



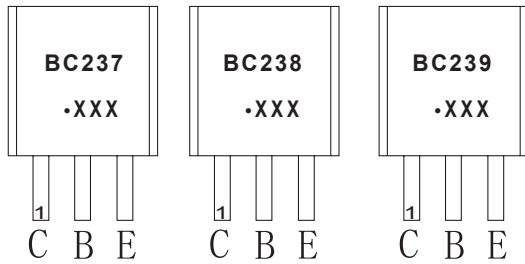
TO-92 Plastic-Encapsulate Transistors

BC237 / BC238 / BC239 TRANSISTOR (NPN)

FEATURES

Amplifier dissipation NPN Silicon

MARKING



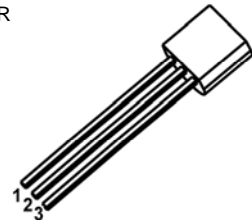
BC237,BC238,BC239=Device code

Solid dot=Green molding compound device,
if none,the normal device

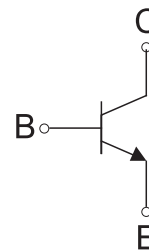
XXX=Code

TO-92

1. COLLECTOR
2. BASE
3. EMITTER



Equivalent Circuit



ORDERING INFORMATION

Part Number	Package	Packing Method	Pack Quantity
BC237	TO-92	Bulk	1000pcs/Bag
BC237-TA	TO-92	Tape	2000pcs/Box
BC238	TO-92	Bulk	1000pcs/Bag
BC238-TA	TO-92	Tape	2000pcs/Box
BC239	TO-92	Bulk	1000pcs/Bag
BC239-TA	TO-92	Tape	2000pcs/Box

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

Symbol	Parameter	Value	Unit
V_{CEO}	Collector-Emitter Voltage	BC237	45
		BC238/239	25
V_{EBO}	Emitter-Base Voltage	BC237	6
		BC238/239	5
I_C	Collector Current -Continuous	0.1	A
P_C	Collector Power Dissipation	350	mW
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	125	$^{\circ}\text{C}/\text{W}$
T_J, T_{stg}	Operation Junction and Storage Temperature Range	-55~150	$^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS

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

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=100\mu\text{A}$, $I_E=0$ BC237 BC238/239	50 30			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=2\text{mA}$, $I_B=0$ BC237 BC238/239	45 25			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=100\mu\text{A}$, $I_C=0$ BC237 BC238/239	6 5			V
Collector cut-off current	I_{CBO}	$V_{CE}=50\text{V}$, $V_{BE}=0$ $V_{CB}=30\text{V}$, $I_E=0$ BC237 BC238/239			15	nA
DC current gain	$h_{FE(1)}$	$V_{CE}=5\text{V}$, $I_C=10\mu\text{A}$ BC237A BC237B/238B BC237C/238C/239C		90 150 270		
	$h_{FE(2)}$	$V_{CE}=5\text{V}$, $I_C=2\text{mA}$ BC237 BC239 BC237A BC237B/238B BC237C/238C/239C	120 120 120 200 380		800 800 220 460 800	
	$h_{FE(3)}$	$V_{CE}=5\text{V}$, $I_C=100\text{mA}$ BC237A BC237B/238B BC237C/238C/239C		120 180 300		
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=10\text{mA}$, $I_B=0.5\text{mA}$ $I_C=100\text{mA}$, $I_B=5\text{mA}$ BC237/238/239 BC237/239 BC238			0.2 0.6 0.8	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C=10\text{mA}$, $I_B=0.5\text{mA}$ $I_C=100\text{mA}$, $I_B=5\text{mA}$			0.83 1.05	V
Base-emitter voltage	V_{BE}	$V_{CE}=5\text{V}$, $I_C=0.1\text{mA}$ $V_{CE}=5\text{V}$, $I_C=2\text{mA}$ $V_{CE}=5\text{V}$, $I_C=100\text{mA}$	0.55	0.5 0.83	0.7	V
Transition frequency	f_T	$V_{CE}=3\text{V}$, $I_C=0.5\text{mA}$, $f=100\text{MHz}$ BC237 BC238 BC239 $V_{CE}=5\text{V}$, $I_C=10\text{mA}$, $f=100\text{MHz}$ BC237 BC238 BC239	150 150 150	100 120 140 200 240 280		MHz
Collector output capacitance	C_{ob}	$V_{CB}=10\text{V}$, $I_E=0$, $f=1\text{MHz}$			4.5	pF
Emitter-base capacitance	C_{ib}	$V_{EB}=0.5\text{V}$, $I_C=0$, $f=1\text{MHz}$		8		Pf
Noise figure	NF	$V_{CE}=5\text{V}$, $I_C=0.2\text{mA}$, $f=1\text{kHz}$, $R_s=2\text{K}\Omega$ BC239 $V_{CE}=5\text{V}$, $I_C=0.2\text{mA}$, $f=1\text{kHz}$, $R_s=2\text{K}\Omega$, $\Delta f=200\text{Hz}$ BC237 BC238 BC239		2 2 2	4 10 10 4	dB

