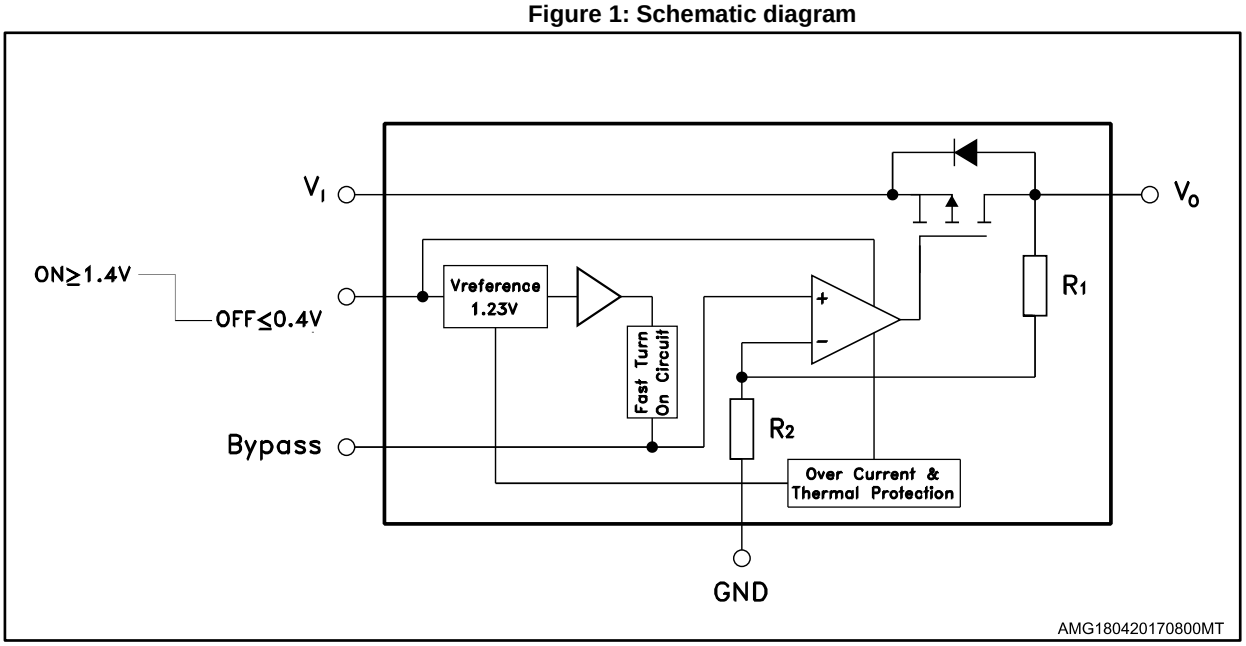
Contents

1 Diagram

Figure 1: Schematic diagram



2 Pin configuration

Figure 2: Pin connections (top view for SOT23-5L, and for DFN6 (3 x 3 mm))

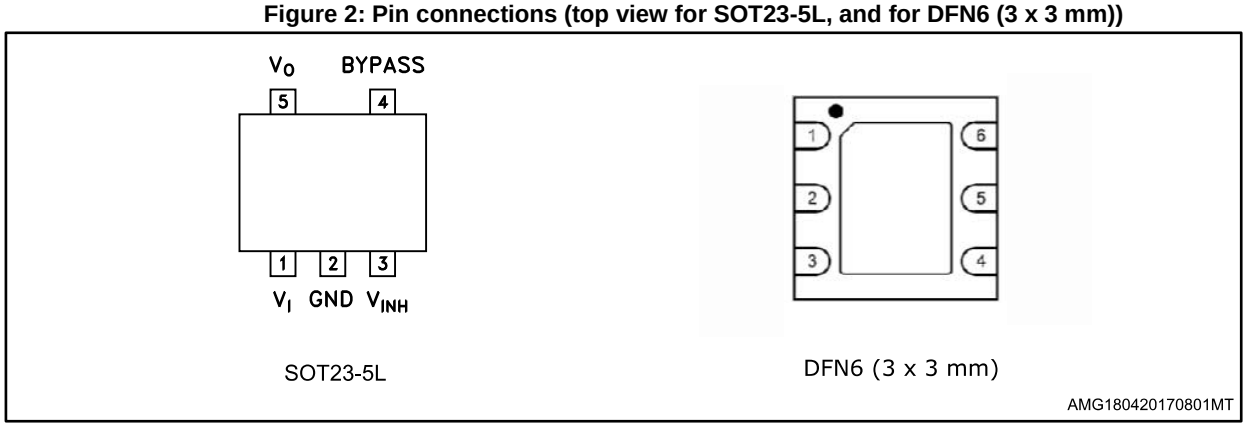


Table 2: Pin description

Pin for SOT23-5L	Pin for DFN6 (3 x 3 mm)	Symbol	Name and function
1	1	V_I	LDO input voltage
2	5	GND	Common ground
3	6	V_{INH}	Inhibit input voltage: ON mode when $V_{INH} \geq 1.2$ V, OFF mode when $V_{INH} \leq 0.4$ V (do not leave it floating; it is not internally pulled down/up)
4	4	Bypass	Bypass pin: an external capacitor to be connected (usually 10 nF) to minimize noise voltage
5	3	V_O	LDO output voltage
-	2	N.C.	Not connected

3 Maximum ratings

Table 3: Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_I	DC input voltage	-0.3 to 6 (1)	V
V_O	DC output voltage	-0.3 to V_I + 0.3	V
V_{INH}	Inhibit input voltage	-0.3 to V_I + 0.3	V
I_O	Output current	Internally limited	
P_D	Power dissipation	Internally limited	
T_{STG}	Storage temperature range	-65 to 150	°C
T_{OP}	Operating junction temperature range	-40 to 125	°C
	Operating junction temperature range, automotive grade version	- 40 to 85	°C

Notes:

(1)The input pin is able to withstand non repetitive spike of 6.5 V for 200 ms.

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

Table 4: Thermal data

Symbol	Parameter	SOT23-5L	DFN6 (3 x 3 mm)	Unit
R_{thJC}	Thermal resistance junction-case	81	10	°C/W
R_{thJA}	Thermal resistance junction-ambient	255	55	°C/W

4 Electrical characteristics

T_J = 25 °C, $V_I = V_{O(NOM)}$ + 0.5 V, C_I = 1 µF, C_O = 2.2 µF, C_{BYP} = 33 nF, I_O = 1 mA, V_{INH} = 1.4 V, unless otherwise specified.

