

BC489, A, B

High Current Transistors

NPN Silicon

Features

- Pb-Free Packages are Available*

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|----------------|-------------|----------------------------|
| Collector–Emitter Voltage | V_{CEO} | 80 | Vdc |
| Collector–Base Voltage | V_{CBO} | 80 | Vdc |
| Collector–Emitter Voltage | V_{EBO} | 5.0 | Vdc |
| Collector Current – Continuous | I_C | 0.5 | Adc |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $T_A = 25^\circ\text{C}$ | P_D | 625 5.0 | mW mW/ $^\circ\text{C}$ |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $T_A = 25^\circ\text{C}$ | P_D | 1.5 12 | W mW/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

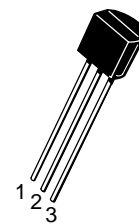
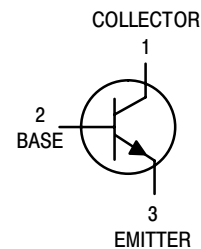
| Characteristic | Symbol | Max | Unit |
|---|-----------------|------|---------------------------|
| Thermal Resistance, Junction–to–Ambient | $R_{\theta JA}$ | 200 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction–to–Case | $R_{\theta JC}$ | 83.3 | $^\circ\text{C}/\text{W}$ |

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.



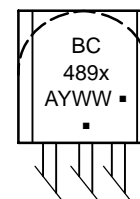
ON Semiconductor®

<http://onsemi.com>



TO-92
CASE 29
STYLE 17

MARKING DIAGRAM



BC489x = Device Code
x = A or B
A = Assembly Location
Y = Year
WW = Work Week
■ = 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.

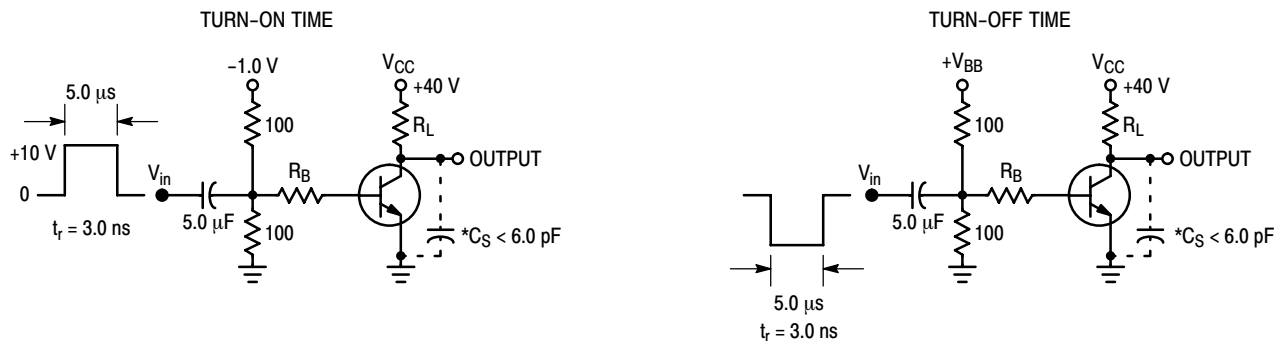
*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|---|------------------------------|---------------------------|-----------------------------|------|
| OFF CHARACTERISTICS | | | | | |
