

Singlemode Build Out Attenuators

Features

- A range of fixed attenuation values. Standard values of 1 through 20 and 25dB
- UPC and APC offer Excellent Return Loss
- FC, SC, ST, and D4 styles
- Attenuation is wavelength independent and polarization insensitive
- Low PDL
- Low modal noise
- Long term reliability
- Very low reflectance
- Excellent Price/Performance
- Vibration resistant
- Single and Dual Window
- Designed to comply with Bellcore GR-NWT-00910

Applications

- Power leveling in DWDM transmission systems
- Test and Measurement
- Power attenuation at the receiver

Available Collateral

- Application Specification 114-13055
- Test reports qualifying product to Bellcore 910
- Customer Drawings

Customizable Features

- Attenuation tolerance
- PC and SPC configurations
- Attenuation values in 1dB increments
- Labeling
- Kitting/Packaging
- Wavelength Dependent Loss
- Reflectance
- Pass Band



Photo #110813 FC mod

Tyco Electronics' high performance Build Out Attenuators utilize a unique all-fiber construction to absorb the optical signal.

By employing a Tyco Electronics' technology, the design minimizes reflectance, attenuation tolerance and PDL while maximizing reliability, environmental stability, and power handling. There are no filters, air gaps, or core mismatches.

Specifications

Attenuation Values —
1-20dB and 25 dB (Fixed)

Reflectance —
<-45dB, -50, -55 and -60dB for PC, SPC, UPC and APC polish respectively

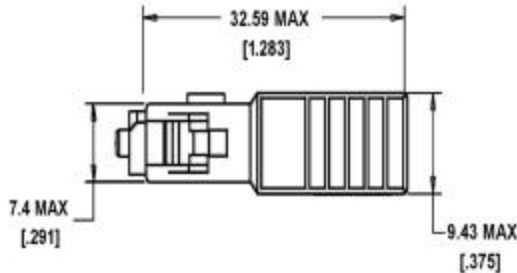
Operating Temperature —
-40°C to +75°C

Vibration Resistance —
<0.1 x attenuation



**Singlemode
SC Attenuators, Build Out Style,
Fixed Value**

Dual Window and Bellcore Bandpass



R=Reflectance

Note: Additional attenuation values available upon request.

Dual Window Attenuators

| Part Numbers | Bandpass 1310/1550nm ±25nm |
|------------------|----------------------------|
| Attenuation (dB) | SC/UPC R ≤ -55 dB |
| 1 | 209943-1 |
| 2 | 209943-2 |
| 3 | 209943-3 |
| 4 | 209943-4 |
| 5 | 209943-5 |
| 6 | 209943-6 |
| 7 | 209943-7 |
| 8 | 209943-8 |
| 9 | 209943-9 |
| 10 | 1-209943-0 |
| 11 | 1-209943-1 |
| 12 | 1-209943-2 |
| 13 | 1-209943-3 |
| 14 | 1-209943-4 |
| 15 | 1-209943-5 |
| 16 | 1-209943-6 |
| 17 | 1-209943-7 |
| 18 | 1-209943-8 |
| 19 | 1-209943-9 |
| 20 | 2-209943-0 |
| 25 | 2-209943-5 |

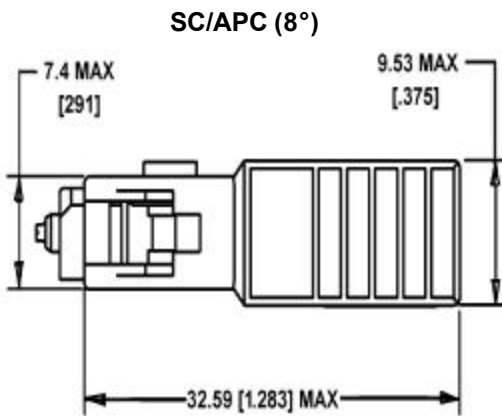
Note: Attenuation Tolerance, Ambient ---
≥ 5 dB: ± .10 x nominal attenuation value
< 5 dB: ± 0.50 dB

