MMIC REFLECTIONLESS

Low Pass Filter
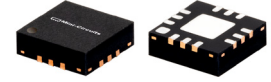
XLF-861+

50Ω   DC to 860 MHz

Generic photo used for illustration purposes only

CASE STYLE: DQ1225

+RoHS Compliant
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

THE BIG DEAL
• Match to 50Ω in the stop band, eliminates undesired reflections
• Cascadable
• Excellent Power handling
• Temperature sData, up to +105°C
• Small size, 3 x 3 mm
• Protected by US Patent No. 8,392,495

APPLICATIONS
• Harmonics Rejection
• Wideband Matching
• Transmitters / Receivers

PRODUCT OVERVIEW
Mini-Circuits' XLF-861+ reflectionless filter employs a novel filter topology which absorbs and terminates stop band signals internally rather than reflecting them back to the source. This new capability enables unique applications for filter circuits beyond those suited to traditional approaches. Traditional filters are reflective in the stop band, sending signals back to the source at 100% of the power level. These reflections interact with neighboring components and often result in inter-modulation and other interferences. Reflectionless filters eliminate stop band reflections, allowing them to be paired with sensitive devices and used in applications that otherwise require circuits such as isolation amplifiers or attenuators.

KEY FEATURES

Features	Advantages
Reflectionless Technology	Reflectionless filters absorb unwanted signals, preventing reflections back to the source. This reduces generation of additional unwanted signals without the need for extra components like attenuators, improving system dynamic range and saving board space.
50Ω Match in Stopband	Reflectionless filters maintain good impedance matching in the stopband, allowing for integration with high gain, wideband amplifiers without the risk of creating out-of-band instabilities.
Excellent RF Performance Repeatability	Fabricated on a GaAs process, X-series filters are inherently repeaData for large-volume production.
Excellent Stability over temperature	With ±0.3 dB variation over temperature, is ideal for use in wide temperature range applications without the need for additional temperature compensation.
Excellent Power Handling in a Compact Package	High power handling extends the usability of these filters to the transmit path for inter-stage filtering.

ELECTRICAL SPECIFICATIONS[1] AT +25°C

| Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	DC - F1	DC - 860	—	1.4	1.8	dB
	Frequency Cut-off	F2	1150	—	3.0	—	dB
	VSWR	DC - F1	DC - 860	—	1.2	—	:1
Stop Band	Rejection	F3 - F4	1700 - 7500	12	15	—	dB
		F4 - F5	7500 - 25000	—	24	—	dB
	VSWR	F3 - F4	1700 - 7500	—	1.2	—	:1
		F4 - F5	7500 - 25000	—	2.3	—	:1

1. Measured on Mini-Circuits Characterization Test Board TB-844-861+

ABSOLUTE MAXIMUM RATINGS[2]

| Parameter	Ratings
Operating Temperature	-55°C to +105°C
Storage Temperature	-65°C to +150°C
RF Power Input, Passband (DC-F1)[3]	2 W at +25°C
RF Power Input, Stopband (F2-F5)[4]	0.2 W at +25°C

2. Permanent damage may occur if any of these limits are exceeded.
3. Passband rating derates linearly to 1 W at 105°C ambient
4. Stopband rating derates linearly to 0.1 W at 105°C ambient
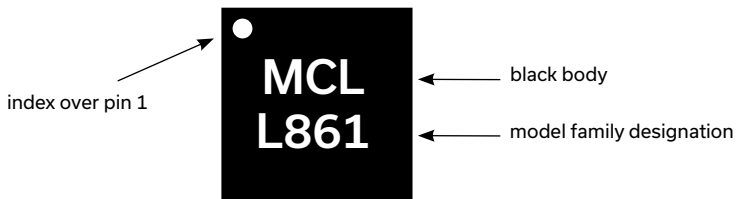
SPECIFICATION DEFINITION
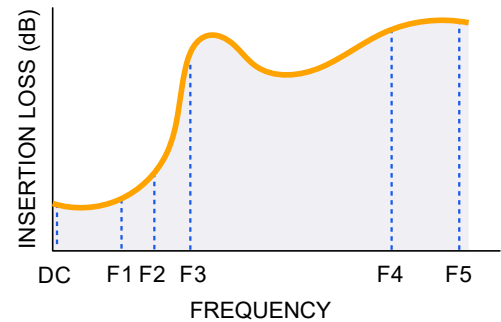
SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION
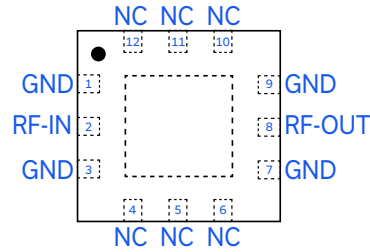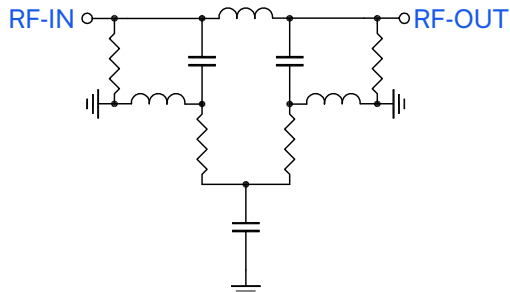
Function	Pad Number	Description
RF-IN	2	RF Input Pad
RF-OUT	8	RF Output Pad
GND	1,3,7,9, Paddle	Connected to ground
NC (GND Externally)	4,5,6,10,11,12	No internal connection

