

## HD/FHD Selectable Video Filter Driver And Video Coaxial

### Control Decoder

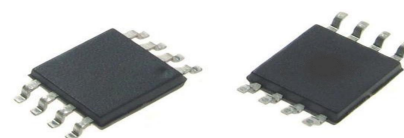
#### PRODUCT DESCRIPTION

The MS7336M integrated a bandwidth selectable video amplifier and video coaxial control decoder. The video amplifier integrates Single rail-to-rail output driver with 6dB Gain and 10th output reconstruction filter, which also can select 35MHz/55MHz -3dB bandwidth. The video coaxial control decoder integrated a high-speed processor, effective separation for mixed-signal. MS7336M provides improved image quality compared with passive LC filters and discrete drivers solution. Operating from single supplies ranging from +2.7V to +5V and sinking an ultra-low 34mA quiescent current, the MS7336M is ideally suited for battery powered applications.

The MS7336M has lead MSOP-8 package, and ESD (HBM) reaches over 3KV.

#### FEATURES

- 35MHz/55MHz -3dB selectable 10th order filter
- Transparent input clamping
- 6dB output driver Gain and drive dual video load
- Rail-to-Rail Output
- Input Voltage Range Includes Ground
- AC or DC Coupled Inputs
- AC or DC Coupled Outputs
- Operates from 2.7V to 5V Single power supply
- Low Power 34mA Supply Current
- Lead MSOP-8 package



**MSOP-8**

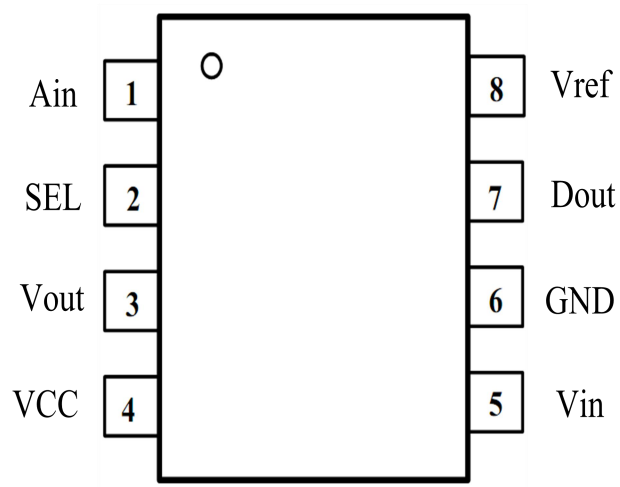
#### APPLICATIONS

- Video On Demand (VOD)
- Communications device
- Portable and handheld product
- AHD/TVI/CVI video driver and reverse control decoder

#### PACKAGE/ORDERING INFORMATION

Part Number	Package	Marking
MS7336M	MSOP8	MS7336M

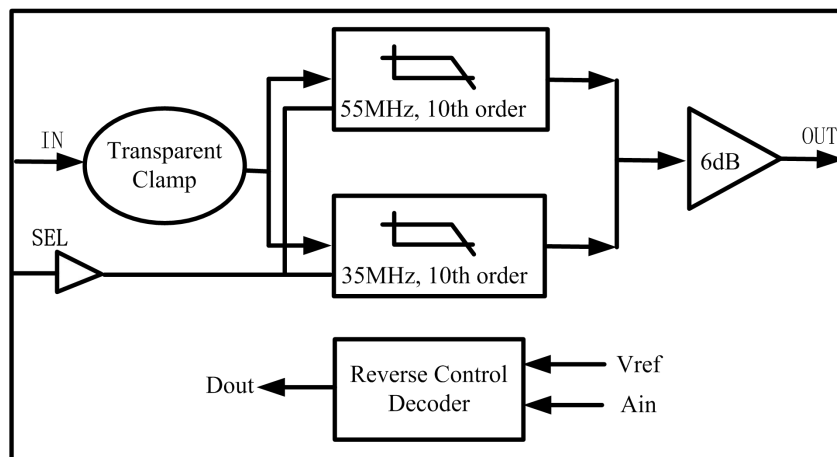
## PIN CONFIGURATION



## PIN DESCRIPTION

Pin	Name	Type	Description
1	Ain	I	Comparator Input
2	SEL	I	SEL is low: FHD(55MHz) SEL is high: HD(35MHz) SEL is float: HD(35MHz)
3	Vout	O	Video Output
4	VCC	-	Power Supply
5	Vin	I	Video Input
6	GND	-	Ground
7	Dout	O	Reverse Control Output
8	Vref	I	Internal Reference

## BLOCK DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

Any exceeding absolute maximum rating application causes permanent damage to device. Because long-time absolute operation state affects device reliability. Absolute ratings just conclude from a series of extreme tests. It doesn't represent chip can operate normally in these extreme conditions.