Bellcore Bandpass Attenuators

| Part Numbers | Bandpass 1260-1360nm & 1430-1580nm |
|------------------|------------------------------------|
| Attenuation (dB) | SC/UPC R ≤ -55 dB |
| 1 | 209250-1 |
| 2 | 209250-2 |
| 3 | 209250-3 |
| 4 | 209250-4 |
| 5 | 209250-5 |
| 6 | 209250-6 |
| 7 | 209250-7 |
| 8 | 209250-8 |
| 9 | 209250-9 |
| 10 | 1-209250-0 |
| 11 | 1-209250-1 |
| 12 | 1-209250-2 |
| 13 | 1-209250-3 |
| 14 | 1-209250-4 |
| 15 | 1-209250-5 |
| 16 | 1-209250-6 |
| 17 | 1-209250-7 |
| 18 | 1-209250-8 |
| 19 | 1-209250-9 |
| 20 | 2-209250-0 |
| 25 | 2-209250-5 |

Note: Attenuation Tolerance, Ambient ----
≥ 5 dB: ± .15 x nominal attenuation value
< 5 dB: ± 0.75 dB

**Singlemode
SC Attenuators, Build Out Style
Fixed Value**



R=Reflectance

Note: Additional attenuation values available upon request.

*9° APC Available (417496-X)

Dual Window Attenuators

| Part Numbers | Bandpass 1310/1550nm ±25nm |
|------------------|----------------------------|
| Attenuation (dB) | SC/APC R ≤ -60 dB |
| 1 | 209597-1 |
| 2 | 209597-2 |
| 3 | 209597-3 |
| 4 | 209597-4 |
| 5 | 209597-5 |
| 6 | 209597-6 |
| 7 | 209597-7 |
| 8 | 209597-8 |
| 9 | 209597-9 |
| 10 | 1-209597-0 |
| 11 | 1-209597-1 |
| 12 | 1-209597-2 |
| 13 | 1-209597-3 |
| 14 | 1-209597-4 |
| 15 | 1-209597-5 |
| 16 | 1-209597-6 |
| 17 | 1-209597-7 |
| 18 | 1-209597-8 |
| 19 | 1-209597-9 |
| 20 | 2-209597-0 |
| 25 | 2-209597-5 |

Note: Attenuation Tolerance, Ambient ---
≥ 5 dB: ± .10 x nominal attenuation value
< 5 dB: ± 0.50 dB

Bellcore Bandpass Attenuators

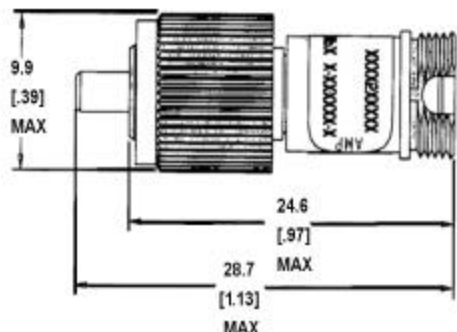
| Part Numbers | Bandpass 1260-1360nm & 1430-1580nm |
|------------------|------------------------------------|
| Attenuation (dB) | SC/APC (8°) R ≤ -60 dB |
| 1 | 417021-1 |
| 2 | 417021-2 |
| 3 | 417021-3 |
| 4 | 417021-4 |
| 5 | 417021-5 |
| 6 | 417021-6 |
| 7 | 417021-7 |
| 8 | 417021-8 |
| 9 | 417021-9 |
| 10 | 1-417021-0 |
| 11 | 1-417021-1 |
| 12 | 1-417021-2 |
| 13 | 1-417021-3 |
| 14 | 1-417021-4 |
| 15 | 1-417021-5 |
| 16 | 1-417021-6 |
| 17 | 1-417021-7 |
| 18 | 1-417021-8 |
| 19 | 1-417021-9 |
| 20 | 2-417021-0 |
| 25 | 2-417021-5 |

Note: Attenuation Tolerance, Ambient ---
≥ 5 dB: ± .15 x nominal attenuation value
< 5 dB: ± 0.75 dB



**Singlemode
FC Attenuators, Build Out Style
Fixed Value**

Dual Window and Bellcore Bandpass



R=Reflectance
Note: Additional attenuation values available upon request.

