

**2N4033**

## Features

- Meets MIL-S-19500/512
- Collector-Base Voltage 80V
- Collector Current: 1.0 A
- Fast Switching 250 nS

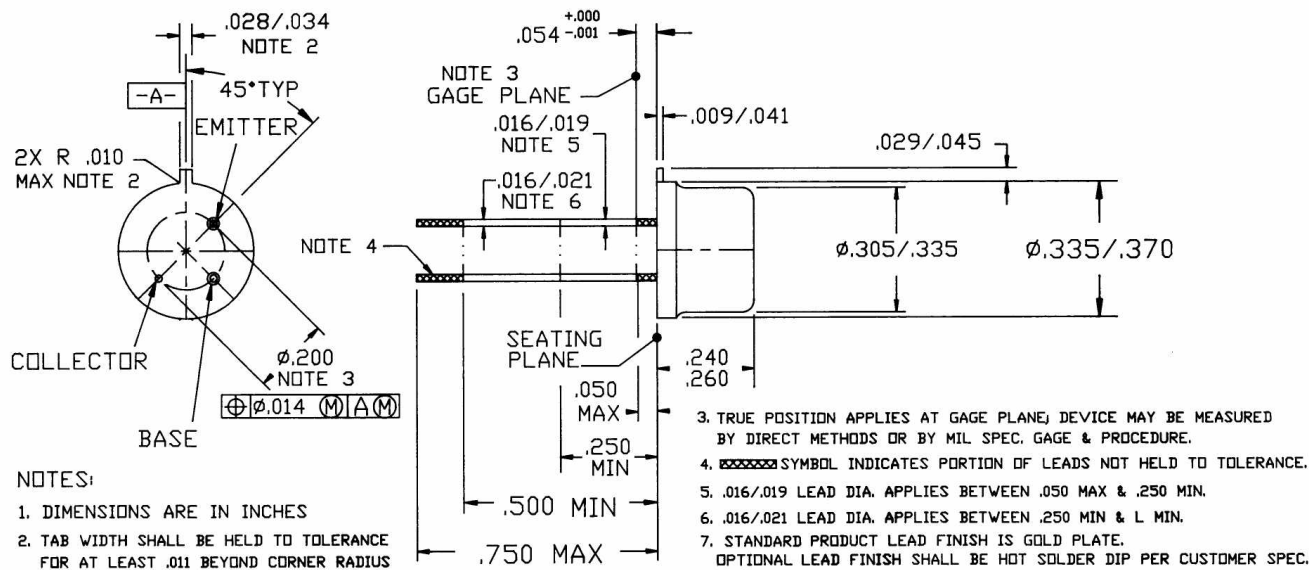
**80 Volts  
1.0 Amps**

**PNP  
BIPOLAR  
TRANSISTOR**

## Maximum Ratings

RATING	SYMBOL	MAX.	UNIT
Collector-Emitter Voltage	$V_{CEO}$	-80	Vdc
Collector-Base Voltage	$V_{CBO}$	-80	Vdc
Emitter-Base Voltage	$V_{EBO}$	-5.0	Vdc
Collector Current--Continuous	$I_C$	-1.0	Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	0.8 4.56	W mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	4.0 22.8	W mW/ $^\circ\text{C}$
Operating Temperature Range	$T_J$	-55 to +200	$^\circ\text{C}$
Storage Temperature Range	$T_S$	-55 to +200	$^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	140	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	25	$^\circ\text{C/W}$

## Mechanical Outline



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### Electrical Parameters (T<sub>A</sub> @ 25°C unless otherwise specified)

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>Off Characteristics</b>					
Collector-Emitter Breakdown Voltage(1) (I <sub>C</sub> = -10 mA)	<b>BV<sub>CEO</sub></b>	-80		--	V
Collector-Base Breakdown Voltage (I <sub>C</sub> = -10 μA)	<b>BV<sub>CB0</sub></b>	-80		--	V
Emitter-Base Breakdown Voltage (I <sub>E</sub> = -10 uA)	<b>BV<sub>EBO</sub></b>	-5.0		--	V
Collector Cutoff Current (V <sub>CB</sub> = -60 V) (V <sub>CB</sub> = -60 V, T <sub>A</sub> = 150°C)	<b>I<sub>CBO</sub></b>	--		-10 -25	nA uA
Emitter Cutoff Current (V <sub>EB</sub> = -3.0 V)	<b>I<sub>EBO</sub></b>	--		-25	nA
D.C. Current Gain (I <sub>C</sub> = -500 mA, V <sub>CE</sub> = -5.0 V @ -55°C)(1) (I <sub>C</sub> = -100 μA, V <sub>CE</sub> = -5.0 V) (I <sub>C</sub> = -100 mA, V <sub>CE</sub> = -5.0 V)(1) (I <sub>C</sub> = -500 mA, V <sub>CE</sub> = -5.0 V)(1) (I <sub>C</sub> = -1.0 A, V <sub>CE</sub> = -5 V)(1)	<b>h<sub>FE</sub></b>	30 50 100 70 25		-- -- 300 -- --	--
Collector-Emitter Saturation Voltage(1) (I <sub>C</sub> = -150 mA, I <sub>B</sub> = -15 mA) (I <sub>C</sub> = -500 mA, I <sub>B</sub> = -50 mA) (I <sub>C</sub> = -1.0A, I <sub>B</sub> = -100mA)	<b>V<sub>CE(Sat)</sub></b>	--		-0.15 -0.50 1.0	V
Base-Emitter Saturation Voltage(1) (I <sub>C</sub> = -150 mA, I <sub>B</sub> = -15 mA)	<b>V<sub>BE(Sat)</sub></b>	--		-0.9	V
Base-Emitter On Voltage (I <sub>C</sub> = -500 mA, V <sub>CE</sub> = -0.5 V)(1)	<b>V<sub>BE(Sat)</sub></b>	--		-1.2	V
Output Capacitance (V <sub>CE</sub> = -10 V, 100kHz ≤ f ≤ 1.0MHz)	<b>C<sub>OBO</sub></b>	--		20	pF
Input Capacitance (V <sub>CE</sub> = -0.5 V, 100kHz ≤ f ≤ 1.0 MHz)	<b>C<sub>IBO</sub></b>	--		80	pF
Small Signal Current Gain (I <sub>C</sub> = -50 mA, V <sub>CE</sub> = -10 V, f = 100 MHz)	<b>/h<sub>fe</sub>/</b>	1.5		6.0	
Switching Speeds					ns
Delay Time (I <sub>C</sub> = 500mAdc; I <sub>B</sub> = 50mAdc)	<b>t<sub>d</sub></b>	--		15	
Rise Time (I <sub>C</sub> = 500mAdc; I <sub>B</sub> = 50mAdc)	<b>t<sub>r</sub></b>	--		25	
Storage Time (I <sub>C</sub> = 500mAdc; I <sub>B1</sub> = I <sub>B2</sub> = 50mAdc)	<b>t<sub>s</sub></b>	--		175	
Fall Time (I <sub>C</sub> = 500mAdc; I <sub>B1</sub> = I <sub>B2</sub> = 50mAdc)	<b>t<sub>f</sub></b>	--		35	