

BC856BDW1T1G, BC857BDW1T1G Series, BC858CDW1T1G Series

Preferred Devices

Dual General Purpose Transistors

PNP Duals

These transistors are designed for general purpose amplifier applications. They are housed in the SOT-363/SC-88 which is designed for low power surface mount applications.

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} | -65 -45 -30 | V |
| Collector - Base Voltage | V_{CBO} | -80 -50 -30 | V |
| Emitter - Base Voltage | V_{EBO} | -5.0 | V |
| Collector Current - Continuous | I_C | -100 | mAdc |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------|-------------|---------------------------|
| Total Device Dissipation Per Device FR-5 Board (Note 1) $T_A = 25^\circ\text{C}$ Derate Above 25°C | P_D | 380 250 | mW |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 328 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

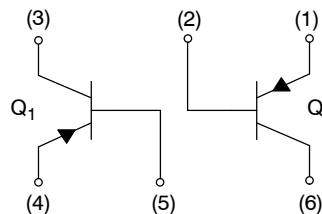
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR-5 = 1.0 x 0.75 x 0.062 in



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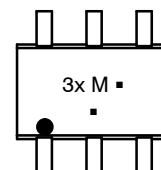
<http://onsemi.com>



1

SOT-363/SC-88
CASE 419B
STYLE 1

MARKING DIAGRAM



3x = Specific Device Code
x = B, F, G, or L
(See Ordering Information)
M = Date Code
▪ = Pb-Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

