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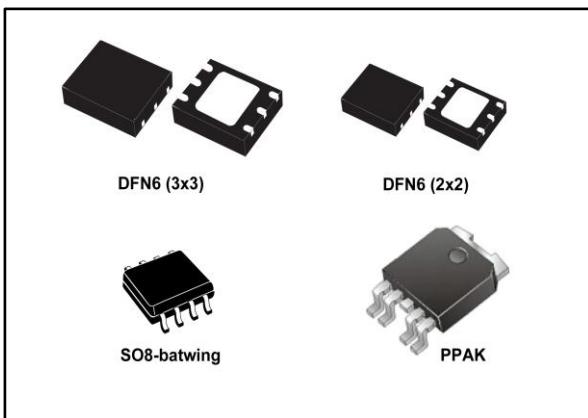
sales@integrated-circuit.com



LDL112

1.2 A low quiescent current LDO with reverse current protection

Datasheet - production data



Features

- Input voltage from 1.6 to 5.5 V
- Very low-dropout voltage (300 mV typ. at 1 A load)
- Low quiescent current (35 µA typ. at no-load, 1 µA max. in off mode)
- Output voltage tolerance: $\pm 2.0\%$ at 25 °C
- 1.2 A guaranteed output current
- Wide range of output voltages available on request: 0.8 V to 5 V with 50 mV step and adjustable
- Logic-controlled electronic shutdown
- Compatible with ceramic capacitor $C_{OUT} = 1 \mu F$
- Internal current and thermal limit
- Available in DFN6 (2x2), DFN6 (3x3) mm, SO8-batwing and PPAK packages
- Temperature range: -40 °C to 125 °C
- Reverse current protection
- Output discharge function (optional)

Applications

- Consumer
- Computer
- Battery-powered systems
- Low voltage point-of-load
- USB-powered devices

Description

The LDL112 is a low-dropout linear regulator, which can provide a maximum current of 1.2 A, with a typical dropout voltage of 300 mV.

It is stabilized with a ceramic capacitor on the output.

The very low drop voltage, low quiescent current and reverse current protection features make it suitable for low power battery-powered applications.

The enable logic control function puts the LDL112 in shutdown mode allowing a total current consumption lower than 1 µA.

The device is equipped with current limit and thermal protection.

Contents**LDL112****Contents**

1	Diagram	5
2	Pin configuration	6
3	Typical application	7
4	Maximum ratings	8
5	Electrical characteristics	9
6	Application information	11
6.1	Thermal and short-circuit protections	11
6.2	Output voltage setting for ADJ version	11
6.3	Reverse current protection	12
7	Typical performance characteristics	13
8	Package information	17
8.1	DFN6 (3x3) package information	18
8.2	DFN6 (3x3) packing information	20
8.3	DFN6 (2x2) package information	22
8.4	DFN6 (2x2) packing information	25
8.5	SO8-batwing package information	26
8.6	SO8-batwing packing information	28
8.7	PPAK package information	29
8.8	PPAK packing information	31
9	Ordering information	33
10	Revision history	34

LDL112**List of tables****List of tables**

Table 1: Pin description	6
Table 2: Absolute maximum ratings	8
Table 3: Thermal data.....	8
Table 4: LDL112 electrical characteristics (fixed version)	9
Table 5: LDL112 electrical characteristics (adjustable version)	10
Table 6: DFN6 (3x3) mechanical data	19
Table 7: DFN6 (3x3) tape and reel mechanical data.....	21
Table 8: DFN6 (2x2) mechanical data	23
Table 9: DFN6 (2x2) tape and reel mechanical data.....	25
Table 10: SO8-batwing mechanical data.....	26
Table 11: SO8-batwing mechanical data..	28
Table 12: PPAK mechanical data	30
Table 13: PPAK mechanical data	32
Table 14: Order codes	33
Table 15: Document revision history	34

List of figures
LDL112
List of figures

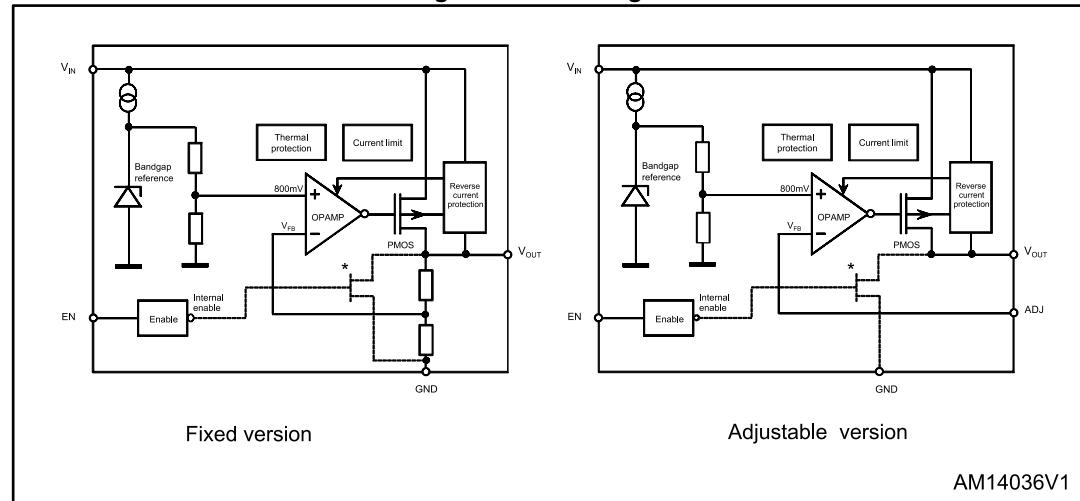
Figure 1: Block diagram	5
Figure 2: Pin connection DFN6 (3x3) and DFN6 (2x2) (top view)	6
Figure 3: Pin connection PPAK and SO8 (top view)	6
Figure 4: Typical application circuits	7
Figure 5: Output voltage vs temperature ($V_{OUT} = 3.3 \text{ V}$, $I_{OUT} = 5 \text{ mA}$)	13
Figure 6: Output voltage vs temperature ($V_{OUT} = 3.3 \text{ V}$, $I_{OUT} = 1.2 \text{ A}$)	13
Figure 7: Output voltage vs temperature ($V_{OUT} = V_{ADJ}$, $I_{OUT} = 5 \text{ mA}$)	13
Figure 8: Output voltage vs temperature ($V_{OUT} = V_{ADJ}$, $I_{OUT} = 1.2 \text{ A}$)	13
Figure 9: Line regulation vs temperature	13
Figure 10: Load regulation vs temperature	13
Figure 11: Quiescent current vs temperature ($I_{OUT} = 0 \text{ mA}$)	14
Figure 12: Quiescent current vs temperature ($I_{OUT} = 1.2 \text{ A}$)	14
Figure 13: Shutdown current vs temperature	14
Figure 14: Quiescent current vs load current	14
Figure 15: Dropout voltage vs temperature ($I_{OUT} = 600 \text{ mA}$)	14
Figure 16: Dropout voltage vs temperature ($I_{OUT} = 1.2 \text{ A}$)	14
Figure 17: Dropout voltage vs load current	15
Figure 18: Short-circuit current vs input voltage	15
Figure 19: Enable thresholds vs temperature	15
Figure 20: SVR vs frequency	15
Figure 21: Output noise spectral density	15
Figure 22: Stability plan vs C_{out} , ESR	15
Figure 23: Line transient	16
Figure 24: Load transient	16
Figure 25: Enable transient	16
Figure 26: Turn-on time	16
Figure 27: DFN6 (3x3) package outline	18
Figure 28: DFN6 (3x3) recommended footprint	19
Figure 29: DFN6 (3x3) tube outline	20
Figure 30: DFN6 (3x3) reel outline	21
Figure 31: DFN6 (2x2) package outline	22
Figure 32: DFN (2x2) recommended footprint	24
Figure 33: DFN6 (2x2) reel outline	25
Figure 34: SO8-batwing package outline	26
Figure 35: SO8-batwing recommended footprint	27
Figure 36: SO8-batwing tape and reel outline	28
Figure 37: PPAK package outline	29
Figure 38: PPAK tape outline	31
Figure 39: PPAK reel outline	31

LDL112

Diagram

1 Diagram

Figure 1: Block diagram



(*) The output discharge function is optional.

Pin configuration

LDL112

2 Pin configuration

Figure 2: Pin connection DFN6 (3x3) and DFN6 (2x2) (top view)

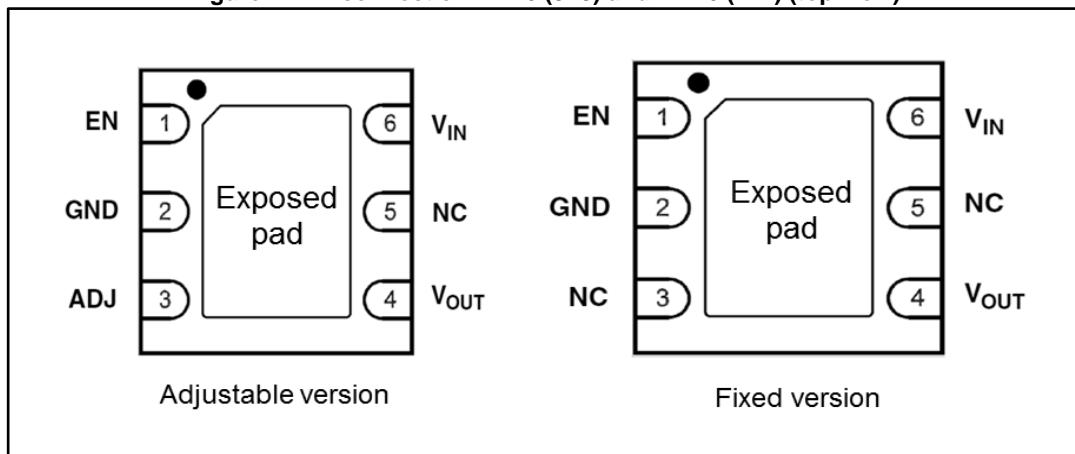


Figure 3: Pin connection PPAK and SO8 (top view)

