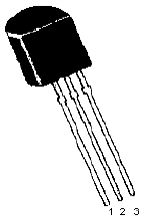
Low Power Bipolar Transistor



Pin Configuration:
1. Emitter
2. Base
3. Collector

Features:

- NPN Silicon Planar Epitaxial Transistors
- General Purpose Switching Applications

Absolute Maximum Ratings

Description	Symbol	2N4401	Unit
Collector-Emitter Voltage	V_{CEO}	40	V
Collector-Base Voltage	V_{CBO}	60	
Emitter-Base Voltage	V_{EBO}	6	
Collector Current Continuous	I_C	600	mA
Power Dissipation at T_a = 25°C Derate above 25°C	P_D	625 5	mW mW/°C
Power Dissipation at T_c= 25°C Derate above 25°C		1.5 12	W W/°C
Operating and Storage Junction Temperature Range	T_j, T_{stg}	-55 to +150	°C

Thermal Resistance

Junction to Case	$R_{th\ (j-c)}$	83.3	°C/W
Junction to Ambient	$R_{th\ (j-a)}$	200	

Electrical Characteristics (T_a = 25°C unless otherwise specified)

Description	Symbol	Test Condition	2N4401	Unit
Collector Emitter Voltage	BV_{CEO}*	I_C = 1mA, I_B = 0	>40	V
Collector Base Voltage	BV_{CBO}	I_C = 100µA, I_E = 0	>60	
Emitter Base Voltage	BV_{EBO}	I_E = 100µA, I_C = 0	>6	
Base Cut off Current	I_{BEV}	V_{CE} = 35V, V_{EB} = 0.4V	<0.1	µA
Collector Cut off Current	I_{CEX}	V_{CE} = 35V, V_{EB} = 0.4V		
Collector Emitter Saturation Voltage	$V_{CE\ (Sat)}$*	I_C = 150mA, I_B = 15mA I_C = 500mA, I_B = 50mA	<0.4 <0.75	V
Base Emitter Saturation Voltage	$V_{BE\ (Sat)}$*	I_C = 150mA, I_B = 15mA I_C = 500mA, I_B = 50mA	0.75 - 0.95 <1.2	
DC Current Gain	h_{FE}	I_C = 0.1mA, V_{CE} = 1V I_C = 1mA, V_{CE} = 1V I_C = 10mA, V_{CE} = 1V I_C = 150mA, V_{CE} = 1V* I_C = 500mA, V_{CE} = 2V*	>20 >40 >80 100 - 300 >40	-

Dynamic Characteristics

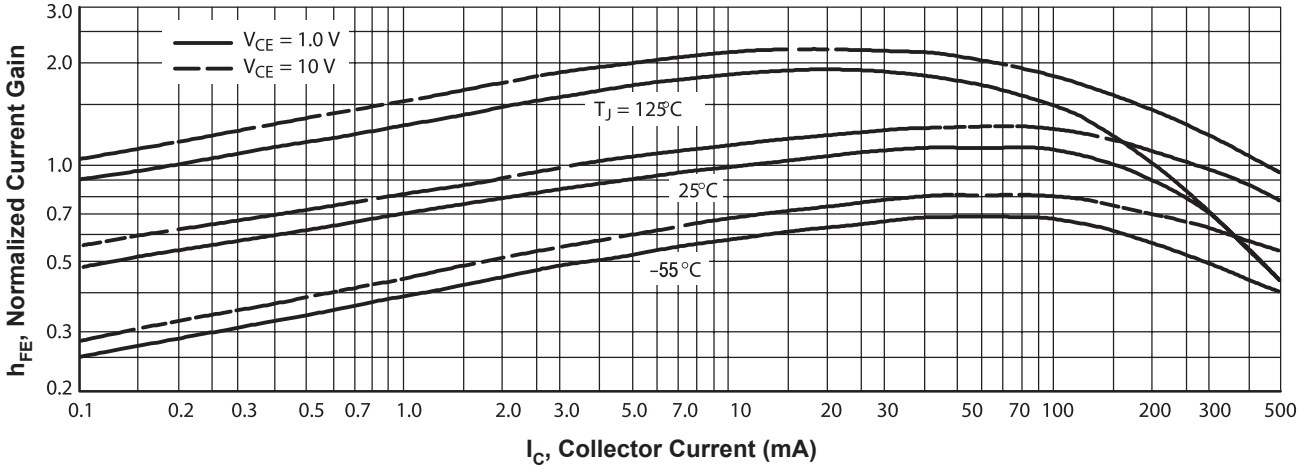
Small Signal Current Gain	h_{fe}	I_C = 1mA, V_{CE} = 10V, f = 1kHz	40 - 500	-
Input Impedance	h_{ie}	I_C = 1mA, V_{CE} = 10V, f = 1kHz	1 - 15	kΩ
Voltage Feedback Ratio	h_{re}	I_C = 1mA, V_{CE} = 10V, f = 1kHz	0.1 - 8	$\times 10^{-4}$
Output Impedance	h_{oe}	I_C = 1mA, V_{CE} = 10V, f = 1kHz	1 - 30	µΩ
Collector-Base Capacitance	C_{cb}	V_{CB} = 5V, I_E = 0, f = 100kHz V_{CB} = 10V, I_E = 0, f = 140kHz	<6.5 -	pF
Emitter-Base Capacitance	C_{eb}	V_{EB} = 0.5V, I_C = 0, f = 100kHz	<30	
Transition Frequency	f_T	I_C = 20mA, V_{CE} = 10V, f = 100MHz	>250	MHz

