

# BC487, BC487B

## High Current Transistors

### NPN Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

| Rating                                                                                 | Symbol         | Value       | Unit                       |
|----------------------------------------------------------------------------------------|----------------|-------------|----------------------------|
| Collector – Emitter Voltage                                                            | $V_{CEO}$      | 60          | Vdc                        |
| Collector – Base Voltage                                                               | $V_{CBO}$      | 60          | Vdc                        |
| Emitter – Base Voltage                                                                 | $V_{EBO}$      | 5.0         | Vdc                        |
| Collector Current – Continuous                                                         | $I_C$          | 0.5         | Adc                        |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 625<br>5.0  | mW<br>mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.5<br>12   | W<br>mW/ $^\circ\text{C}$  |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | -55 to +150 | $^\circ\text{C}$           |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

#### THERMAL CHARACTERISTICS

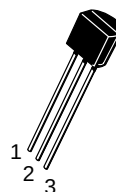
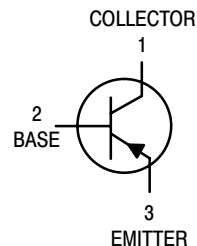
| Characteristic                             | Symbol          | Max  | Unit               |
|--------------------------------------------|-----------------|------|--------------------|
| Thermal Resistance,<br>Junction-to-Ambient | $R_{\theta JA}$ | 200  | $^\circ\text{C/W}$ |
| Thermal Resistance,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

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



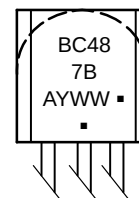
ON Semiconductor®

<http://onsemi.com>



TO-92  
CASE 29  
STYLE 17

#### MARKING DIAGRAM



BC487B = Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
■ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

| Device    | Package            | Shipping†        |
|-----------|--------------------|------------------|
| BC487     | TO-92              | 5000 Units / Box |
| BC487G    | TO-92<br>(Pb-Free) | 5000 Units / Box |
| BC487B    | TO-92              | 5000 Units / Box |
| BC487BG   | TO-92<br>(Pb-Free) | 5000 Units / Box |
| BC487BRL1 | TO-92              | 2000/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<sub>A</sub> = 25°C unless otherwise noted)

| Characteristic                                                                                 | Symbol               | Min | Typ | Max | Unit |
|------------------------------------------------------------------------------------------------|----------------------|-----|-----|-----|------|
| <b>OFF CHARACTERISTICS</b>                                                                     |                      |     |     |     |      |
| Collector–Emitter Breakdown Voltage (Note 1)<br>(I <sub>C</sub> = 10 mAdc, I <sub>B</sub> = 0) | V <sub>(BR)CEO</sub> | 60  | –   | –   | Vdc  |
| Collector–Base Breakdown Voltage<br>(I <sub>C</sub> = 100 µAdc, I <sub>E</sub> = 0)            | V <sub>(BR)CBO</sub> | 60  | –   | –   | Vdc  |
| Emitter–Base Breakdown Voltage<br>(I <sub>E</sub> = 10 µAdc, I <sub>C</sub> = 0)               | V <sub>(BR)EBO</sub> | 5.0 | –   | –   | Vdc  |
| Collector Cutoff Current<br>(V <sub>CB</sub> = 40 Vdc, I <sub>E</sub> = 0)                     | I <sub>CBO</sub>     | –   | –   | 100 | nAdc |

