BSWM-4X4ER

Bidirectional Blocking Wideband 4X4 Switching Matrix, 100 kHz … 8500 MHz

Features

- extremely wideband
- high isolation
- high dynamic
- non-reflective
- compact 19” 1U design
- graphical user interface

Applications

- MIMO test
- network investigation
- signal routing
- research & development (R&D)
- test equipment

At a Glance

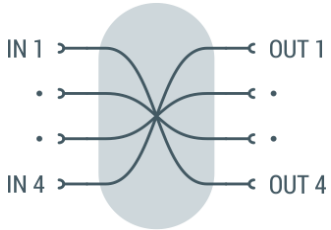
Modern communication standards, including cellular Wi-Fi, ISM, and Bluetooth, require bidirectional signal transmissions regardless of the multiplexing method, whether TDD (Time Domain Division) or FDD (Frequency Domain Division). The BSWM-4X4ER offers an innovative and efficient routing solution for these communication systems, covering frequencies of over 8 GHz and providing four full parallel bidirectional signal paths.

AC or DC Power Supply Options

The BSWM-4X48ER comes in variants designed for either DC or AC mains power supply, catering to both stationary and mobile applications. Both variants support a broad input voltage range, whether AC or DC.

Principal Block Diagram

The BSWM-4X4ER features four equivalent inputs and four equivalent outputs interconnected via a blocking matrix. A single input can route to multiple outputs without any loss of signal transmission.



Wear-free Solid-State Switches

The BSWM-4X4ER incorporates modern solid-state switching elements, guaranteeing rapid response to operational inputs and an unlimited number of switching cycles with minimal maintenance requirements.

High Channel Isolation

To prevent unintentional signal coupling between different signal types, the device provides high channel isolation. Strong and weak signals in adjacent radio channels do not affect each other.

Versatile Control

The BSWM-4X4ER is equipped with multiple control options for user convenience. It features a local MMI on the front panel, as well as LAN and USB interfaces. Depending on the customer's needs, the system can be managed using the intuitive web-based graphical user interface or through SCPI-based ASCII commands via its interface ports.

Synchronous Operation

The BSWM-4X4ER offers two switching modes:

- Direct: every switching operation is executed after reception of the command.
- Synchronous: all switching commands are stored until a "SYNC" command executes the switching operation synchronously.

External Triggering

Similar to several other products from Becker Nachrichtentechnik GmbH, the BSWM-4X4ER includes a TRIGGER IO port. This physical interface enables the device to execute switching operations synchronously across multiple matrices, triggered by hardware signals.

RF Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{IN}/Z_{OUT}		50		Ω	
number of inputs	N_{IN}		4			bi-directional, blocking
number of outputs	N_{OUT}		4			bi-directional, blocking
low frequency	f_{MIN}		100	200	kHz	
high frequency	f_{MAX}	8000	8300		MHz	
insertion loss	S_{21}	-6	-3		dB	f ≤ 4000 MHz
		-8	-5		dB	f > 4000 MHz
return loss	S_{11}/S_{22}		-14	-11	dB	f ≤ 4000 MHz
			-10	-8		f > 4000 MHz
OFF isolation	S_{21}		-90	-80	dB	f ≤ 4000 MHz, SPDT switch open
			-85	-70		f > 4000 MHz
channel isolation	S_{23}		-90	-80	dB	f ≤ 4000 MHz, SPDT switch closed
			-85	-70		f > 4000 MHz
3rd order intercept	OIP3		+50		dBm	
2rd order intercept	OIP2		+90		dBm	
DC voltage	U_{DC}			20	V	RF ports
ESD discharge resistor	R_{ESD}		4.7		kΩ	RF ports
RF power	P_{ON_MAX}			+30	dBm	CW, “ON”, f > 10 MHz
	P_{OFF_MAX}			+20	dBm	CW, “OFF”, f > 10 MHz
RF connectors	X_{RF}	N female				rear side
processing time	t_{SW}		15		ms	between two switching commands
trigger input	X_{TRIG}	BNC female				internal 1 kΩ pull up, active high
trigger level	u_{TRIG}	TTL (0 / 5 V)				
trigger offset	t_{O_FALL}		6.5		µs	50% trigger → 50% RF falling edge, note 1
	t_{O_RISE}		1.1		µs	50% trigger → 50% RF rising edge, note 1
switch rise time	t_{RISE}		1		µs	10% → 90% RF
switch fall time	t_{FALL}		2		µs	90% → 10% RF

