SEMICONDUCTOR
TECHNICAL DATA

2N3250A
2N3251A

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	mAdc
Power Dissipation @ T_A = 25°C Derate above 25°C @ T_C = 25°C Derate above 25°C	P_T	 0.36 2.06 1.2 6.9	 Watts mW/°C Watts mW/°C
Operating Junction and Storage Temperature Range	T_J, T_{stg}	−65 to 200	°C

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

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)				
Characteristic	**Symbol**	**Min**	**Max**	**Unit**
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage[1] (I_C = 10 mAdc)	$V_{(BR)CEO}$	60	—	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc)	$V_{(BR)CBO}$	60	—	Vdc
Base-Emitter Voltage (I_E = 10 μAdc)	$V_{(BR)EBO}$	5.0	—	Vdc
Collector Cutoff Current (V_{CE} = 40 Vdc, $V_{EB(off)}$ = 3.0 Vdc) (V_{CE} = 40 Vdc, V_{EB} = 3.0 Vdc, T_A = 150°C)	I_{CEX}	 — —	 20 20	 nAdc μAdc
Collector Cutoff Current (V_{CB} = 40 Vdc)	I_{CBO}	—	20	nAdc
Emitter Cutoff Current (V_{EB} = 3.0 Vdc, V_{CE} = 40 Vdc)	I_{BEX}	—	50	nAdc

[1] Pulsed: Pulse Width 250 to 350 μs, Duty Cycle 1.0 to 2.0%.

(continued)

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

Characteristic		Symbol	Min	Max	Unit
ON CHARACTERISTICS					
DC Current Gain		h_{FE}			—
(I_C = 0.1 mAdc, V_{CE} = 1.0 Vdc)	2N3250A		40	—	
	2N3251A		80	—	
(I_C = 1.0 mAdc)	2N3250A		45	—	
	2N3251A		90	—	
(I_C = 10 mAdc, V_{CE} = 1.0 Vdc)(1)	2N3250A		50	150	
	2N3251A		100	300	
(I_C = 50 mAdc, V_{CE} = 1.0 Vdc)(1)	2N3250A		15	—	
	2N3251A		30	—	
(I_C = 1.0 mAdc, V_{CE} = 1.0 Vdc, T_A = −55°C)	2N3250A		20	—	
	2N3251A		40	—	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
(I_C = 10 mAdc, I_B = 1.0 mAdc)			—	0.25	
(I_C = 50 mAdc, I_B = 5.0 mAdc)(1)			—	0.5	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$			Vdc
(I_C = 10 mAdc, I_B = 1.0 mAdc)			0.6	0.9	
(I_C = 50 mAdc, I_B = 5.0 mAdc)(1)			—	1.2	
SMALL-SIGNAL CHARACTERISTICS					
Current Gain	2N3250A	h_{fe}	50	200	—
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	2N3251A		100	400	
Small-Signal Current Transfer Ratio, Magnitude	2N3250A	$\lvert h_{fe} \rvert$	2.5	9.0	—
(I_C = 10 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)	2N3251A		3.0	9.0	
Output Capacitance (V_{CB} = 10 Vdc, f = 0.1 to 1.0 MHz)		C_{obo}	—	6.0	pF
Input Capacitance (V_{EB} = 1.0 Vdc, f = 0.1 to 1.0 MHz) (Output open circuited)		C_{ibo}	—	8.0	pF
Collector-Base Time Constant (I_C = 10 mAdc, V_{CE} = 20 Vdc, f = 31.8 MHz)		$r_b'C_c$	5.0	250	ps
Noise Figure (I_C = 100 µAdc, V_{CE} = 5.0 Vdc, f = 100 Hz, R_G = 1.0 kohms)		NF	—	6.0	dB
Voltage Feedback Ratio	2N3250A	h_{re}	—	10	X 10^{-4}
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	2N3251A		—	20	
Input Impedance	2N3250A	h_{ie}	1.0	6.0	kohms
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	2N3251A		2.0	12	
Output Admittance	2N3250A	h_{oe}	4.0	40	µmhos
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	2N3251A		10	60	
SWITCHING CHARACTERISTICS (See Figure 30) (V_{CC} = 3.0 Vdc, I_C = 10 mAdc, I_B = 1.0 mAdc, V_{BE} = 0.5 Vdc)					
Delay Time (V_{BE} = 0.5 Vdc)		t_d	—	35	ns
Rise Time (V_{BE} = 0.5 Vdc)		t_r	—	35	ns
Storage Time	2N3250A	t_s	—	175	ns
	2N3251A		—	200	
Fall Time		t_f	—	50	ns

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

ASSURANCE TESTING (Pre/Post Burn-In)
Burn-In Conditions: T_A = 25 ±3°C, V_{CB} = 25 Vdc, 10 Vdc for JANS
P_T = 360 mW

Characteristics Tested		Symbol	Initial and End Point Limits		Unit
			Min	Max	
Collector Cutoff Current (V_{CB} = 40 Vdc)		I_{CBO}	—	20	nAdc
DC Current Gain(1)		h_{FE}			—
(I_C = 10 mAdc, V_{CE} = 1.0 Vdc)	2N3250A		50	150	
	2N3251A		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%