Switching Characteristics

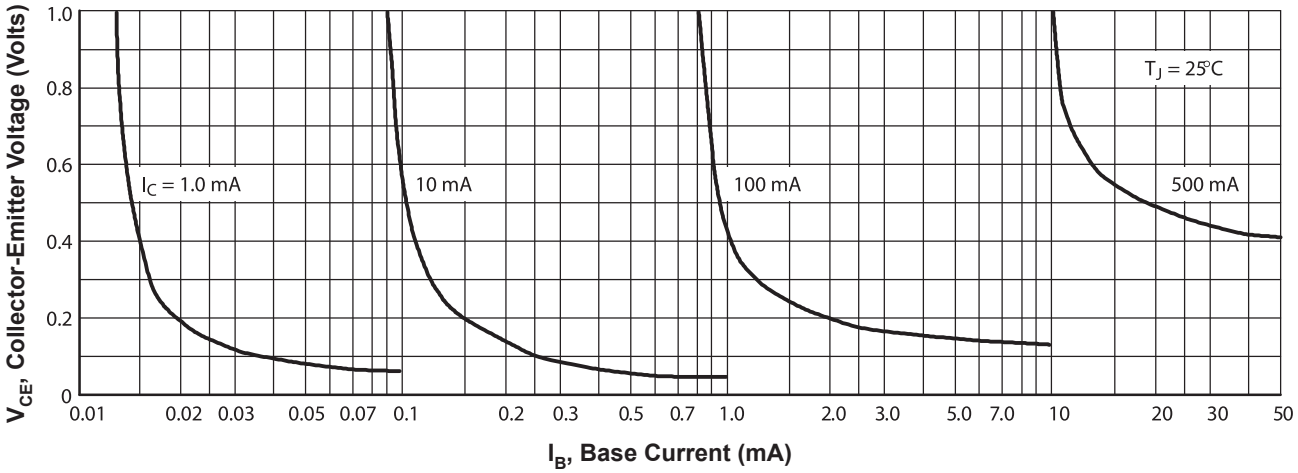
Delay Time	t_d	V_{CC} = 30V, V_{EB} = 2V	<15	ns
Rise Time	t_r	I_C = 150mA, I_{B1} = 15mA	<20	
Storage time	t_s	V_{CC} = 30V, I_C = 150mA	<225	
Fall Time	t_f	I_{B1} = I_{B2} = 15mA	<30	

*Pulse Test: Pulse Width: ≤300µs, Duty ≤2%

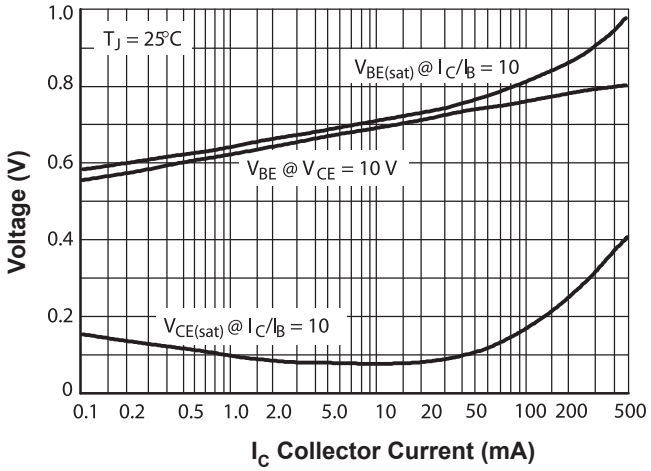
DC Current Gain



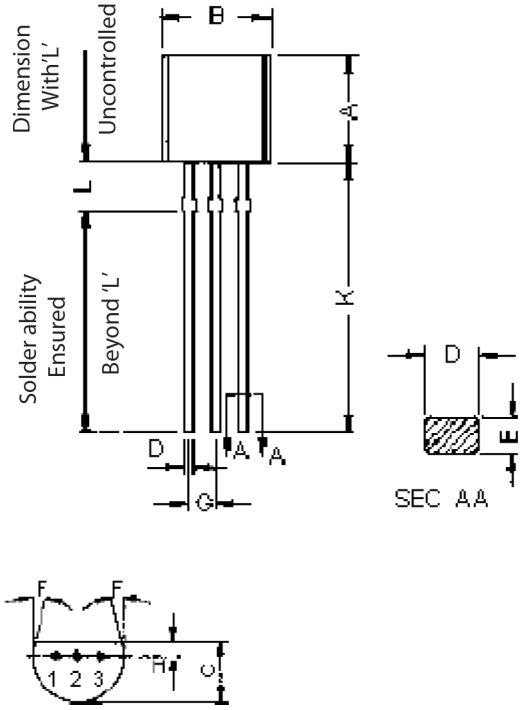
DC Current Gain



On Voltages



TO-92 Plastic Package



Dimensions	Min.	Max.
A	4.32	5.33
B	4.45	5.2
C	3.18	4.19
D	0.41	0.55
E	0.35	0.5
F	5°	
G	1.14	1.4
H		1.53
K	12.7	-
L	1.982	2.082

Dimensions : Millimetres

Part Number Table

Description	Part Number
Transistor, NPN, TO-92	2N4401