



maxim
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GMSL1 Power Over Coax Summary

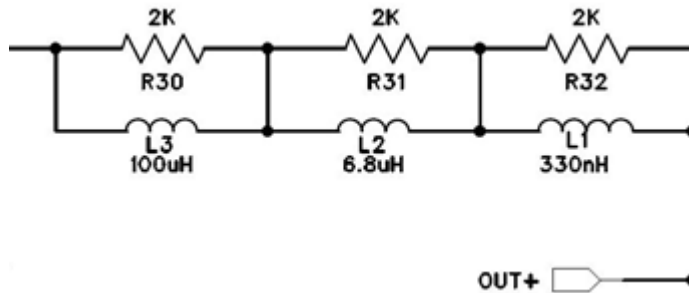
10/17/2016

Overview

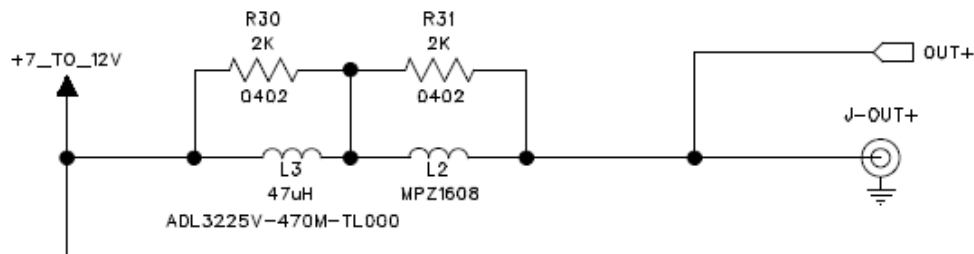
- Maxim reference PoC filter design and simulation
- PoC design considerations
- Summary

Maxim Reference PoC Filter Design

- 3-inductors (330nH, 6.8uH and 100uH)



- One ferrite bead and inductor 47uH **or** 100uH



PoC Filter Response (3-stage vs. 2-stage)

