



TO-92 Plastic-Encapsulate Transistors

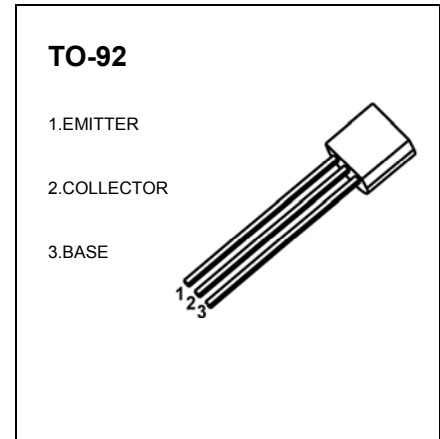
2SA1015 TRANSISTOR (PNP)

FEATURES

- Power dissipation

MAXIMUM RATINGS (T_a=25°C unless otherwise noted)

| Symbol | Parameter | Value | Unit |
|------------------|---------------------------------------------|----------|------|
| V _{CB0} | Collector-Base Voltage | -50 | V |
| V _{CE0} | Collector-Emitter Voltage | -50 | V |
| V _{EBO} | Emitter-Base Voltage | -5 | V |
| I _c | Collector Current -Continuous | -150 | mA |
| P _D | Collector Power Dissipation | 400 | mW |
| R _{θJA} | Thermal Resistance from Junction to Ambient | 312 | °C/W |
| T _j | Junction Temperature | 150 | °C |
| T _{stg} | Storage Temperature | -55~+150 | °C |



