

# BCX71JLT1G

## General Purpose Transistor

### PNP Silicon

#### Features

- Moisture Sensitivity Level: 1
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### MAXIMUM RATINGS

| Rating                         | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector – Emitter Voltage    | $V_{CEO}$ | -45   | Vdc  |
| Collector – Base Voltage       | $V_{CBO}$ | -45   | Vdc  |
| Emitter – Base Voltage         | $V_{EBO}$ | -5.0  | Vdc  |
| Collector Current – Continuous | $I_C$     | -100  | mAdc |

#### THERMAL CHARACTERISTICS

| Characteristic                                                                                   | Symbol          | Max        | Unit                       |
|--------------------------------------------------------------------------------------------------|-----------------|------------|----------------------------|
| Total Device Dissipation (Note 1)<br>$T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$           | 350<br>2.8 | mW<br>mW/ $^\circ\text{C}$ |
| Storage Temperature                                                                              | $T_{stg}$       | 150        | $^\circ\text{C}$           |
| Thermal Resistance,<br>Junction-to-Ambient (Note 1)                                              | $R_{\theta JA}$ | 357        | $^\circ\text{C/W}$         |

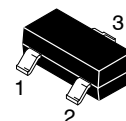
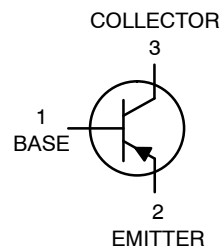
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Package mounted on 99.5% alumina 10 X 8 X 0.6 mm.



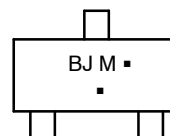
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SOT-23  
CASE 318  
STYLE 6

#### MARKING DIAGRAM



BJ = Device Code  
M = Date Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or overbar may vary depending upon manufacturing location.

#### ORDERING INFORMATION

| Device     | Package             | Shipping†        |
|------------|---------------------|------------------|
| BCX71JLT1G | SOT-23<br>(Pb-free) | 3000/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.

# BCX71JLT1G

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

| Characteristic                                                                                               | Symbol               | Min  | Max | Unit     |
|--------------------------------------------------------------------------------------------------------------|----------------------|------|-----|----------|
| <b>OFF CHARACTERISTICS</b>                                                                                   |                      |      |     |          |
| Collector–Emitter Breakdown Voltage<br>(I <sub>C</sub> = 2.0 mA, I <sub>B</sub> = 0)                         | V <sub>(BR)CEO</sub> | –45  | –   | Vdc      |
| Collector–Base Breakdown Voltage<br>(I <sub>E</sub> = 1.0 μA, I <sub>E</sub> = 0)                            | V <sub>(BR)EBO</sub> | –5.0 | –   | Vdc      |
| Collector Cutoff Current<br>(V <sub>CE</sub> = 32 Vdc)<br>(V <sub>CE</sub> = 32 Vdc, T <sub>A</sub> = 150°C) | I <sub>CES</sub>     | –    | –20 | nA<br>μA |

## ON CHARACTERISTICS

|                                                                                                                                                                                                                                                            |                      |                         |                      |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------|----------------------|-----|
| DC Current Gain<br>(I <sub>C</sub> = 10 μA, V <sub>CE</sub> = 5.0 Vdc)<br>(I <sub>C</sub> = 2.0 mA, V <sub>CE</sub> = 5.0 Vdc)<br>(I <sub>C</sub> = 50 mA, V <sub>CE</sub> = 1.0 Vdc)<br>(I <sub>C</sub> = 2.0 mA, V <sub>CE</sub> = 5.0 Vdc, f = 1.0 kHz) | h <sub>FE</sub>      | 40<br>250<br>100<br>250 | –<br>460<br>–<br>500 | –   |
| Collector–Emitter Saturation Voltage<br>(I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.25 mA)<br>(I <sub>C</sub> = 50 mA, I <sub>B</sub> = 1.25 mA)                                                                                                           | V <sub>CE(sat)</sub> | –<br>–                  | –0.25<br>–0.55       | Vdc |
| Base–Emitter Saturation Voltage<br>(I <sub>C</sub> = 1.0 mA, V <sub>CE</sub> = 5.0 Vdc)<br>(I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 Vdc)                                                                                                             | V <sub>BE(sat)</sub> | –0.6<br>–0.68           | –0.85<br>–1.05       | Vdc |
| Base–Emitter On Voltage<br>(I <sub>C</sub> = 2.0 mA, V <sub>CE</sub> = 5.0 Vdc)                                                                                                                                                                            | V <sub>BE(on)</sub>  | –0.6                    | –0.75                | Vdc |
| Output Capacitance<br>(V <sub>CE</sub> = 10 Vdc, I <sub>C</sub> = 0, f = 1.0 MHz)                                                                                                                                                                          | C <sub>obo</sub>     | –                       | 6.0                  | pF  |
| Noise Figure<br>(I <sub>C</sub> = 0.2 mA, V <sub>CE</sub> = 5.0 Vdc, R <sub>S</sub> = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)                                                                                                                                    | NF                   | –                       | 6.0                  | dB  |

