COAXIAL

# Phase-Stable Flex Cables CBN Series

50Ω DC to 26.5 GHz SMA-Male to SMA-Male

## KEY FEATURES

- Broadband
- Low Loss Dielectric
- Exceptional Phase & Amplitude Stability
- Extremely Flexible

*Generic photo used for illustration purposes only*

## APPLICATIONS

- Test & Measurement
- High-Speed Data Systems
- Instrumentation
- Precision Measurement
- High-Volume Production Test
- R&D Labs & Device Characterization
- Circuit Level Breadboarding
- Equipment Rack & Stack Interconnects
- Tight & Limited Spacing Applications

## PRODUCT OVERVIEW

The CBN series carries on the Mini-Circuits commitment to quality, consistency, performance, and value. While achieving the design goal of extreme flexibility, the CBN design has largely eliminated flex resistance as well as spring-back. Difficult routing challenges have been greatly simplified while maintaining improved attenuation and unparalleled RF stability.

Whether your application is packaged device characterization on the bench, circuit-level breadboarding, the interconnection of RF equipment in a lab or production environment, or deliverable products where space limitations exist, CBN is the correct choice when extreme flexibility and RF stability is of primary concern.

The CBN-XX-SMSM+ SMA-Male to SMA-Male cable family is ideal for interconnecting coaxial components and subassemblies in a wide range of systems, including test and measurement, instrumentation, and more. This flexible cable provides excellent phase and amplitude stability as well as flexibility. These cables are presently available from 1 to 15 feet long; for custom lengths, please contact the Mini-Circuits Sales Department.

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50Ω DC to 26.5 GHz SMA-Male to SMA-Male

## ELECTRICAL SPECIFICATIONS[1]

| | |
|---|---|
| Operation Frequency (GHz) | 26.5 |
| Impedance (Ω) | 50 |
| Velocity of Propagation (%) | 74 |
| Shielding Effectiveness (dB) | 90 |
| Voltage Withstand Min. (VDC) | 2000 |
| Bending Phase[2] Max. (deg.) | ±6 @ 26.5 GHz |
| Return Loss Typ. [VSWR] | 17.5 dB [1.30:1] |
| Return Loss Max. [VSWR] | 35.0 dB [1.04:1] |

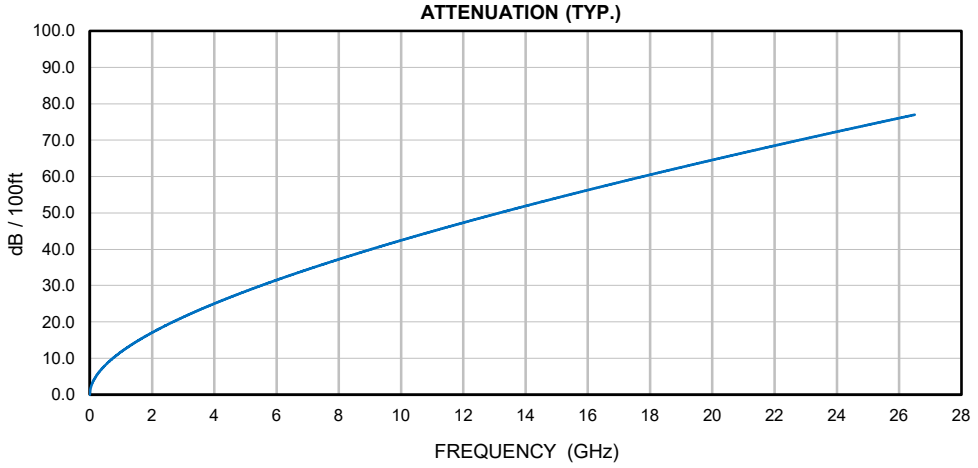
1. Permanent damage may occur if any of these limits are exceeded
2. Phase & Amplitude stability specs guaranteed from 18-inch cable lengths. For cables shorter than 18 inches, no degradation in performance is expected.

