

## 描述 / Descriptions

TO-92 塑封封装 NPN 半导体三极管。Silicon NPN transistor in a TO-92 Plastic Package.

## 特征 / Features

耐压高，快速转换。无卤产品。

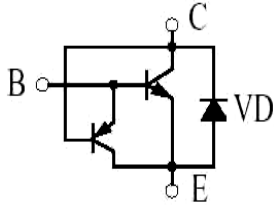
High Voltage Capability High Speed Switching. HF Product.

## 用途 / Applications

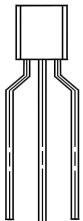
主要用于节能灯、日光灯电子镇流器及其它开关、振荡电路。

High frequency electronic lighting ballast applications, converters, inverters, switching regulators, etc.

## 内部等效电路 / Equivalent Circuit



## 引脚排列 / Pinning



1 2 3

PIN1 : Base

PIN 2 : Collector

PIN 3 : Emitter

## 放大及印章代码 / hFE Classifications & Marking

见印章说明。See Marking Instructions.

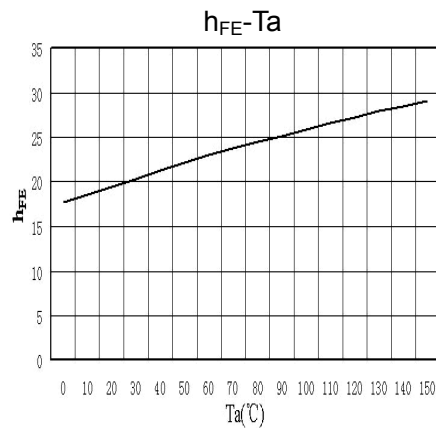
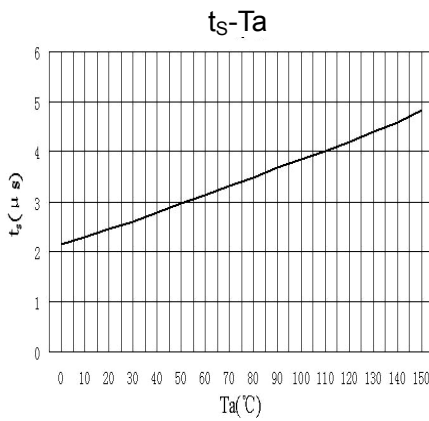
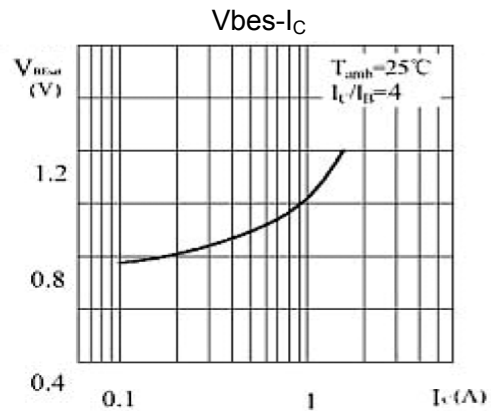
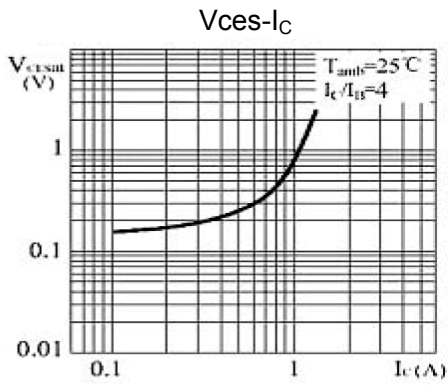
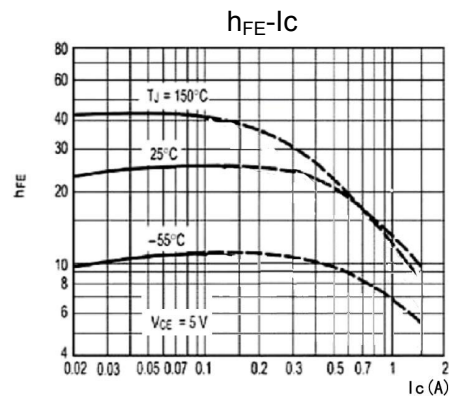
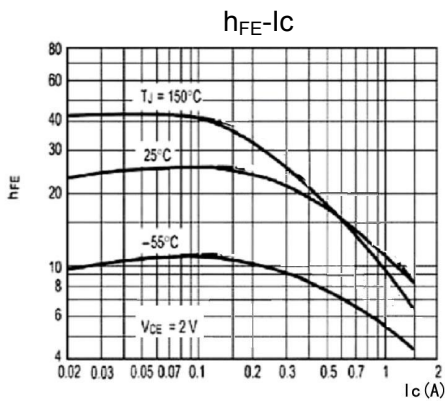
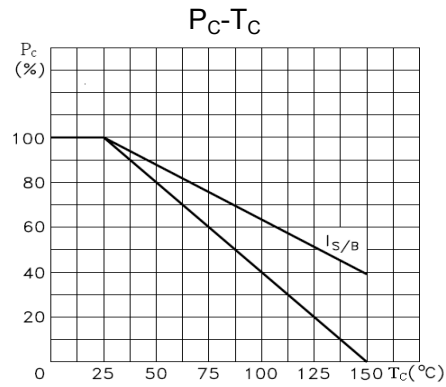
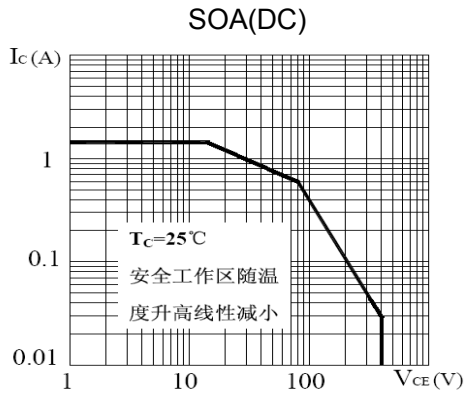
**极限参数 / Absolute Maximum Ratings(Ta=25°C)**

