



**Product Family:** [Bessel Absorptive Filter–9th Order](#)

**Part Number Series:** [FL9 Series](#)

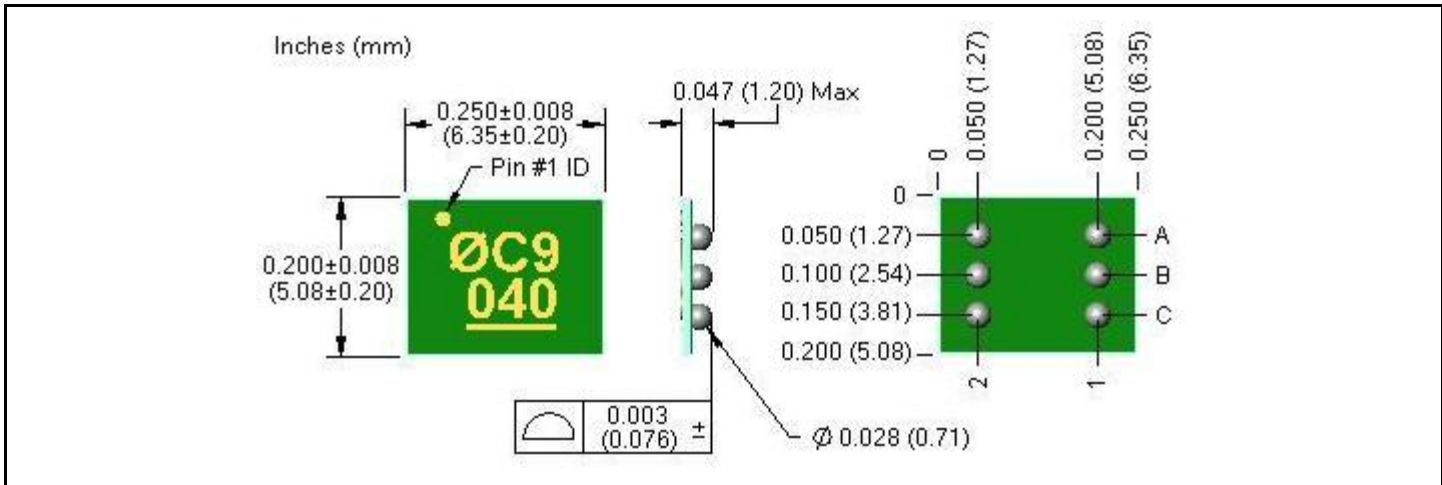
	<p><b>Construction:</b></p> <ul style="list-style-type: none"> <li>• High Purity Alumina Substrate</li> <li>• Nickel alloy thin-film resistive element</li> <li>• Epoxy-resin overcoat</li> <li>• Available in RoHS (Sn95.5/Ag3.8/Cu0.7) or Non-RoHS (Sn63/Pb37)</li> </ul>	<p><b>Features:</b></p> <ul style="list-style-type: none"> <li>• Cutoff frequencies between 2.5GHz and 4.0 GHz</li> <li>• Low pass</li> <li>• Absorptive</li> <li>• Ball Grid Array (BGA) for high bandwidth</li> <li>• Competitive pricing</li> </ul>
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**Description:**

Thin Film Technology's FL9 series of surface mount low pass filters are designed for use in Duo-Binary modulation schemes where flat group delay and return loss beyond the cutoff frequency are important characteristics. The discrete (0.25GHz) cutoff series of 1/4 bitrates are intended for use in varying bitrates and application requirements including OC-192(10Gb/s) and forward error correction beyond 12Gb/s.

This product is currently available with solder finishes of Sn63/Pb37, as well as a RoHS compliant / Lead Free solder finish of Sn95.5/Ag3.8/Cu0.7. For the RoHS compliant / Lead Free part, the customer must specify this upon ordering by following the instructions in the part numbering section of this specification.

**Product Dimensions:**



**Part Numbering:** Ex. FL9B5BH033-T\*-C

Product Designator	Orders	Type	Impedance	Function	Footprint	Cutoff Freq.	Custom Code	T&R Qty *	RoHS
FL	9 (9th Order)	B (Absorptive)	5 (50 ohm)	B (Bessel)	H (6 ball BGA)	025 = 2.5 GHz 028 = 2.75 GHz 030 = 3.0 GHz 033 = 3.25 GHz 035 = 3.5 GHz 038 = 3.75 GHz 040 = 4.0 GHz	S (Standard)  TBD (Custom)	-T1 = 100  -T5 = 500	-C (RoHS)  Leave blank for non-RoHS

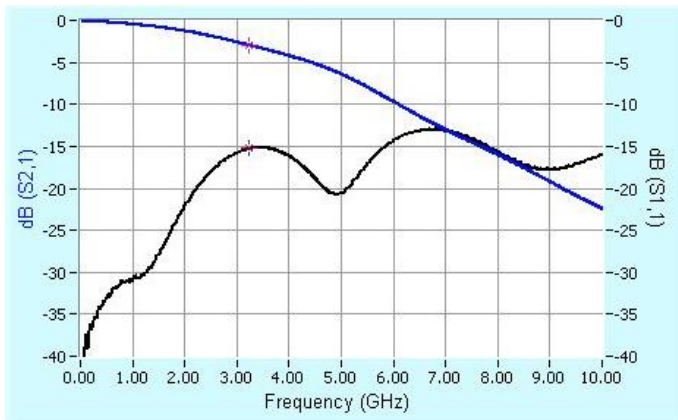
\*Note: T&R package quantity (-T#) will be added to the part number by us depending on the quantity ordered.

