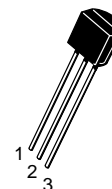
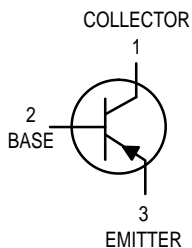


Amplifier Transistors

PNP Silicon

BC556,B
BC557A,B,C
BC558B



CASE 29-04, STYLE 17
TO-92 (TO-226AA)

MAXIMUM RATINGS

| Rating | Symbol | BC 556 | BC 557 | BC 558 | Unit |
|--|----------------|-------------|--------|--------|------------------------------|
| Collector–Emitter Voltage | V_{CEO} | -65 | -45 | -30 | Vdc |
| Collector–Base Voltage | V_{CBO} | -80 | -50 | -30 | Vdc |
| Emitter–Base Voltage | V_{EBO} | -5.0 | | | Vdc |
| Collector Current — Continuous | I_C | -100 | | | mAdc |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 625 5.0 | | | mW mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 1.5 12 | | | Watt mW/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -55 to +150 | | | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------|------|---------------------------|
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 200 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 83.3 | $^\circ\text{C}/\text{W}$ |

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | | |
|---|--|---------------|----------------------------|-------------------------------------|--|-----------------------------|
| Collector–Emitter Breakdown Voltage ($I_C = -2.0 \text{ mAdc}, I_B = 0$) | BC556 BC557 BC558 | $V_{(BR)CEO}$ | -65 -45 -30 | — — — | — — — | V |
| Collector–Base Breakdown Voltage ($I_C = -100 \mu\text{Adc}$) | BC556 BC557 BC558 | $V_{(BR)CBO}$ | -80 -50 -30 | — — — | — — — | V |
| Emitter–Base Breakdown Voltage ($I_E = -100 \mu\text{Adc}, I_C = 0$) | BC556 BC557 BC558 | $V_{(BR)EBO}$ | -5.0 -5.0 -5.0 | — — — | — — — | V |
| Collector–Emitter Leakage Current ($V_{CES} = -40 \text{ V}$) ($V_{CES} = -20 \text{ V}$) ($V_{CES} = -20 \text{ V}, T_A = 125^\circ\text{C}$) | BC556 BC557 BC558 BC556 BC557 BC558 | I_{CES} | — — — — — — | -2.0 -2.0 -2.0 — — — | -100 -100 -100 -4.0 -4.0 -4.0 | nA μA |

BC556,B BC557A,B,C BC558B
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|----------------------|-------|--------|-------|------|
| ON CHARACTERISTICS | | | | | |
| DC Current Gain ($I_C = -10 \mu\text{Adc}$, $V_{CE} = -5.0 \text{ V}$) | h_{FE} | — | 90 | — | — |
| | BC557A | — | 150 | — | — |
| | BC556B/557B/558B | — | 270 | — | — |
| | BC557C | — | 270 | — | — |
| ($I_C = -2.0 \text{ mAdc}$, $V_{CE} = -5.0 \text{ V}$) | BC556 | 120 | — | 500 | — |
| | BC557 | 120 | — | 800 | — |
| | BC558 | 120 | — | 800 | — |
| | BC557A | 120 | 170 | 220 | — |
| | BC556B/557B/558B | 180 | 290 | 460 | — |
| | BC557C | 420 | 500 | 800 | — |
| ($I_C = -100 \text{ mAdc}$, $V_{CE} = -5.0 \text{ V}$) | BC557A | — | 120 | — | — |
| | BC556B/557B/558B | — | 180 | — | — |
| | BC557C | — | 300 | — | — |
| Collector–Emitter Saturation Voltage ($I_C = -10 \text{ mAdc}$, $I_B = -0.5 \text{ mAdc}$) ($I_C = -10 \text{ mAdc}$, $I_B = \text{see Note 1}$) ($I_C = -100 \text{ mAdc}$, $I_B = -5.0 \text{ mAdc}$) | $V_{CE(\text{sat})}$ | — | -0.075 | -0.3 | V |
| | | — | -0.3 | -0.6 | |
| | | — | -0.25 | -0.65 | |
| Base–Emitter Saturation Voltage ($I_C = -10 \text{ mAdc}$, $I_B = -0.5 \text{ mAdc}$) ($I_C = -100 \text{ mAdc}$, $I_B = -5.0 \text{ mAdc}$) | $V_{BE(\text{sat})}$ | — | -0.7 | — | V |
| | | — | -1.0 | — | |
| Base–Emitter On Voltage ($I_C = -2.0 \text{ mAdc}$, $V_{CE} = -5.0 \text{ Vdc}$) ($I_C = -10 \text{ mAdc}$, $V_{CE} = -5.0 \text{ Vdc}$) | $V_{BE(\text{on})}$ | -0.55 | -0.62 | -0.7 | V |
| | | — | -0.7 | -0.82 | |

