

■ DESCRIPTION

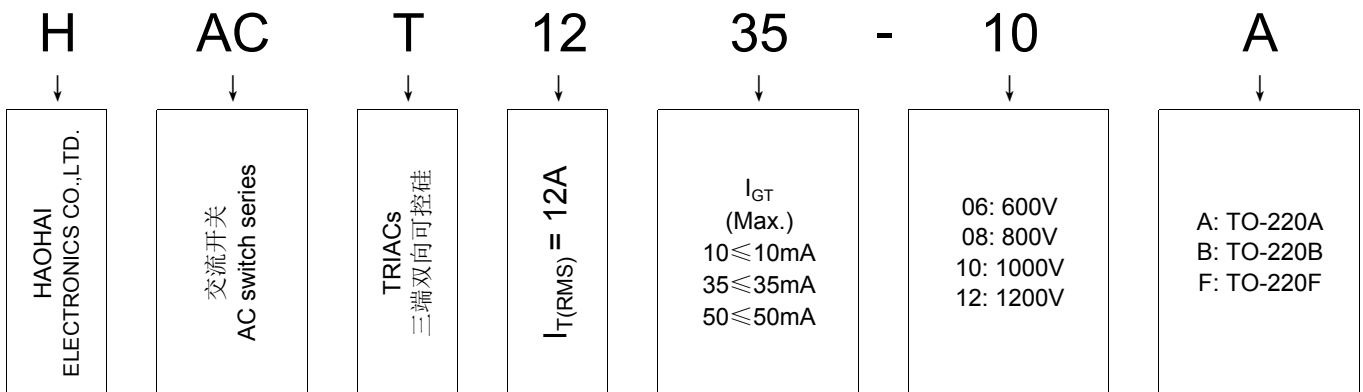
The HACT12 series of double mesa technology provide high interference immunity, They can be used as an static ON/OFF function in electrical control system, and used as a driver of low power and high inductance or resistive loads, such as jet pumps of dishwashers, fans of air-conditioner.....HACT12-A provides insulation voltage rated at 2500V RMS and HACT12-F provides insulation voltage rated at 2000V RMS from all three terminals to external heatsink.

■应用：交流电静态开关设备、工业控制系统开/关；小功率驱动、高感性或阻性负载，如：继电器、阀门、电磁阀、饮水机、洗衣机、泵、风机、低功率电机、门锁、以及各种灯具；空气清新器、雾化器、加湿器等小家电、白电产品驱动等控制电路。

■封装形式: TO-220A、TO-220B、TO-220F

■ Product Model Reference & Naming 【产品型号参考及型号命名】

型号列表	对应触发电流、耐压、封装		
TO-220A	HACT1210-10A	HACT1235-10A	HACT1250-10A
TO-220B	HACT1210-10B	HACT1235-10B	HACT1250-10B
TO-220F	HACT1210-10F	HACT1235-10F	HACT1250-10F
$I_{GT}$	$\leq 10mA$	$\leq 35mA$	$\leq 50mA$



■ PINNING: TO-220A (内绝缘式)、TO-220B (不绝缘)、TO-220F (外绝缘式-全塑封)

Pin	Symbol	
1	T1	
2	T2	
3	G	
4	Tab	

1=T1=COM: Common drive reference to connect to the mains;

3=T3=G: Gate input to connect to the controller through gate resistor;

2=T2=OUT: Output to connect to the load

4=2=Tab (HACT12-B)

