



# FMS6303

## Low-Cost, 3-Channel, Video Filter Driver for SD/ED/HD (1080i)/HD (1080P)

### Features

- Three 6th-Order Video Anti-Aliasing or Reconstruction Filters
- Supports Component YPrPb or RGB Video
- Three Channels: Selectable to 8MHz, 16MHz, 32MHz, or 64MHz for SD/ED/HD\_1080i, HD\_1080p Applications
- Single Video Load Driver ( $2V_{pp}$ ,  $150\Omega$ ,  $A_V = 6dB$ )
- Selectable Clamp or Bias Mode on Pb/B, Pr/R Inputs
- AC- or DC-Coupled Inputs and Outputs
- DC-Coupled Outputs Eliminate Coupling Capacitors
- Output Disable
- Single 5V Supply
- 2kV CDM / 9kV HBM ESD Protection

### Applications

- Cable and Satellite Set-Top Boxes
- DVD Players
- HDTV
- Personal Video Recorders (PVR)
- Video On Demand (VOD)

### Description

FMS6303 offers comprehensive filtering for set-top box or DVD applications. It is intended to replace passive LC filters and drivers with a low-cost integrated device.

Filter channels are specialized for either component (YPbPr) or RGB video signals. These channels offer a selectable frequency response of 8, 16, 32, or 64MHz. Additional functionality of these channels includes input biasing mode and output disable.

The FMS6303 may be driven directly by a DC-coupled DAC output or an AC-coupled signal. All inputs accept standard  $1V_{pp}$  video signals.

Each channel includes an output amplifier capable of driving a single ( $150\Omega$ ) AC- or DC-coupled video load. All outputs can be disabled to save power in DC-coupled applications.

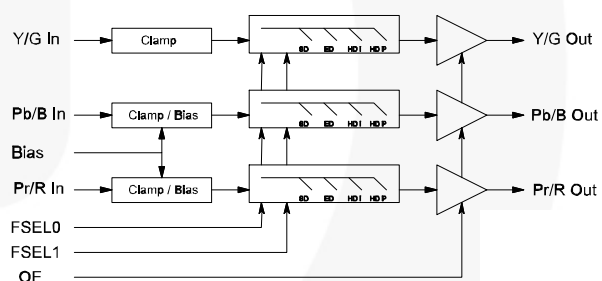


Figure 1. Block Diagram

### Ordering Information

| Part Number     | Operating Temperature Range | Gain Setting | Package  | Packing Method |
|-----------------|-----------------------------|--------------|----------|----------------|
| FMS6303MTC1406X | -40°C to +85°C              | 6dB          | TSSOP-14 | Tape and Reel  |

**Note:**

1. Moisture sensitivity level for all parts is MSL-1.

## Pin Configuration

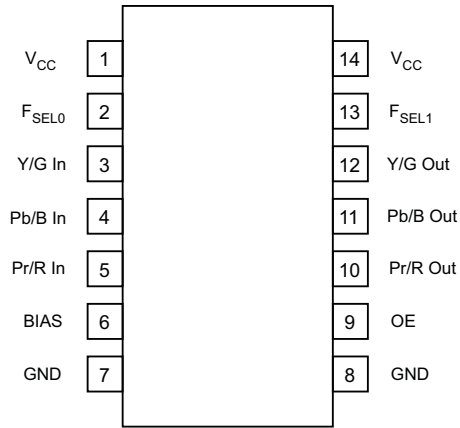


Figure 2. Pin Configuration

## Pin Definitions

| Pin # | Name              | Type   | Description                              |
|-------|-------------------|--------|--|
| 1     | V <sub>CC</sub>   | Input  | +5V supply                               |
| 2     | f <sub>SEL0</sub> | Input  | Selects filter corner frequency          |
| 3     | Y/G In            | Input  | Selectable video input                   |
| 4     | Pb/B In           | Input  | Selectable video input                   |
| 5     | Pr/R In           | Input  | Selectable video input                   |
| 6     | BIAS              | Input  | Input Bias on Pb/B Pr/R 0=Bias 1=Clamp   |
| 7     | GND               | Input  | Must be tied to ground. Do not float.    |
| 8     | GND               | Input  | Must be tied to ground. Do not float.    |
| 9     | OE                | Input  | Output disable control: 0=OFF, 1=ON      |
| 10    | Pr/R Out          | Output | Filtered SD, ED, HD I, HD P video output |
| 11    | Pb/B Out          | Output | Filtered SD, ED, HD I, HD P video output |
| 12    | Y/G Out           | Output | Filtered SD, ED, HD I, HD P video output |
| 13    | f <sub>SEL1</sub> | Input  | Selects filter corner frequency          |
| 14    | V <sub>CC</sub>   | Input  | +5V supply                               |

## Frequency Select Truth Table

| f <sub>SEL1</sub> | f <sub>SEL0</sub> | Filter Frequency | Video Format    | Sync Format                 |
|-------------------|-------------------|------------------|-----------------|-----------------------------|
| 0                 | 0                 | 8MHz             | SD, 480i        | Bi-level, 4.70µs Pulsewidth |
| 0                 | 1                 | 16MHz            | ED, 480p        | Bi-level, 2.35µs Pulsewidth |
| 1                 | 0                 | 32MHz            | HD, 1080i, 720p | Tri-level, 589ns Pulsewidth |
| 1                 | 1                 | 64MHz            | HD, 1080p       | Tri-level, 295ns Pulsewidth |

