

TO-92 Plastic-Encapsulate Transistors

2N4401

TRANSISTOR (NPN)

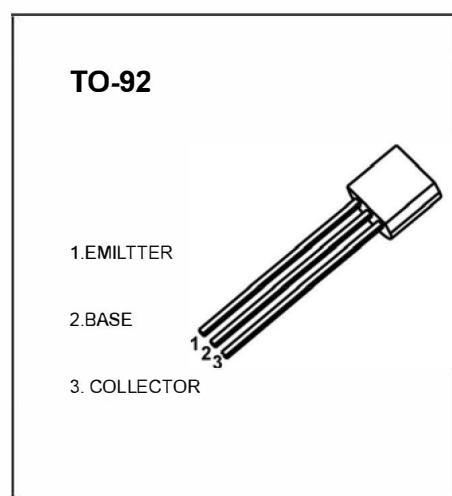
FEATURES

Power dissipation

MAXIMUM RATINGS (T_a=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V _{CBO}	Collector-Base Voltage	60	V
V _{CEO}	Collector-Emitter Voltage	40	V
V _{EBO}	Emitter-Base Voltage	6	V
I _c	Collector Current -Continuous	600	mA
P _c	Collector Power dissipation	0.625	W
T _J	Junction Temperature	150	°C
T _{stg}	Storage Temperature	-55~+150	°C
R _{θJA}	Thermal Resistance, junction to Ambient	357	°C/mW

