

Very low drop voltage regulators with inhibit

Features

- Very low dropout voltage (0.2 V typ. at 50 mA load)
- Very low quiescent current (typ. 500 μ A at 50 mA load)
- Output current up to 50 mA
- Logic-controlled electronic shutdown
- Output voltages of 3.0; 3.3; 3.8; 5.0 V
- Internal current and thermal limit
- Supply voltage rejection: 63 dB (typ)
- Only 1 μ F for stability
- Selection at 25 °C
- Temperature range: -25 °C to 125 °C
- Package available: SOT23-5L



Description

The LD2979 series are very low drop regulators available in SOT23-5L.

The very low drop-voltage and the very low quiescent current make them particularly suitable for low noise, low power applications and in battery powered systems.

Shutdown logic control function is available on five pin version (TTL compatible). This means that

when the device is used as local regulator, it is possible to put a part of the board in standby, decreasing the total power consumption.

Table 1. Device summary

Part numbers	Order codes	Output voltages
LD2979XX30	LD2979M30TR	3.0 V
LD2979XX33	LD2979M33TR	3.3 V
LD2979XX38	LD2979M38TR	3.8 V
LD2979XX50	LD2979M50TR	5.0 V

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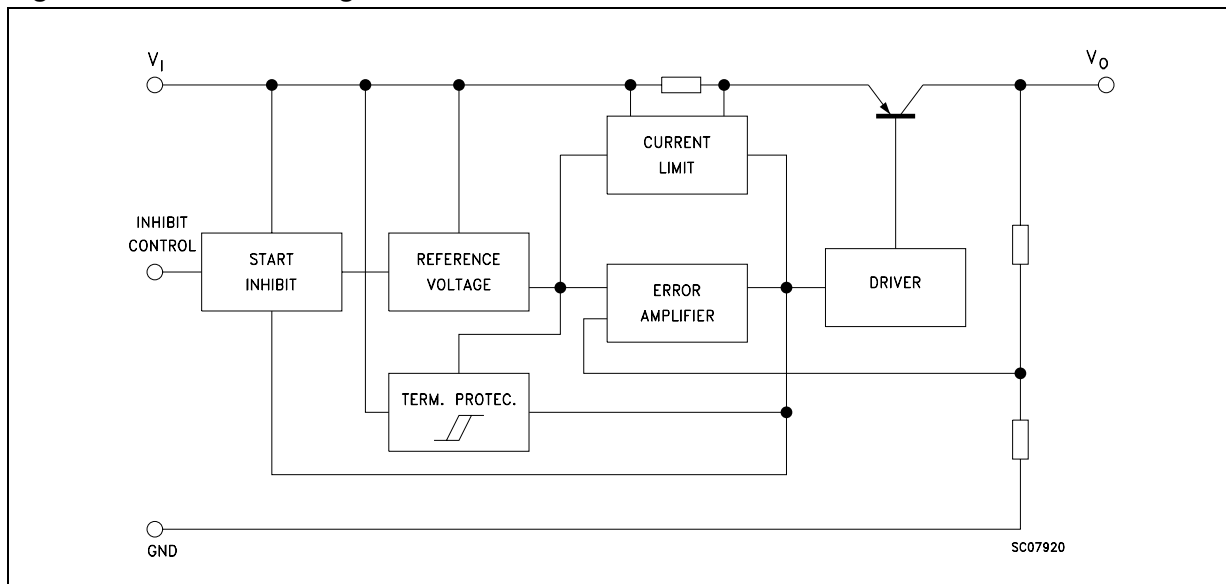
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1 Diagram

Figure 1. Schematic diagram



2 Pin configuration

Figure 2. Pin connections (top view)

