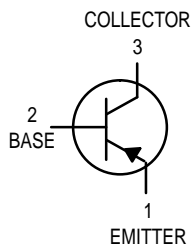
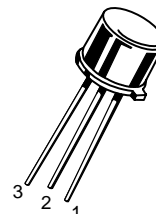


General Purpose Transistors

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/°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/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		°C
Lead Temperature 1/16" from Case for 10 Seconds	T_L	230		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	2N4036	2N4037	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	35	35	°C/W

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

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

OFF CHARACTERISTICS

Collector–Emitter Sustaining Voltage ⁽¹⁾ ($I_C = -100 \text{ mAdc}, I_B = 0$)	$V_{CEO(sus)}$	-65 -40	— —	Vdc
Collector–Base Breakdown Voltage ($I_C = -0.1 \text{ mAdc}$)	$V_{(BR)CBO}$	-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	mAdc
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	μAdc
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	μAdc

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
ON CHARACTERISTICS					
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 ⁽¹⁾ ($I_C = -150\text{ mAdc}$, $I_B = -15\text{ mAdc}$)	2N4036 2N4037	$V_{CE(\text{sat})}$	— —	-0.65 -1.4	Vdc
Base–Emitter Saturation Voltage ⁽¹⁾ ($I_C = -150\text{ mAdc}$, $I_B = -15\text{ mAdc}$)	2N4036	$V_{BE(\text{sat})}$	—	-1.4	Vdc
Base–Emitter On Voltage ⁽¹⁾ ($I_C = -150\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$)	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 $\leq 2.0\%$.