Table 5: LDS3985 electrical characteristics

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_I	Operating input voltage		2.5		6	V
V_O	Output voltage < 2.5 V	I_O = 1 mA	-50		50	mV
		T_J = - 40 to 125 °C	-75		75	
V_O	Output voltage ≥ 2.5 V	I_O = 1 mA	-2		2	% $V_{O(NOM)}$
		T_J= - 40 to 125 °C	-3		3	
ΔV_O	Line regulation (1)	$V_I = V_{O(NOM)}$ + 0.5 to 6 V, T_J = - 40 to 125 °C	-0.1		0.1	%/V
		V_O = 4.7 to 5 V	-0.19		0.19	
ΔV_O	Load regulation	I_O = 1 mA to 300 mA, $V_O \leq$ 2.5 V T_J = - 40 to 125 °C		0.005	0.01	%/mA
ΔV_O	Load regulation	I_O = 1 mA to 300 mA, $V_O \geq$ 2.5 V T_J = - 40 to 125 °C		0.0008	0.004	%/mA
ΔV_O	Output AC line regulation (2)	$V_I = V_{O(NOM)}$ + 1 V, I_O = 300 mA, $t_R = t_F$ = 30 µs		5		mV_{PP}
I_Q	Quiescent current ON mode: V_{INH} = 1.4 V	I_O = 0		85		µA
		I_O = 0, T_J = - 40 to 125 °C			150	
		I_O = 0 to 300 mA		200		
		I_O = 0 to 300 mA, T_J = - 40 to 125 °C			300	
	OFF mode: V_{INH} = 0.4 V			0.003		
		T_J = - 40 to 125 °C			1.5	
V_{DROP}	Dropout voltage (3)	I_O = 1 mA		0.4		mV
		I_O = 1 mA, T_J = - 40 to 125 °C			2	
		I_O = 150 mA		60		
		I_O = 150 mA, T_J = - 40 to 125 °C			100	
		I_O = 300 mA		150		
		I_O = 300 mA, T_J = - 40 to 125 °C			250	

Symbol	Parameter	Test condition		Min.	Typ.	Max.	Unit
I_{SC}	Short-circuit current	R_L = 0			600		mA
SVR	Supply voltage rejection	$V_I = V_{O(NOM)}$+ 0.25 V ± V_{RIPPLE} = 0.1 V, I_O = 50 mA For $V_{O(NOM)}$ < 2.5 V, V_I = 2.55 V	f = 1 kHz		55		dB
			f = 10 kHz		50		
$I_{O(PK)}$	Peak output current	$V_O \geq V_{O(NOM)}$ - 5%		300	550		mA
V_{INH}	Inhibit input logic low	V_I = 2.5 V to 6 V, T_J = - 40 to 125 °C				0.4	V
	Inhibit input logic high			1.4			
I_{INH}	Inhibit input current	V_{INH} = 0.4 V, V_I = 6 V			±1		nA
eN	Output noise voltage	B_W = 10 Hz to 100 kHz, C_O = 2.2 µF			30		μV_{RMS}
t_{ON}	Turn-on time (4)	C_{BYP} = 33 nF			240		µs
T_{SHDN}	Thermal shutdown	(5)			160		°C
C_O	Output capacitor	Capacitance		2.2		22	µF
		ESR		5		5000	mΩ

Notes:

(1)For $V_{O(NOM)}$ < 2 V, V_I = 2.5 V.

(2)For $V_{O(NOM)}$ = 1.25 V, V_I = 2.5 V.

(3)Dropout voltage is the input-to-output voltage difference at which the output voltage is 100 mV below its nominal value. This specification does not apply to input voltages below 2.5 V.

(4)Turn-on time is time measured between the enable input just exceeding V_{INH} high value and the output voltage just reaching 95% of its nominal value.

(5)Typical thermal protection hysteresis is 20 °C.

Table 6: LDS3985 (automotive grade) electrical characteristics

Symbol	Parameter	Test condition		Min.	Typ.	Max.	Unit
V_I	Operating input voltage			2.5		6	V
V_O	Output voltage < 2.5 V	I_O = 1 mA		-50		50	mV
		T_J = - 40 to 85 °C		-75		75	
V_O	Output voltage ≥ 2.5 V	I_O = 1 mA		-2		2	% $V_{O(NOM)}$
		T_J= - 40 to 85 °C		-3		3	
ΔV_O	Line regulation (1)	V_I = $V_{O(NOM)}$ + 0.5 to 6 V, T_J = - 40 to 85 °C		-0.1		0.1	%/V
		V_O = 4.7 to 5 V		-0.19		0.19	
ΔV_O	Load regulation	I_O = 1 mA to 300 mA, V_O ≤ 2.5 V T_J = - 40 to 85 °C			0.005	0.01	%/mA
ΔV_O	Load regulation	I_O = 1 mA to 300 mA, V_O ≥ 2.5 V T_J = - 40 to 85 °C			0.0008	0.004	%/mA
ΔV_O	Output AC line regulation (2)	V_I = $V_{O(NOM)}$ + 1 V, I_O = 300 mA t_R = t_F = 30 µs			5		mV_{PP}
I_Q	Quiescent current ON mode: V_{INH} = 1.4 V	I_O = 0			85		µA
		I_O = 0, T_J = - 40 to 85 °C				150	
		I_O = 0 to 300 mA			200		
		I_O = 0 to 300 mA, T_J = - 40 to 85 °C				300	
	OFF mode: V_{INH} = 0.4 V				0.003		
		T_J = - 40 to 85 °C				1.5	
V_{DROP}	Dropout voltage (3)	I_O = 1 mA			0.4		mV
		I_O = 1 mA, T_J = -40 to 85 °C				2	
		I_O = 150 mA			60		
		I_O = 150 mA, T_J = - 40 to 85 °C				100	
		I_O = 300 mA			150		
		I_O = 300 mA, T_J = - 40 to 85 °C				250	
I_{SC}	Short-circuit current	R_L = 0			600		mA
SVR	Supply voltage rejection	V_I = $V_{O(NOM)}$ + 0.25 V ± V_{RIPPLE} = 0.1 V, I_O = 50 mA For $V_{O(NOM)}$ < 2.5 V V_I = 2.55 V	f = 1 kHz		55		dB
			f = 10 kHz		50		

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$I_{O(PK)}$	Peak output current	$V_O \geq V_{O(NOM)}$ - 5%	300	550		mA
V_{INH}	Inhibit input logic low	V_I = 2.5 V to 6 V, T_J = - 40 to 85 °C			0.4	V
	Inhibit input logic high		1.4			
I_{INH}	Inhibit input current	V_{INH} = 0.4 V, V_I = 6 V		±1		nA
eN	Output noise voltage	B_W = 10 Hz to 100 kHz, C_O = 2.2 µF		30		μV_{RMS}
t_{ON}	Turn-on time (4)	C_{BYP} = 33 nF		240		µs
T_{SHDN}	Thermal shutdown	(5)		160		°C
C_O	Output capacitor	Capacitance	2.2		22	µF
		ESR	5		5000	mΩ

Notes:

(1)For $V_{O(NOM)}$ < 2 V, V_I = 2.5 V.

