

## TVP5160 Anti-Aliasing Filters

### 1 Overview

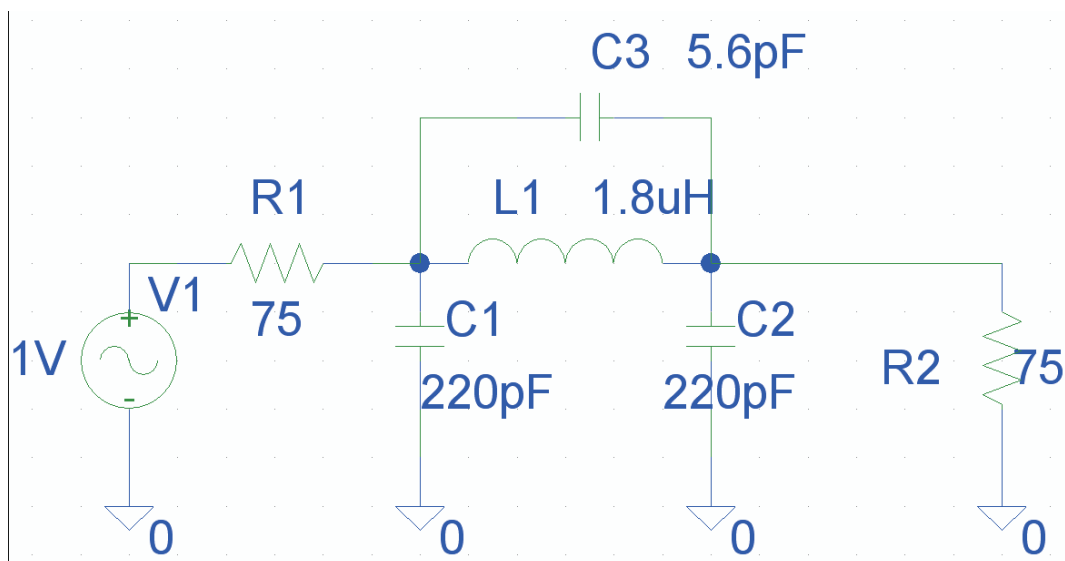
This document describes the anti-aliasing filters used on the TVP5160EVM Rev1.1. They are designed based on the sampling frequencies of the ADC(s) given the particular input and apply to both NTSC and PAL video color standards. The filters are also designed to minimize system costs by using standard EIA values and by utilizing elliptical filters instead of other filter type which may require additional inductors.

**Table 1. TVP5160 EVM Anti-Aliasing Filter Specifics**

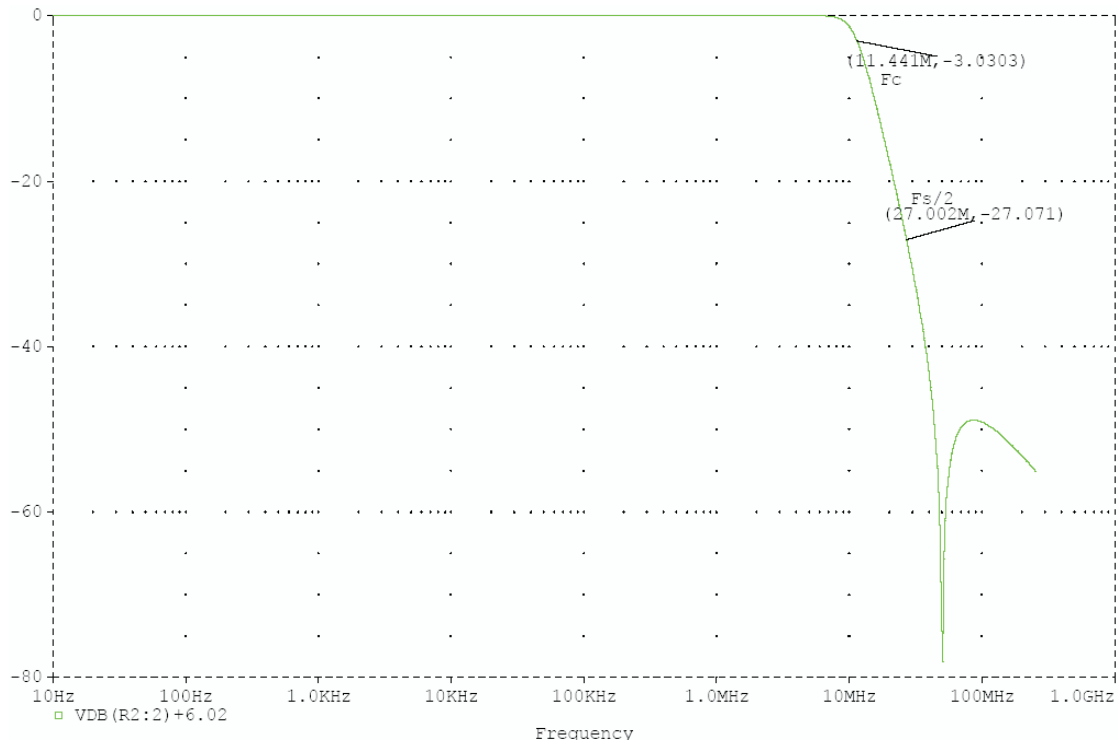
Input Type	Sampling Frequency ( $f_s$ )	Cutoff Frequency ( $f_c$ )	Over-sampling	ADCs Used	Comments
CVBS	54 MHz	~12 MHz	4x	1	Each ADC provides 4x oversampling with CVBS
S-Video	54 MHz	~12 MHz	4x	2	Both Y and C are 4x oversampled using both ADCs
Y	54 MHz	~12 MHz	4x	1	Y or YPbPr is 4x oversampled using one ADC
Pb/Pr	27 MHz	~9 MHz	2x	1	PbPr of YPbPr is 2x oversampling using one ADC
SCART	27 MHz	~9 MHz	2x	2	SCART uses both ADCs for CVBS/RGB by multiplexing the samples

