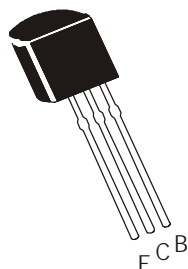


## NPN SILICON PLANAR EPITAXIAL TRANSISTOR

CD965



TO-92  
Plastic Package

### For Low Frequency Power Amplification

#### ABSOLUTE MAXIMUM RATINGS

DESCRIPTION	SYMBOL	VALUE	UNITS
Collector Emitter Voltage	$V_{CEO}$	20	V
Collector Base Voltage	$V_{CBO}$	40	V
Emitter Base Voltage	$V_{EBO}$	7	V
Collector Current	$I_C$	5	A
Collector Current Peak	$I_{CP}$	8	A
Power Dissipation @ $T_a=25^\circ\text{C}$	$P_C$	0.75	W
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	- 55 to +150	$^\circ\text{C}$

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

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
Collector Emitter Voltage	$V_{CEO}$	$I_C=1\text{mA}$ , $I_B=0$	20			V
Collector Base Voltage	$V_{CBO}$	$I_C=100\mu\text{A}$ , $I_E=0$	40			V
Emitter Base Voltage	$V_{EBO}$	$I_E=10\mu\text{A}$ , $I_C=0$	7			V
Collector Cut Off Current	$I_{CBO}$	$V_{CB}=10\text{V}$ , $I_E=0$			100	nA
Emitter Cut Off Current	$I_{EBO}$	$V_{EB}=7\text{V}$ , $I_C=0$			100	nA
DC Current Gain	$h_{FE}$	* $I_C=500\text{mA}$ , $V_{CE}=2\text{V}$ $I_C=2\text{A}$ , $V_{CE}=2\text{V}$	180 150		600	
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=3\text{A}$ , $I_B=100\text{mA}$			1.35	V
Base Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=1\text{A}$ , $I_B=25\text{mA}$			1.20	V

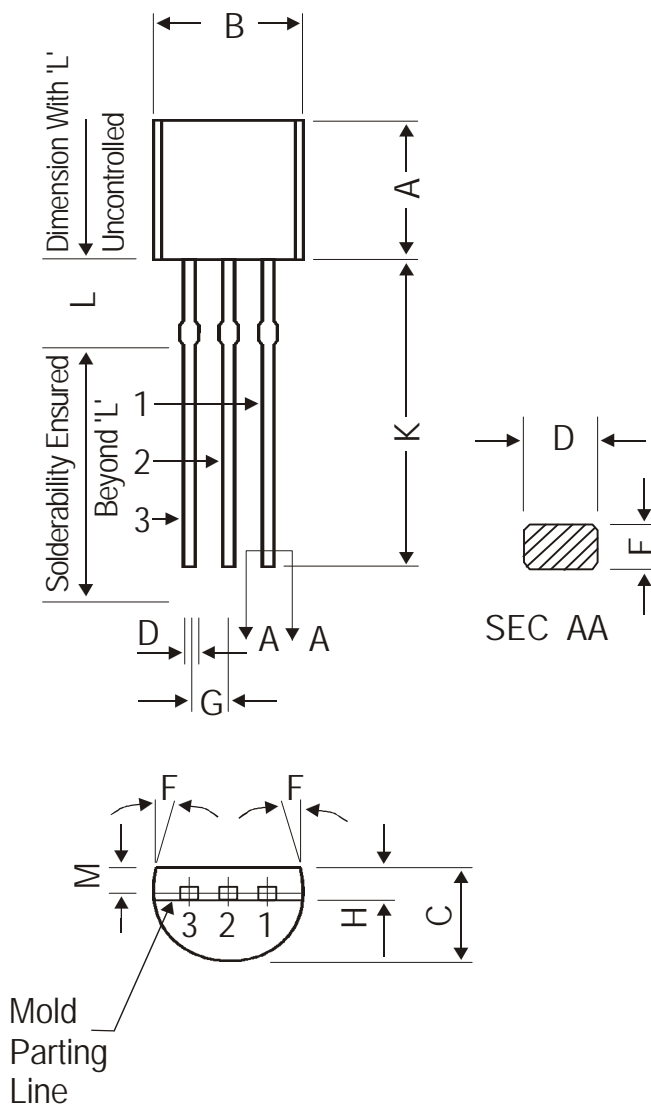
#### DYNAMIC CHARACTERISTICS

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
Output Capacitance	$C_{ob}$	$I_E=0$ , $V_{CB}=20\text{V}$ , $f=1\text{MHz}$			50	pF
Transition Frequency	$f_T$	$I_C=50\text{mA}$ , $V_{CE}=6\text{V}$		150		MHz

* $h_{FE}$ Classification	P : 180 - 270	Q : 230 - 380	R : 340 - 600
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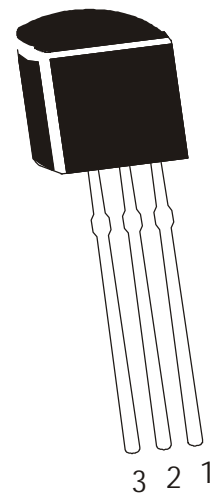
CD965Rev\_3 080903E

