TriQuint SEMICONDUCTOR®

Advance Product Information

September 16, 2004

5GHz - 9GHz Packaged Bessel Filter

TGB2010-EPU-SM

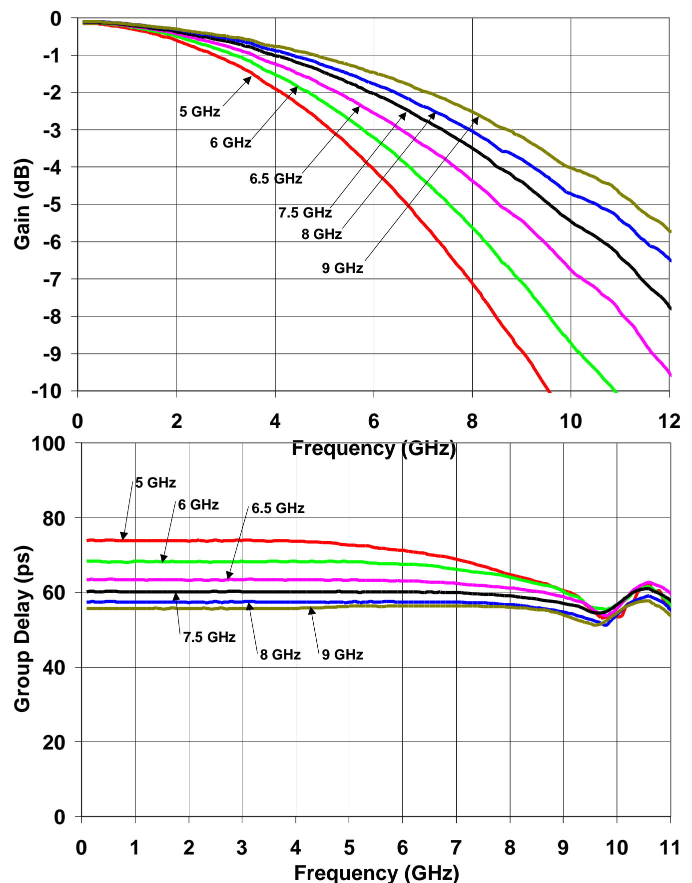
Key Features and Performance

- 5, 6, 6.5, 7.5, 8, 9 GHz and Thru Filters
- <±2.0ps Group Delay to F_o
- Typical >15dB Return Loss to F_o
- Filter Bandwidth ± 0.5 GHz
- Package Dimensions:
  2 x 2 x 0.90 mm

Primary Applications

- High-Speed Optical Networks
- Filter Networks

Preliminary Measured Performance



Product Description

The TGB2010 Bessel Filter has low inband return loss, low group delay variation, and a smaller package footprint than competing filters. Insertion loss and group delay for each filter matches an ideal 3rd order Bessel filter and is matched to 50 Ohms eliminating the need for additional components for multiple reflection management.

A range of 5 to 9 GHz cutoff frequencies in 1GHz steps are available. The TGB2010 series package size is 2mm x 2mm allowing integration on tightly packed circuit boards.

Evaluation Boards are available.

Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice.

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TABLE I
MAXIMUM RATINGS

Symbol	Parameter	Value	Notes
P_{IN}	Input Continuous Wave Power in-band out-of-band	 17 dBm 11 dBm	1/
T_{ASSY}	Assembly Temperature	260 ^{0}C	
T_{STG}	Storage Temperature	-65 to 150 ^{0}C	

1/ These ratings represent the maximum operable values for this device

TABLE II
TGB2010-EPU-SM RF CHARACTERIZATION TABLE
(T_A = 25°C, Nominal)

Symbol	Parameter	Test Conditions	Typical	Units	Notes
F_o	3dB Bandwidth (GHz)	F = 5, 6, 6.5, 7.5, 8, 9	$\pm$0.5	GHz	
T_g	Group Delay Variation Within 3dB Bandwidth	F = 5 - 9	$\pm$2.0	pS	
RL_{5GHz}	Return Loss	F = DC - 5 GHz	15	dB	
RL_{6GHz}	Return Loss	F = DC - 6 GHz	15	dB	
$RL_{6.5GHz}$	Return Loss	F = DC - 6.5 GHz	15	dB	
$RL_{7.5GHz}$	Return Loss	F = DC - 7.5 GHz	15	dB	
RL_{8GHz}	Return Loss	F = DC - 7 GHz	15	dB	
RL_{9GHz}	Return Loss	F = DC - 7 GHz	15	dB	

Note: Table II Lists the RF Characteristics of typical devices as determined by fixtured measurements.

