

TO-92 Plastic-Encapsulate Transistors

3DD13001B TRANSISTOR (NPN)

FEATURE

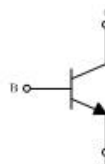
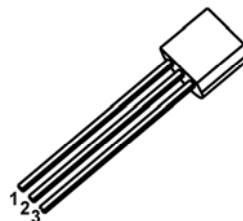
- power switching applications

MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{CB0}	Collector -Base Voltage	600	V
V_{CE0}	Collector-Emitter Voltage	400	V
V_{EB0}	Emitter-Base Voltage	7	V
I_C	Collector Current -Continuous	0.2	A
P_C	Collector Power Dissipation	0.75	W
T_J	Junction Temperature	150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature	-55~150	$^{\circ}\text{C}$

TO-92

1. BASE
2. COLLECTOR
3. EMITTER



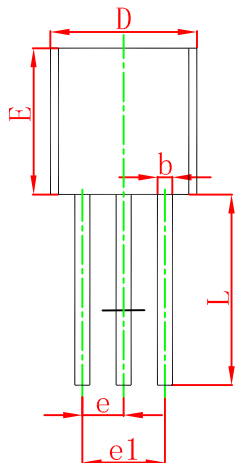
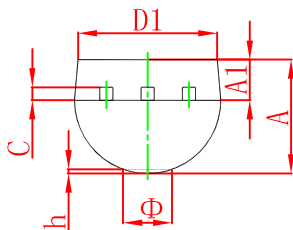
ELECTRICAL CHARACTERISTICS ($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$, $I_E = 0$	600			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}$, $I_B = 0$	400			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = 100\mu\text{A}$, $I_C = 0$	7			V
Collector cut-off current	I_{CBO}	$V_{CB} = 600\text{V}$, $I_E = 0$			100	μA
Collector cut-off current	I_{CEO}	$V_{CE} = 400\text{V}$, $I_B = 0$			200	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 7\text{V}$, $I_C = 0$			100	μA
DC current gain	$h_{FE(1)}$	$V_{CE} = 20\text{V}$, $I_C = 20\text{mA}$	10		40	
	$h_{FE(2)}$	$V_{CE} = 10\text{V}$, $I_C = 0.25\text{mA}$	5			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 50\text{mA}$, $I_B = 10\text{mA}$			0.5	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 50\text{mA}$, $I_B = 10\text{mA}$			1.2	V
Transition frequency	f_T	$V_{CE} = 20\text{V}$, $I_C = 20\text{mA}$ $f = 1\text{MHz}$	8			MHz
Fall time	t_f	$I_C = 50\text{mA}$, $I_{B1} = -I_{B2} = 5\text{mA}$, $V_{CC} = 45\text{V}$			0.3	μs
Storage time	t_s				1.5	μs

CLASSIFICATION OF $h_{FE(1)}$

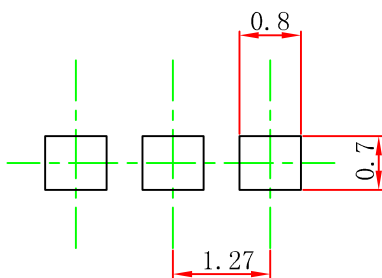
Range	10-13	13-16	16-19	19-22	22-25	25-28	28-31	31-34	34-37	37-40
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TO-92 Package Outline Dimensions



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	4.400	4.700	0.173	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



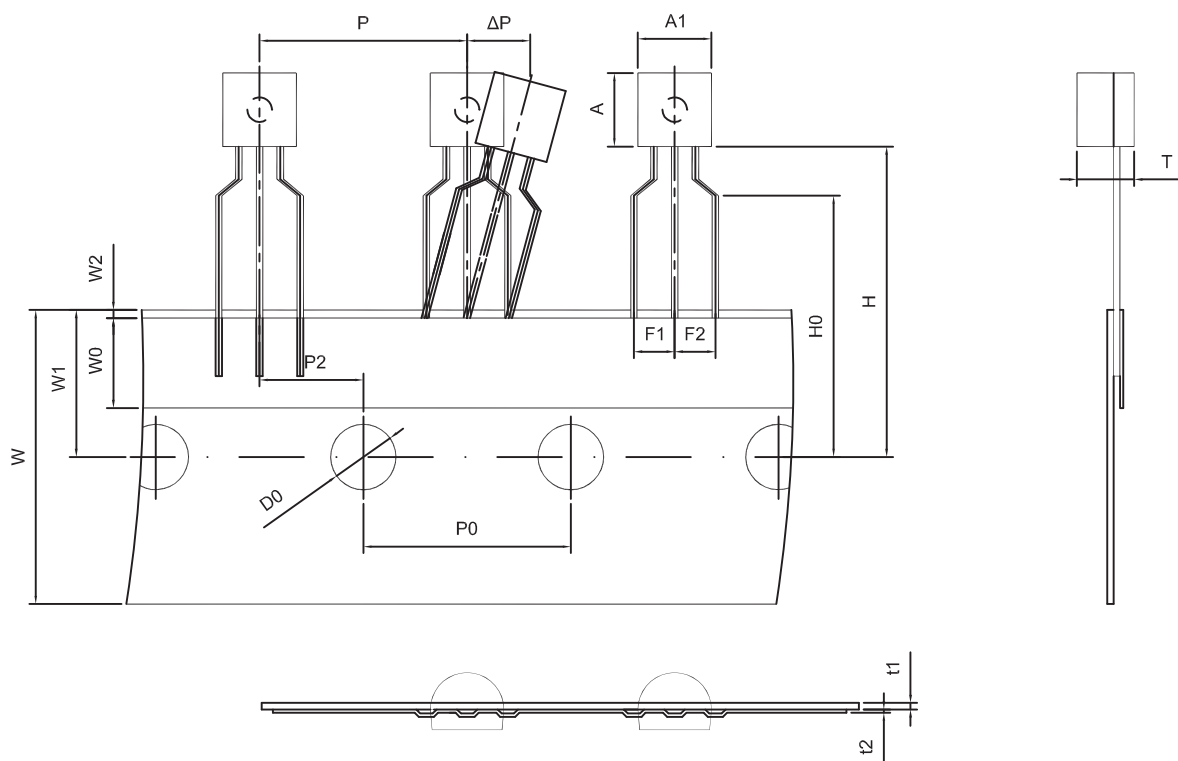
Note:

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

NOTICE

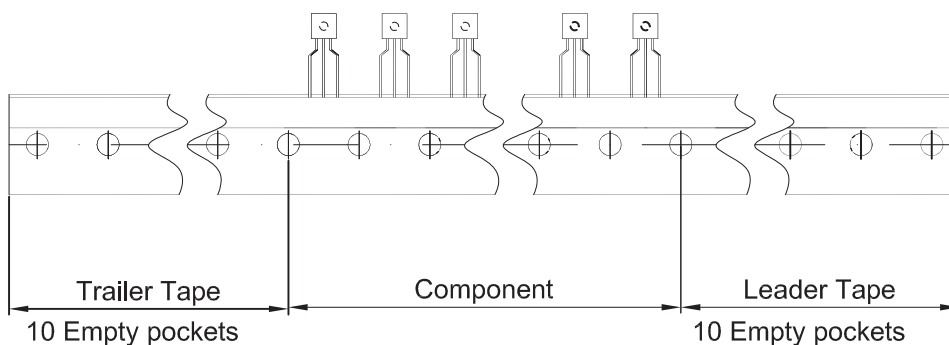
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TO-92 PACKAGE TAPEING DIMENSION



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±0.5	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