

2N3251AJAN, JTX

Processed per MIL-S-19500/323

PNP Silicon

Small-Signal Transistors



...designed for general-purpose switching and amplifier applications.

MAXIMUM RATINGS			
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	60	Vdc
Collector-Base Voltage	V_{CBO}	60	Vdc
Emitter-Base Voltage	V_{EBO}	5.0	Vdc
Collector Current	I_C	200	mA dc
Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	0.36 2.06 1.2 6.9	Watts mW/ $^\circ\text{C}$ Watts mW/ $^\circ\text{C}$
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 65 to 200	$^\circ\text{C}$



CASE 22-03, STYLE 1
TO-206AA (TO-18)

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted.)				
Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 10 \text{ mA dc}$)	$V_{(BR)CEO}$	60	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 10 \mu\text{A dc}$)	$V_{(BR)CBO}$	60	—	Vdc
Base-Emitter Voltage ($I_E = 10 \mu\text{A dc}$)	$V_{(BR)EBO}$	5.0	—	Vdc
Collector Cutoff Current ($V_{CE} = 40 \text{ Vdc}$, $V_{EB(off)} = 3.0 \text{ Vdc}$) ($V_{CE} = 40 \text{ Vdc}$, $V_{EB} = 3.0 \text{ Vdc}$, $T_A = 150^\circ\text{C}$)	I_{CEX}	— —	20 20	nA dc $\mu\text{A dc}$
Collector Cutoff Current ($V_{CB} = 40 \text{ Vdc}$)	I_{CBO}	—	20	nA dc
Emitter Cutoff Current ($V_{EB} = 3.0 \text{ Vdc}$, $V_{CE} = 40 \text{ Vdc}$)	I_{BEX}	—	50	nA dc

(1) Pulsed. Pulse Width 250 to 350 μs , Duty Cycle 1.0 to 2.0%.

(continued)

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ELECTRICAL CHARACTERISTICS — continued ($T_A = 25^\circ\text{C}$ unless otherwise noted.)				
Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS				
DC Current Gain ($I_C = 0.1 \text{ mA}$, $V_{CE} = 1.0 \text{ Vdc}$) ($I_C = 1.0 \text{ mA}$) ($I_C = 10 \text{ mA}$, $V_{CE} = 1.0 \text{ Vdc}$)(1) ($I_C = 50 \text{ mA}$, $V_{CE} = 1.0 \text{ Vdc}$)(1) ($I_C = 1.0 \text{ mA}$, $V_{CE} = 1.0 \text{ Vdc}$, $T_A = -55^\circ\text{C}$)	h_{FE}	80 90 100 30 40	— — 300 — —	—
Collector-Emitter Saturation Voltage ($I_C = 10 \text{ mA}$, $I_B = 1.0 \text{ mA}$) ($I_C = 50 \text{ mA}$, $I_B = 5.0 \text{ mA}$)(1)	$V_{CE(sat)}$	— —	0.25 0.5	Vdc
Base-Emitter Saturation Voltage ($I_C = 10 \text{ mA}$, $I_B = 1.0 \text{ mA}$) ($I_C = 50 \text{ mA}$, $I_B = 5.0 \text{ mA}$)(1)	$V_{BE(sat)}$	0.6 —	0.9 1.2	Vdc
SMALL-SIGNAL CHARACTERISTICS				
Current Gain ($I_C = 1.0 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	h_{fe}	50 100	200 400	—
Small-Signal Current Transfer Ratio, Magnitude ($I_C = 10 \text{ mA}$, $V_{CE} = 20 \text{ Vdc}$, $f = 100 \text{ MHz}$)	$ h_{fe} $	2.5 3.0	9.0 9.0	—
Output Capacitance ($V_{CB} = 10 \text{ Vdc}$, $f = 0.1$ to 1.0 MHz)	C_{obo}	—	6.0	pF
Input Capacitance ($V_{EB} = 1.0 \text{ Vdc}$, $f = 0.1$ to 1.0 MHz) (Output open circuited)	C_{ibo}	—	8.0	pF
Collector-Base Time Constant ($I_C = 10 \text{ mA}$, $V_{CE} = 20 \text{ Vdc}$, $f = 31.8 \text{ MHz}$)	t_b/C_c	5.0	250	ps
Noise Figure ($I_C = 100 \mu\text{A}$, $V_{CE} = 5.0 \text{ Vdc}$, $f = 100 \text{ Hz}$, $R_G = 1.0 \text{ kohms}$)	NF	—	6.0	dB
Voltage Feedback Ratio ($I_C = 1.0 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	h_{re}	— —	10 20	$\times 10^{-4}$
Input Impedance ($I_C = 1.0 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	h_{ie}	2.0	12	kohms
Output Admittance ($I_C = 1.0 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	h_{oe}	10	60	μmhos
SWITCHING CHARACTERISTICS (See Section 4, Figure 12) ($V_{CC} = 3.0 \text{ Vdc}$, $I_C = 10 \text{ mA}$, $I_B = 1.0 \text{ mA}$, $V_{BE} = 0.5 \text{ Vdc}$)				
Delay Time ($V_{BE} = 0.5 \text{ Vdc}$)	t_d	—	35	ns
Rise Time ($V_{BE} = 0.5 \text{ Vdc}$)	t_r	—	35	ns
Storage Time	t_s	—	200	ns
Fall Time	t_f	—	50	ns

