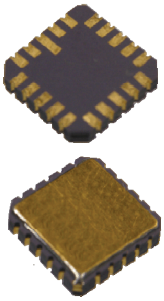
Surface Mount Quad NPN Transistor

2N6989U (TX, TXV)



Features:

- Ceramic 20 pin surface mount package
- Small package to minimize circuit board area
- Electrical performance similar to a 2N2222A
- Hermetically sealed
- Processed per MIL-PRF-19500/559

Description:

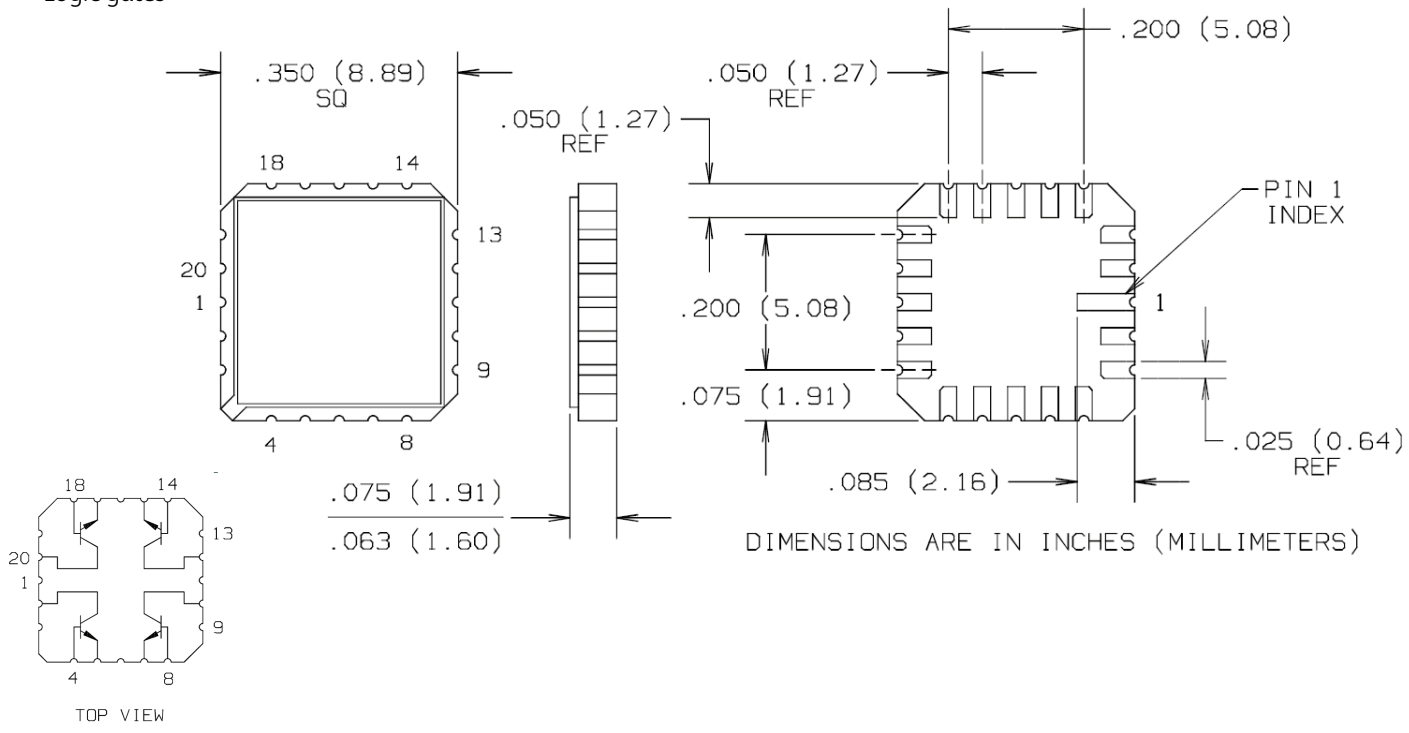
The 2N6989U (TX, TXV) is a hermetically sealed, ceramic surface-mount device, consisting of 4 silicon NPN transistors. The 20 pin ceramic package is ideal for designs where board space and device weight are important design considerations.

Typical screening lot acceptance test are per MIL-PRF-19500/559. The burn-in condition is V_{CB} = 30 V, P_D = 250 mW each transistor, T_A =25° C. Refer to MIL-PRF-19500/558 for complete requirements.

When ordering parts without processing, do not use the TX or TXV suffix.

