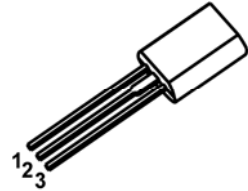


**JSCJ TO-92MOD Plastic-Encapsulate Transistors****2SA1013** TRANSISTOR (PNP)**FEATURE**

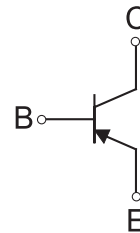
- High Voltage:  $V_{CEO} = -160V$
- Large Continuous Collector Current Capability
- Complementary to 2SC2383

**TO-92MOD**

1. EMITTER
2. COLLECTOR
3. BASE

**MARKING**

A1013=Device code  
Solid dot= Green molding compound device,  
if none, the normal device  
XXX=Code

**Equivalent Circuit****ORDERING INFORMATION**

| Part Number | Package  | Packing Method | Pack Quantity |
|-------------|----------|----------------|---------------|
| 2SA1013     | TO-92MOD | Bulk           | 500pcs/Bag    |
| 2SA1013-TA  | TO-92MOD | Tape           | 2000pcs/Box   |

**MAXIMUM RATINGS** ( $T_a = 25^\circ C$  unless otherwise noted)

| Symbol         | Parameter                                        | Value       | Unit       |
|----------------|--------------------------------------------------|-------------|------------|
| $V_{CBO}$      | Collector-Base Voltage                           | -160        | V          |
| $V_{CEO}$      | Collector-Emitter Voltage                        | -160        | V          |
| $V_{EBO}$      | Emitter-Base Voltage                             | -6          | V          |
| $I_C$          | Collector Current -Continuous                    | -1          | A          |
| $P_C$          | Collector Power Dissipation                      | 0.9         | W          |
| $T_J, T_{stg}$ | Operation Junction and Storage Temperature Range | -55 to +150 | $^\circ C$ |