Dual Window Attenuators

Part Numbers Bandpass
1310/1550nm ±25nm

| Attenuation (dB) | FC/UPC R ≤ -55 dB |
|------------------|----------------------|
| 1 | 209948-1 |
| 2 | 209948-2 |
| 3 | 209948-3 |
| 4 | 209948-4 |
| 5 | 209948-5 |
| 6 | 209948-6 |
| 7 | 209948-7 |
| 8 | 209948-8 |
| 9 | 209948-9 |
| 10 | 1-209948-0 |
| 11 | 1-209948-1 |
| 12 | 1-209948-2 |
| 13 | 1-209948-3 |
| 14 | 1-209948-4 |
| 15 | 1-209948-5 |
| 16 | 1-209948-6 |
| 17 | 1-209948-7 |
| 18 | 1-209948-8 |
| 19 | 1-209948-9 |
| 20 | 2-209948-0 |
| 25 | 2-209948-5 |

Note: Attenuation Tolerance, Ambient ---
≥ 5 dB: ± .10 x nominal attenuation value
< 5 dB: ± 0.50 dB

Bellcore Bandpass Attenuators

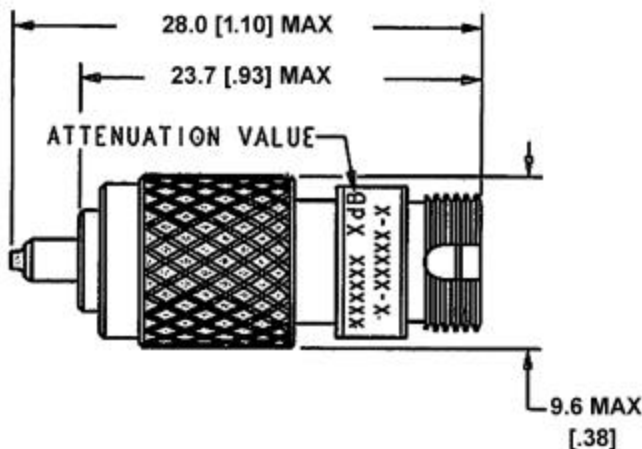
Part Numbers Bandpass 1260-1360nm
& 1430-1580nm

| Attenuation (dB) | FC/UPC R ≤ -55 dB |
|------------------|----------------------|
| 1 | 209285-1 |
| 2 | 209285-2 |
| 3 | 209285-3 |
| 4 | 209285-4 |
| 5 | 209285-5 |
| 6 | 209285-6 |
| 7 | 209285-7 |
| 8 | 209285-8 |
| 9 | 209285-9 |
| 10 | 1-209285-0 |
| 11 | 1-209285-1 |
| 12 | 1-209285-2 |
| 13 | 1-209285-3 |
| 14 | 1-209285-4 |
| 15 | 1-209285-5 |
| 16 | 1-209285-6 |
| 17 | 1-209285-7 |
| 18 | 1-209285-8 |
| 19 | 1-209285-9 |
| 20 | 2-209285-0 |
| 25 | 2-209285-5 |

Note: Attenuation Tolerance, Ambient ---
≥ 5 dB: ± .15 x nominal attenuation value
< 5 dB: ± 0.75 dB

**Singlemode
FC Attenuators, Build Out Style
Fixed Value**

FC/APC (8°)



R=Reflectance
Note: Additional attenuation values available upon request.