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

| Symbol           | Parameter                                      | Min. | Max.                 | Unit |
|------------------|--|------|----------------------|------|
| V <sub>CC</sub>  | DC Supply Voltage                              | -0.3 | 6.0                  | V    |
| V <sub>IO</sub>  | Analog and Digital I/O                         | -0.3 | V <sub>CC</sub> +0.3 | V    |
| I <sub>OUT</sub> | Output Current, Any One Channel, Do Not Exceed |      | 50                   | mA   |

## Reliability Information

| Symbol           | Parameter   | Min. | Typ. | Max. | Unit |
|------------------|---|------|------|------|------|
| T <sub>J</sub>   | Junction Temperature  |      |      | +150 | °C   |
| T <sub>STG</sub> | Storage Temperature Range   | -65  |      | +150 | °C   |
| T <sub>L</sub>   | Reflow Temperature, Soldering 10 Seconds                              |      |      | +260 | °C   |
| θ <sub>JA</sub>  | Thermal Resistance, JEDEC Standard Multi-Layer Test Boards, Still Air |      | 97   |      | °C/W |

## Electrostatic Discharge Information

| Symbol | Parameter                         | Max. | Unit |
|--------|-----------------------------------|------|------|
| ESD    | Human Body Model, JESD22-A114     | 9    | kV   |
|        | Charged Device Model, JESD22-C101 | 2    |      |

## Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to Absolute Maximum Ratings.

| Symbol          | Parameter                   | Min. | Typ. | Max. | Unit |
|-----------------|-----------------------------|------|------|------|------|
| T <sub>A</sub>  | Operating Temperature Range | -40  |      | +85  | °C   |
| V <sub>CC</sub> | Supply Voltage Range        | 4.75 | 5.00 | 5.25 | V    |

## Electrical Characteristics

Unless otherwise noted, T<sub>A</sub>=25°C, V<sub>CC</sub>=5V, R<sub>SOURCE</sub>=37.5Ω, inputs AC coupled with 0.1μF, all outputs AC coupled with 220μF into 150Ω loads, referenced to 400kHz.

| Symbol              | Parameter                              | Condition                             | Min. | Typ. | Max.            | Unit            |
|---------------------|--|---------------------------------------|------|------|-----------------|-----------------|
| A <sub>v</sub>      | Channel Gain <sup>(2)</sup>            | DC                                    | 5.8  | 6.0  | 6.2             | dB              |
| I <sub>CC</sub>     | Supply Current <sup>(2)</sup>          | No Load, SD, ED, HD 1080i             |      | 36   |                 | mA              |
|                     |  | No Load, HD 1080p                     |      | 60   | 80              |                 |
| I <sub>CC_SD</sub>  | Shutdown Supply Current <sup>(2)</sup> | No Load, Output Disabled              |      | 20   | 40              | mA              |
| PSRR                | Power Supply Rejection                 | DC (All Channels)                     |      | 70   |                 | dB              |
| V <sub>IN</sub>     | Video Input Voltage Range              | Referenced to GND if DC Coupled       |      | 1.0  |                 | V <sub>PP</sub> |
| V <sub>IL</sub>     | Digital Input Low <sup>(2)</sup>       | f <sub>SEL0</sub> , f <sub>SEL1</sub> | 0    |      | 0.8             | V               |
| V <sub>IH</sub>     | Digital Input High <sup>(2)</sup>      | f <sub>SEL0</sub> , f <sub>SEL1</sub> | 2.4  |      | V <sub>CC</sub> | V               |
| t <sub>ENABLE</sub> | Output Enable Time                     | 150Ω DC Load                          |      | 10   |                 | μs              |

### Note:

- 100% tested at 25°C.

## Standard Definition (480i) Electrical Characteristics

Unless otherwise noted,  $T_A=25^\circ\text{C}$ ,  $V_{CC}=5\text{V}$ ,  $R_{SOURCE}=37.5\Omega$ , all inputs AC coupled with  $0.1\mu\text{F}$ , all outputs AC coupled with  $220\mu\text{F}$  into  $150\Omega$  loads, referenced to  $400\text{kHz}$ .

| Symbol       | Parameter                                    | Condition                          | Min. | Typ. | Max. | Unit |
|--------------|--|------------------------------------|------|------|------|------|
| $AV_{SD}$    | Channel Gain Error <sup>(3)</sup>            | DC                                 | -0.2 | 0    | 0.2  | dB   |
| $f_{1dBSD}$  | -1dB Bandwidth <sup>(3)</sup>                |                                    | 5.2  | 7.0  |      | MHz  |
| $f_{cSD}$    | -3dB Bandwidth <sup>(3)</sup>                |                                    | 6.5  | 8.0  |      | MHz  |
| $f_{SBSD}$   | Attenuation (Stopband Reject) <sup>(3)</sup> | $f=27\text{MHz}$                   | 45   | 50   |      | dB   |
| DG           | Differential Gain                            |                                    |      | 0.1  |      | %    |
| DP           | Differential Phase                           |                                    |      | 0.8  |      | °    |
| THD          | Total Harmonic Distortion, Output            | $V_{OUT}=1.4V_{PP}$ , 3.58MHz      |      | 0.25 |      | %    |
| $X_{TALKSD}$ | Crosstalk (ch-to-ch)                         | 1MHz                               |      | -78  |      | dB   |
| SNR          | Signal-to-Noise Ratio <sup>(4)</sup>         | NTC-7 Weighting, 100kHz to 4.2MHz  |      | 74   |      | dB   |
| $t_{pdSD}$   | Propagation Delay                            | Delay from Input to Output, 4.5MHz |      | 65   |      | ns   |

### Notes:

- 100% tested at  $25^\circ\text{C}$ .
- SNR=20 • log (714mV / rms noise).

