



**浩畅半导体**  
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**2N4401**      TRANSISTOR (NPN)

TO-92 Plastic-Encapsulate Transistors

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客户确认：

公司签章：

部门	工程部	品保部	采购部
签名			
日期			



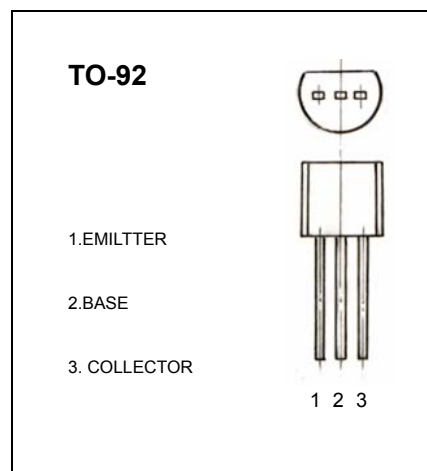
**2N4401** TRANSISTOR (NPN)

**FEATURES**

Power dissipation

**MAXIMUM RATINGS (T<sub>A</sub>=25°C unless otherwise noted)**

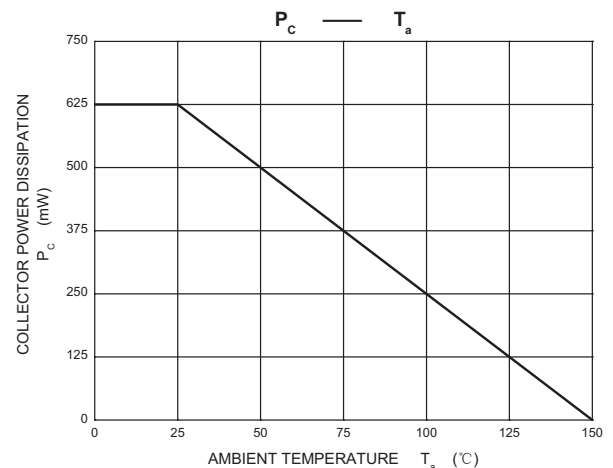
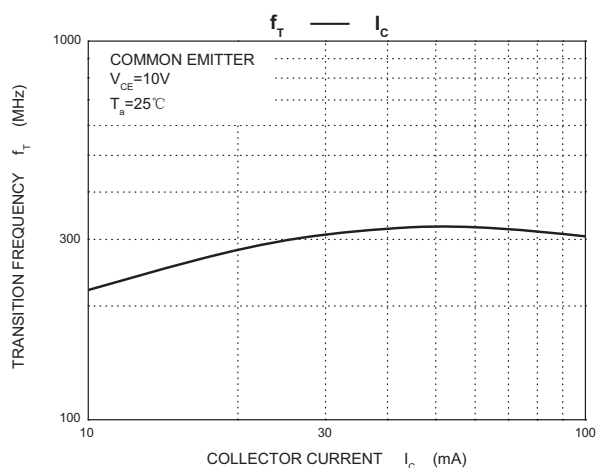
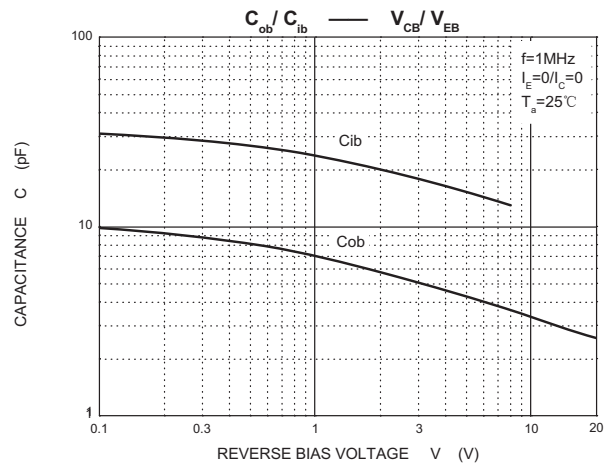
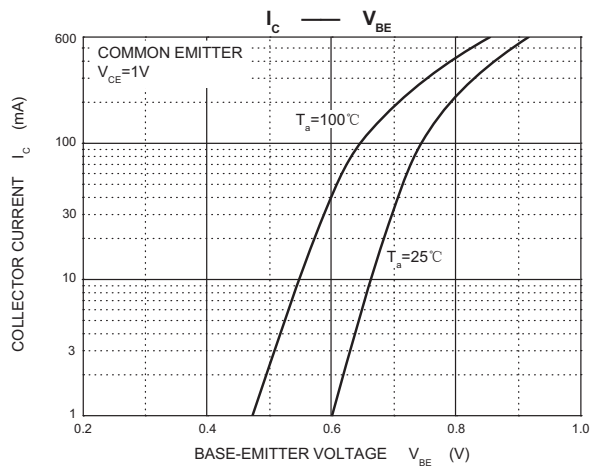
