描述 / Descriptions

TO-220F 塑封封装 双向可控硅。Triac in a TO-220F Plastic Package.

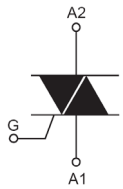
特征 / Features

中电流可控硅，高转换性能，低通态压降，高可靠性和稳定性，热敏电阻特性低，绝缘 BTA。
Medium current triac, High commutation performances,Low on state voltage drop,High reliability and stability,Low thermal resistance,insulated BTA.

用途 / Applications

主要应用于开关电路，如固态继电器、温控器、马达驱动和马达调速控制、相位控制调光器等。
They can be used as an ON/OFF function in applications such as static relays,heating regulation, induction motor starting circuits or phase control operation in light dimmers,motor speed controllers,etc.

内部等效电路 / Equivalent Circuit



引脚排列 / Pinning

PIN1：Main Terminal 1　　PIN 2：Main Terminal 2　　PIN 3：Gate

放大及印章代码 / h_{FE} Classifications & Marking

见印章说明。See Marking Instructions.

极限参数 / Absolute Maximum Ratings(Ta=25℃)

参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Repetitive peak off-state voltages	V_{DRM}/V_{RRM}	600/800	V
On-state rms current(full sine wave T_C=86℃)	$I_{T(RMS)}$	16	A
Non repetitive surge peak on-state current(full cycle, T_j initial = 25 °C)	$I_{TSM(F=50Hz\ t=20ms)}$	160	A
Non repetitive surge peak on-state current(full cycle, T_j initial =25°C)	$I_{TSM(F=60Hz\ t=16.7ms)}$	168	A
I^2t value for fusing	$I^2t_{(tp=10ms)}$	144	A^2s
Critical rate of rise of on-state current I_G =2xI_{GT}, t_r≤100 ns（F=120Hz T_j=125℃）	dI/dt	50	A/μs
Non repetitive surge peak off-state Voltage(t_p = 10 ms T_j =25°C)	V_{DSM}/V_{RSM}	V_{DRM}/V_{RRM} + 100	V
Peak gate current(t_p =20μs T_j=125℃)	I_{GM}	4.0	A
Average gate power dissipation(T_j=125℃)	$P_{G(AV)}$	1.0	W
Maximum operating Junction Temperature	T_j	-40～125	℃
Storage Temperature Range	T_{stg}	-40～150	℃
Junction to ambient	$R_{th(j-a)}$	60	℃/W
Junction to case (AC)	$R_{th(j-c)}$	2.1	℃/W

电性能参数 / Electrical Characteristics(Ta=25℃)

免缓冲器和逻辑电平（3 象限） / Snubberless and logic level (3 quadrants)

符号 Symbol	测试条件 Test Conditions	信号区 Quadrant		BTA16F			单位 Unit
				SW	CW	BW	
I_{GT}(1)	V_D=12V R_L=33Ω	I-II-III	Max.	10	35	50	mA
V_{GT}	V_D=12V R_L=33Ω	I-II-III	Max.	1.3			V
V_{GD}	V_D=V_{DRM} R_L=3.3KΩ T_j=125℃	I-II-III	Min.	0.2			V
I_H(2)	I_T=500mA		Max.	15	35	50	mA
I_L	I_G=1.2I_{GT}	I-III	Max.	25	50	70	mA
		II		30	60	80	
dV/dt (2)	V_D = 67 % V_{DRM} gate open T_j = 125° C		Min.	40	500	1000	V/μs
(dI/dt)c (2)	(dV/dt)c = 0.1V/μS T_j = 125° C		Min.	8.5	-	-	A/mS
	(dV/dt)c = 10V/μS T_j = 125° C		Min.	3.0	-	-	
	Without snubber T_j = 125° C		Min.	-	8.5	14	

Note 1：minimum I_{GT} is guaranted at 5% of I_{GT} max.
Note 2：for both polarities of A2 referenced to A1.