## Enhanced Definition (480p) Electrical Characteristics

Unless otherwise noted,  $T_A=25^\circ\text{C}$ ,  $V_{CC}=5\text{V}$ ,  $R_{SOURCE}=37.5\Omega$ , inputs AC coupled with  $0.1\mu\text{F}$ , all outputs AC coupled with  $220\mu\text{F}$  into  $150\Omega$  loads, referenced to  $400\text{kHz}$ .

| Symbol       | Parameter                                    | Condition                         | Min. | Typ. | Max. | Unit |
|--------------|--|-----------------------------------|------|------|------|------|
| $AV_{ED}$    | Channel Gain Error <sup>(5)</sup>            | DC                                | -0.2 | 0    | 0.2  | dB   |
| $f_{1dBSED}$ | -1dB Bandwidth <sup>(5)</sup>                |                                   | 10   | 14   |      | MHz  |
| $f_{cED}$    | -3dB Bandwidth <sup>(5)</sup>                |                                   | 13   | 16   |      | MHz  |
| $f_{SBED}$   | Attenuation (Stopband Reject) <sup>(5)</sup> | $f=54\text{MHz}$                  | 37   | 50   |      | dB   |
| THD          | Total Harmonic Distortion, Output            | $V_{OUT}=1.4V_{PP}$ , 7MHz        |      | 0.1  |      | %    |
| $X_{TALKED}$ | Crosstalk (ch-to-ch)                         | 1MHz                              |      | -70  |      | dB   |
| SNR          | Signal-to-Noise Ratio <sup>(6)</sup>         | Unweighted; 100kHz to 15MHz       |      | 66   |      | dB   |
| $t_{pdED}$   | Propagation Delay                            | Delay from Input to Output, 10MHz |      | 30   |      | ns   |

### Notes:

- 100% tested at  $25^\circ\text{C}$ .
- SNR=20 • log (714mV / rms noise).

## High-Definition (1080i) Electrical Characteristic

Unless otherwise noted,  $T_A=25^\circ\text{C}$ ,  $V_{CC}=5\text{V}$ ,  $R_{SOURCE}=37.5\Omega$ , inputs AC coupled with  $0.1\mu\text{F}$ , all outputs AC coupled with  $220\mu\text{F}$  into  $150\Omega$  loads, referenced to  $400\text{kHz}$ .

| Symbol       | Parameter                                    | Condition  | Min. | Typ. | Max. | Unit |
|--------------|--|--|------|------|------|------|
| $AV_{HD}$    | Channel Gain Error <sup>(7)</sup>            | DC   | -0.2 | 0    | 0.2  | dB   |
| $f_{1dBHD}$  | -1dB Bandwidth <sup>(7)</sup>                |  | 28   | 30   |      | MHz  |
| $f_{cHD}$    | -3dB Bandwidth <sup>(7)</sup>                |  | 30   | 32   |      | MHz  |
| $f_{SBHD}$   | Attenuation (Stopband Reject) <sup>(7)</sup> | $f=74.25\text{MHz}$                                | 30   | 40   |      | dB   |
| THD          | Total Harmonic Distortion, Output            | $V_{OUT}=1.4V_{PP}$ , 22MHz, 6dB, $150\Omega$ Load |      | 0.5  |      | %    |
| $X_{TALKHD}$ | Crosstalk (ch-to-ch)                         | 1MHz   |      | -72  |      | dB   |
|              |  | 30MHz  |      | -63  |      | dB   |
| SNR          | Signal-to-Noise Ratio <sup>(8)</sup>         | Unweighted, 100kHz to 30MHz                        |      | 66   |      | dB   |
| $t_{pdHD}$   | Propagation Delay                            | Delay from Input to Output, 20MHz                  |      | 17   |      | ns   |

### Notes:

7. 100% tested at  $25^\circ\text{C}$ .
8.  $\text{SNR}=20 \cdot \log(714\text{mV} / \text{rms noise})$ .

## High-Definition (1080p) Electrical Characteristics

Unless otherwise noted,  $T_A=25^\circ\text{C}$ ,  $V_{CC}=5\text{V}$ ,  $R_{SOURCE}=37.5\Omega$ , inputs AC coupled with  $0.1\mu\text{F}$ , all outputs AC coupled with  $220\mu\text{F}$  into  $150\Omega$  loads, referenced to  $400\text{kHz}$ .

| Symbol       | Parameter                                    | Condition  | Min. | Typ. | Max. | Unit |
|--------------|--|--|------|------|------|------|
| $AV_{HD}$    | Channel Gain Error <sup>(9)</sup>            | DC   | -0.2 | 0    | 0.2  | dB   |
| $f_{1dBHD}$  | -1dB Bandwidth <sup>(9)</sup>                |  | 50   | 55   |      | MHz  |
| $f_{cHD}$    | -3dB Bandwidth <sup>(9)</sup>                |  | 60   | 65   |      | MHz  |
| $f_{sbHD}$   | Attenuation (Stopband Reject) <sup>(9)</sup> | $f=148\text{MHz}$                                  | 15   | 23   |      | dB   |
| THD          | Total Harmonic Distortion, Output            | $V_{OUT}=1.4V_{PP}$ , 44MHz, 6dB, $150\Omega$ Load |      | 0.5  |      | %    |
| $X_{TALKHD}$ | Crosstalk (ch-to-ch)                         | 1MHz   |      | -78  |      | dB   |
|              |  | 60MHz  |      | -62  |      | dB   |
| SNR          | Signal-to-Noise Ratio <sup>(10)</sup>        | Unweighted, 100kHz to 60MHz                        |      | 69   |      | dB   |
| $t_{pdHD}$   | Propagation Delay                            | Delay from Input to Output, 20MHz                  |      | 8    |      | ns   |

### Notes:

9. 100% tested at  $25^\circ\text{C}$ .
10.  $\text{SNR}=20 \cdot \log(714\text{mV} / \text{rms noise})$ .