■ABSOLUTE MAXIMUM RATINGS

SYMBOL	Signification in Symbol	Test Conditions	Value	Unit	
$I_{T(RMS)}$	RMS On-state Current	TO-220A	$T_C=92^{\circ}C$	12	A
		TO-220B	$T_C=103^{\circ}C$		
		TO-220F	$T_C=92^{\circ}C$		
$I_{TSM}$	Non Repetitive Surge Peak on-state Current (full cycle)	F=50Hz	120		
$I_{GM}$	Peak Gate Current		4		
$I^2t$	$I^2t$ Value for Fusing Consideration	$t_p=10mS$	72	$A^2ses$	
$di/dt$	Rate of rise of on-state current ( $I_G = 2 \times I_{GT}$ )		50	$A/\mu S$	
$V_{DRM}$	Repetitive peak off-state Voltages	$T_J=25^{\circ}C$	1000	V	
$V_{RRM}$	Repetitive peak Reverse Voltages	$T_J=25^{\circ}C$	1000		
$V_{DSM}$	Non Repetitive Surge peak off-state Voltages	$T_J=25^{\circ}C$	$V_{DRM}+100$		
$V_{RSM}$	Non Repetitive peak Reverse Voltages	$T_J=25^{\circ}C$	$V_{RRM}+100$		
$P_{G(AV)}$	Average gate power dissipation		1	W	
$P_{GM}$	Peak gate power		5		
$T_j$	Operating Junction Temperature Range		-40 ~ +125	$^{\circ}C$	
$T_{stg}$	Storage Junction Temperature Range		-40 ~ +150		

■ ELECTRICAL CHARACTERISTICS (T<sub>j</sub>=25°C unless otherwise specified)

SYMBOL	Parameter & Test Conditions	Quadrant		Value			Unit
				HACT1210	HACT1235	HACT1250	
I <sub>GT</sub>	V <sub>D</sub> =12V, R <sub>L</sub> =33Ω	I - II - III	Max.	10	35	50	mA
I <sub>H</sub>	I <sub>T</sub> =100mA	I - II - III	Max.	15	45	60	
I <sub>L</sub>	I <sub>G</sub> =1.2 I <sub>GT</sub>	I - III	Max.	20	50	70	
		II	Max.	30	70	100	
dV/dt	V <sub>D</sub> =2/3 V <sub>DRM</sub> gate open, T <sub>j</sub> =125°C	I - II - III	Min.	1000	1500	2000	V/μs
V <sub>GT</sub>	V <sub>D</sub> =12V, R <sub>L</sub> =33Ω	I - II - III	Max.	1.5			V
V <sub>GD</sub>	V <sub>D</sub> =V <sub>DRM</sub> , R <sub>L</sub> =3.3KΩ, T <sub>j</sub> =125°C	I - II - III	Min.	0.2			

■ STATIC CHARACTERISTICS

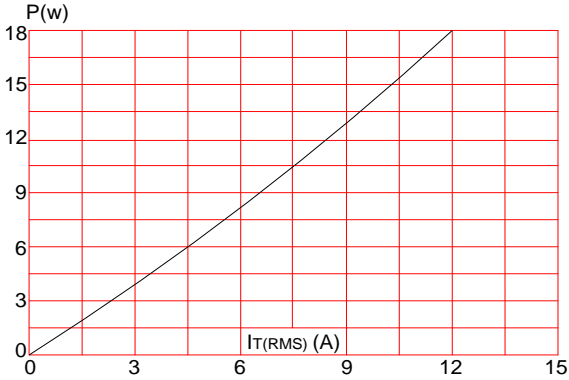
Symbol	Parameter		Value (Max.)	Unit
V <sub>TM</sub>	I <sub>TM</sub> =17A, t <sub>p</sub> =380μs	T <sub>j</sub> =25°C	1.65	V
I <sub>DRM</sub>	V <sub>D</sub> =V <sub>DRM</sub> , V <sub>R</sub> =V <sub>RRM</sub>	T <sub>j</sub> =25°C	10	μA
I <sub>RRM</sub>	V <sub>D</sub> =V <sub>DRM</sub> , V <sub>R</sub> =V <sub>RRM</sub>	T <sub>j</sub> =125°C	3000	