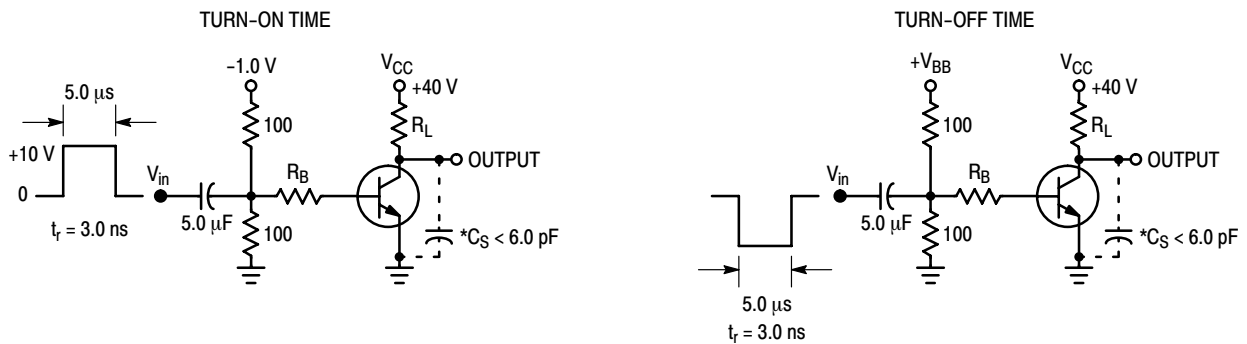
## ON CHARACTERISTICS\*

|                                                                                                                                                                                                  |                      |     |      |     |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----|------|-----|-----|
| DC Current Gain<br>(I <sub>C</sub> = 10 mAdc, V <sub>CE</sub> = 2.0 Vdc)<br>(I <sub>C</sub> = 100 mAdc, V <sub>CE</sub> = 2.0 Vdc)<br><br>(I <sub>C</sub> = 1.0 Adc, V <sub>CE</sub> = 5.0 Vdc)* | h <sub>FE</sub>      | 40  | –    | –   | –   |
|                                                                                                                                                                                                  |                      | 60  | –    | 400 |     |
|                                                                                                                                                                                                  |                      | 160 | 260  | 400 |     |
|                                                                                                                                                                                                  |                      | 15  | –    | –   |     |
| Collector–Emitter Saturation Voltage<br>(I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 50 mAdc)<br>(I <sub>C</sub> = 1.0 Adc, I <sub>B</sub> = 100 mAdc)                                           | V <sub>CE(sat)</sub> | –   | 0.2  | 0.5 | Vdc |
|                                                                                                                                                                                                  |                      | –   | 0.3  | –   |     |
| Base–Emitter Saturation Voltage<br>(I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 50 mAdc)<br>(I <sub>C</sub> = 1.0 Adc, I <sub>B</sub> = 100 mAdc) <sup>(1)</sup>                                 | V <sub>BE(sat)</sub> | –   | 0.85 | 1.2 | Vdc |
|                                                                                                                                                                                                  |                      | –   | 0.9  | –   |     |

## DYNAMIC CHARACTERISTICS

|                                                                                                        |                 |   |     |   |     |
|--------------------------------------------------------------------------------------------------------|-----------------|---|-----|---|-----|
| Current–Gain – Bandwidth Product<br>(I <sub>C</sub> = 50 mAdc, V <sub>CE</sub> = 2.0 Vdc, f = 100 MHz) | f <sub>T</sub>  | – | 200 | – | MHz |
| Output Capacitance<br>(V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)                      | C <sub>ob</sub> | – | 7.0 | – | pF  |
| Input Capacitance<br>(V <sub>EB</sub> = 0.5 Vdc, I <sub>C</sub> = 0, f = 1.0 MHz)                      | C <sub>ib</sub> | – | 50  | – | pF  |

1. Pulse Test: Pulse Width = 300 µs, Duty Cycle 2.0%.



\*Total Shunt Capacitance of Test Jig and Connectors  
For PNP Test Circuits, Reverse All Voltage Polarities

**Figure 1. Switching Time Test Circuits**

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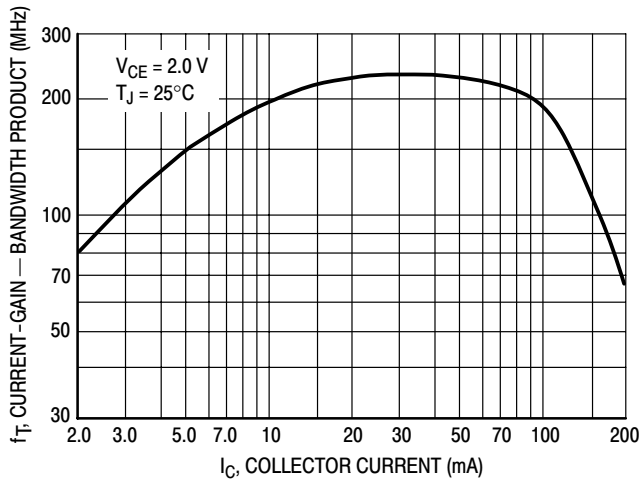


