BGS22W2L10

DPDT (Dual-Pole / Double-Throw) Differential RF Switch

Data Sheet

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Revision History

Previous Version: v1.3, October 11, 2012	
Page	**Subjects (major changes since last revision)**
8	Updated BGS22W2L10 Block Diagram (Figure 1)
10	Updated RF Characteristics (Table 6)
11	Updated Pin Configuration (Table 7)

Contents

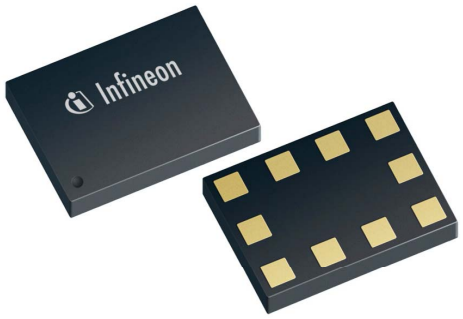
List of Figures

List of Tables

BGS22W2L10 DPDT (Dual-Pole / Double-Throw) Differential RF Switch

1 Features

- DPDT (Dual-Pole / Double-Throw) differential RF switch
- Frequency range: 0.1 - 2 *GHz*
- High signal power up to 24 *dBm*
- Supply voltage 2.4 - 3.6 *V*
- Low insertion loss
- High isolation
- Small package size of 1.55 x 1.15 mm^2
- No decoupling capacitors required if no DC applied on RF lines
- RoHS compliant package



RoHS

2 Product Description

The BGS22W2L10 is a DPDT (Dual-Pole / Double Throw) RF switch which combines two differential signals into one differential output or splits one differential signal into two separate differential lines. The parallel paths of the switch are controlled simultaneously through the same signals. The switch is designed to operate in battery powered applications with a supply voltage range of 2.4 - 3.6 *V*. The highly symmetric design ensures best phase- and amplitude accuracy.
A typical application is to combine two Rx paths in a mobile cellular device after the Rx filters or duplexers into one input to the tranceiver IC. The IC can also be used for a wide variety of applications switching balanced signals in a frequency range of 0.1 - 3 *GHz*. The RF switch is packaged in a standard RoHS compliant TSLP-10-1 package with a small outline of only 1.55 x 1.15 mm^2.
No decoupling capacitors are required in typical applications as long as no DC is applied to any RF port.

