

## Loop Directional Couplers for 2.45 GHz Waveguides

### General Description

DC114 (Fig. 1), DC123 and DC132 are small-housing loop-type directional couplers intended for sampling of the powers of the incident or reflected waves in high-power 2450 MHz industrial applications using the rectangular waveguides WR340, WR284, and WR430, respectively.

Standard coupling factor is -60 dB, allowing maximal waveguide working power 30 kW. Optional coupling factors are -50 dB (3 kW) and -70 dB (50 kW).

The output connector can be either Nf (DC1..N) or SMAf (DC1..S).

A coupler module is fastened to a parent waveguide by means of six M3 or similar-diameter screws after machining of appropriate openings in the waveguide wall according to the waveguide machining template shown in Fig. 5. The template is the same for all coupler models.

Alternatively, a calibrated assembly consisting of a coupler module fixed to a precisely machined parent waveguide with standard length 174 mm can be provided as shown in Fig. 2.

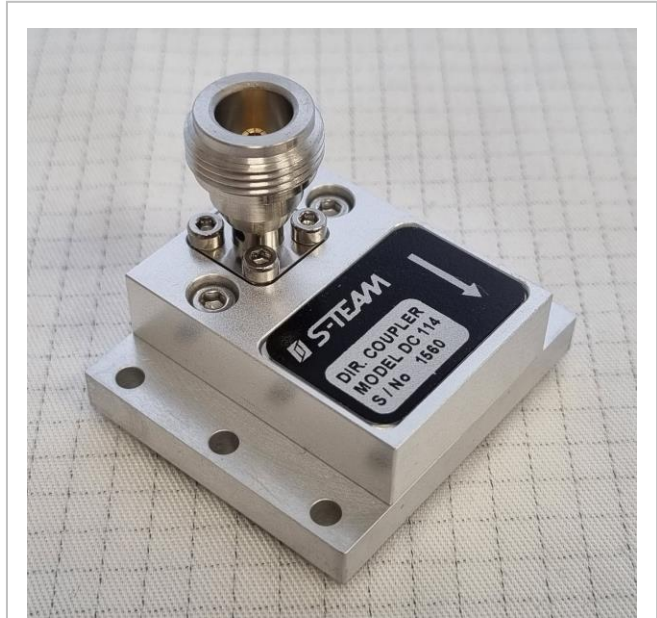


Fig. 1. Directional coupler DC114N.

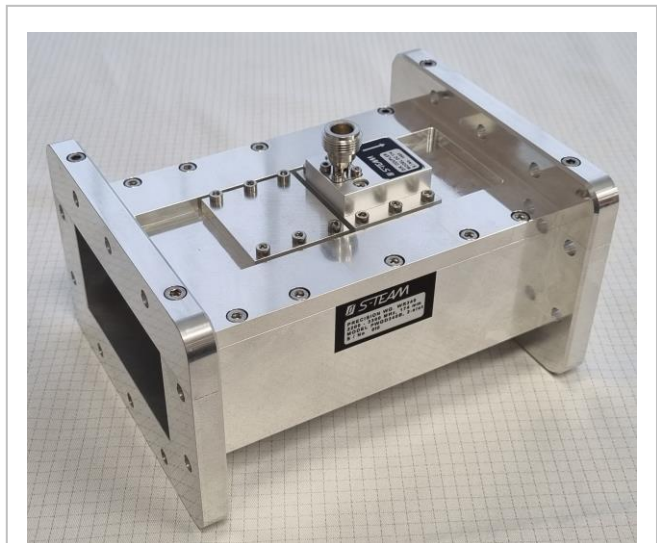


Fig. 2. DC114N installed on a standard-length waveguide.

## Specifications

Waveguide of destination	DC114: WR340 (R26) DC123: WR284 (R32) DC132: WR430 (R22)
Waveguide wall thickness	2 mm ± 0.1 mm
Frequency range	2425 – 2475 MHz
Coupling factor/Max working power	-50 dB / 3 kW -60 dB / 30 kW (default) -70 dB / 50 kW
Coupling factor uncertainty limits (3-σ deviation)	±1 dB
Directivity	25 dB min
Coupled port impedance	50 Ω
Coupled port connectors	Nf (DC114N) or SMAf (DC114S)
Dimensions (L x W x H)	40 mm × 46 mm × 37.1 mm (Nf) or 25.9 mm (SMAf)
Mass	75 g (DC1..N), 65 g (DC1..S)
Waveguide surface flatness required at DC114 interface	0.04 mm
Surface finish	E-CLPS 4600
Operating temperature range	-10 °C to +65 °C
Storage temperature range	-20 °C to +80 °C