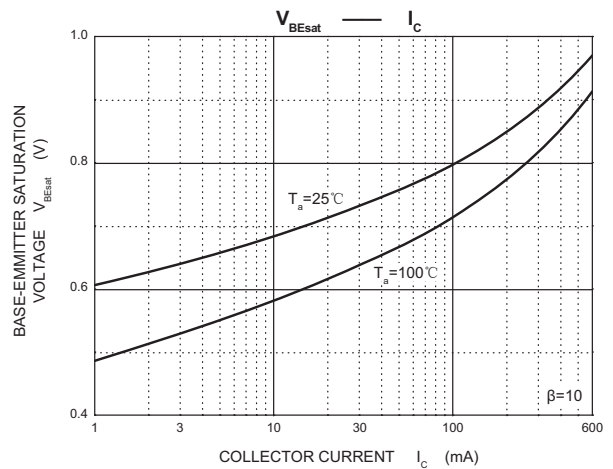
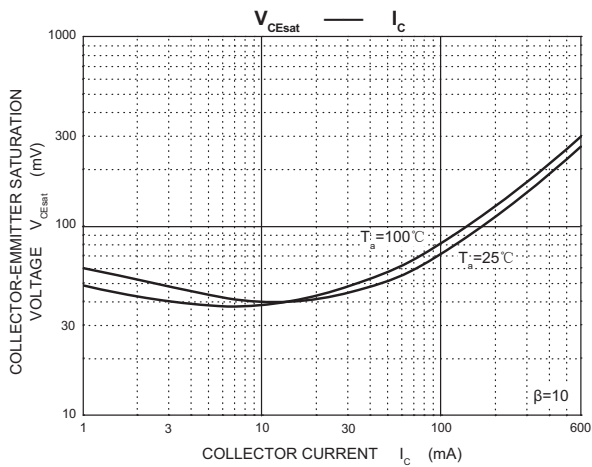
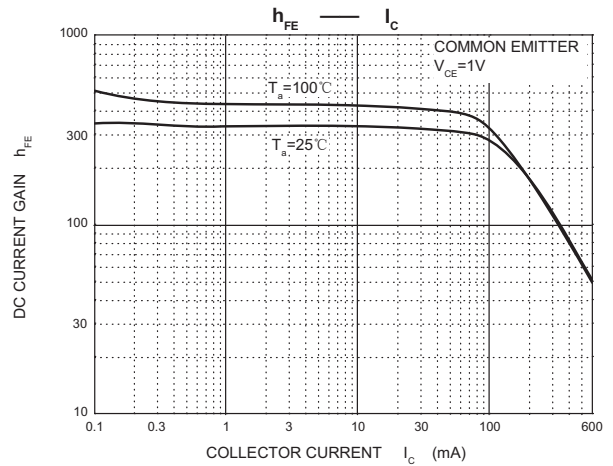
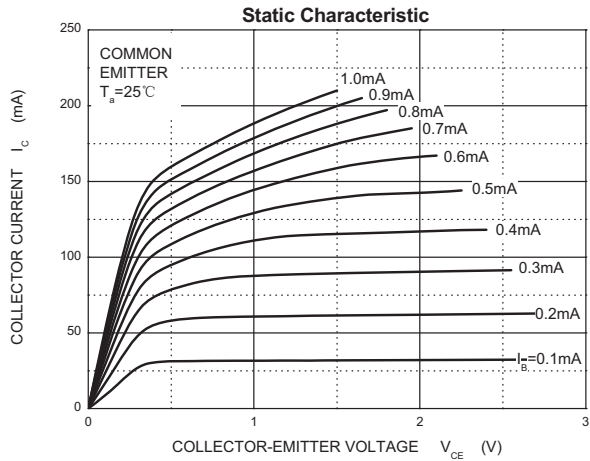
Symbol	Parameter	Value	Units
V <sub>CBO</sub>	Collector-Base Voltage	60	V
V <sub>CEO</sub>	Collector-Emitter Voltage	40	V
V <sub>EBO</sub>	Emitter-Base Voltage	6	V
I <sub>C</sub>	Collector Current -Continuous	600	mA
P <sub>C</sub>	Collector Power dissipation	0.625	W
T <sub>J</sub>	Junction Temperature	150	°C
T <sub>stg</sub>	Storage Temperature	-55to +150	°C
R <sub>θJA</sub>	Thermal Resistance, junction to Ambient	357	°C/mW