Table 1: Ordering Information

Type	Package	Marking
BGS22W2L10	TSLP-10-1	22W6

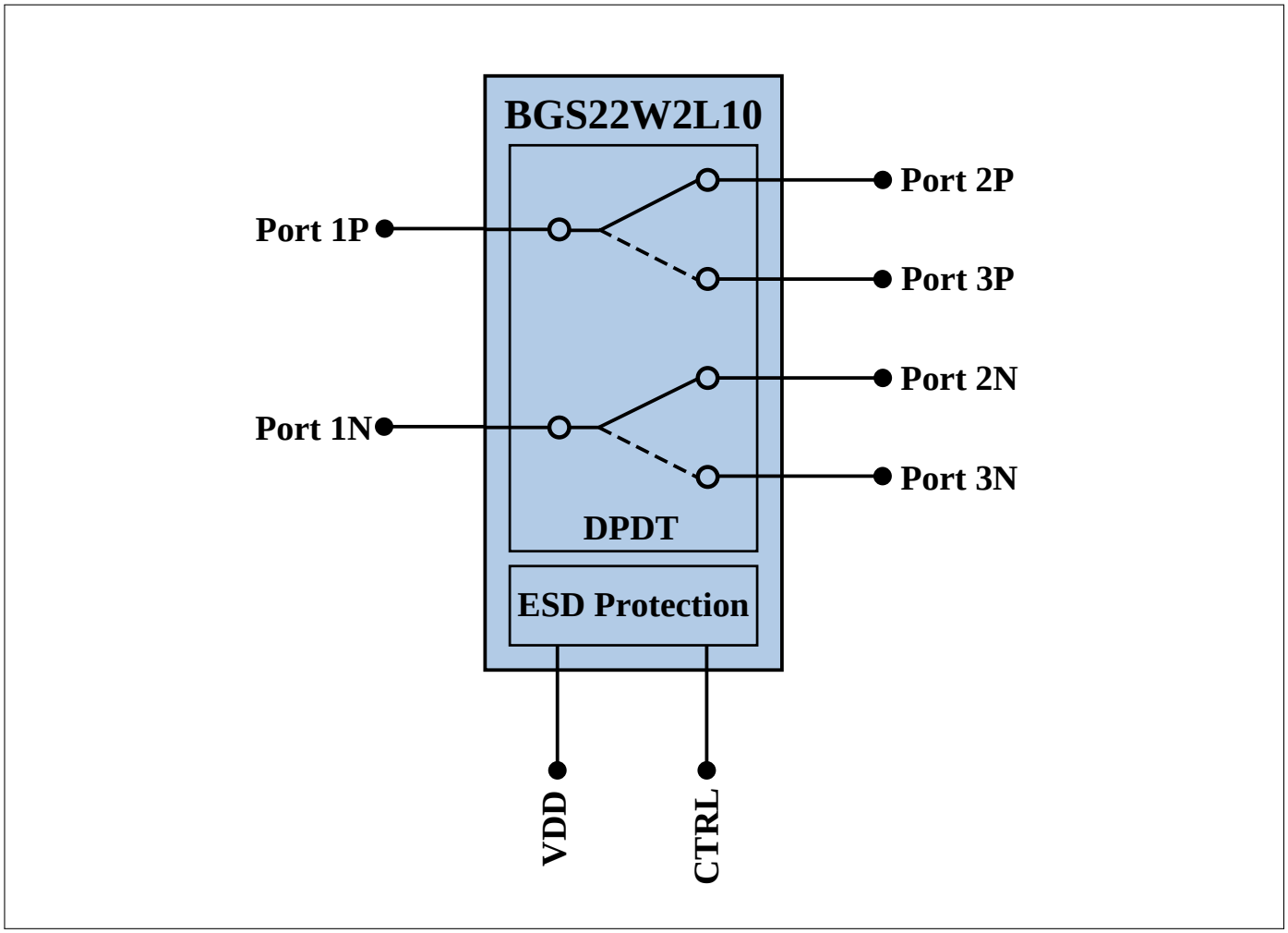


Figure 1: BGS22W2L10 Block Diagram

Table 2: Truth Table

Pin No.	CRTL
Port 1 to Port 2	0
Port 1 to Port 3	1

3 Maximum Ratings

Table 3: Maximum Ratings at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Supply Voltage	V_{DD}	-0.5	–	5.5	V	–
Control Voltage	V_{Ctrl}	-0.3	–	3.6	V	–
Storage Temperature Range	T_{STG}	-55	–	150	°C	–
RF Input Power	P_{In}	–	–	26	dBm	–
ESD Capability Human Body Model	V_{ESD_HBM}	1000	–	–	V	–
Junction Temperature	T_j	–	–	125	°C	–
Thermal Resistance Junction - Soldering Point	R_{thJS}	–	–	43	K/W	–

Attention:
Stresses above the max. values listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the integrated circuit.

4 Operation Ranges

Table 4: Operation Ranges

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Supply Voltage	V_{DD}	2.4	–	3.6	V	–
Control Voltage Low	V_{Ctrl_L}	-0.3	–	0.4	V	–
Control Voltage High	V_{Ctrl_H}	1.2	–	V_{DD}	V	–
RF Frequency	f_{RF}	0.1	–	2	*GHz*	–
Ambient Temperature	T_A	-30	25	85	°C	–

Table 5: RF Input Power

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
RF Input Power (50Ω)	P_{In}	–	–	24	dBm	–

5 RF Characteristics

Table 6: RF Characteristics

Test Conditions (unless otherwise specified):

- Terminating Port Impedance: Z_0 = 50 Ω
- Temperature Range: T_A = -30 ... +85 °C
- Supply Voltage: V_{DD} = 2.4 – 3.6 *V*
- Input Power: P_{IN} = 0 *dBm*

