

2N3810
2N3811

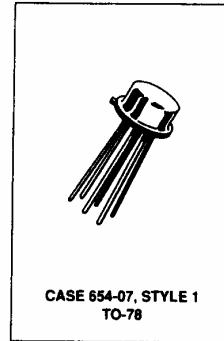
CRYSTALONCS
2805 Veterans Highway
Suite 14
Ronkonkoma, N.Y. 11779

**PNP Silicon Dual
Small-Signal Transistors**

...designed for general-purpose amplifier applications.

3

MAXIMUM RATINGS				
Rating	Symbol	Value		Unit
Collector-Emitter Voltage	V_{CE0}	60		Vdc
Collector-Base Voltage	V_{CBO}	60		Vdc
Emitter-Base Voltage	V_{EBO}	5.0		Vdc
Collector Current — Continuous	I_C	50		mAdc
Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_T	One Die	All Die Equal Power	mW mW/°C
		500	600	
		2.86	3.43	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-65 to 200		°C



ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted.)					
Characteristic	Symbol	Min	Max	Unit	
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 ($V_{CB} = 50 \text{ Vdc}$) ($V_{CB} = 50 \text{ Vdc}, T_A = 150^\circ\text{C}$)	I_{CBO}	—	10	nAdc	
		—	10	μAdc	
Base Cutoff Current ($V_{EB} = 4.0 \text{ Vdc}$)	I_{EBO}	—	10	nAdc	

⁽¹⁾ Pulsed. Pulse Width 250 to 350 μs . Duty Cycle 10 to 20%.

(continued)

DISCRETE MILITARY OPERATION DATA

ELECTRICAL CHARACTERISTICS — continued (T _A = 25°C unless otherwise noted)		Symbol	Min	Max	Unit
ON CHARACTERISTICS					
DC Current Gain	2N3810	h _{FE}	100	—	—
(I _C = 0.1 mA _{dc} , V _{CE} = 5.0 V _{dc})			150	450	
(I _C = 0.1 mA _{dc} , V _{CE} = 3.0 V _{dc})			150	450	
(I _C = 0.5 mA _{dc} , V _{CE} = 3.0 V _{dc})			150	450	
(I _C = 1.0 mA _{dc} , V _{CE} = 3.0 V _{dc})			125	—	
(I _C = 10 mA _{dc} , V _{CE} = 3.0 V _{dc}) ⁽¹⁾			60	—	
(I _C = 0.1 mA _{dc} , V _{CE} = 5.0 V _{dc} , T _A = -55°C)			75	—	
(I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc})	2N3811		225	—	
(I _C = 0.01 mA _{dc} , V _{CE} = 5.0 V _{dc})			300	900	
(I _C = 0.1 mA _{dc} , V _{CE} = 5.0 V _{dc})			300	900	
(I _C = 0.5 mA _{dc} , V _{CE} = 5.0 V _{dc})			300	900	
(I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc})			250	—	
(I _C = 10 mA _{dc} , V _{CE} = 5.0 V _{dc})			100	—	
(I _C = 0.1 mA _{dc} , V _{CE} = 5.0 V _{dc} , T _A = -55°C)			—	—	
Collector-Emitter Saturation Voltage		V _{CE(sat)}	—	0.2	V _{dc}
(I _C = 0.1 mA _{dc} , I _B = 0.01 mA _{dc})			—	0.25	
(I _C = 1.0 mA _{dc} , I _B = 0.1 mA _{dc})			—	—	
Base-Emitter Saturation Voltage		V _{BE(on)}	—	0.7	V _{dc}
(I _C = 0.1 mA _{dc} , I _B = 0.01 mA _{dc})			—	0.8	
(I _C = 1.0 mA _{dc} , I _B = 0.1 mA _{dc})			—	—	
Base-Emitter Voltage		V _{BE}	—	0.7	V _{dc}
(I _C = 0.1 mA _{dc} , V _{CE} = 5.0 V _{dc})			—	—	
SMALL-SIGNAL CHARACTERISTICS					
Collector-Base Capacitance		C _{cb0}	—	5.0	pF
(V _{CB} = 5.0 V _{dc} , I _E = 0, f = 0.1 to 1.0 MHz)			—	—	
Input Capacitance		C _{ibo}	—	8.0	pF
(V _{EB} = 0.5 V _{dc} , I _C = 0, f = 0.1 to 1.0 MHz)			—	—	
Current Gain	2N3810 2N3811	h _{fe}	150 200	600 900	—
(I _C = 1.0 mA _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz)			—	—	
Small-Signal Current Transfer Ratio Magnitude		h _{fe}	1.0	—	—
(I _C = 0.5 mA _{dc} , V _{CE} = 5.0 V _{dc} , f = 30 MHz)			1.0	5.0	
(I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc} , f = 100 MHz)			—	—	
Input Impedance	2N3810 2N3811	h _{ie}	3.0 3.0	30 40	ohms
(I _C = 1.0 mA _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz)			—	—	
Voltage Feedback Ratio		h _{re}	—	25	X 10 ⁻⁴
(I _C = 1.0 mA _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz)			5.0	60	μmhos
Output Admittance		h _{oe}	—	—	—
(I _C = 1.0 mA _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz)			—	—	

