

2N4401

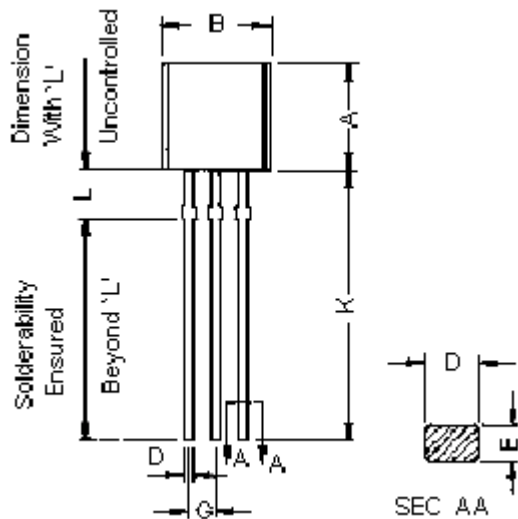
Low Power Bipolar Transistors



Features:

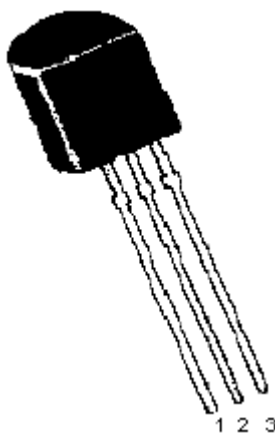
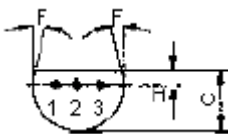
- NPN Silicon Planar Epitaxial Transistors.
- General Purpose Switching Applications.

TO-92 Plastic Package



Dimensions	Minimum	Maximum
A	4.32	5.33
B	4.45	5.20
C	3.18	4.19
D	0.41	0.55
E	0.35	0.50
F	5°	
G	1.14	1.40
H		1.53
K	12.70	-
L	1.982	2.082

Dimensions : Millimetres



Pin Configuration:

1. Emitter
2. Base
3. Collector



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Absolute Maximum Ratings

Rating	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 $T_a = 25^\circ\text{C}$ Derate above 25°C	P_D	625 5.0	mW mW/ $^\circ\text{C}$
Power Dissipation at $T_c = 25^\circ\text{C}$ Derate above 25°C		1.5 12	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_j, T_{stg}	-55 to +150	$^\circ\text{C}$
Thermal Resistance			
Junction to Case	$R_{th(j-c)}$	83.3	$^\circ\text{C/W}$
Junction to Ambient	$R_{th(j-a)}$	200	

Electrical Characteristics ($T_a = 25^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	2N4401	Unit
Collector Emitter Voltage $I_C = 1\text{mA}, I_B = 0$	BV_{CEO}^*	>40	V
Collector Base Voltage $I_C = 100\mu\text{A}, I_E = 0$	BV_{CBO}	>60	
Emitter Base Voltage $I_E = 100\mu\text{A}, I_C = 0$	BV_{EBO}	>6	
Base Cut off Current $V_{CE} = 35\text{V}, V_{EB} = 0.4\text{V}$	I_{BEV}	<0.1	μA
Collector Cut off Current $V_{CE} = 35\text{V}, V_{EB} = 0.4\text{V}$	I_{CEX}		
Collector Emitter Saturation Voltage $I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$	$V_{CE(Sat)}^*$	<0.4 <0.75	V
Base Emitter Saturation Voltage $I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$	$V_{BE(Sat)}^*$	0.75 - 0.95 <1.2	

