

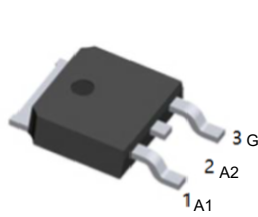
1.Description

NPNN 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.

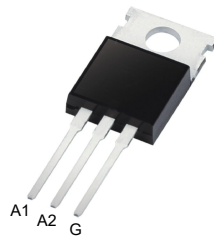
2.Features

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

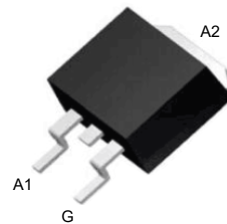
3.Pinning Information



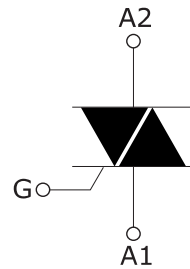
TO-252



TO-220/TO-220F



TO-263





4.Absolute maximum ratings ($T_J=25^{\circ}\text{C}$ unless otherwise stated)

Parameter			Symbol	Values	Units
RMS on-state current (full sine wave)	BTA	T _C =80°C	I _{T(RMS)}	16	A
	BTB	T _C =90°C			
Non repetitive surge peak on-state current (full cycle, T _J initial=25°C)	F=50HZ, tp=20ms		I _{TSM}	160	A
I ² t value for fusing	tp=10ms		I ² t	144	A ² S
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}	4	A
Average gate power dissipation		T _J =150°C	P _{G(AV)}	1	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
$V_D=12V$ $R_L=33\Omega$	I	MAX	I_{GT}	≤ 50		mA
	II	MAX	V_{GT}	1.5		V
$V_D=V_{DRM}$, $R_L=3.3k\Omega$, $T_J=125^\circ C$	III	MIN	V_{GD}	0.2		V
$I_T=100mA$		MAX	I_H	60		mA
$I_G=1.2 \times I_{GT}$		MAX	I_L	I - III	60	mA
		MAX		II	100	mA
$V_D = 67\% V_{DRM}$, gate open, mA, $T_J=125^\circ C$		MIN	dv/dt	500		V/us
Critical rise rate of commutation voltage $T_J=150^\circ C$		MIN	(dv/dt)c	10		V/us

5.2 Electrical characteristics (4 quadrants)

Parameter	Quadrant	Range	Symbol	value		Units
$V_D=12V$ $R_L=33\Omega$	I	MAX	I_{GT}	I II III	IV	mA
	II	MAX		≤ 50	≤ 120	mA
	III	MAX	V_{GT}	1.5		V
$V_D=V_{DRM}$, $R_L=3.3k\Omega$, $T_J=125^\circ C$	IV	MIN	V_{GD}	0.2		V
$I_T=500mA$		MAX	I_H	60		mA
$I_G=1.2 \times I_{GT}$		MAX	I_L	60		mA
		MAX		100		mA
$V_D = 67\% V_{DRM}$, gate open, mA, $T_J=125^\circ C$		MIN	dv/dt	500		V/us
Critical rise rate of commutation voltage $T_J=150^\circ C$		MIN	(dv/dt)c	10		V/us