### Typical Performance Characteristics

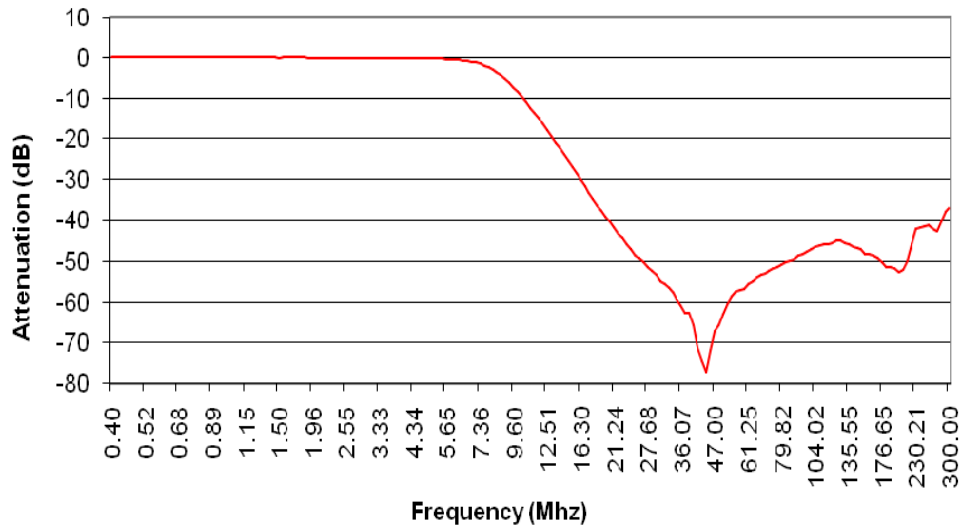


Figure 3. FMS6303 SD Frequency Response

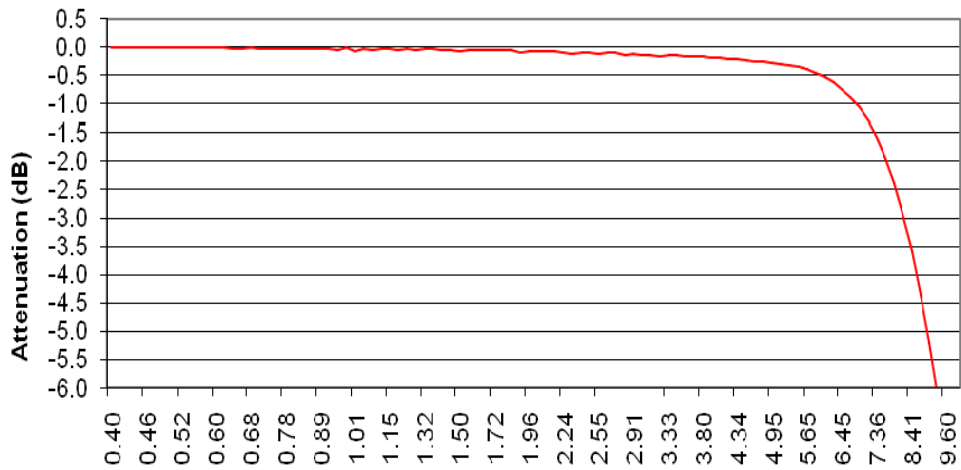


Figure 4. FMS6303 SD Frequency Response (Flatness)

