HAND FLEX™

# Coaxial Cable

# 141-0.5MSM+

50Ω 0.5M DC to 18 GHz SMA-Male

## THE BIG DEAL

- Wideband frequency coverage, DC to 18 GHz
- Low Loss, 1.2 dB at 18 GHz
- Excellent Return Loss, 19 dB at 18 GHz
- Hand formable to almost any custom shape without special bending tools
- 8mm bend radius for tight installations
- Anti-torque nut prevents cable stress during installation
- Insulated outer jacket standard[1]
- Ideal for interconnect of assembled systems



*Generic photo used for illustration purposes only*

| | |
|---|---|
| **Model No.** | 141-0.5MSM+ |
| **Case Style** | KQ1506-19.7 |
| **Connectors** | SMA-Male |

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

## APPLICATIONS

- Replacement for custom bent 0.141" semi-rigid cables
- Communication receivers and transmitters
- Military and aerospace system
- Environmental and test chambers

## PRODUCT OVERVIEW

The 141 Series Hand-Flex™ Coaxial Cables are ideal for interconnection of coaxial components or sub-systems. The construction includes a silver-plated copper-clad steel center conductor which maintains the shape after bending. The outer shield is copper braid, tin soaked, which minimizes signal leakage and at the same time flexible for easy bend. Dielectric is low loss PTFE. Connectors have passivated stainless-steel coupling nut over a gold plated connector body and Silver Plated Copper Clad Steel.

## KEY FEATURES

| Features | Advantages |
|---|---|
| Hand-Formable RF Cables | The 141 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 | Capable of only 8mm bend radius, the 141 Hand-Flex™ series is able to make connections in tight spaces making these cables ideal for dense system integration |
| Excellent Return Loss | Supporting typical return loss of 30 dB to 6 GHz and 21 dB to 18 GHz, the 141 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:<br>• 546W at 0.5 GHz<br>• 90W at 18 GHz | Mini-Circuits 141 Cable series can support medium to high RF power levels enabling these cables to be used in the transmit path. NOTE: power rating is at sea-level altitudes. |
| Built-in Anti-torque nut | Mini-Circuits' 141 Series Hand-Flex™ cables include an anti-torque feature to support the connector body during installation alleviating risk of stress to the connector/cable interface. |
| Jacketed and Unjacketed options | Standard 141 Series cables include a blue FEP insulator jacket reducing the risk of accidental shorting of DC power lines or active pins during installation and operation. Un-jacketed versions are available upon request. |

REV. B
ECO-019239
141-0.5MSM+
MCL NY
231215

## ELECTRICAL SPECIFICATIONS AT +25°C

| Parameter | Condition (GHz) | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Frequency Range | | DC | | 18 | GHz |
| Length[2] | | | 0.5 | | Meters |
| Insertion Loss | DC - 2 | — | 0.21 | 0.41 | dB |
| | 2 - 6 | — | 0.37 | 0.77 | |
| | 6 - 10 | — | 0.62 | 1.05 | |
| | 10 - 18 | — | 0.86 | 1.50 | |
| Return Loss | DC - 2 | 23 | 38 | — | dB |
| | 2 - 6 | 23 | 38 | — | |
| | 6 - 10 | 17 | 34 | — | |
| | 10 - 18 | 17 | 34 | — | |

1. Unjacketed cable also available upon request.
2. Custom sizes available, consult factory.

## ABSOLUTE MAXIMUM RATINGS

| Parameter | Ratings |
|---|---|
| Operating Temperature | -55°C to +105°C |
| Storage Temperature | -55°C to +105°C |
| Power Handling at +25°C, Sea Level | 546W at 0.5 GHz<br>387W at 1 GHz<br>273W at 2 GHz<br>156W at 6 GHz<br>121W at 10 GHz<br>90W at 18 GHz |

