



## Jiangsu Weida Semiconductor Co., Ltd.

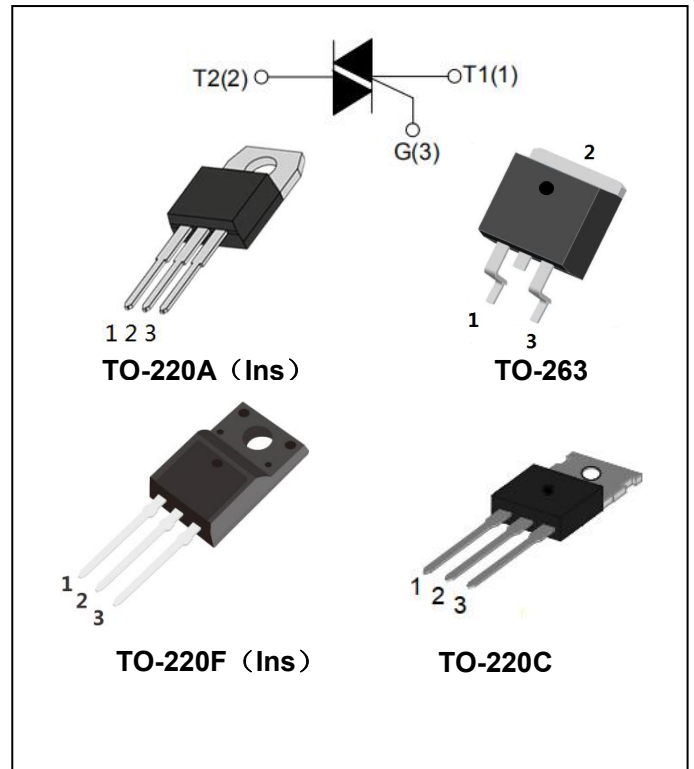
### BT138 Series 16A Triacs

#### DESCRIPTION:

With low holding and latching current, BT139 Series triacs are especially recommended for use on middle and small resistance type power load.

#### MAIN FEATURES:

symbol	value	unit
$I_{T(RMS)}$	16	A
$V_{DRM}/V_{RRM}$	600/800	V
$V_{TM}$	$\leq 1.6$	V



#### ABSOLUTE MAXIMUM RATINGS:

Parameter	Symbol	Value	Unit	
Storage junction temperature range	$T_{stg}$	-40~150	$^{\circ}C$	
Operating junction temperature range	$T_j$	-40~125	$^{\circ}C$	
Repetitive peak off-state voltage ( $T_j=25^{\circ}C$ )	$V_{DRM}$	600/800	V	
Repetitive peak reverse voltage ( $T_j=25^{\circ}C$ )	$V_{RRM}$	600/800	V	
RMS on-state current	$I_{T(RMS)}$	16	A	
Non repetitive surge peak on-state current (full cycle, F=50Hz)	$I_{TSM}$	140	A	
$I^2t$ value for fusing ( $t_p=10ms$ )	$I^2t$	98	$A^2s$	
Critical rate of rise of on-state current ( $I_G=2 \times I_{GT}$ )	di/dt	I - II - III	50	A/ $\mu s$
		IV	10	
Peak gate current	$I_{GM}$	2	A	



## Jiangsu Weida Semiconductor Co., Ltd.

### BT138 Series 16A Triacs

Average gate power dissipation	$P_{G(AV)}$	0.5	W
Peak gate power	$P_{GM}$	5	W

### ELECTRICAL CHARACTERISTICS ( $T_j=25^\circ\text{C}$ unless otherwise specified)

Parameter	Test Condition	Quadrant		Value			Unit
				D	E	F	
$I_{GT}$	$V_D=12\text{V}, R_L=33\Omega$	I - II - III	MAX	5	10	25	mA
		IV		10	25	70	
$V_{GT}$		I - II - III - IV		1.3			V
$V_{GD}$	$V_D=V_{DRM}$	I - II - III - IV	MIN	0.2			V
$I_H$	$I_T=100\text{mA}$		MAX	10	20	40	mA
$I_L$	$I_G=1.2I_{GT}$	I - III - IV	MAX	15	30	50	mA
		II		20	40	70	
$dV/dt$	$V_D=0.66 \times V_{DRM}$ $T_j=125^\circ\text{C}$ Gate open		MIN	20	50	100	V/ $\mu\text{s}$