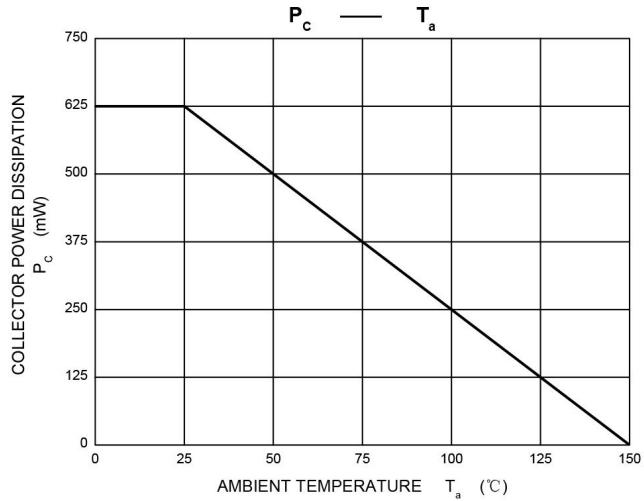
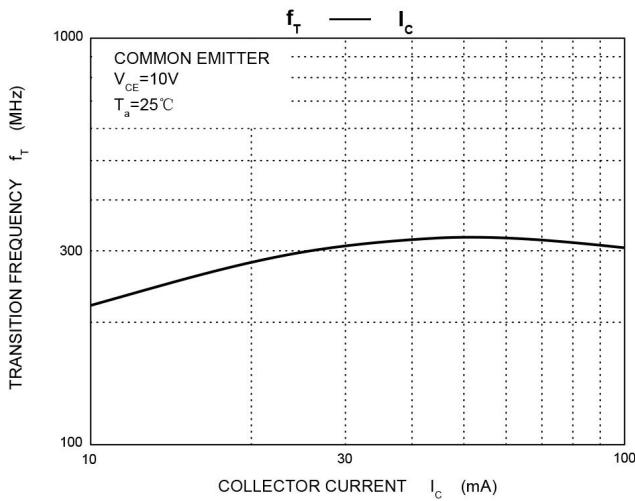
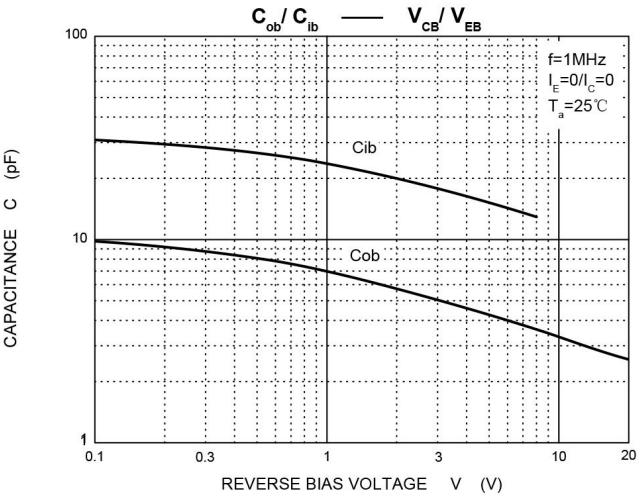
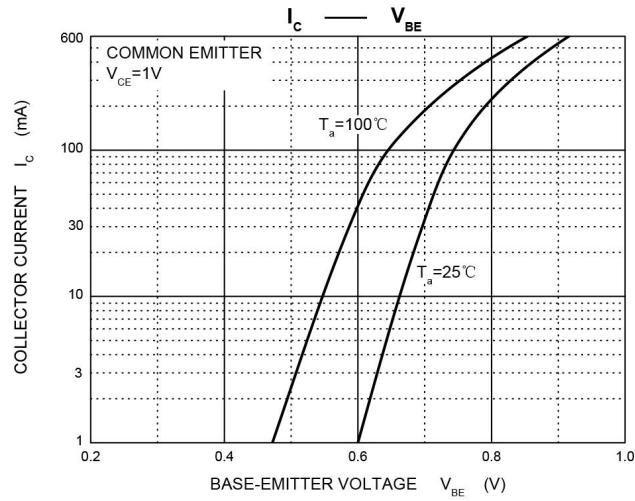
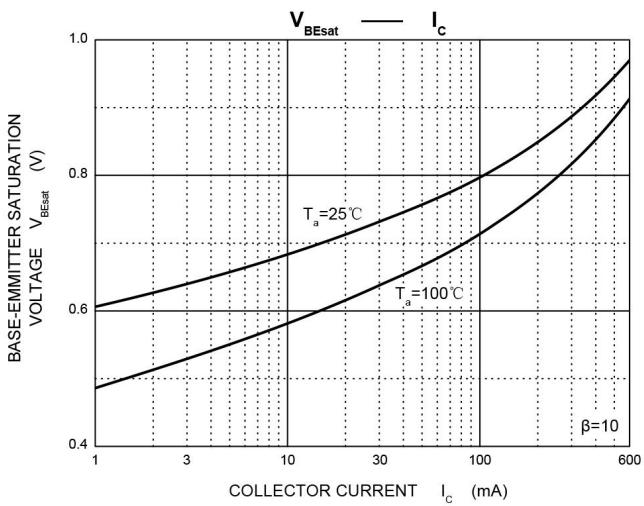
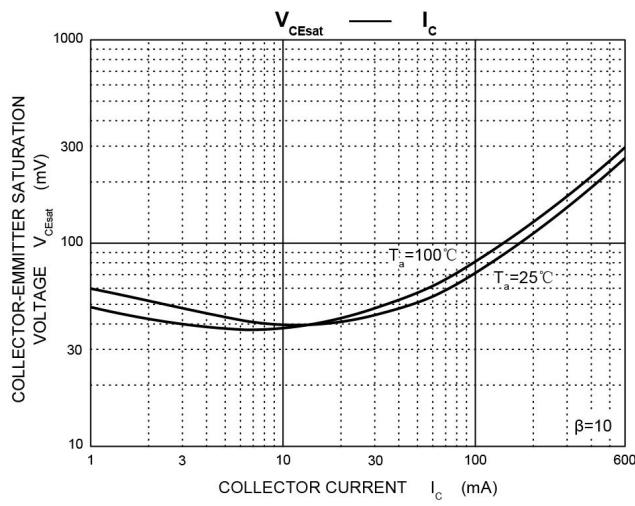
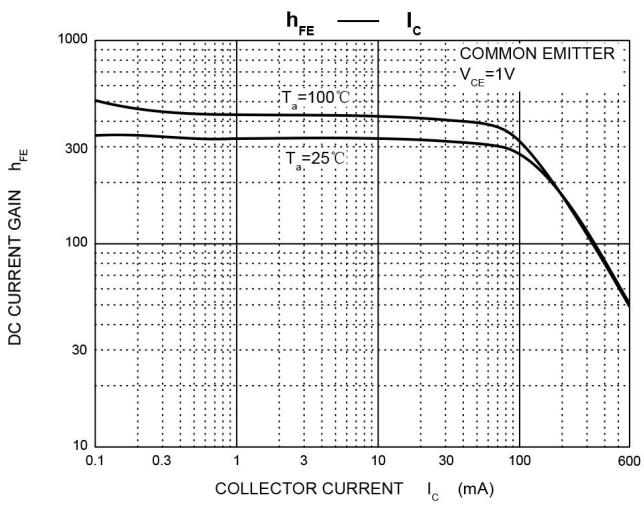
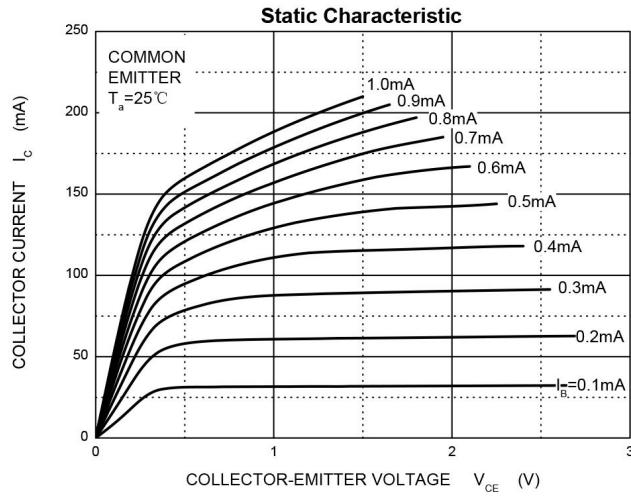
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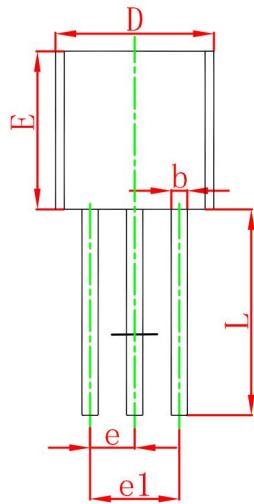
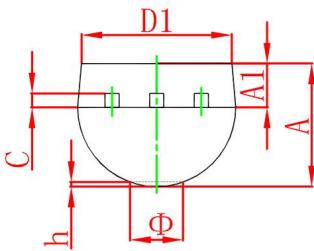
ELECTRICAL CHARACTERISTICS (T_a=25°C unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Max	Unit
Collector-base breakdown voltage	V _{(BR)CBO}	I _C =100μA, I _E =0	60		V
Collector-emitter breakdown voltage	V _{(BR)CEO}	I _C = 1mA, I _B =0	40		V
Emitter-base breakdown voltage	V _{(BR)EBO}	I _E =100μA, I _C =0	6		V
Collector cut-off current	I _{CBO}	V _{CB} =35V, I _E =0		0.1	μA
