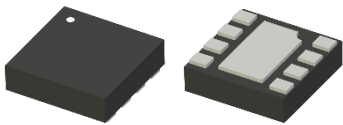


Description

The ASWD-S2-0004 is a high-performance broadband GaAs SPDT RF switch engineered for low insertion loss and superior signal integrity up to 8.5 GHz. Optimized for ultra-wideband (UWB) and Wi-Fi IEEE 802.11a/b/g/n/ac/ax systems, it is also well-suited for test equipment requiring ultra-fast switching speeds. Housed in a compact 2.0 mm × 2.0 mm × 0.6 mm DFN-8L package, the ASWD-S2-0004 is lead-free, RoHS-compliant, and rated at Moisture Sensitivity Level (MSL) 3, ensuring reliability in demanding applications.



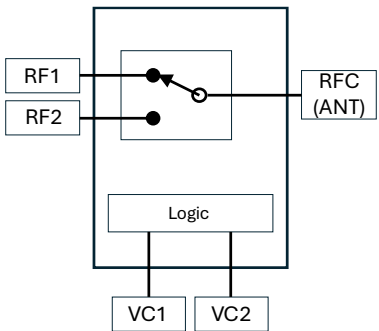
Key Features

- DFN-8L Package: 2.0mm x 2.0mm
- Frequency Range: 1 ~ 8.5 GHz
- Low Insertion Loss: 0.6 dB Typ. @f = 2.0 to 6.0 GHz
- High Isolation: 30 dB Typ. @f = 2.0 to 6.0 GHz
- P_{0.1dB} = +26 dBm Typ.
- Wide Control Voltage V_{CTL_H} = 2.9 ~ 5.0 V
- Low Current Consumption: 1 μA
- [RoHS Compliant | MSL Level 3](#)

Typical Applications

- UWB System
- Wi-Fi IEEE 802.11a/b/g/n/ac/ax system
- GSM/WCDMA/LTE/5G NR receiving
- Ultra-Fast Switching for Test Equipment

Functional Block Diagram



Ordering Information

Part No.	Description
ASWD-S2-0004	1~ 8.5GHz Broadband GaAs SPDT RF Switch on Cut Tape
ASWD-S2-0004	1~ 8.5GHz Broadband GaAs SPDT RF Switch on Tape & Reel
ASWD-S2-0004-EVB	1~ 8.5GHz Broadband GaAs SPDT RF Switch EVB

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Control Voltage	V _{CTL}	-	-	8.5	V
Max Input Power	P _{IN, MAX}	-	-	+34	dBm
Operating Temperature	T _{OP}	-40	-	85	°C
Storage Temperature	T _{STG}	-65	-	150	°C
Moisture Sensitivity Level	-	MSL3			-

Operation of this device outside the parameter ranges given above may cause permanent damage.

Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Unit
V _{CTL}	2.9	3.0	5.0	V
Pin (RFC – RFX), CW, 50 Ω			25	dBm
T _j at MTTF>105 hrs.	-	150	-	°C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

RF Electrical Specifications

Parameters		Condition	Values			Unit
			Minimum	Typical	Maximum	
Insertion Loss	IL	2.0-6.0 GHz	-	0.6	-	dB
		6.0-8.0 GHz	-	0.9	-	
Isolation	ISL	2.4 GHz	24	29	-	dB
		5.3 GHz	28	33	-	
		5.8 GHz	25	30	-	
		6.0-8.5 GHz	-	20	-	
Return Loss	RL		-	16	-	dB
Input P _{0.1dB}	P _{0.1dB}	2.4 GHz	-	26	-	dBm
		5.3 GHz		26		
		5.8 GHz		25		
2 nd Harmonics	2f ₀	2.4 GHz, Pin = 20dBm	-	-80	-	dBc
		5.3 GHz, Pin = 20dBm	-	-71	-	
		5.8 GHz, Pin = 20dBm	-	-71	-	
3 rd Harmonics	3f ₀	2.4 GHz, Pin = 20dBm	-	-83	-	dBc
		5.3 GHz, Pin = 20dBm	-	-71	-	
		5.8 GHz, Pin = 20dBm	-	-72	-	
Turn-on switching time	t _{SW_On}	-	-	13	-	ns
Turn-off switching time	t _{SW_Off}	-	-	35	-	ns

Notes:

1. Production screening tests are done at 1000MHz and 2000MHz.
2. This is just a linearity figure of merit. Refer to 'Recommended Operating Conditions' table for Pin levels