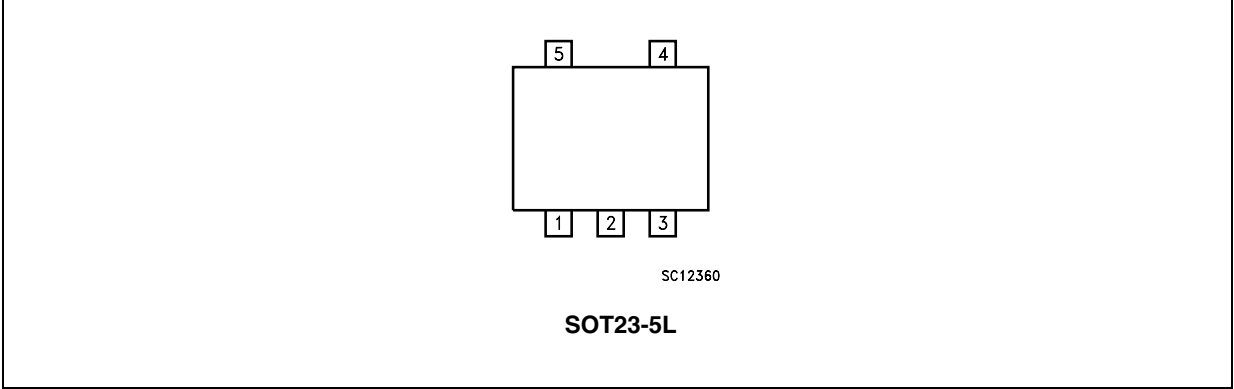


Table 2. Pin description

Symbol	Name and function	Pin number
V_I	Input voltage	1
GND	Ground	2
INHIBIT	Control switch ON/OFF ⁽¹⁾	3
NC	Not to be connected	4
V_O	Output voltage	5

1. Inhibit pin is not internally pulled-up then it must not be left floating. Connect to a positive voltage higher than 2 V to able the device.

3 Maximum ratings

Table 3. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_I	DC input voltage	16	V
V_{INH}	DC inhibit input voltage	V_{IN}	V
I_O	Output current	Internally limited	
P_D	Power dissipation	Internally limited	
T_{STG}	Storage temperature range	-40 to 150	°C
T_{OP}	Operating junction temperature range	-25 to 125	°C

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

4 Electrical characteristics

Table 4. Electrical characteristics for LD2979xx (refer to the test circuits, $T_a = 25^\circ\text{C}$, $V_{IN} = V_{O(NOM)} + 1\text{ V}$, $I_O = 1\text{ mA}$, $V_{INH} = 2\text{ V}$, $C_O = 1\text{ }\mu\text{F}$, unless otherwise specified).