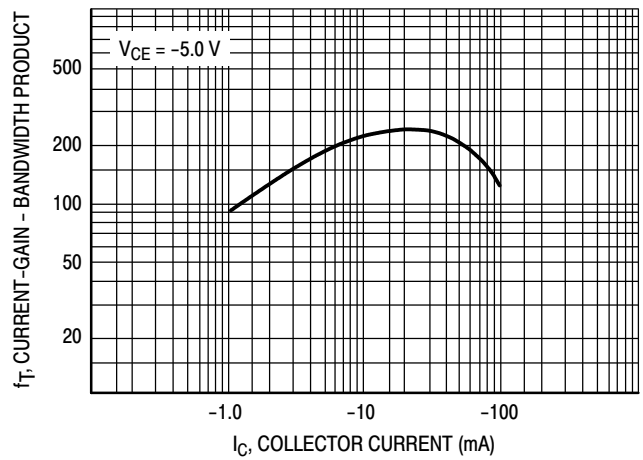
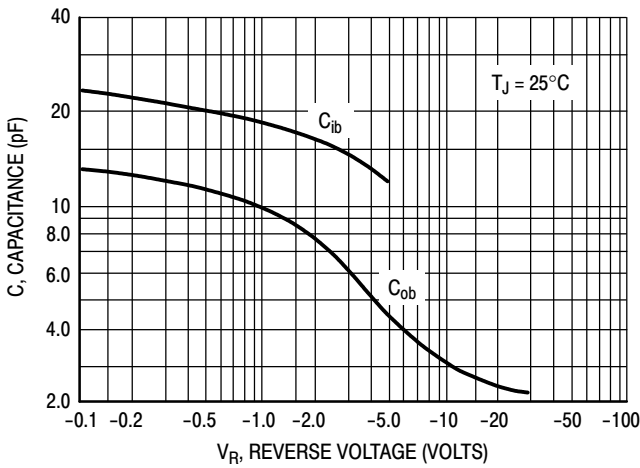
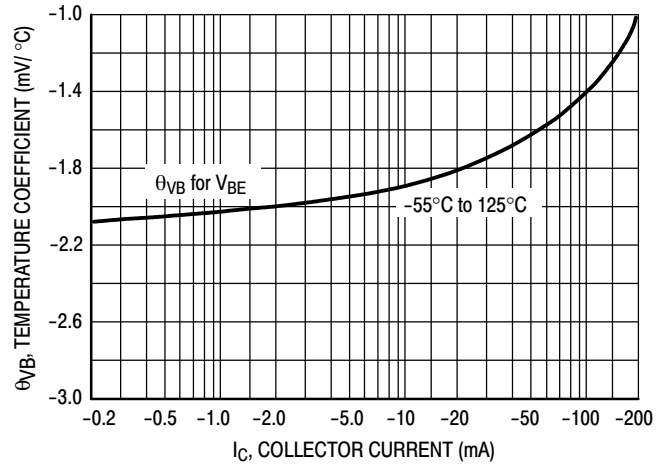
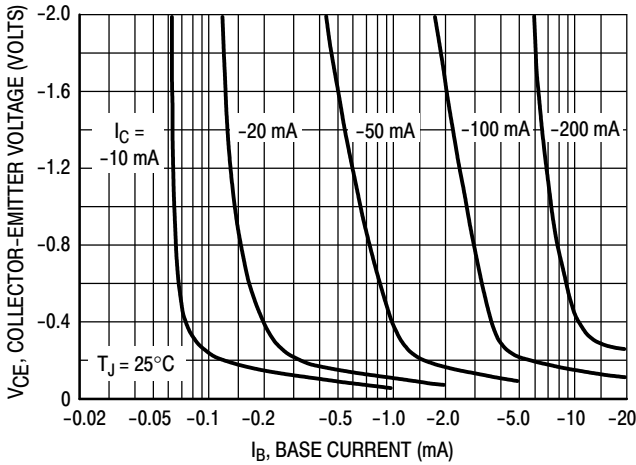
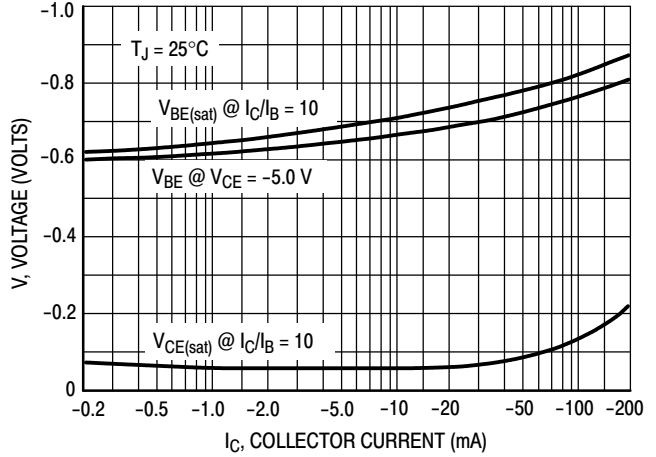
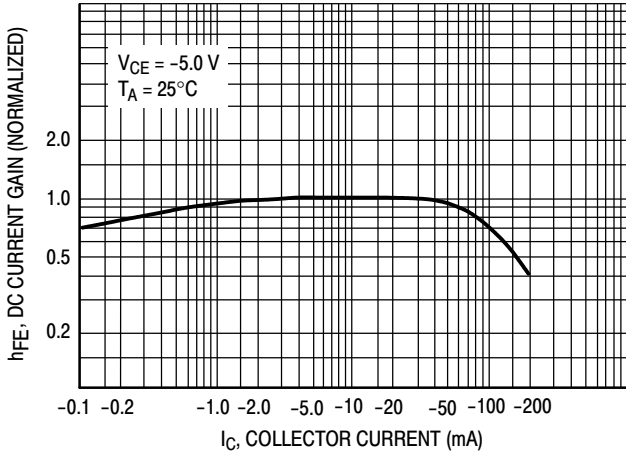
Preferred devices are recommended choices for future use and best overall value.

