

## 1. General description

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

## 2. Features and benefits

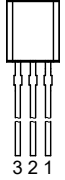
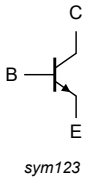
- Fast switching
- High voltage capability
- Very low switching and conduction losses

## 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	 <p>TO-92 (SOT54)</p>	 <p>sym123</p>
2	C	collector		
3	E	emitter		

## 5. Ordering information

Table 2. Ordering information

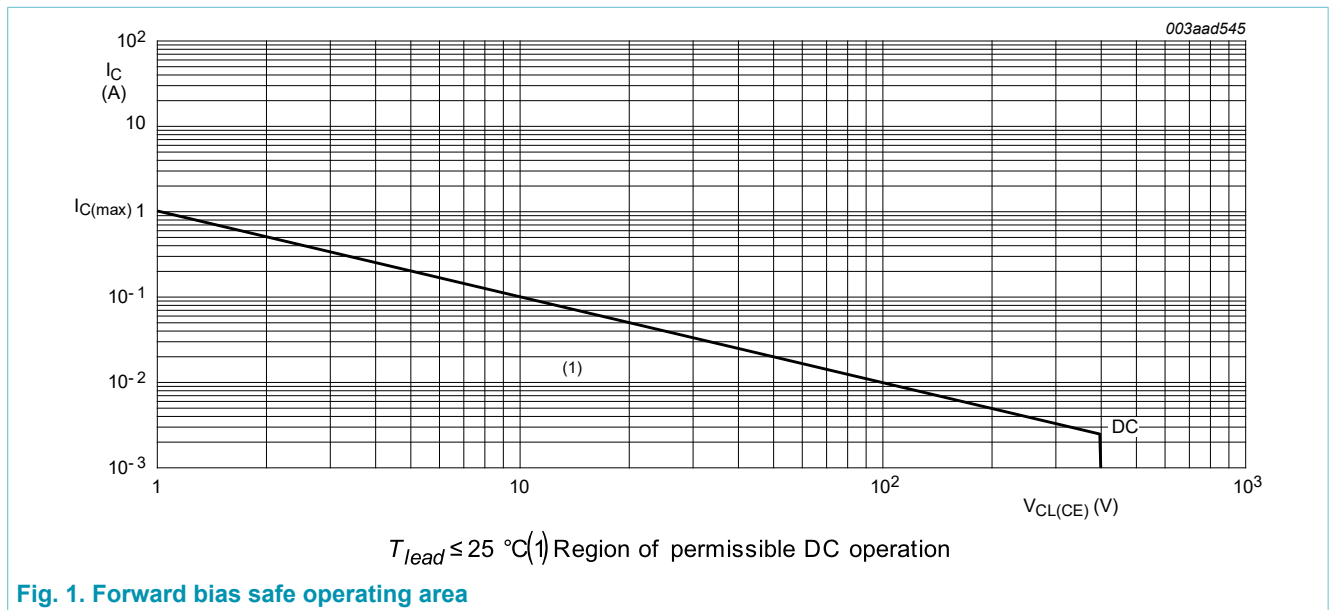
Type number	Package		
	Name	Description	Version
BUJ100LR	TO-92	plastic single-ended leaded (through hole) package; 3 leads	SOT54