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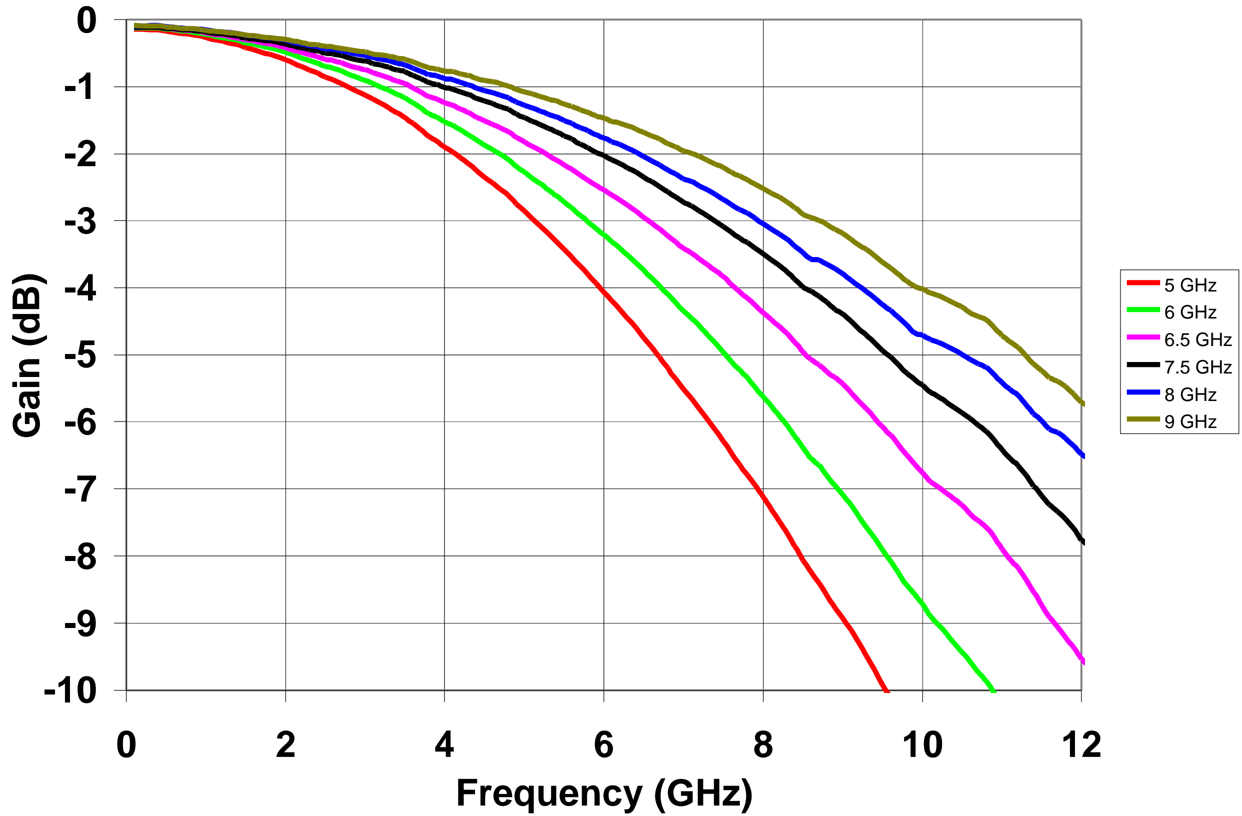
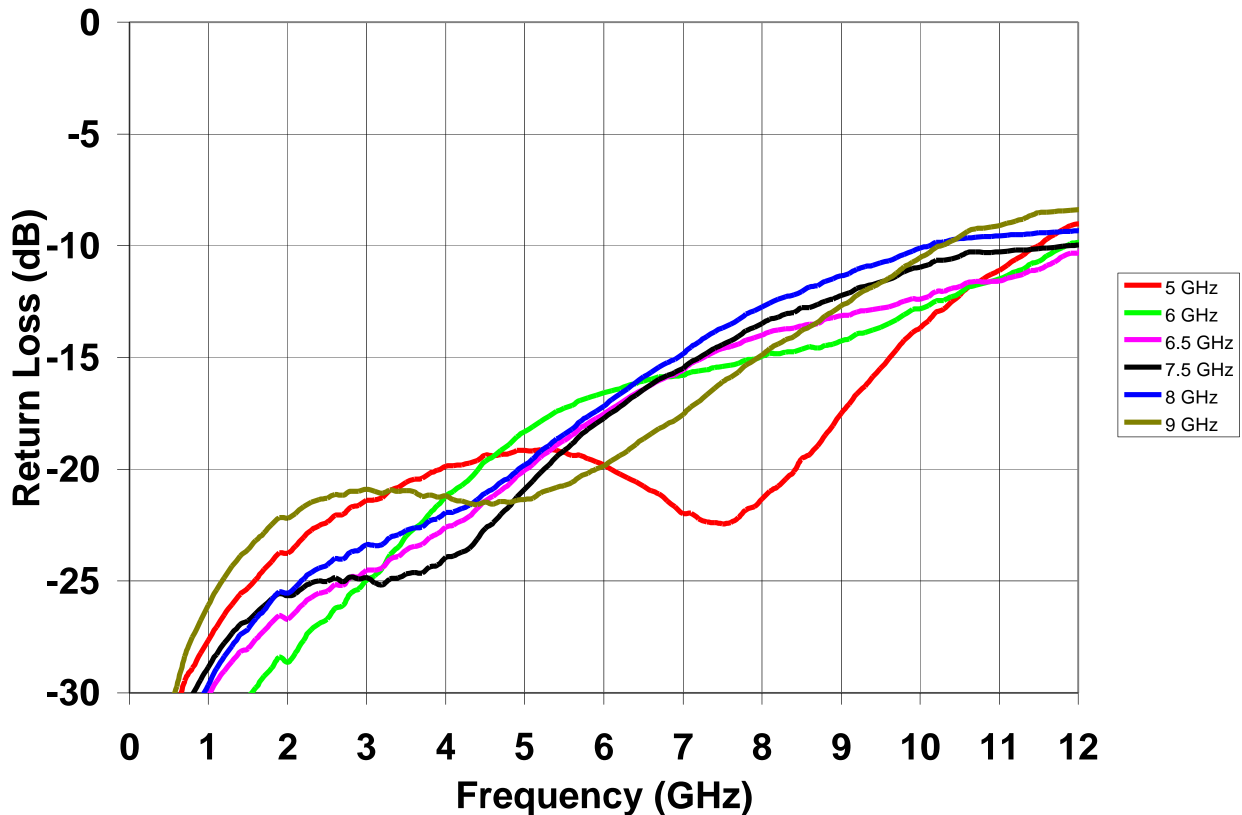
Measured Fixture Performance





