GEC PLESSEY
SEMICONDUCTORS

DECEMBER 1992
PRELIMINARY INFORMATION

DS3054 2.4

SL5066

VIDEO MODULATOR

(Supersedes edition in Consumer IC Handbook September 1991)

The SL5066 is a video up converter, capable of operating at frequencies up to 900MHz. It is compatible with PAL and NTSC, accepting baseband video and sound inputs and modulating up to any desired VHF or UHF channel.

Output drive is directly into 75Ω. Prescaler outputs are also provided enabling the use of a synthesiser to control oscillator frequency. The SL5066 operates from a 5V supply.

This device is not suitable for use in SECAM applications.

FEATURES

- 5V Operation
- Symmetrical RF Oscillator Operating to 900MHz
- Symmetrical RF drive to a frequency synthesiser
- Video Signal Input Clamp
- Video Peak White Level Detection and Automatic Gain Control
- Control of Video Modulation Index
- Direct Drive into 75 Ohms, via Symmetrical Outputs
- Picture Carrier to Sound Carrier Ratio Adjustment
- Low External Component Count

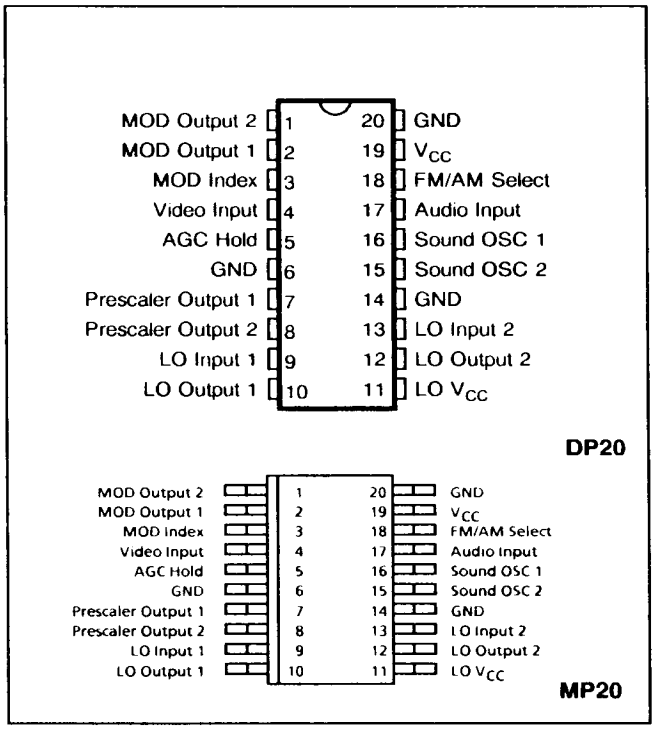


Fig.1 Pin connections - top view

APPLICATIONS

- Video Recorders
- Cable Systems
- Video Cameras
- Personal Computers
- Video Security Systems
- In Home Rebroadcast System (LPTV)

ORDERING INFORMATION

- SL5066 DP (DIL Plastic Package)
- SL5066 T MP (Miniature Plastic Package)

ELECTRICAL CHARACTERISTICS

T_{amb} = -10 to +80°C, V_{CC} = 4.5 to 5.5V

These characteristics are guaranteed by either production test or design. They apply within the specified ambient temperature and supply voltage ranges unless otherwise stated.

Characteristic	Pin	Value			Units	Conditions
		Min	Typ	Max		
Supply Voltage	11,19	4.5		5.5	V	
Supply Current	11,19		51		mA	
LO Prescaler Output Level	7,8		10		mV RMS	Single ended into 50Ω
LO Prescaler Output Impedance	7,8		50		Ω	
LO drift with temp from switch on	10,12		70		kHz	See Note 1
LO variation with supply	10,12		330		kHz	See Note 1, V_{CC} = 4.5 to 5.5V
RF carrier output level	1,2		80		dBμV	Single ended into 75Ω
Video Input	4	0.5	1.0	1.5	V p-p	
Video mod index	1,2		73		%	See Note 2
Video Signal/Noise Ratio	1,2		59		dB	Weighted PAL 200kHz - 5.5MHz
Sound Subcarrier tempdrift from switch on	15,16		4		kHz	See Note 1
Sound drift with supply	15,16		2.5		kHz	V_{CC} = 4.5 to 5.5V
Audio Input Impedance	17		25		kΩ	
Audio Input Voltage reference	17		2		V	
Audio Input Level	17			2	V p-p	
FM THD	1,2		1		%	Q = 9, Δf = ± 35kHz (50μs Pre emphasis, 400Hz)
FM THD	1,2		1		%	Q = 9, Δf = ± 80kHz (No Pre emphasis, 400Hz)
Picture/Sound Carrier Ratio (FM)	1,2		16		dB	R = 0, See Note 3
Sound Oscillator FM Deviation	1,2		85		kHz/V	C = 120pF, L = 5.6μH (Q_L = 9)