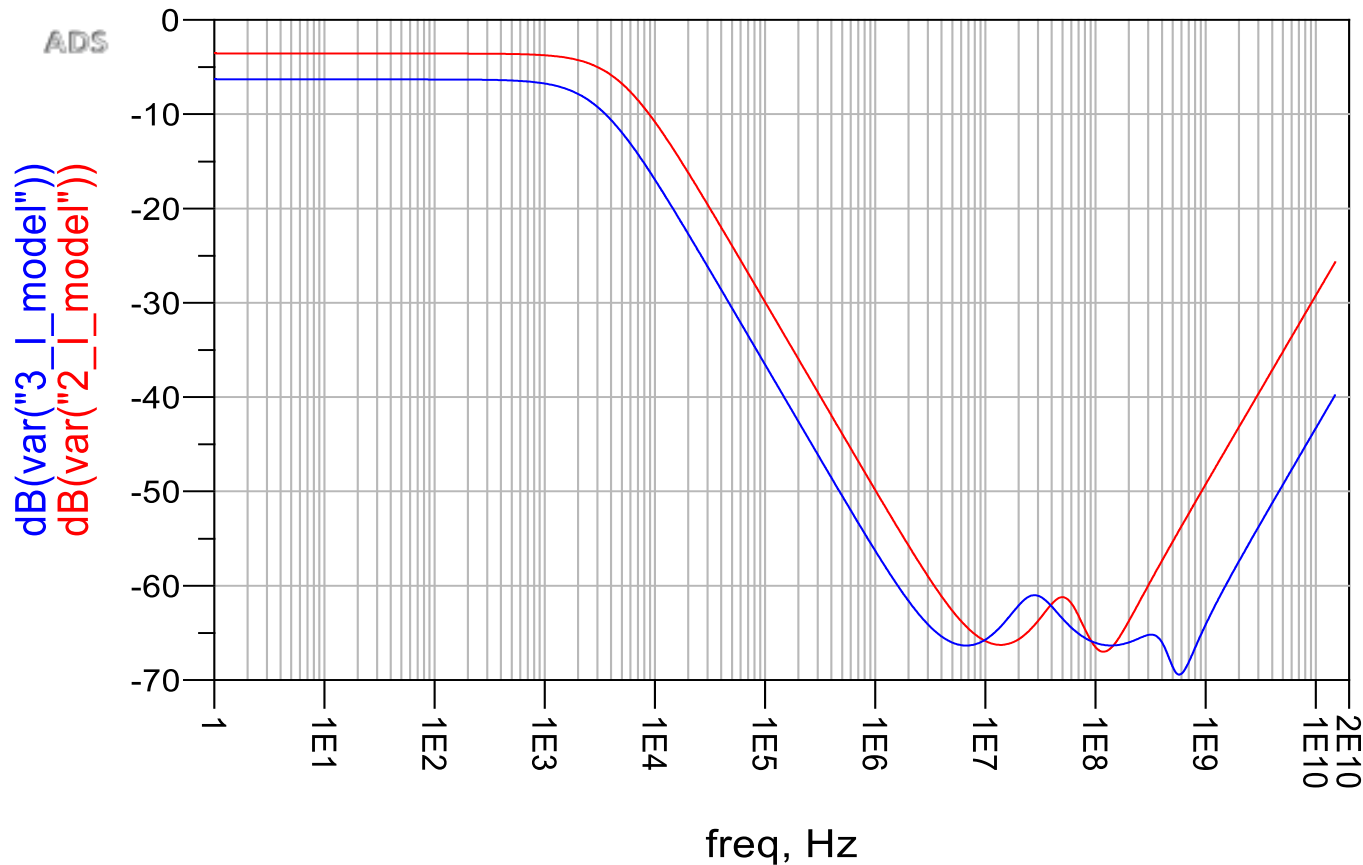


Figure 1. Filter response vs. Frequency

2-stage PoC Filter Temperature Effect

- One ferrite bead and inductor solution
 - > 47uH 2.5mmX3.2mm (i.e. ADL3225V-470M-TL000)
 - > 100uH 3.0mmX3.0mm (i.e. LQH3NPZ101MME)
 - > Ferrite 0603 (i.e. MPZ1608S102A00)
- Test board is used and components temperature is -40C, 25C, 105C, 115C

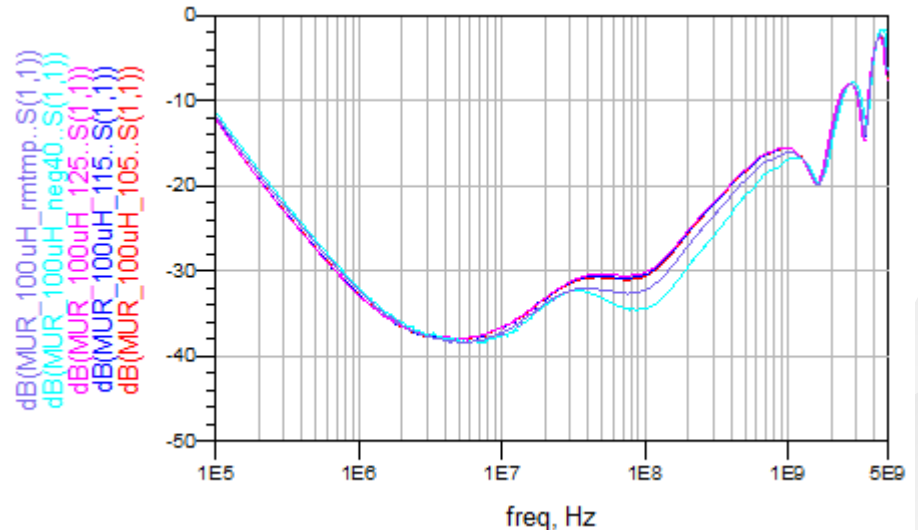
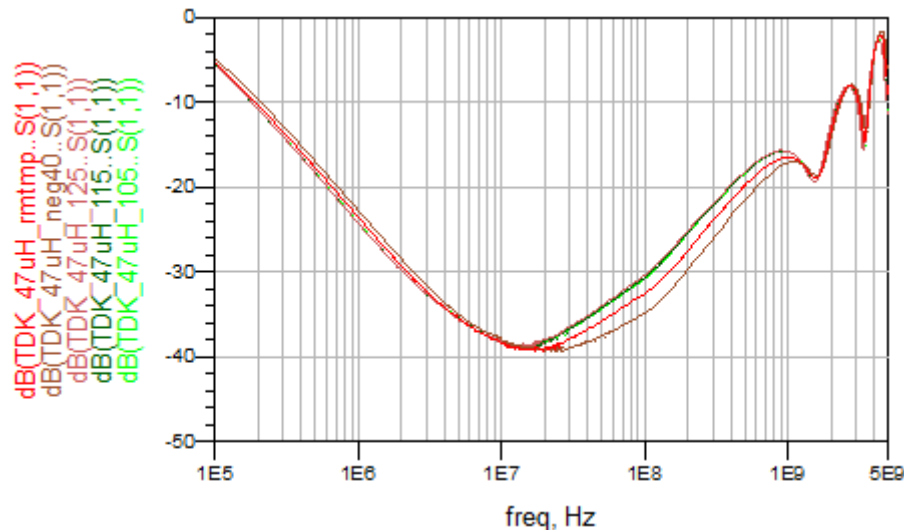
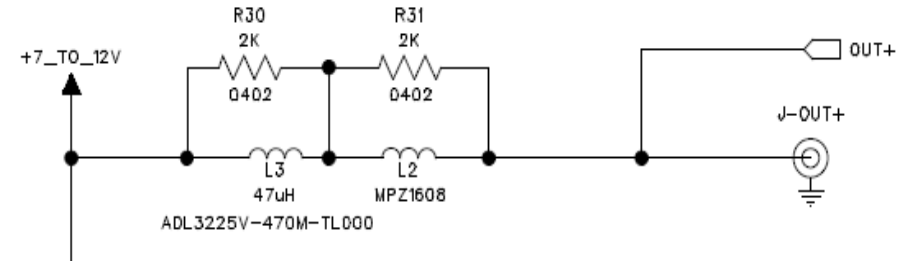


