



COAXIAL SOLID STATE

SP4T RF Switch

ZSW4-E673+

50Ω 10 MHz to 67 GHz Reflective

THE BIG DEAL

- Ultra wideband operation, 10 MHz to 67 GHz
- High Isolation, 45 dB
- Low VSWR, 1.4:1 typ. Across Operating Band
- All-OFF State Available
- Bi-directional



Generic photo used for illustration purposes only

APPLICATIONS

- LTE & 5G MIMO Infrastructure
- Test & Measurement Equipment
- R&D, Production, and OTA Test Systems
- WiFi6E, IoT, UWB, and SATCOM
- Communications, Radar, EW, and ECM Defense Systems

Model No.	ZSW4-E673+
Case Style	WV2820
Connectors	1.85mm-Female

+RoHS Compliant
 The +Suffix identifies RoHS Compliance.
 See our website for methodologies and qualifications

PRODUCT OVERVIEW

Mini-Circuits' ZSW4-E673+ is an SP4T reflective, solid-state switch with an internal driver. This switch is designed for wideband operation from 10 MHz to 67 GHz and supports many applications requiring high performance from 5G infrastructure to automated test equipment and various defense applications. The bidirectional switch provides excellent isolation, and high linearity. It operates on a positive +5.0V supply and utilizes standard 3.3V TTL logic. The switch comes housed in a compact, aluminum alloy case (1.48" x 1.39" x 0.71") with 1.85mm-female connectors at all RF ports and a 10-pin digital control snap connector for DC power and control signals.

KEY FEATURES

Feature	Advantages
Ultra Wideband, 10 MHz to 67GHz	One model can be used in many applications, ideal for wideband applications such as military and instrumentation.
Low VSWR, 1.4:1 across the entire band	Low VSWR across the entire band helps to improve system performance by reducing component interaction.
High Isolation, 45 dB Across Operating Band	High isolation significantly reduces leakage of power into OFF ports.



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ELECTRICAL SPECIFICATIONS AT 25°C, VDD=+5V

Parameter	Port	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range			0.01		67	GHz
Insertion Loss ³	RF-IN to any ON port	0.01 to 10	-	2.5	4.0	dB
		10 to 30	-	4.0	5.75	
		30 to 40	-	5.0	6.5	
		40 to 50	-	6.0	7.5	
		50 to 60	-	7.0	9.0	
		60 to 67	-	9.0	12.5	
Isolation	RF-IN to any OFF port @Active states ¹	0.01 to 20	38	50	-	dB
		20 to 50	28	40	-	
		50 to 60	32	45	-	
		60 to 67	28	40	-	
VSWR	RF-IN ² Port	0.01 to 67	-	1.4	-	:1
	Any ON port connected to RF-IN port	0.01 to 67	-	1.4	-	

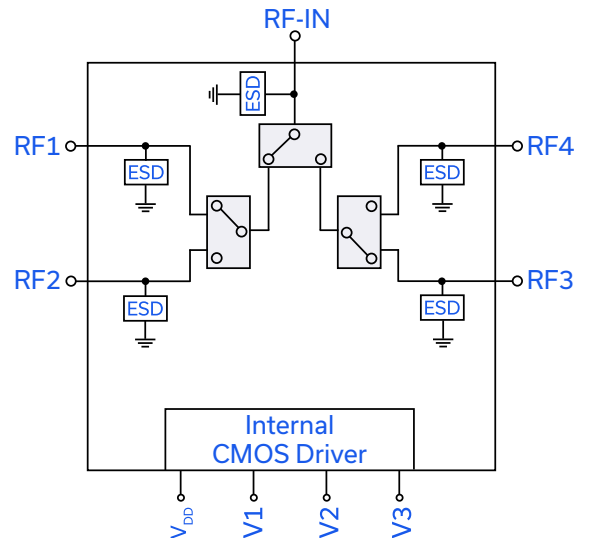
1. See truth table on page 3 for list of states.
2. VSWR defined for RF-IN only at active state.
3. Switch is bi-directional

ABSOLUTE MAXIMUM RATINGS^{4,5}

Parameter	Ratings
Operating Temperature	-20°C to 85°C
Storage Temperature	-20°C to 85°C
Supply Voltage ⁶ (VDD)	+5.5V
Control Voltage (V1, V2, V3)	0V to +3.5V
RF Input Power (10 MHz – 1 GHz) ^{7,8}	+17 dBm
RF Input Power (1 GHz – 67 GHz) ^{7,8}	+27 dBm

