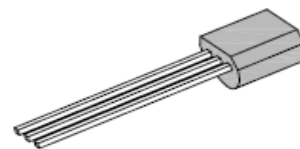


## Epitaxial Planar Transistor (NPN)

### Features

- NPN Silicon Epitaxial Planar Transistor
- Suitable for Lighting, Switching Regulator and Motor Control
- RoHS compliance



TO-92



### Mechanical Data

<b>Case:</b>	TO-92, Plastic Package
<b>Terminals:</b>	Solderable per MIL-STD-202G, Method 208
<b>Weight:</b>	0.18 gram

### Maximum Ratings *(T<sub>Ambient</sub>=25°C unless noted otherwise)*

Symbol	Description	TSL13003	Unit
<b>V<sub>CB0</sub></b>	Collector-Base Voltage	600	V
<b>V<sub>CEO</sub></b>	Collector-Emitter Voltage	400	V
<b>V<sub>EBO</sub></b>	Emitter-Base Voltage	9.0	V
<b>I<sub>C</sub></b>	Collector Current Continuous	1.5	A
	Collector Current Peak*	3.0	A
<b>P<sub>D</sub></b>	Power Dissipation at T <sub>Lead</sub> =25°C	2.0	W
	Derate above 25°C	16	mW/° C
<b>P<sub>C</sub></b>	Power Dissipation at T <sub>A</sub> =25°C	1.1	W
	Derate above 25°C	8.8	mW/° C
<b>T<sub>J</sub>, T<sub>STG</sub></b>	Operating and Storage Junction Temperature Range	-65 to +150	° C

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

# Epitaxial Planar Transistor (NPN)

## TSL13003

### Thermal Characteristics

Symbol	Description	TSL13003	Unit
RthJC	Thermal Resistance from Junction to Case	48	°C/W
RthJL	Thermal Resistance from Junction to Lead	62.5	°C/W
RthJA	Thermal Resistance from Junction to Ambient	113.6	°C/W

### Electrical Characteristics ( $T_{Ambient}=25^{\circ}\text{C}$ unless noted otherwise)

Symbol	Description	TSL13003		Unit	Conditions
		Min.	Max.		
V <sub>CB0</sub>	Collector-Base Voltage	600	-	V	I <sub>C</sub> =1mA, I <sub>E</sub> =0
**V <sub>CEO(SUS)</sub>	Collector Emitter Voltage	400	-	V	I <sub>C</sub> =10mA, I <sub>B</sub> =0
I <sub>CBO</sub>	Collector Cut-off Current	-	1.0	mA	V <sub>CB</sub> =600V, I <sub>E</sub> =0
		-	5.0	mA	V <sub>CB</sub> =600V, I <sub>E</sub> =0, T <sub>c</sub> =100°C
I <sub>EBO</sub>	Emitter Cut-off Current	-	1.0	mA	V <sub>EB</sub> =9V, I <sub>C</sub> =0
**h <sub>FE</sub>	D.C. Current Gain	10	30		V <sub>CE</sub> =2V, I <sub>C</sub> =0.3A
		8.0	40		V <sub>CE</sub> =2V, I <sub>C</sub> =0.5A
		4.0	25		V <sub>CE</sub> =2V, I <sub>C</sub> =1A
**V <sub>CE(sat)</sub>	Collector Emitter Saturation Voltage	-	0.5	V	I <sub>C</sub> =0.5A, I <sub>B</sub> =0.1A
		-	1.0	V	I <sub>C</sub> =1.0A, I <sub>B</sub> =0.25A
		-	3.0	V	I <sub>C</sub> =1.5A, I <sub>B</sub> =0.5A
		-	1.0	V	I <sub>C</sub> =1.0A, I <sub>B</sub> =0.25A, T <sub>c</sub> =100°C
**V <sub>BE(sat)</sub>	Base Emitter Saturation Voltage	-	1.0	V	I <sub>C</sub> =0.5A, I <sub>B</sub> =0.1A
		-	1.2	V	I <sub>C</sub> =1.0A, I <sub>B</sub> =0.25A
		-	1.1	V	I <sub>C</sub> =1.0A, I <sub>B</sub> =0.25A, T <sub>c</sub> =100°C