(2)For $V_{O(NOM)}$ = 1.25 V, V_I = 2.5 V.

(3)Dropout voltage is the input-to-output voltage difference at which the output voltage is 100 mV below its nominal value. This specification does not apply to input voltages below 2.5 V.

(4)Turn-on time is time measured between the enable input just exceeding V_{INH} high value and the output voltage just reaching 95% of its nominal value.

(5)Typical thermal protection hysteresis is 20 °C.

5 Typical performance characteristics

T_J = 25 °C, $V_I = V_{O(NOM)}$ + 0.5 V, C_I = 1 µF, C_O = 2.2 µF, C_{BYP} = 33 nF, I_O = 1 mA, V_{INH} = 1.4 V, unless otherwise specified.

Figure 3: Output voltage vs temperature V_O = 1.35 V

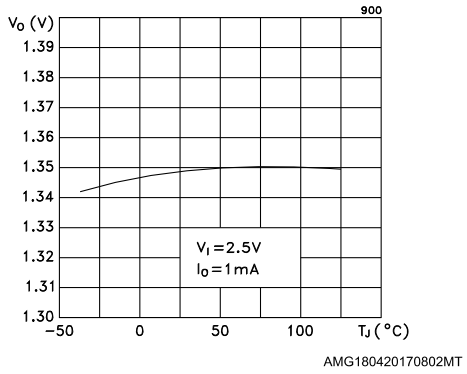


Figure 4: Output voltage vs temperature V_O = 2.8 V

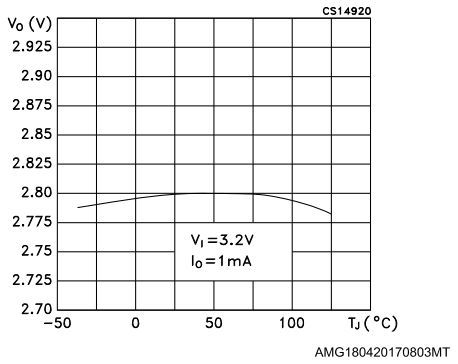


Figure 5: Output voltage vs temperature V_O = 3.3 V

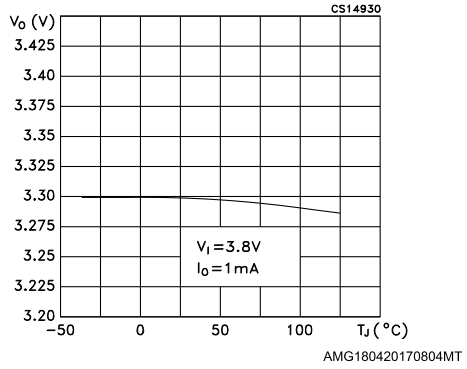


Figure 6: Inhibit voltage vs temperature V_O = 1.35 V

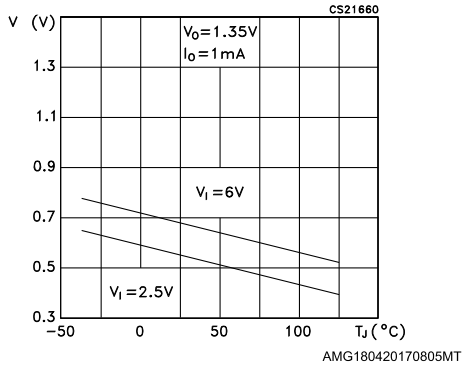


Figure 7: Inhibit voltage vs temperature (V_O = 3.3 V)

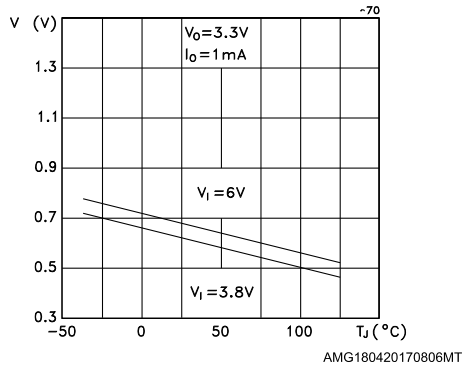


Figure 8: Line regulation vs temperature (V_I = 2.5 V to 6 V)

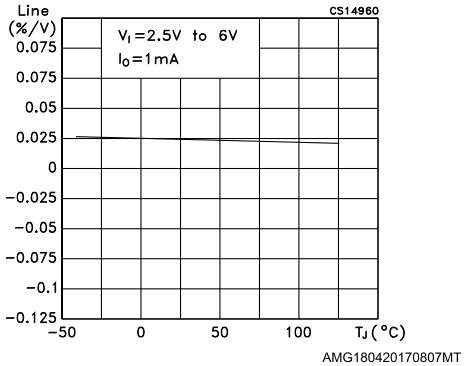


Figure 9: Line regulation vs temperature (V_I = 3.2 V to 6 V)

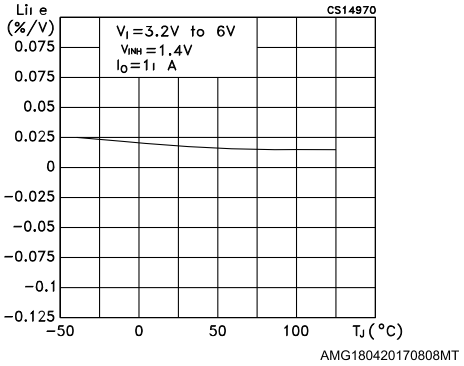


Figure 10: Line regulation vs temperature (V_I = 3.8 V to 6 V)