电性能参数 / Electrical Characteristics(Ta=25℃)

标准（4 象限） / Standard（4 quadrants）

符号 Symbol	测试条件 Test Conditions	信号区 Quadrant		BTA16F C	BTA16F B	单位 Unit
I_{GT}(1)	V_D=12V R_L=33Ω	I-II-III IV	Max.	25 50	50 100	mA
V_{GT}	V_D=12V R_L=33Ω	ALL	Max.	1.3		V
V_{GD}	V_D=V_{DRM} R_L=3.3KΩ T_j=125℃	ALL	Min.	0.2		V
I_H(2)	I_T=500mA		Max.	25	50	mA
I_L	I_G=1.2I_{GT}	I-III- IV	Max.	40	60	mA
		II		80	120	
(dV/dt)(2)	V_D=67% V_{DRM} gate open T_j=125℃		Min.	200	400	V/μs
(dV/dt)c(2)	(dI/dt)c=7A/ms T_j=125℃		Min.	5.0	10	

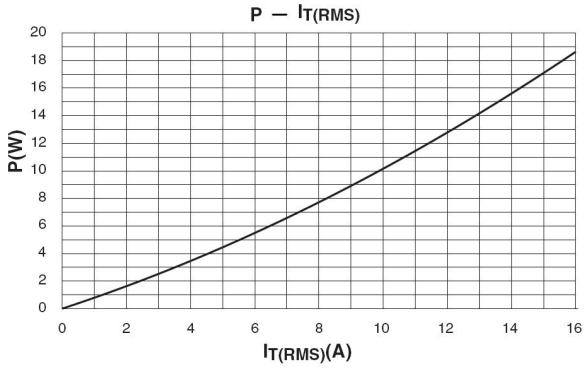
Note 1：minimum I_{GT} is guaranted at 5% of I_{GT} max.
Note 2：for both polarities of A2 referenced to A1.

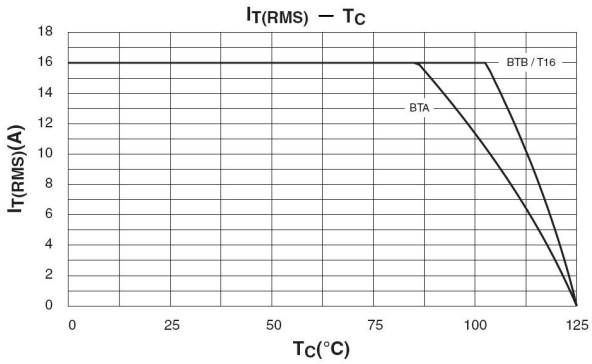
电性能参数 / Electrical Characteristics(Ta=25℃)

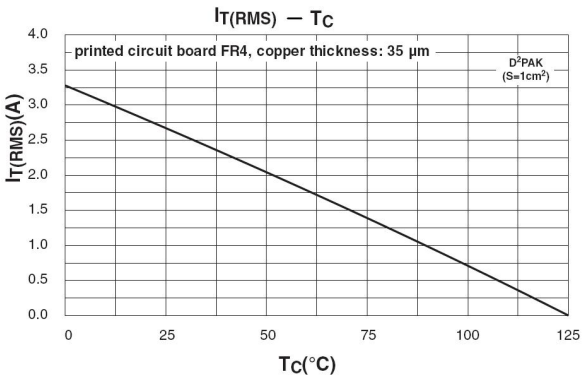
符号 Symbol	测试条件 Test Conditions			数值 Value	单位 Unit
V_{TM}(2)	I_{TM}=22.5A t_p =380μs T_j=25℃		Max.	1.55	V
V_{to}(2)	Threshold voltage T_j=125℃		Max.	0.85	V
R_d(2)	Dynamic resistance T_j=125℃		Max.	25	mΩ
I_{DRM} I_{RRM}	V_{DRM} = V_{RRM}	T_j=25℃	Max.	5.0	μA
		T_j=125℃	Max.	2.0	mA

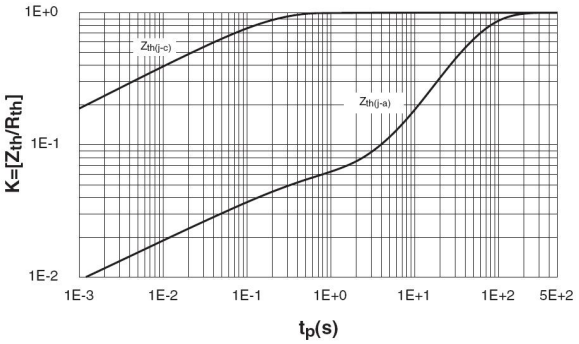
Note2. for both polarities of A2 referenced to A1

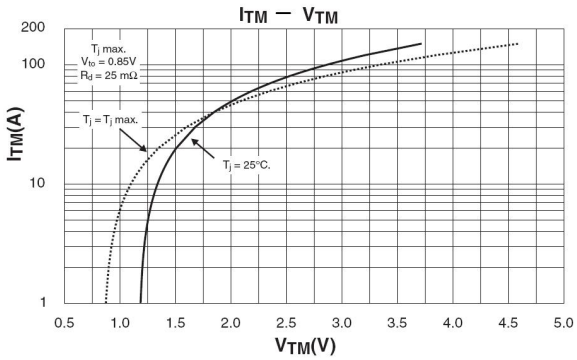
电参数曲线图 / Electrical Characteristic Curve

