MMBT3904ZK

Rev.D Mar.-2025

蓝箭电子
BLUE ROCKET ELECTRONICS

DATA SHEET

描述 / Descriptions

DFN1006-3L 塑封封装 NPN 半导体三极管。

Silicon NPN transistor in a DFN1006-3L Plastic Package.

特征 / Features

低电压，低电流，无卤产品。

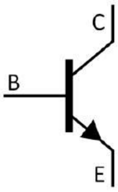
Low current, Low voltage,HF Product.

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：Base PIN 2： Emitter PIN 3：Collector

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

h_{FE} Range	100～300
Marking	• H1AK

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	100	mW
Junction Temperature	T_j	150	℃
Storage Temperature Range	T_{stg}	-55～150	℃
Thermal Resistance, Junction to Ambient	R_{thJA}	310	℃/W
Thermal Resistance, Junction to Lead	R_{thJL}	120	℃/W

*贴装在 PCB 板上 Mount on the PCBA

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 Base Breakdown Voltage	V_{CBO}	I_C=10μA I_E=0	60			V
Collector to Emitter Breakdown Voltage	V_{CEO}	I_C=1.0mA I_B=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
DC Current Gain	$h_{FE(1)}$	V_{CE}=1.0V I_C=10mA	100		300	
	$h_{FE(2)}$	V_{CE}=1.0V I_C=100mA	30			
	$h_{FE(3)}$	V_{CE}=1.0V I_C=50mA	60			
	$h_{FE(4)}$	V_{CE}=1.0V I_C=1.0mA	70			
	$h_{FE(5)}$	V_{CE}=1.0V I_C=0.1mA	40			
Collector-Emitter Saturation Voltage	$V_{CE(sat)(1)}$	I_C=10mA I_B=1.0mA			0.2	V
	$V_{CE(sat)(2)}$	I_C=50mA I_B=5.0mA			0.3	V
Base-Emitter Saturation Voltage	$V_{BE(sat)(1)}$	I_C=10mA I_B=1.0mA	0.65		0.85	V
	$V_{BE(sat)\ (2)}$	I_C=50mA I_B=5.0mA			0.95	V
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