BC856BDW1T1G, BC857BDW1T1G Series, BC858CDW1T1G Series

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|----------------------|----------------------|------|-------------|----------|
| OFF CHARACTERISTICS | | | | | |
| Collector – Emitter Breakdown Voltage (I _C = -10 mA) | V _{(BR)CEO} | -65 -45 -30 | - | - | V |
| Collector – Emitter Breakdown Voltage (I _C = -10 μA, V _{EB} = 0) | V _{(BR)CES} | -80 -50 -30 | - | - | V |
| Collector – Base Breakdown Voltage (I _C = -10 μA) | V _{(BR)CBO} | -80 -50 -30 | - | - | V |
| Emitter – Base Breakdown Voltage (I _E = -1.0 μA) | V _{(BR)EBO} | -5.0 -5.0 -5.0 | - | - | V |
| Collector Cutoff Current (V _{CB} = -30 V) (V _{CB} = -30 V, T _A = 150°C) | I _{CBO} | - | - | -15 -4.0 | nA μA |
| ON CHARACTERISTICS | | | | | |
| DC Current Gain (I _C = -10 μA, V _{CE} = -5.0 V) | h _{FE} | - | 150 | - | - |
| | | - | 270 | - | |
| (I _C = -2.0 mA, V _{CE} = -5.0 V) | | 220 | 290 | 475 | |
| | | 420 | 520 | 800 | |
| Collector – Emitter Saturation Voltage (I _C = -10 mA, I _B = -0.5 mA) | V _{CE(sat)} | - | - | -0.3 | V |
| (I _C = -100 mA, I _B = -5.0 mA) | | - | - | -0.65 | |
| Base – Emitter Saturation Voltage (I _C = -10 mA, I _B = -0.5 mA) | V _{BE(sat)} | - | -0.7 | - | V |
| (I _C = -100 mA, I _B = -5.0 mA) | | - | -0.9 | - | |
| Base – Emitter On Voltage (I _C = -2.0 mA, V _{CE} = -5.0 V) | V _{BE(on)} | -0.6 | - | -0.75 | V |
| (I _C = -10 mA, V _{CE} = -5.0 V) | | - | - | -0.82 | |
| SMALL-SIGNAL CHARACTERISTICS | | | | | |
| Current – Gain – Bandwidth Product (I _C = -10 mA, V _{CE} = -5.0 Vdc, f = 100 MHz) | f _T | 100 | - | - | MHz |
| Output Capacitance (V _{CB} = -10 V, f = 1.0 MHz) | C _{ob} | - | - | 4.5 | pF |
| Noise Figure (I _C = -0.2 mA, V _{CE} = -5.0 Vdc, R _S = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz) | NF | - | - | 10 | dB |

