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# TLE4957Cx-2 E6747

Dynamic Differential Hall Effect Sensor

TLE4957C-2 E6747  
TLE4957CB-2 E6747

## Product Information

2013-10-16

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## 1 General



### 1.1 Target Application

The TLE4957Cx-2 E6747 is a differential hall transmission sensor suited to detect the motion and position of either a magnetized pole wheel or gear tooth (back bias application). The sensor has been specially designed to be robust against noise and vibration in calibrated and un-calibrated mode. High sensitivity and accuracy combined with its wide operational temperature range makes the sensor ideally suited for the harsh automotive requirements. It comes in a three pin package for the supply voltage and an open drain output. Infineon also offers customers the possibility to order sensors with already attached back bias magnets (TLE4957CB-2 E6747).

### 1.2 Features

- Hall based principle
- High sensitivity
- High robustness against vibration
- Adaptive hysteresis
- Large operating airgap
- Single chip solution
- Digital output signal (voltage interface)
- Two-wire and three-wire configuration possible
- Wide operating temperature ranges
- Short-circuit and over temperature protection of output
- High resistance to Piezo effects
- South and north pole pre-induction possible
- Integrated back bias magnet as an option
- Module style package with two integrated capacitors:
  - 4.7 nF between Q and GND
  - 47 nF between  $V_S$  and GND: Needed for micro cuts in power supply

Type	Order Code	Marking	Package
TLE4957C-2 E6747	SP000649296	57D82	PG-SSO-3-92
TLE4957CB-2 E6747	SP001056526	957D00	PG-SSOM-3-11

## 2 Functional Description

### 2.1 General

The TLE4957Cx-2 E6747 detects the motion and position of ferromagnetics and permanent magnet structures by measuring the differential flux density of the magnetic field. To detect ferromagnetic objects the magnetic field must be provided by a back biasing permanent magnet (south or north pole of the magnet attached to the rear unmarked side of the IC package).

### 2.2 Pin Configuration

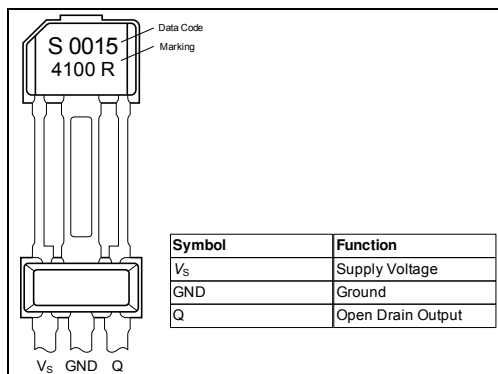


Figure 2-1 Sensor assembly

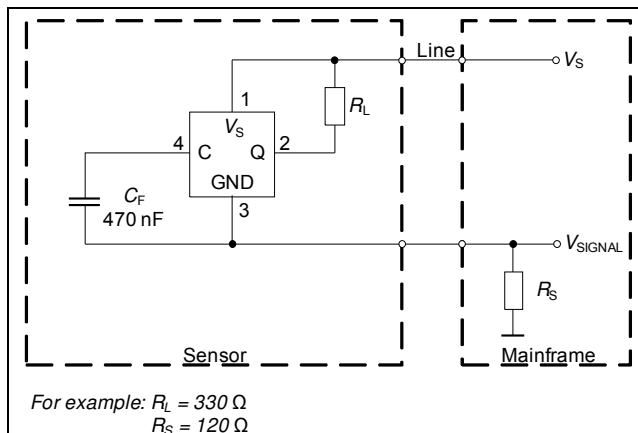


Figure 2-2 Two wire configuration

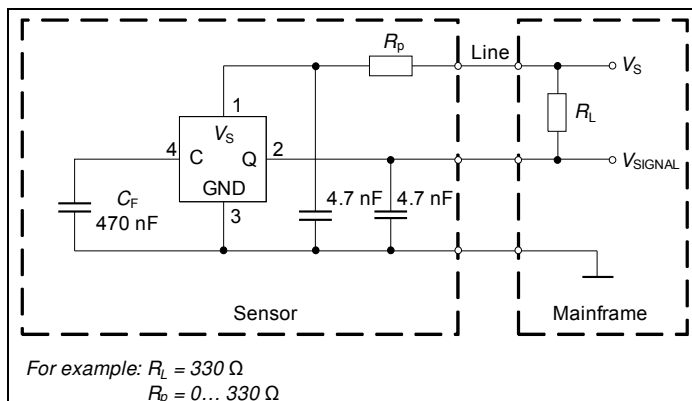


Figure 2-3 Three wire configuration

### 3 Specification

#### 3.1 Operating Range

Table 3-1 Operating Range

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Supply voltage	$V_S$	3.2		18	V	Regulated voltage, continuous
Operation junction temperature	$T_j$	-40		165	°C	time limited