NOTES

1. Including external components effects
2. May be increased by use of external resistor, see Fig.3
3. May be adjusted by use of external resistor dependent on video content, see Fig. 4

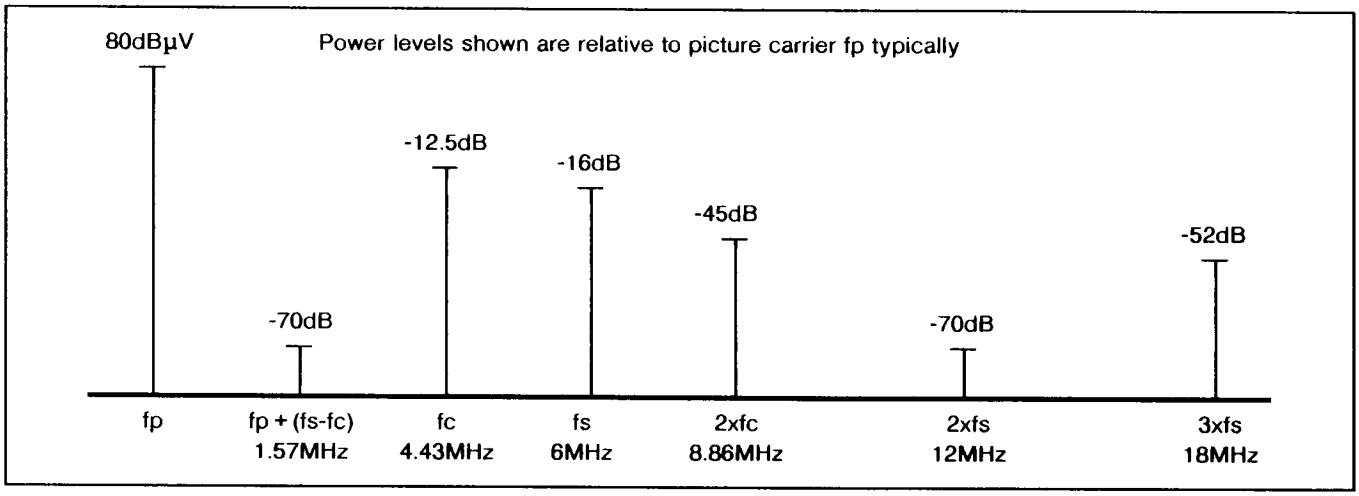


Fig.2 Frequency Spectrum above the Video Picture Carrier (Q_{TANK} = 9)

VIDEO

The Video signal is applied to pin 4 via a coupling capacitor, (see Fig.6). This capacitor provides both clamping and black level hold. The internal peak white AGC can cope with an input signal of between 0.5 and 1.5 Volts peak to peak. The full 9.5 dB AGC range is handled within a 600mV span on this storage capacitor.

Pin 3 (MOD INDEX) sets the modulation index.

For negative modulation (PAL) with an 80% modulation index, pin 3 should be connected directly to ground.

The modulation index is increased by connecting a resistor between pin 3 and Ground.

AUDIO

The sound IF Oscillator can operate from 4.5MHz to 6.5MHz to cover all sound standards. The centre frequency is determined by the Sound IF Tank LC connected between pins 15 and 16.

The centre frequency is given by,

$$f_0 = \frac{1}{2\pi\sqrt{LC}}$$

The Q factor of the TANK is given by,

$$Q = \frac{1770}{2\pi f_0 L} = 1770 \times 2\pi f_0 C$$

The Q factor of the inductor must be high, i.e., >20

A graph of FM deviaion v. C_{TANK} is given in Fig. 10.