Emitter cut-off current	I _{EBO}	V _{EB} =5V, I _C =0		0.1	μA
DC current gain	h _{FE(1)}	V _{CE} =1V, I _C = 0.1mA	20		
	h _{FE(2)}	V _{CE} =1V, I _C =1mA	40		
	h _{FE(3)}	V _{CE} =1V, I _C = 10mA	80		
	h _{FE(4)}	V _{CE} =1V, I _C =150mA	100	300	
	h _{FE(5)}	V _{CE} =2V, I _C = 500mA	40		
Collector-emitter saturation voltage	V _{CE(sat)1}	I _C =150 mA, I _B =15mA		0.4	V
	V _{CE(sat)2}	I _C =500 mA, I _B =50mA		0.75	V
Base-emitter saturation voltage	V _{BE(sat)1}	I _C =150 mA, I _B =15mA		0.95	V
	V _{BE(sat)2}	I _C =500 mA, I _B =50mA		1.2	V
Transition frequency	f _T	V _{CE} = 10V, I _C = 20mA, f=100MHz	250		MHz
Output Capacitance	C _{ob}	V _{CB} =10V, I _E = 0, f=100KHz		6.5	pF
Delay time	t _d	V _{CC} =30V, V _{BE(OFF)} =2V I _C =150mA, I _{B1} =15mA		15	nS
Rise time	t _r			20	nS
Storage time	t _s	V _{CC} =30V, I _C =150mA I _{B1} =-I _{B2} = 15mA		225	nS
Fall time	t _f			30	nS