Dual Window Attenuators

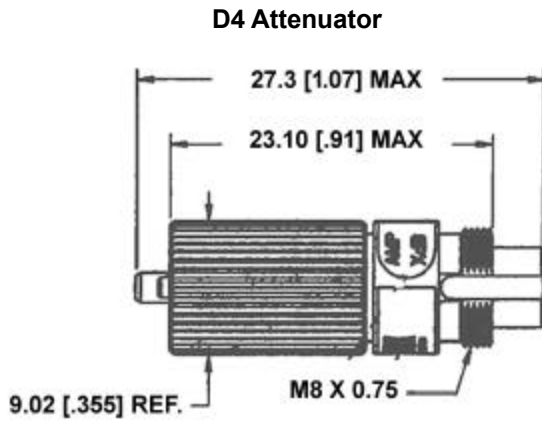
Part Numbers Bandpass
1310/1550nm ±25nm

| Attenuation (dB) | FC/APC R ≤ -60 dB |
|------------------|----------------------|
| 1 | 209845-1 |
| 2 | 209845-2 |
| 3 | 209845-3 |
| 4 | 209845-4 |
| 5 | 209845-5 |
| 6 | 209845-6 |
| 7 | 209845-7 |
| 8 | 209845-8 |
| 9 | 209845-9 |
| 10 | 1-209845-0 |
| 11 | 1-209845-1 |
| 12 | 1-209845-2 |
| 13 | 1-209845-3 |
| 14 | 1-209845-4 |
| 15 | 1-209845-5 |
| 16 | 1-209845-6 |
| 17 | 1-209845-7 |
| 18 | 1-209845-8 |
| 19 | 1-209845-9 |
| 20 | 2-209845-0 |
| 25 | 2-209845-5 |

Note: Attenuation Tolerance, Ambient ---
≥ 5 dB: ± .10 x nominal attenuation value
< 5 dB: ± 0.50 dB



**Singlemode
D4 Attenuators, Build Out Style
Fixed Value**



R=Reflectance
Note: Additional attenuation values available upon request.

Dual Window Attenuators

| Part Numbers | Bandpass 1310/1550nm ±25nm |
|------------------|----------------------------------|
| Attenuation (dB) | D4/PC R ≤ -45 dB |
| 5 | 209570-5 |
| 10 | 1-209570-0 |
| 15 | 1-209570-5 |
| 20 | 2-209570-0 |

Note: Attenuation Tolerance, Ambient ---
 ≥ 5 dB: ± .15 x nominal attenuation value
 < 5 dB: ± 0.75 dB

Variable Optical Attenuators

Features

- Repeatable, variable attenuation from 2 to 40dB
- <-65dB reflectance (unconnectorized)
- Slim design allows dense mounting with easy access to adjustment screw
- Available with standard connector types or unterminated
- Polarization insensitive
- Low modal noise
- Long-term reliability

Applications

- Test and measurement
- Power attenuation at the receiver
- Power leveling in DWDM transmission systems

Available Collateral

- Customer Drawings

Customizable Features

- Lead lengths
- Termination types, including LC, MU, SC, ST, FC

Singlemode Variable Attenuators

| Fiber Conn Type | Part Number | Lead Length |
|-----------------|-------------|-------------|
| None | 107059-1 | 1.2 meters |
| FC/PC | 107059-2 | 1.0 meter |
| SC/PC | 107059-5 | 1.0 meter |
| ST/PC | 107059-6 | 1.0 meter |
| FC/SPC | 1-107059-2 | 1.0 meter |
| SC/SPC | 1-107059-5 | 1.0 meter |
| FC/APC | 209544-1 | 1.0 meter |
| FC/UPC | 209544-3 | 1.0 meter |
| SC/APC | 209544-5 | 1.0 meter |
| SC/UPC | 209544-6 | 1.0 meter |
| SC/APC | 3-209544-5 | 3.0 meters |
| SC/UPC | 3-209544-6 | 3.0 meters |
| SC/APC SC/UPC | 3-209544-7 | 3.0 meters |

Connector Polish

| Polish | Back Reflection |
|--------|-----------------|
| PC | -45 dB |
| SPC | -50 dB |
| UPC | -55 dB |
| APC | -65 dB |



Photo #111143

The Tyco Electronics' Variable Optical Attenuator achieves high reliability with a specially processed fiber that is conveniently adjusted to varying radii by the user. Cladding modes are well controlled by a specially processed fiber.

