



Mini-Circuits

COAXIAL

# Phase-Stable Flex Cables

**CBN-xx-NMNM+**

50Ω DC to 18 GHz N-Male to N-Male

## KEY FEATURES

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

## 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



*Generic photo used for illustration purposes only*

## PRODUCT OVERVIEW

The CBN series is designed to achieve extreme flexibility while carrying on the Mini-Circuits commitment to quality, consistency, performance, and value. By largely eliminating flex resistance as well as spring-back, the CBN design has greatly simplified difficult routing challenges and still maintains improved attenuation and unparalleled RF insertion phase 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-NMNM+ N-Male to N-Male cable family is ideal for interconnecting coaxial components and subassemblies in a wide range of systems, including test and measurement, instrumentation, and more. The CBN cable provides excellent phase and amplitude stability as well as flexibility. These cables are presently available at 1-6 feet long; for custom lengths, please contact the Mini-Circuits Sales Department.

ELECTRICAL SPECIFICATIONS<sup>1</sup>

|                                        |                  |
|----------------------------------------|------------------|
| Operation Frequency (GHz)              | 18               |
| Impedance (Ω)                          | 50               |
| Velocity of Propagation (%)            | 74               |
| Shielding Effectiveness (dB)           | 90               |
| Voltage Withstand Min. (V.DC)          | 500              |
| Bending Phase <sup>2</sup> Max. (deg.) | ±6 ° @ 18 GHz    |
| Return Loss Typ. [VSWR]                | 33.3 dB [1.05:1] |
| Return Loss Max. [VSWR]                | 17.5 dB [1.30:1] |

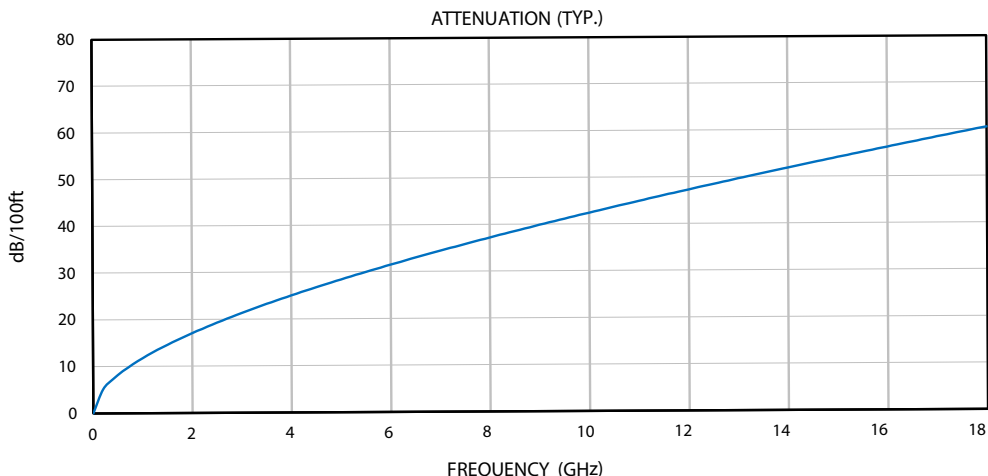
1. Permanent damage may occur if any of these limits are exceeded

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<sup>1</sup>

|                                         |                                            |
|-----------------------------------------|--------------------------------------------|
| Operating Case Temperature <sup>3</sup> | -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 < 0.61 M  | (50 + 88)*A ± 15 [(33.57 + 59.1)*A ± 10.1] |
| Weight (g/m) [lbs/1000ft] @ A < 0.61 M  | (50 + 90)*A ± 15 [(33.57 + 60.5)*A ± 10.1] |

3. Occasional use only.



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

| Frequency (MHz) | 1000  | 2000  | 3000  | 4000  | 6000   | 8000   | 10000  | 12000  | 14000  | 18000  |
|-----------------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| dB / 100 m      | 38.51 | 55.94 | 69.90 | 82.07 | 103.30 | 121.99 | 139.06 | 154.98 | 170.03 | 198.17 |
| dB / 100 ft     | 11.75 | 17.07 | 21.33 | 25.04 | 31.52  | 37.22  | 42.43  | 47.29  | 51.88  | 60.46  |

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

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

Power (VSWR = 1.0; @ 40 °C; Sea Level) W

| Frequency (MHz) | 1000  | 2000  | 3000  | 4000  | 6000  | 8000  | 10000 | 12000 | 14000 | 18000 | 20000 |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 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 |



