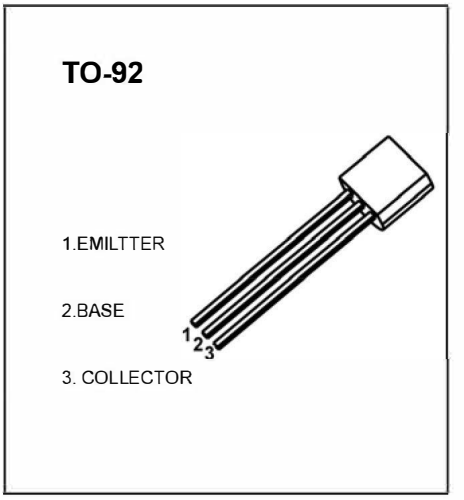
TO-92 Plastic-Encapsulate Transistors

2N4401 TRANSISTOR (NPN)



FEATURES

Power dissipation

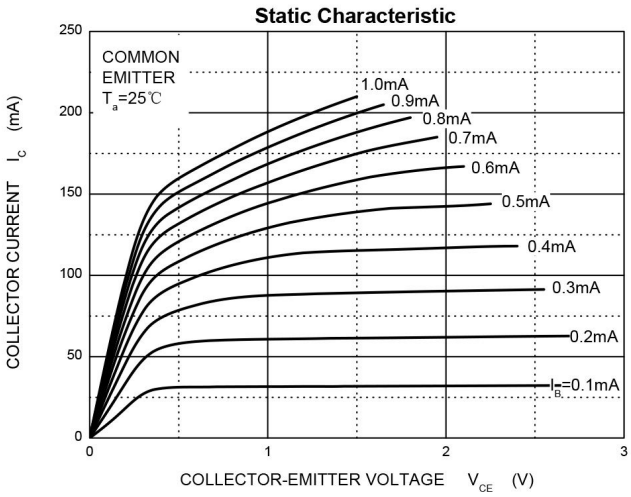
MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

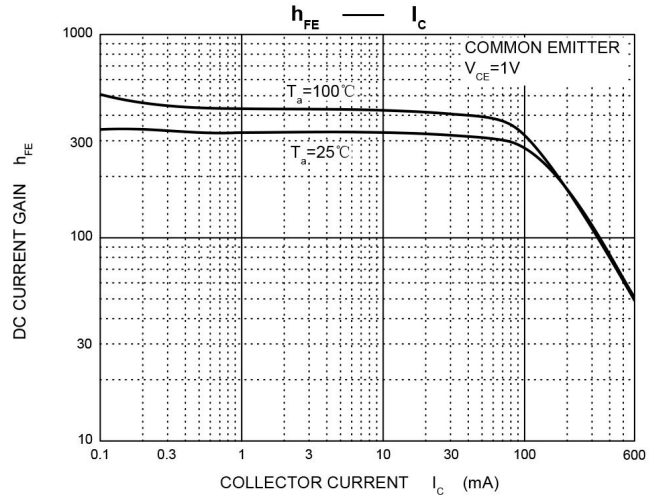
Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	60	V
V_{CEO}	Collector-Emitter Voltage	40	V
V_{EBO}	Emitter-Base Voltage	6	V
I_C	Collector Current -Continuous	600	mA
P_C	Collector Power dissipation	0.625	W
T_J	Junction Temperature	150	℃
T_{stg}	Storage Temperature	-55~+150	℃
$R_{\theta JA}$	Thermal Resistance, junction to Ambient	357	℃/mW

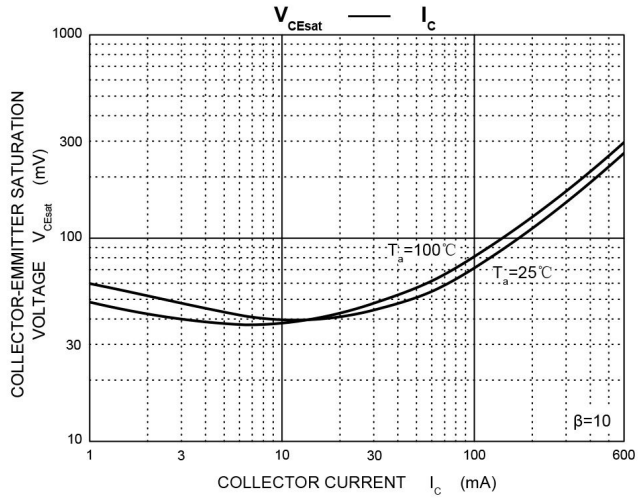
ELECTRICAL CHARACTERISTICS (T_a=25℃ unless otherwise specified)