■ THERMAL RESISTANCES

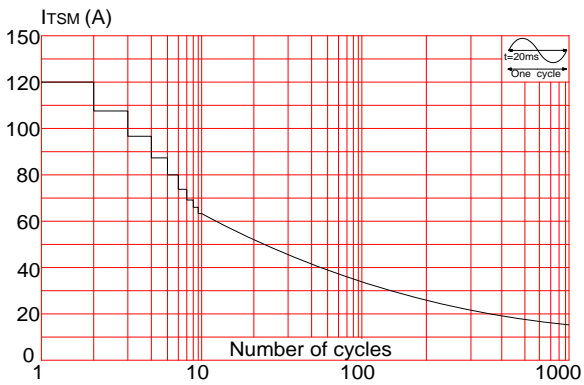
Symbol	Parameter		Value	Unit
R <sub>th(j-c)</sub>	junction to case (AC)	TO-220A (Ins)	4.0	°C/W
		TO-220B (Non-Ins)	2.8	
		TO-220F (Ins)	4.0	

Electrical characteristics & Typical characteristics

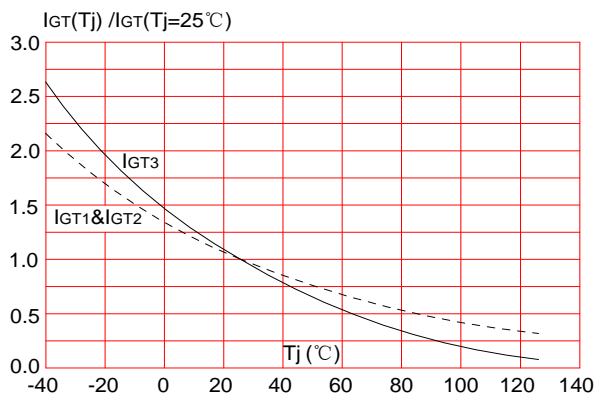
**FIG.1** Maximum power dissipation versus RMS on-state current



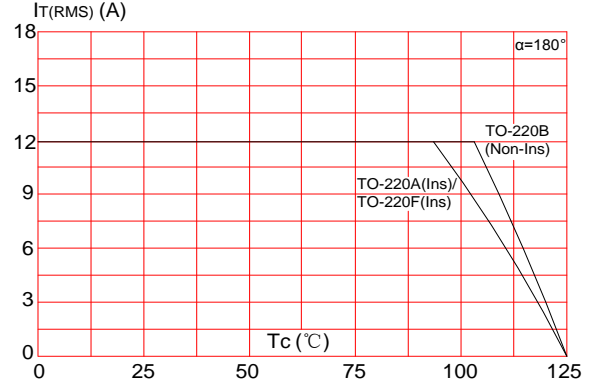
**FIG.3:** Surge peak on-state current versus number of cycles



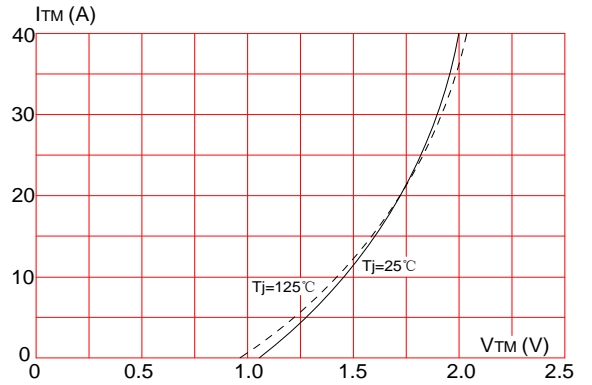
**FIG.5:** Relative variations of gate trigger current versus junction temperature



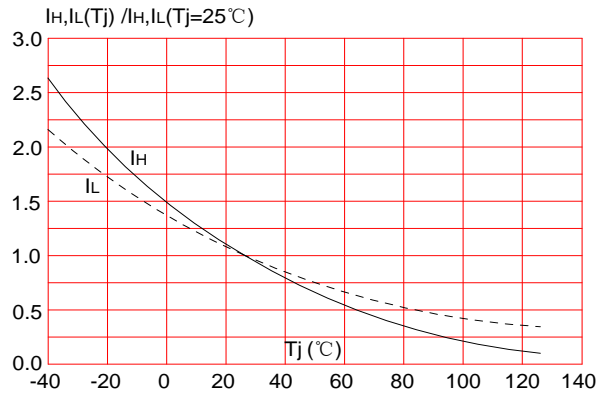
**FIG.2:** RMS on-state current versus case temperature



