



Armored Test Cable **APC-4FT-SMNM+**

Mini-Circuits

50Ω 4FT DC to 18 GHz SMA-Male to N-Male

THE BIG DEAL

- Wideband coverage, DC to 18 GHz
- Extra rugged construction includes protective shield and strain relief for longer life
- Stainless steel connectors for long mating-cycle life
- Useful over temperature range, -55°C to 105°C
- Triple shield cable for excellent shielding effectiveness
- Superior stability of insertion loss, VSWR & phase vs. flexing
- 6 month guarantee*



Generic photo used for illustration purposes only

Model No.	APC-4FT-SMNM+
Case Style	HW1223-4
Connectors	SMA-Male to N-Male

+RoHS Compliant

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

APPLICATIONS

- High volume production test stations
- Research & development labs
- Environmental & temperature test chambers
- Replacement of OEM test port cables
- Field RF testing

Product Guarantee*

Mini-Circuits* will repair or replace your test cable at its option if the connector attachment fails within six months of shipment. This guarantee excludes cable or connector interface damage from misuse or abuse.

PRODUCT OVERVIEW

Mini-Circuits' APC-4FT-SMNM+ is a wideband, armored test cable supporting a wide range of applications from DC to 18 GHz. APC-series test cables feature extra-rugged, crush resistant construction, ideal for demanding production floor environments where heavy machinery is used. This model is 4 ft. in length with SMA-Male to N-Male connectors and provides low insertion loss, excellent return loss, and superior stability of insertion loss, VSWR, and phase versus flexure. Like all Mini-Circuits test cables, the APC-4FT-SMNM+ has been performance qualified to 20,000 bend cycles and comes with our 6 month guarantee.*

KEY FEATURES

Feature	Advantages
Wideband, DC to 18 GHz	Covers a wide range of test applications.
Extra-rugged, crush-resistant armored construction	Provides superior durability and reliability in high-volume production test floor environments where heavy machinery is used and cables are often subjected to mechanical stress.
Excellent stability of Insertion Loss, VSWR and Phase versus Flexure	Reliable performance in a wide range of configurations and in demanding environments where frequent bending is required.
Low Insertion Loss and Excellent Return Loss	Allows accurate measurement with minimal compensation for the effects of the cable connection.
SMA-Male to N-Male Connectors	Interfaces between equipment with SMA and N-Type connectors without the need for additional adapters.





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ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Units
Frequency range		DC		18	GHz
Length		4			FT
Insertion Loss	DC - 2.5	—	0.8	1.05	dB
	2.5 - 6	—	1.33	1.65	
	6 - 12	—	2.0	2.45	
	12 - 18	—	2.55	3.15	
Return Loss	DC - 2.5	23	30	—	dB
	2.5 - 6	20	30	—	
	6 - 12	17	27	—	
	12 - 18	17	22	—	

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-55°C to +105°C
Storage Temperature	-55°C to +105°C
Power Handling at 25°C	891 W Max at 0.4 GHz 539 W Max at 1 GHz 363 W Max at 2 GHz 180 W Max at 6 GHz 117 W Max at 12 GHz 88 W Max at 18 GHz
Shield Effectiveness	>100 dB

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





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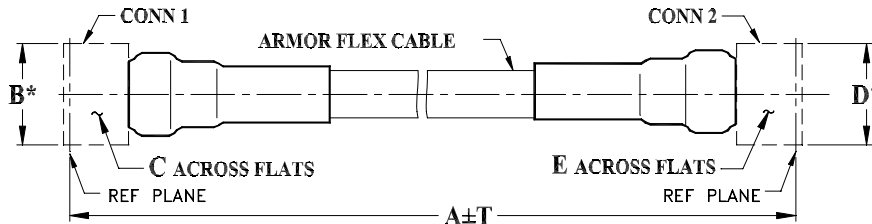
CABLE CONSTRUCTION



