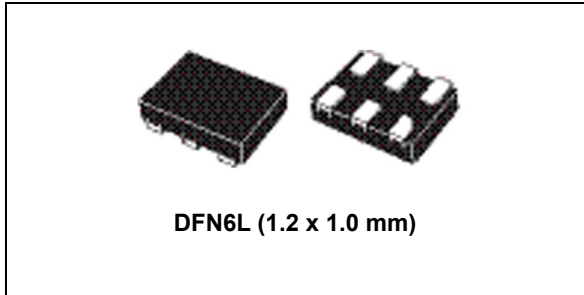


**Ear jack detection IC**

Datasheet - preliminary data

**Applications**

- Mobile phones
- Smart phones
- Tablet PCs
- Ultrabooks

**Features**

- Wide operating voltage range:  
 $V_{CC} = 1.6$  to  $5.0$  V single supply
- Low current consumption:  $I_{CC} = 6 \mu\text{A}$  max.
- Integrated comparators, logic OR gate and N-channel MOSFET
- MIC to GND  $R_{DS(ON)} = 0.8 \Omega$  typ.
- ESD 2 kV HBM
- Available in DFN6L (1.2 x 1.0 mm) package
- Operating temperature:  $-40$  to  $85$  °C

# 1 Description

The STM3301 device is an ear jack detection IC, which integrates a comparator with internal voltage reference, OR gate, pull up resistors for inputs and N-channel MOSFET with low  $R_{DS(ON)}$  to avoid an unpleasant pop noise during jack insertion. The STM3301 device operates from  $V_{CC} = 1.6$  to  $5.0$  V and it is available in a DFN6L (1.2 x 1.0 mm) package making it ideal for portable applications.

