2N3806 thru 2N3810,A 2N3811,A

CASE 610A-04, STYLE 1

2N3812 thru 2N3816,A 2N3817,A

CASE 654-07, STYLE 1

2N3810, 2N3811 — JAN, JTX, JTXV AVAILABLE

DUAL AMPLIFIER TRANSISTOR

PNP SILICON

5

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 — Continuous	I_C	50		mAdc
		One Die	Both Die	
Total Device Dissipation @ T_A = 25°C Metal Can (2N3806 thru 2N3810,A, 2N3811,A) Derate above 25°C	P_D	500 2.86	600 3.43	mW mW/°C
Total Device Dissipation @ T_C = 25°C Flat Package (2N3812 thru 2N3816,A, 2N3817,A) Derate above 25°C	P_D	250 1.5	350 2.06	mW mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200		°C

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, I_B = 0)		$V_{(BR)CEO}$	60	—	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)		$V_{(BR)CBO}$	60	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)		$V_{(BR)EBO}$	5.0	—	Vdc
Collector Cutoff Current (V_{CB} = 50 Vdc, I_E = 0) (V_{CB} = 50 Vdc, I_E = 0, T_A = 150°C)	2N3816,17,12,13,14,15	I_{CBO}	— —	0.01 10	μAdc
Emitter Cutoff Current (V_{BE} = 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)	2N3807,9,11,A,13,15,17,A		75	—	
(I_C = 10 μAdc, V_{CE} = 5.0 Vdc)	2N3806,8,10,A,12,14,16,A 2N3807,9,11,A,13,15,17,A		100 225	— —	
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc)	2N3806,8,10,A,12,14,16,A 2N3807,9,11,A,13,15,17,A		150 300	450 900	
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc, T_A = −55°C)	2N3806,8,10,A,12,14,16,A 2N3807,9,11,A,13,15,17,A		75 150	— —	
(I_C = 500 μAdc, V_{CE} = 5.0 Vdc)	2N3806,8,10,A,12,14,16,A 2N3807,9,11,A,13,15,17,A		150 300	450 900	
(I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc)	2N3806,8,10,A,12,14,16,A 2N3807,9,11,A,13,15,17,A		150 300	450 900	
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)	2N3806,8,10,A,12,14,16,A 2N3807,9,11,A,13,15,17,A		125 250	— —	
Collector-Emitter Saturation Voltage(1) (I_C = 100 μAdc, I_B = 1.0 μA) (I_C = 1.0 mAdc, I_B = 100 μAdc)	2N3814, 2N3815	$V_{CE(sat)}$	— —	0.2 0.25	Vdc
Base-Emitter Saturation Voltage(1) (I_C = 100 μAdc, I_B = 10 μAdc) (I_C = 1.0 mAdc, I_B = 100 μAdc)		$V_{BE(sat)}$	— —	0.7 0.8	Vdc

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

Characteristic		Symbol	Min	Max	Unit
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 (I_C = 500 μAdc, V_{CE} = 5.0 Vdc, f = 30 MHz) (I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc, f = 100 MHz)		f_T	 30 100	 — 500	MHz
Output Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 100 kHz)		C_{obo}	—	4.0	pF
Input Capacitance (V_{BE} = 0.5 Vdc, I_C = 0, f = 100 kHz)		C_{ibo}	—	8.0	pF
Input Impedance (I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	2N3806,8,10,A,12,14,16,A 2N3807,9,11,A,13,15,17,A	h_{ie}	 3.0 10	 30 40	Ω
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 (I_C = 1.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	2N3806,8,10,A,12,14,16,A 2N3807,9,11,A,13,15,17,A	h_{fe}	 150 300	 600 900	—
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 kohms f = 100 Hz, BW = 20 Hz	 2N3806,8,10,A,12,14,16,A 2N3807,9,11,A,13,15,17,A	NF	 — —	 7.0 4.0	dB
Spot Noise f = 1.0 kHz, BW = 200 Hz	2N3806,8,10,A,12,14,16,A 2N3807,9,11,A,13,15,17,A		— —	3.0 1.5	
f = 10 kHz, BW = 2.0 kHz)	2N3806,8,10,A,12,14,16,A 2N3807,9,11,A,13,15,17,A		— —	2.5 1.5	
Broadband Noise Bandwidth 10 Hz to 15.7 kHz	2N3806,8,10,A,12,14,16,A 2N3807,9,11,A,13,15,17,A		— —	3.5 2.5	
MATCHING CHARACTERISTICS					
DC Current Gain Ratio(2) (I_C = 100 μAdc, V_{CE} = 5.0 Vdc)	 2N3608,9,14,15 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 μAdc, V_{CE} = 50 Vdc, T_A = −55 to +125°C) 2N3810A,11A,16A,17A			 0.85	 1.0	
Base-Emitter Voltage Differential (I_C = 10 μAdc to 10 mAdc, V_{CE} = 5.0 Vdc)	 2N3808,9,14,15 2N3810,A,11,A,16,A,17,A	$\lvert V_{BE1}-V_{BE2}\rvert$	 — —	 8.0 5.0	mVdc
(I_C = 100 μAdc, V_{CE} = 5.0 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 μAdc, V_{CE} = 5.0 Vdc, T_A = −55 to +25°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 μAdc, V_{CE} = 5.0 Vdc, T_A = +25 to +125°C) 2N3808,9,14,15 2N3810,11,16,17 2N3810A,11A,16A,17A			 — — —	 2.0 1.0 0.5	

(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.

FIGURE 1 — DC CURRENT GAIN versus COLLECTOR CURRENT

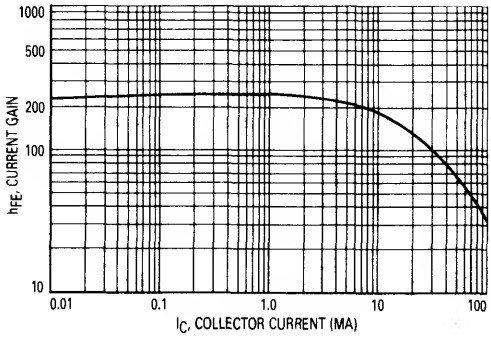

FIGURE 2 — DC CURRENT GAIN versus COLLECTOR CURRENT

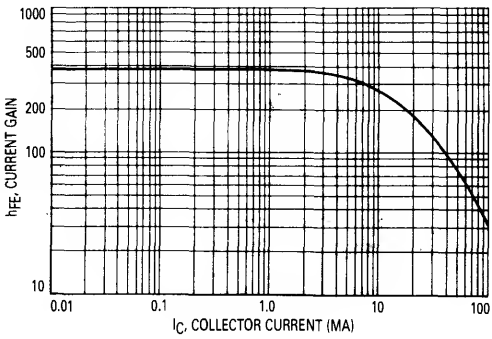

FIGURE 3 — "ON" VOLTAGES

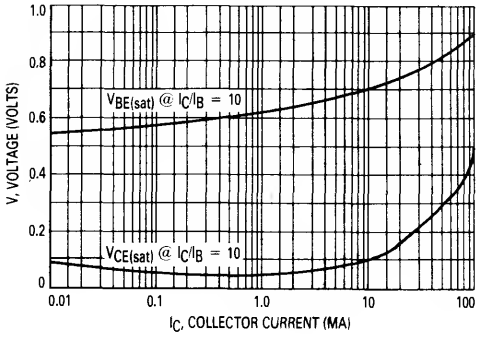

FIGURE 4 — "ON" VOLTAGES