## Typical Directivity

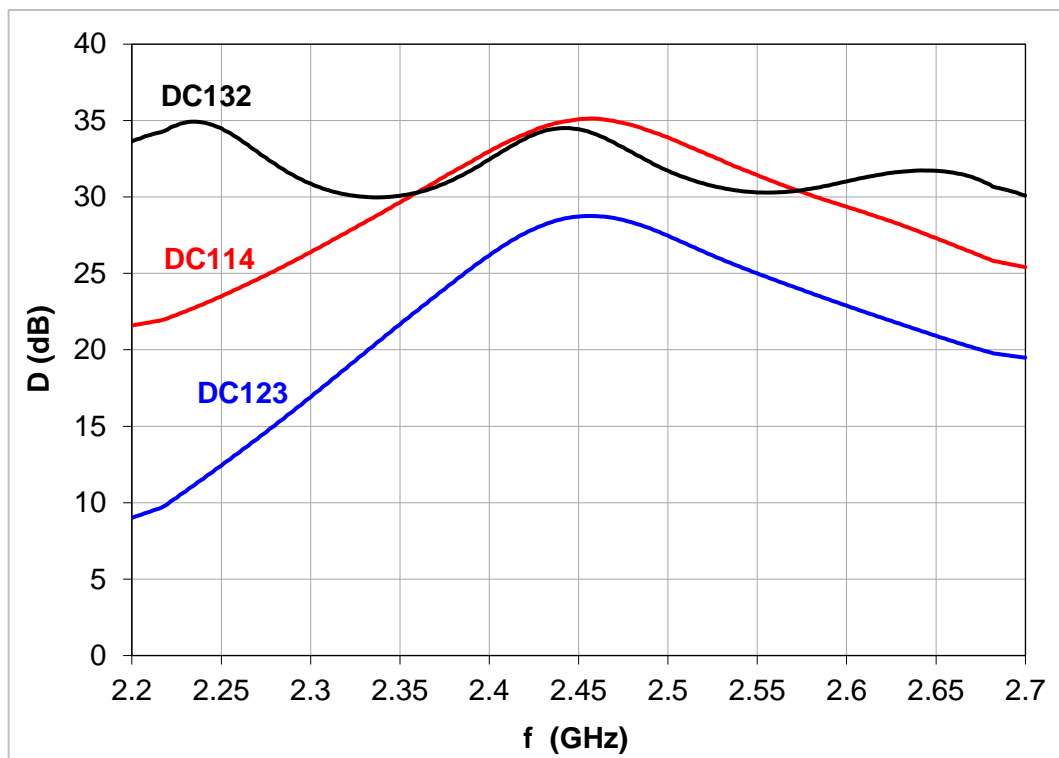


Fig. 3. Typical directivity of the couplers DC114 (red), DC123 (blue), and DC132 (black).