| Collector–Emitter Breakdown Voltage (Note 1) ($I_C = 10\text{ mA}$, $I_B = 0$) | $V_{(BR)CEO}$ | 80 | – | – | Vdc |
| Collector–Base Breakdown Voltage ($I_C = 100\text{ }\mu\text{A}$, $I_E = 0$) | $V_{(BR)CBO}$ | 80 | – | – | Vdc |
| Emitter–Base Breakdown Voltage ($I_E = 10\text{ }\mu\text{A}$, $I_C = 0$) | $V_{(BR)EBO}$ | 5.0 | – | – | Vdc |
| Collector Cutoff Current ($V_{CB} = 60\text{ V}$, $I_E = 0$) | I_{CBO} | – | – | 100 | nAdc |
| ON CHARACTERISTICS | | | | | |
| DC Current Gain ($I_C = 10\text{ mA}$, $V_{CE} = 2.0\text{ Vdc}$) ($I_C = 100\text{ mA}$, $V_{CE} = 2.0\text{ Vdc}$) ($I_C = 1.0\text{ Adc}$, $V_{CE} = 5.0\text{ Vdc}$) | h_{FE} BC489 BC489A BC489B | 40 60 100 160 15 | – – 160 260 – | – 400 250 400 – | – |
| Collector–Emitter Saturation Voltage ($I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$) ($I_C = 1.0\text{ Adc}$, $I_B = 100\text{ mA}$) | $V_{CE(sat)}$ | – – | 0.2 0.3 | 0.5 – | Vdc |
| Collector–Emitter Saturation Voltage ($I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$) ($I_C = 1.0\text{ Adc}$, $I_B = 100\text{ mA}$) (Note 1) | $V_{BE(sat)}$ | – – | 0.85 0.9 | 1.2 – | Vdc |
| DYNAMIC CHARACTERISTICS | | | | | |
| Current–Gain – Bandwidth Product ($I_C = 50\text{ mA}$, $V_{CE} = 2.0\text{ Vdc}$, $f = 100\text{ MHz}$) | f_T | – | 200 | – | MHz |
| Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$) | C_{ob} | – | 7.0 | – | pF |
| Input Capacitance ($V_{EB} = 0.5\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$) | C_{ib} | – | 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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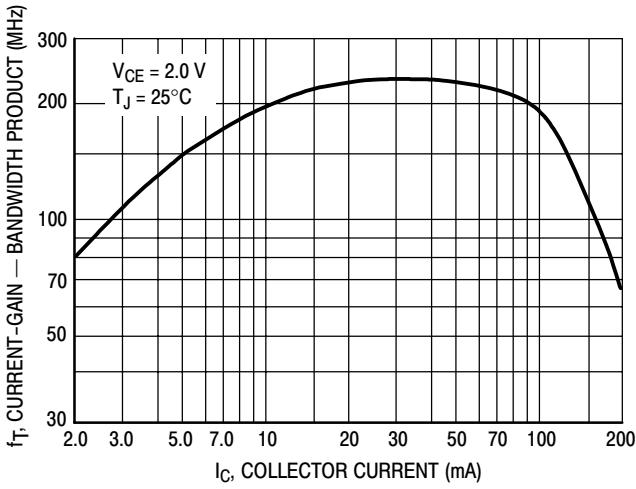


