SONY

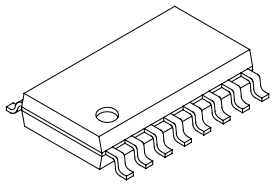
CXA3219M

UHF-Band RF Modulator for VCR

Description

The CXA3219M is a UHF-band RF modulator which converts the frequency of audio and video signals. Some circuits which comprise this IC are a UHF oscillator video clamp, white clip, video modulator, audio FM modulator and an intercarrier SW.

16 pin SOP (Plastic)



Features

- Low voltage of 5V
- Wide bandwidth 470 to 750MHz
- UHF oscillator greatly reduces external parts
- Sharp white clip circuit
- Built-in voltage regulator can accept large fluctuation of supply voltage
- Video input of 0.5Vp-p for general-purpose use
- Mixer simplifies RF unit design
- Picture/sound ratio is adjustable with external parts
- Intercarrier switch

Structure

Bipolar silicon monolithic IC

Applications

PAL system VCR

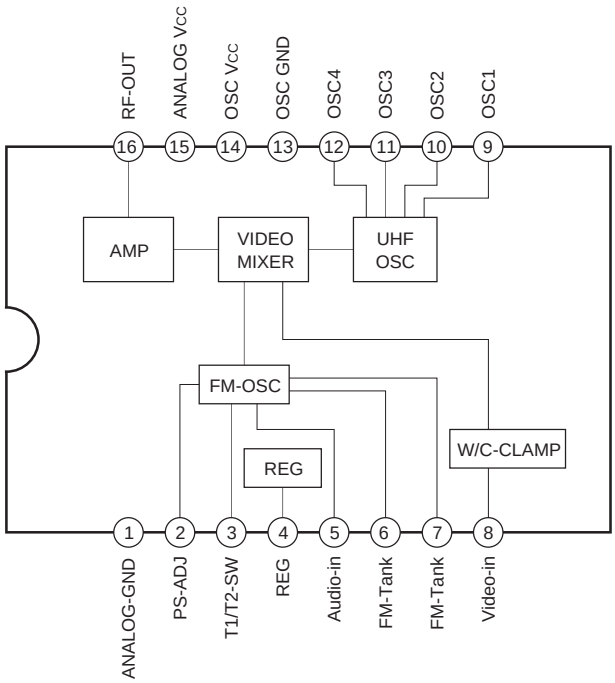
Absolute Maximum Ratings

• Supply voltage	V_{CC}	7	V
• Operating temperature	Topr	–20 to +75	°C
• Storage temperature	Tstg	–55 to +150	°C
• Allowable power dissipation	P_D	350	mW

Recommended Supply Voltage Range

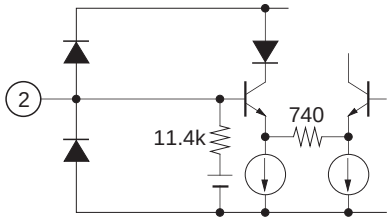
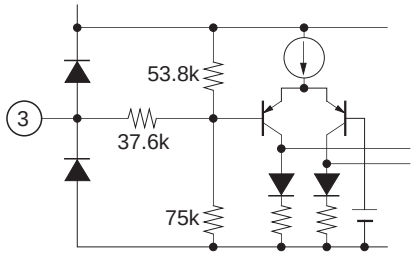
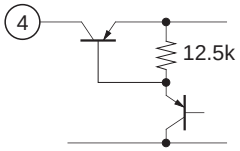
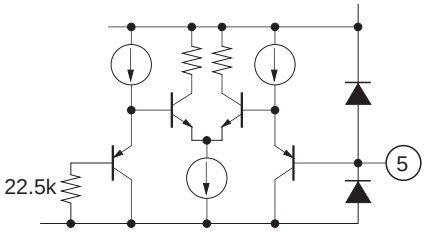
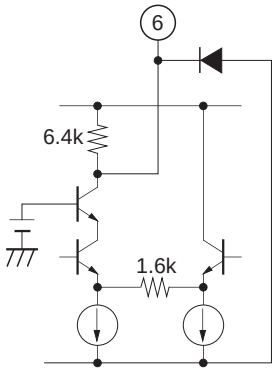
Supply voltage	V_{CC}	5.0 ± 0.5	V

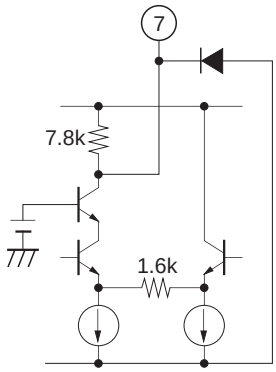
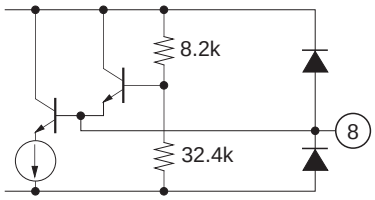
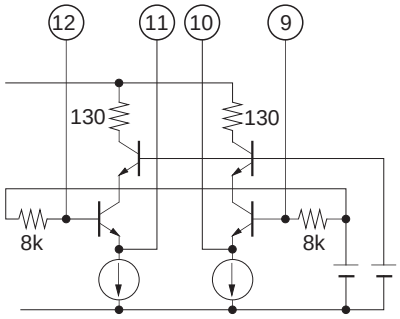
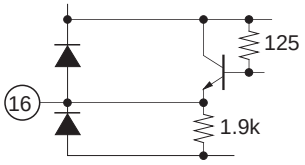
Block Diagram and Pin Configuration



E97X19-PS

Pin Description and Equivalent Circuit

Pin No.	Symbol	Typical pin voltage [V]	Equivalent circuit	Description
1	GND1			GND for RF/audio.
2	P/S ADJ	1.8		P/S adjustment (Adding a capacitor between Pin 2 and GND increases P/S ratio.) Video modulation depth adjustment (Adding a resistor between Pin 2 and GND increases the modulation depth; adding a resistor between Pins 2 and 4 decreases the modulation depth.)
3	T1/T2 SW	2.4		T1/T2 SW. T1 for GND. T2 for OPEN.
4	REG OUT	4.1		Regulator output.
5	AUDIO IN	0		Audio input.
6	TANK1	3.1		5.5MHz audio tank coil connection.

