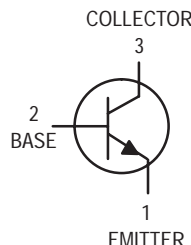
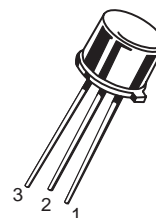


# General Purpose Transistor

## NPN Silicon



**2N1711**



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

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CE}$	50	Vdc
Collector–Base Voltage	$V_{CB}$	75	Vdc
Emitter–Base Voltage	$V_{EB}$	7.0	Vdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	800 4.57	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	3.0 17.15	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–65 to +200	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	58	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	219	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ( $I_C = 100\text{ mAdc}$ , pulsed; $R_{BE} \leq 10\ \Omega$ )(1)	$V_{CE(sus)}$	50	—	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 100\ \mu\text{Adc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	75	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 100\ \mu\text{Adc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	7.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 60\text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 60\text{ Vdc}$ , $I_E = 0$ , $T_A = 150^\circ\text{C}$ )	$I_{CBO}$	— —	0.001 —	0.01 10	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{EB} = 5.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	—	—	0.005	$\mu\text{Adc}$

### ON CHARACTERISTICS

DC Current Gain ( $I_C = 0.01\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 0.1\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $T_A = -55^\circ\text{C}$ ) ( $I_C = 150\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )(1) ( $I_C = 500\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )(1)	$h_{FE}$	20 35 75 35 100 40	— — — — — —	— — — — 300 —	—
Collector–Emitter Saturation Voltage(1) ( $I_C = 150\text{ mAdc}$ , $I_B = 15\text{ mAdc}$ )	$V_{CE(sat)}$	—	0.24	1.5	Vdc
Base–Emitter Saturation Voltage(1) ( $I_C = 150\text{ mAdc}$ , $I_B = 15\text{ mAdc}$ )	$V_{BE(sat)}$	—	1.0	1.3	Vdc

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

(Replaces 2N718A/D)



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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Current-Gain — Bandwidth Product ( $I_C = 50\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 20\text{ MHz}$ )	$f_T$	70	300	—	MHz
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{obo}$	—	4.0	25	pF
Input Capacitance ( $V_{EB} = 0.5\text{ Vdc}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ibo}$	—	20	80	pF
Input Impedance ( $I_C = 1.0\text{ mA}$ , $V_{CB} = 5.0\text{ Vdc}$ , $f = 1.0\text{ kHz}$ ) ( $I_C = 5.0\text{ mA}$ , $V_{CB} = 10\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )	$h_{ib}$	24 4.0	— —	34 8.0	$\Omega$
Voltage Feedback Ratio ( $I_C = 1.0\text{ mA}$ , $V_{CB} = 5.0\text{ Vdc}$ , $f = 1.0\text{ kHz}$ ) ( $I_C = 5.0\text{ mA}$ , $V_{CB} = 10\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )	$h_{rb}$	— —	— —	5.0 5.0	$\times 10^{-4}$
Small-Signal Current Gain ( $I_C = 1.0\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ , $f = 1.0\text{ kHz}$ ) ( $I_C = 5.0\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )	$h_{fe}$	50 70	— —	200 300	—
Output Admittance ( $I_C = 1.0\text{ mA}$ , $V_{CB} = 5.0\text{ Vdc}$ , $f = 1.0\text{ kHz}$ ) ( $I_C = 5.0\text{ mA}$ , $V_{CB} = 10\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )	$h_{ob}$	0.05 0.05	— —	0.5 0.5	$\mu\text{mhos}$
Noise Figure ( $I_C = 300\text{ }\mu\text{A}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )	NF	—	—	8.0	dB