### STATIC CHARACTERISTICS

Symbol	Test Condition			Value	Unit
$V_{TM}$	$I_{TM}=20\text{A}$ $t_p=380\mu\text{s}$	$T_j=25^\circ\text{C}$	MAX	1.6	V
$I_{DRM}$ $I_{RRM}$	$V_{DRM}=V_{RRM}$	$T_j=25^\circ\text{C}$	MAX	5	$\mu\text{A}$
		$T_j=125^\circ\text{C}$		1	mA

### THERMAL RESISTANCES

Symbol	Test Condition		Value	Unit
$R_{th(j-c)}$	junction to case(AC)	TO-220C	1.3	$^\circ\text{C/W}$
		TO-220A(Ins)	2.0	



# Jiangsu Weida Semiconductor Co., Ltd.

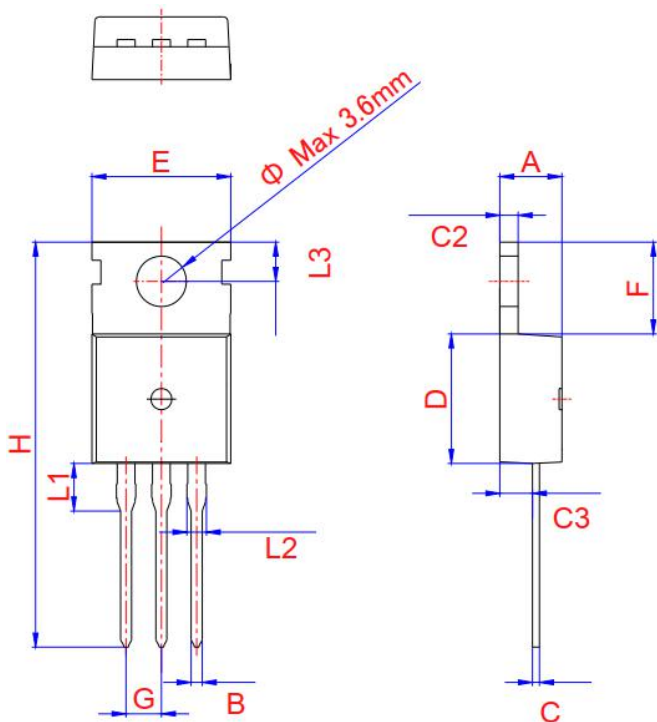
## BT138 Series 16A Triacs

		TO-220F	2.4	
		TO-263	0.9	

### ORDERING INFORMATION

<b>BT</b> Triacs $I_{T(RMS)}: 16A$	<b>139-600</b> $V_{DRM}, V_{RRM}$ : 600: 600V 800: 800V	<b>E</b> D: $I_{GT1-3} \leq 5mA, I_{GT4} \leq 10mA$ E: $I_{GT1-3} \leq 10mA, I_{GT4} \leq 25mA$ F: $I_{GT1-3} \leq 25mA, I_{GT4} \leq 70mA$
--	--	--

