

### 描述 / Descriptions

SOT-89 塑封封装 PNP 半导体三极管。Silicon PNP transistor in a SOT-89 Plastic Package.

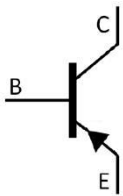
### 特征 / Features

饱和压降低，极好的直流电流增益特性好。  
Low  $V_{CE(sat)}$ , excellent DC current gain characteristics.

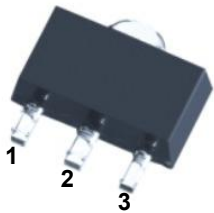
### 用途 / Applications

用于一般放大。  
General purpose amplifier.

### 内部等效电路 / Equivalent Circuit



### 引脚排列 / Pinning



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

### 印章代码 / Marking

$h_{FE}$ Classifications Symbol	Q	R
$h_{FE}$ Range	120~270	180~390
Marking	HAEQ <sup>*</sup>	HAER <sup>*</sup>

**极限参数 / Absolute Maximum Ratings(Ta=25°C)**

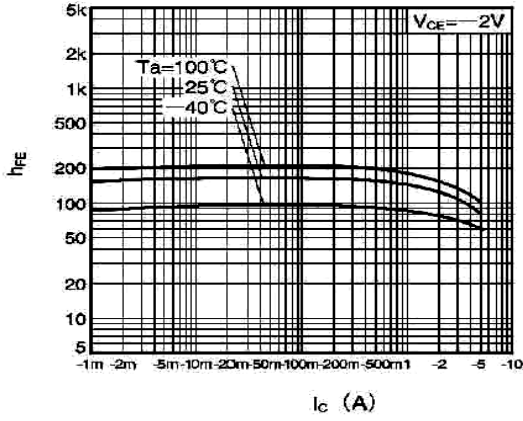
参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Collector to Base Voltage	$V_{CBO}$	-20	V
Collector to Emitter Voltage	$V_{CEO}$	-20	V
Emitter to Base Voltage	$V_{EBO}$	-6.0	V
Collector Current-Continuous	$I_C$	-3.0	A
Collector Current -Continuous(Pulse)	$I_{CP}$	-5.0	A
Collector Power Dissipation	$P_C$	0.6	W
Junction Temperature	$T_j$	150	°C
Storage Temperature Range	$T_{stg}$	-55~150	°C

**电性能参数 / Electrical Characteristics(Ta=25°C)**

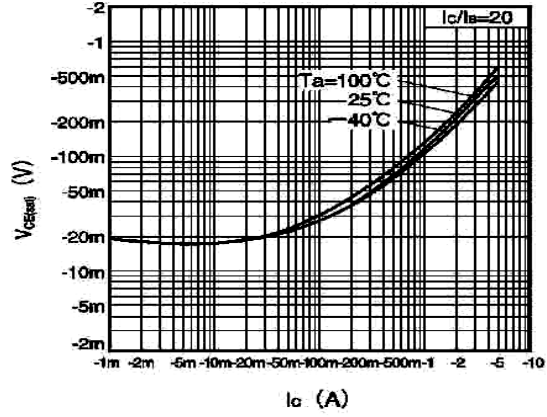
参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Collector to Base Breakdown Voltage	$V_{CBO}$	$I_C=-50\mu A$ $I_E=0$	-20			V
Collector to Emitter Breakdown Voltage	$V_{CEO}$	$I_C=-1.0mA$ $I_B=0$	-20			V
Emitter to Base Breakdown Voltage	$V_{EBO}$	$I_E=-50\mu A$ $I_C=0$	-6.0			V
Collector Cut-Off Current	$I_{CBO}$	$V_{CB}=-20V$ $I_E=0$			-0.1	$\mu A$
Emitter Base Cut-Off Current	$I_{EBO}$	$V_{EB}=-5.0V$ $I_C=0$			-0.1	$\mu A$
DC Current Gain	$h_{FE}$	$V_{CE}=-2.0V$ $I_C=-0.1A$	120		390	
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=-2.0A$ $I_B=-0.1A$			-0.5	V
Transition Frequency	$f_T$	$V_{CE}=-2.0V$ $f=100MHz$ $I_C=-0.5A$		240		MHz
Collector Output Capacitance	$C_{ob}$	$V_{CB}=-10V$ $f=1.0MHz$ $I_E=0$		35		pF

