



Mini-Circuits

HAND
FLEX™

Coaxial Cable

047-12SMPSM+

50Ω 12 inch DC to 18 GHz SMP-Female to SMA-Male

THE BIG DEAL

- Wideband frequency coverage, DC to 18 GHz
- Low Loss, 0.76 dB at 18 GHz
- Excellent Return Loss, 21 dB at 18 GHz
- Hand formable to almost any custom shape without special bending tools
- 3.2 mm bend radius for tight installations
- Connector interface, meets MIL-STD-348
- Ideal for interconnect of assembled systems



Generic photo used for illustration purposes only

Model No.	047-12SMPSM+
Case Style	BZ2329-12
Connectors	SMP-Female to SMA-Male

+RoHS Compliant

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

APPLICATIONS

- Replacement for custom bent 0.047" semi-rigid cables
- Communication receivers and transmitters
- Military and aerospace system
- Environmental and test chambers

PRODUCT OVERVIEW

The 047 Series Hand-Flex™ Coaxial Cables are ideal for interconnection of coaxial components or sub-systems in tight spaces. The outer shield is tin plated copper braid and tin soaked, which minimizes signal leakage and at the same time flexible for easy bend. The 047 Series Hand-Flex™ Cables features gold plated stainless steel (SMA side) and Gold-plated beryllium copper construction (SMP side). The 047 Series Cables are available in variety of length to meet your requirements.

KEY FEATURES

Feature	Advantages
Hand-Formable RF Cables	The 047 Series Hand-Flex™ cables are hand formable making them ideal for use integrating coaxial components and sub-assemblies without the need for special cable-bending tools and alleviating the risk of damage during the bending process typical of semi-rigid coaxial cable assemblies.
Tight Bend Radius, 3.2 mm	Capable of only 3.2 mm bend radius, the 047 Hand-Flex™ series is able to make connections in tight spaces making these cables ideal for dense system integration.
Excellent Return Loss, • 27 dB at 6 GHz • 19 dB at 18 GHz	The 047 Series Hand-Flex™ Cables are ideally suited for interconnecting a wide variety of RF components while minimizing VSWR ripple contribution due to mating cables & connectors.
Good Power Handling Capability: • 22.5W at 0.5 GHz • 4.5W at 18 GHz	Mini-Circuits' 047 Cable series can support medium to high RF power levels enabling these cables to be used in the transmit path.
SMP-F blind mate Push-on/snap-on connectors on one side	Quick connect / disconnect saving time

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ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Units
Frequency Range		DC		18	GHz
Length ¹		12			inches
Insertion Loss	DC - 2	—	0.39	0.80	dB
	2 - 6	—	0.70	1.53	
	6 - 10	—	1.11	1.91	
	10 - 18	—	1.51	2.62	
Return Loss	DC - 2	20	33	—	dB
	2 - 6	20	28	—	
	6 - 10	17	27	—	
	10 - 18	17	26	—	

1. Custom sizes available, consult factory.

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-45°C to 85°C
Storage Temperature	-45°C to 85°C
Power Handling at +25°C, Sea Level	22.5W at 0.5 GHz 15.5W at 1 GHz 11W at 2 GHz 5.5W at 6 GHz 4.6W at 10 GHz 4.5W at 18 GHz

Permanent damage may occur if any of these limits are exceeded.