Good temperature stability can be achieved by the correct choice of temperature coefficients for C_{AUDIO} and L_{AUDIO}

The Audio signal should be coupled into pin 17 via a 470nF capacitor. The maximum input level is 2 Volts peak to peak. PIN 18 should be connected to ground via a resistor. The value of the resistor will determine the Picture Carrier to Sound Carrier Ratio, See fig.4

MODULATED RF OUTPUT

The RF output drive from pins 1 and 2 is designed to drive directly into a 75Ω load. Output drive level is 80dBμV single ended into 75Ω.

LOCAL OSCILLATOR

The Local Oscillator is able to operate up to 900MHz enabling the SL5066 to be used over all VHF and UHF channels. By careful choice of components and layout it is possible to tune over an octave using a fixed inductor.

Good isolation between the local oscillator and the modulated RF outputs is required to prevent signal coupling and affecting apparent modulation index. This is best performed by the use of a ground plane to cut down radiation.

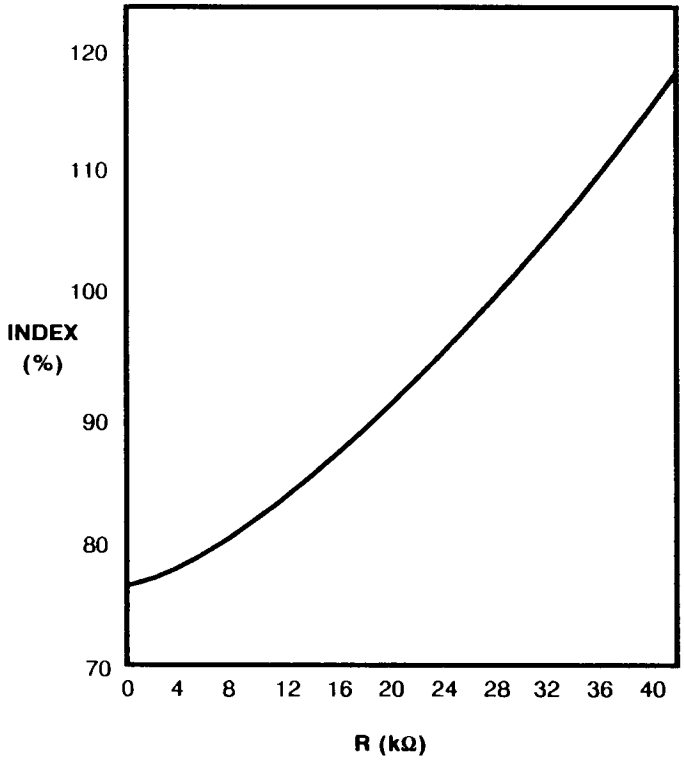


Fig.3 Video Modulation Index (SL5066)

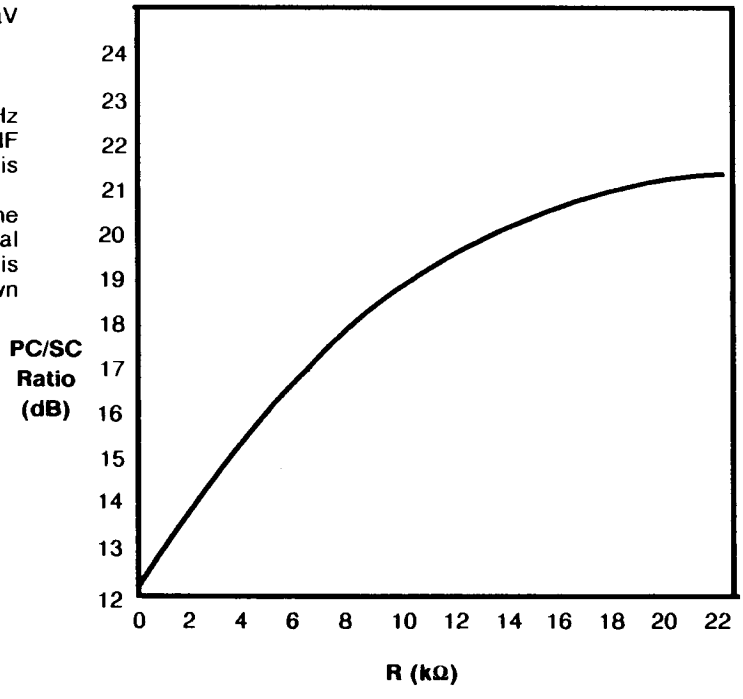


Fig.4 Picture/Sound Carrier Ratio (SL5066)

