UMW BT138D-800E

Bidirectional Thyristor

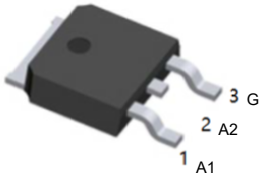
1.Description

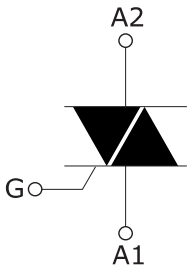
NPNPN five-layer structure of silicon bidirectional devices; with independent intellectual property rights of single-sided digging technology, table glass passivation process; multi-layer metallized electrodes on the back; with high blocking voltage and high temperature stability.

2.Features

vacuum cleaners, power tools and other motor speed controllers; solid state relays; heating controllers (temperature regulation); other phase control circuits.

3.Pinning Information





TO-252

4.Absolute maximum ratings (T_J=25°C unless otherwise stated)

Parameter			Symbol	Values	Units
RMSon-statecurrent(full sine wave)			$I_{T(RMS)}$	12	A
Non repetitive surge peakon-state current (full cycle,T_J initial=25°C)	F=50HZ, tp=20ms		I_{TSM}	95	A
I^2t value for fusing	tp=10ms		I^2t	45	A^2S
Critical rate of rise of on-state current I_G=2 x $I_{GT,}$ tr≤100ns	T_J=125°C		di/dt	50	A/us
Off state repetitive peak voltage Reverse repetitive peak voltage	T_J=25°C		V_{DRM}/V_{RRM}	800	V
Peak gate current	tp=20us	T_J=150°C	I_{GM}	2	A
Average gate power dissipation		T_J=150°C	$P_{G(AV)}$	0.5	W
Storage junction temperature range			T_{STG}	-40 to 150	°C
Operating junction temperature range			T_J	-40 to 125	°C

5.1 Electrical characteristics (3 quadrants)

Parameter	Quadrant	Range	Symbol	Values	Units
V_D=12V R_L=30Ω	Ⅰ	MAX	I_{GT}	≤30	mA
	Ⅱ	MAX	V_{GT}	1.5	V
V_D=V_{DRM}, R_L=3.3kΩ , T_J=125°C	Ⅲ	MIN	V_{GD}	0.2	V
I_T=100mA		MAX	I_H	30	mA
I_G=1.2 x I_{GT}		MAX	I_L	30	mA
		MAX		40	mA
V_D = 67% V_{DRM}, gate open,mA, T_J=125°C		MIN	dv/dt	50	V/us
Critical rise rate of commutation voltage T_J=150°C		MIN	(dv/dt)c	8	V/us

5.2 Electrical characteristics (4 quadrants)

Parameter	Quadrant	Range	Symbol	value		Units
V_D=12V R_L=30Ω	Ⅰ - Ⅱ - Ⅲ	MAX	I_{GT}	Ⅰ Ⅱ Ⅲ	Ⅳ	mA
		MAX		≤30	≤50	mA
	Ⅳ	MAX	V_{GT}	1.5		V
V_D=V_{DRM}, R_L=3.3kΩ , T_J=125°C		MIN	V_{GD}	0.2		V
I_T=500mA		MAX	I_H	30		mA
I_G=1.2 x I_{GT}		MAX	I_L	40		mA
		MAX		50		mA
V_D = 67% V_{DRM}, gate open,mA, T_J=125°C		MIN	dv/dt	50		V/us
Critical rise rate of commutation voltage T_J=150°C		MIN	(dv/dt)c	10		V/us

6.Static Parameters

Parameter			Symbol	Values		Units
I_{TM}=12A	T_J=25°C	MAX	V_{TM}	1.55		V
threshold on-state voltage	T_J=150°C	MAX	V_{T0}	0.86		V
Dynamic resistance	T_J=150°C	MAX	Rd	36.6		mΩ
V_{DRM}=V_{RRM}	T_J=25°C	MAX	I_{DRM}, I_{RRM}	5		uA
	T_J=150°C	MAX		1		mA
Thermal resistance	Junction to case(AC)		$R_{th(j-c)}$	TYP.	1.4	°C/W
	Junction to ambient		$R_{th(j-a)}$	TYP.	70	°C/W

