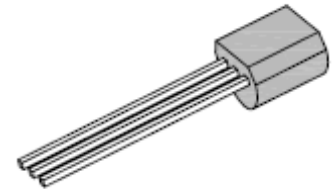


## Small Signal General Purpose Transistors (NPN)

### Features

- NPN Silicon Epitaxial Transistor for Switching and Amplifier Applications



### Mechanical Data

<b>Case:</b>	TO-92, Plastic Package
<b>Terminals:</b>	Solderable per MIL-STD-202G, Method 208
<b>Weight:</b>	0.18 gram

TO-92



### Maximum Ratings *(T<sub>Ambient</sub>=25°C unless noted otherwise)*

Symbol	Description	2N4400	2N4401	Unit	Conditions
	Marking Code	2N4400	2N4401		
<b>V<sub>CEO</sub></b>	Collector-Emitter Voltage	40		V	
<b>V<sub>CBO</sub></b>	Collector-Base Voltage	60		V	
<b>V<sub>EBO</sub></b>	Emitter-Base Voltage	6.0		V	
<b>I<sub>C</sub></b>	Collector Current Continuous	600		mA	
<b>P<sub>D</sub></b>	Power Dissipation at T <sub>A</sub> =25°C	625		mW	
	Derate above 25°C	5.0		mW/° C	
<b>P<sub>D</sub></b>	Power Dissipation at T <sub>C</sub> =25°C	1.5		W	
	Derate above 25°C	12		mW/° C	
<b>R<sub>θJA</sub></b>	Thermal Resistance Junction to Ambient Air	200		° C/W	
<b>R<sub>θJC</sub></b>	Thermal Resistance Junction to Case	83.3		° C/W	
<b>T<sub>J</sub> , T<sub>STG</sub></b>	Operation and Storage Junction Temperature Range	-55 to +150		° C	

# Small Signal General Purpose Transistors (NPN)

## 2N4400/2N4401

### Electrical Characteristics ( $T_{Ambient}=25^{\circ}C$ unless noted otherwise)

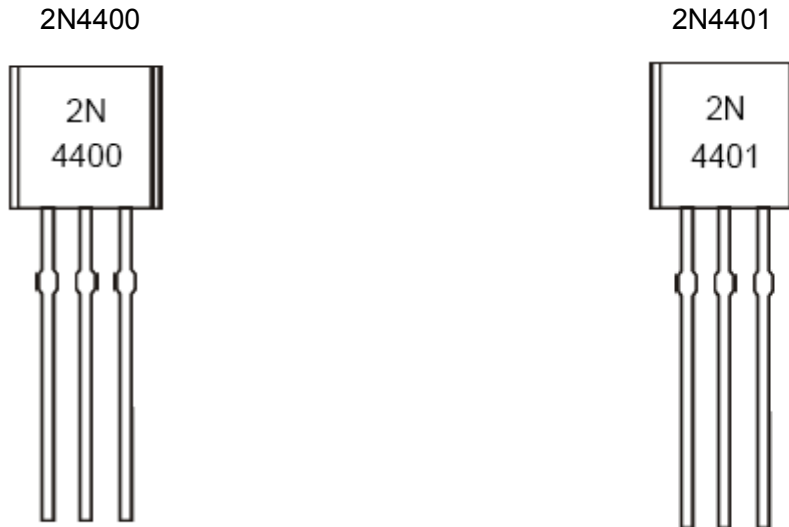
Symbol	Description	2N4400		2N4401		Unit	Conditions
		Min.	Max.	Min.	Max.		
<b>V(BR)CBO</b>	Collector-Base Breakdown Voltage	60	-	60	-	V	$I_C=100\mu A, I_E=0$
<b>V(BR)CEO*</b>	Collector-Emitter Breakdown Voltage	40	-	40	-	V	$I_C=1mA, I_B=0$
<b>V(BR)EBO</b>	Emitter-Base Breakdown Voltage	6.0	-	6.0	-	V	$I_E=100\mu A, I_C=0$
<b>VCE(sat) *</b>	Collector Emitter Saturation Voltage	-	0.40	-	0.40	V	$I_C=150mA, I_B=15mA$
		-	0.75	-	0.75		$I_C=500mA, I_B=50mA$
<b>VBE(sat) *</b>	Base Emitter Saturation Voltage	0.75	0.95	0.75	0.95	V	$I_C=150mA, I_B=15mA$
		-	1.20	-	1.20		$I_C=500mA, I_B=50mA$
<b>ICEV</b>	Collector Cut-Off Current	-	100	-	100	nA	$V_{EB}=0.4V, V_{CE}=35V$
<b>IBEV</b>	Base Cut-Off Current	-	100	-	100	nA	$V_{EB}=0.4V, V_{CE}=35V$
<b>hFE*</b>	D.C. Current Gain	-	-	20	-		$V_{CE}=1V, I_C=0.1mA$
		20	-	40	-		$V_{CE}=1V, I_C=1mA$
		40	-	80	-		$V_{CE}=1V, I_C=10mA$
		50	150	100	300		$V_{CE}=1V, I_C=150mA$
		20	-	40	-		$V_{CE}=2V, I_C=500mA$
<b>hie</b>	Input Impedance	0.5	7.5	1.0	15	k $\Omega$	$V_{CE}=10V, I_C=1mA$ $f=1KHz,$
<b>hre</b>	Voltage Feedback Ratio	0.1	8.0	0.1	8.0	$\times 10^{-4}$	$V_{CE}=10V, I_C=1mA$ $f=1KHz,$
<b>fr</b>	Current Gain-Bandwidth Product	200	-	250	-	MHz	$V_{CE}=10V, I_C=20mA,$ $f=100MHz$
<b>CcBO</b>	Collector-Base Capacitance	-	6.5	-	6.5	pF	$V_{CB}=5V, I_E=0$ $f=100KHz,$
<b>CeBO</b>	Emitter-Base Capacitance	-	30	-	30	pF	$V_{EB}=0.5V, I_C=0$ $f=100KHz,$
<b>hfe</b>	Small Signal Current Gain	20	250	40	500		$V_{CE}=10V, I_C=1mA$ $f=1KHz,$
<b>hoe</b>	Output Admittance	1.0	30	1.0	30	$\mu S$	$V_{CE}=10V, I_C=1mA$ $f=1KHz,$
<b>td</b>	Delay Time	-	15	-	15	nS	$V_{CC}=30V, V_{EB}=2V$ $I_C=150mA, I_B=15mA$
<b>tr</b>	Rise Time	-	20	-	20	nS	
<b>ts</b>	Storage Time	-	225	-	225	nS	
<b>tf</b>	Fall Time	-	30	-	30	nS	$V_{CC}=30V, I_C=150mA$ $I_B=I_{B2}=15mA$