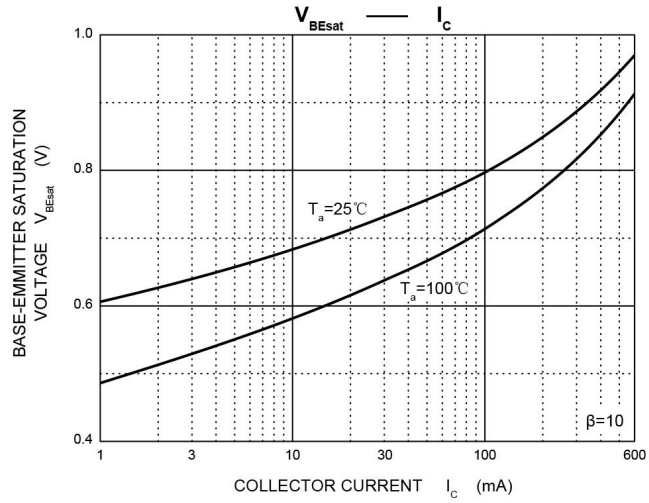
Parameter	Symbol	Test conditions	Min	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C=100μA , I_E=0	60		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C= 1mA , I_B=0	40		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E=100μA, I_C=0	6		V
Collector cut-off current	I_{CBO}	V_{CB}=35V, 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

