描述 / Descriptions

TO-220 塑封封装 NPN 半导体三极管。Silicon NPN transistor in a TO-220 Plastic Package.

特征 / Features

低饱和工作电压，开关转换速度快。

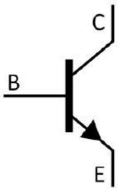
low collector saturation voltage, fast switching speed, wide base reverse-bias SOA.

用途 / Applications

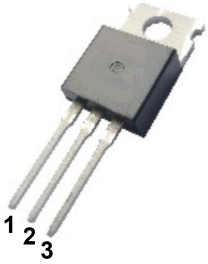
用于高速高压开关,直流转换及高频放大。

High-speed high-voltage converters, and high-frequency power amplifiers.

内部等效电路 / Equivalent Circuit



引脚排列 / Pinning



PIN1：Base PIN 2：Collector PIN 3：Emitter

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℃)

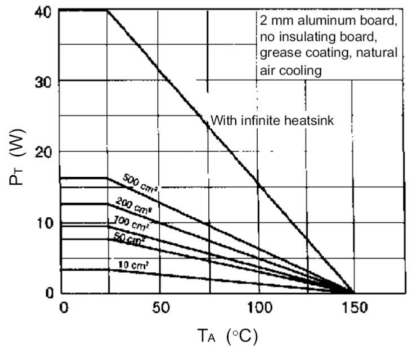
参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Collector to Base Voltage	V_{CBO}	500	V
Collector to Emitter Voltage	V_{CEO}	400	V
Emitter to Base Voltage	V_{EBO}	7.0	V
Collector Current - Continuous	I_C	7.0	A
Base Current - Continuous	I_B	3.5	A
Collector Power Dissipation	P_C	1.5	W
	P_C(Tc=25℃)	40	W
Junction Temperature	T_j	150	℃
Storage Temperature Range	T_{stg}	-55～150	℃

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

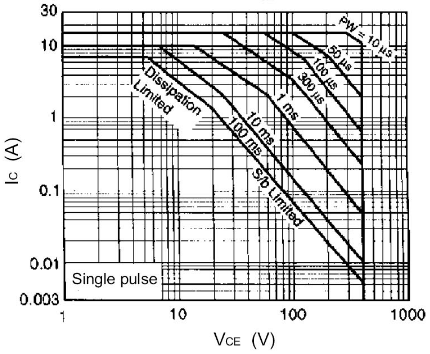
参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Collector to Emitter Breakdown Voltage	V_{CEO}	I_C=3A I_{B1}=0.6A L=1mH	400			V
Collector to Emitter Breakdown Voltage	$V_{CEX(SUS)1}$	I_C=3A I_{B1}=-I_{B2}=0.6A $V_{BE(OFF)}$=-5V L=180μH	450			V
	$V_{CEX(SUS)2}$	I_C=6A I_{B1}=2A -I_{B2}=0.6A $V_{BE(OFF)}$=-5V L=180μH	400			V
Collector Cut-Off Current	I_{CBO}	V_{CB}=400V I_E=0			1.0	μA
Collector Cut-Off Current	I_{CER}	V_{CE}=400V R_{BE}=51Ω T_A=125℃			1.0	mA
Collector Cut-Off Current	I_{CEX1}	V_{CE}=400V $R_{BE(OFF)}$=-1.5V			10	μA
	I_{CEX2}	V_{CE}=400V R_{BE}=-1.5V T_A=125℃			1.0	mA
Emitter Cut-Off Current	I_{EBO}	V_{EB}=5V I_C=0			10	μA
DC Current Gain	$h_{FE(1)}$	V_{CE}=5V I_C=0.1A	20		80	
	$h_{FE(2)}$	V_{CE}=5V I_C=1A	20		80	
	$h_{FE(3)}$	V_{CE}=5V I_C=3A	10			
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=3A I_B=0.6A			1.0	V
Base to Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=3A I_B=0.6A			1.2	V
Turn-On Time	t_{on}	I_C=3A R_L=50Ω I_{B1}=-I_{B2}=0.6A V_{CC}=150V Refer to the test circuit			1.0	μS
Storage Time	t_{stg}				2.5	μS
Fall Time	t_r				1.0	μS