Figure 2. Two stage filter response across temperature

PoC Design Considerations

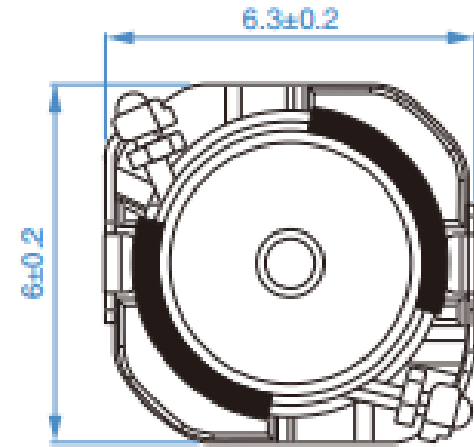
- Choose inductor that has low impedance at DC
- Choose inductor that has high impedance $\sim 1k$ Ohm to cover both forward video (500Mbps to 1.5Gbps) and reverse channel band (below 1Mbps) with sufficient margins
- Component Size
 - > Choose 47uH if control channel operates in Fast and HIM mode
 - > Choose 100uH if control channel operates in Legacy or HIM mode (non-Fast mode)
- Current rating
 - > Smaller inductors have lower current rating. If application requires smaller inductor, increase the voltage sent over Coax cable
 - > Typical cable and connector are rated for 500mA
- Voltage regulator (Linear vs. switching regulator)
- *Add constant load to balance the power noise caused by image processor
- *Allowing for voltage loss

Note: *see application note for details

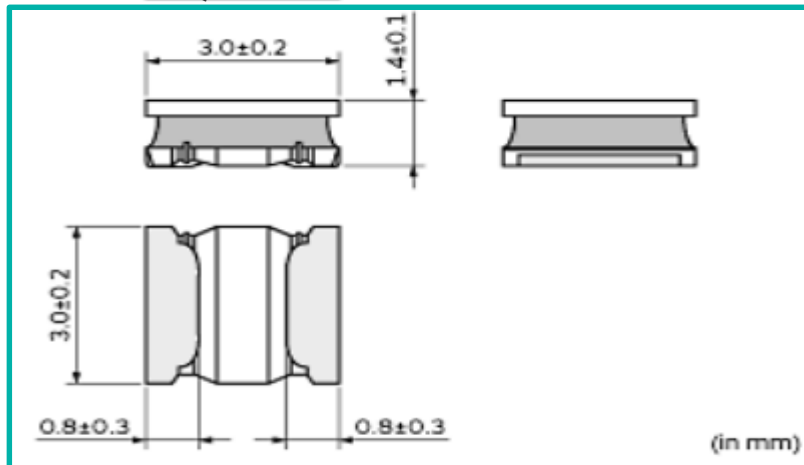
Size Comparison

- TDK 47uH: 8mm sq.
- Murata 100uH: 9mm sq.
- TDK 100uH: 37.8mm sq.
 - > Used in 3 inductor solution
- All tests executed using both inductors.

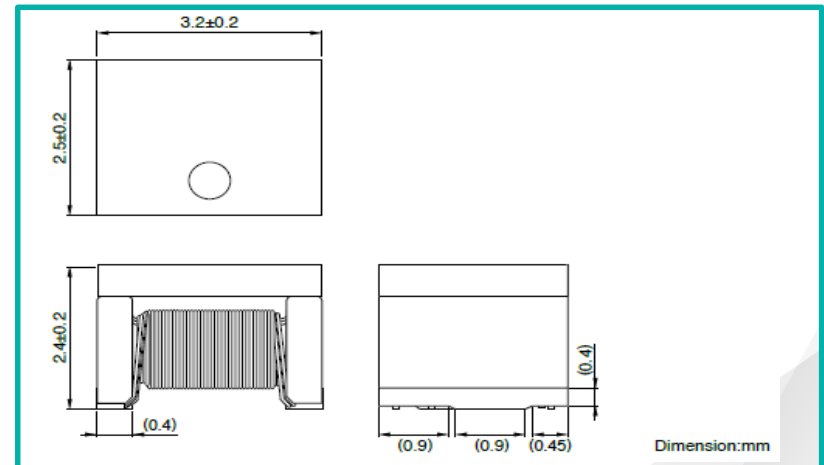
TDK
CLF6045NIT-101M-D



Murata
LQH3NPZ101MME 100uH



TDK
ADL3225V-470M 47uH



Summary

- Maxim recommendation is 3-stage PoC filter on both serializer and deserializer boards. This is because it shows more margin in both forward and reverse channel and it can tolerate more noise induced by the image sensor.
- To minimize the size of camera board, 2-stage filter (one ferrite and 100uH) is Maxim preferred choice. Both 47uH and 100uH inductors show similar performance, however, 100uH provide more margin at low end of the reverse channel frequency band.