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

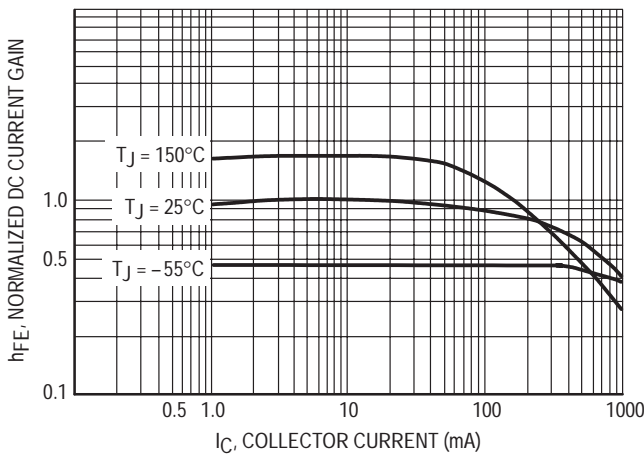


Figure 1. DC Current Gain

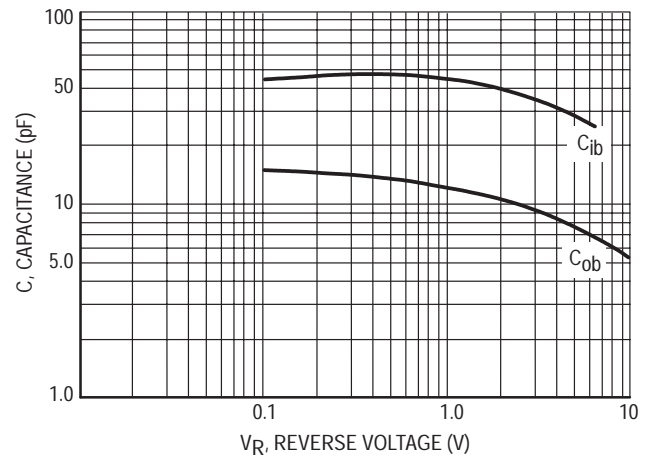


Figure 2. Capacitance

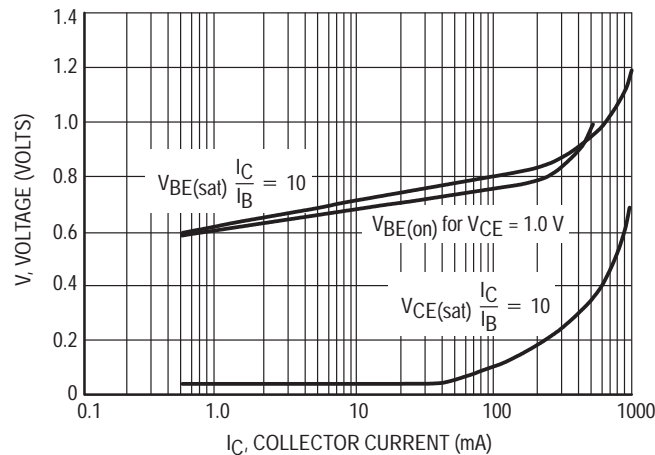


Figure 3. "On" Voltages

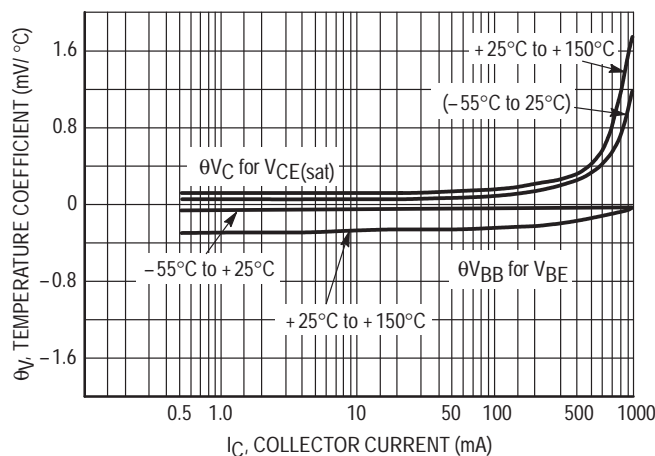


Figure 4. Temperature Coefficients

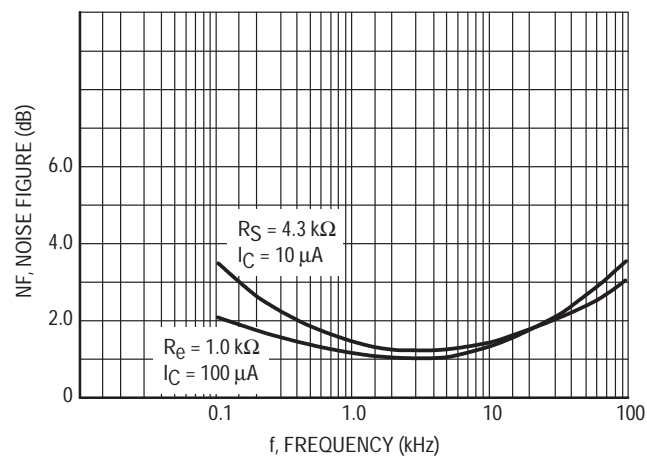


Figure 5. Frequency Effects

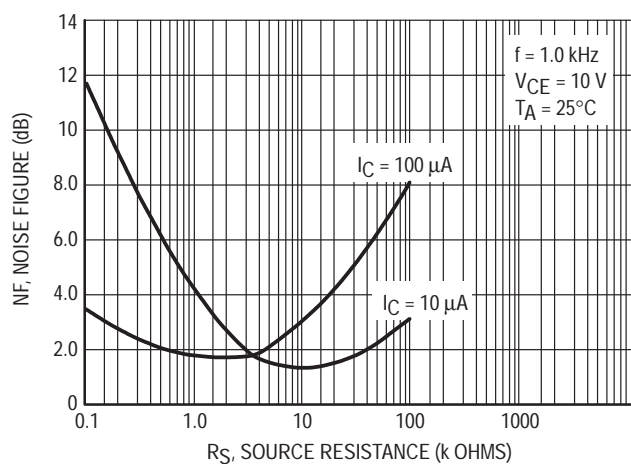


