

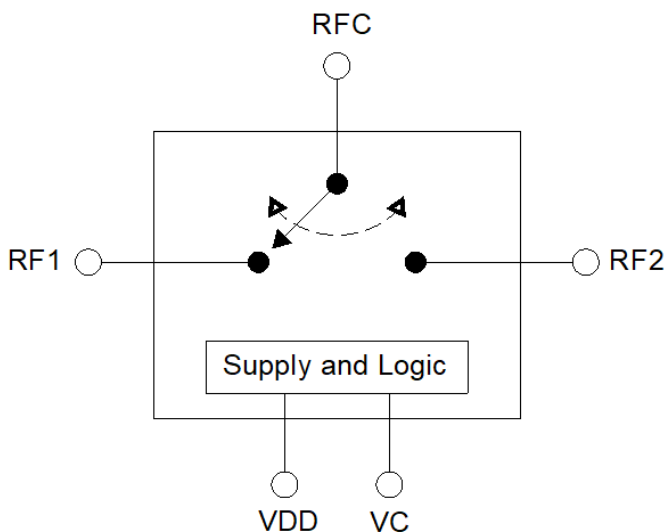
■ Description

The HWS580 is a CMOS Silicon-On-Insulator (SOI), Single-Pole, Double-Throw (SPDT) switch. The HWS580 features low insertion loss with high linearity and ruggedness performance. The device can be used in many wireless digital communication systems like WLAN, Sub-1G, UWB, IEEE 802.11 a/b/g/n/ac/ax and Bluetooth® for transmit/receive selection or antenna diversity function. The HWS580 SPDT switch operating frequency from 0.1 to 9.0 GHz in a low cost 1.0mm x 1.0mm x 0.4mm LUSON-6L plastic lead (Pb) free package.

■ Features

- **Frequency Range** : 0.1 to 9.0 GHz
- **Supply Voltage** : 1.6 to 3.6V
- **Low Insertion Loss** : 0.30 dB @ 2.4 GHz
0.45 dB @ 5.8 GHz
0.60 dB @ 7.125 GHz
0.80 dB @ 8.0 GHz
1.01 dB @ 9.0 GHz
- **High Isolation** : 43 dB @ 2.4 GHz
29 dB @ 5.8 GHz
25 dB @ 7.125 GHz
25 dB @ 8.0 GHz
31 dB @ 9.0 GHz
- **High P0.1dB** : 31 dBm @ 1.0 ~ 8.0 GHz
- **Miniature LUSON6L (1.0x1.0x0.4 mm) Using Lead (Pb) free materials with RoHS compliant**
- **One Bit Control SPDT Switch**
- **HBM ESD Classification Level : 1C**
- **CDM ESD Classification Level : C3**
- **Moisture Sensitivity Level : MSL 1**

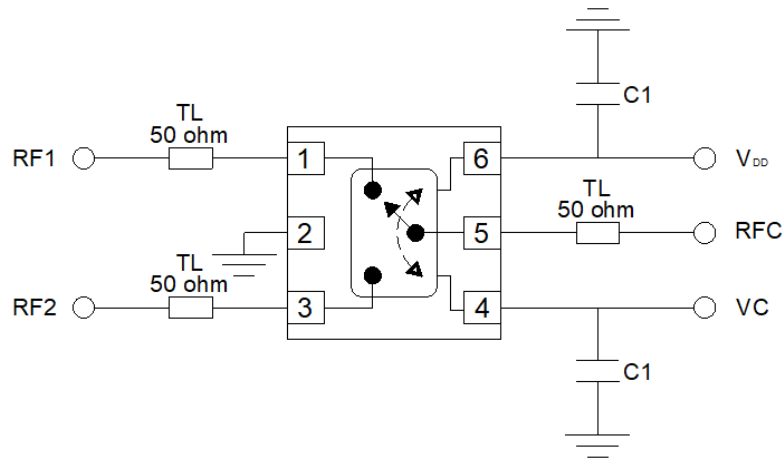
■ Functional Block Diagram



■ Applications

- **IEEE 802.11 a/b/g/n/ac/ax WLAN**
- **Bluetooth®**
- **Sub-1G**
- **UWB**

Application Circuit



Pin Assignments

Pin No.	Name	Description
1	RF1	RF Signal Port
2	GND	Ground
3	RF2	RF Signal Port
4	VC	DC Logic Control Voltage
5	RFC	RF Signal Port
6	V _{DD}	Supply Voltage

