CABLES FOR AUTOMOTIVE MARKET
Sensor and multimedia cables

Catalogue
Introduction

Nexans has developed a range of special and customised cables for the automotive market.

This cable range covers two main applications which require high efficiency and expertise: sensor cables for harsh environment and multimedia market.

The excellent mechanical and chemical characteristics of our cables grant them with high resistance for operating in harsh environment.

The recommended operating temperatures are between -90°C to +260°C with a maximum voltage of 750 volts.

Our cables are available in many different styles including hook-up wires, coaxial cables, multicore cables, multi-pair cables and composite cables including optical elements.

Our research and development department will meet any specific requirement from our customers regarding the chemical, mechanical and electrical properties of the cables.
Cables for sensors

Single and multicore cables for sensors in harsh environment.

- Technology
  Tin / Silver plated Copper or aluminium conductor
  Polyimide wrapped wire also available
  AWG 32 to 14
  PTFE / PFA / ETFE / FEP / polyimide extruded insulation

- Advantages
  High temperature cable (up 260°C)
  High mechanical resistance (abrasion, cutting through)
  High flexibility
  Excellent chemical behaviour (engine oil, break oil, gear box oil, petrol...)
  Weight saving : light conductor materials
  Excellent electromagnetic interference protection

Antenna cables

Coaxial cables for multimedia in-car equipment
Applications: Navigation system (GPS), Car radio, Mobile phone and Remote Control Antenna

- Technology
  RG 174, RG 178, RG 316, RG 179 types
  High speed data bus cable
  Copper or optical fiber medium (IEEE394)
  Single or double braid
  PE / FEP / PTFE insulation

- Advantages
  High temperature cable (up to 105 / 110°C)
  High mechanical resistance jacket
  Easy connecting
  Small and flexible cables
  Conductor cross sections compatible with existing standard connectors
Summary

Part 1  Cables for sensors
ABS
Break altering indicator
Gear box sensor
Oil sensor (level, fluidity)
Gas detection/oxygen sensor
Temperature sensor

Part 2  Antenna cable
CD player connection
Antenna for remote control key
Remote control system antenna
Car antenna for radio, mobile phone and GPS
Part 1

Cables for sensors
Filotex®

Single Core Cable
High Temperature
150°C

Applications
- Sensor Cable for Automotive Application : ABS (Anti Break System) sensor

Main data
- High temperature cable,
- Operation Temperature : -55°C to + 150°C,
- Very Good Chemical Resistance (acids, bases, oil),
- Flame and Fire retardant (IEC332 - 1/2/3 & NFC 32070 C2 / C1),
- Average Weight : 10,1 kg / km

Electrical data
- Operating voltage : 500 V

CONSTRUCTION

CONDUCTOR :
Tin Plated Copper
19 x 0.224 mm
(0,75 mm² AWG20)

INSULATION : ETFE
∅ 1.72 ± 0.07 mm

PRODUCT REFERENCES
FILOTEX Ref : ET 277 327

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**Multicore Cable**

**High Temperature**

150°C

**Filotex®**

**Applications**
- Sensor Cable for Automotive Application: ABS (Anti Break System) sensor

**Main data**
- High Temperature cable
- Operation Temperature: + 150°C

**Electrical data**
- Operating voltage: 250 V
- Conductor resistance: < 40.71 Ω / km

**CONSTRUCTION**

1. **DRAIN WIRE**:
   28 x 0.15 Tinned Copper AWG 20

2. **2 CONDUCTORS**:
   28 x 0.15 mm Tinned Copper
   Insulation: TPE
   Ø = 2.00 mm

3. **TAPE**: Polyester Aluminum

4. **JACKET**: TPE
   Ø = 5.10 mm ± 0.30 mm
### Filotex®

**Single Core Cable**

**High Temperature**

**200°C**

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### Applications

- Hook-up Wire for Automotive Application: Break Altering indicator connection.

### Main data

- Operating Temperature: -50°C to +200°C,
- Good Chemical Resistance,
- The PFA wire could get an additional jacket (PTFE or Polyimide tape) for chemical resistance improvement.

