

## 12A TRIACs

### Features

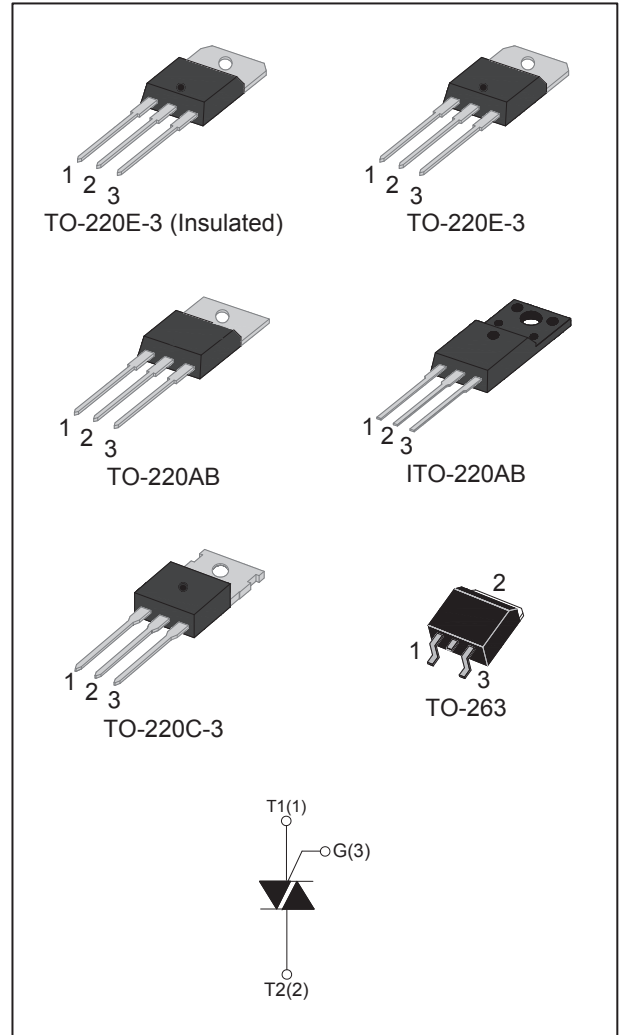
- Glass passivated chip junction
- High voltage and surge capability
- Low thermal resistance and durability
- Triggering in four quadrants
- Pb-free
- RoHS compliant
- SMD device halogen free

### Applications

- Static relays
- Heating regulation
- Induction motor starting circuits
- Phase control operation in light dimmers
- Motor speed controllers

### Main Features

Symbol	Value	Unit
$I_{T(RMS)}$	12	A
$V_{DRM} / V_{RRM}$	600 / 800 / 1200	V



### Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Storage junction temperature range	$T_{STG}$	-40 to 150	°C
Operating junction temperature range	$T_J$	-40 to 125	°C
Repetitive peak off-state voltage ( $T_J = 25^\circ\text{C}$ )	$V_{DRM}$	600 / 800 / 1200	V
Repetitive peak reverse voltage ( $T_J = 25^\circ\text{C}$ )	$V_{RRM}$	600 / 800 / 1200	V
RMS on-state current	TO-220E-3(Ins) ( $T_C=90^\circ\text{C}$ )	12	A
	TO-220E-3 ( $T_C=105^\circ\text{C}$ )		
	TO-220AB ( $T_C=105^\circ\text{C}$ )		
	ITO-220AB ( $T_C=79^\circ\text{C}$ )		
	TO-220C-3 ( $T_C=105^\circ\text{C}$ )		
	TO-263 ( $T_C=115^\circ\text{C}$ )		

## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Non repetitive surge peak on-state current (180° conduction angle, F = 50Hz, t <sub>p</sub> = 20ms, full cycle)	I <sub>TSM</sub>	120	A
I <sup>2</sup> t value for fusing (t <sub>p</sub> = 10ms)	I <sup>2</sup> t	72	A <sup>2</sup> s
Critical rate of rise of on-state current (I <sub>G</sub> = 2×I <sub>GT</sub> , t <sub>r</sub> ≤ 100ns)	dI/dt	50	A/μs
Peak gate current	I <sub>GM</sub>	4	A
Average gate power dissipation	P <sub>G(AV)</sub>	1	W

