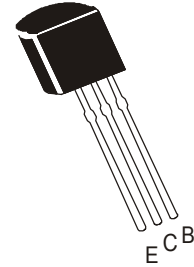


**TO-92 PLASTIC PACKAGE
NPN SILICON PLANAR EPITAXIAL, HIGH SPEED,
HIGH VOLTAGE SWITCHING TRANSISTOR**



Applications

Suitable for Lighting, Switching Regulator and Motor Control

ABSOLUTE MAXIMUM RATINGS

DESCRIPTION	SYMBOL	VALUE	UNIT
Collector Base Voltage	V_{CBO}	600	V
Collector Emitter (sus) Voltage	V_{CEO}	400	V
Emitter Base Voltage	V_{EBO}	9.0	V
Collector Current Continuous	I_C	1.5	A
Peak	** I_{CM}	3.0	A
Power Dissipation @ $T_a=25^\circ\text{C}$	P_C	1.1	W
Derate Above 25°C		8.8	mW/ $^\circ\text{C}$
Power Dissipation @ $T_{Lead}=25^\circ\text{C}$	P_D	2.0	W
Derate Above 25°C		16	mW/ $^\circ\text{C}$
Operating And Storage Junction Temperature Range	T_j, T_{stg}	- 65 to +150	$^\circ\text{C}$

THERMAL RESISTANCE

Junction to Case, $T_c=25^\circ\text{C}$	$R_{th(j-c)}$	48.0	$^\circ\text{C/W}$
Junction to Lead	$R_{th(j-L)}$	62.5	$^\circ\text{C/W}$
Junction to Ambient in free air	$R_{th(j-a)}$	113.6	$^\circ\text{C/W}$

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

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Collector Base Voltage	V_{CBO}	$I_C=1\text{mA}, I_E=0$	600			V
Collector Emitter (sus) Voltage	* $V_{CEO(sus)}$	$I_C=10\text{mA}, I_B=0$	400			V
Collector Cut Off Current	I_{CBO}	$V_{CB}=600\text{V}, I_E=0$ $V_{CB}=600\text{V}, I_E=0, T_c=100^\circ\text{C}$			1.0 5.0	mA mA
Emitter Cut Off Current	I_{EBO}	$V_{EB}=9\text{V}, I_C=0$			1.0	mA
DC Current Gain	* h_{FE}	$I_C=0.3\text{A}, V_{CE}=2\text{V}$ (Note1) $I_C=0.5\text{A}, V_{CE}=2\text{V}$ $I_C=1\text{A}, V_{CE}=2\text{V}$	10 8.0 4.0		30 40 25	
Collector Emitter Saturation Voltage	* $V_{CE(sat)}$	$I_C=0.5\text{A}, I_B=0.1\text{A}$ $I_C=1\text{A}, I_B=0.25\text{A}$ $I_C=1.5\text{A}, I_B=0.5\text{A}$ $I_C=1\text{A}, I_B=0.25\text{A}, T_c=100^\circ\text{C}$			0.5 1.0 3.0 1.0	V V V V
Base Emitter Saturation Voltage	* $V_{BE(sat)}$	$I_C=0.5\text{A}, I_B=0.1\text{A}$ $I_C=1\text{A}, I_B=0.25\text{A}$ $I_C=1\text{A}, I_B=0.25\text{A}, T_c=100^\circ\text{C}$			1.0 1.2 1.1	V V V