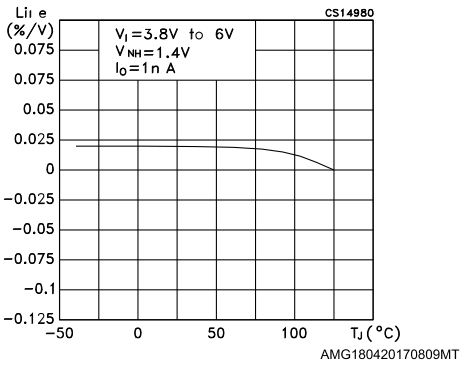


Figure 11: Quiescent current vs temperature (V_I = 2.5 V)

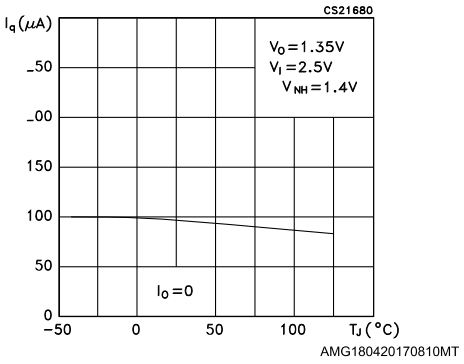


Figure 12: Quiescent current vs temperature (V_I = 6 V)

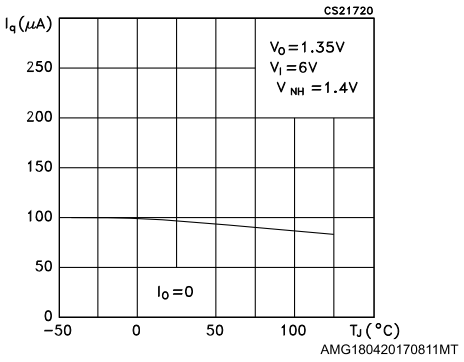


Figure 13: Quiescent current vs temperature (V_I = 3.4 V)

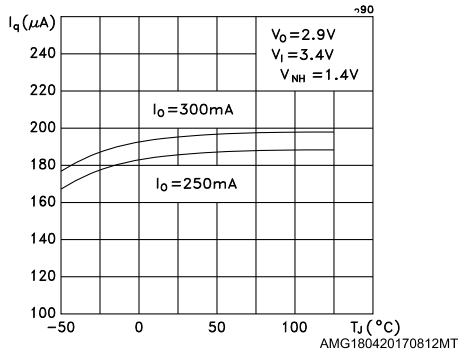


Figure 14: Supply voltage rejection vs frequency

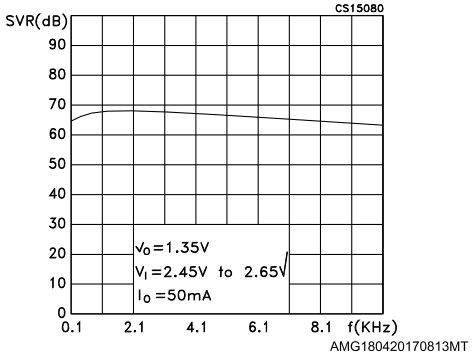


Figure 15: Dropout voltage vs temperature

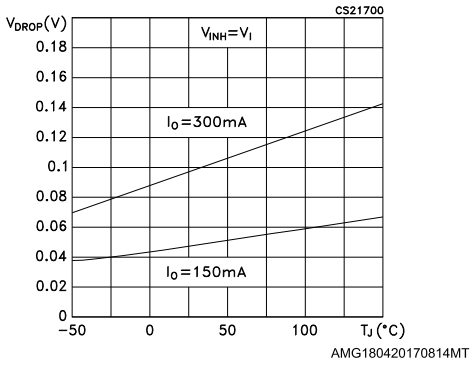


Figure 16: Dropout voltage vs output current

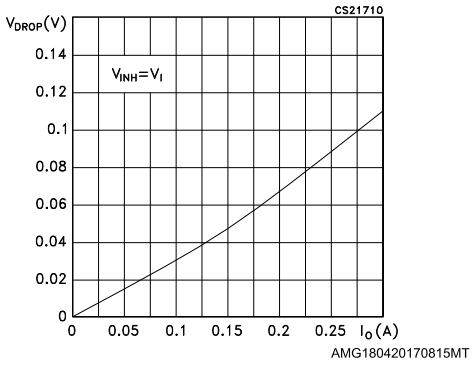
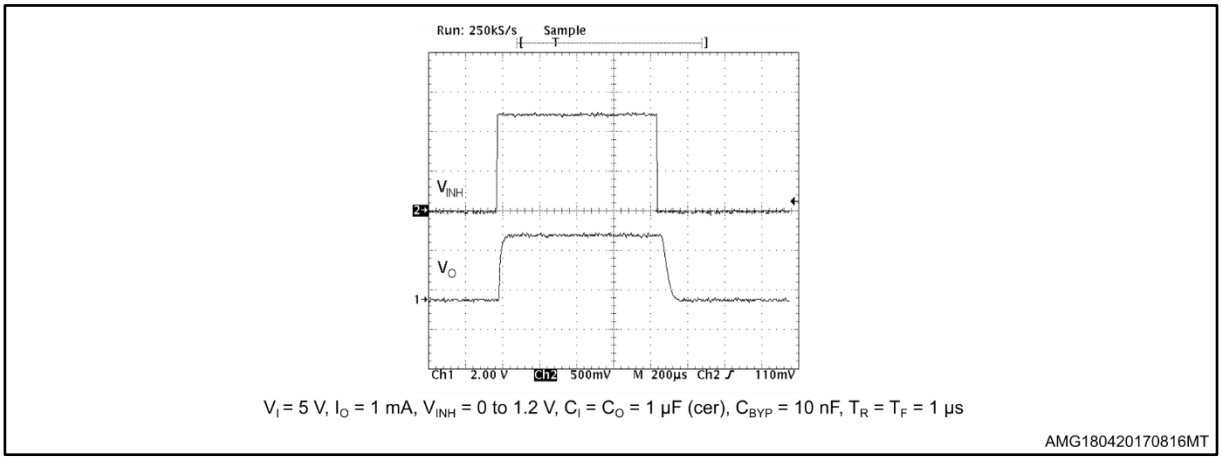


Figure 17: Inhibit transient



6 Package information

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***. ECOPACK® is an ST trademark.