Pin No.	Symbol	Typical pin voltage [V]	Equivalent circuit	Description
7	TANK2	2.9		6.0MHz audio tank coil connection.
8	VIDEO IN	2.6		Video input.
9 10 11 12	OSC1 OSC2 OSC3 OSC4	2.5 1.7 1.7 2.5		Oscillator pin.
13	GND2			GND for oscillator.
14	$V_{CC}1$			Power supply for oscillator.
15	$V_{CC}2$			Power supply for RF/audio.
16	RF OUT	4.1		RF output.

Electrical Characteristics 1

Refer to Electrical Characteristics Test Circuit. (Ta = 25°C, V_{CC} = 5V, fP = 591.25MHz)

Item	Symbol	Conditions		Min.	Typ.	Max.	Unit
Supply current	I_{CC}	V_1 (VIDEO IN) and V_2 (AUDIO IN) at no signal		22	28	35	mA
Video output level	Vo	*1		78.7	81.2	83.7	dBµV
Video modulation depth	mp	V_1 = 0.5Vp-p, FLAT FIELD signal input		72	78.5	86	%
Max. video modulation depth (During limiter operation)	mp (Max.)	V_1 = 1.0Vp-p, FLAT FIELD signal input		92	95.5	99	%
Chroma beat	Vcb	V_1 = 4.43MHz, 0.5Vp-p sine wave input*5		68	78	–	dB
Sync crush level	ΔSync	V_1 = 0.5Vp-p, FLAT FIELD signal input ΔSync = (1 – S/W • 10/4) × 100		–	2	5	%
Differential gain	DG	STAIR STEP signal input V_1 = 0.5Vp-p*2		0	1.6	5	%
Differential phase	DP	STAIR STEP signal input V_1 = 0.5Vp-p*2		–5	0	5	deg
Video 2nd-harmonic wave ratio	V_{VH}	V_1 = 0.5Vp-p, 1MHz sine wave input*3		48	52.5	–	dB
PS ratio	Vps	V_1 = no input, fs = 5.5MHz		11.5	14	16.5	dB
Audio FM modulation sensitivity	βS1 (T1)	V_2 = 100mVp-p, 1kHz sine wave input fs frequency change/0.1V*6	fs = 5.5MHz	0.400	0.420	0.455	kHz/mV
	βS2 (T2)		fs = 6.0MHz	0.380	0.400	0.440	
Audio distortion	THD	V_2 = 1kHz sine wave input*4		0	0.4	1	%
Audio S/N ratio	ASN	V_2 = 1kHz sine wave input 0dB at fs = 5.5MHz with 60kHz deviation V_1 = STAIR STEP signal input (rms measurement)		45	54	–	dB
Max. audio FM modulation depth	ms (Max.)	V_2 = 1Vp-p, 1kHz sine wave input (T1) fs frequency change (kHz)/100kHz × 100		380	415	–	%
Audio 2nd-harmonic wave ratio	V_{S2}	Difference between video carrier (V_1 = no input) and 2nd-harmonic wave, at PS ratio of 14dB conversion		52	57	–	dB

Electrical Characteristics 2

1. Video S/N	50dB (min.), 58dB (typ.)
2. Video amplitude frequency characteristics (at 1MHz reference)	Within ±1dB at 0.5 to 5MHz
3. APL variation (Normalized to APL 50%)	Within ±2% at 10 to 90%
4. Pin 5 input impedance	1MΩ and above
5. Pin 8 input impedance	1MΩ and above

*1 Spectrum analyzer with 50Ω input impedance should be used to test video output level. Measured value Vo (dBm) is used to calculate output according to the following relationship:
Output (dBμ) = Vo (dBm) + 107 50Ω terminal direct reading value

*2 Measured after demodulating by standard demodulator.

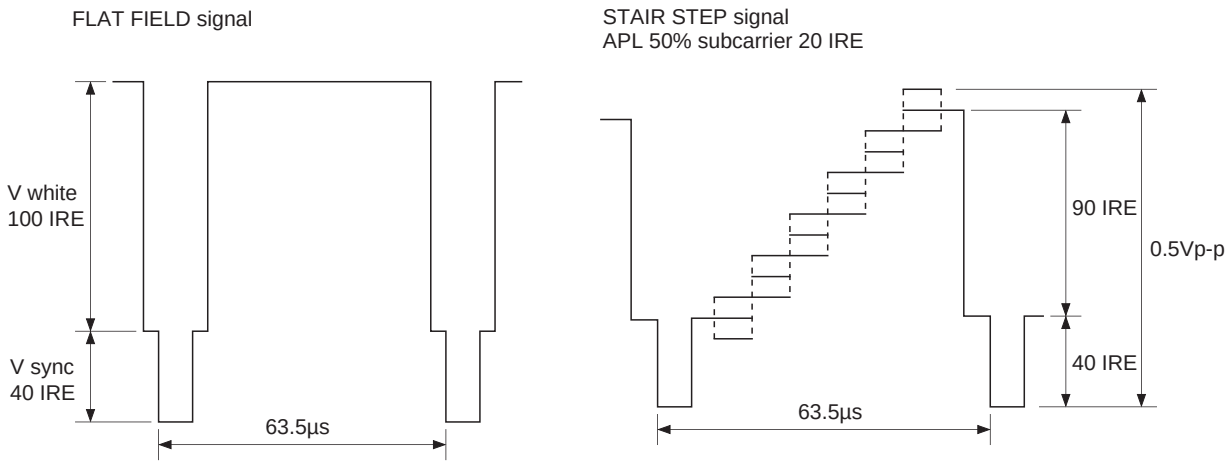
*3 fc + 2MHz component of V_1 carrier (fc) level.

*4 Adjust the V_2 level to obtain an FM deviation of ±30kHz and measure the harmonic distortion after demodulating Vo with a standard demodulator.