Typical Characteristics

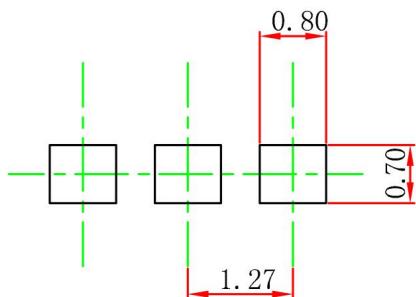


TO-92 Package Outline Dimensions



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



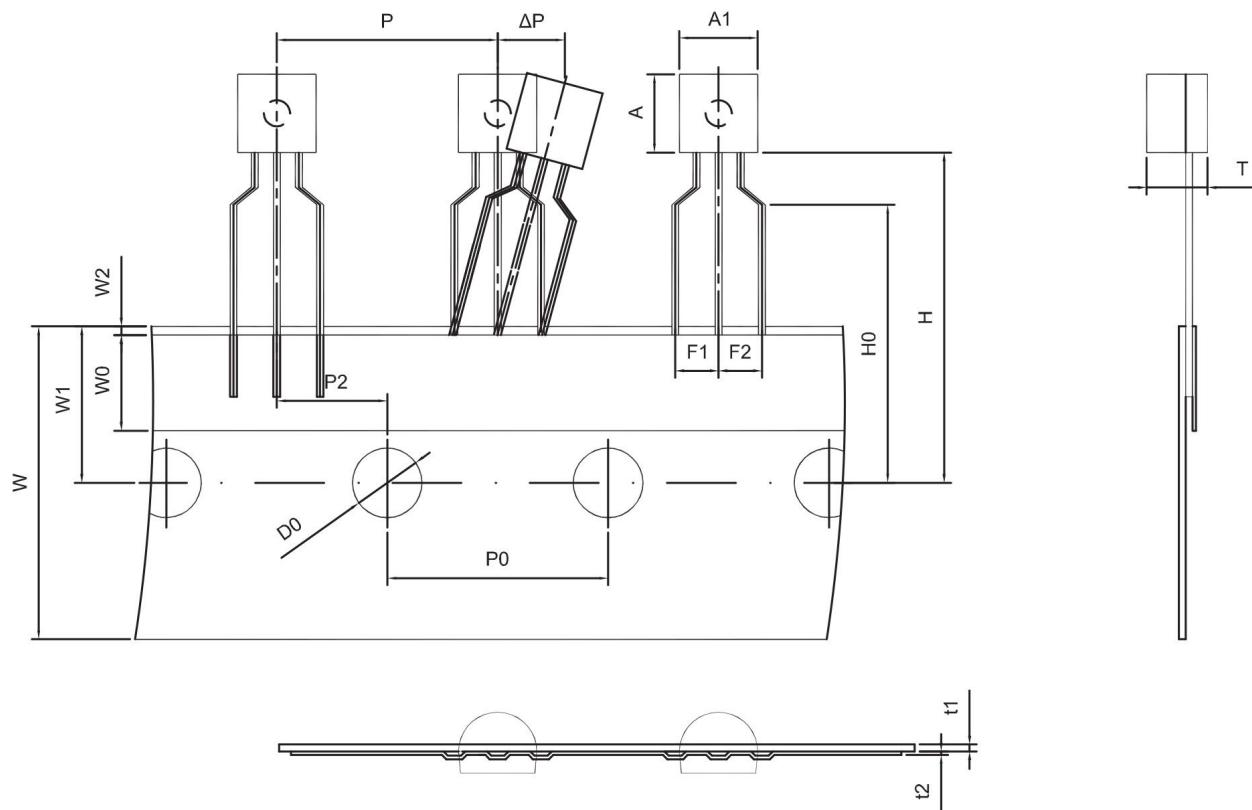
Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.05 mm.
3. The pad layout is for reference purposes only.

NOTICE

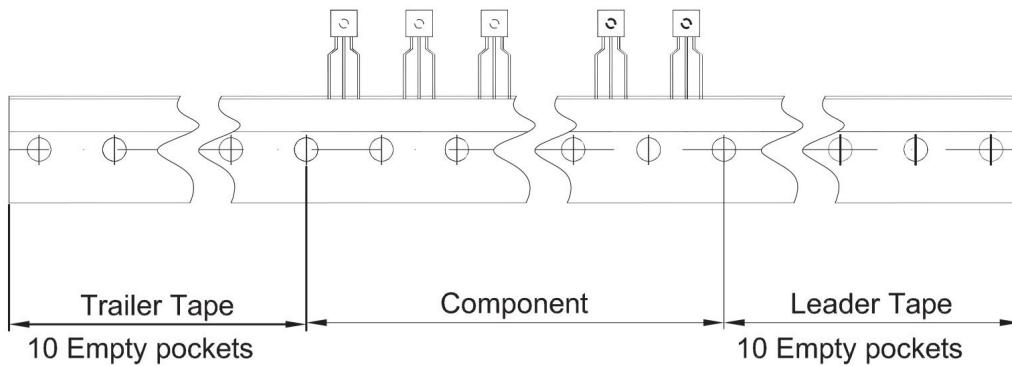
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TO-92 PACKAGE TAPEING DIMENSION



Dimensions are in millimeter

A1	A	T	P	P0	P2	F1	F2	W
4.5±0.2	4.5±0.2	3.5±0.2	12.7±0.3	12.7±0.2	6.35±0.3	2.5±0.3	2.5±0.3	18.0+1.0/-0.5
W0	W1	W2	H	H0	D0	t1	t2	ΔP
6.0±0.5	9.0±0.5	1.0 MAX.	19.0±1.0	16.0±0.5	4.0±0.2	0.4±0.05	0.2±0.05	0 ± 1.0



Package	Box	Box Size(mm)	Carton	Carton Size(mm)
TO-92	2000 pcs	333×162×43	20,000 pcs	350×340×250