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	$V_{IN} = 3.85\text{ V}$	2.793	2.85	2.907	V
		$I_O = 1\text{ to }50\text{ mA}$, $T_a = -25\text{ to }125^\circ\text{C}$	2.736		2.964	
V_O	Output voltage	$V_{IN} = 4\text{ V}$	2.940	3	3.060	V
		$I_O = 1\text{ to }50\text{ mA}$, $T_a = -25\text{ to }125^\circ\text{C}$	2.880		3.120	
V_O	Output voltage	$V_{IN} = 4.3\text{ V}$	3.234	3.3	3.366	V
		$I_O = 1\text{ to }50\text{ mA}$, $T_a = -25\text{ to }125^\circ\text{C}$	3.168		3.432	
V_O	Output voltage	$V_{IN} = 4.8\text{ V}$	3.724	3.8	3.876	V
		$I_O = 1\text{ to }50\text{ mA}$, $T_a = -25\text{ to }125^\circ\text{C}$	3.648		3.952	
V_O	Output voltage	$V_{IN} = 6\text{ V}$	4.9	5	5.1	V
		$I_O = 1\text{ to }50\text{ mA}$, $T_a = -25\text{ to }125^\circ\text{C}$	4.8		5.2	
I_O	Output current limit		100			mA
ΔV_O	Line regulation	$V_{IN} = V_{O(NOM)} + 1\text{ V to }16\text{ V}$, $I_O = 1\text{ mA}$			0.028	%/ V_{IN}
		$T_a = -25\text{ to }125^\circ\text{C}$			0.064	
I_d	Quiescent current (On Mode)	$I_O = 0$		80	110	μA
		$I_O = 0$, $T_a = -25\text{ to }125^\circ\text{C}$			170	
		$I_O = 50\text{ mA}$		500	700	
		$I_O = 50\text{ mA}$, $T_a = -25\text{ to }125^\circ\text{C}$			1300	
	Quiescent current (Off Mode)	$V_{INH} < 0.18\text{ V}$		0		μA
		$V_{INH} < 0.18\text{ V}$, $T_a = -25\text{ to }125^\circ\text{C}$			1	
SVR	Supply voltage rejection	$I_O = 50\text{ mA}$, $C_{OUT} = 10\text{ }\mu\text{F}$, $f = 120\text{ Hz}$		63		dB
V_d	Dropout voltage	$I_O = 0$		6	12	mV
		$I_O = 0$, $T_a = -25\text{ to }125^\circ\text{C}$			18	
		$I_O = 1\text{ mA}$		30	60	
		$I_O = 1\text{ mA}$, $T_a = -25\text{ to }125^\circ\text{C}$			90	
		$I_O = 10\text{ mA}$		100	200	
		$I_O = 10\text{ mA}$, $T_a = -25\text{ to }125^\circ\text{C}$			300	
		$I_O = 50\text{ mA}$		200	400	
		$I_O = 50\text{ mA}$, $T_a = -25\text{ to }125^\circ\text{C}$			600	
V_{IL}	Inhibit input logic low	Device Off, $T_a = -25\text{ to }125^\circ\text{C}$			0.18	V
V_{IH}	Inhibit input logic high	Device On, $T_a = -25\text{ to }125^\circ\text{C}$	2			V

Table 4. Electrical characteristics for LD2979xx (continued) (refer to the test circuits, $T_a = 25\text{ }^{\circ}\text{C}$, $V_{IN} = V_{O(NOM)} + 1\text{ V}$, $I_O = 1\text{ mA}$, $V_{INH} = 2\text{ V}$, $C_O = 1\text{ }\mu\text{F}$, unless otherwise specified).

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_I	Inhibit input current	$V_{INH} = 0\text{ V}$		0	-1	μA
		$V_{INH} = 5\text{ V}$, $T_a = -25\text{ to }125^{\circ}\text{C}$		5	15	
eN	Output noise voltage (RMS)	BW= 300Hz to 50kHz, $C_O = 10\mu\text{F}$		160		μV

5 Typical characteristics

(unless otherwise specified $T_A = 25\text{ }^{\circ}\text{C}$)

