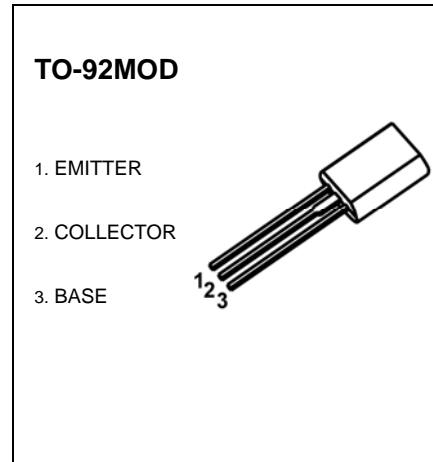


## TO-92MOD Plastic-Encapsulate Transistors

### 2SA1013 TRANSISTOR (PNP)

#### FEATURE

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

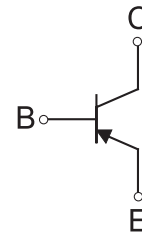


#### MARKING



A1013=Device code  
 Solid dot= Green molding compound device,  
 if none, the normal device  
 XXX=Code

#### Equivalent Circuit



#### ORDERING INFORMATION

Part Number	Package	Packing Method	Pack Quantity
2SA1013	TO-92MOD	Bulk	500pcs/Bag
2SA1013-TA	TO-92MOD	Tape	2000pcs/Box

