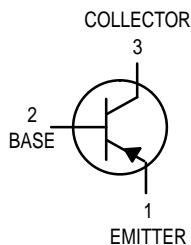
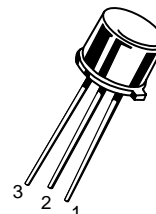


# General Purpose Transistors

## PNP Silicon



**2N4036**  
**2N4037**



CASE 79-04, STYLE 1  
TO-39 (TO-205AD)

### MAXIMUM RATINGS

| Rating   | Symbol         | 2N4036      | 2N4037      | Unit                          |
|--|----------------|-------------|-------------|-------------------------------|
| Collector–Emitter Voltage  | $V_{CEO}$      | -65         | -40         | Vdc                           |
| Collector–Base Voltage   | $V_{CBO}$      | -90         | -60         | Vdc                           |
| Emitter–Base Voltage   | $V_{EBO}$      | -7.0        | -7.0        | Vdc                           |
| Base Current   | $I_B$          | -0.5        |             | Adc                           |
| Collector Current — Continuous   | $I_C$          | -1.0        |             | Adc                           |
| Continuous Power Dissipation<br>at or Below $T_C = 25^\circ\text{C}$<br>Linear Derating Factor | $P_D$          | 5.0<br>28.6 | 5.0<br>28.6 | Watts<br>mW/ $^\circ\text{C}$ |
| Continuous Power Dissipation<br>at or Below $T_A = 25^\circ\text{C}$<br>Linear Derating Factor | $P_D$          | 1.0<br>5.72 | 1.0<br>5.72 | Watts<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range  | $T_J, T_{stg}$ | -65 to +200 |             | $^\circ\text{C}$              |
| Lead Temperature<br>1/16" from Case for 10 Seconds   | $T_L$          | 230         |             | $^\circ\text{C}$              |

### THERMAL CHARACTERISTICS

| Characteristic                       | Symbol          | 2N4036 | 2N4037 | Unit                      |
|--------------------------------------|-----------------|--------|--------|---------------------------|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 35     | 35     | $^\circ\text{C}/\text{W}$ |

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

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

### OFF CHARACTERISTICS

|   |                |            |               |                 |
|---|----------------|------------|---------------|-----------------|
| Collector–Emitter Sustaining Voltage <sup>(1)</sup><br>( $I_C = -100 \text{ mAdc}, I_B = 0$ )   | $V_{CEO(sus)}$ | -65<br>-40 | —<br>—        | Vdc             |
| Collector–Base Breakdown Voltage<br>( $I_C = -0.1 \text{ mAdc}$ )   | $V_{(BR)CBO}$  | -60        | —             | Vdc             |
| Collector Cutoff Current<br>( $V_{CE} = -85 \text{ Vdc}, V_{EB} = -1.5 \text{ Vdc}$ )<br>( $V_{CE} = -30 \text{ Vdc}, V_{EB} = -1.5 \text{ Vdc}, T_C = 150^\circ\text{C}$ ) | $I_{CEX}$      | —<br>—     | -0.1<br>-100  | mAdc            |
| Collector Cutoff Current<br>( $V_{CB} = -90 \text{ Vdc}, I_E = 0$ )<br>( $V_{CB} = -60 \text{ Vdc}, I_E = 0$ )  | $I_{CBO}$      | —<br>—     | -1.0<br>-0.25 | $\mu\text{Adc}$ |
| Emitter Cutoff Current<br>( $V_{EB} = -7.0 \text{ Vdc}, I_C = 0$ )<br>( $V_{EB} = -5.0 \text{ Vdc}, I_C = 0$ )  | $I_{EBO}$      | —<br>—     | -10<br>-1.0   | $\mu\text{Adc}$ |

1. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

**2N4036 2N4037**
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (Continued)

| Characteristic  |                  | Symbol               | Min    | Max           | Unit |
|---|------------------|----------------------|--------|---------------|------|
| <b>ON CHARACTERISTICS</b>   |                  |                      |        |               |      |
| DC Current Gain<br>( $I_C = -0.1\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )                                   | 2N4036           | hFE                  | 20     | —             | —    |
| ( $I_C = -1.0\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )  | 2N4037           |                      | 15     | —             | —    |
| ( $I_C = -150\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )(1)   | 2N4036           |                      | 40     | 140           | —    |
|   | 2N4037           |                      | 50     | 250           | —    |
| ( $I_C = -150\text{ mAdc}$ , $V_{CE} = -2.0\text{ Vdc}$ )(1)  | 2N4036           |                      | 20     | 200           | —    |
| ( $I_C = -500\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )(1)   | 2N4036           | 20                   | —      | —             | —    |
| Collector–Emitter Saturation Voltage <sup>(1)</sup><br>( $I_C = -150\text{ mAdc}$ , $I_B = -15\text{ mAdc}$ ) | 2N4036<br>2N4037 | $V_{CE(\text{sat})}$ | —<br>— | -0.65<br>-1.4 | Vdc  |
| Base–Emitter Saturation Voltage <sup>(1)</sup><br>( $I_C = -150\text{ mAdc}$ , $I_B = -15\text{ mAdc}$ )      | 2N4036           | $V_{BE(\text{sat})}$ | —      | -1.4          | Vdc  |
| Base–Emitter On Voltage <sup>(1)</sup><br>( $I_C = -150\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )            | 2N4037           | $V_{BE(\text{on})}$  | —      | -1.5          | Vdc  |

**SMALL–SIGNAL CHARACTERISTICS**

|  |                  |            |            |         |    |
|--|------------------|------------|------------|---------|----|
| Collector–Base Capacitance<br>( $V_{CB} = -10\text{ Vdc}$ , $f = 1.0\text{ MHz}$ )                             | 2N4037           | $C_{cb}$   | —          | 30      | pF |
| Current Gain — High Frequency<br>( $I_C = -50\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ , $f = 20\text{ MHz}$ ) | 2N4036<br>2N4037 | $ h_{fe} $ | 3.0<br>3.0 | —<br>10 | —  |

**SWITCHING CHARACTERISTICS**

|  |        |           |   |     |    |
|--|--------|-----------|---|-----|----|
| Rise Time<br>( $I_{B1} = -15\text{ mAdc}$ )    | 2N4036 | $t_r$     | — | 70  | ns |
| Storage Time<br>( $I_{B2} = -15\text{ mAdc}$ ) | 2N4036 | $t_s$     | — | 600 | ns |
| Fall Time<br>( $I_{B2} = -15\text{ mAdc}$ )    | 2N4036 | $t_f$     | — | 100 | ns |
| Turn–On Time<br>( $I_{B1} = I_{B2}$ )          | 2N4036 | $t_{on}$  | — | 110 | ns |
| Turn–Off Time<br>( $I_{B1} = I_{B2}$ )         | 2N4036 | $t_{off}$ | — | 700 | ns |

1. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

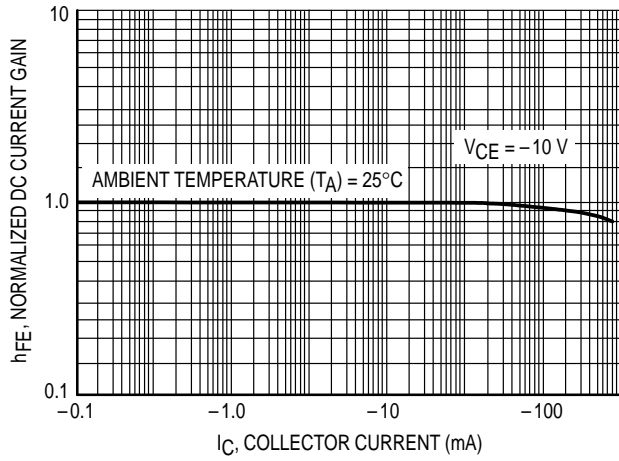


Figure 1. Current Gain Characteristics versus Collector-Emitter Voltage

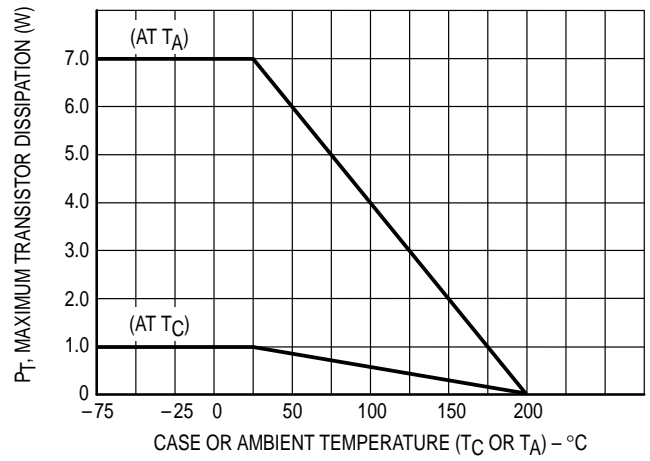


Figure 2. Dissipation Derating Curve

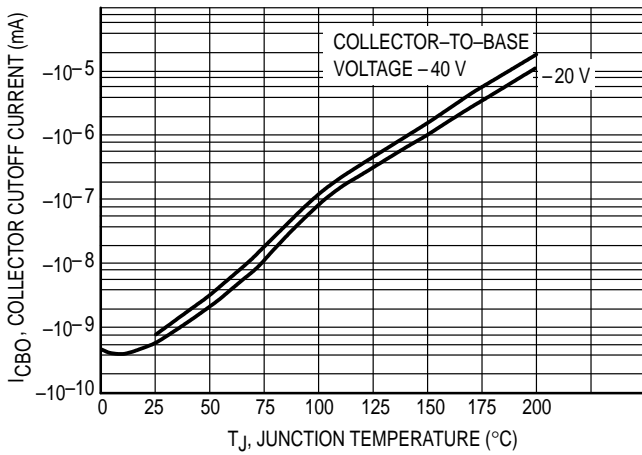


Figure 3. Typical Collector-Cutoff Current versus Junction Temperature

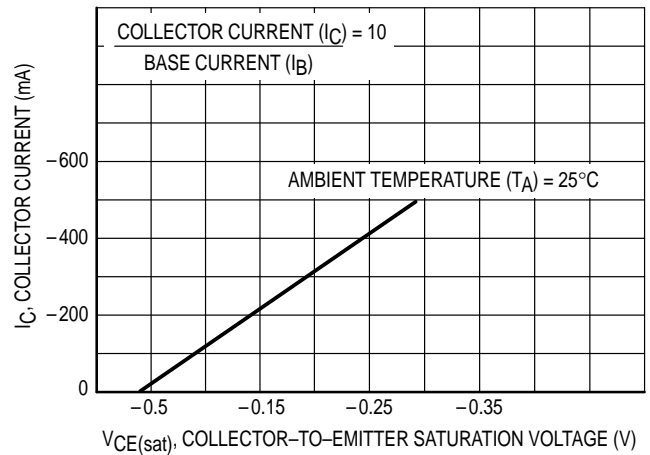


Figure 4. Typical Saturation-Voltage Characteristics

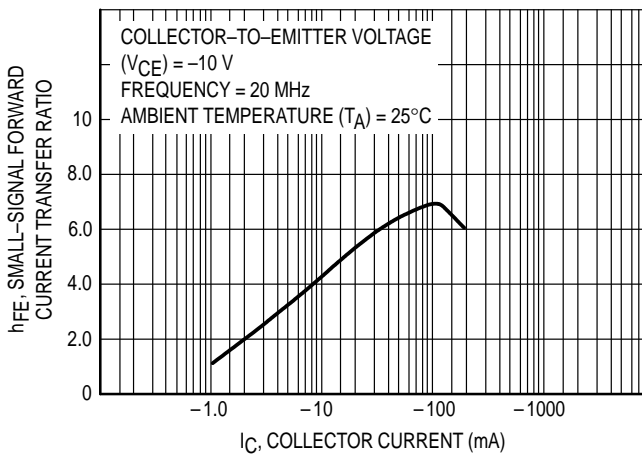


Figure 5. Typical Small-Signal Beta Characteristics

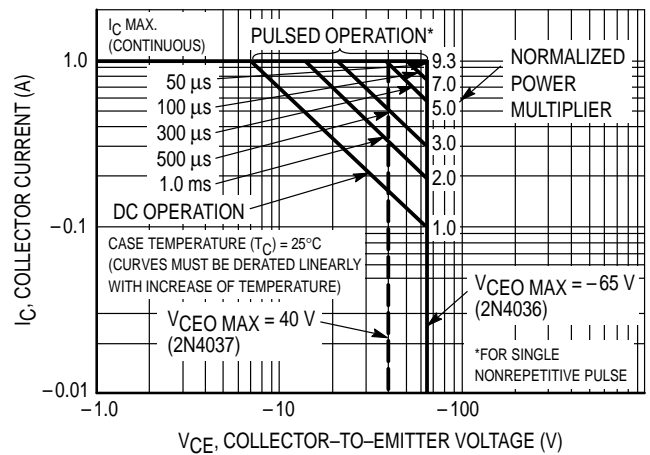
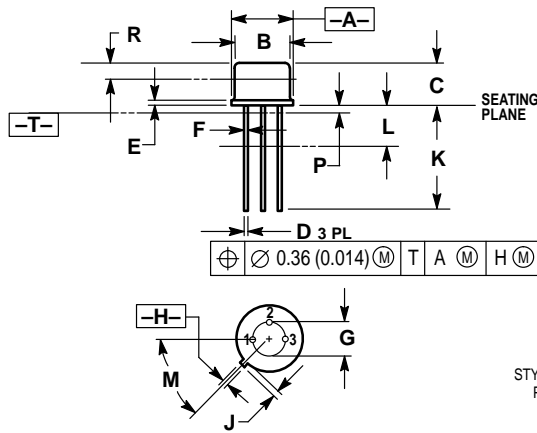


Figure 6. Maximum Safe Operating Areas (SOA)

PACKAGE DIMENSIONS



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION J MEASURED FROM DIMENSION A MAXIMUM.
  4. DIMENSION B SHALL NOT VARY MORE THAN 0.25 (0.010) IN ZONE R. THIS ZONE CONTROLLED FOR AUTOMATIC HANDLING.
  5. DIMENSION F APPLIES BETWEEN DIMENSION P AND L. DIMENSION D APPLIES BETWEEN DIMENSION L AND K MINIMUM. LEAD DIAMETER IS UNCONTROLLED IN DIMENSION P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.335     | 0.370 | 8.51        | 9.39  |
| B   | 0.305     | 0.335 | 7.75        | 8.50  |
| C   | 0.240     | 0.260 | 6.10        | 6.60  |
| D   | 0.016     | 0.021 | 0.41        | 0.53  |
| E   | 0.009     | 0.041 | 0.23        | 1.04  |
| F   | 0.016     | 0.019 | 0.41        | 0.48  |
| G   | 0.200 BSC |       | 5.08 BSC    |       |
| H   | 0.028     | 0.034 | 0.72        | 0.86  |
| J   | 0.029     | 0.045 | 0.74        | 1.14  |
| K   | 0.500     | 0.750 | 12.70       | 19.05 |
| L   | 0.250     | —     | 6.35        | —     |
| M   | 45° BSC   |       | 45° BSC     |       |
| P   | —         | 0.050 | —           | 1.27  |
| R   | 0.100     | —     | 2.54        | —     |

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

CASE 079-04  
(TO-205AD)  
ISSUE N

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