TYPICAL CHARACTERISTICS – BC856



TYPICAL CHARACTERISTICS – BC857/BC858

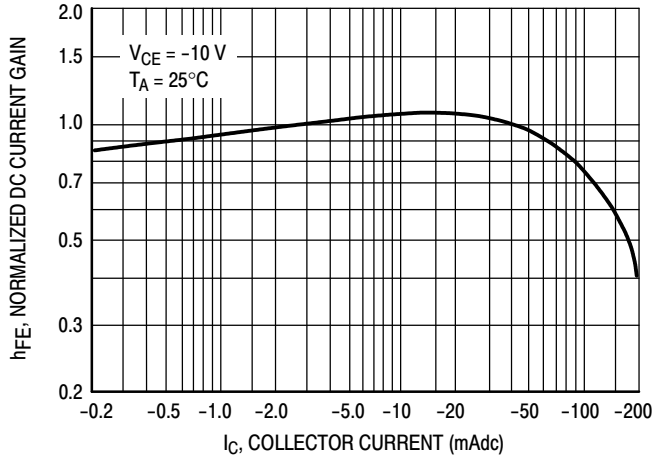


Figure 7. Normalized DC Current Gain

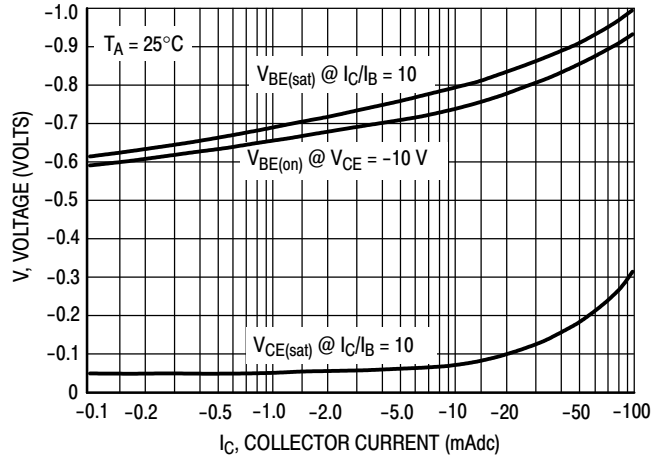


Figure 8. "Saturation" and "On" Voltages

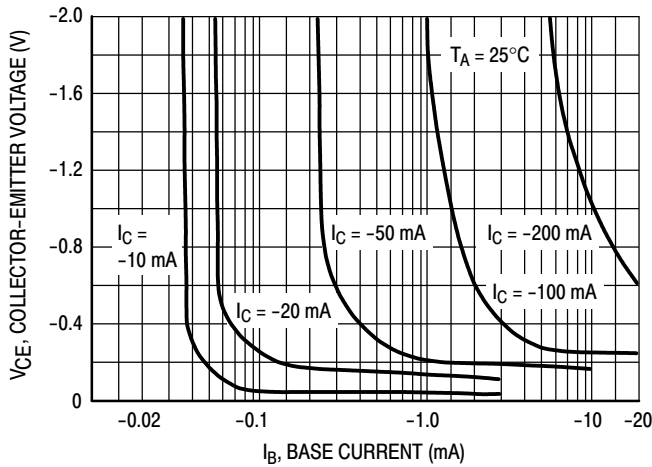


Figure 9. Collector Saturation Region

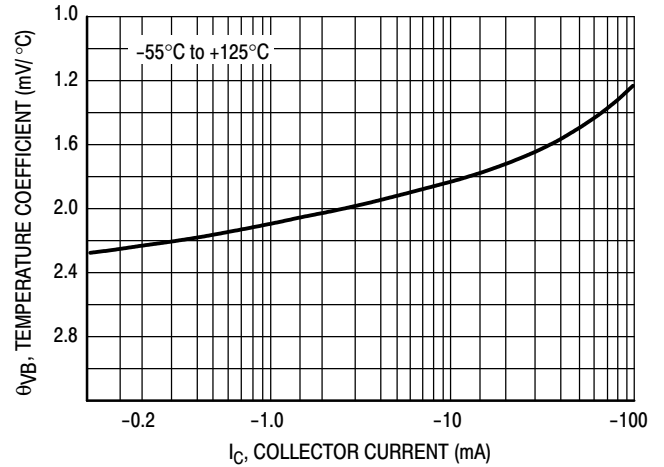


Figure 10. Base-Emitter Temperature Coefficient

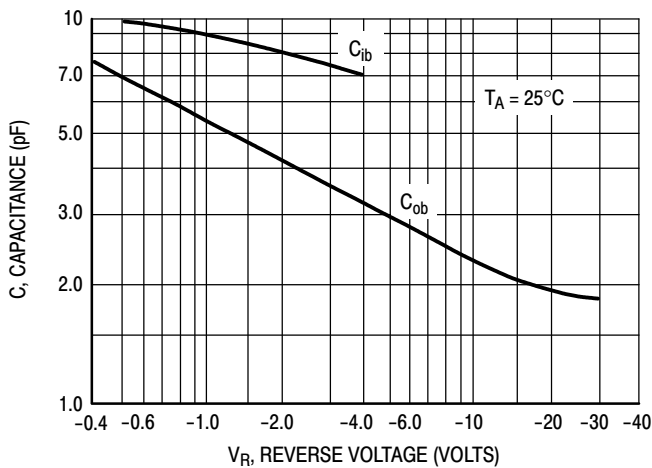


Figure 11. Capacitances

