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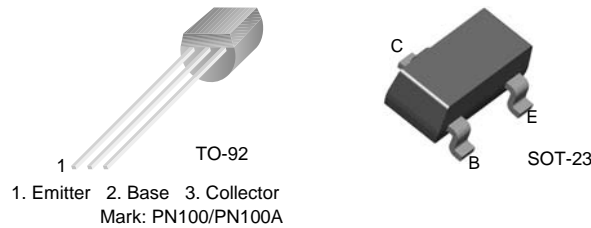
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PN100/PN100A/MMBT100/MMBT100A

NPN General Purpose Amplifier

- This device is designed for general purpose amplifier applications at collector currents to 300mA.
- Sourced from process 10.



Absolute Maximum Ratings* $T_a = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Ratings | Units |
|----------------|----------------------------------|--------------|------------|
| V_{CEO} | Collector-Emitter Voltage | | 45 |
| V_{CBO} | Collector-Base Voltage | | 75 |
| V_{EBO} | Emitter-Base Voltage | | 6.0 |
| I_C | Collector current | - Continuous | 500 |
| T_J, T_{stg} | Junction and Storage Temperature | | -55 ~ +150 |

* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

1. These ratings are based on a maximum junction temperature of 150 degrees C.
 2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
- * Pulse Test: Pulse Width \leq 300 μ s, Duty Cycle \leq 2%

Thermal Characteristics $T_A=25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Max. | | Units |
|-----------------|---|-----------------|-----------------------|-------|
| | | PN100 PN100A | *MMBT100 *MMBT100A | |
| P_D | Total Device Dissipation Derate above 25°C | 625 | 350 | mW |
| | | 5.0 | 2.8 | mW/°C |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 83.3 | | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 200 | 357 | °C/W |

* Device mounted on FR-4 PCB 1.6" x 1.6" x 0.06."

Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Test Condition | Min. | Max. | Units |
|-------------------------------------|---------------------------------------|---|---|--|-------------------------------|
| Off Characteristics | | | | | |
| BV_{CBO} | Collector-Base Breakdown Voltage | $I_C = 10\mu\text{A}, I_E = 0$ | 75 | | V |
| BV_{CEO} | Collector-Emitter Breakdown Voltage * | $I_C = 1\text{mA}, I_B = 0$ | 45 | | V |
| BV_{EBO} | Emitter-Base Breakdown Voltage | $I_E = 10\mu\text{A}, I_C = 0$ | 6.0 | | V |
| I_{CBO} | Collector-Base Cutoff Current | $V_{CB} = 60\text{V}$ | | 50 | nA |
| I_{CES} | Collector-Emitter Cutoff Current | $V_{CE} = 40\text{V}$ | | 50 | nA |
| I_{EBO} | Emitter Cutoff Current | $V_{EB} = 4\text{V}$ | | 50 | nA |
| On Characteristics | | | | | |
| h_{FE} | DC Current Gain | $I_C = 100\mu\text{A}, V_{CE} = 1.0\text{V}$ $I_C = 10\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 100\text{mA}, V_{CE} = 1.0\text{V}^*$ $I_C = 150\text{mA}, V_{CE} = 5.0\text{V}^*$ | 100 100A 100 100A 100 100A | 80 240 100 300 100 100 100 | 450 600 350 |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 200\text{mA}, I_B = 20\text{mA}$ | | 0.2 0.4 | V V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | $I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 200\text{mA}, I_B = 20\text{mA}$ | | 0.85 1.0 | V V |
| Small Signal Characteristics | | | | | |
| f_T | Current Gain Bandwidth Product | $V_{CE} = 20\text{V}, I_C = 20\text{mA}$ | | 250 | MHz |
| C_{obo} | Output Capacitance | $V_{CB} = 5.0\text{V}, f = 1.0\text{MHz}$ | | 4.5 | pF |
| NF | Noise Figure | $I_C = 100\mu\text{A}, V_{CE} = 5.0\text{V}$ $R_G = 2.0\text{k}\Omega, f = 1.0\text{KHz}$ | 100 100A | 5.0 4.0 | dB dB |

* Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$

Typical Characteristics

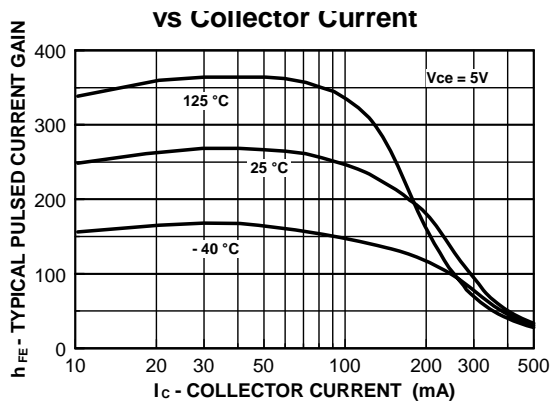


Figure 1. Typical Pulsed Current Gain vs Collector Current

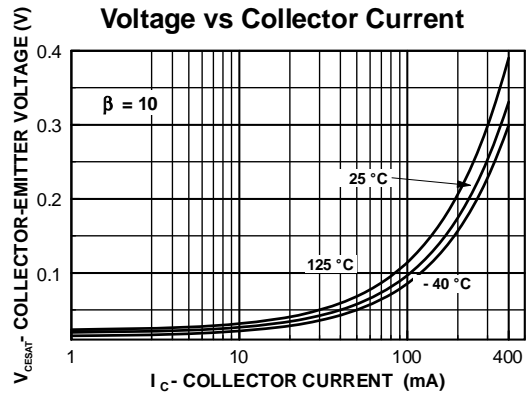


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

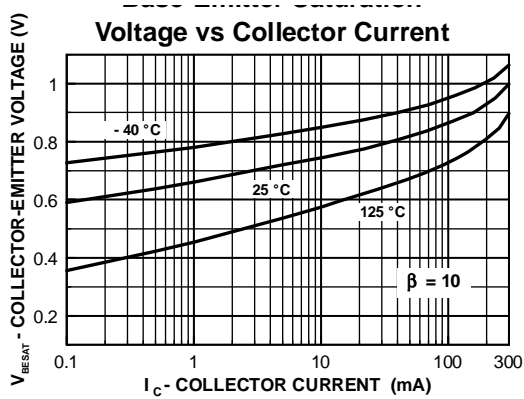


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

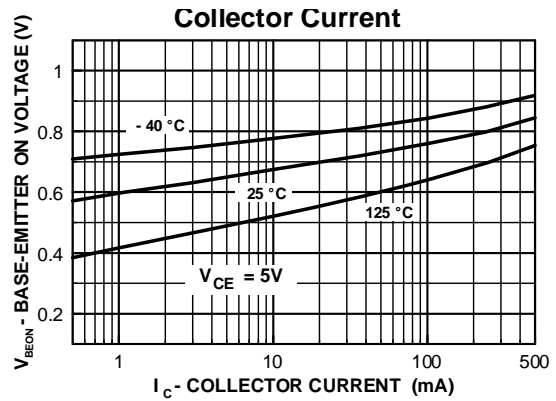


Figure 4. Base-Emitter On Voltage vs Collector Current

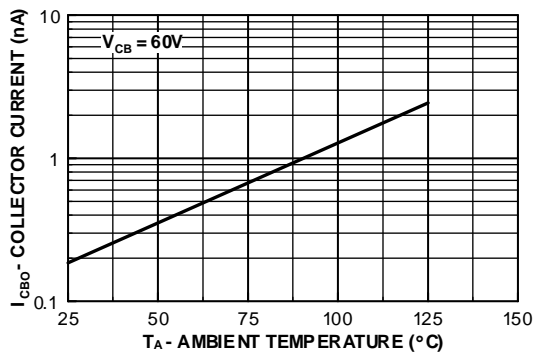


Figure 5. Collector Cutoff Current vs Ambient Temperature

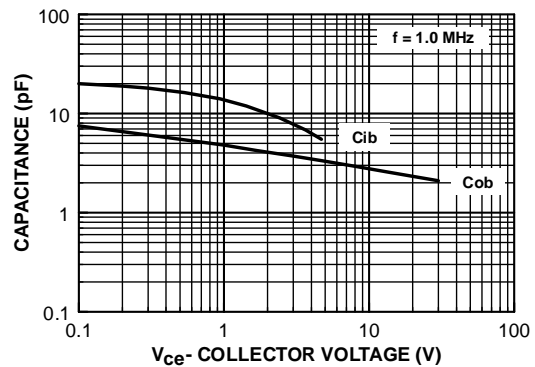


Figure 6. Input and Output Capacitance vs Reverse Voltag

Typical Characteristics (Continued)