## SWITCHING CHARACTERISTICS

|                                                                                                                  |                  |   |     |    |
|------------------------------------------------------------------------------------------------------------------|------------------|---|-----|----|
| Turn–On Time<br>(I <sub>C</sub> = 10 mA, I <sub>B1</sub> = 1.0 mA)                                               | t <sub>on</sub>  | – | 150 | ns |
| Turn–Off Time<br>(I <sub>B2</sub> = 1.0 mA, V <sub>BB</sub> = 3.6 Vdc, R1 = R2 = 5.0 kΩ, R <sub>L</sub> = 990 Ω) | t <sub>off</sub> | – | 800 | ns |

## TYPICAL NOISE CHARACTERISTICS

(V<sub>CE</sub> = –5.0 Vdc, T<sub>A</sub> = 25°C)

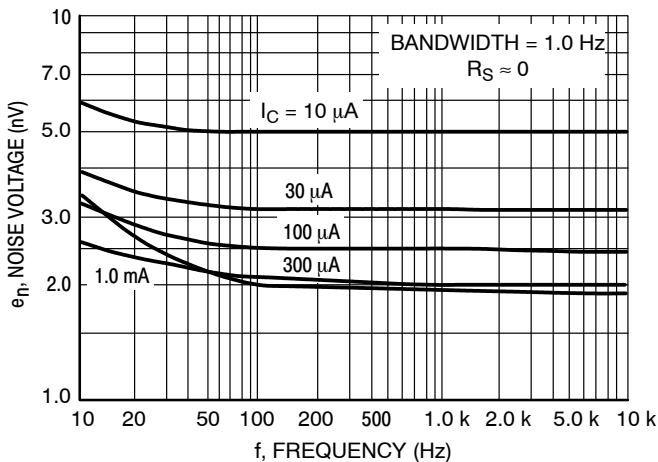


Figure 1. Noise Voltage

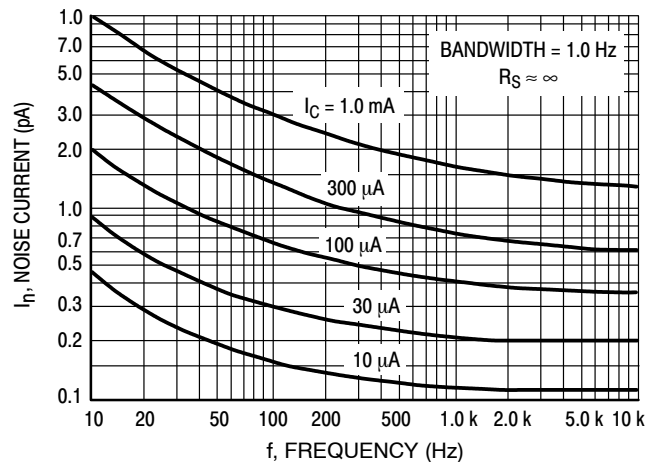