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

HAND FLEX™

# Coaxial Cable

**141-0.5MSM+**

50Ω 0.5M DC to 18 GHz SMA-Male

## CABLE CONSTRUCTION



Center Conductor: Silver Plated Copper Clad Steel

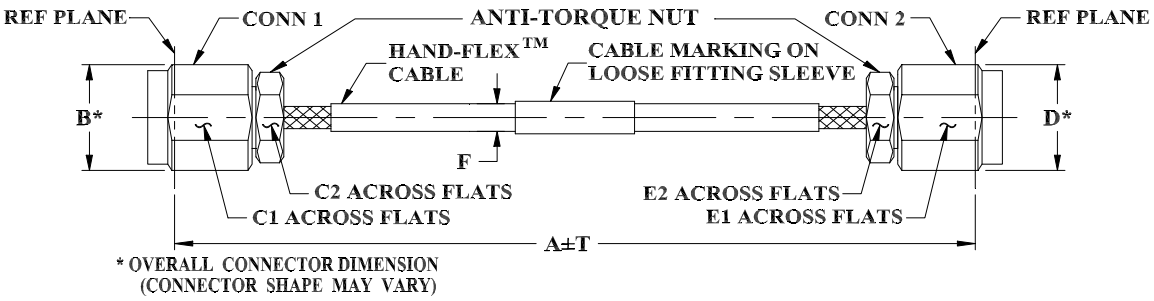
Dielectric: Solid PTFE

Outer Shield: Copper Braid, Tin Soaked

Jacket: FEP, Blue (Unjacketed cable also available upon request)

Connectors:
Coupling Nut: Stainless Steel Passivated
Body: Stainless Steel Gold Plated
Center Pin: Silver Plated Copper Clad Steel

## OUTLINE DRAWING

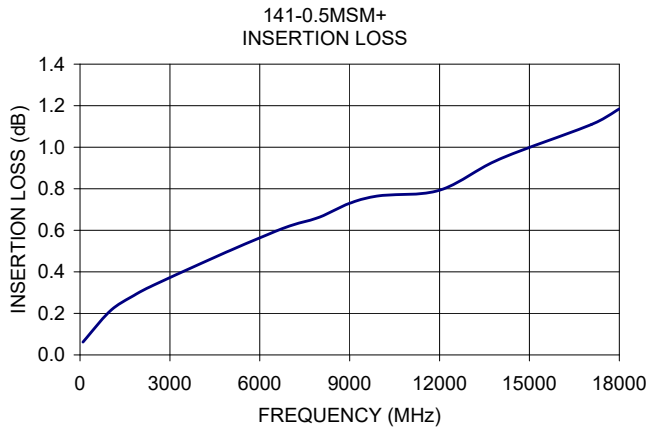


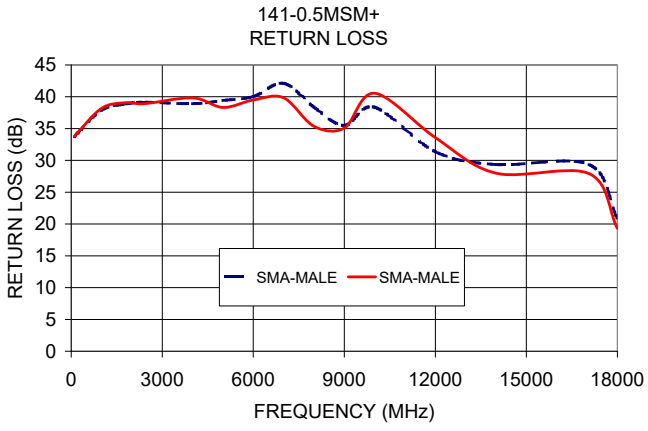

## OUTLINE DIMENSIONS (Inch / mm)

| A | B | C1 | C2 | D | E1 | E2 | F | T | wt |
|---|---|---|---|---|---|---|---|---|---|
| 19.69 | .36 | .315 | .250 | .36 | .315 | .250 | **.163±.004** | .15 | **grams** |
| 500 | 9.14 | 8.00 | 6.35 | 9.14 | 8.00 | 6.35 | **4.14±0.10** | 3.81 | 27.12 |