Figure 3. Output voltage vs temperature

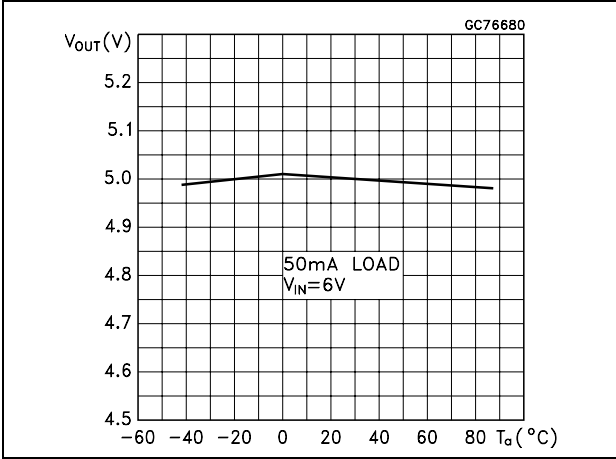


Figure 4. Output voltage vs input voltage

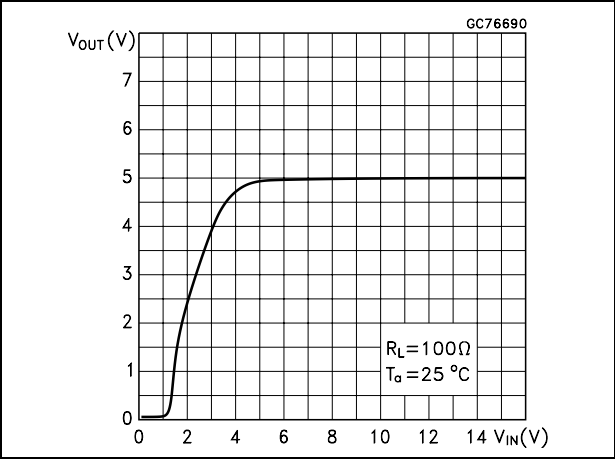


Figure 5. Output voltage vs input voltage

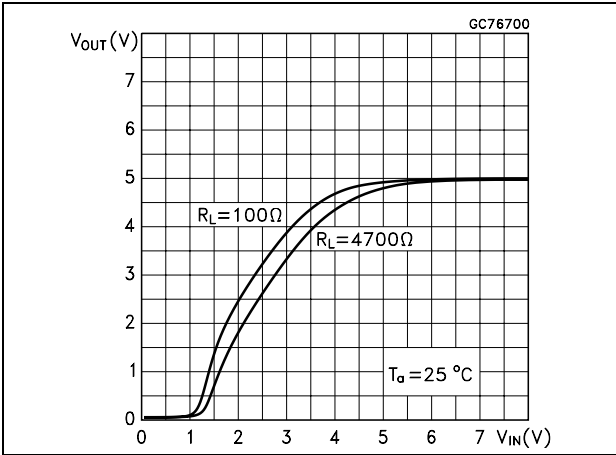


Figure 6. Dropout voltage vs output current

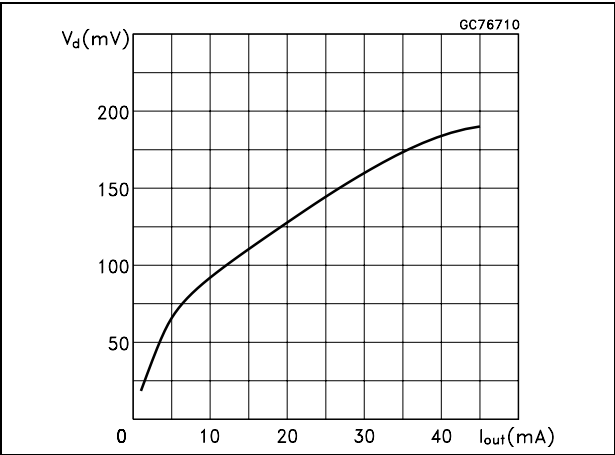


Figure 7. Dropout voltage vs temperature

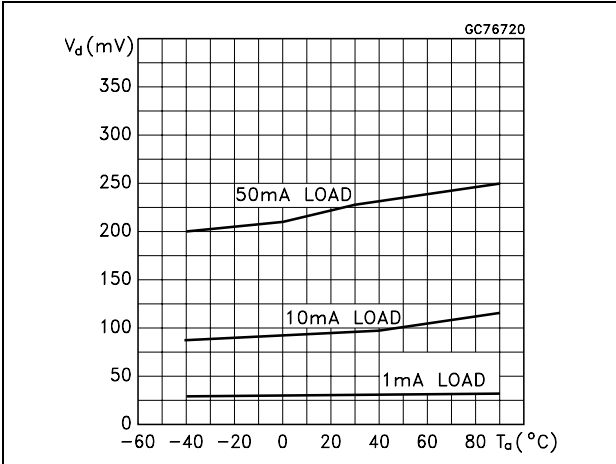


