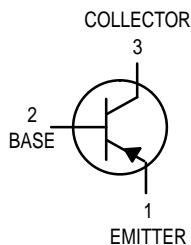
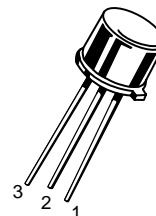


# General Purpose Transistors

## 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 at or Below $T_C = 25^\circ\text{C}$ Linear Derating Factor	$P_D$	5.0 28.6	5.0 28.6	Watts mW/ $^\circ\text{C}$
Continuous Power Dissipation at or Below $T_A = 25^\circ\text{C}$ Linear Derating Factor	$P_D$	1.0 5.72	1.0 5.72	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200		$^\circ\text{C}$
Lead Temperature 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
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### OFF CHARACTERISTICS

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

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 ( $I_C = -0.1\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )	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> ( $I_C = -150\text{ mAdc}$ , $I_B = -15\text{ mAdc}$ )	2N4036 2N4037	$V_{CE(\text{sat})}$	— —	-0.65 -1.4	Vdc
Base–Emitter Saturation Voltage <sup>(1)</sup> ( $I_C = -150\text{ mAdc}$ , $I_B = -15\text{ mAdc}$ )	2N4036	$V_{BE(\text{sat})}$	—	-1.4	Vdc
Base–Emitter On Voltage <sup>(1)</sup> ( $I_C = -150\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )	2N4037	$V_{BE(\text{on})}$	—	-1.5	Vdc