### Electrical data

- Operating voltage: 300 V,
- Test voltage: 1000 V
- Linear resistance: 250 Ohms / km

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### Construction

1. **Conductor:**
   - Silver Plated Copper
   - Section: 0.15mm² / AWG26
   - Ø: 0.45 mm

2. **Insulation:**
   - PFA
   - Ø = 0.83 ± 0.02 mm
Filotex®

Single Core Cable
High Temperature PTFE Insulated Wire
260°C

Applications
- Hook-up wire for automotive application: break altering indicator connection.

Electrical Characteristics
- Voltage Rating: 250 Volts RMS
- Low Operating Temperature: -55°C
- High Operating Temperature: 260°C
- Good Chemical Resistance
- Non Flammable
- Nominal Weight: 3.06 g/m

Identification
- Color of wire: Black

Specification: Study 132500

FILOTEX® Study 132500
Filotex®

Single Core Cable
High Temperature
260°C

Applications
- Hook-up Wire for Automotive Application: Gear Box

Main data
- Operation Temperature: -55°C to +260°C,
- Very Good Chemical Resistance,
- Fire Retardant (Norm NFC 32070/C1),
- Average Weight: 10.5 g/m.

Electrical data
- Operating voltage: 600 V

CONSTRUCTION

1. CONDUCTOR:
   Nickel Plated Copper
   19 x 0.225 mm (AWG 20)
   Ø1.10 mm

2. INSULATION:
   Extruded PTFE
   Ø1.85 ± 0.05 mm
Low Voltage Cable
ETFE Jacket
150°C

Applications
- Sensor cable for Automotive applications: Oil analysis (level, fluidity, ...)

Main data
- Operating temperature: -40°C to +150°C,
- Very good chemical resistance,
- According to NFC 93524

Electrical data
- Operating voltage: 600 V (max.),

CONSTRUCTION

1 CONDUCTOR:
Tin p. Copper 7x0.13mm
Section: 0.093mm²/AWG 28
Insulation: ETFE
Ø = 0.67 ± 0.03 mm

2 SCREEN
Tinned Copper Braid
(0.10mm)

3 JACKET ETFE
Ø 1.45 ± 0.04 mm
Filotex®

Low Voltage Cable
PFA Jacket
260°C

Applications
- Harness for Automotive applications: gas Detection and oxygen sensor.

Main data
- Operating temperature: -55°C to +260°C,
- Very good chemical resistance,
- Fire retardant (Norm NFC 32070/C1)

Electrical data
- Operating voltage: 600 V (max.),

CONSTRUCTION

1. 2 CONDUCTORS:
   - Nickel Plated Copper
   - 19 x 0.22 mm (AWG 20)
   - INSULATION
   - Extruded PTFE
   - Ø 1.85 ± 0.05 mm

2. 2 FILLERS
   - FEP, Ø 1.20 mm

3. HELICOIDAL BRAID
   - Nickel Plated Copper
   - Ø 0.20 mm

4. OUTER JACKET
   - PFA
   - Ø 5.20 ± 0.20 mm

PRODUCT REFERENCES
FILOTEX Ref: ET 123 518
Unscreened hook-up wires
High temperature

KZ 05

To NF C 93-523 French specification
- Operating voltage: 600 volts
- Operating temperature: -55 °C up to +200 °C
(ambient temperature + rise)

Main characteristics
- Application:
  - Internal wiring in electronic equipment
  - Aircrafts and satellites
- Operating frequency: up to 2000 Hz
- Excellent chemical resistance
- They are fire retardant (to NFC 32070/C1 French specification)

PRODUCT IN THE RANGE
- KZ 04
- KZ 05
- KZ 06

CONSTRUCTION

1 CONDUCTOR
Stranded silvered copper wires

2 INSULATION
extruded polytetrafluoroethylene (PTFE)
(radial thickness according to the gauges: from 0.28 mm up to 0.30 mm)
## UNSCREENED HOOK-UP WIRES

