage reapplied			107	kA ² √s	
Maximum on-state voltage drop	V _{TM}	I _{TM} = 150A, T _J = 25 °C, 180° conduction			1.3	V	
Maximum holding current	I _H	Anode supply = 12 V initial I _T = 30 A, T _J = 25 °C			200	mA	
Maximum latching current	I _L	Anode supply = 12 V resistive load = 1 Ω Gate pulse: 10 V, 100 μs, T _J = 25 °C			400		

SWITCHING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Typical delay time	t_d	$T_J = 25^\circ\text{C}$, gate current = 1A $dI_g/dt = 1\text{A}/\mu\text{s}$		1	μs
Typical rise time	t_r	$V_d = 0.67\% V_{DRM}$		2	
Typical tum-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}	$T_J = 125\text{ }^{\circ}\text{C}$	30	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/ μ s

TRIGGERING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum peak gate power	P _{GM}	t _p ≤ 5 ms, T _J = T _J maximum		10	W
Maximum average gate power	P _{G(AV)}	f = 50 Hz, T _J = T _J maximum		3	
Maximum peak gate current	I _{GM}	t _p ≤ 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 = 12 V, resistive load; R _a = 1 Ω	3	
Maximum required DC gate current to trigger	I _{GT}			100	
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	dl/dt	T _J = 25°C ,I _{GM} = 1.5A ,t _r ≤ 0.5 μs		200	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	0.21	°C/W
Typical thermal resistance, case to heatsink per module	R _{thCS}	Mounting surface, smooth , flat and greased	0.09	
Mounting torque ± 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.

Device code

MTPT	150	16
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① ② ③

- ① - Module type : "MTPT" for 3Ø Bridge + Thyristor
- ② - $I_{F(AV)}$ rating : "150" for 200 A
- ③ - Voltage code : code x 100 = V_{RRM}