## MECHANICAL & ENVIRONMENTAL SPECIFICATIONS[1]

| | |
|---|---|
| Operating Case Temperature[3] | -40°C to +85°C |
| Storage Temperature | -40°C to +85°C |
| Bend Radius: Installation (mm) [in] | 16 [0.64] |
| Bend Radius: Repeated (mm) [in] | 50 [1.97] |
| Weight (g/m) [lbs/1000ft] @ A < 2ft | (50 + 17)*A ± 15 [(33.57 + 11.4)*A ± 10.1] |
| Weight (g/m) [lbs/1000ft] @ A > 2ft | (50 + 18)*A ± 15 [(33.57 + 12.1)*A ± 10.1] |

3. Temperature extremes are not intended for continuous normal operation.

**ATTENUATION (TYP.)**




**Attenuation (Typical @ 25°C & VSWR = 1.0) dB**

| Frequency (MHz) | 1000 | 2000 | 3000 | 4000 | 6000 | 8000 | 10000 | 12000 | 14000 | 18000 | 20000 | 26500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| dB / 100 m | 38.49 | 55.91 | 69.87 | 82.03 | 103.25 | 121.94 | 139.00 | 154.91 | 169.65 | 198.08 | 211.40 | 252.14 |
| dB / 100 ft | 11.73 | 17.04 | 21.30 | 25.00 | 31.47 | 37.17 | 42.37 | 47.22 | 51.80 | 60.38 | 64.43 | 76.85 |

**Calculate Attenuation = $K1 * \sqrt{FMHz} + K2 * FMHz + 0.02\sqrt{FGHz}$ dB**

| | | | | |
|---|---|---|---|---|
| dB / 100 m | K1 = | 1.1370000 | K2 = | 0.0025300 |
| dB / 100 ft | K1 = | 0.3465576 | K2 = | 0.0007711 |

**Power (VSWR = 1.0; 25°C; Sea Level) W**

| Frequency (MHz) | 1000 | 2000 | 3000 | 4000 | 6000 | 8000 | 10000 | 12000 | 14000 | 18000 | 20000 | 26500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avg. Power (kW) | 0.473 | 0.362 | 0.261 | 0.222 | 0.176 | 0.149 | 0.131 | 0.118 | 0.107 | 0.092 | 0.086 | 0.072 |

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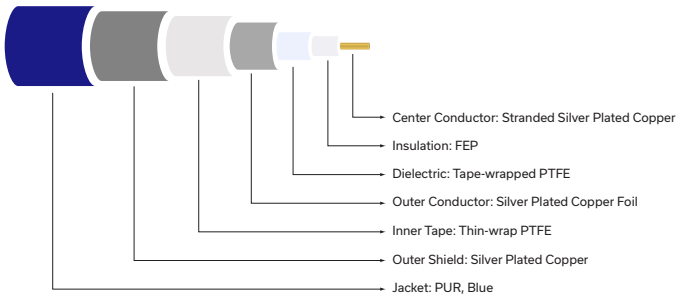
# Phase-Stable Flex Cables CBN Series

50Ω DC to 26.5 GHz SMA-Male to SMA-Male

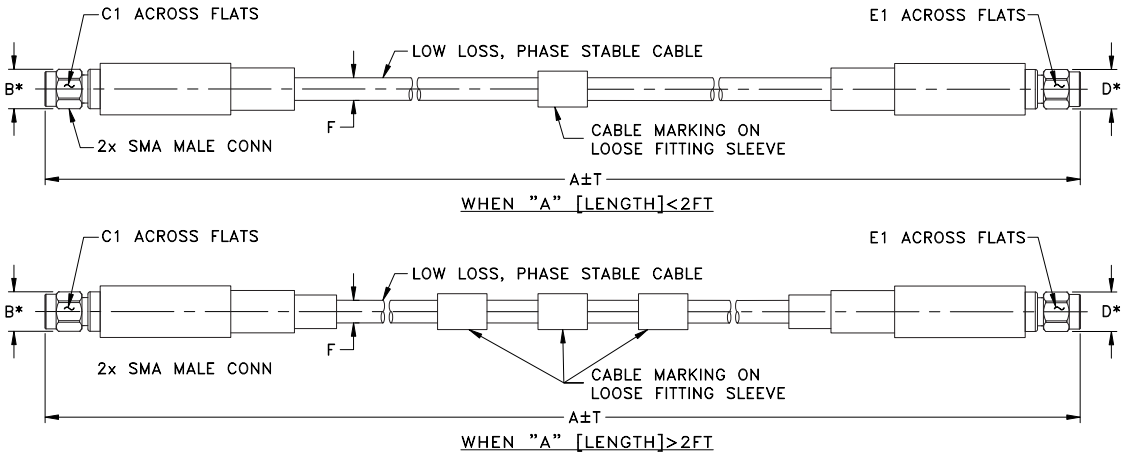
## COAXIAL CONNECTIONS

| Description | Connector 1 | Connector 2 |
|---|---|---|
| Connector Type | SMA-Male | SMA-Male |
| Orientation | Straight | Straight |