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Insertion Loss						
	IL	0.17	0.22	0.36	dB	824 - 915 MHz
		0.32	0.39	0.61	dB	1710 - 1910 MHz
Insertion Loss[1]						
	IL	0.20	0.22	0.30	dB	824 - 915 MHz
		0.36	0.39	0.50	dB	1710 - 1910 MHz
Return Loss						
	RL	22	27	36	dB	824 - 915 MHz
		14	17	20	dB	1710 - 1910 MHz
Isolation						
	ISO	31	35	39	dB	824 - 915 MHz
		22	27	30	dB	1710 - 1910 MHz
P0.1 dB Compression Point[1]						
	$P_{0.1dB}$	28	28.5	29	dBm	1000 MHz
Harmonic Generation up to 12.75 GHz						
Any Path	P_{Harm}	-95	-85	-80	dBc	21 dBm, 50Ω, 25 % Duty Cycle
Intermodulation Distortion in Rx Band[1]						
IMD2_Low	P_{IMD2_L}	-125	-115	-110	dBm	Tx = 10 dBm, Interferer = -15 dBm
IMD3	P_{IMD3}	-125	-115	-110	dBm	
IMD2_High	P_{IMD2_H}	-125	-115	-110	dBm	
Switching Time and Current Consumption						
RF Rise Time	$t_{10\%-90\%}$	–	0.35	1	µs	10% - 90% of RF Signal
Ctrl to RF Time	$t_{Ctrl-RF}$	–	0.6	1.5	µs	50% of Ctrl Signal to 90% of RF Signal
Supply Current	I_{DD}	75	120	350	µA	–
Phase Error[1]						
Between any two Paths	Ph_{Err}	0.3	1	1.9	Deg.	–

Note: All electrical characteristics are measured with all RF ports terminated by 50 Ω loads.