PRODUCT MARKING

index over pin 1

black body

model family designation

Marking may contain other features or characters for internal lot control

Low Pass Filter

XLF-861+

50Ω   DC to 860 MHz

TYPICAL PERFORMANCE DATA AT +25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
10	0.67	1.02
100	0.65	1.06
200	0.67	1.09
400	0.76	1.18
860	1.38	1.30
1150	2.97	1.21
1700	15.26	1.22
2500	16.70	1.11
4000	15.03	1.02
5500	16.44	1.11
7500	16.09	1.26
9000	12.17	1.48
11000	26.57	1.17
13000	27.34	1.48
15000	25.78	1.52
17000	23.91	1.32
19000	22.50	1.86
21000	23.63	3.26
23000	24.92	4.53
25000	27.04	6.16
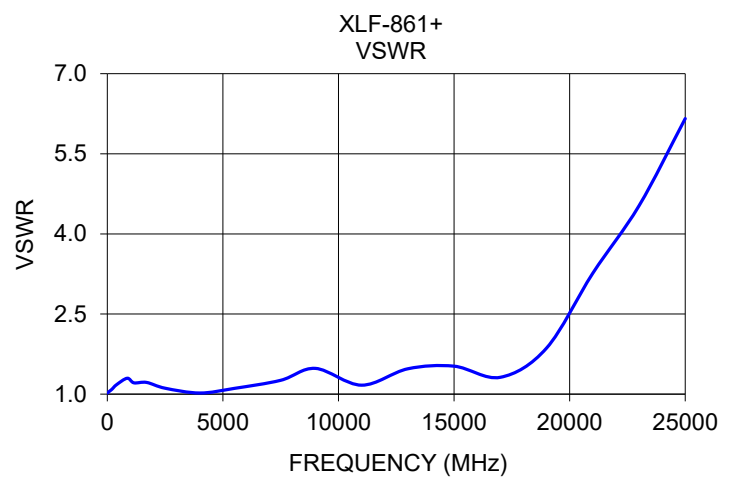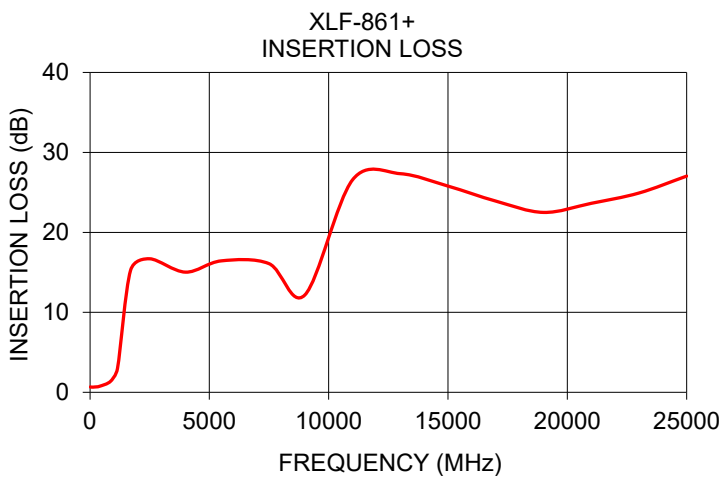
XLF-861+
INSERTION LOSS

XLF-861+
VSWR

ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS **CLICK HERE**

Performance Data & Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	DQ1225 Plastic package, exposed paddle lead finish: matte-tin
Tape & Reel **Standard quantities available on reel**	F66 7" reels with 20, 50, 100, 200, 500 ,1000, 2000, 3000 devices
Suggested Layout for PCB Design	PL-451
Evaluation Board	TB-844-861+ (without connectors) TB-844-861C+ (with connectors) B20-118-F1+ Connector sold separately
Environmental Ratings	ENV82