Figure 6. Source Resistance Effects

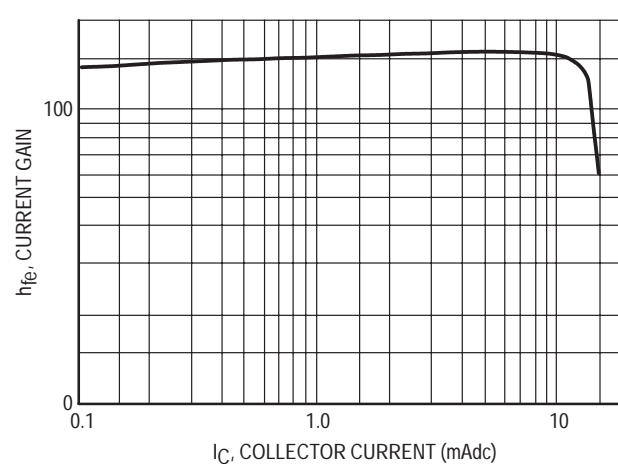
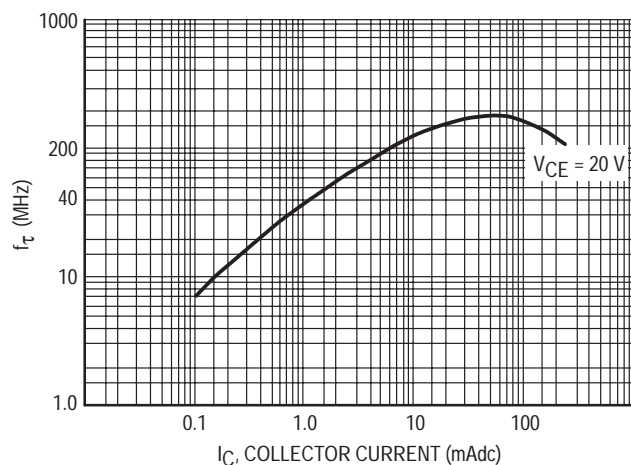
Figure 7. Current Gain Bandwidth Product versus Collector Current — 1.0 kHz  $h_{fe}$ 

Figure 8. Current Gain — Bandwidth Product

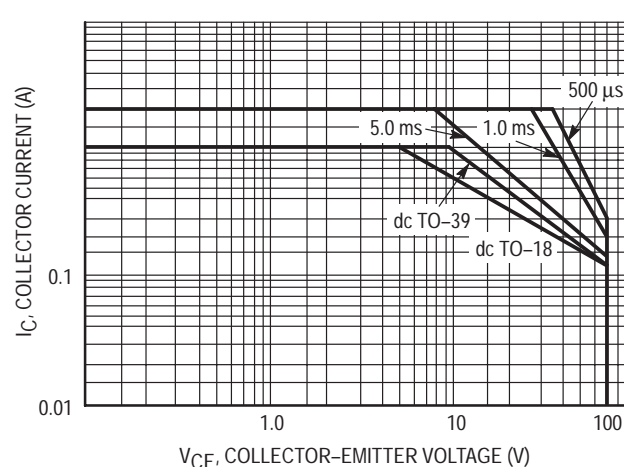
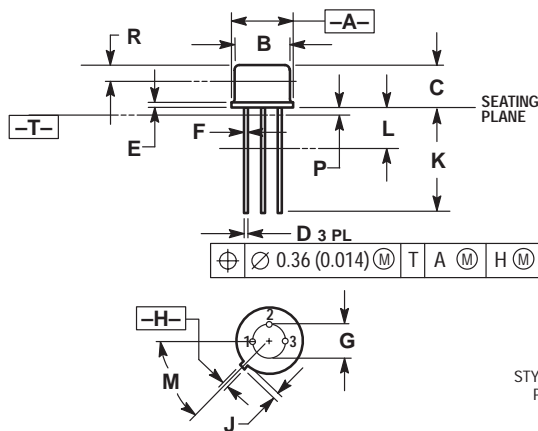


Figure 9. Active Region Safe Operating Area

## 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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