### 2 Anti-Aliasing Filter for CVBS, S-Video, and Y (of YPbPr)

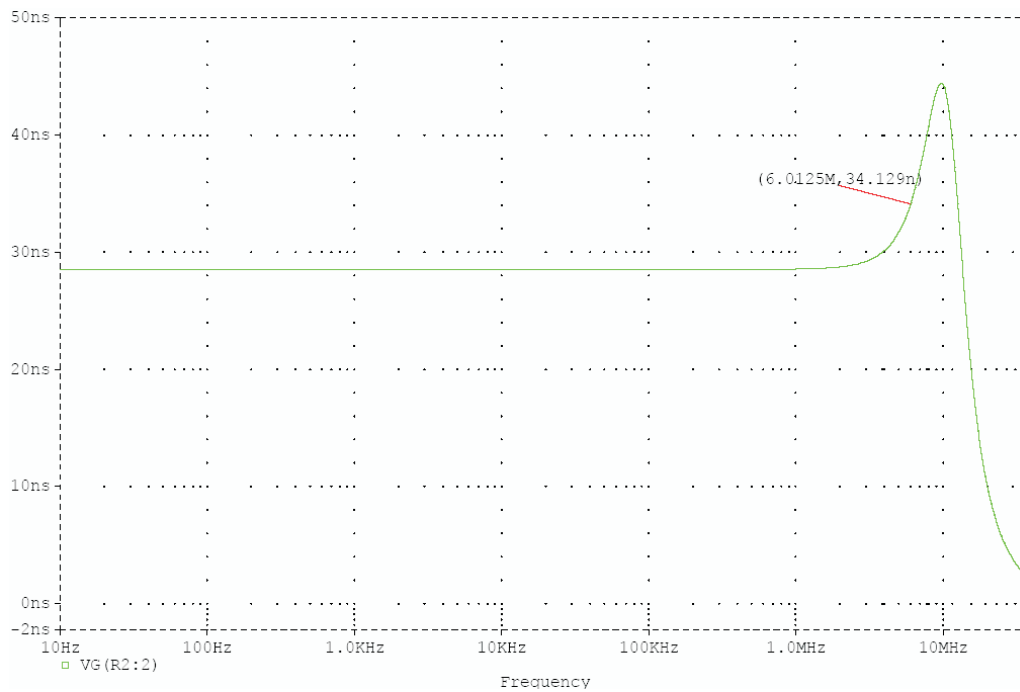
This anti-aliasing filter is designed for the CVBS, S-Video and Y (of YPbPr) input signals on the TVP5160 EVM Revision 1.1. All of these inputs are sampled at 54MHz. It uses one inductor and three capacitors all at standard EIA values. The frequency response and group delay curves for this filter design are shown below.