Figure 8. Quiescent current vs temperature

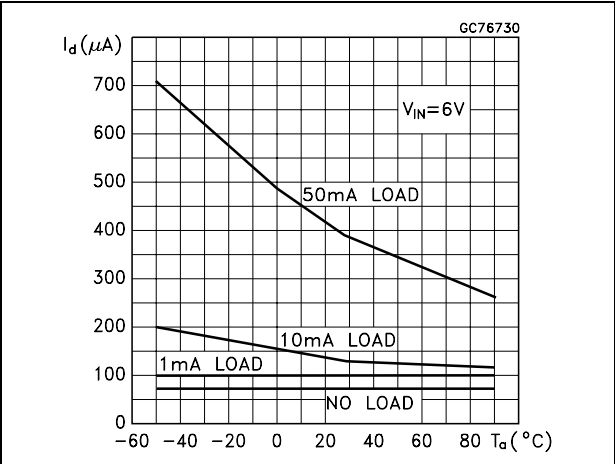


Figure 9. Short circuit current vs dropout voltage

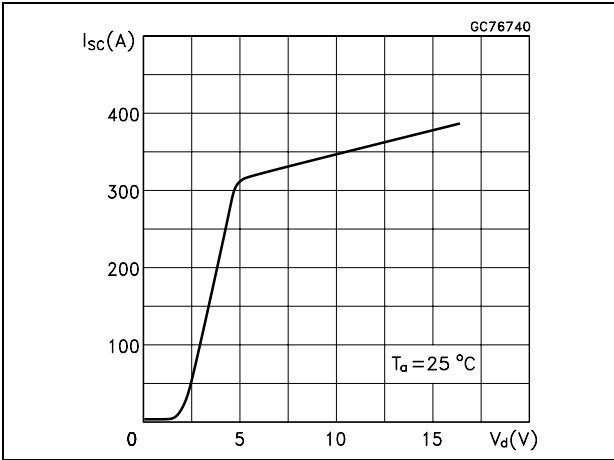


Figure 10. Inhibit voltage vs temperature

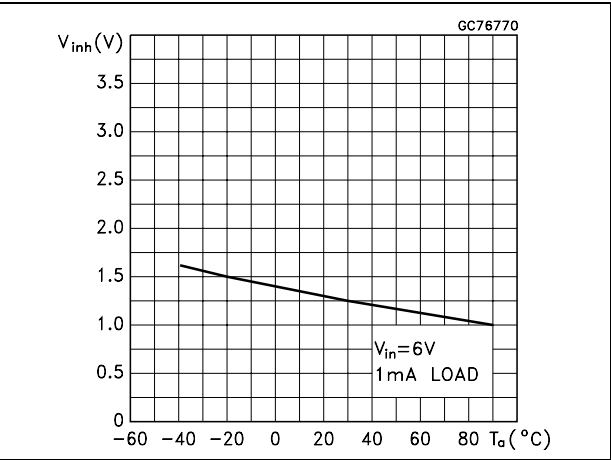


Figure 11. Supply voltage rejection vs frequency

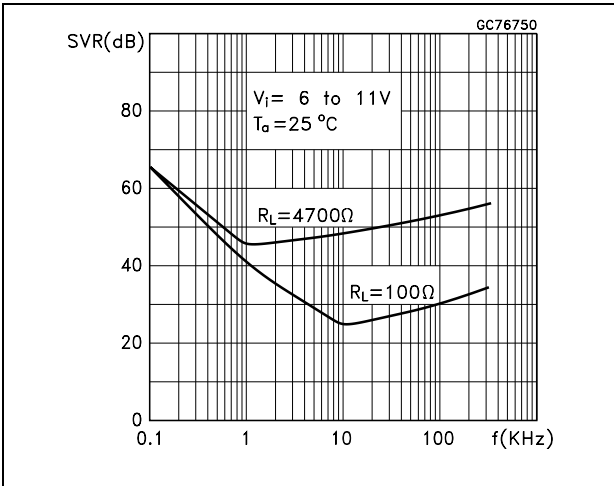
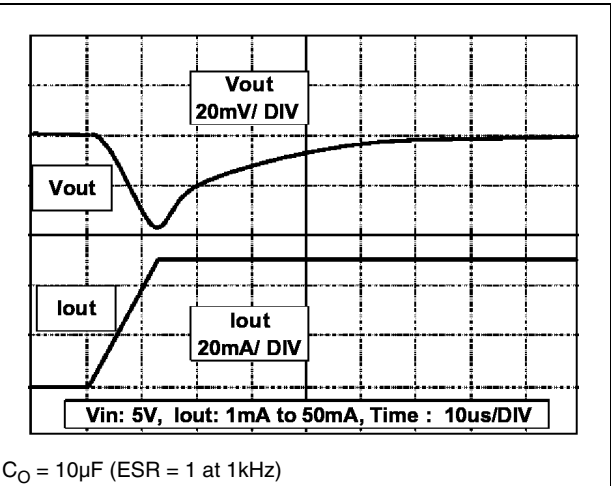