## 6. Limiting values

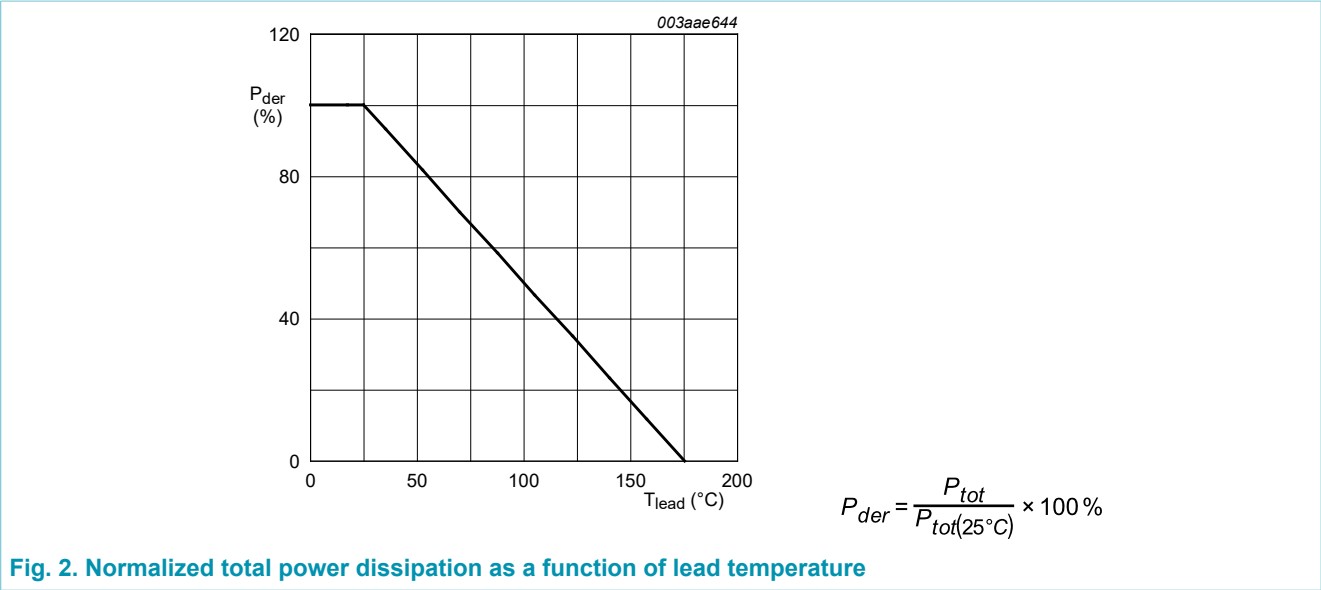
**Table 3. Limiting values**

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; <a href="#">Fig. 1</a>	-	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	$T_{lead} \leq 25\text{ °C};$ <a href="#">Fig. 2</a>	-	2.1	W
$T_{stg}$	storage temperature		-65	150	°C
$T_j$	junction temperature		-	150	°C



**Fig. 1. Forward bias safe operating area**



### 7. Thermal characteristics

Table 4. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-lead)}$	thermal resistance from junction to lead	<a href="#">Fig. 3</a>	-	-	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

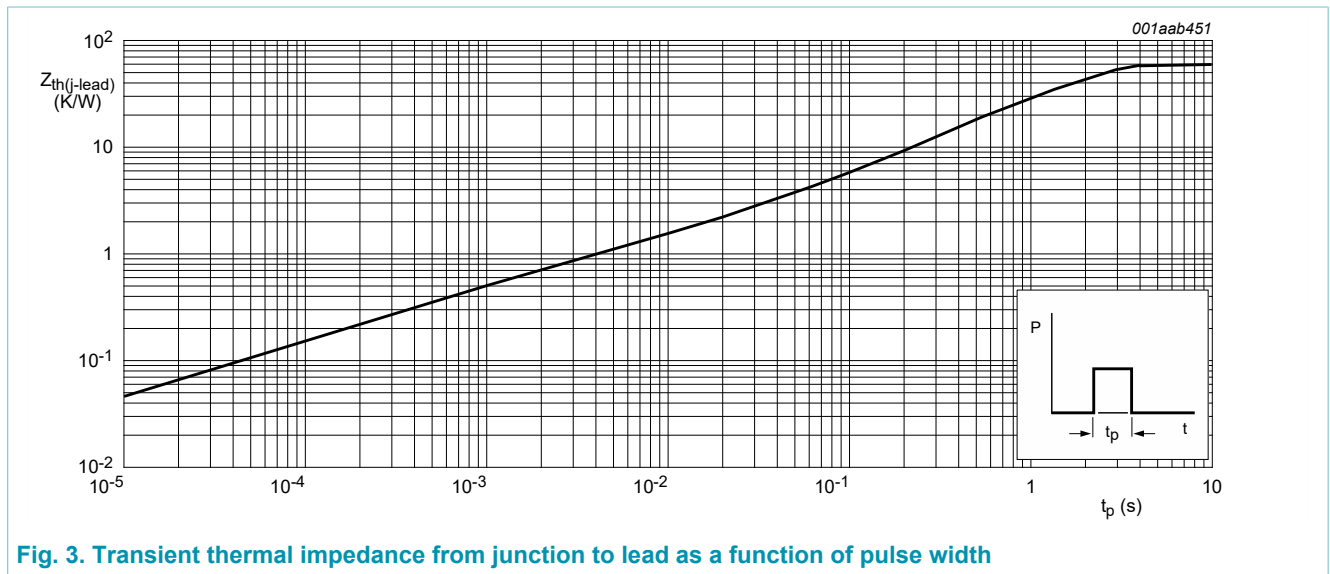
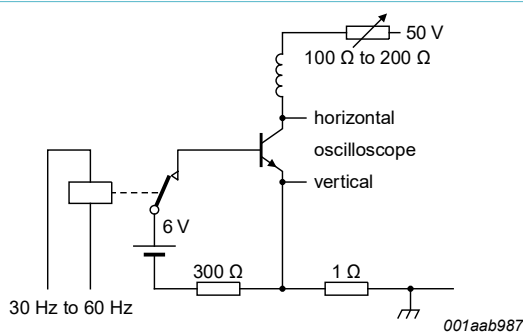