### PACKAGE MECHANICAL DATA

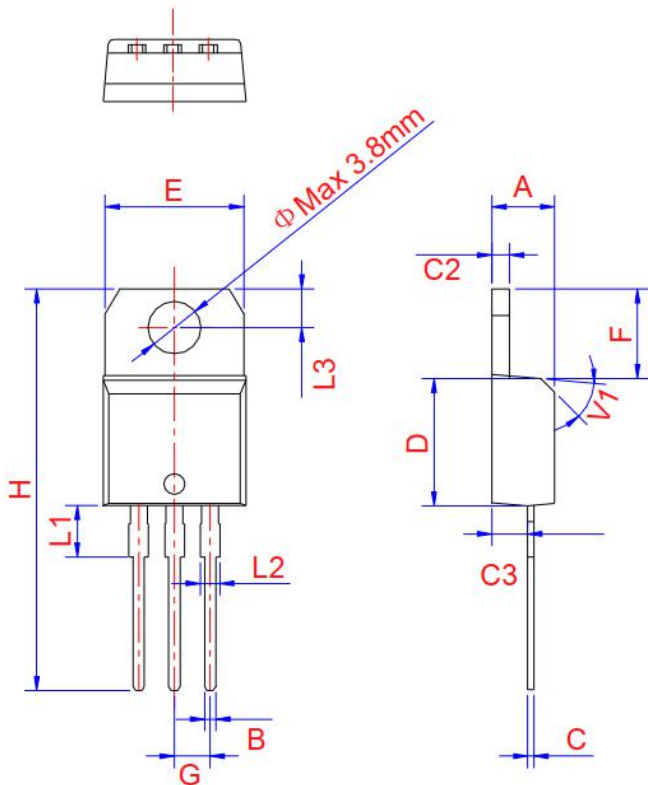


Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.3		4.5	0.169		0.177
B	0.7		0.9	0.028		0.035
C	0.45		0.6	0.018		0.024
C2	1.23	1.30	1.32	0.048	0.051	0.052
C3	2.2		2.6	0.087		0.102
D	8.9		9.9	0.35		0.39
E	9.9	10.1	10.3	0.39	0.398	0.406
F	6.3		6.9	0.248		0.272
G		2.54			0.1	
H	28		29.8	1.102		1.173
L1		3.39			0.133	
L2	1.14		1.7	0.045		0.067
L3	2.65		2.95	0.104		0.116
Φ		3.6			0.142	



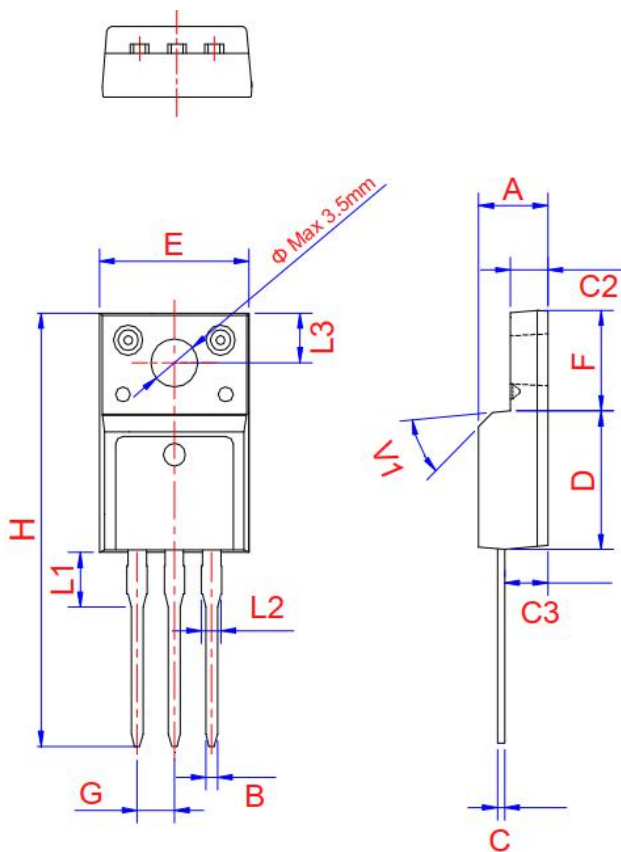
# Jiangsu Weida Semiconductor Co., Ltd.