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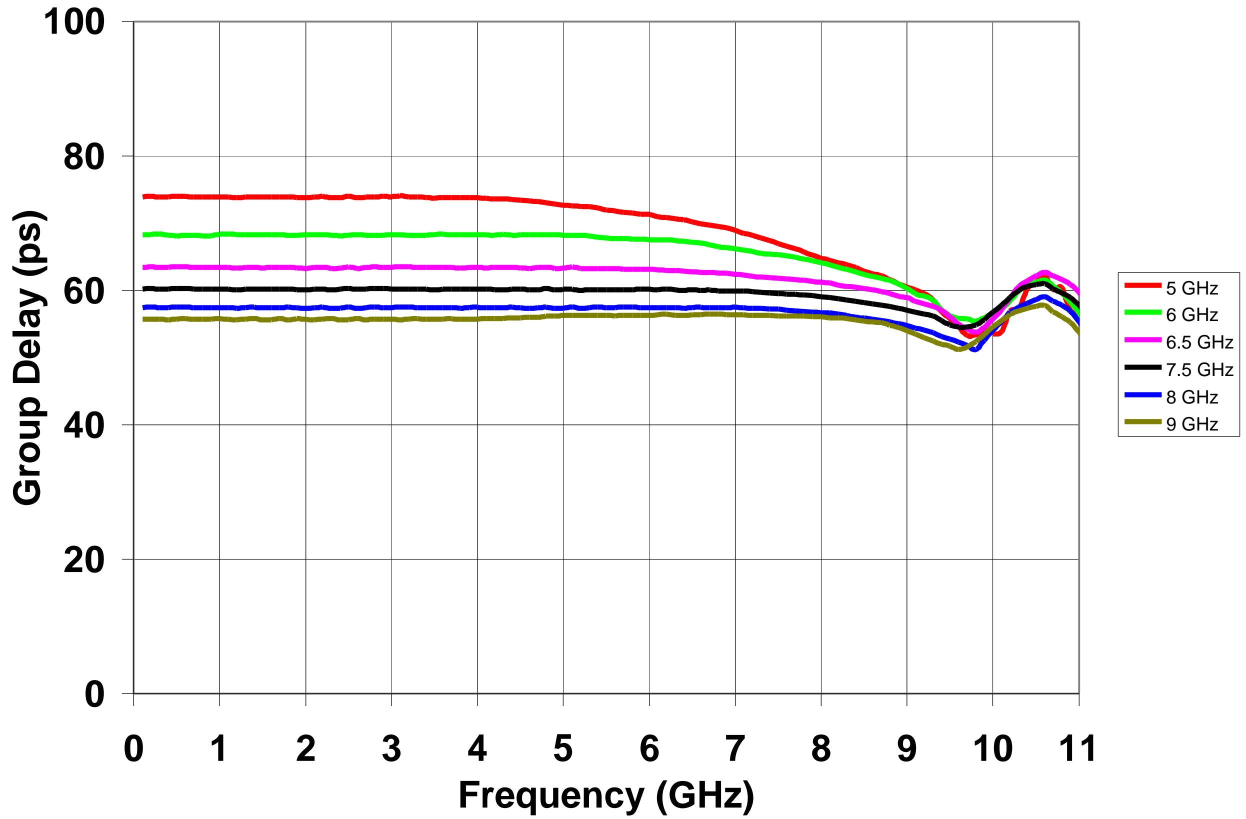
Measured Fixture Performance