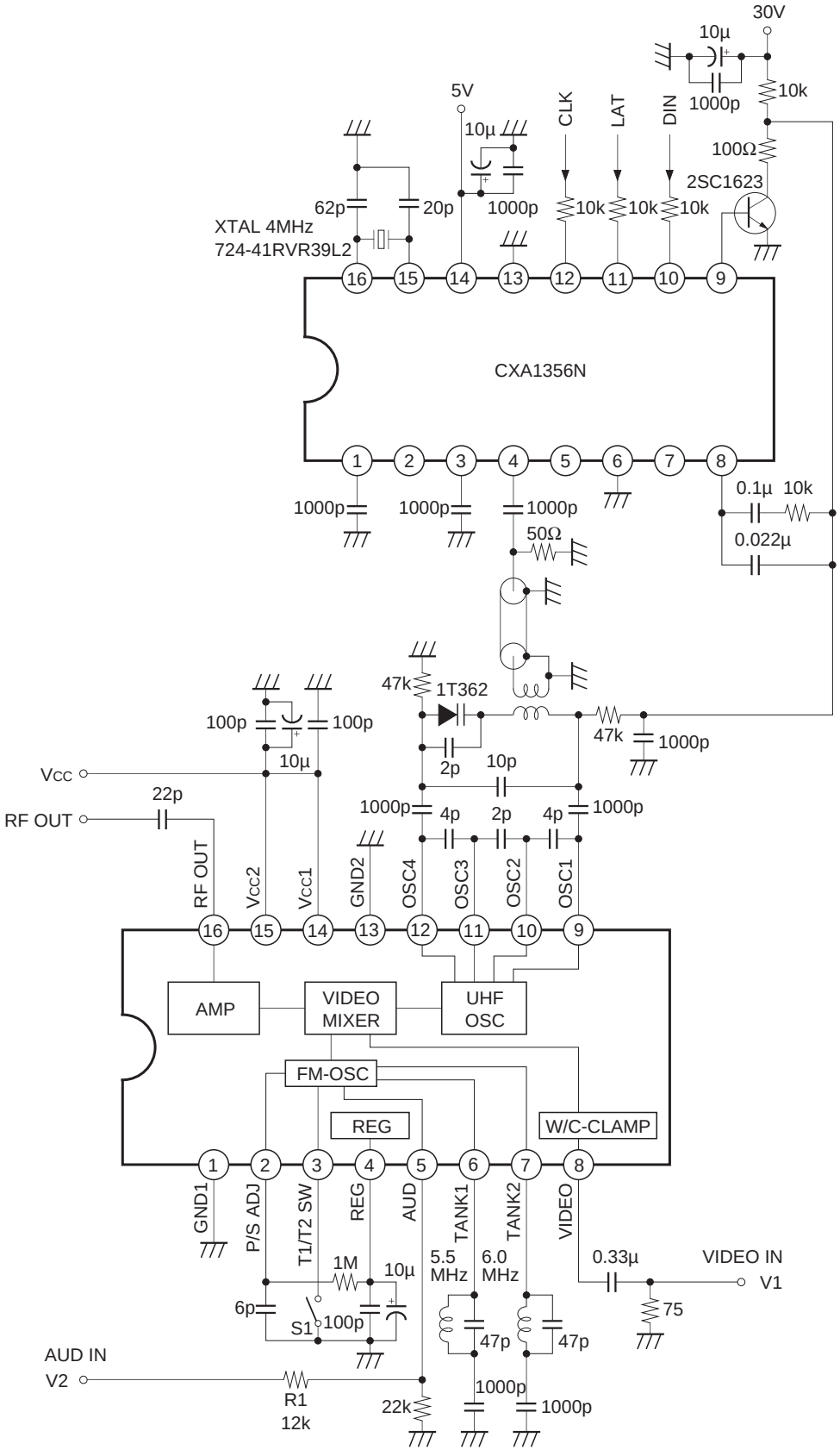
*5 Video determined by measuring ratio (dB) of chroma beat to video carrier level when V_1 = no signal by spectrum analyzer.

*6 R1 (12kΩ) of the Electrical Characteristics Test Circuit is added for obtaining a better match between the audio modulation sensitivity classifications and the actual pre-emphasis.

