

Quad, Wide-Bandwidth SPDT Video Analog Switch

UM330 TSSOP16

General Description

The UM330 is a quad, bi-directional, single-pole/double-throw (SPDT) video analog switch operates from a single +5V supply. The device is recommended for both RGB and composite video switching applications. The video switch can be driven from a current output RAMDAC or voltage output composite video source.

The UM330 features quad 6Ω R_{ON} (TYP) SPDT switches with 500MHz bandwidth and low crosstalk. The switch offers a high-performance, low-cost solution to switch between video sources. The switch is available in Pb-free TSSOP16 package.

Applications

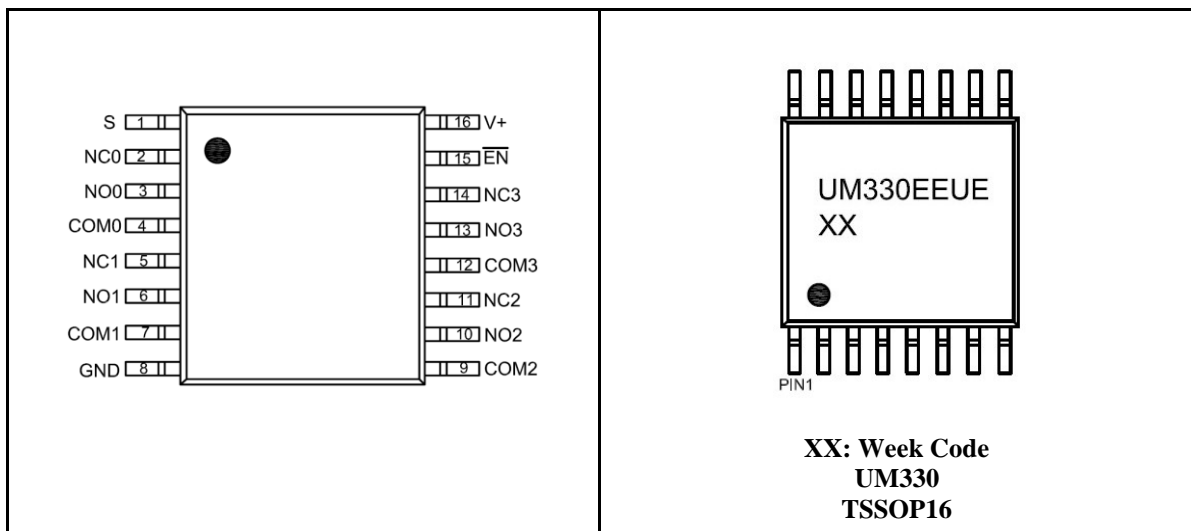
- Personal Video Recorders
- Terrestrial Set-Top Boxes
- Hard Disk Recorders
- DVD Players
- Game Consoles
- Digital VCRs
- Desktop Video Editors
- Audio and Video Switching

Features

- Wide Bandwidth: 500MHz(TYP)
- Low On-Resistance: 6Ω (TYP)
- Single-Supply Operation: 5V
- Fast Switching Time
- Rail-to-Rail Operation
- Typical Power Consumption($5\mu W$)
- TTL/CMOS Compatible
- Low Crosstalk: -60dB (10MHz)
- Hot Insertion Capable(It will need extra protection in power path)
- Micro Size Package: TSSOP16

Pin Configurations

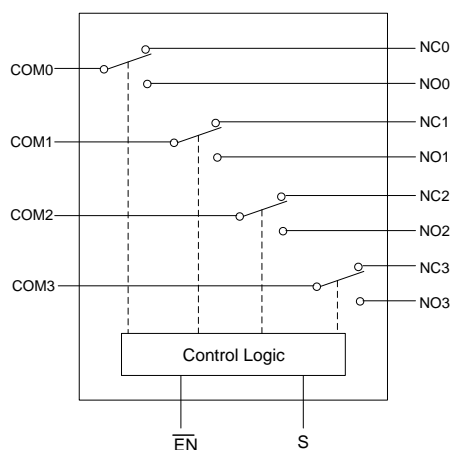
Top View



Pin Description

Name	Function
NC0,NC1,NC2,NC3,NO0,NO1,NO2,NO3	Analog video I/O
S	Select input
EN	Switch-enable input
COM0,COM1,COM2,COM3	Analog video I/O
GND	Ground
V ₊	Power supply