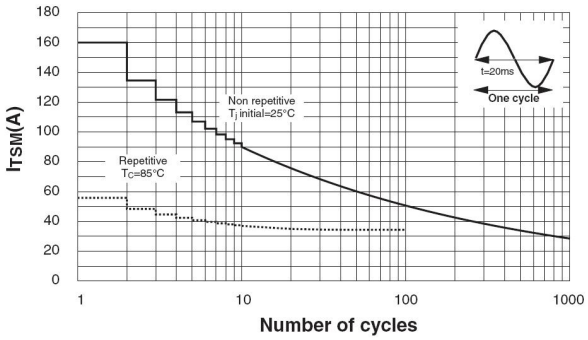




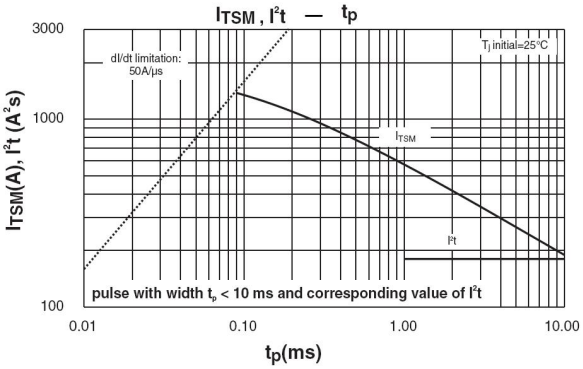


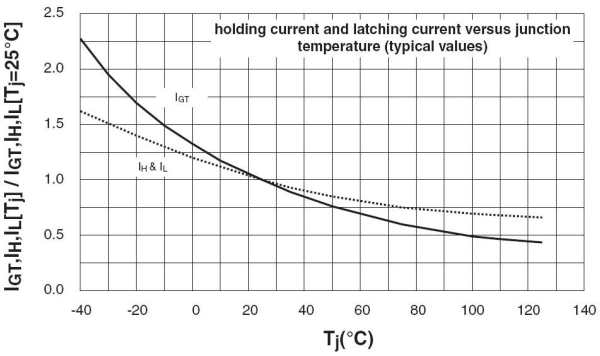


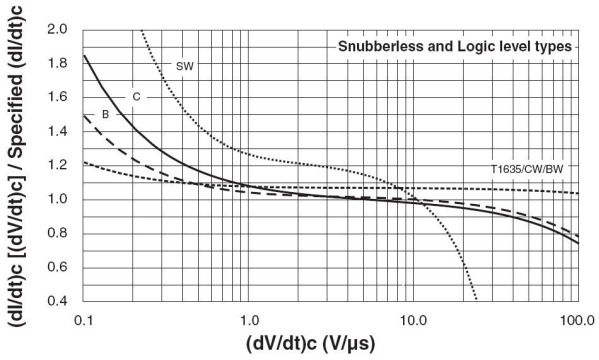


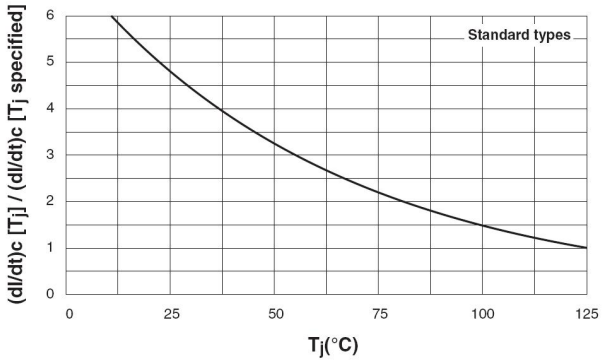


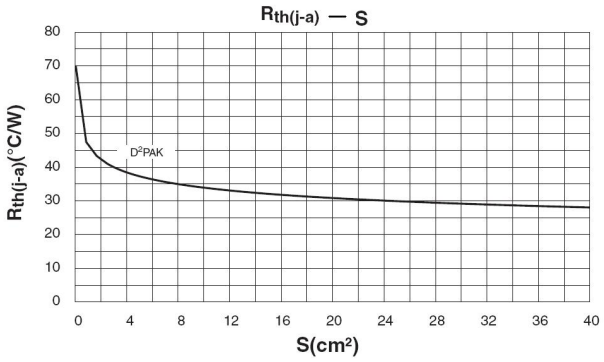
电参数曲线图 / Electrical Characteristic Curve