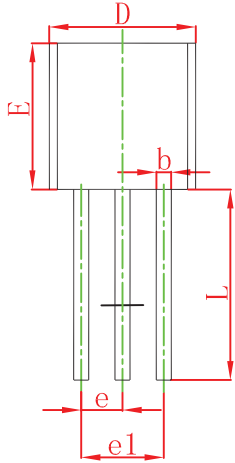
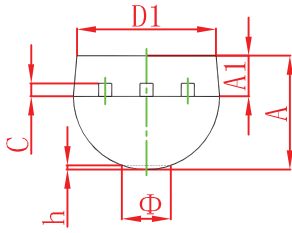
**ELECTRICAL CHARACTERISTICS (T<sub>amb</sub>=25°C unless otherwise specified)**

Parameter	Symbol	Test conditions	MIN	MAX	UNIT
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =100μA, I <sub>E</sub> =0	60		V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> = 1mA, I <sub>B</sub> =0	40		V
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =100μA, I <sub>C</sub> =0	6		V
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> =35V, I <sub>E</sub> =0		0.1	μA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> =5V, I <sub>C</sub> =0		0.1	μA
DC current gain	h <sub>FE(1)</sub>	V <sub>CE</sub> =1V, I <sub>C</sub> = 0.1mA	20		
	h <sub>FE(2)</sub>	V <sub>CE</sub> =1V, I <sub>C</sub> =1mA	40		
	h <sub>FE(3)</sub>	V <sub>CE</sub> =1V, I <sub>C</sub> = 10mA	80		
	h <sub>FE(4)</sub>	V <sub>CE</sub> =1V, I <sub>C</sub> =150mA	100	300	
	h <sub>FE(5)</sub>	V <sub>CE</sub> =2V, I <sub>C</sub> = 500mA	40		
Collector-emitter saturation voltage	V <sub>CE(sat)1</sub>	I <sub>C</sub> =150 mA, I <sub>B</sub> =15mA		0.4	V
	V <sub>CE(sat)2</sub>	I <sub>C</sub> =500 mA, I <sub>B</sub> =50mA		0.75	V
Base-emitter saturation voltage	V <sub>BE(sat)1</sub>	I <sub>C</sub> =150 mA, I <sub>B</sub> =15mA		0.95	V
	V <sub>BE(sat)2</sub>	I <sub>C</sub> =500 mA, I <sub>B</sub> =50mA		1.2	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> = 10V, I <sub>C</sub> = 20mA, f=100MHz	250		MHz
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =10V, I <sub>E</sub> = 0, f=100KHz		6.5	pF
Delay time	t <sub>d</sub>	V <sub>CC</sub> =30V, V <sub>BE(OFF)</sub> =2V I <sub>C</sub> =150mA, I <sub>B1</sub> =15mA		15	nS
Rise time	t <sub>r</sub>			20	nS
Storage time	t <sub>s</sub>	V <sub>CC</sub> =30V, I <sub>C</sub> =150mA I <sub>B1</sub> =-I <sub>B2</sub> = 15mA		225	nS
Fall time	t <sub>f</sub>			30	nS

# Typical Characteristics

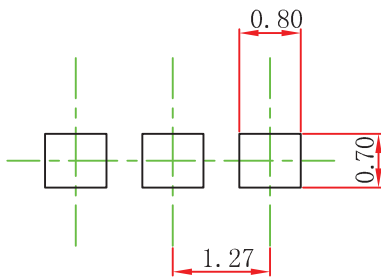


## TO-92 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP		0.050 TYP	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015

## TO-92 Suggested Pad Layout



### Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.