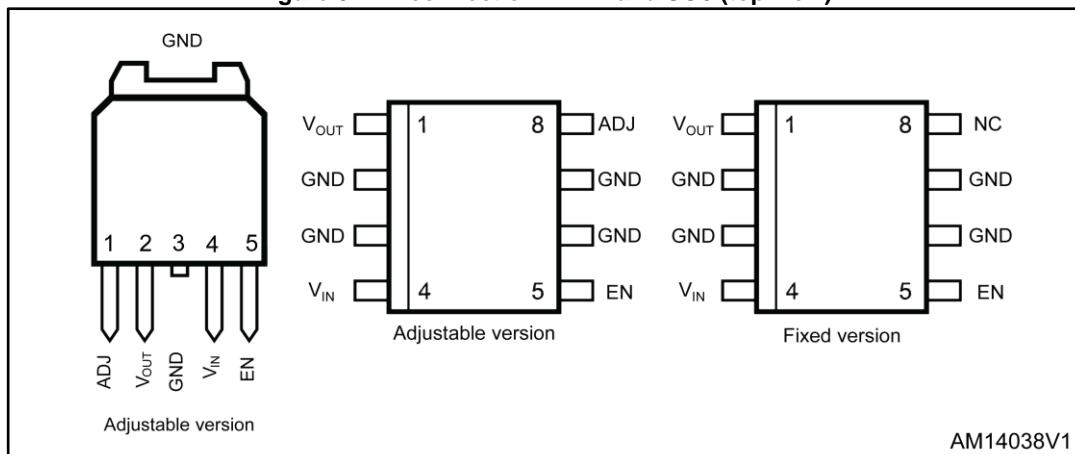


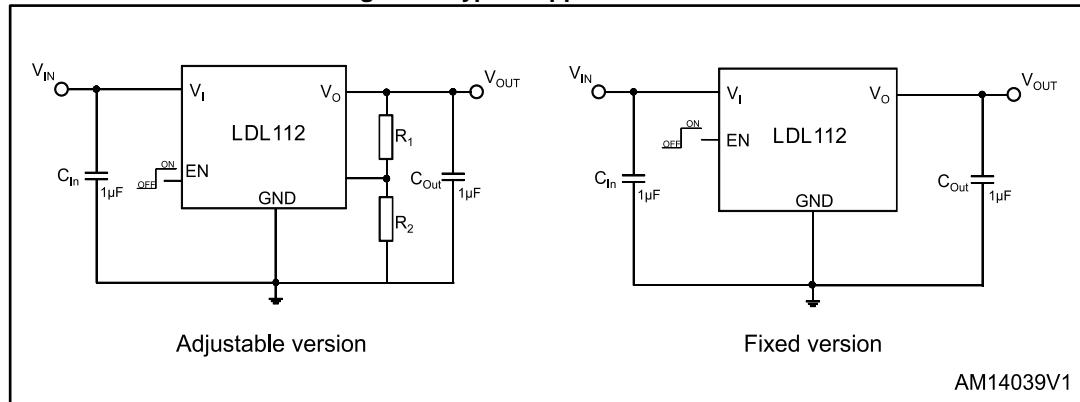
Table 1: Pin description

Symbol	Function
V _{IN}	LDO input voltage
GND	Common ground
EN	Enable pin logic input: low = shutdown, high = active
ADJ	Adjustable pin (on adjustable version)
V _{OUT}	LDO output voltage
Exposed pad	Must be connected to GND
NC	Not connected

LDL112**Typical application**

3 Typical application

Figure 4: Typical application circuits



Maximum ratings

LDL112

4 Maximum ratings

Table 2: Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{IN}	DC input voltage	- 0.3 to 7	V
V_{OUT}	DC output voltage	- 0.3 to $V_I + 0.3$	V
V_{EN}	Enable input voltage	- 0.3 to $V_I + 0.3$	V
V_{ADJ}	ADJ pin voltage	2	V
I_{OUT}	Output current	Internally limited	mA
P_D	Power dissipation	Internally limited	mW
T_{STG}	Storage temperature range	- 65 to 150	°C
T_{OP}	Operating junction temperature range	- 40 to 125	°C



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

Table 3: Thermal data

Symbol	Parameter	DFN6 (3x3)	DFN6 (2x2)	SO8	PPAK	Unit
R_{thJA}	Thermal resistance junction-ambient	55	65	55 ⁽¹⁾	100	°C/W
R_{thJC}	Thermal resistance junction-case	10	15	20	8	°C/W

Notes:

⁽¹⁾Considering 6 cm² of copper board heatsink.

LDL112

Electrical characteristics

5 Electrical characteristics

$T_J = 25^\circ\text{C}$, $V_{IN} = V_{OUT(NOM)} + 0.5 \text{ V}$ (for $V_{OUT(NOM)} \leq 1 \text{ V}$, $V_{IN} = 2.1 \text{ V}$), $C_{IN} = C_{OUT} = 1 \mu\text{F}$,
 $I_{OUT} = 5 \text{ mA}$, $V_{EN} = V_{IN}$, unless otherwise specified.

Table 4: LDL112 electrical characteristics (fixed version)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{IN}	Operating input voltage		1.6		5.5	V
V_{OUT}	V_{OUT} accuracy	$I_{OUT} = 5 \text{ mA}$, $T_J = 25^\circ\text{C}$	-2.0		2.0	%
		$I_{OUT} = 5 \text{ mA}$, $-40^\circ\text{C} < T_J < 125^\circ\text{C}$	-3.0		3.0	%
ΔV_{OUT}	Static line regulation ⁽¹⁾	$V_{OUT(NOM)} + 0.5 \text{ V} < V_{IN} \leq 5.5 \text{ V}$ ⁽²⁾		0.05	0.1	%/V
ΔV_{OUT}	Static load regulation	$I_{OUT} = 0 \text{ mA}$ to 1.2 A , $V_{IN} > 2.1 \text{ V}$		15	30	mV
V_{DROP}	Dropout voltage ⁽³⁾	$I_{OUT} = 1 \text{ A}$, $V_{OUT} = 3.3 \text{ V}$	300			
		$I_{OUT} = 1.2 \text{ A}$, $V_{OUT} = 3.3 \text{ V}$ $40^\circ\text{C} < T_J < 125^\circ\text{C}$		350	600	mV
e_N	Output noise voltage	10 Hz to 100 kHz , $I_{OUT} = 10 \text{ mA}$		135		μV_{RMS}
SVR	Supply voltage rejection	$V_{IN} = V_{OUT(NOM)} + 0.5 \text{ V}$ ⁽²⁾ +/- V_{RIPPLE} $V_{\text{RIPPLE}} = 0.2 \text{ V}$ $f = 1 \text{ kHz}$ $I_{OUT} = 10 \text{ mA}$		57		dB
I_Q	Quiescent current	$I_{OUT} = 0 \text{ mA}$, $-40^\circ\text{C} < T_J < 125^\circ\text{C}$	35	70		
		$I_{OUT} = 1.2 \text{ A}$, $V_{OUT(NOM)} + 1 \text{ V}$ ⁽²⁾ $40^\circ\text{C} < T_J < 125^\circ\text{C}$		250	400	μA
		V_{IN} input current in off mode: $V_{EN} = \text{GND}$		0.1	1	
I_{SC}	Short-circuit current	$R_L = 0$, $V_{IN} > 2.1 \text{ V}$	1.4	2		A
V_{EN}	Enable input logic low	$V_{IN} = V_{OUT(NOM)} + 0.5 \text{ V}$ ⁽²⁾ to 5.5 V $-40^\circ\text{C} < T_J < 125^\circ\text{C}$			0.35	
	Enable input logic high	$V_{IN} = V_{OUT(NOM)} + 0.5 \text{ V}$ ⁽²⁾ to 5.5 V $-40^\circ\text{C} < T_J < 125^\circ\text{C}$	1.4			V
I_{EN}	Enable pin input current	$V_{EN} = V_{IN}$			100	nA
T_{SHDN}	Thermal shutdown			165		$^\circ\text{C}$
	Hysteresis			20		
C_{OUT}	Output capacitor	Capacitance (see <i>Section 7: "Typical performance characteristics"</i>)	1		10	μF

Notes:

⁽¹⁾Not applicable for $V_{out(nom)} > 4.5 \text{ V}$.

⁽²⁾For V_{OUTNOM} lower than or equal to 1 V , $V_{IN} = 2.1 \text{ V}$.

⁽³⁾Dropout voltage is the input-to-output voltage difference at which the output voltage is 100 mV below its nominal value.

Electrical characteristics

LDL112

$T_J = 25^\circ\text{C}$, $V_{IN} = 2.1 \text{ V}$, $C_{IN} = C_{OUT} = 1 \mu\text{F}$, $I_{OUT} = 5 \text{ mA}$, $V_{EN} = V_{IN}$, unless otherwise specified.

Table 5: LDL112 electrical characteristics (adjustable version)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{IN}	Operating input voltage		1.6		5.5	V
V_{ADJ}	V_{ADJ} accuracy	$I_{OUT} = 5 \text{ mA}$, $T_J = 25^\circ\text{C}$	784	800	816	mV
		$I_{OUT} = 5 \text{ mA}$, $-40^\circ\text{C} < T_J < 125^\circ\text{C}$	-3.0		3.0	%
ΔV_{OUT}	Static line regulation ⁽¹⁾	2.1 V ⁽²⁾ $\leq V_{IN} \leq 5.5 \text{ V}$, $I_{OUT} = 1 \text{ mA}$		0.05	0.1	%/V
ΔV_{OUT}	Static load regulation	$I_{OUT} = 0 \text{ mA}$ to 1.2 A , $V_{IN} > 2.1 \text{ V}$		6	20	mV
V_{DROP}	Dropout voltage ⁽³⁾	$I_{OUT} = 1 \text{ A}$, $V_{OUT} = 3.3 \text{ V}$		300		mV
		$I_{OUT} = 1.2 \text{ A}$, $V_{OUT} = 3.3 \text{ V}$ $40^\circ\text{C} < T_J < 125^\circ\text{C}$		350	600	
e_N	Output noise voltage	10 Hz to 100 kHz, $I_{OUT} = 10 \text{ mA}$		60		μVRMS
I_{ADJ}	Adjust pin current			0.130	1	μA
SVR	Supply voltage rejection	$V_{IN} = V_{OUTNOM} + 0.5 \text{ V}$ ⁽²⁾ +/- V_{RIPPLE} $V_{RIPPLE} = 0.2 \text{ V}$ $f = 1 \text{ kHz}$ $I_{OUT} = 10 \text{ mA}$		53		dB
I_Q	Quiescent current	$I_{OUT} = 0 \text{ mA}$ $-40^\circ\text{C} < T_J < 125^\circ\text{C}$		35	70	μA
		$I_{OUT} = 1.2 \text{ A}$, $2.1 \text{ V} < V_{IN} < 5.5 \text{ V}$ $-40^\circ\text{C} < T_J < 125^\circ\text{C}$		240	400	
		V_{IN} input current in off mode: $V_{EN} = \text{GND}$		0.1	1	
I_{SC}	Short-circuit current	$R_L = 0$, $V_{IN} > 2.1 \text{ V}$	1.4	2		A
V_{EN}	Enable input logic low	$V_{IN} = 2 \text{ V}$ ⁽²⁾ to 5.5 V $-40^\circ\text{C} < T_J < 125^\circ\text{C}$		0	0.35	V
	Enable input logic high	$V_{IN} = 2 \text{ V}$ ⁽²⁾ to 5.5 V $-40^\circ\text{C} < T_J < 125^\circ\text{C}$	1.4			
I_{EN}	Enable pin input current	$V_{EN} = V_{IN}$			100	nA
T_{SHDN}	Thermal shutdown			165		$^\circ\text{C}$
	Hysteresis			20		
C_{OUT}	Output capacitor	Capacitance (see <i>Section 7: "Typical performance characteristics"</i>)	1		10	μF

Notes:

⁽¹⁾Not applicable for $V_{out(nom)} > 4.5 \text{ V}$.

