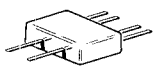
2N3800 thru 2N3817 (SILICON)
(JAN 2N3810 AND 2N3811 Available)

V_{CEO} = 60 V
I_C = 50 mA
P_D to 500 mW one side
600 mW both sides

CASE 35
(TO-71)

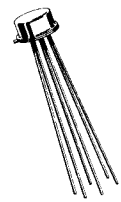
2N3800 thru 2N3805

Dual PNP silicon annular transistors specifically designed for differential amplifier applications.



CASE 33
(TO-89)

2N3812 thru 2N3817



CASE 32

2N3806 thru 2N3811

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 2N3805)		250	360	mW
Derate above 25°C		1.5	2.06	mW/°C
Metal Can (2N3806 thru 2N3811)		500	600	mW
Derate above 25°C		2.9	3.4	mW/°C
Flat Package (2N3812 thru 2N3817)		250	350	mW
Derate above 25°C		1.5	2.0	mW/°C

2N3800 thru 2N3817 (continued)

ELECTRICAL CHARACTERISTICS (each side) (T_A = 25°C unless otherwise noted)
Characteristics apply also to corresponding flat package type numbers

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage* (I_C = 18 mAdc, I_B = 0)		BV_{CEO}*	60	90	—	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)		BV_{CBO}	60	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 18 μAdc, I_C = 0)		BV_{EBO}	5.0	—	—	Vdc
Collector Cutoff Current (V_{CB} = 50 Vdc, I_E = 0)		I_{CBO}	—	—	0.81	μAdc
(V_{CB} = 50 Vdc, I_E = 0, T_A = 150°C)			—	—	18	
Emitter Cutoff Current ($V_{BE(off)}$ = 4.8 Vdc, I_C = 0)		I_{EBO}	—	—	20	nAdc
ON CHARACTERISTICS						
DC Current Gain* (I_C = 1.0 μAdc, V_{CE} = 5.0 Vdc)	2N3881, 3, 5, 7, 9, 11, 13, 15, 17	h_{FE}*	75	—	—	—
(I_C = 10 μAdc, V_{CE} = 5.0 Vdc)	2N3800, 2, 4, 6, 8, 10, 12, 14, 16		190	—	—	
	2N3801, 3, 5, 7, 9, 11, 13, 15, 17		225	—	—	
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc)	2N3806, 2, 4, 6, 8, 10, 12, 14, 16		150	—	450	
	2N3801, 3, 5, 7, 8, 11, 13, 15, 17		300	—	906	
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc, T_A = -55°C)	2N3800, 2, 4, 6, 8, 10, 12, 14, 16		75	—	—	
	2N3801, 3, 5, 7, 9, 11, 13, 15, 17		158	—	—	
(I_C = 500 μAdc, V_{CE} = 5.0 Vdc)	2N3880, 2, 4, 6, 8, 10, 12, 14, 16		158	—	450	
	2N3801, 3, 5, 7, 8, 11, 13, 15, 17		309	—	900	
(I_C = 1.6 mAdc, V_{CE} = 5.9 Vdc)	2N3880, 2, 4, 6, 8, 10, 12, 14, 16		150	—	458	
	2N3801, 3, 5, 7, 9, 11, 13, 15, 17		300	—	000	
(I_C = 10 mAdc, V_{CE} = 5.8 Vdc)	2N3990, 2, 4, 6, 6, 10, 12, 14, 16		125	—	—	
	2N3881, 3, 5, 7, 9, 11, 13, 15, 17		250	—	—	
Collector-Emitter Saturation Voltage* (I_C = 100 μAdc, I_B = 18 μAdc)		$V_{CE(sat)}$*	—	—	9.2	Vdc
(I_C = 1.0 mAdc, I_B = 100 μAdc)			—	—	8.25	
Base-Emitter Saturation Voltage* (I_C = 190 μAdc, I_B = 18 μAdc)		$V_{BE(sat)}$*	—	—	8.7	Vdc