4. Operation of this device above any of these conditions may cause permanent damage.
5. Operation in the range between the max operating power and the absolute maximum rating for extended periods of time may result in reduced life and reliability.
6. Do not apply DC voltage at any of the RF ports. In Application where DC voltage is present at either input or output port, coupling capacitors are required. For DC Block, please use Mini Circuits P/N. BLK-E653+
7. Applicable at any port.
8. Compression level not noted as it exceeds max safe operating power level

FUNCTIONAL DIAGRAM





DC ELECTRICAL SPECIFICATIONS

Parameter	Min.	Typ.	Max.	Units
Supply Voltage, V_{DD}	4.7	5.0	5.3	V
Supply Current, I_{DD}	-	10	25 ⁹	mA
Control Voltage Low ("0") V1, V2, V3	0	0.4	0.8	V
Control Voltage High ("1") V1, V2, V3	2.0	3.0	3.3	V
Control Current ("1" or "0") V1, V2, V3	-	1	1.5	mA

9. Specified for steady state condition

SWITCHING SPECIFICATIONS

Parameter	Condition	Min.	Typ.	Max.	Units
Switching time 50% trigger to 10/90% signal level (ON time and OFF time)	Pulse rate = 10 kHz Control voltage = 0/3.3V Duty cycle = 50%	-	7	-	μs
Video feedthrough @ all ports		-	15	-	mVp-p

TRUTH TABLE

State of Control Voltage	CONTROL LOGIC LEVELS			RF ROUTING			
	V1	V2	V3 ¹⁰	RF1	RF2	RF3	RF4
1	0	0	1	ON	OFF	OFF	OFF
2	0	1	1	OFF	ON	OFF	OFF
3	1	0	1	OFF	OFF	ON	OFF
4	1	1	1	OFF	OFF	OFF	ON
5	0	0	0	OFF	OFF	OFF	OFF

10. V3: An internal pull-up resistor sets this bit high. V3 can be left floating and switch can be controlled with only V1 & V2 if the "All-Off" Control State 5 is not required. LOGIC "0" and LOGIC "1" are defined in the DC ELECTRICAL SPECIFICATION table above.



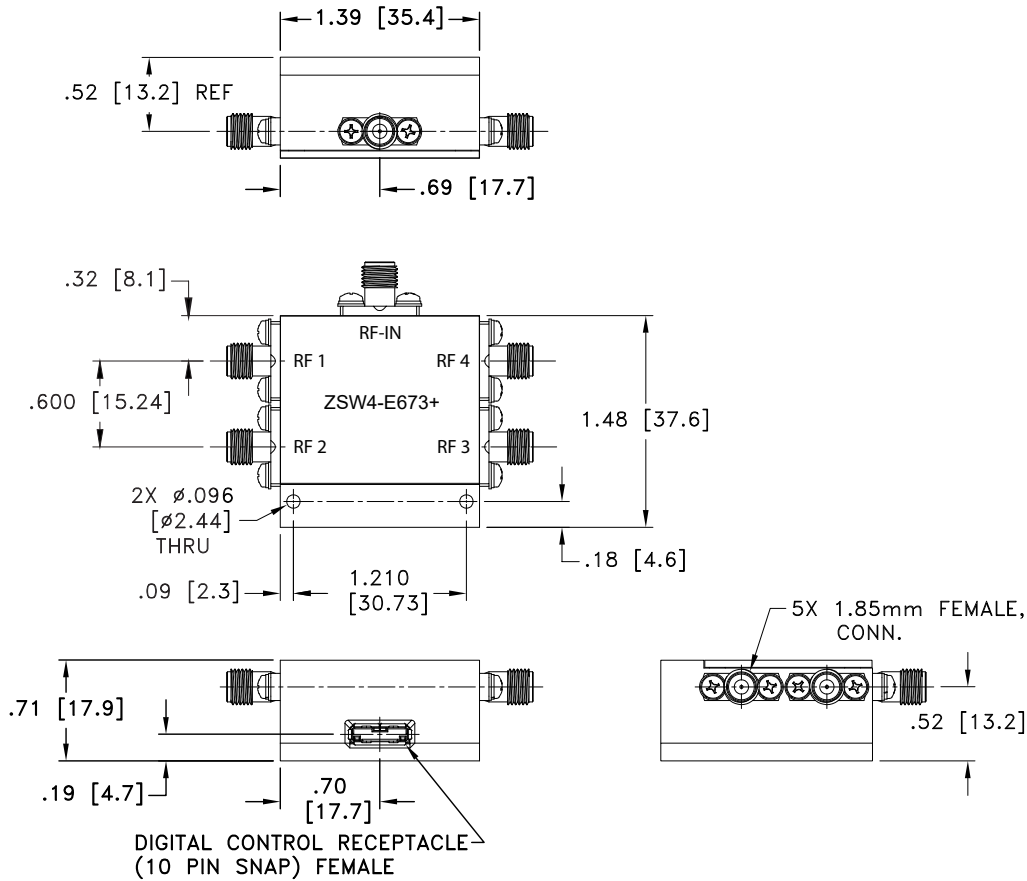
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OUTLINE DRAWING



