

General Purpose Transistor

PNP Silicon

PZT3906T1G

Features

- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector – Emitter Voltage | V_{CEO} | -40 | Vdc |
| Collector – Base Voltage | V_{CBO} | -40 | Vdc |
| Emitter – Base Voltage | V_{EBO} | -5.0 | Vdc |
| Collector Current – Continuous | I_C | -200 | mAdc |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------|----------------|------------|
| Total Device Dissipation (Note 1) $T_A = 25^\circ\text{C}$ | P_D | 1.5 12 | W mW/°C |
| Thermal Resistance Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 83.3 | °C/W |
| Thermal Resistance Junction-to-Lead #4 | $R_{\theta JA}$ | 35 | °C/W |
| Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | °C |

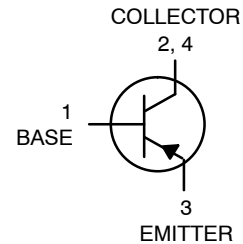
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR-4 with 1 oz and 713 mm² of copper area.



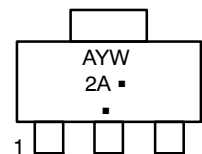
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**SOT-223
CASE 318E**

MARKING DIAGRAM



2A = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping† |
|------------|----------------------|--------------------|
| PZT3906T1G | SOT-223 (Pb-Free) | 1000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|--|---------------|------|-----|------|
| OFF CHARACTERISTICS (Note 2) | | | | |
| Collector – Emitter Breakdown Voltage (Note 2) ($I_C = -1.0\text{ mAdc}$, $I_B = 0$) | $V_{(BR)CEO}$ | -40 | – | Vdc |
| Collector – Base Breakdown Voltage ($I_C = -10\text{ }\mu\text{Adc}$, $I_E = 0$) | $V_{(BR)CBO}$ | -40 | – | |
| Emitter – Base Breakdown Voltage ($I_E = -10\text{ }\mu\text{Adc}$, $I_C = 0$) | $V_{(BR)EBO}$ | -5.0 | – | |
| Base Cutoff Current ($V_{CE} = -30\text{ Vdc}$, $V_{EB} = -3.0\text{ Vdc}$) | I_{BL} | – | -50 | nAdc |
| Collector Cutoff Current ($V_{CE} = -30\text{ Vdc}$, $V_{EB} = -3.0\text{ Vdc}$) | I_{CEX} | – | -50 | |

ON CHARACTERISTICS (Note 2)

| | | | | |
|--|---------------|-----------------------------|-------------------------|-----|
| DC Current Gain ($I_C = -0.1\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$) ($I_C = -1.0\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$) ($I_C = -10\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$) ($I_C = -50\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$) ($I_C = -100\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$) | H_{FE} | 60 80 100 60 30 | – – 300 – – | – |
| Collector – Emitter Saturation Voltage ($I_C = -10\text{ mAdc}$, $I_B = -1.0\text{ mAdc}$) ($I_C = -50\text{ mAdc}$, $I_B = -5.0\text{ mAdc}$) | $V_{CE(sat)}$ | – – | -0.25 -0.4 | Vdc |
| Base – Emitter Saturation Voltage ($I_C = -10\text{ mAdc}$, $I_B = -1.0\text{ mAdc}$) ($I_C = -50\text{ mAdc}$, $I_B = -5.0\text{ mAdc}$) | $V_{BE(sat)}$ | -0.65 – | -0.85 -0.95 | |