## TYPICAL PERFORMANCE DATA AND CHARTS

| Frequency (MHz) | Insertion Loss (dB) | Return Loss (dB) | |
|---|---|---|---|
| | | SMA-Male | SMA-Male |
| 100 | 0.06 | 33.7 | 33.8 |
| 1000 | 0.21 | 37.9 | 38.2 |
| 1800 | 0.29 | 38.9 | 39.1 |
| 2404 | 0.33 | 39.2 | 38.9 |
| 4001 | 0.44 | 38.9 | 39.8 |
| 5000 | 0.50 | 39.4 | 38.3 |
| 6000 | 0.56 | 40.0 | 39.5 |
| 7001 | 0.62 | 42.1 | 39.8 |
| 8001 | 0.66 | 38.4 | 35.4 |
| 9000 | 0.73 | 35.5 | 35.1 |
| 10000 | 0.77 | 38.4 | 40.6 |
| 12001 | 0.79 | 31.4 | 33.6 |
| 14001 | 0.94 | 29.4 | 28.0 |
| 17069 | 1.11 | 29.3 | 27.9 |
| 18000 | 1.18 | 20.8 | 19.3 |



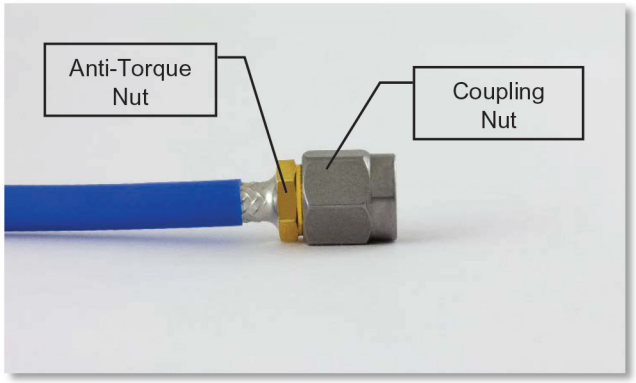



## PROPER CABLE CONNECTION USING ANTI-TORQUE NUT

Mini-Circuits 141-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 torqueing and twisting when tightening the cable connector.

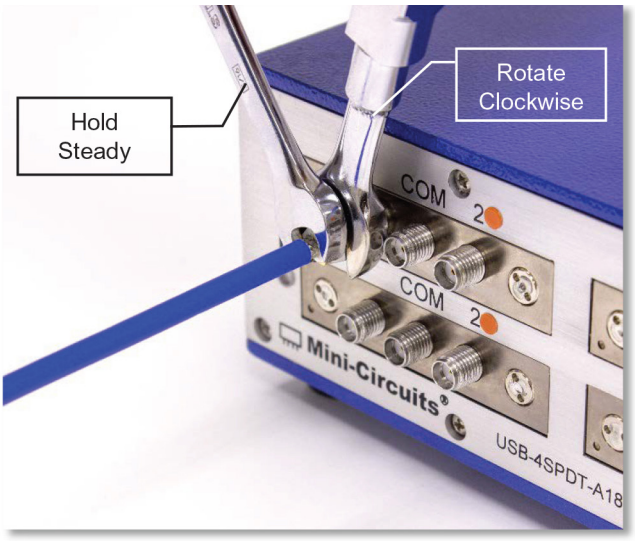
**TO PROPERLY TIGHTEN THE CABLE CONNECTOR:**

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-torqueing 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

