

### 描述 / Descriptions

TO-252 塑封封装 NPN 半导体三极管。Silicon NPN transistor in a TO-252 Plastic Package.

### 特征 / Features

饱和压降低，电流大， $f_T$  高，极好的放大线性，开关速度快。

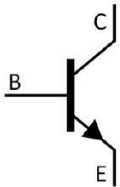
Low  $V_{CE(sat)}$ , high current and high  $f_T$ , excellent linearity of  $h_{FE}$ , fast switching time.

### 用途 / Applications

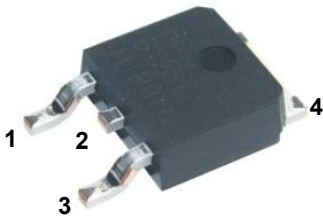
用于继电器驱动电路、高速转换电路、大电流开关电路。

Relay drivers, high-speed inverters, general high-current switching applications.

### 内部等效电路 / Equivalent Circuit



### 引脚排列 / Pinning



PIN1 : Base

PIN 2,4 : Collector

PIN 3 : Emitter

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

$h_{FE}$ Classifications Symbol	M	L	K
$h_{FE}$ Range	100~200	160~320	200~400

**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	$V_{CBO}$	60	V
Collector to Emitter Voltage	$V_{CEO}$	60	V
Emitter to Base Voltage	$V_{EBO}$	7.0	V
Collector Current - Continuous	$I_C$	3.0	A
Collector Power Dissipation*	* $P_C$	2.0	W
Junction Temperature	$T_j$	150	°C
Storage Temperature Range	$T_{stg}$	-55~150	°C

