

**2N3700**

## Features

- Meets MIL-S-19500/391
- Collector-Base Voltage 140V
- Fast Switching 30 nS

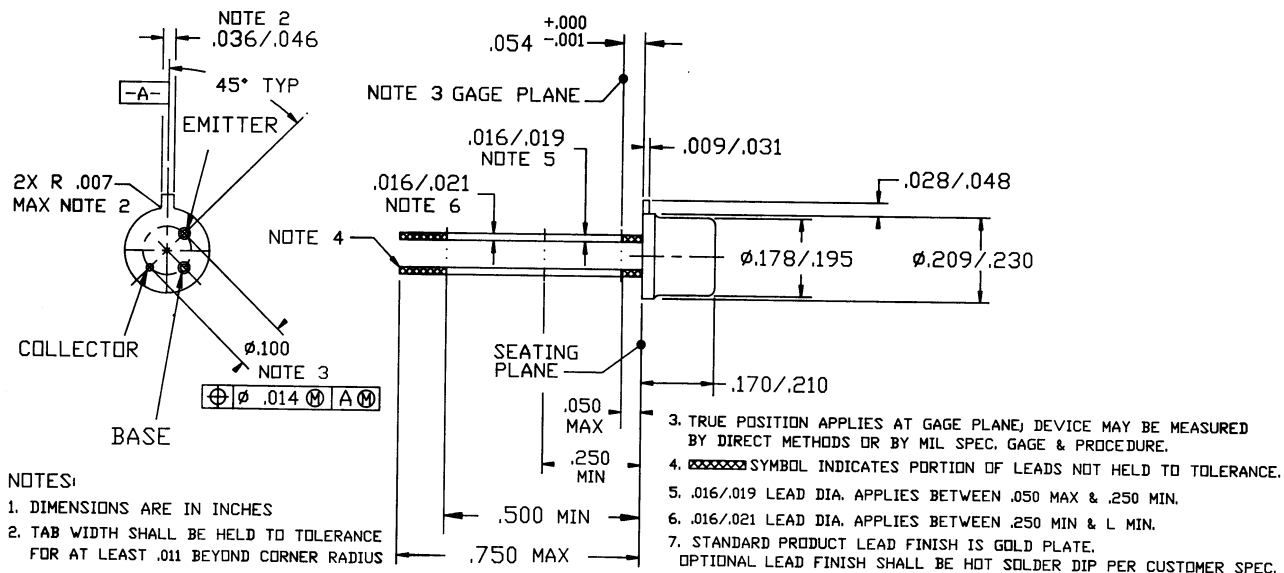
**140 Volts  
1 Amp**

**NPN  
BIPOLAR  
TRANSISTOR**

## Maximum Ratings

RATING	SYMBOL	MAX.	UNIT
Collector-Emitter Voltage	$V_{CEO}$	80	Vdc
Collector-Base Voltage	$V_{CBO}$	140	Vdc
Emitter-Base Voltage	$V_{EBO}$	7.0	Vdc
Total Device Dissipation @ TA = 25°C Derate above 25°C	$P_D$	0.5 2.85	Watts mW/°C
Total Device Dissipation @ TA = 25°C Derate above 25°C	$P_D$	1.8 10.3	Watts mW/°C
Operating Temperature Range	$T_J$	-55 to +175	°C
Storage Temperature Range	$T_s$	-55 to +175	°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	300	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83	°C/W

## Mechanical Outline



**2N3700**

## 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 (I <sub>C</sub> = 30 mA <sub>dc</sub> , I <sub>B</sub> = 0)	<b>BV<sub>CEO</sub></b>	80		--	V <sub>dc</sub>
Collector-Base Breakdown Voltage (I <sub>C</sub> = 100 μA <sub>dc</sub> , I <sub>E</sub> = 0)	<b>BV<sub>CEO</sub></b>	140		--	V <sub>dc</sub>
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 100 μA <sub>dc</sub> , I <sub>C</sub> = 0)	<b>BV<sub>EBO</sub></b>	7.0		--	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> = 90 V <sub>dc</sub> , I <sub>E</sub> = 0) (V <sub>CB</sub> = 90 V <sub>dc</sub> , I <sub>E</sub> = 0, T <sub>A</sub> = + 150°C)	<b>I<sub>CES</sub></b>	--		0.01 10	μA <sub>dc</sub>
Emitter Cutoff Current (V <sub>EB</sub> = 5.0 V <sub>dc</sub> , I <sub>C</sub> = 0)	<b>I<sub>EBO</sub></b>	--		10	nA <sub>dc</sub>
D.C. Current Gain (I <sub>C</sub> = 0.1 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> )(1) (I <sub>C</sub> = 150 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )(1) (I <sub>C</sub> = 150 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , T <sub>C</sub> = -55°C)(1) (I <sub>C</sub> = 500 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )(1) (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )	<b>h<sub>FE</sub></b>				--
Collector-Emitter Saturation Voltage(1) (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> )	<b>V<sub>CE(Sat)</sub></b>	--		0.2 0.5	V <sub>dc</sub>
Base-Emitter Saturation Voltage(1) (I <sub>C</sub> = 150 mA <sub>dc</sub> , I <sub>B</sub> = 15 mA <sub>dc</sub> )	<b>V<sub>BE(Sat)</sub></b>	--		1.1	V <sub>dc</sub>
Small-signal short circuit forward current transfer ratio (I <sub>C</sub> = 50 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 20 MHz)	<b>/h<sub>fe</sub>/</b>	5		20	
Output Capacitance (V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, 100kHz ≤ f ≤ 1MHz)	<b>C<sub>OBO</sub></b>	--		12	pf
Input Capacitance (V <sub>EB</sub> = 0.5 V <sub>dc</sub> , I <sub>C</sub> = 0, 100kHz ≤ f ≤ 1MHz)	<b>C<sub>IBo</sub></b>	--		60	pf
Small—Signal Current Gain (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> , f = 1.0 MHz)	<b>h<sub>fe</sub></b>	80		400	--
Collector Base Time Constant (I <sub>E</sub> = 10 mA <sub>dc</sub> , V <sub>CB</sub> = 10 V <sub>dc</sub> , f = 79.8 MHz)	<b>rb'C<sub>C</sub></b>			400	ps
Noise Figure (I <sub>C</sub> = 100 μA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , R <sub>g</sub> = 1.0 k ohms, f = 200Hz)	<b>NF</b>	--		4	dB

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 1.0%.