<table>
<thead>
<tr>
<th>Reference</th>
<th>CONDUCTOR</th>
<th>D.C. resist. at 20°C (Ohms/Km)</th>
<th>Overall diameter mini. mm</th>
<th>Overall diameter maxi. mm</th>
<th>Maximum weight Kg / Km</th>
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Filotex®

KZ 57
Screened and jacketed hook-up wires
High temperature

PRODUCT IN THE RANGE
- KZ 55
- KZ 57
- KZ 59

CONSTRUCTION
Base core : KZ05

1 CONDUCTOR
Stranded silvered copper wires

2 INSULATION
Extruded polytetrafluorethylene (PTFE) (radial thickness according to the gauges : from 0.28 mm up to 0.30 mm)

3 SCREEN
Silvered copper braid

4 OUTER JACKET
Fluoropolymer (FEP) (radial thickness : 0.30 mm nominal)

To NF C 93-523 French specification
- Operating voltage : 600 volts
- Operating temperature : -55 °C up to +200 °C (ambient temperature + rise)

Main characteristics
- Application:
  - Internal wiring in electronic equipment
  - Aircrafts and satellites
- Operating frequency : up to 2000 Hz
- Excellent chemical resistance
- They are fire retardant (to NFC 32070/C1 French specification)

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### SCREENED AND JACKETED HOOK-UP WIRES

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<thead>
<tr>
<th>Reference</th>
<th>Type</th>
<th>Gauge</th>
<th>Cross section Ø x mm</th>
<th>Construction Ø x mm</th>
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Colour coding: white core - White outer jacket
Filotex®

KZ 69
Screened and jacketed pairs
High temperature

PRODUCT IN THE RANGE
- KZ 67
- KZ 69
- KZ 71

CONSTRUCTION
Base core : KZ05

1 CONDUCTOR
Stranded silvered copper wires

2 INSULATION
extruded polytetrafluorethylene (PTFE) (radial thickness according to the gauges : from 0.25 mm up to 0.30 mm)

3 SCREEN
Silvered copper braid

4 OUTER JACKET
Fluoropolymer (FEP) (radial thickness : 0.30 mm nominal)

To NF C 93-523 French specification
- Operating voltage : 600 volts
- Operating temperature : -55 °C up to +200 °C (ambient temperature + rise)

Main characteristics
- Application :
  - Internal wiring in electronic equipment
  - Aircrafts and satellites
- Operating frequency : up to 2000 Hz
- Excellent chemical resistance
- They are fire retardant (to NFC 32070/C1 French specification)
## SCREENED AND JACKETED PAIRS

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<th>Reference</th>
<th>Type</th>
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<th>Cross section mm²</th>
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<th>DC resist. at 20°C O/Km maxi.</th>
<th>Braid Nom. Ø strands mm mini.</th>
<th>Overall diameter max. mm</th>
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**Colour coding:**
- cores: white + light blue
- outer jacket: white
Filotex®

KZ 81
Screened and jacketed triples
High temperature

PRODUCT IN THE RANGE
- KZ 79
- KZ 81
- KZ 83

CONSTRUCTION
Base core : KZ05

1 CONDUCTOR
Stranded silvered copper wires

2 INSULATION
Extruded polytetrafluorethylene (PTFE) (radial thickness according to the gauges : from 0.25 mm up to 0.30 mm)

3 SCREEN
Silvered copper braid

4 OUTER JACKET
Fluoropolymer (FEP) (radial thickness : 0.30 mm nominal)

To NF C 93-523 French specification
- Operating voltage : 600 volts
- Operating temperature : -55 °C up to +200 °C (ambient temperature + rise)

Main characteristics
- Application:
  - Internal wiring in electronic equipment
  - Aircrafts and satellites
- Operating frequency : up to 2000 Hz
- Excellent chemical resistance
- They are fire retardant (to NFC 32070/C1 French specification)
## Screened and Jacketed Triples

