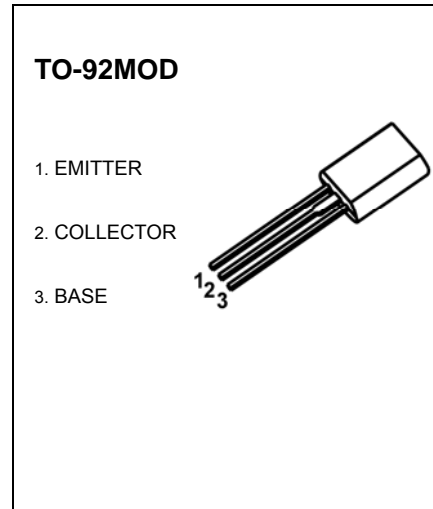


TO-92MOD Plastic-Encapsulate Transistors

2SA1013 TRANSISTOR (PNP)

FEATURE

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



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 | Junction Temperature | 150 | $^\circ C$ |
| T_{stg} | Storage Temperature | -55 to +150 | $^\circ C$ |

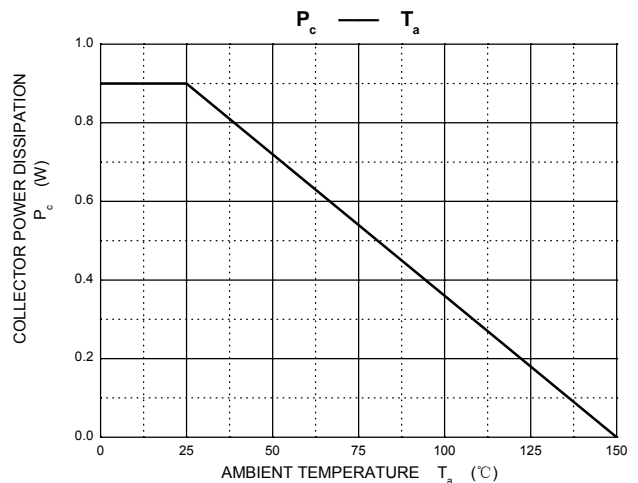
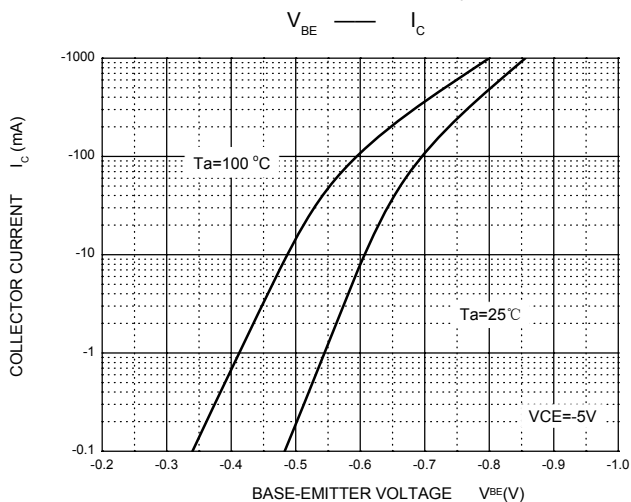
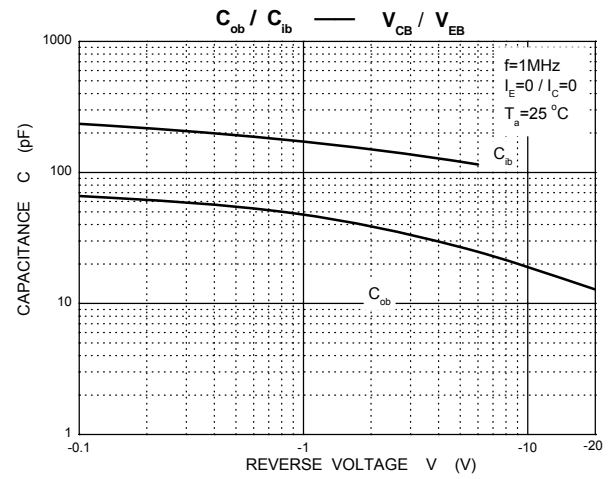