Figure 1. Application hookup

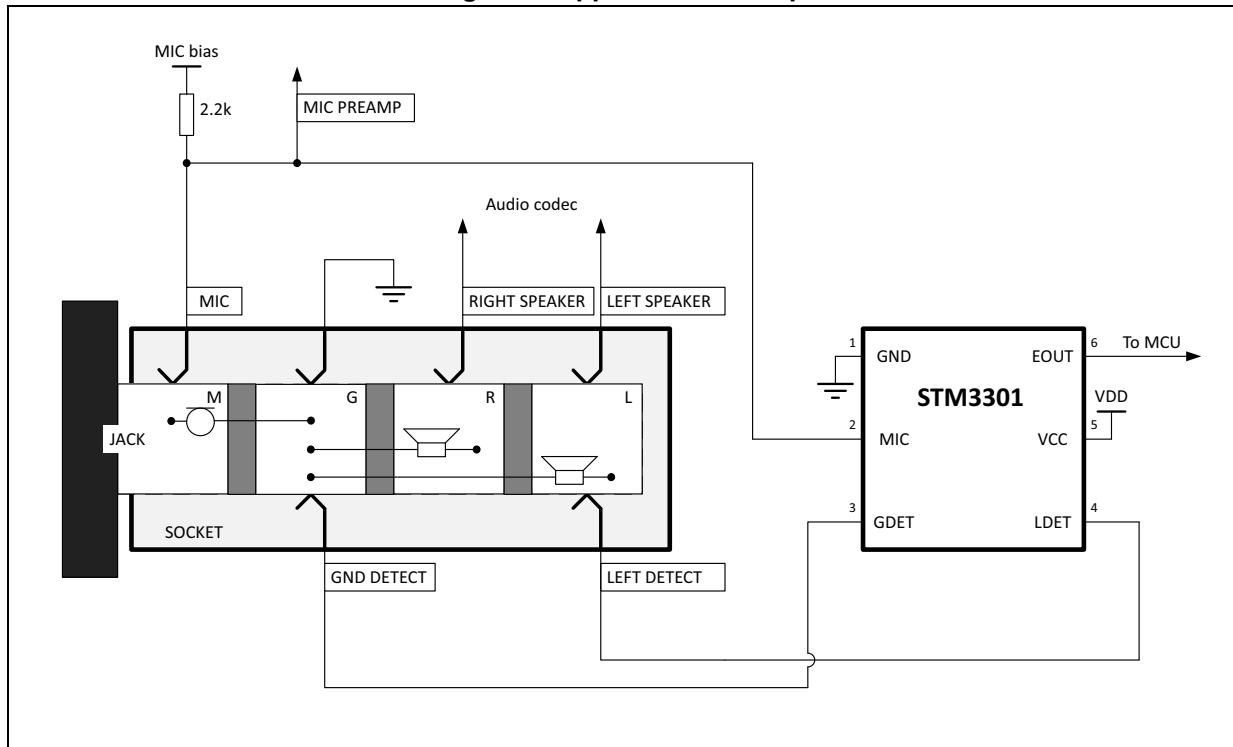


Figure 2. Block diagram

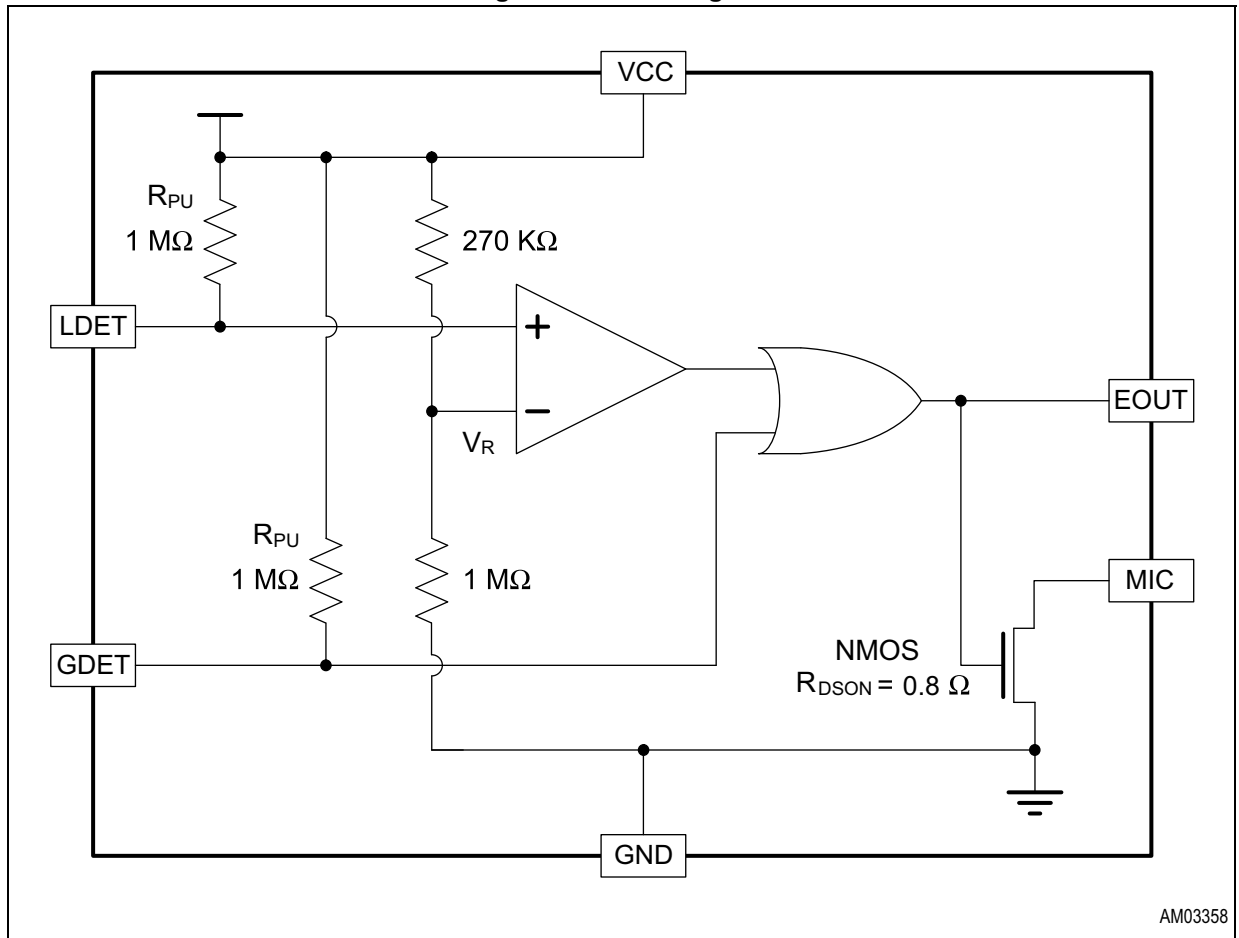


Table 1. Truth table

LDET	GDET	EOUT	MIC state
0	0	0	Hi-Z
0	1	1	Low
1	0	1	Low
1	1	1	Low

## 2 Pin description

Figure 3. Pinout

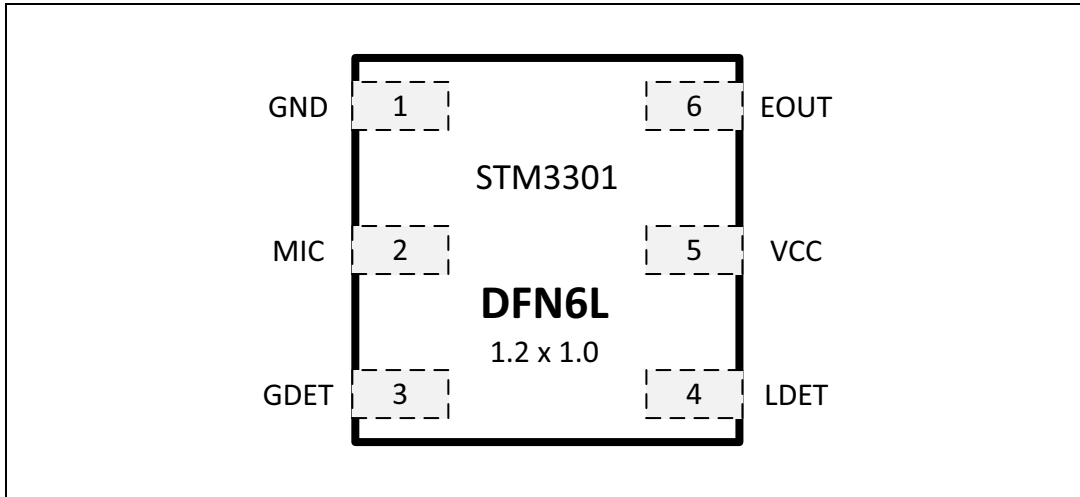


Table 2. Pin assignment

Symbol	Pin	Type	Default state	Description
GND	1	Power	N/A	System ground
MIC	2	I/O (OD)	Low	Open drain active low I/O for MIC connection, see <a href="#">Table 1</a> .
GDET	3	I	Open	Ground jack socket connection
LDET	4	I	Open	Left speaker jack socket connection
VCC	5	Power	N/A	Power supply
EOUT	6	O (PP)	Low	Jack insertion state output (push-pull); see <a href="#">Table 1</a> .

### 3 Maximum ratings

Stressing the device above the ratings listed in [Table 3: Absolute maximum ratings](#) may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those indicated in [Section 4](#) of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**Table 3. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{CC}$	Power supply voltage	-0.3 to 6.0	V
$V_{IN}$	DC input voltage	-0.3 to 6.0	V
$I_{IK}$	Input clamp diode current	-20	mA
$V_{ESD}$	HBM (JESD22-A114-A)	2	kV
$T_{STG}$	Storage temperature range	-65 to 150	°C
$T_{SLD}^{(1)}$	Lead solder temperature for 10 seconds	260	°C
$T_J$	Junction temperature	150	°C

1. Reflow at peak temperature of 255 °C to 260 °C for less than 30 seconds (total thermal budget not to exceed 180 °C).

## 4 DC and AC parameters

This section summarizes the operating measurement conditions, and the DC and AC characteristics of the device. The parameters in [Table 4](#) to [Table 9](#) are derived from tests performed under the measurement conditions summarized in [Table 4](#) to [Table 9](#). Designers should check that the operating conditions in their circuit match the operating conditions when relying on the quoted parameters.

**Table 4. Recommended operation conditions**

Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_{CC}$	Supply voltage	1.6		5.0	V
$V_{IN}$	DC input voltage	0		$V_{CC}$	V
$T_A$	Operating temperature	-40		85	°C
dt/dV	Input rise and fall time	0		10	ns/V

The test conditions are valid for ambient operating temperature  $T_A = -40$  to  $+85$  °C,  $V_{CC} = 1.8$  V, all typical values are at 25 °C, the min. and max. values are over operating free air temperature range of -40 to 85 °C unless otherwise noted.