SMALL-SIGNAL CHARACTERISTICS

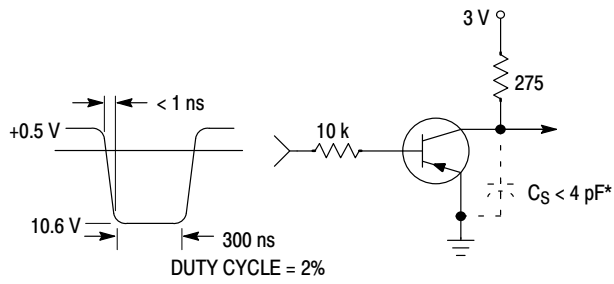
| | | | | |
|--|-----------|-----|-----|------------------|
| Current – Gain – Bandwidth Product ($I_C = -10\text{ mAdc}$, $V_{CE} = -20\text{ Vdc}$, $f = 100\text{ MHz}$) | f_T | 250 | – | MHz |
| Output Capacitance ($V_{CB} = -5.0\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$) | C_{obo} | – | 4.5 | pF |
| Input Capacitance ($V_{EB} = -0.5\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$) | C_{ibo} | – | 10 | |
| Input Impedance ($I_C = -1.0\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$, $f = 1.0\text{ kHz}$) | h_{ie} | 2.0 | 12 | k Ω |
| Voltage Feedback Ratio ($I_C = -1.0\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$, $f = 1.0\text{ kHz}$) | h_{re} | 0.1 | 10 | $\times 10^{-4}$ |
| Small – Signal Current Gain ($I_C = -1.0\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$, $f = 1.0\text{ kHz}$) | h_{fe} | 100 | 400 | – |
| Output Admittance ($I_C = -1.0\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$, $f = 1.0\text{ kHz}$) | h_{oe} | 3.0 | 60 | μmhos |
| Noise Figure ($I_C = -100\text{ }\mu\text{Adc}$, $V_{CE} = -5.0\text{ Vdc}$, $R_S = 1.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$) | NF | – | 4.0 | dB |

SWITCHING CHARACTERISTICS

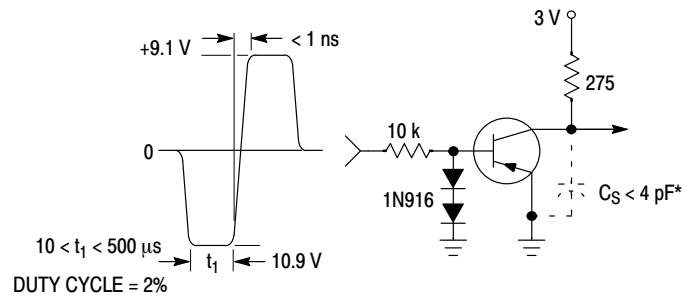
| | | | | | |
|--------------|---|-------|---|-----|----|
| Delay Time | $(V_{CC} = -3.0\text{ Vdc}$, $V_{BE} = 0.5\text{ Vdc}$, $I_C = -10\text{ mAdc}$, $I_{B1} = -1.0\text{ mAdc})$ | t_d | – | 35 | ns |
| Rise Time | | t_r | – | 35 | |
| Storage Time | $(V_{CC} = -3.0\text{ Vdc}$, $I_C = -10\text{ mAdc}$, $I_{B1} = I_{B2} = -1.0\text{ mAdc})$ | t_s | – | 225 | |
| Fall Time | | t_f | – | 75 | |

2. Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

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**Figure 1. Delay and Rise Time
Equivalent Test Circuit**



**Figure 2. Storage and Fall Time
Equivalent Test Circuit**

* Total shunt capacitance of test jig and connectors

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TYPICAL TRANSIENT CHARACTERISTICS