ESD RATING
Human body model (HBM): Class 1A (250 to <500V) in accordance with ANSI/ESD 5.1-2001

MSL RATING
Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020D

NOTES
A.   Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B.   Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C.   The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

REFLECTIONLESS FILTER APPLICATION NOTE
Application Circuit Example: Pairing mixers with reflectionless filters to improve system dynamic range
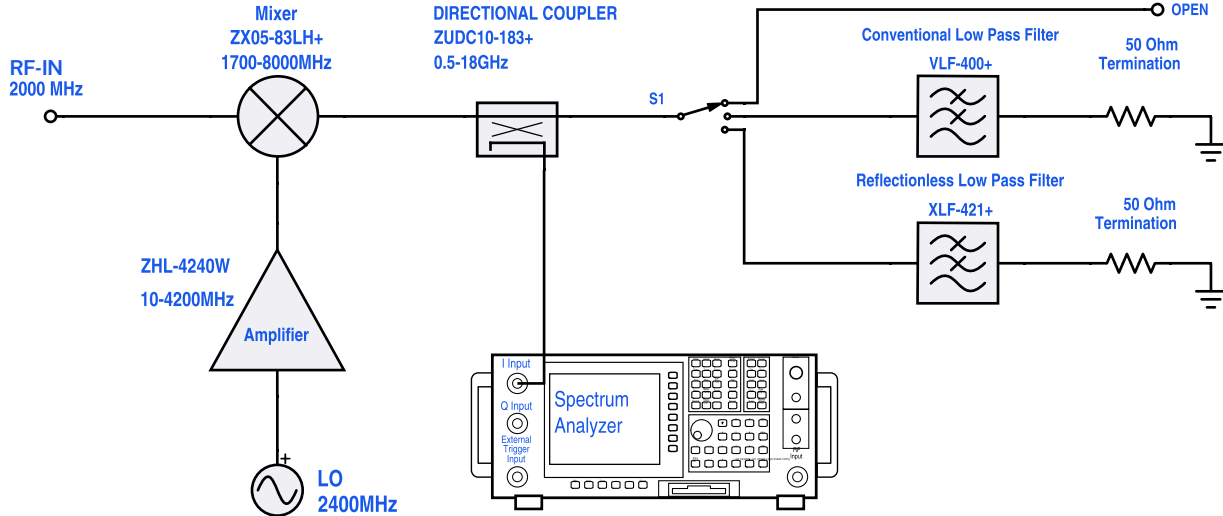
Test block diagram: IF output reflection spectrum with single input frequency
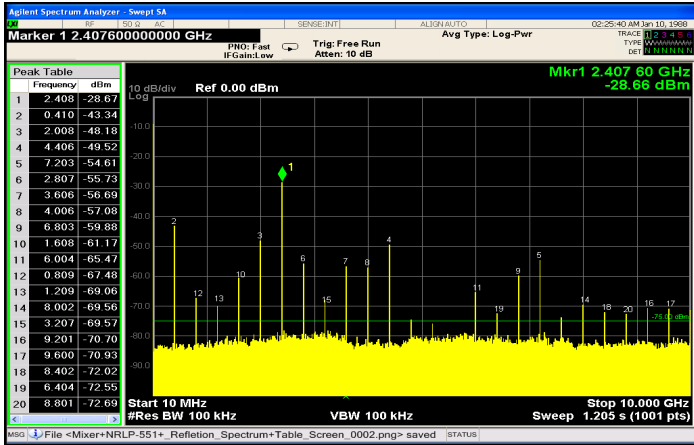

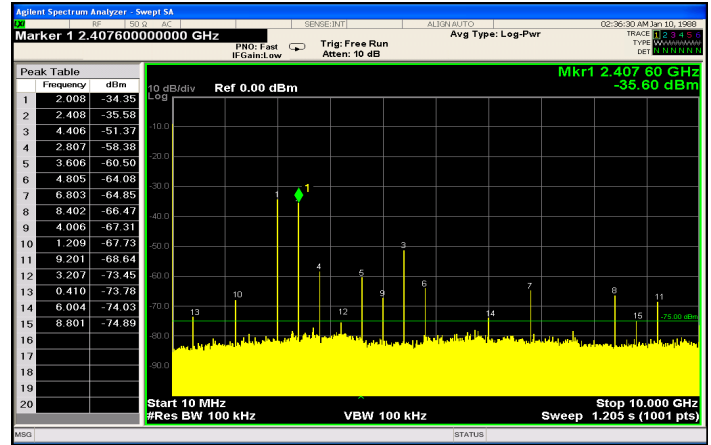Figure 1. IF output reflection spectrum without filter

Figure 2. IF output reflection spectrum with conventional filter