⁽²⁾For V_{OUT} lower than or equal to 1 V , $V_{IN} = 2.1 \text{ V}$.

⁽³⁾Dropout voltage is the input-to-output voltage difference at which the output voltage is 100 mV below its nominal value.

6 Application information

6.1 Thermal and short-circuit protections

The LDL112 is self-protected from short-circuit condition and overtemperature. When the output load is higher than the one supported by the device, the output current increases until the limit of typically 2 A is reached, at this point the current is kept constant even when the load impedance is zero.

Thermal protection acts when the junction temperature reaches 165 °C, therefore the IC shuts down. As soon as the junction temperature falls again below the thermal hysteresis value the device starts working again.

In order to calculate the maximum power that the device can dissipate, keeping the junction temperature below the T_{OP} , the following formula is used:

Equation 1

$$P_{DMAX} = (125 - T_{AMB}) / R_{THJA}$$

6.2 Output voltage setting for ADJ version

In the adjustable version, the output voltage can be set from 0.8 V up to the input voltage minus the voltage drop across the pass transistor (dropout voltage), by connecting a resistor divider between the ADJ pin and the output, thus allowing remote voltage sensing.

The resistor divider could be selected by the following equation:

Equation 2

$$V_{OUT} = V_{ADJ} \left(1 + R1 / R2\right), \text{ with } V_{ADJ} = 0.8 \text{ V (typ.)}$$

It is recommended to use resistors with values in the range of 10 kΩ to 50 kΩ. Lower values can also be suitable, but current consumption increases.

Application informationLDL112

6.3 Reverse current protection

The device avoids the reverse current to flow from output to input during any operating condition (with enable pin in high or low status). The reverse current protection acts in particular during fast turning on/off operations or when another power supply (with higher voltage than the input one) is connected to the output port. If a power supply with lower voltage than the LDO output voltage is connected to V_{OUT} pin, LDO enters the current protection status, causing high power dissipation.

In the application, the LDL112 reverse current protection acts in the following cases:

1. **Off-state, EN pin is at GND level, $V_{OUT} > [V_{IN} + 100 \text{ mV}]$.** In this case the device power pass element (MOSFET) is off, the bulk and gate are switched to V_{OUT} and therefore all possible current paths from V_{OUT} to V_{IN} are interrupted.
2. **On-state, EN pin is at high level and $V_{OUT} > V_{OUT(nominal)}$.** In this condition, V_{OUT} is higher than the nominal level, so the device op-amp works in open loop and the power element is off. V_{GS} is zero, the bulk and gate are switched to V_{OUT} (where $V_{OUT} > [V_{IN} + 100 \text{ mV}]$) therefore all possible current paths from V_{OUT} to V_{IN} are interrupted.
3. **On-state, EN pin is at high level and $V_{OUT} < V_{OUT(nominal)}$.** In this condition V_{OUT} is lower than the nominal level, so the op-amp works in open loop with the power MOSFET on. V_{GS} is maximal so the power channel conducts with very low $R_{DS(on)}$. When $V_{OUT} > V_{IN}$ the current can flow from V_{OUT} to V_{IN} until the condition $V_{OUT} > (V_{IN} + 100 \text{ mV})$ is reached.

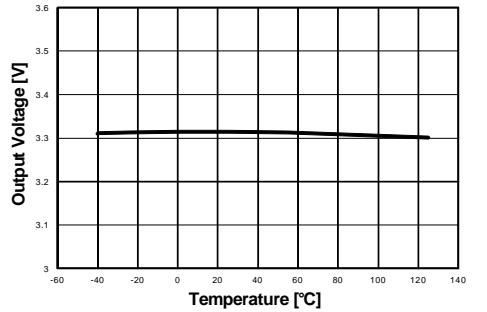
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Typical performance characteristics

7 Typical performance characteristics

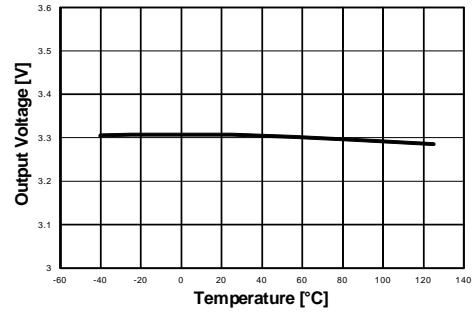
($C_{IN} = C_{OUT} = 1 \mu F$, V_{EN} to V_{IN} , $T = 25^\circ C$ unless otherwise specified)

Figure 5: Output voltage vs temperature
($V_{OUT} = 3.3 V$, $I_{OUT} = 5 mA$)



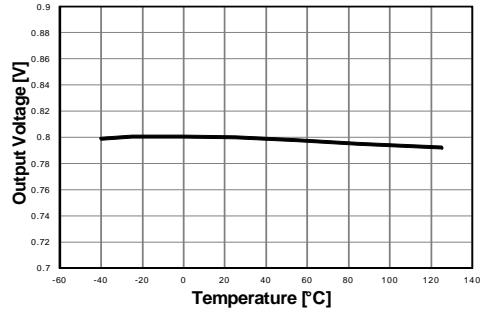
$V_{IN}=3.8V$, $I_{OUT}=5mA$, $V_{OUT}=3.3V$ AM14040V1

Figure 6: Output voltage vs temperature
($V_{OUT} = 3.3 V$, $I_{OUT} = 1.2 A$)



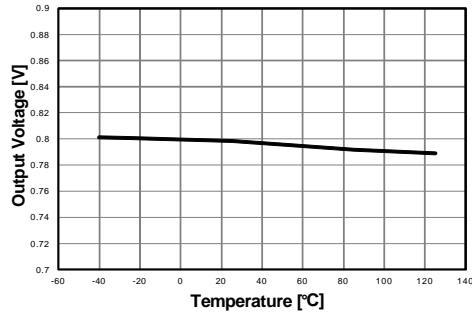
$V_{IN}=3.8V$, $I_{OUT}=1.2A$, $V_{OUT}=3.3V$ AM14041V1

Figure 7: Output voltage vs temperature
($V_{OUT} = V_{ADJ}$, $I_{OUT} = 5 mA$)



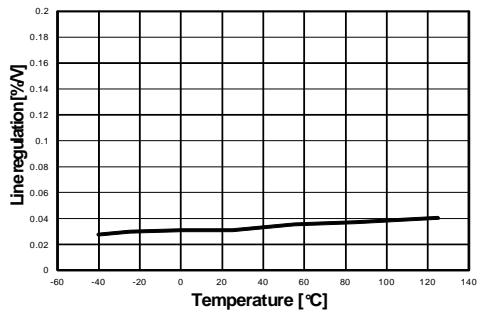
$V_{IN}=1.6V$, $I_{OUT}=5mA$, $V_{OUT}=V_{ADJ}$ AM14042V1

Figure 8: Output voltage vs temperature
($V_{OUT} = V_{ADJ}$, $I_{OUT} = 1.2 A$)



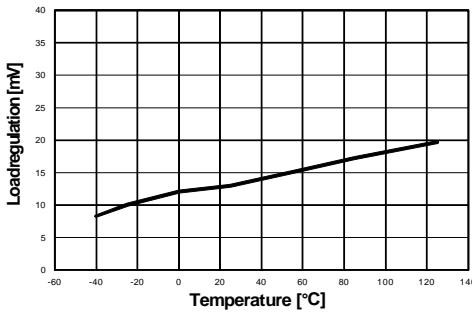
$V_{IN}=2V$, $I_{OUT}=1.2A$, $V_{OUT}=V_{ADJ}$ AM14043V1

Figure 9: Line regulation vs temperature



$V_{IN}=3.8V$ to $5.5V$, $I_{OUT}=1.2A$, $V_{OUT}=3.3V$ AM14044V1

Figure 10: Load regulation vs temperature

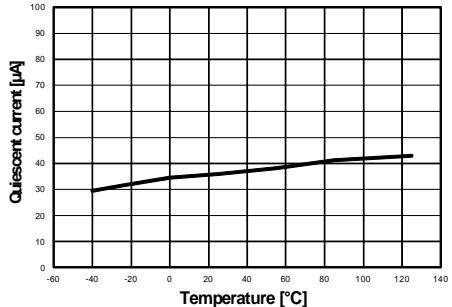


$V_{IN}=3.8V$, I_{OUT} from $0mA$ to $1.2A$, $V_{OUT}=3.3V$ AM14045V1

Typical performance characteristics

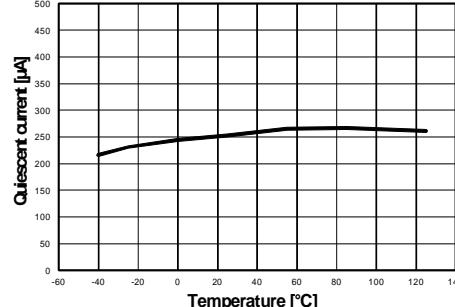
LDL112

Figure 11: Quiescent current vs temperature (I_{OUT} = 0 mA)



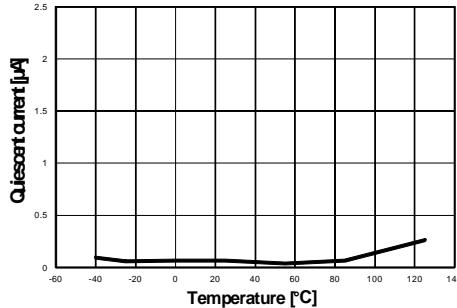
V_{IN}=3.8V, I_{OUT}= 0mA, V_{OUT}=3.3V AM14046V1

Figure 12: Quiescent current vs temperature (I_{OUT} = 1.2 A)



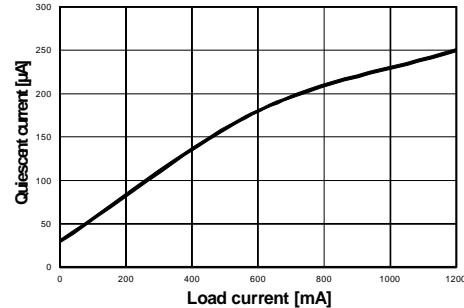
V_{IN}=3.8V, I_{OUT}= 1.2A, V_{OUT}=3.3V AM14047V1

Figure 13: Shutdown current vs temperature



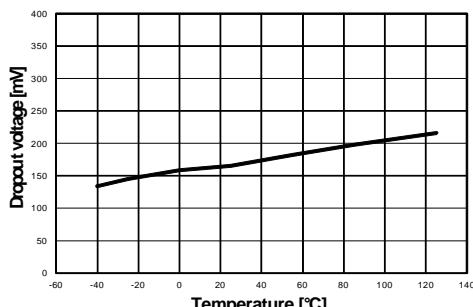
V_{IN}=2V, V_{EN}= GND, V_{OUT}=V_{ADJ} AM14048V1