* Pulse Test: PW=300ms, Duty Cycle=2%

** Pulse Test: Pulse Width=5ms, Duty Cycle=10%

DYNAMIC CHARACTERISTICS

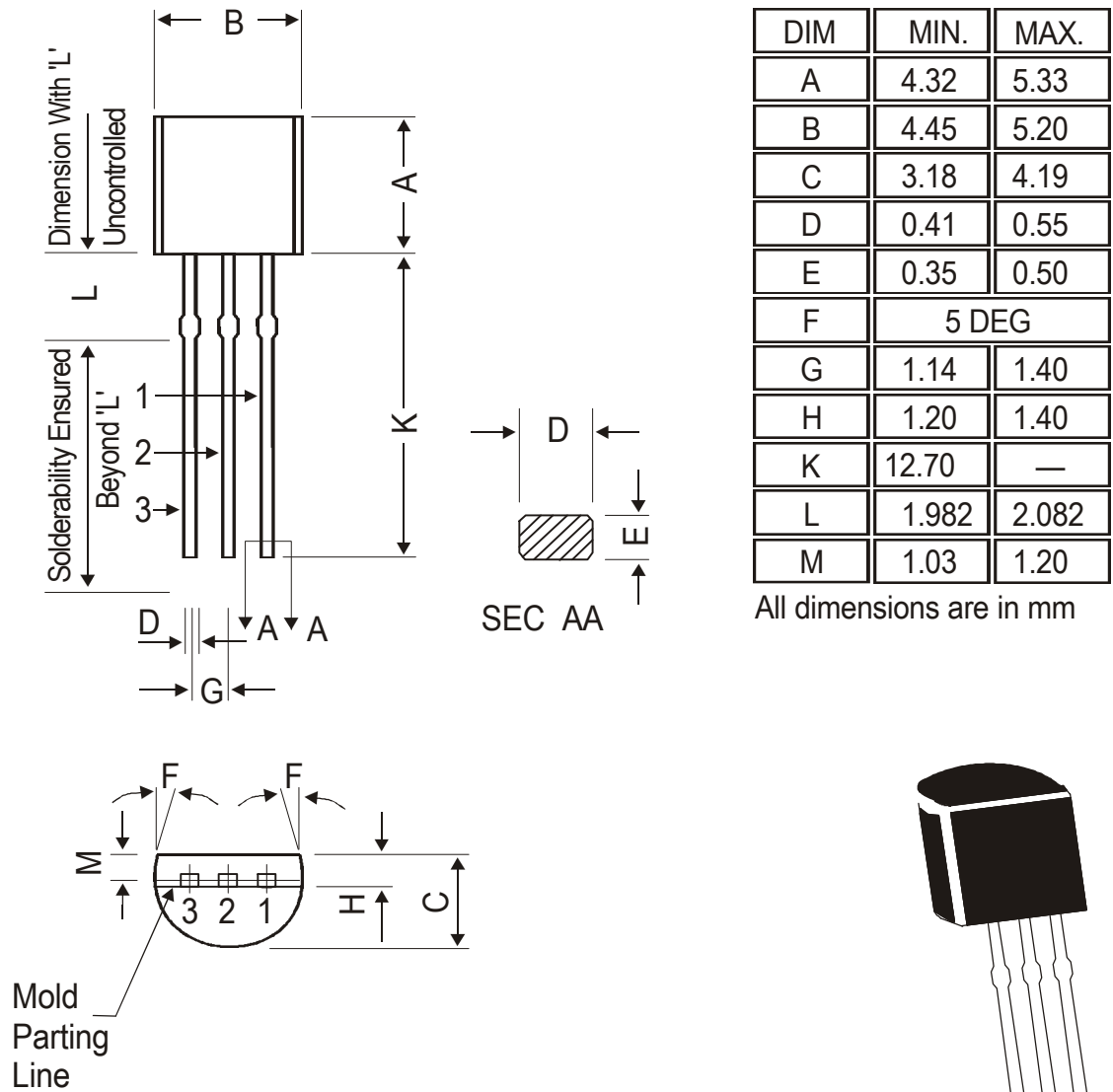
DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Current Gain Bandwidth Product	f_T	$I_C=100mA, V_{CE}=10V,$ $f=1MHz$	4.0			MHz
Output Capacitance	C_{ob}	$V_{CB}=10V, f=0.1MHz$		21		pF

SWITCHING TIME

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Turn On Time	t_{on}	$V_{CC}=125V$			1.1	μs
Fall Time	t_f	$I_{B1}=0.2A, I_{B2}=0.2A$			0.7	μs
Storage Time	t_{stg}	$I_C=1A$			4.0	μs