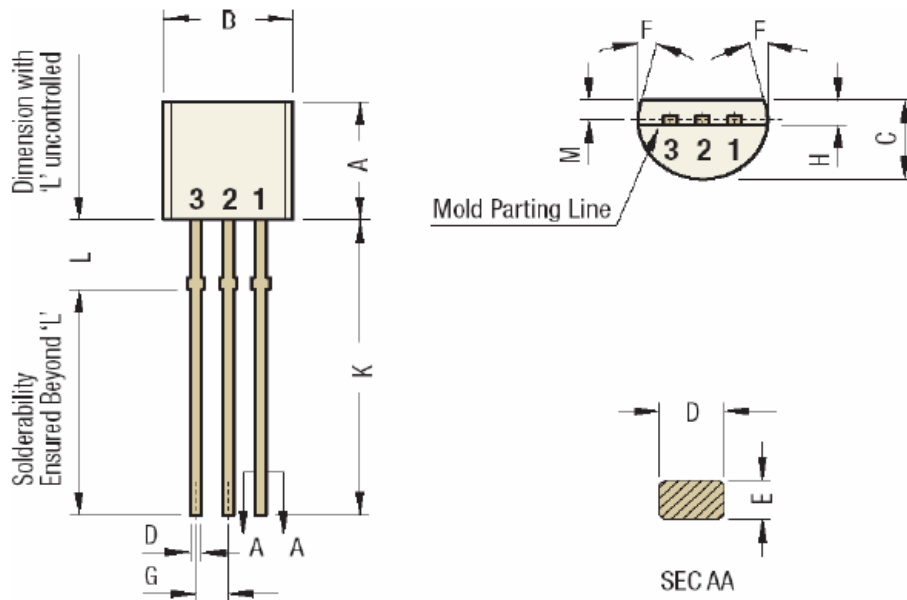
# Epitaxial Planar Transistor (NPN)

## TSL13003

Symbol	Description	TSL13003		Unit	Conditions
		Min.	Max.		
$f_T$	Current Gain Bandwidth Product	4.0	-	MHz	$V_{CE}=10V, I_C=100mA, f=1MHz$
$C_{ob}$	Out-Put Capacitance	21 (typ.)		pF	$V_{CB}=10V, f=0.1MHz$
$t_{on}$	Turn Time	-	1.1	$\mu s$	$V_{CC}=125V$
$t_f$	Fall Time	-	0.7	$\mu s$	$I_{B1}=I_{B2}=0.2A$
$t_s$	Storage Time	-	4.0	$\mu s$	$I_C=1.0A$

Note: \*\*Pulse Test: Pulse Width $\leq$ 300 $\mu s$ , Duty Cycles $\leq$ 2%

### Dimensions in mm

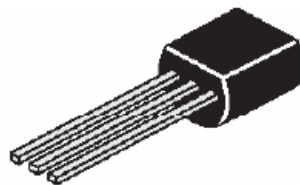


DIM	Min	Max
A	4.32	5.33
B	4.46	5.20
C	3.18	4.19
D	0.40	0.56
E	0.30	0.56
F		5°

All Dimensions are in mm

DIM	Min	Max
G	1.14	1.40
H	1.20	1.80
K	12.5	
L	1.982	2.082
M	1.03	1.53

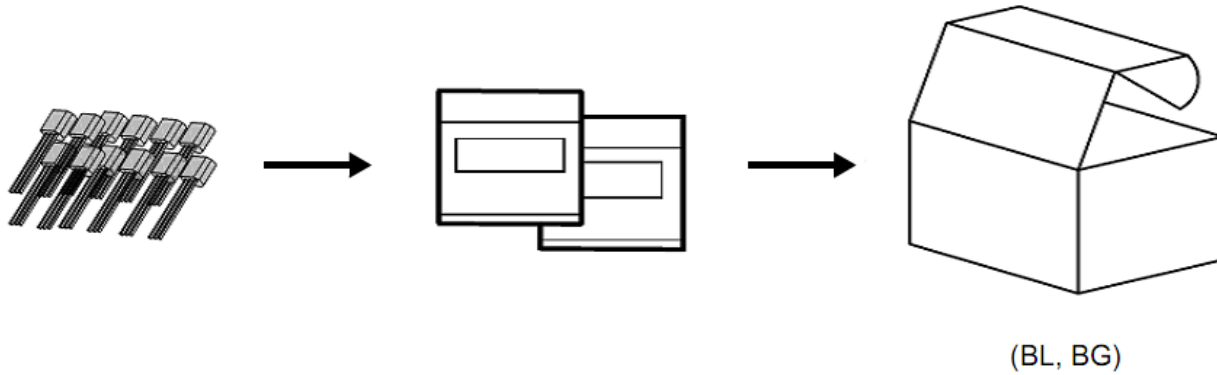
Pin 1 Base  
Pin 2 Collector  
Pin 3 Emitter