#### 3.2 Electrical and Magnetic Characteristics

Table 3-2 Electrical and Magnetic Characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Supply current	$I_S$		6.8		mA	
Output rise time	$t_r$		12		μs	$V_{Load} = 4.5$ to 24 V
Output fall time	$t_f$		1.8		μs	$V_{Load} = 5$ V
Frequency range	$f$	0.001	–	8	kHz	Operation below 1 Hz
Minimum signal amplitude	$ \Delta B_{max} $			100	mT	Additional to $B_0$

#### 3.3 ESD Protection

Table 3-3 ESD Protection

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
ESD Protection	$V_{ESD}$	–	–	$\pm 6$	kV	R = 1.5 kΩ C = 100 pF

#### 3.4 Self-calibration Characteristics

Table 3-4 Self-calibration Characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Signal jitter in running mode; 1 sigma value	$\sigma 1$		$\leq \pm 0.11$		%	$\Delta B_{pp} = 10$ mT ideal sinusoidal input signal; $T_j < 150^\circ\text{C}$
	$\sigma 2$		$\leq \pm 0.16$		%	$\Delta B_{pp} = 10$ mT ideal sinusoidal signal; ( $150^\circ\text{C} \leq T_j < 175^\circ\text{C}$ )

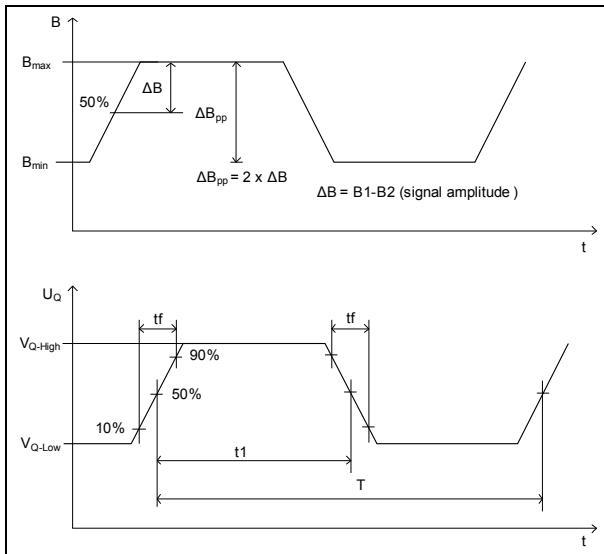


Figure 3-1 Rise / Fall time definition

### 3.5 Operating Characteristics - TLE4957CB-2 E6747

Table 3-5 Operating Characteristics

Parameter	Symbol	Values			Unit	Remarks
		min	typ	max		
Operational airgap	AG		2.9		mm	Valid in running mode, measured from sensor housing (branded side) to target tooth. Valid at 25°C & 0h. No missing output pulses.
Minimum signal amplitude	$ \Delta B_{\min} $		0.8		mT	