Figure 2. Current-Gain - Bandwidth Product

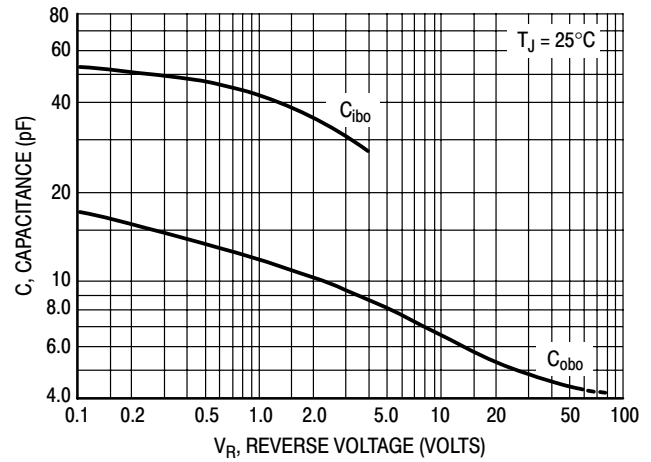


Figure 3. Capacitance

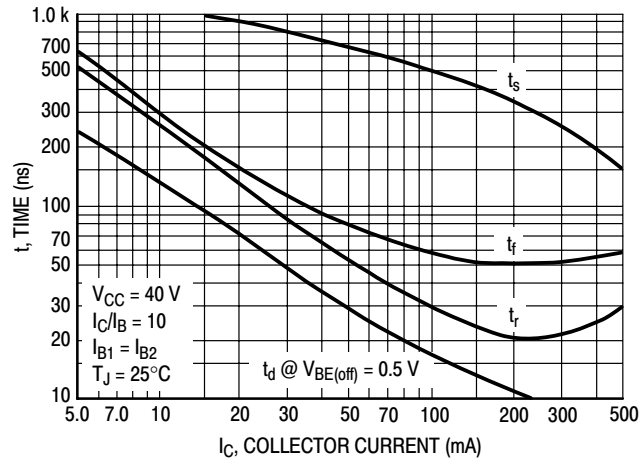


Figure 4. Switching Time

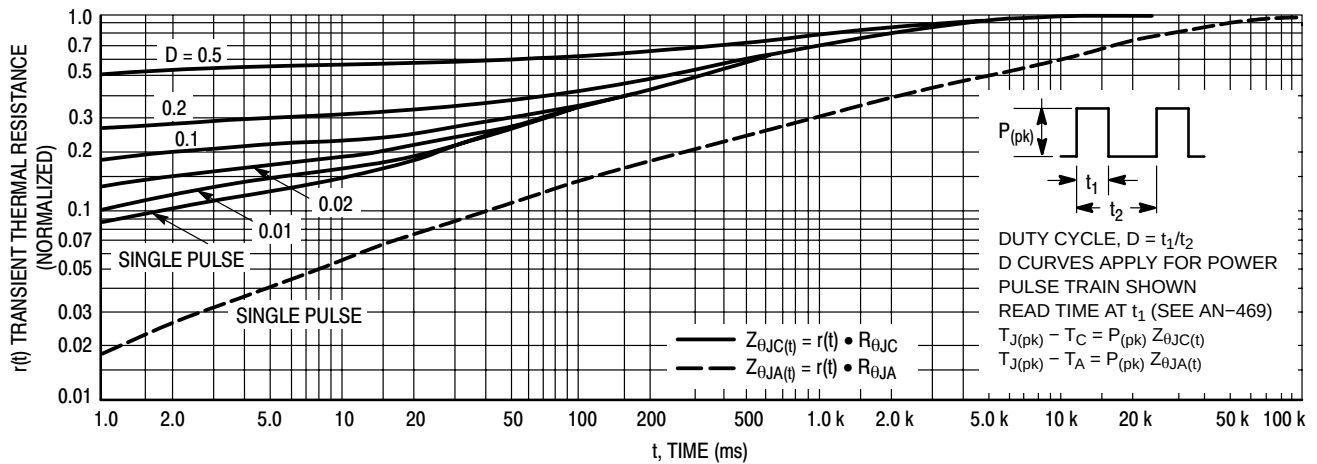


Figure 5. Thermal Response

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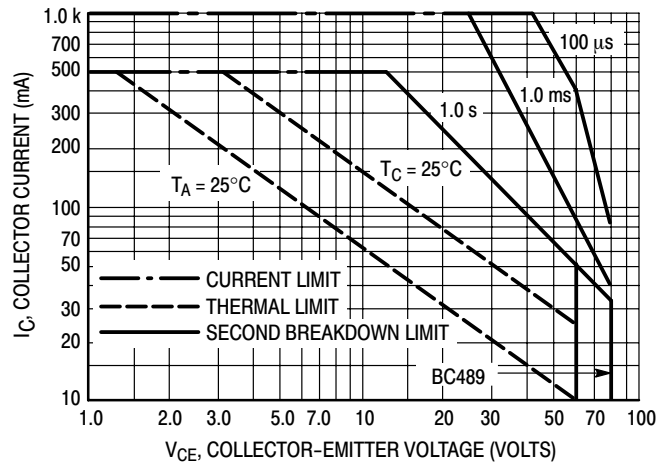