Block Diagram



Function Table

$\overline{\text{EN}}$	S	COM0	COM1	COM2	COM3	Function
H	X	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Disable
L	L	NC0	NC1	NC2	NC3	S=0
L	H	NO0	NO1	NO2	NO3	S=1

Ordering Information

Part Number	Packaging Type	Marking Code	Shipping Qty
UM330	TSSOP16	UM330EEUE	3000pcs/13 Inch Tape & Reel

Absolute Maximum Ratings

Symbol	Parameter	Limit	Unit
V ₊	Supply Voltage	- 0.3 to + 6.0	V
V _S	DC Output Voltage	- 0.3 to + 6.0	
V _{IN}	DC Input Voltage	- 0.3 to + 6.0	
I _O	Continuous Current	±200	mA
T _O	Operating Temperature Range	- 40 to +85	°C
T _J	Junction Temperature	+150	
T _{STG}	Storage Temperature Range	- 65 to +150	
T _L	Junction Lead Temperature (Soldering, 10seconds)	+300	
ESD	ESD Method 3015.7	4000	

DC Electrical Characteristics

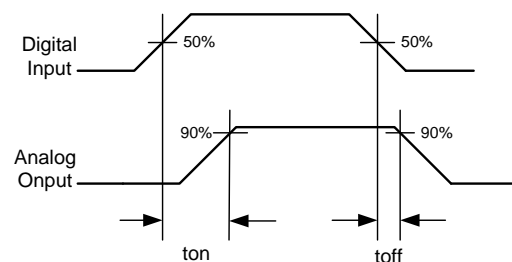
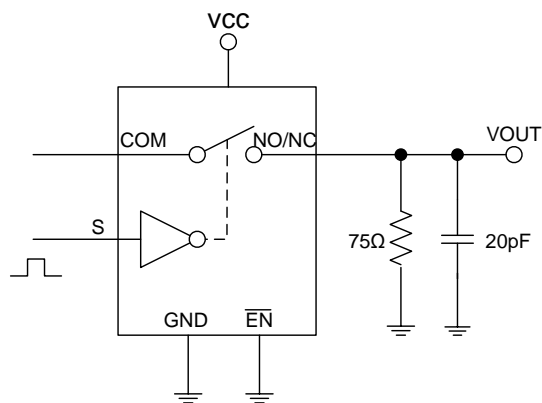
 (Over the Operating Range, V₊=+5V±10%, T_A=-40°C to +85°C.)

Symbol	Parameter	Test Conditions	Limits (-40 to 85 °C)			Unit
			Min	Typ	Max	
V _{ANALOG}	Analog Signal Range		0		2.0	V
R _{ON}	On Resistance	V ₊ =4.5V, V _I =1.0V, R _L =75Ω, I _{ON} =13mA		6	9	Ω
		V ₊ =4.5V, V _I =2.0V, R _L =75Ω, I _{ON} =26mA		7	10	Ω
I _{CC}	Quiescent Power Supply Current	V ₊ =5.5V, V _{IN} = GND or 5V		0.1	1	μA
I _{CC(T)}	Transience Power Supply Current	V ₊ =4.3V, V _{IN} =1.8V		11	20	μA
Δ I _{CC}	Supply Current per Input @ TTL HIGH	V ₊ =5.5V, V _{IN} = 3.4V			15	μA
I _{IH}	Input High Current	V ₊ =5.5V, V _{IN} = V ₊			±1	μA
I _{IL}	Input Low Current	V ₊ =5.5V, V _{IN} = GND			±1	μA
I _O	Analog Output Leakage Current	0≤NO,NC or COM≤V ₊ , Switch OFF			±1	μA
I _{OS}	Short Circuit Current			230		mA
V _{IH}	Input High Voltage		2			V
V _{IL}	Input Low Voltage		-0.5		0.8	V
V _{IK}	Clamp Diode Voltage	V ₊ =4.5V, I _{IN} = -18mA	-0.7	-0.9		V
V _H	Input Hysteresis at Control Pins			200		mV