TO-92 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP		0.050 TYP	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015

TO-92 Suggested Pad Layout



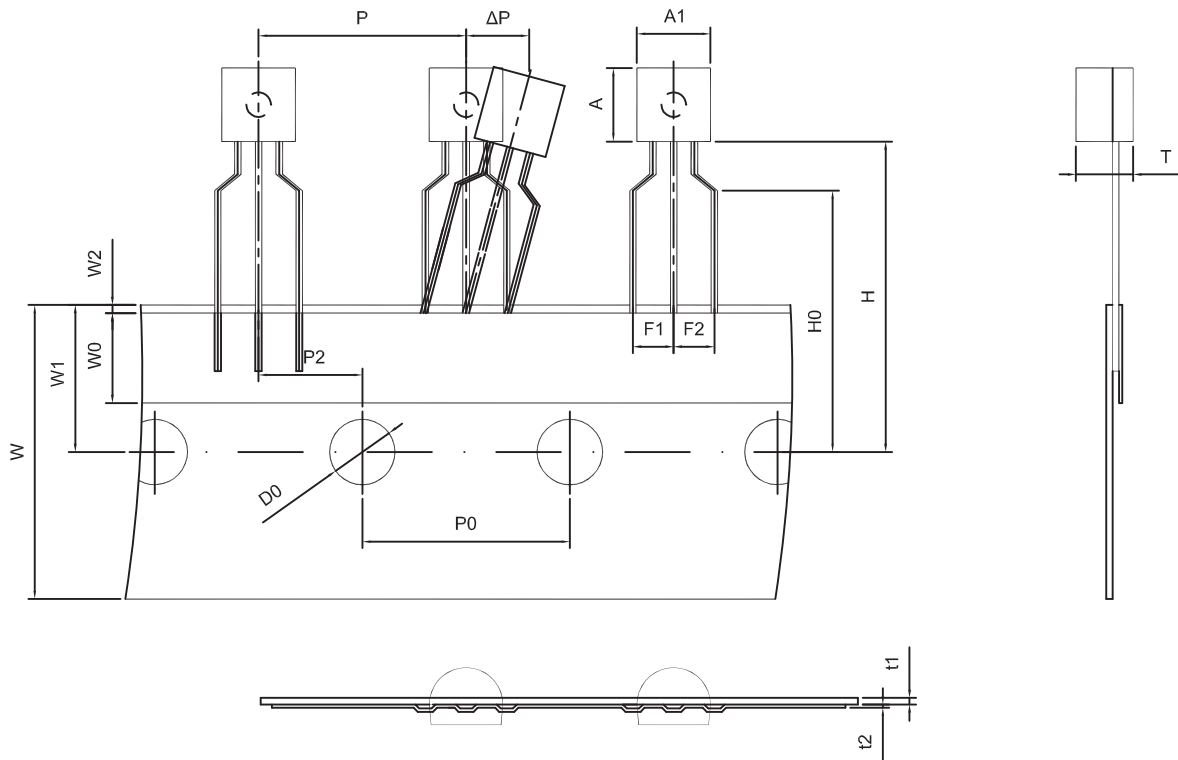
Note:

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

NOTICE

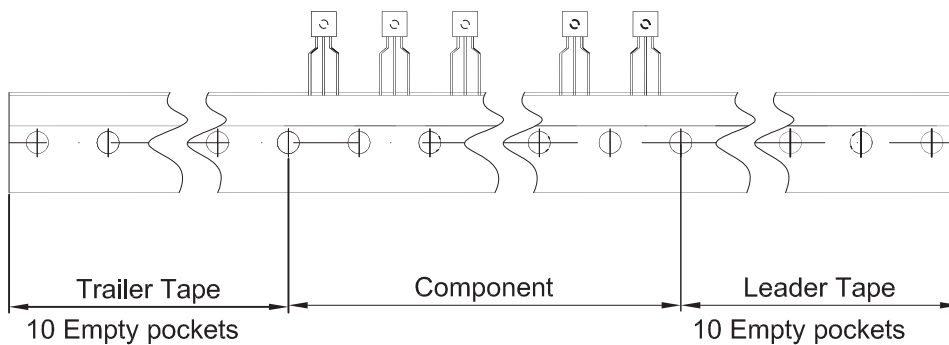
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TO-92 PACKAGE TAPING DIMENSION



Dimensions are in millimeter

A1	A	T	P	P0	P2	F1	F2	W
4.5	4.5	3.5	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 MAX.	19.0	16.0	4.0	0.4	0.2	0



Package	Box	Box Size(mm)	Carton	Carton Size(mm)
TO-92	2000 pcs	333×162×43	20,000 pcs	350×340×250