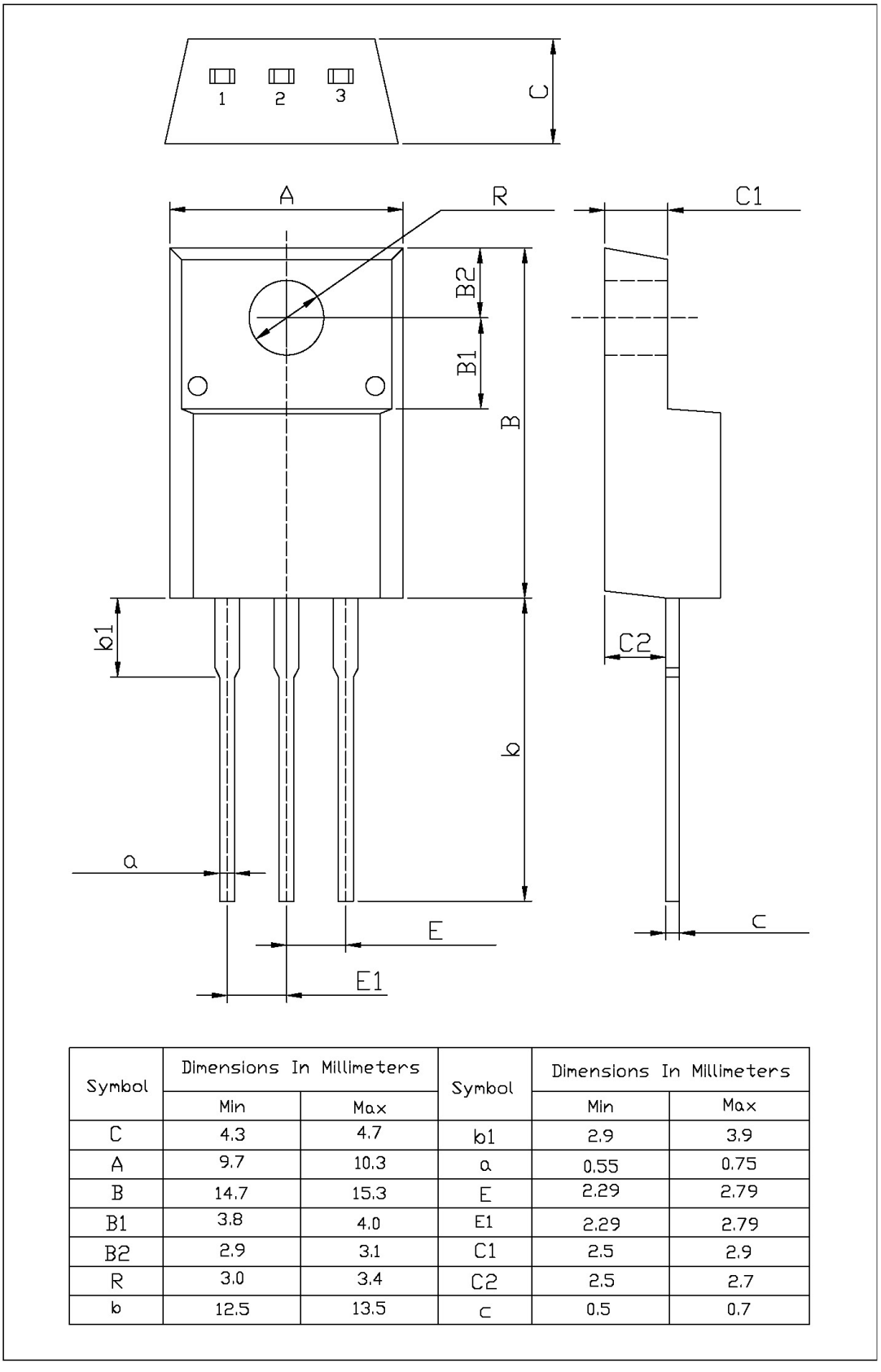






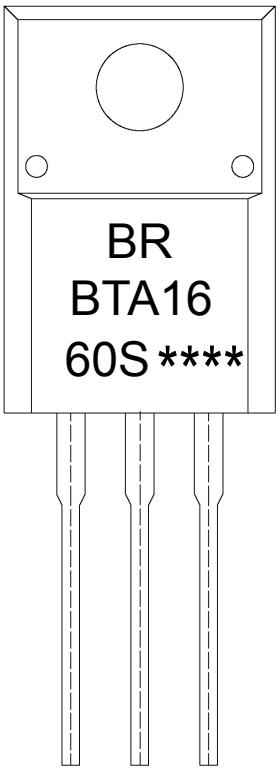
外形尺寸图 / Package Dimensions

TO-220F 单位：mm



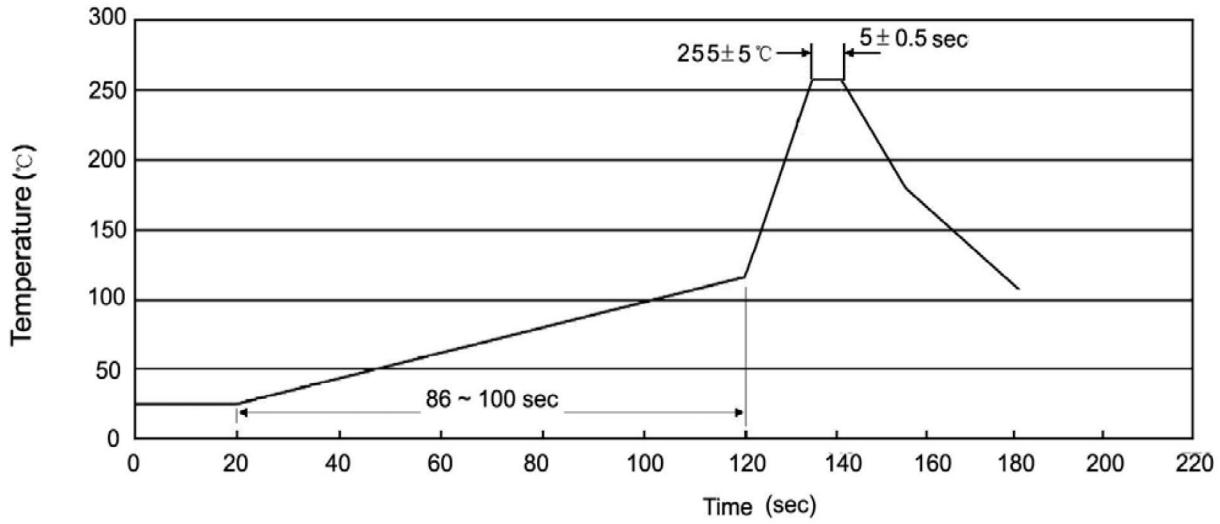
Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
C	4.3	4.7	b1	2.9	3.9
A	9.7	10.3	a	0.55	0.75
B	14.7	15.3	E	2.29	2.79
B1	3.8	4.0	E1	2.29	2.79
B2	2.9	3.1	C1	2.5	2.9
R	3.0	3.4	C2	2.5	2.7
b	12.5	13.5	c	0.5	0.7

印章说明 / Marking Instructions



说明：	
BR：	为公司代码
BTA16：	为产品型号
60S:	为 V_{RRM} 和 I_{GT} 分档代码
****：	为生产批号代码，随生产批号变化。
Note:	
BR:	Company Code
BTA16:	Product Type.
60S:	V_{RRM}/I_{GT} Bracket code
****:	Lot No. Code, code change with Lot No.

波峰焊温度曲线图(无铅) / Temperature Profile for Dip Soldering(Pb-Free)



说明：

1、预热温度 25～150℃，时间 60～90sec;

2、峰值温度 255±5℃，时间持续为 5±0.5sec;

3、焊接制程冷却速度为 2～10℃/sec.

Note:

1.Preheating:25~150℃, Time:60~90sec.

2.Peak Temp.:255±5℃, Duration:5±0.5sec.

3. Cooling Speed: 2~10℃/sec.

耐焊接热试验条件 / Resistance to Soldering Heat Test Conditions

温度：270±5℃　　时间：10±1 sec.　　Temp.:270±5℃　　Time:10±1 sec

包装规格 / Packaging SPEC.

散件包装 / BULK

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm³)		
	Units/Bag 只/袋	Bags/Inner Box 袋/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Bag 袋	Inner Box 盒	Outer Box 箱
TO-220/F	200	10	2,000	5	10,000	135×190	237×172×102	560×245×195

套管包装 / TUBE

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm³)		
	Units/Tube 只/套管	Tubes/Inner Box 套管/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Tube 套管	Inner Box 盒	Outer Box 箱
TO-220/F	50	20	1,000	5	5,000	532×31.4×5.5	555×164×50	575×290×180

使用说明 / Notices