**Electrical Specifications:**

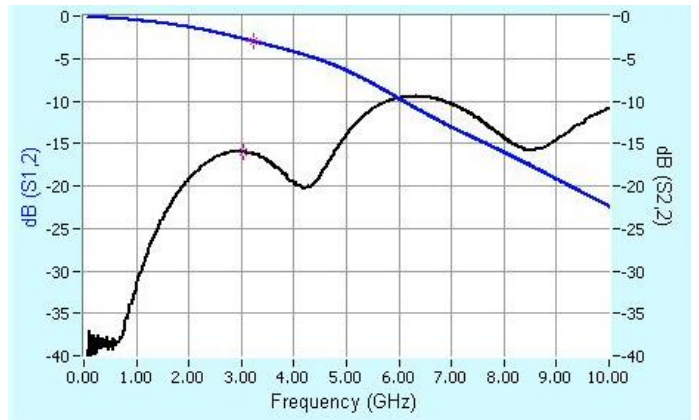
Parameter	Specification
English Size	2520
Metric Size	6450
Type	Absorptive Low Pass
Function	Bessel
Order	9th
Reference Impedance	50 ohms
Fo Cutoff Freq (-3dB)	2.5 to 4.0GHz in 0.25 GHz steps
Fo Cutoff Tolerance	Fo ±0.25 GHz
Return Loss (S11) (S22)	<15dB Loss through Fo <10dB Loss through two times Fo  <13dB Loss through Fo
Rejection	-10dB through three times Fo
Group Delay Ripple (max)	20ps Max through 1.6x Fo
Rated Current	100mA
Isolation Resistance	>100Mohm @ 50Vdc
Operating Temperature	-40°C ~ +85°C
Packaging	100 or 500 pcs/reel

Please consult the factory for any desired variations to the above specifications

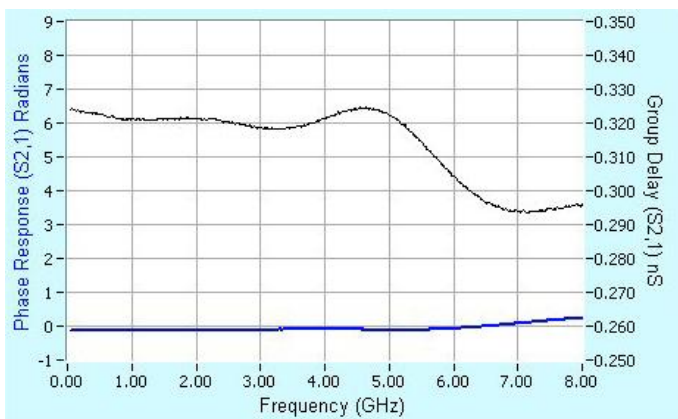
**Frequency Performance Plots -3.25 GHz typical:**



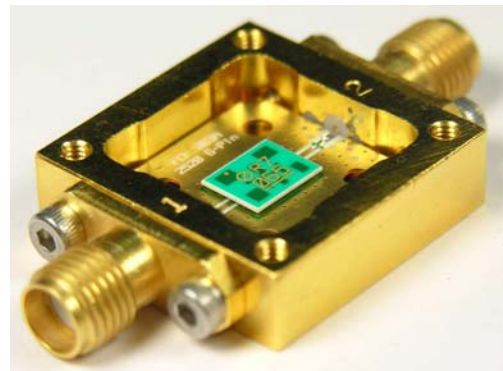
S2,1 (Blue) / S1,1 (Black)



S1,2 (Blue) / S2,2 (Black)



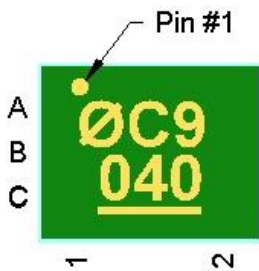
Phase Response (Blue) / Group Delay (Black)



These products are available mounted into a Coaxial Measurement Module (CMM) for bench evaluation purposes. Please call the factory.

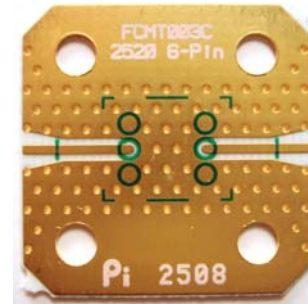
**Marking and Recommended Land Pattern:**

**Marking:**



Pin 1	Corner of pin A1
Row 1	TFT "don't stop" logo
	C = Monthly date code
	9 = Filter orders (9th)
Row 2	Fo Freq (040=4.0 GHz) (roundup as necessary so 033=3.25 GHz, etc.)
Row 3	Underline indicates absorptive type filter

**Recommended Land Pattern:**



Please call the factory for DXF output of Land Pattern

**Tape and Reel Packaging:**

Packaging Specifications	General Guidelines & Recommendations
Packaging Requirements	<ul style="list-style-type: none"> <li>All taping done in accordance with EIA 481 standards.</li> <li>Pieces taped with the marking up and showing through the cover tape (as shown in the drawing below).</li> <li>All orders under 100 pcs will be put on cut tape only with no leader or trailer.</li> </ul>
Labeling Requirements	Labels will contain the TFT part number and quantity of pieces taped.

