



NES

NEW ENGLAND SEMICONDUCTOR

**2N3806,A
thru
2N3809,A
2N3810*,A
2N3811*,A**

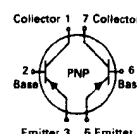
*also available as
JAN, JANTX,
JANTXV

PNP SILICON DUAL AMPLIFIER TRANSISTOR

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

RATINGS	SYMBOL	VALUE	UNITS
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 Power Dissipation Derate above 25°C	P_D	500 2.86	mW mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	$^\circ\text{C}$

TO-99



DUAL TRANSISTORS
PNP SILICON

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

Characteristics	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ⁽¹⁾ $I_C = 10 \text{ mAdc}, I_B = 0$	$V_{(BR)CEO}$	60		Vdc
Collector-Base Breakdown Voltage $I_C = 10 \mu\text{Adc}, I_E = 0$	$V_{(BR)CBO}$	60		Vdc
Emitter-Base Breakdown Voltage $I_E = 10 \mu\text{Adc}, I_C = 0$	$V_{(BR)EBO}$	5.0		Vdc
Collector Cutoff Current $V_{CB} = 50 \text{ Vdc}, I_E = 0$ $V_{CB} = 50 \text{ Vdc}, I_E = 0, T_A = 150^\circ\text{C}$	I_{CBO}		0.01 10	μAdc
Emitter Cutoff Current $V_{BE} = 4.0 \text{ Vdc}, I_C = 0$	I_{EBO}		20	ηAdc

ON CHARACTERISTICS (I)

DC Current Gain $I_C = 1.0 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 10 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 100 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 100 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}, T_A = -55^\circ\text{C}$ $I_C = 500 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 1.0 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 10 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$	2N3807,9,11,A 2N3806,8,10,A 2N3807,9,11,A 2N3806,8,10,A 2N3807,9,11,A 2N3806,8,10,A 2N3807,9,11,A 2N3806,8,10,A 2N3807,9,11,A 2N3806,8,10,A 2N3807,9,11,A 2N3806,8,10,A	h_{FE}	75 100 225 150 300 75 150 150 300 150 300 125 250	450 900	--
Collector-Emitter Saturation Voltage $I_C = 100 \mu\text{Adc}, I_B = 1.0 \mu\text{Adc}$ $I_C = 1.0 \text{ mAdc}, I_B = 100 \mu\text{Adc}$		$V_{CE(sat)}$		0.2 0.25	Vdc
Base-Emitter Saturation Voltage $I_C = 100 \mu\text{Adc}, I_B = 10 \mu\text{Adc}$ $I_C = 1.0 \text{ mAdc}, I_B = 100 \mu\text{Adc}$		$V_{BE(sat)}$		0.7 0.8	Vdc

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T4-4.8-860-356 REV: --



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ELECTRICAL CHARACTERISTICS..con't.. ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristics		Symbol	Min	Max	Unit
ON CHARACTERISTICS (1) con't					
Base-Emitter On Voltage I _C = 100 μAdc, V _{CE} = 10 μAdc		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	p ^f
Input Capacitance V _{BE} = 0.5 Vdc, I _C = 0, f = 100 kHz		C _{ibo}		8.0	p ^f
Input Impedance I _C = 1.0 mAdc, V _{CE} = 10 Vdc, f = 1.0 kHz		h _{je}	3.0 10	30 40	kΩ
Voltage Feedback Ratio I _C = 1.0 mAdc, V _{CE} = 10 Vdc, f = 1.0 kHz		h _{re}		25	x10 ⁻⁴
Small-Signal Current Gain I _C = 1.0 mAdc, V _{CE} = 10 Vdc, f = 1.0 kHz		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		NF		7.0 4.0	dB
Spot Noise f = 1.0 kHz, BW = 200 Hz				3.0 1.5	
f = 10 kHz, BW = 2.0 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 μAdc, V _{CE} = 5.0 Vdc		h _{FE1} /h _{FE2}	0.8 0.9 0.95 0.85	1.0 1.0 1.0 1.0	--
T _A = -55 to +125 ⁰ C					
Base-Emitter Voltage Differential I _C = 10 μAdc to 10 mAdc, V _{CE} = 5.0 Vdc		V _{BE1} -V _{BE2}		8.0 5.0 5.0 3.0 1.5	mVdc
I _C = 100 μAdc, V _{CE} = 5.0 Vdc					
Base-Emitter Voltage Differential Change Due to Temperature I _C = 100 μAdc, V _{CE} = 5.0 Vdc T _A = -55 to +125 ⁰ C		ΔV _{BE1} -V _{BE2}		1.6 0.8 0.4 2.0 1.0 0.5	mVdc
I _C = 100 μAdc, V _{CE} = 5.0 Vdc T _A = +25 to +125 ⁰ C					

(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.

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