



## T12xxH Series 12A TRIACs

Rev.7.0

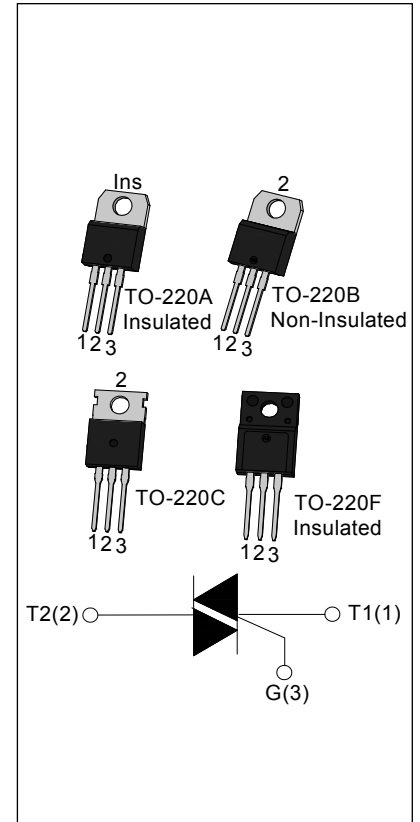
### DESCRIPTION:

T12xxH series triacs of high junction temperature with high dv/dt rate with strong resistance to electromagnetic interference provide high ability to withstand the shock loading of large current. They are especially recommended for use on inductive load and high environment temperature condition.

From all three terminals to external heatsink, T12xxH-xxA provides a rated insulation voltage of 2500 V<sub>RMS</sub>, and T12xxH-xxF provides a rated insulation voltage of 2000 V<sub>RMS</sub>, complying with UL standards (File ref: E252906). All the packages listed above are RoHS compliant. (2011/65/EU)

### MAIN FEATURES

Symbol	Value	Unit
I <sub>T(RMS)</sub>	12	A
V <sub>DRM</sub> /V <sub>RPM</sub>	600/800	V
T <sub>jmax</sub>	150	°C



### ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Storage junction temperature range		T <sub>stg</sub>	-40-150	°C
Operating junction temperature range		T <sub>j</sub>	-40-150	°C
Repetitive peak off-state voltage(T <sub>j</sub> =25°C)		V <sub>DRM</sub>	600/800	V
Repetitive peak reverse voltage(T <sub>j</sub> =25°C)		V <sub>RPM</sub>	600/800	V
RMS on-state current	TO-220A(Ins)/ TO-220F(Ins) (T <sub>c</sub> =110°C)	I <sub>T(RMS)</sub>	12	A
	TO-220C/ TO-220B(Non-Ins) (T <sub>c</sub> =120°C)			
Non repetitive surge peak on-state current (full cycle, F=50Hz)		I <sub>TSM</sub>	120	A
I <sup>2</sup> t value for fusing (tp=10ms)		I <sup>2</sup> t	78	A <sup>2</sup> s

Critical rate of rise of on-state current ( $I_G=2 \times I_{GT}$ )	di/dt	50	A/ $\mu$ s
Peak gate current	$I_{GM}$	4	A
Average gate power dissipation	$P_{G(AV)}$	1	W
Peak gate power	$P_{GM}$	5	W

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

Symbol	Test Condition	Quadrant		Value				Unit
				T1210H	T1220H	T1235H	T1250H	
$I_{GT}$	$V_D=12\text{V}$ $R_L=33\Omega$	I - II - III	MAX	10	20	35	50	mA
$V_{GT}$		I - II - III	MAX	1.3				V
$V_{GD}$	$V_D=V_{DRM}$ $T_j=150^\circ\text{C}$ $R_L=3.3\text{K}\Omega$	I - II - III	MIN	0.2				V
$I_L$	$I_G=1.2I_{GT}$	I - III	MAX	20	40	50	70	mA
		II		35	55	70	100	
$I_H$	$I_T=100\text{mA}$		MAX	20	30	45	60	mA
dV/dt	$V_D=2/3V_{DRM}$ $R_{GK}=1\text{K}\Omega$ $T_j=150^\circ\text{C}$		MIN	200	500	1000	1500	V/ $\mu$ s

**STATIC CHARACTERISTICS**

Symbol	Parameter		Value(MAX)	Unit
$V_{TM}$	$I_{TM}=17\text{A}$ $t_p=380\mu\text{s}$	$T_j=25^\circ\text{C}$	1.4	V
$I_{DRM}$	$V_D=V_{DRM}$ $V_R=V_{RRM}$	$T_j=25^\circ\text{C}$	5	$\mu\text{A}$
$I_{RRM}$		$T_j=150^\circ\text{C}$	2	mA