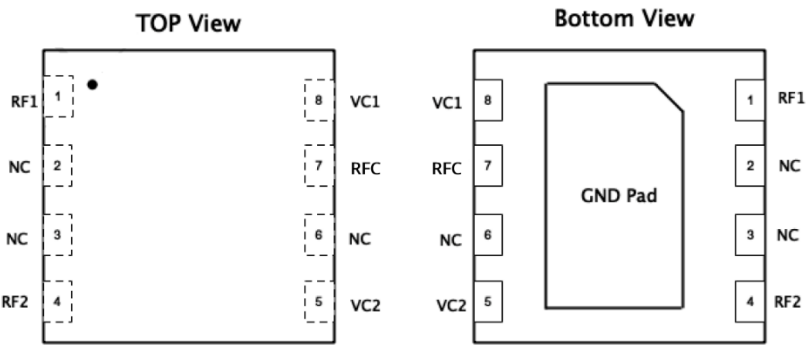
DC Electrical Specifications

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Control Voltage	V _{CTL_H}	2.9	3.0	5.0	V
	V _{CTL_L}	0	0	0.4	V
Control Current	I _{CTL}	-	1	-	uA

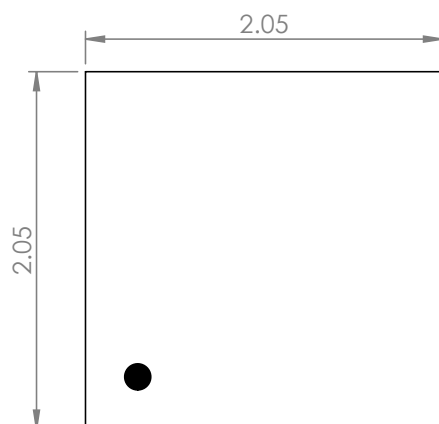
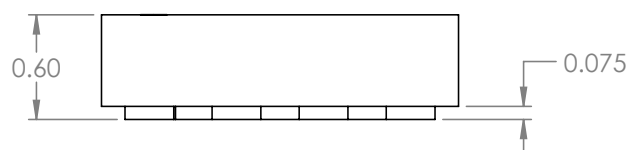
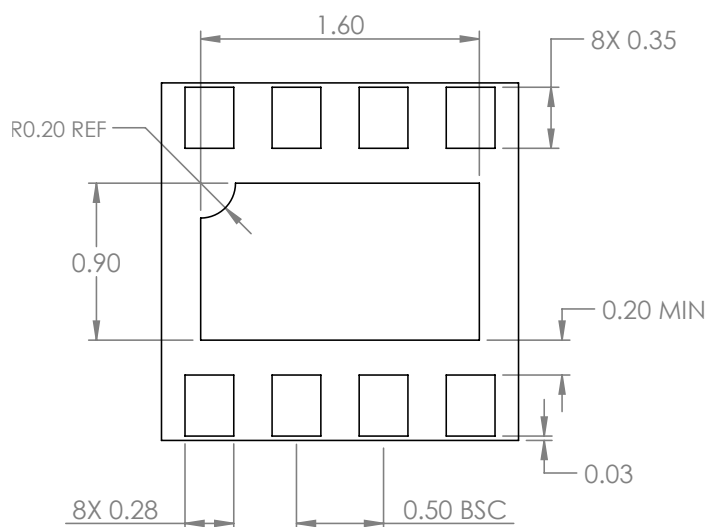
Control Logic