## CABLE CONSTRUCTION




## CASE STYLE DRAWING




Unless Otherwise Specified dimensions are in inches [mm], Tolerances: 2 Pl.±0.03; 3 PL ±0.015 inches

| A | | B | C1 | D | E1 | F | T | | Wt. grams |
|---|---|---|---|---|---|---|---|---|---|
| Feet | Meters | | | | | | Feet | Meters | |
| 1.00 | 0.30 | .36 (9.14) | .315 (8.00) | .36 (9.14) | .315 (8.00) | .205 (5.20) | +.04/-0 | +.01/-0 | 32.0 |
| 1.50 | 0.46 | | | | | | +.04/-0 | +.01/-0 | 40.0 |
| 2.00 | 0.61 | | | | | | +.04/-0 | +.01/-0 | 48.0 |
| 2.50 | 0.76 | | | | | | +.04/-0 | +.01/-0 | 56.0 |
| 3.00 | 0.91 | | | | | | +.06/-0 | +.02/-0 | 63.5 |
| 3.28 | 1.00 | | | | | | +.07/-0 | +.02/-0 | 68.0 |
| 3.50 | 1.07 | | | | | | +.07/-0 | +.02/-0 | 71.5 |
| 4.00 | 1.22 | | | | | | +.08/-0 | +.02/-0 | 79.0 |
| 4.92 | 1.50 | | | | | | +.10/-0 | +.03/-0 | 93.0 |
| 5.00 | 1.52 | | | | | | +.10/-0 | +.03/-0 | 94.0 |
| 6.00 | 1.83 | | | | | | +.12/-0 | +.04/-0 | 109.5 |
| 6.56 | 2.00 | | | | | | +.13/-0 | +.04/-0 | 118.0 |
| 10.00 | 3.05 | | | | | | +.20/-0 | +.06/-0 | 170.5 |
| 15.00 | 4.57 | | | | | | +.30/-0 | +.09/-0 | 246.5 |

**PRODUCT MARKING*:** CBN-XX-SMSM+

*Marking may contain other features or characters for internal lot control.

# Phase-Stable Flex Cables CBN Series

50Ω DC to 26.5 GHz SMA-Male to SMA-Male

## ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD CLICK HERE

| | |
|---|---|
| **Performance Data & Graphs** | Data<br>Graphs<br>S-Parameter (S2P Files) Data Set (.zip file) |
| **Case Style** | GM3711 |
| **RoHS Status** | Compliant |
| **Environmental Ratings** | ENV149 |

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

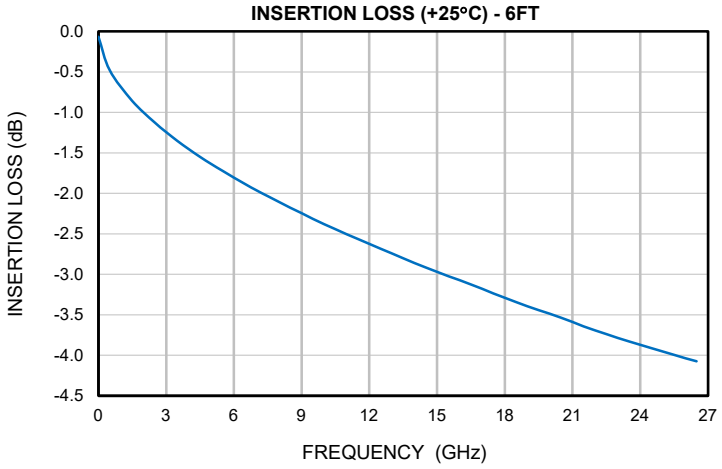
# Phase-Stable Flexible Cable SMA Male to SMA Male