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## Phase-Stable Flex Cables

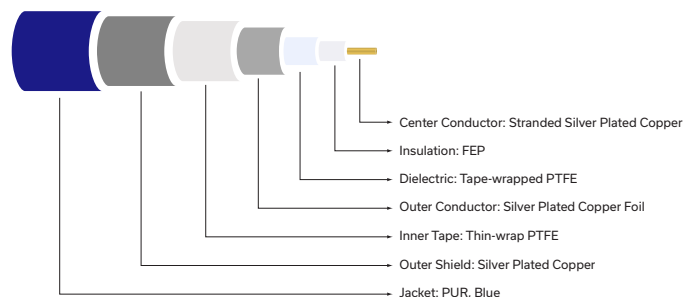
CBN-xx-NMNM+

50Ω DC to 18 GHz N-Male to N-Male

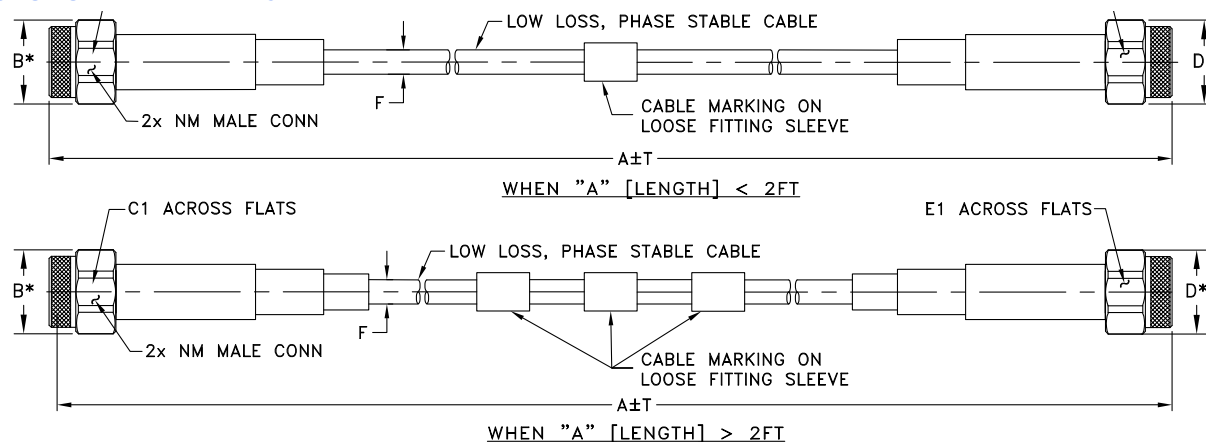
## COAXIAL CONNECTIONS

| Description    | Connector 1 | Connector 2 |
|----------------|-------------|-------------|
| Connector Type | N-Type Male | N-Type 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              | C2 | D              | E1              | E2 | F              | T       |         | Wt.<br>grams |
|-------|--------|----------------|-----------------|----|----------------|-----------------|----|----------------|---------|---------|--------------|
| Feet  | Meters |                |                 |    |                |                 |    |                | Feet    | Meters  |              |
| 1.00  | 0.30   | .88<br>(22.35) | .748<br>(19.00) | -  | .88<br>(22.35) | .748<br>(19.00) | -  | .205<br>(5.20) | +.04/-0 | +.01/-0 | 103.0        |
| 3.00  | 0.91   |                |                 |    |                |                 |    |                | +.06/-0 | +.02/-0 | 135.5        |
| 6.00  | 1.83   |                |                 |    |                |                 |    |                | +.12/-0 | +.04/-0 | 181.5        |
| 15.00 | 4.57   |                |                 |    |                |                 |    |                | +.30/-0 | +.09/-0 | 318.5        |

## PRODUCT MARKING\*: CBN-XX-NMNM+

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





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50Ω DC to 18 GHz N-Male to N-Male

ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD

[CLICK HERE](#)

|                           |                                              |
|---------------------------|----------------------------------------------|
| Performance Data & Graphs | Data                                         |
|                           | Graphs                                       |
|                           | S-Parameter (S2P Files) Data Set (.zip file) |
| Case Style                | GM3735                                       |
| 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](http://www.minicircuits.com/terms/viewterm.html)



Phase-Stable Flexible Cable N-Type Male to N-Type Male

CBN-3FT-NMNM+

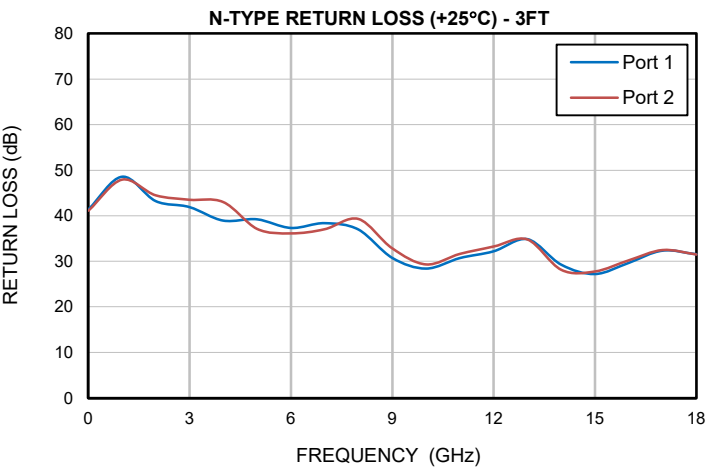
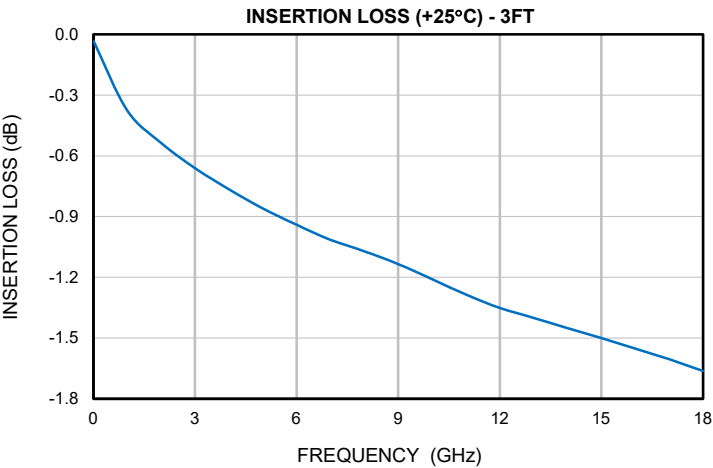
Typical Performance Data