— $T_J = 25^\circ\text{C}$
 - - - $T_J = 125^\circ\text{C}$

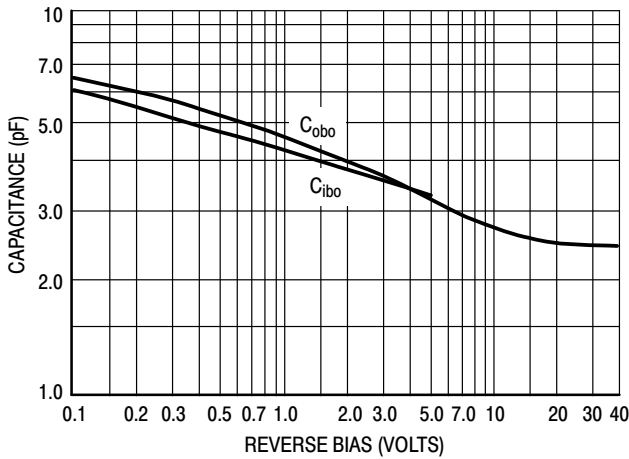


Figure 3. Capacitance

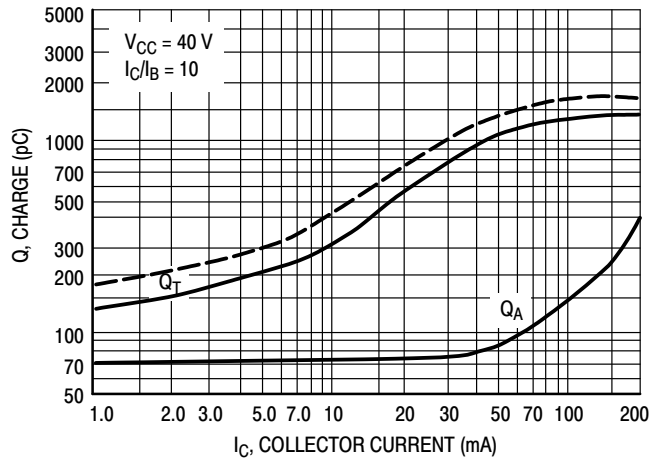


Figure 4. Charge Data

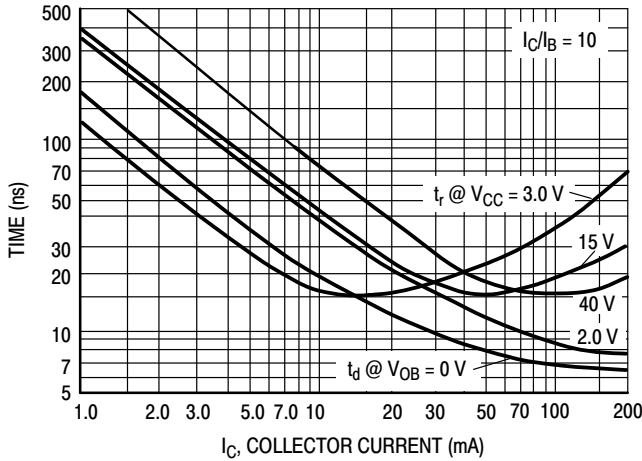


Figure 5. Turn-On Time

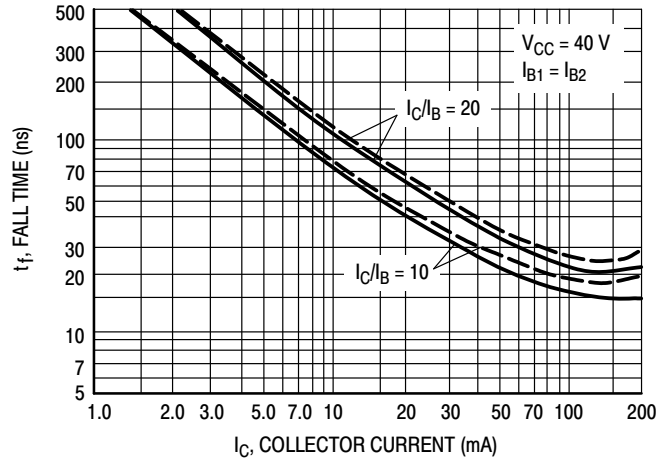


Figure 6. Fall Time

TYPICAL AUDIO SMALL-SIGNAL CHARACTERISTICS NOISE FIGURE VARIATIONS

($V_{CE} = -5.0\text{ Vdc}$, $T_A = 25^\circ\text{C}$, Bandwidth = 1.0 Hz)

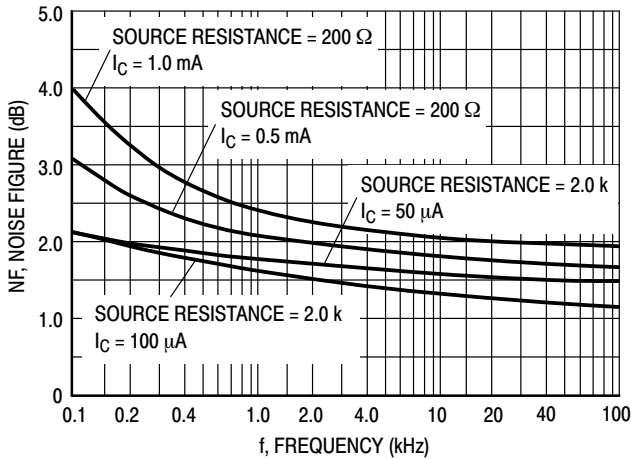


Figure 7.