Parameter	Symbol	Range	Unit
Supply Voltage, V+ to V-	VCC	6	V
Input Voltage	Vin	GND-0.3 ~ (+VS)+0.3V	V
Storage Temperature Range	T <sub>stg</sub>	-65 ~ 150	V
Junction Temperature		160	V
Operating Temperature Range	TA	-40 ~ +125	V
Power Dissipation, PD @ TA= 25°C		0.8	°C
Package Thermal Resistance, θJA		128	°C
Lead Temperature Range (Soldering 10 sec)		260	°C
ESD Susceptibility HBM MM		>3000V >300V	V

### Electrical Characteristics(3.3V)

(VCC=3.3V, TA = 25°C, unless otherwise noted.)

#### Operational amplifier channel:

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Voltage Gain	Av	Vpp=1V, RL=150Ω		6		dB
-1dB	HD	RL=150Ω		27		MHz
Bandwidth	FHD			25		
-3dB	HD	RL=150Ω		35		MHz
Bandwidth	FHD			55		
Stop-Band	HD	f=50MHz, RL=150Ω		40		dB
Rejection	FHD	f=100MHz, RL=150Ω		30		
Slew Rate	HD	Vin=1V step, 20%-80%, f=100k, RL=150Ω		60		V/us
	FHD			80		
Group Delay	HD	F=400kHz		23.5		ns
	FHD			14.4		
Rise Time	HD	Vout=2Vp-p, 80%-20%		10		ns
	FHD			9.2		
Fall Time	HD			9.2		ns
	FHD			6.5		
Output Voltage Swing		Vin=3V, RL=150Ω		3.14		V
Output Short-Circuit Current	Isc	Vin=0.1V, 10Ω to VDD		156		mA
Output Level Shift Voltage		Vin=0V, no load		235		mV

**video coaxial control decoding channel:**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Transmission Delay		F=100k,Vpp=1V,REF=1V,rising edge		19		ns
		F=100k,Vpp=1V,REF=1V,trailing edge		17.3		
		F=400k,Vpp=1V,REF=1V,rising edge		18.5		
		F=400k,Vpp=1V,REF=1V,trailing edge		17.7		
		F=1M,Vpp=1V,REF=1V,rising edge		19		
		F=1M,Vpp=1V,REF=1V,trailing edge		17.3		
Dout Output High	V <sub>OH</sub>	R <sub>L</sub> =1K		3.087		V
Dout Output Low	V <sub>OL</sub>	R <sub>L</sub> =1K		5.4		mV
Dout Sensitivity		REF=0.5V, V <sub>DOUT</sub> from 0 to 1		0.8		V
		REF=0.5V, V <sub>DOUT</sub> from 1 to 0		0		
		REF=1.5V, V <sub>DOUT</sub> from 0 to 1		1.52		
		REF=1.5V, V <sub>DOUT</sub> from 1 to 0		1.14		
Bandwidth		No load, Vpp=1V, REF=1V duty cycle<55%		5.4		MHz

**Supply Voltage:**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Voltage operating range		Vin=1M, Vpp=0.5V, R <sub>L</sub> =150Ω	2.5		5.5	V
Power Supply Rejection Ration	PSRR	Vs=+2.7V to 5.5V	52	60	63	dB
Supply current	I <sub>SY</sub>	No input, No load	15	15.6	16	mA

**Electrical Characteristics(5V)**
**Operational amplifier channel:**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Voltage Gain	$A_v$	$V_{pp}=1V, R_L=150\Omega$		6		dB
-1dB Bandwidth	HD	$R_L=150\Omega$		27		MHz
	FHD			25		
-3dB Bandwidth	HD	$R_L=150\Omega$		35		MHz
	FHD			55		
Stop-Band Rejection	HD	$f=50MHz, R_L=150\Omega$		32		dB
	FHD	$f=100MHz, R_L=150\Omega$		30		
Slew Rate	HD	$V_{in}=1V$ step , 20%-80%, $f=100k, R_L=150\Omega$		65		V/us
	FHD			80		
Group Delay	HD	$F=400kHz$		23.5		ns
	FHD			14.4		
Rise Time	HD	$V_{out}=2V_{p-p}, 80\%-20\%$		10.7		ns
	FHD			8.5		
Fall Time	HD			9		ns
	FHD			6		
Output Voltage Swing		$V_{in}=3V, R_L=150\Omega$		4.74		V
Output Short-Circuit Current	$I_{sc}$	$V_{in}=0.1V, 10\Omega$ to VDD		234		mA
Output Level Shift Voltage		$V_{in}=0V, no\ load$		255		mV