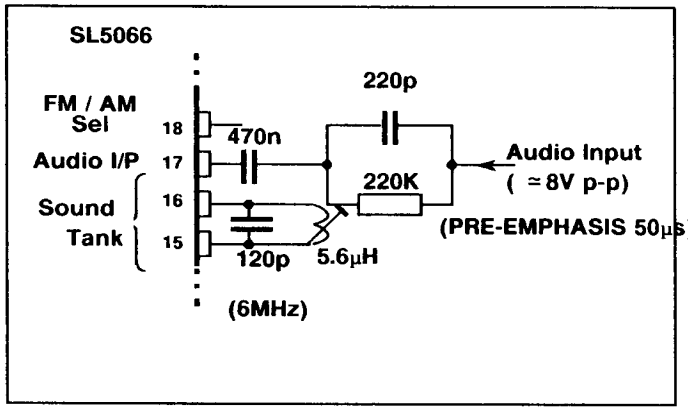


Fig.5 Typical FM sound section

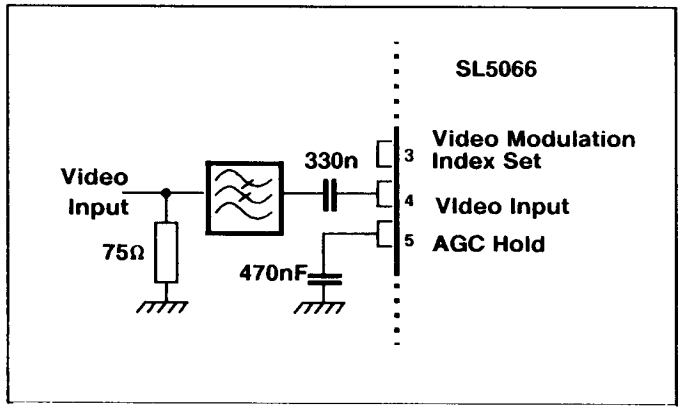


Fig.6 Video input

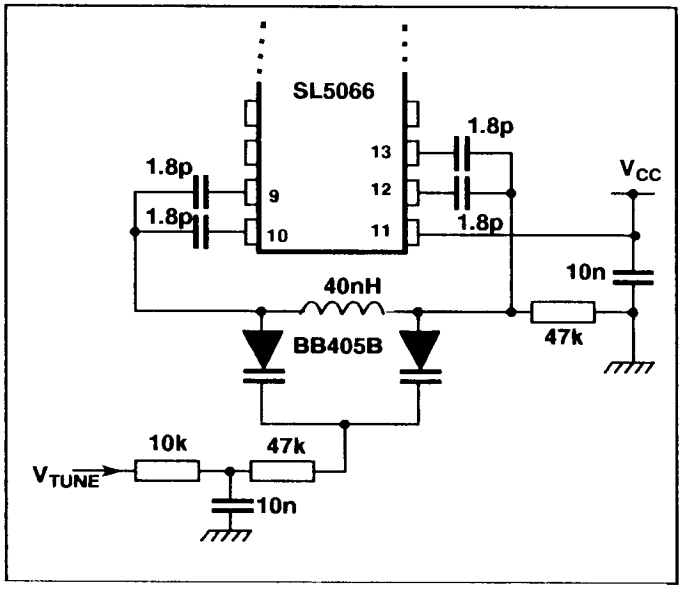


Fig.8 Test circuit

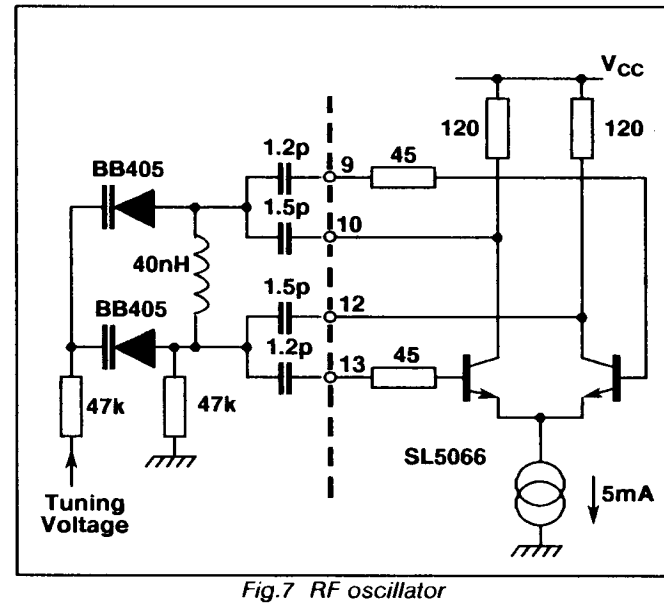