Weight: 70 grams

Dimensions are in inches [mm]. Tolerances: 2 Pl.±.03[.76]; 3 Pl. ±.015[.38]

CONNECTORS

RF ports (RF1, RF2, RF3, RF4, RF-IN)	1.85mm female
Supply & control port	10 pin digital control snap ¹¹ connector female

11. Mating connector is Hirose ST40X-10S-CV(30).

Function	Pin Number on Snap Connector	Description
VDD	J1-1	Positive Supply Voltage
	J1-2	
	J1-3	
C4	J1-4	Ground
	J1-5	
	J1-9	
	J1-10	
V1	J1-6	Control bit 1
V2	J1-8	Control bit 2
V3	J1-7	Enable





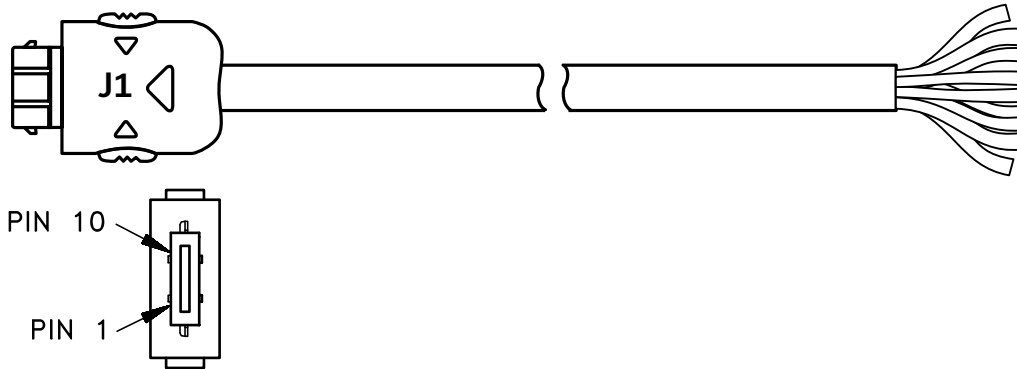
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CONTROL CABLE



INCLUDED ACCESSORIES

CBL-5FT-MPD+ is a "Pigtail" connector included with every purchase of ZSW4-E673+. CBL-5FT-MPD+ is a shielded cable with stripped wires (#32AWG) on one end and a connector on the other end designed to mate to the ZSW4-E673+. These bare wires enable the customer to assemble their own cable as required to interface with the ZSW4-E673+ (cable length is 4.9ft/ 1.5meters).

CBL-5FT-MPD+ WIRING INFORMATION

J1 Pin Number	Function	Description	Wire Color
1	VDD	Positive Supply Voltage	Green
2	VDD	Positive Supply Voltage	Green & Black
3	VDD	Positive Supply Voltage	Red
4	GND	Ground	Orange
5	GND	Ground	Orange & Black
6	V1	Control bit 1	Red & Black
7	V3	Enable	Black
8	V2	Control bit 2	Blue
9	GND	Ground	White
10	GND	Ground	White & Black
Shield	-	Shield Braid	-