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

# Small Signal General Purpose Transistors (NPN)

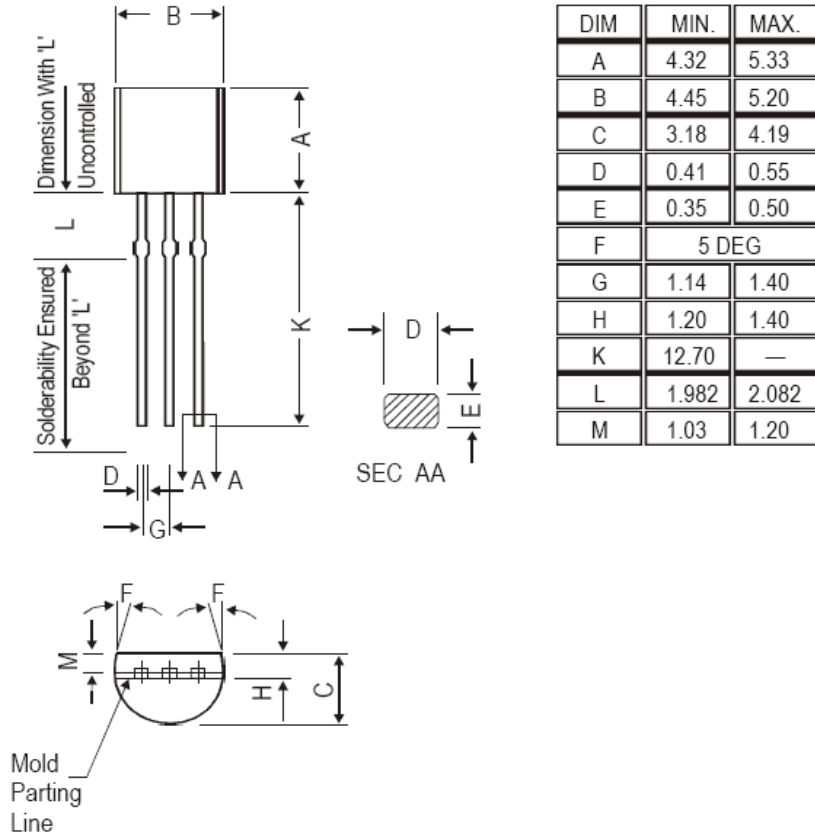
## 2N4400/2N4401

### Marking Information:



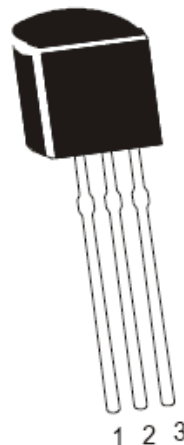
### Dimensions in mm

#### TO-92



# Small Signal General Purpose Transistors (NPN)

2N4400/2N4401



## PIN CONFIGURATION

1. EMITTER
2. BASE
3. COLLECTOR

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