Fig.7 RF oscillator

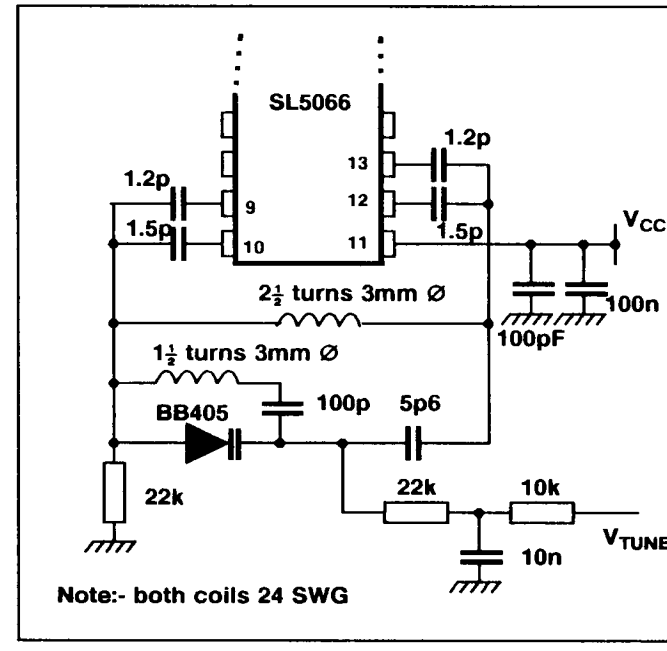


Fig.9 UHF application

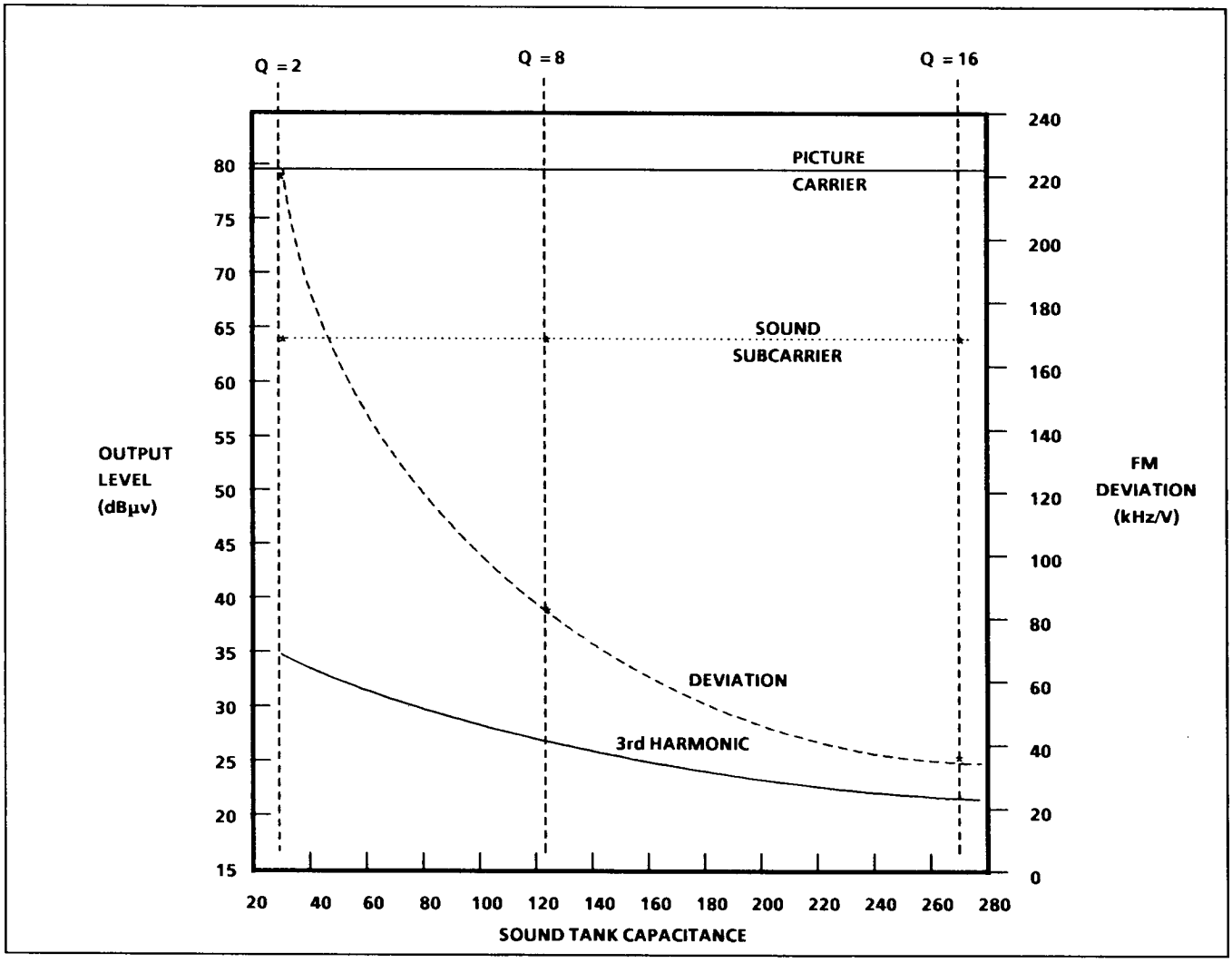


Fig. 10 Sound oscillator harmonics v. tank capacitance (f_{SOUND} = 6.0MHz)