Figure 2. Noise Current

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## NOISE FIGURE CONTOURS

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

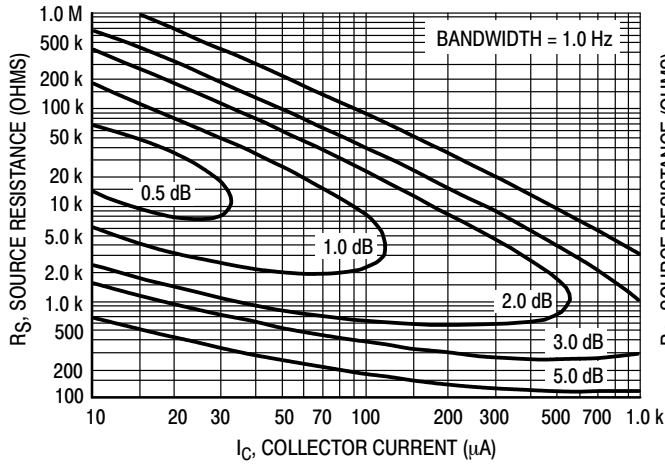


Figure 3. Narrow Band, 100 Hz

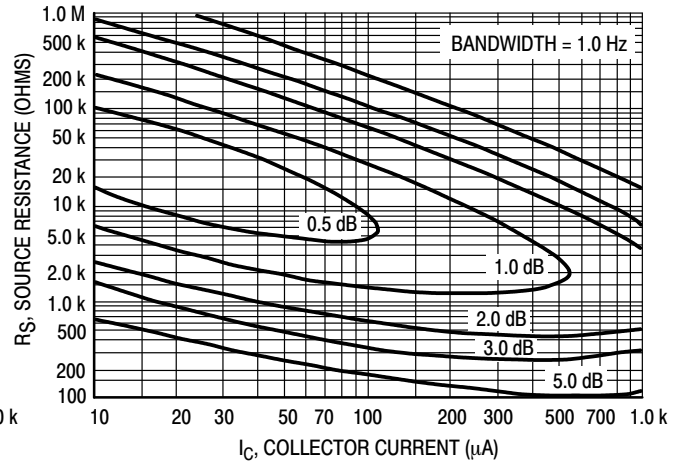


Figure 4. Narrow Band, 1.0 kHz

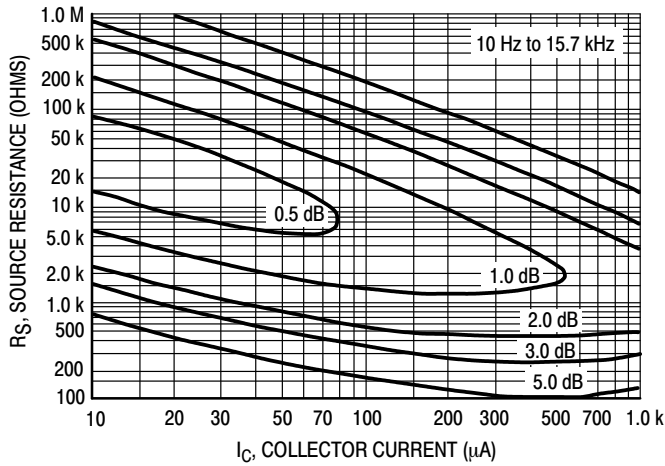


Figure 5. Wideband

Noise Figure is Defined as:

$$NF = 20 \log_{10} \left[ \frac{e_n^2 + 4KTR_S + I_n^2 R_S^2}{4KTR_S} \right]^{1/2}$$

$e_n$  = Noise Voltage of the Transistor referred to the input. (Figure 3)

$I_n$  = Noise Current of the Transistor referred to the input. (Figure 4)

$K$  = Boltzman's Constant ( $1.38 \times 10^{-23} \text{ J/}^\circ\text{K}$ )

$T$  = Temperature of the Source Resistance ( $^\circ\text{K}$ )

$R_S$  = Source Resistance (Ohms)