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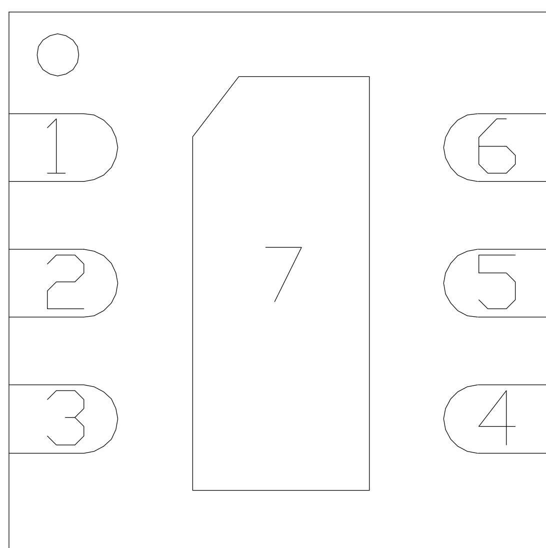
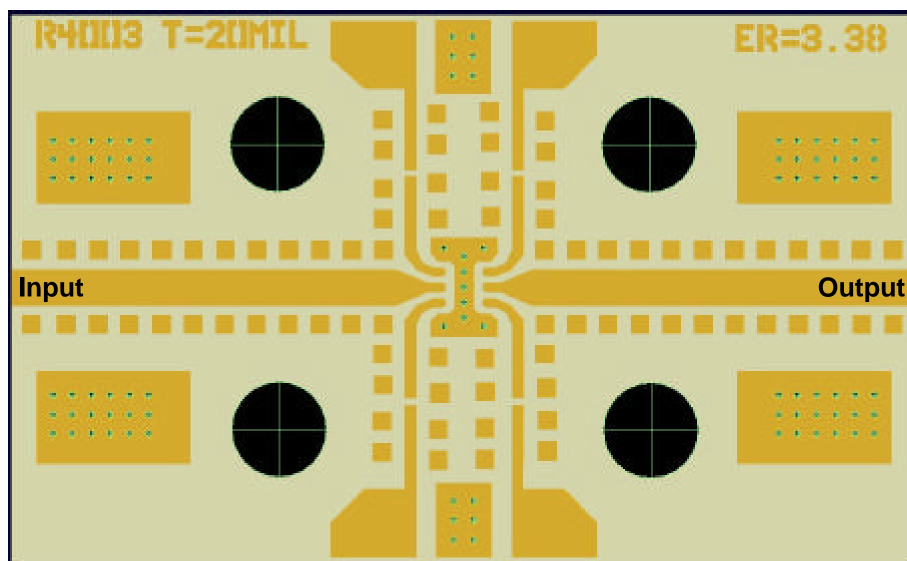
Package Pinout



Pin	Signal
1	NC
2	Input
3	NC
4	NC
5	Output
6	NC
7 (Paddle)	Ground

Evaluation Board



Note: No external components required.