6.1 SOT23-5L package information

Figure 18: SOT23-5L package outline

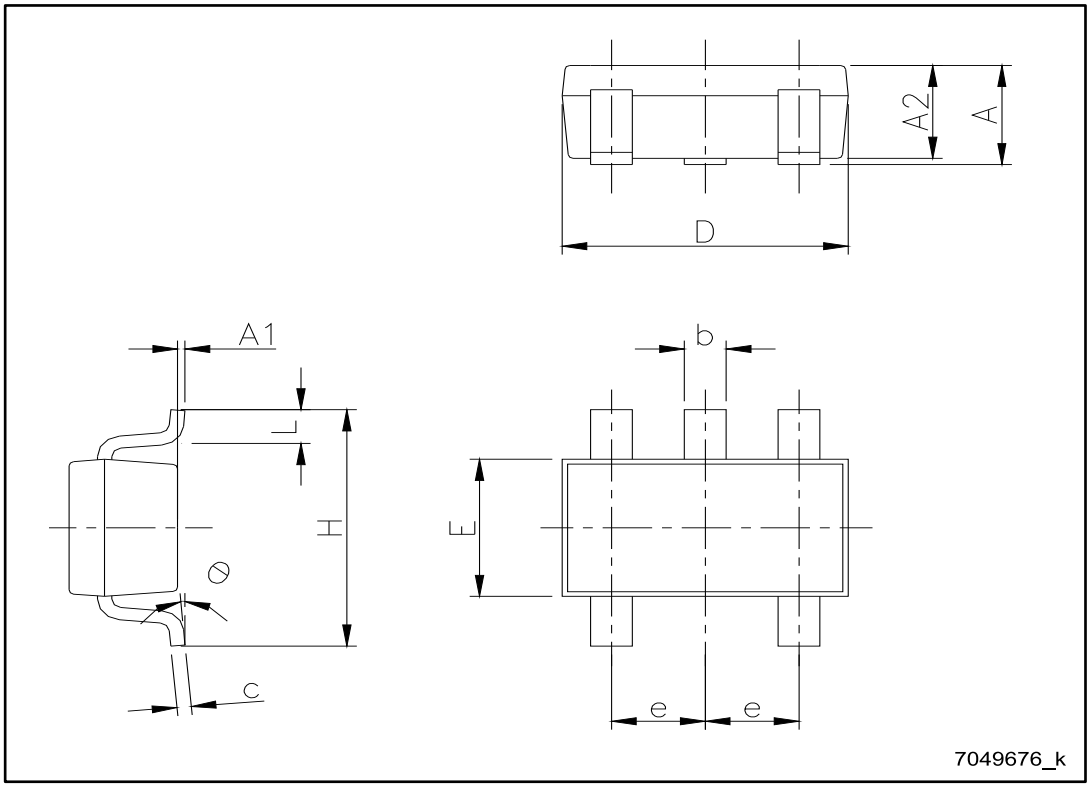
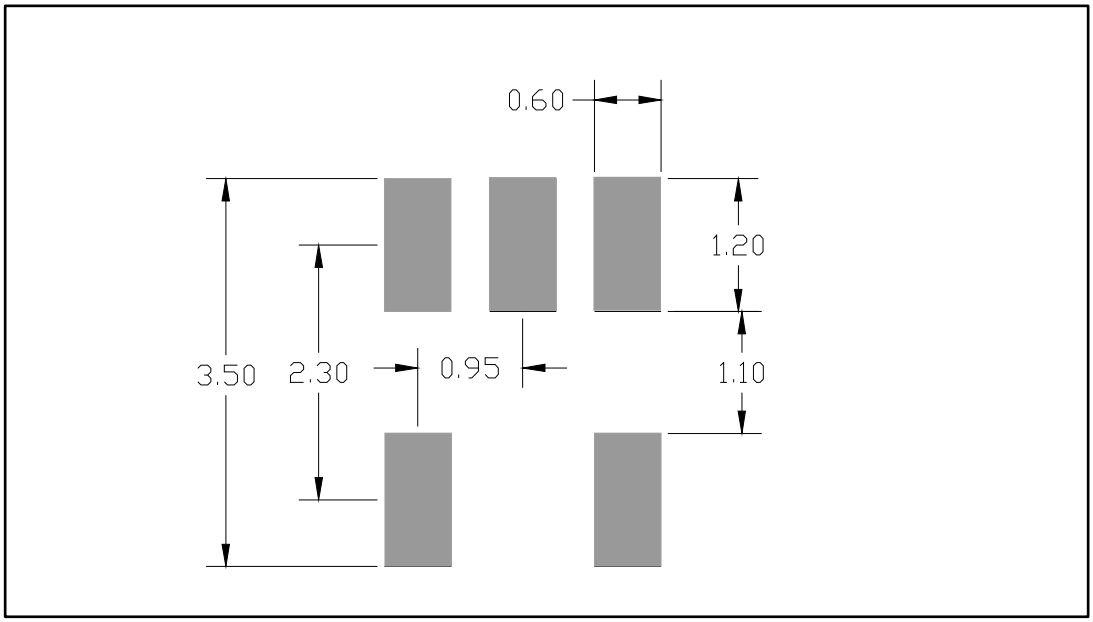


Table 7: SOT23-5L package mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.90		1.45
A1	0		0.15
A2	0.90		1.30
b	0.30		0.50
c	0.09		0.20
D		2.95	
E		1.60	
e		0.95	
H		2.80	
L	0.30		0.60
θ	0°		8°