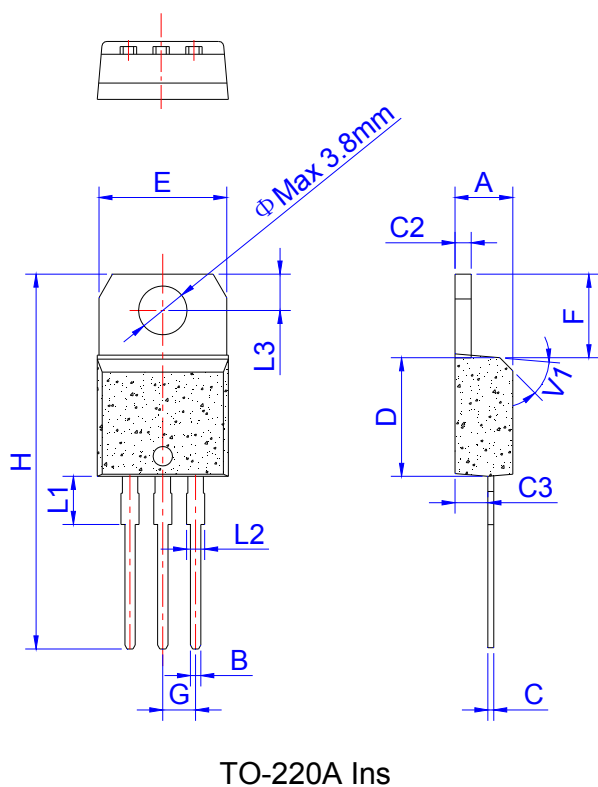
**THERMAL RESISTANCES**

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	junction to case(AC)	TO-220A(Ins)	2.3	$^\circ\text{C}/\text{W}$
		TO-220C/ TO-220B(Non-Ins)	1.4	
		TO-220F(Ins)	2.5	

ORDERING INFORMATION

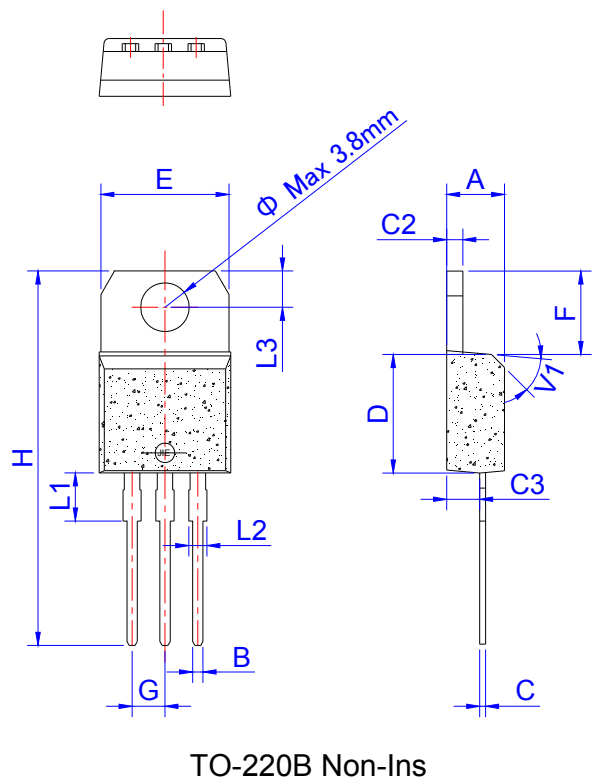
<p><b>T</b></p> <p>Triacs</p> <p><math>I_{T(RMS)}: 12A</math></p> <p>10: <math>I_{GT1-3} \leq 10mA</math></p> <p>20: <math>I_{GT1-3} \leq 20mA</math></p> <p>35: <math>I_{GT1-3} \leq 35mA</math></p> <p>50: <math>I_{GT1-3} \leq 50mA</math></p>	<p><b>12</b></p>	<p><b>20</b></p>	<p><b>H</b></p>	<p><b>-6</b></p>	<p><b>B</b></p> <p>C: TO-220C</p> <p>A: TO-220A(Ins)</p> <p>F: TO-220F(Ins)</p> <p>B: TO-220B(Non-Ins)</p> <p>6: <math>V_{DRM} / V_{RRM} \geq 600V</math></p> <p>8: <math>V_{DRM} / V_{RRM} \geq 800V</math></p> <p>High junction temperature</p>
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PACKAGE MECHANICAL DATA

