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2N3805,A, 2N3806 thru 2N3810,A, 2N3811,A 2N3812 thru 2N3816,A, 2N3817,A

DUAL PNP SILICON ANNULAR TRANSISTORS

... specifically designed for differential amplifier applications.

- Tight h_{FE} Match: 5%
- High h_{FE} : to 225 (min) @ $I_C = 10 \mu A$
- Low Noise: 1.5 dB (Max) @ 1.0 kHz and 10 kHz
- h_{FE} Match Temperature Tracking: from -55°C to +125°C
- Tight V_{BE} Match: 1.5 mVdc
- 2N3810 JAN, JTX and 2N3811 JAN, JTX Available

PNP SILICON DIFFERENTIAL AMPLIFIERS

*MAXIMUM RATINGS (each side)

Rating	Symbol	Value	Unit		
Collector-Emitter Voltage	V_{CEO}	60	Vdc		
Collector-Base Voltage	V_{CB}	60	Vdc		
Emitter-Base Voltage	V_{EB}	5.0	Vdc		
Collector Current	I_C	50	mAde		
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	°C		
Total Device Dissipation @ $T_A = 25^{\circ}\text{C}$ Metal Can (2N3800 thru 2N3804,A 2N3805,A Derate above 25°C Metal Can (2N3806 thru 2N3810,A, 2N3811,A Derate above 25°C Flat Package (2N3812 thru 2N3816,A, 2N3817,A Derate above 25°C	P_D	One Side	Both Sides	mW	
		250	360		
		1.43	2.06		mW/°C
		500	600		mW
		2.86	3.43		mW/°C
		250	250		mW
		1.43	2.06		mW/°C

*Indicates JEDEC Registered Data.



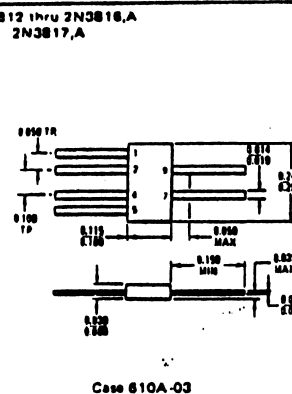
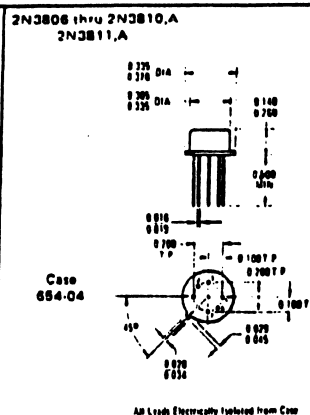
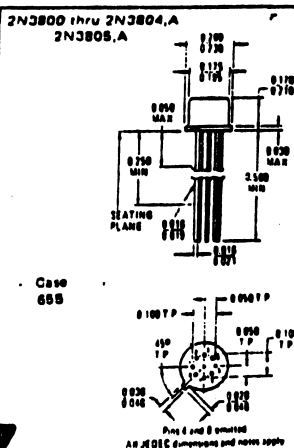
2N3800 thru 2N3804,A
2N3805,A
Case 665



2N3806 thru 2N3810,A
2N3811,A
Case 654-04



2N3812 thru 2N3816,A
2N3817,A
Case 610A-03



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2N3806 thru 2N3810,A, 2N3811,A, 2N3812,A, 2N3816,A, 2N3817,A

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

Characteristic	Symbol	Min	Max	Unit
Base-Emitter On Voltage ($I_C = 100\ \mu\text{Adc}$, $V_{CE} = 5.0\ \text{Vdc}$)	$V_{BE(on)}$	—	0.7	Vdc

SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ($I_C = 500\ \mu\text{Adc}$, $V_{CE} = 5.0\ \text{Vdc}$, $f = 30\ \text{MHz}$) ($I_C = 1.0\ \text{mAdc}$, $V_{CE} = 5.0\ \text{Vdc}$, $f = 100\ \text{MHz}$)	f_T	30 100	— 500	MHz
Output Capacitance ($V_{CB} = 5.0\ \text{Vdc}$, $I_E = 0$, $f = 100\ \text{kHz}$)	C_{obo}	—	4.0	pF
Input Capacitance ($V_{BE} = 0.5\ \text{Vdc}$, $I_C = 0$, $f = 100\ \text{kHz}$)	C_{ibo}	—	8.0	pF
Input Impedance ($I_C = 1.0\ \text{mAdc}$, $V_{CE} = 10\ \text{Vdc}$, $f = 1.0\ \text{kHz}$)	h_{ie}	3.0 10	30 40	Ω
Voltage Feedback Ratio ($I_C = 1.0\ \text{mAdc}$, $V_{CE} = 10\ \text{Vdc}$, $f = 1.0\ \text{kHz}$)	h_{re}	—	25	$\times 10^{-4}$
Small-Signal Current Gain ($I_C = 1.0\ \text{mAdc}$, $V_{CE} = 10\ \text{Vdc}$, $f = 1.0\ \text{kHz}$)	h_{fe}	150 300	600 900	—
Output Admittance ($I_C = 1.0\ \text{mAdc}$, $V_{CE} = 10\ \text{Vdc}$, $f = 1.0\ \text{kHz}$)	h_{oe}	5.0	60	μmhos
Noise Figure ($I_C = 100\ \mu\text{Adc}$, $V_{CE} = 10\ \text{Vdc}$, $R_G = 3.0\ \text{kohms}$ $f = 100\ \text{Hz}$, $BW = 20\ \text{Hz}$)	NF	—	7.0	dB
		—	4.0	
Spot Noise $f = 1.0\ \text{kHz}$, $BW = 200\ \text{Hz}$		—	3.0	
		—	1.5	
$f = 10\ \text{kHz}$, $BW = 2.0\ \text{kHz}$		—	2.5	
		—	1.5	
Broadband Noise Bandwidth 10 Hz to 15.7 kHz		—	3.5	
		—	2.5	

MATCHING CHARACTERISTICS

DC Current Gain Ratio(2) ($I_C = 100\ \mu\text{Adc}$, $V_{CE} = 5.0\ \text{Vdc}$)	2N3808,9,14,15 2N3810,11,16,17 2N3810A,11A,16A,17A	h_{FE1}/h_{FE2}	0.8 0.9 0.95	1.0 1.0 1.0	—
($I_C = 100\ \mu\text{Adc}$, $V_{CE} = 50\ \text{Vdc}$, $T_A = -55$ to $+125^\circ\text{C}$)	2N3810A,11A,16A,17A		0.85	1.0	
Base-Emitter Voltage Differential ($I_C = 10\ \mu\text{Adc}$ to $10\ \text{mAdc}$, $V_{CE} = 5.0\ \text{Vdc}$)	2N3808,9,14,15 2N3810,A,11,A,16,A,17,A	$ V_{BE1}-V_{BE2} $	— —	8.0 5.0	mVdc
($I_C = 100\ \mu\text{Adc}$, $V_{CE} = 5.0\ \text{Vdc}$)	2N3808,9,14,15 2N3810,11,16,17 2N3810A,11A,16A,17A		— — —	5.0 3.0 1.5	
Base-Emitter Voltage Differential Change Due to Temperature ($I_C = 100\ \mu\text{Adc}$, $V_{CE} = 5.0\ \text{Vdc}$, $T_A = -55$ to $+25^\circ\text{C}$)	2N3808,9,14,15 2N3810,11,16,17 2N3810A,11A,16A,17A	$\Delta(V_{BE1}-V_{BE2})$	— — —	1.6 0.8 0.4	mVdc
($I_C = 100\ \mu\text{Adc}$, $V_{CE} = 5.0\ \text{Vdc}$, $T_A = +25$ to $+125^\circ\text{C}$)	2N3808,9,14,15 2N3810,11,16,17 2N3810A,11A,16A,17A		— — —	2.0 1.0 0.5	

- (1) Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.
(2) The lowest h_{FE} reading is taken as h_{FE1} for this ratio.