Figure 14: Quiescent current vs load current



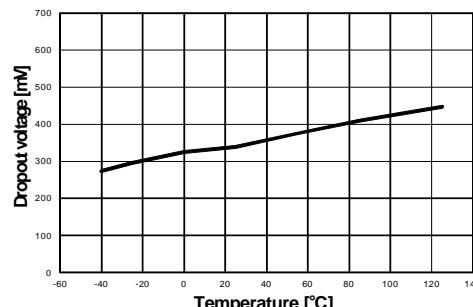
V_{IN}=2V, V_{OUT}=V_{ADJ}, T=25°C AM14049V1

Figure 15: Dropout voltage vs temperature (I_{OUT} = 600 mA)



I_{OUT}= 0.6A, V_{OUT}=3.3V AM14050V1

Figure 16: Dropout voltage vs temperature (I_{OUT} = 1.2 A)



I_{OUT}= 1.2A, V_{OUT}=3.3V AM14051V1

LDL112

Typical performance characteristics

Figure 17: Dropout voltage vs load current

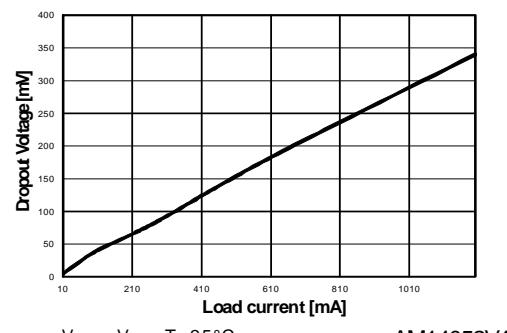


Figure 18: Short-circuit current vs input voltage

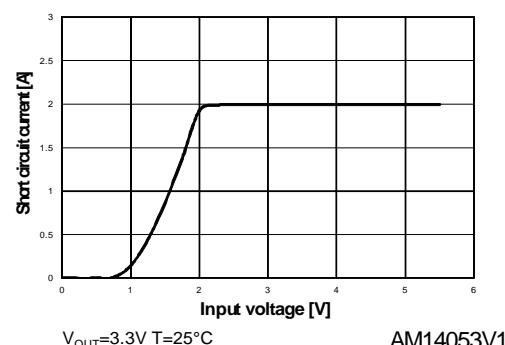


Figure 19: Enable thresholds vs temperature

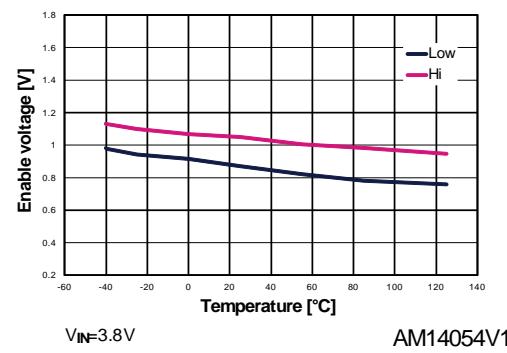


Figure 20: SVR vs frequency

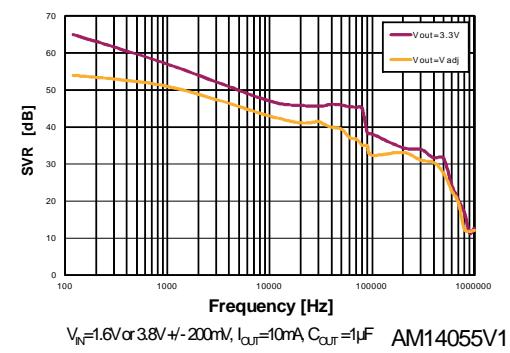


Figure 21: Output noise spectral density

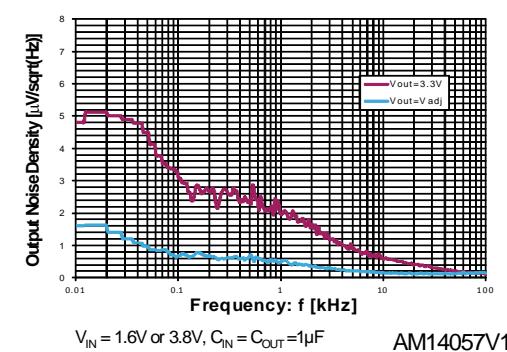
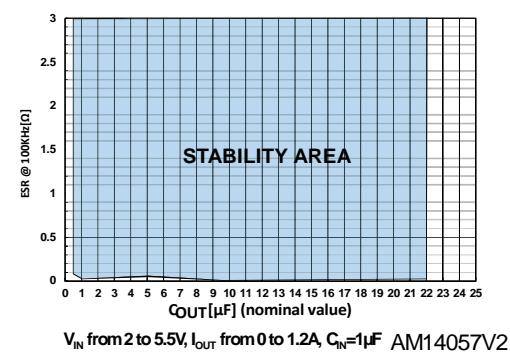


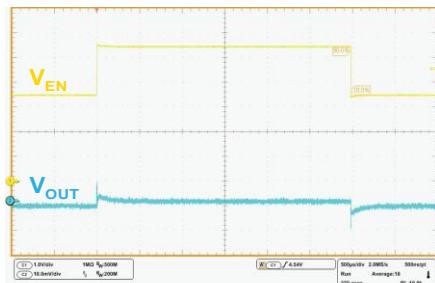
Figure 22: Stability plan vs Cout, ESR



Typical performance characteristics

LDL112

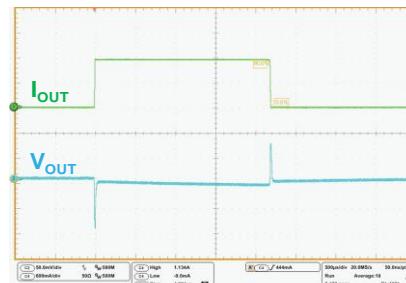
Figure 23: Line transient



V_{IN} from 3.5V to 5.5V, $V_{EN} = 2V$, $I_{out} = 10mA$, $V_{out} = 3.3V$, $C_{out} = 1\mu F$, $t_r = t_f = 1\mu s$

AM14058V1

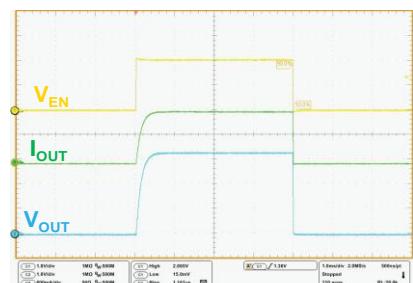
Figure 24: Load transient



$V_{IN} = V_{EN} = 4V$, I_{out} from 5mA to 1.2A, $V_{out} = 3.3V$, $t_r = t_f = 5\mu s$

AM14059V1

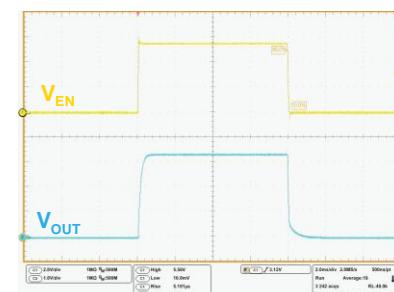
Figure 25: Enable transient



$V_{IN} = 4V$, $V_{EN} = 0V$ to $2V$, $I_{out} = 1.2A$, $V_{out} = 3.3V$, $t_r = t_f = 1\mu s$

AM14060V1

Figure 26: Turn-on time



$V_{IN} = V_{EN}$ from $0V$ to $5.5V$, $I_{out} = 5mA$, $V_{out} = 3.3V$, $t_r = t_f = 5\mu s$

AM14061V1

LDL112Package information

8 Package information

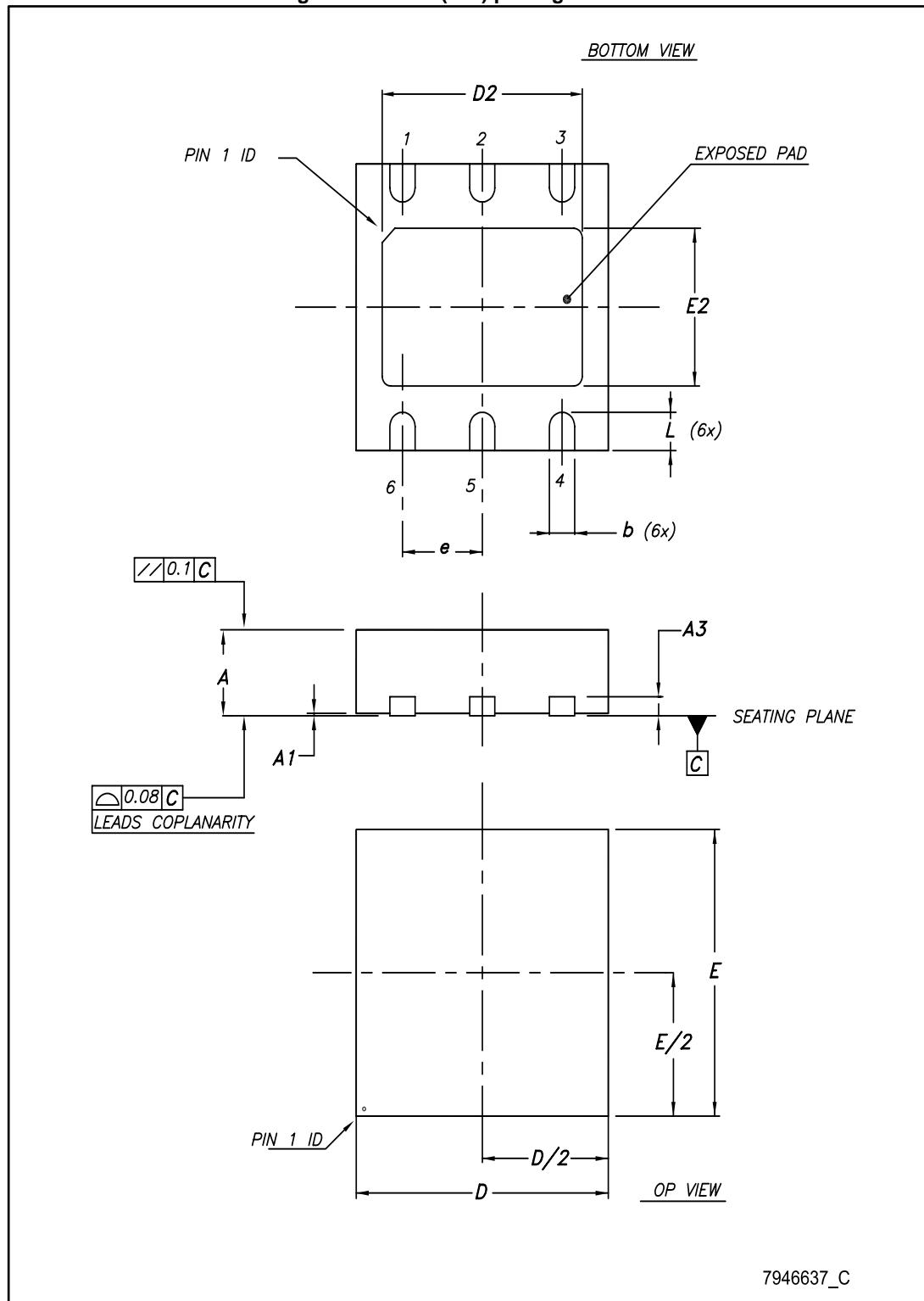
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com.
ECOPACK® is an ST trademark.