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<thead>
<tr>
<th>Reference</th>
<th>Type</th>
<th>Gauge</th>
<th>Cross section</th>
<th>Nom. Ø</th>
<th>DC resist. at 20°C O/Km</th>
<th>Overall diameter</th>
<th>Braid Nom. Ø</th>
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<tr>
<td><strong>KZ 81-06</strong></td>
<td>KZ 05-06</td>
<td>22</td>
<td>0.34</td>
<td>7 x 0.25</td>
<td>0.75</td>
<td>57</td>
<td>0.13</td>
<td>3.86</td>
</tr>
<tr>
<td><strong>KZ 81-07</strong></td>
<td>KZ 05-07</td>
<td>20</td>
<td>0.60</td>
<td>19 x 0.20</td>
<td>1.00</td>
<td>33</td>
<td>0.13</td>
<td>4.40</td>
</tr>
<tr>
<td><strong>KZ 81-08</strong></td>
<td>KZ 05-08</td>
<td>18</td>
<td>0.93</td>
<td>19 x 0.25</td>
<td>1.25</td>
<td>21.5</td>
<td>0.13</td>
<td>5.18</td>
</tr>
<tr>
<td><strong>KZ 81-09</strong></td>
<td>KZ 05-09</td>
<td>16</td>
<td>1.34</td>
<td>19 x 0.30</td>
<td>1.50</td>
<td>14.6</td>
<td>0.13</td>
<td>5.83</td>
</tr>
<tr>
<td><strong>KZ 81-10</strong></td>
<td>KZ 05-10</td>
<td>14</td>
<td>1.91</td>
<td>27 x 0.30</td>
<td>1.85</td>
<td>10.5</td>
<td>0.13</td>
<td>6.64</td>
</tr>
<tr>
<td><strong>KZ 81-11</strong></td>
<td>KZ 05-11</td>
<td>12</td>
<td>3.18</td>
<td>45 x 0.30</td>
<td>2.45</td>
<td>6.3</td>
<td>0.13</td>
<td>7.89</td>
</tr>
</tbody>
</table>

Colour coding:
- cores: white + light blue + orange
- outer jacket: white
Part 2

Antenna cables
Coaxial cable 75 $\Omega$

PVC Jacket

Type RG179 PE/PVC

Applications
- Coaxial cable for automotive market: CD player connection,
- High frequency transmission

Main data
- Operating temperature: -40°C to + 105°C,

Electrical data
- Characteristic impedance: 75 $\Omega \pm 3$ at 200 MHz,
- Capacitance: < 75 pF / m,
- Relative propagation velocity: 69%
Coaxial Cable 50 Ω
RG 174 A/U

Applications
- High frequency transmission cable,
- Coaxial cable also used for automotive market,
- Car antenna for radio, mobile phone and GPS.

Main Data
- Operating Temperature: -40 °C to +85 °C

Electrical values
- Characteristic impedance: 50 +/- 2 Ohms
- Capacitance: 106 pF/m.

CONSTRUCTION

1. 7 x 0.16 mm Copper covered-steel (0.14 mm², AWG 26)
2. PE Insulation
   Ø = 1.52 +/- 0.07 mm
3. 0.10 mm Tinned Copper Braid
   Ø = 2.02 mm
4. Black PVC non Migrating Jacket
   Ø = 2.79 ± 0.13 mm
Coaxial Cable 50 Ω
PVC Jacket
VW approval – Norm N909 486 01

Applications
- Coaxial cable for automotive market: remote control system antenna,
- High frequency transmission,
- VW approval: N 909 486 01.

Electrical values
- Z.C.: 50 Ohms ± 2 at 200 MHz
- Capacity: 101 pF/m ± 5%
- Linear resistance <= 320 Ohms/Km
- Attenuation:
  - 100 MHz <= 29.7 dB/100 m
  - 400 MHz <= 61.7 dB/100 m
  - 1000 MHz <= 101.2 dB/100 m
  - 2000 MHz <= 150.6 dB/100 m

Main data
- Operating Temperature: -40 °C to +85 °C

CONSTRUCTION
1. 7 x 0.16 mm Plain Copper (0.14 mm², AWG 26)
2. Natural Polyethylene Insulation Ø = 1.52 mm
3. 0.10 mm Tinned Copper Braid
4. Black PVC Jacket Ø = 2.79 mm

PRODUCT REFERENCES
FILOTEX Ref: ET 279 160
Coaxial Cable 50 Ω
PA Jacket
Volvo approval

Applications
- Coaxial cable for Automotive market,
- High frequency transmission cable,
- Car antenna for radio, mobile phone and GPS.