# CBN-6FT-SMSM+

*Typical Performance Data*

| FREQ. | INSERTION LOSS | SMA MALE RETURN LOSS IN | SMA MALE RETURN LOSS OUT |
|---|---|---|---|
| (GHz) | (dB) | (dB) | (dB) |
| 0 | 0.07 | 33.12 | 32.97 |
| 1 | 0.48 | 41.51 | 41.96 |
| 2 | 0.86 | 37.15 | 35.81 |
| 3 | 1.13 | 33.27 | 33.20 |
| 4 | 1.35 | 32.23 | 32.42 |
| 5 | 1.55 | 31.80 | 31.83 |
| 6 | 1.72 | 34.47 | 34.73 |
| 7 | 1.89 | 36.05 | 36.68 |
| 8 | 2.03 | 38.50 | 39.75 |
| 9 | 2.18 | 42.96 | 43.98 |
| 10 | 2.31 | 41.06 | 44.04 |
| 11 | 2.44 | 39.67 | 39.78 |
| 12 | 2.57 | 38.82 | 38.06 |
| 13 | 2.68 | 37.36 | 38.99 |
| 14 | 2.80 | 37.22 | 39.14 |
| 15 | 2.92 | 37.11 | 40.14 |
| 16 | 3.02 | 37.08 | 39.71 |
| 17 | 3.13 | 36.22 | 39.63 |
| 18 | 3.23 | 35.63 | 36.03 |
| 19 | 3.34 | 30.99 | 31.24 |
| 20 | 3.44 | 28.39 | 27.65 |
| 21 | 3.54 | 26.14 | 25.94 |
| 22 | 3.64 | 23.97 | 24.02 |
| 23 | 3.74 | 22.31 | 22.80 |
| 24 | 3.83 | 22.37 | 22.23 |
| 25 | 3.91 | 22.07 | 21.87 |
| 26 | 3.99 | 22.37 | 23.12 |
| 27 | 4.08 | 24.54 | 23.66 |