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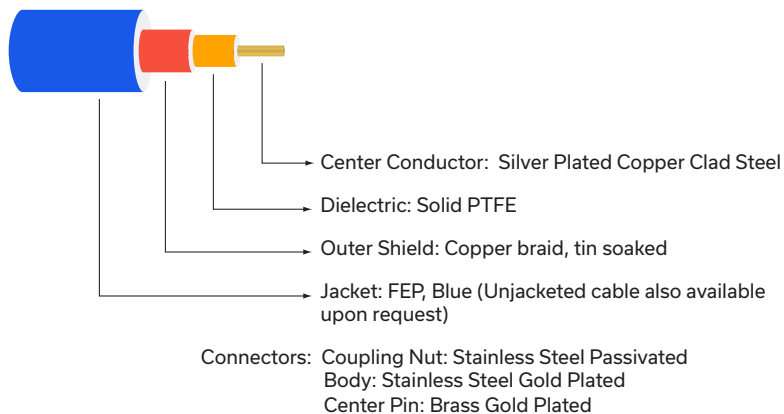
HAND
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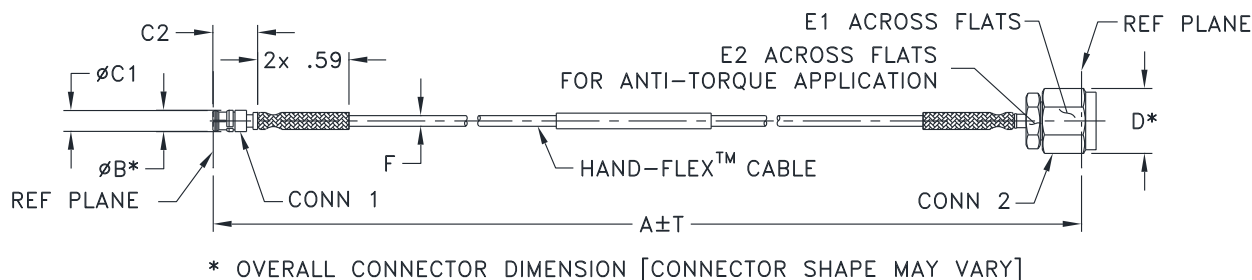
047-12SMPSM+

50Ω 12 inch DC to 18 GHz SMP-Female to SMA-Male

CABLE CONSTRUCTION



OUTLINE DRAWING



OUTLINE DIMENSIONS (Inch/mm)

A	B	C1	C2	D	E1
12.0	.14	.135	.287	.36	.313
304.80	3.56	3.43	7.29	9.14	7.95
E2	F	T	wt		
.250	.069	0.1	grams		
6.35	1.75	2.54	6.33		





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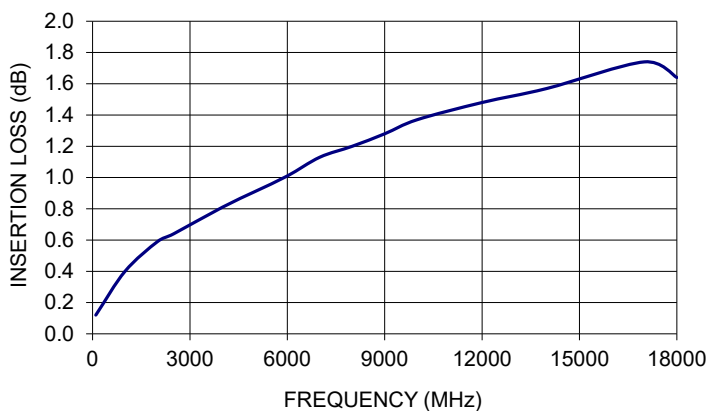
047-12SMPSM+

50Ω 12 inch DC to 18 GHz SMP-Female to SMA-Male

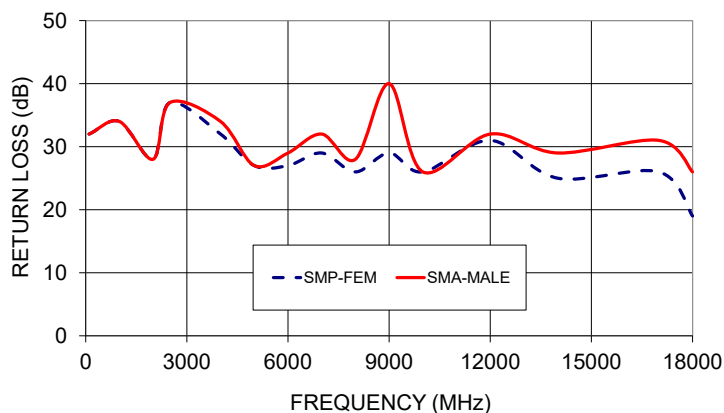
TYPICAL PERFORMANCE DATA AND CHARTS

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)	
		SMP-Female	SMA-Male
100	0.12	32.0	32.0
1000	0.40	34.0	34.0
2000	0.59	28.0	28.0
2500	0.64	37.0	37.0
4000	0.81	32.0	34.0
5000	0.91	27.0	27.0
6000	1.01	27.0	29.0
7000	1.13	29.0	32.0
8000	1.20	26.0	28.0
9000	1.28	29.0	40.0
10000	1.37	26.0	26.0
12000	1.48	31.0	32.0
14000	1.57	25.0	29.0
17000	1.74	26.0	31.0
18000	1.64	19.0	26.0