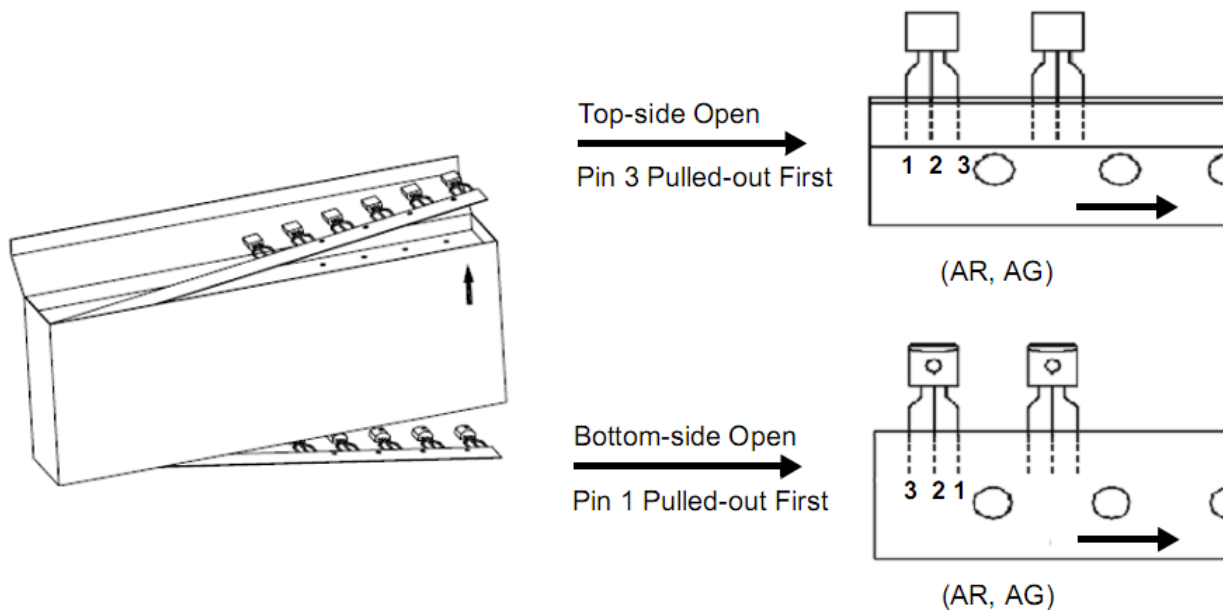
TO-92

### Packing Information

#### Bulk Packing



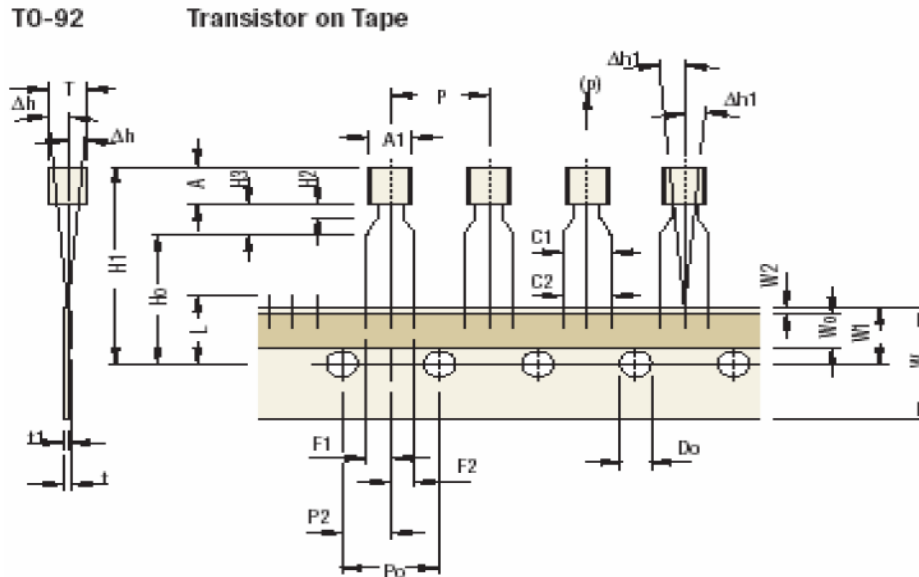
#### Tape and Ammo Packing



Flat Side toward Adhesive

Pack	Description	Standard Pack	Inner Box	Carton Box
BL	Bulk, RoHS	1K/polybag	5K	80K
BG	Bulk, Halogen Free	1K/polybag	5K	80K
AR	Ammo, RoHS	2K/ammo box	-	40K
AG	Ammo, Halogen Free	2K/ammo box	-	40K

### Tape Dimensions



		T0-92			
Item description	Symbol	Min	Nom	Max	Tol
Body width	A1	4.45		5.20	
Body height	A	4.32		5.33	
Body thickness	T	3.18		4.19	
Pitch of component <sup>Cr</sup>	P		12.7		±1.0
Feed hole pitch <sup>S1</sup>	Po		12.7		±0.3
Feed hole center to component centre <sup>S2</sup>	P2		6.35		±0.4
Comp. alignment, Side view <sup>S3</sup>	Dh		0	1.0	
Comp. alignment, Front view <sup>S3</sup>	Dh1		0	1.3	
Tape width <sup>Cr</sup>	W		18		±0.5
Hold down tape width <sup>Cr</sup>	Wo		6		±0.2
Hole position	W1		9		+0.7 -0.5
Hold-down tape position	W2	0.0		0.7	
Lead wire clinch height	Ho		16		±0.5
Component height	H1			24.0	
Length of snipped leads	L			11.0	
Feed hole diameter <sup>Cr</sup>	Do		4		±0.2
Total tape thickness <sup>S4</sup>	t			1.2	
Lead-to-lead distance <sup>Cr</sup>	F1, F2	2.4		2.7	
Stand off	H2	0.45		1.45	
Clinch height	H3			3.0	
Lead parallelism <sup>Cr</sup>	C1-C2			0.22	
Pull-out force	(p)	6N			

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