

TLE4957Cx-2 E6747

Dynamic Differential Hall Effect Sensor

TLE4957C-2 E6747
TLE4957CB-2 E6747

Product Information

2013-10-16

Sense & Control

Table of Contents

	Table of Contents	2
1	General	3
1.1	Target Application	3
1.2	Features	3
2	Functional Description	4
2.1	General	4
2.2	Pin Configuration	4
3	Specification	5
3.1	Operating Range	5
3.2	Electrical and Magnetic Characteristics	5
3.3	ESD Protection	5
3.4	Self-calibration Characteristics	5
3.5	Operating Characteristics - TLE4957CB-2 E6747	6
4	Package Information	7
4.1	Package Information - TLE4957CB-2 E6747	9

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

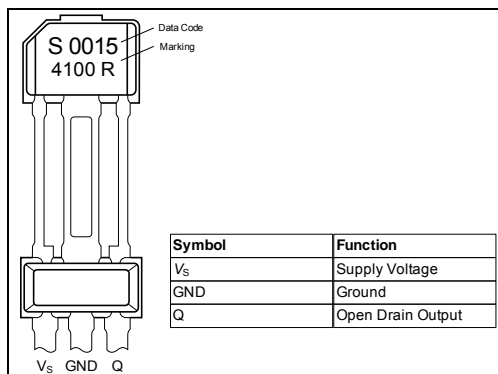


Figure 2-1 Sensor assembly

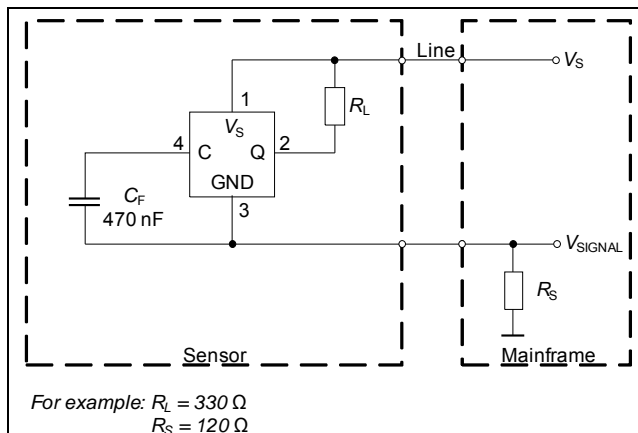


Figure 2-2 Two wire configuration

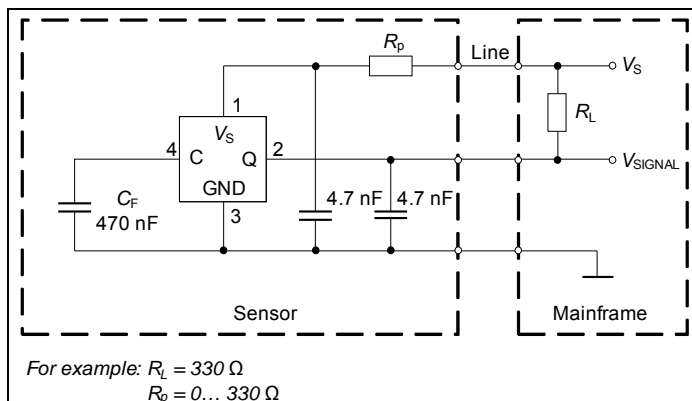


Figure 2-3 Three wire configuration

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}	–	–	± 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; ($150^\circ\text{C} \leq T_j < 175^\circ\text{C}$)