Main data
- Operating temperature: -30°C to +105°C,

Electrical data
- Impedance: 50 Ω ± 2 at 200 MHz,
- Capacity: 84 pF / m,
- Propagation velocity: 80%,
- Attenuation: < 50 dB / 100 m at 1 GHz,
  < 62 dB / 100 m at 2 GHz,
  < 79.4 dB / 100 m at 3 GHz.
Coaxial Cable 50 Ω

Applications
- Coaxial cable for automotive market,
- High Frequency transmission cable,
- Car antenna for radio, mobile phone and GPS.

Electrical characteristics
- Nominal capacitance at 800Hz = 80pF/m
- Impedance : 50 ± 3 Ω
- Conductor DC resistance ≤ 47 Ω/hm x Km
- Insulation resistance > 10 GΩ/hm x Km

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>1</th>
<th>10</th>
<th>50</th>
<th>100</th>
<th>300</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuation (dB/100m)</td>
<td>1.7</td>
<td>5</td>
<td>12</td>
<td>17</td>
<td>28</td>
<td>39</td>
<td>56</td>
<td>80</td>
</tr>
</tbody>
</table>

Mechanical characteristics
- Operating temperature = -40°C to +80°C
- Static bending radius = 7.5 x diameter
- Dynamic bending radius = 15 x diameter

CONSTRUCTION
1. CONDUCTOR
   7x0.27mm bare copper
   Stranded conductor AWG 22
2. INSULATION
   TEXFOAM®
   Diameter = 2.10 mm
3. SHIELD
   Aluminium/Polyester/
   Aluminium foil
4. SCREEN
   Tinned Copper Braid
   (0.10 mm)
   Optical coverage= 90%
5. JACKET
   Halogen free jacket FNRC
   Diameter = 3.20 ± 0.10 mm
Coaxial Cable 50 Ω
Type RG 316
TPE jacket

Applications
- Coaxial cable for automotive market,
- High Frequency transmission cable,
- Car antenna for radio, mobile phone and GPS.

Electrical data (acc. to MIL C17 / see our coaxial catalogue)
- Impedance : 50 Ω ± 2 Ω at 200 MHz,
- Capacity : 105 pF / m,

Main data
- Operating temperature : 110°C during 3000 hours
  120°C during 10 min.

CONSTRUCTION
① CONDUCTOR : 7x0.17 mm Tinned Copper (AWG 26)
② DIELECTRIC : FEP
  Ø = 1.48 mm
③ SCREEN : 0.10mm tinned copper braid
④ JACKET: TPE, black
  Ø = 2.55 ± 0.05 mm
Main application
- High frequency transmission cable,
- Coaxial cable also used for automotive market,
- Car antenna for radio, mobile phone and GPS.

Electrical values
- Voltage rating: 900 Volts (RMS),
- Peak temperature: 200 °C (PTFE/FEP) or 180 °C (FEP/FEP),
- Operating frequency: up to 3 GHz,
- Dimensions and high frequency characteristics: see table below.

Physical properties
- Very good resistance to solvents,
- Very good resistance to soldering operations.