## BT138 Series 16A Triacs



TO-220A Ins

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.4	4.47	4.6	0.173	0.176	0.181
B	0.61		0.88	0.024		0.035
C	0.46	0.50	0.7	0.018	0.02	0.028
C2	1.21	1.27	1.32	0.048	0.050	0.052
C3	2.4		2.72	0.094		0.107
D	8.6		9.7	0.339		0.382
E	9.8		10.4	0.386		0.409
F	6.55		6.95	0.258		0.274
G		2.54			0.1	
H	28		29.8	1.102		1.173
L1		3.75			0.148	
L2	1.14		1.7	0.045		0.067
L3	2.65		2.95	0.104		0.116
V1		45°			45°	

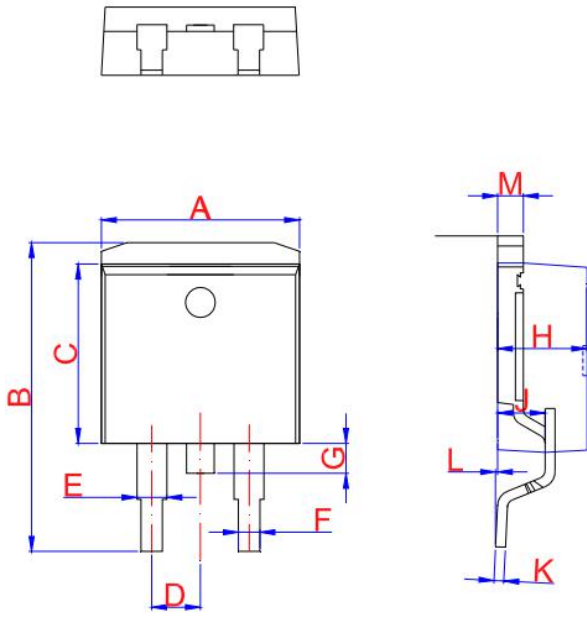


TO-220F Ins

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.5		4.9	0.177		0.193
B	0.74	0.8	0.83	0.029	0.031	0.033
C	0.47		0.65	0.019		0.026
C2	2.45		2.75	0.096		0.108
C3	2.6		3	0.102		0.118
D	8.8		9.3	0.346		0.366
E	9.8		10.4	0.386		0.41
F	6.4		6.8	0.252		0.268
G		2.54			0.1	
H	28		29.8	1.102		1.173
L1		3.63			0.148	
L2	1.14		1.7	0.045		0.067
L3	2.65	3.3	0		0.13	0.116
V1		45°			45°	



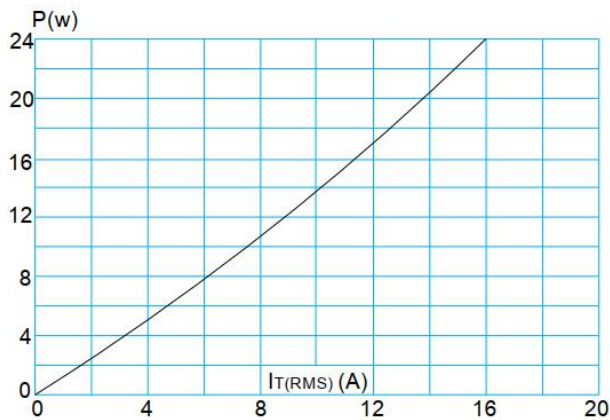
**Jiangsu Weida Semiconductor Co., Ltd.**  
**BT138 Series 16A Triacs**