# Hand-Flex Coaxial Cable, SMA-M/SMA-M 141-0.5SM+

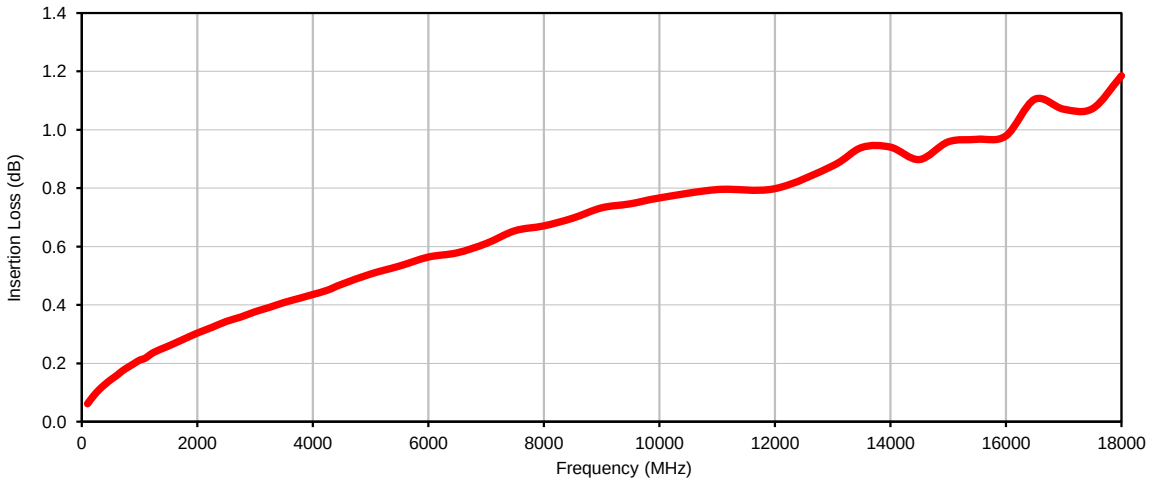
*Typical Performance Data*

| FREQUENCY (MHz) | INSERTION LOSS (dB) | SMA-MALE 1 RETURN LOSS (dB) | SMA-MALE 2 RETURN LOSS (dB) |
|---|---|---|---|
| 100.0 | 0.06 | 33.7 | 33.8 |
| 200.0 | 0.09 | 39.4 | 40.0 |
| 300.0 | 0.11 | 40.9 | 40.9 |
| 400.0 | 0.13 | 37.9 | 37.4 |
| 500.0 | 0.14 | 38.9 | 38.5 |
| 600.0 | 0.16 | 36.9 | 36.9 |
| 700.0 | 0.17 | 37.0 | 37.1 |
| 800.0 | 0.19 | 37.2 | 36.8 |
| 900.0 | 0.20 | 36.8 | 36.4 |
| 1000.0 | 0.21 | 37.9 | 38.2 |
| 1100.0 | 0.22 | 36.5 | 37.0 |
| 1250.0 | 0.24 | 37.7 | 37.1 |
| 1500.0 | 0.26 | 36.0 | 36.0 |
| 1750.0 | 0.28 | 36.9 | 37.1 |
| 2000.0 | 0.30 | 37.9 | 37.3 |
| 2250.0 | 0.32 | 36.6 | 36.7 |
| 2500.0 | 0.34 | 38.3 | 37.6 |
| 2750.0 | 0.36 | 39.0 | 38.5 |
| 3000.0 | 0.38 | 38.9 | 39.6 |
| 3250.0 | 0.39 | 40.6 | 41.5 |
| 3500.0 | 0.41 | 40.0 | 40.9 |
| 3750.0 | 0.42 | 38.9 | 39.8 |
| 4000.0 | 0.44 | 39.1 | 40.1 |
| 4250.0 | 0.45 | 38.3 | 38.9 |
| 4500.0 | 0.47 | 38.5 | 39.1 |
| 5000.0 | 0.51 | 39.4 | 38.3 |
| 5500.0 | 0.53 | 40.8 | 40.0 |
| 6000.0 | 0.56 | 40.0 | 39.5 |
| 6500.0 | 0.58 | 39.0 | 37.0 |
| 7000.0 | 0.61 | 42.4 | 40.1 |
| 7500.0 | 0.65 | 34.2 | 32.8 |
| 8000.0 | 0.67 | 38.3 | 35.3 |
| 8500.0 | 0.70 | 35.0 | 33.7 |
| 9000.0 | 0.73 | 35.7 | 35.3 |
| 9500.0 | 0.75 | 34.3 | 35.2 |
| 10000.0 | 0.77 | 38.4 | 40.6 |
| 11000.0 | 0.79 | 33.4 | 37.7 |
| 12000.0 | 0.80 | 31.5 | 34.1 |
| 13000.0 | 0.88 | 28.7 | 28.2 |
| 13500.0 | 0.94 | 28.4 | 28.0 |
| 14000.0 | 0.94 | 29.4 | 27.9 |
| 14500.0 | 0.90 | 29.4 | 27.2 |
| 15000.0 | 0.96 | 27.3 | 26.3 |
| 15500.0 | 0.97 | 26.6 | 25.7 |
| 16000.0 | 0.98 | 27.6 | 25.9 |
| 16500.0 | 1.10 | 29.2 | 27.5 |
| 17000.0 | 1.07 | 29.5 | 27.4 |
| 17500.0 | 1.07 | 27.5 | 26.2 |
| 18000.0 | 1.18 | 20.8 | 19.3 |