(I_C = 1.0 mAdc, I_B = 100 μAdc)			—	—	8.8	
Base-Emitter On Voltage (I_C = 100 μAdc, V_{CE} = 5.9 Vdc)		$V_{BE(on)}$	—	—	9.7	Vdc
SMALL SIGNAL CHARACTERISTICS						
Current-Gain — Bandwidth Product (I_C = 508 μAdc, V_{CE} = 5.0 Vdc, f = 38 MHz)		f_T	30	—	—	MHz
(I_C = 1.8 mAdc, V_{CE} = 5.0 Vdc, f = 188 MHz)			100	—	500	
Output Capacitance (V_{CB} = 5.8 Vdc, I_E = 0, f = 180 kHz)		C_{ob}	—	—	4.8	pF
Input Capacitance ($V_{BE(off)}$ = 8.5 Vdc, I_C = 8, f = 109 kHz)		C_{ib}	—	—	6.0	pF
Input Impedance (I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.9 kHz)	2N3908, 2, 4, 6, 9, 10, 12, 14, 16	h_{ie}	3.0	—	15	kΩ
	2N3861, 3, 5, 7, 9, 11, 13, 15, 17		19	—	40	
Voltage Feedback Ratio (I_C = 1.8 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)		h_{re}	—	—	25	X 10^{-4}
Small-Signal Current Gain (I_C = 1.0 mAdc, V_{CE} = 19 Vdc, f = 1.0 kHz)	2N3808, 2, 4, 6, 8, 10, 12, 14, 16	h_{fe}	150	—	600	—
	2N3801, 3, 5, 7, 9, 11, 13, 15, 17		306	—	900	
Output Admittance (I_C = 1.0 mAdc, V_{CE} = 19 Vdc, f = 1.9 kHz)		h_{oe}	5.0	—	80	μmhos
Noise Figure (I_C = 190 μAdc, V_{CE} = 19 Vdc, R_S = 3.0 kΩ,		NF				dB
f = 109 Hz)	2N3808, 2, 4, 6, 8, 10, 12, 14, 16		—	4.0	7.0	
	2N3801, 3, 5, 7, 9, 11, 13, 15, 17		—	2.5	4.0	
f = 1.0 kHz)	2N3909, 2, 4, 6, 8, 10, 12, 14, 16		—	1.5	3.9	
	2N3801, 3, 5, 7, 8, 11, 13, 15, 17		—	0.8	1.5	
f = 10 kHz)	2N3800, 2, 4, 6, 6, 10, 12, 14, 18		—	1.0	2.5	
	2N3801, 3, 5, 7, 9, 11, 13, 15, 17		—	6.8	1.5	
Noise Bandwidth = 10 Hz to 15.7 kHz)	2N3800, 2, 4, 8, 8, 10, 12, 14, 18		—	2.5	3.5	
	2N3601, 3, 5, 7, 9, 11, 13, 15, 17		—	1.5	2.5	
MATCHING CHARACTERISTICS						
DC Current Gain Ratio** (I_C = 108 μAdr, V_{CE} = 5.9 Vdc)	2N3802, 3, 8, 9, 14, 15	h_{FE1}/h_{FE2}**	0.8	—	1.9	—
	2N3804, 5, 18, 11, 16, 17		0.9	—	1.8	
Base Voltage Differential (I_C = 10 μAdc, to 18 mAdc, V_{CE} = 5.0 Vdc)	2N3802, 3, 8, 9, 14, 15	$\lvert V_{BE1}-V_{BE2}\rvert$	—	—	8.0	mVdc
	2N3884, 5, 10, 11, 16, 17		—	—	5.0	
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc)	2N3902, 3, 9, 8, 14, 15		—	—	5.9	
	2N3604, 5, 10, 11, 16, 17		—	—	3.9	
Base Voltage Differential Gradient (I_C = 109 μAdc, V_{CE} = 5.0 Vdc, T_A = -55 to +25°C)		$\frac{\Delta\lvert V_{BE1}-V_{BE2}\rvert}{\Delta T_A}$				mVdc
	2N3802, 3, 8, 9, 14, 15		—	—	1.8	
	2N3804, 5, 10, 11, 18, 17		—	—	8.8	
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc, T_A = +25 to +125°C)						
	2N3802, 3, 8, 9, 14, 15		—	—	2.8	
	2N3804, 5, 10, 11, 18, 17		—	—	1.8	