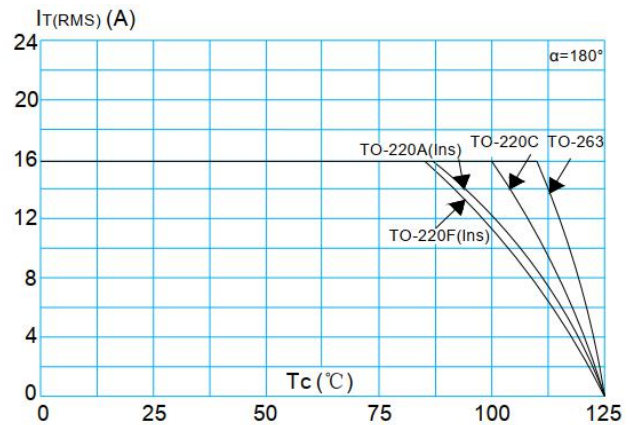
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.9		10.3	0.390		0.406
B	14.7		15.8	0.579		0.622
C	8.5		8.9	0.370		0.378
D		2.54			0.100	
E	1.20		1.40	0.047		0.055
F	0.75		0.85	0.029		0.033
G			1.75			0.069
H	4.40	4.60	4.80	0.173	0.181	0.189
J	2.40	2.60	2.80	0.094	0.102	0.110
L	0	0.1	0.25	0	0.004	0.010
M	1.17	1.27	1.37	0.046	0.05	0.054

TO-263

**FIG.1:** Maximum power dissipation versus RMS on-state current



**FIG.2:** RMS on-state current versus case temperature

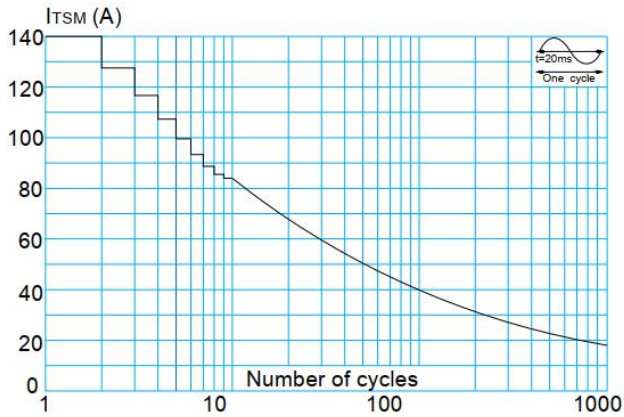




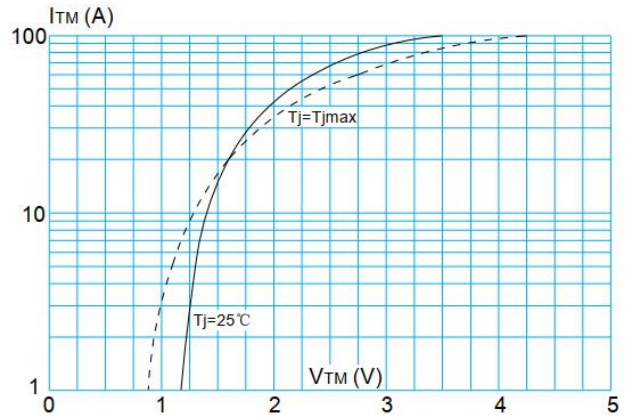
# Jiangsu Weida Semiconductor Co., Ltd.

## BT138 Series 16A Triacs

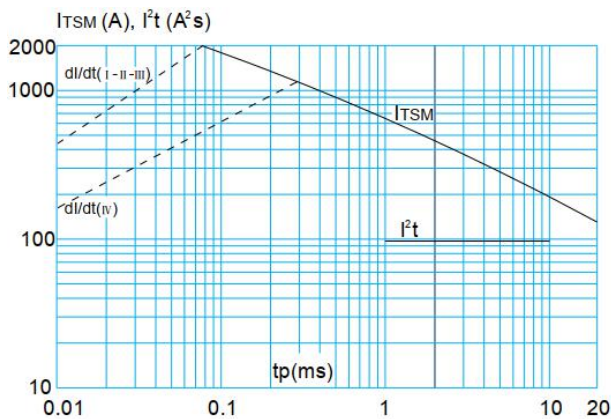
**FIG.3:** Surge peak on-state current versus number of cycles