电参数曲线图 / Electrical Characteristic Curve

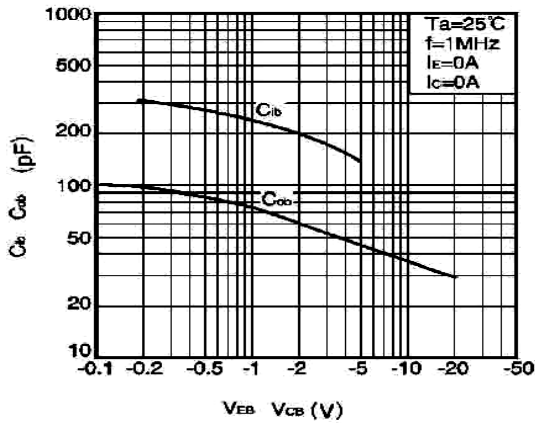
$h_{FE} - I_C$



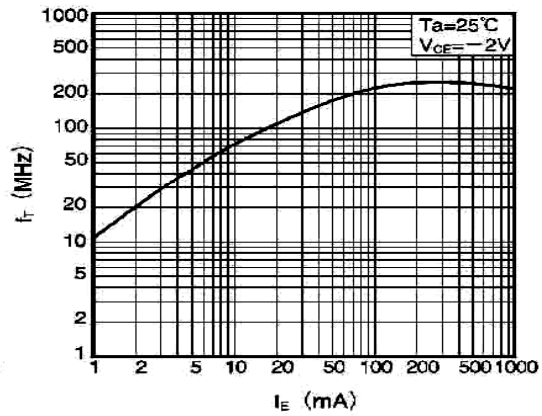
$V_{CE(sat)} - I_C$



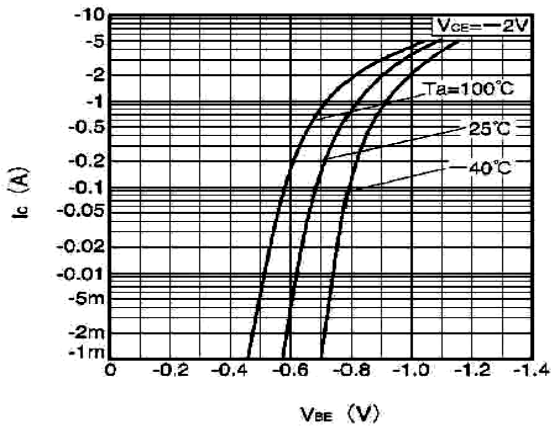
$C_{ib} C_{ob} - V_{EB} V_{CE}$



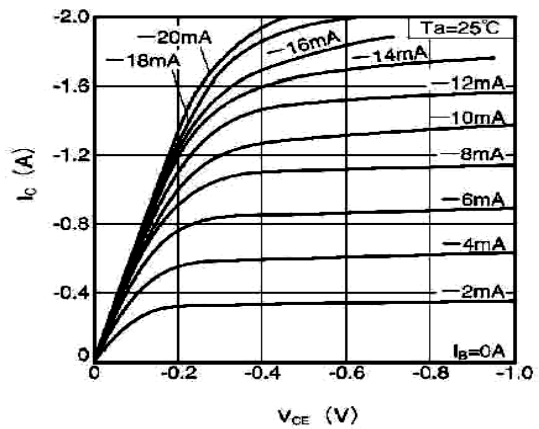
$f_T - I_E$



$I_C - V_{BE}$



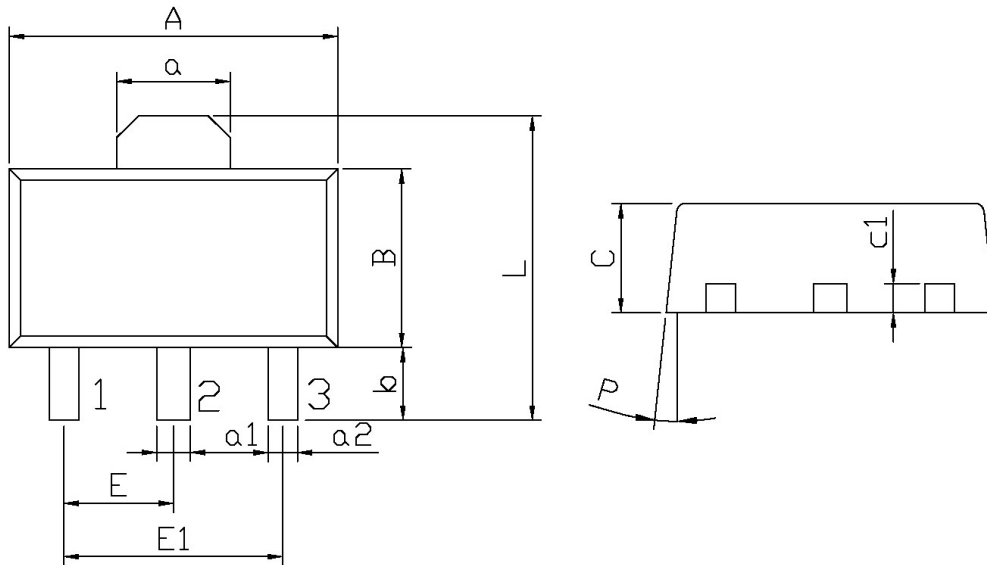
$I_C - V_{CE}$



外形尺寸图 / Package Dimensions

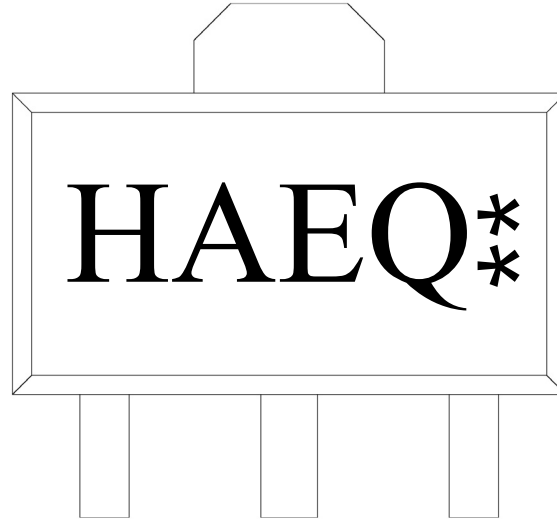
SOT-89

单位: mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	4.4	4.7	a1	0.36	0.56
B	2.35	2.65	a2	0.30	0.50
L	3.878	4.478	C	1.40	1.70
a	1.45	1.65	c1	0.35	0.50
E	1.40	1.60	P	6°	
E1	2.80	3.20			
b	0.80	1.20			

印章说明 / Marking Instructions



说明：

H： 为公司代码

AE： 为型号代码

Q： 为  $h_{FE}$  分档代码

\*\*： 为生产批号代码，随生产批号变化。

Note:

H: Company Code.

AE: Product Type.

Q:  $h_{FE}$  Classifications Symbol

\*\* : Lot No. Code, code change with Lot No.

**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°C，时间 60~90sec;
- 2、峰值温度 245±5°C，时间持续为 5±0.5sec;
- 3、焊接制程冷却速度为 2~10°C/sec.

Note:

- 1.Preheating:25~150°C, Time:60~90sec.
- 2.Peak Temp.:245±5°C, Duration:5±0.5sec.
3. Cooling Speed: 2~10°C/sec.

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

温度：260±5°C

时间：10±1 sec.

Temp.:260±5°C

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 <sup>3</sup> )		
	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
SOT-89	1,000	7	7,000	8	56,000	7" ×12	180×120×180	385×257×392

**使用说明 / Notices**