

## MULTIPLE (QUAD) NPN SILICON DUAL IN-LINE AND FLATPACK SWITCHING TRANSISTOR

Qualified per MIL-PRF-19500/559

### Devices

2N6989  
2N6989U

2N6990

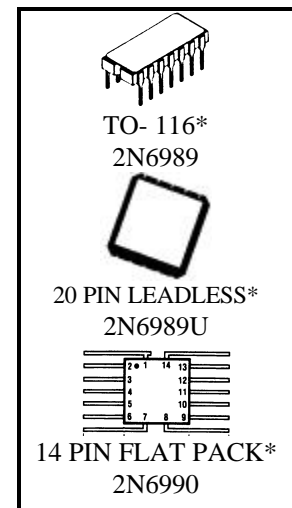
### Qualified Level

JAN  
JANTX  
JANTXV  
JANS

### MAXIMUM RATINGS <sup>(1)</sup>

Ratings	Symbol	Value	Units
Collector-Emitter Voltage <sup>(3)</sup>	V <sub>CEO</sub>	50	Vdc
Collector-Base Voltage <sup>(3)</sup>	V <sub>CBO</sub>	75	Vdc
Emitter-Base Voltage <sup>(3)</sup>	V <sub>EBO</sub>	6.0	Vdc
Collector Current <sup>(3)</sup>	I <sub>C</sub>	800	mAdc
Total Power Dissipation @ T <sub>A</sub> = +25°C	P <sub>D</sub>	1.5	W
2N6989 <sup>(2)</sup>		1.0	
2N6989U <sup>(2)</sup> 2N6990 <sup>(2)</sup>		0.4	
Operating & Storage Junction Temperature Range	T <sub>op</sub> , T <sub>stg</sub>	-65 to +200	°C

- 1) Maximum voltage between transistors shall be ≥ 500 Vdc
- 2) Derate linearly 8.57 mW/°C above T<sub>A</sub> = +25°C for 2N6989 and 2N6989U  
Derate linearly 2.286 mW/°C above T<sub>A</sub> = +25°C for 2N6990  
Ratings apply to total package.
- 3) Ratings apply to each transistor in the array.



\*See appendix A for package outline

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristics	Symbol	Min.	Max.	Unit
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#### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage I <sub>C</sub> = 10 mAdc	V <sub>(BR)CEO</sub>	50		Vdc
Collector-Base Cutoff Current V <sub>CB</sub> = 60 Vdc V <sub>CB</sub> = 75 Vdc; I <sub>c</sub> = 10 μAdc	I <sub>CBO</sub>		10 10	ηAdc μAdc
Emitter-Base Cutoff Current V <sub>EB</sub> = 4.0Vdc V <sub>EB</sub> = 6.0Vdc; I <sub>c</sub> = 10 μAdc	I <sub>EBO</sub>		10 10	ηAdc μAdc

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
<b>DC CHARACTERISTICS <sup>(4)</sup></b>				
Forward-Current Transfer Ratio I <sub>C</sub> = 0.1 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> I <sub>C</sub> = 150 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> I <sub>C</sub> = 500 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub>	h <sub>FE</sub>	50 75 100 100 30	325 300	
Collector-Emitter Saturation Voltage I <sub>C</sub> = 150 mA <sub>dc</sub> , I <sub>B</sub> = 15 mA <sub>dc</sub> I <sub>C</sub> = 500 mA <sub>dc</sub> , I <sub>B</sub> = 50 mA <sub>dc</sub>	V <sub>CE(sat)</sub>		0.3 1.0	V <sub>dc</sub>
Base-Emitter Saturation Voltage I <sub>C</sub> = 150 mA <sub>dc</sub> , I <sub>B</sub> = 15 mA <sub>dc</sub> I <sub>C</sub> = 500 mA <sub>dc</sub> , I <sub>B</sub> = 50 mA <sub>dc</sub>	V <sub>BE(sat)</sub>	0.6	1.2 2.0	V <sub>dc</sub>

**DYNAMIC CHARACTERISTICS**

Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio I <sub>C</sub> = 20 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 100 MHz	h <sub>fe</sub>	2.5	8.0	
Forward Current Transfer Ratio I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 1.0 kHz	h <sub>fe</sub>	50		
Output Capacitance V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, 100 kHz ≤ f ≤ 1.0 MHz	C <sub>obo</sub>		8.0	pF
Input Capacitance V <sub>EB</sub> = 0.5 V <sub>dc</sub> , I <sub>E</sub> = 0, 100 kHz ≤ f ≤ 1.0 MHz	C <sub>ibo</sub>		25	pF

(4) Pulse Test: Pulse Width = 300μs, Duty Cycle ≤ 2.0%.



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