*Pulse Test : Pulse Width: $\leq 300\mu\text{s}$, Duty $\leq 2.0\%$



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Electrical Characteristics ($T_a = 25^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	2N4401	Unit
DC Current Gain 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*	h _{FE}	>20 >40 >80 100 - 300 >40	-
Dynamic Characteristics			
Small Signal Current Gain I _C = 1mA, V _{CE} = 10V, f = 1KHz	h _{fe}	40 - 500	-
Input Impedance I _C = 1mA, V _{CE} = 10V, f = 1KHz	h _{ie}	1.0 - 15	kΩ
Voltage Feedback Ratio I _C = 1mA, V _{CE} = 10V, f = 1KHz	h _{re}	0.1 - 8.0	x10 ⁻⁴
Output Impedance I _C = 1mA, V _{CE} = 10V, f = 1KHz	h _{oe}	1.0 - 30	μΩ
Collector-Base Capacitance V _{CB} = 5V, I _E = 0, f = 100KHz V _{CB} = 10V, I _E = 0, f = 140KHz	C _{cb}	<6.5 -	pF
Emitter-Base Capacitance V _{EB} = 0.5V, I _C = 0, f = 100kHz	C _{eb}	<30	
Transition Frequency I _C = 20mA, V _{CE} = 10V, f = 100MHz	f _T	>250	MHz
Switching Characteristics			
V _{CC} = 30V, V _{EB} = 2V I _C = 150mA, I _{B1} = 15mA			
Delay Time	t _d	<15	ns
Rise Time	t _r	<20	
V _{CC} = 30V, I _C = 150mA I _{B1} = I _{B2} = 15mA			
Storage time	t _s	<225	ns
Fall Time	t _f	<30	

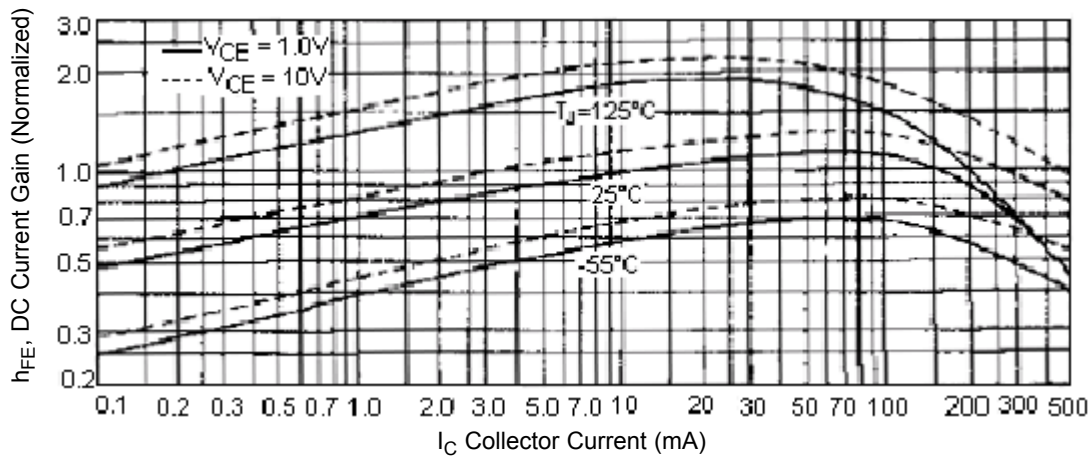
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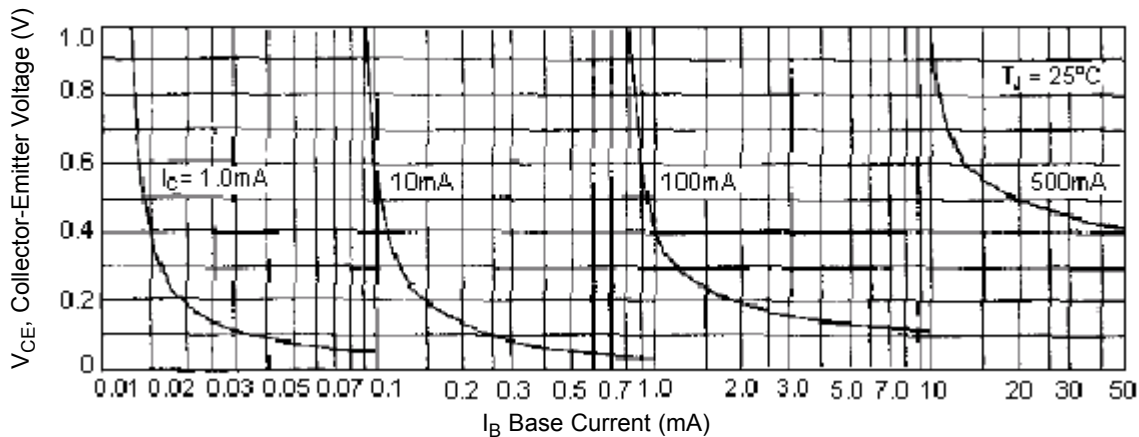
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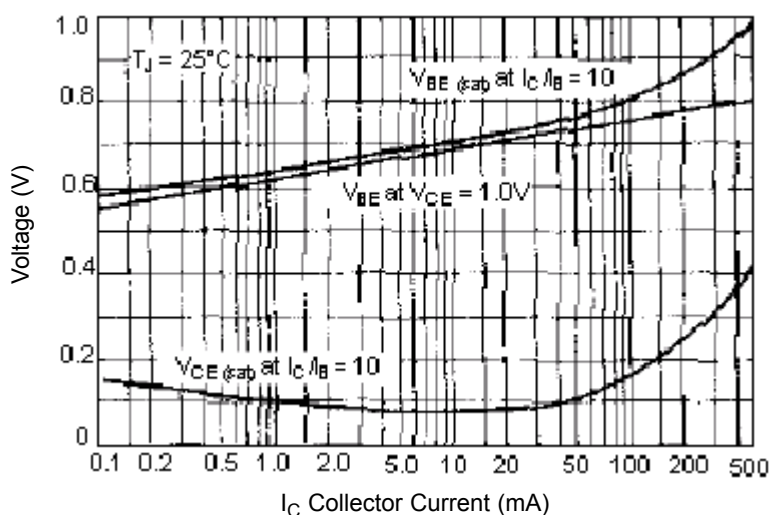
DC Current Gain