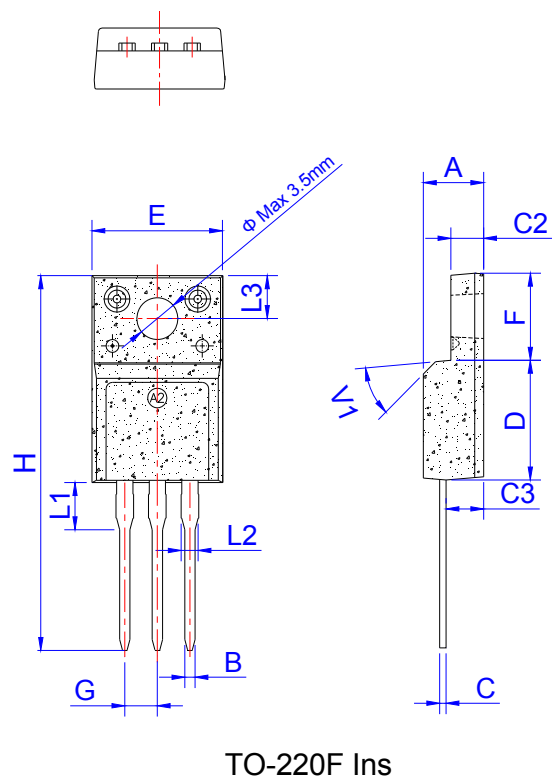


Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.61		0.88	0.024		0.035
C	0.46		0.70	0.018		0.028
C2	1.21		1.32	0.048		0.052
C3	2.40		2.72	0.094		0.107
D	8.60		9.70	0.339		0.382
E	9.80		10.4	0.386		0.409
F	6.55		6.95	0.258		0.274
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.75			0.148	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
V1		45°			45°	

PACKAGE MECHANICAL DATA

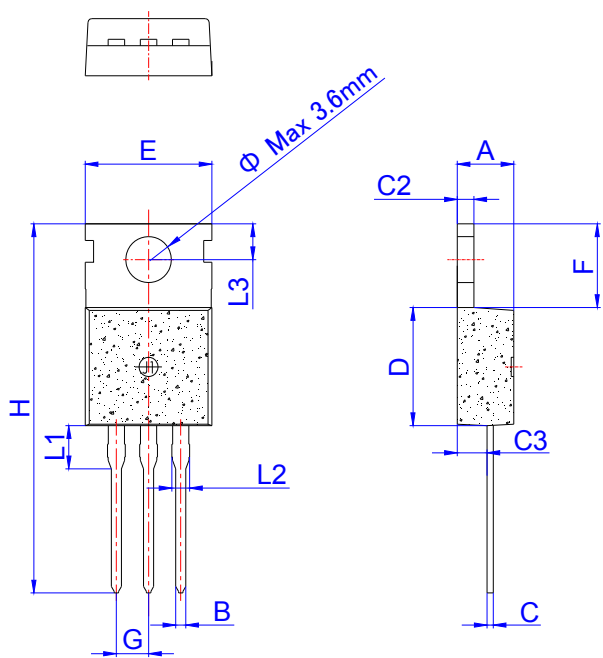


Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.61		0.88	0.024		0.035
C	0.46		0.70	0.018		0.028
C2	1.21		1.32	0.048		0.052
C3	2.40		2.72	0.094		0.107
D	8.60		9.70	0.339		0.382
E	9.60		10.4	0.378		0.409
F	6.20		6.60	0.244		0.260
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.75			0.148	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
V1		45°			45°	



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.50		4.90	0.177		0.193
B	0.74	0.80	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	2.60		3.00	0.102		0.118
D	8.80		9.30	0.346		0.366
E	9.80		10.4	0.386		0.410
F	6.40		6.80	0.252		0.268
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.63			0.143	
L2	1.14		1.70	0.045		0.067
L3		3.30			0.130	
V1		45°			45°	