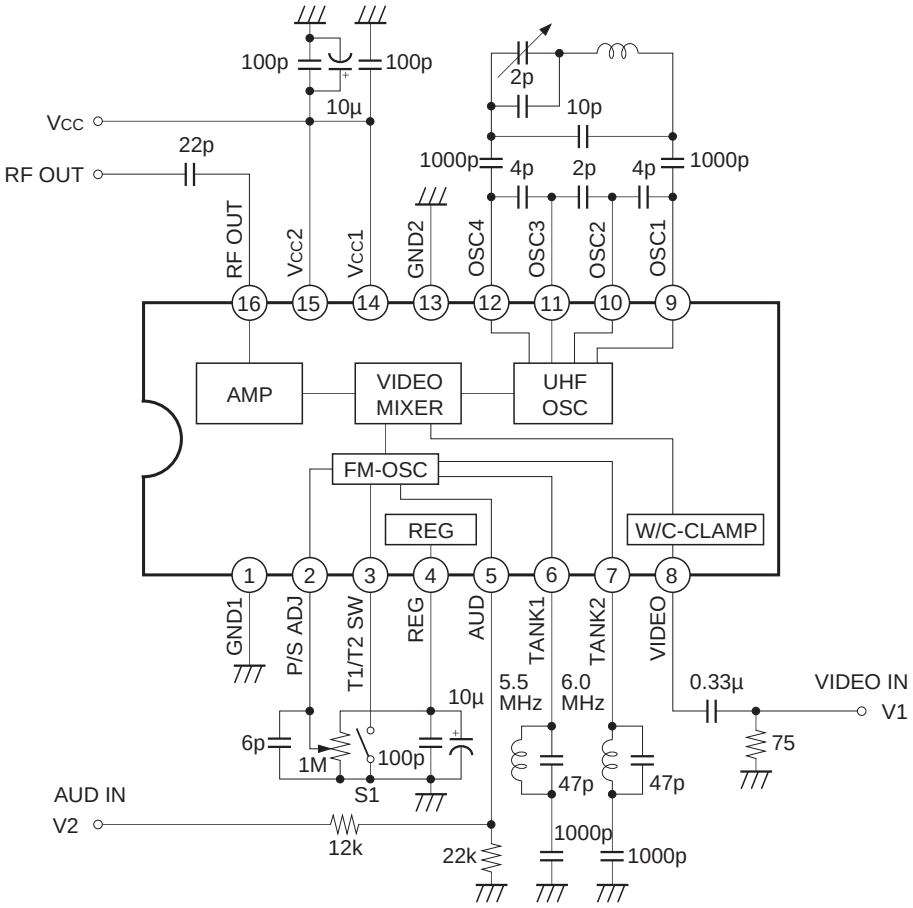
Input Waveform



Electrical Characteristics Test Circuit

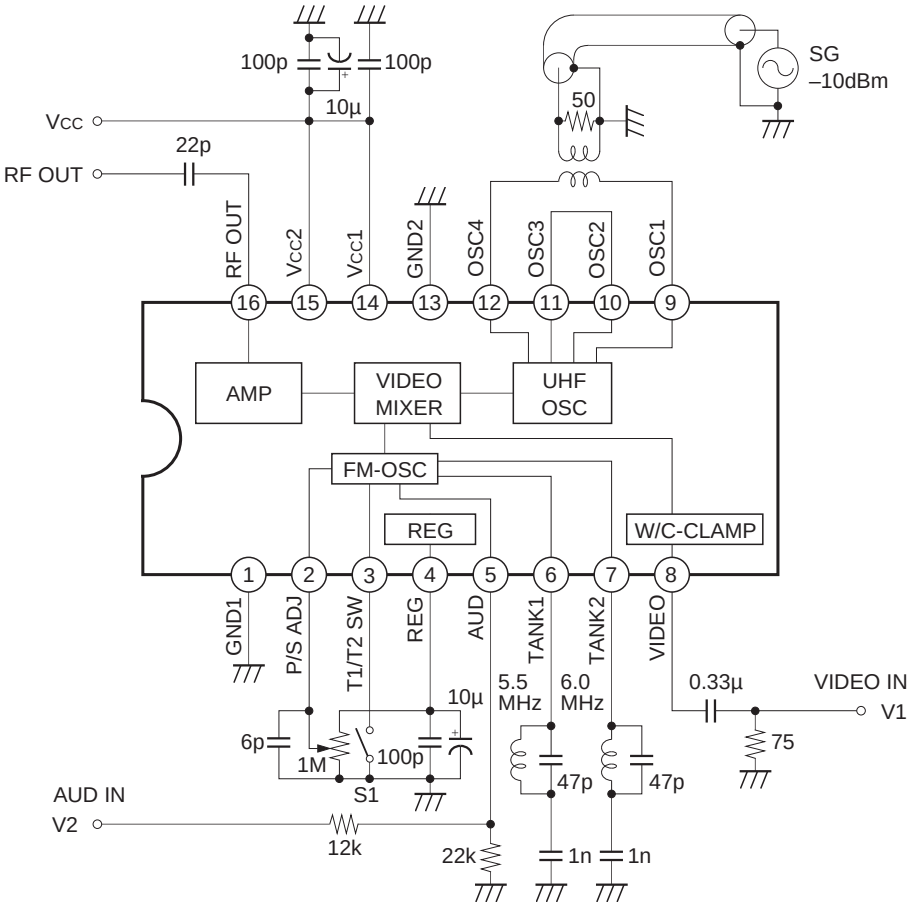


Application Circuit 1



Application circuits shown are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits or for any infringement of third party patent and other right due to same.

Application Circuit 2



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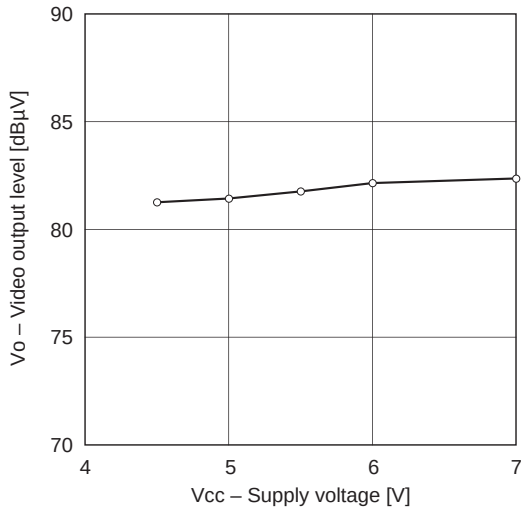
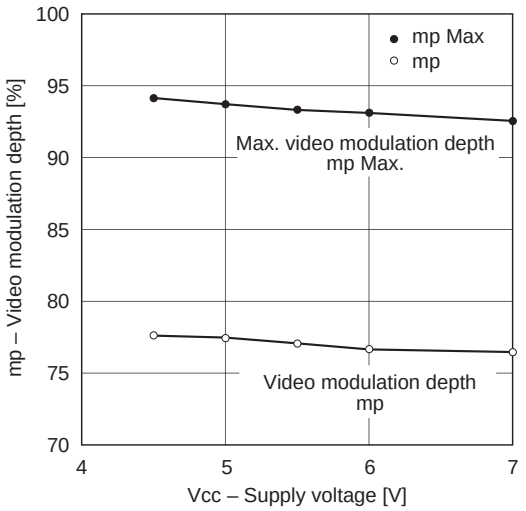
Example of Representative Characteristics

Supply voltage vs. Video output level

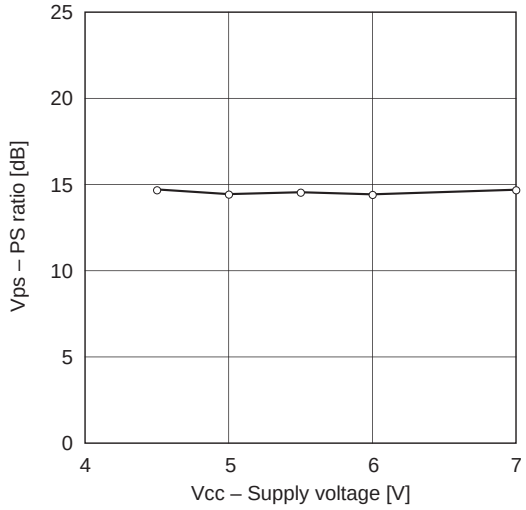


Supply voltage vs. Video modulation depth

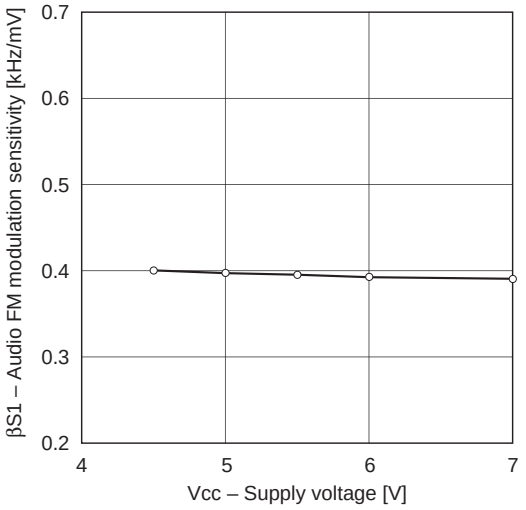
(fp = 591.25MHz, Ta = 25°C)



