

Technical Characteristics

WR75 Circulator

Specifications

Electrical



Frequency	10.70 - 12.75 GHz
Isolation	20 dB min
Insertion Loss	0.11 dB max (over operating temperature & power)
Return Loss	20 dB min
Power	275 Watts CW (tested to +1 dB 350 Watts CW)
EMC	-80 dBi
Mass	76 grams (2.70 ounces)
Material / Finish	Aluminum housing, clear chromate or low emissivity paint

Environmental

Operating Temperature	-25°C to +125°C
Storage Temperature	-45°C to +135°C

Qualification

Random Vibration (3-Axis)

Frequency	Level
20 - 50 Hz	+6.0 dB/Octave
50 - 600 Hz	0.5 g ² /Hz
600 - 2000 Hz	-4.5 dB/Octave
Overall	23.6 g _{RMS}
Duration	180 seconds in each of 3 mutually perpendicular axes

Sine Vibration (3-Axis)

Frequency	Level
5 - 22.6 Hz	6.4 mm (0-peak)
22.6 - 50 Hz	13.0 g
50 - 100 Hz	10.0 g
Sweep rate 2 octave/min, 3 mutually perpendicular axes	

Mechanical Shock

Frequency (Hz)	Level [SRS Q = 10]
200	280 g
850	1,260 g
4,000	4,200 g
10,000	4,200 g
Number of events	3 shocks per axis (18 in total)

Multipactor Test

Pressure	< 1.5 x 10 ⁻⁵ mbar
Baking Temperature	+85°C
Seeding	One strontium 90 (90Sr)
Test Temperature	+22°C
Frequency	10.70 GHz
Pulse Repetition Frequency	1,000 Hz
Pulse Width	20 µs
Duty Cycle	2%
Max. RF Power (Peak)	1,320 Watts for forward configuration 612 Watts for full short circuit at any phase

Technical Characteristics

WR75 Circulator

Qualification

Corona Test		
Pressure		Five pressure cycles in the range 0.26-26 mbar
Seeding		None
Test Temperature		+22 °C
Frequency		10.70 GHz
Pulse Repetition Frequency		1,000 Hz
Pulse Width		20 µs
Duty Cycle		2%
Max. RF Power (Peak)		400 Watts for forward configuration 100 Watts for full short circuit at any phase

Thermal Analysis

Low Power TVAC Test at Operational Min. Temperature, -25 °C

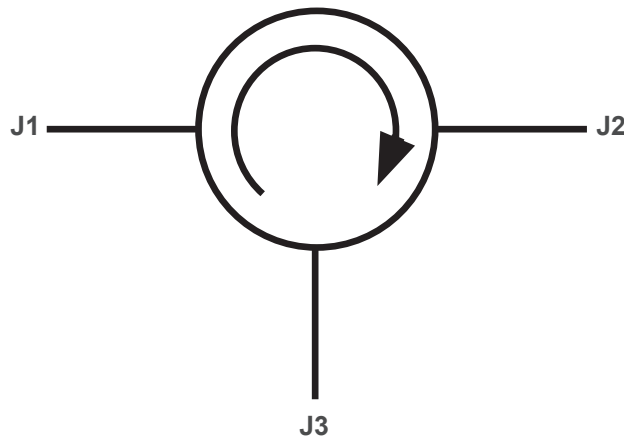
Pressure in TVAC chamber to		1 x 10 ⁻⁶ Torr
Low Power Baseplate Temperature		-25 °C and +125 °C
Low Power		100m Watts CW

High Power TVAC Test at Operational Max. Temperature, +125 °C

Pressure in TVAC chamber to		1 x 10 ⁻⁶ Torr
High Power Baseplate Temperature		+125 °C
High Power		346m Watts CW

Thermal Cycle (Non-Operating Temperature Limits)

Conditions		-45 °C to +135 °C 1 Hour at each temperature extreme
Transition Rate		4 °C per minute nominal
Number of Cycles		13