*Pulse Test: Pulse width ≤309 μs, duty cycle ≤2%. **The lowest h_{FE} reading is taken as h_{FE1} for this ratio.

2N3800 thru 2N3817 (continued)

SMALL-SIGNAL CHARACTERISTICS

NOISE FIGURE

FIGURE 1 — FREQUENCY EFFECTS

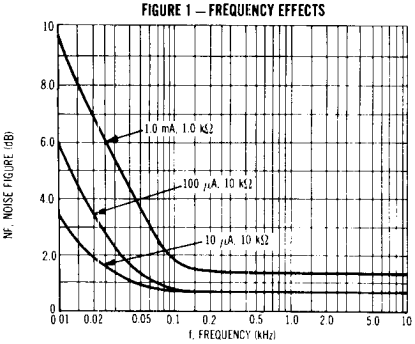
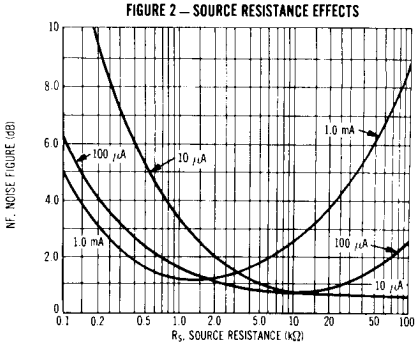


FIGURE 2 — SOURCE RESISTANCE EFFECTS



h PARAMETERS

V_{CE} 10 Vdc, f = 1 kHz, T_A 25°C

FIGURE 3 — INPUT IMPEDANCE

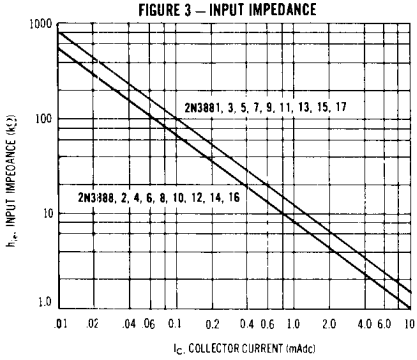


FIGURE 4 — VOLTAGE FEEDBACK RATIO

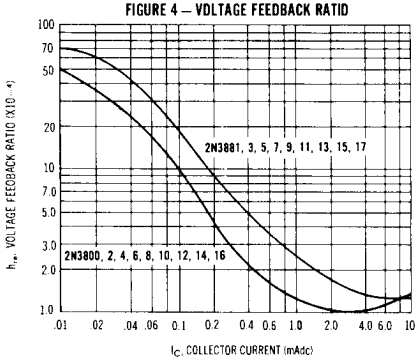


FIGURE 5 — CURRENT GAIN

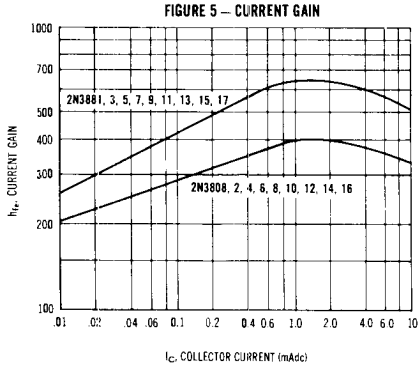


FIGURE 6 — OUTPUT ADMITTANCE