Package information

LDL112

8.1 DFN6 (3x3) package information

Figure 27: DFN6 (3x3) package outline



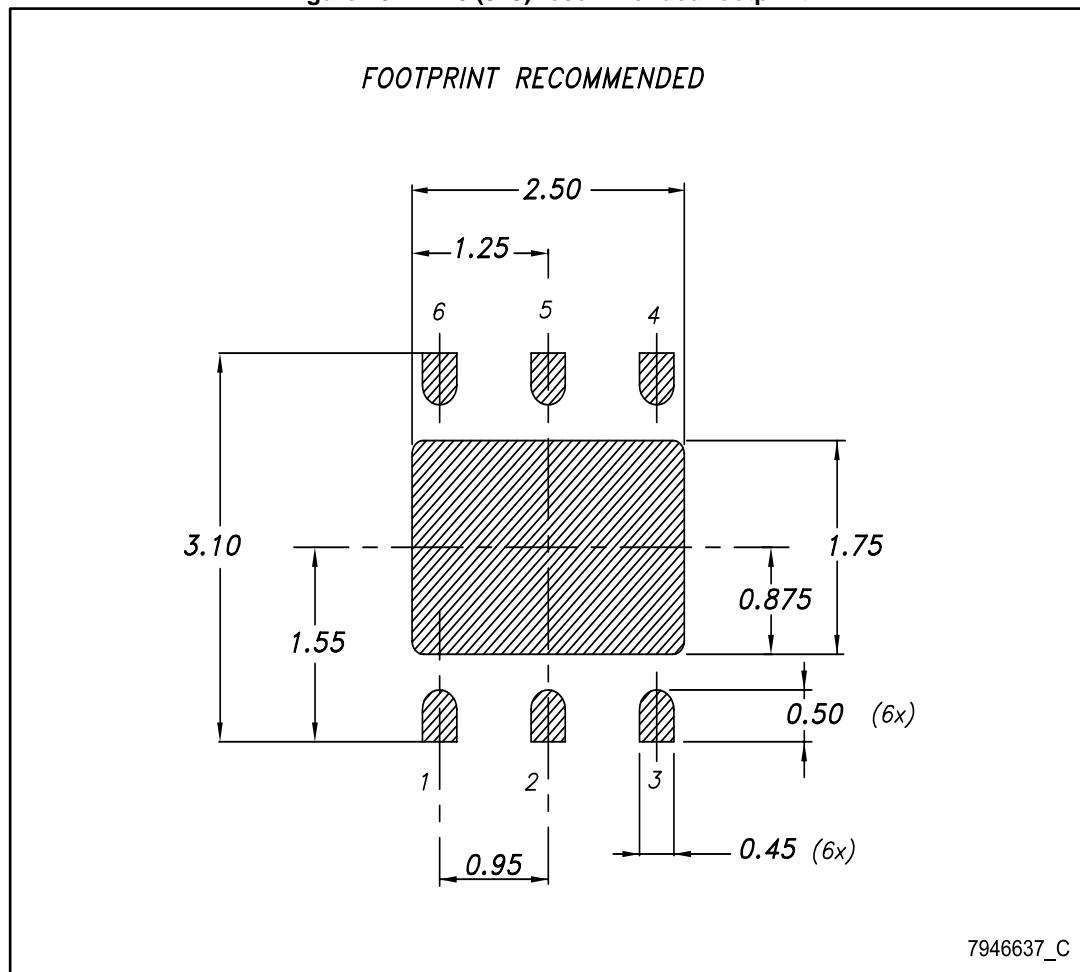
LDL112

Package information

Table 6: DFN6 (3x3) 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 28: DFN6 (3x3) recommended footprint

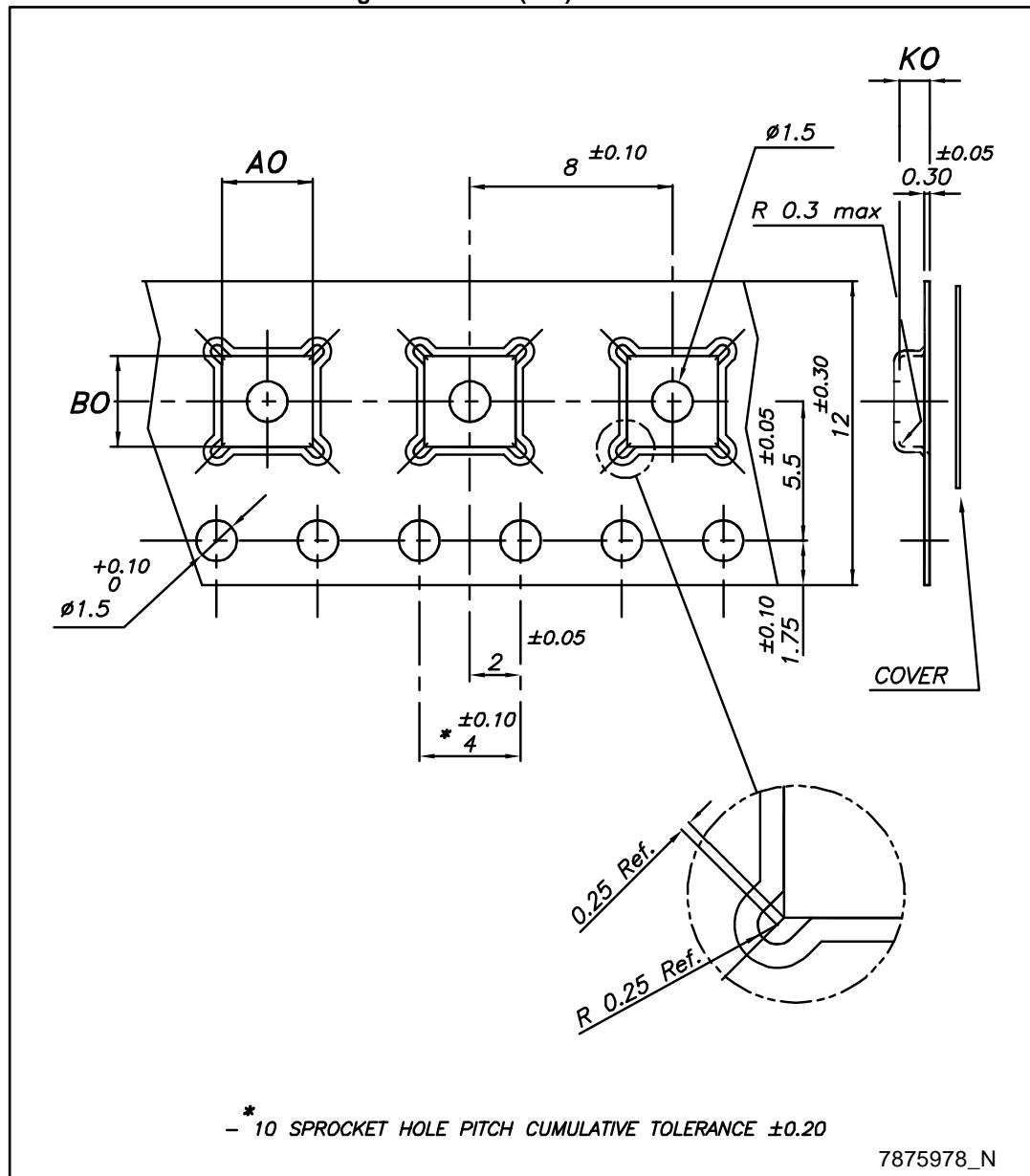


Package information

LDL112

8.2 DFN6 (3x3) packing information

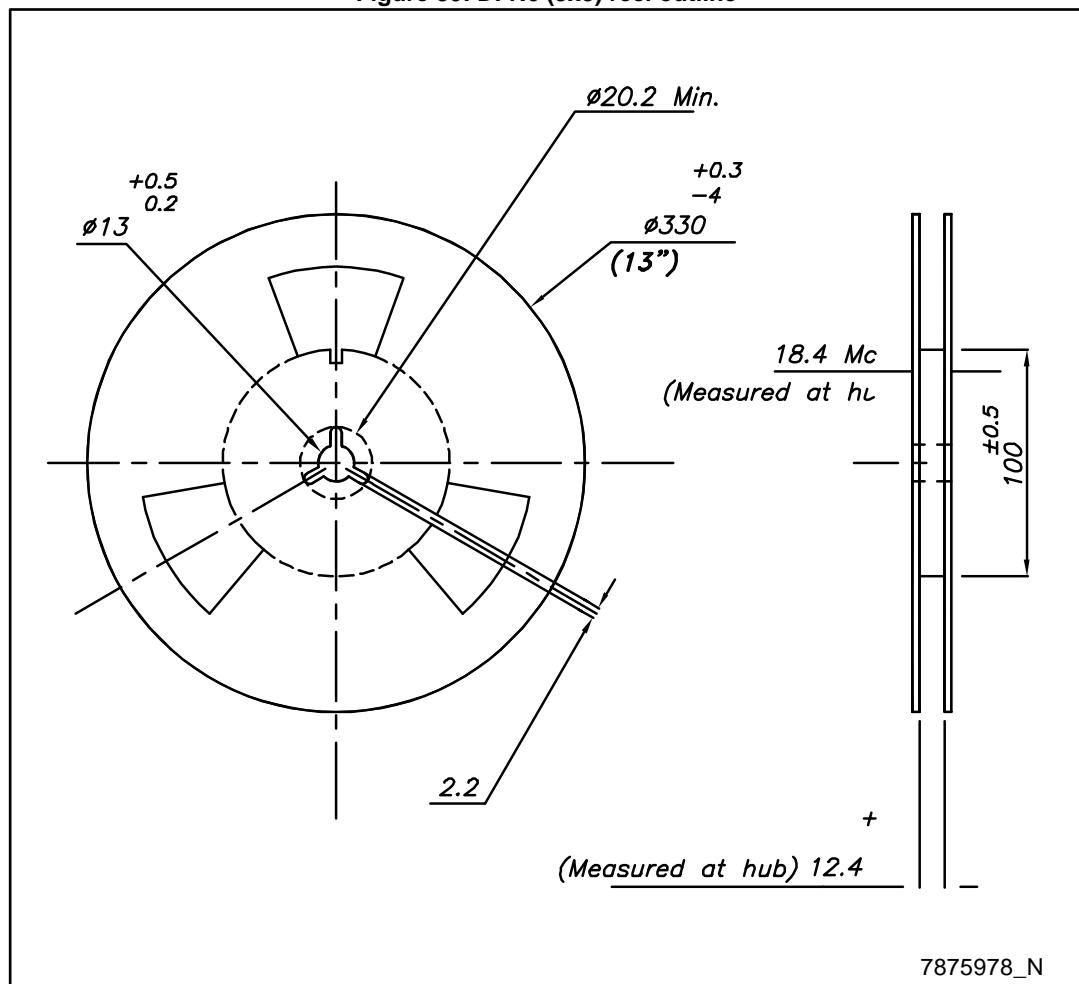
Figure 29: DFN6 (3x3) tube outline



LDL112

Package information

Figure 30: DFN6 (3x3) reel outline



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Table 7: DFN6 (3x3) tape and reel mechanical data