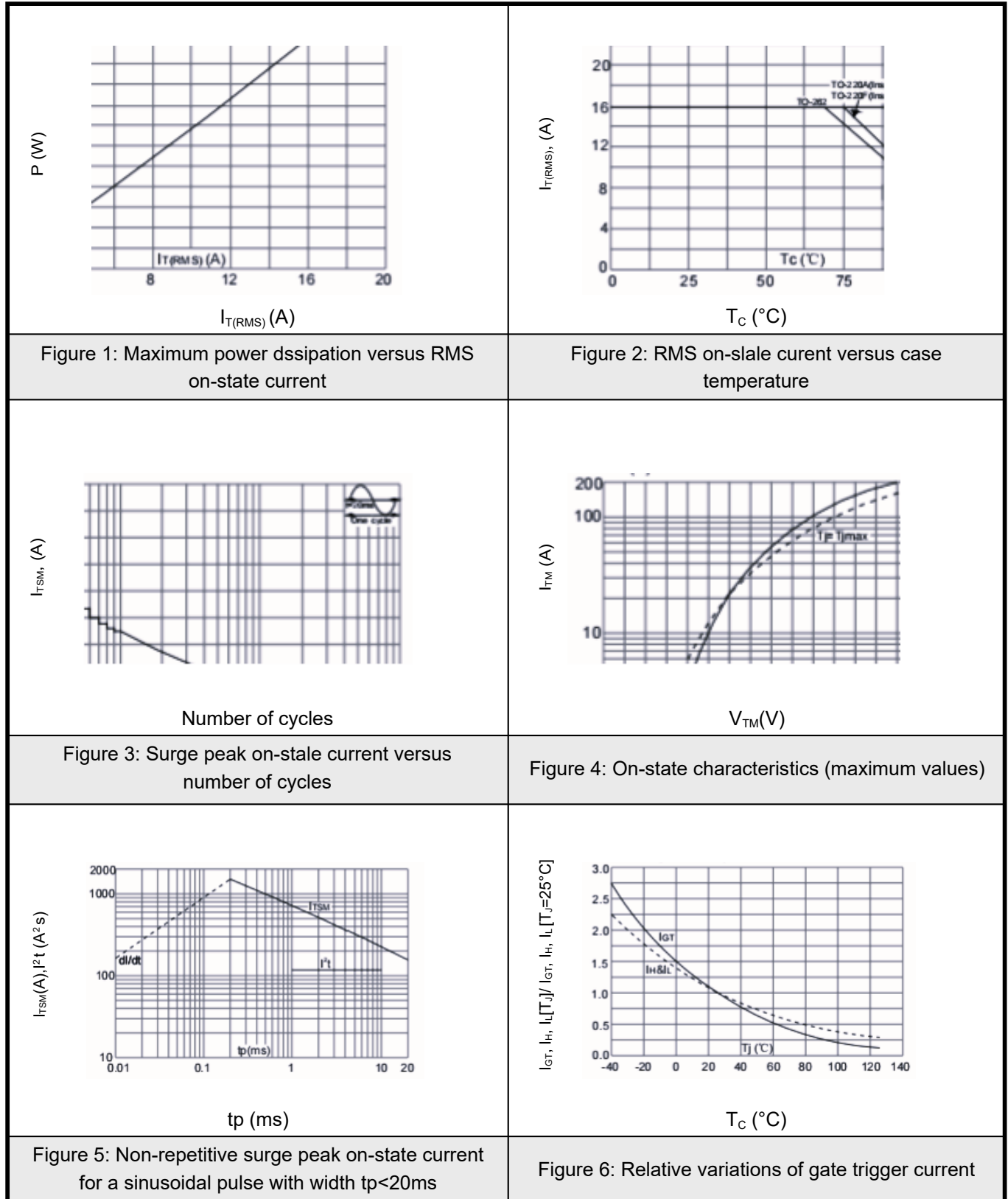


6.Static Parameters

Parameter			Symbol	Values	Units
$I_{TM}=32A$	$T_J=25^{\circ}C$	MAX	V_{TM}	1.5	V
threshold on-state voltage	$T_J=150^{\circ}C$	MAX	V_{T0}	0.87	V
Dynamic resistance	$T_J=150^{\circ}C$	MAX	R_d	14.6	mΩ
$V_{DRM}=V_{RRM}$	$T_J=25^{\circ}C$	MAX	I_{DRM}, I_{RRM}	5	uA
	$T_J=150^{\circ}C$	MAX		1	mA
Junction to ambient	BTA		$R_{th(j-c)}$	2.1	$^{\circ}C/W$
	BTB			1.3	$^{\circ}C/W$