Figure 12. Load transient response



$C_O = 10\mu\text{F}$ (ESR = 1 at 1kHz)

Figure 13. Inhibit current vs temperature

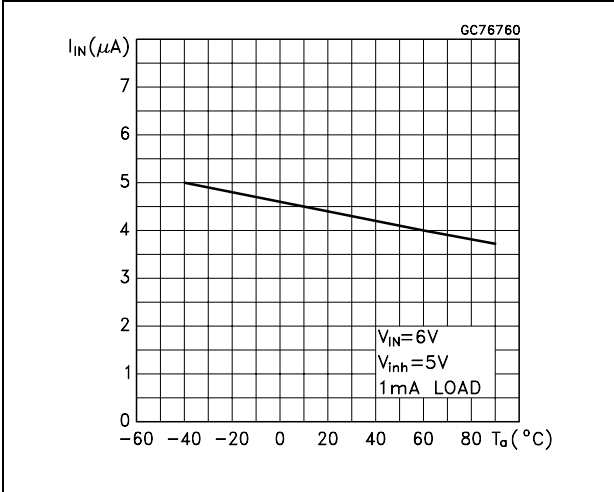
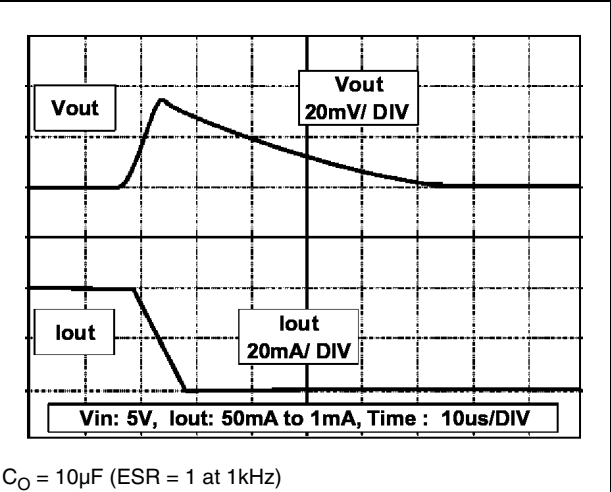
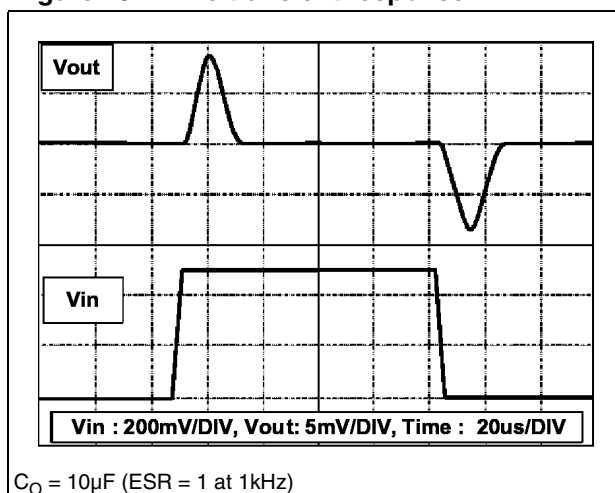


Figure 14. Load transient response



$C_O = 10\mu\text{F}$ (ESR = 1 at 1kHz)

