

## TO-92MOD Plastic-Encapsulate Transistors

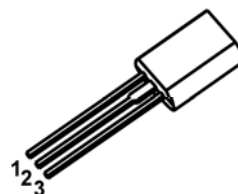
TRANSISTOR (PNP)

### Features:

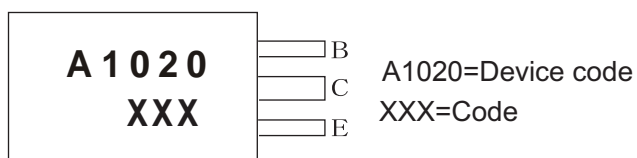
- Power Amplifier Applications

### TO-92MOD

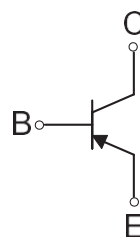
- 1.EMITTER
- 2.COLLECTOR
- 3.BASE



### MARKING



### Equivalent Circuit



### ORDERING INFORMATION

Part Number	Package	Packing Method	Pack Quantity
2SA1020	TO-92L	Bulk	500pcs/Bag
2SA1020-TA	TO-92L	Tape	2000pcs/Box

### MAXIMUM RATINGS (T<sub>a</sub>=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V <sub>CB0</sub>	Collector-Base Voltage	-50	V
V <sub>CE0</sub>	Collector-Emitter Voltage	-50	V
V <sub>EB0</sub>	Emitter-Base Voltage	-5	V
I <sub>c</sub>	Collector Current –Continuous	-2	A
P <sub>c</sub>	Collector Power Dissipation	900	mW
T <sub>J</sub> , T <sub>stg</sub>	Operation Junction and Storage Temperature Range	-55-150	°C

## ELECTRICAL CHARACTERISTICS

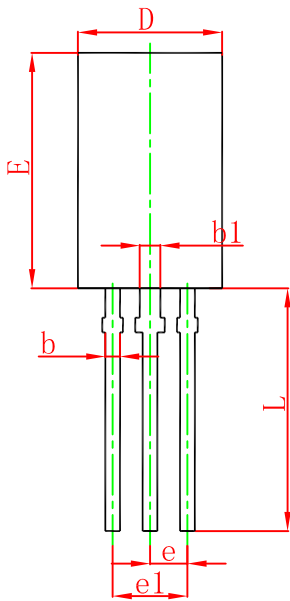
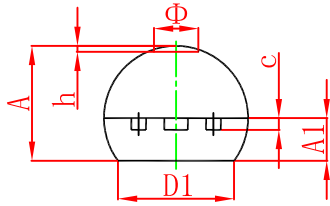
$T_a=25\text{ }^\circ\text{C}$  unless otherwise specified

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = -100\mu\text{A}, I_E = 0$	-50			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = -10\text{mA}, I_B = 0$	-50			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = -100\mu\text{A}, I_C = 0$	-5			V
Collector cut-off current	$I_{CBO}$	$V_{CB} = -50\text{V}, I_E = 0$			-1	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = -5\text{V}, I_C = 0$			-1	$\mu\text{A}$
DC current gain	$h_{FE(1)}$	$V_{CE} = -2\text{V}, I_C = -0.5\text{A}$	70		240	
	$h_{FE(2)}$	$V_{CE} = -2\text{V}, I_C = -1.5\text{A}$	40			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -1\text{A}, I_B = -50\text{mA}$			-0.5	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = -1\text{A}, I_B = -50\text{mA}$			-1.2	V
Transition frequency	$f_T$	$V_{CE} = -2\text{V}, I_C = -500\text{mA}$		100		MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$		40		pF
Turn-on time	$t_{on}$	$V_{CC} = -30\text{V}, I_{B1} = -I_{B2} = -0.05\text{A}, I_C = -1\text{A}$		0.1		$\mu\text{s}$
Storage time	$t_s$			1		$\mu\text{s}$
Fall time	$t_f$			0.1		$\mu\text{s}$