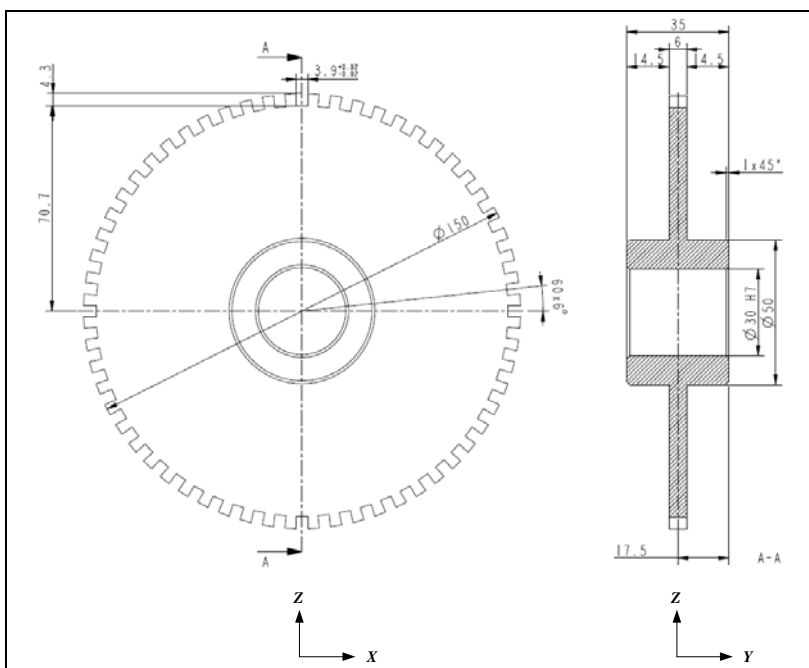


Figure 3-2 Reference Target Wheel

Table 3-6 Reference target wheel geometry

Parameter	Symbol	Typ value	Unit	Remarks
Outside diameter	$d$	150	mm	
Number of teeth	$Z$	60	-	
Pitch Ratio		50:50	%	
Material		ST37		