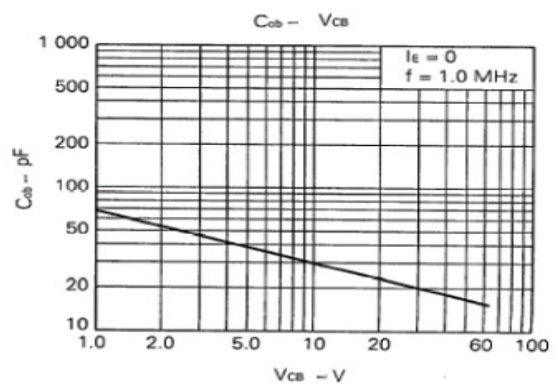
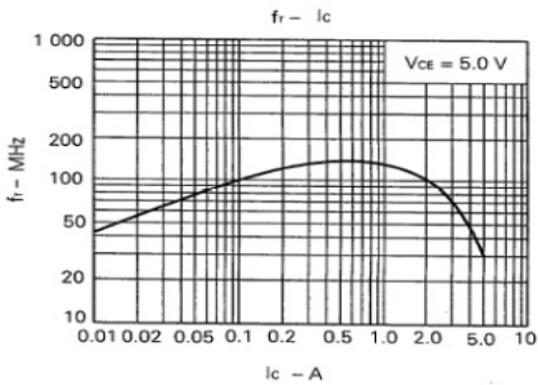
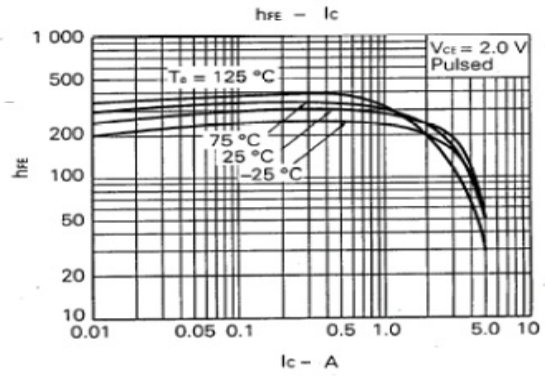
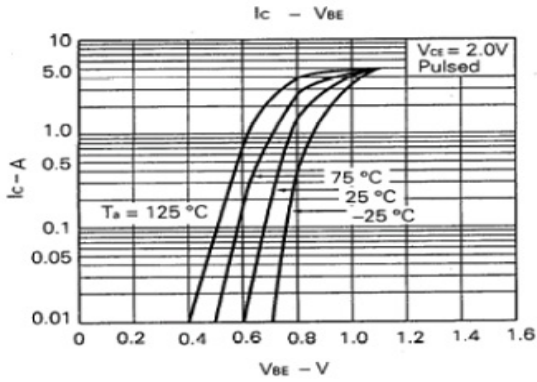
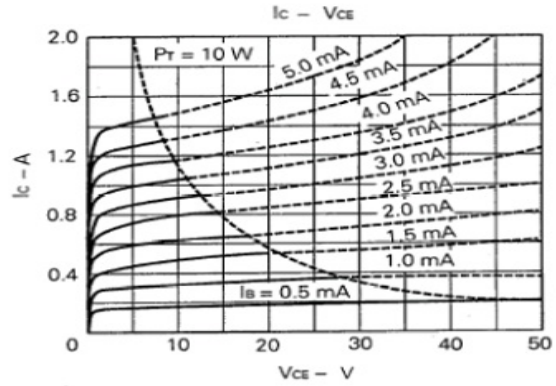
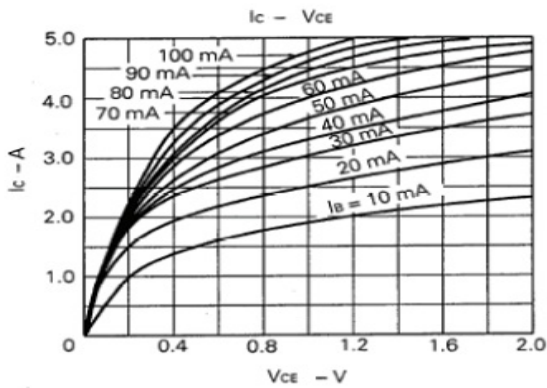
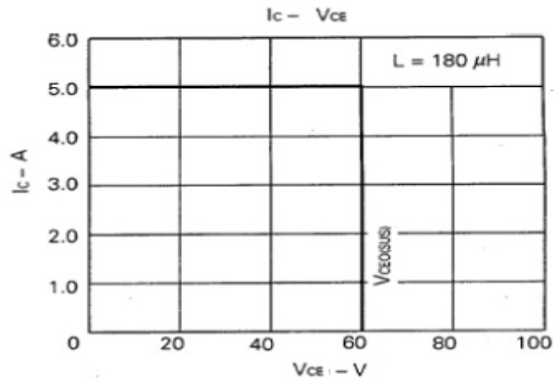
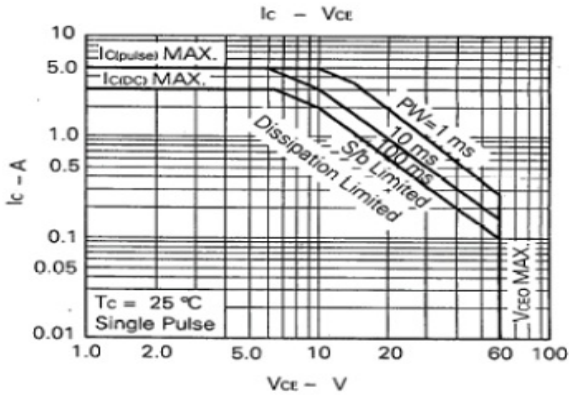
\*在 7.5×7.5×0.7mm 陶瓷板上。

\*When mounted on a 7.5×7.5×0.7mm ceramic board

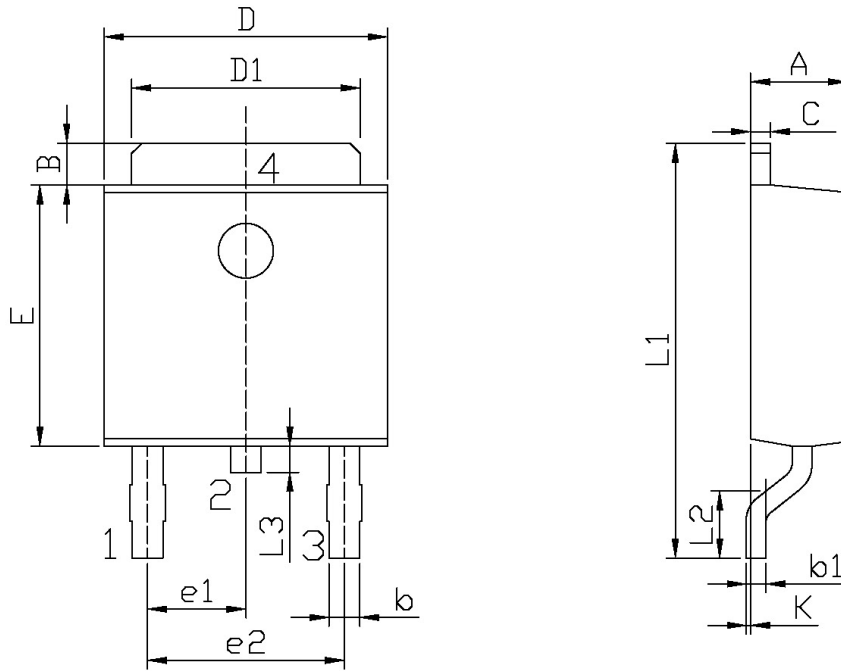
**电性能参数 / Electrical Characteristics(Ta=25°C)**