047-12SMPSM+
INSERTION LOSS



047-12SMPSM+
RETURN LOSS





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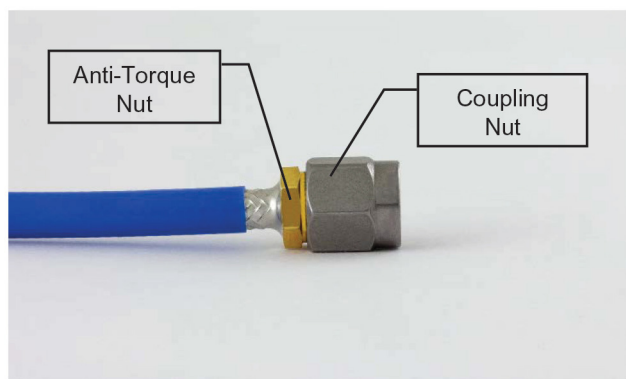
50Ω 12 inch DC to 18 GHz SMP-Female to SMA-Male

PROPER CABLE CONNECTION USING ANTI-TORQUE NUT

Mini-Circuits 047-series HandFlex™ interconnect cables are constructed with an anti-torque nut adjacent to the connector coupling nut. When used properly, this feature prevents possible damage to the cable due to torquing and twisting when tightening the cable connector.

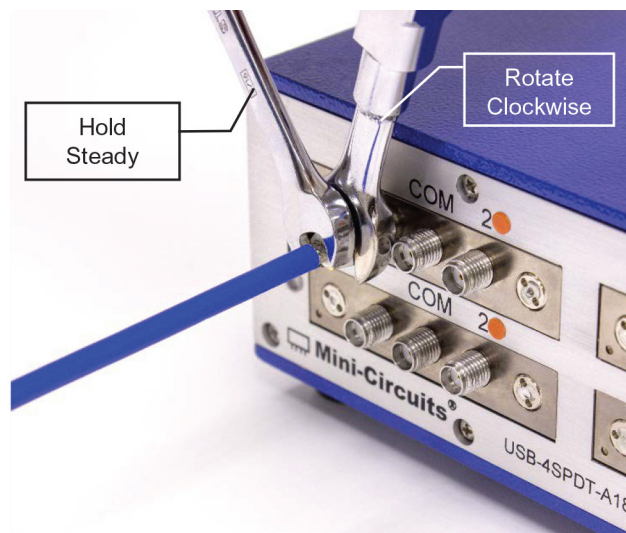
TO PROPERLY TIGHTEN THE CABLE CONNECTOR:

1) The cable connector includes a coupling nut which rotates to fasten the connector, and an anti-torque nut, which is fixed to prevent the cable from twisting during connection.



2) To properly tighten the cable, use a standard 1/4-inch open end wrench to brace the anti-torque nut.

3) Using a 5/16-inch open end wrench, rotate the coupling nut clockwise to tighten the cable connector.



*NOTE: Mini-Circuits recommends using a 5/16-inch open end wrench calibrated to 8 inch-pounds maximum torque to prevent damage due to over-torquing the connector.