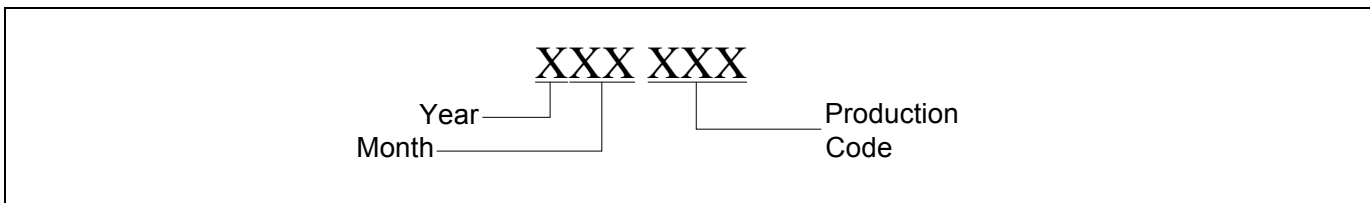
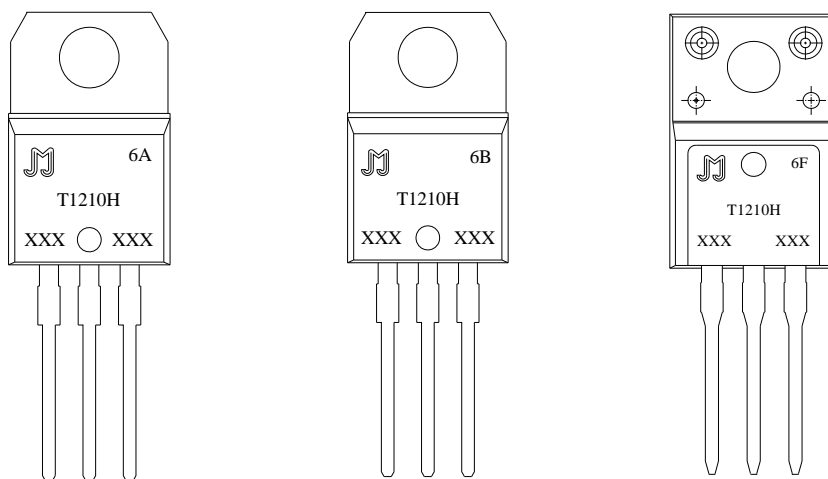
PACKAGE MECHANICAL DATA



TO-220C

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.70		0.90	0.028		0.035
C	0.45		0.60	0.018		0.024
C2	1.23		1.32	0.048		0.052
C3	2.20		2.60	0.087		0.102
D	8.90		9.90	0.350		0.390
E	9.90		10.3	0.390		0.406
F	6.30		6.90	0.248		0.272
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.39			0.133	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
$\phi$		3.6			0.142	

MARKING



PACKAGE INFORMATION

PACKAGE	WEIGHT (PER PCS)	OUTLINE	TUBE (PCS)	INNER BOX (PCS)	PER CARTON
TO-220A	2.308g	TUBE	50	1,000	8,000
TO-220B	1.935g	TUBE	50	1,000	8,000
TO-220C	2.05g	TUBE	50	1,000	8,000
TO-220F	2.093g	TUBE	50	1,000	8,000