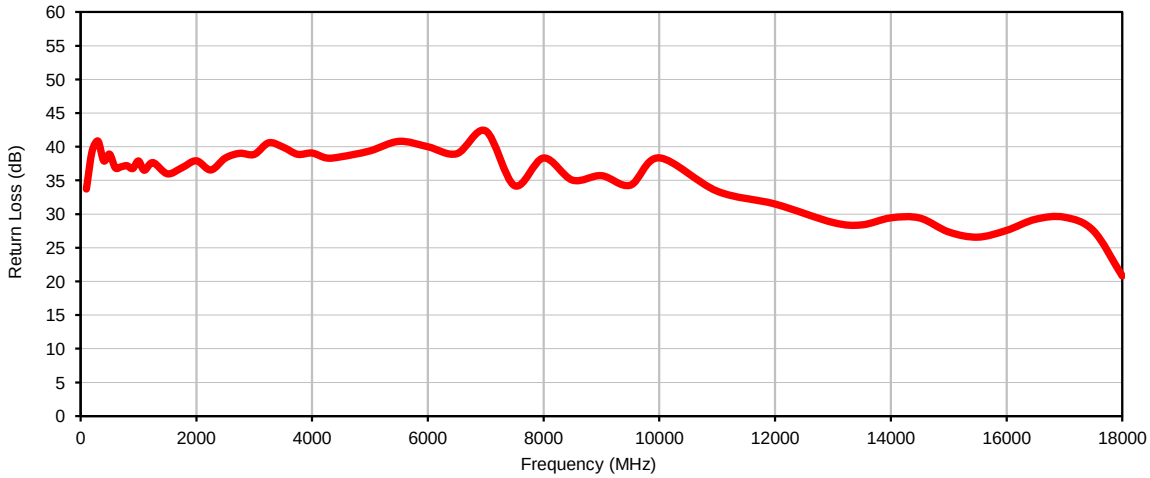
# Hand-Flex Coaxial Cable, SMA-M/SMA-M 141-0.5SM+