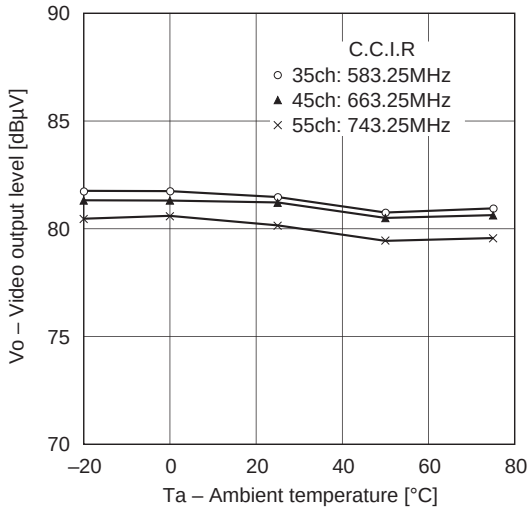
Supply voltage vs. PS ratio



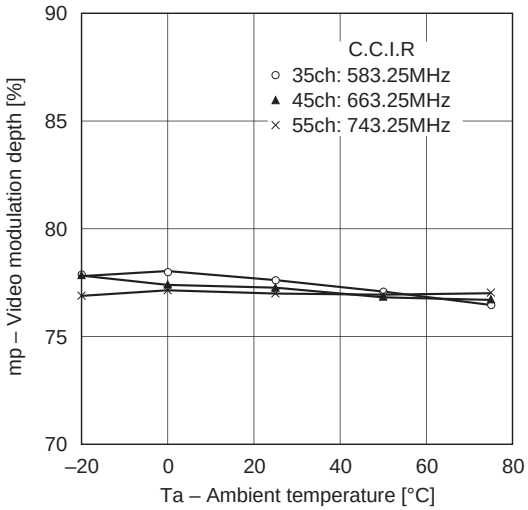
Supply voltage vs. Audio FM modulation sensitivity



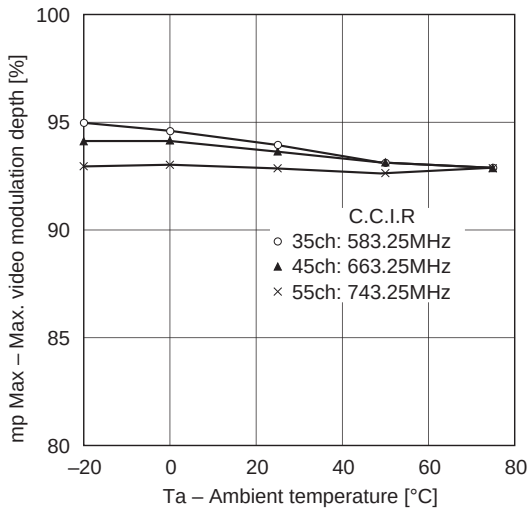
Ambient temperature vs. Video output level



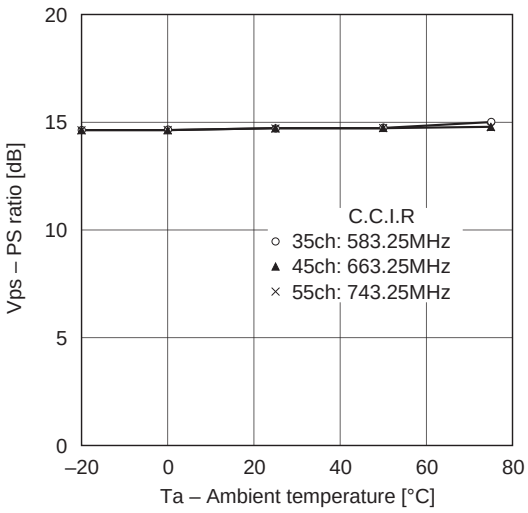
Ambient temperature vs. Video modulation depth



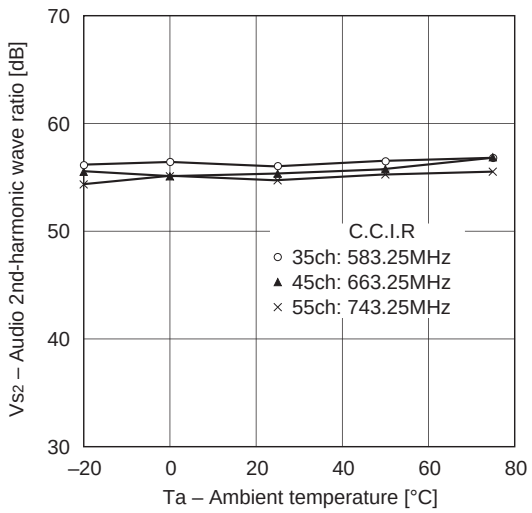
Ambient temperature vs. Max. video modulation dep



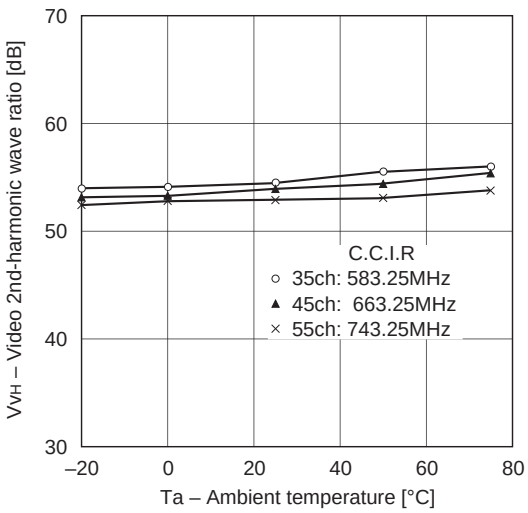
Ambient temperature vs. PS ratio



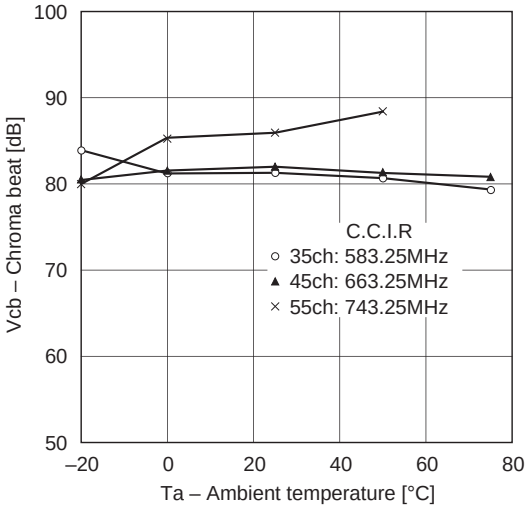
Ambient temperature vs. Audio 2nd-harmonic wave ratio