### CLASSIFICATION OF $h_{FE(1)}$

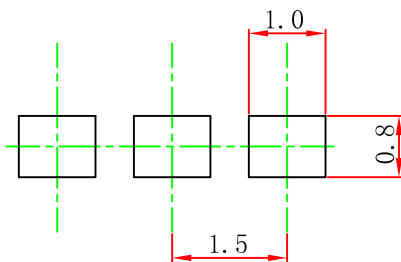
Rank	O	Y
Range	70-140	120-240

TO-92MOD Package Outline Dimensions



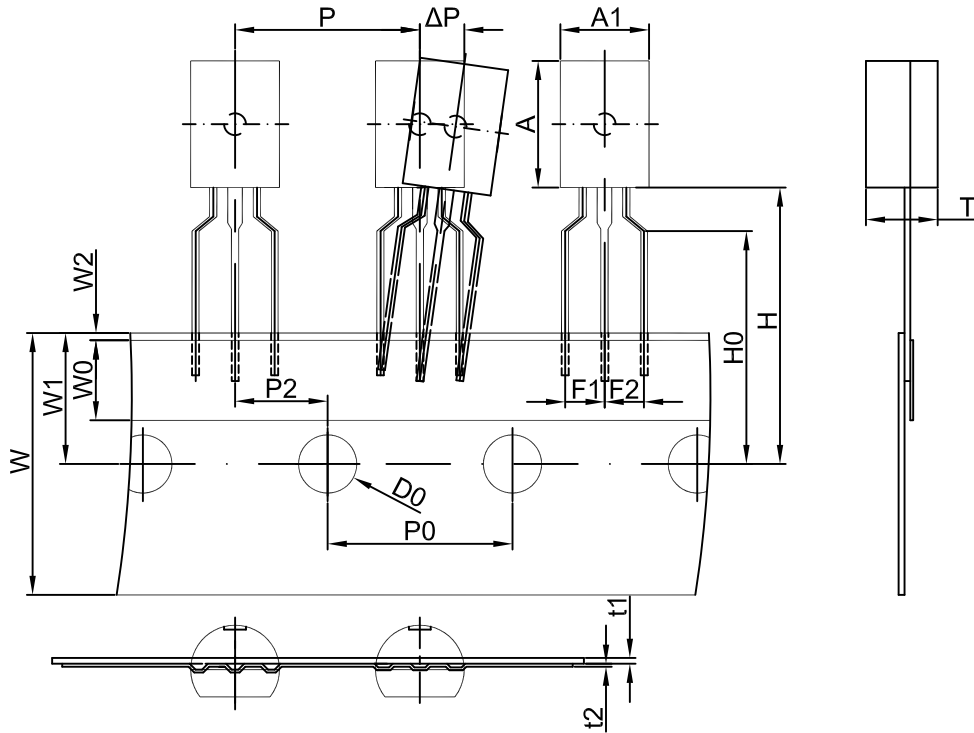
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.800	5.000	0.189	0.197
A1	1.730	2.030	0.068	0.080
b	0.440	0.600	0.017	0.024
b1	0.940	1.100	0.037	0.043
c	0.350	0.450	0.014	0.018
D	5.900	6.100	0.232	0.240
D1	4.000		0.157	
E	8.500	8.700	0.335	0.343
e	1.500 TYP.		0.059 TYP.	
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



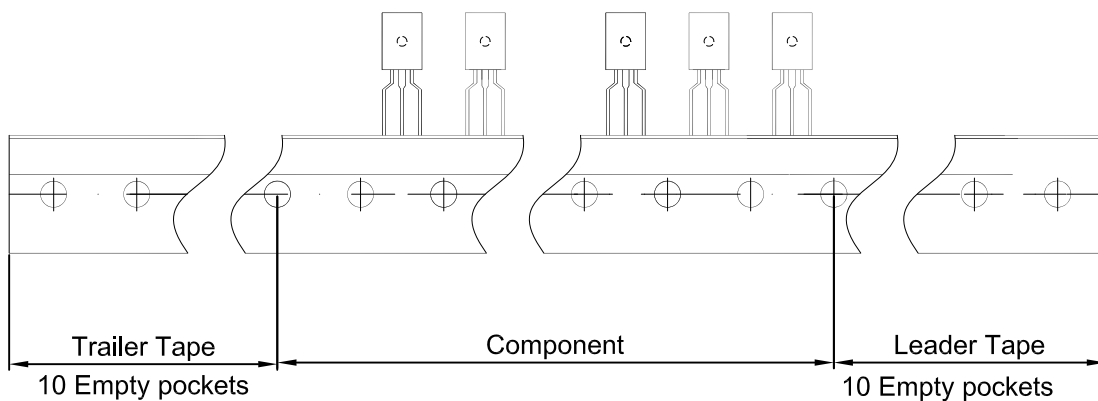
- Note:
1. Controlling dimension: in millimeters.
  2. General tolerance:  $\pm 0.05$ mm.
  3. The pad layout is for reference purposes only.

**TO-92MOD PACKAGE TAPING 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