2N3800 thru 2N3804,A (SILICON)
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.

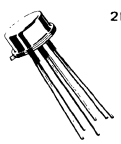
- Tight h_{FE} Match: 5%
- High h_{FE}: to 225 (min) @ I_C = 10 μAdc
- Low Noise: 1.5 dB (Max) @ 1.0 kHz and 10 kHz
- h_{FE} Match Temperature Tracking: from - 55°C to +125°C
- Tight V_{BE} Match: 1.5 mVdc
- 2N3810 JAN, JTX and 2N3811 JAN, JTX Available

PNP SILICON DIFFERENTIAL AMPLIFIERS

*MAXIMUM RATINGS (each side)

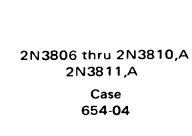
Rating	Symbol	Value		Unit
Collector-Emitter Voltage	V_{CEO}	60		Vdc
Collector-Base Voltage	V_{CB}	60		Vdc
Emitter-Base Voltage	V_{EB}	5.0		Vdc
Collector Current	I_C	50		mAdc
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		°C
		One Side	Both Sides	
Total Device Dissipation @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

*Indicates JEDEC Registered Data.



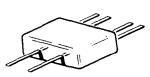
2N3800 thru 2N3804,A
2N3805,A

Case
655



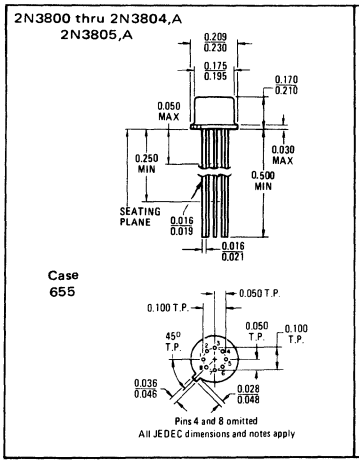
2N3806 thru 2N3810,A
2N3811,A

Case
654-04

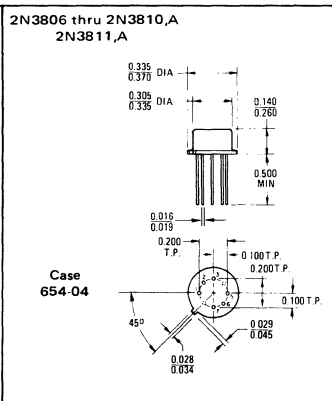


2N3812 thru 2N3816,A
2N3817,A

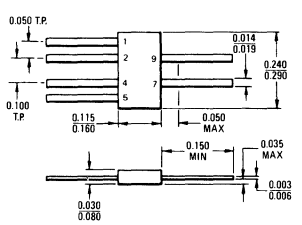
Case 610A-03



Pins 4 and 8 omitted
All JEDEC dimensions and notes apply



All Leads Electrically Isolated from Case



Case 610A-03

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (1) (I_C = 10 mAdc, I_B = 0)	BV_{CEO}	60	–	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	BV_{CBO}	60	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	BV_{EBO}	5.0	–	Vdc
Collector Cutoff Current	I_{CBO}			μAdc
(V_{CB} = 50 Vdc, I_E = 0)		–	0.01	
(V_{CB} = 50 Vdc, I_E = 0, T_A = 150°C)		–	10	
Emitter Cutoff Current ($V_{BE(off)}$ = 4.0 Vdc, I_C = 0)	I_{EBO}	–	20	nAdc
ON CHARACTERISTICS				
DC Current Gain (1)	h_{FE}			–
(I_C = 1.0 μAdc, V_{CE} = 5.0 Vdc)				
2N3801,3,5,A,7,9,11,A,13,15,17,A		75	–	
(I_C = 10 μAdc, V_{CE} = 5.0 Vdc)				
2N3800,2,4,A,6,8,10,A,12,14,16,A		100	–	
2N3801,3,5,A,7,9,11,A,13,15,17,A		225	–	
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc)				
2N3800,2,4,A,6,8,10,A,12,14,16,A		150	450	
2N3801,3,5,A,7,9,11,A,13,15,17,A		300	900	
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc, T_A = -55°C)				
2N3800,2,4,A,6,8,10,A,12,14,16,A		75	–	
2N3801,3,5,A,7,9,11,A,13,15,17,A		150	–	
(I_C = 500 μAdc, V_{CE} = 5.0 Vdc)				
2N3800,2,4,A,6,8,10,A,12,14,16,A		150	450	
2N3801,3,5,A,7,9,11,A,13,15,17,A		300	900	
(I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc)				
2N3800,2,4,A,6,8,10,A,12,14,16,A		150	450	
2N3801,3,5,A,7,9,11,A,13,15,17,A		300	900	
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)				
2N3800,2,4,A,6,8,10,A,12,14,16,A		125	–	
2N3801,3,5,A,7,9,11,A,13,15,17,A		250	–	
Collector-Emitter Saturation Voltage (1)	$V_{CE(sat)}$			Vdc
(I_C = 100 μAdc, I_B = 10 μAdc)		–	0.2	
(I_C = 1.0 mAdc, I_B = 100 μAdc)		–	0.25	
Base-Emitter Saturation Voltage (1)	$V_{BE(sat)}$			Vdc
(I_C = 100 μAdc, I_B = 10 μAdc)		–	0.7	
(I_C = 1.0 mAdc, I_B = 100 μAdc)		–	0.8	
Base-Emitter On Voltage (I_C = 100 μAdc, V_{CE} = 5.0 Vdc)	$V_{BE(on)}$	–	0.7	Vdc
SMALL-SIGNAL CHARACTERISTICS				
Current Gain – Bandwidth Product	f_T			MHz
(I_C = 500 μAdc, V_{CE} = 5.0 Vdc, f = 30 MHz)		30	–	
(I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc, f = 100 MHz)		100	500	
Output Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 100 kHz)	C_{ob}	–	4.0	pF
Input Capacitance ($V_{BE(off)}$ = 0.5 Vdc, I_C = 0, f = 100 kHz)	C_{ib}	–	8.0	pF
Input Impedance	h_{ie}			kΩ
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)				
2N3800,2,4,A,6,8,10,A,12,14,16,A		3.0	15	
2N3801,3,5,A,7,9,11,A,13,15,17,A		10	40	
Voltage Feedback Ratio (I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{re}	–	25	X 10^{-4}
Small-Signal Current Gain	h_{fe}			–
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)				
2N3800,2,4,A,6,8,10,A,12,14,16,A		150	600	
2N3801,3,5,A,7,9,11,A,13,15,17,A		300	900	