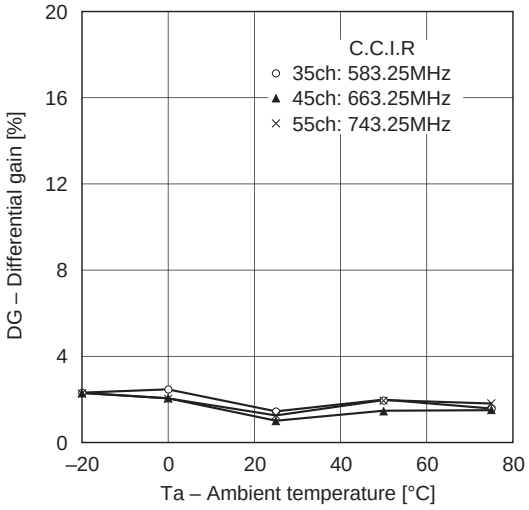
Ambient temperature vs. Video 2nd-harmonic wave ratio



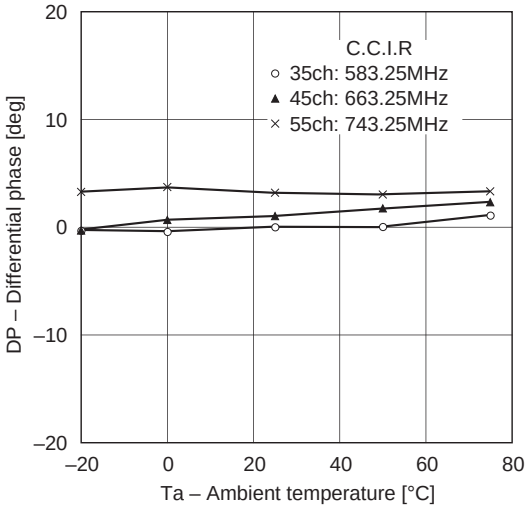
Ambient temperature vs. Chroma beat



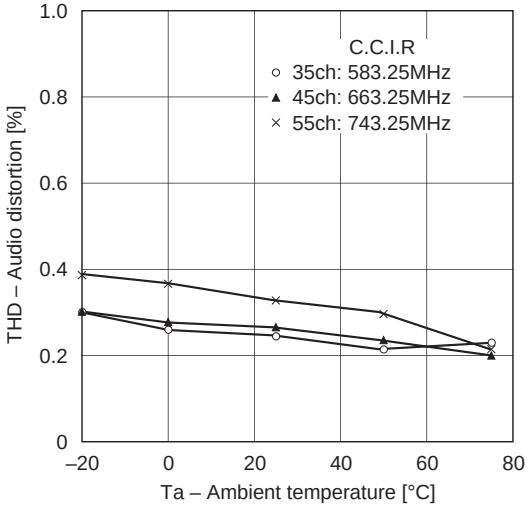
Ambient temperature vs. Differential gain



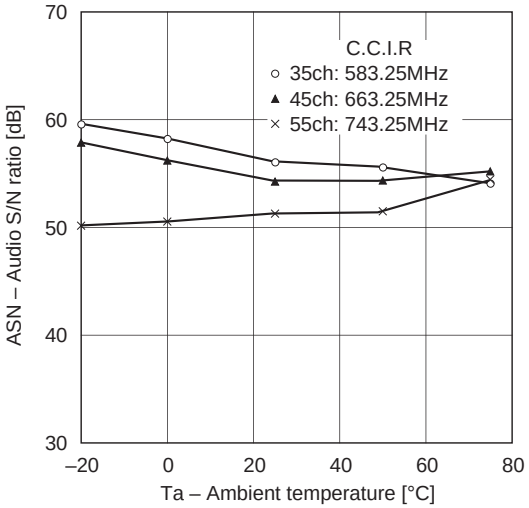
Ambient temperature vs. Differential phase



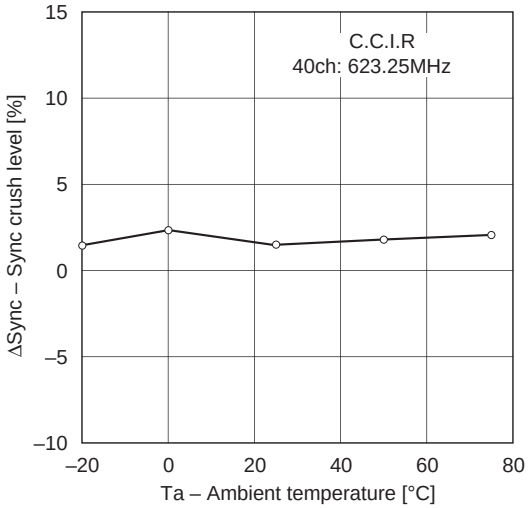
Ambient temperature vs. Audio distortion



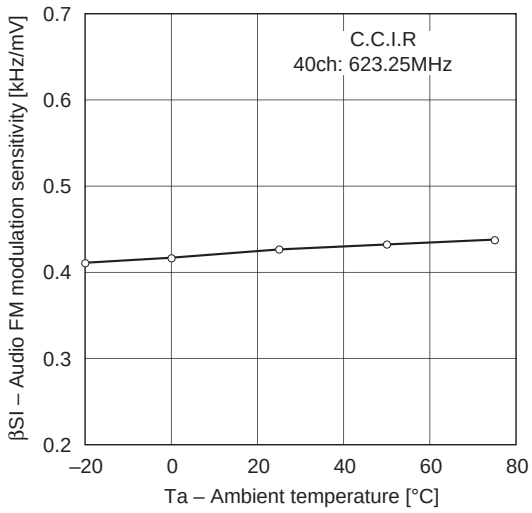
Ambient temperature vs. Audio S/N ratio



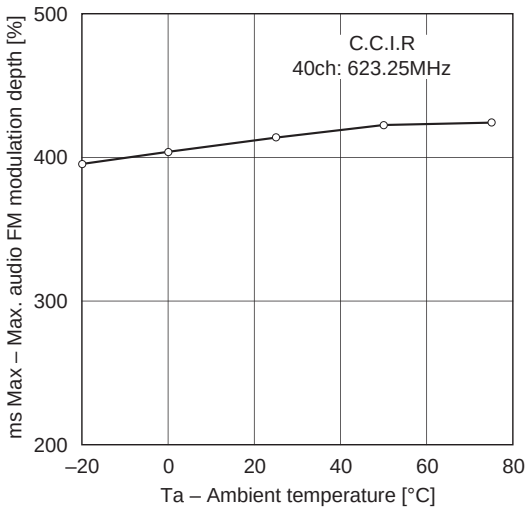
Ambient temperature vs. Sync crush level