[1] T_A = *+25 °C*, V_{DD} = 3 *V*

6 Package Outline and Pin Configuration

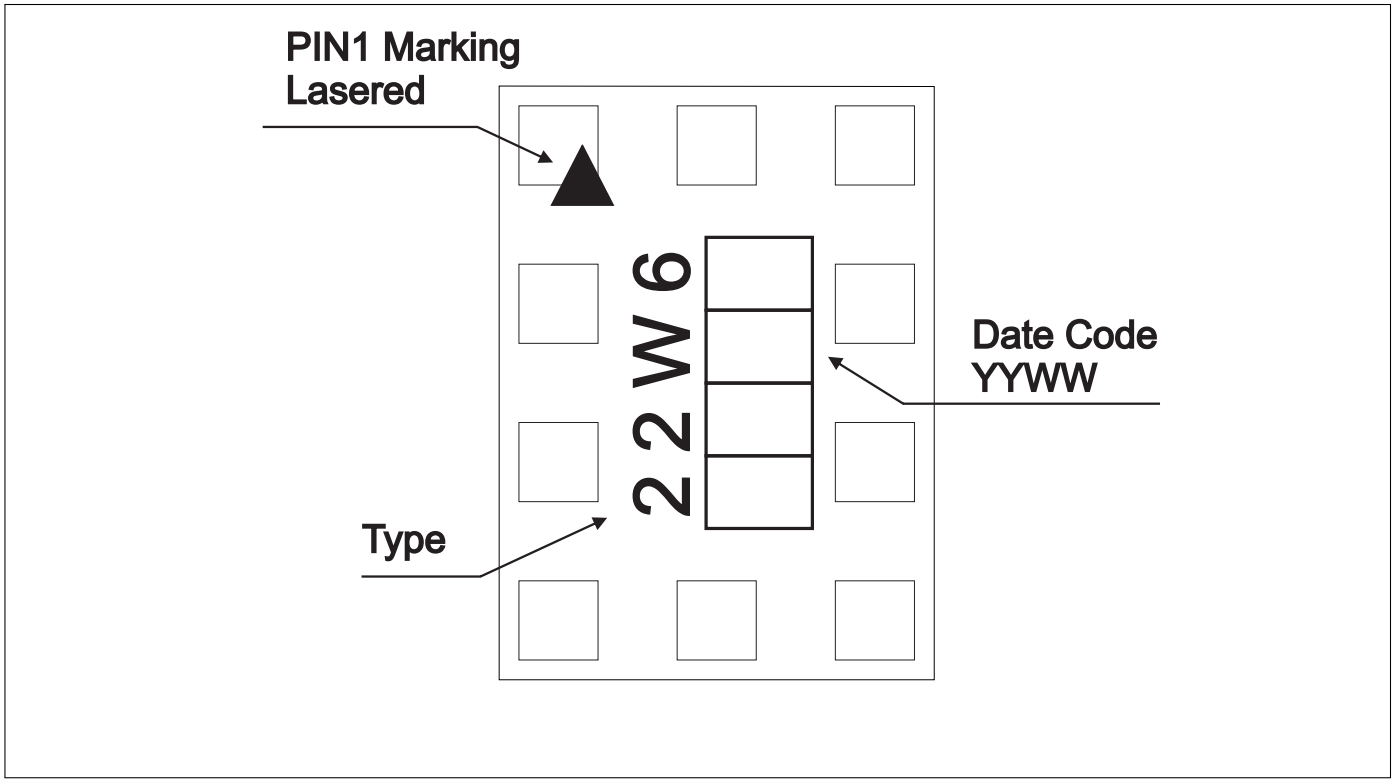


Figure 2: Marking Layout (top view)

Table 7: Pin Configuration

Pin No.	Name	Pin Type	Buffer Type	Function
1	Port 3P	I/O		Differential Output P of Port 3
2	GND	GND		Ground Pin
3	GND	GND		Ground Pin
4	Port 2N	I/O		Differential Output N of Port 2
5	Port 2P	I/O		Differential Output P of Port 2
6	CTRL	I		Control Voltage
7	Port 1P	I/O		Differential Input P of Port 1
8	Port 1N	I/O		Differential Input N of Port 1
9	VDD	PWR		Supply Voltage
10	Port 3N	I/O		Differential Output N of Port 3

Table 8: Mechanical Data

Parameter	Symbol	Value	Unit
Package X-Dimension	X	1.55 ± 0.05	*mm*
Package Y-Dimension	Y	1.15 ± 0.05	*mm*
Package Area	A	1.783	mm^2
Package Height	H	0.39 +0.01/-0.03	*mm*

