

1. General description

High voltage, high speed, planar passivated NPN power switching transistor in a SOT54 (TO-92) plastic package.

2. Features and benefits

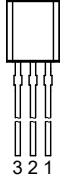
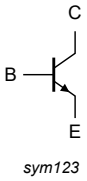
- Fast switching
- High voltage capability
- Very low switching and conduction losses

3. Applications

- Compact fluorescent lamps (CFL)
- Electronic lighting ballasts
- Inverters
- Off-line self-oscillating power supplies

4. Pinning information

Table 1. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 TO-92 (SOT54)	 sym123
2	C	collector		
3	E	emitter		

5. Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
BUJ100LR	TO-92	plastic single-ended leaded (through hole) package; 3 leads	SOT54

6. Limiting values

Table 3. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V_{CESM}	collector-emitter peak voltage	$V_{BE} = 0\text{ V}$		-	700	V
V_{CBO}	collector-base voltage	$I_E = 0\text{ A}$		-	700	V
V_{CEO}	collector-emitter voltage	$I_B = 0\text{ A}$		-	400	V
V_{EBO}	emitter-base voltage	$I_C = 0\text{ A}; I(\text{Emitter}) = 10\text{ mA}$		-	9	V
I_C	collector current	DC; Fig. 1		-	1	A
I_{CM}	peak collector current			-	2	A
I_B	base current	DC		-	0.5	A
I_{BM}	peak base current			-	1	A
P_{tot}	total power dissipation	$T_{lead} \leq 25\text{ }^{\circ}\text{C}$; Fig. 2		-	2.1	W
T_{stg}	storage temperature			-65	150	$^{\circ}\text{C}$
T_j	junction temperature			-	150	$^{\circ}\text{C}$

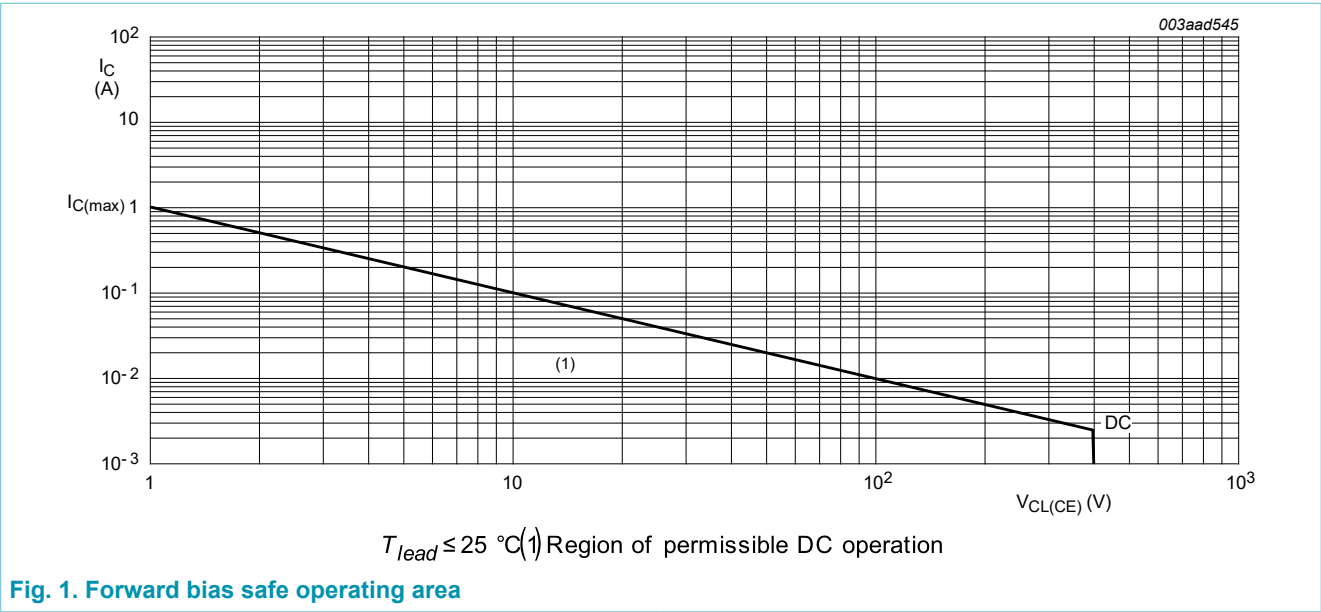
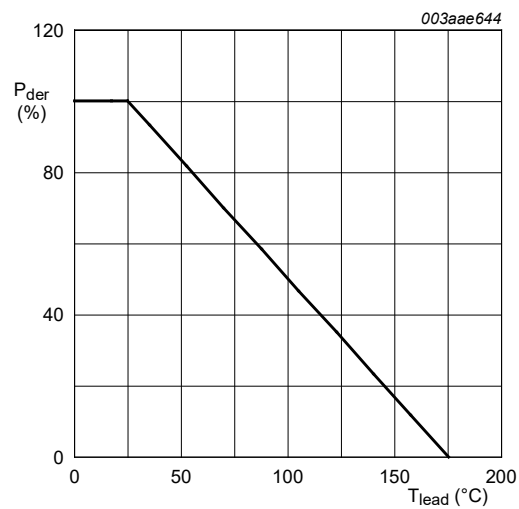