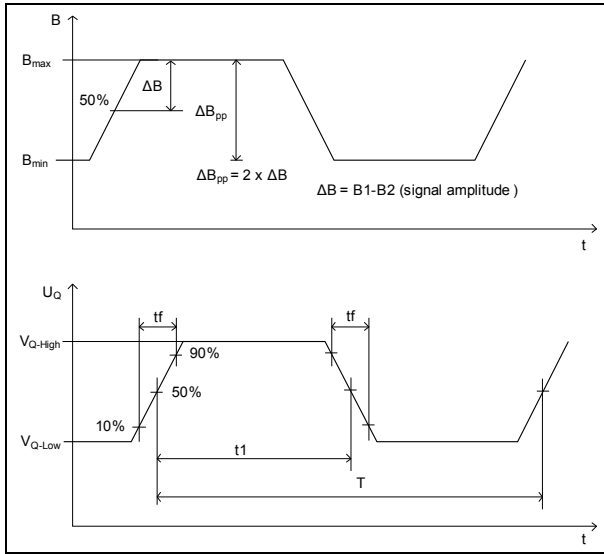


Figure 3-1 Rise / Fall time definition

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	

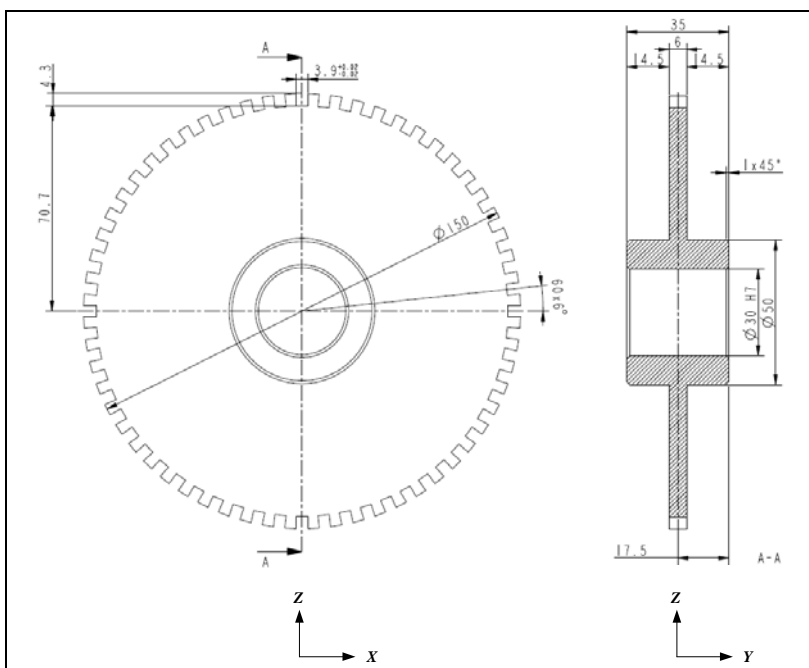


Figure 3-2 Reference Target Wheel

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

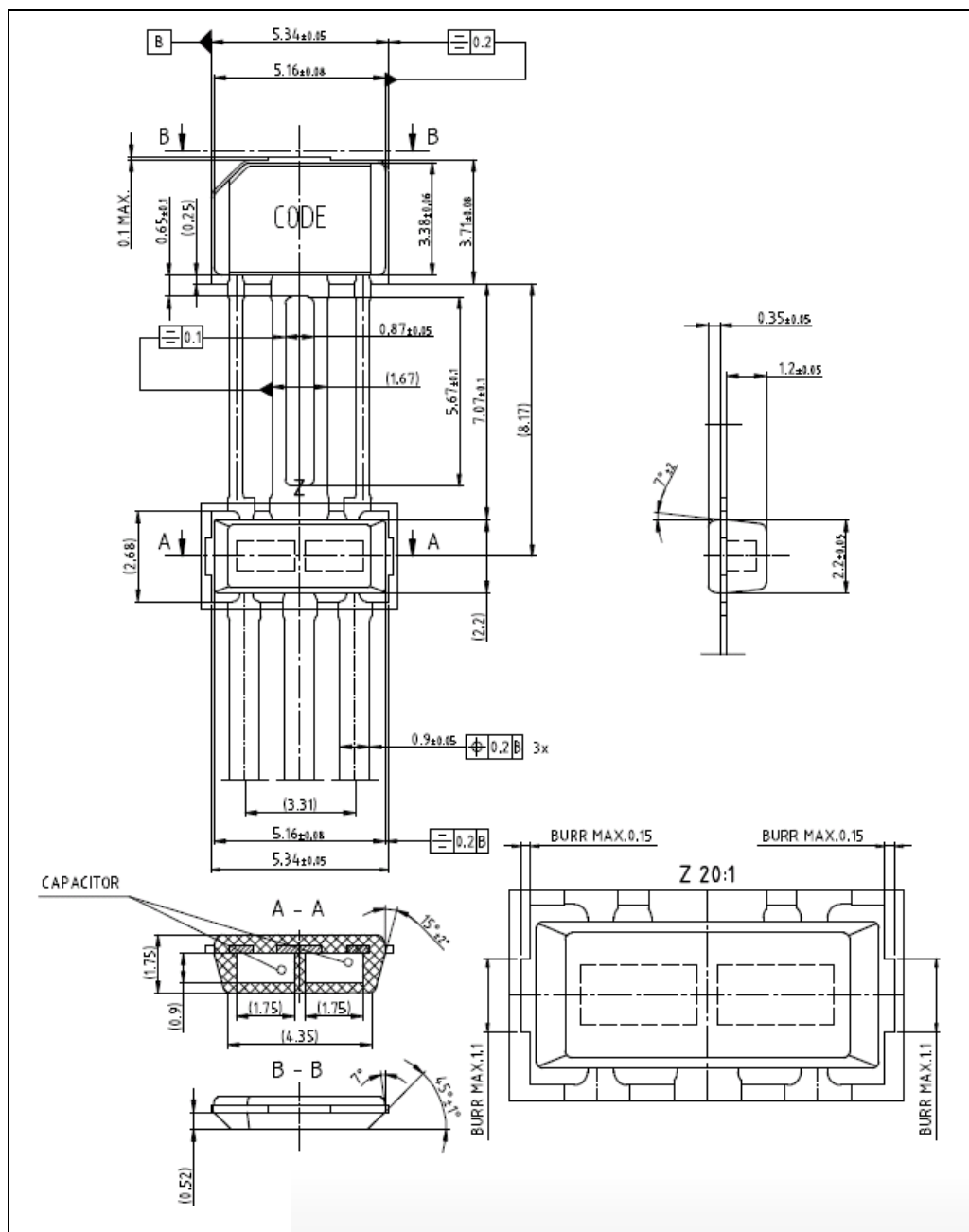


Figure 4-1 Package dimensions (PG-SSO-3-92)

