2N3299
2N3300

CASE 79, STYLE 1
TO-39 (TO-205AD)

GENERAL PURPOSE TRANSISTOR

2N3301
2N3302

CASE 22, STYLE 1
TO-18 (TO-206AA)

GENERAL PURPOSE TRANSISTOR

NPN SILICON

Refer to 2N2218 for graphs.

MAXIMUM RATINGS

Rating	Symbol	Value		Unit
Collector-Emitter Voltage (Applicable 0 to 10 mAdc)	V_{CEO}	30		Vdc
Collector-Base Voltage	V_{CBO}	60		Vdc
Emitter-Base Voltage	V_{EBO}	5.0		Vdc
Collector Current — Continuous	I_C	500		mAdc
		2N3299 2N3300	2N3301 2N3302	
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	0.8 4.56	0.36 2.06	Watt mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	3.0 17.2	1.8 10.3	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200		°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Sustaining Voltage(1) (I_C = 10 mAdc, I_B = 0)		$V_{CEO(sus)}$	30	—	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)		$V_{(BR)CBO}$	60	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)		$V_{(BR)EBO}$	5.0	—	Vdc
Collector Cutoff Current (V_{CE} = 50 Vdc, V_{BE} = 0) (V_{CE} = 50 Vdc, V_{BE} = 0, T_A = 150°C)		I_{CES}	— —	0.01 10	μAdc
Emitter Cutoff Current (V_{BE} = 3.0 Vdc, I_C = 0)		I_{EBO}	—	10	nAdc
Base Current (V_{CE} = 50 Vdc, V_{BE} = 0)		I_B	—	10	nAdc
ON CHARACTERISTICS					
DC Current Gain	2N3299, 2N3301	h_{FE}	20	—	—
(I_C = 0.1 mAdc, V_{CE} = 10 Vdc)	2N3300, 2N3302		35	—	
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc)	2N3299, 2N3301		25	—	
	2N3300, 2N3302		50	—	
(I_C = 10 mAdc, V_{CE} = 10 Vdc)(1)	2N3299, 2N3301		35	—	
	2N3300, 2N3302		75	—	
(I_C = 150 mAdc, V_{CE} = 1.0 Vdc)(1)	2N3299, 2N3301		20	—	
	2N3300, 2N3302		50	—	
(I_C = 150 mAdc, V_{CE} = 10 Vdc)(1)	2N3299, 2N3301		40	120	
	2N3300, 2N3302		100	300	
(I_C = 500 mAdc, V_{CE} = 10 Vdc)(1)	2N3299, 2N3301		20	—	
	2N3300, 2N3302		50	—	
Collector-Emitter Saturation Voltage (I_C = 150 mAdc, I_B = 15 mAdc) (I_C = 300 mAdc, I_B = 30 mAdc) (I_C = 500 mAdc, I_B = 50 mAdc)		$V_{CE(sat)}$	— — —	0.22 0.45 0.6	Vdc
Base-Emitter Saturation Voltage (I_C = 150 mAdc, I_B = 15 mAdc) (I_C = 300 mAdc, I_B = 30 mAdc) (I_C = 500 mAdc, I_B = 50 mAdc)		$V_{BE(sat)}$	— — —	1.1 1.3 1.5	Vdc
Base Emitter Voltage (I_C = 150 mA, V_{CE} = 10 V)		$V_{BE(on)}$	—	1.1 V	Max
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)		f_T	250	—	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 140 kHz)		C_{obo}	—	8.0	pF
Input Capacitance (V_{BE} = 2.0 Vdc, I_C = 0, f = 140 kHz)		C_{ibo}	—	20	pF
SWITCHING CHARACTERISTICS					
Turn-On Time (V_{CC} = 25 Vdc, I_C = 300 mAdc, I_{B1} = 30 mAdc)		t_{on}	—	60	ns
Turn-Off Time (V_{CC} = 25 Vdc, I_C = 300 mAdc, I_{B1} = I_{B2} = 30 mAdc)		t_{off}	—	150	ns

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