7.Typical Characteristic

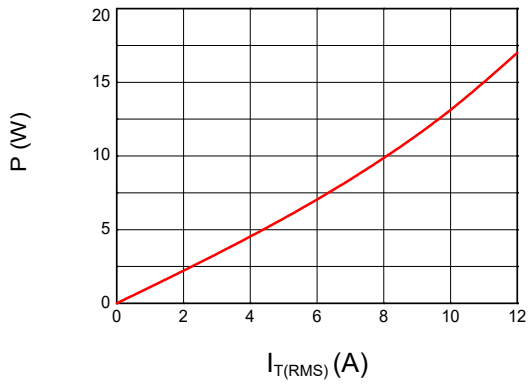


Figure 1: Maximum power dssipation versus RMS on-state current (full cycle)

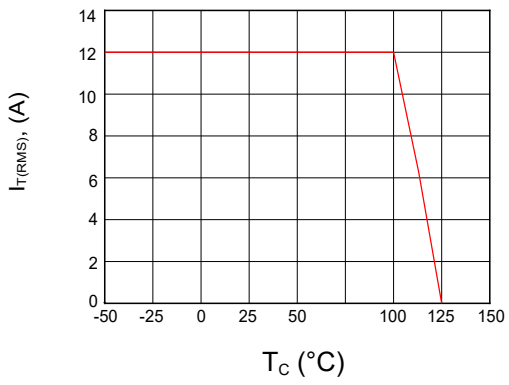


Figure 2: RMS on-slale curent versus case temperature (full cycle)

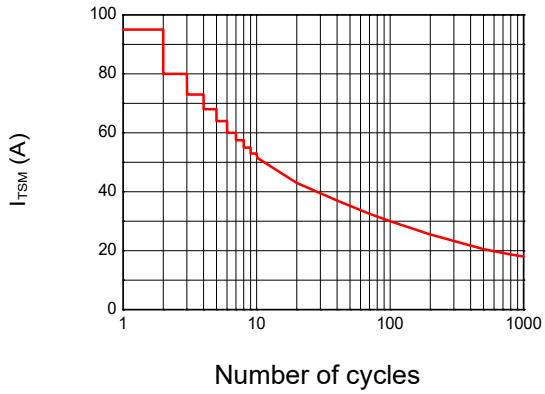


Figure 3: Surge peak on-stale current versus number of cycles

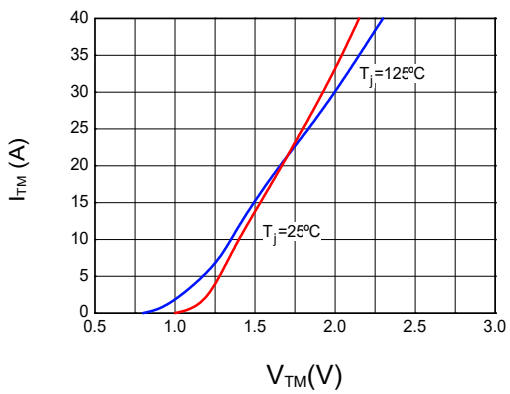


Figure 4: On-state characteristics (maximum values)