**Table 5. General characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{CC}$	Current consumption	No jack: GDET, LDET are floating		2.2	6	μA

**Table 6. LDET input characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{IL}$	Low level input voltage				1.35	V
$V_{IH}$	High level input voltage		1.49			V
$t_{PLH}$ , $t_{PHL}$	Propagation delay to EOUI	$R_L = 1\text{ M}\Omega$ , $C_L = 15\text{ pF}$ overdrive = 20 mV		2.6		μs
$I_{IH}$	High level input leakage	$V_{I(LDET)} = V_{CC}$		0.1		μA
$I_{IL}$	Low level input leakage	$V_{I(LDET)} = 0\text{ V}$		1.8		μA

**Table 7. GDET input characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{IL}$	Low level input voltage				0.54	V
$V_{IH}$	High level input voltage		1.17			V
$t_{PLH}$ , $t_{PHL}$	Propagation delay to EOUI	$R_L = 1\text{ M}\Omega$ , $C_L = 15\text{ pF}$		0.4		μs
$I_{IH}$	High level input leakage	$V_{I(GDET)} = V_{CC}$		0.1		μA
$I_{IL}$	Low level input leakage	$V_{I(GDET)} = 0\text{ V}$		1.8		μA

Table 8. EOUT output characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{OL}$	Low level output voltage	$I_{O(EOUT)} = -0.1 \text{ mA}$			0.45	V
$V_{OH}$	High level output voltage	$I_{O(EOUT)} = 0.1 \text{ mA}$	1.35			V
$t_r$	Rise time	$R_L = 1 \text{ M}\Omega, C_L = 15 \text{ pF}$		10		ns
$t_f$	Fall time	$R_L = 1 \text{ M}\Omega, C_L = 15 \text{ pF}$		10		ns

Table 9. MIC output characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$R_{DSON}$	Shunt switch on resistance	$I_{O(MIC)} = 100 \text{ mA}$		0.8		$\Omega$