Dimensional Drawings

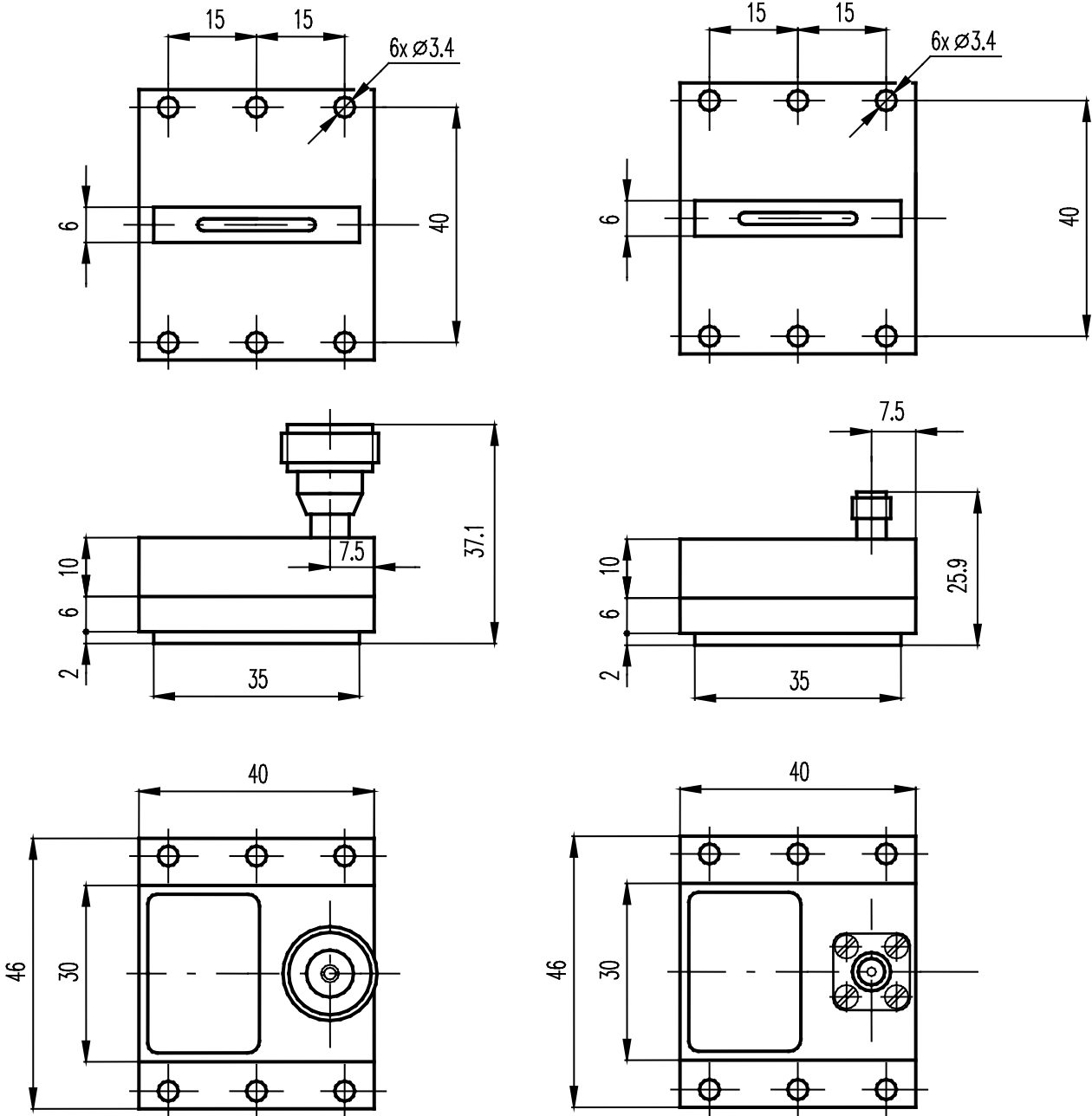


Fig. 4. Basic DC114, DC123, and DC132 dimensions. Left: variant with Nf connector, right: variant with SMAf connector. All dimensions are in millimeters.

### Waveguide Machining Template

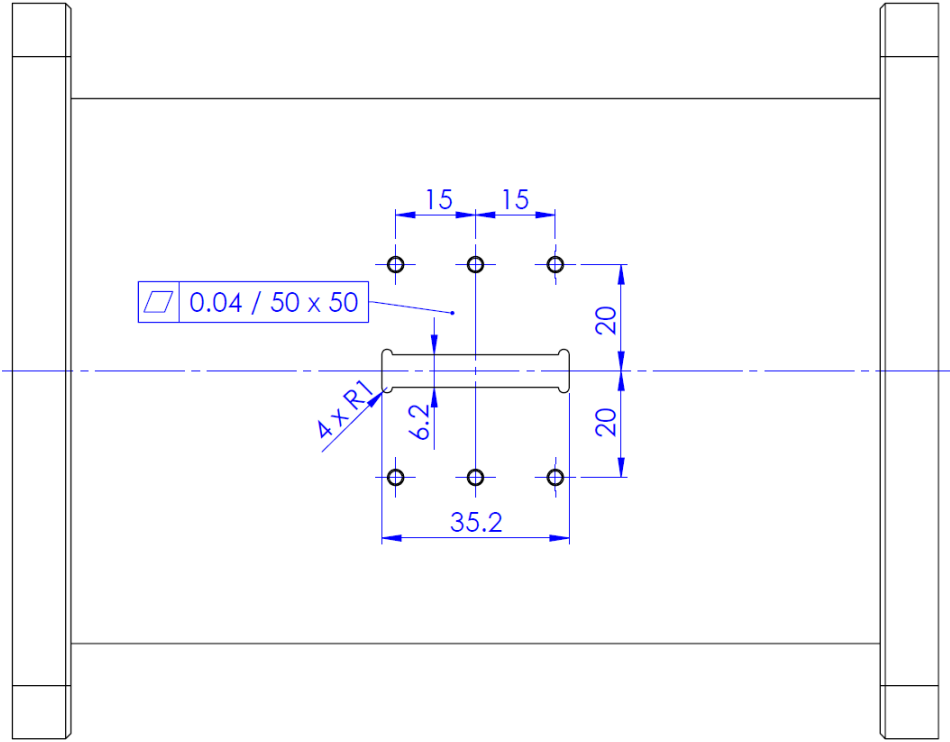


Fig. 5. Waveguide machining template. All dimensions are in millimeters. The pattern is centered about the waveguide axis. The waveguide wall thickness must be 2 mm ± 0.1 mm. The pattern is valid for all coupler models.

### Important Note

Complying with the specified waveguide wall thickness and flatness of its surface interfacing with the coupler module is important for the specified coupling factor.

To avoid problems with manufacturing precision waveguide components, a calibrated assembly consisting of a coupler module fixed to a precision parent waveguide can be ordered. Standard waveguide length is 174 mm.