## Electrical Characteristics (T<sub>J</sub> = 25°C unless otherwise specified)

Standard (4 Quadrants)

Symbol	Test Condition	Quadrant		Value				Unit
I <sub>GT</sub>	V <sub>D</sub> = 12V, R <sub>L</sub> = 100Ω	I - II - III	MAX	5	10	25	50	mA
		IV		10	25	50	100	
V <sub>GT</sub>	V <sub>D</sub> = 12V, R <sub>L</sub> = 100Ω	ALL	MAX	1.5				V
V <sub>GD</sub>	V <sub>D</sub> = V <sub>DRM</sub> , T <sub>J</sub> = 125°C	ALL	MIN	0.2				V
I <sub>L</sub>	I <sub>G</sub> = 1.2×I <sub>GT</sub>	I - III - IV	MAX	5	20	50	70	mA
		II		10	35	60	80	
I <sub>H</sub>	V <sub>AK</sub> = 12V, I <sub>GK</sub> = 100mA		MAX	5	20	40	60	mA
dV/dt	V <sub>D</sub> = 67% V <sub>DRM</sub> , Gate open, T <sub>J</sub> = 125°C		MIN	15	100	200	500	V/μs

## Static Characteristics

Symbol	Test Condition			Value	Unit
V <sub>TM</sub>	I <sub>TM</sub> = 17A, t <sub>p</sub> = 380μs	T <sub>J</sub> = 25°C	MAX	1.55	V
I <sub>DRM</sub> I <sub>RRM</sub>	V <sub>D</sub> = V <sub>DRM</sub> , V <sub>R</sub> = V <sub>RRM</sub>	T <sub>J</sub> = 25°C	MAX	5	μA
		T <sub>J</sub> = 125°C		1.5	mA

## Thermal Resistances

Symbol	Parameter	Value	Unit
R <sub>θJC</sub>	Junction to case(AC)	TO-220E-3(Ins)	2.3
		TO-220E-3	1.4
		TO-220AB	1.4
		ITO-220AB	2.5
		TO-220C-3	1.4
		TO-263	1.4

## Ordering Information

Ordering Type	Marking	Package	Quantity	Delivery Mode
BT12xx-yyEI	BT12xx-yyEI	TO-220E-3(Ins)	50	Tube
BT12xx-yyE	BT12xx-yyE	TO-220E-3	50	Tube
BT12xx-yyT	BT12xx-yyT	TO-220AB	50	Tube
BT12xx-yyTF	BT12xx-yyTF	ITO-220AB	50	Tube
BT12xx-yyC	BT12xx-yyC	TO-220C-3	50	Tube
BT12xx-yyTD	BT12xx-yyTD	TO-263	50	Tube
BT12xx-yyTD	BT12xx-yyTD	TO-263	800	13" diameter reel

Note : xx = sensitivity, yy = voltage

## Ordering Information Scheme

**BT 12 10 - 600 E**

**Triac series**

BT = 4 Quadrants

**$I_{T(RMS)}$**

12 = 12A

**$I_{GT}$  Sensitivity**

10 = 5/5/5/10mA

25 = 10/10/10/25mA

50 = 25/25/25/50mA

A0 = 50/50/50/100mA

**$V_{DRM}$  /  $V_{RRM}$**

600 = 600V

800 = 800V

12 = 1200V

**Package type**

EI = TO-220E-3(Ins)