- Inner Conductor: Silver Plated Copper Clad Steel
- Dielectric: Solid PTFE
- Shield: Silver-Plated Copper Flat Ribbon Braid
Aluminum Polyimide Tape Interlayer 36 GA
Silver-Plated Copper Braid (90%k)
- Armor: Stainless Steel
- Braid: Stainless Steel with Copper Wire Winding
- Jacket: TPE

- Connectors:
- Passivated stainless steel
 - Captive contact
 - Thick wall interface (SMA)
 - Gold plated beryllium copper center contacts
 - PTFE dielectric

OUTLINE DRAWING



* OVERALL CONNECTOR OR CABLE & BOOT DIMENSION
(CONNECTOR SHAPE MAY VARY)

OUTLINE DIMENSIONS (Inch/mm)

A		B	C	D	E	T		wt
Feet	Meters	.70	.312	.88	.750	Feet	Meters	grams
4	1.22	17.78	7.92	22.35	19.05	0.12	0.04	377





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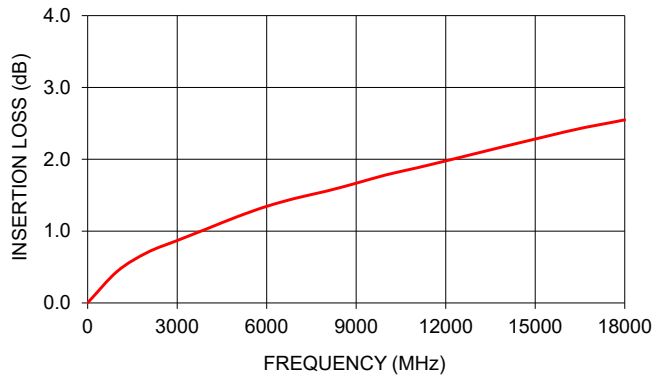
Mini-Circuits

50Ω 4FT DC to 18 GHz SMA-Male to N-Male

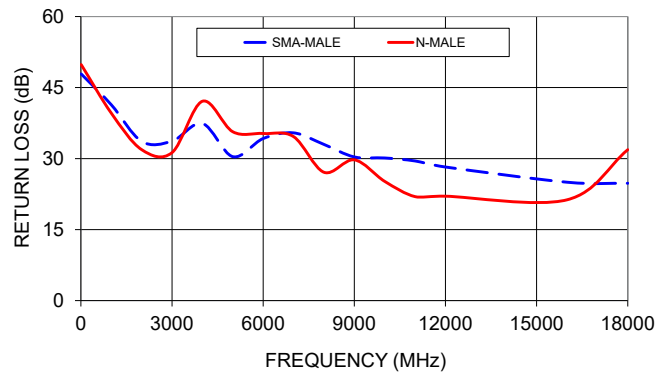
TYPICAL PERFORMANCE DATA

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)	
		SMA-Male	N-Male
10	0.01	47.88	49.85
1000	0.44	41.37	39.60
2000	0.70	33.64	31.89
3000	0.87	33.68	31.26
4000	1.03	37.41	42.11
5000	1.20	30.40	35.66
6000	1.34	34.24	35.30
7000	1.46	35.43	34.64
8000	1.56	32.99	27.11
9000	1.67	30.34	29.73
10000	1.78	30.13	25.18
11000	1.88	29.50	21.96
12000	1.98	28.22	22.05
16000	2.38	25.01	21.29
18000	2.55	24.78	31.87

