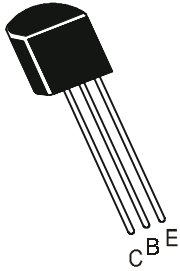


**SILICON PLANAR EPITAXIAL TRANSISTORS**

**BC 413, B, C  
BC 414, B, C**



**TO-92  
Plastic Package**

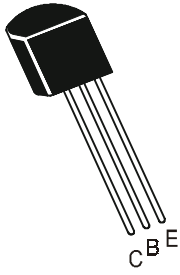
**Low Noise Transistors**

**ABSOLUTE MAXIMUM RATINGS ( Ta=25°C unless specified otherwise)**

DESCRIPTION	SYMBOL	BC 413	BC414	UNITS
Collector Emitter Voltage	$V_{CEO}$	30	45	V
Collector Base Voltage	$V_{CBO}$	45	50	V
Emitter Base Voltage	$V_{EBO}$		5.0	V
Collector Current Continuous	$I_C$		100	mA
Total Device Dissipation@ Ta=25°C Derate Above 25°C	$P_D$		350	mW
			2.8	mW/ °C
Total Device Dissipation@ Tc=25°C Derate Above 25°C	$P_D$		1.0	W
			8.0	mW/ °C
Operating And Storage Junction Temperature Range	$T_j, T_{stg}$		-55 to +150	°C
<b>THERMAL RESISTANCE</b>				
Junction to ambient	$R_{th(j-a)}$		357	°C/W
Junction to case	$R_{th(j-c)}$		125	°C/W

**SILICON PLANAR EPITAXIAL TRANSISTORS**

**BC 413, B, C  
BC 414, B, C**



**TO-92  
Plastic Package**

**ELECTRICAL CHARACTERISTICS (Ta=25°C unless specified otherwise)**

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
<b>Collector Emitter Breakdown Voltage</b>	$BV_{CEO}$	$I_C=10mA, I_B=0$				
			<b>BC413</b>	30		V
	<b>BC414</b>		45			V
<b>Collector Base Breakdown Voltage</b>	$BV_{CBO}$	$I_C=10\mu A, I_E=0$				
			<b>BC413</b>	45		V
	<b>BC414</b>		50			V
<b>Emitter Base Breakdown Voltage</b>	$BV_{EBO}$	$I_E=10\mu A, I_C=0$	5			V
<b>Collector-Cut off Current</b>	$I_{CBO}$	$V_{CB}=30V, I_E=0$ $V_{CB}=30V, I_E=0$ $T_a = +125^\circ C$			15	nA
					5	$\mu A$
<b>Emitter cut off Current</b>	$I_{EBO}$	$V_{EB}=4V, I_C=0$			15	nA
<b>DC Current Gain</b>	$h_{FE}$	$I_C=10\mu A, V_{CE}=5V$				
			<b>BC413B, BC414B</b>	100		
			<b>BC413C, BC414C</b>	100		
			<b>BC413B, BC414B</b>	180	460	
			<b>BC413C, BC414C</b>	380	800	
	<b>BC413, BC414</b>	180	800			
<b>Collector Emitter Saturation Voltage</b>	$V_{CE(sat)}$	$I_C=10mA, I_B=0.5mA$ $I_C=10mA, I_B=$ see note 1			0.25	V
					0.60	V
		$V_{CE(sat) 2}$	$I_C=100mA, I_B=5mA$			0.60
<b>Base Emitter Saturation Voltage</b>	$V_{BE(sat)}$	$I_C=100mA, I_B=5mA$		1.10		V
<b>Base Emitter On Voltage</b>	$V_{BE(on)}$	$I_C=10\mu A, V_{CE}=5V$ $I_C=100\mu A, V_{CE}=5V$		0.52		V
				0.55		V
			$I_C=2mA, V_{CE}=5V$	0.55		0.75

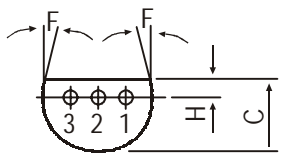
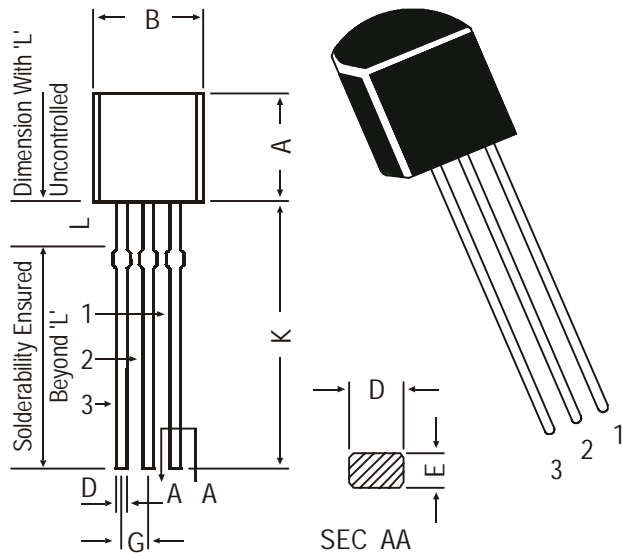
**ELECTRICAL CHARACTERISTICS (Ta=25°C unless specified otherwise)**