## 5 Part numbering

Table 10. Ordering information scheme

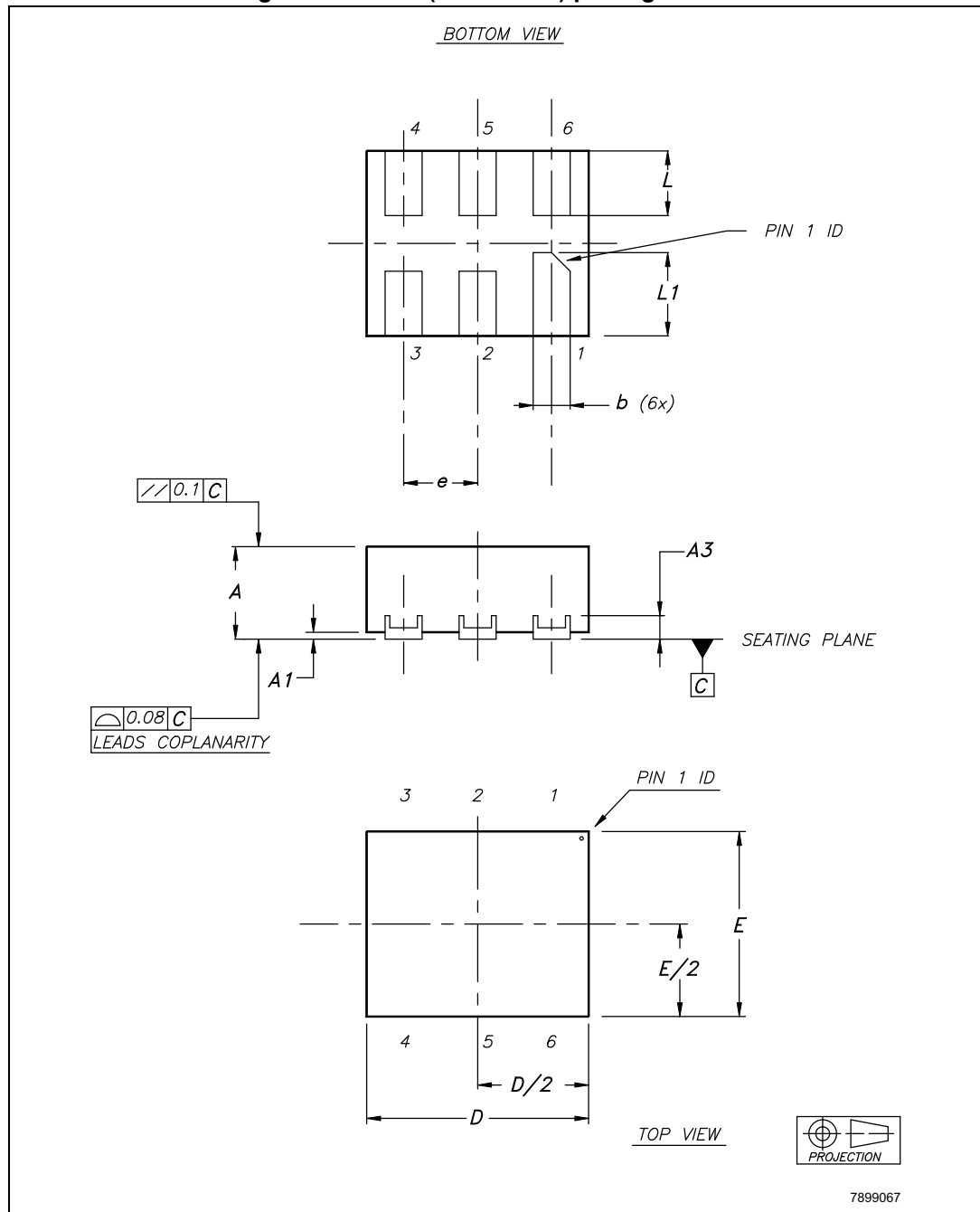
Example:	STG3300	D	TR
<b>Device type</b> STM3301 - earphone jack detector			
<b>EOUT output type</b> No letter = push-pull			
<b>Package</b> D = DFN6L (1.2 mm x 1.0 mm)			
<b>Shipping method</b> TR = ECOPACK® package, tape and reel			



## 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](http://www.st.com). ECOPACK is an ST trademark.

Figure 4. DFN6L (1.2 x 1 mm) package outline



1. Drawing is not to scale.

Table 11. DFN6L (1.2 x 1 mm) package mechanical data

Symbol	Dimensions (millimeters)		
	Typ.	Min.	Max.
A	0.50	0.45	0.55
A1	0.02	0	0.05
A3	0.127		
b	0.20	0.15	0.25
D	1.20	1.15	1.25
E	1	0.95	1.05
e	0.40		
L	0.35	0.30	0.40
L1	0.45	0.40	0.50