Fig. 1. Forward bias safe operating area



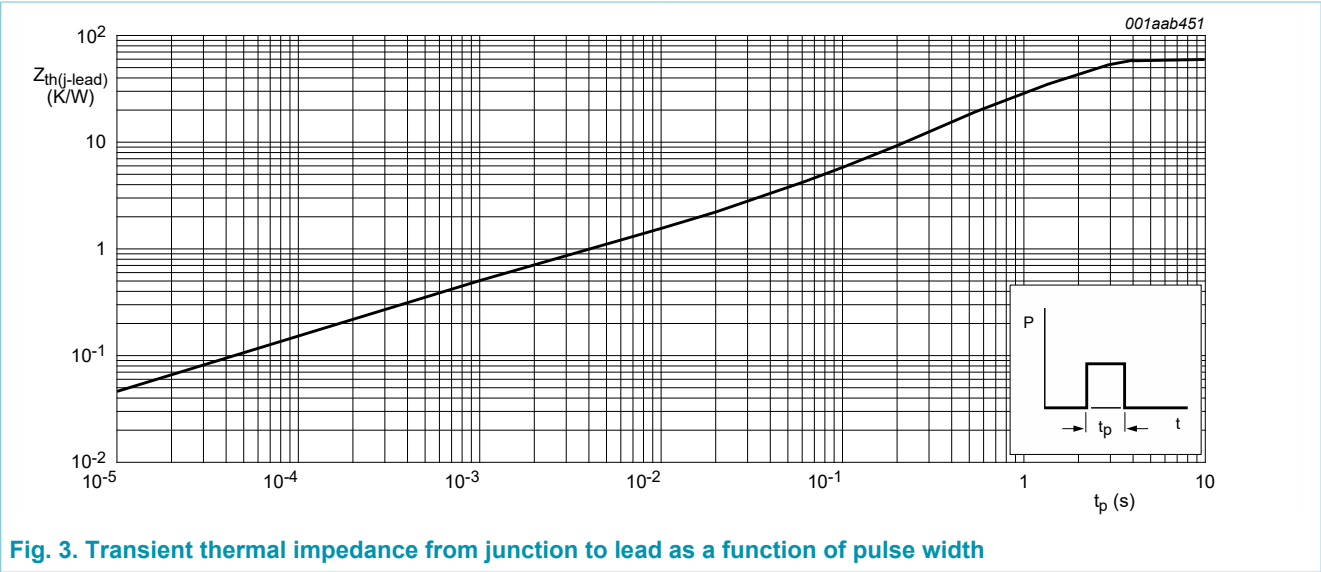
$$P_{der} = \frac{P_{tot}}{P_{tot(25^{\circ}C)}} \times 100\%$$

Fig. 2. Normalized total power dissipation as a function of lead temperature

7. Thermal characteristics

Table 4. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-lead)}$	thermal resistance from junction to lead	Fig. 3	-	-	60	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	printed circuit board mounted; lead length 4 mm	-	150	-	K/W



