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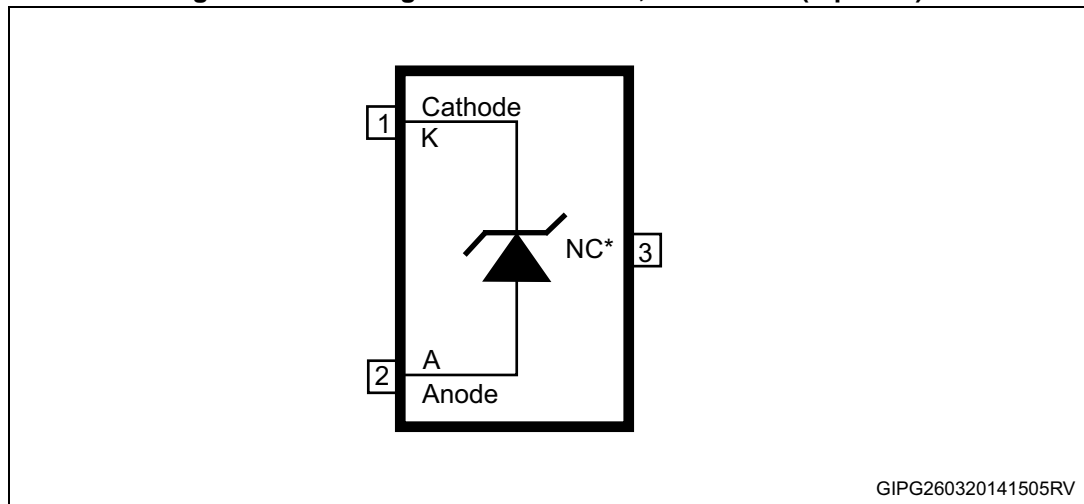
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# 1 Pin configuration

Figure 1. Pin configuration SOT23-3L, SOT323-3L (top view)



*Note:* The NC pin must be left unconnected or connected to anode.

## 2 Maximum ratings

**Table 1. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$I_k$	Reverse breakdown current	20	mA
$I_f$	Forward current	15	mA
$P_d$	Power dissipation <sup>(1)</sup>	500	mW
$T_{std}$	Storage temperature	-65 to +150	°C
$E_{SD}$	Human body model (HBM)	2	kV
	Machine model (MM)	200	V
	Charged device model	1500	V
$T_{lead}$	Lead temperature (soldering) 10 sec	260	°C
$T_j$	Max. junction temperature	+150	°C

1.  $P_d$  has been calculated with  $T_{amb} = 25\text{ °C}$  and  $T_{jmax} = 150\text{ °C}$

*Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.*

**Table 2. Thermal data**

Symbol	Parameter	SOT323-3L	SOT23-3L	Unit
$R_{thJA}$	Thermal resistance junction-ambient	246	242	°C/W
$R_{thJC}$	Thermal resistance junction-case	171	103	°C/W

**Table 3. Operating conditions**

Symbol	Parameter	Value	Unit
$I_{kmin}$	Minimum operating current	10	μA
$I_{kmax}$	Maximum operating current	15	mA
$T_{oper}$	Operating free air temperature range	-40 to +85	°C

### 3 Electrical characteristics

Limits are 100% production tested at 25 °C. Limits over full temperature range are guaranteed through correlation and by design.  $I_k = 10 \mu\text{A}$ ,  $T_{\text{amb}} = 25 \text{ °C}$  (unless otherwise specified).