## TYPICAL STATIC CHARACTERISTICS

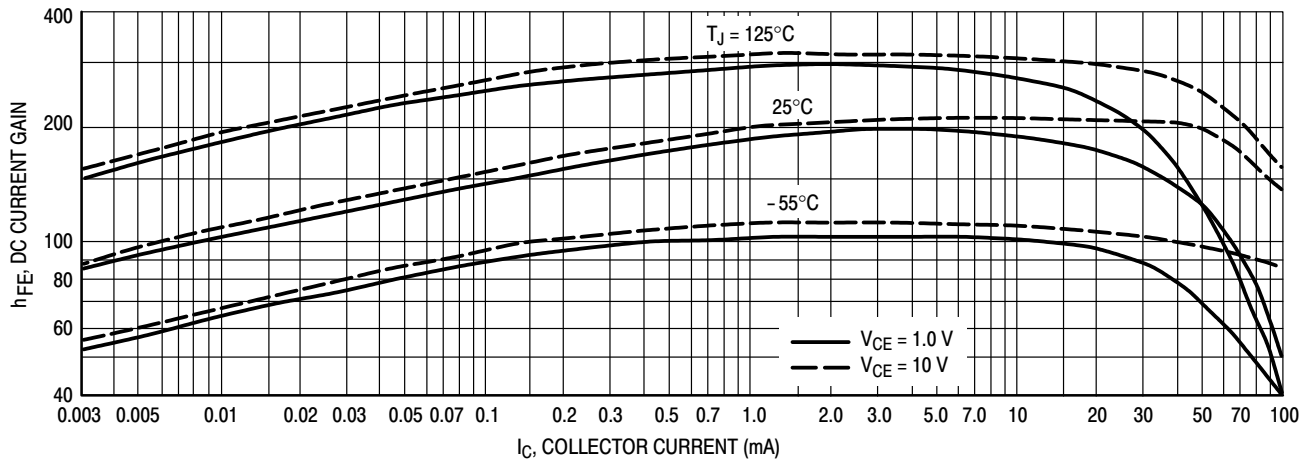


Figure 6. DC Current Gain

TYPICAL STATIC CHARACTERISTICS

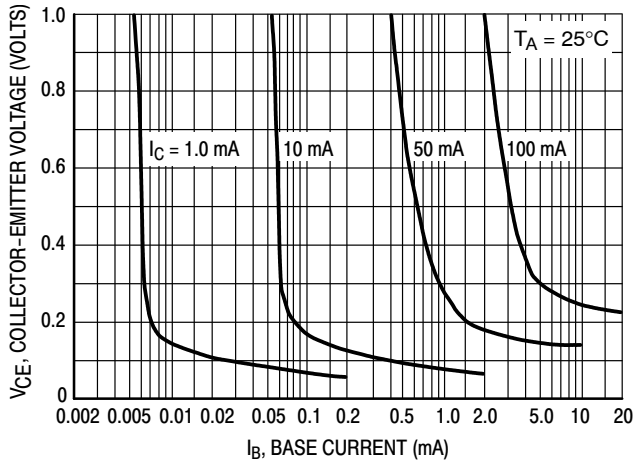


Figure 7. Collector Saturation Region

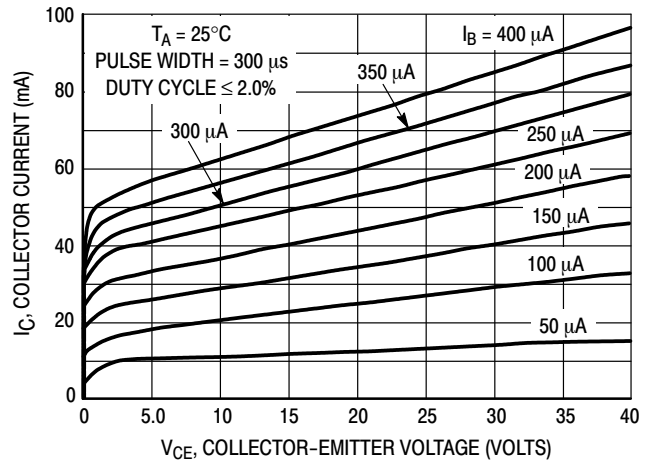


Figure 8. Collector Characteristics

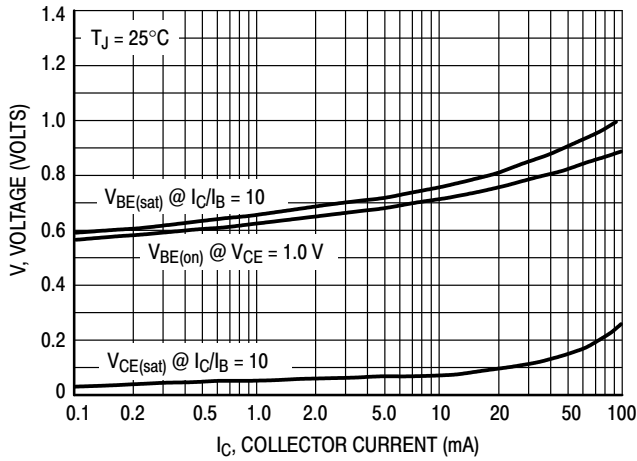