Figure 2. Current-Gain — Bandwidth Product

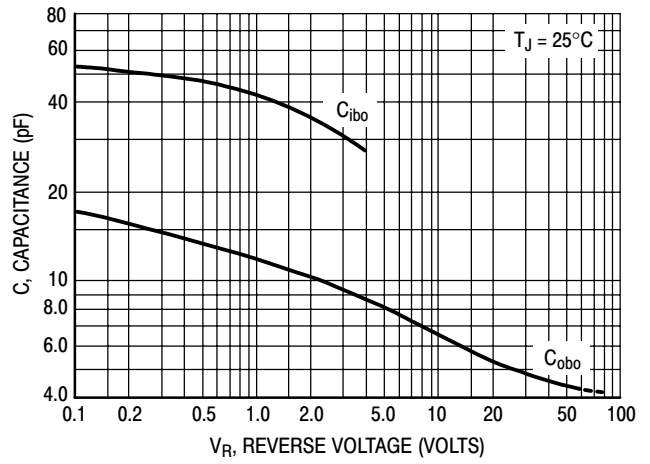


Figure 3. Capacitance

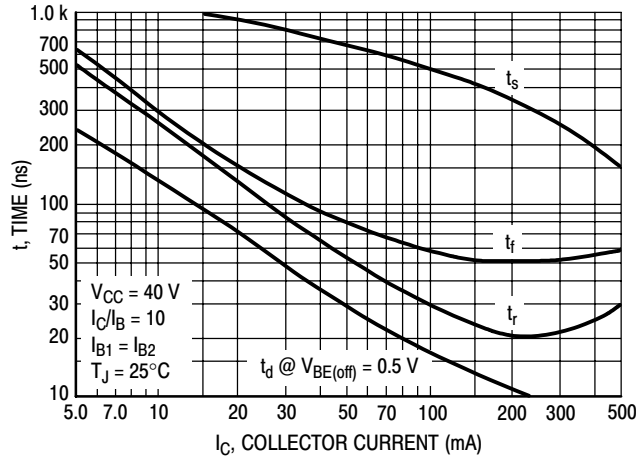


Figure 4. Switching Time

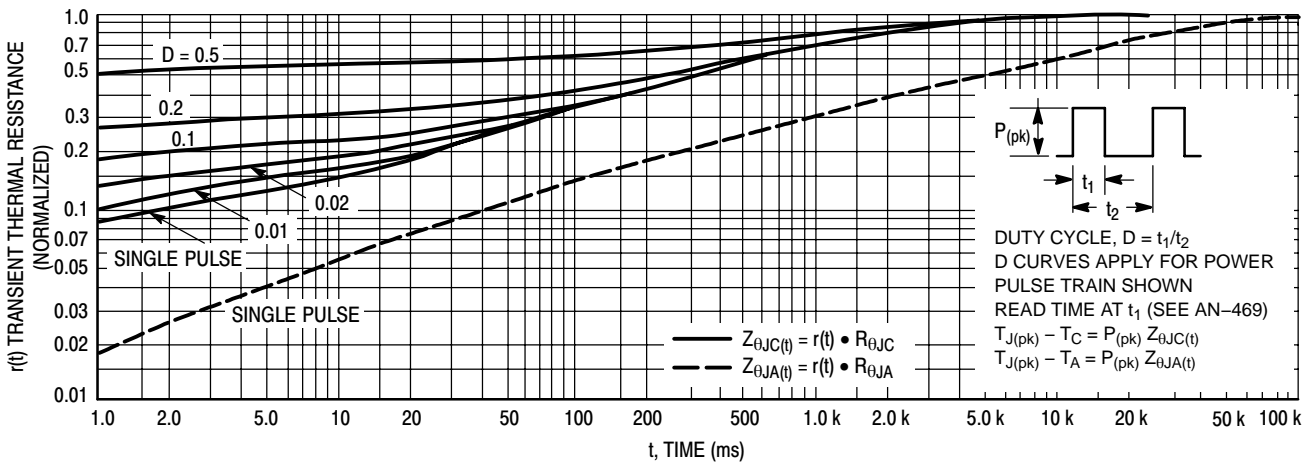


Figure 5. Thermal Response

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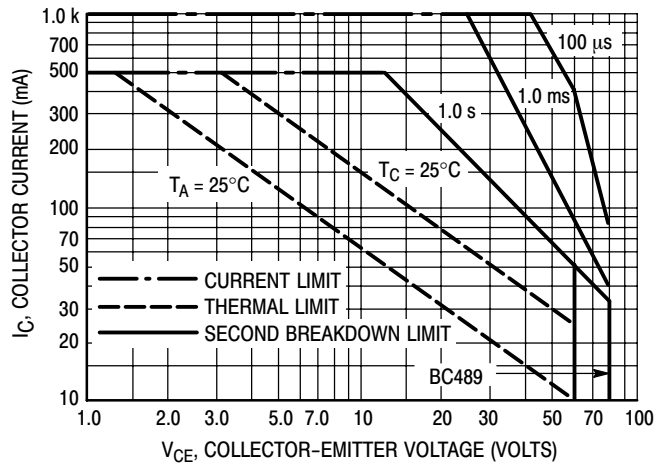