**Figure 1. Schematic for CVBS, S-Video and Y**



**Figure 2. Frequency response for CVBS, S-Video and Y – 54 MHz**



**Figure 3. Group Delay Response for CVBS, S-video and Y – 54 MHz**

### 3 anti-Aliasing Filter for PbPr (of YPbPr) and SCART – 27 MHz

This anti-aliasing filter is designed for the PbPr (of YPbPr) and SCART input signals on the TVP5160 EVM Revision 1.1. By using two ADCs sampling at 54MHz, the sampling rate of these inputs is 27MHz. It uses one inductor and three capacitors all at standard EIA values. The frequency response and group delay curves for this filter design are shown below.

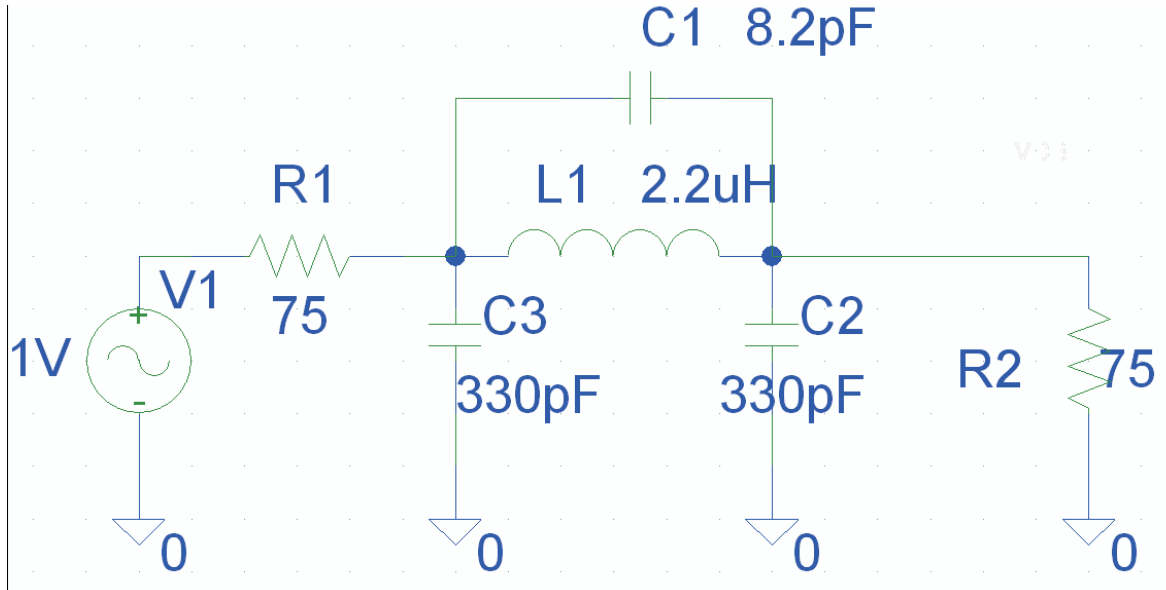


Figure 4. Schematic for PbPr and SCART

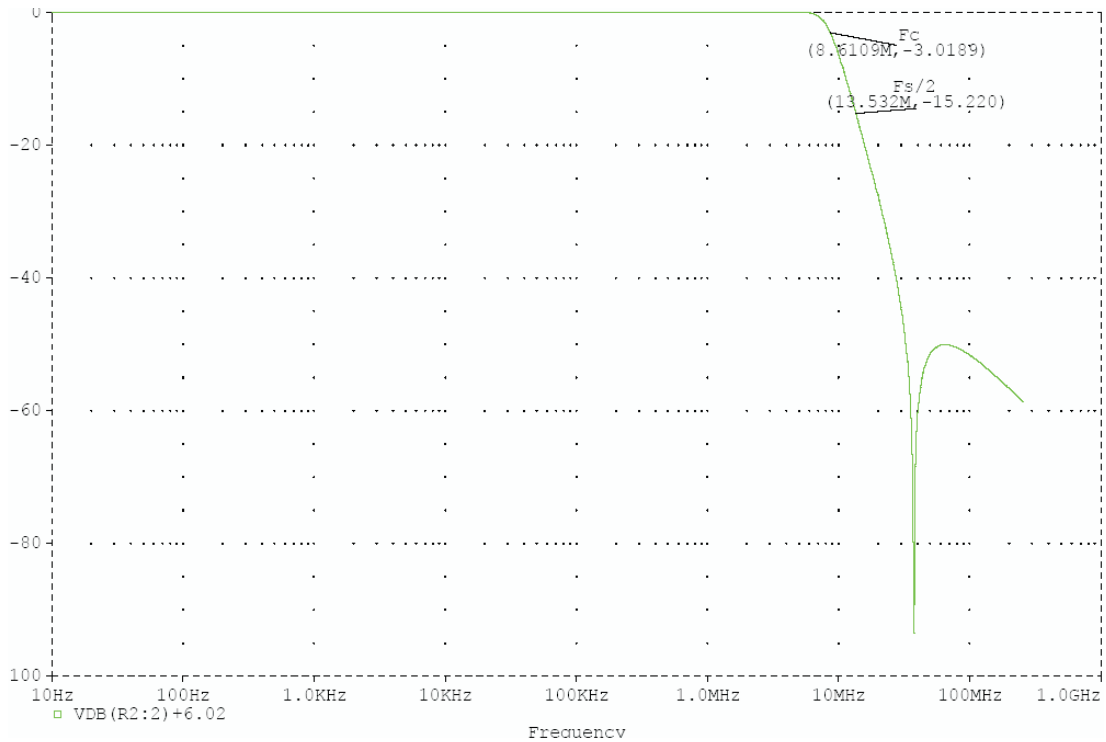