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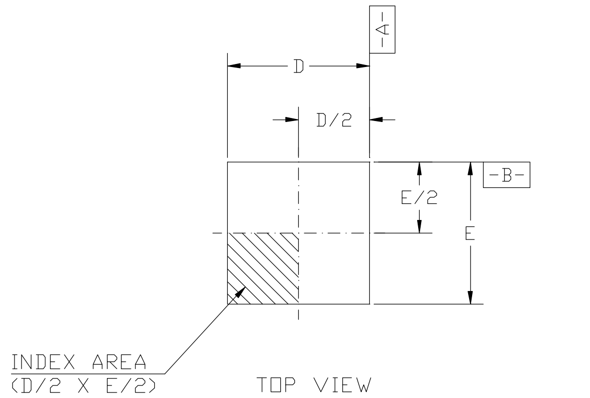
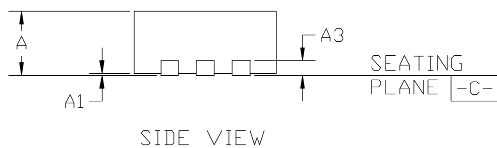
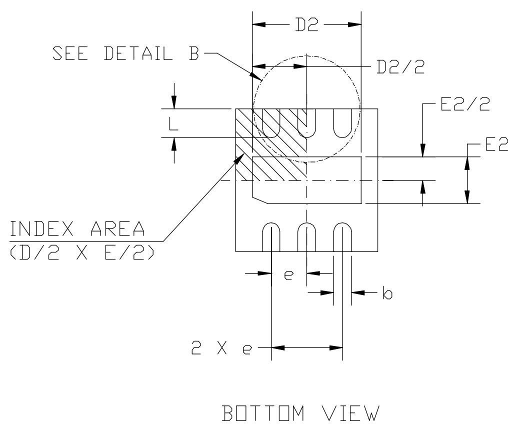
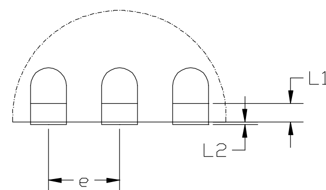
Packaged Dimensional Drawing TGB2010-EPU-SM





Symbol	MIN	NOM	MAX	UNITS
A	0.80	0.90	1.00	mm
A1	0.00	0.02	0.05	mm
A3	---	0.20 ref	---	mm
L1	---	---	0.15	mm
L2	---	---	0.13	mm
b	0.18	0.25	0.30	mm
D	1.85	2.00	2.15	mm
E	1.85	2.00	2.15	mm
D2	1.30	---	1.75	mm
E2	0.50	---	0.80	mm
L	0.30	0.40	0.50	mm
e	0.45	0.50	0.55	mm





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Assembly of a TGB2010-EPU Surface Mount Package onto a Circuit Board

Solders designated Pb-free such as SnAgCu have reflow temperatures which are higher than those required for Sn/Pb. Typical soldering temperatures are 20 to 30 degrees higher. The molding compound used in this package can withstand 260°C peak temperatures. In addition, the molding compound is free of flame retardants defined by some regulations as hazardous.

1. Clean the circuit board or module with Acetone. Rinse with alcohol and DI water. Allow the circuit to fully dry.

2. To improve the RF performance, we recommend attaching the paddle on the bottom of the package using Pb free solder.

3. Apply Pb free solder to each circuit board pad and to the backside contact for the package.

4. Reflow using manufacturer recommended oven and solder profiles.

5. Clean the assembly with alcohol.

Ordering Information

PACKAGE PART NUMBER DESIGNATIONS

Part No	Package Style	Cutoff Frequency
TGB2010-00-EPU-SM	MLF/QFN	Thru
TGB2010-50-EPU-SM	MLF/QFN	5.0 ± 0.5 GHz
TGB2010-60-EPU-SM	MLF/QFN	6.0 ± 0.5 GHz
TGB2010-65-EPU-SM	MLF/QFN	6.5 ± 0.5 GHz
TGB2010-75-EPU-SM	MLF/QFN	7.5 ± 0.5 GHz
TGB2010-80-EPU-SM	MLF/QFN	8.0 ± 0.5 GHz
TGB2010-90-EPU-SM	MLF/QFN	9.0 ± 0.5 GHz

Note: Package marked with 2 digit center frequency and manufacturing week only.