2N3800 thru 2N3804,A, 2N3805,A, 2N3806 thru 2N3810,A, 2N3811,A, 2N3812 thru 2N3816,A, 2N3817,A (continued)

Characteristic	Symbol	Min	Max	Unit
SMALL-SIGNAL CHARACTERISTICS (continued)				
Output Admittance (I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{oe}	5.0	60	μmhos
Noise Figure (I_C = 100 μAdc, V_{CE} = 10 Vdc, R_G = 3.0 k ohms	NF			dB
Spot Noise f = 100 Hz, BW = 20 Hz 2N3800, 2,4,A,6,8,10,A,12,14,16,A		–	7.0	
2N3801,3,5,A,7,9,11,A,13,15,17,A		–	4.0	
Spot Noise f = 1.0 kHz, BW = 2.0 kHz 2N3800,2,4,A,6,8,10,A,12,14,16,A		–	3.0	
2N3801,3,5,A,7,9,11,A,13,15,17,A		–	1.5	
Spot Noise f = 10 kHz, BW = 200 Hz 2N3800,2,4,A,6,8,10,A,12,14,16,A		–	2.5	
2N3801,3,5,A,7,9,11,A,13,15,17,A		–	1.5	
Broadband Noise Bandwidth 10 Hz to 15.7 kHz 2N3800,2,4,A,6,8,10,A,12,14,16,A		–	3.5	
2N3801,3,5,A,7,9,11,A,13,15,17,A		–	2.5	
MATCHING CHARACTERISTICS				
DC Current Gain Ratio (2)	h_{FE1}/h_{FE2}			–
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc) 2N3802,3,8,9,14,15		0.8	1.0	
2N3804,5,10,11,16,17		0.9	1.0	
2N3804A,5A,10A,11A,16A,17A		0.95	1.0	
(I_C = 100 μAdc, V_{CE} = 50 Vdc, T_A = -55 to +125°C) 2N3804A,5A,10A,11A,16A,17A		0.85	1.0	
Base Voltage Differential	$\lvert V_{BE1}-V_{BE2}\rvert$			mVdc
(I_C = 10 μAdc to 10 mAdc, V_{CE} = 5.0 Vdc) 2N3802,3,8,9,14,15		–	8.0	
2N3804,A,5,A,10,A,11,A,16,A,17,A		–	5.0	
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc) 2N3802,3,8,9,14,15		–	5.0	
2N3804,5,10,11,16,17		–	3.0	
2N3804A,5A,10A,11A,16A,17A		–	1.5	
Base Voltage Differential Gradient	$\Delta\lvert V_{BE1}-V_{BE2}\rvert$			mVdc
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc, T_A = -55 to +25°C) 2N3802,3,8,9,14,15		–	1.6	
2N3804,5,10,11,16,17		–	0.8	
2N3804A,5A,10A,11A,16A,17A		–	0.4	
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc, T_A = +25 to +125°C) 2N3802,3,8,9,14,15		–	2.0	
2N3804,5,10,11,16,17		–	1.0	
2N3804A,5A,10A,11A,16A,17A		–	0.5	

*Indicates JEDEC Registered Data.

