Quad, Wide-Bandwidth SPDT Video Analog Switch

UM330A *SSOP16(0.635)*

1 Description

The UM330A is a quad, bi-directional, single-pole/double-throw (SPDT) video analog switch operates from a 1.65V to 5.5V single 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 UM330A features quad 7.6Ω R_{ON} (TYP) SPDT switches with 600MHz 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 SSOP16(0.635) package.

2 Applications

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

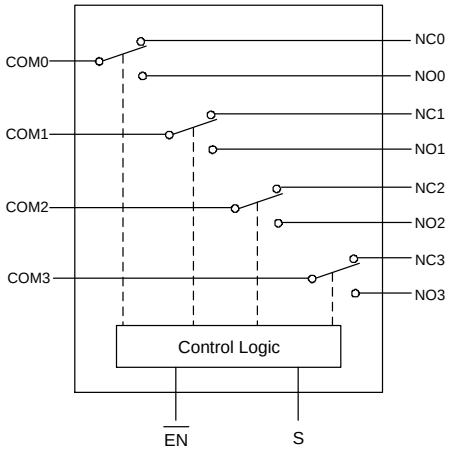
3 Features

- Wide Bandwidth: 600MHz (TYP)
- Low On-Resistance: 7.6Ω (TYP)
- Single Supply Operation: 1.65V to 5.5V
- Fast Switching Time
- Rail-to-Rail Operation
- Typical Power Consumption: 5μW
- TTL/CMOS Compatible
- Low Crosstalk: -60dB (10MHz)
- Hot Insertion Capable (Need extra protection in power path)
- Micro Size Package: SSOP16(0.635)

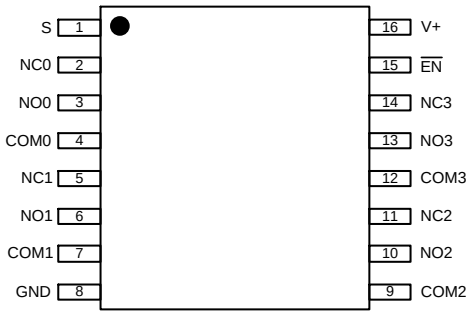
4 Ordering Information

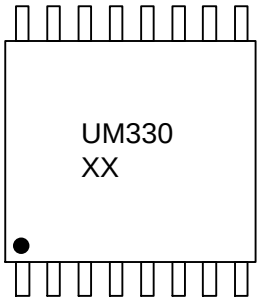
Part Number	Package Type	Marking Code	Shipping Qty
UM330AEESAE	SSOP16(0.635)	UM330	4000pcs/13 Inch Tape & Reel

5 Block Diagram



6 Pin Configuration and Function





XX: Week Code
UM330AEESAE
SSOP16(0.635)

Table 6-1. Pin Functions of UM330A

Pin No.	Pin Name	Function
1	S	Select Input.
2	NC0	Normally closed (NC) signal path, switch 0.
3	NO0	Normally open (NO) signal path, switch 0.
4	COM0	Common signal path, switch 0.
5	NC1	Normally closed (NC) signal path, switch 1.
6	NO1	Normally open (NO) signal path, switch 1.
7	COM1	Common signal path, switch 1.
8	GND	Ground.
9	COM2	Common signal path, switch 2.
10	NO2	Normally open (NO) signal path, switch 2.
11	NC2	Normally closed (NC) signal path, switch 2.
12	COM3	Common signal path, switch 3.
13	NO3	Normally open (NO) signal path, switch 3.
14	NC3	Normally closed (NC) signal path, switch 3.
15	$\overline{EN}$	Switch-Enable Input. $\overline{EN}$= L enables the device.
16	V_+	Positive power supply pin.

6.1 Function Table

$\overline{EN}$	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

7 Specifications

7.1 Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_+	Supply voltage		-0.3		6	V
V_{IN}	Voltage on NCx, NOx, COMx pins		-0.3		6	V
	Voltage on select input pin		-0.3		6	V
V_{ESD}	Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001	All pins		±8		kV
I_O	Continuous current		-200		200	mA
T_J	Junction temperature				150	℃
T_{STG}	Storage temperature		-65		150	℃
T_L	Lead temperature for soldering 10 seconds				260	℃

Note 1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

7.2 Recommended Operating Conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_+	Supply voltage		1.65		5.5	V
V_{IN}	Voltage on NCx, NOx, COMx pins		0		V_+	V
	Voltage on select input pin		0		V_+	V
T_A	Operating ambient temperature		-40		125	℃

7.3 DC Electrical Characteristics

Over the Operating Range, V+= 5V±10%, T_A= -40°C to 125°C. All typical values are at 25°C.

