

# Transistors

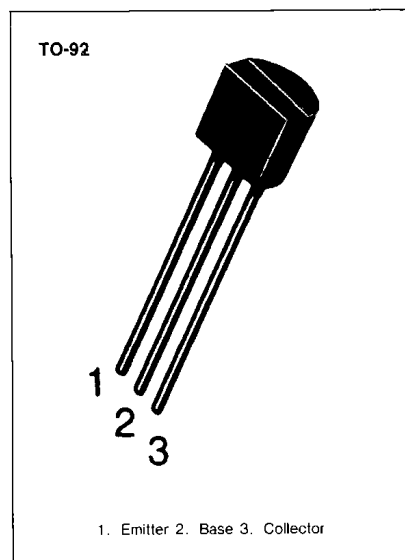
## 2N4401

### GENERAL PURPOSE TRANSISTOR

- Collector-Emitter Voltage:  $V_{CE0} = 40V$
- Collector Dissipation:  $P_C (\text{max}) = 625mW$

### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ C$ )

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	$V_{CBO}$	60	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Collector Current	$I_C$	600	mA
Collector Dissipation	$P_C$	625	mW
Junction Temperature	$T_J$	150	$^\circ C$
Storage Temperature	$T_{stg}$	-55 ~ 150	$^\circ C$



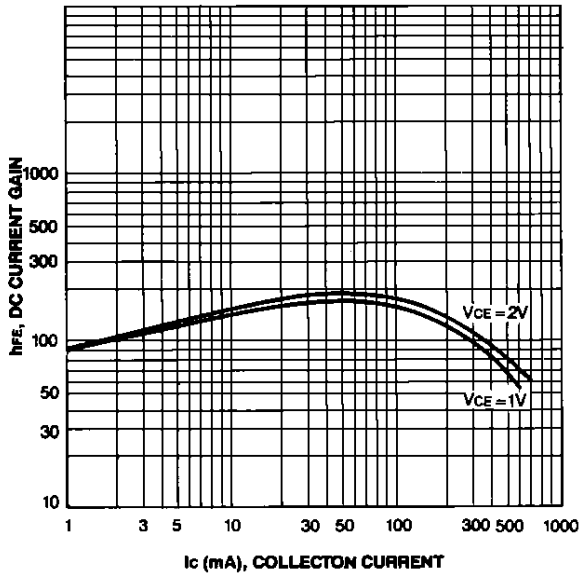
### ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ C$ )

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	$BV_{CBO}$	$I_C = 100\mu A, I_E = 0$	60			V
*Collector-Emitter Breakdown Voltage	$BV_{CEO}$	$I_C = 1mA, I_B = 0$	40			V
Emitter-Base Breakdown Voltage	$BV_{EBO}$	$I_E = 100\mu A, I_C = 0$	6			V
Collector Cut-off Current	$I_{CEX}$	$V_{CE} = 35V, V_{EB} = 0.4V$			100	nA
*DC Current Gain	$h_{FE}$	$V_{CE} = 1V, I_C = 0.1mA$	20			
		$V_{CE} = 1V, I_C = 1mA$	40			
		$V_{CE} = 1V, I_C = 10mA$	80			
		$V_{CE} = 1V, I_C = 150mA$	100		300	
		$V_{CE} = 2V, I_C = 500mA$	40			
*Collector-Emitter Saturation Voltage	$V_{CE} (\text{sat})$	$I_C = 150mA, I_B = 15mA$			0.4	V
		$I_C = 50mA, I_B = 50mA$			0.75	V
*Base-Emitter Saturation Voltage	$V_{BE} (\text{sat})$	$I_C = 150mA, I_B = 15mA$	0.75		0.95	V
		$I_C = 500mA, I_B = 50mA$			1.2	V
Output Capacitance	$C_{CB}$	$V_{CB} = 5V, I_E = 0$			6.5	pF
		$f = 100MHz$				
Current Gain Bandwidth Product	$f_T$	$V_{CE} = 10V, I_C = 20mA$				
		$f = 100MHz$	250			MHz
Turn On Time	$t_{ON}$	$V_{CC} = 30V, V_{BE} = 2V$			35	ns
		$I_C = 150mA, I_B1 = 15mA$				
Turn Off Time	$t_{OFF}$	$V_{CC} = 30V, I_C = 150mA$			255	ns
		$I_B1 = I_B2 = 15mA$				

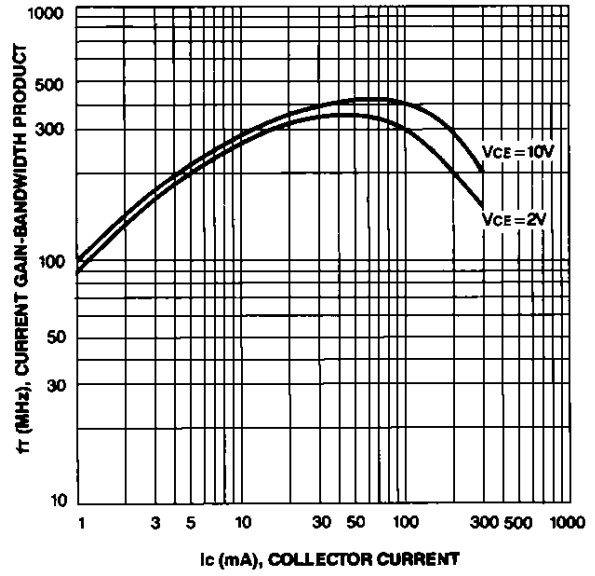
\* Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$



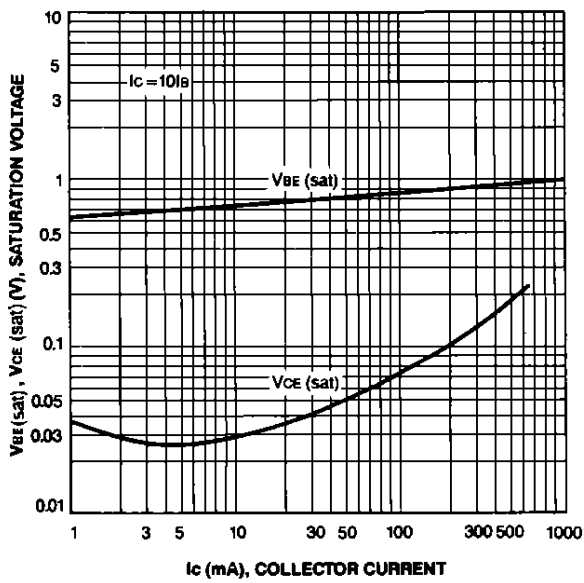
### DC CURRENT GAIN



### CURRENT GAIN-BANDWIDTH PRODUCT



### COLLECTOR-EMITTER SATURATION VOLTAGE BASE-EMITTER SATURATION VOLTAGE



### COLLECTOR-BASE CAPACITANCE OUTPUT CAPACITANCE