Applications:

- General switching
- Amplification
- Signal processing
- Radio transmission
- Logic gates



General Note
TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

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Electrical Specifications

Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)	
Collector-Base Voltage	75 V
Collector-Emitter Voltage	50 V
Emitter-Base Voltage	6.0 V
Collector Current-Continuous	800 mA
Operating Junction Temperature (T_J)	-65° C to +200 °C
Storage Junction Temperature (T_{stg})	-65° C to +200 °C
Power Dissipation (single transistor, no heat sink)	0.5 W
Power Dissipation T_A = 25° C (four devices driven equally)	1.0 W(1)
Isolation Voltage	500 V

Electrical Characteristics (T_A = 25° C unless otherwise noted)

SYMBOL	PARAMETER	MIN	MAX	UNITS	TEST CONDITIONS
OFF CHARACTERISTICS					
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	75		V	I_C = 10 µA
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	50		V	I_C = 10 mA(2)
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	6		V	I_E = 10 µA
I_{CBO}	Collector-Base Cutoff Current		10	nA	V_{CB} = 60 V
I_{CBO2}	Emitter-Base Cutoff Current		10	µA	V_{CB} = 60 V, T_A = 150° C
I_{EBO}	Emitter-Base Cutoff Current		10	nA	V_{EB} = 4 V
ON CHARACTERISTICS					
$h_{FE\ 1}$	Forward-Current Transfer Ratio	50		-	V_{CE} = 10 V, I_C = 0.1 mA
$h_{FE\ 2}$	Forward-Current Transfer Ratio	75	325	-	V_{CE} = 10 V, I_C = 1.0 mA
$h_{FE\ 3}$	Forward-Current Transfer Ratio	100		-	V_{CE} = 10 V, I_C = 10 mA(2)
$h_{FE\ 4}$	Forward-Current Transfer Ratio	100	300	-	V_{CE} = 10 V, I_C = 150 mA(2)
$h_{FE\ 5}$	Forward-Current Transfer Ratio	30		-	V_{CE} = 10 V, I_C = 500 mA(2)
$h_{FE\ 6}$	Forward-Current Transfer Ratio	35		-	V_{CE} = 10 V, I_C = 10 mA, T_A = 55° C(2)

Note:

1. Derate linearly 8.57 mW/°C above T_A = 25°C
2. Pulse Width = 300 µs ±50, 1-2% Duty Cycle

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Electrical Characteristics (T_A = 25° C unless otherwise noted)					
SYMBOL	**PARAMETER**	**MIN**	**MAX**	**UNITS**	**TEST CONDITIONS**
ON CHARACTERISTICS					
$V_{CE\ (SAT)1}$	Collector-Emitter Saturation Voltage		0.3	V	I_C = 150 mA, I_B= 15 mA(2)
$V_{CE\ (SAT)2}$	Collector-Emitter Saturation Voltage		1.0	V	I_C = 500 mA, I_B= 50 mA(2)
$V_{CE\ (SAT)3}$	Collector-Emitter Saturation Voltage		0.45	V	I_C = 150 mA, I_B= 15 mA, T_A = 150° C(2)
$V_{BE(SAT)\ 1}$	Base-Emitter Saturation Voltage	0.6	1.2	V	I_C = 150 mA, I_B= 15 mA(2)
$V_{BE(SAT)\ 2}$	Base-Emitter Saturation Voltage		2.0	V	I_C = 500 mA, I_B= 50 mA(2)
$V_{BE(SAT)\ 3}$	Base-Emitter Saturation Voltage		1.4	V	I_C = 150 mA, I_B= 15 mA, T_A = 55° C(2)
SMALL-SIGNAL CHARACTERISTICS					
$\lvert h_{fe} \rvert$	Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio	2.5	8.0	-	V_{CE} = 10 V, I_C = 20 mA, f = 100 MHz
h_{fe}	Small Signal Short Circuit Forward Current Transfer Ratio	50		-	V_{CE} = 10 V, I_C = 1 mA, f = 1 kHz
C_{obo}	Open Circuit Output Capacitance		8	pF	V_{CB} = 10 V, I_E = 0, 100 kHz ≤ f ≤ 1 MHZ
C_{ibo}	Input Capacitance (Output Open)		33	pF	V_{EB} = 0.5 V, I_C =0, 100 kHz ≤ f ≤ 1 MHZ
SWITCHING CHARACTERISTICS					
t_{on}	Turn-On Time		35	ns	V_{CC} = 30 V, I_C = 150 mA, I_B = 15 mA
t_{off}	Turn-Off Time		300	ns	V_{CC} = 30 V, I_C = 150 mA, I_{B1} = I_{B2} = 15 mA
TRANSISTOR TO TRANSISTOR ISOLATION					
R_{t-t}	Isolation Resistance	10k		MΩ	V_{t-t} = 500 V

Note:

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