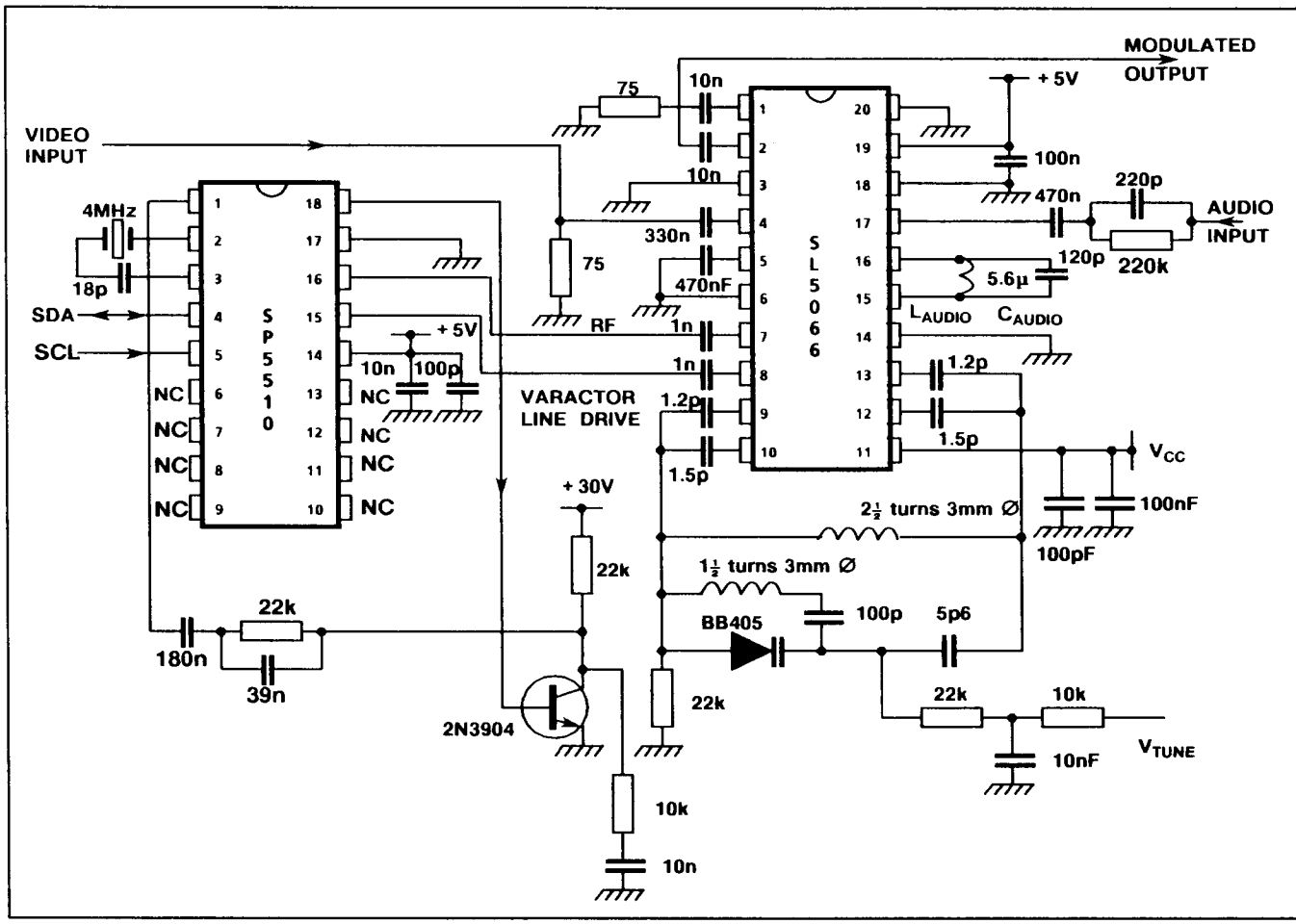