E = TO-220E-3

T = TO-220AB

TF = ITO-220AB

C = TO-220C-3

TD = TO-263

## Ratings and Characteristics Curves

Fig.1 - RMS on-state current versus case temperature

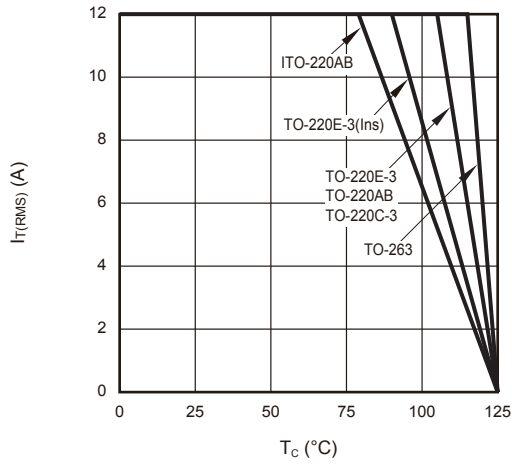


Fig.2 - Surge peak on-state current versus number of cycles

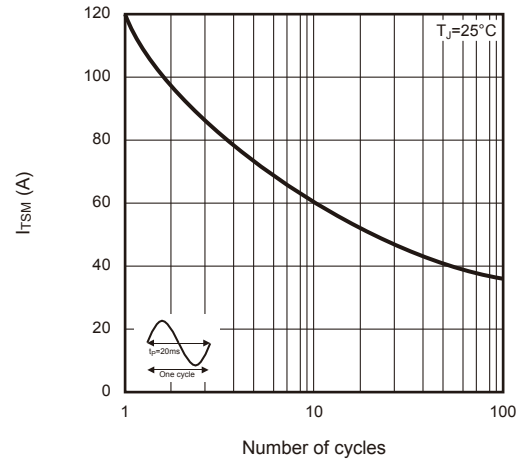


Fig.3 - On-state characteristics (maximum values)

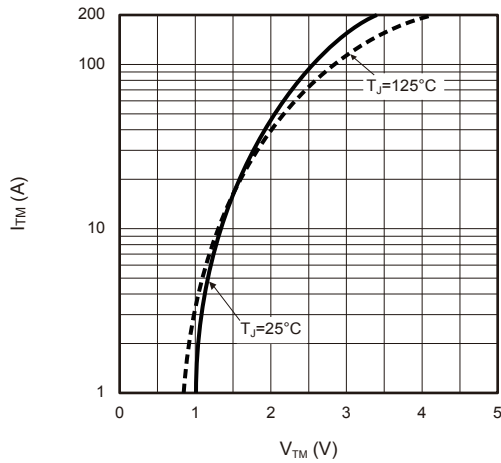


Fig.4 - Maximum power dissipation versus RMS on-state current

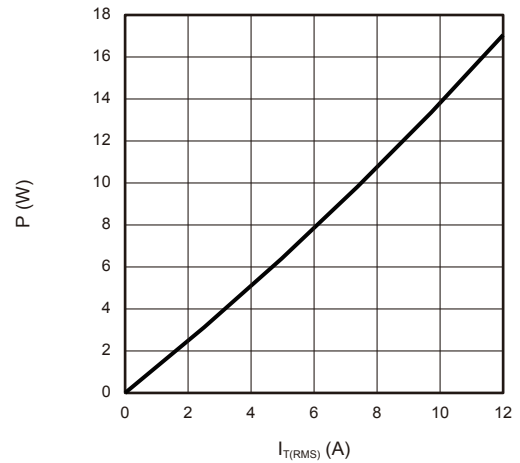
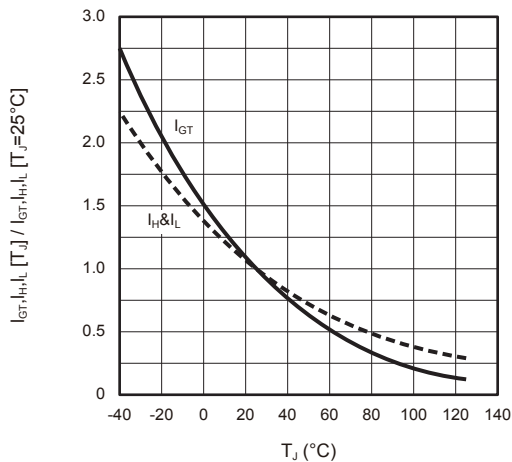
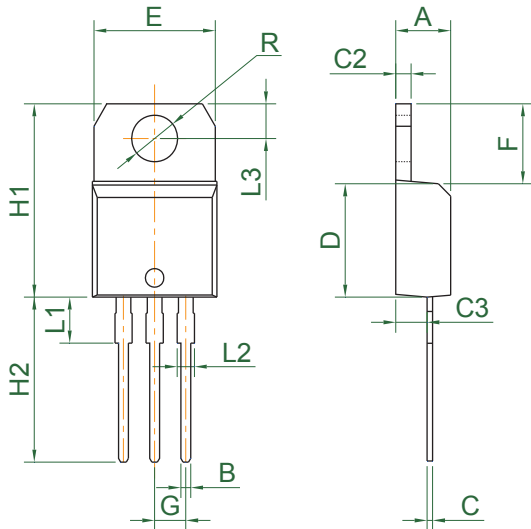


