

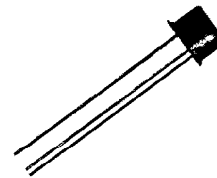
NPN EPITAXIAL PLANAR SILICON POWER TRANSISTORS

... for power-amplifier and high-speed-switching applications.

- 15 WATT @ 100°C CASE TEMPERATURE
- MAXIMUM $V_{CE(SAT)} = 0.3$ VOLTS @ 1.0 AMP. I_C
- TYPICAL $t_{ON} = 130$ ns @ 1.0 AMP. I_C
- MINIMUM $f_T = 30$ MHz

NPN EPITAXIAL PLANAR SILICON POWER TRANSISTOR

TO-5



MAXIMUM RATINGS

RATINGS	SYMBOL	2N4300	UNITS
Collector-Emitter Voltage ¹	V_{CEO}	80	Vdc
Collector-Base Voltage	V_{CBO}	100	Vdc
Emitter-Base Voltage	V_{EBO}	8.0	Vdc
Collector Current -- Continuous	I_C	2.0	Adc
Peak ²		4.0	Adc
Base Current -- Continuous	I_B	1.0	Adc
Emitter Current--Continuous	I_E	3.0	Adc
Total Power Dissipation @ $T_C = 25^\circ C^3$	P_D	1.0	W
Derate above $25^\circ C^4$		15	W/°C
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	°C
Lead temperature $\frac{1}{4}$ inch from Case for 10 seconds	T_L	230	°C

THERMAL CHARACTERISTICS

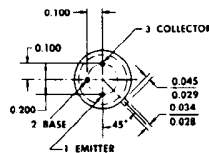
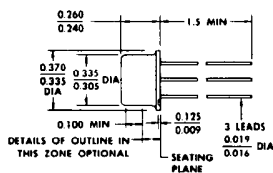
CHARACTERISTICS	SYMBOL	MAX.	UNITS
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	6.66	°C/W
Thermal Resistance, Junction-to-Free-Air	$R_{\theta JA}$	175	°C/W

¹This value applies when the base-emitter diode is open-circuited. ³Derate linearly to 200°C free air temperature at the rate of 5.72 mW/°

²This value applies for $t_p \leq 0.3$ ms, duty cycle $\leq 10\%$.

⁴Derate linearly to 200°C case temperature at the rate of 0.15 W/°

MECHANICAL OUTLINE



THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE CASE.

ALL JEDEC TO-5 DIMENSIONS AND NOTES ARE APPLICABLE.

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED

NEW ENGLAND SEMICONDUCTOR

6 Lake Street Lawrence, MA 01841
1-800-446-1158 / (978) 794-1666 / FAX: (978) 689-0803

T4-4.860-329 REV: --



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NEW ENGLAND SEMICONDUCTOR

2N4300

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}\text{C}$ unless otherwise noted)

Characteristics	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage ⁵ $I_C = 30 \text{ mAdc}, I_B = 0$	$V_{(BR)CEO}$	80		Vdc
Collector Cutoff Current $V_{CE} = 40 \text{ Vdc}, I_B = 0$	I_{CFO}		1.0	μAdc
Collector Cutoff Current $V_{CE} = 90 \text{ Vdc}, V_{BE} = 0$ $V_{CE} = 90 \text{ Vdc}, V_{BE} = 0, T_C = 150^{\circ}\text{C}$	I_{CES}		10 75	μAdc μAdc
Emitter Cutoff Current $V_{EB} = 5.0 \text{ Vdc}, I_C = 0$ $V_{EB} = 8.0 \text{ Vdc}, I_C = 0$	I_{EBO}		0.5 10	μAdc
ON CHARACTERISTICS^{5 & 6}				
Static Forward Current Transfer Ratio $I_C = 1.0 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ $I_C = 2.0 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$	h_{FE}	30 15	120	
Collector-Emitter Saturation Voltage $I_C = 1.0 \text{ Adc}, I_B = 100 \text{ mAdc}$ $I_C = 2.0 \text{ Adc}, I_B = 200 \text{ mAdc}$	$V_{CE(sat)}$		0.3 0.5	Vdc
Base-Emitter Voltage $I_C = 2.0 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$	V_{BE}		1.2	Vdc
DYNAMIC CHARACTERISTICS				
Forward Current Transfer Ratio $I_C = 1.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}, f = 1 \text{ kHz}$	h_{fe}	30		
Forward Current Transfer Ratio $I_C = 1.0 \text{ Adc}, V_{CE} = 10 \text{ Vdc}, f = 15 \text{ MHz}$	$ h_{fe} $	2.0		
SWITCHING CHARACTERISTICS				
Characteristics	Symbol	Typical	Units	
Turn-On Time	t_{on}	0.13	μs	
Turn-Off Time	t_{off}	1.5	μs	

⁵These parameters must be measured using pulse techniques, $I_p = 300 \mu\text{s}$, duty cycle $\leq 2.0\%$.

⁶These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts.

SX LEVEL RELIABILITY TESTING

100% SCREENING	GROUP A	GROUP B (Sample)	GROUP C (Sample)
Internal Visual	Visual and Mechanical	Solderability	Physical Dimensions
Temp Cycle	DC Static Tests 25°C	Temp Cycle	Thermal Shock
Thermal Response	DC Static Tests High Temp	Fine and Gross Leak	Terminal Strength
Constant Acceleration	DC Static Tests Low Temp	Bond Strength	Hermetic Seal
PIND	Dynamic Tests @ 25°C	Intermittent Op Life	Moisture Resistance
Fine and Gross Leak		Steady State Op Life	Shock Test
HTRB		Thermal Resistance	Vibration Test
Power Burn In		Hi-Temp (non-operating)	Constant Acceleration
			Salt Atmosphere
			Operation Life

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