Fig. 3. Transient thermal impedance from junction to lead as a function of pulse width

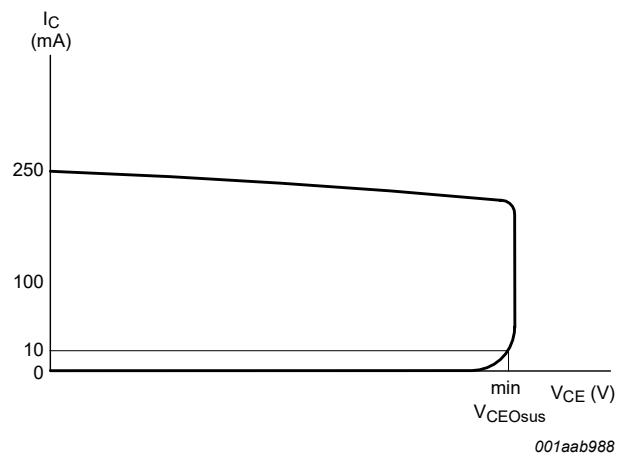
## 8. Characteristics

**Table 5. Characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$I_{CES}$	collector-emitter cut-off current (base shorted)	$V_{BE} = 0\text{ V}; V_{CE} = 700\text{ V}; T_j = 125\text{ }^\circ\text{C}$	-	-	5	mA
$I_{EBO}$	emitter-base cut-off current (collector open)	$V_{EB} = 9\text{ V}; I_C = 0\text{ A}; T_{lead} = 25\text{ }^\circ\text{C}$	-	-	1	mA
$V_{CEOsus}$	collector-emitter sustaining voltage (base open)	$I_B = 0\text{ A}; I_C = 1\text{ mA}; L_C = 25\text{ mH}; T_{lead} = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>	400	-	-	V
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 0.25\text{ A}; I_B = 50\text{ mA}; T_{lead} = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 6</a>	-	0.2	0.5	V
		$I_C = 0.5\text{ A}; I_B = 125\text{ mA}; T_{lead} = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 6</a>	-	0.3	1	V
		$I_C = 0.75\text{ A}; I_B = 250\text{ mA}; T_{lead} = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 6</a>	-	0.4	1.5	V
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 0.25\text{ A}; I_B = 50\text{ mA}; T_{lead} = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 7</a>	-	-	1	V
		$I_C = 0.5\text{ A}; I_B = 125\text{ mA}; T_{lead} = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 7</a>	-	-	1.2	V
$h_{FE}$	DC current gain	$I_C = 0.5\text{ mA}; V_{CE} = 2\text{ V}; T_{lead} = 25\text{ }^\circ\text{C}$	12	-	-	
		$I_C = 0.4\text{ A}; V_{CE} = 5\text{ V}; T_{lead} = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 8</a> ; <a href="#">Fig. 9</a>	10	-	30	
		$I_C = 0.8\text{ A}; V_{CE} = 5\text{ V}; T_{lead} = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 8</a> ; <a href="#">Fig. 9</a>	5	7.5	20	
<b>Dynamic characteristics</b>						
$t_f$	fall time	$I_C = 1\text{ A}; I_{Bon} = 200\text{ mA}; V_{BB} = -5\text{ V}; L_B = 1\text{ }\mu\text{H}; T_{lead} = 25\text{ }^\circ\text{C};$ inductive load; <a href="#">Fig. 10</a> ; <a href="#">Fig. 11</a>	-	80	-	ns



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



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

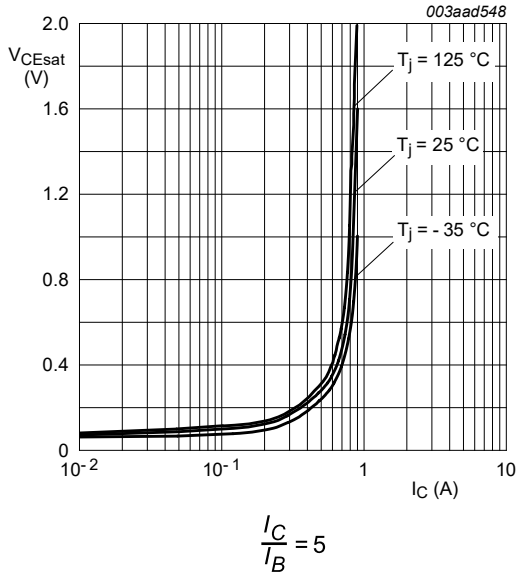


Fig. 6. Collector-emitter saturation voltage as a function of collector current; typical values