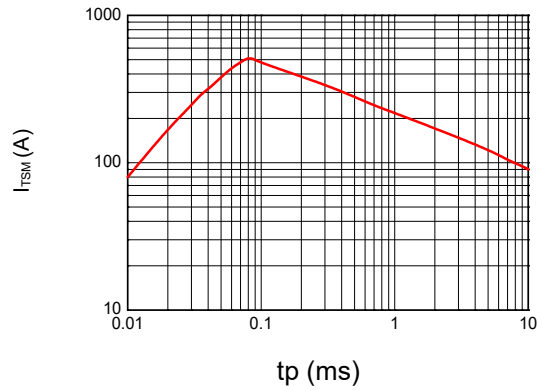


Figure 5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp<10ms

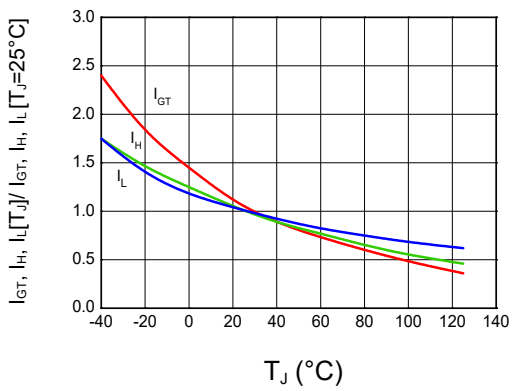
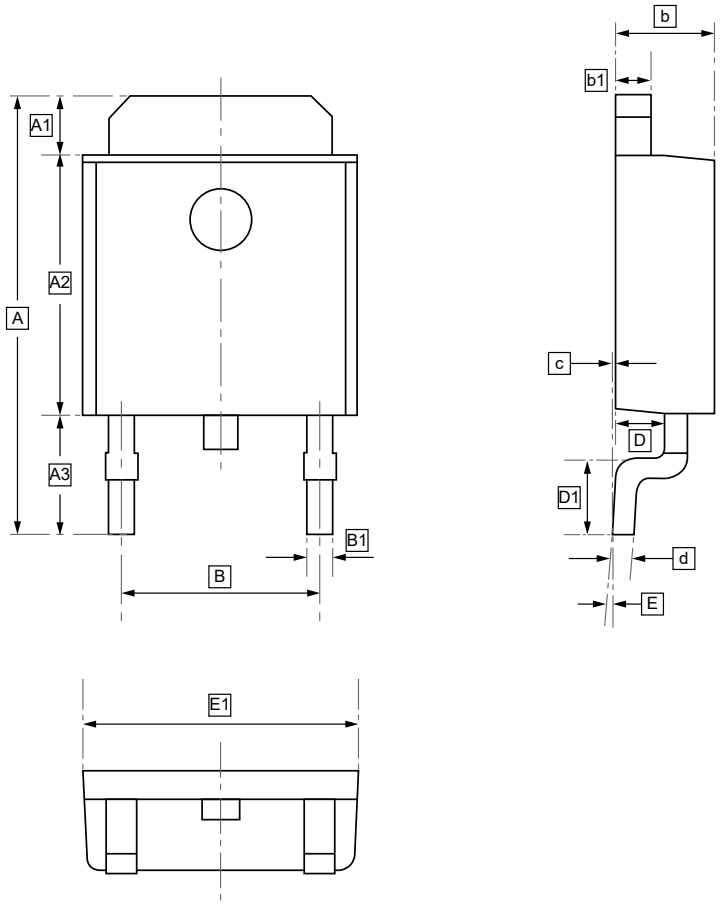


Figure 6: Relative variations of gate trigger current, holding current and latching current versus junction temperature (typical values)

8.TO-252 Package Outline Dimensions

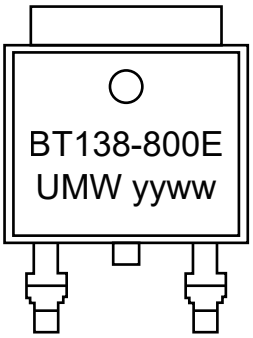


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	B	B1	b	b1	c	D	D1	d
Min	10.04	1.35	5.94	2.65	4.60	0.55	2.20	0.75	0	1.05	1.73	0.45
Max	10.44	1.45	6.14	2.95		0.65	2.40	0.85	0.15	1.25		0.55

Symbol	E	E1
Min	0°	6.40
Max	8°	6.60

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW BT138D-800E	TO-252	2500	Tape and reel

10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.