(continued)

ELECTRICAL CHARACTERISTICS — continued (T _A = 25°C unless otherwise noted)		Symbol	Min	Max	Unit
SMALL-SIGNAL CHARACTERISTICS (continued)					
Noise Figure (R _G = 3.0 ohm)	2N3810	NF	—	7.0	dB
(I _C = 100 μA _{dc} , V _{CE} = 10 V _{dc} , f = 100 Hz)			—	3.0	
(I _C = 100 μA _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz)			—	2.5	
(I _C = 100 μA _{dc} , V _{CE} = 10 V _{dc} , f = 10 kHz)			—	3.5	
(I _C = 100 μA _{dc} , V _{CE} = 10 V _{dc} , f = 10 to 15.7 kHz)			—	—	
(I _C = 100 μA _{dc} , V _{CE} = 10 V _{dc} , f = 100 Hz)	2N3811		—	4.0	
(I _C = 100 μA _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz)			—	2.0	
(I _C = 100 μA _{dc} , V _{CE} = 10 V _{dc} , f = 10 kHz)			—	2.0	
(I _C = 100 μA _{dc} , V _{CE} = 10 V _{dc} , f = 10 to 15.7 kHz)			—	2.5	
MATCHING CHARACTERISTICS					
DC Current Gain Ratio ⁽²⁾		h _{FE1} /h _{FE2}	0.9	1.0	—
(I _C = 0.1 mA _{dc} , V _{CE} = 5.0 V _{dc})			—	—	
Base-Emitter Voltage Differential		V _{BE1} - V _{BE2}	—	5.0	mV _{dc}
(I _C = 10 μA _{dc} , V _{CE} = 5.0 V _{dc})			—	3.0	
(I _C = 100 μA _{dc} , V _{CE} = 5.0 V _{dc})			—	5.0	
(I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc})			—	—	
Base-Emitter Voltage Differential Change Due to Temperature		V _{BE1} - V _{BE2}	—	0.8	mV _{dc}
(I _C = 100 μA _{dc} , V _{CE} = 5.0 V _{dc})			—	1.0	
(T _A = 25°C to -55°C)			—	—	
(T _A = 25°C to 125°C)			—	—	
ASSURANCE TESTING (Pre/Post Burn-In)					
Burn-In Conditions: T _A = 25 ± 3°C, V _{CB} = 45 V _{dc} , 10 V _{dc} for JANS					
PT = 300 mW Each, 600 mW Both					
Characteristics Tested	Symbol	Initial and End Point Limits			Unit
		Min	Max		
Collector Cutoff Current (V _{CB} = 50 V _{dc})	I _{CBO}	—	10	nA _{dc}	
DC Current Gain ⁽¹⁾ (I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc})	h _{FE}	150	450	—	
		300	900		
Delta from Pre-Burn-In Measured Values					
Delta Collector Cutoff Current	ΔI _{CBO}	Min	Max	% of Initial Value	
		—	±100 or ±2.0 whichever is greater	nA _{dc}	
Delta DC Current Gain ⁽¹⁾	Δh _{FE}	Min	Max	% of Initial Value	
		—	±15	nA _{dc}	

(1) Pulsed Pulse Width 250 to 350 μs, Duty Cycle 1.0 to 2.0%.

(2) Larger value is the denominator.