Figure 9. "On" Voltages

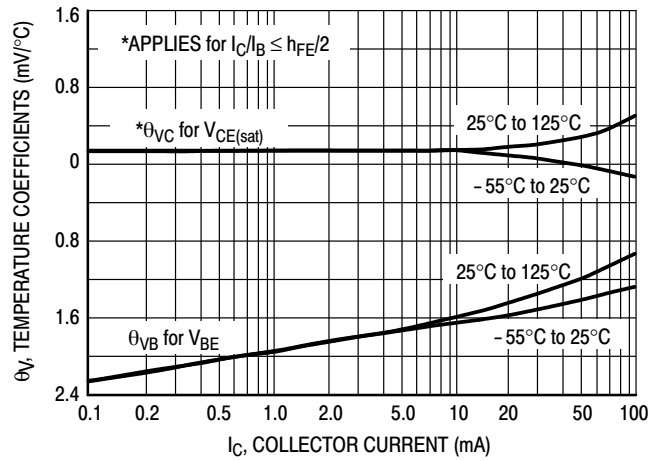


Figure 10. Temperature Coefficients

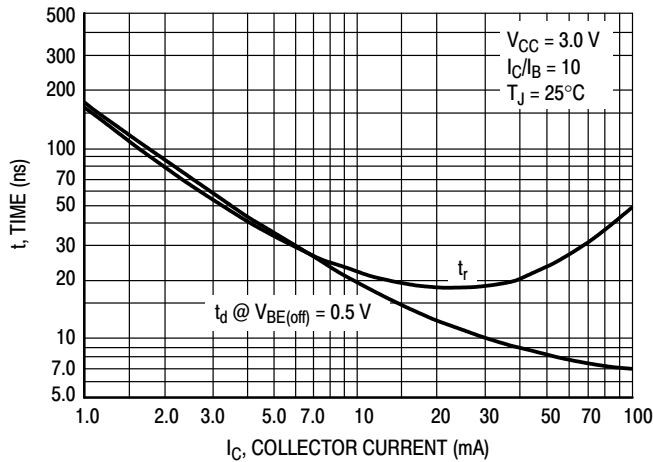


Figure 11. Turn-On Time

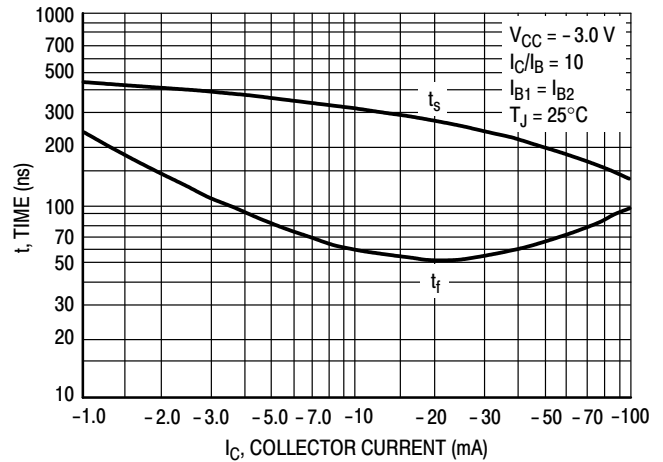


Figure 12. Turn-Off Time

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## TYPICAL DYNAMIC CHARACTERISTICS