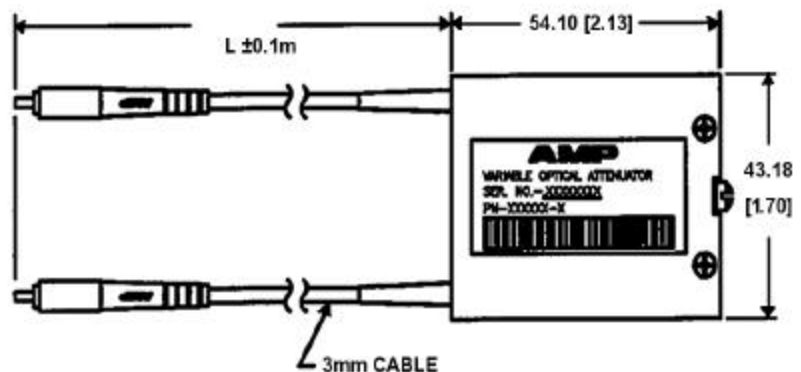
Specifications

- Minimum Attenuation — < 2dB
- Maximum Attenuation — ≥ 40dB
- Operational Wavelength — 1250-1580nm
- Reflectance — ≤ -65dB unconnectorized

Operating Temperature — -40°C to +75°C

Vibration Resistance — < 0.15 x attenuation setting

Adjustment Resolution — Continuously Adjustable



In Line Attenuators

Product Facts

- A range of fixed attenuation values. Standard values of 1 through 20, and 25 dB
- UPC and APC offer Excellent Return Loss
- Attenuation is wavelength independent and polarization insensitive
- Low PDL
- Low modal noise
- Long term reliability
- <-60dB reflectance (unconnectorized)
- Low cost
- Vibration resistant
- Single and Dual Window
- Designed to comply with Bellcore GR-NWT-00910

Applications

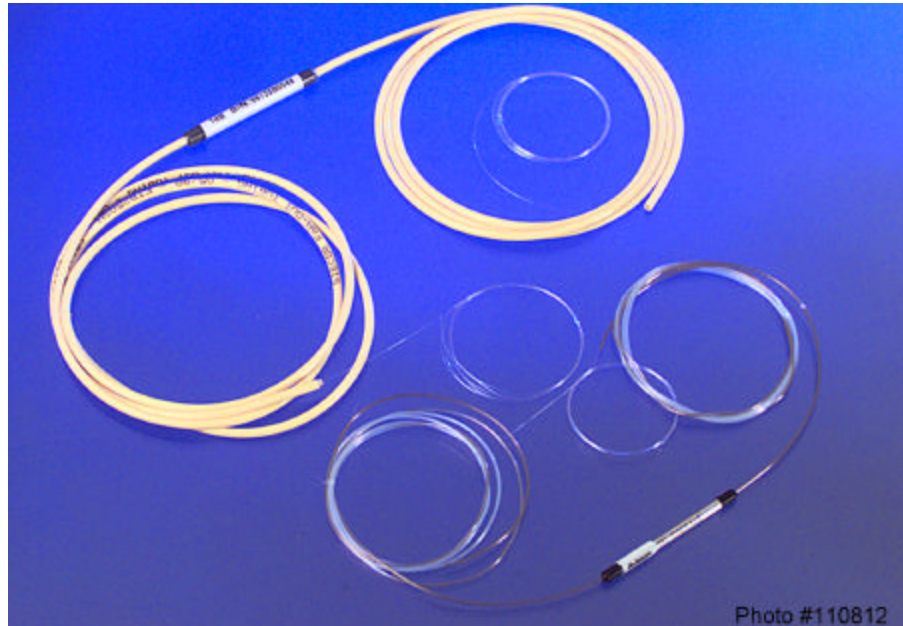
- Power leveling in DWDM transmission systems
- Test and Measurement
- Power attenuation at the receiver

Available Collateral

- Product designed to meet Bellcore 910
- Customer Drawings

Customizable Features

- Lead lengths
- Connectorized types, including LC, MU, SC, ST, and FC
- Available in Heavy Duty, Medium Duty, and Light Duty



Tyco Electronics' High Performance In Line Attenuators utilize a unique all fiber construction to absorb the optical signal.

By employing a Tyco Electronics' technology, the design minimizes reflectance, attenuation tolerance and PDL while maximizing reliability, environmental stability, and power handling. There are no filters, air gaps, or core mismatches.