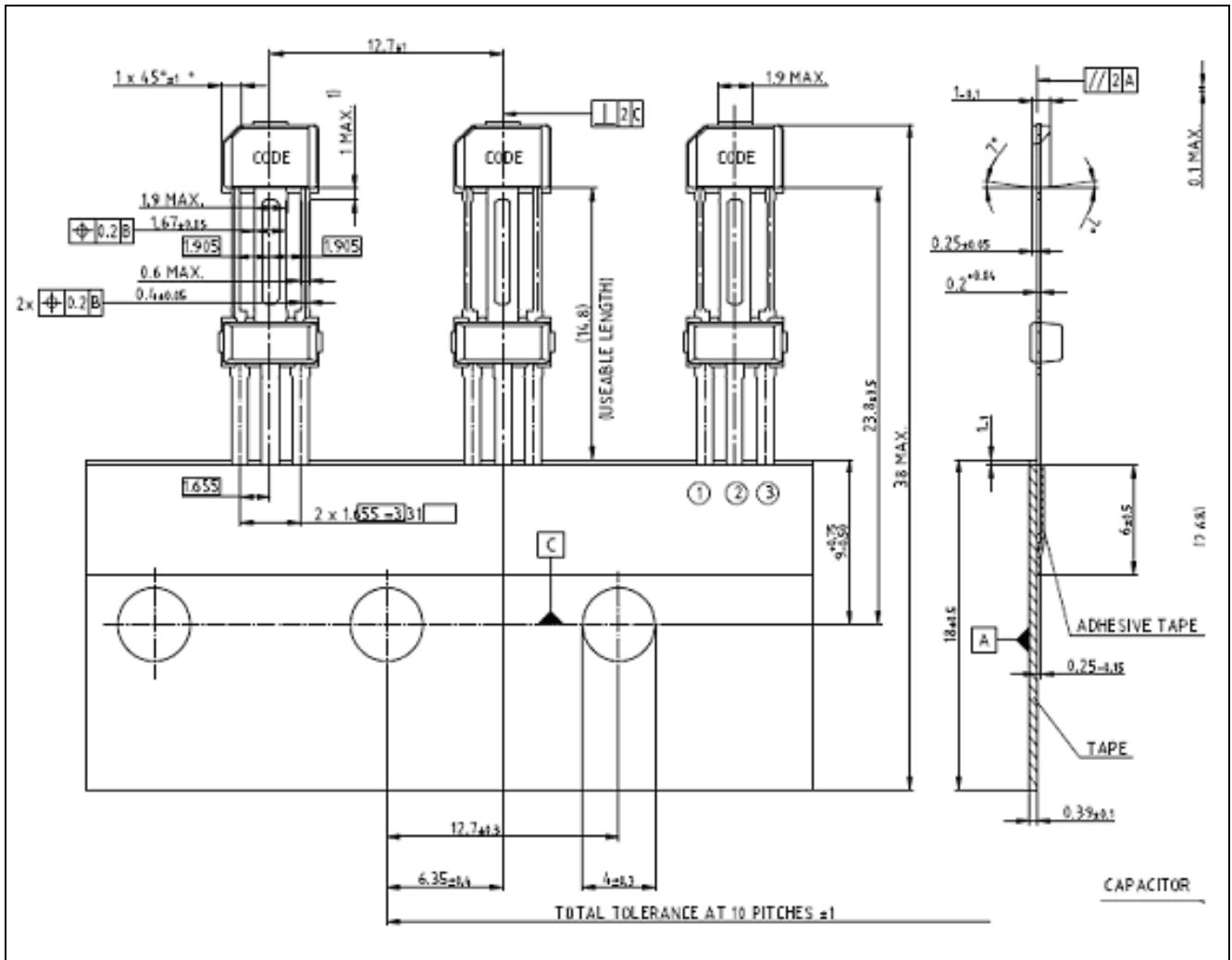


Figure 4-2 Tape loading orientating the PG-SSO-3-92

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

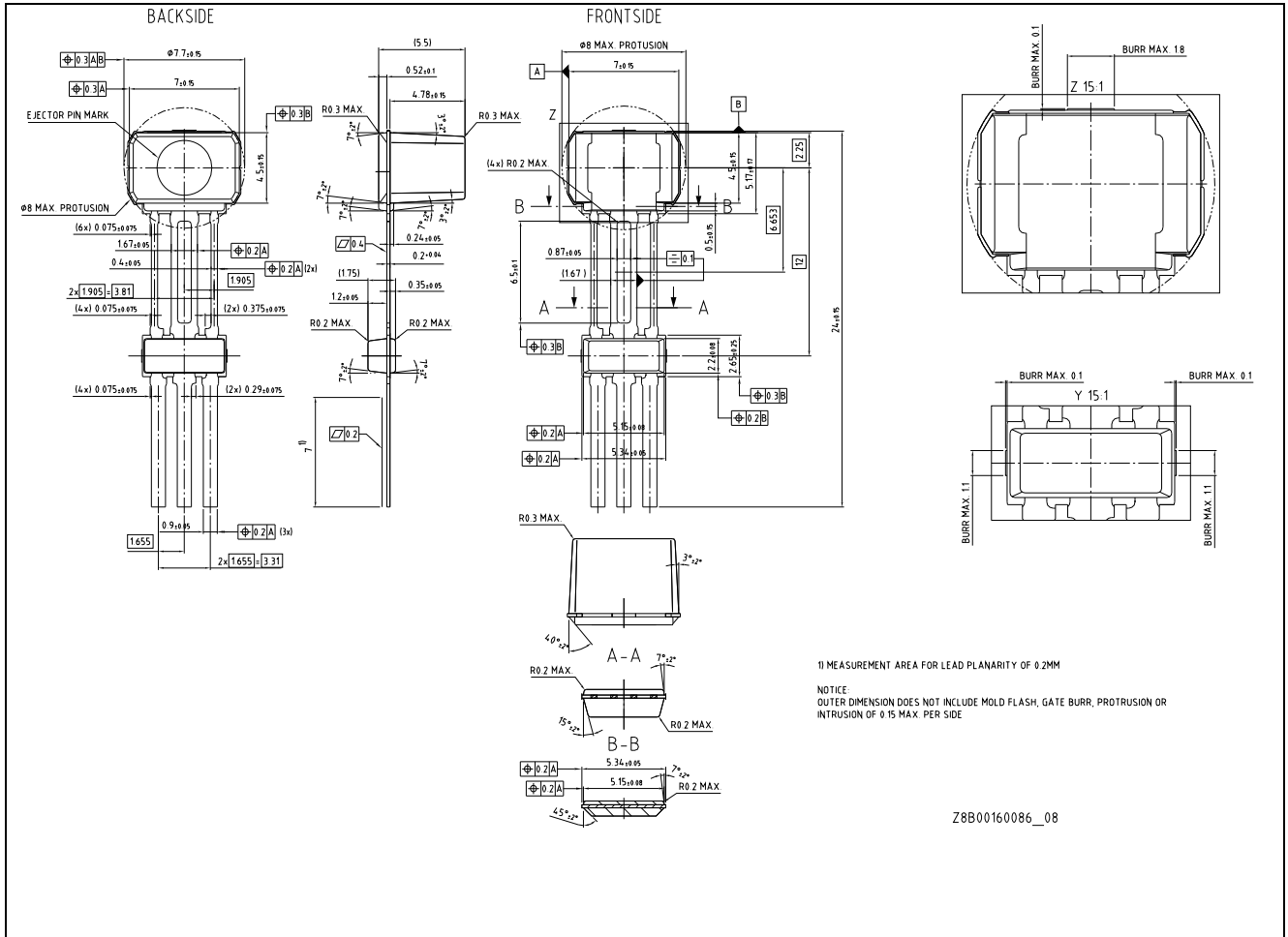


Figure 4-3 PG-SSOM-2-11 package outline

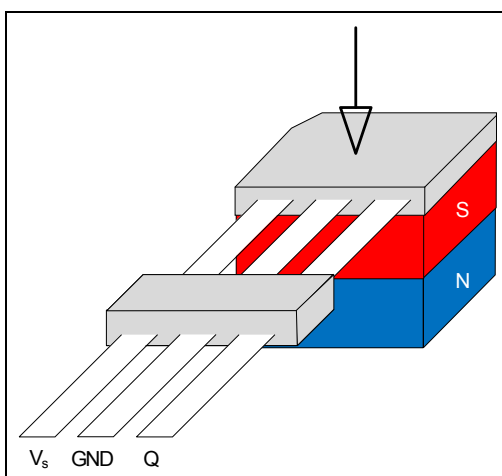