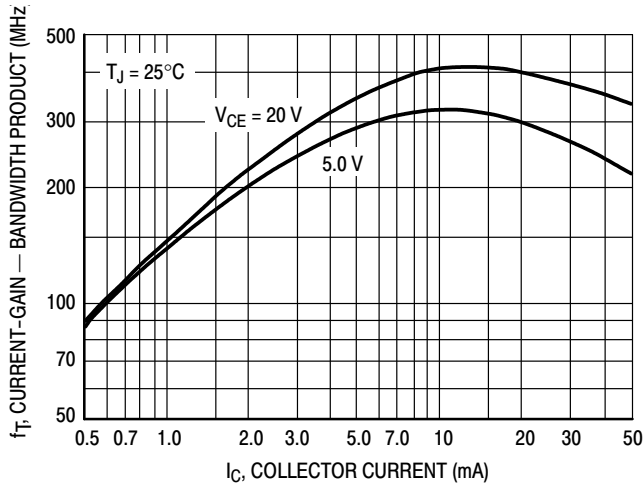


Figure 13. Current-Gain — Bandwidth Product

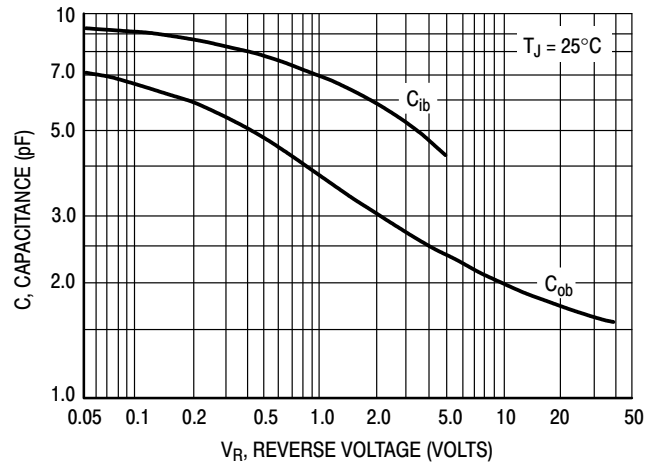


Figure 14. Capacitance

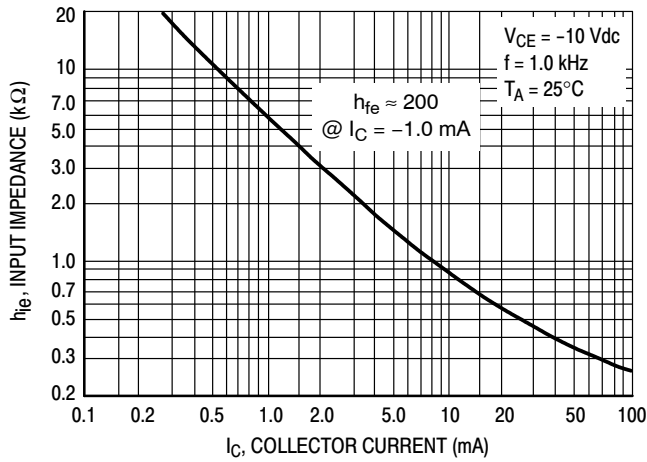


Figure 15. Input Impedance

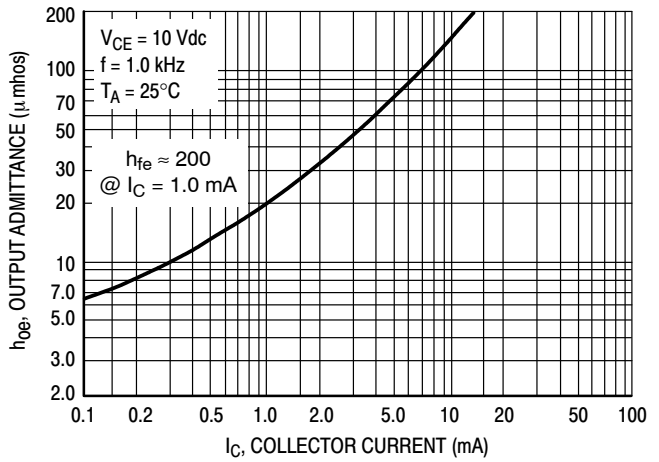


Figure 16. Output Admittance

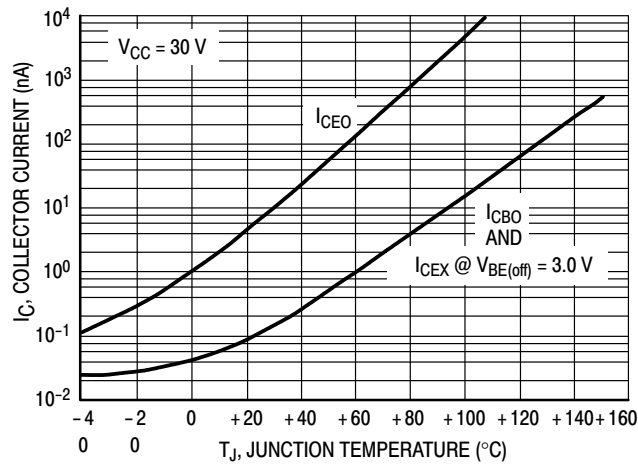


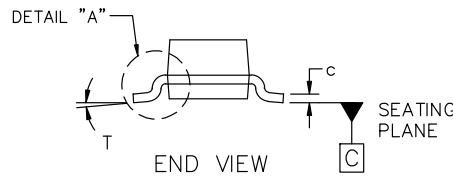
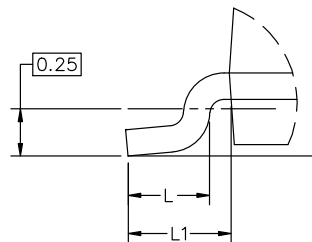
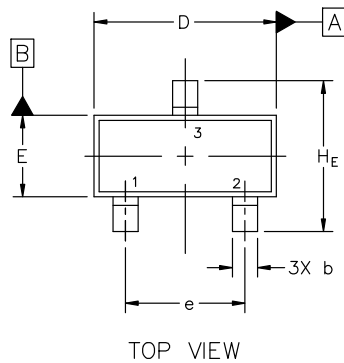
Figure 17. Typical Collector Leakage Current



SCALE 4:1

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CASE 318  
ISSUE AU

DATE 14 AUG 2024

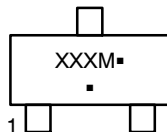


| MILLIMETERS |      |      |      |
|-------------|------|------|------|
| DIM         | MIN  | NOM  | MAX  |
| A           | 0.89 | 1.00 | 1.11 |
| A1          | 0.01 | 0.06 | 0.10 |
| b           | 0.37 | 0.44 | 0.50 |
| c           | 0.08 | 0.14 | 0.20 |
| D           | 2.80 | 2.90 | 3.04 |
| E           | 1.20 | 1.30 | 1.40 |
| e           | 1.78 | 1.90 | 2.04 |
| L           | 0.30 | 0.43 | 0.55 |
| L1          | 0.35 | 0.54 | 0.69 |
| HE          | 2.10 | 2.40 | 2.64 |
| T           | 0°   | ---  | 10°  |

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

GENERIC  
MARKING DIAGRAM\*



XXX = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



RECOMMENDED  
MOUNTING FOOTPRINT

\* For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERM/D.

STYLES ON PAGE 2

|                  |                                      |                                                                                                                                                                                     |
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**ISSUE AU**

DATE 14 AUG 2024

|                                                         |                                                       |                                                             |                                                             |                                                             |                                                             |