NOTES

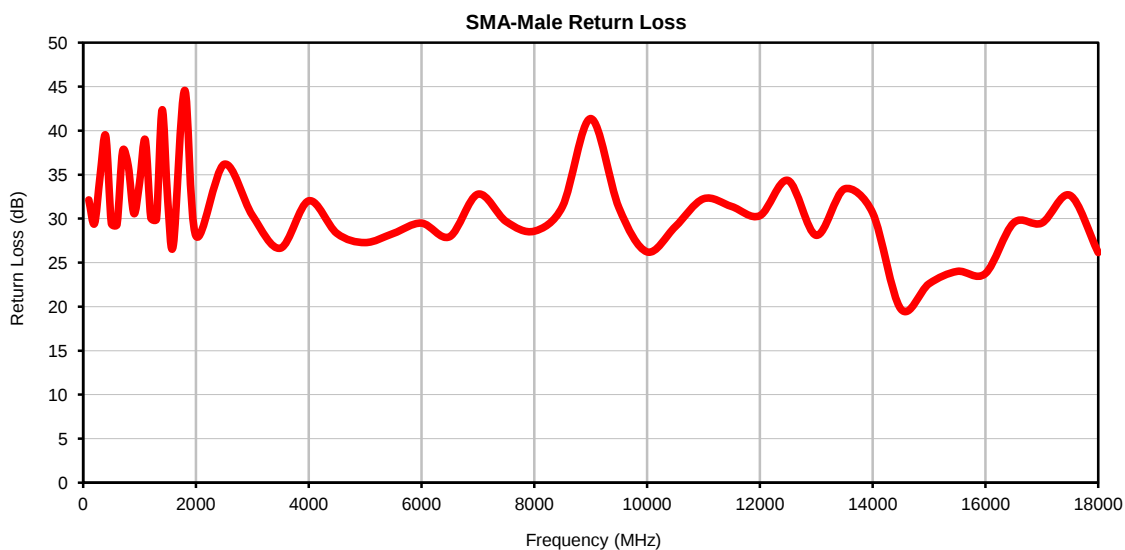
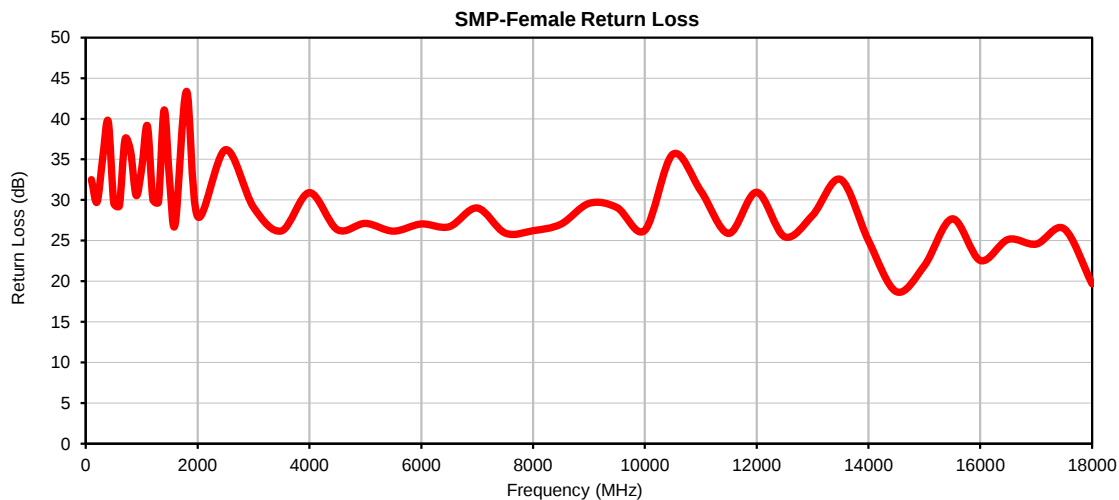
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/terms/viewterm.html