**video coaxial control decoding channel:**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Transmission Delay		F=100k,Vpp=1V,REF=1V,rising edge		16		ns
		F=100k,Vpp=1V,REF=1V,trailing edge		17.6		
		F=400k,Vpp=1V,REF=1V,rising edge		16		
		F=400k,Vpp=1V,REF=1V,trailing edge		17.7		
		F=1M,Vpp=1V,REF=1V,rising edge		16		
		F=1M,Vpp=1V,REF=1V,trailing edge		17.6		
Dout Output High	V <sub>OH</sub>	R <sub>L</sub> =1K		4.74		V
Dout Output Low	V <sub>OL</sub>	R <sub>L</sub> =1K		7.8		mV
Dout Sensitivity		REF=0.5V, V <sub>DOUT</sub> from 0 to 1		0.84		V
		REF=0.5V, V <sub>DOUT</sub> from 1 to 0		0.47		
		REF=1.5V, V <sub>DOUT</sub> from 0 to 1		1.52		
		REF=1.5V, V <sub>DOUT</sub> from 1 to 0		1.12		
Bandwidth		No load, Vpp=1V, REF=1V duty cycle<55%		4.8		MHz

**Supply Voltage:**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Voltage operating range		Vin=1M, Vpp=0.5V, R <sub>L</sub> =150Ω	2.5		5.5	V
Power Supply Rejection Ration	PSRR	Vs=+2.7V to 5.5V	52	60	63	dB
Supply current	I <sub>SY</sub>	Vin=1M, Vpp=1V, REF=1V, R <sub>L</sub> =150Ω		34		mA

## APPLICATIONS INFORMATION

### Functional Description

MS7336M operates from a single +2.7V to +5V supply. In application, MS7336M is a fully integrated solution for filtering and buffering HDTV signals in front of video decoder or behind video encoder, and reverse control decoder. MS7336M's solution can help you save PCB size and production cost, it also improves video signal performance comparing with traditional design using discrete components. MS7336M features a DC-coupled input buffer, 10th low-pass filter to eliminate out-of-band noise of video encoder, and a gain of +6dB in the output amplifier to drive 75Ω load. The AC or DC-coupled input buffer eliminates sync crush, droop, and field tilt. The output of MS7336M also can be DC-coupled or AC-coupled.

### Power-Supply Bypassing and Layout

Correct power supply bypassing is very important for optimizing video performance in design. both 0.1μF ceramic and 10μF electrolytic capacitors are always used to Bypass VCC pin of MS7336M, please place these two capacitors as close to the MS7336M output pin as possible, a large ground plane is also needed to ensure optimum performance. The input and output termination resistors should be placed as close to the related pin of MS7336M as possible to avoid performance degradation. The PCB traces at the output side should have 75Ω characteristic impedance in order to match the 75Ω characteristic impedance cable connecting external load. In design, please keep the board trace at the inputs and outputs of the MS7336M as short as possible to minimize the parasitic stray capacitance and noise pickup.

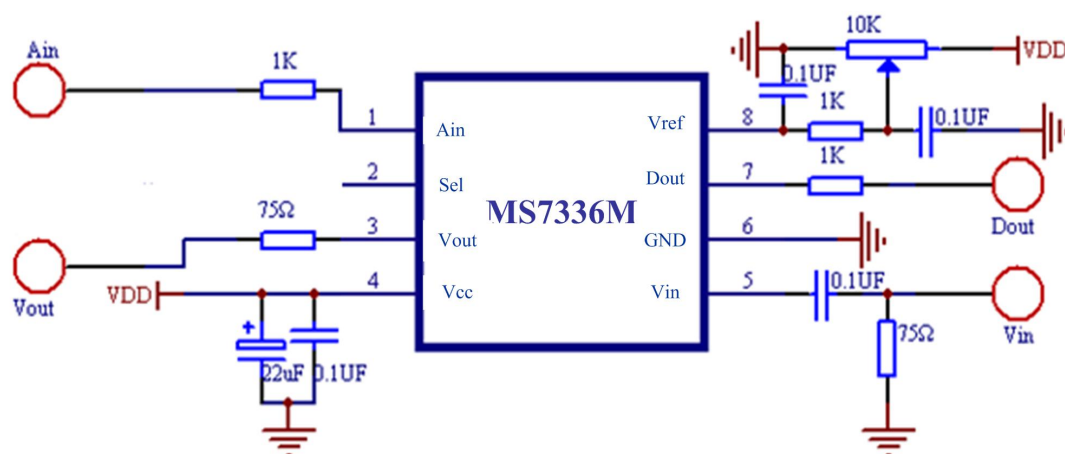
0.1uF capacitor is used to stabilize Vref pin of MS7336M.