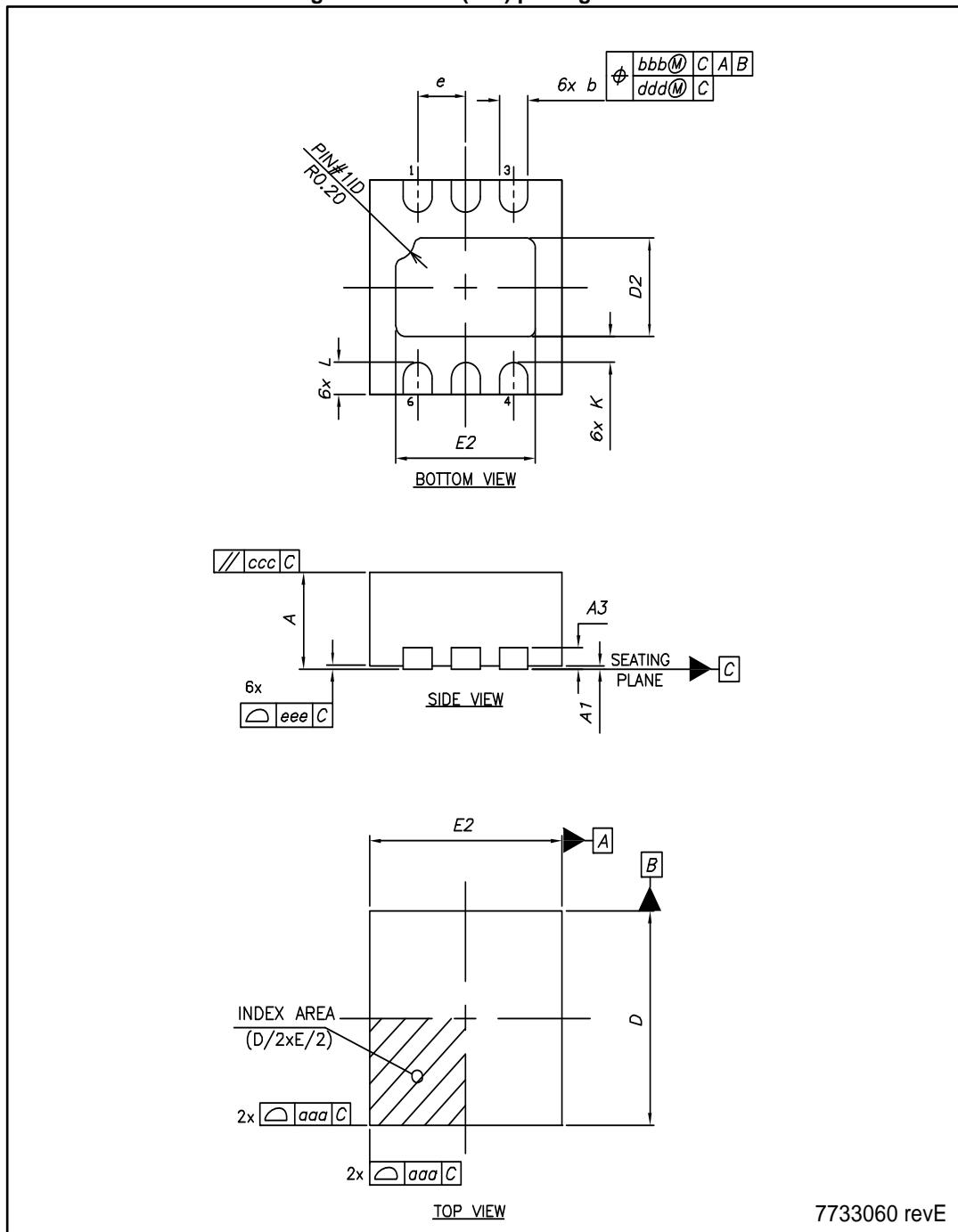
Dim.	mm		
	Min.	Typ.	Max.
A0	3.20	3.30	3.40
B0	3.20	3.30	3.40
K0	1	1.10	1.20

Package information

LDL112

8.3 DFN6 (2x2) package information

Figure 31: DFN6 (2x2) package outline

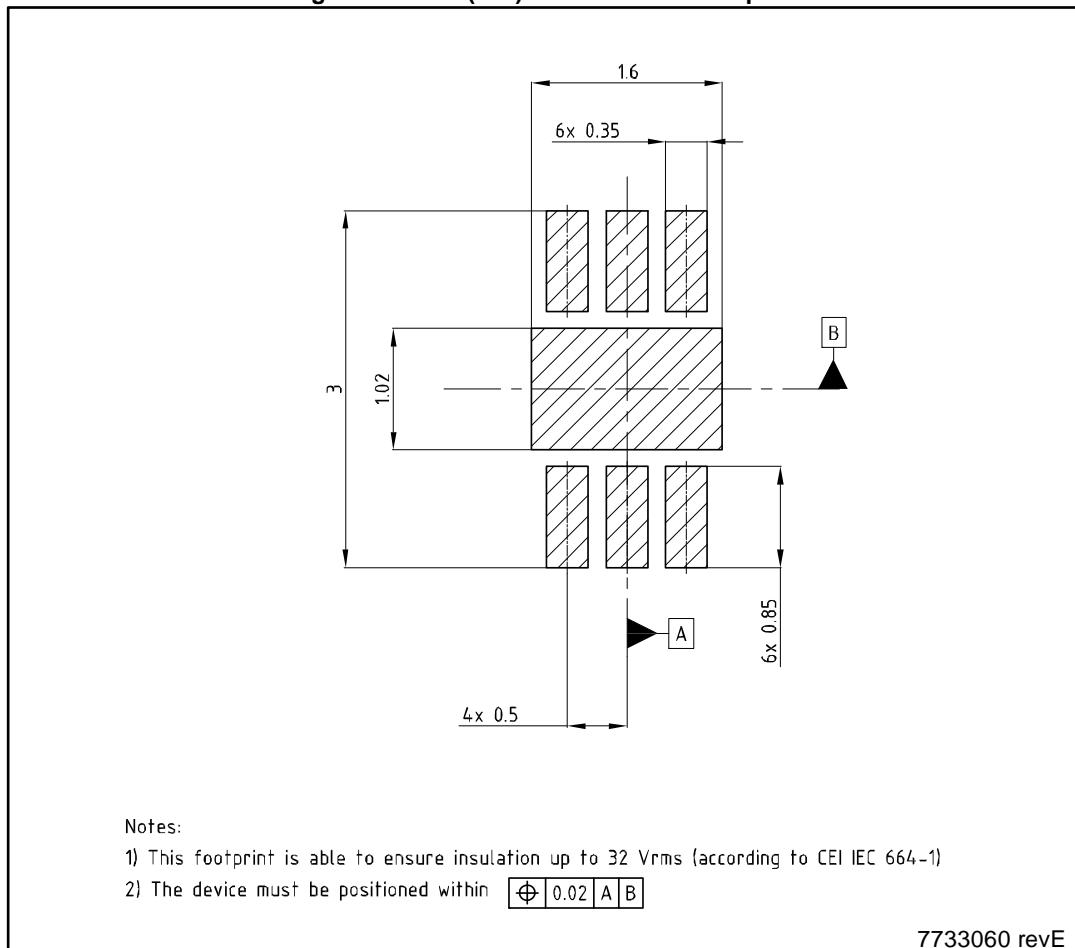


LDL112

Package information

Table 8: DFN6 (2x2) mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A3	-	0.203 Ref	-
b	0.25	0.30	0.35
D	-	2.00	-
E	-	2.00	-
e	-	0.50	-
D2	0.77	0.92	1.02
E2	1.30	1.45	1.55
K	0.15	-	-
L	0.20	0.30	0.40
aaa	-	0.05	-
bbb	-	0.10	-
ccc	-	0.10	-
ddd	-	0.05	-
eee	-	0.08	-

Package information**LDL112****Figure 32: DFN (2x2) recommended footprint**

LDL112

Package information

8.4 DFN6 (2x2) packing information

Figure 33: DFN6 (2x2) reel outline

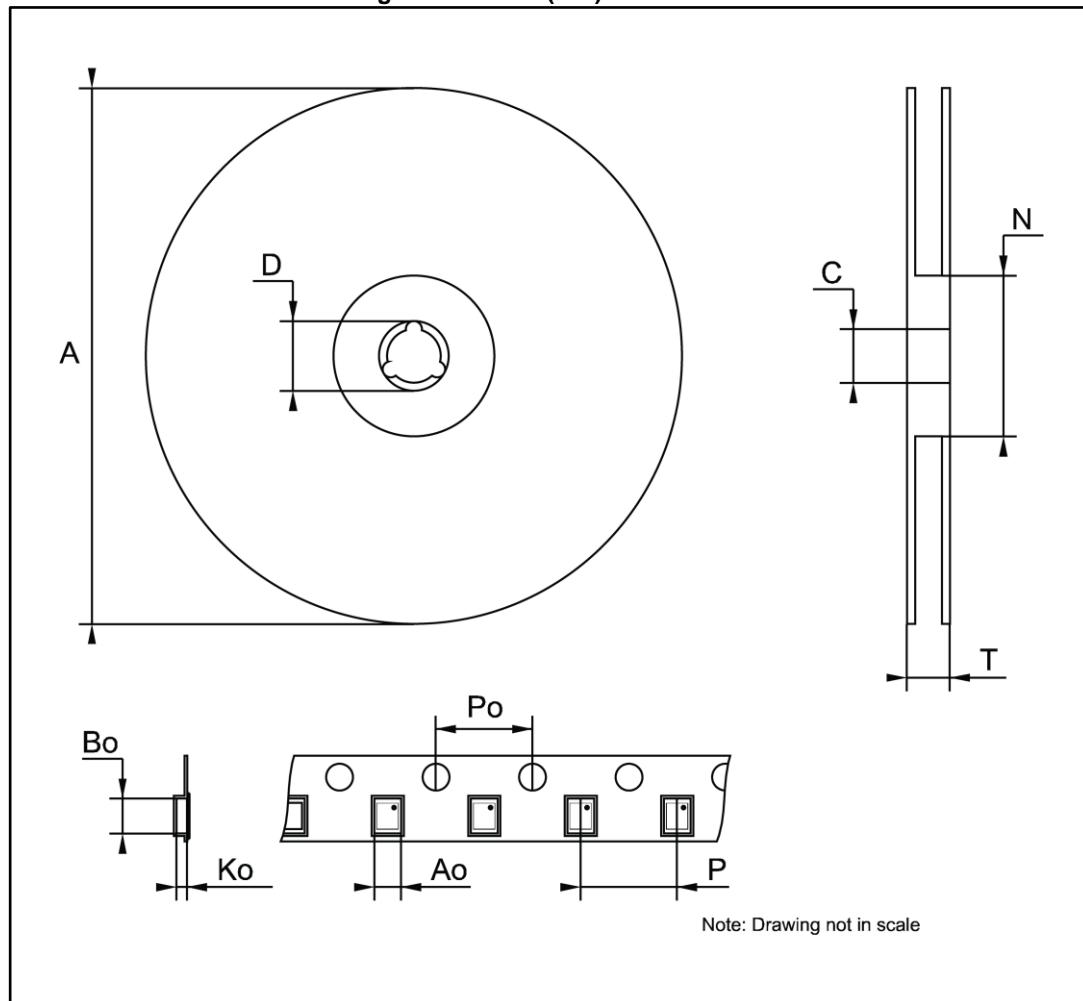


Table 9: DFN6 (2x2) tape and reel mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A			180
C	12.8		13.2
D	20.2		
N	60		
T			14.4
A0		2.4	
B0		2.4	
K0		1.3	
P0		4	
P		4	