**Table 4. Electrical characteristics for TS4061**

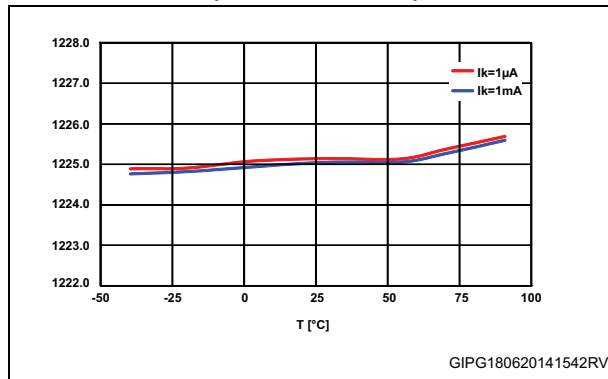
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_k$	Reverse breakdown voltage ( $V_k = 1.225 \text{ V}$ )	$I_k = 10 \mu\text{A}$ , TS4061A	1.2237	1.225	1.2262	V
		$I_k = 10 \mu\text{A}$ , TS4061B	1.2225		1.2275	
	Reverse breakdown voltage ( $V_k = 1.25 \text{ V}$ )	$I_k = 10 \mu\text{A}$ , TS4061A	1.2487	1.25	1.2512	V
		$I_k = 10 \mu\text{A}$ , TS4061B	1.2475		1.2525	
$I_{k\text{min}}$	Minimum operating current	$T_{\text{amb}} = 25 \text{ °C}$		7.5	10	$\mu\text{A}$
		$-40 \text{ °C} < T_{\text{amb}} < +85 \text{ °C}$			12	
$\Delta V_k / \Delta T$	Average temperature coefficient	$10 \mu\text{A} < I_k < 15 \text{ mA}$		20	35	ppm/°C
$\Delta V_k / \Delta I_k$	Reverse breakdown voltage change with operating current range	$I_{k\text{min}} < I_k < 1 \text{ mA}$ $-40 \text{ °C} < T_{\text{amb}} < +85 \text{ °C}$		0.2	1	mV
		$1 \text{ mA} < I_k < 15 \text{ mA}$ $-40 \text{ °C} < T_{\text{amb}} < +85 \text{ °C}$		1.7	4	
$R_{ka}$	Static impedance	$\Delta I_k = 10 \mu\text{A}$ to $10 \text{ mA}$		0.15	0.3	$\Omega$
Hys	Thermal hysteresis <sup>(1)</sup>	$I_k = 10 \mu\text{A}$		120		ppm
Noise	Wideband noise	$I_k = 10 \mu\text{A}$ $10 \text{ Hz} < f < 10 \text{ kHz}$		95		$\mu\text{VRMS}$
	Low frequency noise	$I_k = 10 \mu\text{A}$ $0.1 \text{ Hz} < f < 10 \text{ Hz}$		10		$\mu\text{Vp-p}$

1. Thermal hysteresis is defined as the difference in voltage measured at +25 °C after cycling to -40 °C and the measurement at +25 °C after cycling to temperature +85 °C.

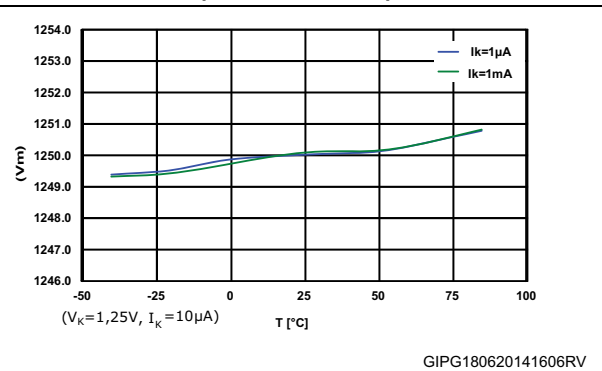
## 4 Typical performance characteristics

(The following plots are referred to the typical application circuit and, unless otherwise noted, at  $T_A = 25^\circ\text{C}$ )

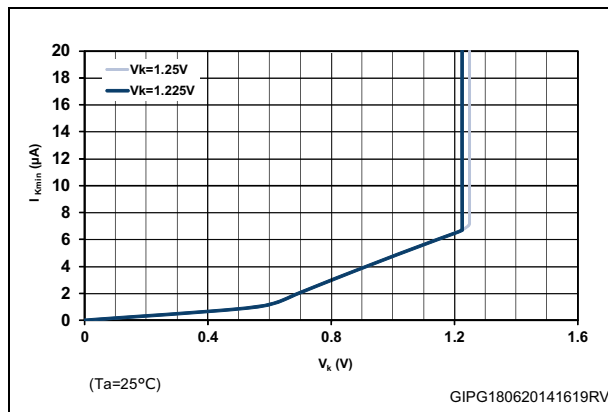
**Figure 2.  $V_K$  change vs temperature (1.225 V version)**