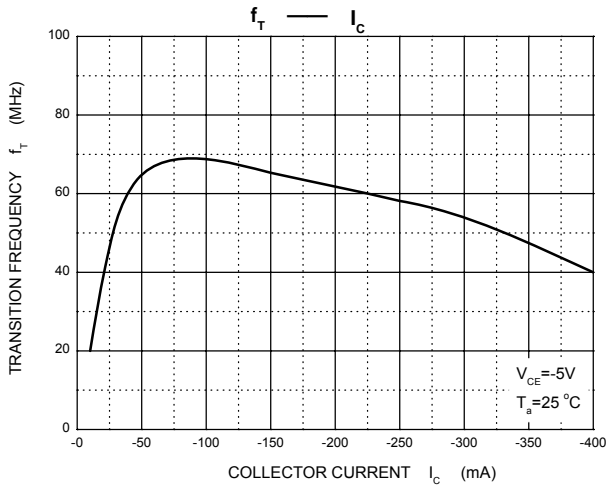
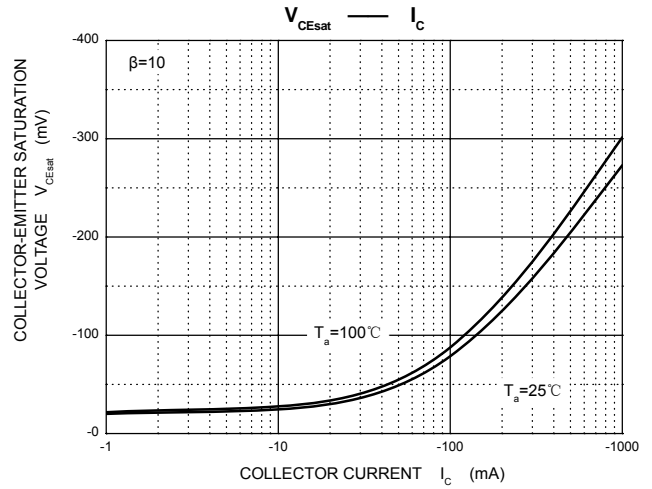
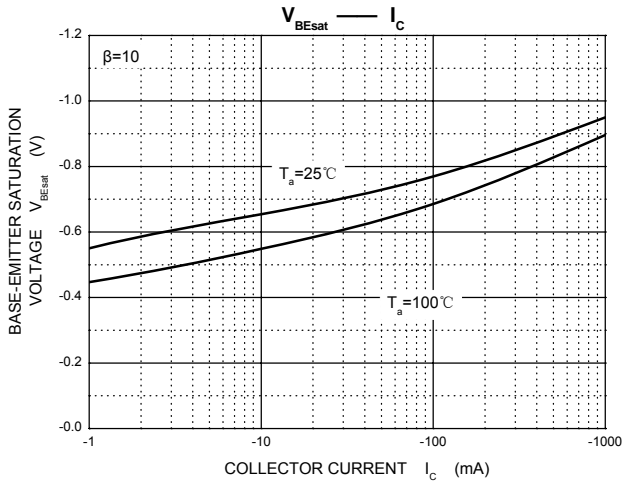
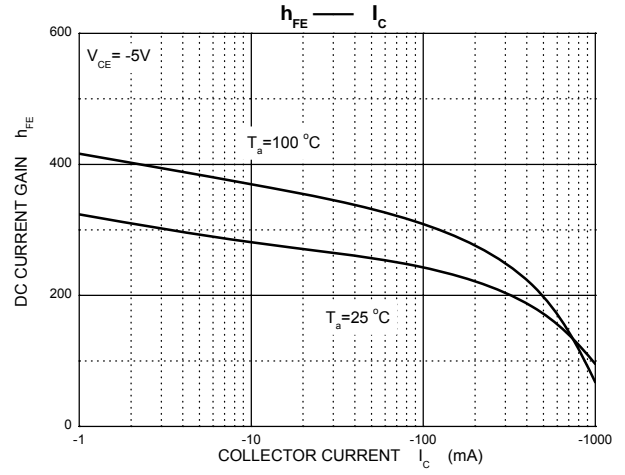
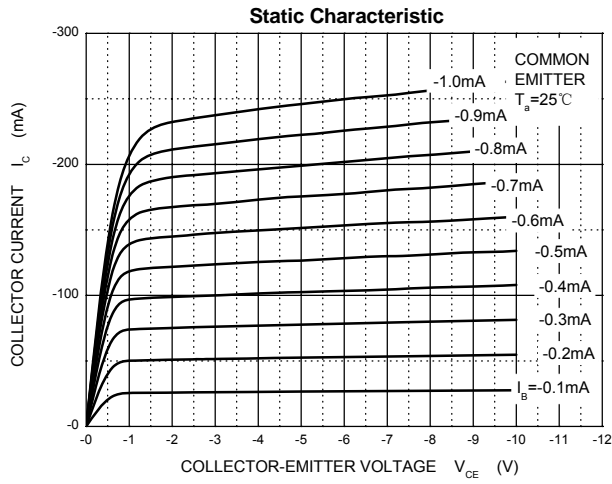
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ C$ unless otherwise specified)

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

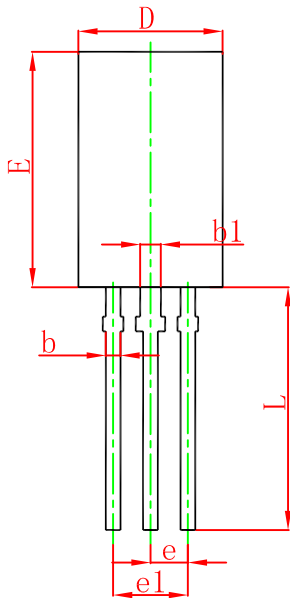
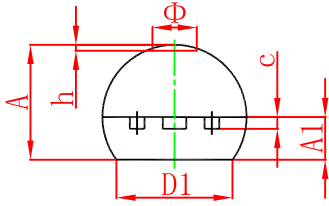
CLASSIFICATION OF h_{FE}