Figure 6. Active Region — Safe Operating Area

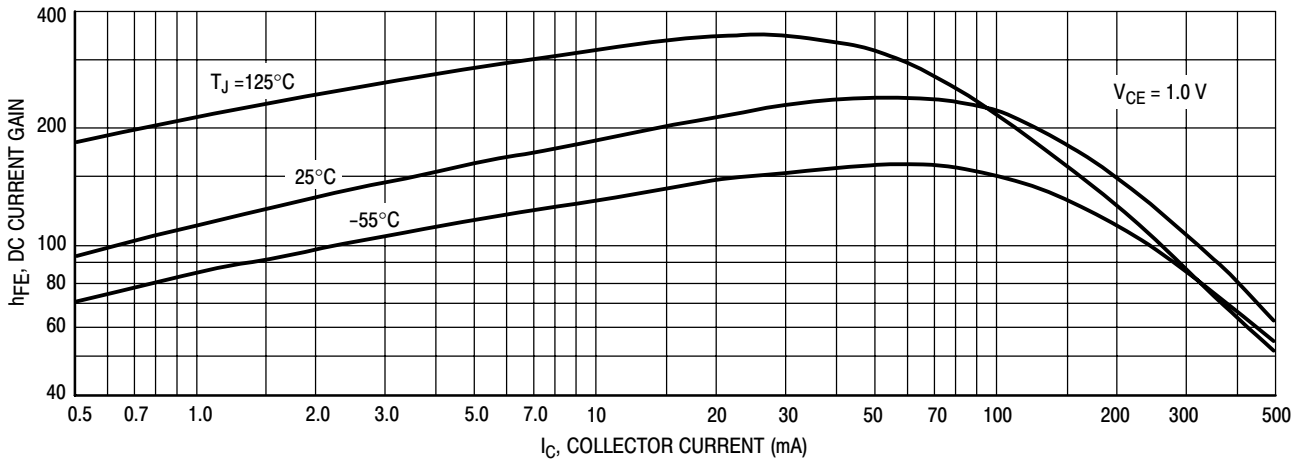


Figure 7. DC Current Gain

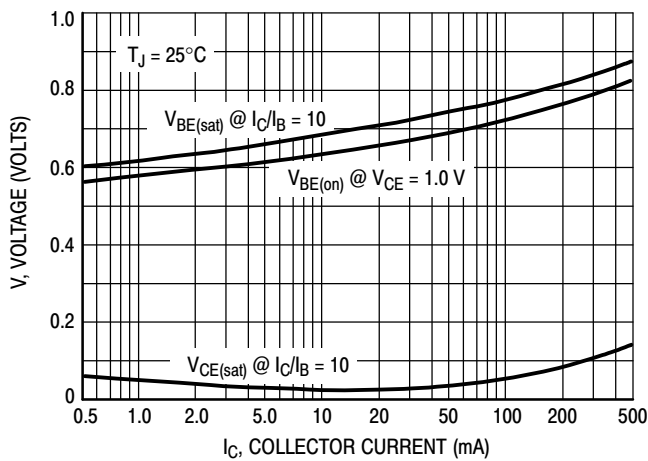


Figure 8. "On" Voltages

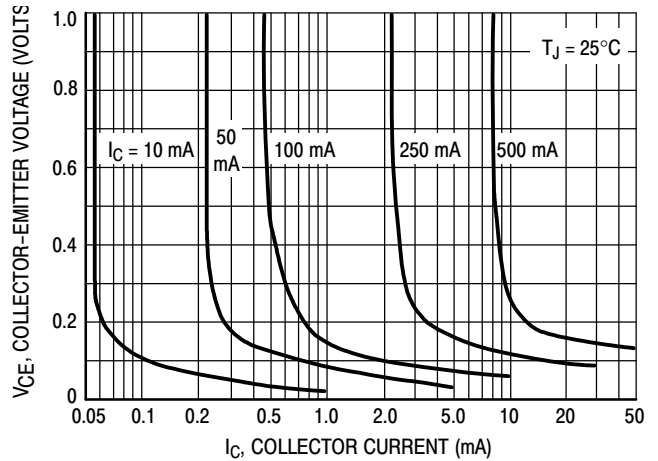


Figure 9. Collector Saturation Region

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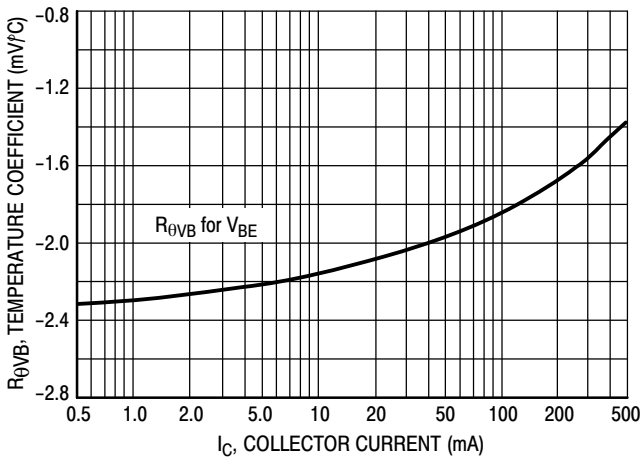