Evaluation Board Bill of Material

Component	Value	Description	Supplier	Part Number
IC		HWS580	Hexawave	
C1	100pF	By-pass Capacitor	Murata	GRM1555C1H101JA01D

Note :

1. The internal DC voltage at each RF port is zero voltage, and if an external DC voltage will be coupled to RF port, then DC blocking capacitor is required.
2. Information in the above application is for reference only, and does not guarantee the mass production design of the device.

■ Absolute Maximum Ratings

Parameter	Symbol	Maximum	Units
Supply Voltage	V _{DD}	4.2	V
RF Input Power	P _{in}	+31	dBm
Operating Ambient Temperature	T _{op}	-40 to +85	°C
Storage Temperature	T _{STG}	-65 to +150	°C
HBM ESD Classification Level		1C	
CDM ESD Classification Level		C3	

Note : If the satisfied of any one or more of the above conditions will lead to equipment damage.

■ Recommended Operating Ranges

Parameter	Symbol	Min	Typ	Max	Unit
Operation Frequency	Freq.	0.1		9.0	GHz
Supply Voltage	V _{DD}	1.6	3.3	3.6	V
Control Voltage (Low)	VC_L	0	0	0.2	V
Control Voltage (High)	VC_H	1.2	3.3	V _{DD}	V

Note : Recommended Operating Ranges indicate conditions for which the device is intended to be functional, but does not guarantee specific performance limits.

■ Logic Truth Table of Switch (ON-Path)

VC (Pin4)	Insertion Loss Path
H	RFC to RF1
L	RFC to RF2

Note :

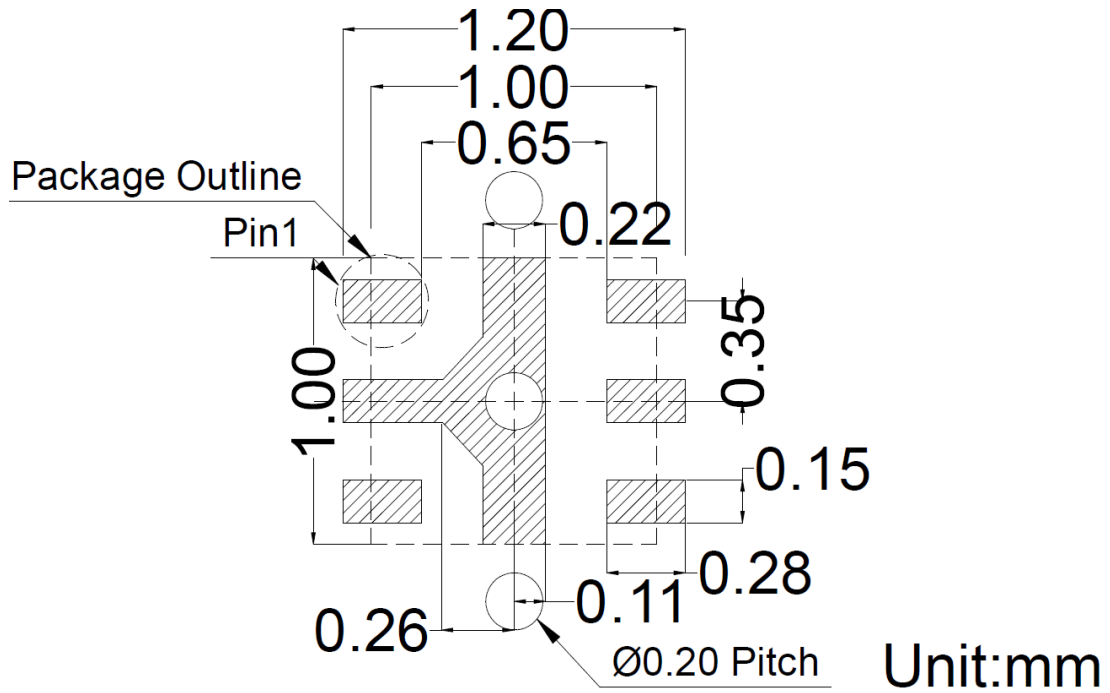
1. "H" = VC_H, "L" = VC_L.
2. Any modes other than those listed above are not supported.