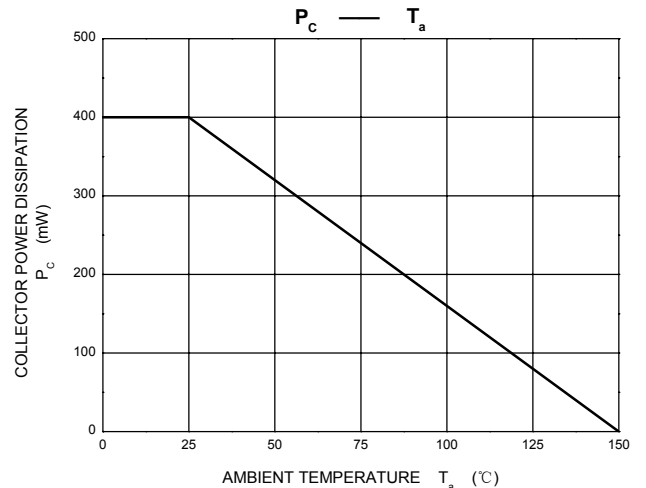
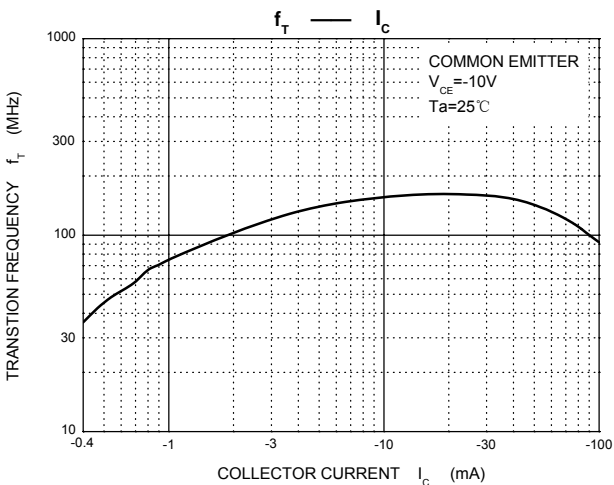
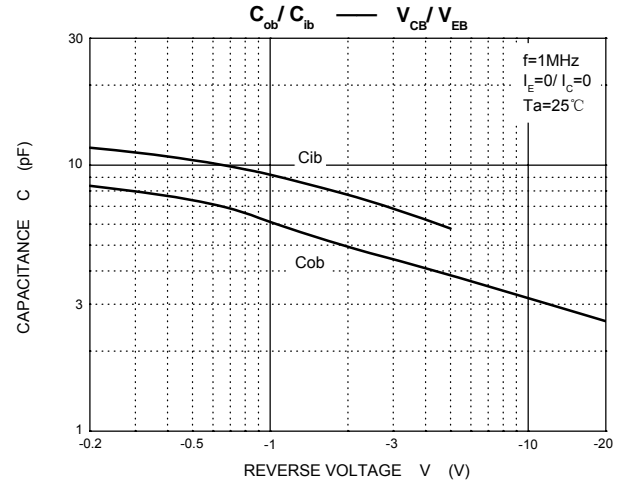
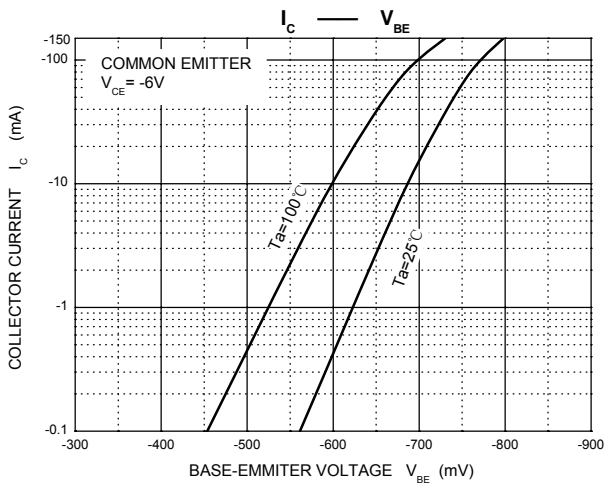
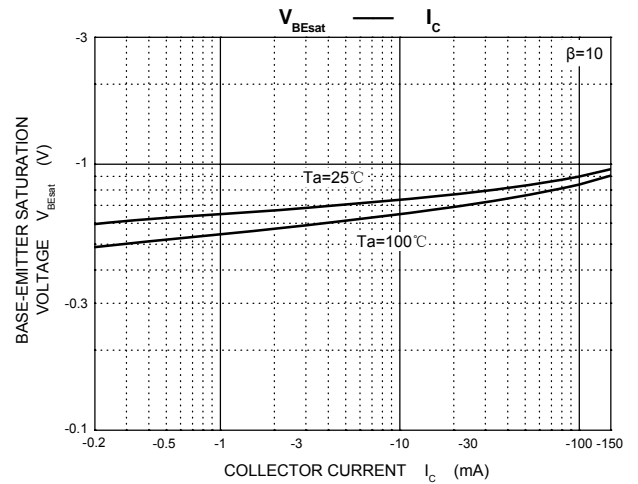
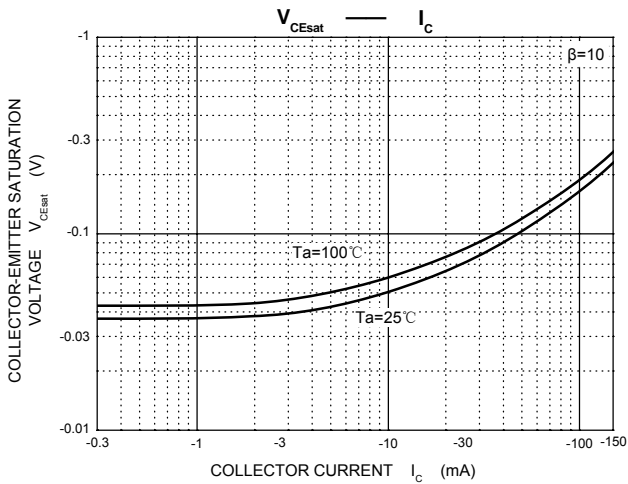
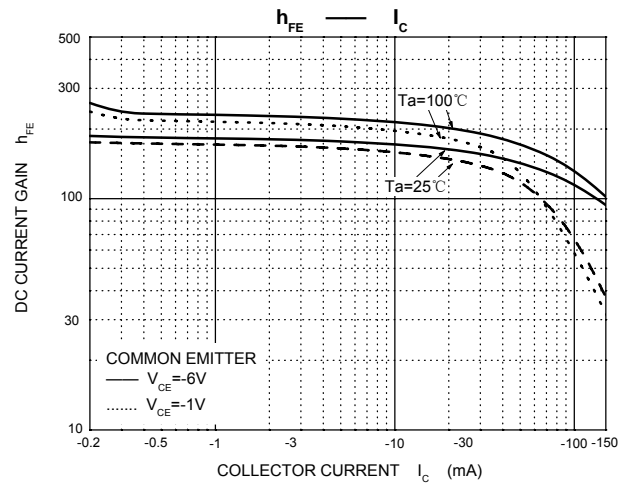
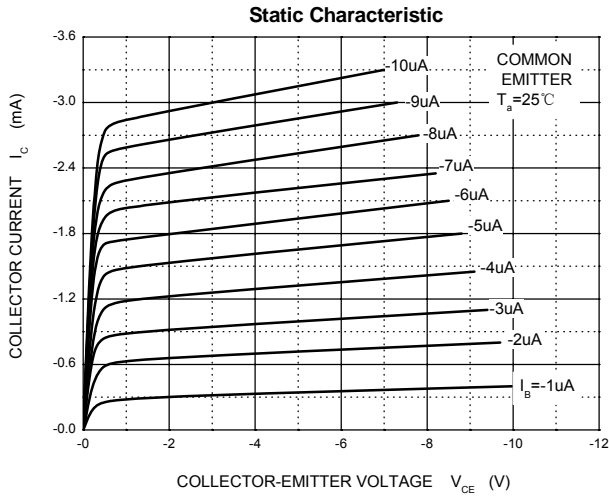
ELECTRICAL CHARACTERISTICS (T_a=25°C unless otherwise specified)