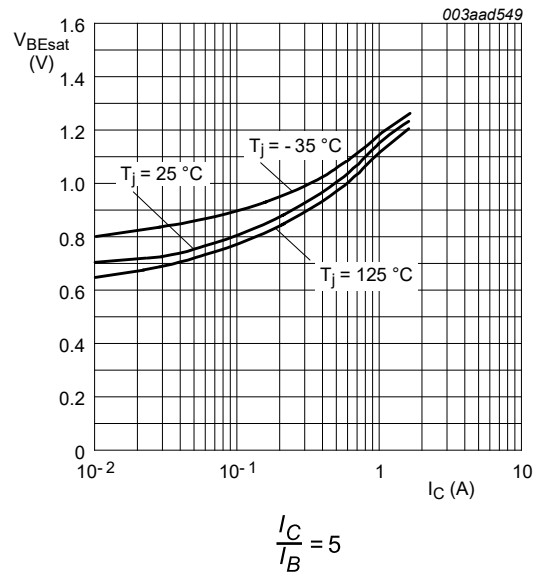


Fig. 7. Base-emitter saturation voltage as a function of collector current; typical values

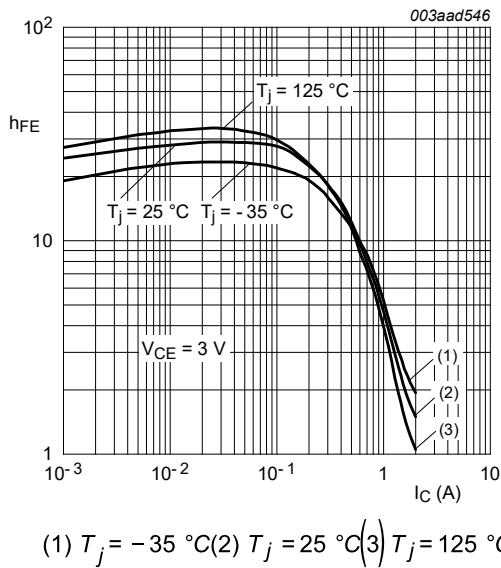


Fig. 8. DC current gain as a function of collector current; typical values

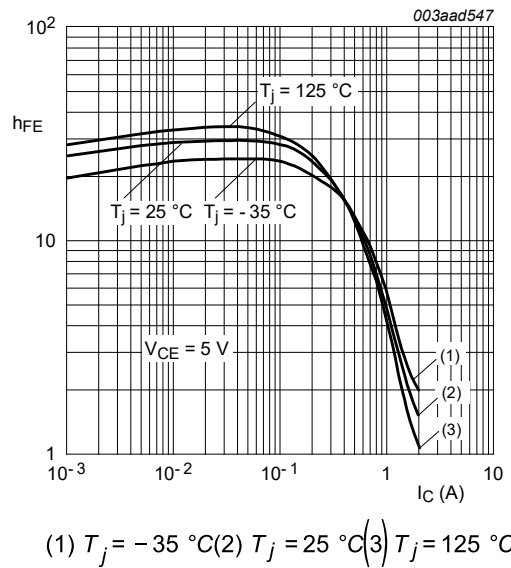
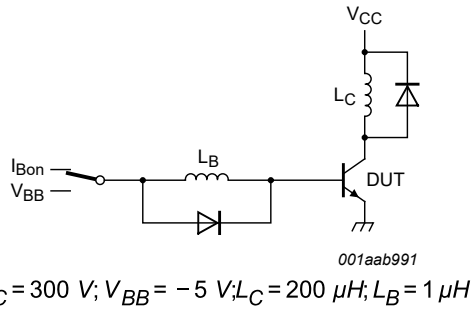
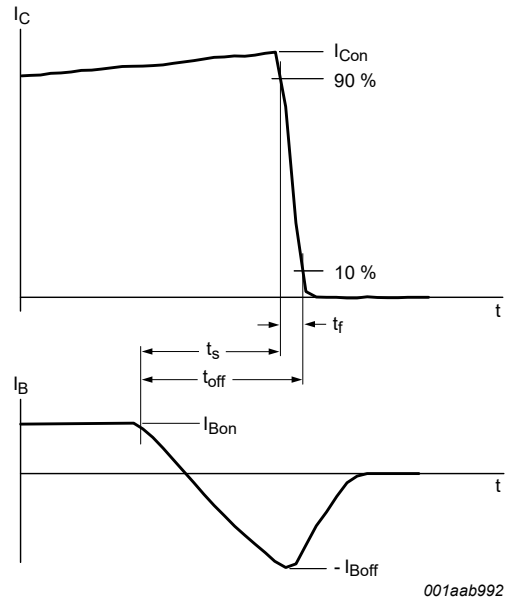