Figure 5. DFN6L (1.2 x 1 mm) footprint recommendation

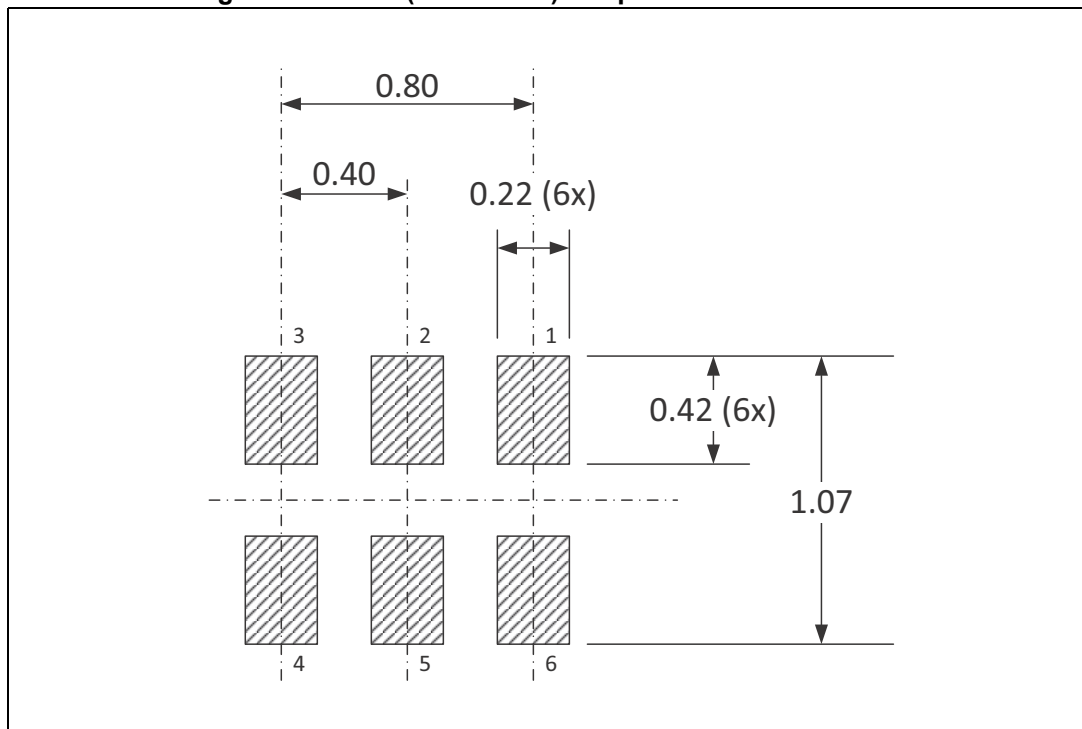