(1) Pulsed. Pulse Width 250 to 350 μs , Duty Cycle 1.0 to 2.0%.

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ASSURANCE TESTING (Pre/Post Burn-In)

Burn-In Conditions: $T_A = 25 \pm 3^\circ\text{C}$, $V_{CB} = 25 \text{ Vdc}$, $P_D = 360 \text{ mW}$

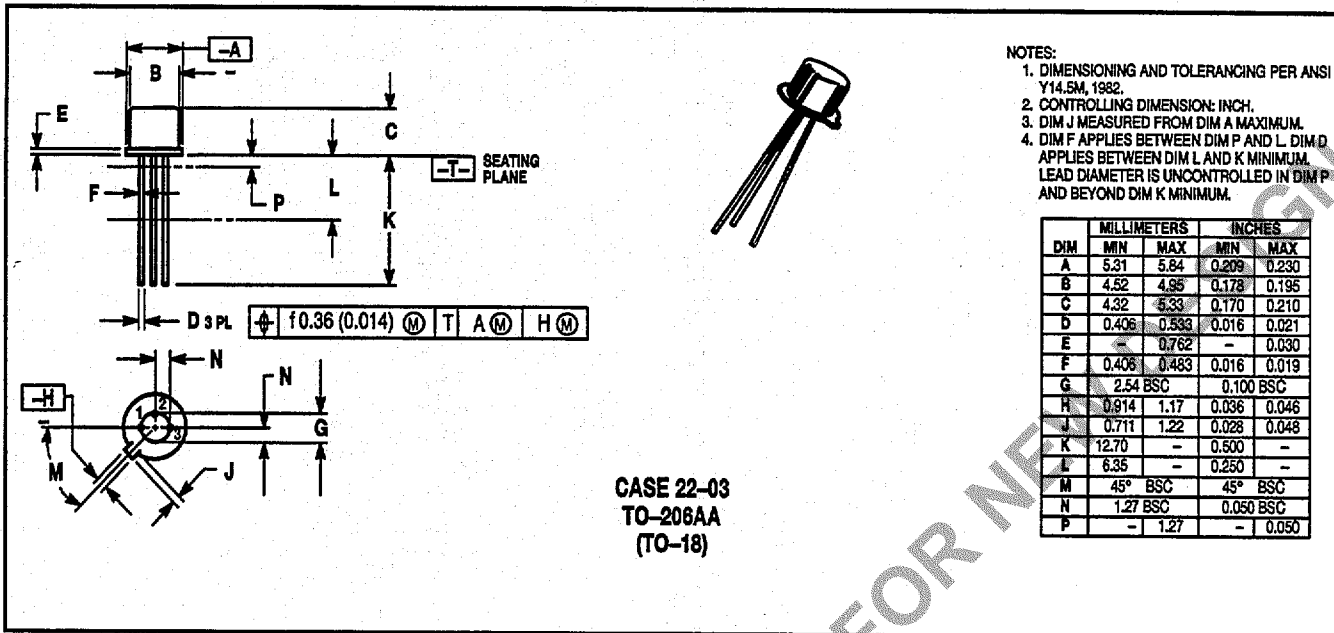
Characteristics Tested	Symbol	Initial and End Point Limits		Unit
		Min	Max	
Collector Cutoff Current ($V_{CB} = 40 \text{ Vdc}$)	I_{CBO}	—	20	nAdc
DC Current Gain(1) ($I_C = 10 \text{ mAdc}$, $V_{CE} = 1.0 \text{ Vdc}$)	h_{FE}	100	300	—

Delta from Pre-Burn-In Measured Values		Min	Max	
Delta Collector Cutoff Current	ΔI_{CBO}	—	± 100 or ± 5.0 whichever is greater	% of Initial Value nAdc
Delta DC Current Gain(1)	Δh_{FE}	—	± 15	% of Initial Value

(1) Pulsed. Pulse Width 250 to 350 μs , Duty Cycle 1.0 to 2.0%.

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PACKAGE DIMENSIONS



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