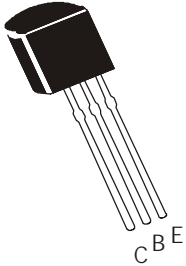


**NPN SILICON PLANAR EPITAXIAL TRANSISTORS**

**BC237,238, A,B,C  
 BC239, B,C**



**TO-92  
 Plastic Package**  
 For Lead Free Parts, Device  
 Part # will be Prefixed with  
 "T"

**Amplifier Transistors**

**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub>=25°C)**

DESCRIPTION	SYMBOL	BC237	BC238	BC239	UNITS
Collector Emitter Voltage	V <sub>CEO</sub>	45	25	25	V
Collector Emitter Voltage	V <sub>CES</sub>	50	30	30	V
Emitter Base Voltage	V <sub>EBO</sub>	6.0	5.0	5.0	V
Collector Current Continuous	I <sub>C</sub>	100			mA
Power Dissipation at T <sub>a</sub> =25°C	P <sub>D</sub>	350			mW
Derate Above 25°C		2.8			mW/°C
Power Dissipation at T <sub>c</sub> =25°C	P <sub>D</sub>	1.0			W
Derate Above 25°C		8.0			mW/°C
Operating And Storage Junction Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	- 55 to +150			°C

**THERMAL RESISTANCE**

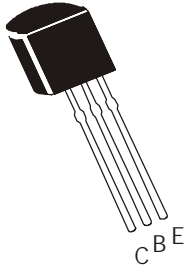
Junction to Ambient in free air	R <sub>th (j-a)</sub>	357	°C/W
Junction to Case	R <sub>th (j-c)</sub>	125	°C/W

**ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless specified otherwise)**

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	MAX	UNITS
Collector Emitter Voltage	V <sub>CEO</sub>	I <sub>C</sub> =2mA, I <sub>B</sub> =0			
		<b>BC237</b>	45		V
		<b>BC238/BC239</b>	25		V
Emitter Base Voltage	V <sub>EBO</sub>	I <sub>E</sub> =10μA, I <sub>C</sub> =0			
		<b>BC237</b>	6.0		V
		<b>BC238/BC239</b>	5.0		V
Collector Cut Off Current	I <sub>CES</sub>	<b>BC238/BC239</b>		15	nA
		V <sub>CE</sub> =30V, V <sub>BE</sub> =0			
		<b>BC237</b>		15	nA
		V <sub>CE</sub> =50V, V <sub>BE</sub> =0			
		<b>BC238/BC239</b>		4.0	μA
		V <sub>CE</sub> =30V, V <sub>BE</sub> =0, T <sub>a</sub> =125°C			
		<b>BC237</b>		4.0	μA
		V <sub>CE</sub> =50V, V <sub>BE</sub> =0, T <sub>a</sub> =125°C			

# NPN SILICON PLANAR EPITAXIAL TRANSISTORS

**BC237,238, A,B,C**  
**BC239, B,C**



**TO-92**  
**Plastic Package**  
For Lead Free Parts, Device  
Part # will be Prefixed with  
"T"

## ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ\text{C}$ unless specified otherwise)

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	MAX	UNITS	
DC Current Gain	$h_{FE}$	$I_C=10\mu\text{A}$ , $V_{CE}=5\text{V}$				
		<b>A</b>		TYP90		
		<b>B</b>		TYP150		
		<b>C</b>		TYP270		
		$I_C=2\text{mA}$ , $V_{CE}=5\text{V}$				
		<b>BC237/238/239</b>				
<b>A</b>		120	800			
<b>B</b>		120	220			
<b>C</b>		200	460			
			380	800		
		$*I_C=100\text{mA}$ , $V_{CE}=5\text{V}$				
<b>A</b>				TYP120		
<b>B</b>				TYP180		
<b>C</b>				TYP300		
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=10\text{mA}$ , $I_B=0.5\text{mA}$		0.20	V	
		$*I_C=100\text{mA}$ , $I_B=5\text{mA}$		0.60	V	
		<b>BC237/239</b>		0.80	V	
		<b>BC238</b>				
Base Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=10\text{mA}$ , $I_B=0.5\text{mA}$		0.83	V	
		$*I_C=100\text{mA}$ , $I_B=5\text{mA}$		1.05	V	
Base Emitter On Voltage	$V_{BE(on)}$	$I_C=2\text{mA}$ , $V_{CE}=5\text{V}$	0.55	0.70	V	