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

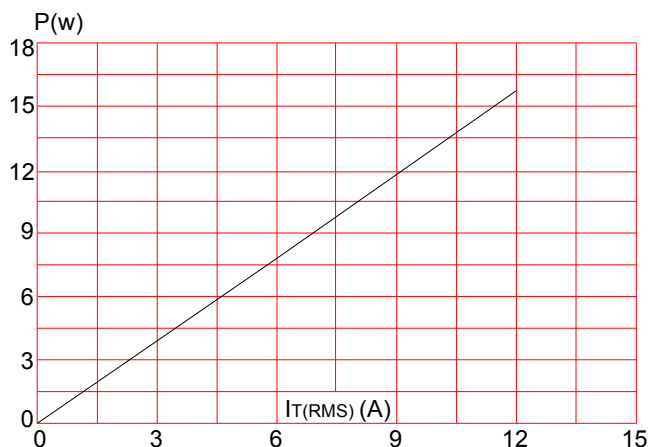


FIG.3: Surge peak on-state current versus number of cycles

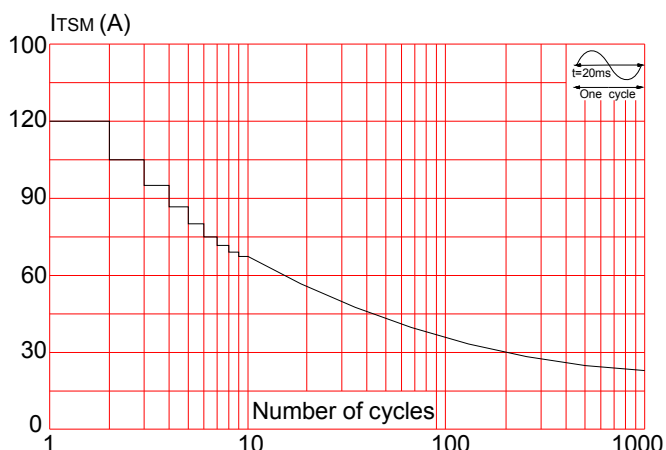


FIG.2: RMS on-state current versus case temperature

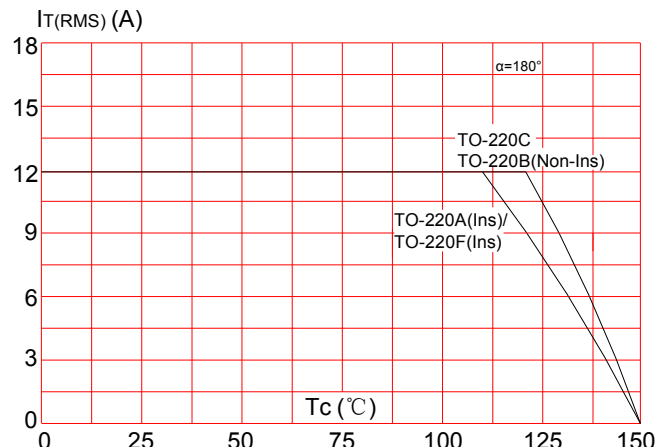
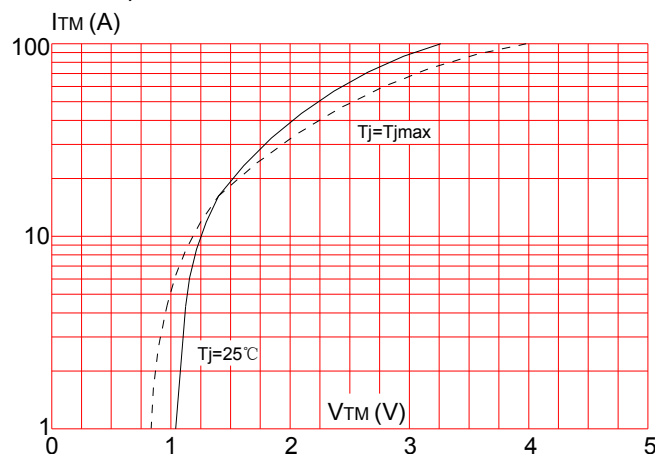
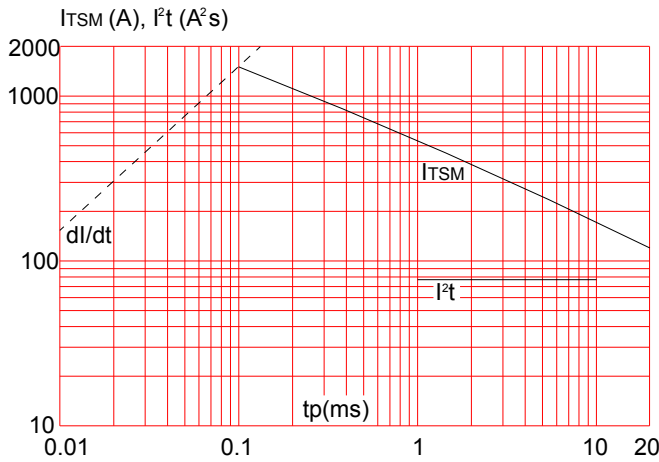


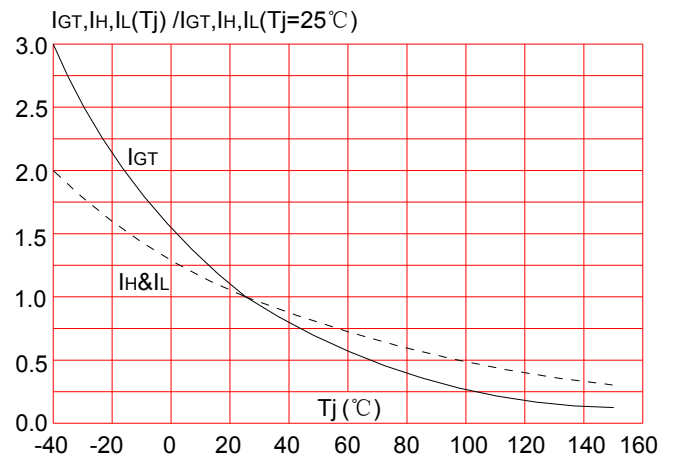
FIG.4: On-state characteristics (maximum values)



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



**FIG.6:** Relative variations of gate trigger current, holding current and latching current versus junction temperature



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