Figure 6. Active Region – Safe Operating Area

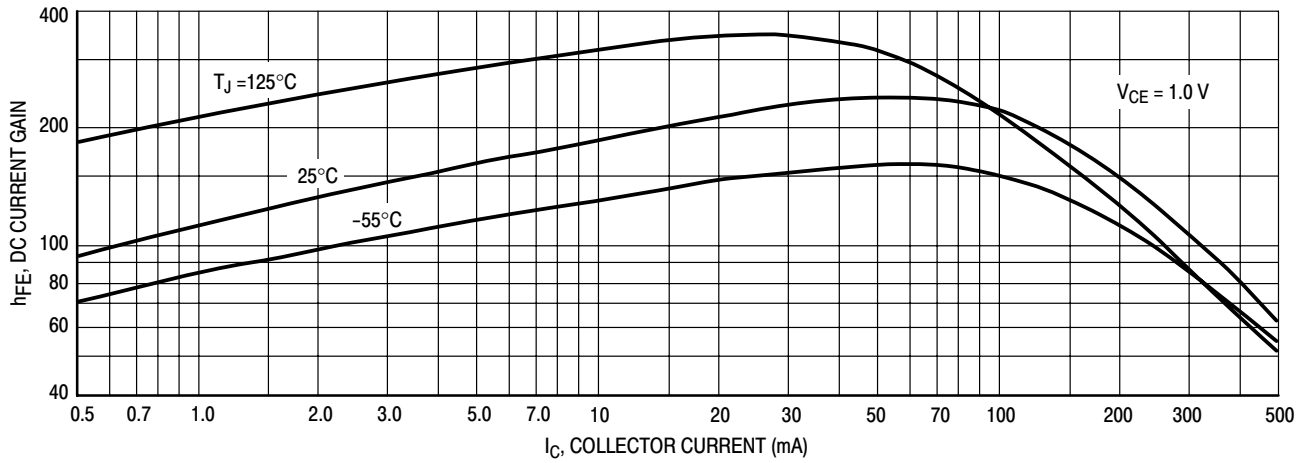


Figure 7. DC Current Gain

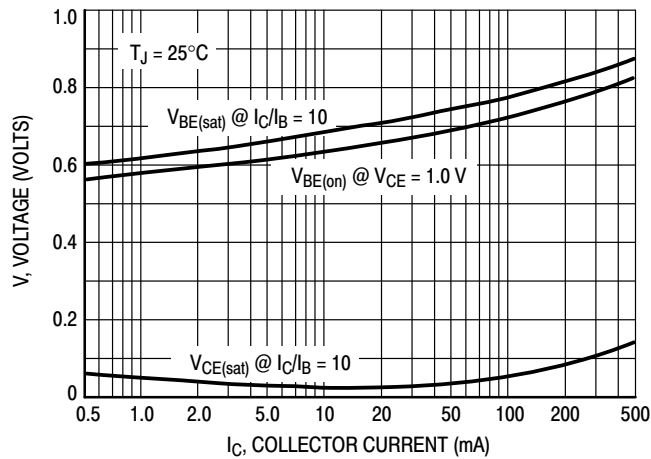


Figure 8. "On" Voltages