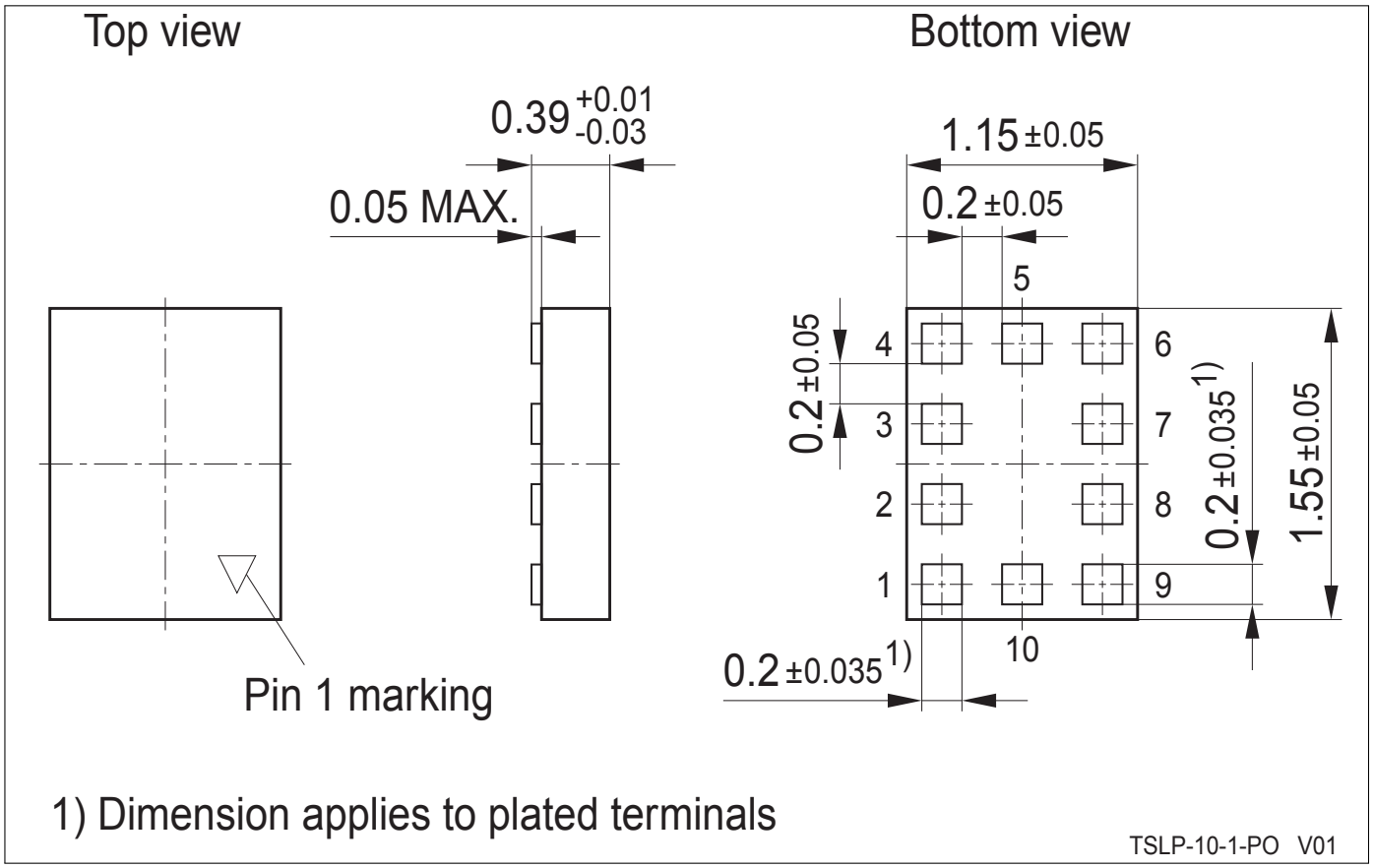


Figure 3: TSLP-10-1 Package Outline (top, side and bottom view)

