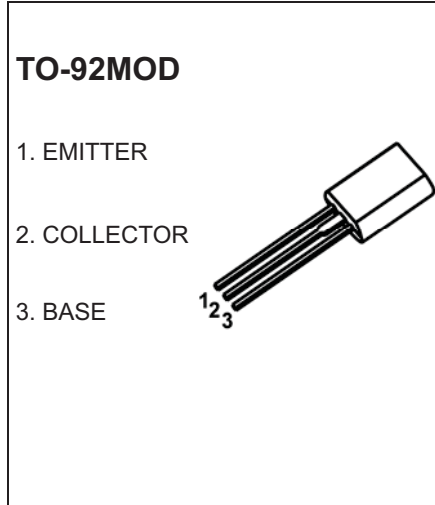


TO-92MOD Plastic-Encapsulate Transistors

2SC2230/2230A TRANSISTOR (NPN)

FEATURE

- High voltage: $V_{CE0}=180V(2SC2230A)$
- High DC Current Gain



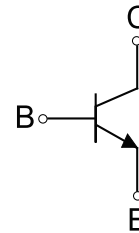
MARKING



C2230,C2230A=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
2SC2230/2SC2230A	TO-92MOD	Bulk	500pcs/Bag
2SC2230-TA/2SC2230A-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	200	V
V_{CE0}	Collector-Emitter Voltage	2SC2230	160
		2SC2230A	180
V_{EBO}	Emitter-Base Voltage	5	V
I_c	Collector Current -Continuous	0.1	A
P_D	Collector Power Dissipation	800	mW
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	156	$^{\circ}C / W$
T_j	Junction Temperature	150	$^{\circ}C$
T_{stg}	Storage Temperature	-55~+150	$^{\circ}C$

ELECTRICAL CHARACTERISTICS

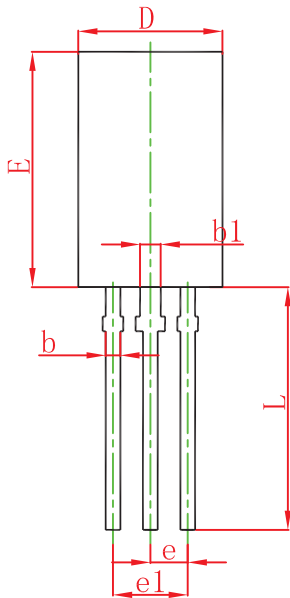
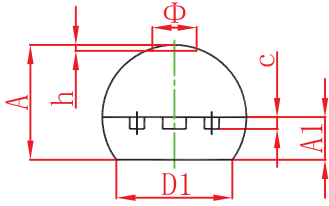
$T_a=25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Test conditions	Min	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=100\mu\text{A}, I_E=0$	200		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=10\text{mA}, I_B=0$ 2SC2230 2SC2230A	160 180		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=10\mu\text{A}, I_C=0$	5		V
Collector cut-off current	I_{CBO}	$V_{CB}=200\text{V}, I_E=0$		0.1	μA
Emitter cut-off current	I_{EBO}	$V_{EB}=5\text{V}, I_C=0$		0.1	μA
DC current gain	h_{FE1}	$V_{CE}=10\text{V}, I_C=10\text{mA}$	120	400	
	h_{FE2}	$V_{CE}=10\text{V}, I_C=50\text{mA}$	80		
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=50\text{mA}, I_B=5\text{mA}$		0.5	V
Base-emitter voltage	V_{BE}	$I_C=1\text{mA}, V_{CE}=10\text{V}$	0.5	0.7	V
Transition frequency	f_T	$V_{CE}=10\text{V}, I_C=10\text{mA}$	50		MHz
Collector output capacitance	C_{ob}	$V_{CB}=10\text{V}, I_E=0, f=1\text{MHz}$		7	pF

CLASSIFICATION OF h_{FE1}

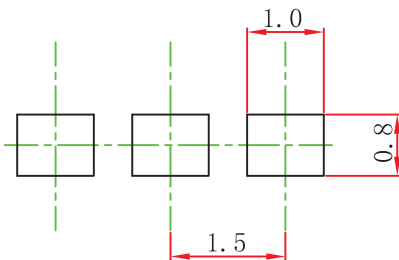
Rank	Y	GR
Range	120-240	200-400

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
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015