Control VC1	Control VC2	RFC-RF1	RFC-RF2
1	0	ON	OFF
0	1	OFF	ON

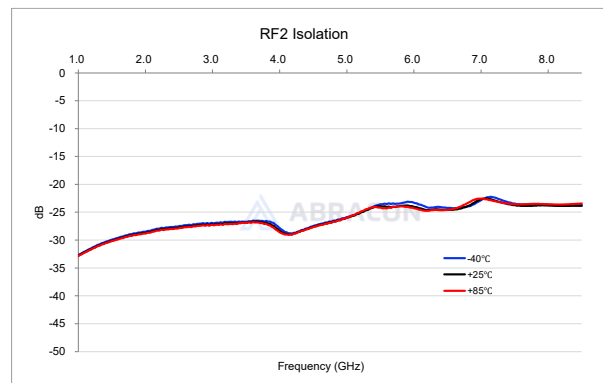
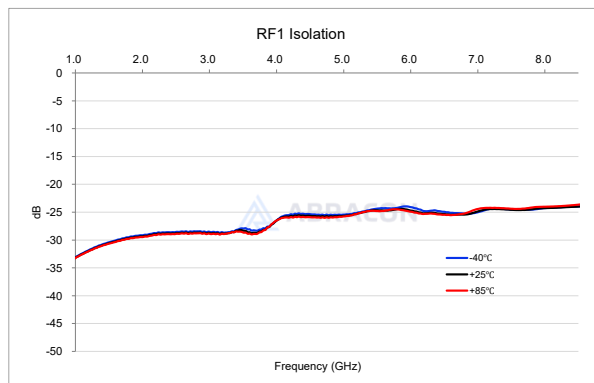
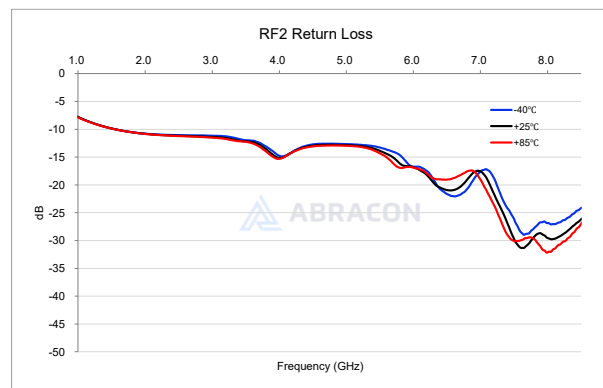
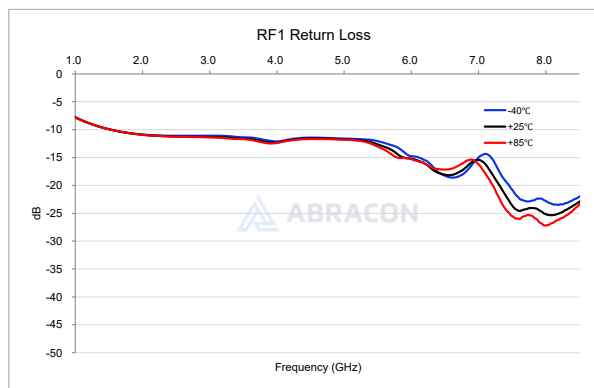
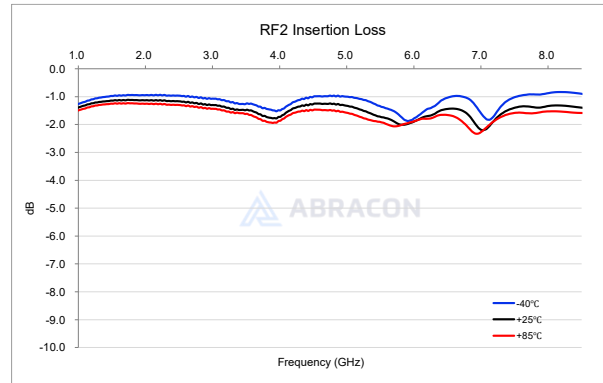
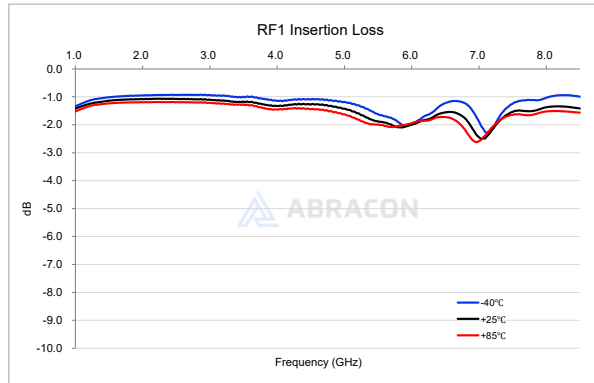
Pin Configuration



Pin	Name	Description
1	RF1	RF Port
2	NC	N/C
3	NC	N/C
4	RF2	RF Port
5	VC2	Voltage Control
6	NC	N/C
7	RFC	RF Common Port (Antenna Port)
8	VC1	Voltage Control
9	EPAD	Ground

