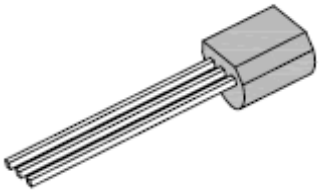
Small Signal General Purpose Transistors (NPN)

Features

- NPN Silicon Epitaxial Transistor for Switching and Amplifier Applications



TO-92

RoHS Compliant

Mechanical Data

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

Maximum Ratings *(T Ambient=25ºC unless noted otherwise)*

Symbol	Description	2N4400	2N4401	Unit	Conditions
	Marking Code	2N4400	2N4401		
V_{CEO}	Collector-Emitter Voltage	40		V	
V_{CBO}	Collector-Base Voltage	60		V	
V_{EBO}	Emitter-Base Voltage	6.0		V	
I_C	Collector Current Continuous	600		mA	
P_D	Power Dissipation at T_A=25°C	625		mW	
	Derate above 25°C	5.0		mW/° C	
P_D	Power Dissipation at T_C=25°C	1.5		W	
	Derate above 25°C	12		mW/° C	
$R_{\theta JA}$	Thermal Resistance Junction to Ambient Air	200		° C/W	
$R_{\theta JC}$	Thermal Resistance Junction to Case	83.3		° C/W	
T_J ,T_{STG}	Operation and Storage Junction Temperature Range	-55 to +150		° C	

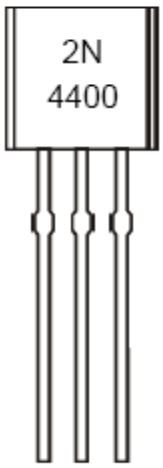
Electrical Characteristics *(T Ambient=25ºC unless noted otherwise)*

Symbol	Description	2N4400		2N4401		Unit	Conditions
		Min.	Max.	Min.	Max.		
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	60	-	60	-	V	I_C=100μA, I_E=0
$V_{(BR)CEO}$*	Collector-Emitter Breakdown Voltage	40	-	40	-	V	I_C=1mA, I_B=0
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	6.0	-	6.0	-	V	I_E=100μA, I_C=0
$V_{CE(sat)}$ *	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
$V_{BE(sat)}$ *	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
I_{CEV}	Collector Cut–Off Current	-	100	-	100	nA	V_{EB}=0.4V, V_{CE}=35V
I_{BEV}	Base Cut–Off Current	-	100	-	100	nA	V_{EB}=0.4V, V_{CE}=35V
h_{FE}*	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
h_{ie}	Input Impedance	0.5	7.5	1.0	15	kΩ	V_{CE}=10V, I_C=1mA f=1KHz,
h_{re}	Voltage Feedback Ratio	0.1	8.0	0.1	8.0	$x10^{-4}$	V_{CE}=10V, I_C=1mA f=1KHz,
f_T	Current Gain-Bandwidth Product	200	-	250	-	MHz	V_{CE}=10V, I_C=20mA, f=100MHz
C_{CBO}	Collector-Base Capacitance	-	6.5	-	6.5	pF	V_{CB}=5V, I_E=0 f=100KHz,
C_{EBO}	Emitter-Base Capacitance	-	30	-	30	pF	V_{EB}=0.5V, I_C=0 f=100KHz,
h_{fe}	Small Signal Current Gain	20	250	40	500		V_{CE}=10V, I_C=1mA f=1KHz,
h_{oe}	Output Admittance	1.0	30	1.0	30	μS	V_{CE}=10V, I_C=1mA f=1KHz,
t_d	Delay Time	-	15	-	15	nS	V_{CC}=30V, V_{EB}=2V I_C=150mA, I_{B1}=15mA
t_r	Rise Time	-	20	-	20	nS	
t_s	Storage Time	-	225	-	225	nS	V_{CC}=30V, I_C=150mA I_{B1}=I_{B2}=15mA
t_f	Fall Time	-	30	-	30	nS	

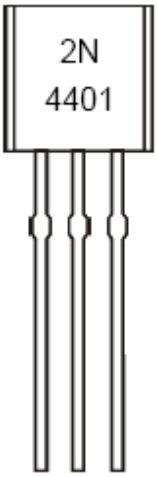
*Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

Marking Information:

2N4400

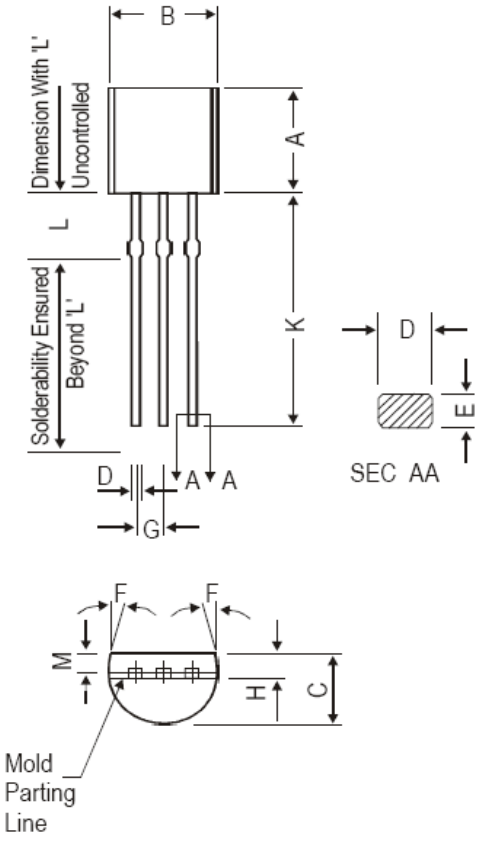


2N4401



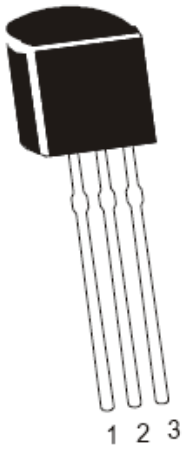
Dimensions in mm

TO-92



DIM	MIN.	MAX.
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 DEG	
G	1.14	1.40
H	1.20	1.40
K	12.70	—
L	1.982	2.082
M	1.03	1.20

2N4400/2N4401



PIN CONFIGURATION
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