Fig.1 Power dissipation

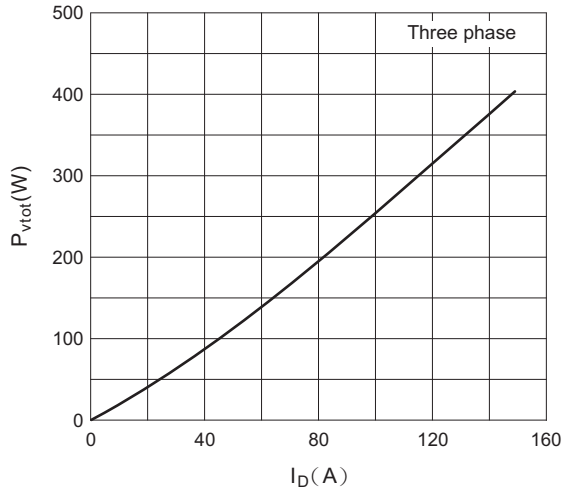


Fig.2 Forward current derating curve

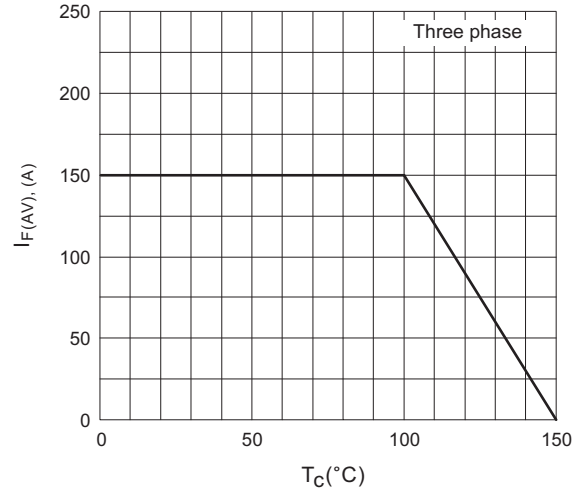


Fig.3 Transient thermal impedance

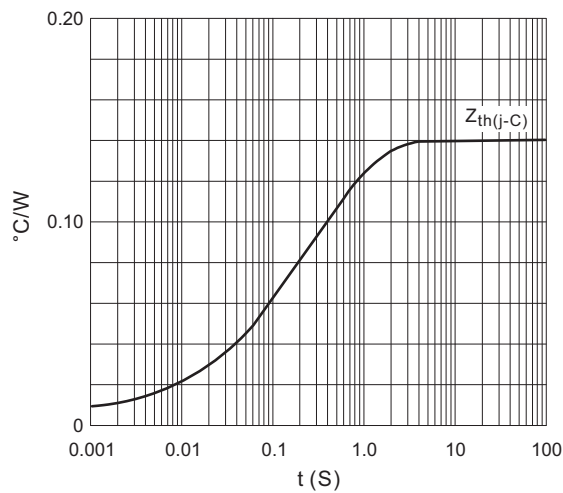


Fig.4 Max non-repetitive forward surge current

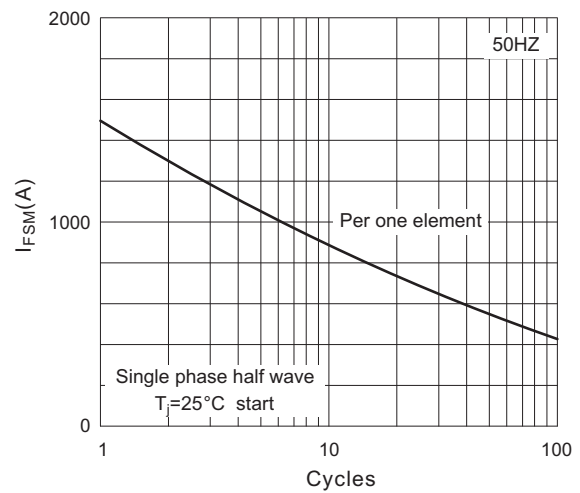


Fig.5 Forward characteristics

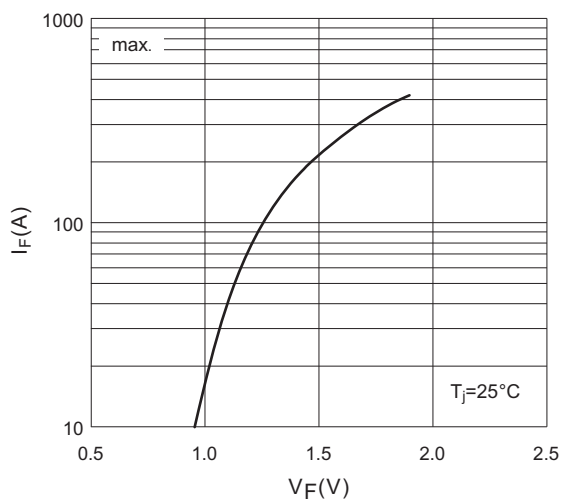


Fig.6 SCR power dissipation

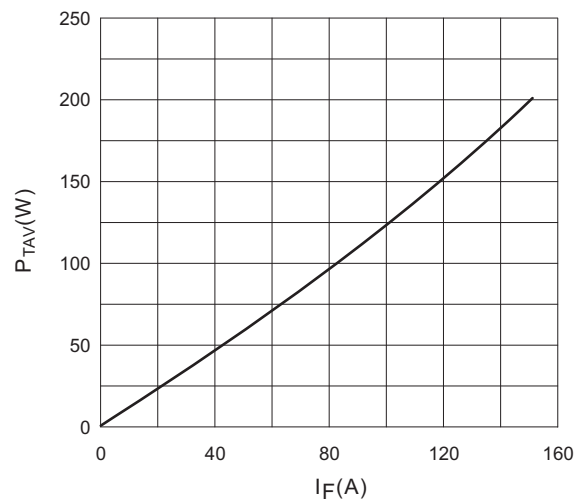


Fig.7 SCR forward current derating curve

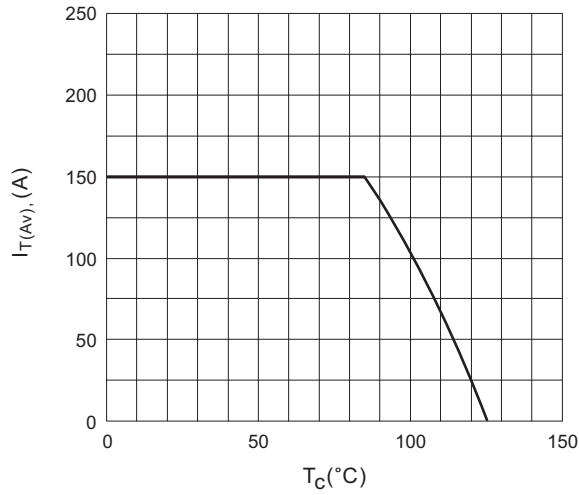


Fig.8 SCR transient thermal impedance

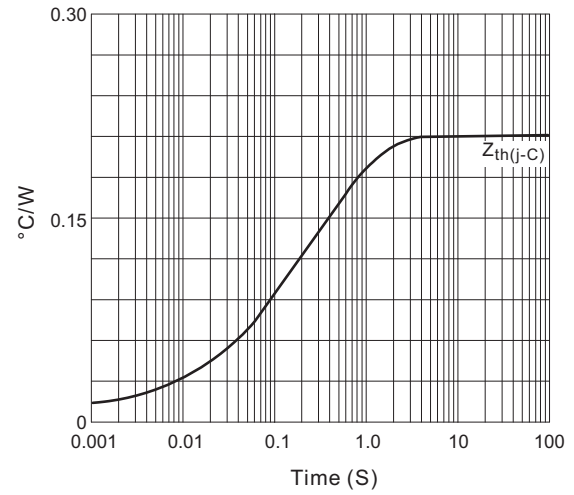


Fig.9 SCR forward characteristics

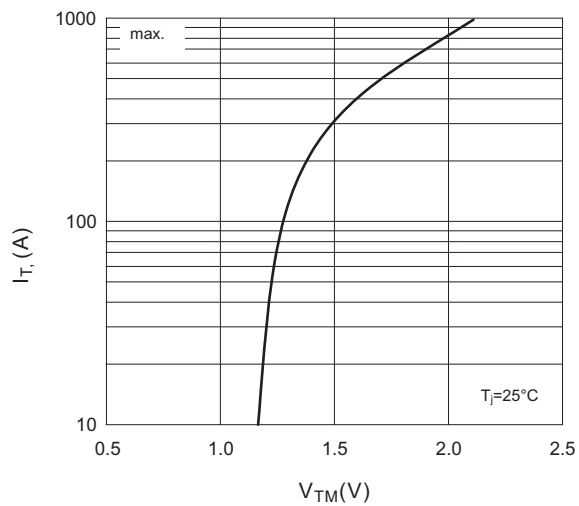


Fig.10 Gate trigger characteristics