<table>
<thead>
<tr>
<th>FILOTEX</th>
<th>CAPACITANCE</th>
<th>IMPEDANCE</th>
<th>Relative Velocity</th>
<th>ATTENUATION at 900 MHz</th>
<th>ATTENUATION at 1800 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>RG 316 (124 467)</td>
<td>0.95 pF/m, 50 ± 2 Ω</td>
<td>69.5%</td>
<td>0.80 dB/m</td>
<td>1.2 dB/m</td>
<td></td>
</tr>
<tr>
<td>RG 316 (296 891)</td>
<td>0.95 pF/m, 50 ± 2 Ω</td>
<td>69.5%</td>
<td>0.80 dB/m</td>
<td>1.2 dB/m</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FILOTEX</th>
<th>CONDUCTOR</th>
<th>INSULATION</th>
<th>SHIELD</th>
<th>JACKET</th>
</tr>
</thead>
<tbody>
<tr>
<td>PART NUMBER</td>
<td>composition</td>
<td>nature</td>
<td>Ø diameter</td>
<td>material</td>
</tr>
<tr>
<td>RG 316 (124 467)</td>
<td>7*0.17</td>
<td>SPCC</td>
<td>0.5 mm</td>
<td>PTFE</td>
</tr>
<tr>
<td>RG 316 (296 891)</td>
<td>7*0.17</td>
<td>SPCC</td>
<td>0.5 mm</td>
<td>FEP</td>
</tr>
</tbody>
</table>
Filotex® Miniature Coaxial Cable 50 Ω

Applications
- Coaxial cable for automotive market,
- High Frequency transmission cable,
- Car antenna for radio, mobile phone and GPS.

Electrical characteristics
- Voltage rating : 750 Volts (RMS)
- Operating Temperature : -90°C to +200°C
- Operating Frequency : up to 3 Ghz
- Impedance : 50 ± 5 Ω
- Capacitance : 95 pF/m
- Propagation velocity : 69.5%
- Nominal attenuation at :
  - 300 MHz 80 dB/100m
  - 900 MHz 130 dB/100m
  - 1000 MHz 135 dB/100m
  - 1800 MHz 190 dB/100m
  - 3000 MHz 240 dB/100m

Physical characteristics
- Very good resistance to solvents
- Very good resistance to soldering operations
- Nominal weight : 4.7 g/m
Coaxial Cable 50 \( \Omega \)  
RG 178  
FEP Jacket

**Main application**
- High frequency transmission cable,
- Coaxial cable also used for automotive market,
- Car antenna for radio, mobile phone and GPS.

**Main characteristics**
- Voltage rating : 750 Volts (RMS),
- Peak temperature : 200 °C,
- Operating frequency : up to 3 GHz,
- Dimensions and high frequency characteristics : see table below.

**CONSTRUCTION**
Flexible PTFE coaxial cable

1. **CONDUCTOR**
   7 strands of silver plated copper covered steel

2. **INSULATION**
   Extruded PTFE

3. **SHIELD**
   Silver plated copper braid

4. **JACKET**
   Brown FEP

**CONSTRUCTION**
Flexible PTFE coaxial cable

**PRODUCT REFERENCES**
FILOTEX Ref : ET 111 336

**Electrical values**

<table>
<thead>
<tr>
<th>FILOTEX PART NUMBER</th>
<th>CAPACITANCE</th>
<th>IMPEDANCE</th>
<th>Relative Velocity of Propagation</th>
<th>ATTENUATION at 900 Mhz</th>
<th>ATTENUATION at 1800 Mhz</th>
</tr>
</thead>
<tbody>
<tr>
<td>RG 178 (111 336)</td>
<td>95 pF/m</td>
<td>50 ± 2( \Omega )</td>
<td>69.5%</td>
<td>1.5 dB/m</td>
<td>2.4 dB/m</td>
</tr>
</tbody>
</table>

**Physical properties**
- Very good resistance to solvents,
- Very good resistance to soldering operations.
Coaxial Cable 50 Ω
RG 178 BU
TPE jacket

Applications
- High Frequency transmission cable,
- Coaxial cable also used for automotive market,
- Car antenna for radio, mobile phone and GPS.

Electrical data (acc. to MIL C17 / see our coaxial catalogue)
- Impedance : 50 Ω ± 2 Ω at 200 MHz,
- Operating voltage : 750 V,
- Capacity : 105 pF / m,
- Relative velocity of propagation : 69,5 %
- Attenuation : 17 dB / 100 m at 10 MHz,
  70 dB / 100 m at 200 MHz,
  100 dB / 100 m at 400 MHz,

Main data
- Operating temperature : -30°C to +110°C,