Product Dimensions**TOP VIEW****FRONT VIEW****BOTTOM VIEW***Unit: mm*

Performance Plots

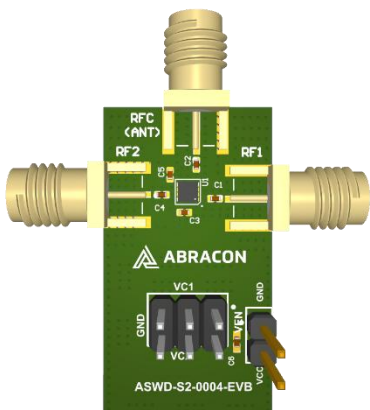


ASWD-S2-0004

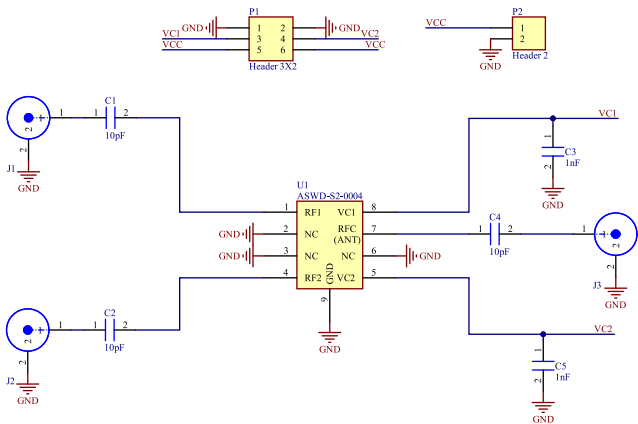
1~ 8.5GHz Broadband GaAs SPDT RF Switch



Evaluation Board ASWD-S2-0004-EVB



EVB



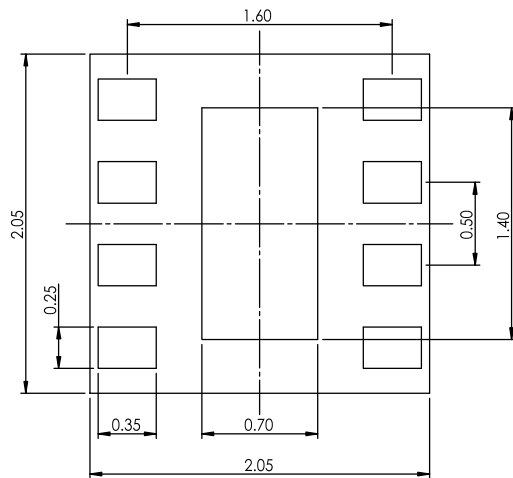
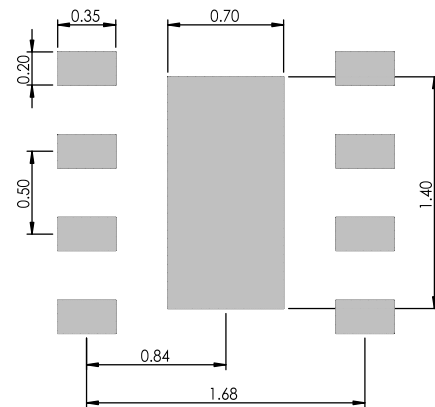
Schematic

Bill of Material

Component	Description	Manufacturer	Manufacturer Part	QTY
U1	1~ 8.5GHz Broadband GaAs SPDT RF Switch	Abrakon	ASWD-S2-0004	1
C1, C2, C4	Capacitor (10pF)	Murata	GRM0222C1C100GA03	3
C3, C5	Capacitor (1nF)	Murata	GRM022R60J102KE19	2

NOTES:

- 1. Input and output are 50-ohm lines.

IC Footprint & PCB Land Pattern**Footprint****Land Pattern***Unit: mm*

Reflow Profile [JEDEC J-STD-020]

Solder paste: Sn/3.0Ag/0.5Cu

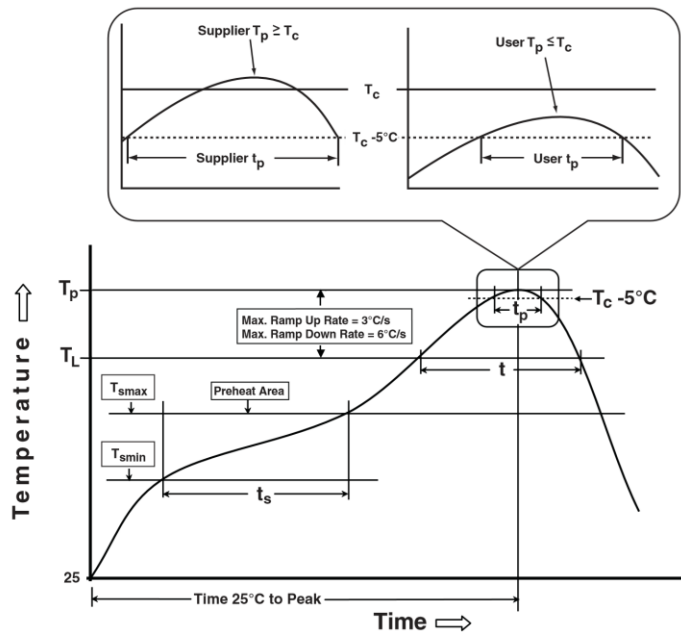


Table 1

SnPb Eutectic Process

Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5mm	235°C	220°C
≥2.5mm	220°C	220°C