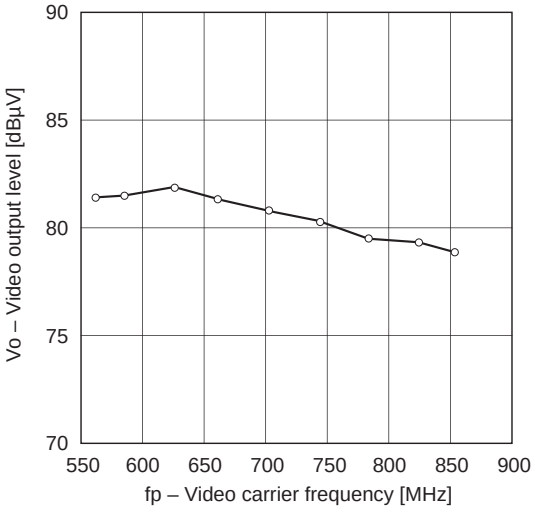
Ambient temperature vs. Audio FM modulation sensitivity



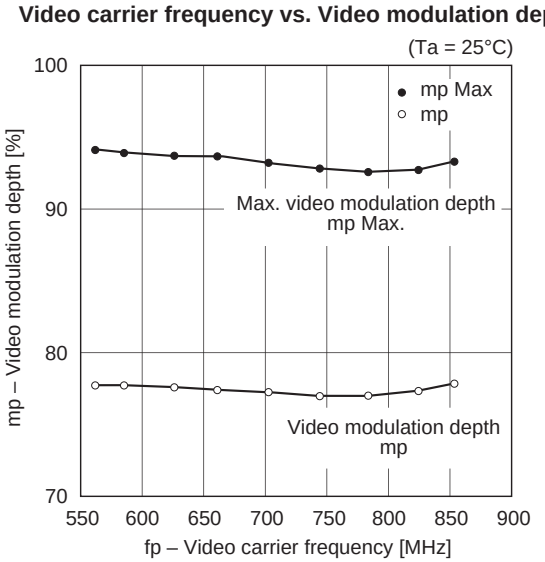
Ambient temperature vs. Max. audio FM modulation depth



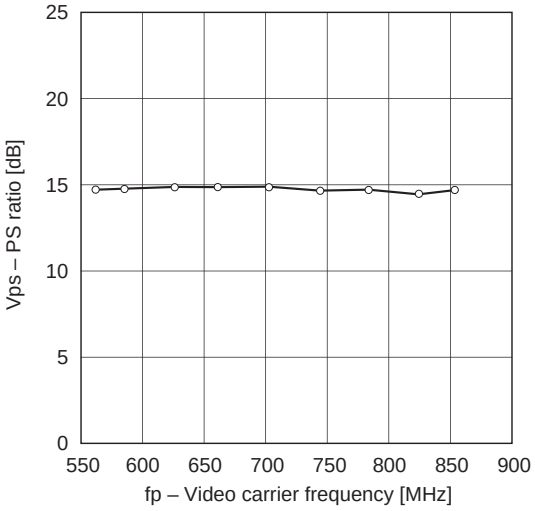
Video carrier frequency vs. Video output level



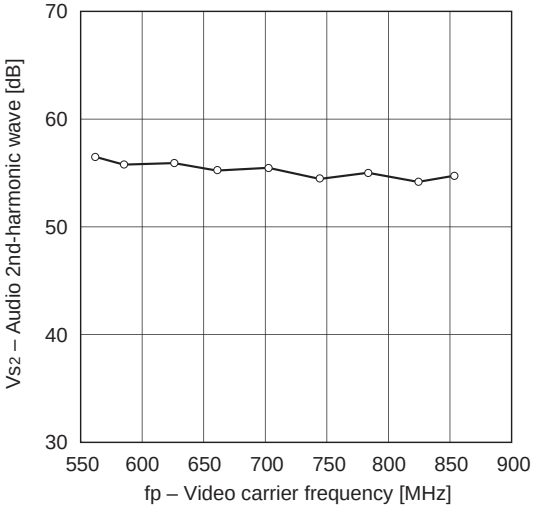
Video carrier frequency vs. Video modulation depth



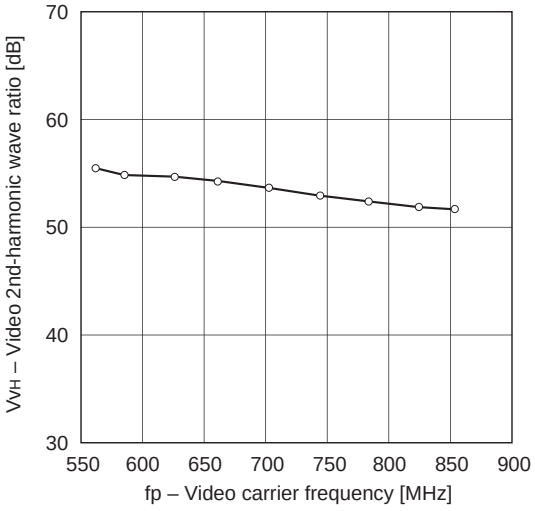
Video carrier frequency vs. PS ratio



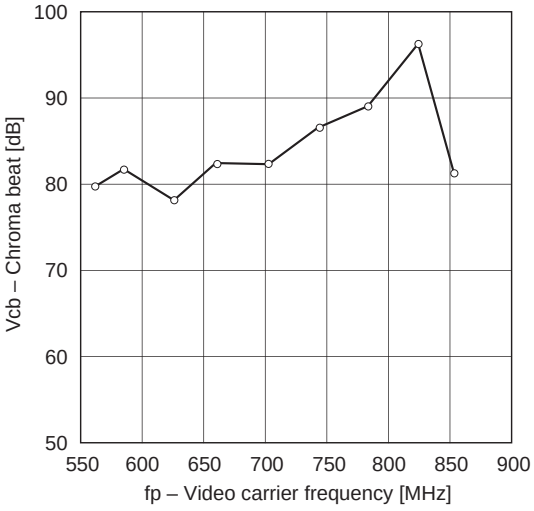
Video carrier frequency vs. Audio 2nd-harmonic wave ratio