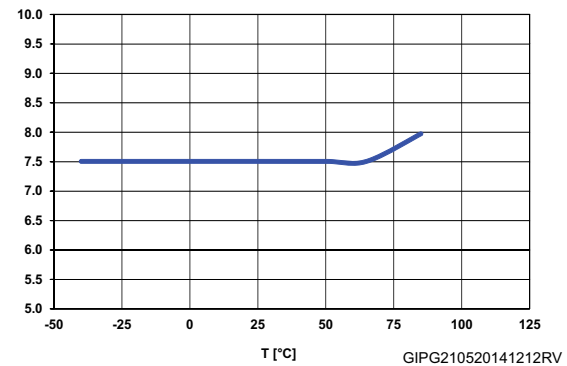
**Figure 3.  $V_K$  change vs temperature (1.25 V version)**



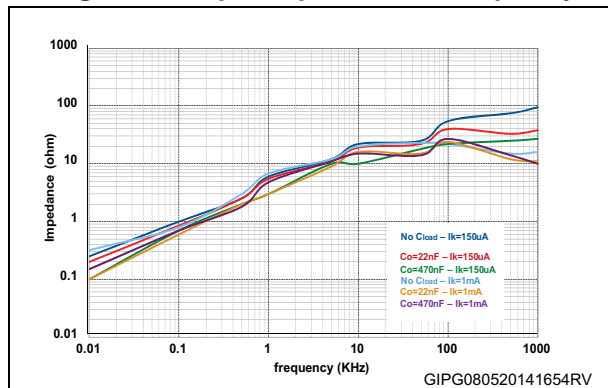
**Figure 4.  $I_{Kmin}$  minimum current for regulation**



**Figure 5.  $I_{Kmin}$  minimum current for regulation vs temperature**



**Figure 6. Output impedance vs frequency**



**Figure 7. Forward characteristics**

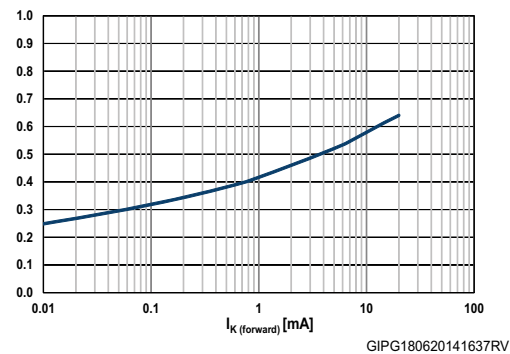


Figure 8. Start-up waveform (no  $C_{load}$ )

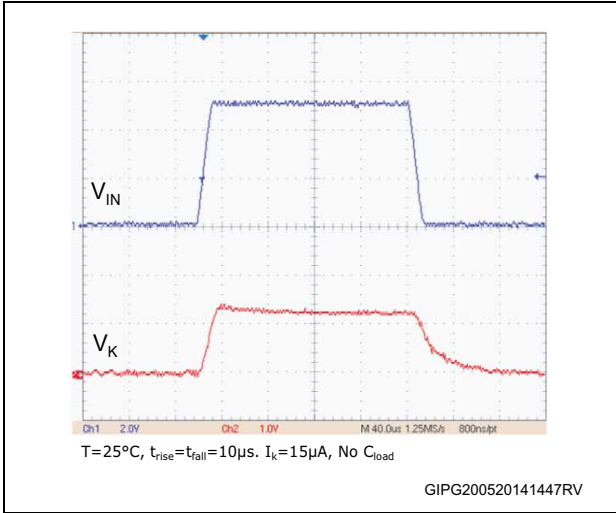


Figure 9. Start-up waveform ( $C_{load} = 100\text{ nF}$ )