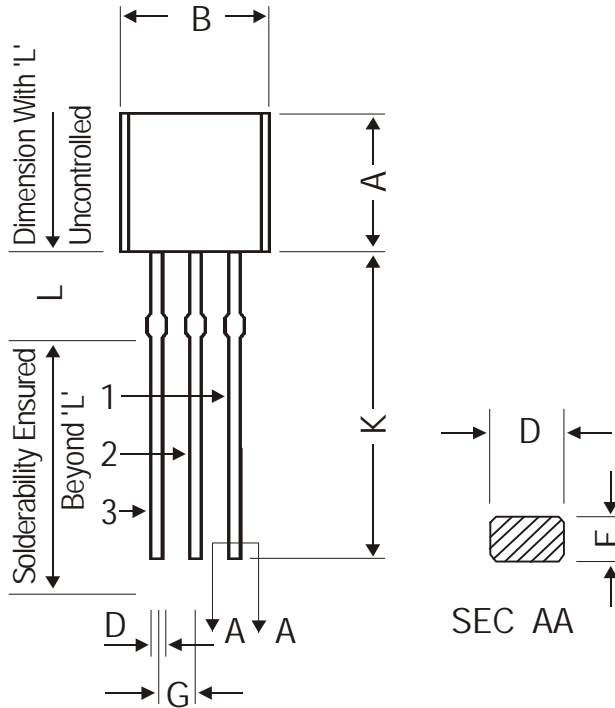
## SMALL SIGNAL CHARACTERISTICS

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	MAX	UNITS
Transistors Frequency	$f_T$	$I_C=0.5\text{mA}$ , $V_{CE}=3\text{V}$ , $f=100\text{MHz}$			
		<b>BC237</b>		TYP100	MHz
		<b>BC238</b>		TYP120	MHz
		<b>BC239</b>		TYP140	MHz
		$I_C=10\text{mA}$ , $V_{CE}=5\text{V}$ , $f=100\text{MHz}$	150		MHz
Collector Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}$ , $I_E=0$ , $f=1\text{MHz}$		4.5	pF
Emitter Input Capacitance	$C_{ib}$	$V_{EB}=0.5\text{V}$ , $f=1\text{MHz}$		TYP8	pF
Noise Figure	NF	$V_{CE}=5\text{V}$ , $I_C=0.2\text{mA}$ , $R_S=2\text{K}\Omega$ , $f=1\text{KHz}$ , $B=200\text{Hz}$		10	dB
		<b>BC237/238</b>		4.0	dB
		<b>BC239</b>			

\*Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

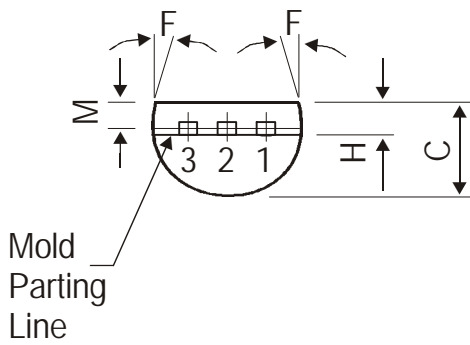
BC237\_239Rev\_1 201205E

**TO-92 Plastic Package**



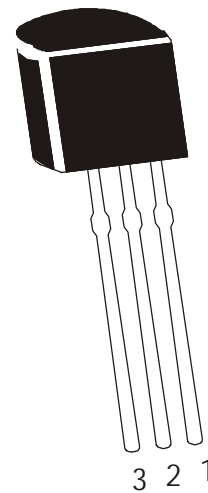
DIM	MIN.	MAX.
A	4.32	5.33
B	4.45	5.20
C	3.18	4.19
D	0.41	0.55
E	0.35	0.50
F	5 DEG	
G	1.14	1.40
H	1.20	1.40
K	12.70	—
L	1.982	2.082
M	1.03	1.20

All dimensions are in mm



**PIN CONFIGURATION**

1. EMITTER
2. BASE
3. COLLECTOR



The TO-92 Package , Tape and Ammo Pack drawings are correct as on the date of issue/revision of this Data Sheet.