Specifications

Attenuation Values —

1-20dB and 25 dB (Fixed)

Reflectance —

<-45dB, -50, -55 and -60dB for PC, SPC, UPC and APC polish respectively

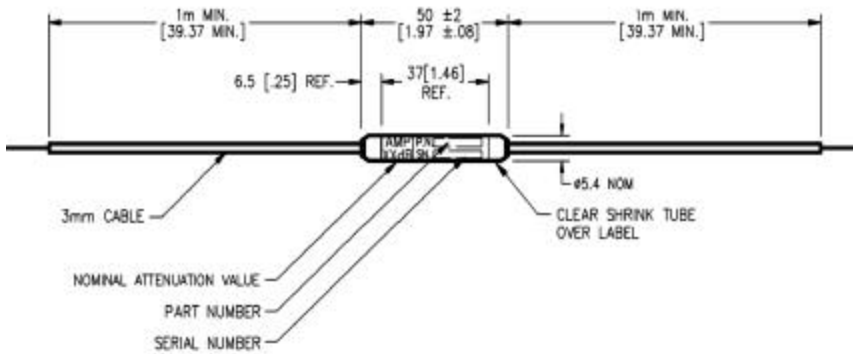
Operating Temperature —

-40°C to +75°C

Vibration Resistance —

<0.1 x attenuation

**Singlemode
In Line Attenuators, Heavy Duty
Fixed Value**



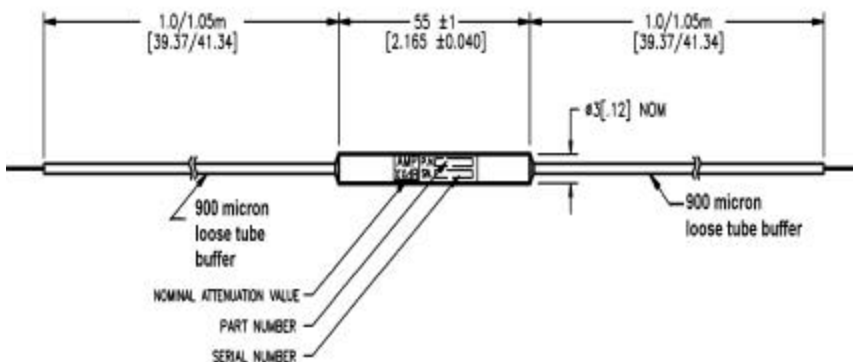
R=Reflectance
Note: Connectorization available upon request.

Dual Window In Line Attenuators

| Part Numbers | Bandpass 1310/1550nm ±25nm |
|--------------|-------------------------------|
| | Attenuation (dB) |
| | R ≤ -60 dB |
| 1 | 417277-1 |
| 2 | 417277-2 |
| 3 | 417277-3 |
| 4 | 417277-4 |
| 5 | 417277-5 |
| 6 | 417277-6 |
| 7 | 417277-7 |
| 8 | 417277-8 |
| 9 | 417277-9 |
| 10 | 1-417277-0 |
| 11 | 1-417277-1 |
| 12 | 1-417277-2 |
| 13 | 1-417277-3 |
| 14 | 1-417277-4 |
| 15 | 1-417277-5 |
| 16 | 1-417277-6 |
| 17 | 1-417277-7 |
| 18 | 1-417277-8 |
| 19 | 1-417277-9 |
| 20 | 2-417277-0 |
| 25 | 2-417277-5 |

Note: Attenuation Tolerance, Ambient, 25° C unconnectorized---
 ≥ 5 dB: ± .10 x nominal attenuation value
 < 5 dB: ± 0.50 dB

**Singlemode
In Line Attenuators, Medium Duty
Fixed Value**



R=Reflectance
Note: Connectorization available upon request.