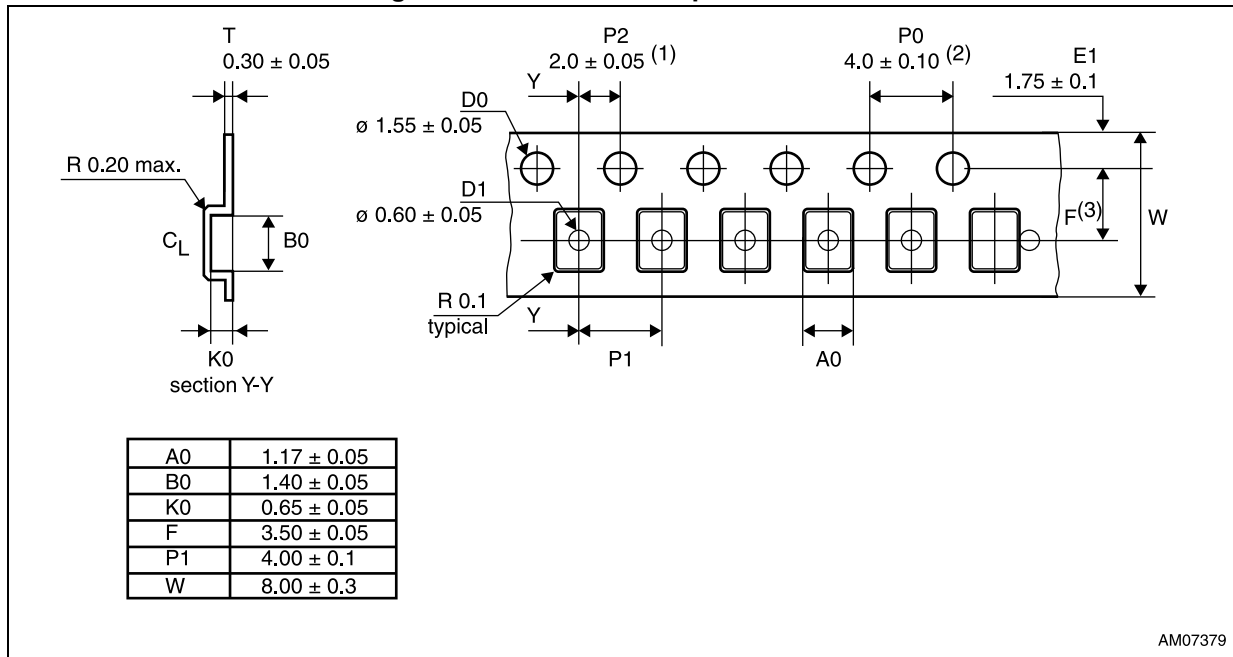
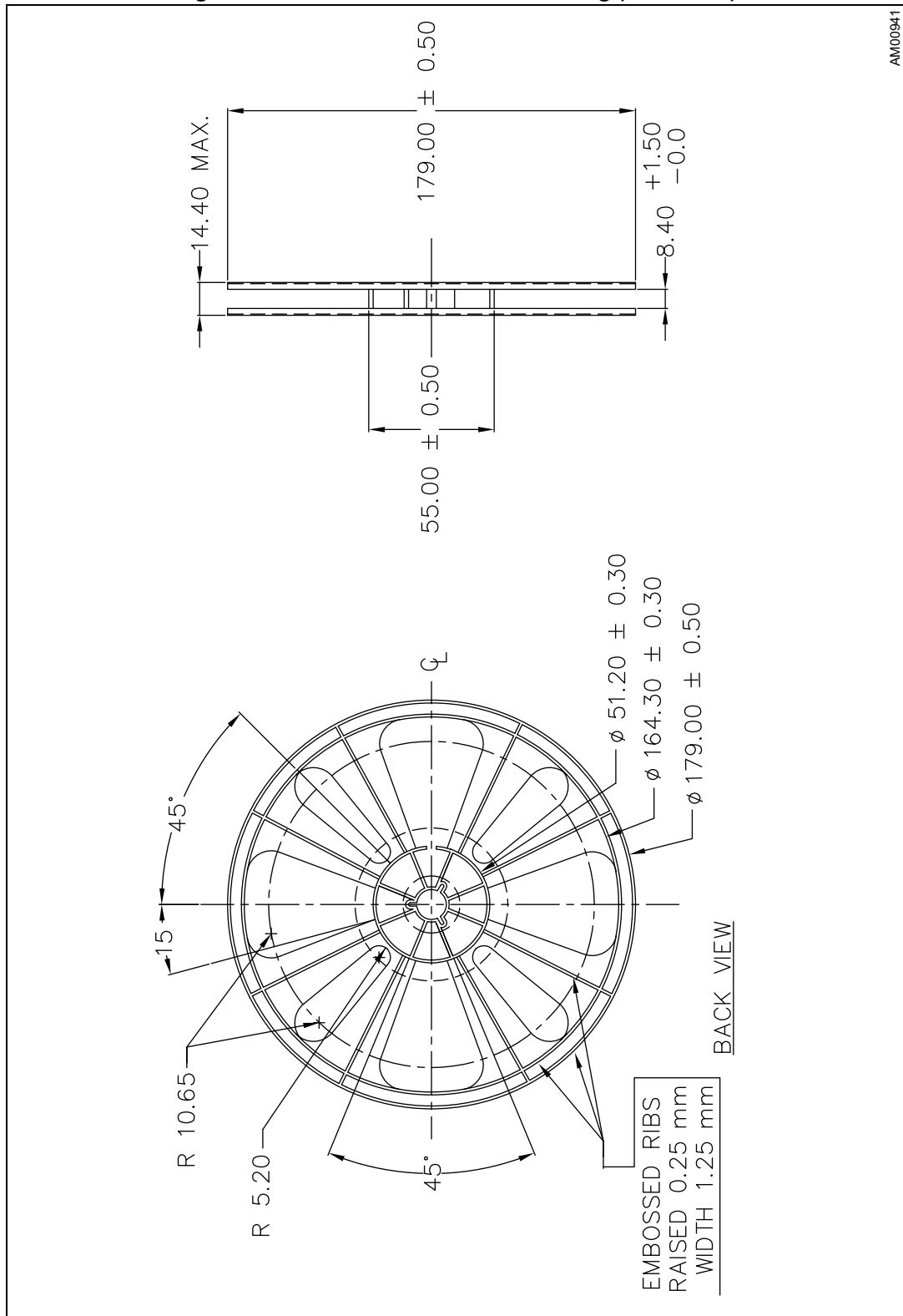