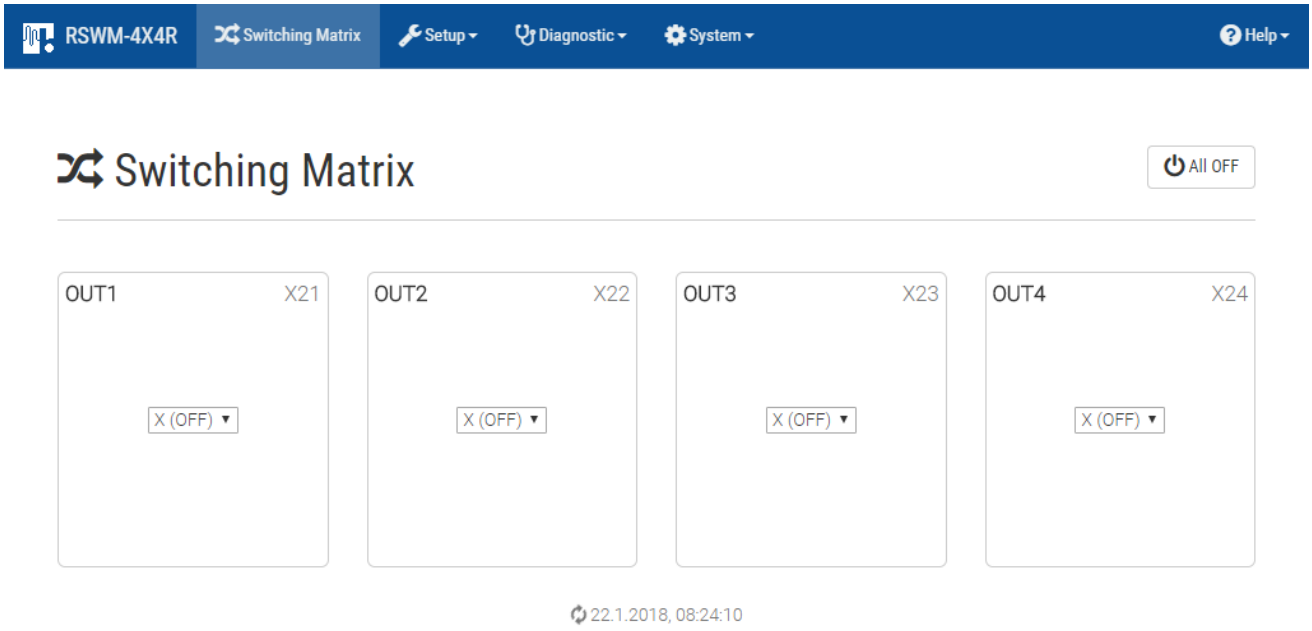
Note 1: capacitive load at ‘TRIGGER IO’ Port ≤ 100pF, trigger mode “OUT”

Common Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply		90	230	260	V	50 / 60 Hz AC
power consumption			15		W	
power socket	X_{AC}	IEC-60320 C14				country specific mains cable
Remote interfaces						
	LAN	10/100 BaseT		TCP/IP		RJ45
	USB	2.0 (high speed)				USB type B
Dimensions and weight						
dimensions	W x H x D	approx. 482 x 44 x 265			mm	19” 1U, without connectors and handles
weight	m		3		kg	
Environment conditions						
operating temp. range	T_o	+5		+45	°C	
storage temp. range	T_s	-40		+70	°C	
Product conformity						
Electromagnetic compatibility	EU: in line with EMC directive (2014/30/EC)					applied harmonized standards: EN61326-2-1, (for use in control and laboratory environments), EN55035, EN55032, EN61000-3-2, EN61000-3-3
Electrical safety	EU: in line with low voltage directive (2014/35/EC)					applied harmonized standard: EN 61010-1
Ordering information	BSWM-4X4ER	1205.4502.1				Variant with AC Supply
	BSWM-4X4ER	1205.4502.1				Variant with DC Supply