参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Collector to Base Voltage	$V_{CBO}$	800	V
Collector to Emitter Voltage	$V_{CEO}$	500	V
Emitter to Base Voltage	$V_{EBO}$	9.0	V
Collector Current - Continuous	$I_C$	1.5	A
Collector Power Dissipation	$P_C$	1.0	W
Junction Temperature	$T_j$	150	°C
Storage Temperature Range	$T_{sag}$	-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	$V_{CBO}$	$I_C=100\mu A$ $I_E=0$	800			V
Collector to Emitter Breakdown Voltage	$V_{CEO}$	$I_C=1mA$ $I_B=0$	500			V
Emitter to Base Breakdown Voltage	$V_{EBO}$	$I_E=1mA$ $I_C=0$	9.0			V
Collector Cut-Off Current	$I_{CBO}$	$V_{CB}=800V$ $I_E=0$			0.1	mA
Collector cut-off current	$I_{CEO}$	$V_{CE}=500V$ $I_B=0$			0.1	mA
Emitter Base Cut-Off Current	$I_{EBO}$	$V_{EB}=9.0V$ $I_C=0$			0.1	mA
DC Current Gain	$h_{FE}$	$V_{CE}=5.0V$ $I_C=200mA$	30		40	
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=1A$ $I_B=250mA$			0.8	V
Base to Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=1A$ $I_B=250mA$			1.2	V
Transition Frequency	$f_T$	$V_{CE}=10V$ $I_C=100mA$ $f=1.0MHz$	5.0			MHz
Fall time	$t_f$	$V_{CE}=5V$ $I_C=250mA$ (UI9600)			0.6	$\mu s$
Storage time	$t_s$				3.5	$\mu s$