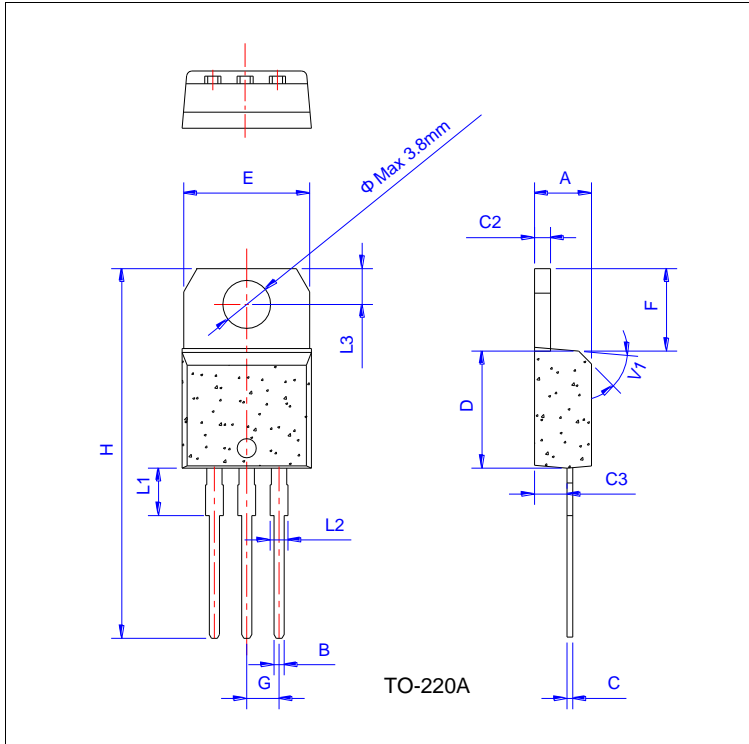
**FIG.4:** On-state characteristics (maximum values)



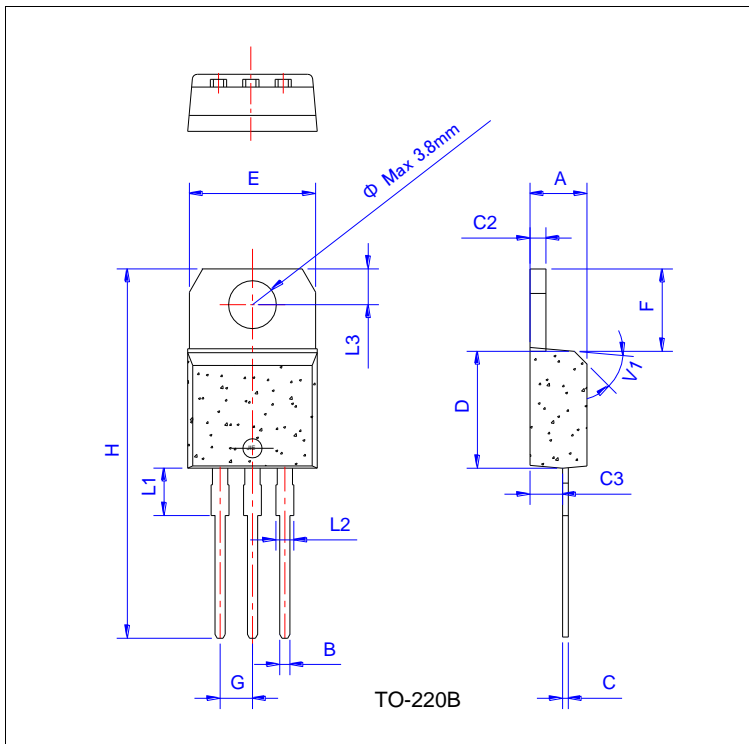
**FIG.6:** Relative variations of holding current, latching current versus junction temperature