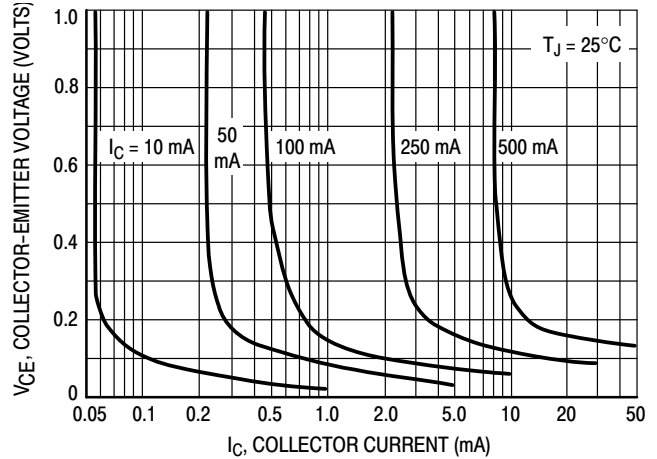


Figure 9. Collector Saturation Region

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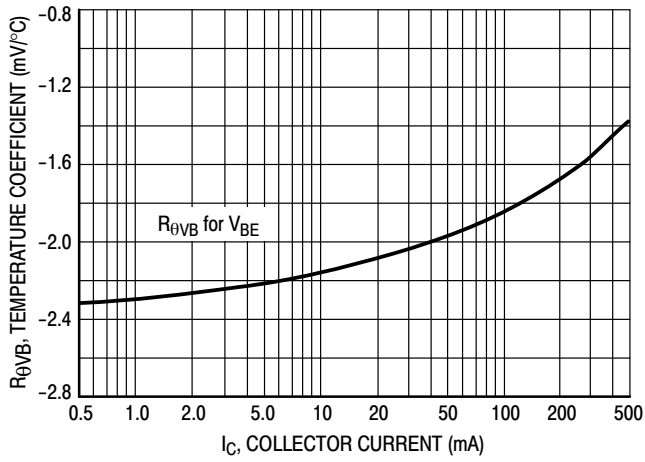