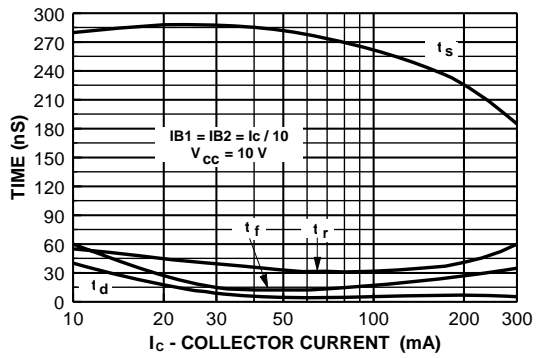


Figure 7. Switching Times vs Collector Current

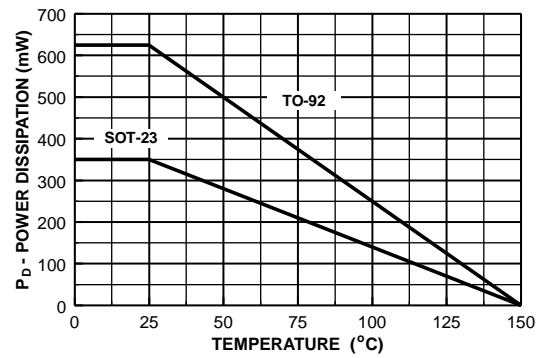
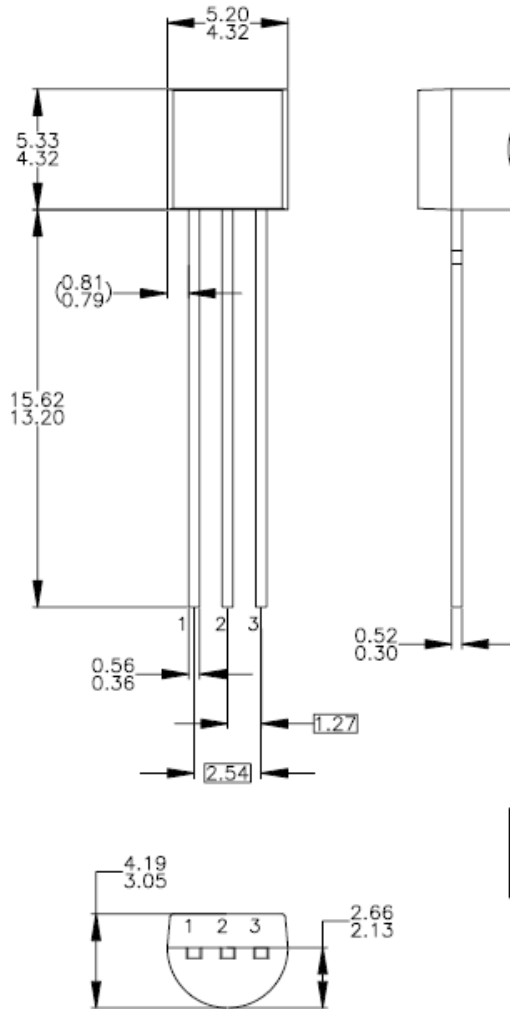


Figure 8. Power Dissipation vs Ambient Temperature

Package Dimension (TO92)



NOTES: UNLESS OTHERWISE SPECIFIED

- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-1994.
- D) TO-92 (92,94,96,97,98) PIN CONFIGURATION:

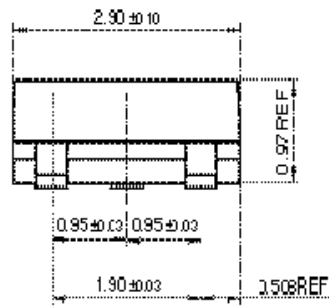
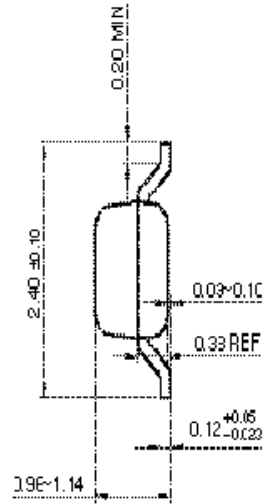
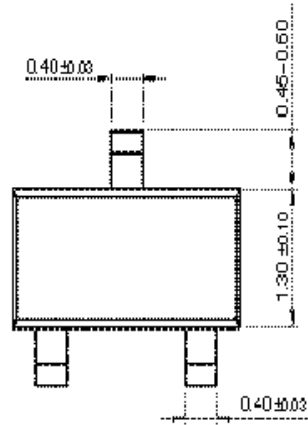
| Pin | 92 | | | 94 | | | 96 | | | 97 | | | 98 | | |
|-----|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|
| | P | F | M | P | F | M | B | F | M | P | F | M | P | F | M |
| 1 | E | S | S | E | S | S | B | D | G | C | G | D | C | G | D |
| 2 | B | D | G | C | G | D | E | S | S | B | D | G | E | S | S |
| 3 | C | G | D | B | D | G | C | G | D | E | S | S | B | D | G |

LEGEND:

P - BIPOLAR E - EMITTER D - DRAIN
 F - JFET B - BASE S - SOURCE
 M - DMOS C - COLLECTOR G - GATE

- E) FOR PACKAGE 92, 94, 96, 97 AND 98: PIN CONFIGURATION DRAIN "D" AND SOURCE "S" ARE INTERCHANGEABLE AT JFET "F" OPTION.
- F) DRAWING FILENAME: MKT-2A03DREV3.




Package Dimension (SOT23)





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