MMBT3904(BR3DG3904M)

Rev.C Feb.-2015

蓝箭电子 BLUE ROCKET ELECTRONICS

DATA SHEET

描述 / Descriptions

SOT-23 塑封封装 NPN 半导体三极管。Silicon NPN transistor in a SOT-23 Plastic Package.

特征 / Features

低电流，低电压。

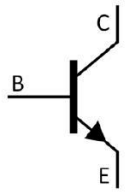
Low current, Low voltage.

用途 / Applications

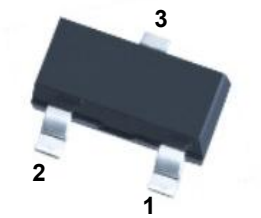
用于普通放大及开关。

General purpose amplifier and switching.

内部等效电路 / Equivalent Circuit



引脚排列 / Pinning



PIN 1：Emitter PIN 2：Base PIN 3：Collector

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

h_{FE} Range	100～300
Marking	• H1A

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}	60	V
Collector to Emitter Voltage	V_{CEO}	40	V
Emitter to Base Voltage	V_{EBO}	6.0	V
Collector Current	I_C	200	mA
Collector Power Dissipation	P_C	200	mW
Collector Power Dissipation	*P_C	350	mW
Junction Temperature	T_j	150	℃
Storage Temperature Range	T_{stg}	-55～150	℃

*在 7×5×0.6mm 陶瓷板上 *When mounted on a 7×5×0.6mm ceramic board

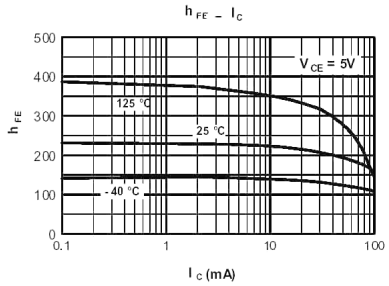
电性能参数 / Electrical Characteristics(Ta=25℃)

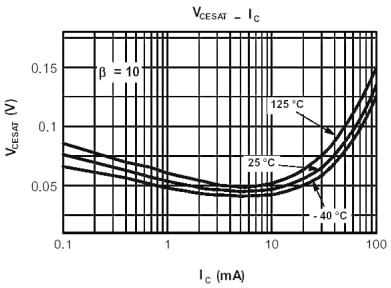
参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Collector to Emitter Breakdown Voltage	V_{CEO}	I_C=10μA I_B=0	60			V
Collector to Base Breakdown Voltage	V_{CBO}	I_C=1.0mA I_E=0	40			V
Emitter to Base Breakdown Voltage	V_{EBO}	I_E=10μA I_C=0	6.0			V
Collector Cut-Off Current	I_{CBO}	V_{CB}=30V I_E=0			0.05	μA
Emitter Cut-Off Current	I_{EBO}	V_{EB}=3.0V I_C=0			0.05	μA
Forward Current Transfer Ratio$_{(1)}$	$h_{FE(1)}$	V_{CE}=1.0V I_C=10mA	100		300	
Forward Current Transfer Ratio$_{(2)}$	$h_{FE(2)}$	V_{CE}=1.0V I_C=100mA	30			
Forward Current Transfer Ratio$_{(3)}$	$h_{FE(3)}$	V_{CE}=1.0V I_C=50mA	60			
Forward Current Transfer Ratio$_{(4)}$	$h_{FE(4)}$	V_{CE}=1.0V I_C=1.0mA	70			
Forward Current Transfer Ratio$_{(5)}$	$h_{FE(5)}$	V_{CE}=1.0V I_C=0.1mA	40			
Collector-Emitter Saturation Voltage$_{(1)}$	$V_{CE(sat)\ (1)}$	I_C=10mA I_B=1.0mA			0.2	V
Collector-Emitter Saturation Voltage$_{(2)}$	$V_{CE(sat)\ (2)}$	I_C=50mA I_B=5.0mA			0.3	V
Base-Emitter Saturation Voltage$_{(1)}$	$V_{BE(sat)\ (1)}$	I_C=10mA I_B=1.0mA	0.65		0.85	V
Base-Emitter Saturation Voltage$_{(2)}$	$V_{BE(sat)\ (2)}$	I_C=50mA I_B=5.0mA			0.95	V

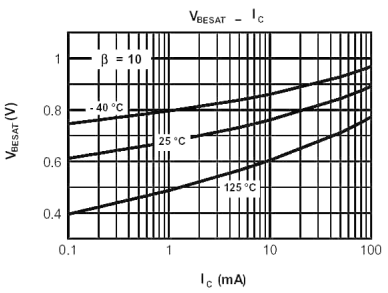
电性能参数 / Electrical Characteristics(Ta=25℃)