*Typical Performance Curves*

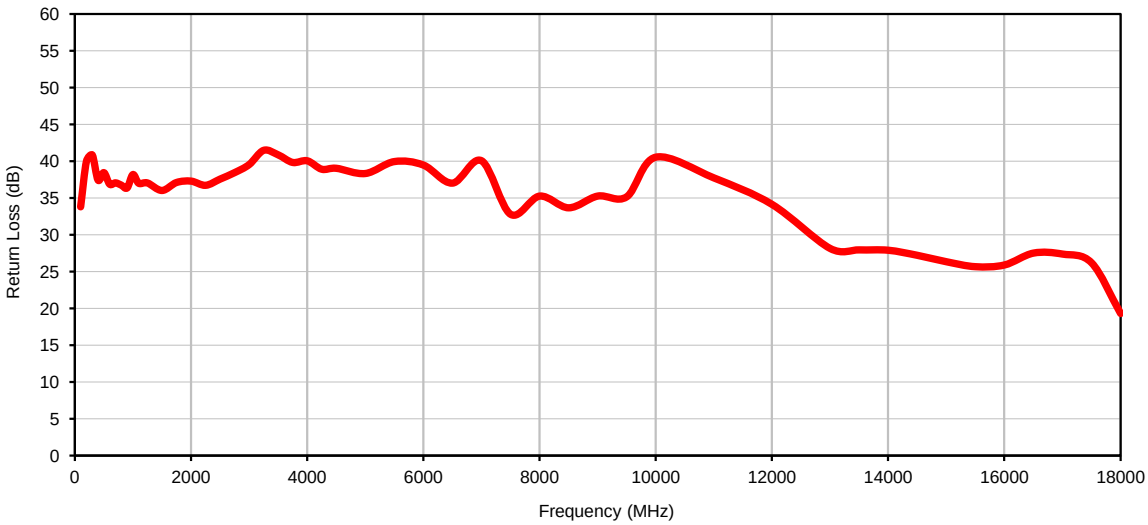
**Insertion Loss**




**SMA-Male 1 Return Loss**



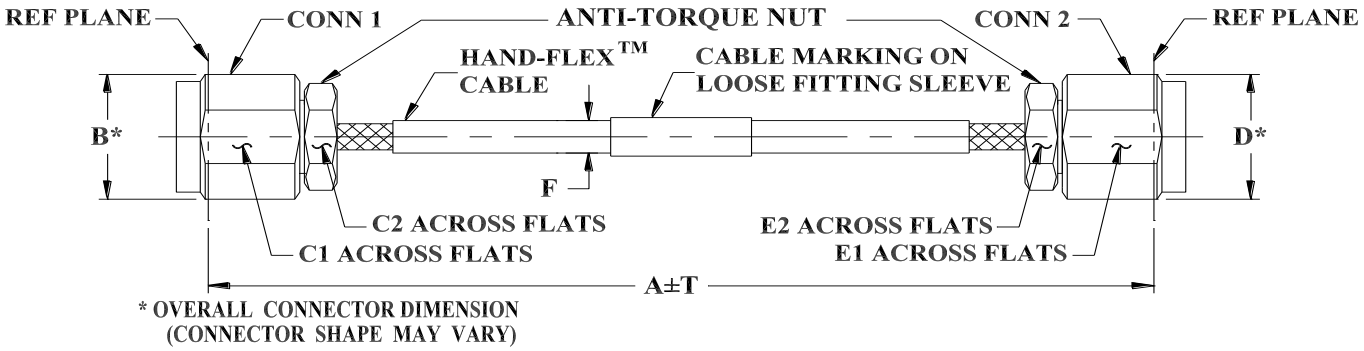

**SMA-Male 2 Return Loss**



# Case Style KQ

**KQ1506**

## Outline Dimensions




KQ1506 SERIES
SMA MALE (CONN-1)
SMA MALE (CONN-2)

| CASE STYLE # | A | | B | C1 | C2 | D | E1 | E2 | F | | T | | WEIGHT GRAMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INCH | MM | | | | | | | 141U-ASM+ | 141-ASM+ | INCH | MM | |
| KQ1506-2 | 2.00 | 50.80 | .36 (9.14) | .315 (8.00) | .250 (6.35) | .36 (9.14) | .315 (8.00) | .250 (6.35) | .141±.003 (3.58±0.07) | .163±.004 (4.14±0.10) | .05 | 1.27 | 6.89 |
| KQ1506-3 | 3.00 | 76.20 | | | | | | | | | .05 | 1.27 | 8.03 |
| KQ1506-3.94 | 3.94 | 100.00 | | | | | | | | | .05 | 1.27 | 9.10 |
| KQ1506-4 | 4.00 | 101.60 | | | | | | | | | .05 | 1.27 | 9.17 |
| KQ1506-5 | 5.00 | 127.00 | | | | | | | | | .05 | 1.27 | 10.32 |
| KQ1506-6 | 6.00 | 152.40 | | | | | | | | | .05 | 1.27 | 11.46 |
| KQ1506-7 | 7.00 | 177.80 | | | | | | | | | .10 | 2.54 | 12.60 |
| KQ1506-7.87 | 7.87 | 200.00 | | | | | | | | | .10 | 2.54 | 13.60 |
| KQ1506-8 | 8.00 | 203.20 | | | | | | | | | .10 | 2.54 | 13.74 |
| KQ1506-9 | 9.00 | 228.60 | | | | | | | | | .10 | 2.54 | 14.89 |
| KQ1506-10 | 10.00 | 254.00 | | | | | | | | | .10 | 2.54 | 16.03 |
| KQ1506-11 | 11.00 | 279.40 | | | | | | | | | .10 | 2.54 | 17.17 |
| KQ1506-11.81 | 11.81 | 300.00 | | | | | | | | | .10 | 2.54 | 18.09 |
| KQ1506-12 | 12.00 | 304.80 | | | | | | | | | .10 | 2.54 | 18.32 |
| KQ1506-13 | 13.00 | 330.20 | | | | | | | | | .15 | 3.81 | 19.46 |
| KQ1506-14 | 14.00 | 355.60 | | | | | | | | | .15 | 3.81 | 20.60 |
| KQ1506-15 | 15.00 | 381.00 | | | | | | | | | .15 | 3.81 | 21.75 |
| KQ1506-16 | 16.00 | 406.40 | | | | | | | | | .15 | 3.81 | 22.89 |
| KQ1506-17 | 17.00 | 431.80 | | | | | | | | | .15 | 3.81 | 24.03 |
| KQ1506-18 | 18.00 | 457.20 | | | | | | | | | .15 | 3.81 | 25.17 |
| KQ1506-19 | 19.00 | 482.60 | | | | | | | | | .15 | 3.81 | 26.32 |
| KQ1506-19.7 | 19.69 | 500.00 | | | | | | | | | .15 | 3.81 | 27.12 |
| KQ1506-20 | 20.00 | 508.00 | | | | | | | | | .15 | 3.81 | 27.45 |