## ELECTRICAL CHARACTERISTICS

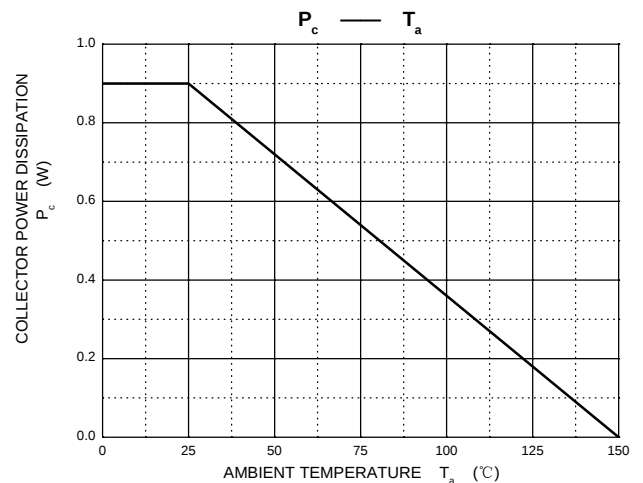
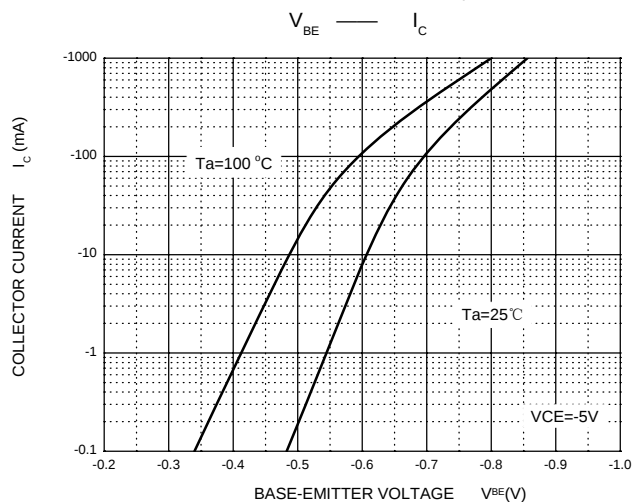
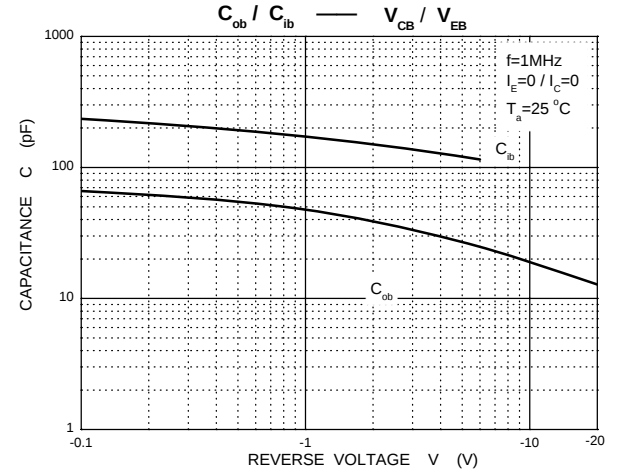
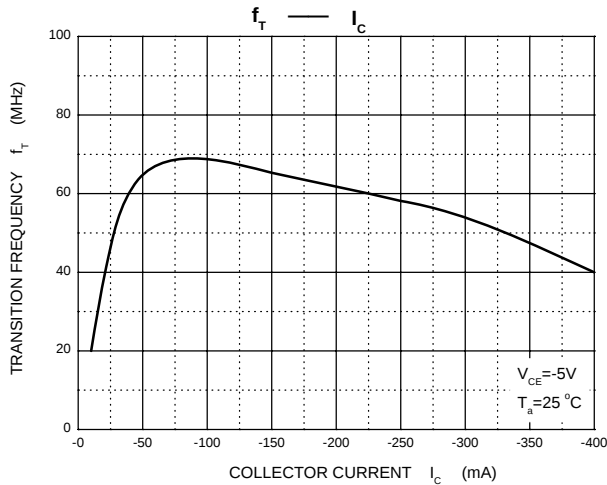
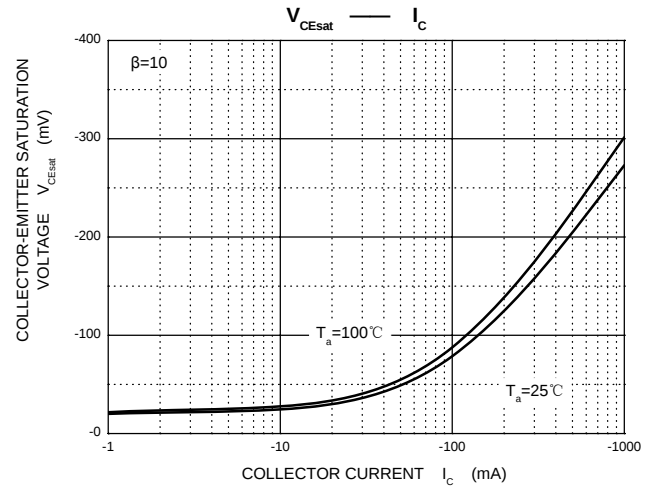
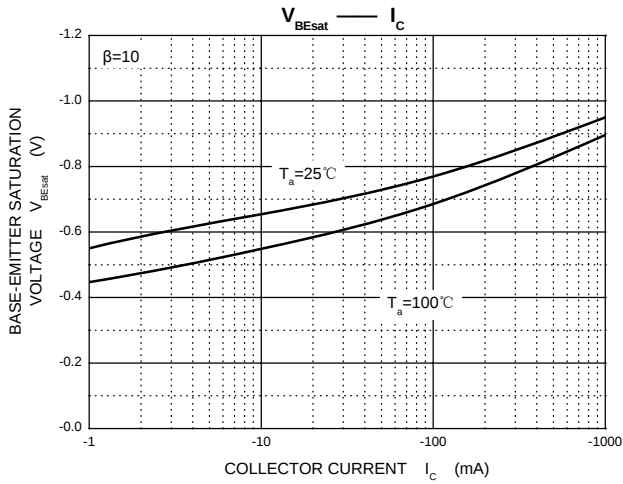
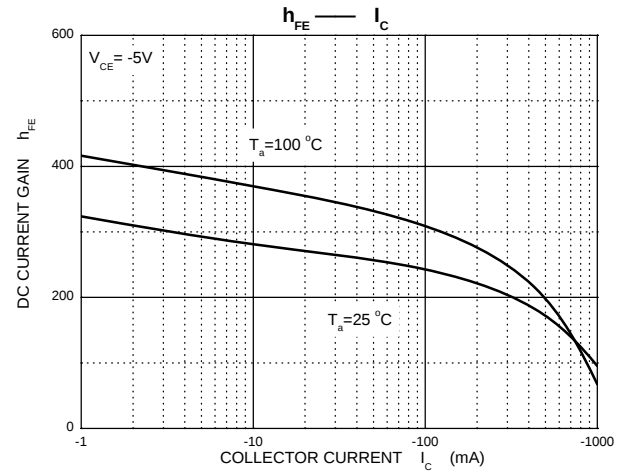
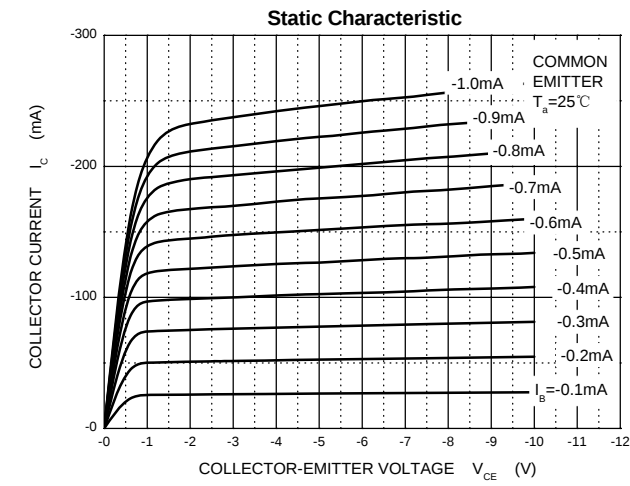
$T_a=25^{\circ}\text{C}$  unless otherwise specified