Figure 6. DFN6L carrier tape information



1. Measured from centerline of sprocket hole to centerline of pocket.
2. Cumulative tolerance of 10 sprocket holes is ± 0.20.
3. Measured from centerline of sprocket hole to centerline of pocket.
4. Other material available.
5. Drawing is not to scale.
6. All dimensions are in millimeters unless otherwise stated.

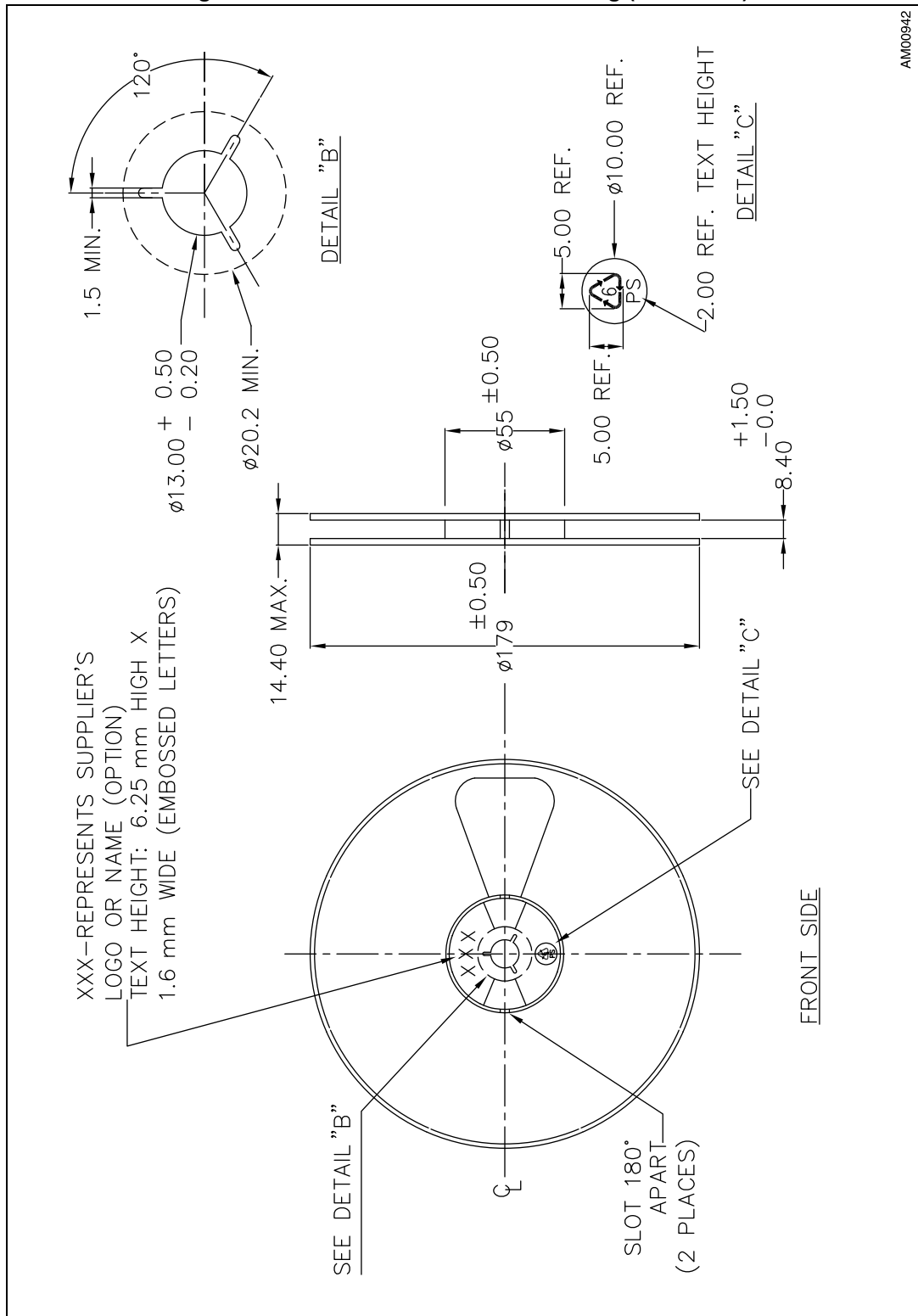
Figure 7. DFN6L reel information drawing (back view)



AM00941

1. Drawing is not to scale.
2. Dimensions are in millimeters.

Figure 8. DFN6L reel information drawing (front view)



1. Drawing is not to scale.
2. Dimensions are in millimeters.

## 7 Revision history

Table 12. Document revision history

Date	Revision	Changes
14-Oct-2013	1	Initial release.

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