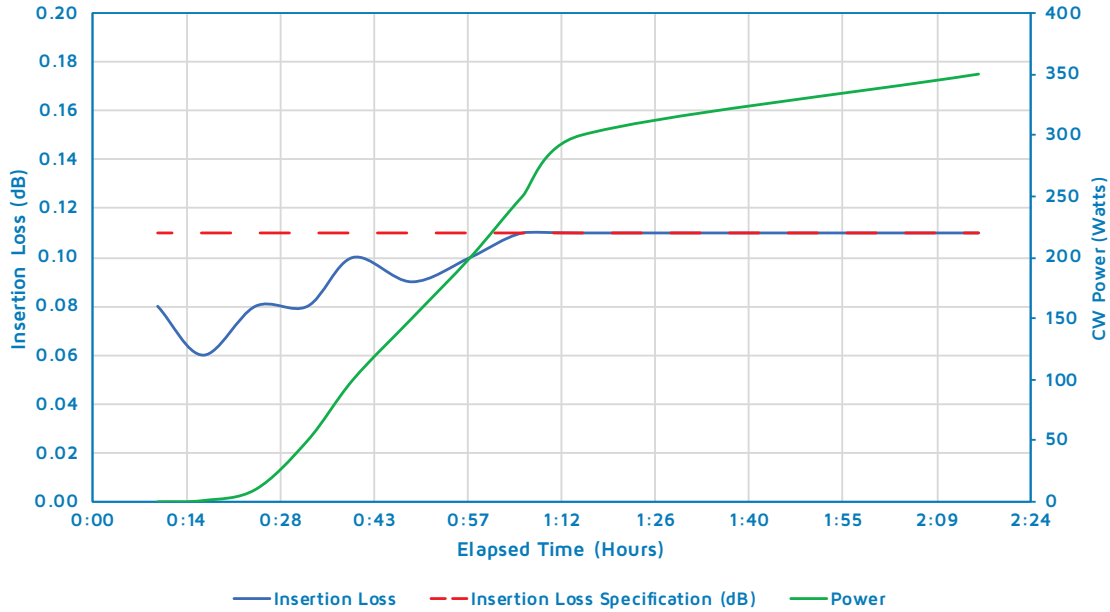


Schematic of WR75 Circulator

Technical Characteristics

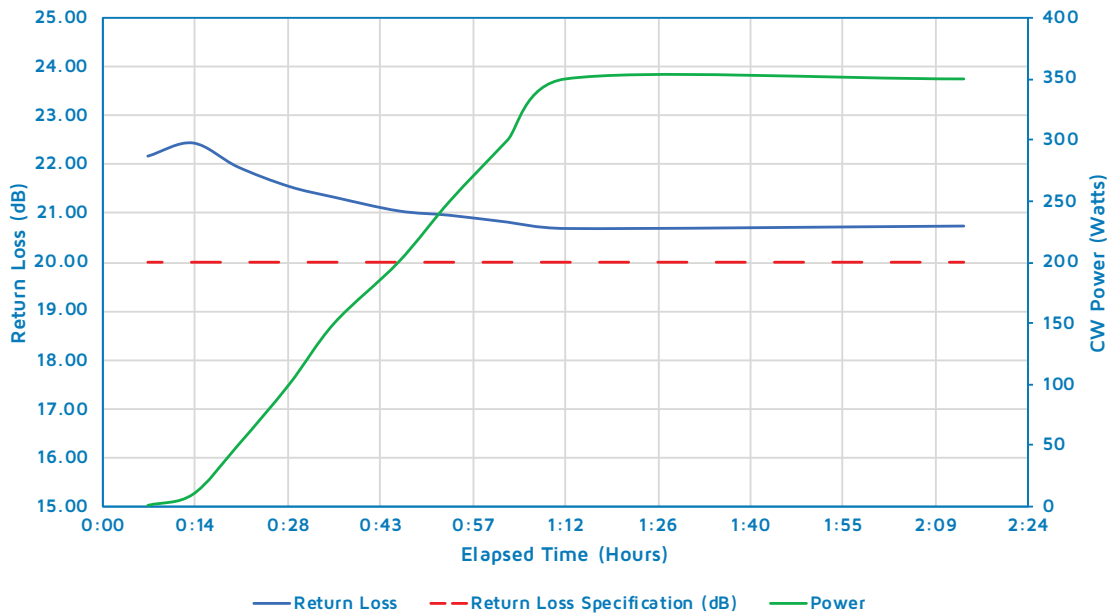
Test Results Power in Thermal Vacuum

Ku-Band WR75 Circulator Thermal Vacuum Testing (TVAC), 1×10^{-6} Torr
Insertion Loss & Power vs Time



Insertion Loss Versus Time, Power Applied J1 to J2, J3 terminated to a matched load

Ku-Band WR75 Circulator Thermal Vacuum Testing (TVAC), 1×10^{-6} Torr
Return Loss & Power Applied vs Time



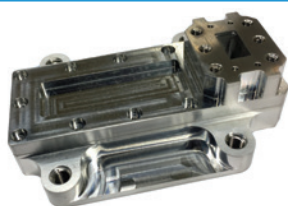
Return Loss J1 Versus Time, Power Applied J1 to J3, J2

Technical Characteristics

WR75 Termination (Load)

Specifications

Electrical



Frequency	10.70 – 12.75 GHz
Return Loss	21 dB min
Power	212 Watts CW (tested to +1 dB 267 Watts CW)
EMC	-80 dBi
Mass	121g (4.30 ounce)
Material / Finish	Aluminum housing, clear chromate or low emissivity paint

Environmental

Operating Temperature	-25 to +135°C
Storage Temperature	-45 to +150°C

Qualification

Random Vibration (3-Axis)

Frequency	Level
20 - 50 Hz	+6.0 dB/Octave
50 - 600 Hz	0.5 g ² /Hz
600 - 2000 Hz	-4.5 dB/Octave
Overall	23.6 g _{RMS}

Sine Vibration (3-Axis)

Frequency	Level
5 - 22.6 Hz	6.4 mm
22.6 - 50 Hz	13.0 g
50 - 100 Hz	10.0 g

Mechanical Shock

Frequency (Hz)	Level
200 Hz	280 g
850 Hz	1,260 g