Package information

LDL112

8.5 SO8-batwing package information

Figure 34: SO8-batwing package outline

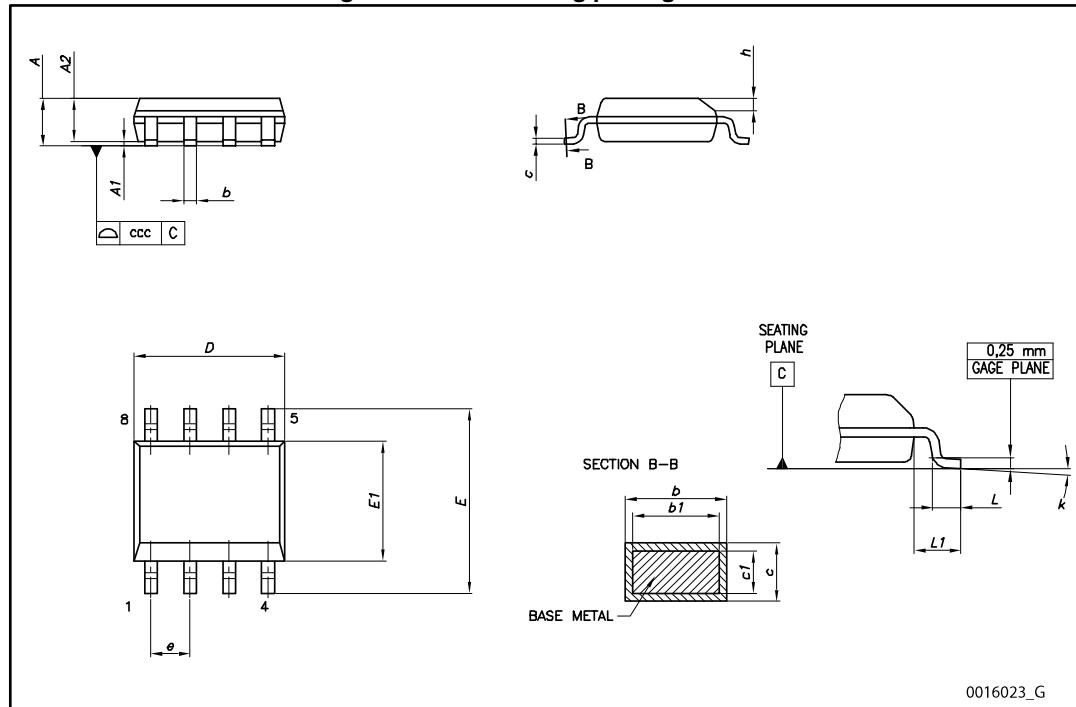
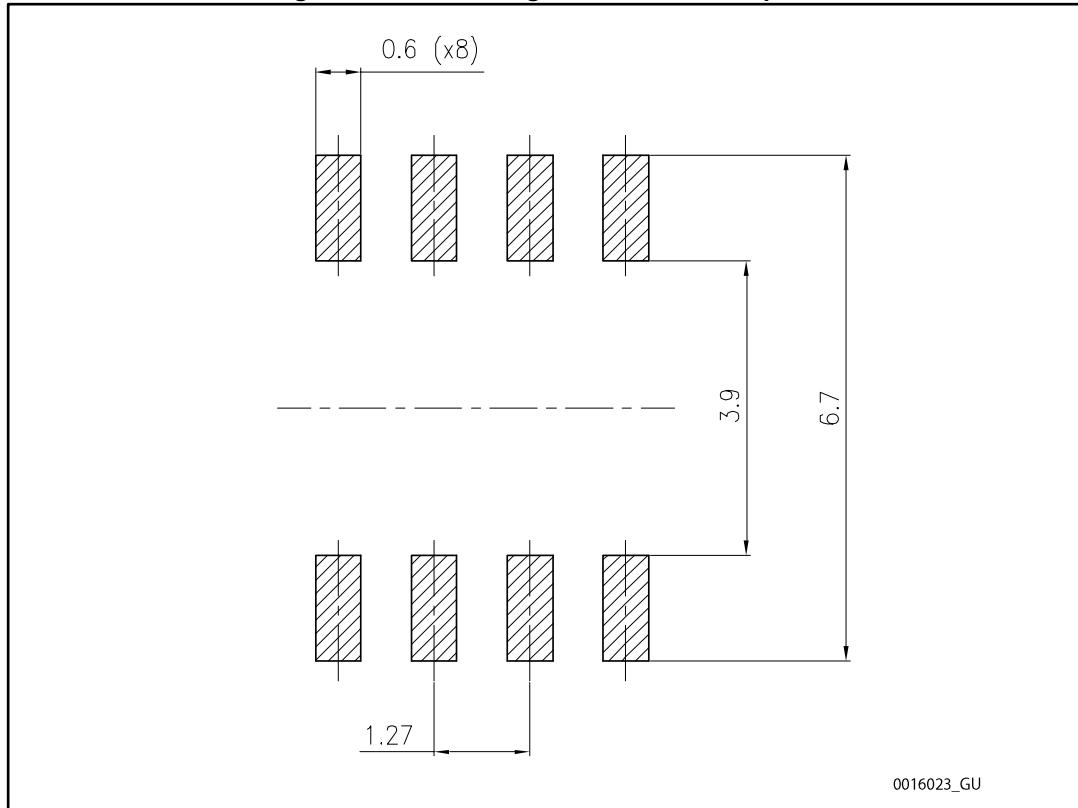


Table 10: SO8-batwing mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A			1.75
A1	0.10		0.25
A2	1.25		
b	0.31		0.51
b1	0.28		0.48
c	0.10		0.25
c1	0.10		0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e		1.27	
h	0.25		0.50
L	0.40		1.27
L1		1.04	
L2		0.25	
k	0°		8°
ccc			0.10