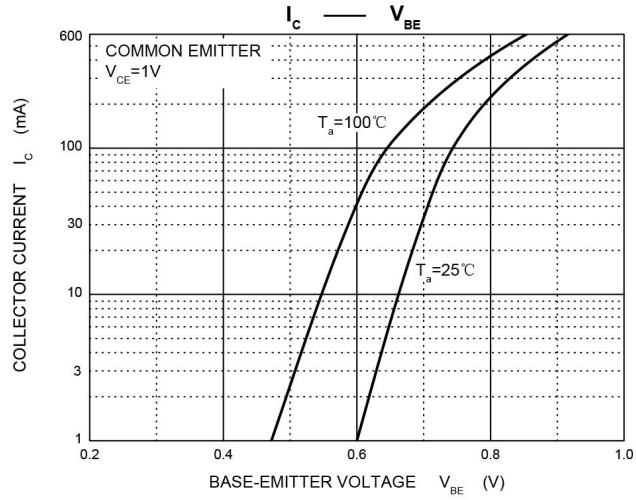
Typical Characteristics

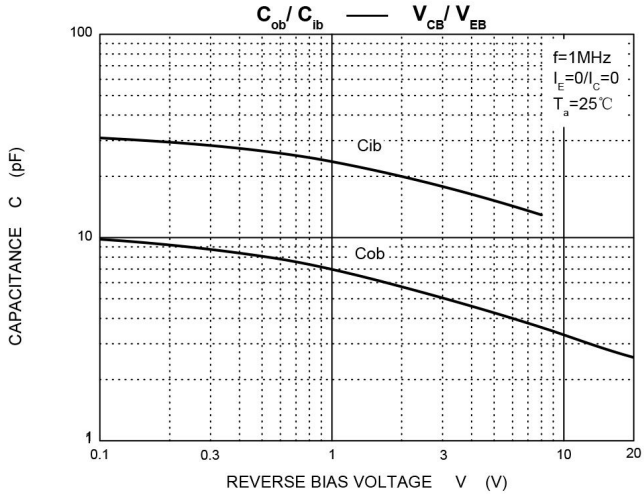


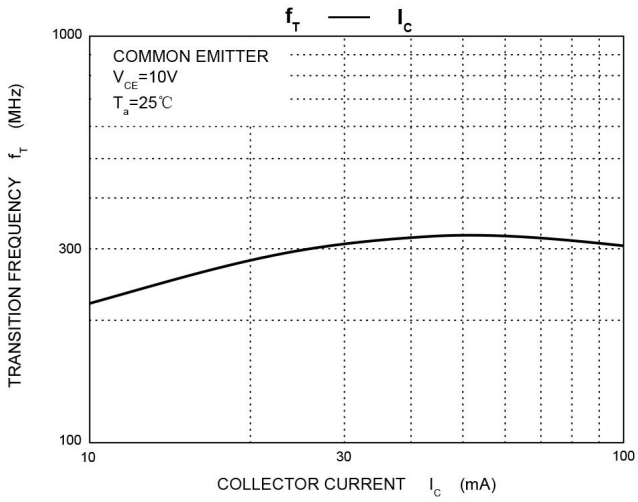


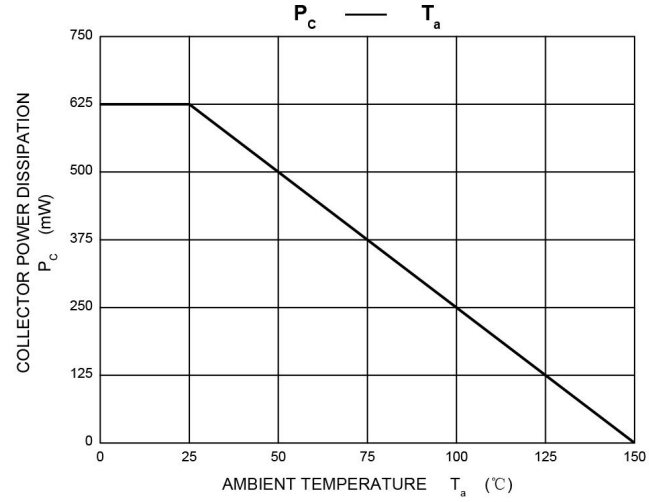




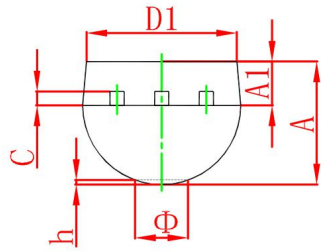


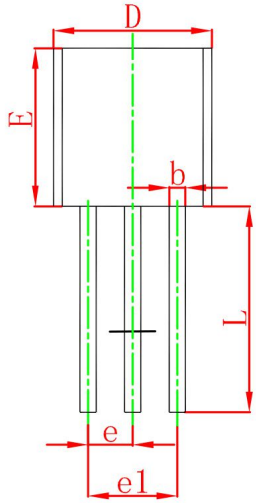






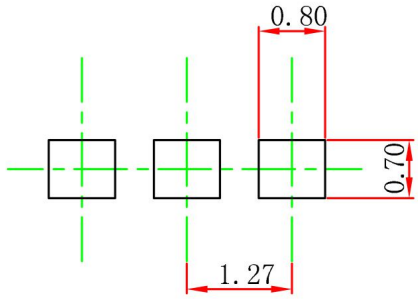
TO-92 Package Outline Dimensions





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:± 0.05mm.
3.The pad layout is for reference purposes only.