## 4 Package Information

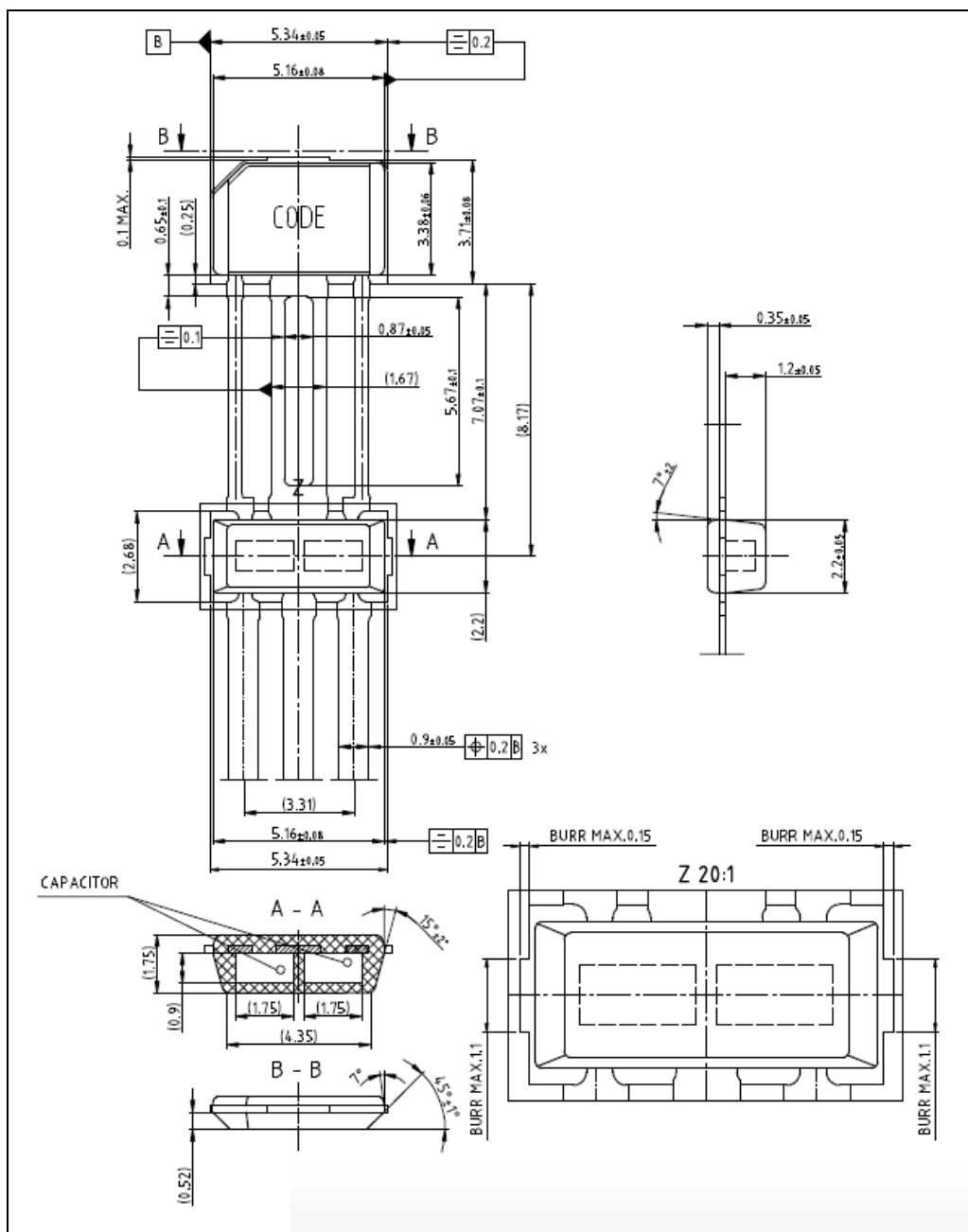


Figure 4-1 Package dimensions (PG-SSO-3-92)