AC Electrical Characteristics

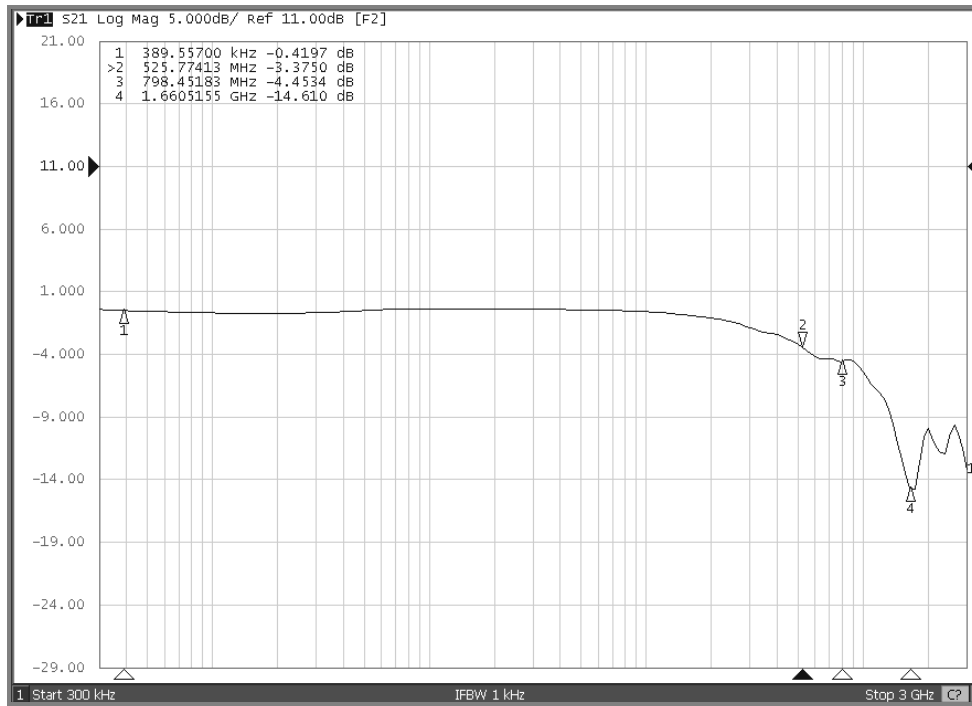
Symbol	Parameter	Test Conditions	Limits (-40 to 85 °C)			Unit
			Min	Typ	Max	
t_{ON}	Turn On Time	$R_L=75\Omega, C_L=20pF$		14	17	ns
t_{OFF}	Turn Off Time	$R_L=75\Omega, C_L=20pF$		4	7	ns
V_{ISO}	Off Isolation	$R_L=150\Omega, f = 10MHz$		-50		dB
V_{CT}	Crosstalk	$R_{IN}=10\Omega, R_L=150\Omega, f = 10MHz$		-60		dB
BW	-3dB Bandwidth	$R_L=150\Omega$		500		MHz
DG	Differential Gain	$R_L=150\Omega, f = 3.58MHz$		0.51		%
DP	Differential Phase	$R_L=150\Omega, f = 3.58MHz$		0.01		°
I_{CCD}	Supply Current per Input per MHz	$V_+=5.5V, NO, NC$ and COM Pins Open, $EN=GND$, Control Input Toggling 50% Duty Cycle		0.25		mA/MHz
Capacitance						
C_{IN}	Input/Enable Capacitance	$V_{IN}= 0V, f=1MHz$		5		pF
C_{OFF}	Switch Off Capacitance	$V_{IN}= 0V, f=1MHz$		5		pF
C_{ON}	Switch On Capacitance	$V_{IN}= 0V, f=1MHz$		10		pF