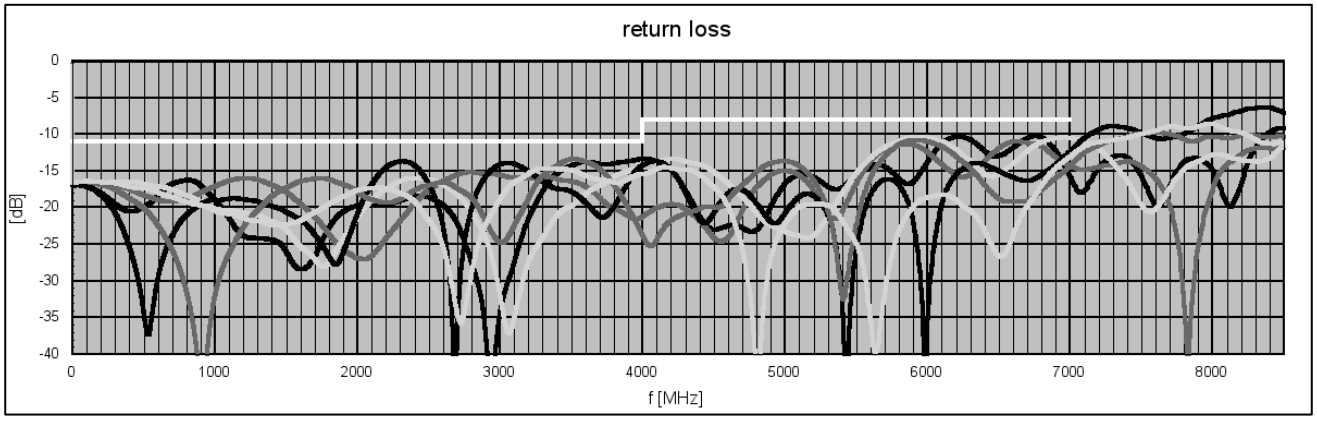
Graphical User Interface

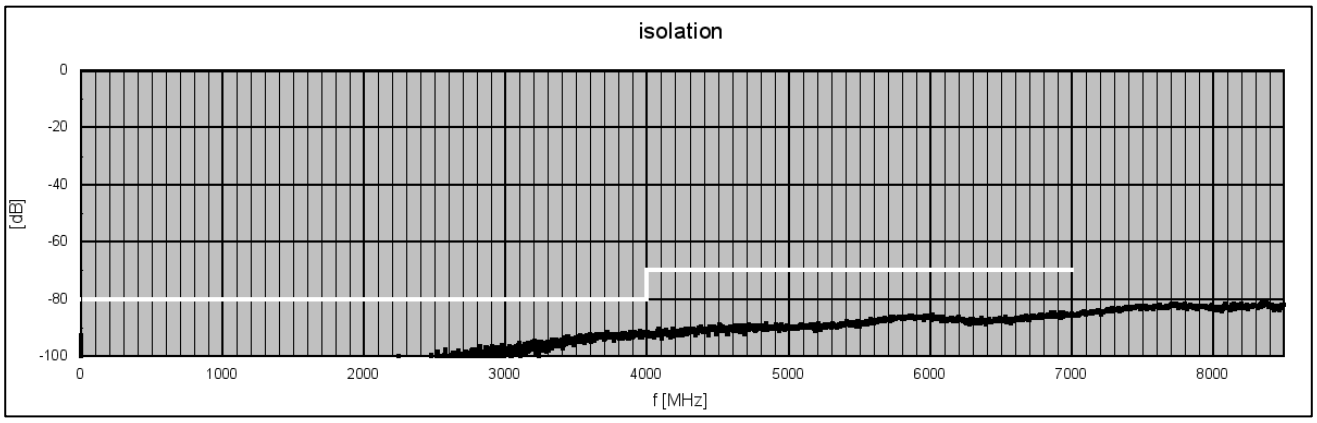
The graphical user interface (GUI) enables users to define custom labels tailored to their specific applications, making input selection more contextually meaningful.