| FREQ. | INSERTION LOSS | N-TYPE MALE<br>RETURN LOSS IN | N-TYPE MALE<br>RETURN LOSS OUT |
|-------|----------------|-------------------------------|--------------------------------|
| (GHz) | (dB)           | (dB)                          | (dB)                           |
| 0     | 0.03           | 41.36                         | 41.12                          |
| 1     | 0.37           | 48.58                         | 47.91                          |
| 2     | 0.54           | 43.22                         | 44.48                          |
| 3     | 0.66           | 41.91                         | 43.53                          |
| 4     | 0.76           | 38.93                         | 43.02                          |
| 5     | 0.86           | 39.20                         | 37.12                          |
| 6     | 0.94           | 37.33                         | 36.13                          |
| 7     | 1.01           | 38.40                         | 37.00                          |
| 8     | 1.07           | 36.94                         | 39.25                          |
| 9     | 1.13           | 30.75                         | 32.80                          |
| 10    | 1.21           | 28.42                         | 29.31                          |
| 11    | 1.29           | 30.71                         | 31.63                          |
| 12    | 1.35           | 32.20                         | 33.23                          |
| 13    | 1.40           | 34.83                         | 34.76                          |
| 14    | 1.45           | 29.26                         | 28.13                          |
| 15    | 1.50           | 27.19                         | 27.74                          |
| 16    | 1.55           | 29.69                         | 30.24                          |
| 17    | 1.61           | 32.35                         | 32.47                          |
| 18    | 1.66           | 31.53                         | 31.51                          |

Phase-Stable Flexible Cable N-Type Male to N-Type Male

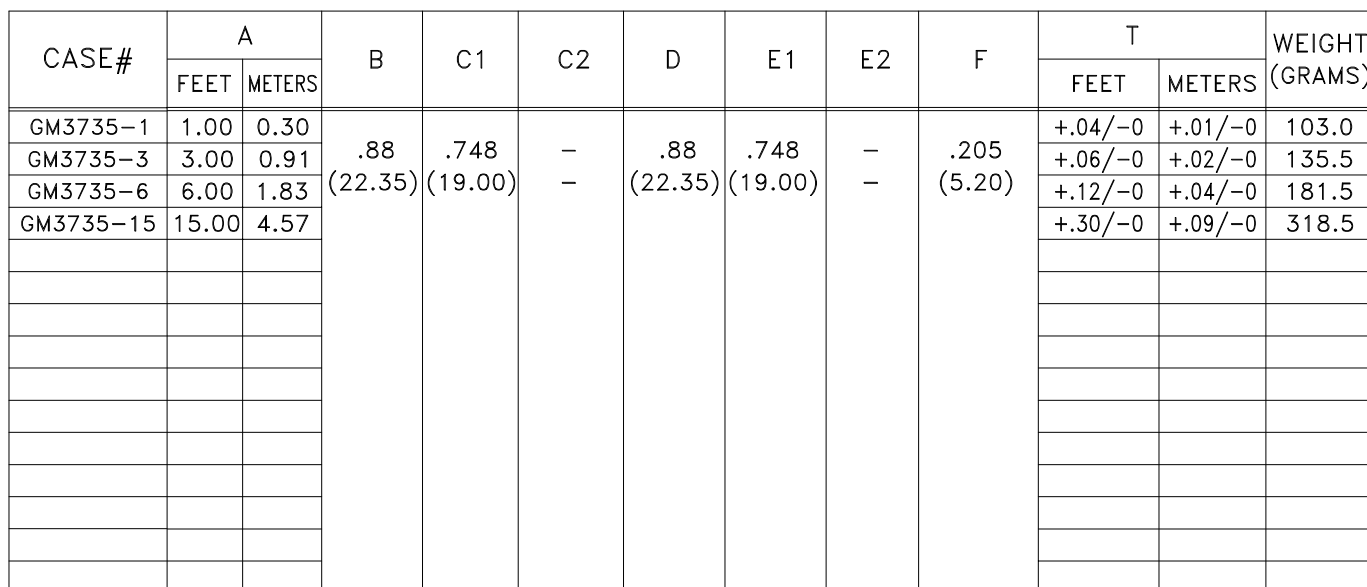
CBN-3FT-NMNM+

Typical Performance Curves



## Outline Dimensions

# GM3735



Sheet 1 OF 1



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           |