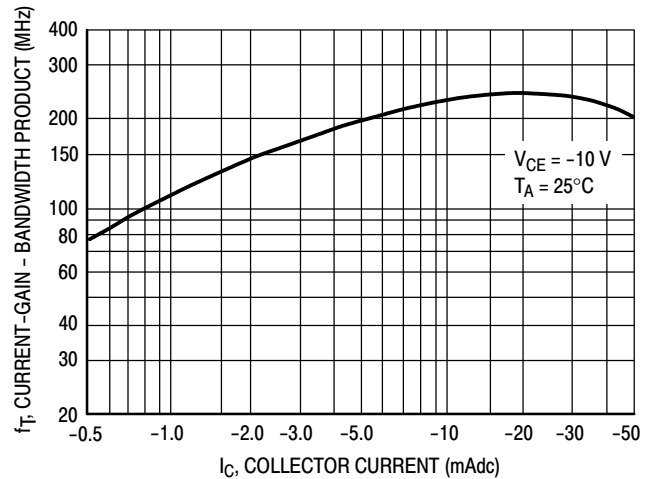


Figure 12. Current-Gain - Bandwidth Product

BC856BDW1T1G, BC857BDW1T1G Series, BC858CDW1T1G Series

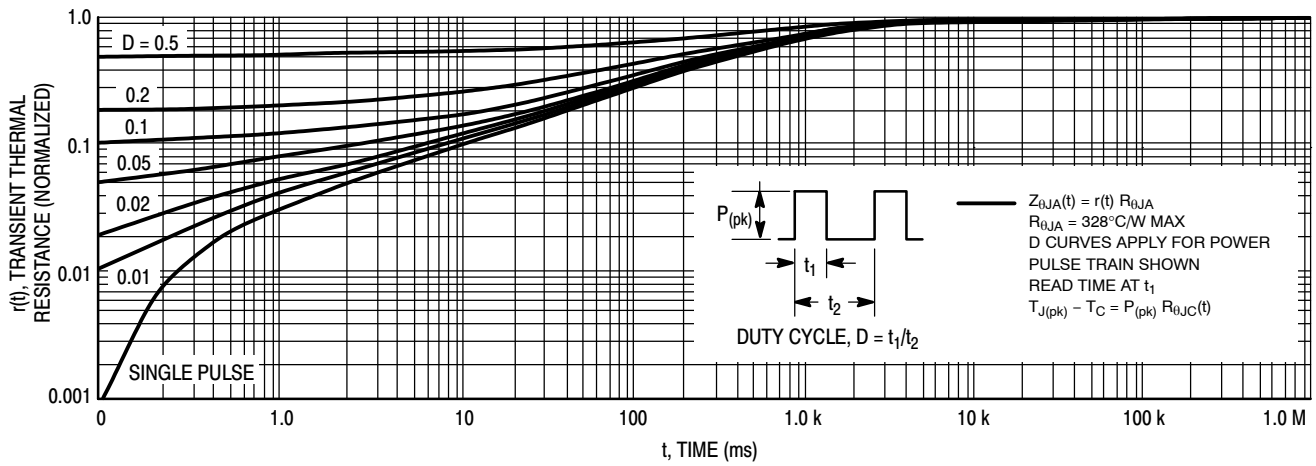


Figure 13. Thermal Response

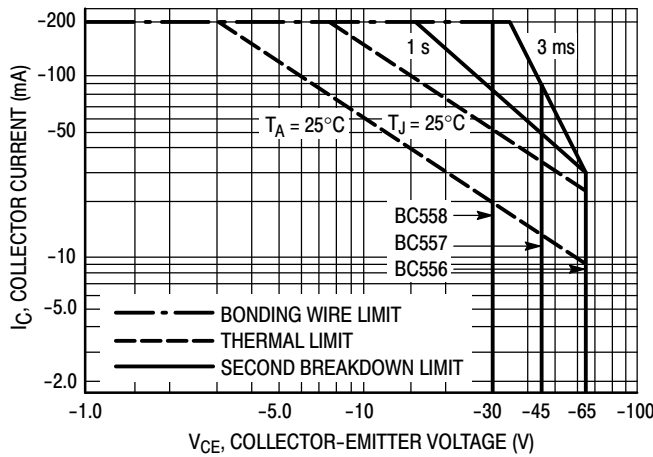


Figure 14. Active Region Safe Operating Area

The safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed for reliable operation. Collector load lines for specific circuits must fall below the limits indicated by the applicable curve.