TO-92MOD Suggested Pad Layout



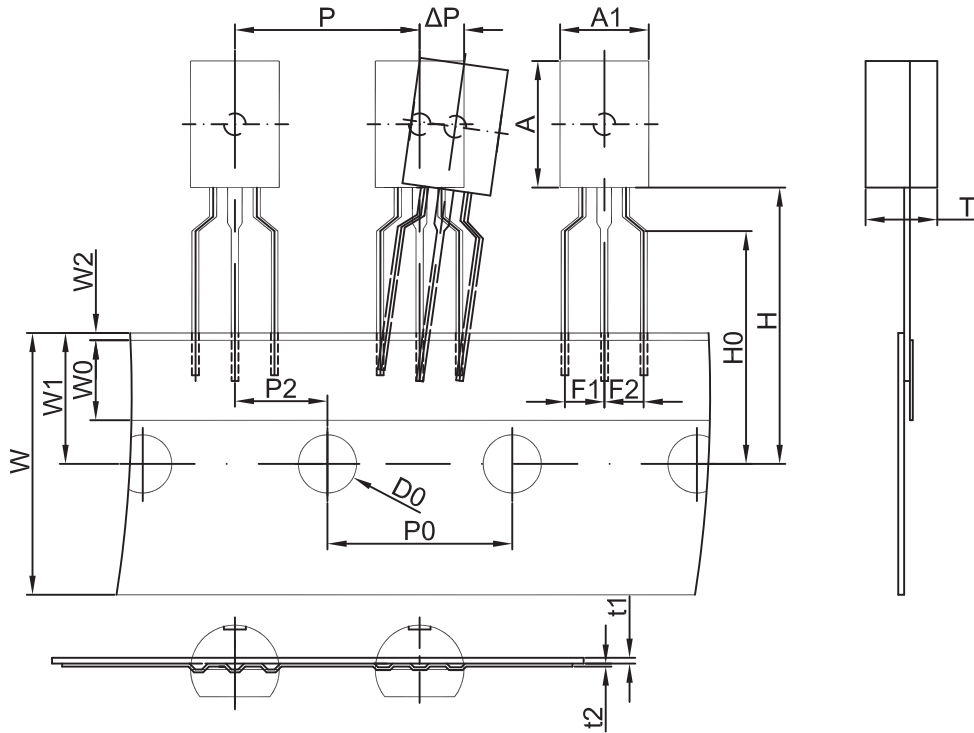
Note:

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

NOTICE

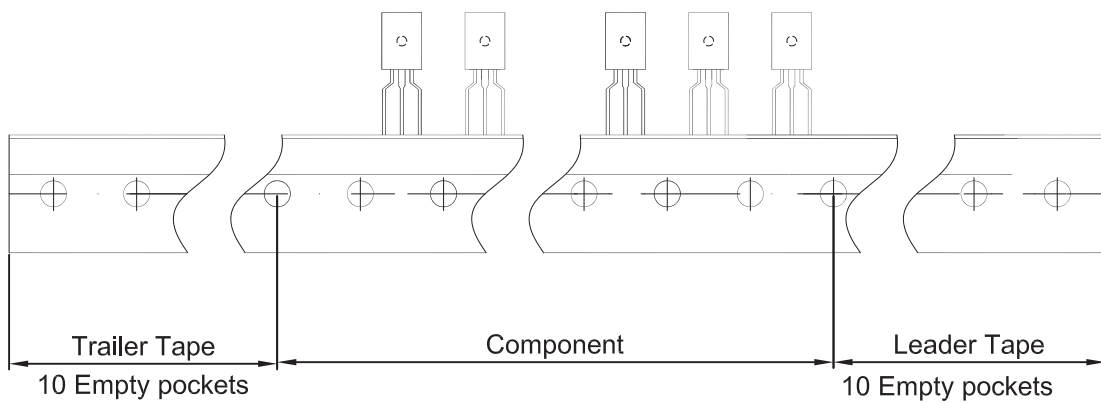
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TO-92MOD PACKAGE TAPING DIMENSION



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