8. Characteristics

Table 5. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I _{CES}	collector-emitter cut-off current (base shorted)	V _{BE} = 0 V; V _{CE} = 700 V; T _j = 125 °C		-	-	5	mA
I _{EBO}	emitter-base cut-off current (collector open)	V _{EB} = 9 V; I _C = 0 A; T _{lead} = 25 °C		-	-	1	mA
V _{CEOsus}	collector-emitter sustaining voltage (base open)	I _B = 0 A; I _C = 1 mA; L _C = 25 mH; T _{lead} = 25 °C; Fig. 4 ; Fig. 5		400	-	-	V
V _{CEsat}	collector-emitter saturation voltage	I _C = 0.25 A; I _B = 50 mA; T _{lead} = 25 °C; Fig. 6		-	0.2	0.5	V
		I _C = 0.5 A; I _B = 125 mA; T _{lead} = 25 °C; Fig. 6		-	0.3	1	V
		I _C = 0.75 A; I _B = 250 mA; T _{lead} = 25 °C; Fig. 6		-	0.4	1.5	V
V _{BEsat}	base-emitter saturation voltage	I _C = 0.25 A; I _B = 50 mA; T _{lead} = 25 °C; Fig. 7		-	-	1	V
		I _C = 0.5 A; I _B = 125 mA; T _{lead} = 25 °C; Fig. 7		-	-	1.2	V
h _{FE}	DC current gain	I _C = 0.5 mA; V _{CE} = 2 V; T _{lead} = 25 °C		12	-	-	
		I _C = 0.4 A; V _{CE} = 5 V; T _{lead} = 25 °C; Fig. 8 ; Fig. 9		10	-	30	
		I _C = 0.8 A; V _{CE} = 5 V; T _{lead} = 25 °C; Fig. 8 ; Fig. 9		5	7.5	20	
Dynamic characteristics							
t _f	fall time	I _C = 1 A; I _{Bon} = 200 mA; V _{BB} = -5 V; L _B = 1 μH; T _{lead} = 25 °C; inductive load; Fig. 10 ; Fig. 11		-	80	-	ns

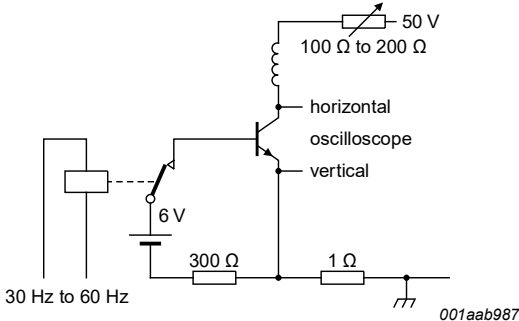


Fig. 4. Test circuit for collector-emitter sustaining voltage

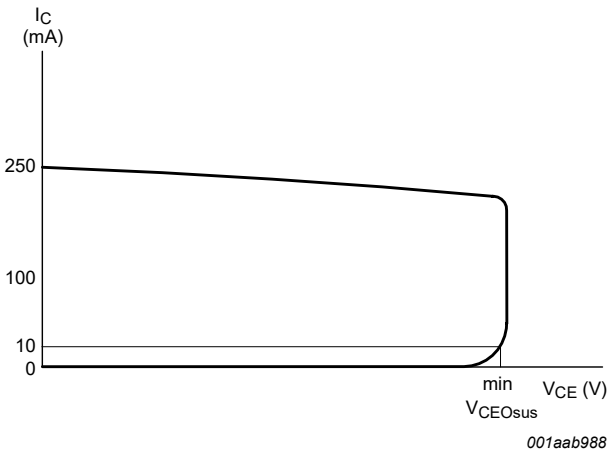


Fig. 5. Oscilloscope display for collector-emitter sustaining voltage test waveform

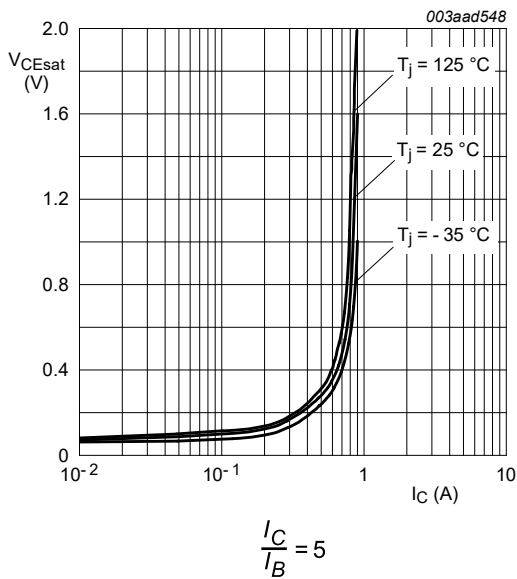


Fig. 6. Collector-emitter saturation voltage as a function of collector current; typical values