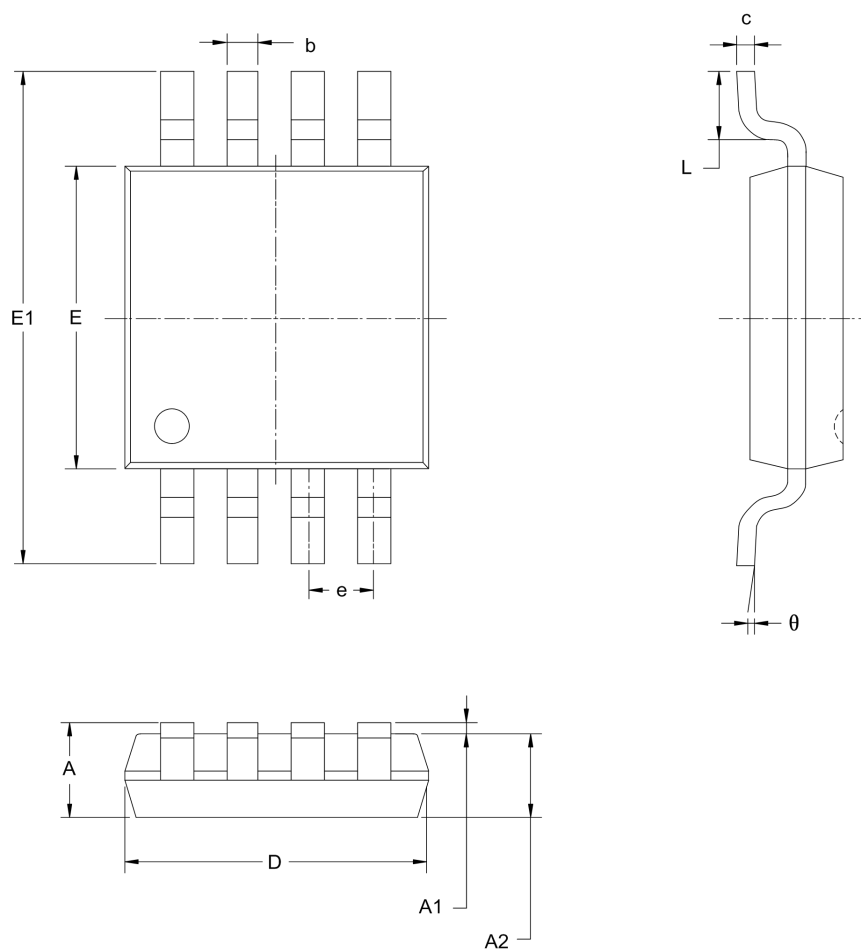
### Different Bandwidth To Choose

The SEL pin of MS7336M can select 35MHz/55MHz -3dB bandwidth. SEL is high select 35MHz, 55MHz select is low.



TYPICAL APPLICATION DIAGRAM

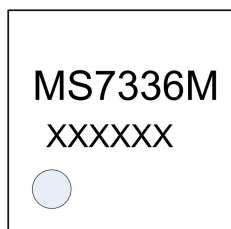


**PACKAGE OUTLINE DIMENSIONS**
**MSOP8:**


Symbol	Dimensions In Millimeters		Dimensions in Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650BSC		0.026BSC	
L	0.400	0.800	0.016	0.031
$\theta$	0°	6°	0°	6°

**MARKING and PACKAGING SPECIFICATIONS**

## 1、Marking drawing description



MS7336M: product name

XXXXXX: Product code

## 2、Marking drawing pattern

Laser printing, contents in the middle, font type Arial.

## 3、Packaging Specifications

Device	Package	piece/reel	reel/box	piece /box	box/carton	piece/carton
MS7336M	MSOP8	3000	1	3000	8	24000

**REVISION HISTORY**

Revision	Revision Date	Description	Page
V1.6	2021/7/6	Add Add TYPICAL APPLICATION DIAGRAM	9

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**MOS CIRCUIT OPERATION PRECAUTIONS**

Static electricity can be generated in many places. The following precautions can be taken to effectively prevent the damage of MOS circuit caused by electrostatic discharge:

1. The operator shall ground through the anti-static wristband.
2. The equipment shell must be grounded.
3. The tools used in the assembly process must be grounded.
4. Must use conductor packaging or anti-static materials packaging or transportation.



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