- Three 4th-order 8MHz (SD) f lters
- Drives single, AC- or DC-coupled, video loads ($2V_{pp}$, 150Ω)
- Drives dual, AC- or DC-coupled, video loads ($2V_{pp}$, 75Ω)
- Transparent input clamping
- AC- or DC-coupled inputs
- AC- or DC-coupled outputs
- DC-coupled outputs eliminate AC-coupling capacitors
- 5V only
- Robust 8kV ESD protection
- Lead-free SOIC-8 package

- Cable set-top boxes
- Satellite set-top boxes
- DVD players
- HDTV
- Personal Video Recorders (PVR)
- Video On Demand (VOD)

The FMS6143 Low-Cost Video Filter (LCVF) is intended to replace passive LC f lters and drivers with a low-cost integrated device. Three 4th-order f lters provide improved image quality compared to typical 2nd or 3rd-order passive solutions.

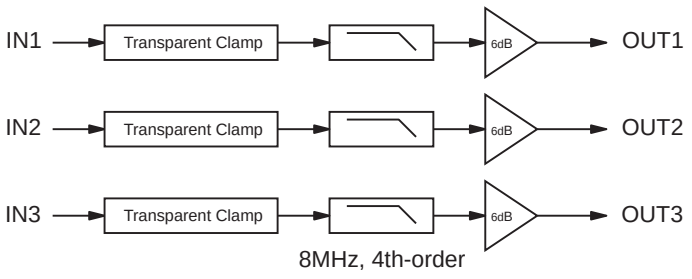
The FMS6143 may be directly driven by a DC-coupled DAC output or an AC-coupled signal. Internal diode clamps and bias circuitry may be used if AC-coupled inputs are required (see *Applications* section for details).

The outputs can drive AC- or DC-coupled single (150Ω) or dual (75Ω) loads. DC-coupling the outputs removes the need for output coupling capacitors. The input DC-levels are offset approximately +280mV at the output (see the *Applications* section for details).

AN-8002 — : http://www.onsemi.com/pub/Collateral AN-8002.PDF

AN-6024 — http://www.onsemi.com/pub/Collateral/ AN-6024.pdf.pdf

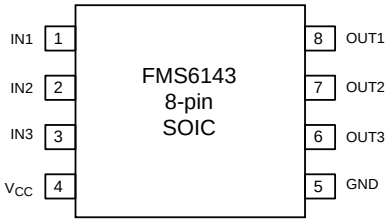
AN-6041 — http://www.onsemi.com/pub/Collateral/AN-6041.pdf.pdf



FMS6143CSX	-40 to +85°C	RoHS	SOIC-8	Tape and Reel

October-2017, Rev. 5

Publication Order Number:
FMS6143/D



1	IN1	Input	Video input, Channel 1
2	IN2	Input	Video input, Channel 2
3	IN1 ‘		
3			
Ű C M ž	ézŏ M3	Pį	Y IN1
ž 3			
ž 3			

The “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values def ned in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The “Recommended Operating Conditions” table def nes the conditions for actual device operation.

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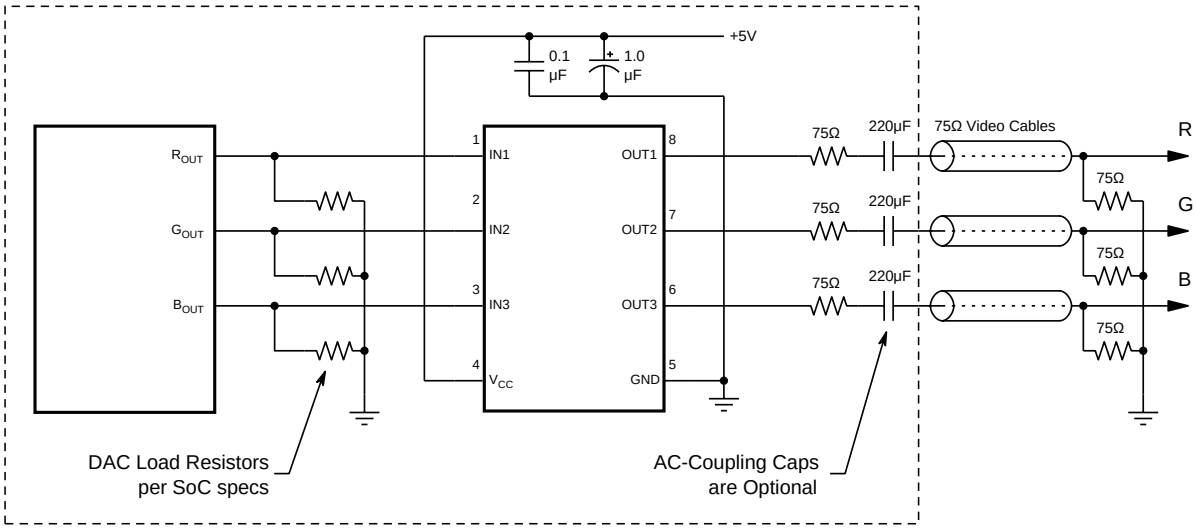
The following circuit may be used for direct DC-coupled drive by DACs with an output voltage range of 0V to 1.4V. AC-coupled or DC-coupled outputs may be used with AC-coupled outputs, offering slightly lower power dissipation.