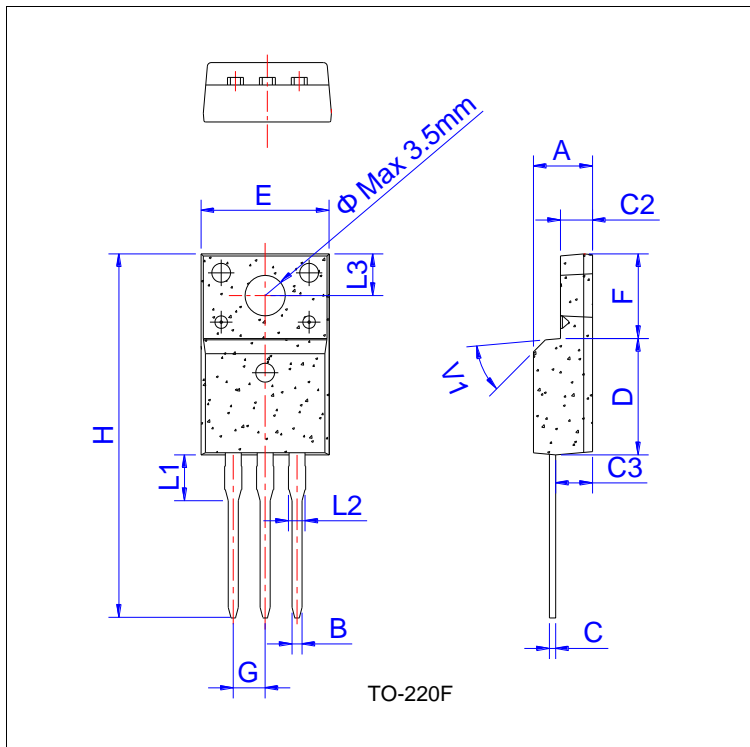
PACKAGE MECHANICAL DATA (mm & inch) 封装尺寸数据 (毫米与英寸对照)



REF	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	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	6.585	6.95	0.258	0.274
G	2.54 TYP.		0.100 TYP.	
H	28.0	29.8	1.102	1.173
L1	3.75 TYP.		0.148 TYP.	
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.	Max.	Min.	Max.
A	4.40	5.60	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	10.40	0.378	0.409
F	6.20	6.60	0.244	0.260
G	2.54 TYP.		0.100 TYP.	
H	28.0	29.8	1.102	1.173
L1	3.75 TYP.		0.148 TYP.	
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.	Max.	Min.	Max.
A	4.40	4.80	0.173	0.189
B	0.74	0.83	0.029	0.033
C	0.48	0.75	0.019	0.030
C2	2.40	2.70	0.094	0.106
C3	2.60	3.00	0.102	0.118
D	8.80	9.30	0.346	0.366
E	9.70	10.3	0.382	0.406
F	6.40	7.00	0.252	0.276
G	2.54 TYP.		0.10 TYP.	
H	28.0	29.8	1.102	1.173
L1	3.63 TYP.		0.143 TYP.	
L2	1.14	1.70	0.045	0.067
L3	3.30 TYP.		0.130 TYP.	
V1	45°		45°	

<p>TO-220A / TO-220B</p> <p>TO-220F</p>	<p>打印标识 H: 浩海电子 XXXXXXXXXX: 器件型号 KKG: 注册商标 YY: 出厂年份 WW: 出厂自然周 (01~53)</p> <p>Marking H: HAOHAI ELECTRONICS XXXXXXXXXX: Part Number KKG: Registered trademark YY: Factory Year WW: Factory natural Week bb: (01~53)</p>	<p>包装规格 TO-220A、TO-220B、TO-220F 条管装、纸盒装、纸箱装 每管50只 每盒1000只 每箱5000只</p> <p>Packaging Specifications 50Pcs/Tub 1Kpcs/BOX 5Kpcs/Cartons</p>
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Manufacturers version information  
2015-06-15, KKG™ Product Data-1.1  
2017-10-15, KKG™ Product Data-1.2



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