|---------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|
| STYLE 1 THRU 5:<br>CANCELLED                            | STYLE 6:<br>PIN 1. BASE<br>2. EMITTER<br>3. COLLECTOR | STYLE 7:<br>PIN 1. EMITTER<br>2. BASE<br>3. COLLECTOR       | STYLE 8:<br>PIN 1. ANODE<br>2. NO CONNECTION<br>3. CATHODE  |                                                             |                                                             |
| STYLE 9:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE      | STYLE 10:<br>PIN 1. DRAIN<br>2. SOURCE<br>3. GATE     | STYLE 11:<br>PIN 1. ANODE<br>2. CATHODE<br>3. CATHODE-ANODE | STYLE 12:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. ANODE       | STYLE 13:<br>PIN 1. SOURCE<br>2. DRAIN<br>3. GATE           | STYLE 14:<br>PIN 1. CATHODE<br>2. GATE<br>3. ANODE          |
| STYLE 15:<br>PIN 1. GATE<br>2. CATHODE<br>3. ANODE      | STYLE 16:<br>PIN 1. ANODE<br>2. CATHODE<br>3. CATHODE | STYLE 17:<br>PIN 1. NO CONNECTION<br>2. ANODE<br>3. CATHODE | STYLE 18:<br>PIN 1. NO CONNECTION<br>2. CATHODE<br>3. ANODE | STYLE 19:<br>PIN 1. CATHODE<br>2. ANODE<br>3. CATHODE-ANODE | STYLE 20:<br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE          |
| STYLE 21:<br>PIN 1. GATE<br>2. SOURCE<br>3. DRAIN       | STYLE 22:<br>PIN 1. RETURN<br>2. OUTPUT<br>3. INPUT   | STYLE 23:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE         | STYLE 24:<br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE           | STYLE 25:<br>PIN 1. ANODE<br>2. CATHODE<br>3. GATE          | STYLE 26:<br>PIN 1. CATHODE<br>2. ANODE<br>3. NO CONNECTION |
| STYLE 27:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. CATHODE | STYLE 28:<br>PIN 1. ANODE<br>2. ANODE<br>3. ANODE     |                                                             |                                                             |                                                             |                                                             |

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