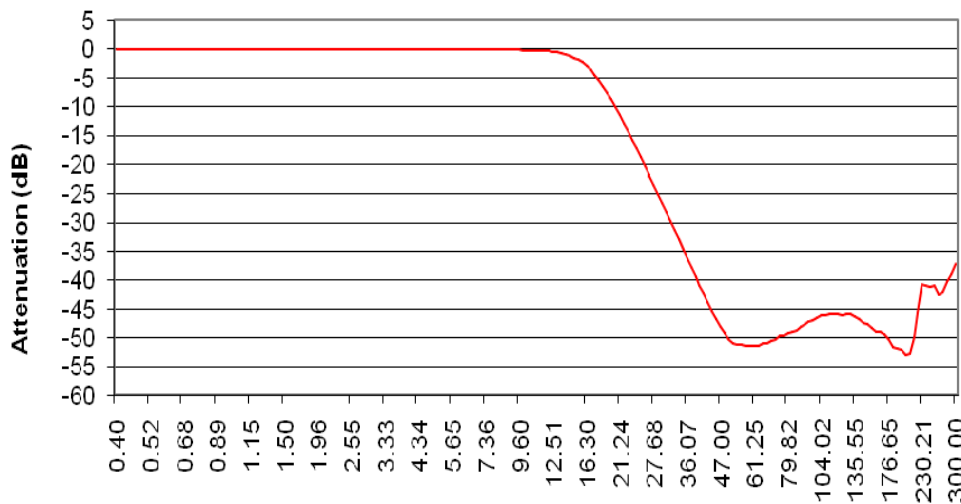


Figure 5. FMS6303 ED Frequency Response

## Typical Performance Characteristics

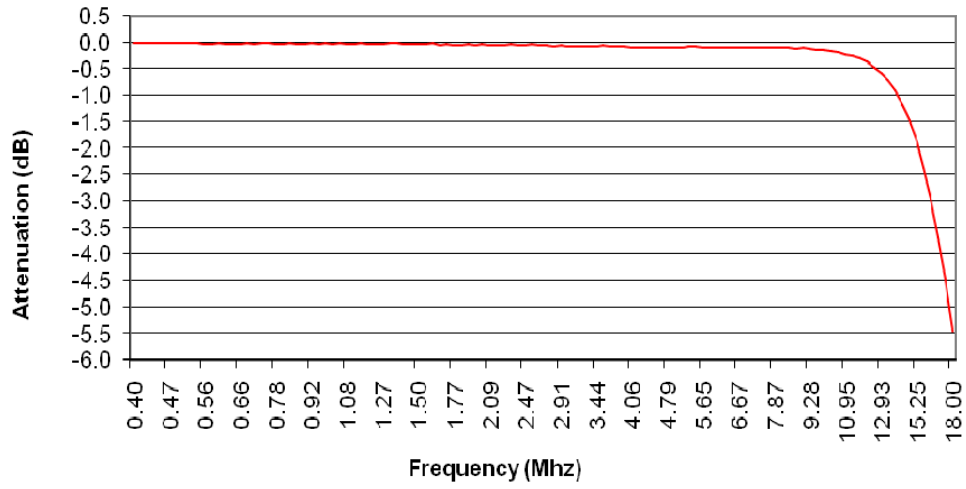


Figure 6. FMS6303 ED Frequency Response (Flatness)

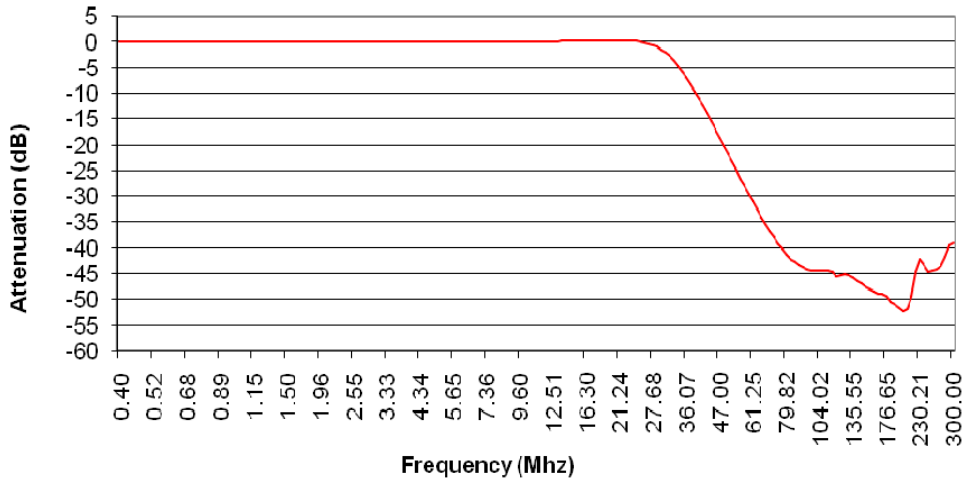


Figure 7. FMS6303 1080i HD Frequency Response

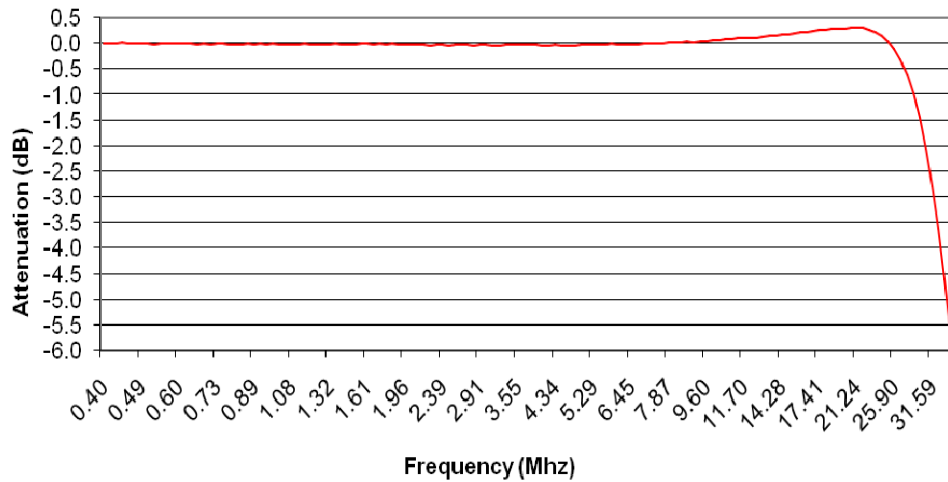


Figure 8. FMS6303 1080i HD Frequency Response (Flatness)