SMALL–SIGNAL CHARACTERISTICS

| | | | | | |
|--|------------------|-----|-----|-----|-----|
| Current–Gain — Bandwidth Product ($I_C = -10 \text{ mA}$, $V_{CE} = -5.0 \text{ V}$, $f = 100 \text{ MHz}$) | f_T | — | 280 | — | MHz |
| | BC556 | — | 320 | — | |
| | BC557 | — | 360 | — | |
| | BC558 | — | 360 | — | |
| Output Capacitance ($V_{CB} = -10 \text{ V}$, $I_C = 0$, $f = 1.0 \text{ MHz}$) | C_{ob} | — | 3.0 | 6.0 | pF |
| Noise Figure ($I_C = -0.2 \text{ mAdc}$, $V_{CE} = -5.0 \text{ V}$, $R_S = 2.0 \text{ k}\Omega$, $f = 1.0 \text{ kHz}$, $\Delta f = 200 \text{ Hz}$) | NF | — | 2.0 | 10 | dB |
| | BC556 | — | 2.0 | 10 | |
| | BC557 | — | 2.0 | 10 | |
| | BC558 | — | 2.0 | 10 | |
| Small–Signal Current Gain ($I_C = -2.0 \text{ mAdc}$, $V_{CE} = -5.0 \text{ V}$, $f = 1.0 \text{ kHz}$) | h_{fe} | 125 | — | 500 | — |
| | BC556 | 125 | — | 900 | |
| | BC557/558 | 125 | 220 | 260 | |
| | BC557A | 240 | 330 | 500 | |
| | BC556B/557B/558B | 450 | 600 | 900 | |
| | BC557C | 450 | 600 | 900 | |

Note 1: $I_C = -10 \text{ mAdc}$ on the constant base current characteristics, which yields the point $I_C = -11 \text{ mAdc}$, $V_{CE} = -1.0 \text{ V}$.