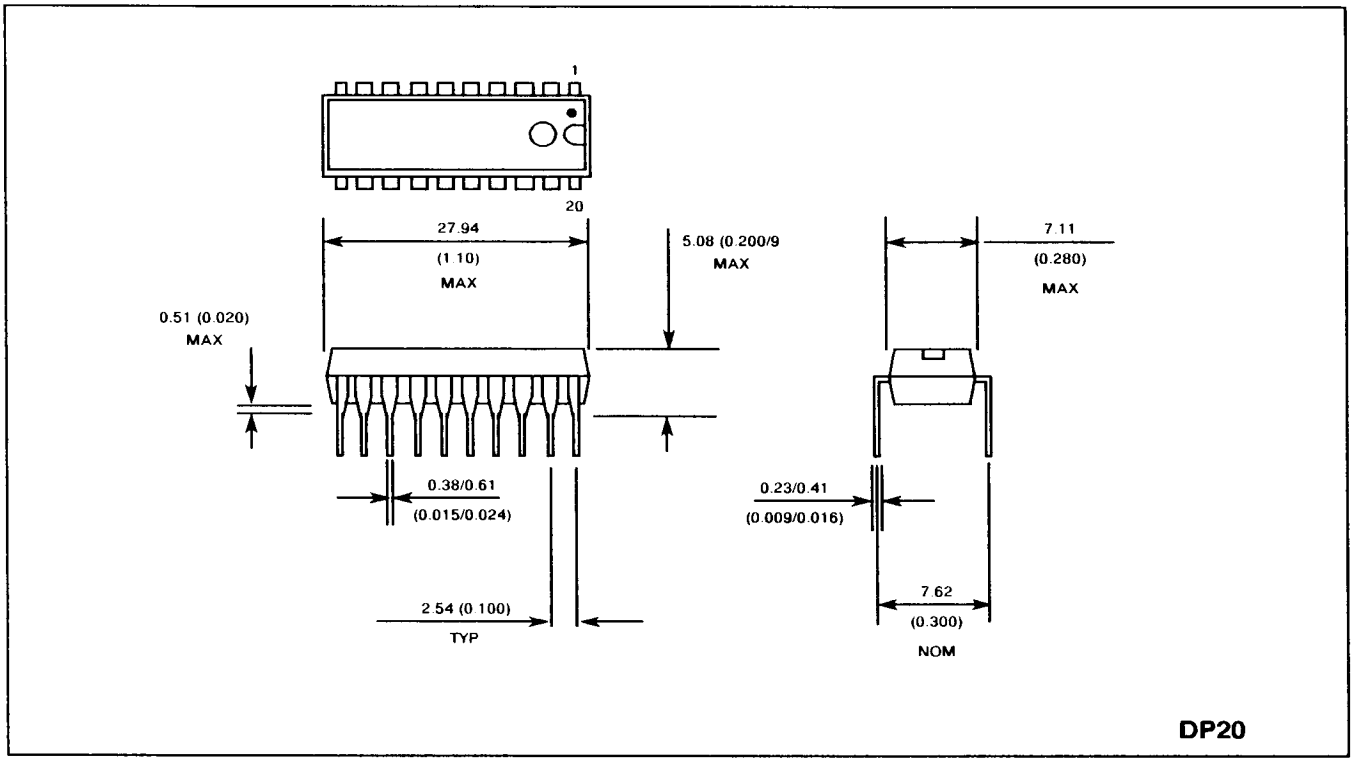