APC-4FT-SMNM+
INSERTION LOSS



APC-4FT-SMNM+
RETURN LOSS



NOTES

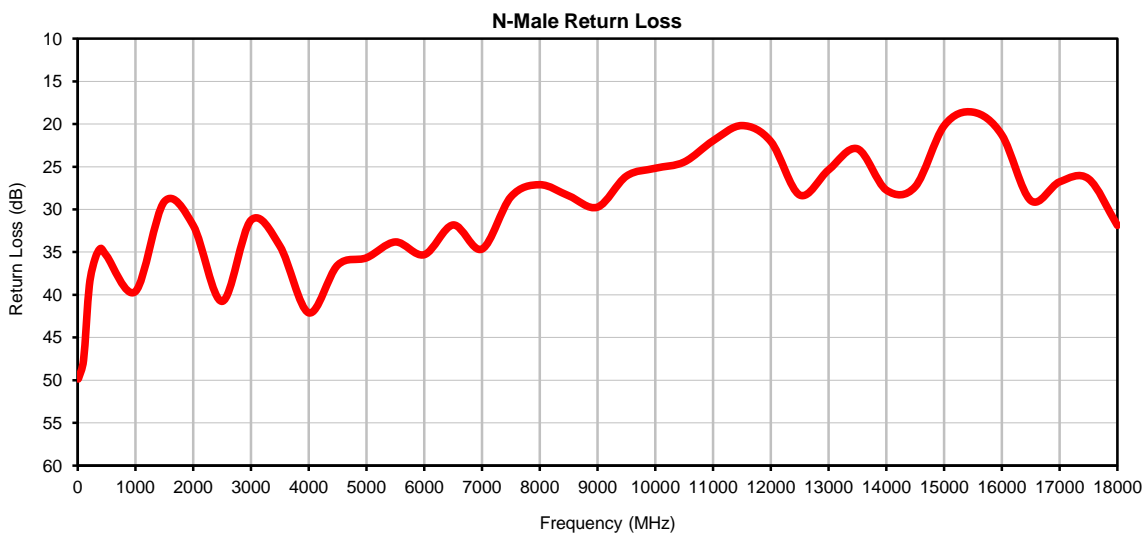
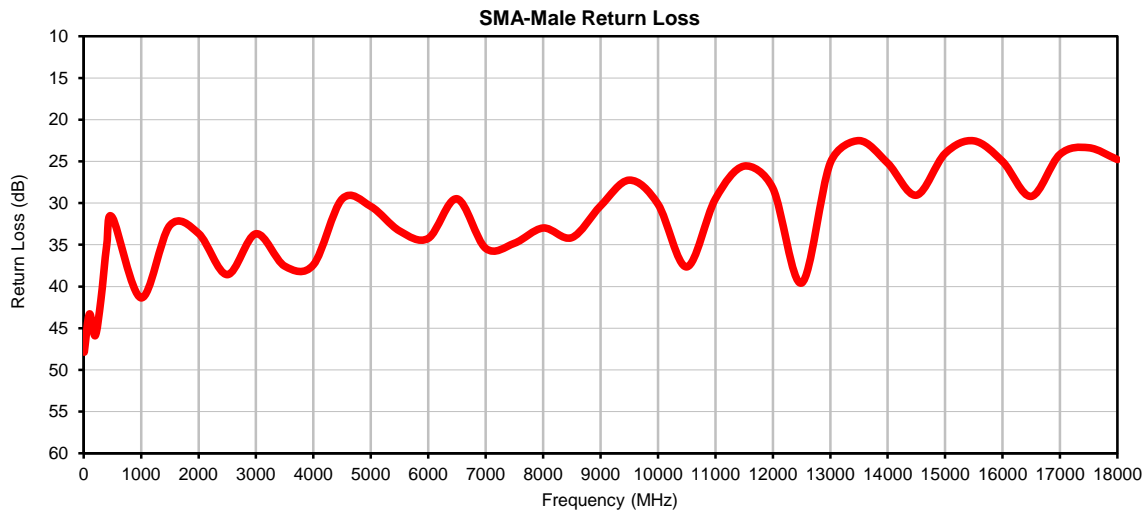
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- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document 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/MCLStore/terms.jsp