Table 2

Pb-Free Process

Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6mm	260°C	260°C	260°C
1.6mm - 2.5mm	260°C	250°C	245°C
>2.5mm	250°C	245°C	245°C

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100°C	150°C
Temperature maximum (T_{smax})	150°C	200°C
Time (T_{smin} to T_{smax}) (t_s)	60 – 120 sec.	60 – 120 sec.
Average ramp-up rate (T_{smin} to T_p)	3°C/sec. max	3°C/sec. max
Liquidous temperature (T_L)	183°C	217°C
Time at Liquidous (T_L)	60 – 90 sec.	60 – 90 sec.
Peak package body temperature (T_p)*	See Table 1	See Table 2
Time (T_p)** within 5°C of the specified classification temperature (T_c)	20 sec.	10 sec.
Ramp-down rate (T_p to T_{smax})	3°C/sec. max	3°C/sec. max
Time 25°C to peak temperature	6 min. max	8 min. max
Reflow cycles	2 max	2 max

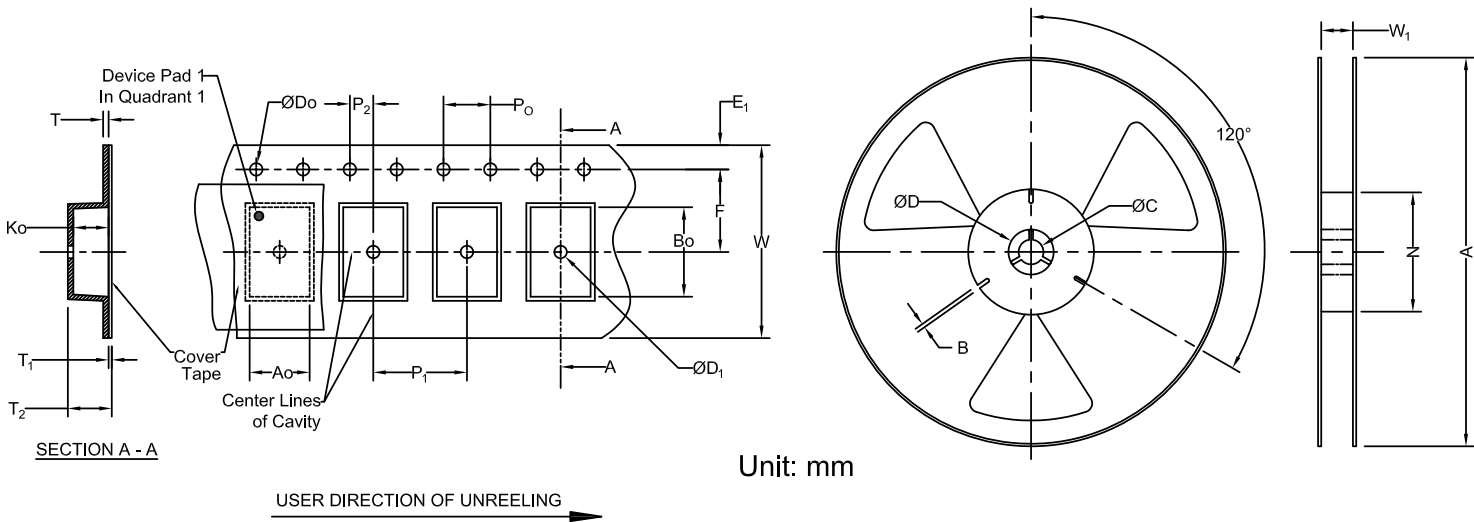
*Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

**Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.

Packaging

Packaging

Tape & Reel Dimension



Carrier Tape Specifications (mm)										
E1	D0	P0	P2	F	P1	W	A0	B0	K0	Reel Qty
1.75 ± 0.1	1.55 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	3.5 ± 0.05	2.0 ± 0.05	8.0 ± 0.1	2.25 ± 0.1	2.25 ± 0.05	0.7 ± 0.1	5,000

Reel Specifications (mm)					
A	W1	N	B	C	D
177.8	8.4 ± 1.5	53.6	1.5	13.2 ± 0.3	20.2