

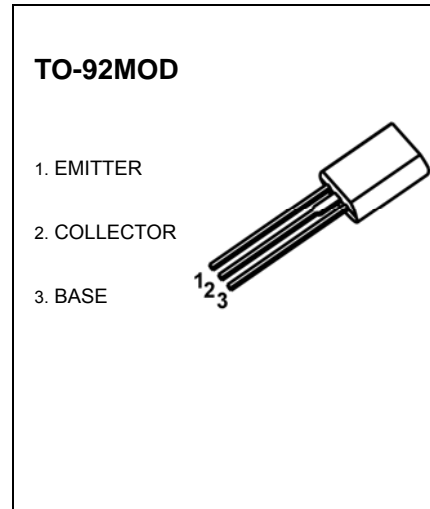


**TO-92MOD Plastic-Encapsulate Transistors**

**2SA1013** TRANSISTOR (PNP)

**FEATURE**

- High Voltage:  $V_{CEO} = -160V$
- Large Continuous Collector Current Capability
- Complementary to 2SC2383



**MAXIMUM RATINGS** ( $T_a = 25^\circ C$  unless otherwise noted)

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-Base Voltage	-160	V
$V_{CEO}$	Collector-Emitter Voltage	-160	V
$V_{EBO}$	Emitter-Base Voltage	-6	V
$I_C$	Collector Current -Continuous	-1	A
$P_C$	Collector Power Dissipation	0.9	W
$T_J$	Junction Temperature	150	$^\circ C$
$T_{stg}$	Storage Temperature	-55 to +150	$^\circ C$

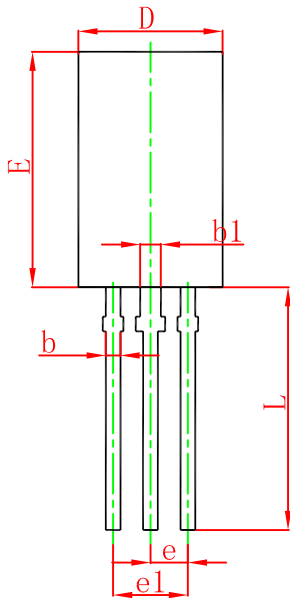
**ELECTRICAL CHARACTERISTICS** ( $T_a = 25^\circ C$  unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Max	Unit
Collector-base breakdown voltage	$V(BR)_{CBO}$	$I_C = -100\mu A, I_E = 0$	-160		V
Collector-emitter breakdown voltage	$V(BR)_{CEO}$	$I_C = -1mA, I_B = 0$	-160		V
Emitter-base breakdown voltage	$V(BR)_{EBO}$	$I_E = -10\mu A, I_C = 0$	-6		V
Collector cut-off current	$I_{CBO}$	$V_{CB} = -150V, I_E = 0$		-1	$\mu A$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = -6V, I_C = 0$		-1	$\mu A$
DC current gain	$h_{FE}$	$V_{CE} = -5V, I_C = -200mA$	60	320	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -500mA, I_B = -50mA$		-1.5	V
Base-emitter voltage	$V_{BE}$	$I_C = -5mA, V_{CE} = -5V$	-0.45	-0.75	V
Transition frequency	$f_T$	$V_{CE} = -5V, I_C = -200mA$	15		MHz
Collector Output capacitance	$C_{ob}$	$V_{CB} = -10V, I_E = 0, f = 1MHz$		35	pF

**CLASSIFICATION OF  $h_{FE}$**

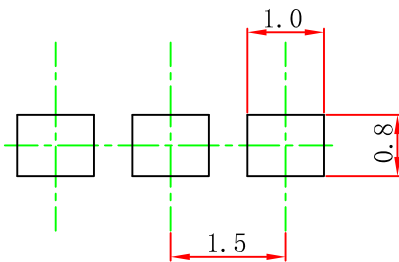
Rank	R	O	Y
Range	60-120	100-200	160-320

## TO-92MOD Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.800	5.000	0.189	0.197
A1	1.730	2.030	0.068	0.080
b	0.440	0.600	0.017	0.024
b1	0.940	1.100	0.037	0.043
c	0.350	0.450	0.014	0.018
D	5.900	6.100	0.232	0.240
D1	4.000		0.157	
E	8.500	8.700	0.335	0.343
e	1.500 TYP.		0.059 TYP.	
e1	2.900	3.100	0.114	0.122
L	13.800	14.200	0.543	0.559
$\Phi$		1.600		0.063
h	0.000	0.380	0.000	0.015