Fig.5 - Relative variations of gate trigger current, holding current and latching current versus junction temperature



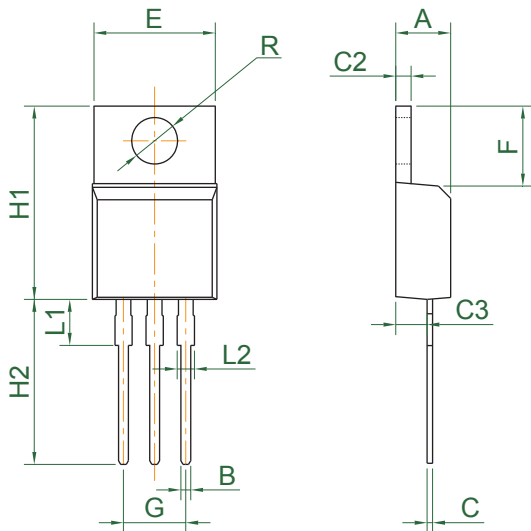
## Package Outline Dimensions

**TO-220E-3 / TO-220E-3(Ins)**



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.38	-	4.61	.172	-	.182
B	0.6	-	0.92	.024	-	.036
C	0.35	-	0.7	.014	-	.028
C2	1.15	-	1.36	.045	-	.054
C3	2.35	-	2.75	.092	-	.108
D	8.6	-	9.7	.339	-	.382
E	9.8	-	10.4	.386	-	.409
F	5.85	-	6.95	.230	-	.274
G	2.4	-	2.7	.094	-	.106
H1	14.8	-	16.1	.583	-	.634
H2	13.0	-	14.0	.512	-	.551
L1	2.8	-	4.2	.110	-	.165
L2	1.14	-	1.7	.045	-	.067
L3	2.65	-	3.1	.104	-	.122
R	3.7	-	3.95	.146	-	.156

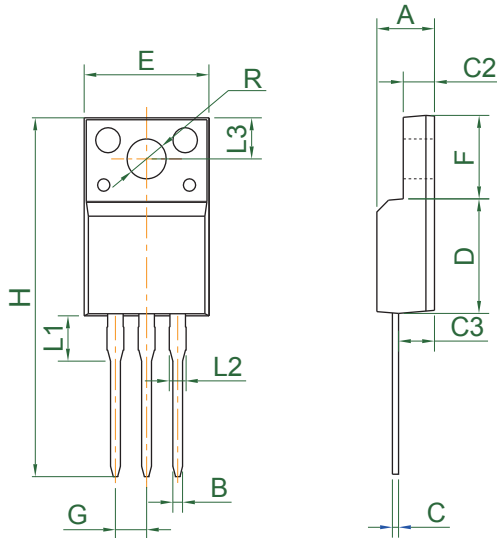
**TO-220AB**



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.07	-	4.85	.160	-	.191
B	0.6	-	1.0	.024	-	.039
C	0.28	-	0.7	.011	-	.028
C2	1.1	-	1.5	.043	-	.059
C3	2.04	-	2.92	.080	-	.115
E	-	-	10.5	-	-	.413
F	5.8	-	6.93	.228	-	.273
G	4.84	-	5.32	.190	-	.209
H1	13.0	-	16.6	.512	-	.654
H2	12.7	-	14.2	.500	-	.559
L1	2.7	-	4.5	.106	-	.177
L2	1.1	-	1.7	.043	-	.067
R	3.4	-	3.95	.134	-	.156

