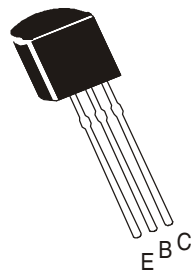


NPN SILICON PLANAR TRANSISTOR

CD9013



TO-92
Plastic Package

General Purpose Audio Amplifier Applications

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$ Unless Otherwise Specified)

DESCRIPTION	SYMBOL	VALUE	UNITS
Collector Emitter Voltage	V_{CEO}	30	V
Collector Base Voltage	V_{CBO}	40	V
Emitter Base Voltage	V_{EBO}	5	V
Collector Current Continuous	I_C	500	mA
Collector Power Dissipation	P_C	625	mW
Operating And Storage Junction Temperature Range	T_j, T_{stg}	-55 to +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$ Unless Otherwise Specified)

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	MAX	UNITS
Collector Emitter Voltage	V_{CEO}	$I_C=1\text{mA}, I_B=0$	30		V
Collector Base Voltage	V_{CBO}	$I_C=100\mu\text{A}, I_E=0$	40		V
Emitter Base Voltage	V_{EBO}	$I_E=100\mu\text{A}, I_C=0$	5		V
Collector Cut off Current	I_{CBO}	$V_{CB}=25\text{V}, I_E=0$		100	nA
Emitter Cut off Current	I_{EBO}	$V_{BE}=3\text{V}, I_C=0$		100	nA
DC Current Gain	$*h_{FE}$	$V_{CE}=1\text{V}, I_C=50\text{mA}$	64	465	
	h_{FE}	$V_{CE}=1\text{V}, I_C=500\text{mA}$	25		
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=150\text{mA}, I_B=15\text{mA}$		0.2	V
		$I_C=500\text{mA}, I_B=50\text{mA}$		0.6	V
Base Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=150\text{mA}, I_B=15\text{mA}$		1.0	V
		$I_C=500\text{mA}, I_B=50\text{mA}$		1.2	V

DYNAMIC CHARACTERISTICS

Output Capacitance	C_{ob}	$V_{CB}=10\text{V}, f=1\text{MHz}$		10	pF
Transition Frequency	f_T	$I_C=50\text{mA}, V_{CE}=10\text{V}, f=100\text{MHz}$	200		MHz
Noise Figure	NF	$V_{CE}=10\text{V}, I_C=1\text{mA}, f=1\text{KHz}$		6.0	dB

$*h_{FE}$ CLASSIFICATION

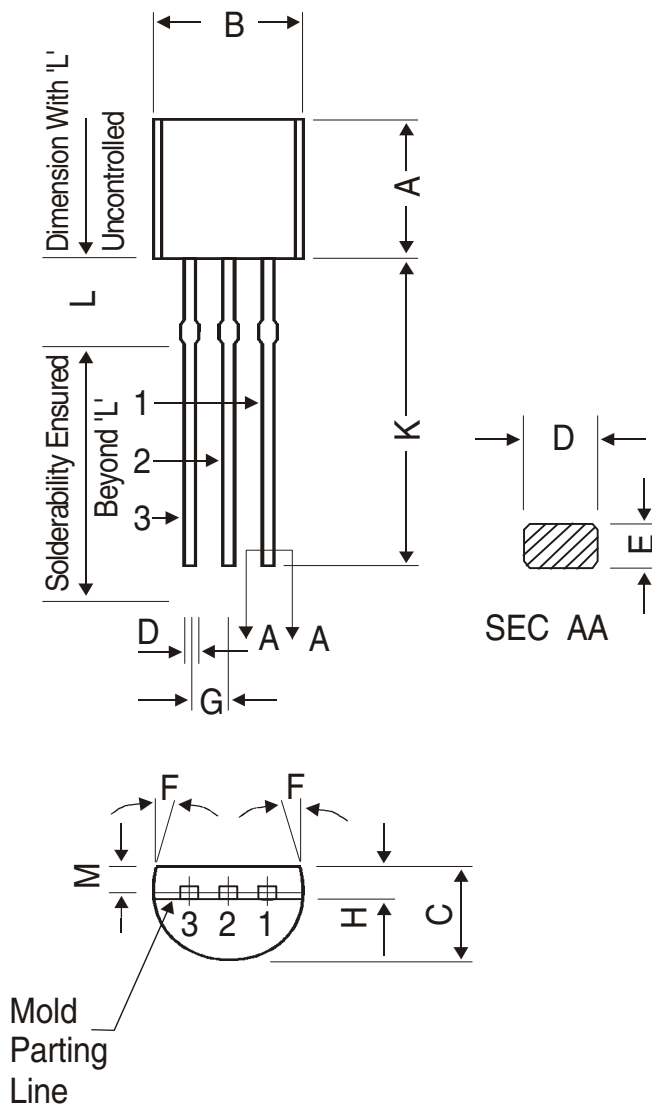
D/E/F:64 - 135

G/H/I: 118 - 305

J: 278 - 465

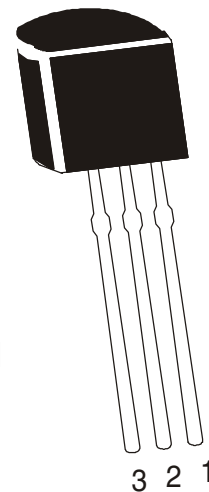
TO-92 Plastic Package

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. COLLECTOR
2. BASE
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.

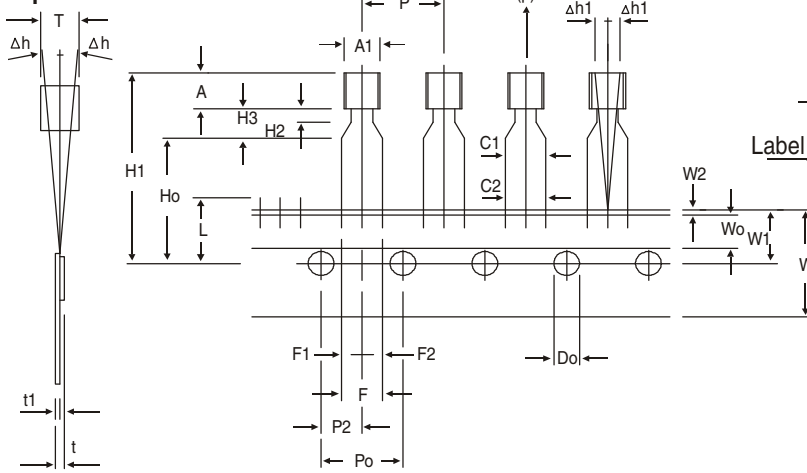
Packing Details

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

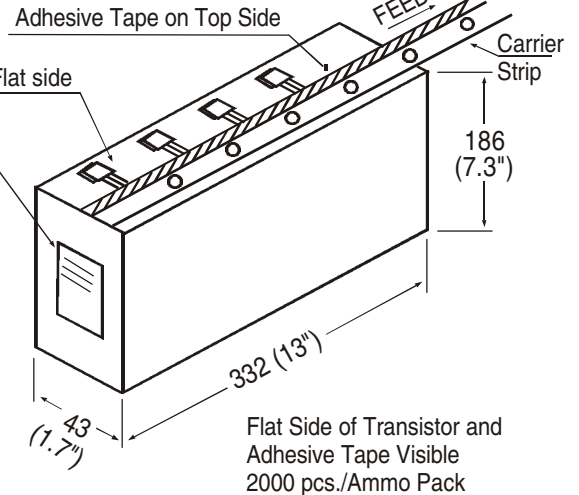
TO-92 Plastic Package

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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