#### 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

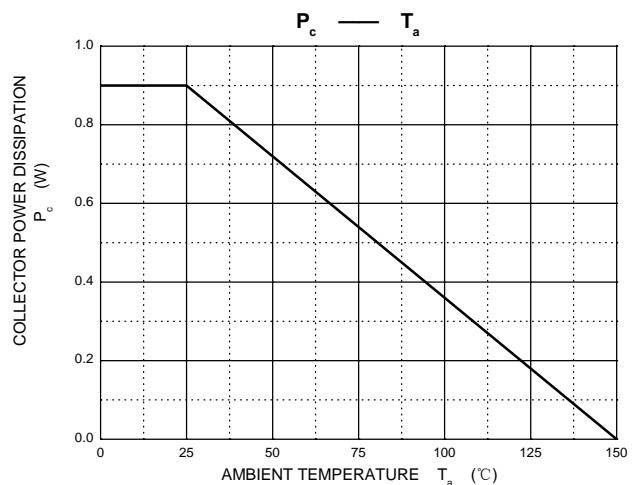
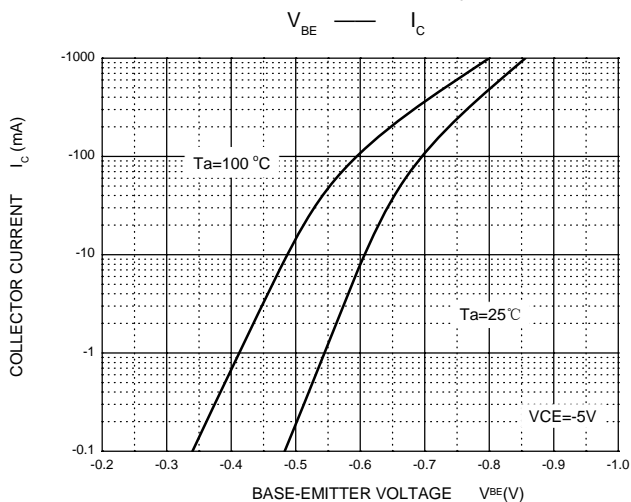
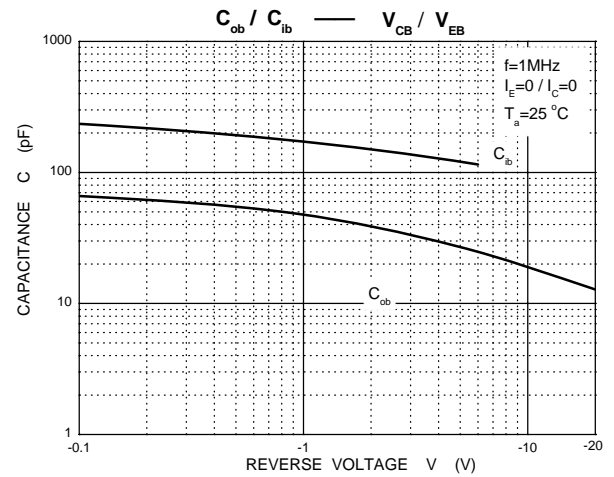
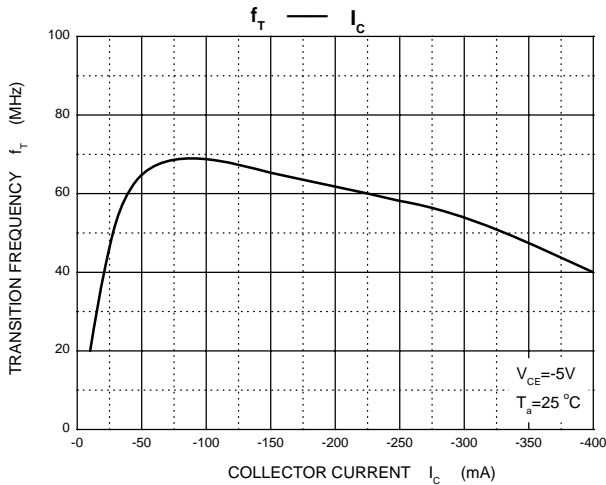
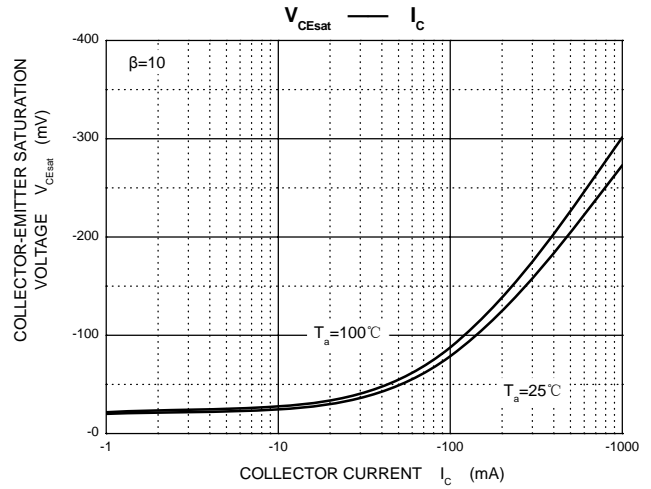
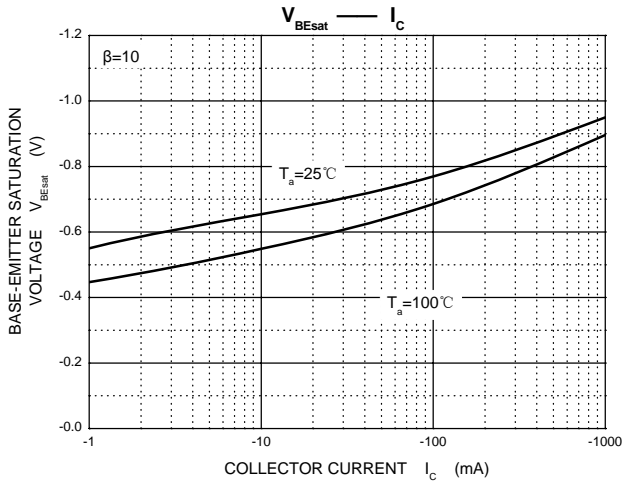
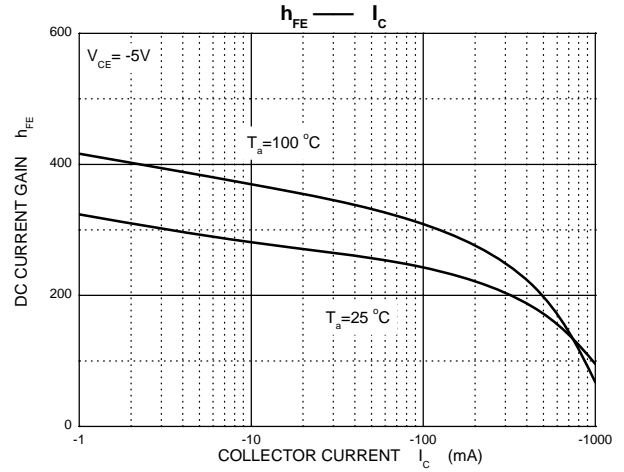
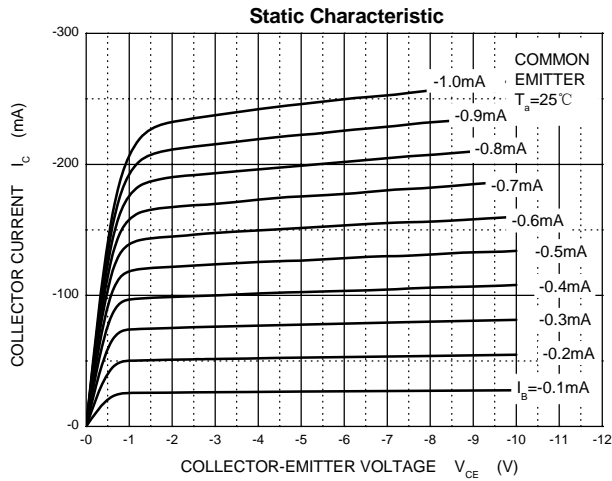
$T_a=25^\circ\text{C}$  unless otherwise specified

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

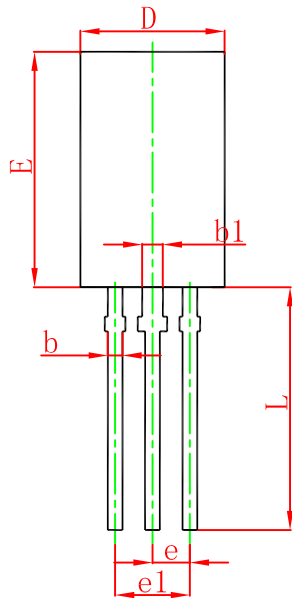
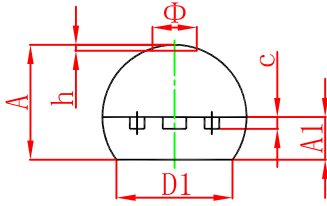
### CLASSIFICATION OF $h_{\text{FE}}$