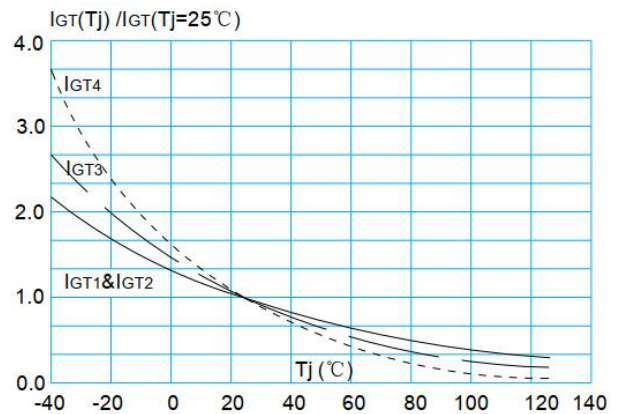
**FIG.4:** On-state characteristics (maximum values)



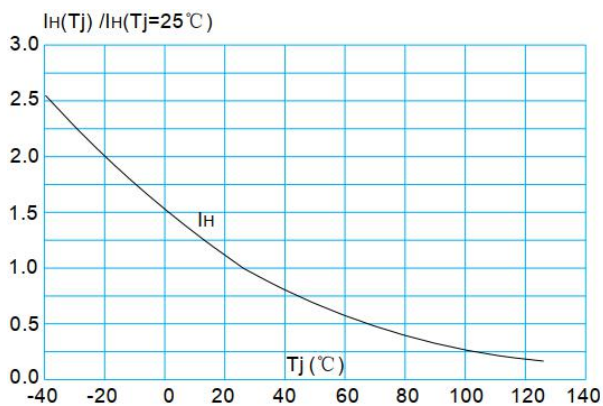
**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20\text{ms}$ , and corresponding value of  $I^2t$  ( I - II -III:  $dI/dt < 50\text{A}/\mu\text{s}$ ; IV:  $dI/dt < 10\text{A}/\mu\text{s}$ )



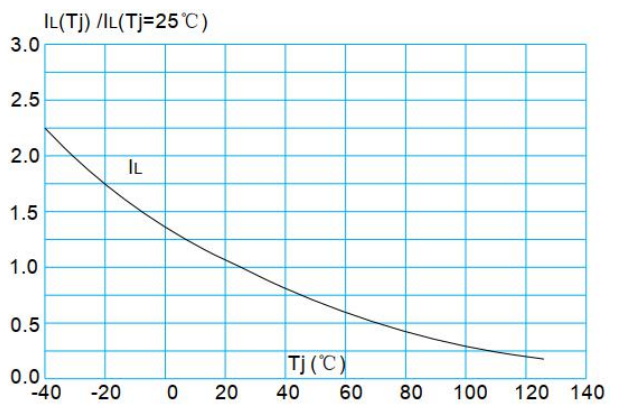
**FIG.6:** Relative variations of gate trigger current versus junction temperature



**FIG.7:** Relative variations of holding current versus junction temperature



**FIG.8:** Relative variations of latching current versus junction temperature





**Jiangsu Weida Semiconductor Co., Ltd.**  
**BT138 Series 16A Triacs**

---

Information furnished in this document is believed to be accurate and reliable. However, Jiangsu Weida Semiconductor Co., Ltd assumes no responsibility for the consequences of use without consideration for such information nor use beyond it.

Information mentioned in this document is subject to change without notice, apart from that when an agreement is signed, Jiangsu Weida Semiconductor Co., Ltd complies with the agreement.

Products and information provided in this document have no infringement of patents. Jiangsu Weida Semiconductor Co., Ltd assumes no responsibility for any infringement of other rights of third parties which may result from the use of such products and information.