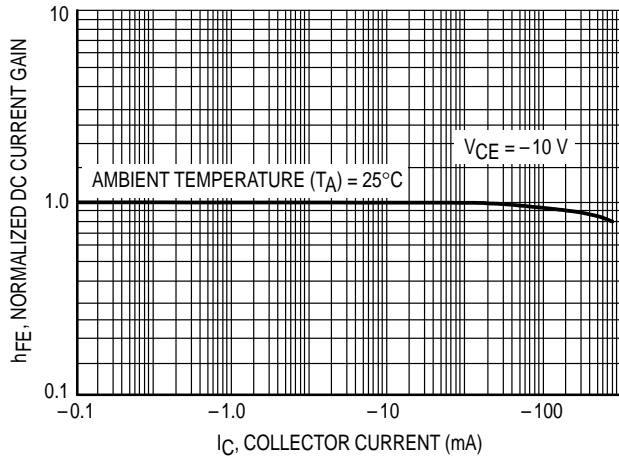


Figure 1. Current Gain Characteristics versus Collector-Emitter Voltage

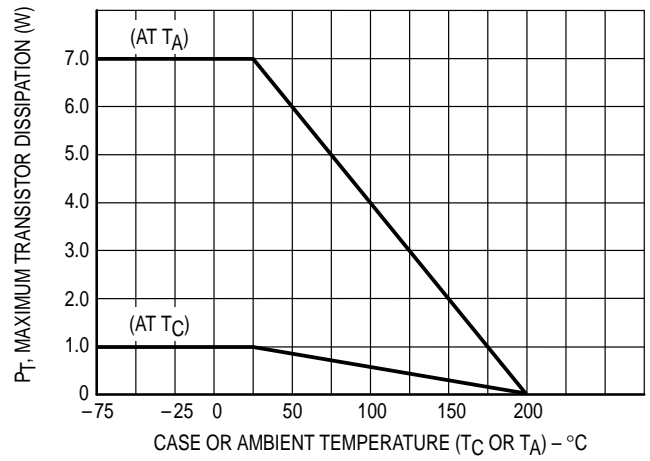


Figure 2. Dissipation Derating Curve

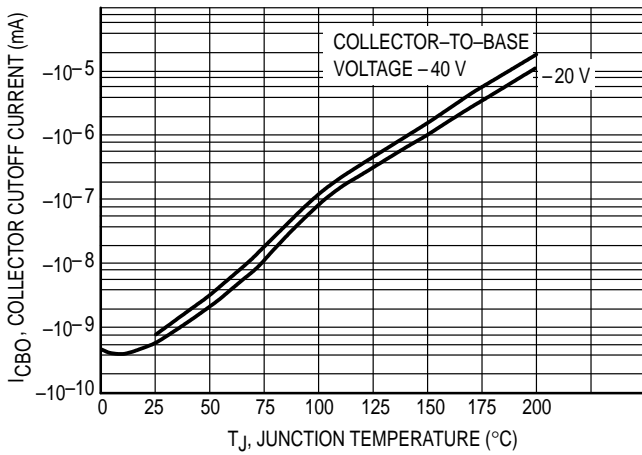


Figure 3. Typical Collector-Cutoff Current versus Junction Temperature

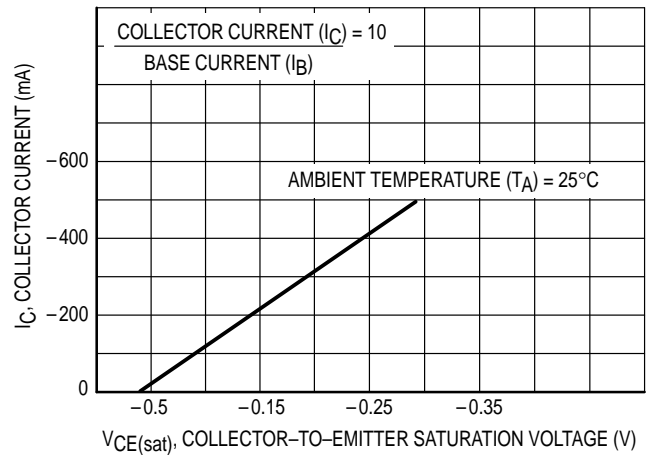


Figure 4. Typical Saturation-Voltage Characteristics

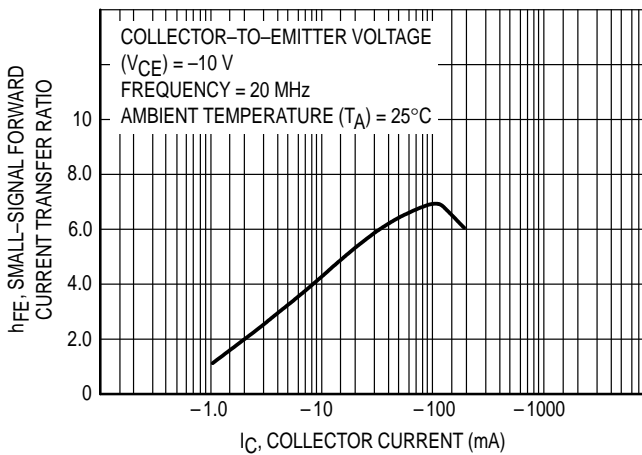


Figure 5. Typical Small-Signal Beta Characteristics

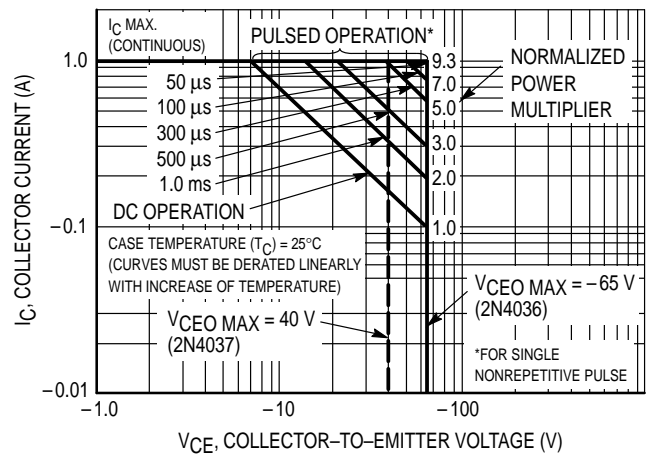
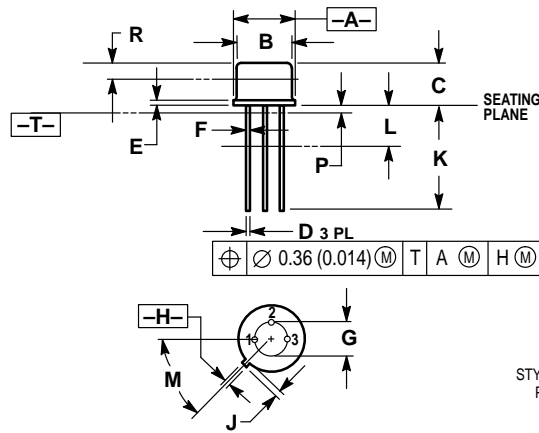


Figure 6. Maximum Safe Operating Areas (SOA)

PACKAGE DIMENSIONS



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	—

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

Mfax is a trademark of Motorola, Inc.

How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
 P.O. Box 5405, Denver, Colorado 80217. 303-675-2140 or 1-800-441-2447

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, 6F Seibu-Butsuryu-Center,
 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 81-3-3521-8315

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 602-244-6609
 INTERNET: http://Design-NET.com

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

