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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 to 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		
$T_A = +25^\circ C$	.....	5W
Derate Above $+25^\circ C$	.....	28.8W/ $^\circ C$
$T_C = +25^\circ C$	.....	200W
Derate Above $+25^\circ C$	.....	1.15W/ $^\circ C$
Operating Junction Temperature Range, T_j		-65° to $+200^\circ C$
Storage Temperature Range, T_{stg}		-65° to $+200^\circ C$
Thermal Resistance, Junction-to-Case, R_{thJC}		0.875 $^\circ C/W$
Thermal Resistance, Junction-to-Ambient, R_{thJA}		35 $^\circ C/W$

Electrical Characteristics: ($T_C = +25^\circ C$ unless otherwise specified)

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

Note 1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

Electrical Characteristics (Cont'd): ($T_C = +25^\circ\text{C}$ 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 $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

