
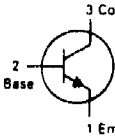


**2N3300**

TO-39

GENERAL PURPOSE  
TRANSISTOR






3 Collector  
2 Base  
1 Emitter

**2N3302**

TO-18

GENERAL PURPOSE  
TRANSISTOR



NPN SILICON

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit	
Collector-Emitter Voltage (Applicable 0 to 10 mAdc)	V <sub>CEO</sub>	30	Vdc	
Collector-Base Voltage	V <sub>CB0</sub>	60	Vdc	
Emitter-Base Voltage	V <sub>EB0</sub>	5.0	Vdc	
Collector Current — Continuous	I <sub>C</sub>	500	mAdc	
Total Device Dissipation (at T <sub>A</sub> = 25°C Derate above 25°C)	P <sub>D</sub>	2N3300	0.8	Watt mW/°C
		2N3302	0.36	
Total Device Dissipation (at T <sub>C</sub> = 25°C Derate above 25°C)	P <sub>D</sub>	2N3300	3.0	Watts mW/°C
		2N3302	1.8	
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-65 to +200	°C	

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Sustaining Voltage(1) (I <sub>C</sub> = 10 mAdc, I <sub>B</sub> = 0)	V <sub>CEO(sus)</sub>	30	—	Vdc
Collector-Base Breakdown Voltage (I <sub>C</sub> = 10 μAdc, I <sub>E</sub> = 0)	V <sub>(BR)CB0</sub>	60	—	Vdc
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 10 μAdc, I <sub>C</sub> = 0)	V <sub>(BR)EB0</sub>	5.0	—	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 50 Vdc, V <sub>BE</sub> = 0) (V <sub>CE</sub> = 50 Vdc, V <sub>BE</sub> = 0, T <sub>A</sub> = 150°C)	I <sub>CES</sub>	—	0.01	μAdc
		—	10	
Emitter Cutoff Current (V <sub>BE</sub> = 3.0 Vdc, I <sub>C</sub> = 0)	I <sub>EBO</sub>	—	10	nAdc
Base Current (V <sub>CE</sub> = 50 Vdc, V <sub>BE</sub> = 0)	I <sub>B</sub>	—	10	nAdc
<b>ON CHARACTERISTICS</b>				
DC Current Gain (I <sub>C</sub> = 0.1 mAdc, V <sub>CE</sub> = 10 Vdc) (I <sub>C</sub> = 1.0 mAdc, V <sub>CE</sub> = 10 Vdc) (I <sub>C</sub> = 10 mAdc, V <sub>CE</sub> = 10 Vdc)(1) (I <sub>C</sub> = 150 mAdc, V <sub>CE</sub> = 1.0 Vdc)(1) (I <sub>C</sub> = 150 mAdc, V <sub>CE</sub> = 10 Vdc)(1) (I <sub>C</sub> = 500 mAdc, V <sub>CE</sub> = 10 Vdc)(1)	h <sub>FE</sub>	35 50 75 50 100 50	— — — — 300 —	—
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 150 mAdc, I <sub>B</sub> = 15 mAdc) (I <sub>C</sub> = 300 mAdc, I <sub>B</sub> = 30 mAdc) (I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 50 mAdc)	V <sub>CE(sat)</sub>	—	0.22	Vdc
		—	0.45	
		—	0.6	
Base-Emitter Saturation Voltage (I <sub>C</sub> = 150 mAdc, I <sub>B</sub> = 15 mAdc) (I <sub>C</sub> = 300 mAdc, I <sub>B</sub> = 30 mAdc) (I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 50 mAdc)	V <sub>BE(sat)</sub>	—	1.1	Vdc
		—	1.3	
		—	1.5	
Base Emitter Voltage (I <sub>C</sub> = 150 mA, V <sub>CE</sub> = 10 V)	V <sub>BE(on)</sub>	—	1.1 V	Max
<b>SMALL-SIGNAL CHARACTERISTICS</b>				
Current-Gain — Bandwidth Product (I <sub>C</sub> = 50 mAdc, V <sub>CE</sub> = 10 Vdc, f = 100 MHz)	f <sub>T</sub>	250	—	MHz
Output Capacitance (V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, f = 140 kHz)	C <sub>ob0</sub>	—	8.0	pF
Input Capacitance (V <sub>BE</sub> = 2.0 Vdc, I <sub>C</sub> = 0, f = 140 kHz)	C <sub>ib0</sub>	—	20	pF
<b>SWITCHING CHARACTERISTICS</b>				
Turn-On Time (V <sub>CC</sub> = 25 Vdc, I <sub>C</sub> = 300 mAdc, I <sub>B1</sub> = 30 mAdc)	t <sub>on</sub>	—	60	ns
Turn-Off Time (V <sub>CC</sub> = 25 Vdc, I <sub>C</sub> = 300 mAdc, I <sub>B1</sub> = I <sub>B2</sub> = 30 mAdc)	t <sub>off</sub>	—	150	ns

(1) Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%.