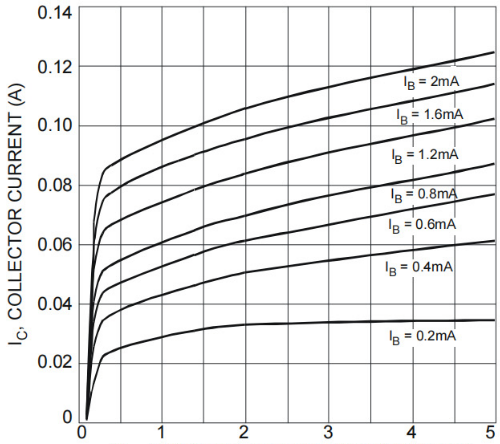


Fig. 1 Typical Collector Current vs. Collector-Emitter Voltage

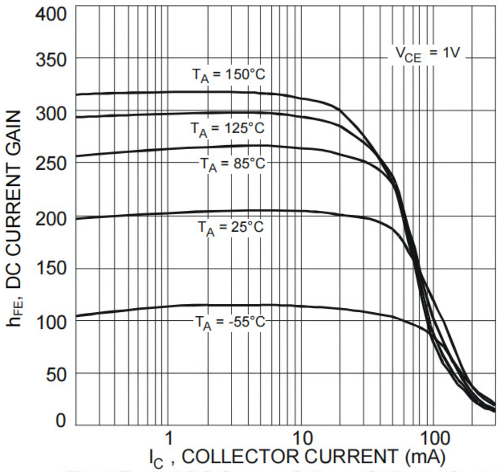


Fig. 2 Typical DC Current Gain vs. Collector Current

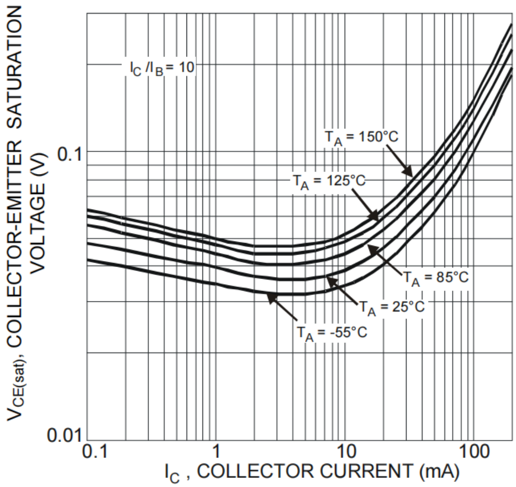


Fig. 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

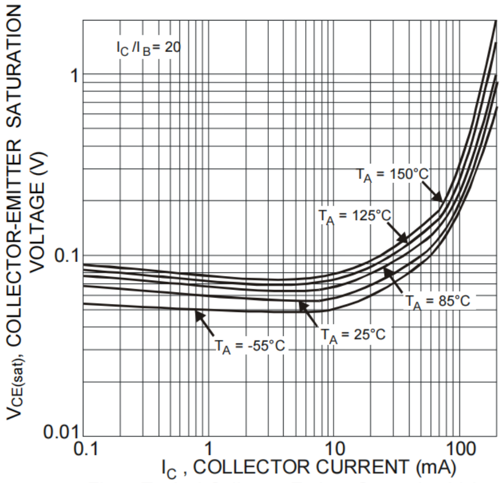


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

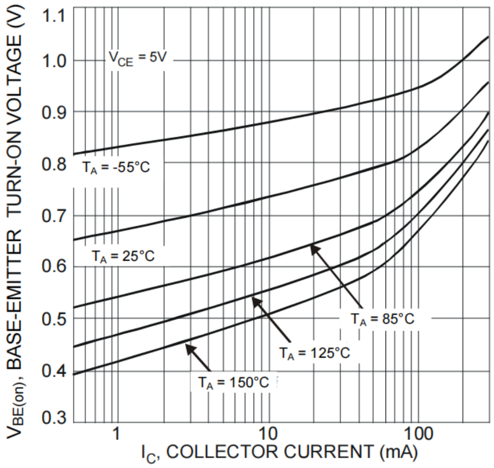


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

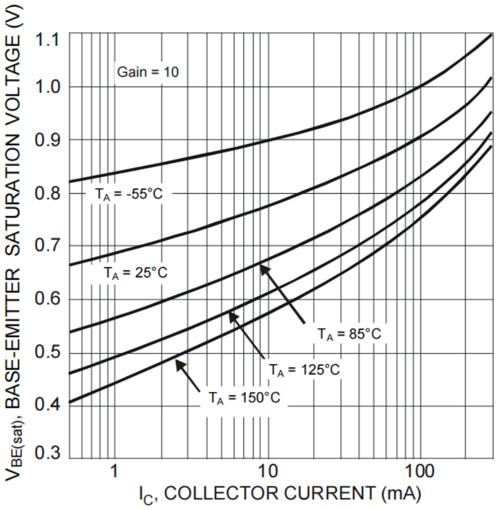
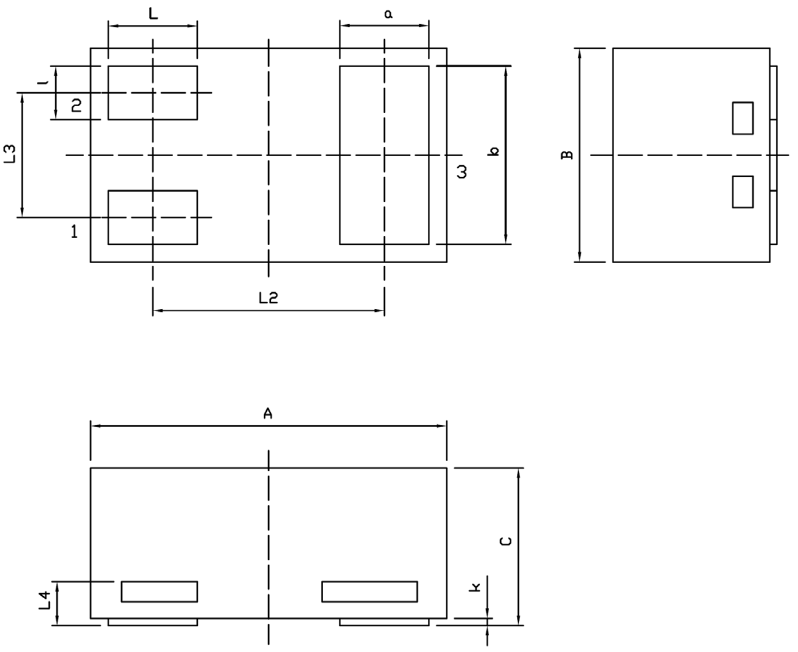