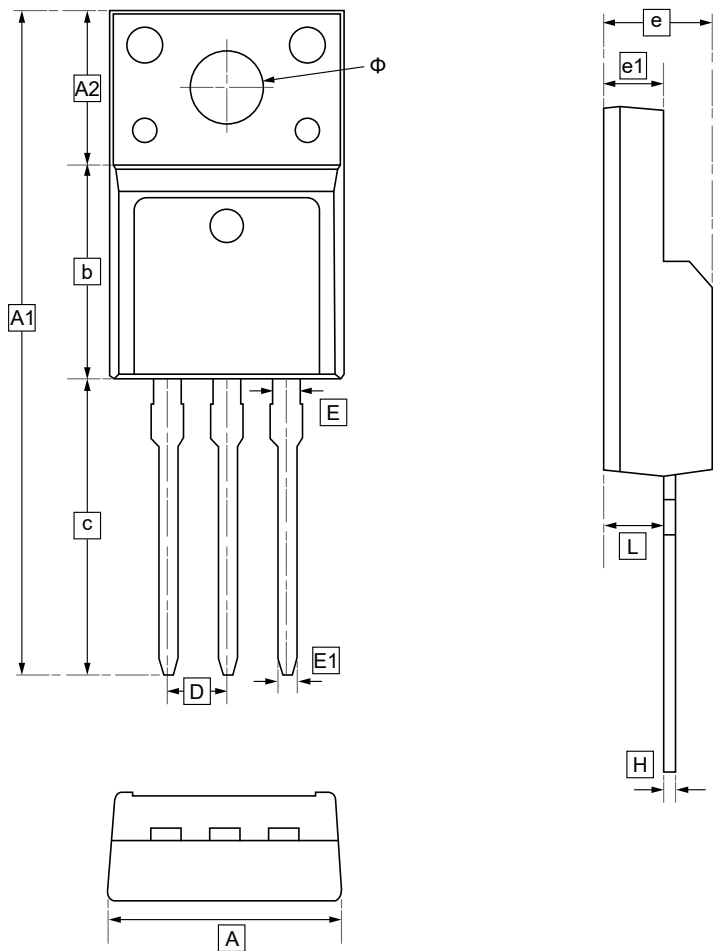


7. Typical Characteristic





8.1 TO-220F Package Outline Dimensions



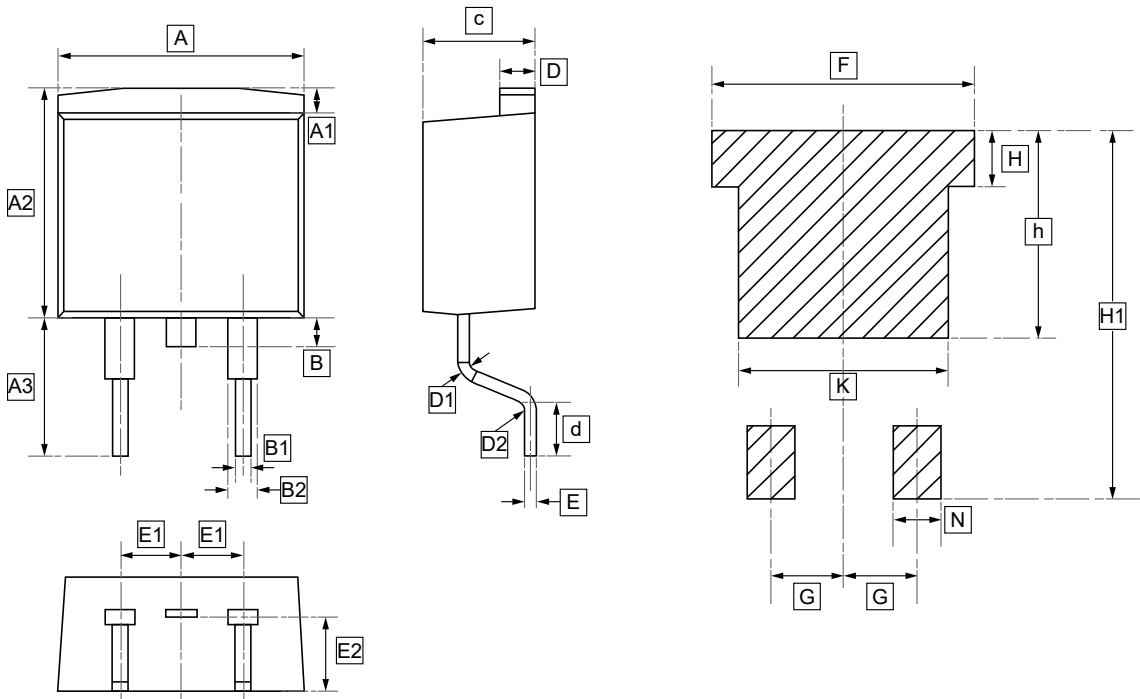
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	Φ	e	e1	L
Min	10.00	28.80	6.58	9.12	12.95	2.54	1.15	0.75	3.13	4.50	2.40	2.50
Max	10.20	29.20	6.78	9.32	13.25		1.25	0.85	3.23	4.70	2.60	2.70