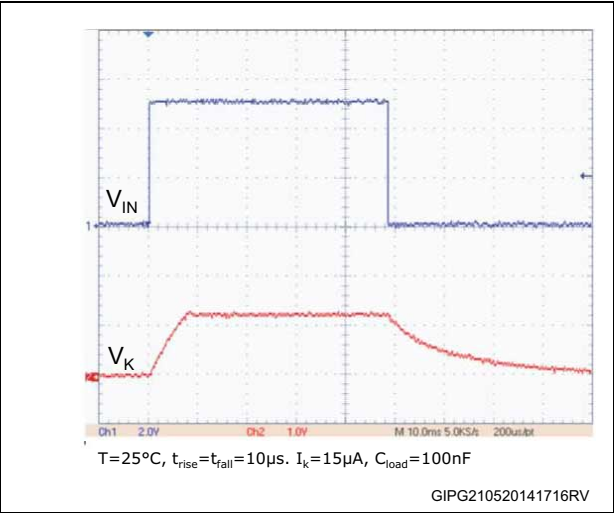
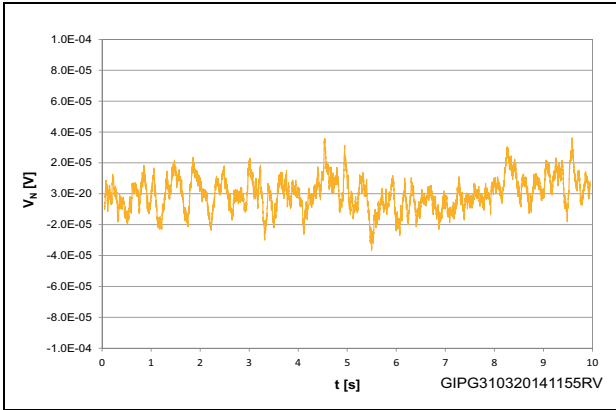