BC557/BC558

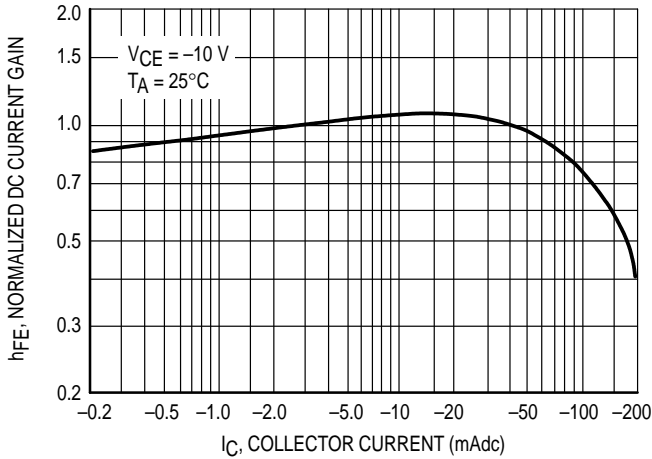


Figure 1. Normalized DC Current Gain

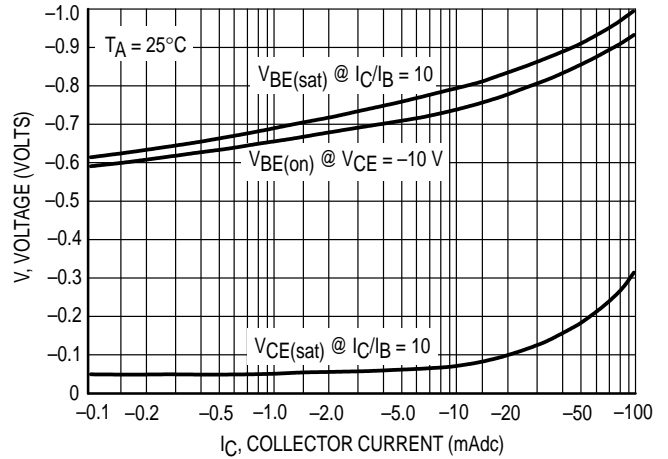


Figure 2. "Saturation" and "On" Voltages

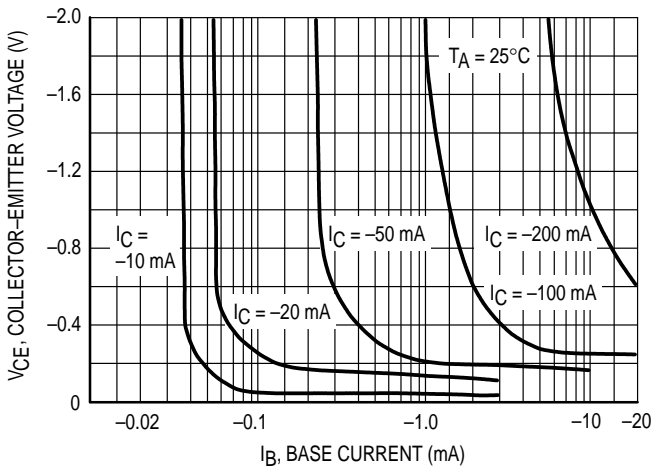


Figure 3. Collector Saturation Region

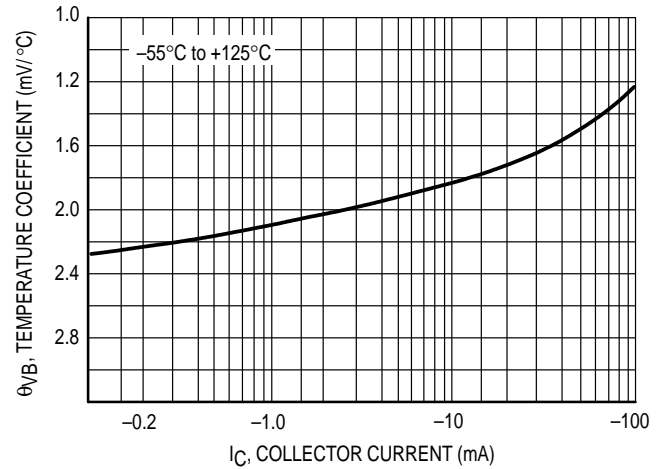


Figure 4. Base-Emitter Temperature Coefficient

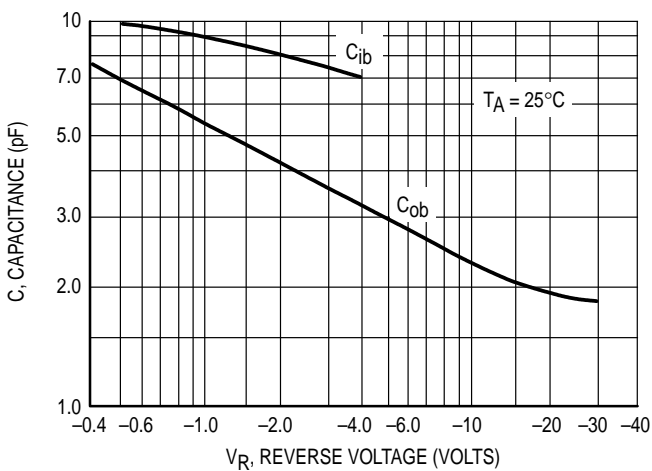


Figure 5. Capacitances

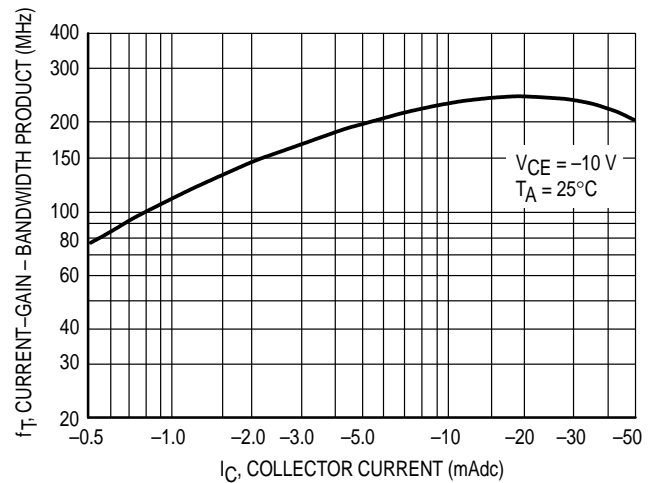


Figure 6. Current-Gain - Bandwidth Product

BC556

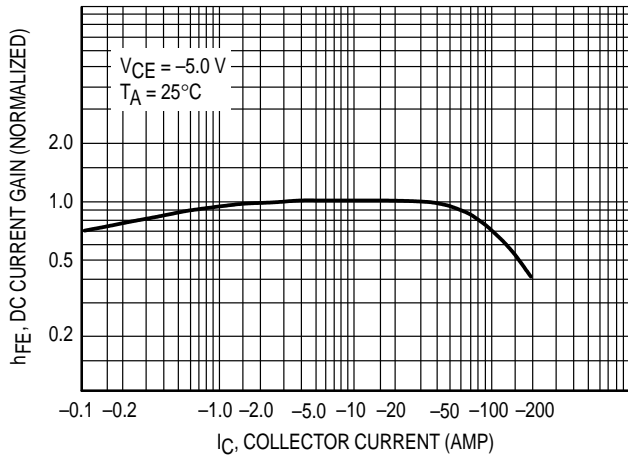