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

外形尺寸图 / Package Dimensions

DFN1006-3L

Unit:mm



Dimensions In Millimeterer			
Symbol	MIN	TYP	MAX
A	0.95	1.00	1.05
B	0.55	0.60	0.65
C	0.45	0.50	0.55
L	0.22	0.26	0.30
L2	-	0.65	-
L3	-	0.35	-
L4	-	0.152	-
a	0.21	0.25	0.29
b	0.47	0.51	0.55
l	0.11	0.15	0.19
k	0.00	-	0.03

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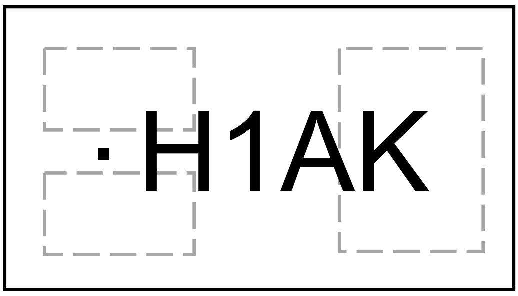
印章说明 / Marking Instructions



说明：

·：区分标识

H：为公司代码

1AK：为型号代码

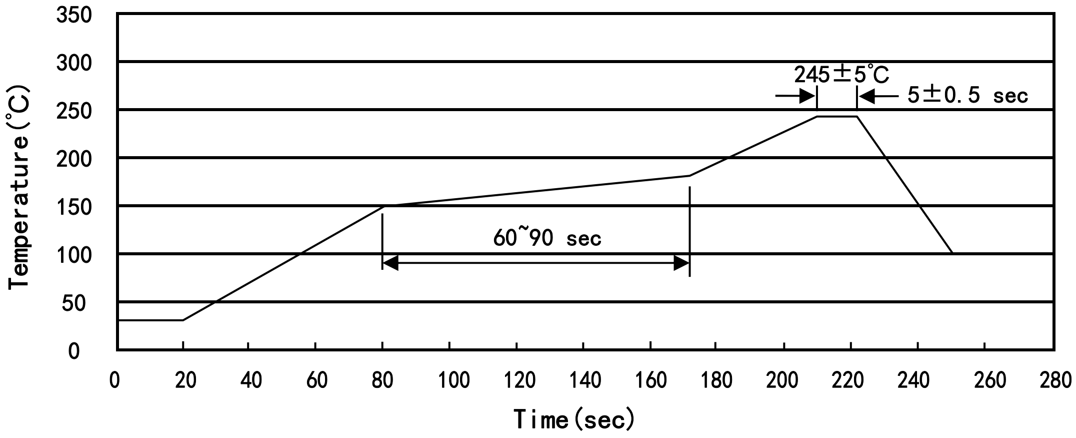
Note:

·：Identify

H：Company Code

1AK：Product Type Code

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



说明：	Note:
1、预热温度 150～180℃，时间 60～90sec;	1.Preheating:150~180℃, Time:60~90sec.
2、峰值温度 245±5℃，时间持续为 5±0.5sec;	2.Peak Temp.:245±5℃, Duration:5±0.5sec.
3、焊接制程冷却速度为 2～10℃/sec.	3. Cooling Speed: 2~10℃/sec.

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

温度：260±5℃　　时间：10±1 sec.　　Temp.:260±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/箱	Reel	Inner Box 盒	Outer Box 箱
DFN1006-3L	10,000	10	100,000	6	600,000	7″ ×8	180×120×180	390×385×205

使用说明 / Notices