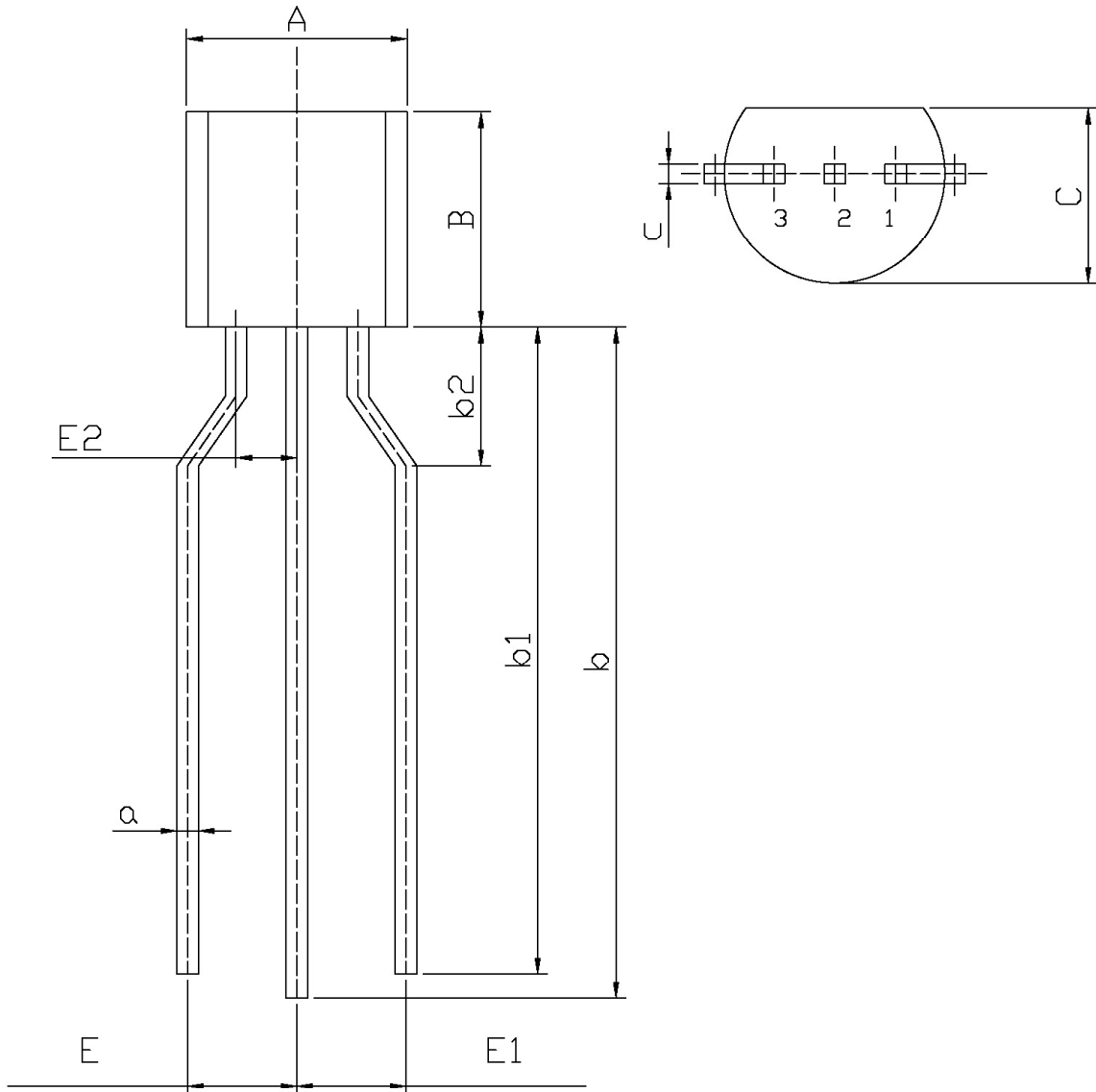
电参数曲线图 / Electrical Characteristic Curve



