

# 2N4999

- HIGH POWER ..... 30 WATTS AT  $T_C = 50^\circ\text{C}$ ,  $V_{CE} = -40\text{ V}$
- HIGH VOLTAGE .....  $-80\text{ V (MIN) } LV_{CEO}$
- HIGH CURRENT SATURATION VOLTAGE ...  $-0.85\text{ V (MAX) } V_{CE(sat)}$  AT  $I_C = 2.0\text{ A}$
- HIGH FREQUENCY ..... 50 AND 60 MHz (MIN)  $f_T$
- BETA GUARANTEED AT 3 POINTS ..... 50 mA, 1.0 A AND 2.0 A
- ISOLATED COLLECTOR PACKAGE ..... NO ISOLATING HARDWARE REQUIRED
- DISCRETE EMITTER GEOMETRY WITH INTEGRATED FEEDBACK RESISTORS

### ABSOLUTE MAXIMUM RATINGS (Note 1)

#### Maximum Temperatures

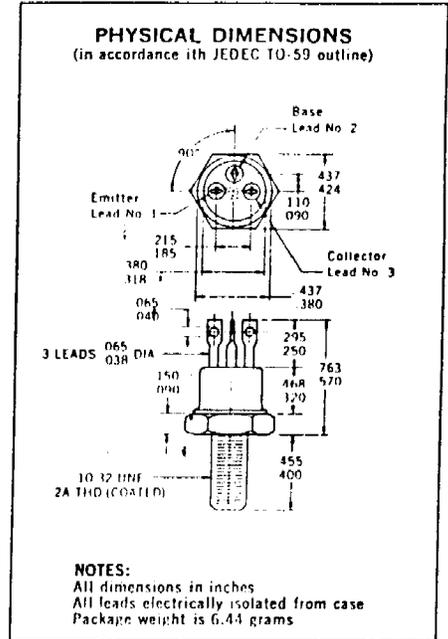
Storage Temperature	$-65^\circ\text{C to } +200^\circ\text{C}$
Operating Junction Temperature	$-65^\circ\text{C to } +200^\circ\text{C}$
Lead Temperature (Soldering, 60 second time limit)	$+300^\circ\text{C}$

#### Maximum Power Dissipation

Total Dissipation at $50^\circ\text{C}$ Case Temperature, $V_{CE} = -40\text{ V}$	30 Watts
(See Maximum Permissible Power Curve and Note 4)	

#### Maximum Voltages and Current

$V_{CES}$	Collector to Emitter Voltage	$-100\text{ Volts}$
$V_{CEO}$	Collector to Emitter Voltage (Note 2)	$-80\text{ Volts}$
$V_{EBO}$	Emitter to Base Voltage	$-5.5\text{ Volts}$
$I_C$	Collector Current	2.0 Amps



NOTES:  
All dimensions in inches  
All leads electrically isolated from case  
Package weight is 6.44 grams

### ELECTRICAL CHARACTERISTICS (25°C Case Temperature unless otherwise noted)

SYMBOL	CHARACTERISTICS	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Notes 2 and 3)	-80			Volts	$I_C = 100\text{ mA}$ $I_B = 0$
$BV_{CES}$	Collector to Emitter Breakdown Voltage	-100			Volts	$I_C = 1.0\text{ mA}$ $V_{BE} = 0$
$BV_{ERO}$	Emitter to Base Breakdown Voltage	-5.5			Volts	$I_C = 0$ $I_E = 1.0\text{ mA}$
$h_{FE}$	DC Pulse Current Gain (Note 3)	20	39			$I_C = 50\text{ mA}$ $V_{CE} = -5.0\text{ V}$
$h_{FE}$	DC Pulse Current Gain (Note 3)	30	40	90		$I_C = 1.0\text{ A}$ $V_{CE} = -5.0\text{ V}$
$h_{FE}(-55^\circ\text{C})$	DC Pulse Current Gain (Note 3)	15	24			$I_C = 1.0\text{ A}$ $V_{CE} = -5.0\text{ V}$
$h_{FE}$	DC Pulse Current Gain (Note 3)	15	28			$I_C = 2.0\text{ A}$ $V_{CE} = -5.0\text{ V}$
$h_{fo}$	High Frequency Current Gain ( $f = 20\text{ MHz}$ )	2.5	4.8			$I_C = 0.2\text{ A}$ $V_{CE} = -5.0\text{ V}$
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 3)	-0.38	-0.46		Volts	$I_C = 1.0\text{ A}$ $I_B = 0.1\text{ A}$
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 3)	-0.73	-0.85		Volts	$I_C = 2.0\text{ A}$ $I_B = 0.2\text{ A}$
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 3)	-0.96	-1.2		Volts	$I_C = 1.0\text{ A}$ $I_B = 0.1\text{ A}$
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 3)	-1.28	-1.5		Volts	$I_C = 2.0\text{ A}$ $I_B = 0.2\text{ A}$
$V_{BE(on)}$	Pulsed Base Emitter "ON" Voltage (Note 3)		-1.5		Volts	$I_C = 2.0\text{ A}$ $V_{CE} = -5.0\text{ V}$
$I_{CES}$	Collector Cutoff Current	.002	1.0		$\mu\text{A}$	$V_{CE} = -60\text{ V}$ $V_{BE} = 0$
$I_{EBO}$	Emitter Cutoff Current		1.0		$\mu\text{A}$	$I_C = 0$ $V_{EB} = -4.0\text{ V}$
$I_{CEX}(150^\circ\text{C})$	Collector Reverse Current		500		$\mu\text{A}$	$V_{CE} = -60\text{ V}$ $V_{EB} = -2.0\text{ V}$
$C_{cb}$	Collector to Base Capacitance		46	120	pF	$I_E = 0$ $V_{CB} = -10\text{ V}$

#### NOTES:

- (1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
- (2) This rating refers to a high current point where collector to emitter voltage is lowest.
- (3) Pulse Conditions: length = 300  $\mu\text{s}$ ; duty cycle = 1%.

