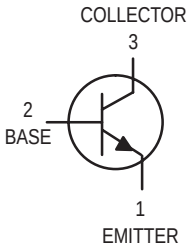
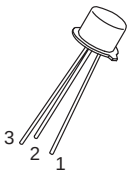
General Purpose Transistor

NPN Silicon

2N2896





CASE 22–03, STYLE 1
TO–18 (TO–206AA)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	90	Vdc
Collector–Emitter Voltage	V_{CER}	140	Vdc
Collector–Base Voltage	V_{CBO}	140	Vdc
Emitter–Base Voltage	V_{EBO}	7.0	Vdc
Collector Current — Continuous	I_C	1.0	Adc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	0.5 2.86	Watts mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.8 10.3	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–65 to +200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	350	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	97	°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Breakdown Voltage (I_C = 100 mAdc, R_{BE} = 10 Ω)[1]	$V_{(BR)CER}$	140	—	Vdc
Collector–Emitter Sustaining Voltage (I_C = 100 mAdc, I_B = 0)[1]	$V_{CEO(sus)}$	90	—	Vdc
Collector –Base Breakdown Voltage (I_C = 0.1 mAdc, I_E = 0)	$V_{(BR)CBO}$	120	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 0.1 mAdc, I_C = 0)	$V_{(BR)EBO}$	7.0	—	Vdc
Collector Cutoff Current (V_{CB} = 60 Vdc, I_C = 0) (V_{CB} = 90 Vdc, I_E = 0) (V_{CB} = 90 Vdc, I_E = 0, T_A = +150°C)	I_{CBO}	— — —	0.01 0.01 10	μAdc
Emitter Cutoff Current (V_{EB} = 5.0 Vdc, I_C = 0)	I_{EBO}	—	0.01	μAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = 1.0 mAdc, V_{CE} = 10 Vdc) (I_C = 10 mAdc, V_{CE} = 10 Vdc, T_A = –55°C) (I_C = 150 mAdc, V_{CE} = 10 Vdc)[1]	h_{FE}	 35 20 60	 — — 200	—
Collector–Emitter Saturation Voltage (I_C = 150 mAdc, I_B = 15 mAdc)[1]	$V_{CE(sat)}$	—	0.6	Vdc
Base–Emitter Saturation Voltage (I_C = 150 mAdc, I_B = 15 Adc)[1]	$V_{BE(sat)}$	—	1.2	Vdc

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 1.8%.

(Replaces 2N2895/D)

MOTOROLA

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
SMALL–SIGNAL CHARACTERISTICS				
Current–Gain — Bandwidth Product (I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	f_T	120	—	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)	C_{obo}	—	15	pF
Input Capacitance (V_{EB} = 0.5 Vdc, I_C = 0, f = 1.0 MHz)	C_{ibo}	—	80	pF
Small–Signal Current Gain (I_C = 5.0 mAdc, V_{CE} = 5.0 Vdc, f = 1.0 kHz)	h_{fe}	50	275	—
Noise Figure (I_C = 0.3 mAdc, V_{CE} = 10 Vdc, R_S = 500 Ω, f = 1.0 kHz)	NF	—	8.0	dB