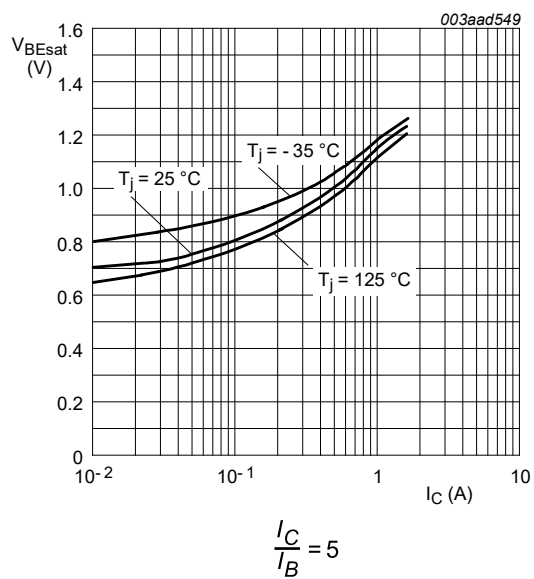


Fig. 7. Base-emitter saturation voltage as a function of collector current; typical values

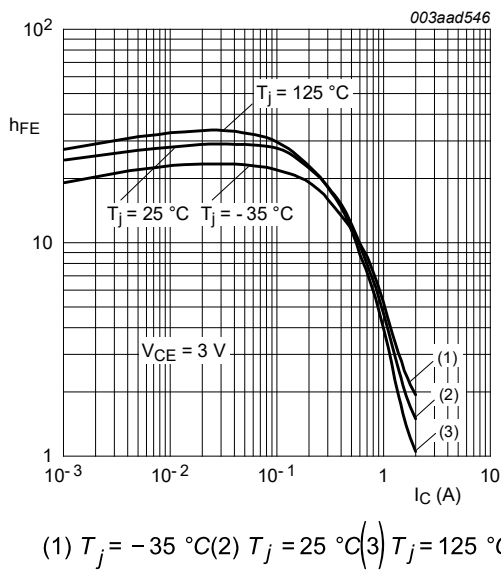


Fig. 8. DC current gain as a function of collector current; typical values

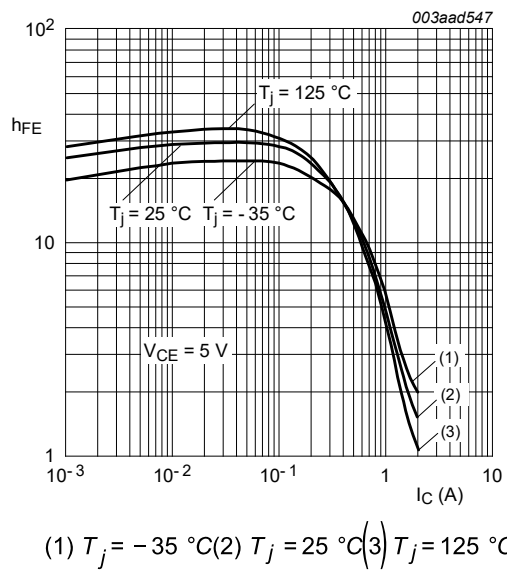


Fig. 9. DC current gain as a function of collector current; typical values

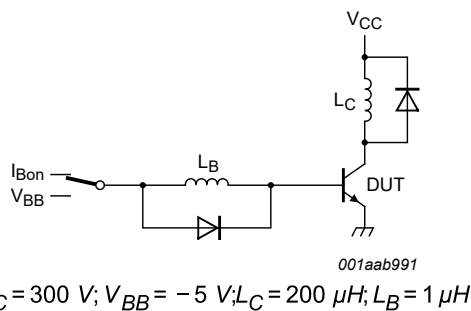