| Parameter                            | Symbol                      | Test conditions                                                  | Min   | Max   | Unit          |
|--------------------------------------|-----------------------------|------------------------------------------------------------------|-------|-------|---------------|
| Collector-base breakdown voltage     | $V(\text{BR})_{\text{CBO}}$ | $I_{\text{C}}=-100\mu\text{A}$ , $I_{\text{E}}=0$                | -160  |       | V             |
| Collector-emitter breakdown voltage  | $V(\text{BR})_{\text{CEO}}$ | $I_{\text{C}}=-1\text{mA}$ , $I_{\text{B}}=0$                    | -160  |       | V             |
| Emitter-base breakdown voltage       | $V(\text{BR})_{\text{EBO}}$ | $I_{\text{E}}=-10\mu\text{A}$ , $I_{\text{C}}=0$                 | -6    |       | V             |
| Collector cut-off current            | $I_{\text{CBO}}$            | $V_{\text{CB}}=-150\text{V}$ , $I_{\text{E}}=0$                  |       | -1    | $\mu\text{A}$ |
| Emitter cut-off current              | $I_{\text{EBO}}$            | $V_{\text{EB}}=-6\text{V}$ , $I_{\text{C}}=0$                    |       | -1    | $\mu\text{A}$ |
| DC current gain                      | $h_{\text{FE}}$             | $V_{\text{CE}}=-5\text{V}$ , $I_{\text{C}}=-200\text{mA}$        | 60    | 320   |               |
| Collector-emitter saturation voltage | $V_{\text{CE(sat)}}$        | $I_{\text{C}}=-500\text{mA}$ , $I_{\text{B}}=-50\text{mA}$       |       | -1.5  | V             |
| Base-emitter voltage                 | $V_{\text{BE}}$             | $I_{\text{C}}=-5\text{mA}$ , $V_{\text{CE}}=-5\text{V}$          | -0.45 | -0.75 | V             |
| Transition frequency                 | $f_{\text{T}}$              | $V_{\text{CE}}=-5\text{V}$ , $I_{\text{C}}=-200\text{mA}$        | 15    |       | MHz           |
| Collector Output capacitance         | $C_{\text{ob}}$             | $V_{\text{CB}}=-10\text{V}$ , $I_{\text{E}}=0$ , $f=1\text{MHz}$ |       | 35    | pF            |