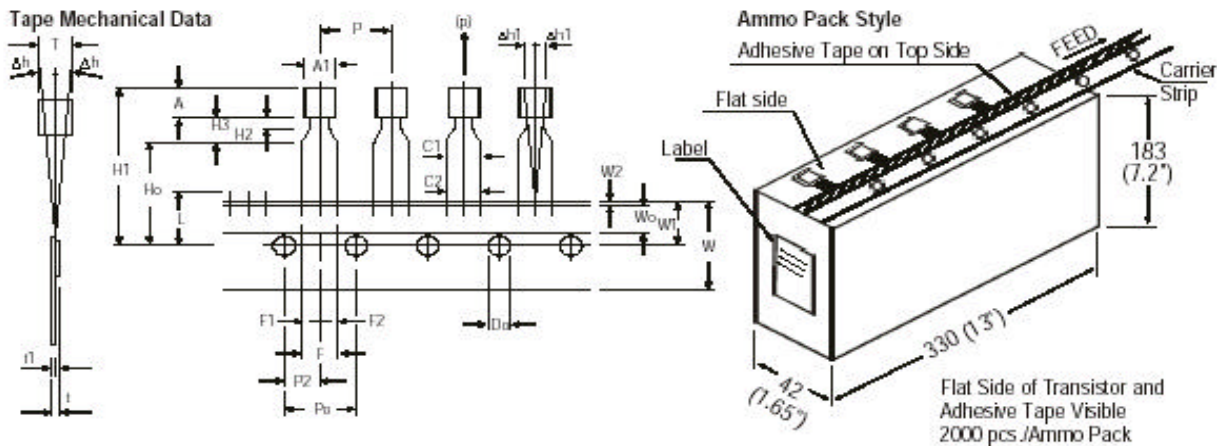
The currently valid dimensions and information, may please be confirmed from the TO-92 Drawing in the Packages and Packing Section of the Product Catalogue.

**Packing Details**

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-92 Bulk	1K/polybag	200 gm/1K pcs	3" x 7.5" x 7.5"	5K	17" x 15" x 13.5"	80K	23 kgs
TO-92 T&A	2K/ammo box	645 gm/2K pcs	12.5" x 8" x 1.8"	2K	17" x 15" x 13.5"	32K	12.5 kgs

**TO-92**  
**Plastic Package**  
For Lead Free Parts, Device  
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**TO-92 Tape and Ammo Pack**



All dimensions are in mm

ITEM	SYMBOL	SPECIFICATION			
		MIN.	NOM.	MAX.	TOL.
BODY WIDTH	A1	4.45		5.20	
BODY HEIGHT	A	4.32		5.33	
BODY THICKNESS	T	3.18		4.19	
PITCH OF COMPONENT	P		12.7		$\pm 1.0$
*1 FEED HOLE PITCH	Po		12.7		$\pm 0.3$
*2 FEED HOLE CENTRE TO COMPONENT CENTRE	P2		6.35		$\pm 0.4$
DISTANCE BETWEEN OUTER LEADS	F		5.08		+0.6 -0.2
*3 COMPONENT ALIGNMENT SIDE VIEW	$\Delta h$		0	1.0	
*4 COMPONENT ALIGNMENT FRONT VIEW	$\Delta h1$		0	1.3	
TAPE WIDTH	W		18		$\pm 0.5$
HOLD-DOWN TAPE WIDTH	W0		6		$\pm 0.2$
HOLE POSITION	W1		9		+0.7 -0.5
HOLD-DOWN TAPE POSITION	W2	0.0		0.7	
LEAD WIRE CLINCH HEIGHT	Ho		16		$\pm 0.5$
COMPONENT HEIGHT	H1			24.0	
LENGTH OF SNIPPED LEADS	L			11.0	
FEED HOLE DIAMETER	Do		4		$\pm 0.2$
*5 TOTAL TAPE THICKNESS	t			1.2	
LEAD - TO - LEAD DISTANCE	F1, F2	2.40		2.70	-0.1
STAND OFF	H2	0.45		1.45	
CLINCH HEIGHT	H3			3.0	
LEAD PARALLELISM	C1 - C2			0.22	
PULL - OUT FORCE	(p)	6N			

**NOTES**

1. Maximum alignment deviation between leads will not to be greater than 0.2mm.
2. Maximum non-cumulative variation between tape feed holes shall not exceed 1 mm in 20 pitches.
3. Holddown tape will not exceed beyond the edge(s) of carrier tape and there shall be no exposure of adhesive.
4. There will be no more than three (3) consecutive missing components in a tape.
5. A tape trailer, having at least three feed holes are provided after the last component in a tape.
6. Splices should not interfere with the sprocket feed holes.

**REMARKS**

- \*1 Cumulative pitch error 1.0 mm/20 pitch
- \*2 To be measured at bottom of clinch
- \*3 At top of body
- \*4 At top of body
- \*5 t1 0.3 – 0.6 mm

**Component Disposal Instructions**

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

### **Disclaimer**

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