

2N2060

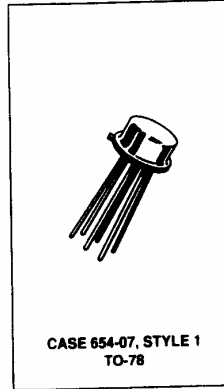
**Dual NPN Silicon  
Small-Signal Transistor**

... designed for general-purpose amplifier applications.

**CRYSTALONCS**  
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*Operation*

MAXIMUM RATINGS				
Rating	Symbol	Value		Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	60		Vdc
Collector-Base Voltage	V <sub>CBO</sub>	100		Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	7.0		Vdc
Collector Current — Continuous	I <sub>C</sub>	500		mAdc
		One Die	All Die Equal Power	
Device Dissipation	P <sub>T</sub>	540	600	mW
@ T <sub>A</sub> = 25 °C		3.08	3.43	mW/°C
Derate above 25 °C		1.5	2.12	Watts
@ T <sub>C</sub> = 25 °C		8.6	12.1	mW/°C
Derate above 25 °C				
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-65 to 200		°C



ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted.)				
Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Breakdown Voltage <sup>(1)</sup> (I <sub>C</sub> = 30 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	60	—	Vdc
Collector-Emitter Breakdown Voltage <sup>(1)</sup> (I <sub>C</sub> = 100 mAdc, R <sub>BE</sub> = 10 ohms max)	V <sub>(BR)CER</sub>	80	—	Vdc
Collector-Base Breakdown Voltage (I <sub>C</sub> = 100 μAdc, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	100	—	Vdc
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 100 μAdc, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	7.0	—	Vdc
Collector Cutoff Current (V <sub>CB</sub> = 80 Vdc)	I <sub>CBO</sub>	—	2.0	nAdc
(V <sub>CB</sub> = 80 Vdc, T <sub>A</sub> = 150 °C)		—	10	μAdc
Base Cutoff Current (V <sub>BE</sub> = 5.0 Vdc)	I <sub>EBO</sub>	—	2.0	nAdc

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

(continued)

2N2060JAN SERIES

ELECTRICAL CHARACTERISTICS — continued (T <sub>A</sub> = 25 °C unless otherwise noted.)				
Characteristic	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS</b>				
DC Current Gain (I <sub>C</sub> = 10 μAdc, V <sub>CE</sub> = 5.0 Vdc) (I <sub>C</sub> = 100 μAdc, V <sub>CE</sub> = 5.0 Vdc) (I <sub>C</sub> = 1.0 mAdc, V <sub>CE</sub> = 5.0 Vdc) (I <sub>C</sub> = 10 mAdc, V <sub>CE</sub> = 5.0 Vdc)(1) (I <sub>C</sub> = 100 μAdc, V <sub>CE</sub> = 5.0 Vdc, T <sub>A</sub> = -55°C)	h <sub>FE</sub>	25 30 40 50 10	75 90 120 150 —	—
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 50 mAdc, I <sub>B</sub> = 5.0 mAdc)	V <sub>CE(sat)</sub>	—	0.3	Vdc
Base-Emitter Saturation Voltage (I <sub>C</sub> = 50 mAdc, I <sub>B</sub> = 5.0 mAdc)	V <sub>BE(sat)</sub>	—	0.9	Vdc
<b>SMALL-SIGNAL CHARACTERISTICS</b>				
Output Capacitance (V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, f = 0.1 to 1.0 MHz)	C <sub>obo</sub>	—	15	pF
Input Capacitance (V <sub>EB</sub> = 0.5 Vdc, I <sub>C</sub> = 0, f = 0.1 to 1.0 MHz)	C <sub>ibo</sub>	—	85	pF
Noise Figure (I <sub>C</sub> = 300 μAdc, V <sub>CE</sub> = 10 Vdc) (f = 1.0 kHz, R <sub>G</sub> = 510 ohms) (f = 10 kHz, R <sub>G</sub> = 1.0 kohms)	NF	—	8.0 8.0	dB
Current Gain (I <sub>C</sub> = 1.0 mAdc, V <sub>CE</sub> = 5.0 Vdc, f = 1.0 kHz)	h <sub>fe</sub>	50	150	—
Small-Signal Current Transfer Ratio, Magnitude (I <sub>C</sub> = 50 mAdc, V <sub>CE</sub> = 10 Vdc, f = 20 MHz)	h <sub>fe</sub>	3.0	25	—
Input Impedance (I <sub>C</sub> = 1.0 mAdc, V <sub>CB</sub> = 5.0 Vdc, f = 1.0 kHz)	h <sub>ib</sub>	20	30	ohms
Input Impedance (I <sub>C</sub> = 1.0 mAdc, V <sub>CB</sub> = 5.0 Vdc, f = 1.0 kHz)	h <sub>ie</sub>	1.0	4.0	kohms
Output Admittance (I <sub>C</sub> = 1.0 mAdc, V <sub>CB</sub> = 5.0 Vdc, f = 1.0 kHz)	h <sub>oe</sub>	—	16	μmhos
<b>MATCHING CHARACTERISTICS</b>				
DC Current Gain Ratio (I <sub>C</sub> = 100 μAdc, V <sub>CE</sub> = 5.0 Vdc)(2) (I <sub>C</sub> = 1.0 mAdc, V <sub>CE</sub> = 5.0 Vdc)(2)	h <sub>FE1</sub> /h <sub>FE2</sub>	0.9 0.9	1.0 1.0	—
Base-Emitter Voltage Differential (I <sub>C</sub> = 100 μAdc, V <sub>CE</sub> = 5.0 Vdc) (I <sub>C</sub> = 1.0 mAdc, V <sub>CE</sub> = 5.0 Vdc)	V <sub>BE1</sub> - V <sub>BE2</sub>	— —	5.0 5.0	mVdc
ΔBase-Emitter Voltage Differential over Temperature (I <sub>C</sub> = 100 μAdc, V <sub>CE</sub> = 5.0 Vdc, T <sub>A</sub> = 25 to -55 °C) (I <sub>C</sub> = 100 μAdc, V <sub>CE</sub> = 5.0 Vdc, T <sub>A</sub> = 25 to 125 °C)	Δ(V <sub>BE1</sub> - V <sub>BE2</sub> )	— —	0.8 1.0	mVdc
Collector to Collector Leakage Current (V <sub>C1C2</sub> = 100 Vdc)	I <sub>C1C2</sub>	—	100	nAdc

(1) Pulsed. Pulse Width 250 to 350 μs. Duty Cycle 1% to 2.0%.  
 (2) The larger number will be placed in the denominator.