### SMALL–SIGNAL CHARACTERISTICS

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

### SWITCHING CHARACTERISTICS

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

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

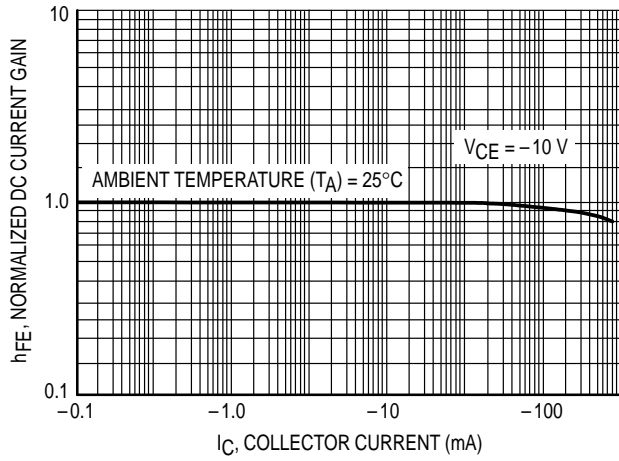


Figure 1. Current Gain Characteristics versus Collector-Emitter Voltage

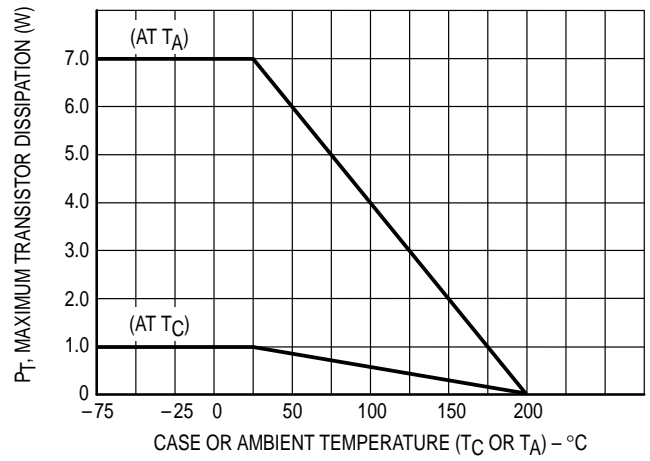


Figure 2. Dissipation Derating Curve

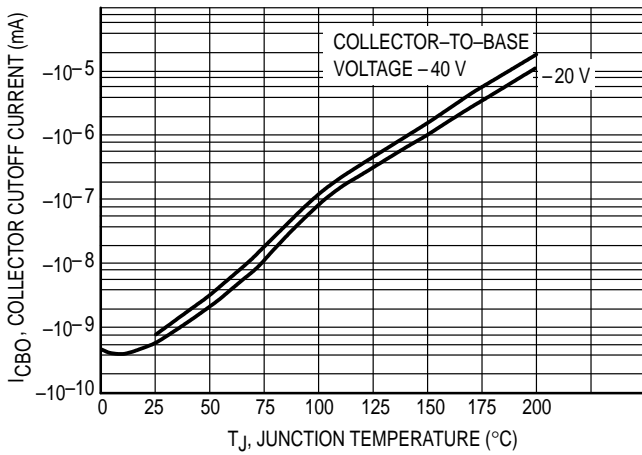


Figure 3. Typical Collector-Cutoff Current versus Junction Temperature

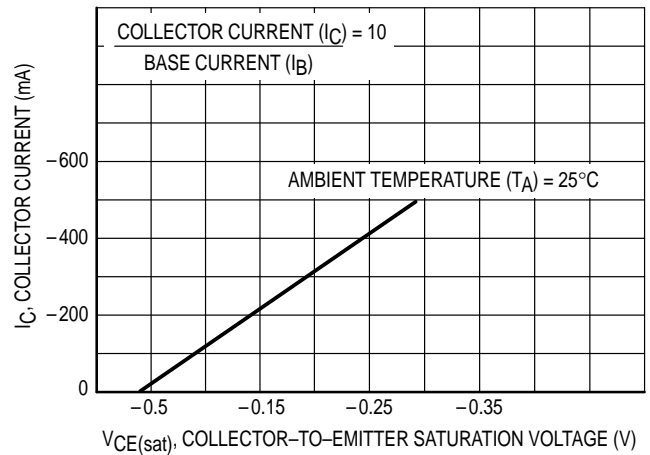


Figure 4. Typical Saturation-Voltage Characteristics

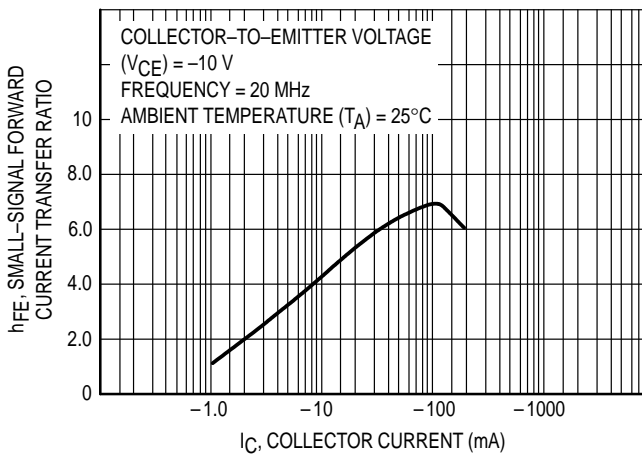


Figure 5. Typical Small-Signal Beta Characteristics

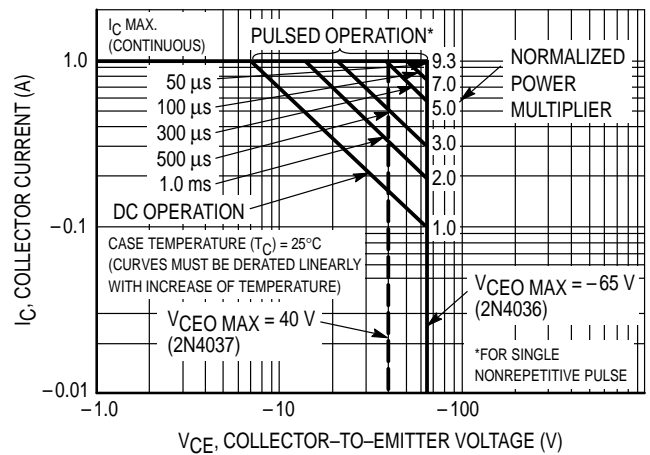
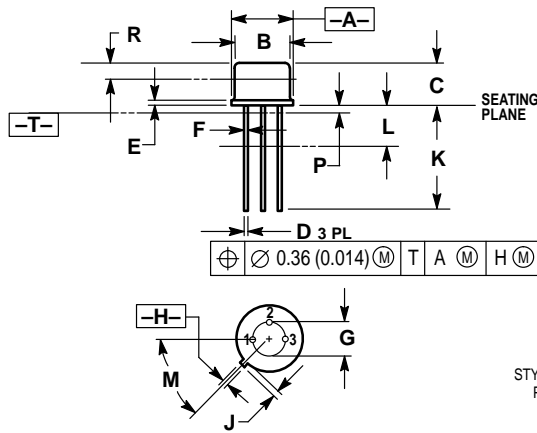


Figure 6. Maximum Safe Operating Areas (SOA)

PACKAGE DIMENSIONS



$\oplus \text{ } \varnothing 0.36 (0.014) \text{ (M) T A (M) H (M)}$

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

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

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	—

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