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

(2) The lowest h_{FE} reading is taken as h_{FE1} for this ratio.

SPOT NOISE FIGURE (V_{CE} = 10 Vdc, T_A = 25°C)

FIGURE 1 – SOURCE RESISTANCE EFFECTS, f = 1.0 kHz

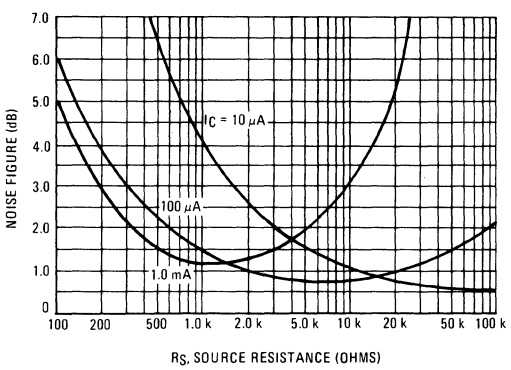


FIGURE 2 – SOURCE RESISTANCE EFFECTS, f = 10 Hz

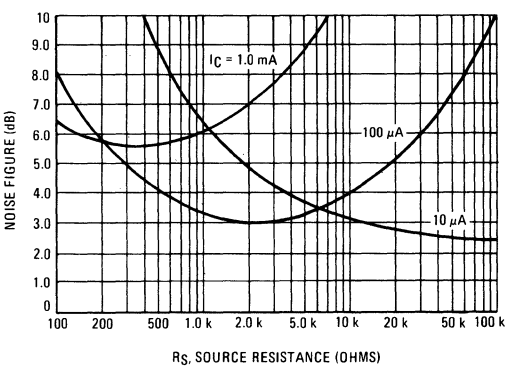


FIGURE 3 – SPOT NOISE FIGURE FREQUENCY EFFECTS

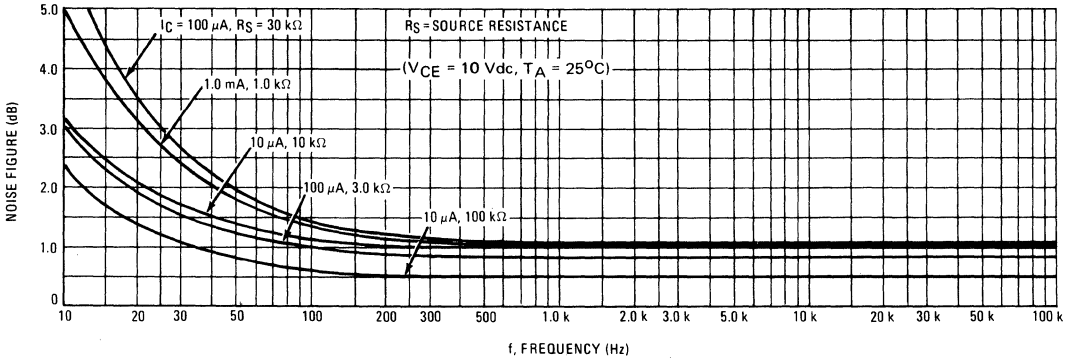


FIGURE 4 – TYPICAL CURRENT GAIN CHARACTERISTICS
(TYPES 2N3800,2,4,A,6,8,10,A,12,14,16,A)

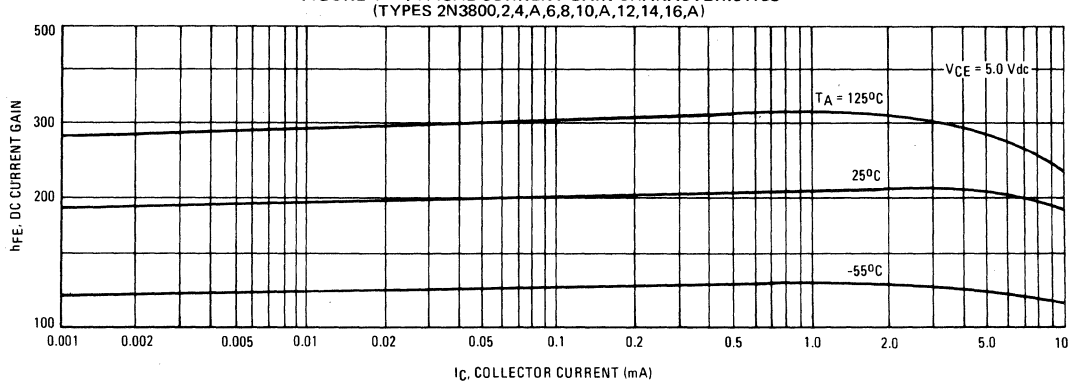


FIGURE 5 – TYPICAL CURRENT GAIN CHARACTERISTICS
(TYPES 2N3801,3,5,A,7,9,11,A,13,15,17,A)