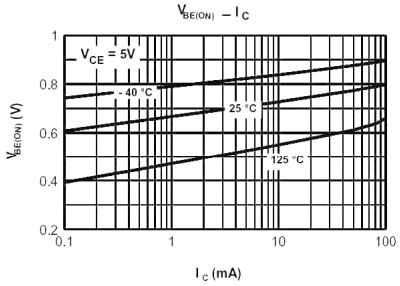
参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Transition Frequency	f_T	V_{CE}=20V I_C=10mA f=100MHz	300			MHz
Output Capacitance	C_{ob}	V_{CB}=5.0V f=1.0MHz			4.0	pF
Storage Time	t_{stg}	V_{CC}=3.0V I_C=10mA I_{B1}=-I_{B2}=1.0mA			200	ns
Fall Time	t_f	V_{CC}=3.0V I_C=10mA I_{B1}=-I_{B2}=1.0mA			50	ns
Delay Time	t_d	V_{CC}=3.0V V_{BE}=0.5V I_C=10mA I_{B1}=1.0mA			35	ns
Rise Time	t_r	V_{CC}=3.0V V_{BE}=0.5V I_C=10mA I_{B1}=1.0mA			35	ns
Input Capacitance	C_{ib}	V_{EB}=0.5V f=1.0MHz			8.0	pF

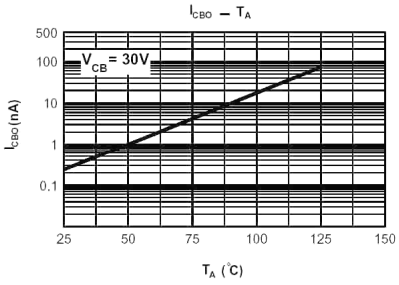
电参数曲线图 / Electrical Characteristic Curve