4,000 Hz	4,200 g
10,000 Hz	4,200 g

Multipactor Test

Frequency (Hz)	Level
Pressure	< 1.5 x 10 ⁻⁵ mbar
Baking Temperature	+85°C
Seeding Source	One strontium 90 (90Sr)
Test Temperature	+22°C
Frequency	10.70 GHz
Pulse Repetition Frequency	1,000 Hz
Pulse Width	20 µs
Duty Cycle	2%
Max. RF Power (Peak)	1,700 Watts

Technical Characteristics

WR75 Termination (Load)

Qualification

Corona Test		
Pressure		Five pressure cycles in the range 0.26-26 mbar
Seeding Source		None
Test Temperature		+22 °C
Frequency		10.70 GHz
Pulse Repetition Frequency		1,000 Hz
Pulse Width		20 µs
Duty Cycle		2%
Max. RF Power (Peak)		500 Watts

Thermal Analysis

Low Power TVAC Test at Operational Min. Temperature, -25 °C

Pressure in TVAC chamber to		1 x 10 ⁻⁶ Torr
Low Power Baseplate Temperature		-25 °C and +135 °C
Low Power		100m Watts CW

High Power TVAC Test at Operational Max. Temperature, +135 °C

Pressure in TVAC chamber to		1 x 10 ⁻⁶ Torr
High Power Baseplate Temperature		+135 °C
High Power		267 Watts CW

Thermal Cycle (Non-Operating Temperature Limits)

Conditions		-45 °C to +150 °C 1 Hour at each temperature extreme
Transition Rate		4 °C per minute nominal
Number of Cycles		13

Ku-Band WR75 Load Thermal Vacuum Testing (TVAC), 1 x 10⁻⁶ Torr
Return Loss & Power Applied vs Time