外形尺寸图 / Package Dimensions

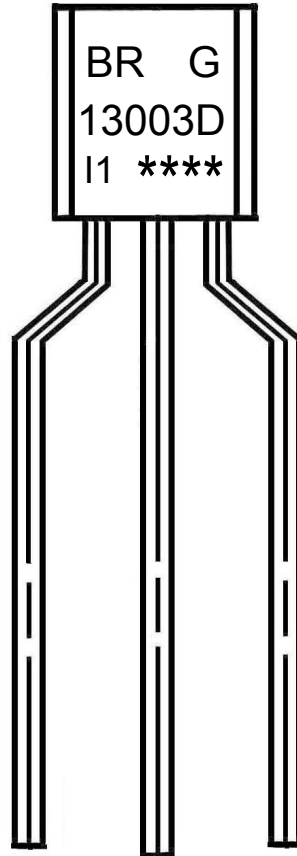
T0-92

Unit:mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
C	3.40	3.80	b2	2.0	3.0
c	0.30	0.50	E	2.4	2.8
A	4.40	4.80	E1	2.4	2.8
B	4.30	4.70	E2	1.22	1.32
b	13	15	a	0.40	0.60
b1	12.5	14.5			

印章说明 / Marking Instructions



说明：

BR: 为公司代码

G : 为无卤产品代码

13003D : 为型号代码

I1: 规格代码

\*\*\*\* : 为生产批号代码，随生产批号变化。

Note:

BR: Company Code.

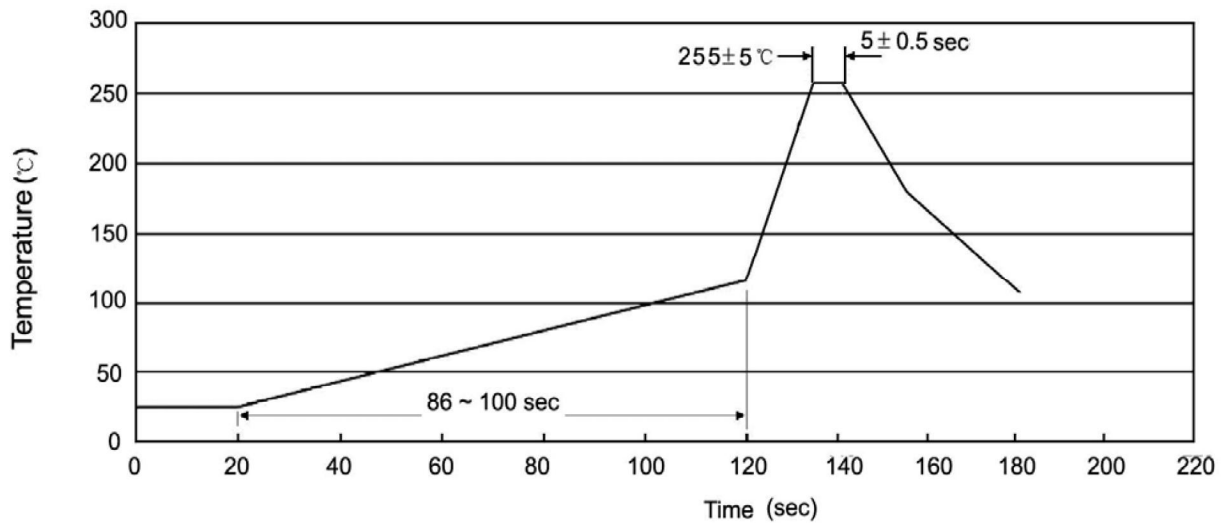
G: HF Product Code

13003D: Product Type.

I1: Specification 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°C，时间 60 ~ 90sec;
- 2、峰值温度 255±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.:255±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：270±5°C

时间：10±1 sec.