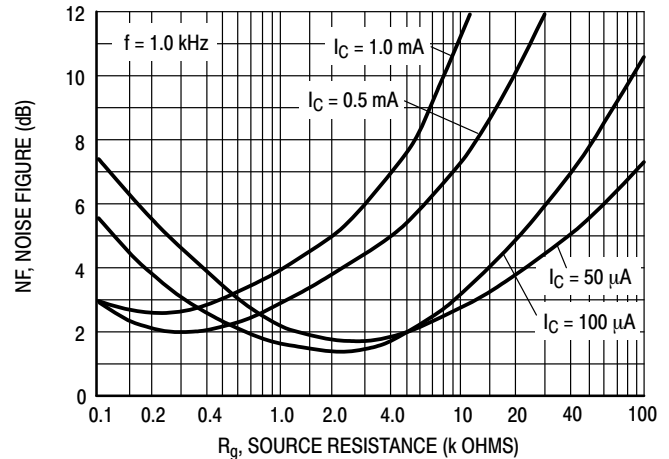


Figure 8.

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h PARAMETERS

($V_{CE} = -10$ Vdc, $f = 1.0$ kHz, $T_A = 25^\circ\text{C}$)

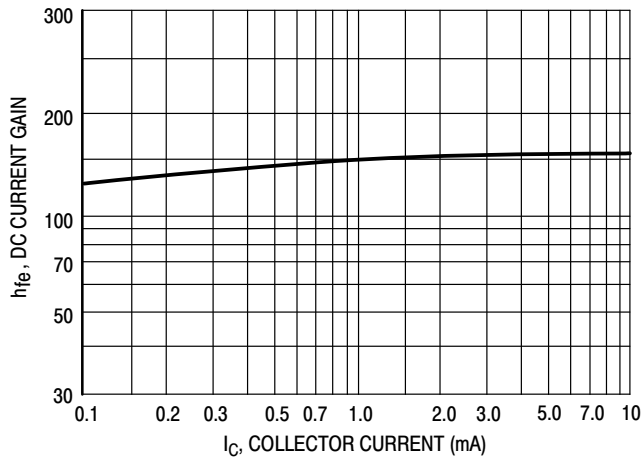


Figure 9. Current Gain

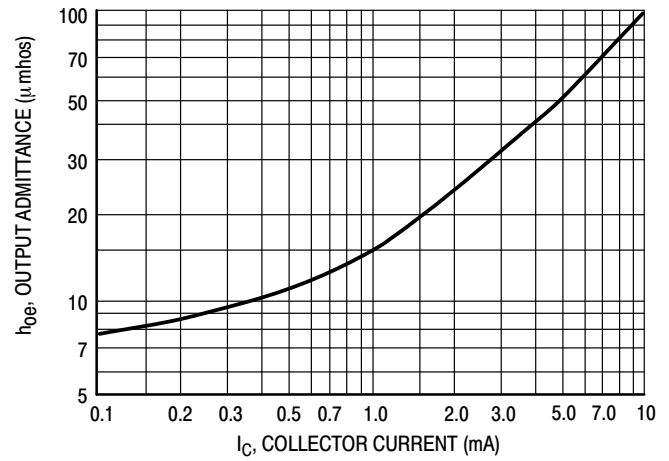


Figure 10. Output Admittance

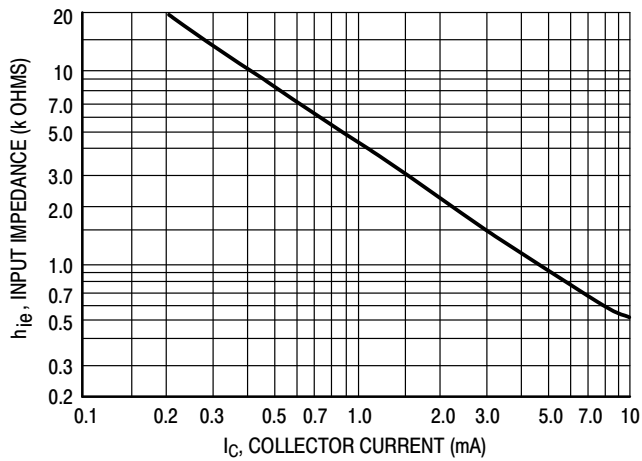


Figure 11. Input Impedance

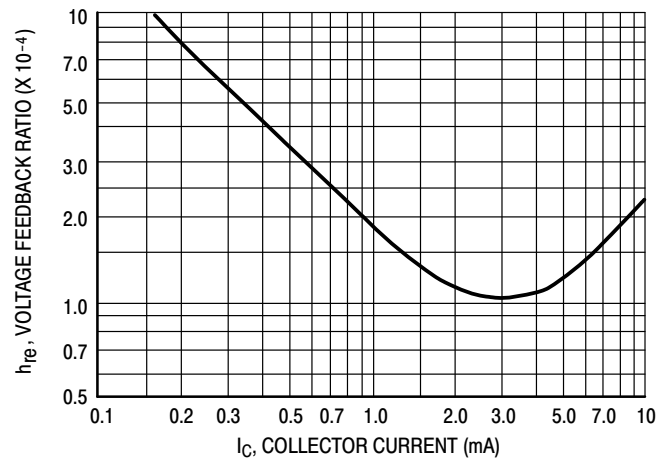


Figure 12. Voltage Feedback Ratio

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TYPICAL STATIC CHARACTERISTICS