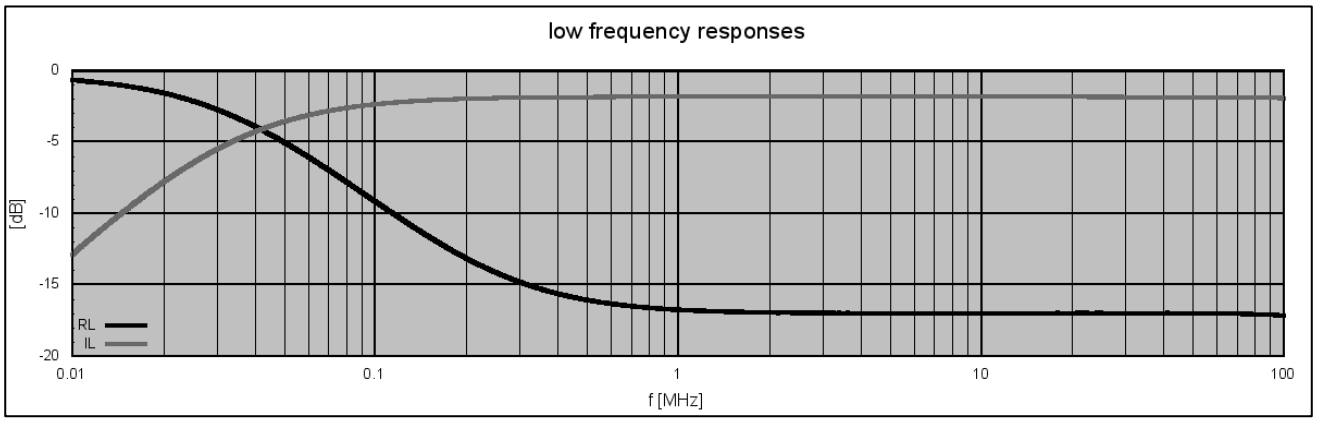


S-Parameters

typical responses





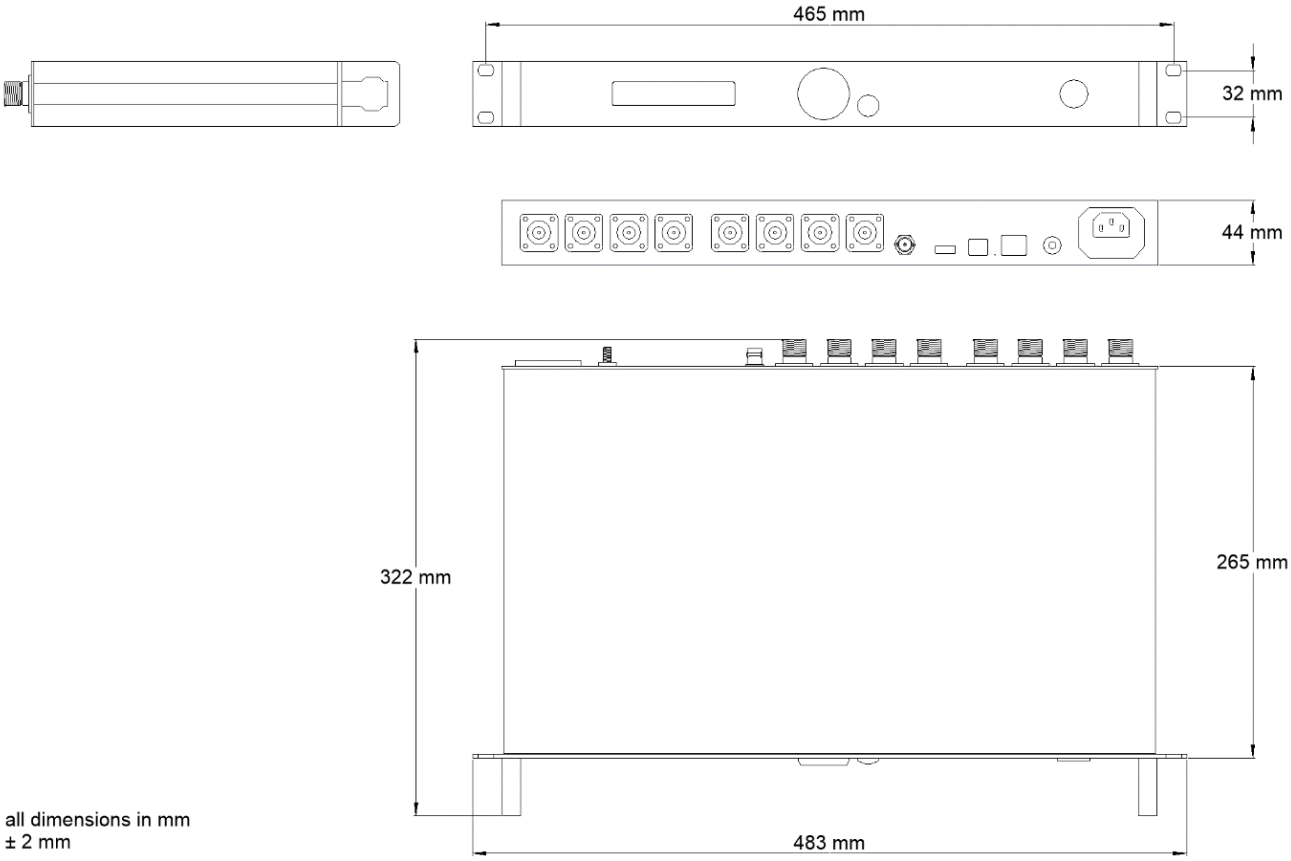


Appearances

Front View

Rear View

Dimensions



all dimensions in mm
± 2 mm

Related Products

Uni- & bi-directional RF Switch Matrices

RF Switches

Programmable RF Attenuation Networks

Individual Solutions According to Customer Requirements