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

Typical Characteristics

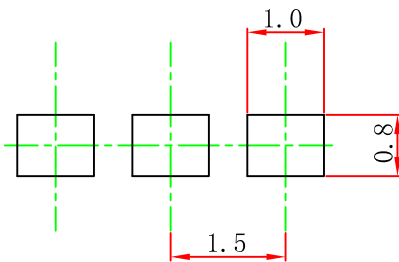


TO-92MOD Package Outline Dimensions



| 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 |
| Φ | | 1.600 | | 0.063 |
| h | 0.000 | 0.380 | 0.000 | 0.015 |

TO-92MOD Suggested Pad Layout



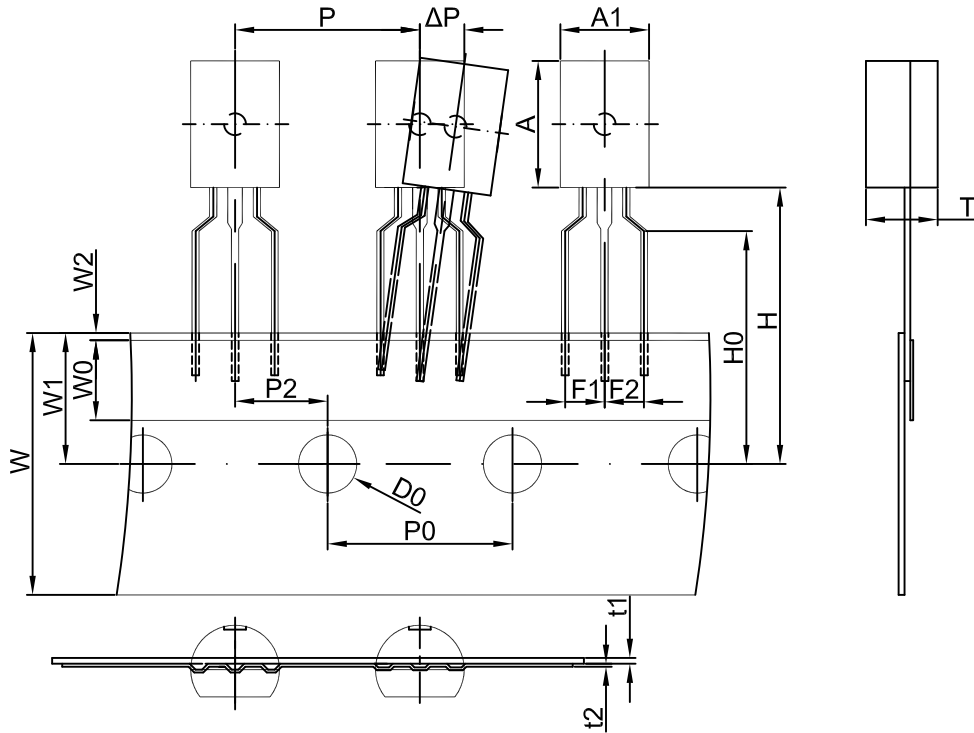
Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.05 mm.
3. The pad layout is for reference purposes only.

NOTICE

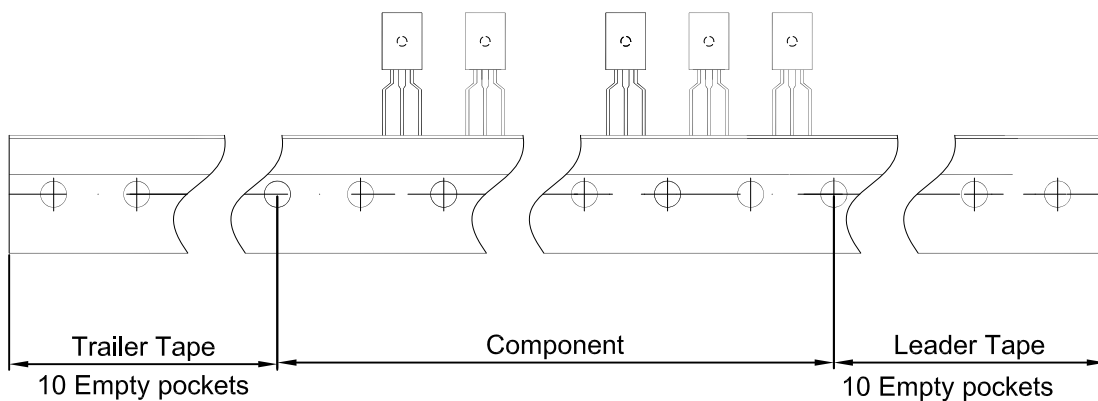
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TO-92MOD PACKAGE TAPEING DIMENSION



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 |