Figure 10. Low frequency noise



## 5 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

### 5.1 SOT23-3L, TS4061

Figure 11. SOT23-3L mechanical drawings

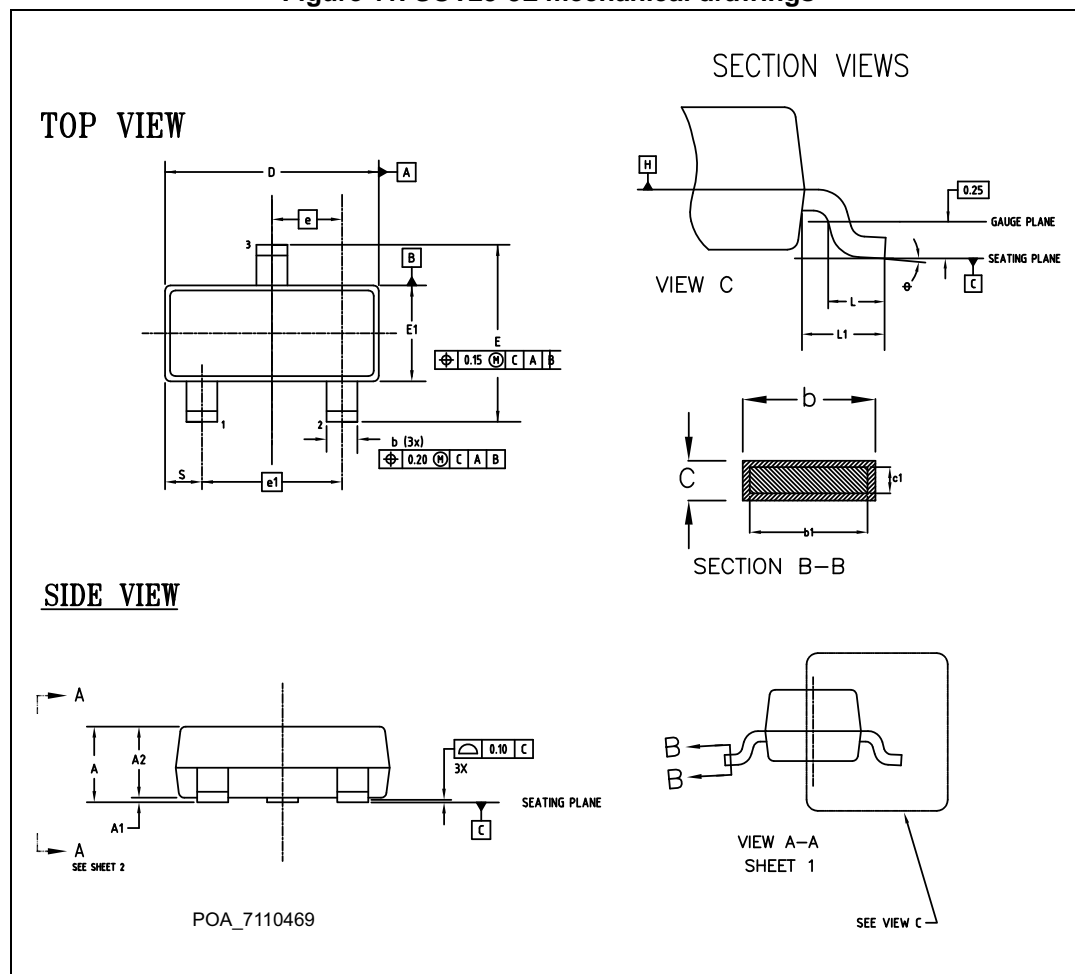
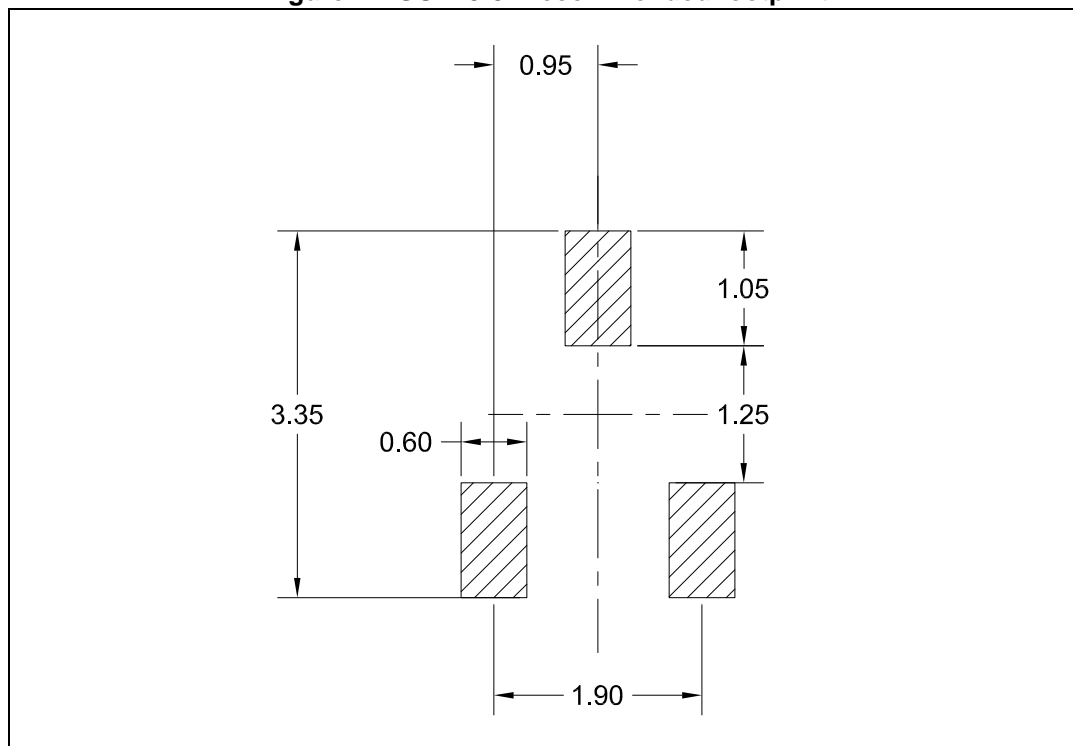


