

TO-92L Plastic-Encapsulate Transistors

2SB649/2SB649A TRANSISTOR (PNP)

FEATURES

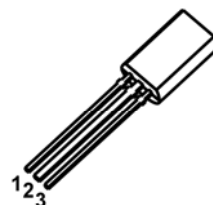
- High Collector Current
- High Collector-Emitter Breakdown Voltage
- Low Saturation Voltage

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

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	-180	V
V_{CEO}	Collector-Emitter Voltage	2SB649	-120
		2SB649A	-160
V_{EBO}	Emitter-Base Voltage	-5	V
I_C	Collector Current	-1.5	A
P_C	Collector Power Dissipation	900	mW
$R_{\theta JA}$	Thermal Resistance From Junction To Ambient	139	$^\circ\text{C}/\text{W}$
T_j	Junction Temperature	150	$^\circ\text{C}$
T_{stg}	Storage Temperature	-55~+150	$^\circ\text{C}$

TO - 92L

1. EMITTER
2. COLLECTOR
3. BASE



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

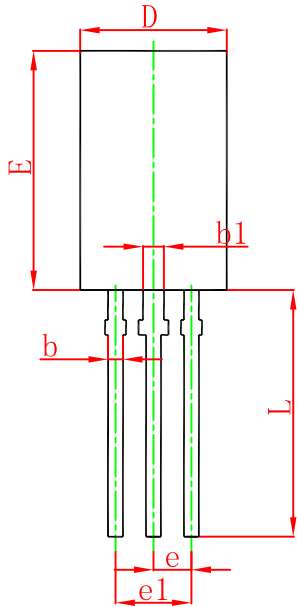
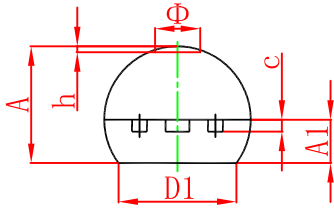
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=-1\text{mA}, I_E=0$	-180			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=-10\text{mA}, I_B=0$	2SB649	-120		V
			2SB649A	-160		
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=-1\text{mA}, I_C=0$	-5			V
Collector cut-off current	I_{CBO}	$V_{CB}=-160\text{V}, I_E=0$			-10	μA
Emitter cut-off current	I_{EBO}	$V_{EB}=-4\text{V}, I_C=0$			-10	μA
DC current gain	$h_{FE(1)}$	$V_{CE}=-5\text{V}, I_C=-150\text{mA}$	2SB649	60	320	
			2SB649A	60	200	
	$h_{FE(2)}^*$	$V_{CE}=-5\text{V}, I_C=-500\text{mA}$	30			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=-500\text{mA}, I_B=-50\text{mA}$			-1	V
Base-emitter voltage	V_{BE}	$V_{CE}=-5\text{V}, I_C=-150\text{mA}$			-1.5	V
Collector output capacitance	C_{ob}	$V_{CB}=-10\text{V}, I_E=0, f=1\text{MHz}$		27		pF
Transition frequency	f_T	$V_{CE}=-5\text{V}, I_C=-150\text{mA}$		140		MHz

*Pulse test

CLASSIFICATION OF $h_{FE(1)}$

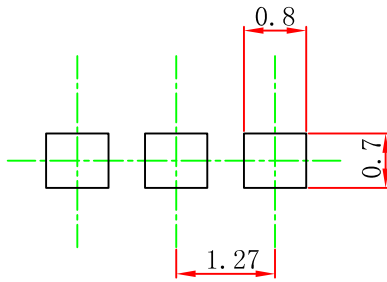
TYPE	2SB649		
	2SB649A		
RANK	B	C	D
RANGE	60-120	100-200	160-320

TO-92L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	3.750	4.050	0.148	0.159
A1	1.280	1.580	0.050	0.062
b	0.380	0.550	0.015	0.022
b1	0.620	0.780	0.024	0.031
c	0.350	0.450	0.014	0.018
D	4.750	5.050	0.187	0.199
D1	4.000		0.157	
E	7.850	8.150	0.309	0.321
e	1.270 TYP.		0.050 TYP.	
e1	2.440	2.640	0.096	0.104
L	13.800	14.200	0.543	0.559
Φ		1.600		0.063
h	0.000	0.300	0.000	0.012