Figure 15. Line transient response

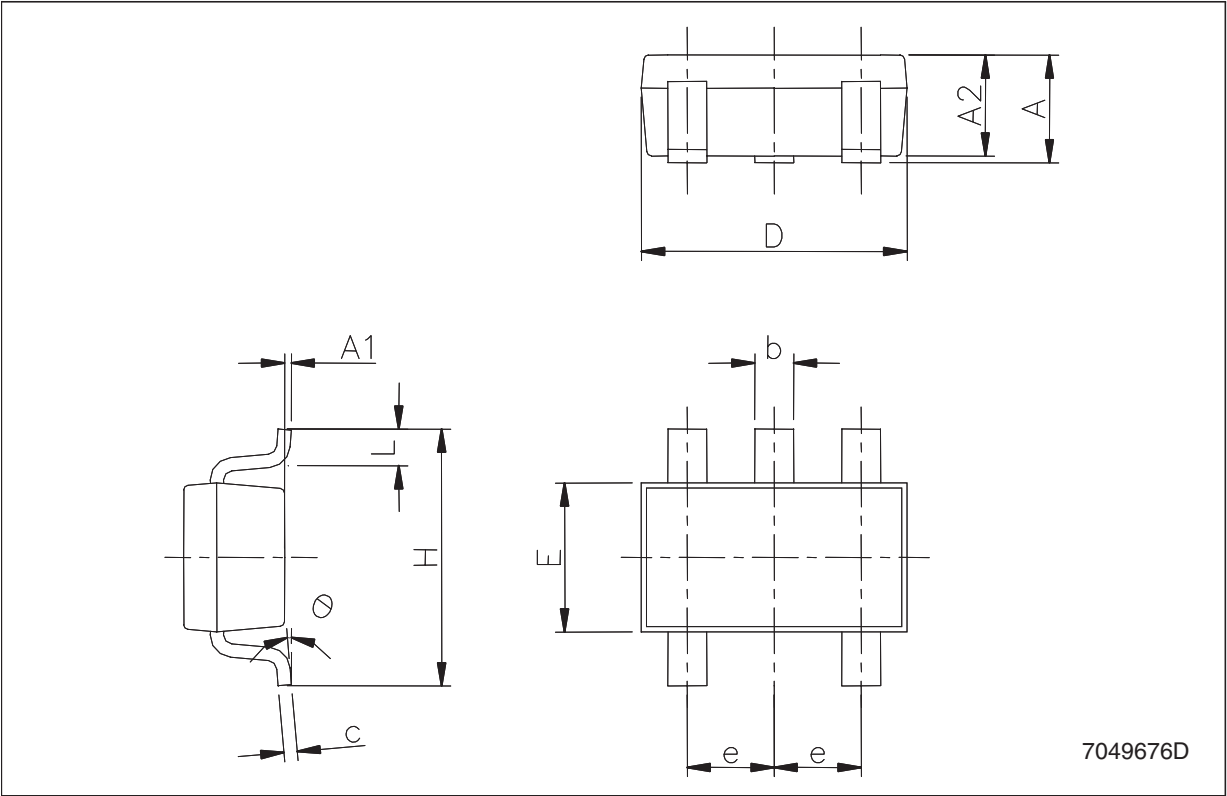


6 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second Level Interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