Table 5. SOT23-3L mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.89		1.12
A1	0.013		0.10
A2	0.88	0.95	1.02
b	0.37		0.50
b1	0.37	0.40	0.45
c	0.085		0.18
c1	0.085		0.16
D	2.80		3.04
E	2.10		2.64
E1	1.20		1.40
e	0.95 BSC		
e1	1.90 BSC		
*L	0.28	0.38	0.48
L1	0.55		
R	0.05		
R1	0.05		
θ	0°		8°
s	0.45		0.60



Figure 12. SOT23-3L recommended footprint



5.2 SOT323-3L, TS4061

Figure 13. SOT323-3L drawings

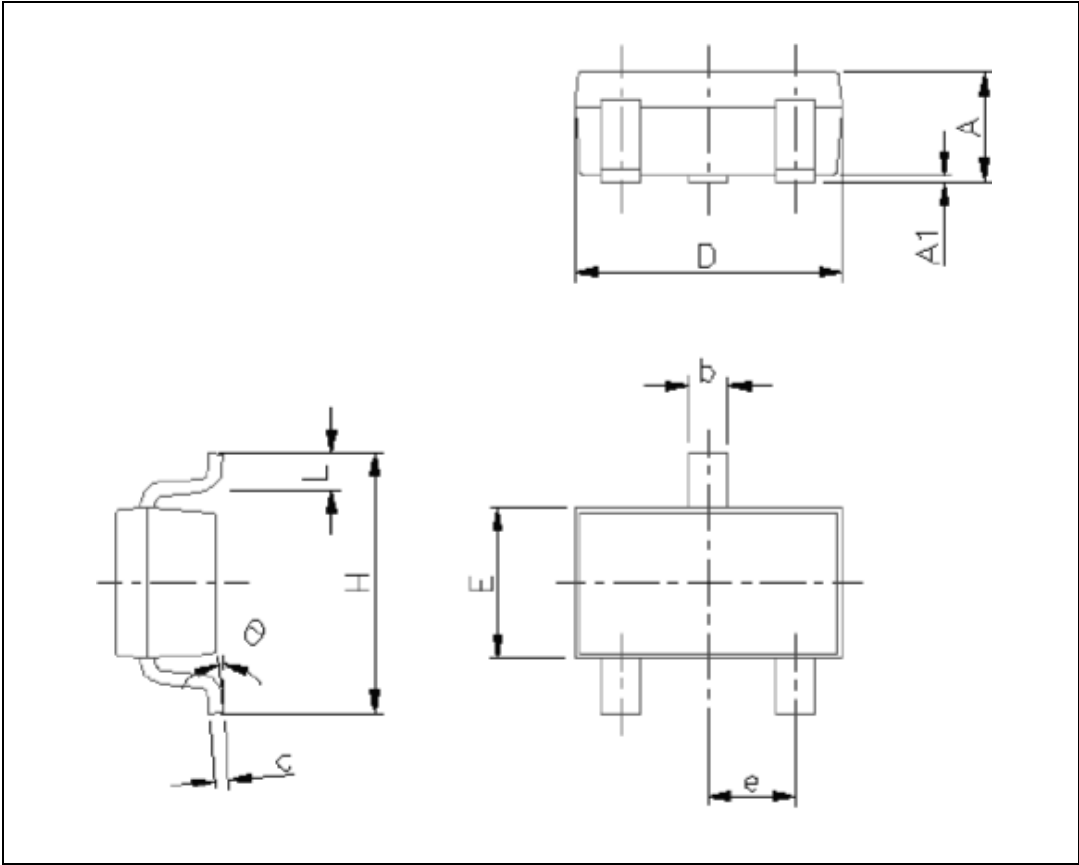
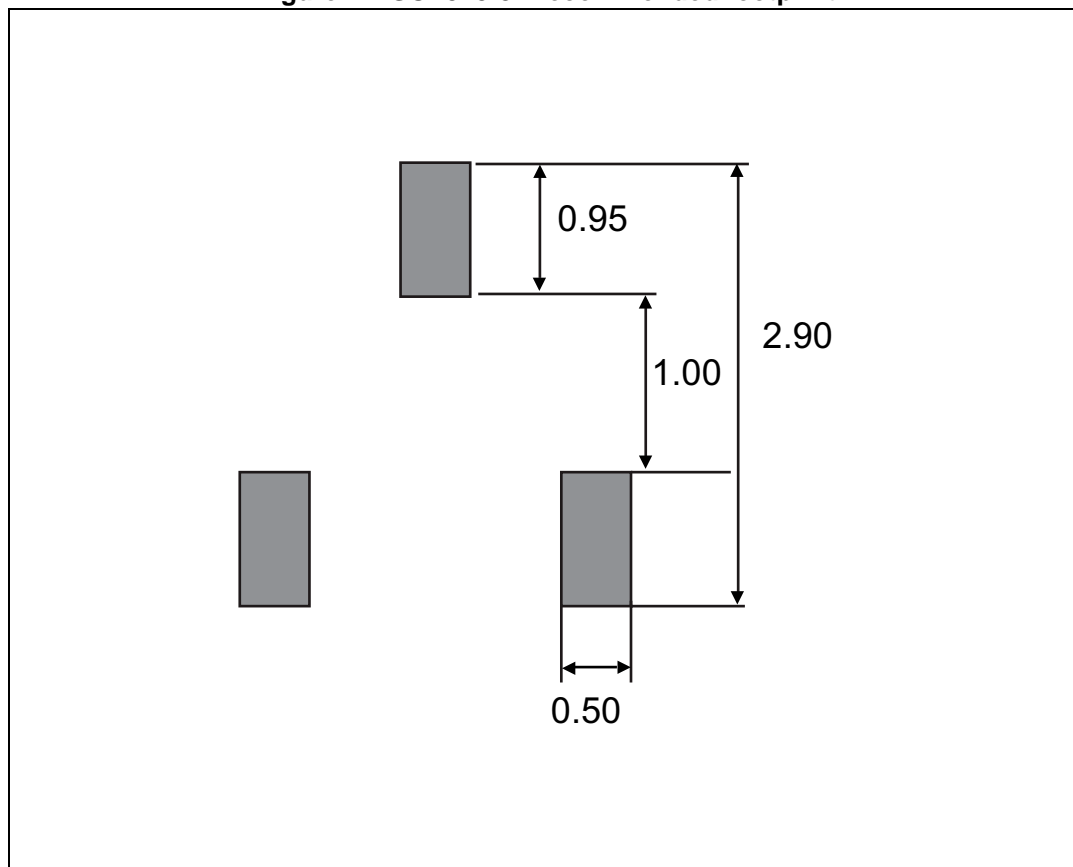