The data of Figure 14 is based upon $T_{J(pk)} = 150^\circ\text{C}$; T_C or T_A is variable depending upon conditions. Pulse curves are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. $T_{J(pk)}$ may be calculated from the data in Figure 13. At high case or ambient temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by the secondary breakdown.

ORDERING INFORMATION

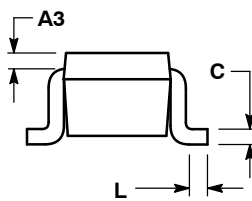
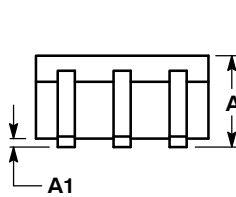
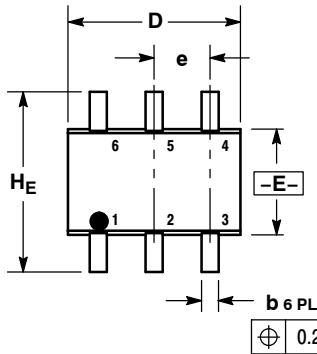
| Device | Device Marking | Package | Shipping† |
|--------------|----------------|----------------------|----------------------|
| BC856BDW1T1G | 3B | SOT-363 (Pb-Free) | 3,000 / Tape & Reel |
| BC856BDW1T3G | 3B | SOT-363 (Pb-Free) | 10,000 / Tape & Reel |
| BC857BDW1T1G | 3F | SOT-363 (Pb-Free) | 3,000 / Tape & Reel |
| BC857CDW1T1G | 3G | SOT-363 (Pb-Free) | 3,000 / Tape & Reel |
| BC858CDW1T1G | 3L | SOT-363 (Pb-Free) | 3,000 / 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.

BC856BDW1T1G, BC857BDW1T1G Series, BC858CDW1T1G Series

PACKAGE DIMENSIONS

SC-88/SC70-6/SOT-363
CASE 419B-02
ISSUE W



NOTES:

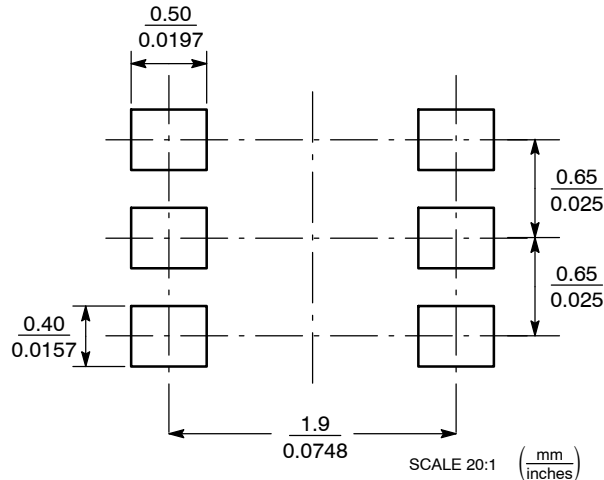
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

| DIM | MILLIMETERS | | | INCHES | | |
|-----|-------------|------|------|-----------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.80 | 0.95 | 1.10 | 0.031 | 0.037 | 0.043 |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| A3 | 0.20 REF | | | 0.008 REF | | |
| b | 0.10 | 0.21 | 0.30 | 0.004 | 0.008 | 0.012 |
| C | 0.10 | 0.14 | 0.25 | 0.004 | 0.005 | 0.010 |
| D | 1.80 | 2.00 | 2.20 | 0.070 | 0.078 | 0.086 |
| E | 1.15 | 1.25 | 1.35 | 0.045 | 0.049 | 0.053 |
| e | 0.65 BSC | | | 0.026 BSC | | |
| L | 0.10 | 0.20 | 0.30 | 0.004 | 0.008 | 0.012 |
| HE | 2.00 | 2.10 | 2.20 | 0.078 | 0.082 | 0.086 |

STYLE 1:

- PIN 1: EMITTER 2
- 2: BASE 2
- 3: COLLECTOR 1
- 4: EMITTER 1
- 5: BASE 1
- 6: COLLECTOR 2

SOLDERING FOOTPRINT*



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

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