



# Delft Circuits

Hardware for quantum engineers



## Data sheet

## Cri/oFlex<sup>®</sup> 3

### Tackle your cryogenic cabling challenge!

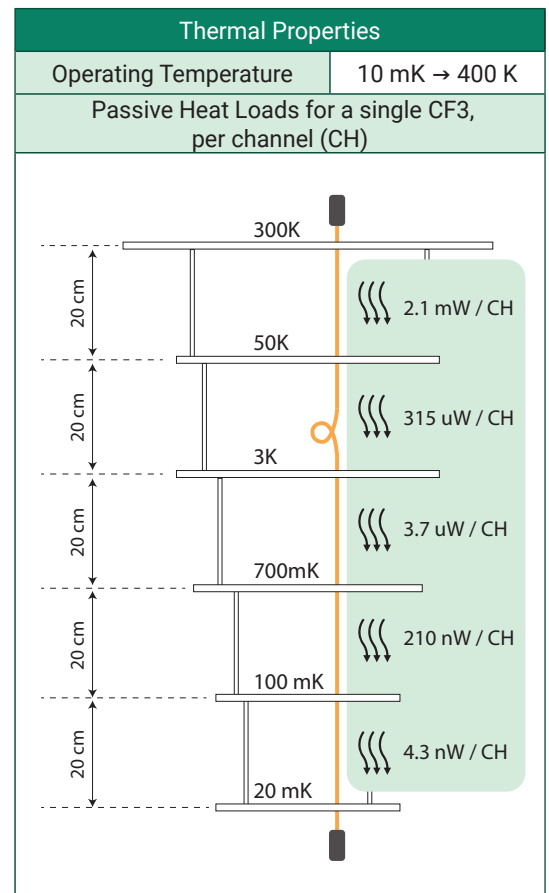
Cri/oFlex<sup>®</sup> 3 (CF3) is our multi-channel solution specifically designed to be end to end i/o from room temperature down to milliKelvin. We utilize a single flexible substrate that can be installed through the vacuum barrier, reaching down to your sample stage while still properly thermalizing and filtering your microwave signals. CF3 is specifically engineered for cryogenic environments where small form factor, low thermal load and microwave signal performance are critical. Cri/oFlex<sup>®</sup> 3 comes as a multi-channel RF cable that is customized to have multiple SMA or SMP connectors on each end. By combining i/o channels in a single flex, it allows for easier and robust high density wiring schemes. Cri/oFlex<sup>®</sup> 3 solves your cryogenic cabling scaling needs!

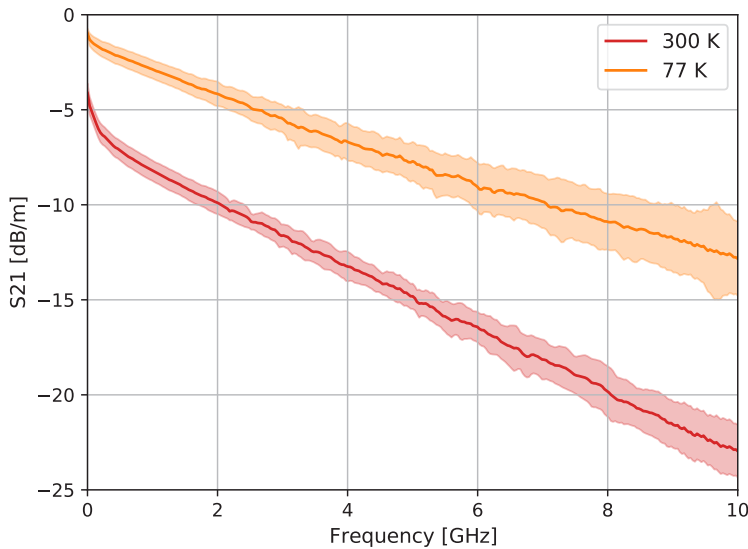
### Features

- High-density microwave channels
- Monolithic design from RT to milliKelvin
- Resilient against thermal cycling
- Optional filtering & signal conditioning
- Integrated vacuum feedthrough
- Low thermal load

General Properties	
Connector	
Connector Type	Right-angle SMA (f) & SMP(m)
Connector Material	Goldplated Brass, PEEK
Housing	Stycast 2850
Flex	
Length	200 to 1000 mm
Amount of Channels	8 Channels
Thickness	0.3 mm
Materials	Polyimide & Silver (Ag)
Transmission-line type	Stripline
Min. Bending Radius	5 mm
Required Length for Longitudinal Rotation	10 cm / 180° rotation
Vacuum Feedthrough	
Leak-rate	<10 <sup>-9</sup> mbar L s <sup>-1</sup>
Compatible Vacuum Connections	KF-40, Entropy System plates

Electrical Properties	
Impedance	Designed for 50 Ω
Operating Frequency	DC to 10 GHz
Maximum Crosstalk (channel-to-channel), L = 200 mm	< -40 dB





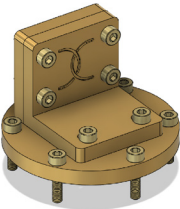
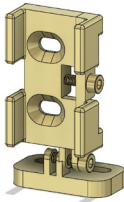
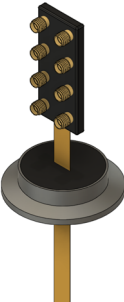

## Microwave Properties

The figure on the left shows the typical roll-off (S21) that can be expected from a DC-10 GHz bandwidth CF3. The solid line shows the average attenuation of 64 channels from a collection of several CF3 cables. From these channels, 90% (1.28  $\sigma$ ) fall within the semi-transparent area around the solid lines. Please note that most of the lines will follow the average quite well, but some outliers are expected due to geometry differences between channels. We are continuously working on getting the deviations smaller between channels, especially at higher frequencies.

## Peripherals

The CF3 platform doesn't just stop at the flexible cabling, we aim to provide a complete solution for your cryogenic cabling needs. Our current stock includes;

- **Thermal Clamps** for proper thermalization at every stage in your cryogenic system, we can supply different footprints based on your requests, do not hesitate to contact us!
- **Vacuum Feedthroughs**, a massively scalable solution to transfer a multitude of lines into the vacuum environments, currently based on the ISO 2861 KF flanges, but can be customized upon request.
- **Brackets**, to properly secure the cables for your experiments we offer a variety of brackets, either used in cold/vacuum or room environments, we will find the solution to your needs!

Peripherals	
<b>Thermal Clamp</b> TH-CL-40.20  Gold plated OF-Copper	<b>Bracket</b> Cold stages  Gold plated OF-Copper
<b>Vacuum Feedthrough</b> KF-40-VAC-FT  SS-304 with Stycast 2850FT	<b>Bracket</b> KF-40-Bracket  Black-anodized Aluminum