Figure 19: SOT23-5L recommended footprint



Dimensions are in mm

6.2 SOT23-5L packing information

Figure 20: SOT23-5L tape and reel outline

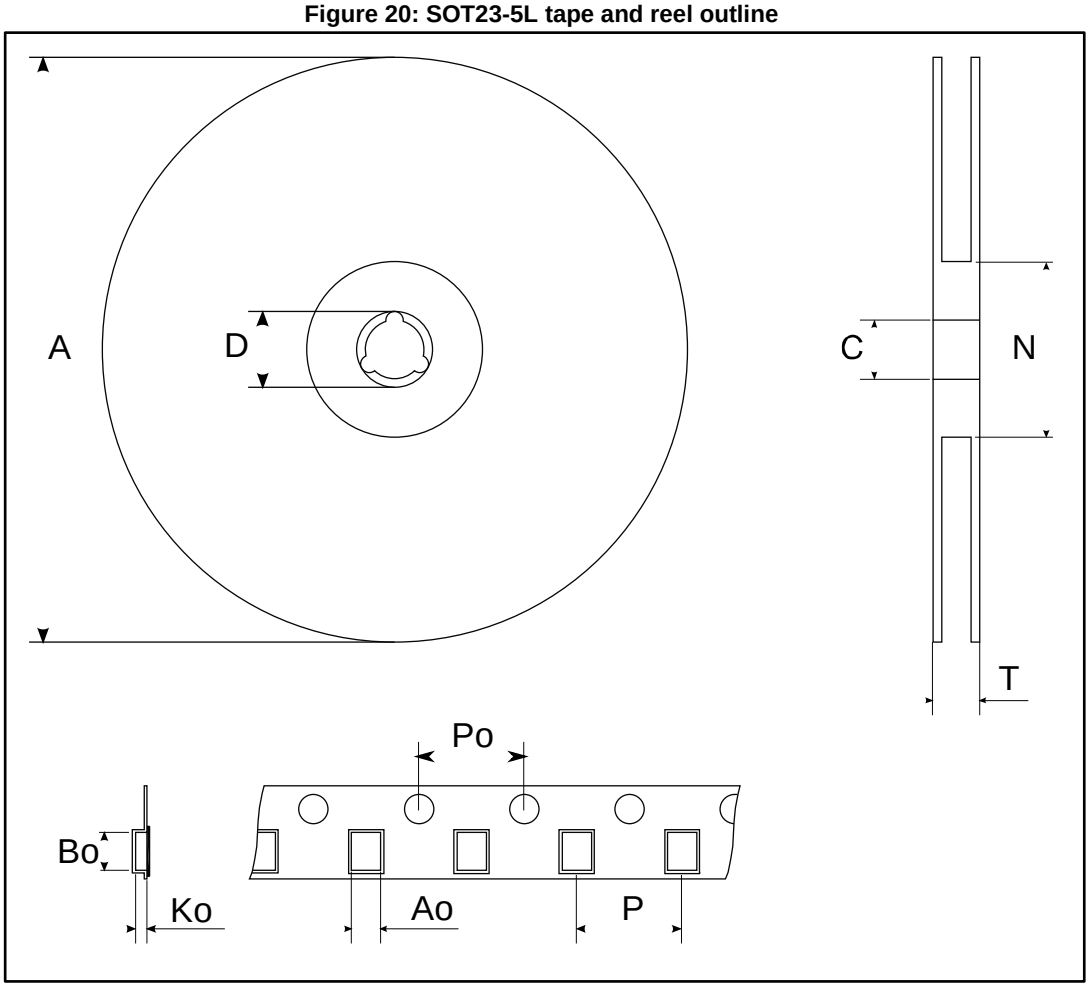


Table 8: SOT23-5L tape and reel mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A			180
C	12.8	13.0	13.2
D	20.2		
N	60		
T			14.4
Ao	3.13	3.23	3.33
Bo	3.07	3.17	3.27
Ko	1.27	1.37	1.47
Po	3.9	4.0	4.1
P	3.9	4.0	4.1