Figure 7. DC Current Gain

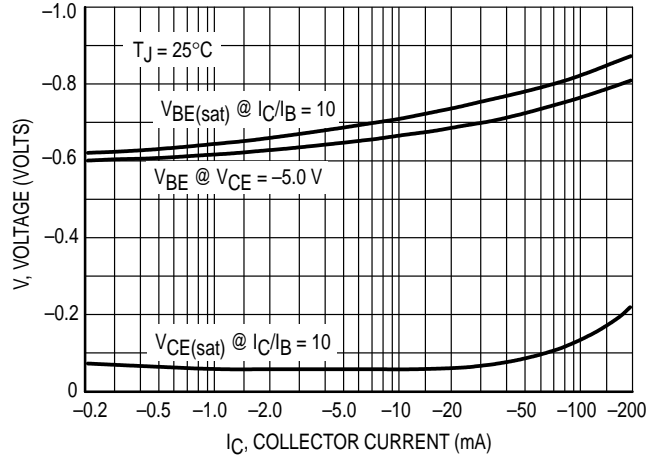


Figure 8. "On" Voltage

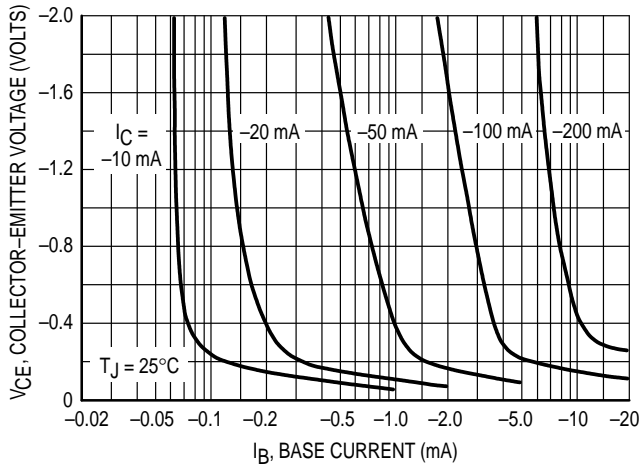


Figure 9. Collector Saturation Region

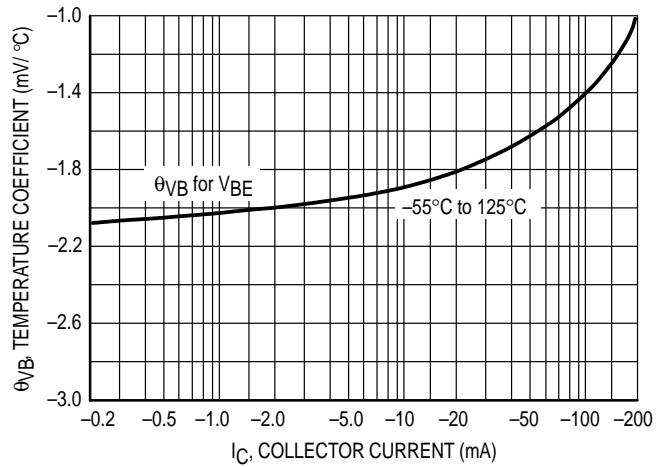


Figure 10. Base-Emitter Temperature Coefficient

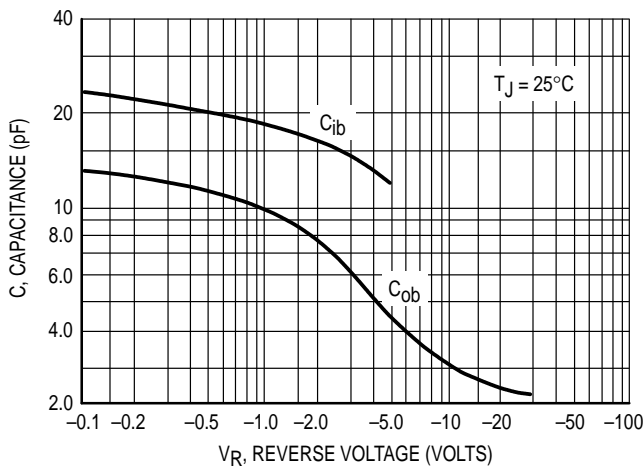


Figure 11. Capacitance

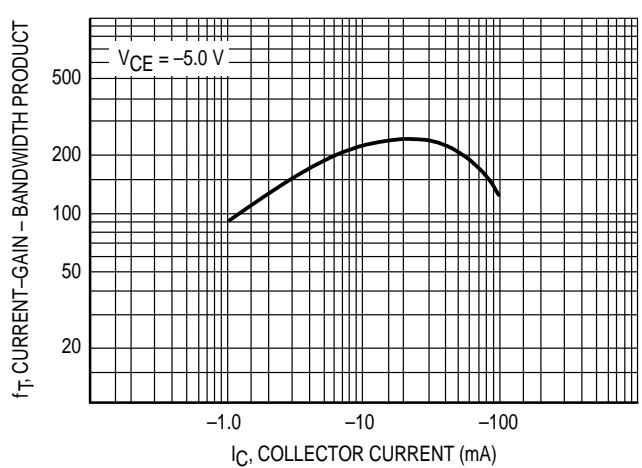


Figure 12. Current-Gain - Bandwidth Product

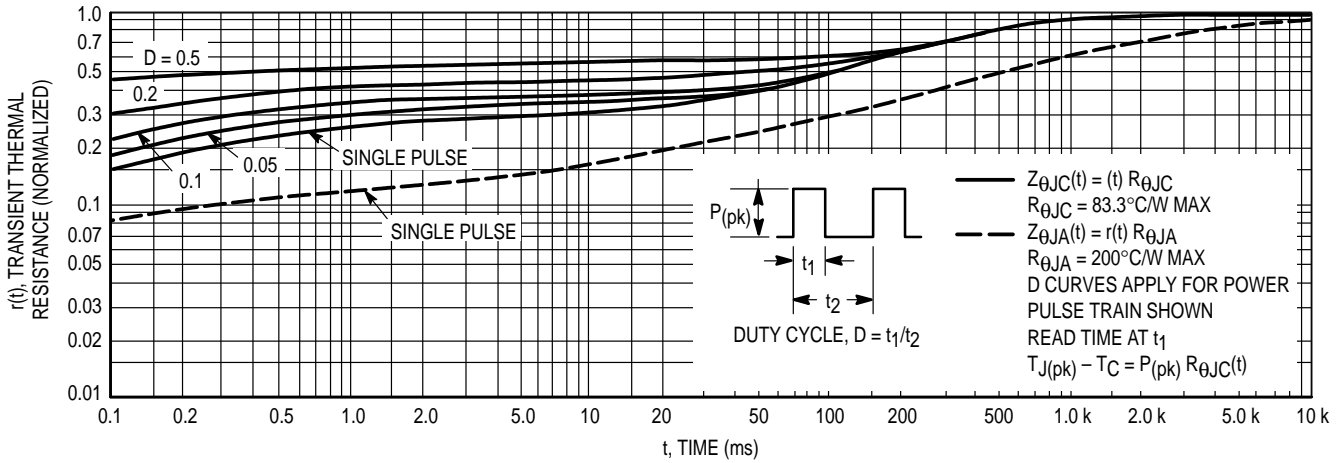


Figure 13. Thermal Response

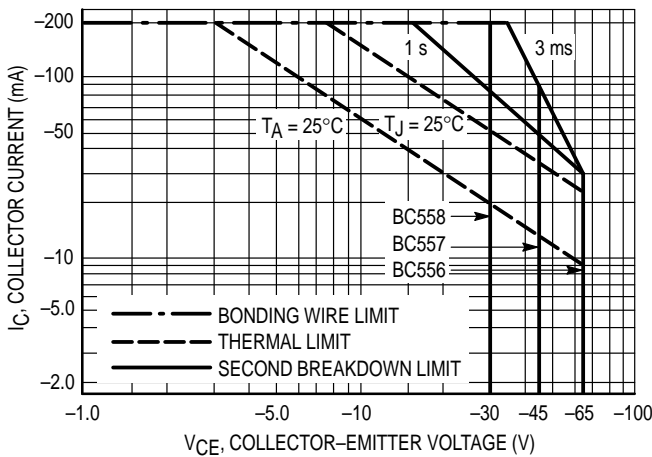