Typical Performance Data

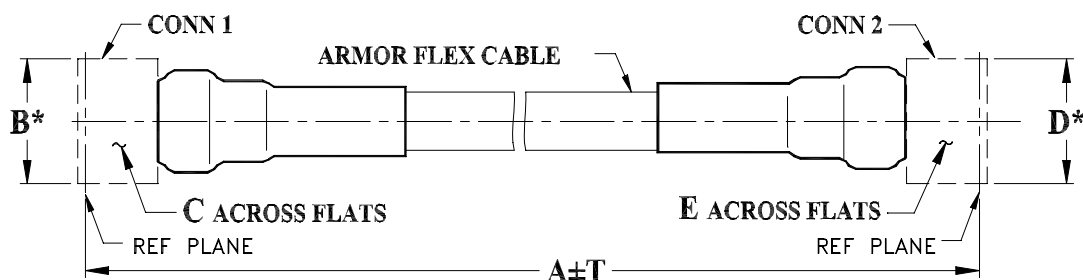
FREQUENCY (MHz)	INSERTION LOSS (dB)	SMA-MALE RETURN LOSS (dB)	N-MALE RETURN LOSS (dB)
10	0.01	47.88	49.85
100	0.09	43.30	47.67
200	0.16	45.90	38.92
300	0.21	41.59	35.77
400	0.25	35.11	34.56
500	0.29	31.74	35.43
1000	0.44	41.37	39.60
1500	0.58	32.69	29.08
2000	0.70	33.64	31.89
2500	0.79	38.58	40.76
3000	0.87	33.68	31.26
3500	0.95	37.56	34.29
4000	1.03	37.41	42.11
4500	1.12	29.51	36.52
5000	1.20	30.40	35.66
5500	1.27	33.34	33.81
6000	1.34	34.24	35.30
6500	1.41	29.49	31.82
7000	1.46	35.43	34.64
7500	1.51	34.82	28.52
8000	1.56	32.99	27.11
8500	1.61	34.14	28.40
9000	1.67	30.34	29.73
9500	1.73	27.25	26.10
10000	1.78	30.13	25.18
10500	1.83	37.66	24.45
11000	1.88	29.50	21.96
11500	1.93	25.57	20.18
12000	1.98	28.22	22.05
12500	2.02	39.59	28.31
13000	2.08	25.18	25.37
13500	2.15	22.51	22.90
14000	2.19	25.21	27.74
14500	2.22	29.05	27.34
15000	2.28	24.05	20.20
15500	2.34	22.54	18.61
16000	2.38	25.01	21.29
16500	2.42	29.20	28.96
17000	2.46	24.15	26.77
17500	2.51	23.37	26.41
18000	2.55	24.78	31.87

Typical Performance Curves



Outline Dimensions

HW1223



* OVERALL CONNECTOR OR CABLE & BOOT DIMENSION
(CONNECTOR SHAPE MAY VARY)

HW1223 SERIES
SMA MALE (CONN-1)
N MALE (CONN-2)

CASE STYLE #	A		B	C	D	E	T		WEIGHT GRAMS
	FEET	METERS					FEET	METERS	
HW1223-1	1	.30	.70 (17.78)	.312 (7.92)	.88 (22.35)	.750 (19.05)	.06	.02	148
HW1223-2	2	.61					.06	.02	225
HW1223-3	3	.91					.09	.03	301
HW1223-3.28	3.28	1.00					.10	.03	322
HW1223-4	4	1.22					.12	.04	377
HW1223-5	5	1.52					.15	.05	453
HW1223-6	6	1.83					.18	.05	529
HW1223-7	7	2.13					.21	.06	606
HW1223-8	8	2.44					.24	.07	682
HW1223-9	9	2.74					.27	.08	758
HW1223-10	10	3.05					.30	.09	834
HW1223-11	11	3.35					.33	.10	910
HW1223-12	12	3.66					.36	.11	987
HW1223-13	13	3.96					.39	.12	1063
HW1223-14	14	4.27					.42	.13	1139
HW1223-15	15	4.57					.45	.14	1215
HW1223-16	16	4.88					.48	.15	1291
HW1223-17	17	5.18					.51	.16	1368
HW1223-18	18	5.49					.54	.16	1444
HW1223-19	19	5.79					.57	.17	1520
HW1223-20	20	6.10	.60	.18	1596				

Unless otherwise specified dimensions are in inches (mm).

Tolerances: 2Pl. ± .03; 3Pl. ± .015

Note:

1. Flexible Coaxial 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 Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 105°C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 105°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except -105°C
Mechanical Flexing	20,000 cycles During each cycle, cable flexed from 90° through 0° to -90° and back with a Radii of 3 inches	- - -