Temp:270±5°C

Time:10±1 sec

**包装规格 / Packaging SPEC.**

散件包装 / BULK

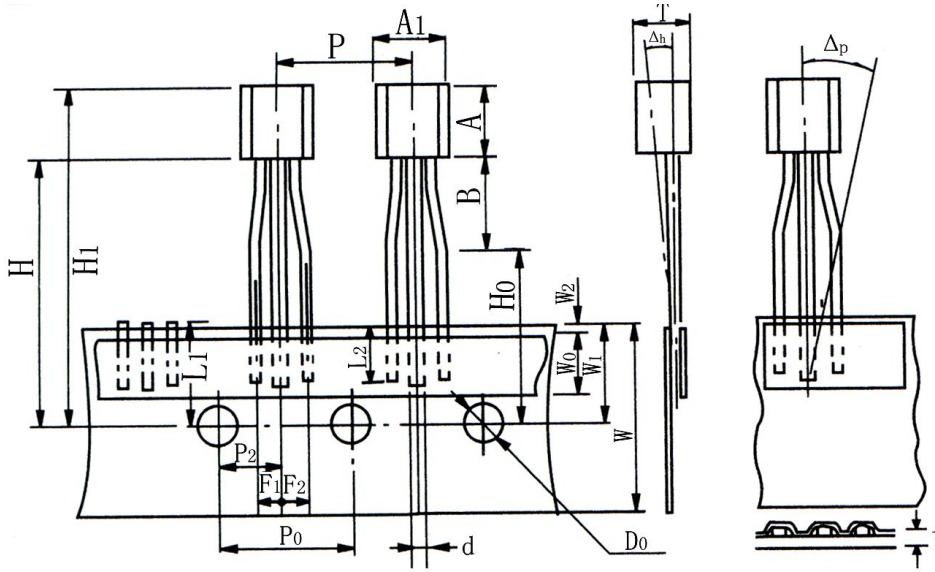
Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm3)		
	Units/Bag 只/袋	Bags/Inner Box 袋/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Bag 袋	Inner Box 盒	Outer Box 箱
TO-92	1,000	10	10,000	5	50,000	135×190	237×172×102	560×245×195
	1,000	10	10,000	10	100,000	135×190	237×172×102	560×245×375

编带包装 / AMMO

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm3)	
	Units/tape 只/纸带	Tape/Inner Box 纸带/盒	Rows/Inner Box 纸带层/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Inner Box 盒	Outer Box 箱
TO-92	3,000	1	120	10	30,000	328×230×42	小箱 480×346×235, 大箱 547×407×268

**使用说明 / Notices**

编带尺寸 / Series Size Chart



项 目	符合	数 值			备 注
		TO-92S	TO-92	TO-92L(M)	
元件宽度	A <sub>1</sub>	4.2MAX	4.8MAX	5.1MAX	
元件高度	A	3.2MAX	4.7MAX	8.2MAX	
元件厚度	T	2.1MAX	3.7MAX	4.1MAX	
引线口径(方线)	d	0.45 典型值			
引线粘接宽度	L <sub>2</sub>	2.5MIN			
元件间距	P	12.7±1.0			
输送孔中心间距	P <sub>0</sub>	12.7±0.3			累积间距误差: ±1.0mm/20 只间隔
输送孔中心与引线中心间距	P <sub>2</sub>	6.35±0.4			
相邻引线间距	F <sub>1</sub> F <sub>2</sub>	2.5 +0.45 -0.15			
元件歪斜度(1)	Δh	0±1.0			
纸带宽	W	18.0 + 1.0 -0.5			
胶粘纸宽	W <sub>0</sub>	6.0±0.3			
输送孔定位	W <sub>1</sub>	9.0±0.5			
粘纸与基纸间距	W <sub>2</sub>	0.5MAX			
元件底部与纸带中心距离	H	19.0±0.5			
焊接平面高度	H <sub>0</sub>	16.0±0.5			
元件顶部与纸带中心距离	H <sub>1</sub>	32.25MAX			
输送孔直径	D <sub>0</sub>	4.0±0.2			
总纸厚	t	0.5±0.1			
引线被切断后相对长度	L <sub>1</sub>	11.0MAX			
元件歪斜度(2)	ΔP	0±1.0			