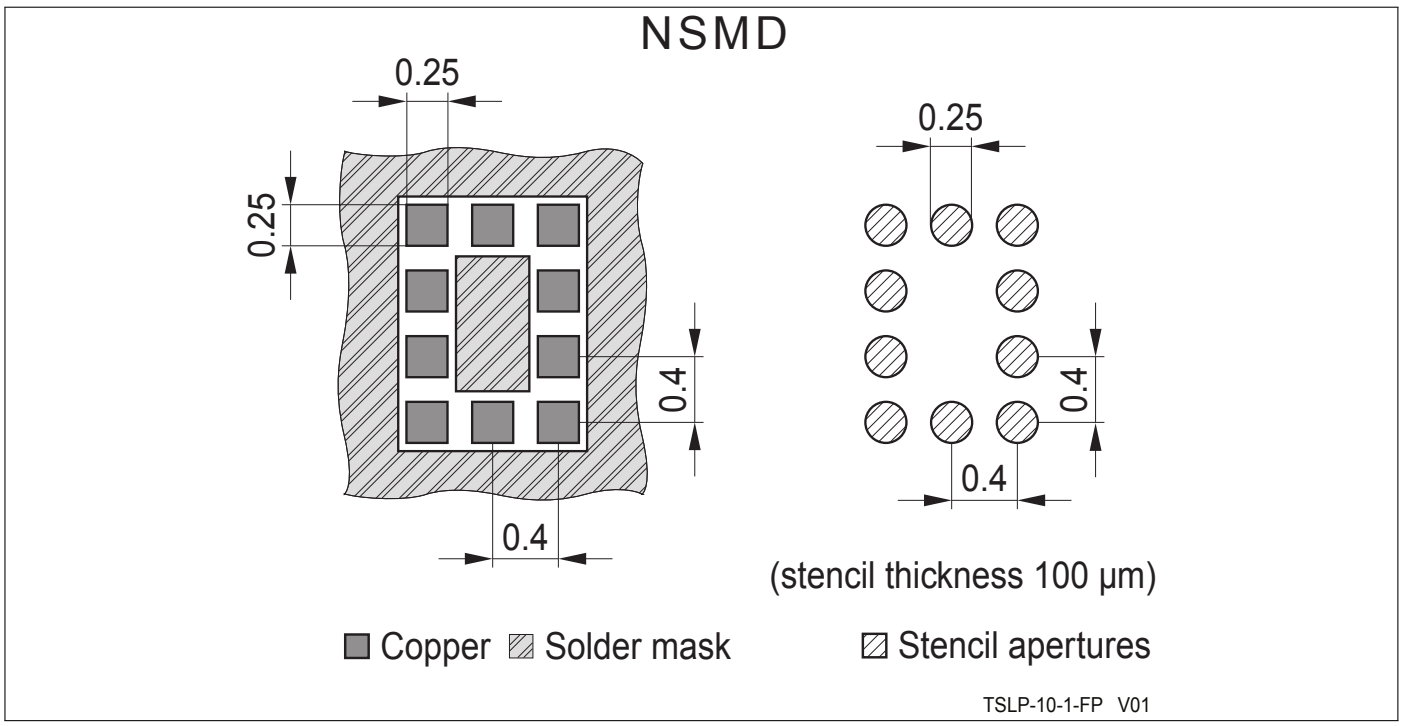


Figure 4: Footprint TSLP-10-1

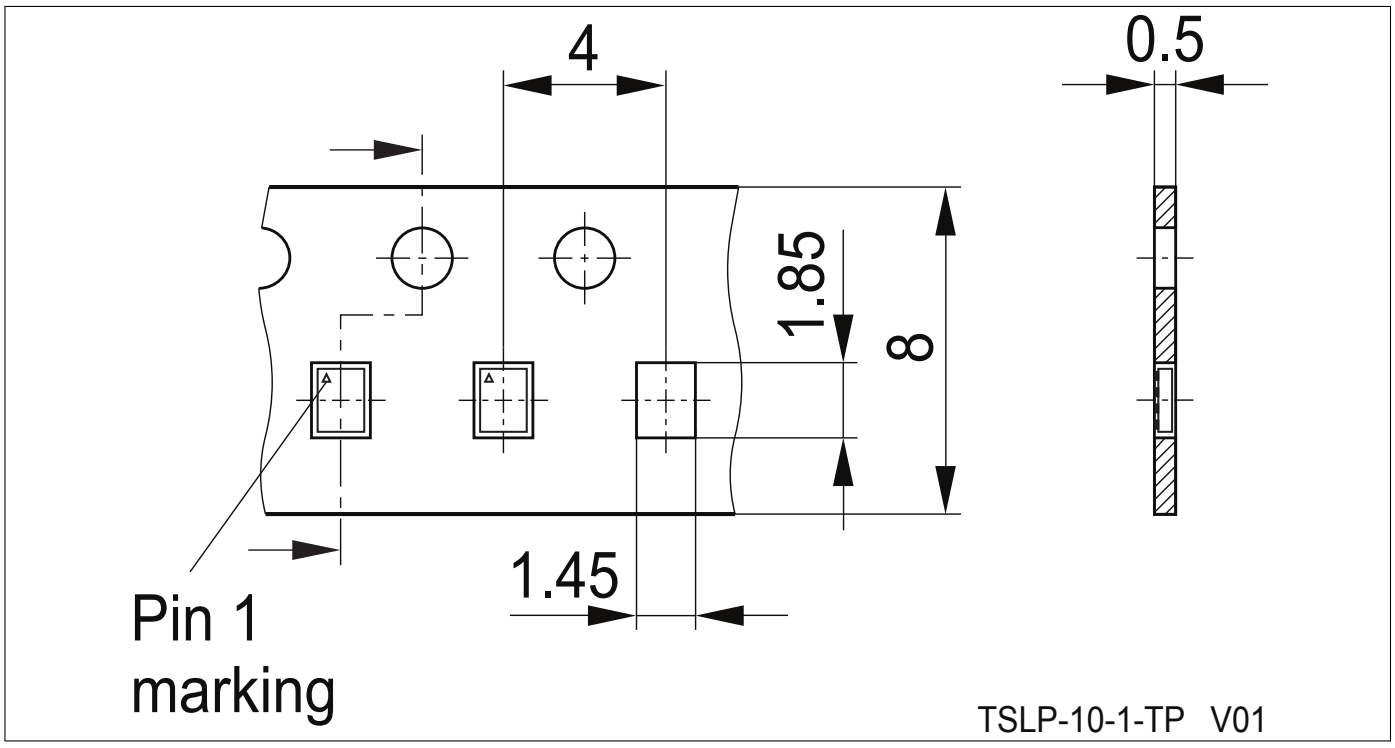


Figure 5: Tape and Reel Dimensions for TSLP-10-1

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