

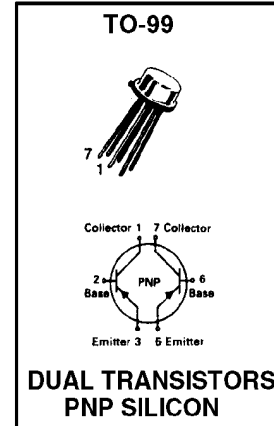


**NEW ENGLAND SEMICONDUCTOR**

**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
Total Power Dissipation Derate above $25^\circ\text{C}$	$P_D$	One Die	Both Die	mW $\text{mW}/^\circ\text{C}$
		500	600	
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200		$^\circ\text{C}$

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

Characteristics	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Breakdown Voltage <sup>(1)</sup> $I_C = 10 \text{ mAdc}, I_B = 0$	$V_{(BR)CEO}$	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	$\mu\text{Adc}$
Emitter Cutoff Current $V_{BE} = 4.0 \text{ Vdc}, I_C = 0$	$I_{EBO}$		20	$\eta\text{Adc}$
<b>ON CHARACTERISTICS (1)</b>				
DC Current Gain $I_C = 1.0 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 10 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 100 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 100 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}, T_A = -55^\circ\text{C}$ $I_C = 500 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 1.0 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$ $I_C = 10 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$	$h_{FE}$	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
<b>ON CHARACTERISTICS (1) con't</b>				
Base-Emitter On Voltage $I_C = 100 \mu\text{A dc}$ , $V_{CE} = 10 \mu\text{A dc}$	$V_{BE(on)}$		0.7	Vdc
<b>SMALL-SIGNAL CHARACTERISTICS</b>				
Current-Gain -- Bandwidth Product $I_C = 500 \mu\text{A dc}$ , $V_{CE} = 5.0 \text{ Vdc}$ , $f = 30 \text{ Mhz}$ $I_C = 1.0 \text{ mA dc}$ , $V_{CE} = 5.0 \text{ Vdc}$ , $f = 100 \text{ Mhz}$	$f_T$	30 100	- 500	MHz
Output Capacitance $V_{CB} = 5.0 \text{ Vdc}$ , $I_E = 0$ , $f = 100 \text{ kHz}$	$C_{obo}$		4.0	$\text{p}^f$
Input Capacitance $V_{BE} = 0.5 \text{ Vdc}$ , $I_C = 0$ , $f = 100 \text{ kHz}$	$C_{ibo}$		8.0	$\text{p}^f$
Input Impedance $I_C = 1.0 \text{ mA dc}$ , $V_{CE} = 10 \text{ Vdc}$ , $f = 1.0 \text{ kHz}$	$h_{je}$	3.0 10	30 40	$\text{k}\Omega$
2N3806,8,10,A 2N3807,9,11,A				
Voltage Feedback Ratio $I_C = 1.0 \text{ mA dc}$ , $V_{CE} = 10 \text{ Vdc}$ , $f = 1.0 \text{ kHz}$	$h_{re}$		25	$\times 10^{-4}$
Small-Signal Current Gain $I_C = 1.0 \text{ mA dc}$ , $V_{CE} = 10 \text{ Vdc}$ , $f = 1.0 \text{ kHz}$	$h_{fe}$	150 300	600 900	--
2N3806,8,10,A 2N3807,9,11,A				
Output Admittance $I_C = 1.0 \text{ mA dc}$ , $V_{CE} = 10 \text{ Vdc}$ , $f = 1.0 \text{ kHz}$	$h_{oe}$	5.0	60	$\mu\text{mhos}$
Noise Figure $I_C = 100 \mu\text{A dc}$ , $V_{CE} = 10 \text{ Vdc}$ , $R_G = 3.0 \text{ kohms}$ $f = 100 \text{ Hz}$ , $\text{BW} = 20 \text{ Hz}$	NF		7.0 4.0	dB
2N3806,8,10,A 2N3807,9,11,A				
Spot Noise $f = 1.0 \text{ kHz}$ , $\text{BW} = 200 \text{ Hz}$			3.0	
2N3806,8,10,A 2N3807,9,11,A			1.5	
$f = 10 \text{ kHz}$ , $\text{BW} = 2.0 \text{ kHz}$			2.5	
2N3806,8,10,A 2N3807,9,11,A			1.5	
Broadband Noise Bandwidth 10 Hz to 15.7 kHz			3.5 2.5	
2N3806,8,10,A 2N3807,9,11,A				
<b>MATCHING CHARACTERISTICS</b>				
DC Current Gain Ratio (2) $I_C = 100 \mu\text{A dc}$ , $V_{CE} = 5.0 \text{ Vdc}$	$h_{FE1}/h_{FE2}$	0.8 0.9 0.95 0.85	1.0 1.0 1.0 1.0	--
2N3808,9 2N3810,11 2N3810A,11A 2N3810A,11A				
$T_A = -55$ to $+125^{\circ}\text{C}$				
Base-Emitter Voltage Differential $I_C = 10 \mu\text{A dc}$ to $10 \text{ mA dc}$ , $V_{CE} = 5.0 \text{ Vdc}$	$V_{BE1} - V_{BE2}$		8.0 5.0 5.0 3.0 1.5	mVdc
2N3808,9 2N3810,A,11,A 2N3808,9 2N3810,11 2N3810A,11A				
$I_C = 100 \mu\text{A dc}$ , $V_{CE} = 5.0 \text{ Vdc}$				
Base-Emitter Voltage Differential Change Due to Temperature $I_C = 100 \mu\text{A dc}$ , $V_{CE} = 5.0 \text{ Vdc}$ $T_A = -55$ to $+125^{\circ}\text{C}$	$\Delta V_{BE1} - V_{BE2}$		1.6 0.8 0.4 2.0 1.0 0.5	mVdc
2N3808,9 2N3810,11 2N3810A,11A 2N3808,9 2N3810,11 2N3810A,11A				
$I_C = 100 \mu\text{A dc}$ , $V_{CE} = 5.0 \text{ Vdc}$ $T_A = +25$ to $+125^{\circ}\text{C}$				

(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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