■ Electrical Specifications

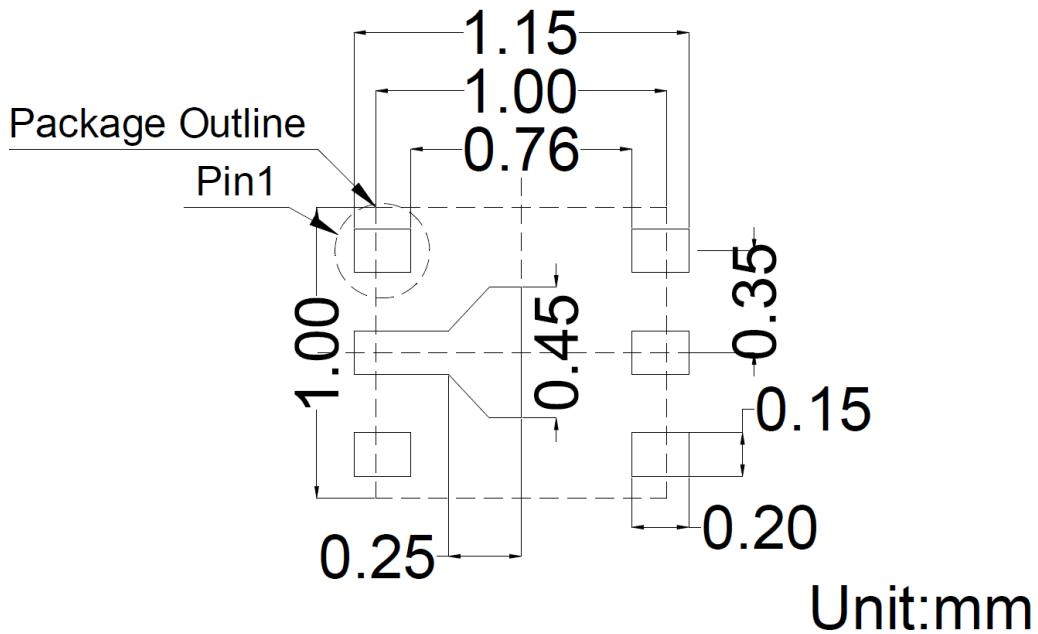
$V_{DD} = 3.3V$, $V_C = 0V/3.3V$, $T_A = 25^\circ C$, 50Ω system, and $P_{in} = 0dBm$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Insertion Loss	IL	0.1 – 2.4 GHz		0.25		dB
		2.4 – 4.8 GHz		0.30		dB
		4.8 – 6.0 GHz		0.45		dB
		6.0 – 7.2 GHz		0.60		dB
		7.2 – 8.0 GHz		0.80		dB
		8.0 – 9.0 GHz		1.01		dB
Isolation (RF1, RF2 to RFC)	ISO-1	0.1 – 2.4 GHz		31		dB
		2.4 – 4.8 GHz		31		dB
		4.8 – 6.0 GHz		13		dB
		6.0 – 7.2 GHz		13		dB
		7.2 – 8.0 GHz		17		dB
		8.0 – 9.0 GHz		20		dB
Isolation (RF1 to RF2)	ISO-2	0.1 – 2.4 GHz		55		dB
		2.4 – 4.8 GHz		43		dB
		4.8 – 6.0 GHz		29		dB
		6.0 – 7.2 GHz		25		dB
		7.2 – 8.0 GHz		25		dB
		8.0 – 9.0 GHz		31		dB
Return Loss	RL	0.1 – 2.4 GHz		33.3		dB
		2.4 – 4.8 GHz		20.8		dB
		4.8 – 6.0 GHz		14.0		dB
		6.0 – 7.2 GHz		16.5		dB
		7.2 – 8.0 GHz		22.7		dB
		8.0 – 9.0 GHz		13.1		dB
Input Power for 0.1 dB Compression	P0.1dB	1.0 – 8.0 GHz		31		dBm
2nd Harmonic	2fo	f = 1.0GHz @24 dBm f = 2.4GHz @24 dBm		-70	-60	dBc
3rd Harmonic	3fo	f = 5.0GHz @24 dBm		-63	-50	dBc
Switching on/off Time	Ts	50% VC to 90/10% RF		100		ns
Supply Current	I _{dd}	$V_{DD} = 3.3V$, $V_C = 0/3.3V$ (No RF Signal)		13	20	uA
Control Current	I _{ctrl}	$V_{DD} = 3.3V$, $V_C = 3.3V$ (No RF Signal)			5	uA