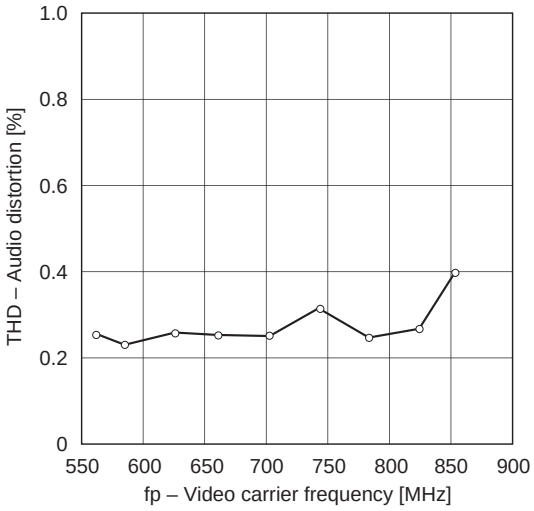
Video carrier frequency vs. Video 2nd-harmonic wave ratio



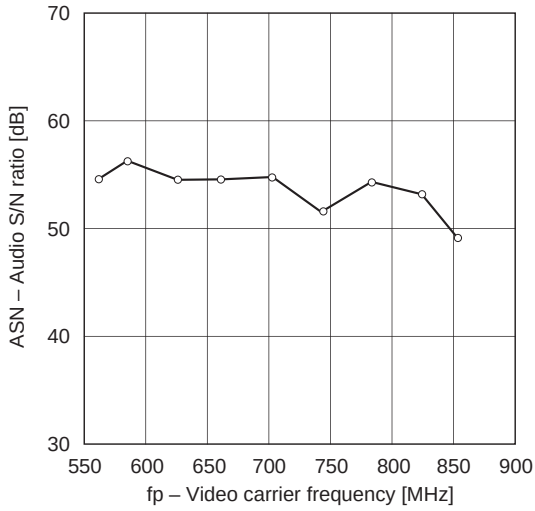
Video carrier frequency vs. Chroma beat



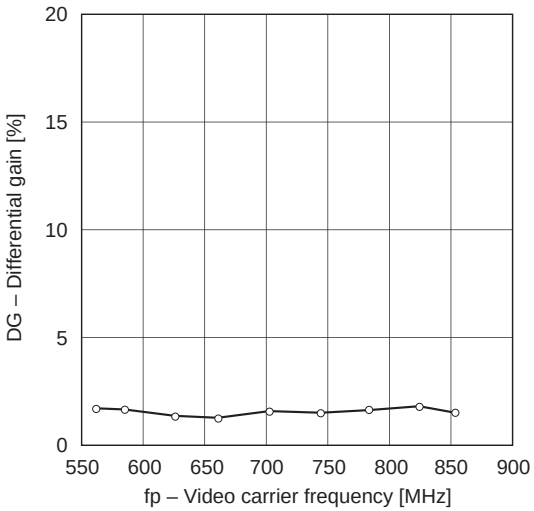
Video carrier frequency vs. Audio distortion



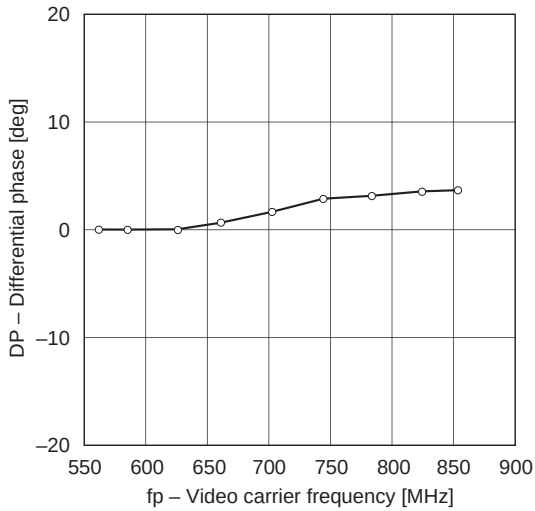
Video carrier frequency vs. Audio S/N ratio



Video carrier frequency vs. Differential gain

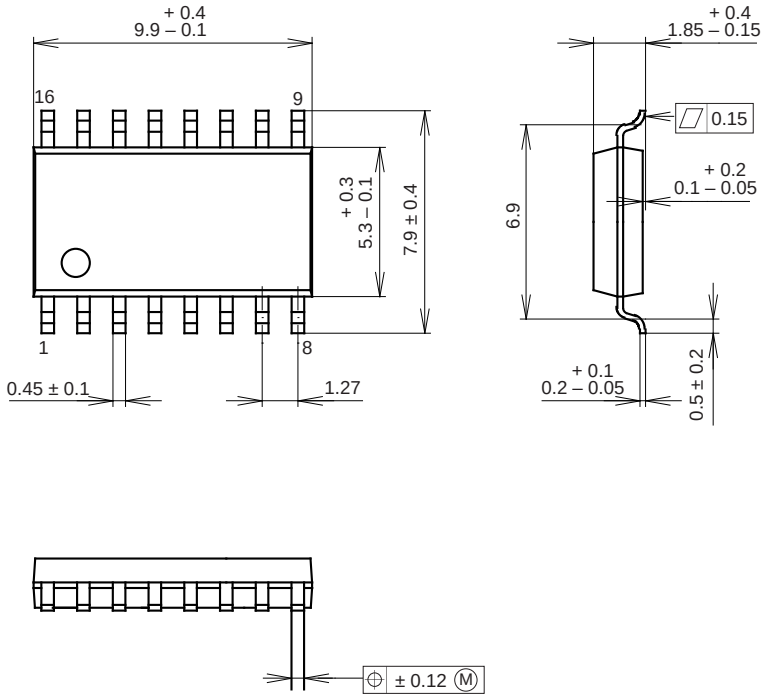


Video carrier frequency vs. Differential phase



Package Outline Unit: mm

16PIN SOP (PLASTIC) 300mil



SONY CODE	SOP-16P-L01
EIAJ CODE	∗SOP016-P-0300-A
JEDEC CODE	

PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	COPPER ALLOY
PACKAGE WEIGHT	0.2g