Figure 10. Base-Emitter Temperature Coefficient

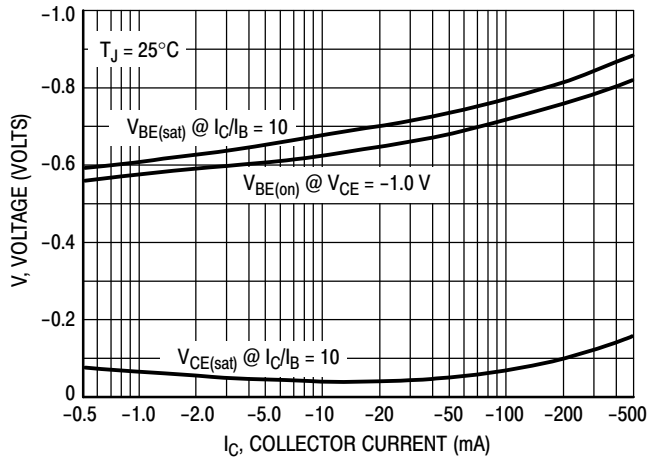


Figure 11. "On" Voltages

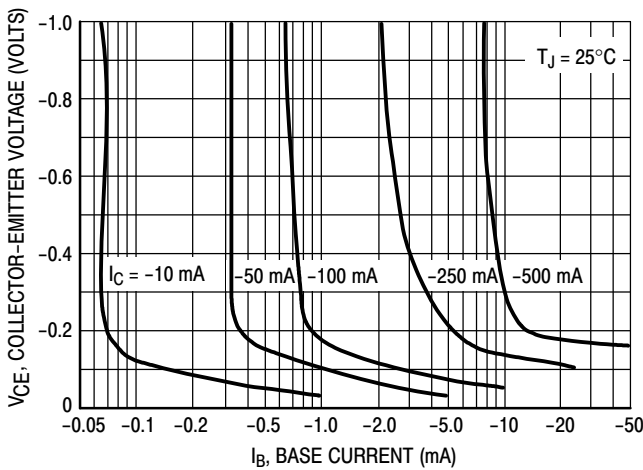


Figure 12. Collector Saturation Region

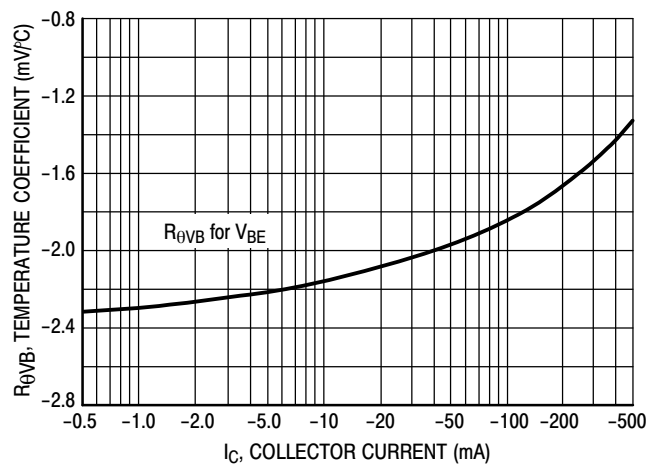


Figure 13. Base-Emitter Temperature Coefficient

ORDERING INFORMATION

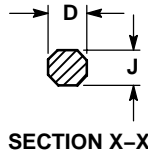
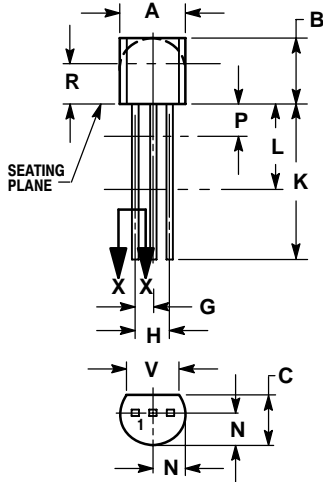
| Device Order Number | Package Type | Shipping [†] |
|---------------------|--------------------|------------------------|
| BC489 | TO-92 | 5000 Units / Bulk |
| BC489G | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC489RL1 | TO-92 | 2000 / Tape & Reel |
| BC489RL1G | TO-92 (Pb-Free) | 2000 / Tape & Reel |
| BC489A | TO-92 | 5000 Units / Bulk |
| BC489AG | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC489AZL1 | TO-92 | 2000 / Tape & Ammo Box |
| BC489AZL1G | TO-92 (Pb-Free) | 2000 / Tape & Ammo Box |
| BC489BZL1 | TO-92 | 2000 / Tape & Ammo Box |
| BC489BZL1G | TO-92 (Pb-Free) | 2000 / Tape & Ammo Box |

[†]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.

BC489, A, B

PACKAGE DIMENSIONS

TO-92 (TO-226AA)
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 |
| 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
- BASE
- EMITTER

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