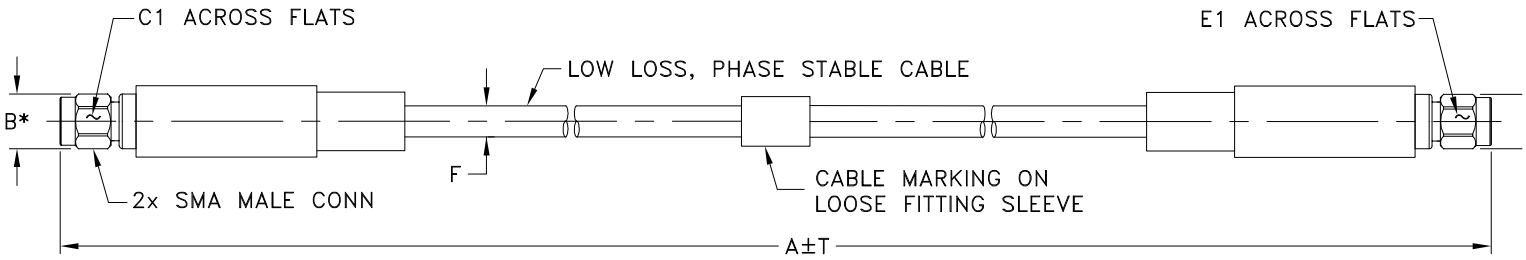
*Typical Performance Curves*



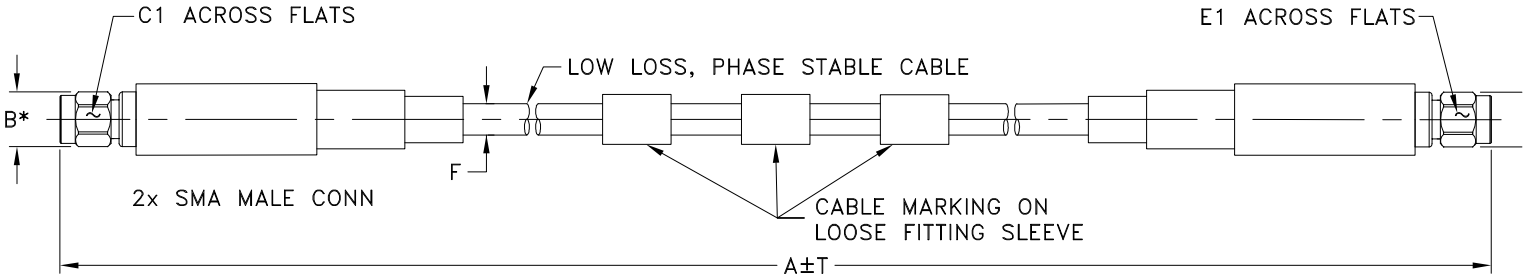

# Case Style GM

## Outline Dimensions

## GM3711




WHEN "A" [LENGTH] < 2FT




WHEN "A" [LENGTH] > 2FT

| CASE# | A | | B | C1 | C2 | D | E1 | E2 | F | T | | WEIGHT (GRAMS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FEET | METERS | | | | | | | | FEET | METERS | |
| GM3711-1 | 1.00 | 0.30 | .36 (9.14) | .315 (8.00) | – – | .36 (9.14) | .315 (8.00) | – – | .205 (5.20) | +.04/-0 | +.01/-0 | 32.0 |
| GM3711-1.5 | 1.50 | 0.46 | | | | | | | | +.04/-0 | +.01/-0 | 40.0 |
| GM3711-2 | 2.00 | 0.61 | | | | | | | | +.04/-0 | +.01/-0 | 48.5 |
| GM3711-2.5 | 2.50 | 0.76 | | | | | | | | +.04/-0 | +.01/-0 | 56.0 |
| GM3711-3 | 3.00 | 0.91 | | | | | | | | +.06/-0 | +.02/-0 | 63.5 |
| GM3711-3.28 | 3.28 | 1.00 | | | | | | | | +.07/-0 | +.02/-0 | 68.0 |
| GM3711-3.5 | 3.50 | 1.07 | | | | | | | | +.07/-0 | +.02/-0 | 71.5 |
| GM3711-4 | 4.00 | 1.22 | | | | | | | | +.08/-0 | +.02/-0 | 79.0 |
| GM3711-4.92 | 4.92 | 1.50 | | | | | | | | +.10/-0 | +.03/-0 | 93.0 |
| GM3711-5 | 5.00 | 1.52 | | | | | | | | +.10/-0 | +.03/-0 | 94.0 |
| GM3711-6 | 6.00 | 1.83 | | | | | | | | +.12/-0 | +.04/-0 | 109.5 |
| GM3711-6.56 | 6.56 | 2.00 | | | | | | | | +.13/-0 | +.04/-0 | 118.0 |
| GM3711-10 | 10.00 | 3.05 | | | | | | | | +.20/-0 | +.06/-0 | 170.5 |
| GM3711-15 | 15.00 | 4.57 | | | | | | | | +.30/-0 | +.09/-0 | 246.5 |
| | | | | | | | | | | | | |

Unless Otherwise Specified dimensions are in inches (mm),
Tolerances: 2 Pl.±0.03; 3 Pl. ±0.015 inches

Notes:
1. "A" Represents Length of Cable.
2. * OVERALL CONNECTOR DIMENSION
   [CONNECTOR SHAPE MAY VARY]

Mini-Circuits

# Environmental Specifications ENV149

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 | -45° to 85°C<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -45° to 85°C<br>Ambient Environment | Individual Model Data Sheet |
| Thermal Shock | -45° to 85°C, 100 cycles | MIL-STD-202; Method 107G |
| Mechanical Flexing | 1000 cycles<br>During each cycle, cable flexed in U-shape up to 90 degrees | ---- |
| Connector Durability | 500 mating cycles | MIL-PRF-39012E, PARAGRAPH 4.6.12 |
| Connector Retention | Force: 60 lb. Min.;<br>Torque: Cable connector turned while held 6 inches from end; Stop at 9 in-lb. or 90-degree twist. | --- |
| Heat-Aging Stability | There are no cracks, defects, or other damage to the surface material of the sample. | MIL-C-17G Para. 4.8.18 |
| Cold Bend | There are no cracks, defects, or other damage to the surface material of the sample. | MIL-C-17G Para. 4.8.19 |