Dual Window In Line Attenuators

| Part Numbers | Bandpass 1310/1550nm ±25nm |
|--------------|-------------------------------|
| | Attenuation (dB) |
| | R ≤ -60 dB |
| 1 | 1321273-1 |
| 2 | 1321273-2 |
| 3 | 1321273-3 |
| 4 | 1321273-4 |
| 5 | 1321273-5 |
| 6 | 1321273-6 |
| 7 | 1321273-7 |
| 8 | 1321273-8 |
| 9 | 1321273-9 |
| 10 | 1-1321273-0 |
| 11 | 1-1321273-1 |
| 12 | 1-1321273-2 |
| 13 | 1-1321273-3 |
| 14 | 1-1321273-4 |
| 15 | 1-1321273-5 |
| 16 | 1-1321273-6 |
| 17 | 1-1321273-7 |
| 18 | 1-1321273-8 |
| 19 | 1-1321273-9 |
| 20 | 2-1321273-0 |
| 25 | 2-1321273-5 |

Note: Attenuation Tolerance, Ambient, 25° C unconnectorized---
 ≥ 5 dB: ± .10 x nominal attenuation value
 < 5 dB: ± 0.50 dB

Loopback Attenuators

Features

- Fixed attenuation values of 0 to 14 dB. Other attenuation values available
- Simulates FDDI cable plant budget
- Compact package
- Mechanically and environmentally stable
- Wavelength independent

Applications

- Test an FDDI station
- Attenuate signal at cross-connect panel
- Simulate system optical budget
- Shipping cover for transceiver modules

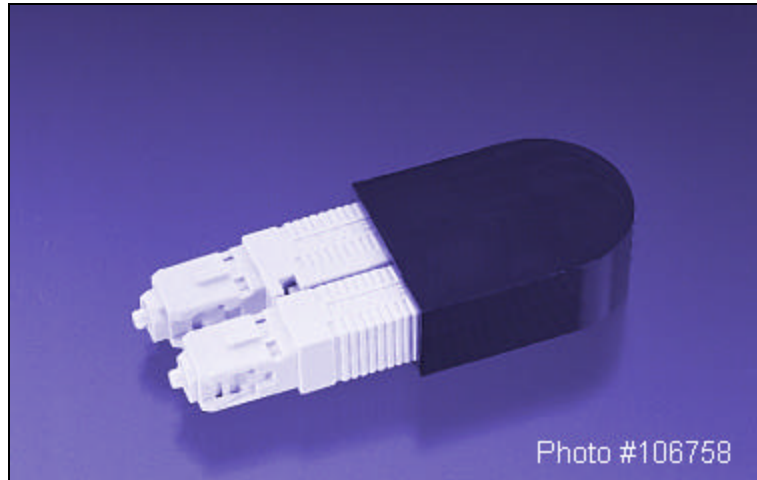


Photo #106758

Tyco Electronics' Loopback Attenuators utilize a unique all-fiber mechanism to cause a fixed attenuation of an optical signal. There are no filters, air-gaps, or core mismatches.

Tyco Electronic's fixed value attenuators use a patented fused fiber technology that relies on the natural physical property of evanescent coupling to create the desired attenuation level.

Specifications

Various Attenuation Values —

0-14 dB (Fixed)

(Others available upon request)

Operational Wavelengths —

850, 1310, 1550nm

Operating Temperature —

-40°C to +75°C

Weight —

<1 oz.

Part Numbers Operating Wavelength 600-1600nm Tested @ 1310nm

| Attenuation (dB) | Fiber Size |
|------------------|------------|
| 0 | 417338-1 |
| 3 | 417338-3 |
| 6 | 417338-6 |
| 9 | 417338-9 |
| 11 | 1-417338-1 |
| 14 | 1-417338-4 |

Note: Attenuation Tolerance, Ambient:
= ± 15%

Except 0 dB = + 0.6dB
3 dB = ± 0.6dB
6 dB = ± 1.0dB

Part Numbers Operating Wavelength 600-1600nm Tested @850 nm

| Attenuation (dB) | Fiber Size |
|------------------|------------|
| 0 | 417355-1 |
| 5 | 417355-5 |
| 6 | 417355-6 |

Note: Attenuation Tolerance, Ambient:

0 dB = + 0.6dB
5 dB = ± 0.75dB
6 dB = ± 1.0dB