Symbol	H
Min	0.45
Max	0.55



8.2 TO-263 Package Outline Dimensions



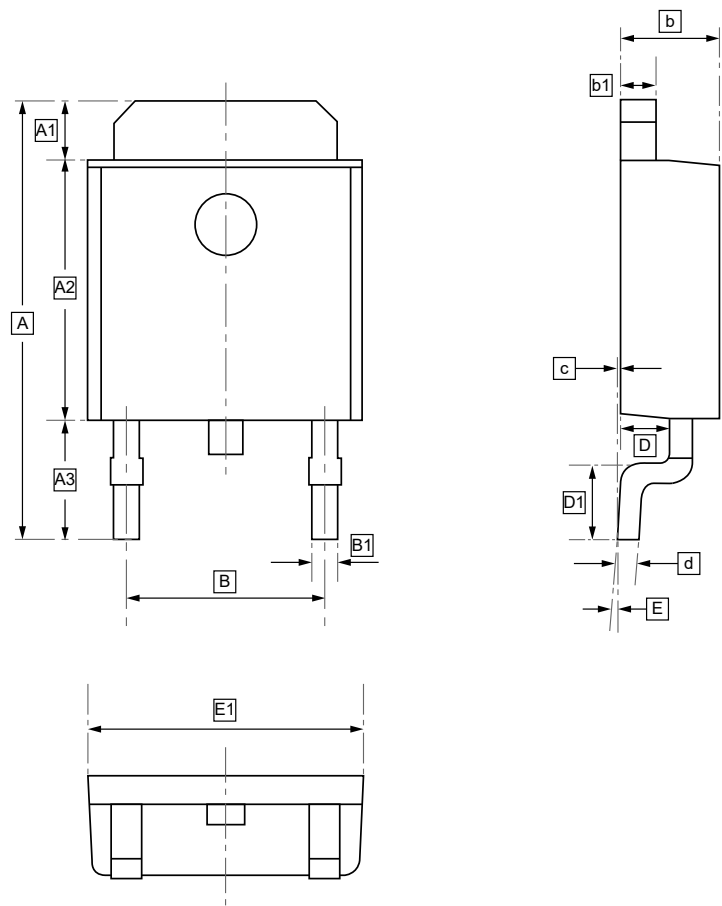
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	B	B1	B2	c	D	D1	D2	d
Min	10.0	0.5	8.3	5.3	-	0.5	1.2	-	1.1	0.6R	0.8R	2.29
Max	TYP.	1.5	8.7	6.1	1.6	0.9	1.6	4.8	1.5	TYP.	TYP.	2.79

Symbol	E	E1	E2	F	H	h	H1	K	G	N
Min	0.3	2.54	2.6	10.4	2.3	8.5	16.0	8.8	2.54	2.08
Max	0.7	TYP.	3.0							



8.3 TO-252 Package Outline Dimensions



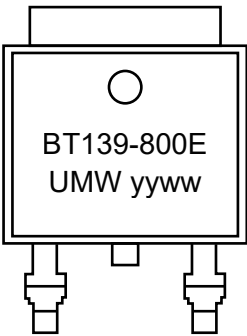
DIMENSIONS (mm are the original dimensions)

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 BT139D-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.

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