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

# Typical Characteristics

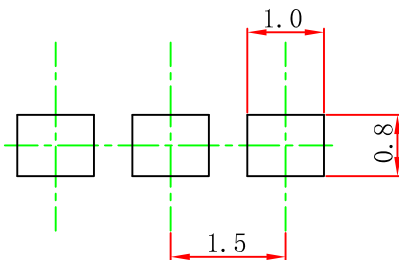


## TO-92MOD Package Outline Dimensions



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



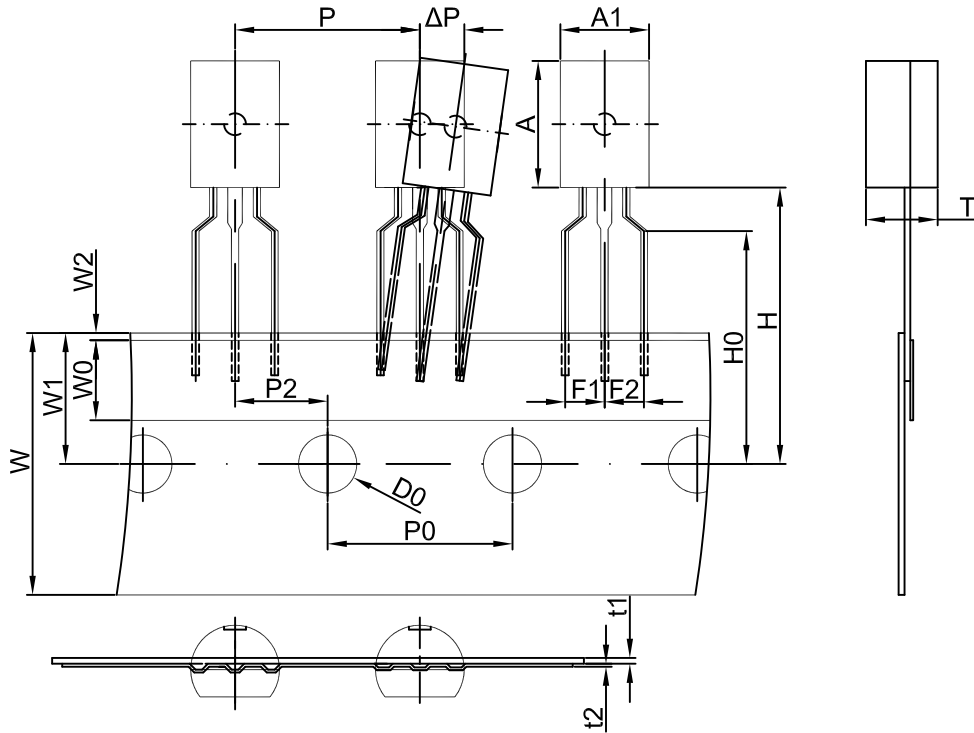
### Note:

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

### NOTICE

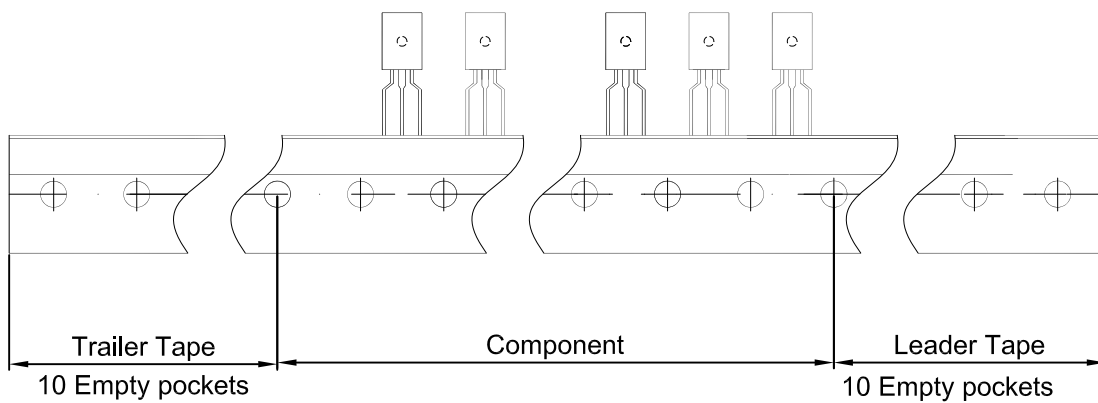
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# TO-92MOD PACKAGE TAPEING DIMENSION



Dimiensions are in millimeter

A1	A	T	P	P0	P2	F1	F2	W
6.0±0.1	8.6±0.1	4.9±0.1	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±2.0/-1	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-92MOD	2000 pcs	333×245×43	20,000 pcs	573×404×266