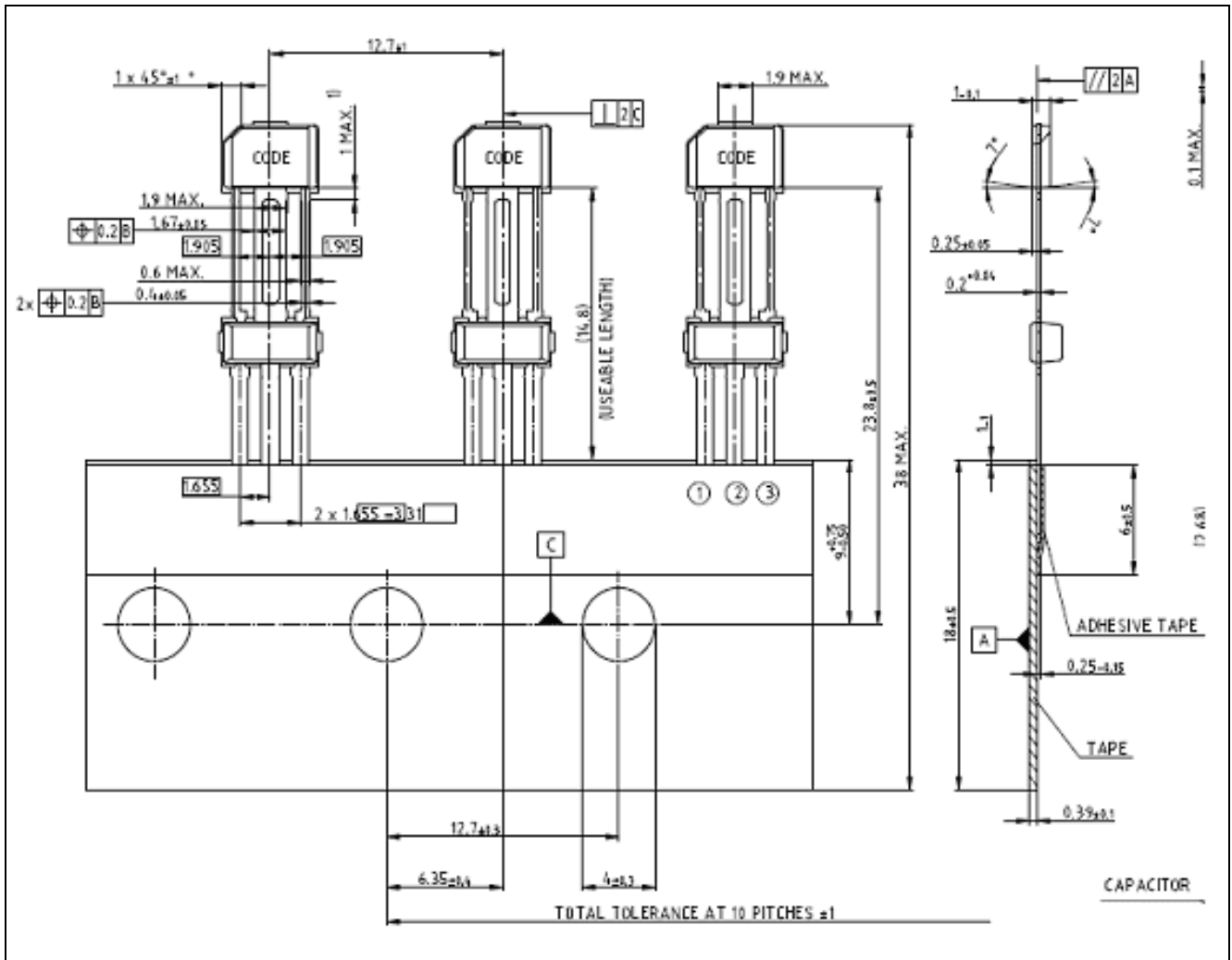


Figure 4-2 Tape loading orientating the PG-SSO-3-92

Pure tin covering (green lead plating) is used. Lead frame material is Wieland K62 (UNS:C18090) and contains CuSn1CrNiTi. Product is RoHS (Restriction of Hazardous Substances) compliant and marked with letter G in front of the data code marking and may contain a data matrix code on the rear side of the package (see also information note 136/03).