### Typical Performance Characteristics

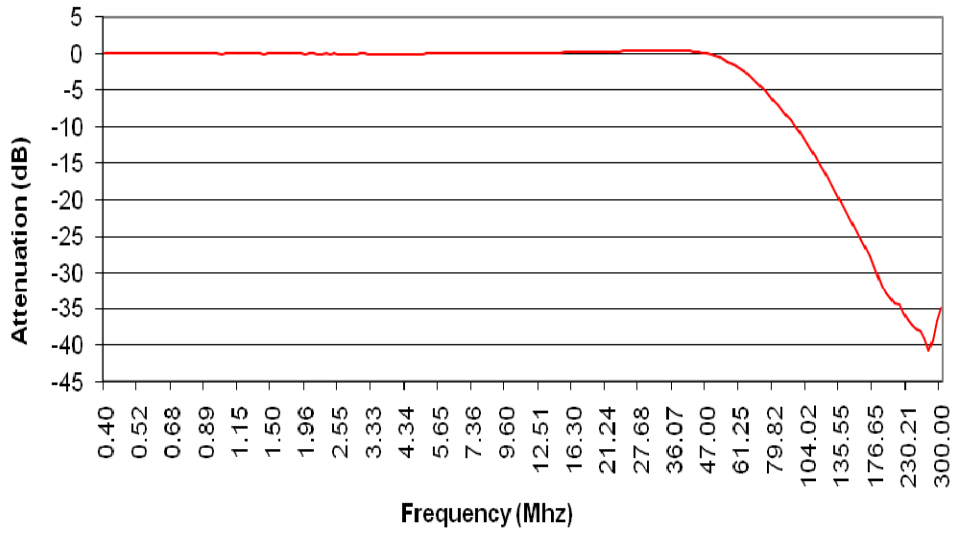


Figure 9. FMS6303 1080p Frequency Response

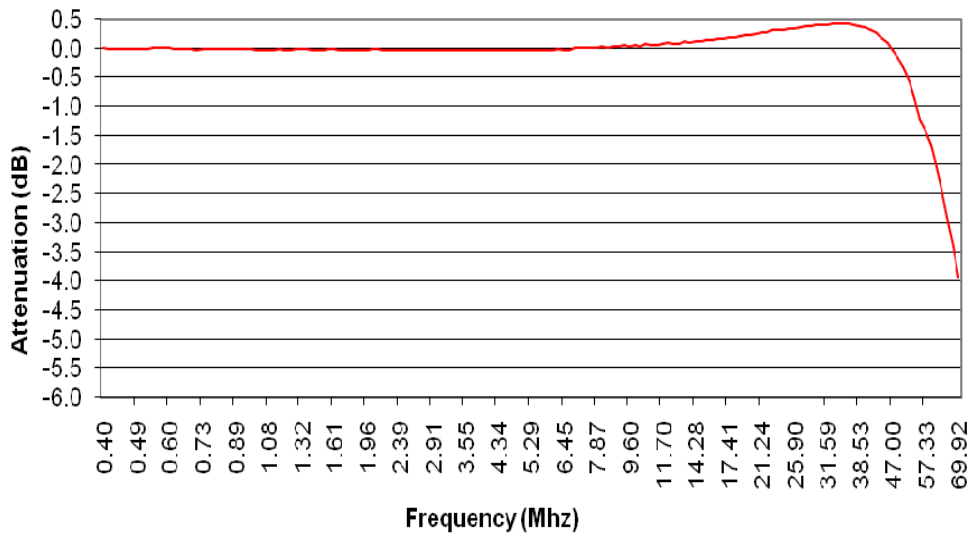


Figure 10. FMS6303 1080p Frequency Response (Flatness)