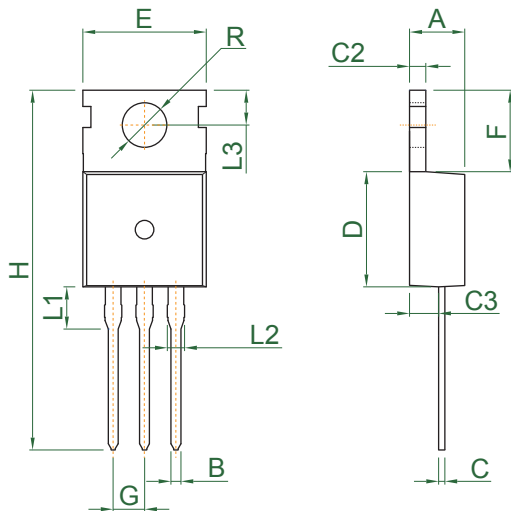
## Package Outline Dimensions

### ITO-220AB



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.0	-	5.1	.157	-	.201
B	0.3	-	0.9	.012	-	.035
C	0.4	-	0.8	.016	-	.031
C2	2.34	-	3.3	.092	-	.130
C3	2.1	-	3.2	.083	-	.126
D	8.3	-	9.3	.327	-	.366
E	9.5	-	10.7	.374	-	.421
F	6.3	-	7.5	.248	-	.295
G	2.01	-	3.07	.079	-	.121
H	28.0	-	29.8	1.102	-	1.173
L1	2.5	-	4.3	.098	-	.169
L2	0.9	-	1.7	.035	-	.067
L3	2.5	-	3.6	.098	-	.142
R	2.7	-	4.31	.106	-	.170

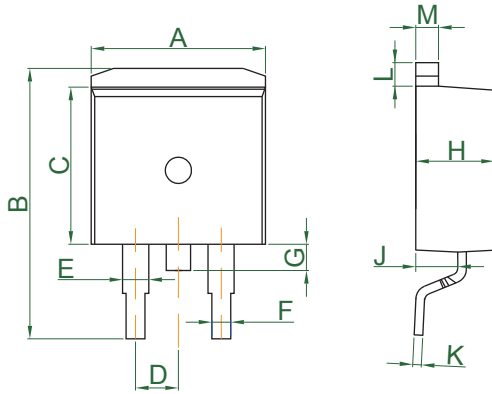
### TO-220C-3



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.4	-	4.6	.173	-	.181
B	0.7	-	0.9	.028	-	.035
C	0.45	-	0.6	.018	-	.024
C2	1.23	-	1.48	.048	-	.058
C3	2.2	-	2.6	.087	-	.102
D	8.9	-	9.9	.350	-	.390
E	9.9	-	10.3	.390	-	.406
F	6.3	-	6.9	.248	-	.272
G	2.4	-	2.7	.094	-	.106
H	28.0	-	29.8	1.102	-	1.173
L1	3.1	-	3.7	.122	-	.146
L2	1.14	-	1.7	.045	-	.067
L3	2.65	-	2.95	.104	-	.116
R	3.45	-	3.65	.136	-	.144

## Package Outline Dimensions

TO-263



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.66	-	10.66	.380	-	.420
B	14.6	-	16.0	.575	-	.630
C	8.39	-	9.75	.330	-	.384
D	2.35	-	2.85	.093	-	.112
E	1.0	-	1.5	.039	-	.059
F	0.51	-	1.01	.020	-	.040
G	0.7	-	1.77	.028	-	.070
H	4.07	-	4.87	.160	-	.192
J	2.3	-	2.9	.091	-	.114
K	0.3	-	0.73	.012	-	.029
L	1.2	-	1.84	.047	-	.072
M	1.1	-	1.65	.043	-	.065