6.3 DFN6 (3 x 3 mm) package information

Figure 21: DFN6 (3 x 3 mm) package outline

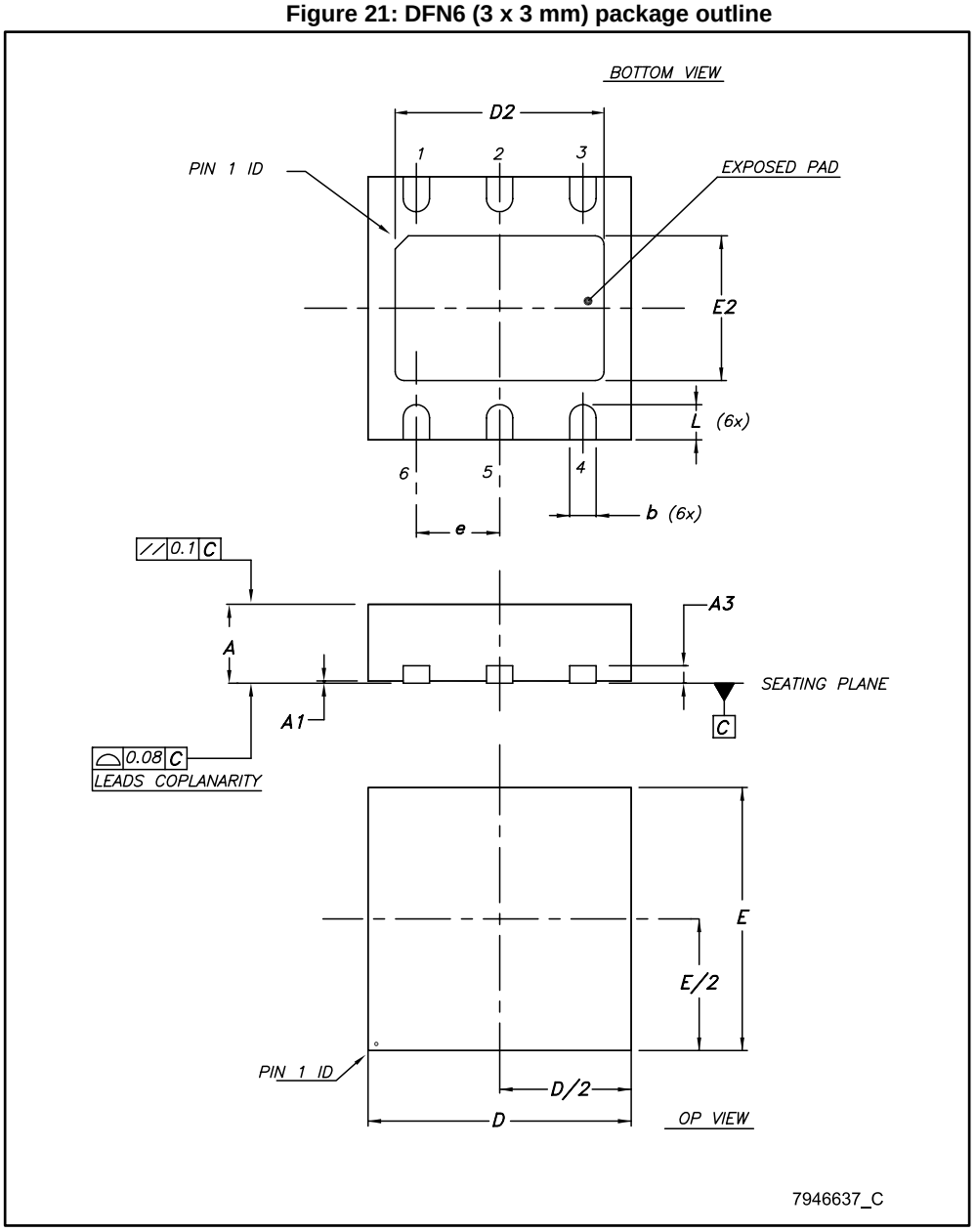
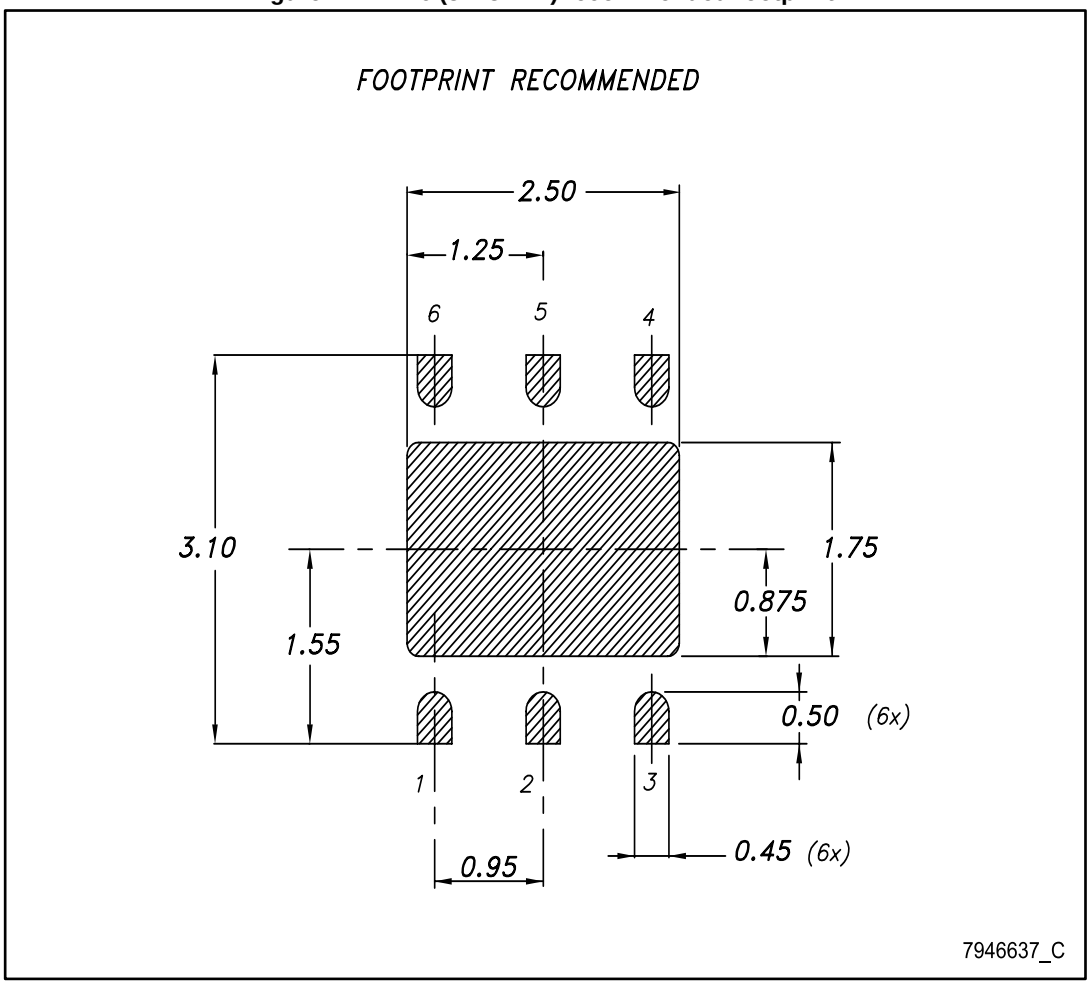


Table 9: DFN6 (3 x 3 mm) mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.80		1
A1	0	0.02	0.05
A3		0.20	
b	0.23		0.45
D	2.90	3	3.10
D2	2.23		2.50
E	2.90	3	3.10
E2	1.50		1.75
e		0.95	
L	0.30	0.40	0.50