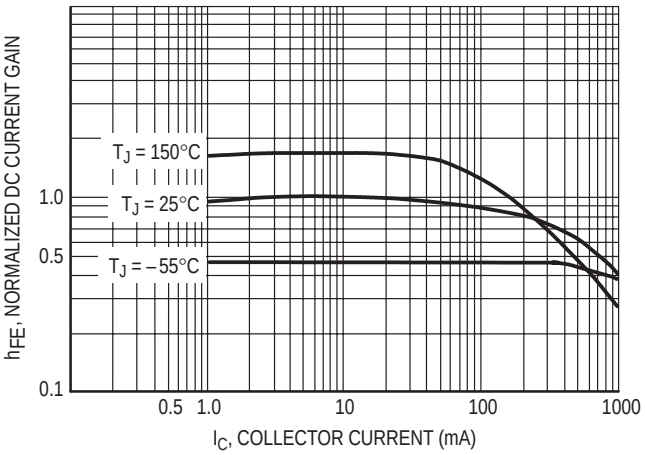


Figure 1. DC Current Gain

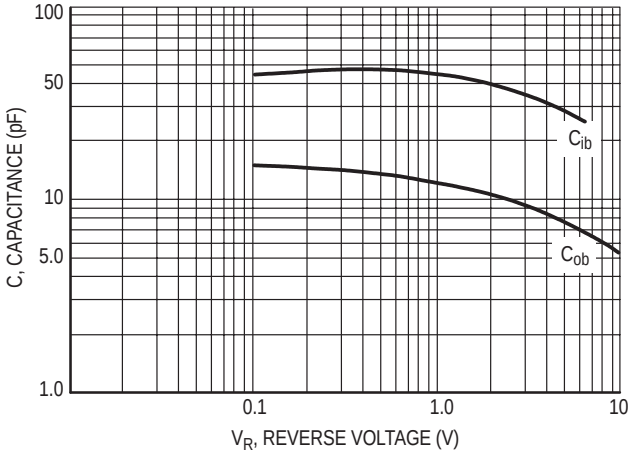


Figure 2. Capacitance

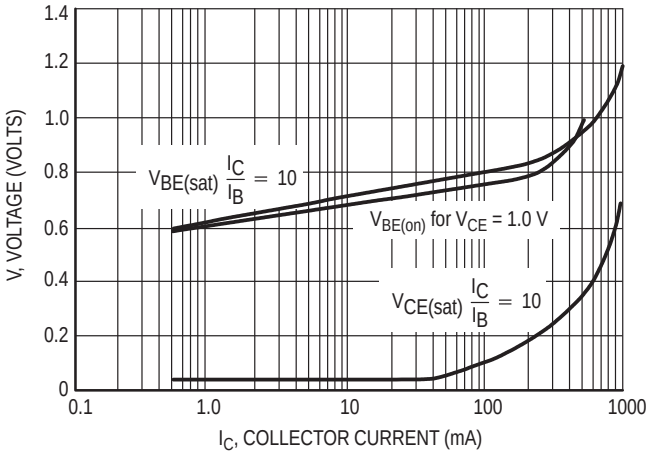


Figure 3. “On” Voltages

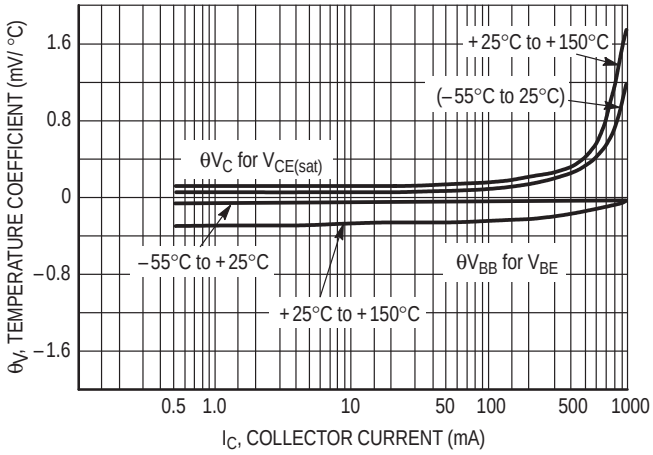


Figure 4. Temperature Coefficients

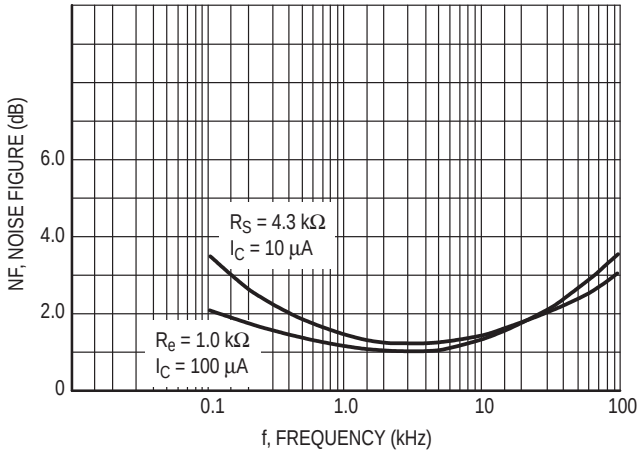


Figure 5. Frequency Effects

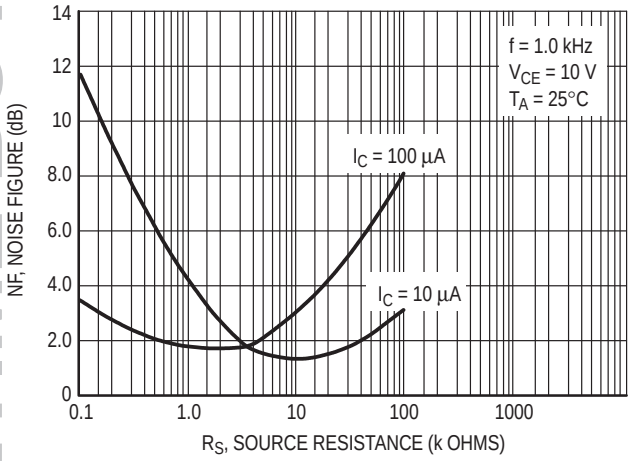


Figure 6. Source Resistance Effects

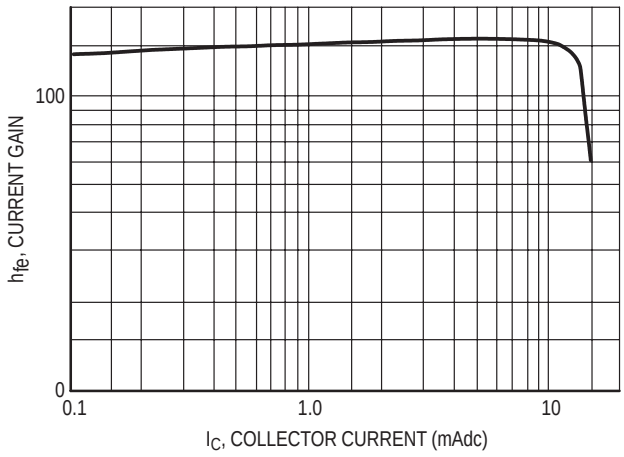


Figure 7. Current Gain Bandwidth Product versus Collector Current — 1.0 kHz h_{fe}

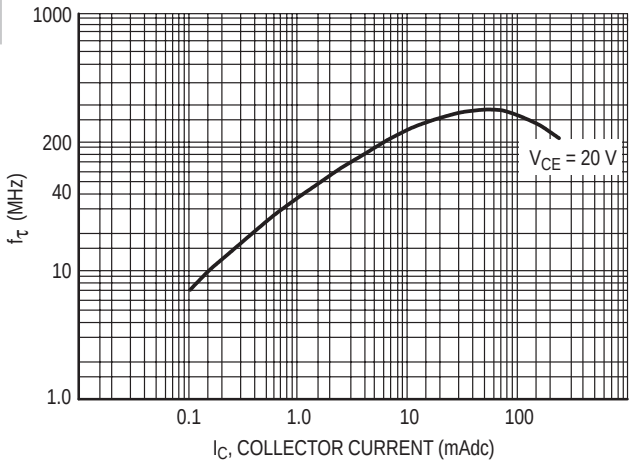


Figure 8. Current Gain — Bandwidth Product

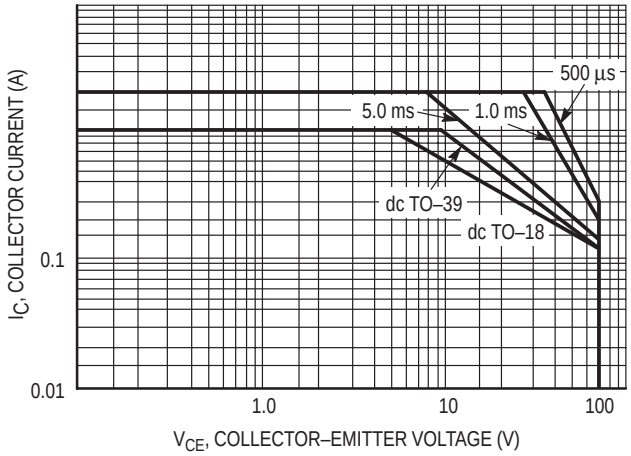
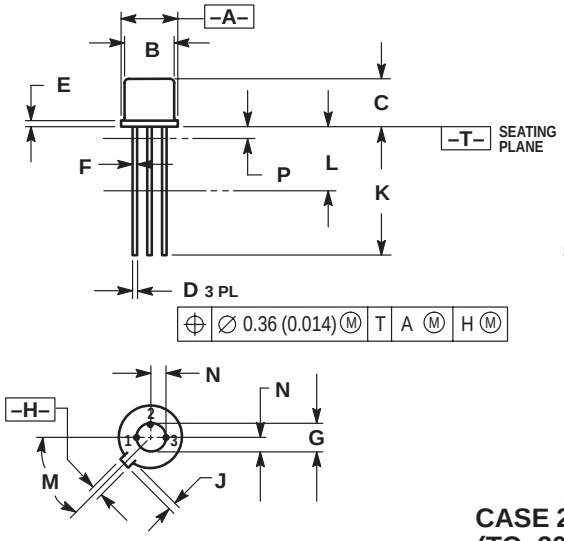


Figure 9. Active Region Safe Operating Area

PACKAGE DIMENSIONS



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

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION J MEASURED FROM DIMENSION A MAXIMUM.
4. 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.
5. DIMENSION E INCLUDES THE TAB THICKNESS. (TAB THICKNESS IS 0.51(0.002) MAXIMUM).

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.209	0.230	5.31	5.84
B	0.178	0.195	4.52	4.95
C	0.170	0.210	4.32	5.33
D	0.016	0.021	0.406	0.533
E	—	0.030	—	0.762
F	0.016	0.019	0.406	0.483
G	0.100 BSC		2.54 BSC	
H	0.036	0.046	0.914	1.17
J	0.028	0.048	0.711	1.22
K	0.500	—	12.70	—
L	0.250	—	6.35	—
M	45 °BSC		45 °BSC	
N	0.050 BSC		1.27 BSC	
P	—	0.050	—	1.27

CASE 22–03
(TO–206AA)
ISSUE R

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