## 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. BASE
2. COLLECTOR
3. EMITTER

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

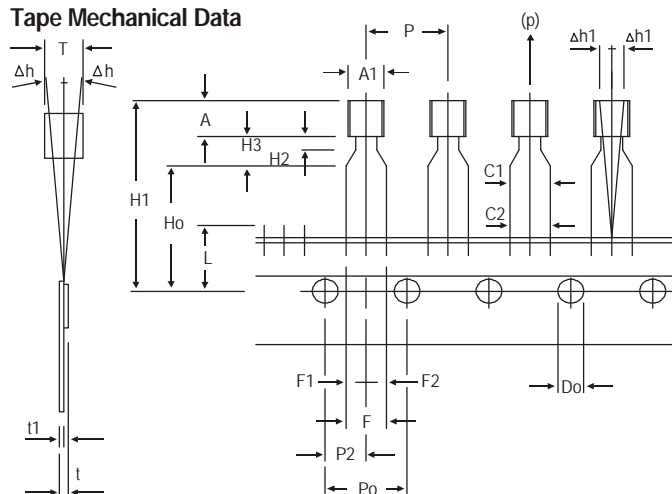
The currently valid dimensions and information, may please be confirmed from the TO-92 Drawing in the Packages and Packing Section of the Product Catalogue.

## Packing Details

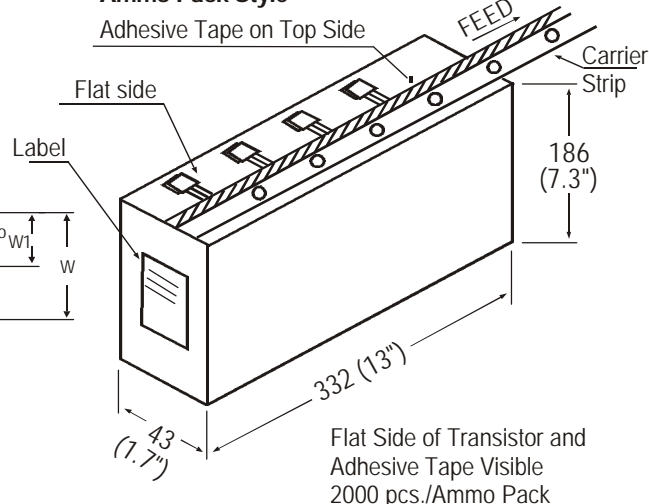
PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-92 Bulk	1K/polybag	200 gm/1K pcs	3" x 7.5" x 7.5"	5K	17" x 15" x 13.5"	80K	23 kgs
TO-92 T&A	2K/ammo box	645 gm/2K pcs	12.5" x 8" x 1.8"	2K	17" x 15" x 13.5"	32K	12.5 kgs

## TO-92 Tape and Ammo Pack

Tape Mechanical Data



Ammo Pack Style



All dimensions are in mm

ITEM	SYMBOL	SPECIFICATION			
		MIN.	NOM.	MAX.	TOL.
BODY WIDTH	A1	4.0		4.8	
BODY HEIGHT	A	4.8		5.2	
BODY THICKNESS	T	3.9		4.2	
PITCH OF COMPONENT	P		12.7		± 1.0
*1 FEED HOLE PITCH	Po		12.7		± 0.3
*2 FEED HOLE CENTRE TO COMPONENT CENTRE	P2		6.35		± 0.4
DISTANCE BETWEEN OUTER LEADS	F		5.08		+ 0.6 - 0.2
*3 COMPONENT ALIGNMENT SIDE VIEW	Δh		0	1.0	
*4 COMPONENT ALIGNMENT FRONT VIEW	Δh1		0	1.3	
TAPE WIDTH	W		18		± 0.5
HOLD-DOWN TAPE WIDTH	W0		6		± 0.2
HOLE POSITION	W1		9		+ 0.7 - 0.5
HOLD-DOWN TAPE POSITION	W2		0.5		± 0.2
LEAD WIRE CLINCH HEIGHT	Ho		16		± 0.5
COMPONENT HEIGHT	H1			23.25	
LENGTH OF SNIPPED LEADS	L			11.0	
FEED HOLE DIAMETER	Do		4		± 0.2
*5 TOTAL TAPE THICKNESS	t			1.2	
LEAD - TO - LEAD DISTANCE	F1, F2		2.54		+ 0.4 - 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

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

### **Disclaimer**

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CDIL is a registered Trademark of  
Continental Device India Limited

C-120 Naraina Industrial Area, New Delhi 110 028, India.  
Telephone + 91-11-2579 6150, 5141 1112 Fax + 91-11-2579 5290, 5141 1119  
email@cdil.com www.cdilsemi.com