Figure 22: DFN6 (3 x 3 mm) recommended footprint



6.4 DFN6 (3 x 3 mm) packing information

Figure 23: DFN6 (3 x 3 mm) tape outline

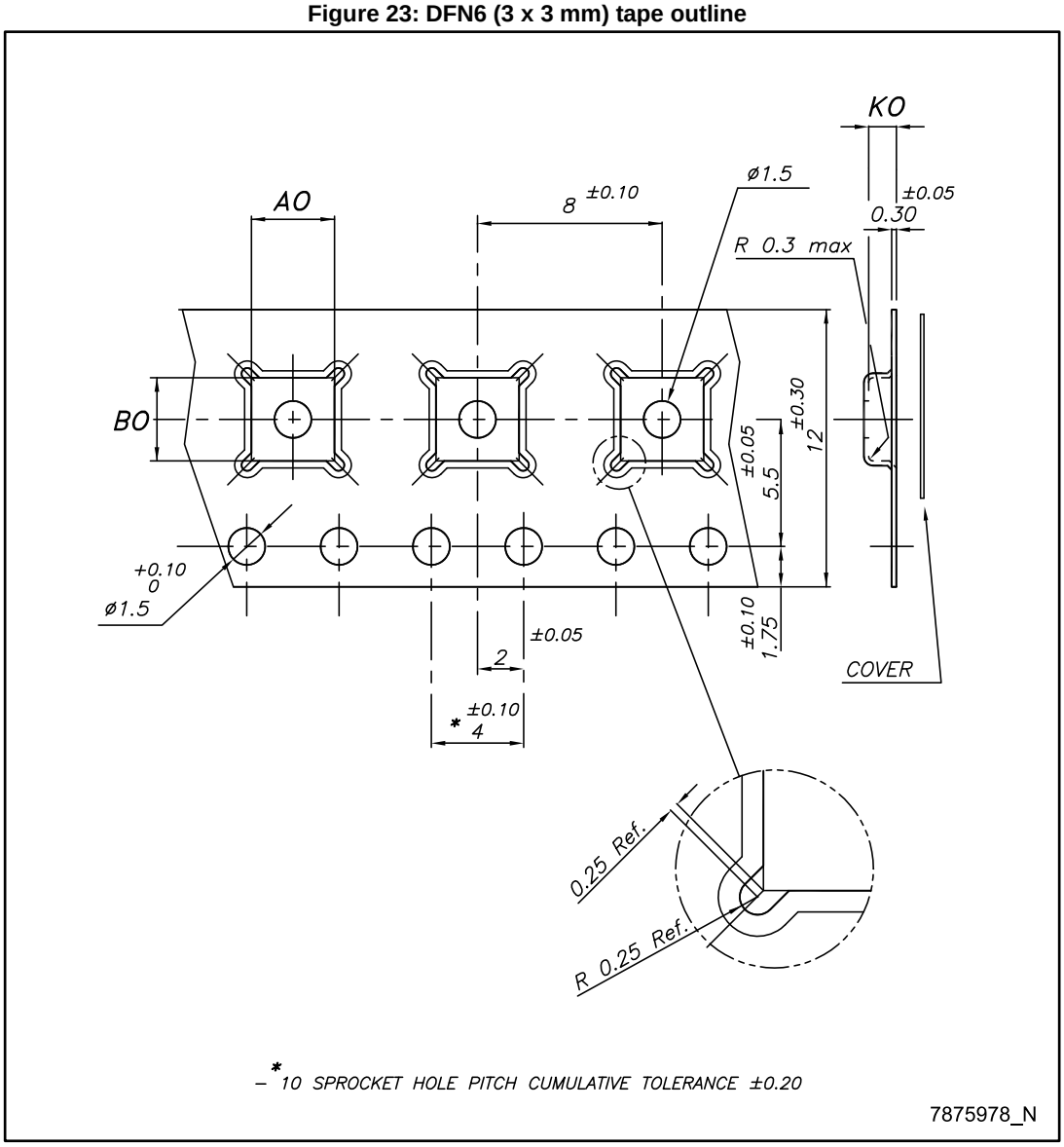


Figure 24: DFN6 (3 x 3 mm) reel outline

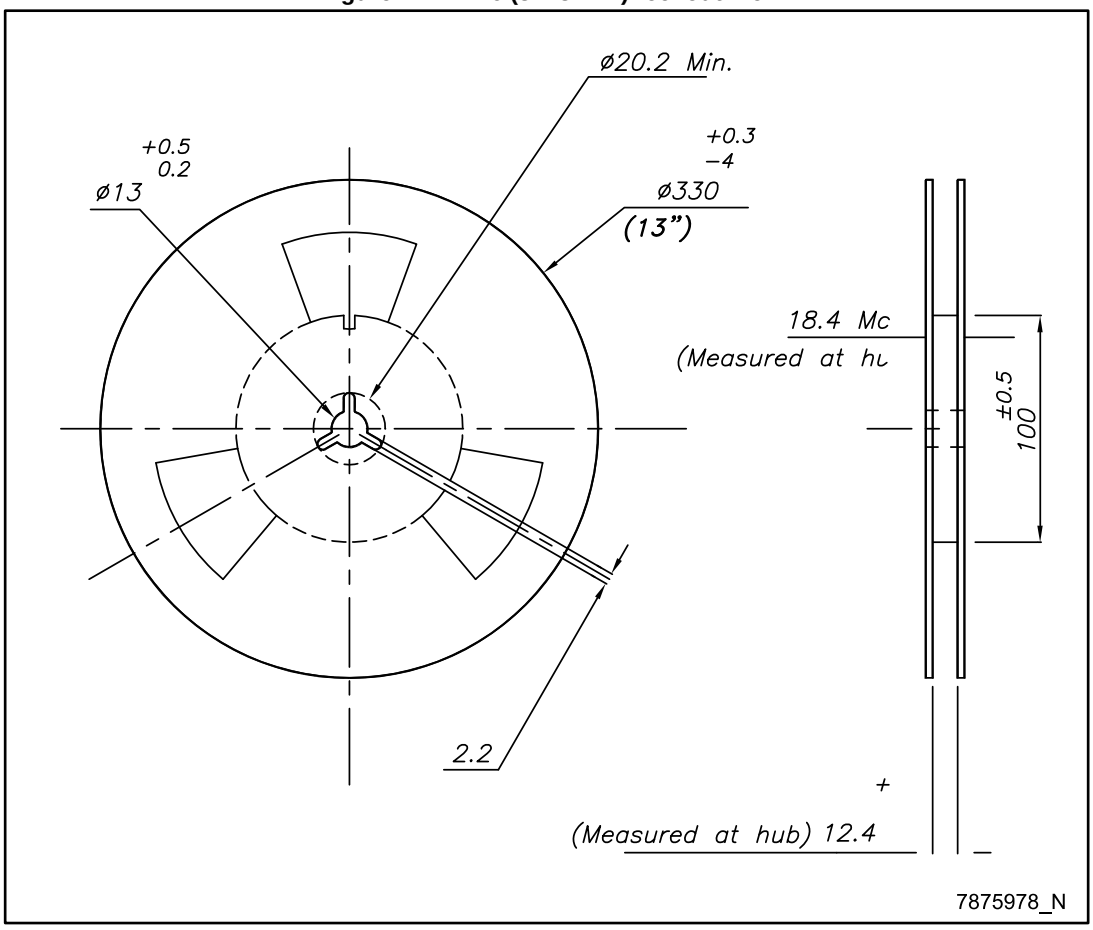


Table 10: DFN6 (3 x 3 mm) tape and reel mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A0	3.20	3.30	3.40
B0	3.20	3.30	3.40
K0	1	1.10	1.20

7 Revision history

Table 11: Document revision history

Date	Revision	Changes
02-Dec-2004	1	First release.
10-Apr-2007	2	Added: new package TSOT23-5L.
16-May-2007	3	Added: new mechanical data DFN6D and order codes updated.
06-Sep-2007	4	Added: Table 1 in cover page.
11-Jun-2008	5	Modified: not found.
11-Jul-2009	6	Modified: not found.
29-Jul-2010	7	Modified: not found and not found.
24-Oct-2013	8	Modified the Title and the Features in cover page. Deleted Table1: Device summary. Updated not found and not found. Added and not found. Minor text changes.
28-Feb-2014	9	Modified the Title and the Features in cover page. Deleted Table1: Device summary. Updated Table 10: Order codes and Section 6: Package mechanical data. Added Table 6: LDS3985 (automotive grade) electrical characteristics and Section 7: Packaging mechanical data. Minor text changes.
03-May-2017	10	Updated *Table 1: "Device summary"*. Minor text changes.

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