LDL112**Package information****Figure 35: SO8-batwing recommended footprint**

Package information

LDL112

8.6 SO8-batwing packing information

Figure 36: SO8-batwing tape and reel outline

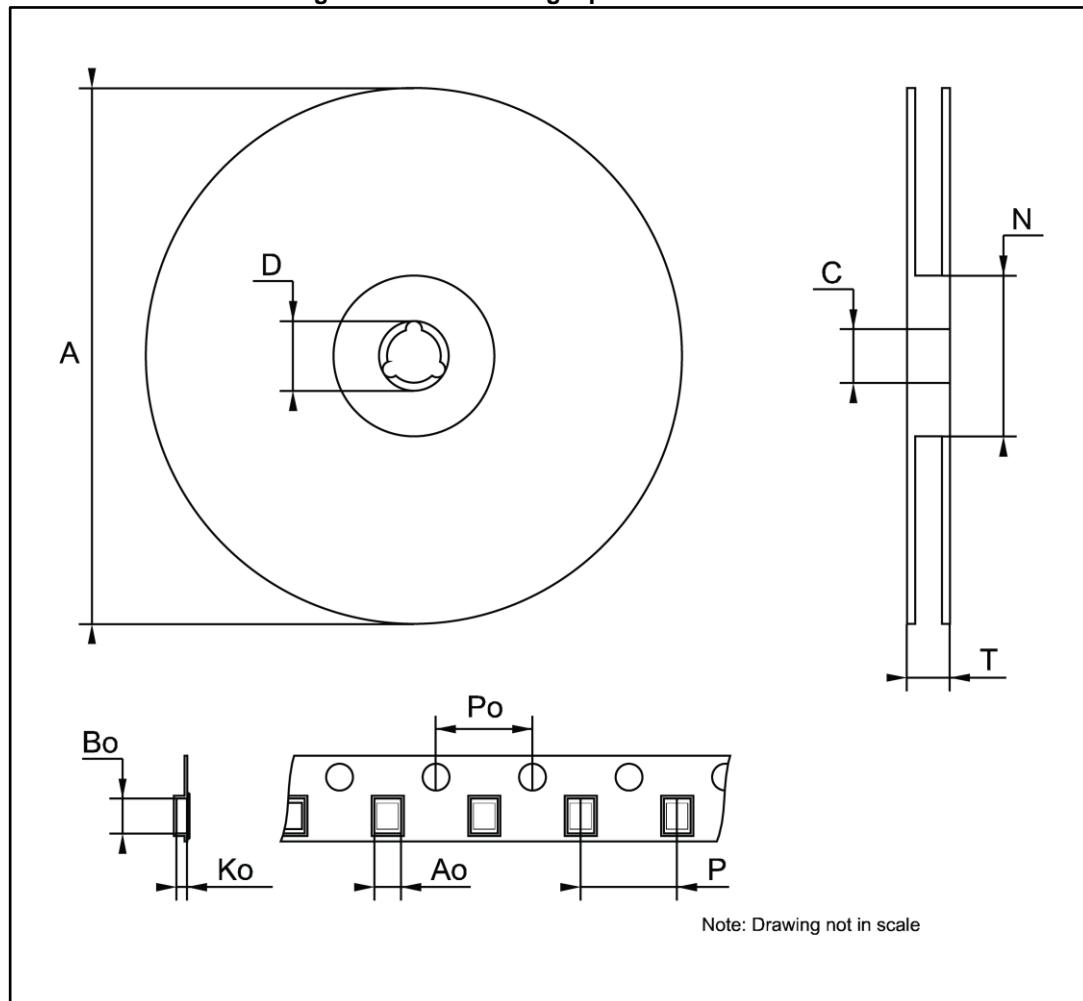


Table 11: SO8-batwing mechanical data

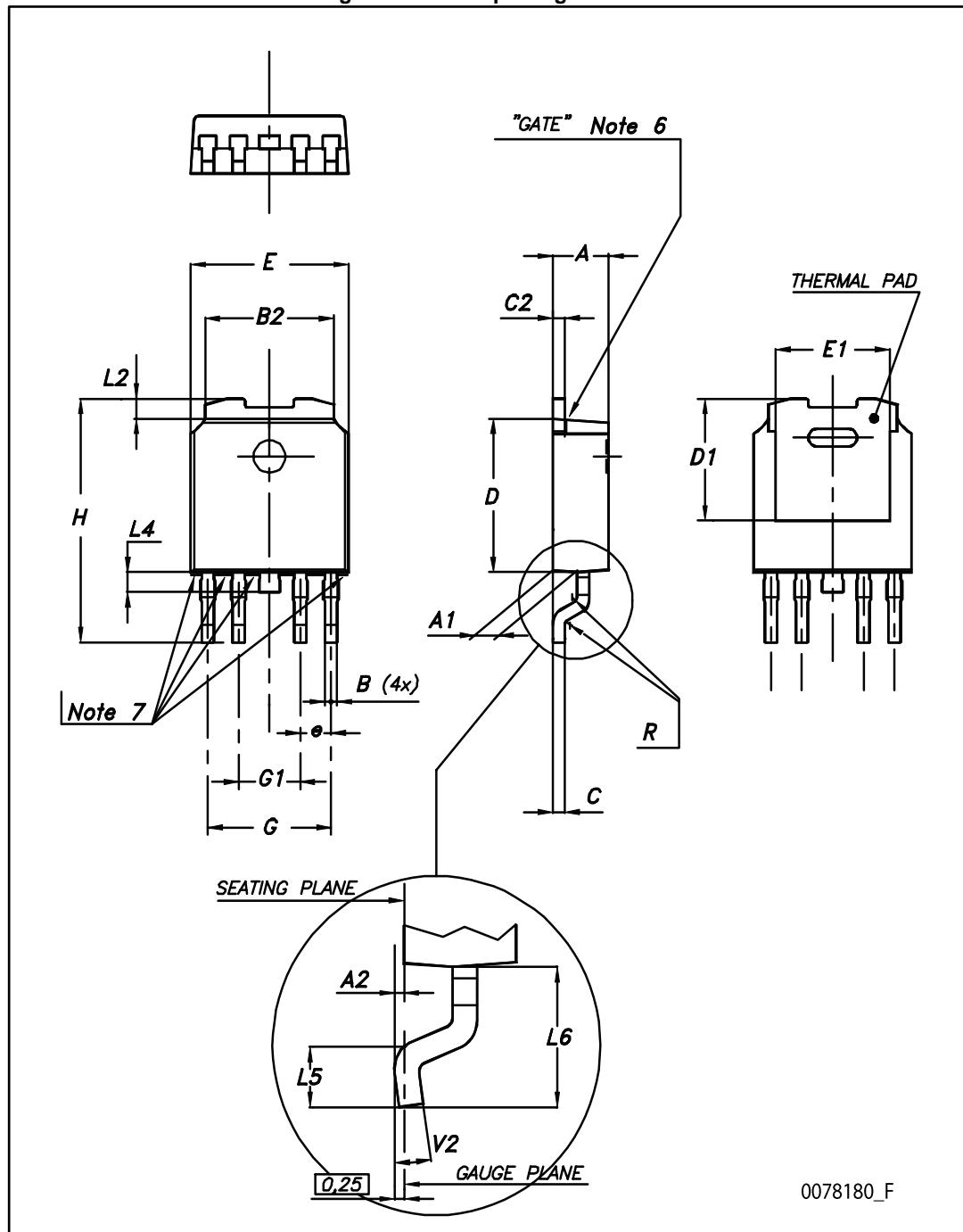
Dim.	mm		
	Min.	Typ.	Max.
A			330
C	12.8		13.2
D	20.2		
N	60		
T			22.4
A0	8.1		8.5
B0	5.5		5.9
K0	2.1		2.3
P0	3.9		4.1
P	7.9		8.1

LDL112

Package information

8.7 PPAK package information

Figure 37: PPAK package outline



Package information

LDL112

Table 12: PPAK mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	2.2		2.4
A1	0.9		1.1
A2	0.03		0.23
B	0.4		0.6
B2	5.2		5.4
C	0.45		0.6
C2	0.48		0.6
D	6		6.2
D1		5.1	
E	6.4		6.6
E1		4.7	
e		1.27	
G	4.9		5.25
G1	2.38		2.7
H	9.35		10.1
L2		0.8	1
L4	0.6		1
L5	1		
L6		2.8	
R		0.20	
V2	0°		8°

LDL112

Package information

8.8 PPAK packing information

Figure 38: PPAK tape outline

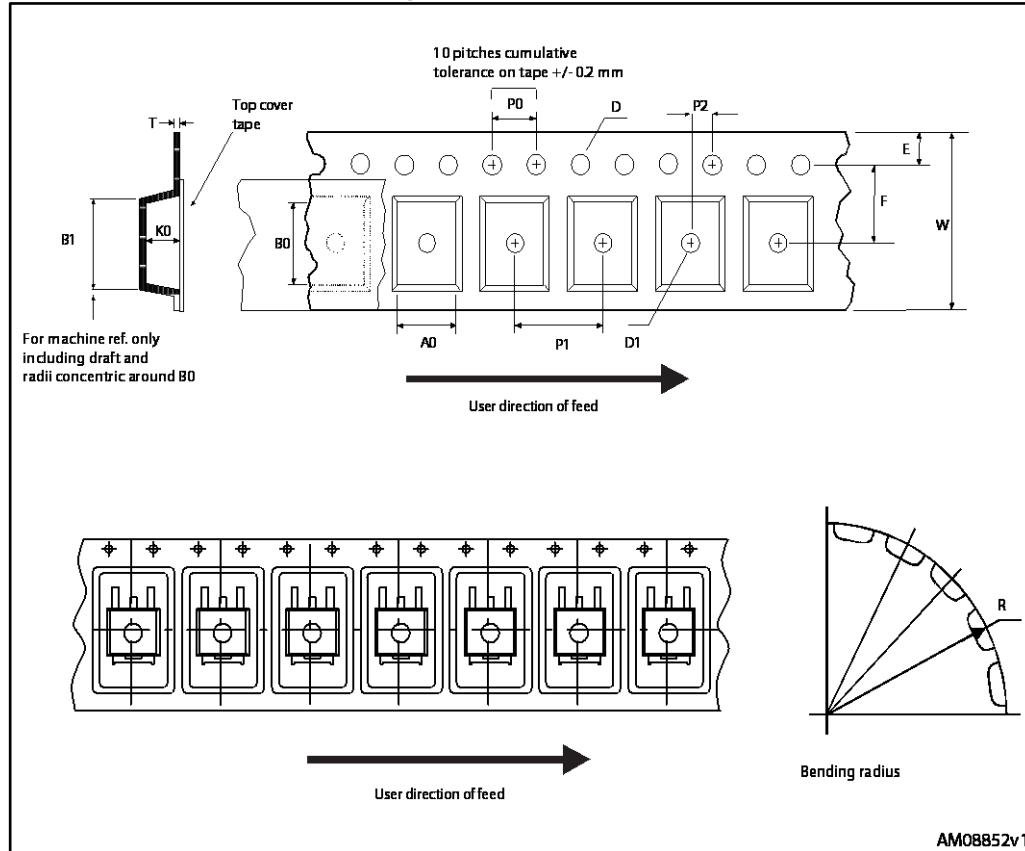
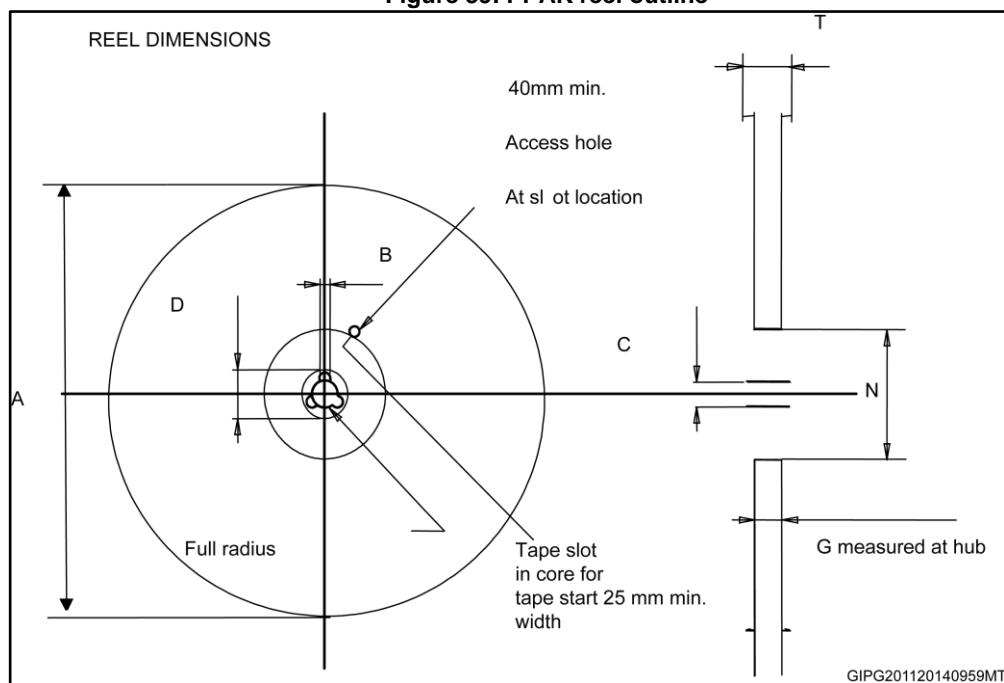


Figure 39: PPAK reel outline



Package information

LDL112

Table 13: PPAK mechanical data

Tape			Reel		
Dim.	mm		Dim.	mm	
	Min.	Max.		Min.	Max.
A0	6.8	7	A		330
B0	10.4	10.6	B	1.5	
B1		12.1	C	12.8	13.2
D	1.5	1.6	D	20.2	
D1	1.5		G	16.4	18.4
E	1.65	1.85	N	50	
F	7.4	7.6	T		22.4
K0	2.55	2.75			
P0	3.9	4.1		Base qty.	2500
P1	7.9	8.1		Base qty.	2500
P2	1.9	2.1			
R	40				
T	0.25	0.35			
W	15.7	16.3			

LDL112Ordering information

9 Ordering information

Table 14: Order codes

DFN6 (3x3)	DFN6 (2x2)	SO8-batwing	PPAK	Output voltage (V)
LDL112PV10R	LDL112PU10R	LDL112D10R		1.0
LDL112PV12R	LDL112PU12R	LDL112D12R		1.2
LDL112PV15R	LDL112PU15R	LDL112D15R		1.5
LDL112PV18R	LDL112PU18R	LDL112D18R		1.8
LDL112PV25R	LDL112PU25R	LDL112D25R		2.5
LDL112PV30R	LDL112PU30R	LDL112D30R		3.0
LDL112PV33R	LDL112PU33R	LDL112D33R		3.3
LDL112PV50R	LDL112PU50R	LDL112D50R		5.0
LDL112PVR	LDL112PUR	LDL112DR	LDL112PT-TR	Adj

Revision history**LDL112**

10 Revision history

Table 15: Document revision history

Date	Revision	Changes
21-Nov-2014	1	Initial release.

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