Fig. 9. DC current gain as a function of collector current; typical values



**Fig. 10. Test circuit for inductive load switching**



**Fig. 11. Switching times waveforms for inductive load**

### 9. Package outline

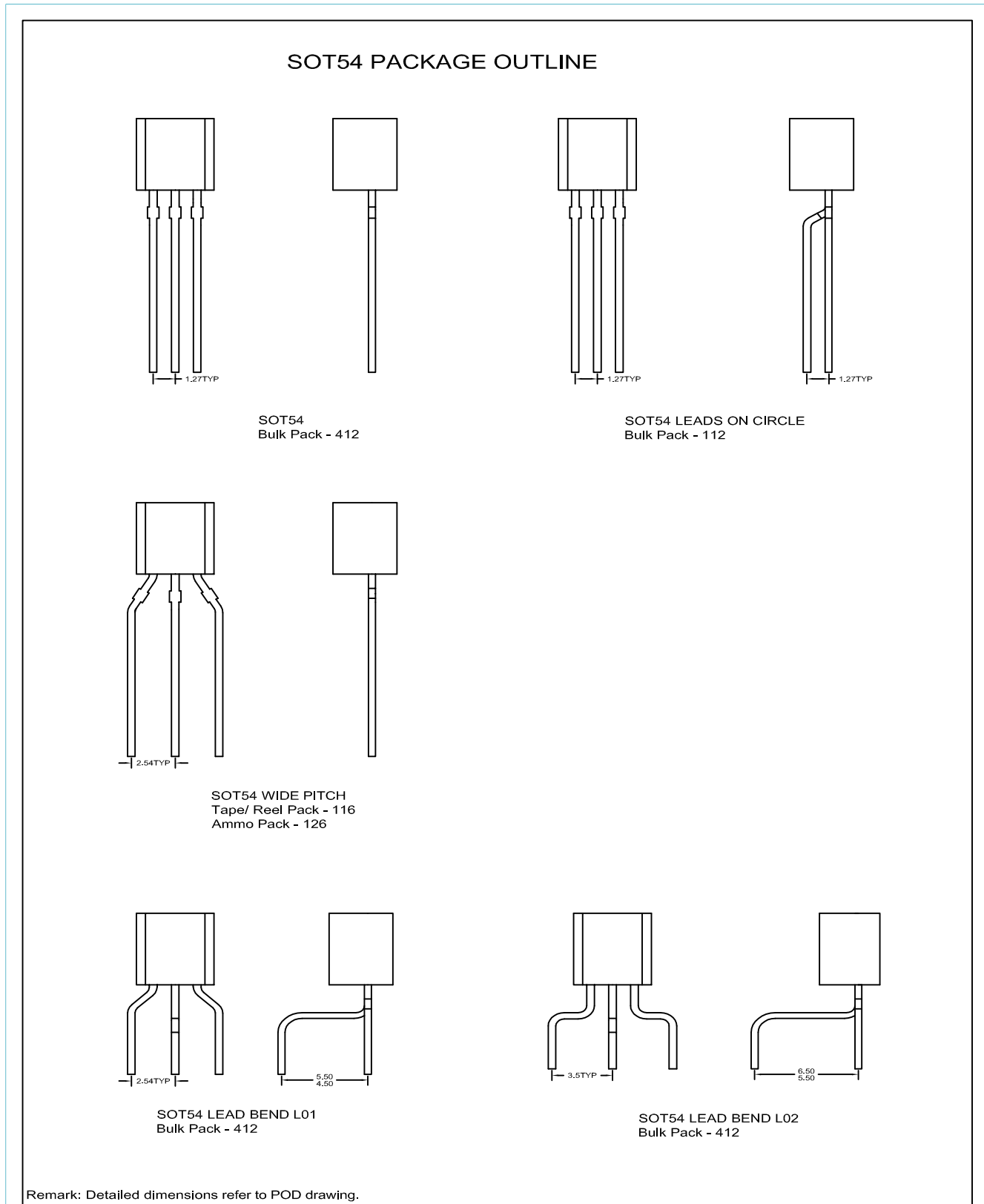


Fig. 12. Package outline TO-92 (SOT54)



## 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.
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