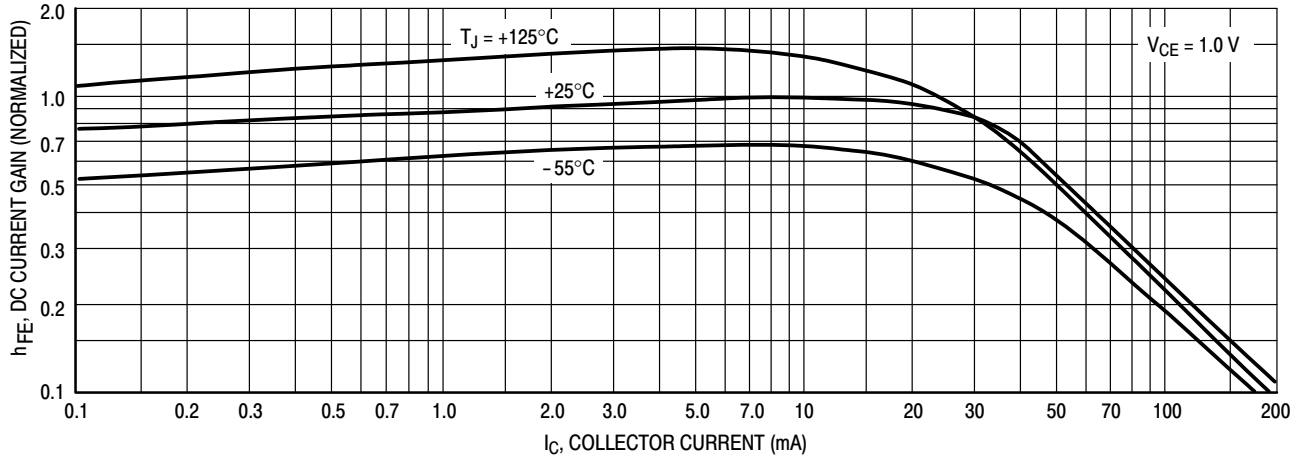


Figure 13. DC Current Gain

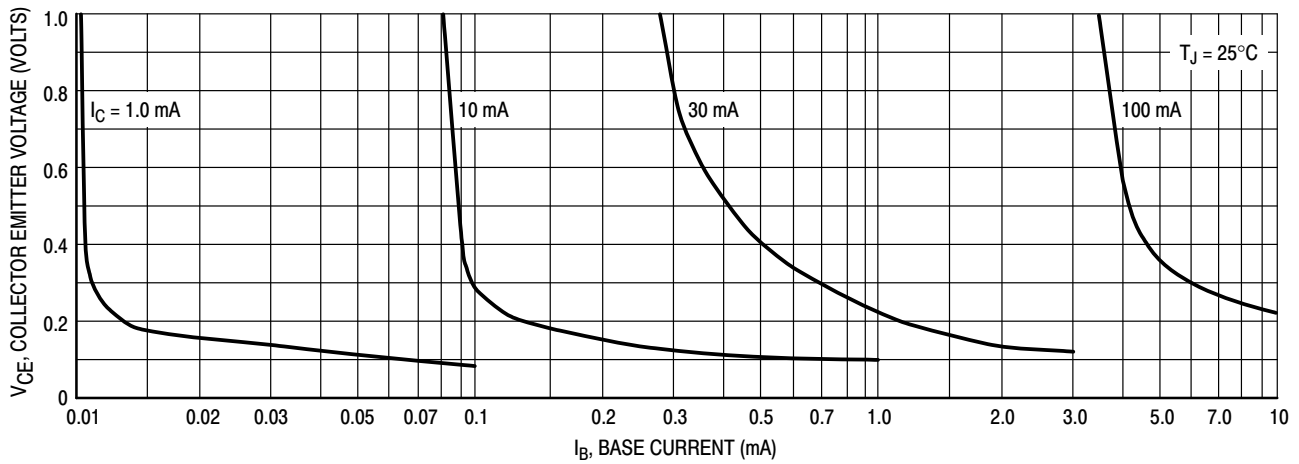


Figure 14. Collector Saturation Region

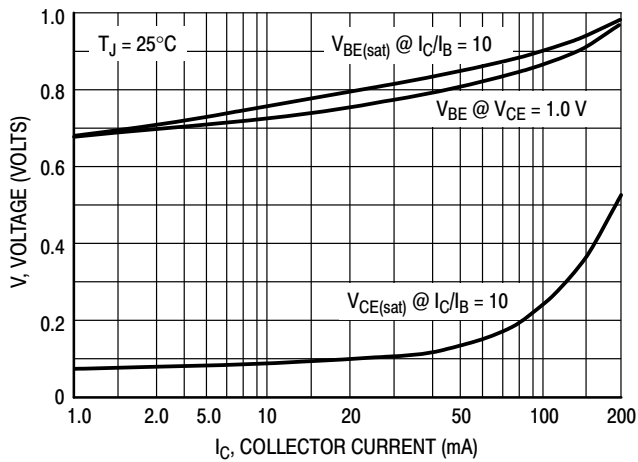


Figure 15. "ON" Voltages

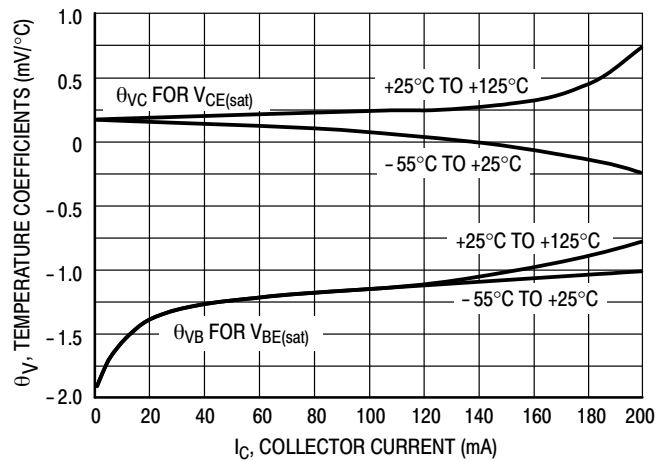


Figure 16. Temperature Coefficients

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