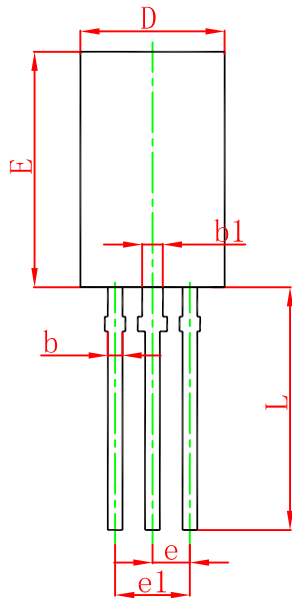
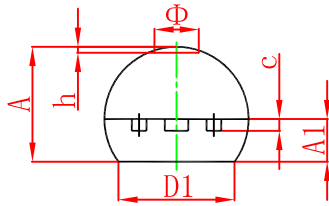
### CLASSIFICATION OF $h_{\text{FE}}$

| Rank  | R      | O       | Y       |
|-------|--------|---------|---------|
| Range | 60-120 | 100-200 | 160-320 |

# Typical Characteristics

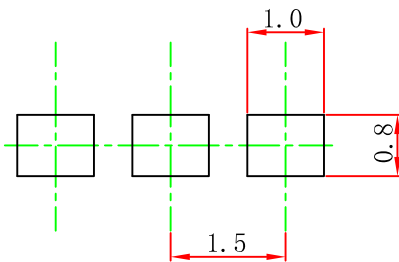


## TO-92MOD Package Outline Dimensions



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min.                      | Max.   | Min.                 | Max.  |
| A      | 4.800                     | 5.000  | 0.189                | 0.197 |
| A1     | 1.730                     | 2.030  | 0.068                | 0.080 |
| b      | 0.440                     | 0.600  | 0.017                | 0.024 |
| b1     | 0.940                     | 1.100  | 0.037                | 0.043 |
| c      | 0.350                     | 0.450  | 0.014                | 0.018 |
| D      | 5.900                     | 6.100  | 0.232                | 0.240 |
| D1     | 4.000                     |        | 0.157                |       |
| E      | 8.500                     | 8.700  | 0.335                | 0.343 |
| e      | 1.500 TYP.                |        | 0.059 TYP.           |       |
| e1     | 2.900                     | 3.100  | 0.114                | 0.122 |
| L      | 13.800                    | 14.200 | 0.543                | 0.559 |
| $\Phi$ |                           | 1.600  |                      | 0.063 |
| h      | 0.000                     | 0.380  | 0.000                | 0.015 |