Figure 4-4 Back-bias field orientation

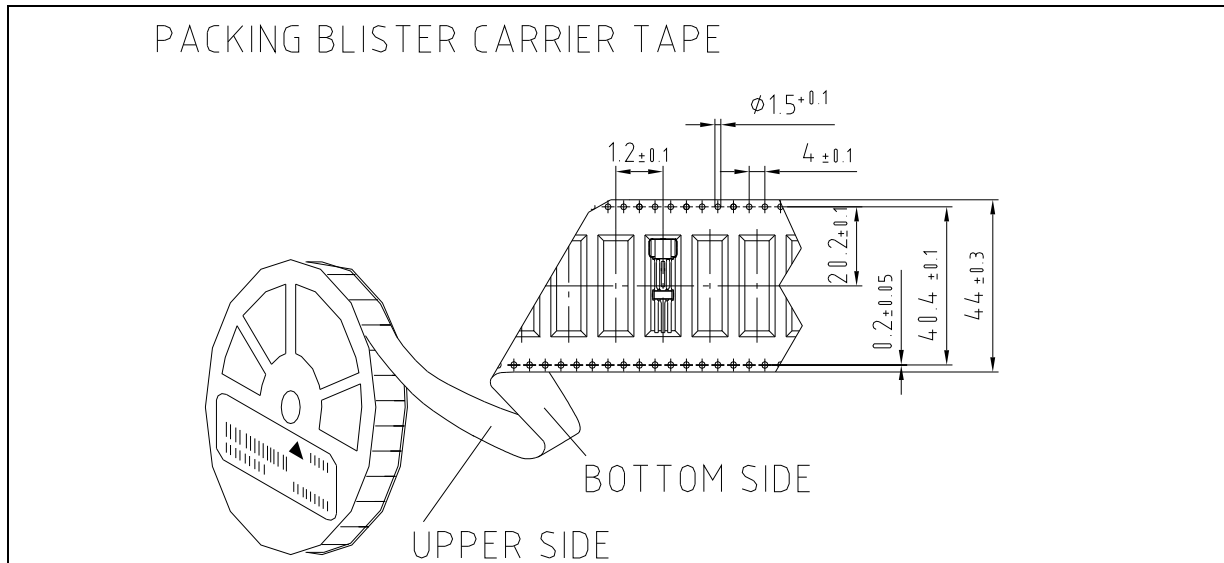


Figure 4-5 PG-SSOM-2-11 blister tape packing information

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

Edition 2013-10-16

Published by
Infineon Technologies AG
81726 Munich, Germany

© 2014 Infineon Technologies AG
All Rights Reserved.

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (www.infineon.com).

Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office. Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

www.infineon.com

Published by Infineon Technologies AG