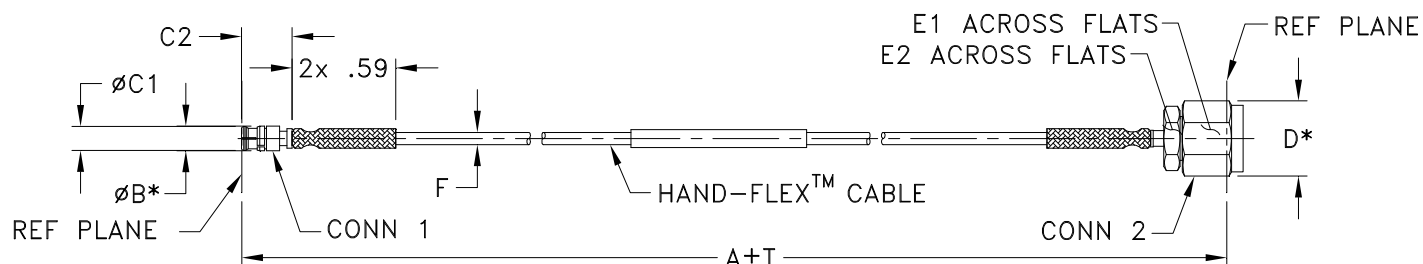
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	SMP-FEMALE RETURN LOSS (dB)	SMA-MALE RETURN LOSS (dB)
100	0.12	32.5	32.1
200	0.18	29.7	29.4
300	0.21	35.0	34.8
400	0.24	39.7	39.4
500	0.27	29.6	29.5
600	0.31	29.3	29.3
700	0.33	37.4	37.7
800	0.35	36.0	36.0
900	0.38	30.6	30.6
1000	0.40	33.9	34.1
1100	0.41	39.1	39.0
1200	0.43	30.0	30.1
1300	0.45	29.8	30.0
1400	0.47	41.1	42.4
1500	0.49	32.3	32.1
1600	0.53	27.1	27.0
1800	0.54	43.4	44.6
2000	0.59	28.0	28.0
2500	0.63	36.2	36.2
3000	0.69	29.1	30.4
3500	0.75	26.2	26.6
4000	0.81	30.9	32.0
4500	0.86	26.3	28.3
5000	0.93	27.1	27.3
5500	0.99	26.2	28.3
6000	1.01	27.0	29.5
6500	1.07	26.7	28.0
7000	1.13	29.0	32.8
7500	1.16	25.9	29.7
8000	1.21	26.2	28.6
8500	1.25	27.0	31.4
9000	1.28	29.6	41.4
9500	1.31	29.1	31.2
10000	1.37	26.3	26.2
10500	1.39	35.6	29.1
11000	1.41	31.1	32.3
11500	1.54	25.9	31.4
12000	1.45	31.0	30.3
12500	1.63	25.5	34.3
13000	1.44	28.1	28.1
13500	1.65	32.5	33.4
14000	1.70	25.0	30.7
14500	1.58	18.7	19.7
15000	1.82	21.9	22.6
15500	1.87	27.7	24.0
16000	1.85	22.5	23.8
16500	1.84	25.1	29.5
17000	1.81	24.6	29.5
17500	1.83	26.5	32.6
18000	1.64	19.7	26.1

Typical Performance Curves



Outline Dimensions



* OVERALL CONNECTOR DIMENSION [CONNECTOR SHAPE MAY VARY]

BZ2329 SERIES
SMP FEMALE (CONN-1)
SMA MALE (CONN-2)

CASE STYLE #	A		B	C1	C2	D	E1	E2	F		G	H	T		WEIGHT GRAMS
	INCH	MM							047U-ASMPSM+	047-ASMPSM+			INCH	MM	
BZ2329-3	3.00	76.20	.14 (3.50)	.135 (3.43)	.287 (7.35)	.36 (9.14)	.313 (8.00)	.250 (6.35)	.048 MAX (1.22 MAX)	.069 MAX (1.75 MAX)	--	--	.05	1.27	3.72
BZ2329-6	6.00	152.40									--	--	.05	1.27	4.88
BZ2329-12	12.00	304.80									--	--	.10	2.54	6.33

Unless otherwise specified dimensions are in inches (mm).

Tolerances: 2Pl. $\pm .03$; 3Pl. $\pm .015$

Note:

- 047 Hand-Flex™ Coaxial Cable.
- "A" represents length of cable.



INTERNET <http://www.minicircuits.com>

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Mini-Circuits ISO 9001 & ISO 14001 Certified



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 105° C or -55° to 85° C (see datasheet) Ambient Environment	Individual Model Data sheet
Storage Temperature	-55° to 105° C or -55° to 85° C (see data sheet) Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 100 Cycles	MIL-STD-202F; Method 107G
Multiple Bend Radius	40 mm, 5 times for 141 series cables 30 mm, 5 times for 086 series cables	
Single Bend Radius	8 mm for 141 series cables 6 mm for 086 series cables	