TO-92L Suggested Pad Layout



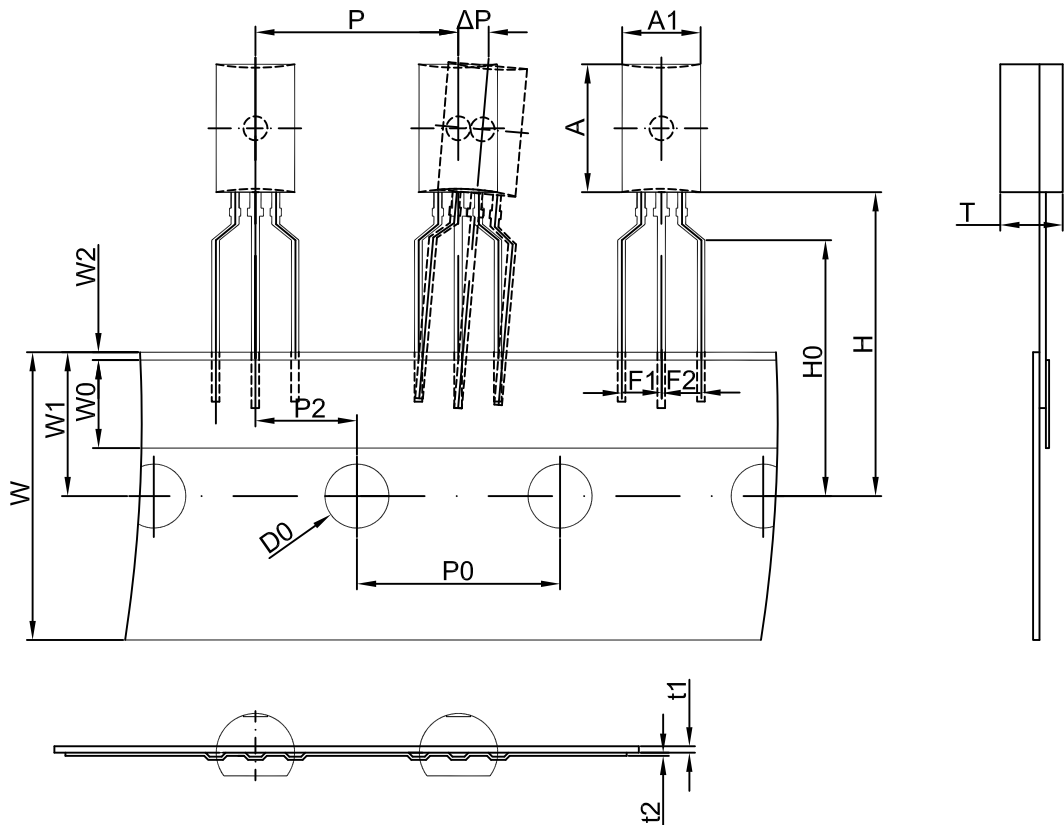
Note:

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

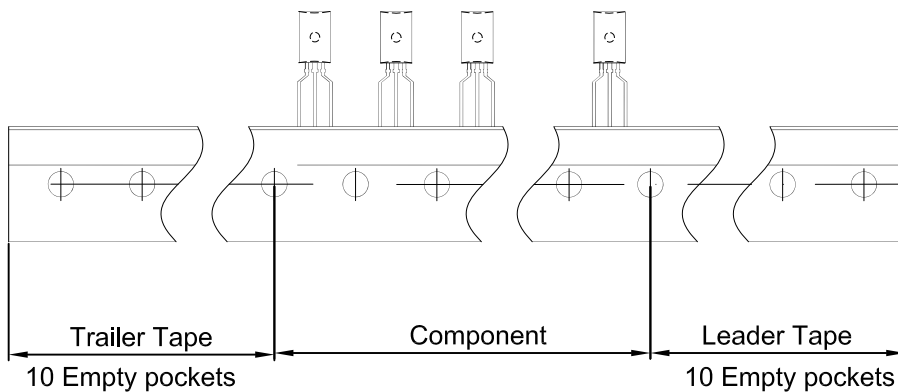
NOTICE

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TO-92L PACKAGE TAPEING DIMENSION



Dimensions are in millimeter								
A1	A	T	P	P0	P2	F1	F2	W
4.9	8.0	3.9	12.7	12.7	6.35	2.5	2.5	18.0
W0	W1	W2	H	H0	D0	t1	t2	ΔP
6.0	9.0	1.0	19.0	16.0	4.0	0.4	0.2	0



Package	Box	Box Size(mm)	Carton	Carton Size(mm)
TO-92L	2000 pcs	333×203×42	20,000 pcs	493×400×264