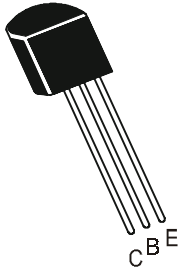


SILICON PLANAR EPITAXIAL TRANSISTORS

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



**TO-92
Plastic Package**

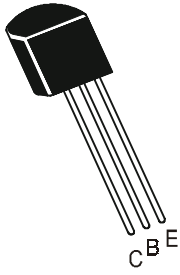
Low Noise Transistors

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	P_D		350	mW
Derate Above 25°C			2.8	mW/ °C
Total Device Dissipation@ Tc=25°C	P_D		1.0	W
Derate Above 25°C			8.0	mW/ °C
Operating And Storage Junction Temperature Range	T_j, T_{stg}		-55 to +150	°C
THERMAL RESISTANCE				
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
Collector Emitter Breakdown Voltage	BV_{CEO}	$I_C=10mA, I_B=0$				
			BC413	30		V
	BC414		45		V	
Collector Base Breakdown Voltage	BV_{CBO}	$I_C=10\mu A, I_E=0$				
			BC413	45		V
	BC414		50		V	
Emitter Base Breakdown Voltage	BV_{EBO}	$I_E=10\mu A, I_C=0$	5			V
Collector-Cut off Current	I_{CBO}	$V_{CB}=30V, I_E=0$			15	nA
					5	μA
Emitter cut off Current	I_{EBO}	$V_{EB}=4V, I_C=0$			15	nA
DC Current Gain	h_{FE}	$I_C=10\mu A, V_{CE}=5V$				
			BC413B, BC414B	100		
			BC413C, BC414C	100		
			BC413B, BC414B	180	460	
			BC413C, BC414C	380	800	
	BC413, BC414	180	800			
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=10mA, I_B=0.5mA$			0.25	V
					0.60	V
		$I_C=10mA, I_B=$ see note 1			0.60	V
	$V_{CE(sat)2}$	$I_C=100mA, I_B=5mA$			0.60	V
Base Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=100mA, I_B=5mA$		1.10		V
Base Emitter On Voltage	$V_{BE(on)}$	$I_C=10\mu A, V_{CE}=5V$		0.52		V
			$I_C=100\mu A, V_{CE}=5V$		0.55	V
		$I_C=2mA, V_{CE}=5V$	0.55		0.75	V

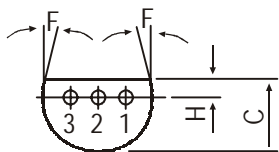
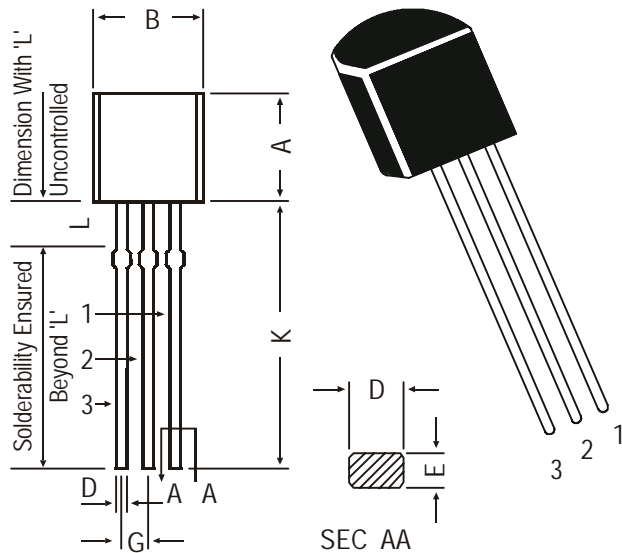
ELECTRICAL CHARACTERISTICS (Ta=25°C unless specified otherwise)

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
DYNAMIC CHARACTERISTICS						
Transition Frequency	f_T	$I_C=10mA, V_{CE}=5V$ $f=100MHz$		250		MHz
Collector Base Capacitance	C_{cbo}	$V_{CE}=10V, I_E=0,$ $f=1MHz$		2.5		pF
Noise Figure	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 μs , Duty Cycle 2%.

TO-92 Plastic Package



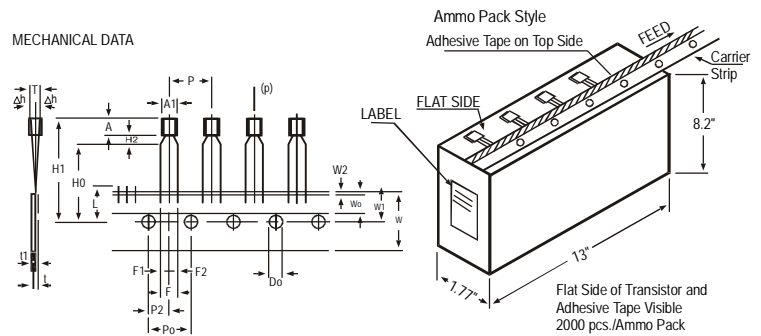
PIN CONFIGURATION

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 -0.2	AT TOP OF BODY
COMPONENT ALIGNMENT	Δh		0	1		
TAPE WIDTH	W		18		±0.5	t1 0.3 - 0.6
HOLD-DOWN TAPE WIDTH	Wo		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	
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

The product information and the selection guides facilitate selection of the CDIL's Discrete Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD is believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Discrete Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).

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