NOTICE

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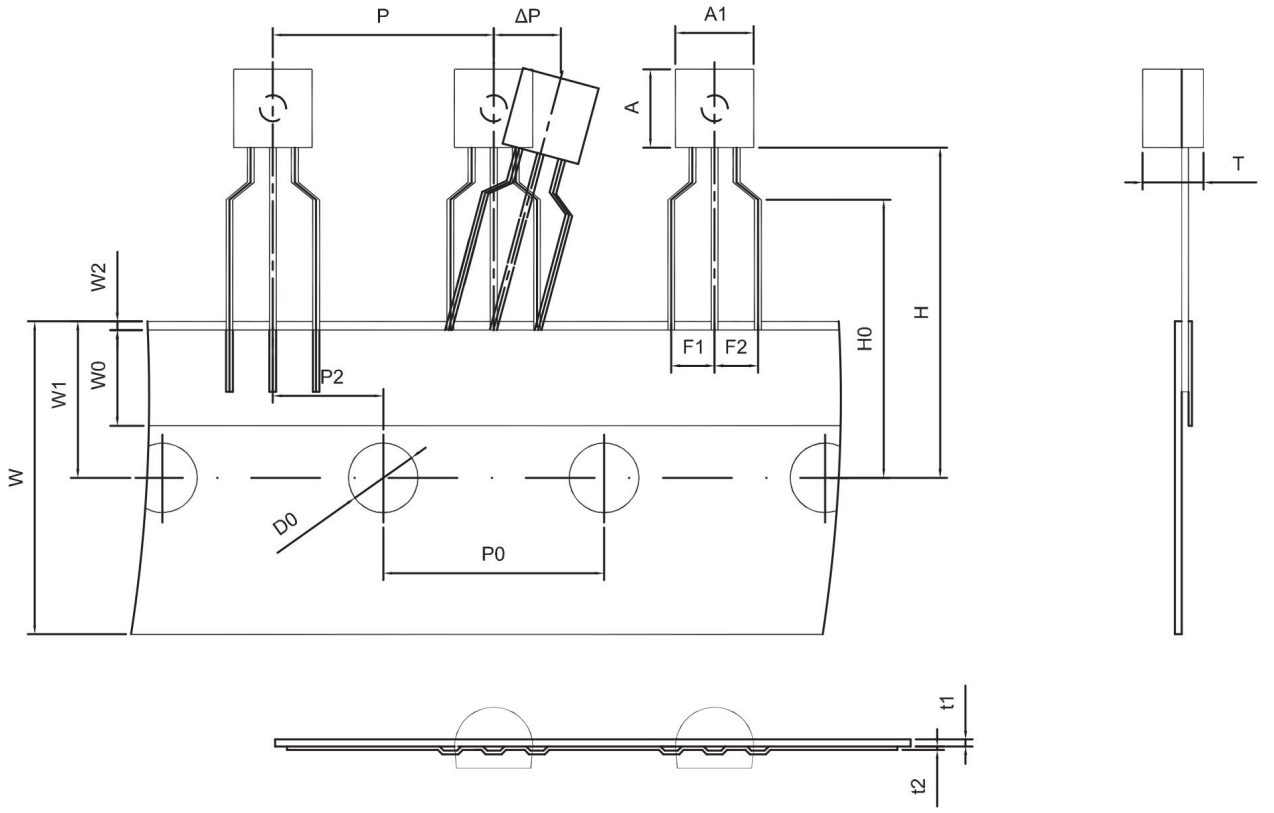
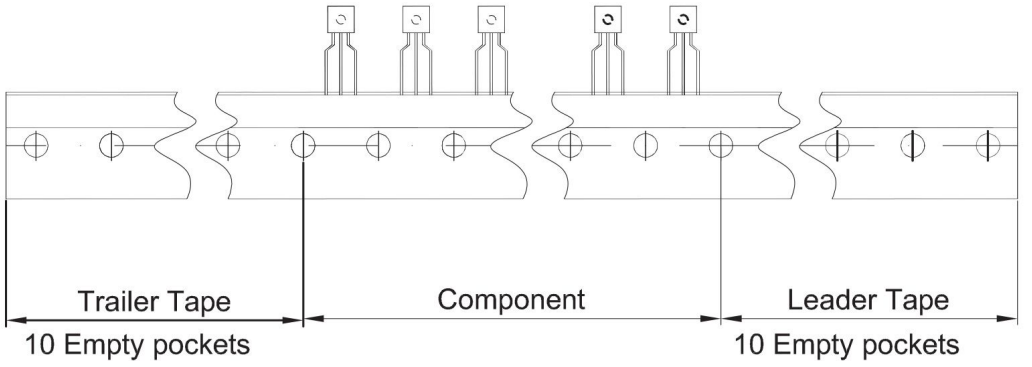
TO-92 PACKAGE TAPEING DIMENSION



Dimiensions 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