电参数曲线图 / Electrical Characteristic Curve

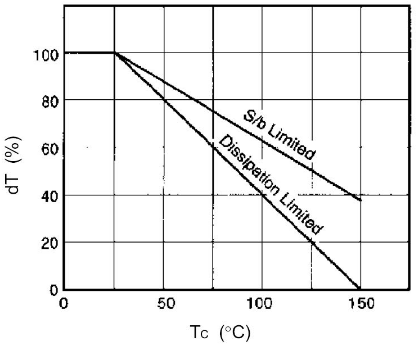
$P_T - T_A$



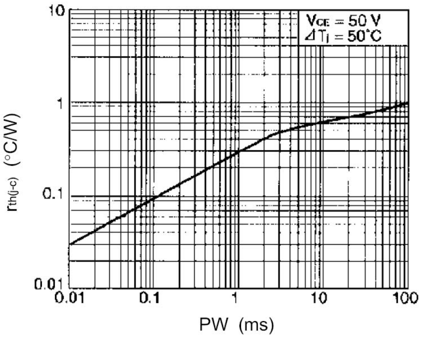
$I_C - V_{CE}$



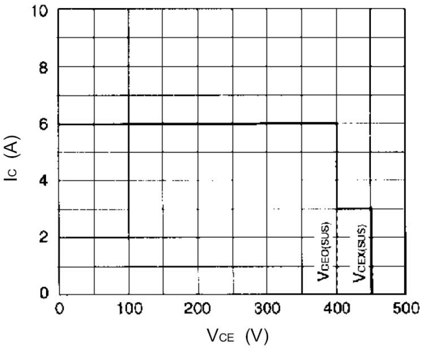
$dT - T_C$



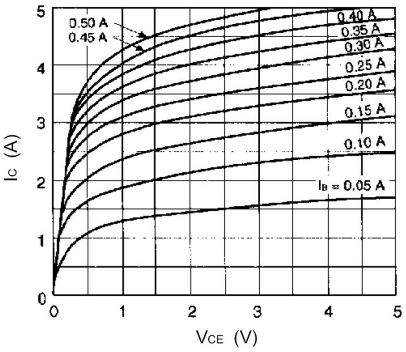
$r_{th(j-c)} - PW$



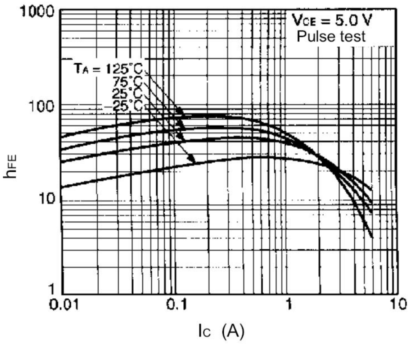
$I_C - V_{CE}$



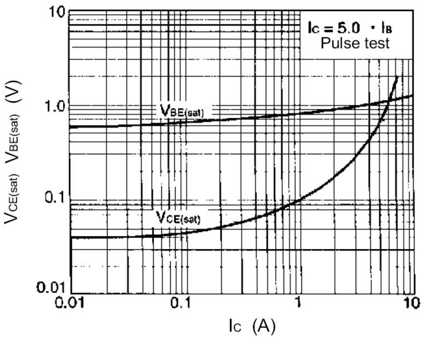
$I_C - V_{CE}$



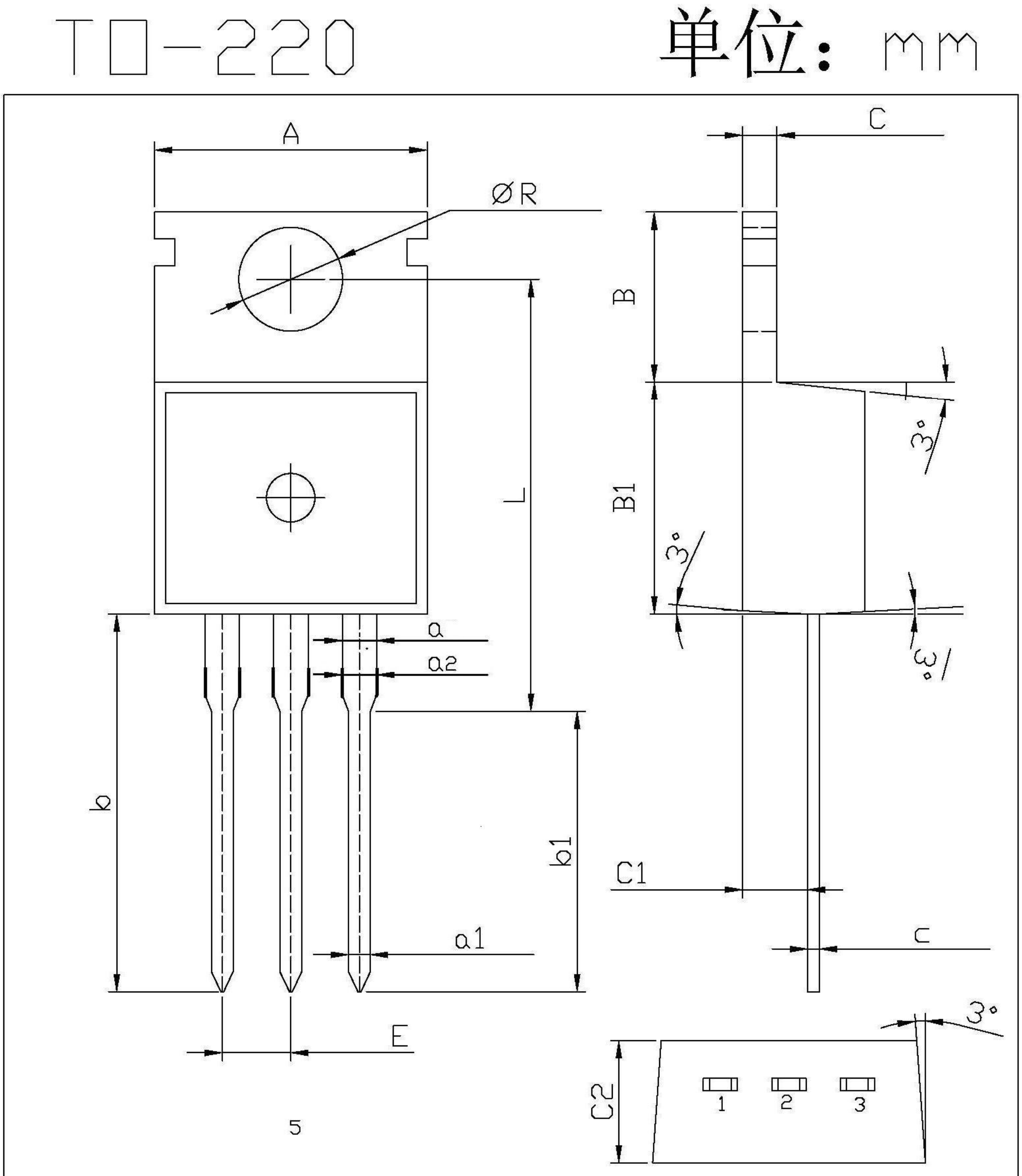
$h_{FE} - I_C$



$V_{CE(sat)}\ V_{BE(sat)} - I_C$

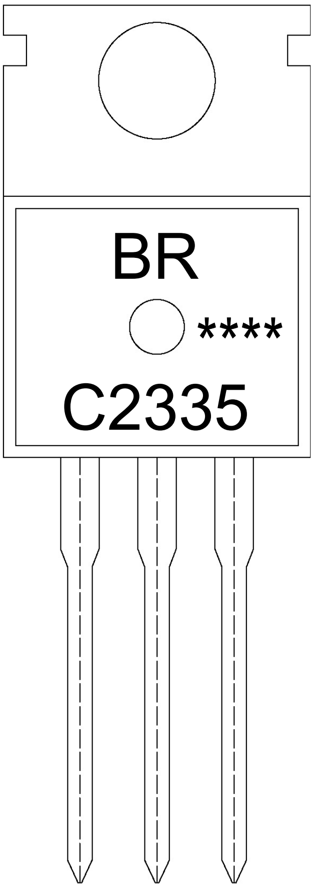


外形尺寸图 / Package Dimensions