Recommended Footprint Patterns

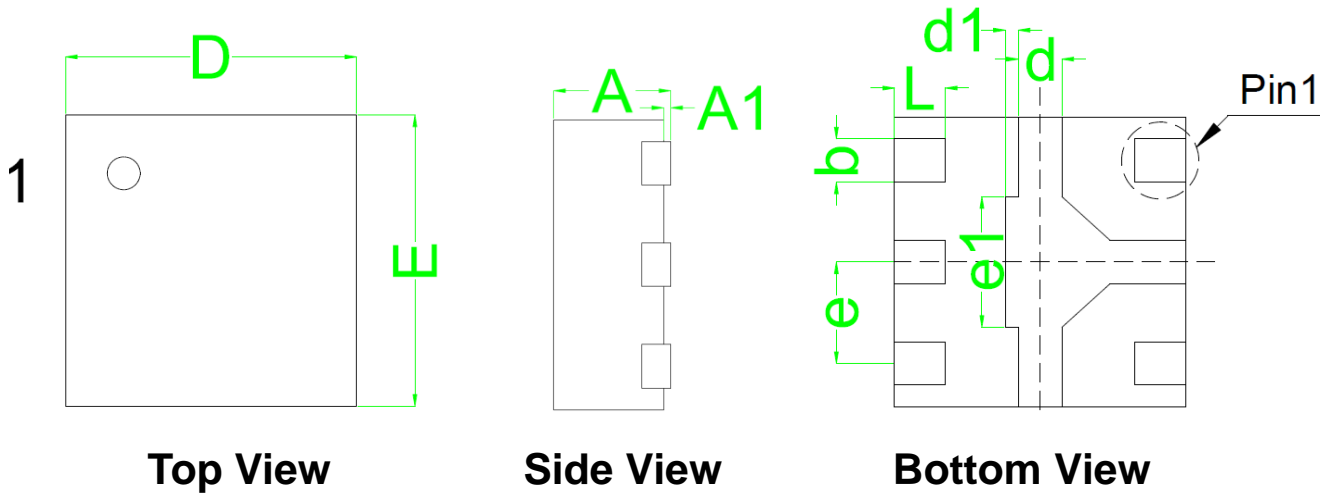


Metallization Top View



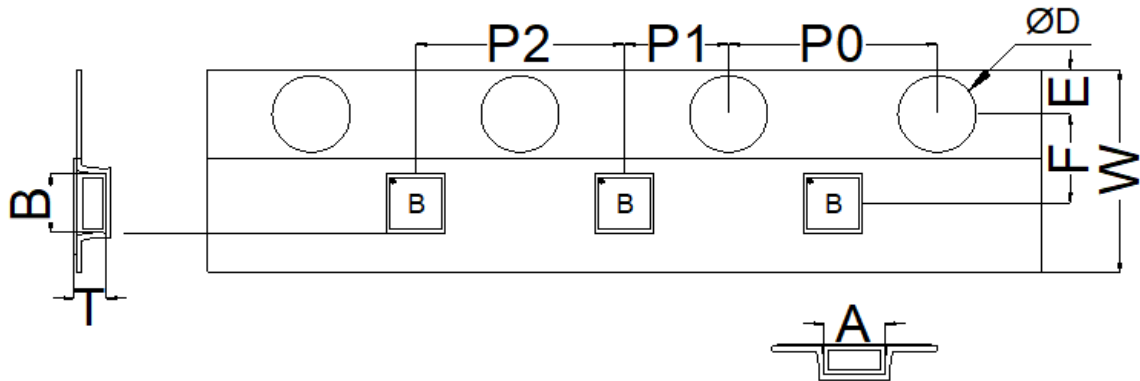
Stencil Aperture Top View

Package Dimensions



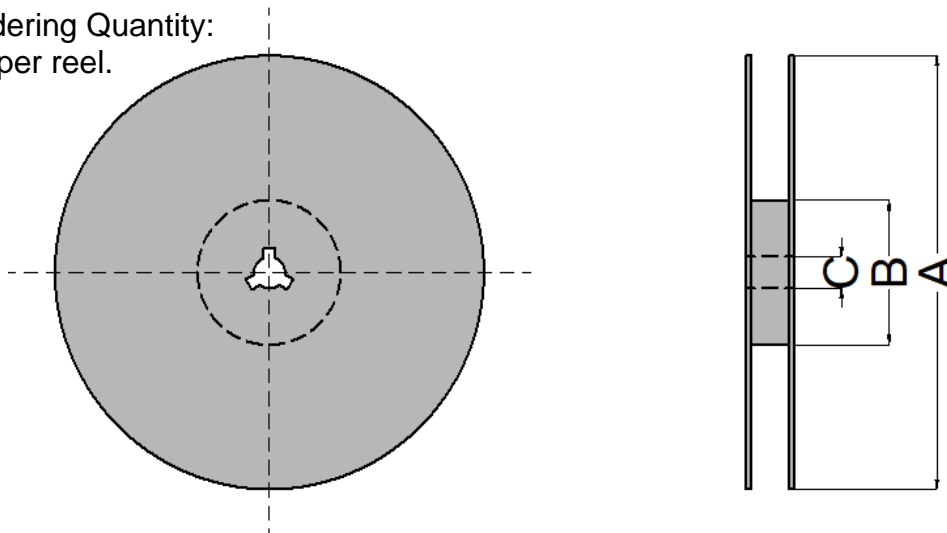
Symbol	Min	Max	Unit
A	0.370	0.400	mm
A1	0.000	0.050	
b	0.100	0.200	
D	0.950	1.030	
d	0.100	0.200	
d1	0.055 REF		
E	0.950	1.030	
e	0.350 TYP.		
e1	0.450 REF		
L	0.125	0.225	

■ Tape and Reel Dimensions



Symbol	Min	Max	Unit
A	1.09	1.19	mm
B	1.12	1.22	
ØD	1.50	1.60	
E	1.65	1.85	
F	3.45	3.55	
P0	3.90	4.10	
P1	1.95	2.05	
P2	3.90	4.10	
T	0.51	0.61	
W	7.90	8.30	

Minimum Ordering Quantity:
5000 pieces per reel.



Symbol	Min	Max	Unit
A	Ø178	Ø182	mm
B	Ø59	Ø61	
C	Ø12.9	Ø13.3	