DC Current Gain



On Voltages

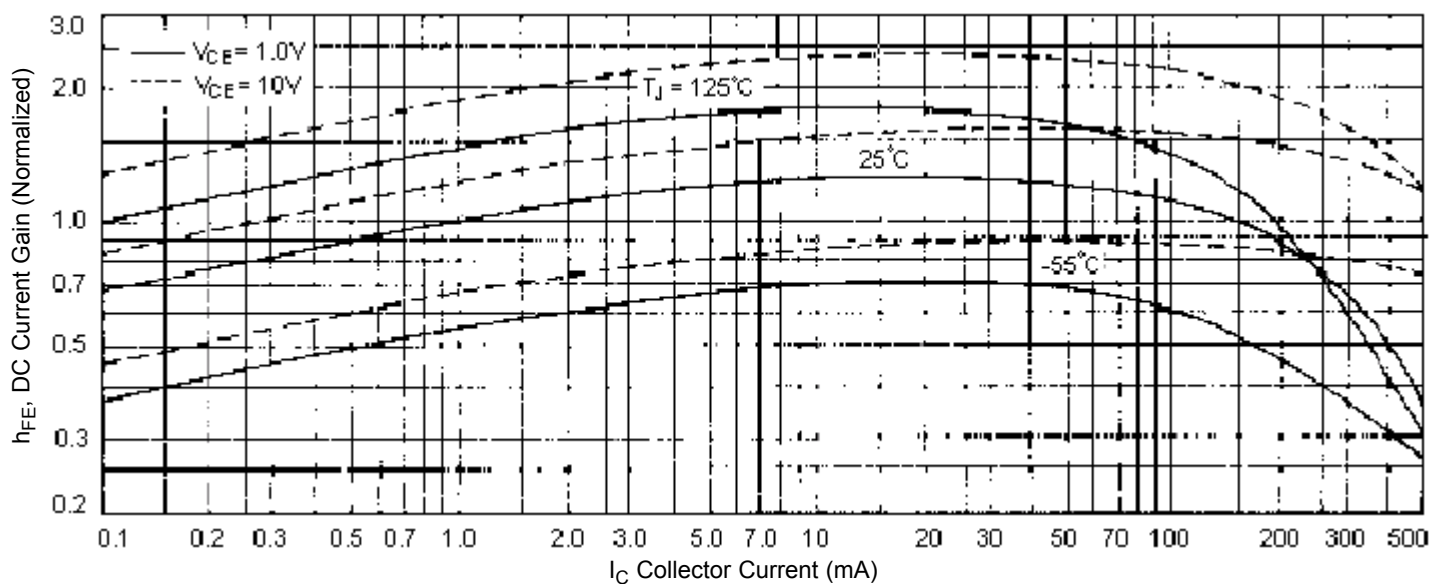


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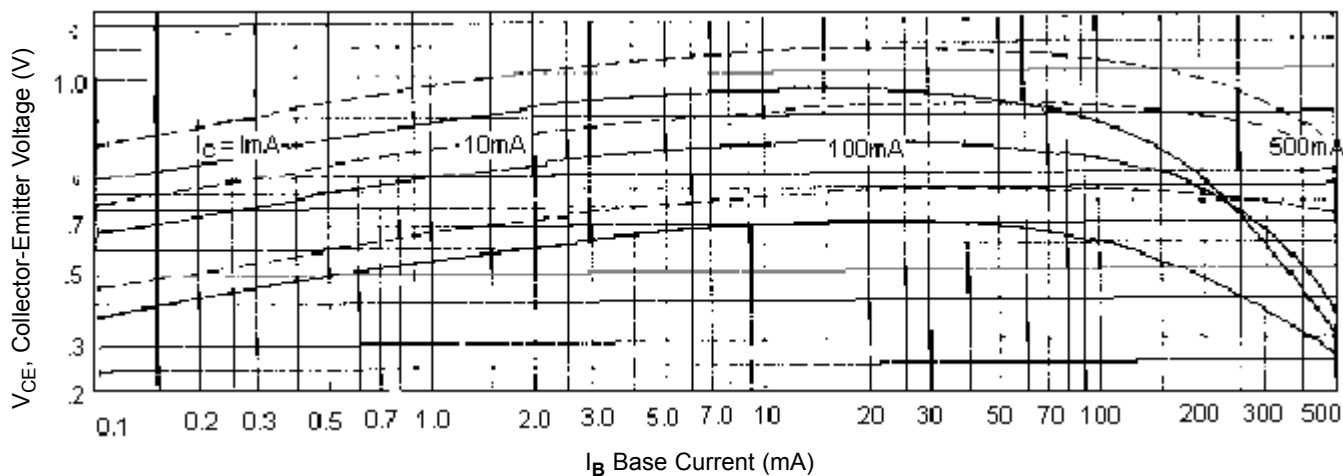
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DC Current Gain



Collector Saturation Region

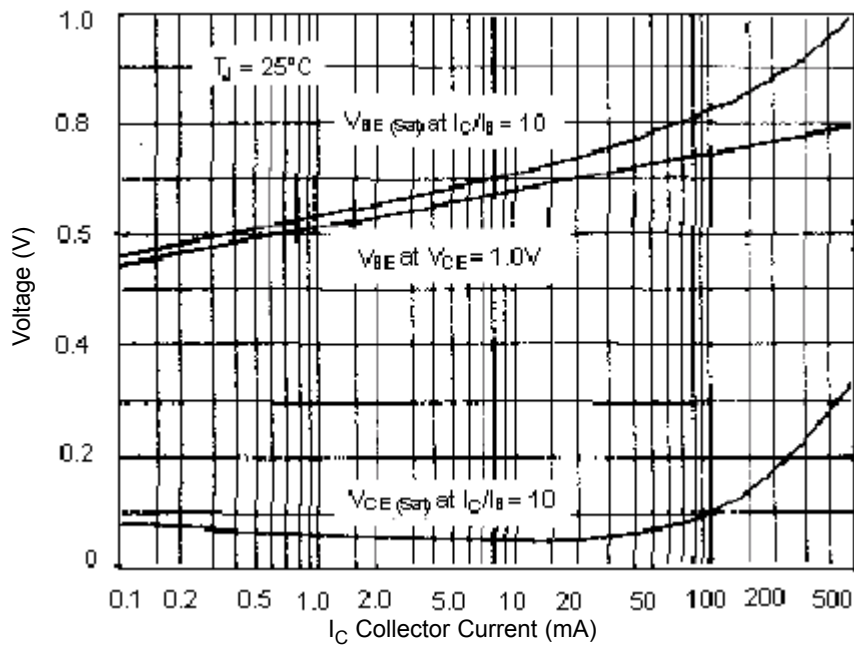


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On Voltages



Part Number Table

Package	Part Number
TO-92	2N4401

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Low Power Bipolar Transistors



Notes:

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**AUSTRALIA – Farnell**

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