Table 6. SOT323-3L mechanical data

Dim.	mm		
	Typ.	Min.	Max.
A		0.80	1.10
A1		0.00	0.10
b		0.25	0.40
c		0.10	0.18
D		1.80	2.20
E		1.15	1.35
e	0.65	0.60	0.70
H		1.80	2.40
L		0.10	0.30

Figure 14. SOT323-3L recommended footprint



## 6 Ordering information

**Table 7. Order codes**

Order codes	Output voltage (V)	Precision (%)	Package	Temperature range (°C)
TS4061AILT-1.25	1.25	0.1	SOT23-3L	-40 to +85
TS4061AILT-1.225	1.225			
TS4061AICT-1.25	1.25	0.1	SOT323-3L	-40 to +85
TS4061AICT-1.225	1.225			
TS4061BILT-1.25	1.25	0.2	SOT23-3L	-40 to +85
TS4061BILT-1.225	1.225			
TS4061BICT-1.25	1.25	0.2	SOT323-3L	-40 to +85
TS4061BICT-1.225	1.225			

## 7 Revision history

**Table 8. Document revision history**

Date	Revision	Changes
21-Jul-2014	1	Initial release.
01-Feb-2018	2	Updated: <i>Table 5, Figure 11, Figure 12</i> and Note: <i>The NC pin must be left unconnected or connected to anode.</i>

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