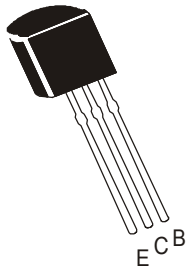
RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

CSL13003

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=25ºC	P_C	1.1	W
Derate Above 25ºC		8.8	mW/ ºC
Power Dissipation @ T_{Lead}=25ºC	P_D	2.0	W
Derate Above 25ºC		16	mW/ ºC
Operating And Storage Junction Temperature Range	T_j, T_{stg}	- 65 to +150	ºC

THERMAL RESISTANCE

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

ELECTRICAL CHARACTERISTICS (T_a=25ºC unless specified otherwise)

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

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

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

DYNAMIC CHARACTERISTICS

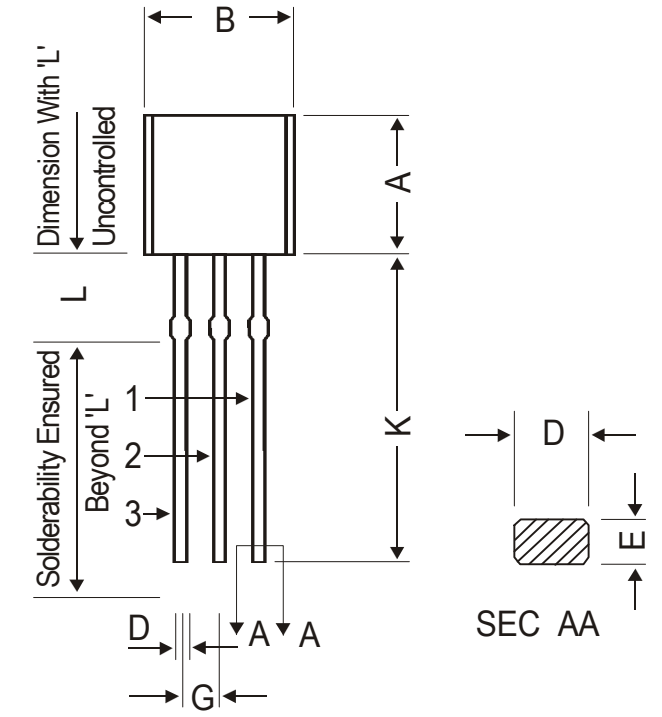
DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Current Gain Bandwidth Product	f_T	I_C=100mA, V_{CE}=10V, f=1MHz	4.0			MHz
Output Capacitance	C_{ob}	V_{CB}=10V, f=0.1MHz		21		pF

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

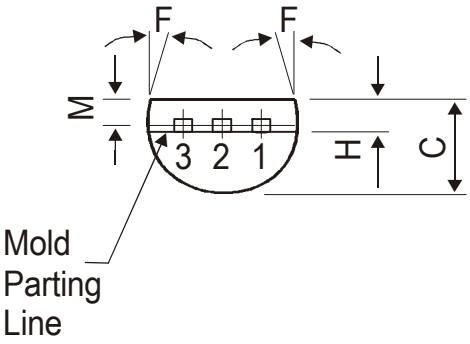
Note (1) h_{FE} Classifications:-	**A**	**B**	**C**	**E**	**F**
Note (1):- Product is pre selected in DC current gain (Groups A to F). RECTRON reserves the right to ship any of the groups according to production availability.	**10-16**	**15-19**	**18-22**	**21-25**	**24-30**
MARKING	**CSL 13003 A**	**CSL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

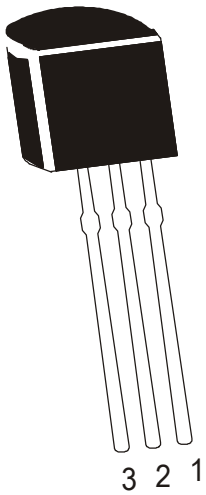
TO-92 Plastic Package



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.

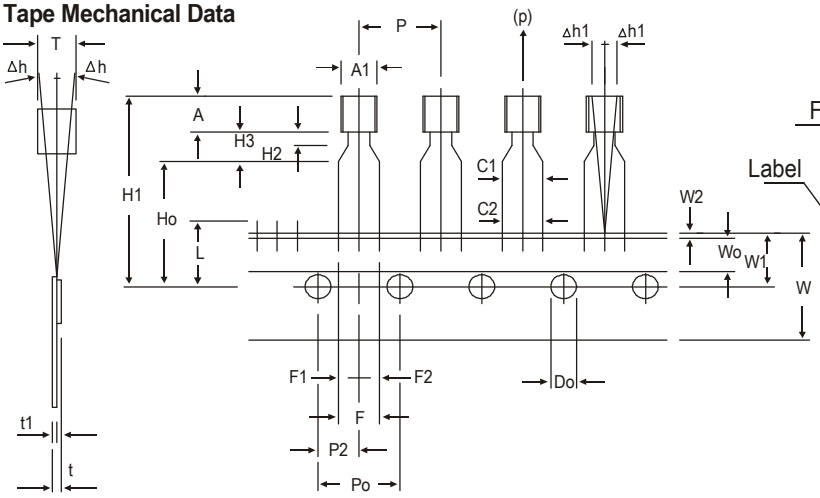
The currently valid dimensions and information, may please be confirmed from the TO-92 Drawing in the Packages and Packing Section of the Product Catalogue.

Packing Details

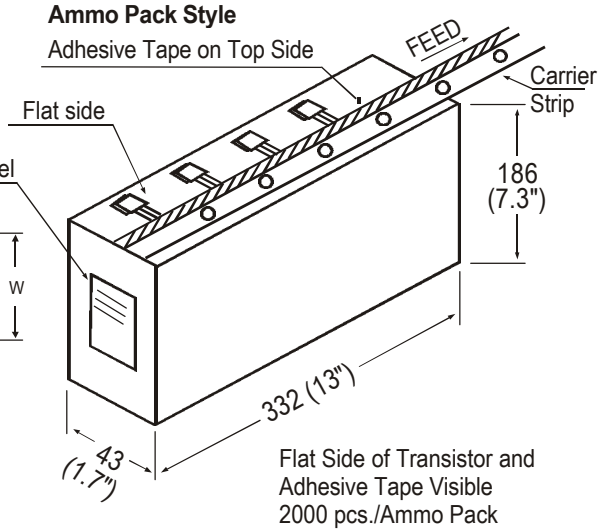
PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-92 Bulk	1K/polybag	200 gm/1K pcs	3" x 7.5" x 7.5"	5K	17" x 15" x 13.5"	80K	23 kgs
TO-92 T&A	2K/ammo box	645 gm/2K pcs	12.5" x 8" x 1.8"	2K	17" x 15" x 13.5"	32K	12.5 kgs

TO-92 Tape and Ammo Pack

Tape Mechanical Data



Ammo Pack Style



Flat Side of Transistor and
Adhesive Tape Visible
2000 pcs./Ammo Pack

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	△h		0	1.0	
*4 COMPONENT ALIGNMENT FRONT VIEW	△h1		0	1.3	
TAPE WIDTH	W		18		± 0.5
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
*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

1. Maximum alignment deviation between leads will not to be greater than 0.2mm.
2. Maximum non-cumulative variation between tape feed holes shall not exceed 1 mm in 20 pitches.
3. Holddown tape will not exceed beyond the edge(s) of carrier tape and there shall be no exposure of adhesive.
4. There will be no more than three (3) consecutive missing components in a tape.
5. A tape trailer, having at least three feed holes are provided after the last component in a tape.
6. 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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