## TO-92MOD Suggested Pad Layout



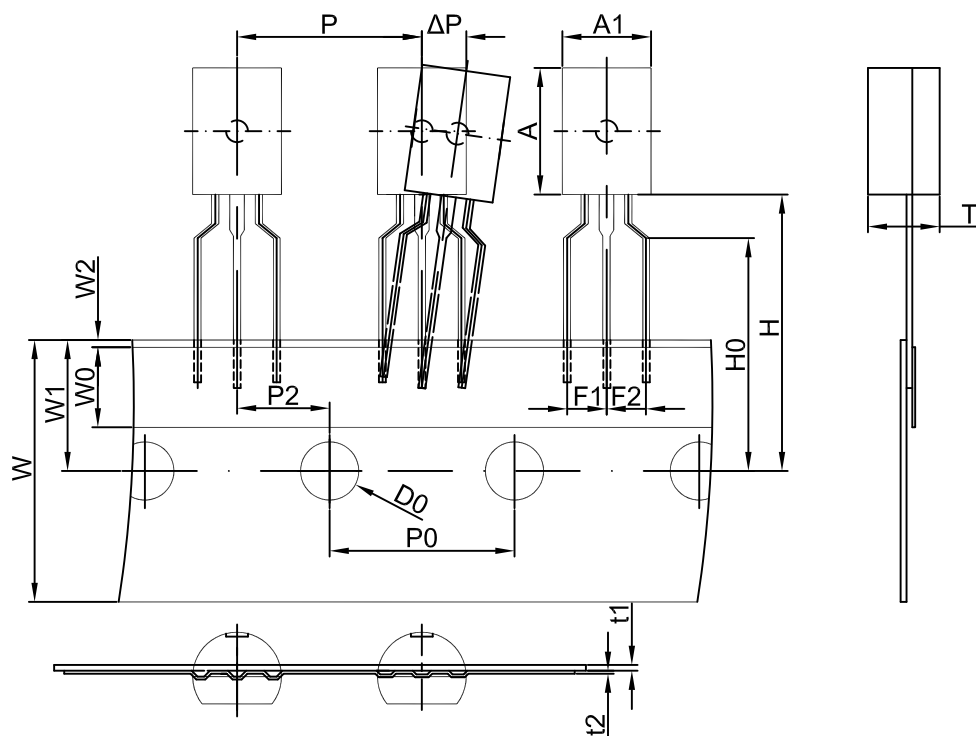
Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.

### NOTICE

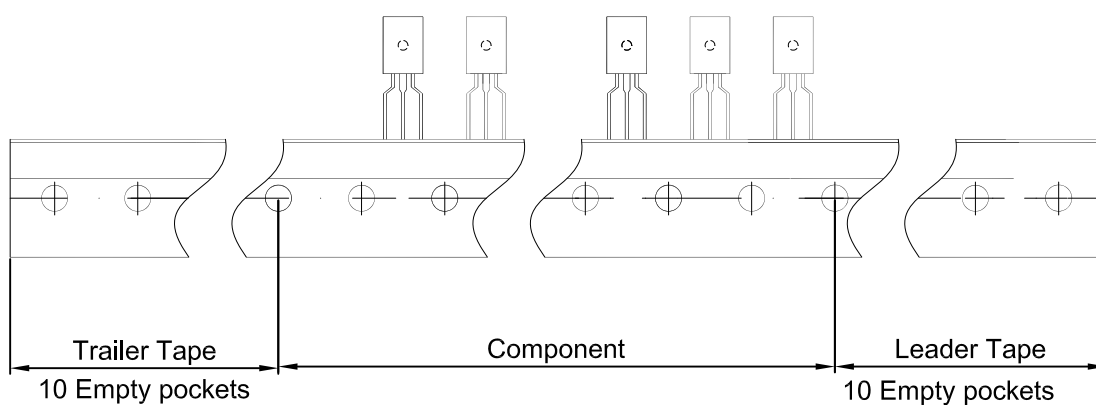
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## TO-92MOD PACKAGE TAPING DIMENSION



Dimiensions are in millimeter

| A1      | A       | T        | P           | P0       | P2       | F1       | F2       | W             |
|---------|---------|----------|-------------|----------|----------|----------|----------|---------------|
| 6.0±0.1 | 8.6±0.1 | 4.9±0.1  | 12.7±0.3    | 12.7±0.2 | 6.35±0.3 | 2.5±0.3  | 2.5±0.3  | 18.0+1.0/-0.5 |
| W0      | W1      | W2       | H           | H0       | D0       | t1       | t2       | ΔP            |
| 6.0±0.5 | 9.0±0.5 | 1.0 MAX. | 19.0±2.0/-1 | 16.0±0.5 | 4.0±0.2  | 0.4±0.05 | 0.2±0.05 | 0 ± 1.0       |



| Package  | Box      | Box Size(mm) | Carton     | Carton Size(mm) |
|----------|----------|--------------|------------|-----------------|
| TO-92MOD | 2000 pcs | 333×245×43   | 20,000 pcs | 573×404×266     |