The FMS6143 Low Cost Video Filter (LCVF) provides 6dB gain from input to output. In addition, the input is slightly offset to optimize the output driver performance. The offset is held to the minimum required value to decrease the standing DC current into the load. Typical voltage levels are shown in the diagram below:

There is a 280mV offset from the DC input level to the DC output level. $V_{OUT} = 2 * V_{IN} + 280mV$.

The same method can be used for biased signals, with the addition of a pull-up resistor to make sure the clamp never operates. The internal pull-down resistance is 800kΩ

Consider using 70µm of copper for high-power designs.

Make the PCB as thin as possible by reducing FR4 thickness.

Use vias in power pad to tie adjacent layers together.

Remember that baseline temperature is a function of board area, not copper thickness.

Modeling techniques provide a f rst-order approximation.

- Use separate analog and digital power planes to supply power.
- Traces should run on top of the ground plane at all times.
- No trace should run over ground/power splits.
- Avoid routing at 90-degree angles.
- Minimize clock and video data trace length differences.
- Include 10µF and 0.1µF ceramic power supply bypass capacitors.
- Place the 0.1µF capacitor within 0.1 inches of the device power pin.
- Place the 10µF capacitor within 0.75 inches of the device power pin.
- For multi-layer boards, use a large ground plane to help dissipate heat.
- For two-layer boards, use a ground plane that extends beyond the device body at least 0.5 inches on all sides. Include a metal paddle under the device on the top layer.
- Minimize all trace lengths to reduce series inductance.

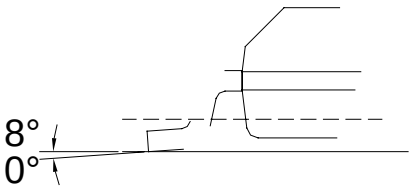
Since the interior of most systems, such as set-top boxes, TVs, and DVD players, are at +70ºC; consideration must be given to providing an adequate heat sink for the device package for maximum heat dissipation. When designing a system board, determine how much power each device dissipates. Ensure that devices of high power are not placed in the same location, such as directly above (top plane) or below (bottom plane), each other on the PCB.

- Understand the system power requirements and environmental conditions.
- Maximize thermal performance of the PCB.

The FMS6143 outputs are DC offset from the input by 150mV. Therefore, $V_{OUT} = 2 \bullet V_{IN}$ DC+150mV. This offset is required to obtain optimal performance from the output driver and is held at the minimum value to decrease the standing DC current into the load. Since the FMS6143 has a 2x (6dB) gain, the output is typically connected via a 75Ω-series back-matching resistor, followed by the 75Ω video cable. Due to the inherent divide by two of this conf guration, the blanking level at the load of the video signal is always less than 1V. When AC-coupling the output, ensure that the coupling capacitor of choice passes the lowest frequency content in the video signal and that line time distortion (video tilt) is kept as low as possible.

The selection of the coupling capacitor is a function of the subsequent circuit input impedance and the leakage current of the input being driven. To obtain the highest quality output video signal, the series termination resistor must be placed as as ofd ' ut

SEE DETAIL A



NOTES: UNLESS OTHERWISE SPECIFIED

A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AA, ISSUE C,
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS DO NOT INCLUDE MOIATB8ER°N"R°)E