

## Quadrature Mixers and Phase Detectors, SFQ Series



### FEATURES:

- ◆ Frequency coverage: 18 to 110 GHz
- ◆ Balanced configuration for low conversion loss
- ◆ Readily to be configured as image rejection mixers
- ◆ IF port DC coupling for phase detection
- ◆ Standard temperature range: -10 to +60 °C

### APPLICATIONS:

- ◆ Phase detector
- ◆ Ranging radar systems
- ◆ Communication systems
- ◆ Test instrumentations

### DESCRIPTION:

Quadrature mixers are also known as I/Q mixers. SFQ series quadrature mixers are GaAs Schottky beamlead diode or MMIC based mixers. These mixers are offered in seven common waveguide bands in the frequency range from 18 to 110 GHz. Since the IF port of the quadrature mixers is DC coupled, the mixers can be used as phase detectors. In addition, these mixers can readily be configured into image rejection mixers or single side-band modulators by adding IF quadrature coupler. The typical LO to RF port isolation of these mixers are 30 dB, which is high enough for most applications without the requirement of additional port filtering. The catalog models are designed for narrow bandwidth operations to address industry focused frequencies. While catalog models focus on specific operation frequencies and package styles, custom designed models are designed and optimized to meet customers' unique applications needs. Subharmonically pumped quadrature mixers are available per request.

### CATALOG MODELS:

Band	Model Number	RF & LO Frequency Range (GHz)	IF Frequency Range (GHz)	Conversion Loss (dB)	LO Power (dBm)	Port Isolation (dB)	RF & LO Connectors	Outline
K	SFQ-42-FC	23.0 to 25.0	DC to 1.0	9.0	16	30.0	K(F)	FQ-KC
Ka	SFQ-28-FC	34.0 to 36.0	DC to 1.0	10.0	16	30.0	K(F)	FQ-AC
K	SFQ-42-F1	23.0 to 25.0	DC to 1.0	9.0	16	30.0	WR-42	FQ-K1
Ka	SFQ-28-F1	34.0 to 36.0	DC to 1.0	10.0	16	30.0	WR-28	FQ-A1
Q	SFQ-22-F1	41.0 to 45.0	DC to 1.0	11.0	16	30.0	WR-22	FQ-Q1
U	SFQ-19-F1	49.0 to 51.0	DC to 1.0	11.0	16	30.0	WR-19	FQ-U1
V	SFQ-15-F1	58.0 to 62.0	DC to 3.0	11.0	16	30.0	WR-15	FQ-V1
E	SFQ-12-F1	75.0 to 79.0	DC to 1.0	12.0	16	30.0	WR-12	FQ-E1
W	SFQ-10-F1	92.0 to 96.0	DC to 1.0	12.0	16	30.0	WR-10	FQ-W1

### CUSTOM DESIGNED MODELS:

Sage Millimeter's custom designed quadrature mixer model numbers are configured per following format. Customers may refer to the format and specify their own model numbers accordingly when placing the order.

**SFQ - RFN LON CL - CR CO CI - XY**

**RFN** is the center frequency of RF in MHz x 10N. For example: 58.0 GHz = 583

**LON** is the center frequency of LO in MHz x 10N. For example: 29.0 GHz = 293

**CL** is the small signal conversion loss in dB. For example: 14 dB = 14

**CR** is the input connector type of RF port

**CO** is the connector type of LO port

**CI** is the connector type of IF port

**X** is for mixer type. "F" is for fundamental LO and "S" is for subharmonically pumped.

**Y** is for factory reserve.

Example: SFQ-58329314-15KFSS-S1 is a custom designed quadrature mixer with RF frequency centered at 58.0 GHz and LO frequency centered at 29.0 GHz, conversion loss 14 dB. The RF connector is WR-15 waveguide, LO connector is K(F) and IF connector is SMA(F) connector. It is a custom designed subharmonically pumped quadrature mixer. "1" is a factory assigned sequential number.