Fig. 10. Test circuit for inductive load switching

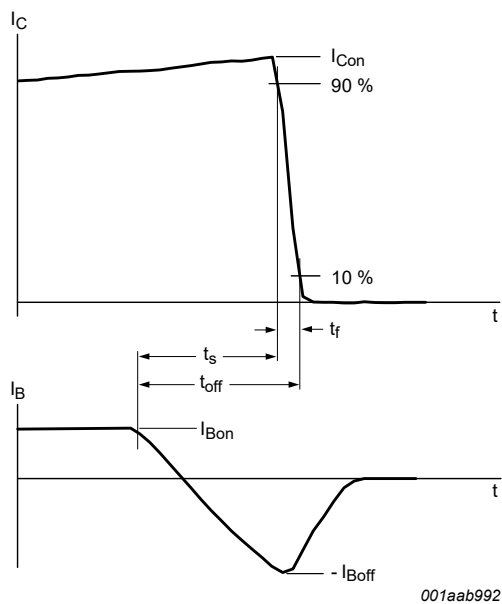


Fig. 11. Switching times waveforms for inductive load

9. Package outline

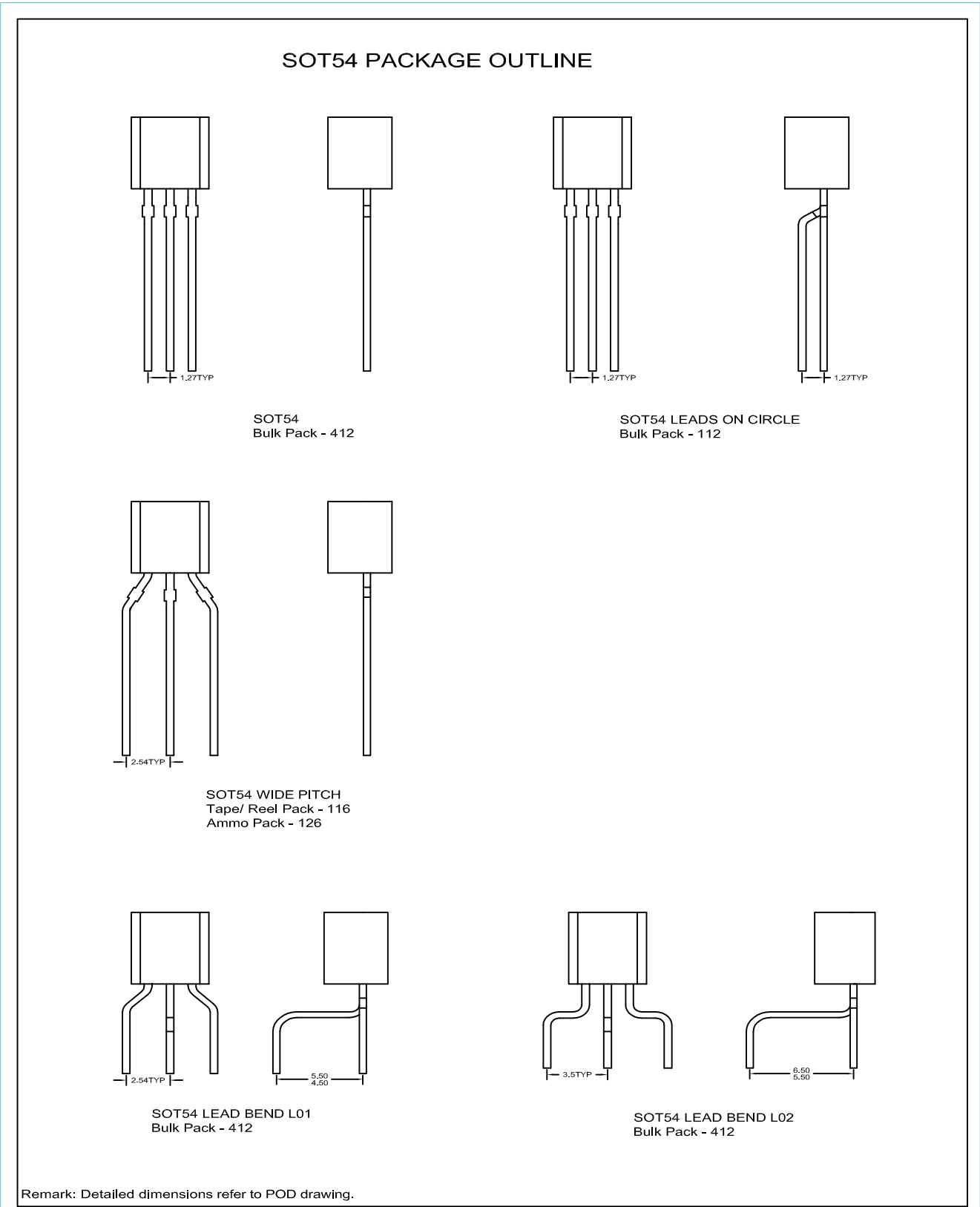


Fig. 12. Package outline TO-92 (SOT54)

10. Legal information

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Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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