## TO-92MOD Suggested Pad Layout



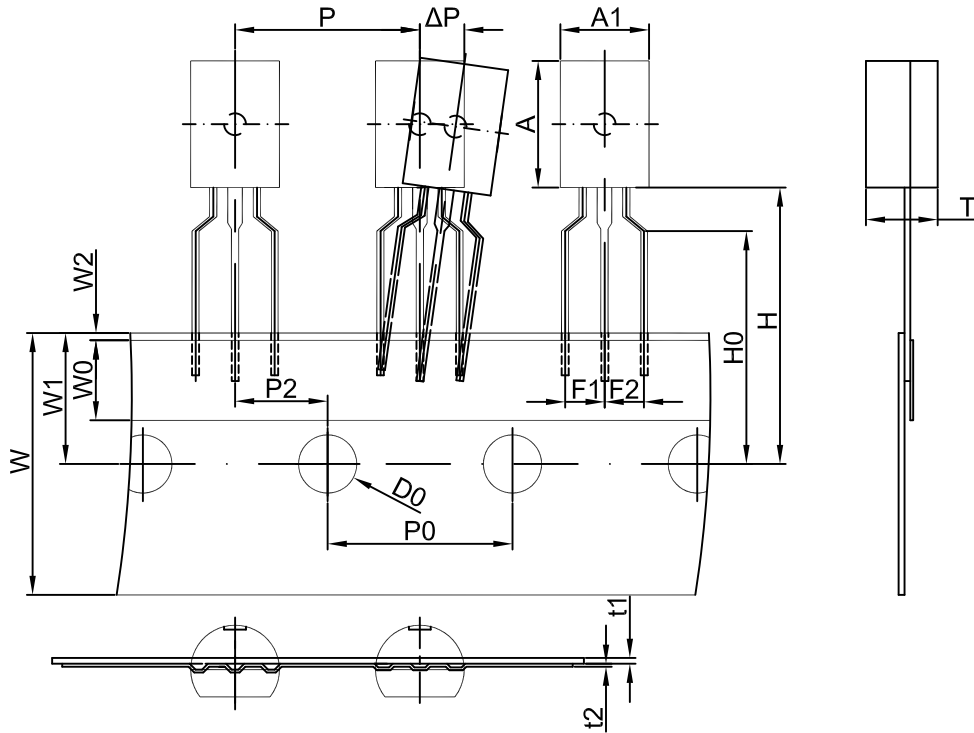
Note:

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

### NOTICE

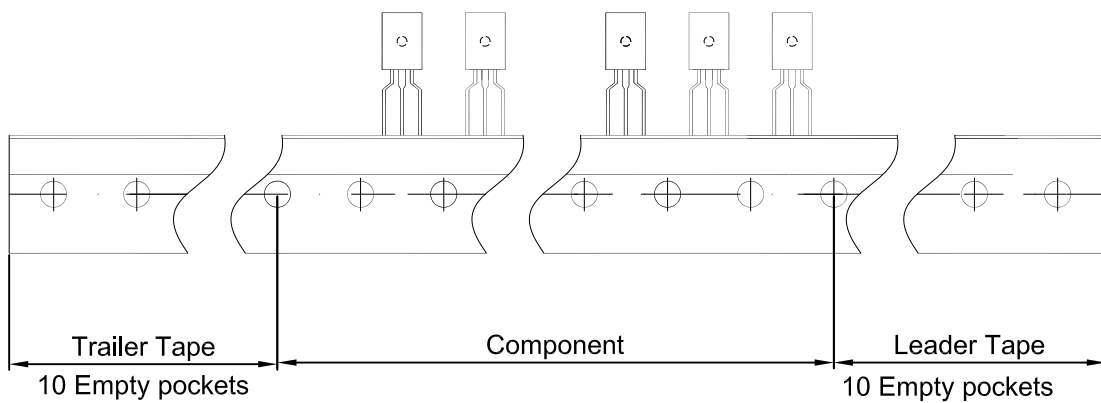
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# TO-92MOD PACKAGE TAPEING DIMENSION



Dimensions are in millimeter

A1	A	T	P	P0	P2	F1	F2	W
6.0	8.6	4.9	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-92MOD	2000 pcs	333×245×43	20,000 pcs	573×404×266