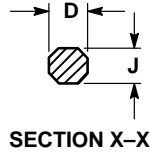
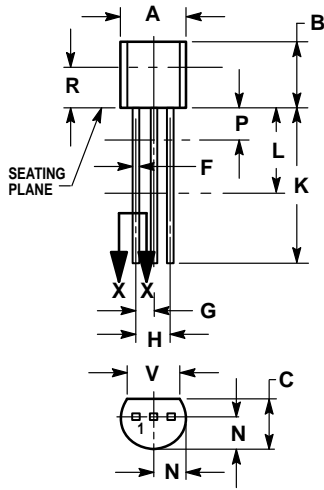


Figure 14. Active Region — Safe Operating Area

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 than can be handled to values less than the limitations imposed by second breakdown.

PACKAGE DIMENSIONS



CASE 029-04
(TO-226AA)
ISSUE AD

- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
 4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K. MINIMUM LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.175 | 0.205 | 4.45 | 5.20 |
| B | 0.170 | 0.210 | 4.32 | 5.33 |
| C | 0.125 | 0.165 | 3.18 | 4.19 |
| D | 0.016 | 0.022 | 0.41 | 0.55 |
| F | 0.016 | 0.019 | 0.41 | 0.48 |
| G | 0.045 | 0.055 | 1.15 | 1.39 |
| H | 0.095 | 0.105 | 2.42 | 2.66 |
| J | 0.015 | 0.020 | 0.39 | 0.50 |
| K | 0.500 | — | 12.70 | — |
| L | 0.250 | — | 6.35 | — |
| N | 0.080 | 0.105 | 2.04 | 2.66 |
| P | — | 0.100 | — | 2.54 |
| R | 0.115 | — | 2.93 | — |
| V | 0.135 | — | 3.43 | — |

- STYLE 17:
PIN 1. COLLECTOR
2. BASE
3. EMITTER

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