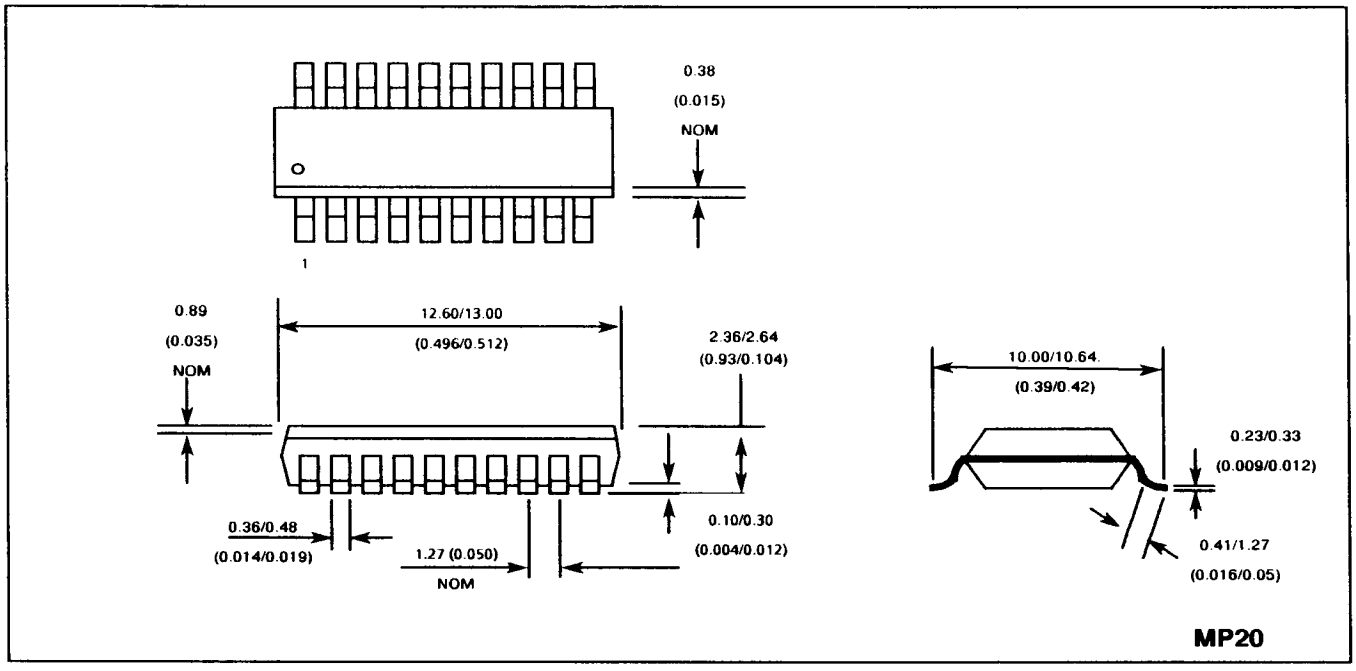
Fig. 11 Typical application showing video modulator with synthesised oscillator

PACKAGE DETAILS

Dimensions are shown thus: mm (in). For further package information please contact your local Customer Service Centre.



20 LEAD PLASTIC DIL



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