### Typical Performance Characteristics

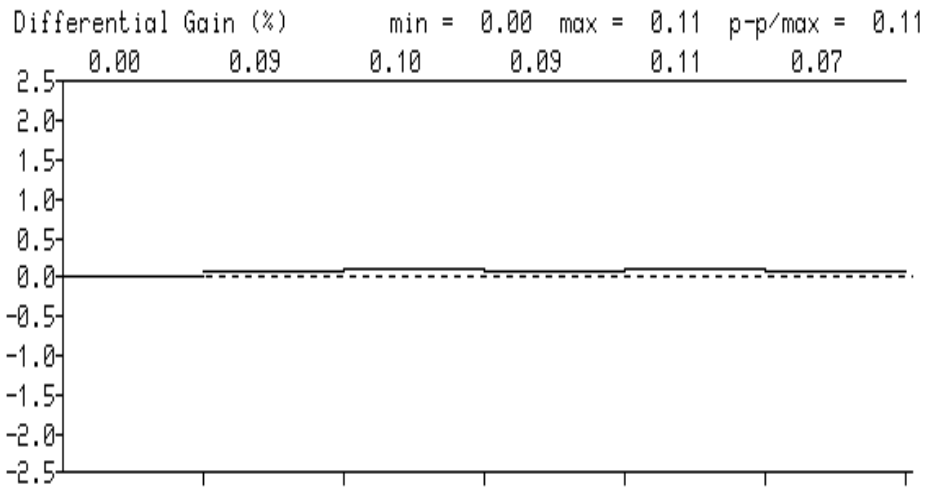


Figure 11. Differential Gain

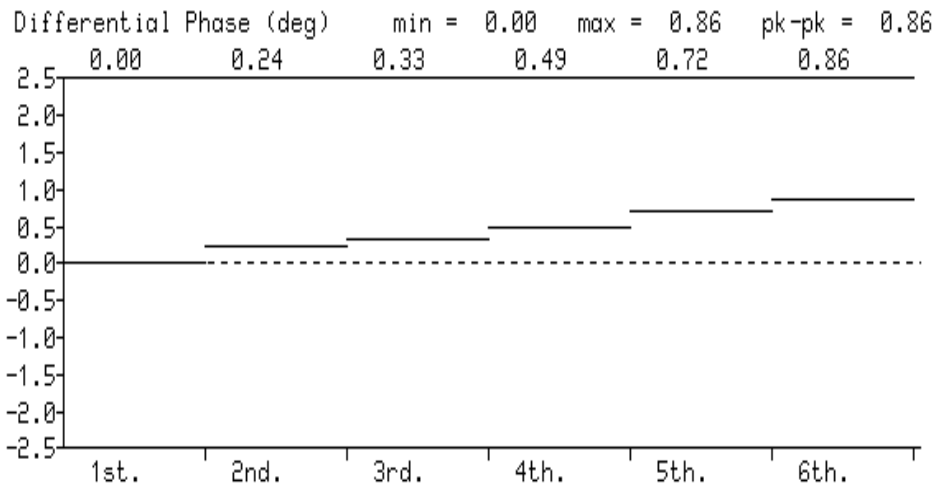


Figure 12. Differential Phase



## Layout Considerations

General layout and supply bypassing play a major role in high-frequency performance and thermal characteristics. Fairchild offers an evaluation board to guide layout and aid device evaluation. The evaluation board is a four-layer board with full power and ground planes. Following this layout configuration provides optimum performance and thermal characteristics for the device. For the best results, follow the steps and recommended routing rules listed below.

### Recommended Routing / Layout Rules

- Do not run analog and digital signals in parallel.
- Use separate analog and digital power planes to supply power.
- Run traces on top of the ground plane at all times.
- Do not run traces over ground/power splits.
- Avoid routing at 90-degree angles.
- Minimize clock and video data trace length differences.
- Include 10 $\mu$ F and 0.1 $\mu$ F ceramic power supply bypass capacitors.
- Place the 0.1 $\mu$ F capacitor within 0.1 inches of the device power pin.
- Place the 10 $\mu$ F 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 by 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.

### Thermal Considerations

Since the interior of most systems, such as set-top boxes, TVs, and DVD players, are at +70°C; 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) and below (bottom plane) each other on the PCB.

### PCB Thermal Layout Considerations

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

- Consider 70 $\mu$ m copper for high-power designs.
- Make the PCB as thin as possible by reducing FR4 thickness.
- Use vias in the power pad to tie adjacent layers together.
- Remember that baseline temperature is a function of board area, not copper thickness.
- Use modeling techniques for first-order approximation.

### Output Considerations

The FMS6303 outputs are DC offset from the input by 150mV; therefore,  $V_{OUT} = 2 \cdot V_{IN} DC + 150mV$ . 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 FMS6303 has a 2x (6dB) gain, the output is typically connected via a 75 $\Omega$ -series back-matching resistor followed by the 75 $\Omega$  video cable. Because of the inherent divide by two of this configuration, 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 close to the device output pin as possible. This greatly reduces the parasitic capacitance and inductance effect on the FMS6303 output driver. Recommended distance from device pin to place series termination resistor is no greater than 0.1 inches.

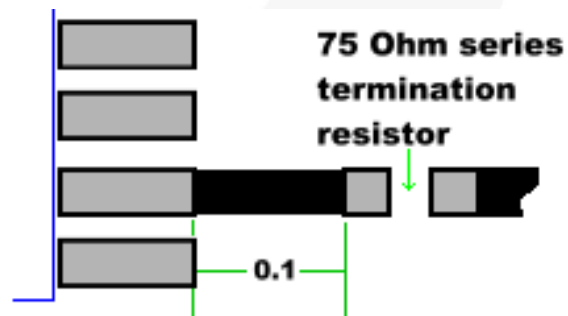
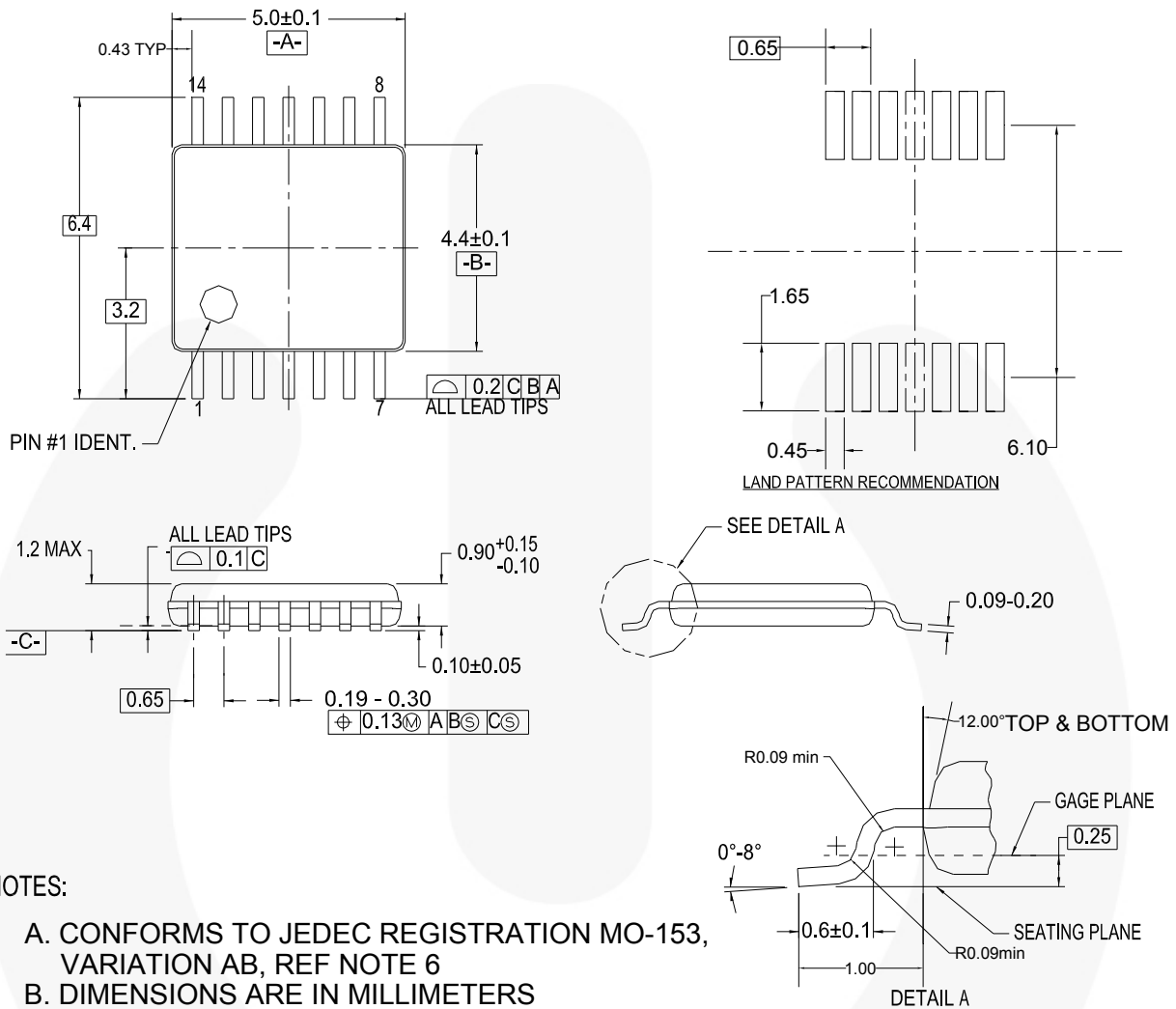