SOT23-5L mechanical data

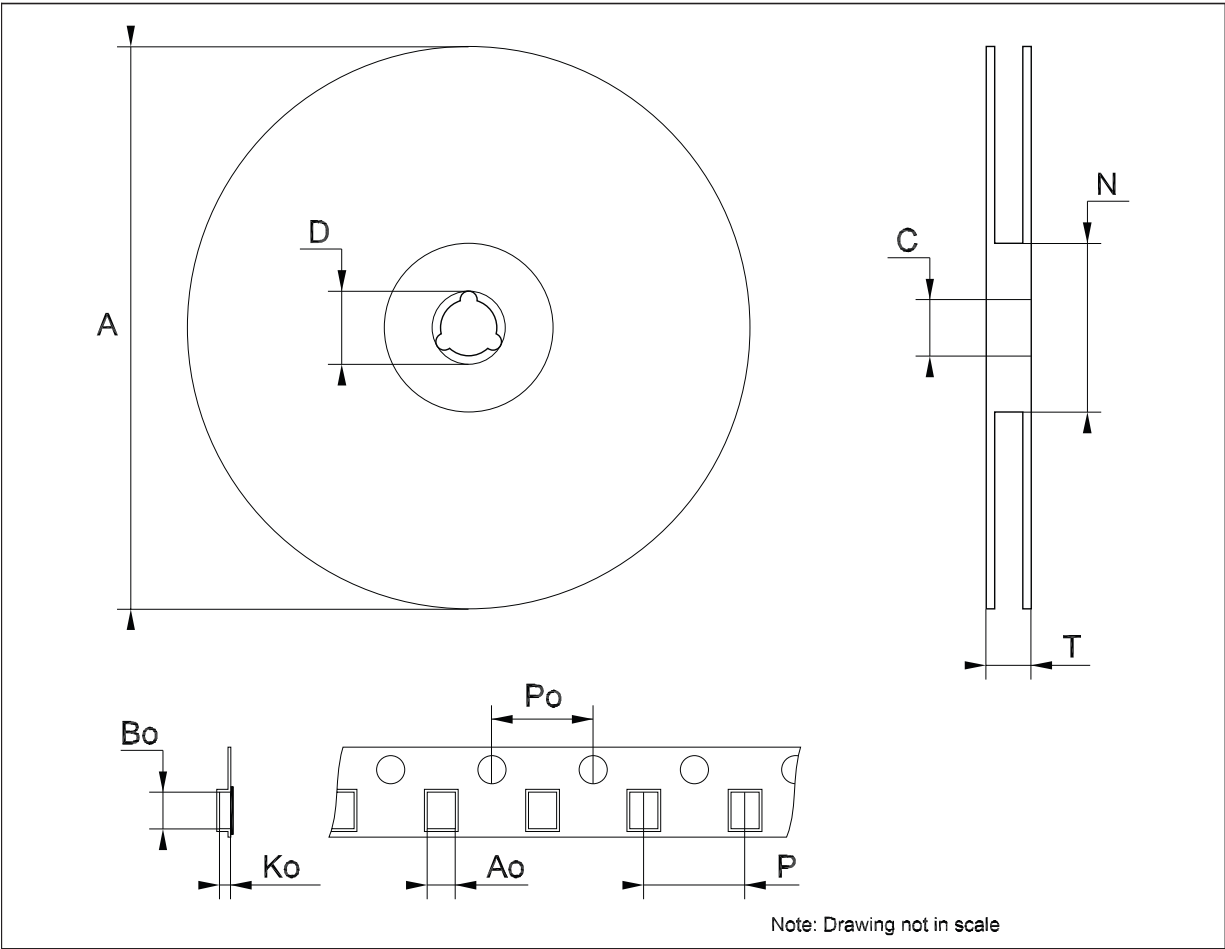
Dim.	mm.			mils.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.45	35.4		57.1
A1	0.00		0.10	0.0		3.9
A2	0.90		1.30	35.4		51.2
b	0.35		0.50	13.7		19.7
C	0.09		0.20	3.5		7.8
D	2.80		3.00	110.2		118.1
E	1.50		1.75	59.0		68.8
e		0.95			37.4	
H	2.60		3.00	102.3		118.1
L	0.10		0.60	3.9		23.6



7049676D

Tape & reel SOT23-xL mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			180			7.086
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			14.4			0.567
Ao	3.13	3.23	3.33	0.123	0.127	0.131
Bo	3.07	3.17	3.27	0.120	0.124	0.128
Ko	1.27	1.37	1.47	0.050	0.054	0.058
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	3.9	4.0	4.1	0.153	0.157	0.161



7 Revision history

Table 5. Document revision history

Date	Revision	Changes
15-Mar-2005	10	Add tape & reel for TO-92.
03-Jul-2006	11	Order codes updated.
16-May-2007	12	Order codes updated.
08-Jun-2007	13	Order codes updated.
09-Apr-2008	14	Modified: Table 1 on page 1 .

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