Switching Time Test



Typical Operating Characteristics

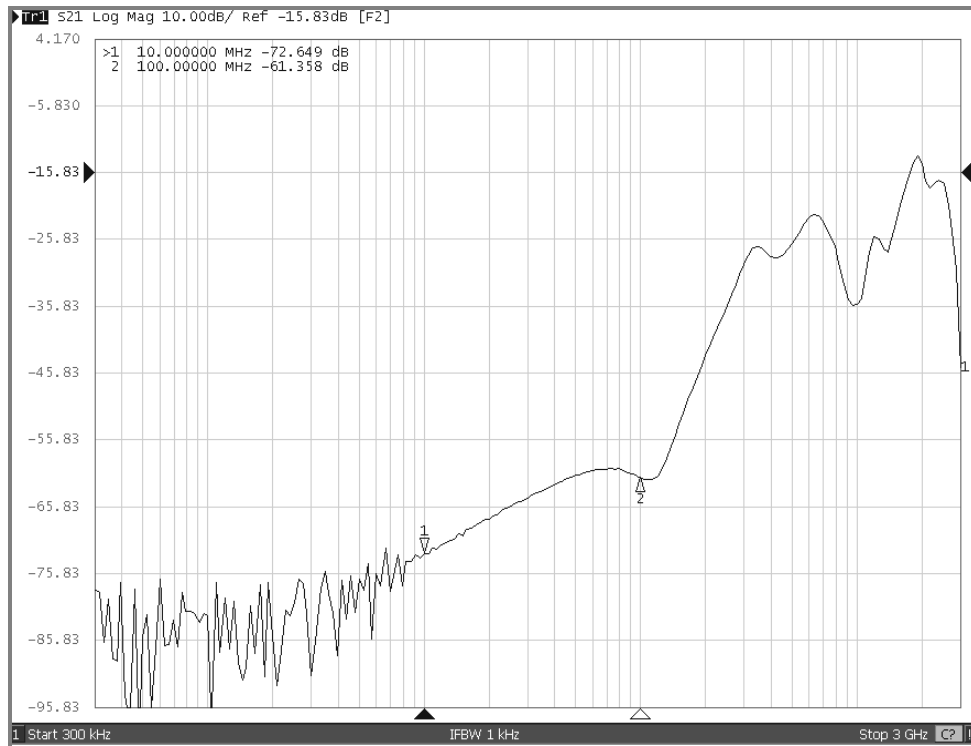
Bandwidth vs. Frequency



Off-Isolation vs. Frequency



Crosstalk vs. Frequency



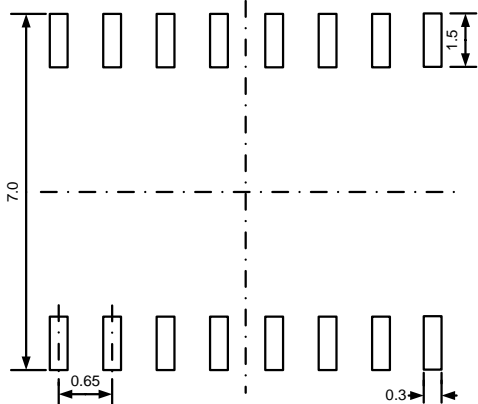
Package Information

UM330 TSSOP16

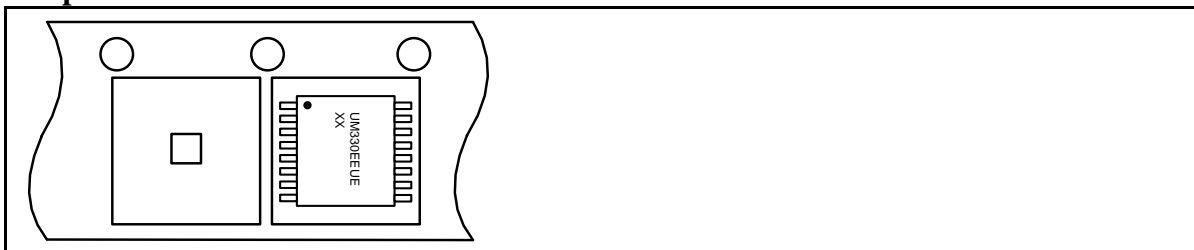
Outline Drawing

DIMENSIONS				
Symbol	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	-	1.20	-	0.047
A1	0.05	0.15	0.002	0.006
A2	0.90	1.05	0.035	0.041
A3	0.34	0.54	0.013	0.021
D	4.86	5.06	0.191	0.199
E	6.20	6.60	0.244	0.260
E1	4.30	4.50	0.169	0.177
b	0.20	0.28	0.008	0.011
e	0.65BSC		0.026BSC	

Land Pattern

	<p>NOTES:</p> <ol style="list-style-type: none"> 1. Compound dimension: 4.96×4.40. 2. Unit: mm. 3. General tolerance $\pm 0.05\text{mm}$ unless otherwise specified. 4. The layout is just for reference.
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Tape and Reel Orientation



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