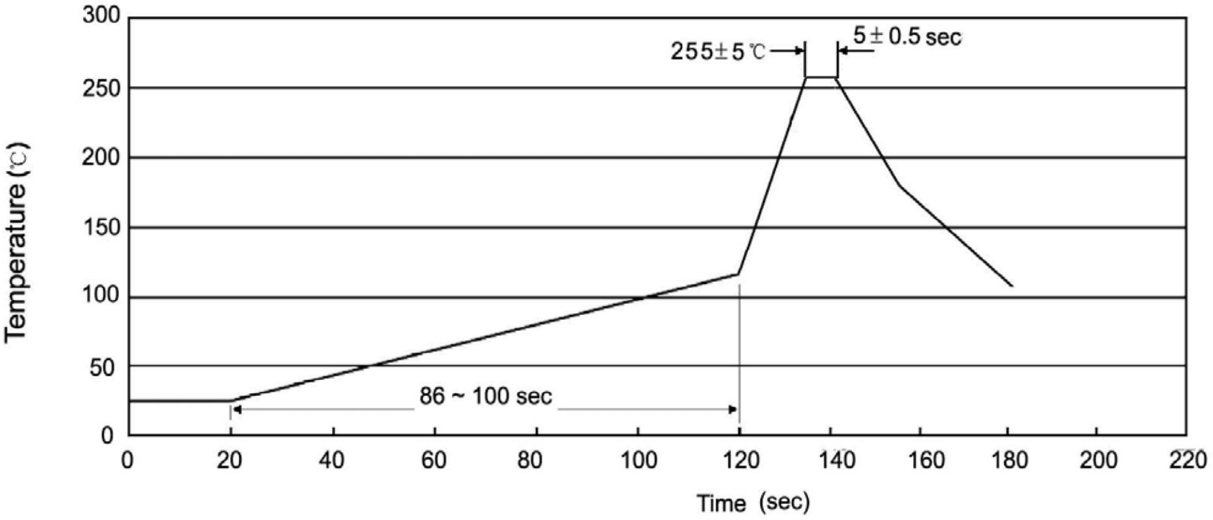
Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	9.8	10.2	C	1.2	1.4
R	3.56	3.64	B	6.3	6.7
L	15.7	16.1	B1	9.0	9.4
b	12.6	13.6	C1	2.2	2.6
b1	9.6	10.6	a1	0.7	0.9
a	1.22	1.32	c	0.4	0.6
E	2.34	2.74	C2	4.3	4.7
a2	1.25	1.45			

印章说明 / Marking Instructions



说明：	
BR：	为公司代码
C2335：	为型号代码
****：	为生产批号代码，随生产批号变化。
Note:	
BR:	Company Code
C2335:	Product Type.
****:	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: mm^3)		
	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: mm^3)		
	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