Figure 13. Distance from Device Pin to Series Termination Resistor

## Physical Dimensions



### NOTES:

- A. CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB, REF NOTE 6
- B. DIMENSIONS ARE IN MILLIMETERS
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS
- D. DIMENSIONING AND TOLERANCES PER ANSI Y14.5M, 1982
- E. LANDPATTERN STANDARD: SOP65P640X110-14M
- F. DRAWING FILE NAME: MTC14REV6

**Figure 14. 14-Lead Thin Shrink Small Outline Package (TSSOP)**

Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.

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| AX-CAP™*   | Global Power Resource™                         | Programmable Active Droop™   | TinyBoost™   |
| BitSiC™  | GreenBridge™                                   | QFET®  | TinyBuck™  |
| Build it Now™  | Green FPS™                                     | QS™  | TinyCalc™  |
| CorePLUS™  | Green FPS™ e-Series™                           | Quiet Series™  | TinyLogic®   |
| CorePOWER™   | Gmax™  | RapidConfigure™  | TINYOPTO™  |
| CROSSVOLT™   | GTO™   |  ™                | TinyPower™   |
| CTL™   | IntelliMAX™                                    | Saving our world, 1mW/W/kW at a time™  | TinyPWM™   |
| Current Transfer Logic™  | ISOPLANAR™                                     | SignalWise™  | TinyWire™  |
| DEUXPEED®  | Making Small Speakers Sound Louder and Better™ | SmartMax™  | TranSiC™   |
| Dual Cool™   | MegaBuck™                                      | SMART START™   | TriFault Detect™   |
| EcoSPARK®  | MICROCOUPLER™                                  | Solutions for Your Success™  | TRUECURRENT®*  |
| EfficientMax™  | MicroFET™                                      | SPM®   | µSerDes™   |
| ESBC™  | MicroPak™                                      | STEALTH™   |  SerDes |
|  Fairchild® | MicroPak2™                                     | SuperFET®  | UHC®   |
| Fairchild Semiconductor®   | MillerDrive™                                   | SuperSOT™-3  | Ultra FRFET™   |
| FACT Quiet Series™   | MotionMax™                                     | SuperSOT™-6  | UniFET™  |
| FACT®  | Motion-SPM™                                    | SuperSOT™-8  | VCX™   |
| FAST®  | mWSaver™                                       | SupreMOS®  | VisualMax™   |
| FastvCore™   | OptoHiT™                                       | SyncFET™   | VoltagePlus™   |
| FETBench™  | OPTOLOGIC®                                     | Sync-Lock™   | XS™  |
| FlashWriter®*  | OPTOPLANAR®                                    |  SYSTEM GENERAL®* |  |
| FPS™   |  |  |  |

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As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

**ANTI-COUNTERFEITING POLICY**

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, [www.fairchildsemi.com](http://www.fairchildsemi.com), under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

**PRODUCT STATUS DEFINITIONS**

**Definition of Terms**

| Datasheet Identification | Product Status        | Definition  |
|--------------------------|-----------------------|---|
| Advance Information      | Formative / In Design | Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.   |
| Preliminary              | First Production      | Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design. |
| No Identification Needed | Full Production       | Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.   |
| Obsolete                 | Not In Production     | Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.  |

Rev. I61