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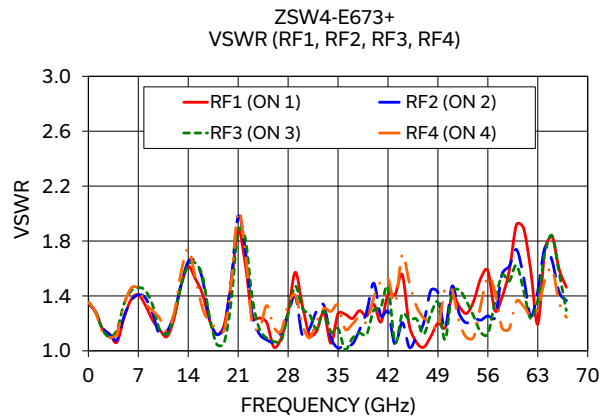
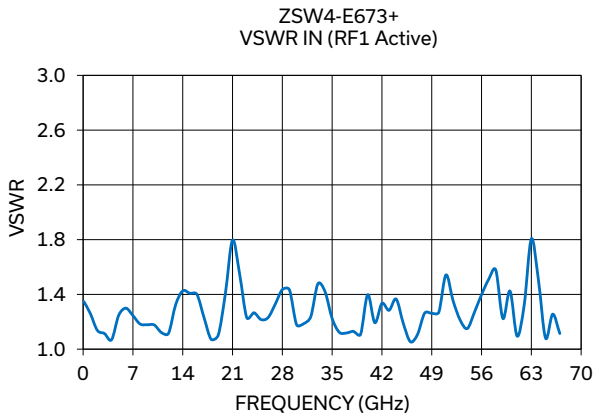
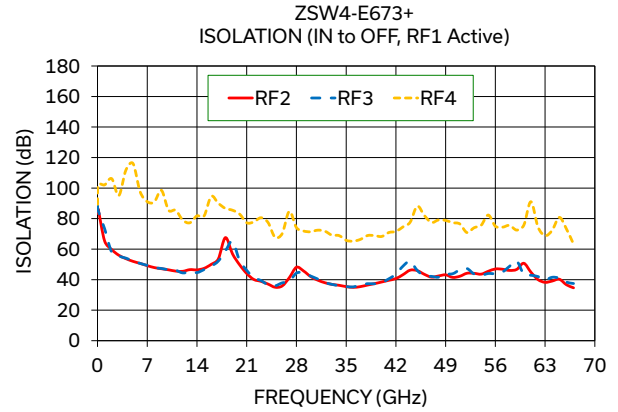
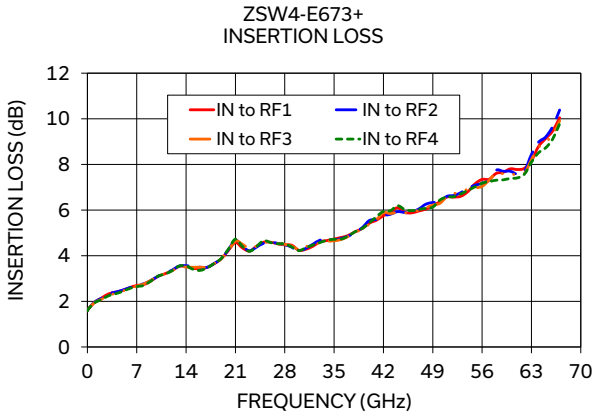
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Mini-Circuits

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TYPICAL PERFORMANCE DATA/GRAPHS

Frequency (GHz)	Insertion Loss (dB)				Isolation (dB)			VSWR (:1)				
	RF-IN to RF1	RF-IN to RF2	RF-IN to RF3	RF-IN to RF4	RF2	RF3	RF4	IN	RF1 (ON 1)	RF2 (ON 2)	RF3 (ON 3)	RF4 (ON 4)
0.0	1.6	1.6	1.6	1.6	83.5	88.4	89.4	1.3	1.3	1.3	1.4	1.4
4.0	2.4	2.4	2.3	2.3	53.7	54.1	111.8	1.1	1.1	1.1	1.1	1.1
8.0	2.7	2.8	2.8	2.7	47.9	47.9	90.9	1.2	1.3	1.4	1.4	1.3
12.0	3.3	3.4	3.3	3.3	45.5	44.4	79.0	1.1	1.2	1.3	1.2	1.3
16.0	3.4	3.5	3.5	3.4	50.0	48.8	94.5	1.4	1.4	1.5	1.5	1.3
20.0	4.2	4.3	4.2	4.3	49.7	52.6	83.0	1.4	1.5	1.5	1.3	1.5
24.0	4.4	4.4	4.4	4.4	37.1	36.6	77.5	1.3	1.2	1.1	1.2	1.2
28.0	4.5	4.5	4.5	4.5	48.1	44.3	74.1	1.4	1.3	1.3	1.3	1.3
32.0	4.4	4.5	4.4	4.5	38.0	38.2	71.8	1.2	1.1	1.3	1.2	1.2
36.0	4.8	4.8	4.7	4.7	35.0	35.2	65.2	1.1	1.3	1.0	1.0	1.2
40.0	5.4	5.5	5.4	5.4	38.5	38.1	68.3	1.4	1.3	1.5	1.3	1.4
44.0	6.1	5.9	5.9	6.2	46.2	52.0	77.6	1.4	1.6	1.2	1.3	1.7
48.0	6.0	6.3	6.1	6.1	42.4	41.6	79.1	1.3	1.1	1.4	1.3	1.2
52.0	6.6	6.6	6.7	6.6	44.2	47.3	70.9	1.4	1.3	1.3	1.4	1.2
56.0	7.3	7.2	7.0	7.2	47.0	43.9	75.0	1.4	1.6	1.3	1.1	1.5
60.0	7.8	7.7	7.6	7.4	50.7	43.6	75.6	1.4	1.9	1.7	1.6	1.4
67.0	10.0	10.4	9.9	9.8	34.7	37.5	63.3	1.1	1.5	1.4	1.3	1.2



- NOTES**
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
 - B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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