Figure 10. Base-Emitter Temperature Coefficient

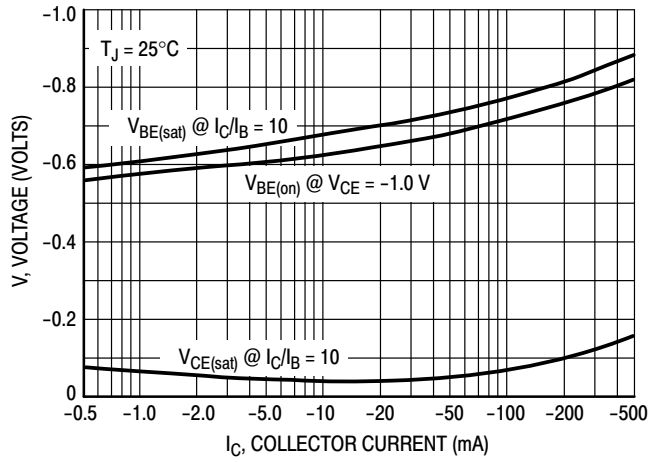


Figure 11. "On" Voltages

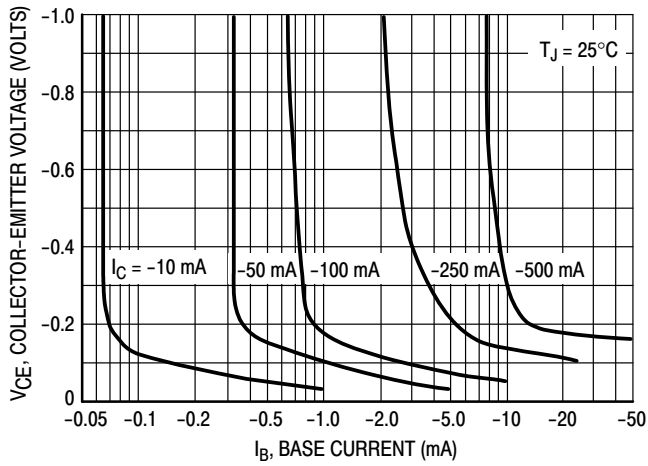


Figure 12. Collector Saturation Region

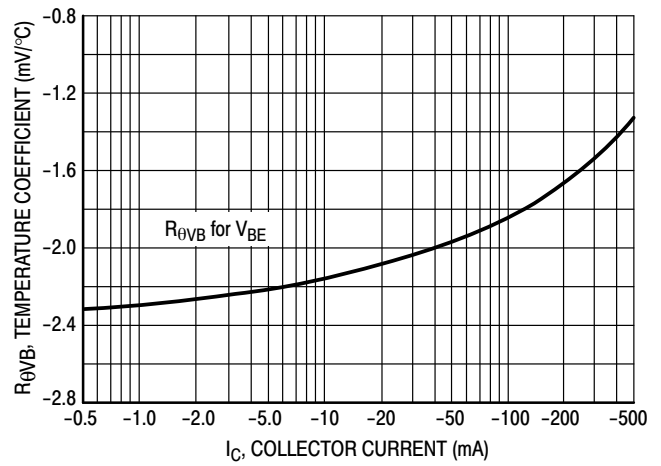
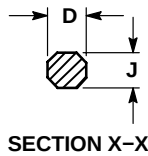
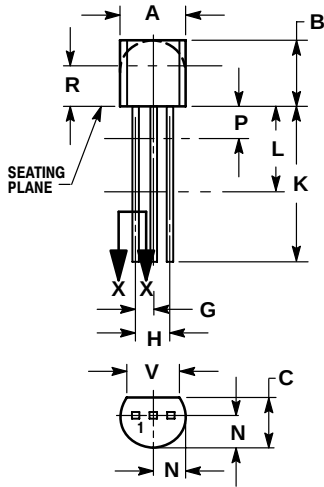


Figure 13. Base-Emitter Temperature Coefficient

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## PACKAGE DIMENSIONS

TO-92  
(TO-226)  
CASE 29-11  
ISSUE AL



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. 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  | 0.021 | 0.407       | 0.533 |
| E   | 0.045  | 0.055 | 1.15        | 1.39  |
| F   | 0.095  | 0.105 | 2.42        | 2.66  |
| G   | 0.015  | 0.020 | 0.39        | 0.50  |
| H   | 0.500  | ---   | 12.70       | ---   |
| I   | 0.250  | ---   | 6.35        | ---   |
| J   | 0.080  | 0.105 | 2.04        | 2.66  |
| K   | ---    | 0.100 | ---         | 2.54  |
| L   | 0.115  | ---   | 2.93        | ---   |
| M   | 0.135  | ---   | 3.43        | ---   |

### STYLE 17:

1. COLLECTOR
2. BASE
3. EMITTER

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