**Unless otherwise specified dimensions are in inches (mm).**
**Tolerances: 2Pl. ± .03; 3Pl. ± .015**

**Note:**

1. 141 Hand-Flex™ Coaxial Cable.
2. "A" Represents Length of Cable.


Mini-Circuits®
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# Case Style KQ

**KQ1506**

## Outline Dimensions

KQ1506 SERIES
SMA MALE (CONN-1)
SMA MALE (CONN-2)

| CASE STYLE # | A | | B | C1 | C2 | D | E1 | E2 | F | | T | | WEIGHT GRAMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INCH | MM | | | | | | | 141U-ASM+ | 141-ASM+ | INCH | MM | |
| KQ1506-22 | 22.00 | 558.80 | .36 (9.14) | .315 (8.00) | .250 (6.35) | .36 (9.14) | .315 (8.00) | .250 (6.35) | .141±.003 (3.58±0.07) | .163±.004 (4.14±0.10) | .15 | 3.81 | 29.75 |
| KQ1506-24 | 24.00 | 609.60 | | | | | | | | | .15 | 3.81 | 32.03 |
| KQ1506-26 | 26.00 | 660.40 | | | | | | | | | .20 | 5.08 | 34.32 |
| KQ1506-30 | 30.00 | 762.00 | | | | | | | | | .20 | 5.08 | 38.89 |
| KQ1506-32 | 32.00 | 812.80 | | | | | | | | | .20 | 5.08 | 41.18 |
| KQ1506-36 | 36.00 | 914.40 | | | | | | | | | .30 | 7.62 | 45.75 |
| KQ1506-39.4 | 39.37 | 1000.00 | | | | | | | | | .30 | 7.62 | 49.63 |
| KQ1506-40 | 40.00 | 1016.00 | | | | | | | | | .30 | 7.62 | 50.32 |
| KQ1506-48 | 48.00 | 1219.20 | | | | | | | | | .40 | 10.16 | 61.75 |
| KQ1506-50 | 50.0 | 1270.00 | | | | | | | | | .40 | 10.16 | 72.15 |
| KQ1506-59.1 | 59.06 | 1500.00 | | | | | | | | | .40 | 10.16 | 73.18 |
| KQ1506-60 | 60.00 | 1524.00 | | | | | | | | | .40 | 10.16 | 73.18 |
| KQ1506-72 | 72.00 | 1828.80 | | | | | | | | | .40 | 10.16 | 86.90 |
| KQ1506-78.7 | 78.74 | 2000.00 | | | | | | | | | .40 | 10.16 | 94.55 |
| | | | | | | | | | | | | | |
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**Unless otherwise specified dimensions are in inches (mm).**
**Tolerances: 2Pl. ± .03; 3Pl. ± .015**

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Mini-Circuits

**Environmental Specifications** **ENV52**

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)<br>Ambient Environment | Individual Model Data sheet |
| Storage Temperature | -55° to 105° C or -55° to 85° C (see data sheet)<br>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<br>30 mm, 5 times for 086 series cables | |
| Single Bend Radius | 8 mm for 141 series cables<br>6 mm for 086 series cables | |


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