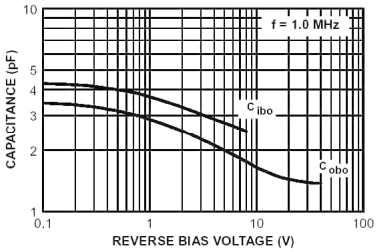


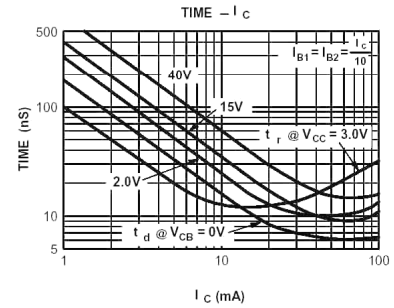


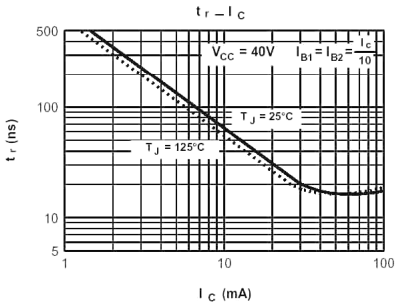


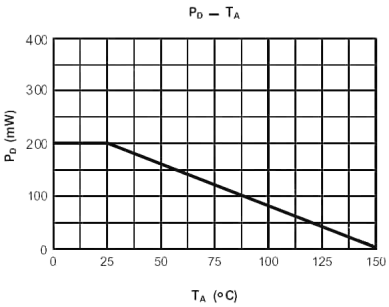






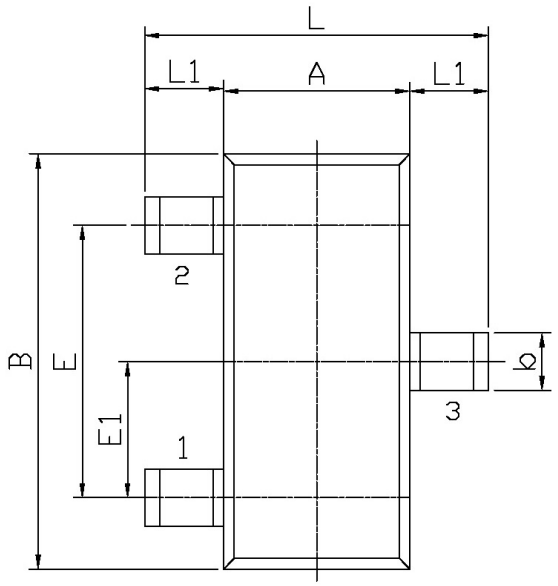


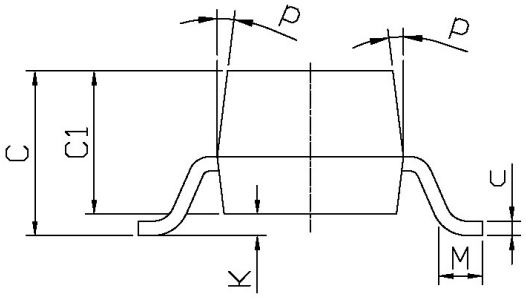




外形尺寸图 / Package Dimensions

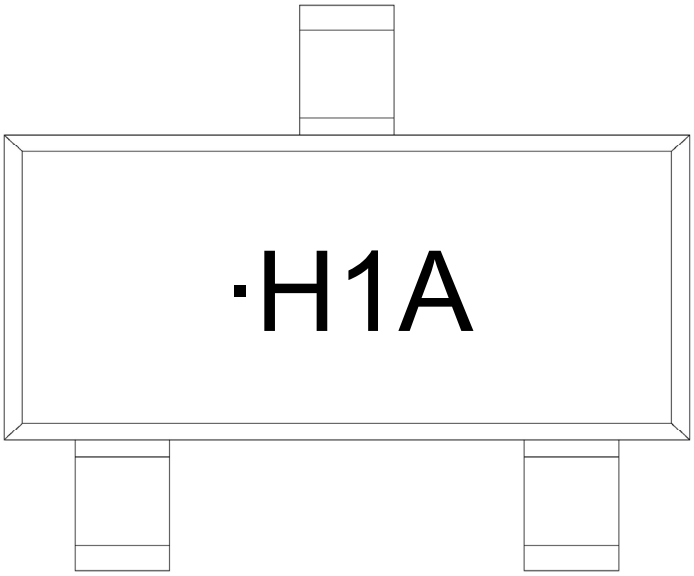
SOT-23 单位：mm





Symbol	Dimensions In Millmeters		Symbol	Dimensions In Millmeters	
	Min	Max		Min	Max
L	2.2	2.7	C	1.30Max	
L1	0.45	0.65	C1	0.90	1.20
A	1.15	1.50	c	0.05	0.20
B	2.70	3.10	K	0	0.10
E	1.70	2.10	M	0.20MIN	
E1	0.85	1.05	P	7	
b	0.35	0.55			

印章说明 / Marking Instructions



说明：

·： 区分标识

H： 为公司代码

1A： 为型号代码

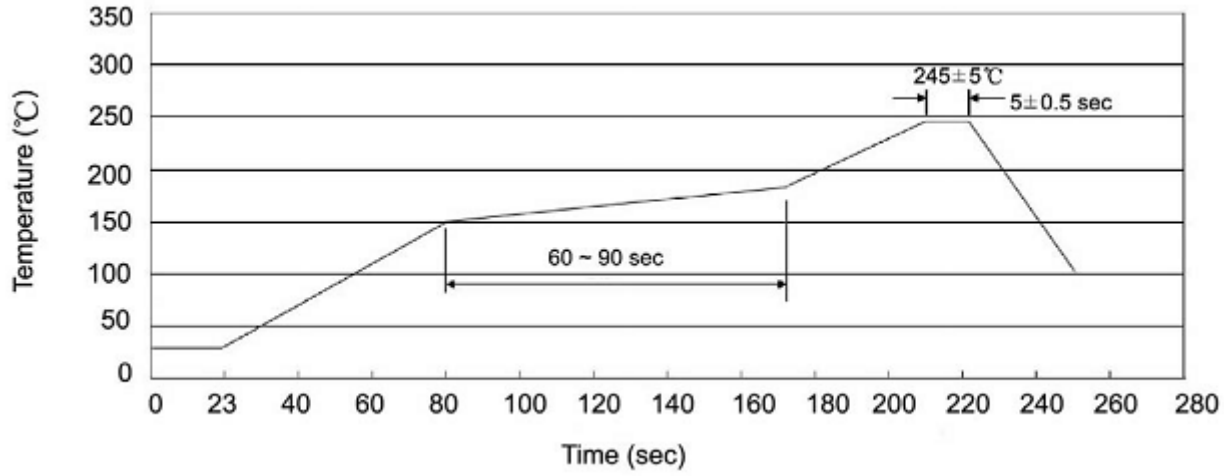
Note:

·： Identify

H： Company Code

1A： Product Type

回流焊温度曲线图(无铅) / Temperature Profile for IR Reflow Soldering(Pb-Free)



说明：

1、预热温度 25～150℃，时间 60～90sec;

2、峰值温度 245±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.:245±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.

卷盘包装 / REEL

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm^3)		
	Units/Reel 只/卷盘	Reels/Inner Box 卷盘/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/盒	Reel	Inner Box 盒	Outer Box 箱
SOT-23	3,000	10	30,000	8	240,000	7″ ×8	180×120×180	385×257×392

使用说明 / Notices