| Parameter | Symbol | Test conditions | Min | Typ | Max | Unit |
|--------------------------------------|----------------------|-----------------------------------------------------------------------------------|-----|-----|------|------|
| Collector-base breakdown voltage | V _{(BR)CBO} | I _C = -100μA, I _E =0 | -50 | | | V |
| Collector-emitter breakdown voltage | V _{(BR)CEO} | I _C = -0.1mA, I _B =0 | -50 | | | V |
| Emitter-base breakdown voltage | V _{(BR)EBO} | I _E = -100μA, I _C =0 | -5 | | | V |
| Collector cut-off current | I _{CBO} | V _{CB} = -50V, I _E =0 | | | -0.1 | μA |
| Collector cut-off current | I _{CEO} | V _{CE} = -50V, I _B =0 | | | -0.1 | μA |
| Emitter cut-off current | I _{EBO} | V _{EB} = -5V, I _C =0 | | | -0.1 | μA |
| DC current gain | h _{FE} | V _{CE} = -6V, I _C = -2mA | 70 | | 400 | |
| Collector-emitter saturation voltage | V _{CE(sat)} | I _C = -100mA, I _B = -10mA | | | -0.3 | V |
| Base-emitter saturation voltage | V _{BE(sat)} | I _C = -100mA, I _B = -10mA | | | -1.1 | V |
| Transition frequency | f _T | V _{CE} = -10 V, I _C = -1mA f =30MHz | 80 | | | MHz |
| Collector output capacitance | C _{ob} | V _{CB} =-10V, I _E =0, f=1MHz | | | 7 | pF |
| Noise figure | NF | V _{CE} = -6 V, I _C = -0.1mA, f =1kHz, R _G =10kΩ | | | 6 | dB |

CLASSIFICATION OF h_{FE}

| Rank | O | Y | GR |
|-------|--------|---------|---------|
| Range | 70-140 | 120-240 | 200-400 |

Typical Characteristics



TO-92 Package Outline Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 3.300 | 3.700 | 0.130 | 0.146 |
| A1 | 1.100 | 1.400 | 0.043 | 0.055 |
| b | 0.380 | 0.550 | 0.015 | 0.022 |
| c | 0.360 | 0.510 | 0.014 | 0.020 |
| D | 4.300 | 4.700 | 0.169 | 0.185 |
| D1 | 3.430 | | 0.135 | |
| E | 4.300 | 4.700 | 0.169 | 0.185 |
| e | 1.270 TYP | | 0.050 TYP | |
| e1 | 2.440 | 2.640 | 0.096 | 0.104 |
| L | 14.100 | 14.500 | 0.555 | 0.571 |
| Φ | | 1.600 | | 0.063 |
| h | 0.000 | 0.380 | 0.000 | 0.015 |

TO-92 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-92 PACKAGE TAPEING DIMENSION



| Dimiensions are in millimeter | | | | | | | | |
|-------------------------------|---------|----------|----------|----------|----------|----------|----------|---------------|
| A1 | A | T | P | P0 | P2 | F1 | F2 | W |
| 4.5±0.2 | 4.5±0.2 | 3.5±0.2 | 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±1.0 | 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-92 | 2000 pcs | 333×162×43 | 20,000 pcs | 350×340×250 |