Note (1) h_{FE} Classifications:-	A	B	C	E	F
Note (1):- Product is pre selected in DC current gain (Groups A to F). RECTRON reserves the right to ship any of the groups according to production availability.	10-16	15-19	18-22	21-25	24-30
MARKING	CSL 13003 A	CSL 13003 B	CSL 13003 C	CSL 13003 E	CSL 13003 F

TO-92 Plastic Package

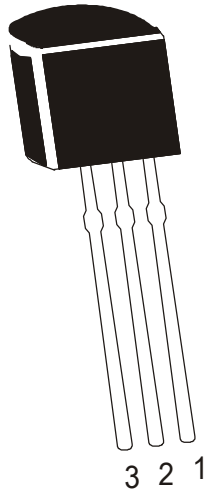


DIM	MIN.	MAX.
A	4.32	5.33
B	4.45	5.20
C	3.18	4.19
D	0.41	0.55
E	0.35	0.50
F	5 DEG	
G	1.14	1.40
H	1.20	1.40
K	12.70	—
L	1.982	2.082
M	1.03	1.20

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.

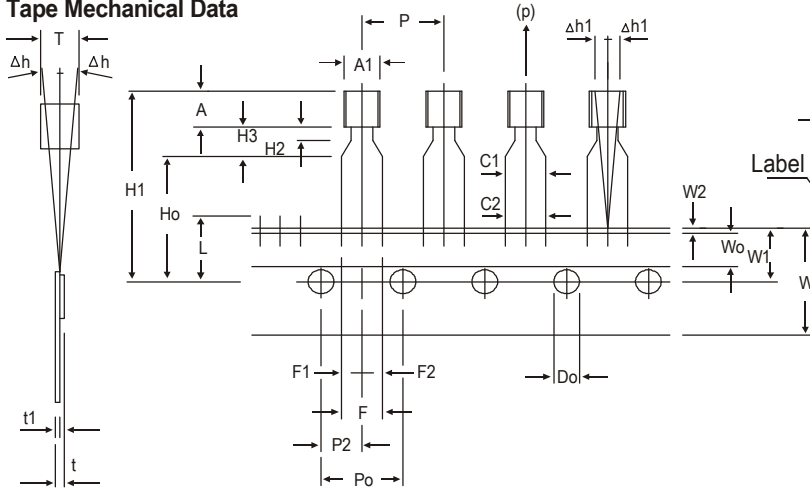
The currently valid dimensions and information, may please be confirmed from the TO-92 Drawing in the Packages and Packing Section of the Product Catalogue.

Packing Details

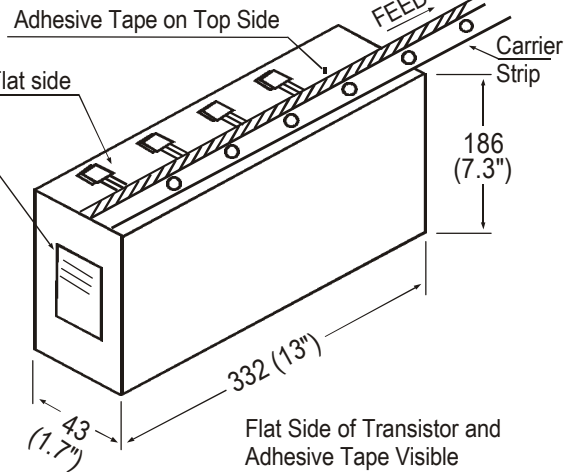
PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-92 Bulk	1K/polybag	200 gm/1K pcs	3" x 7.5" x 7.5"	5K	17" x 15" x 13.5"	80K	23 kgs
TO-92 T&A	2K/ammo box	645 gm/2K pcs	12.5" x 8" x 1.8"	2K	17" x 15" x 13.5"	32K	12.5 kgs

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

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