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
<b>DYNAMIC CHARACTERISTICS</b>						
<b>Transition Frequency</b>	$f_T$	$I_C=10mA, V_{CE}=5V$ $f=100MHz$		250		MHz
<b>Collector Base Capacitance</b>	$C_{cbo}$	$V_{CE}= 10V, I_E=0,$ $f =1MHz$		2.5		pF
<b>Noise Figure</b>	NF	$I_C=0.2mA, V_{CE}=5V$ $R_S=2K\Omega f=30Hz-15KHz$			2.5	dB

**Note 1 :**  $I_B$  is value for which  $I_C =11mA @ V_{CE} =1V$

**Note 2 :** Pulse test = 300 $\mu s$ , Duty Cycle 2%.

TO-92 Plastic Package



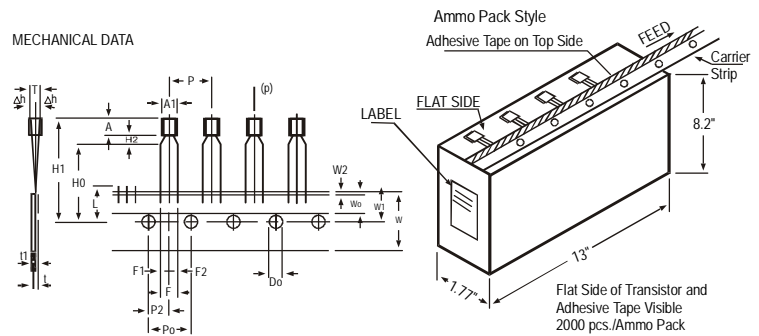
PIN CONFIGURATION

1. EMITTER
2. BASE
3. COLLECTOR

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	1.14	1.53
K	12.70	—
L	1.982	2.082

All dimensions in mm.

TO-92 Transistors on Tape and Ammo Pack



All dimensions in mm unless specified otherwise

ITEM	SYMBOL	SPECIFICATION				REMARKS
		MIN.	NOM.	MAX.	TOL.	
BODY WIDTH	A1	4.0		4.8		CUMULATIVE PITCH ERROR 1.0 mm/20 PITCH
BODY HEIGHT	A	4.8		5.2		
BODY THICKNESS	T	3.9		4.2		
PITCH OF COMPONENT	P		12.7		±1	
FEED HOLE PITCH	Po		12.7		±0.3	
FEED HOLE CENTRE TO COMPONENT CENTRE	P2		6.35		±0.4	TO BE MEASURED AT BOTTOM OF CLINCH
DISTANCE BETWEEN OUTER LEADS	F		5.08		+0.6	AT TOP OF BODY
COMPONENT ALIGNMENT	Δh		0	1	-0.2	
TAPE WIDTH	W		18		±0.5	
HOLD-DOWN TAPE WIDTH	W0		6		±0.2	t1 0.3 - 0.6
HOLE POSITION	W1		9		+0.7	
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	
TOTAL TAPE THICKNESS	t			1.2		
LEAD - TO - LEAD DISTANCE F1,	F2		2.54		+0.4	
					-0.1	
CLINCH HEIGHT	H2			3		
PULL - OUT FORCE	(P)	6N				

NOTES

1. MAXIMUM ALIGNMENT DEVIATION BETWEEN LEADS NOT TO BE GREATER THAN 0.2 mm.
2. MAXIMUM NON-CUMULATIVE VARIATION BETWEEN TAPE FEED HOLES SHALL NOT EXCEED 1 mm IN 20 PITCHES.
3. HOLDDOWN TAPE NOT TO EXCEED BEYOND THE EDGE(S) OF CARRIER TAPE AND THERE SHALL BE NO EXPOSURE OF ADHESIVE.
4. NO MORE THAN 3 CONSECUTIVE MISSING COMPONENTS ARE PERMITTED.
5. A TAPE TRAILER, HAVING AT LEAST THREE FEED HOLES ARE REQUIRED AFTER THE LAST COMPONENT.
6. SPLICES SHALL NOT INTERFERE WITH THE SPROCKET FEED HOLES.

Packing Detail

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

### **Disclaimer**

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