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	$V_{CBO}$	$I_C=100\mu A$ $I_E=0$	60			V
Collector to Emitter Breakdown Voltage	$V_{CEO}$	$I_C=1.0mA$ $I_B=0$	60			V
Emitter to Base Breakdown Voltage	$V_{EBO}$	$I_E=100\mu A$ $I_C=0$	7.0			V
Collector Cut-Off Current	$I_{CBO}$	$V_{CB}=60V$ $I_E=0$			10.0	$\mu A$
Emitter Cut-Off Current	$I_{EBO}$	$V_{EB}=7.0V$ $I_C=0$			10.0	$\mu A$
DC Current Gain	$h_{FE(1)}$	$V_{CE}=2.0V$ $I_C=600mA$	100		400	
	$h_{FE(2)}$	$V_{CE}=2.0V$ $I_C=200mA$	60			
	$h_{FE(3)}$	$V_{CE}=2.0V$ $I_C=2.0A$	50			
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=1.5A$ $I_B=150mA$			0.25	V
Base to Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=1.5A$ $I_B=150mA$			1.2	V
Transition Frequency	$f_T$	$V_{CE}=5.0V$ $I_C=1.5A$		120		MHz
Collector output capacitance	$C_{ob}$	$V_{CB}=10V$ $I_E=0$ $f=1.0MHz$		30		pF
Turn-On Time	$t_{on}$	$V_{CC}=10V$ $I_C=1A$ $I_{B1}=-I_{B2}=-0.1$			0.5	$\mu s$
Storage Time	$t_{stg}$				2.0	$\mu s$
Fall Time	$t_f$				0.5	$\mu s$

电参数曲线图 / Electrical Characteristic Curve



**外形尺寸图 / Package Dimensions**

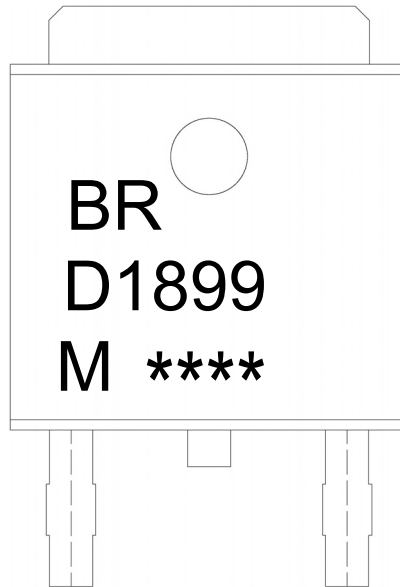


单位: mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.50	0.70	e2	4.43	4.73
b1	0.45	0.55	L1	9.45	9.95
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.10	5.50	K	0.00	0.10

TO-252

印章说明 / Marking Instructions



说明：

BR： 为公司代码

D1899： 为型号代码

M： 为  $h_{FE}$  分档代码

\*\*\*\*： 为生产批号代码，随生产批号变化

Note:

BR: Company Code

D1899: Product Type.

M:  $h_{FE}$  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
TO-252	2,500	2	5,000	5	25,000	13" × 16	360×360×50	385×257×392

套管包装 / TUBE

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm <sup>3</sup> )		
	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-251/252	75	48	3,600	5	18,000	526×20.5×5.25	555×164×50	575×290×180

**使用说明 / Notices**