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2N4398 & 2N4399
Silicon PNP Transistor
High Power

Description:

The 2N4398 and 2N4399 are silicon PNP high power transistors in a TO3 type package designed for use in power amplifier and switching circuits.

Features:

- Low Collector–Emitter Saturation Voltage: I_C = 15A, $V_{CE(sat)}$ = 1.0V Max
- DC Current Gain Specified: 1.0 o 30A

Absolute Maximum Ratings:

Collector–Emitter Voltage, V_{CEO}
- 2N4398 . . . . . 40V
- 2N4399 . . . . . 60V

Collector–Base Voltage, V_{CB}
- 2N4398 . . . . . 40V
- 2N4399 . . . . . 60V

Emitter–Base Voltage, V_{EB} 5.0V

Collector Current, I_C
- Continuous 30A
- Peak 50A

Base Current, I_B
- Continuous 7.5A
- Peak 15A

Total Power Dissipation, P_D
- T_A = +25°C 5W
  - Derate Above +25°C . . . . . 28.8W/°C
- T_C = +25°C 200W
  - Derate Above +25°C . . . . . 1.15W/°C

Operating Junction Temperature Range, T_j . . . . . –65° to +200°C

Storage Temperature Range, T_{stg} . . . . . –65° to +200°C

Thermal Resistance, Junction–to–Case, R_{thJC} . . . . . 0.875°C/W

Thermal Resistance, Junction–to–Ambient, R_{thJA} . . . . . 35°C/W

Electrical Characteristics: (T_C = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
Collector–Emitter Sustaining Voltage 2N4398	$V_{CEO(SUS)}$	I_C = 200mA, I_B = 0, Note 1	40	–	–	V
2N4399			60	–	–	V
Collector Cutoff Current	I_{CEO}	V_{CE} = Rated Value, $V_{BE(OFF)}$ = 1.5V	–	–	5	mA
	I_{CEX}	V_{CE} = 30V, $V_{BE(OFF)}$ = 1.5V	–	–	5	mA
		T_C = +150°C	–	–	10	mA
	I_{CBO}	V_{CE} = Rated Value, I_E = 0	–	–	1	mA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 5V, I_c = 0	–	–	5	mA

Note 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

Electrical Characteristics (Cont'd): (T_C = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
On Characteristics (Note 1)							
DC Current Gain	h_{FE}	V_{CE} = 2V	I_C = 1A	40	–	–	
			I_C = 15A	15	–	60	
			I_C = 30A	5	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 10A, I_B = 1A		–	–	0.75	V
		I_C = 15A, I_B = 1.5A		–	–	1.0	V
		I_C = 20A, I_B = 2A		–	–	2.0	V
		I_C = 30A, I_B = 6A		–	–	4.0	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	I_C = 10A, I_B = 1A		–	–	1.6	V
		I_C = 15A, I_B = 1.5A		–	–	1.85	V
		I_C = 20A, I_B = 2A		–	–	2.5	V
Base–Emitter ON Voltage	$V_{BE(on)}$	I_C = 15A, V_{CE} = 2V		–	–	1.7	V
		I_C = 30A, V_{CE} = 4V		–	–	3.0	V
Dynamic Characteristics							
Current Gain Bandwidth Product	f_T	I_C = 1A, V_{CE} = 10V, f = 1MHz		4	–	–	MHz
Small–Signal Current Gain	h_{fe}	I_C = 1A, V_{CE} = 10V, f = 1MHz		40	–	–	
Switching Characteristics							
Rise Time	t_r	V_{CC} = 30V, I_C = 10A, I_{B1} = I_{B2} = 1A		–	–	0.4	us
Storage Time	t_s			–	–	1.5	us
Fall Time	t_f			–	–	0.6	us

Note 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.