4.1 Package Information - TLE4957CB-2 E6747

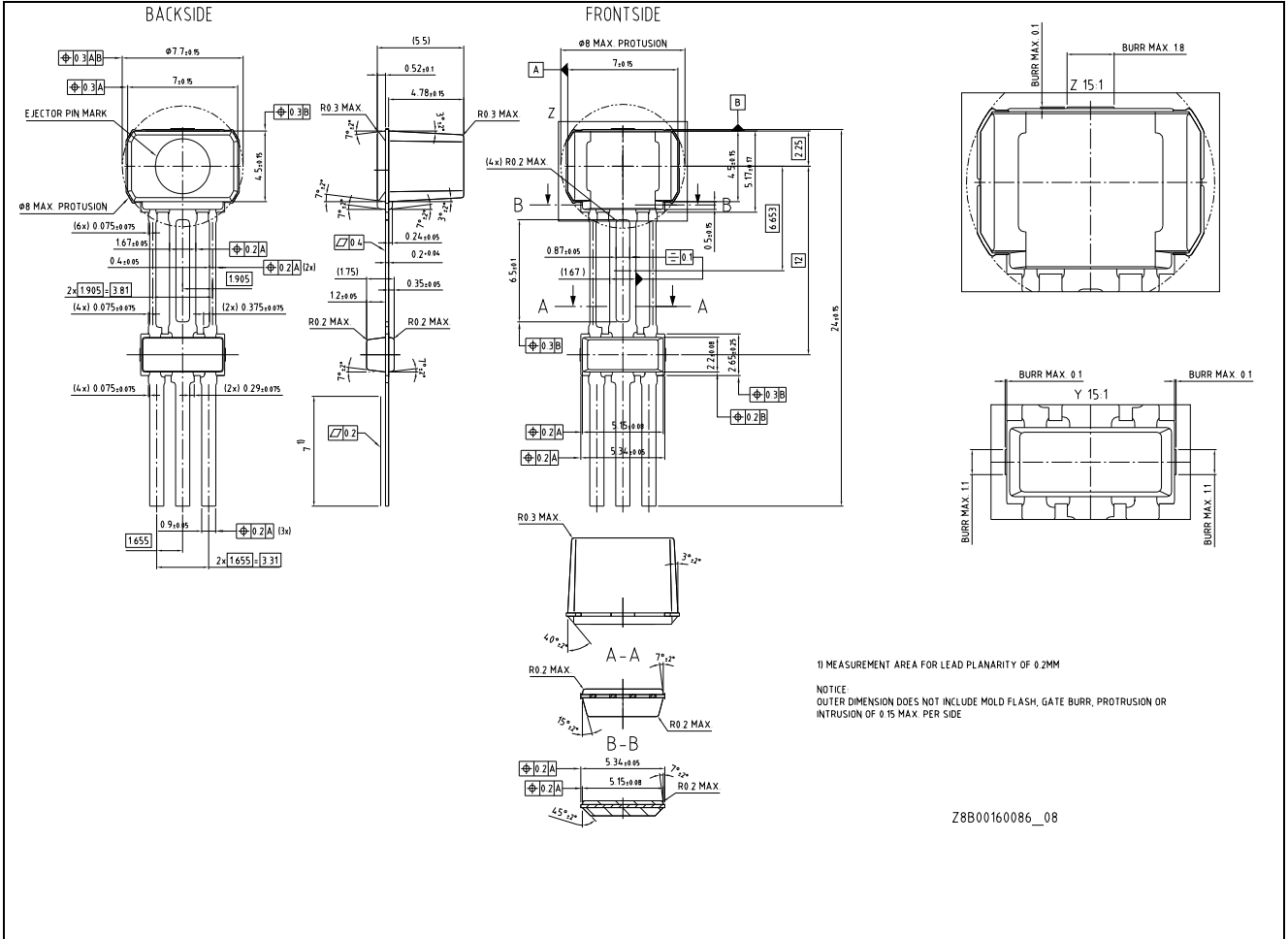


Figure 4-3 PG-SSOM-2-11 package outline

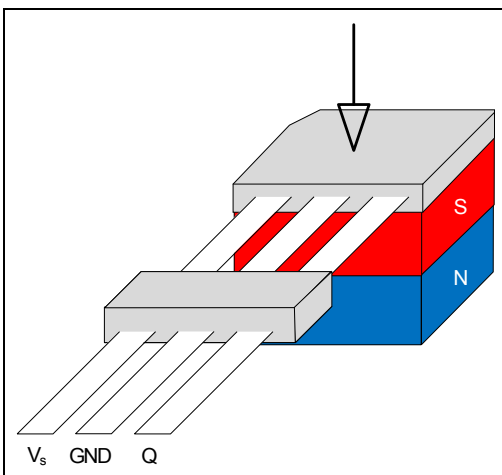


Figure 4-4 Back-bias field orientation

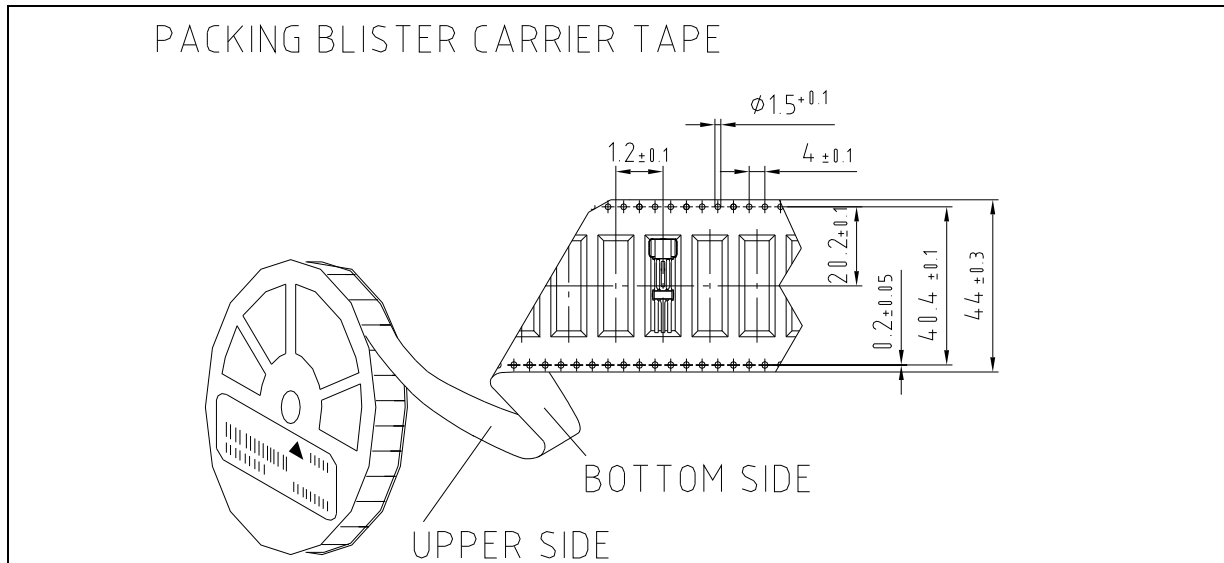


Figure 4-5 PG-SSOM-2-11 blister tape packing information

For additional packages information, sort of packing and others, please see Infineon internet web page: <http://www.infineon.com/products>

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