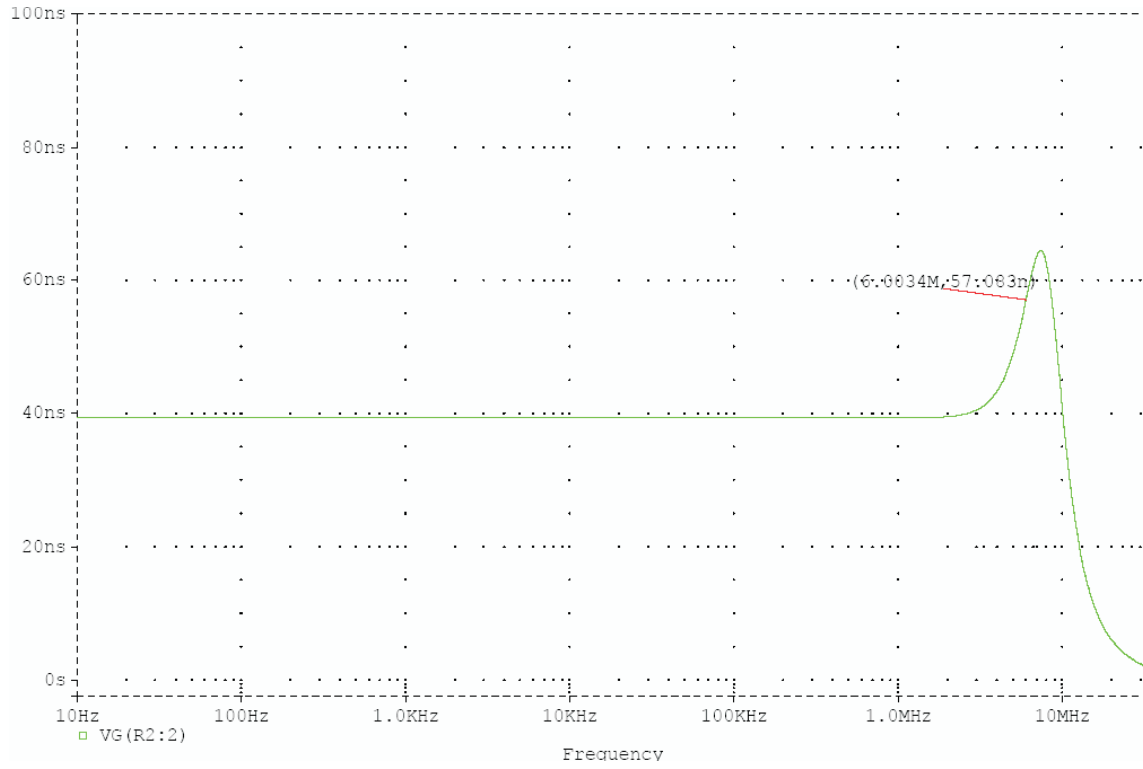


Figure 5. Frequency Response for PbPr and SCART – 27 MHz



**Figure 6. Group Delay Response for PbPr and SCART – 27 MHz**

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Interface	<a href="http://interface.ti.com">interface.ti.com</a>	Energy	<a href="http://www.ti.com/energy">www.ti.com/energy</a>
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Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>	Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>	Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>	Space, Avionics & Defense	<a href="http://www.ti.com/space-avionics-defense">www.ti.com/space-avionics-defense</a>
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