Symbol	Parameter	Test Conditions	Limits (-40℃ to 125℃)			Unit
			Min	Typ	Max	
V_{ANALOG}	Analog Signal Range		0		V_+	V
R_{ON}	On Resistance	V_+=4.5V, V_I=1.0V, I_{ON}=13mA		7.6	13	Ω
		V_+=4.5V, V_I=2.0V, I_{ON}=26mA		7.1	12	Ω
I_{CC}	Quiescent Power Supply Current	V_+=5.5V, V_{IN}= GND or 5V		0.01	5	μA
I_{CCT}	Transience Power Supply Current	V_+=4.3V, V_{IN}=1.8V		2.7	20	μA
$\triangle I_{CC}$	Supply Current per Input @ TTL HIGH	V_+=5.5V, V_{IN}=3.4V		2.7	15	μA
I_{IH}	Input High Current	V_+=5.5V, V_{IN}=V_+			3	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_H	Input Hysteresis at Control Pins			200		mV
V_{IK}	Clamp Diode Voltage	V_+=4.5V, I_{IN}=-18mA	-0.7	-0.9		V

7.4 AC Electrical Characteristics

Over the Operating Range, V+= 5V±10%, T_A= -40°C to 125°C. All typical values are at 25°C.

Symbol	Parameter	Test Conditions	Limits (-40℃ to 125℃)			Unit
			Min	Typ	Max	
t_{ON}	Turn On Time	R_L=75Ω, C_L=20pF		30	45	ns
t_{OFF}	Turn Off Time	R_L=75Ω, C_L=20pF		15	30	ns
V_{ISO}	Off Isolation	R_L=150Ω, f=10MHz		-50		dB
VCT	Crosstalk	R_{IN}=10Ω, R_L=150Ω, f=10MHz		-60		dB
BW	-3dB Bandwidth	R_L=150Ω		600		MHz
DG	Differential Gain	R_L=150Ω, f=3.58MHz		0.51		%
DP	Differential Phase	R_L=150Ω, f=3.58MHz		0.01		o
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

8 Parameter Measurement Information

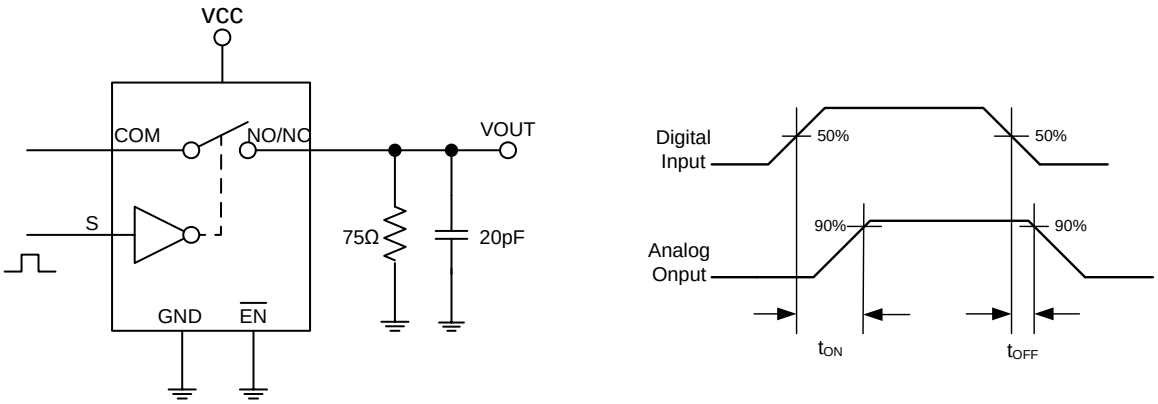
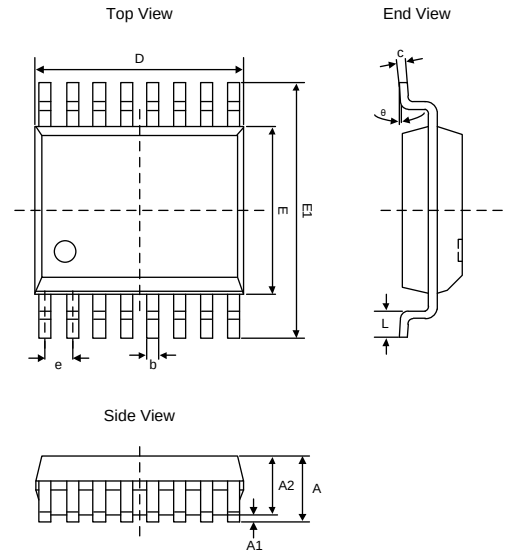


Figure 8-1. Turn On/Off Time Measurement Setup

Package Information

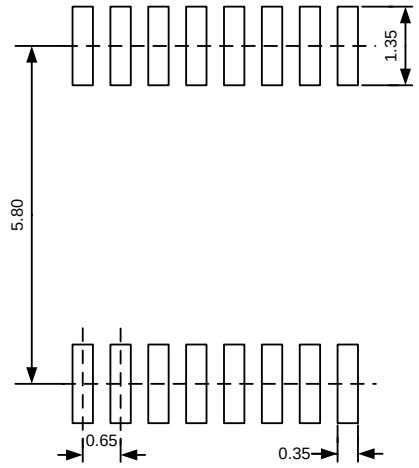
SSOP16(0.635)

Outline Drawing



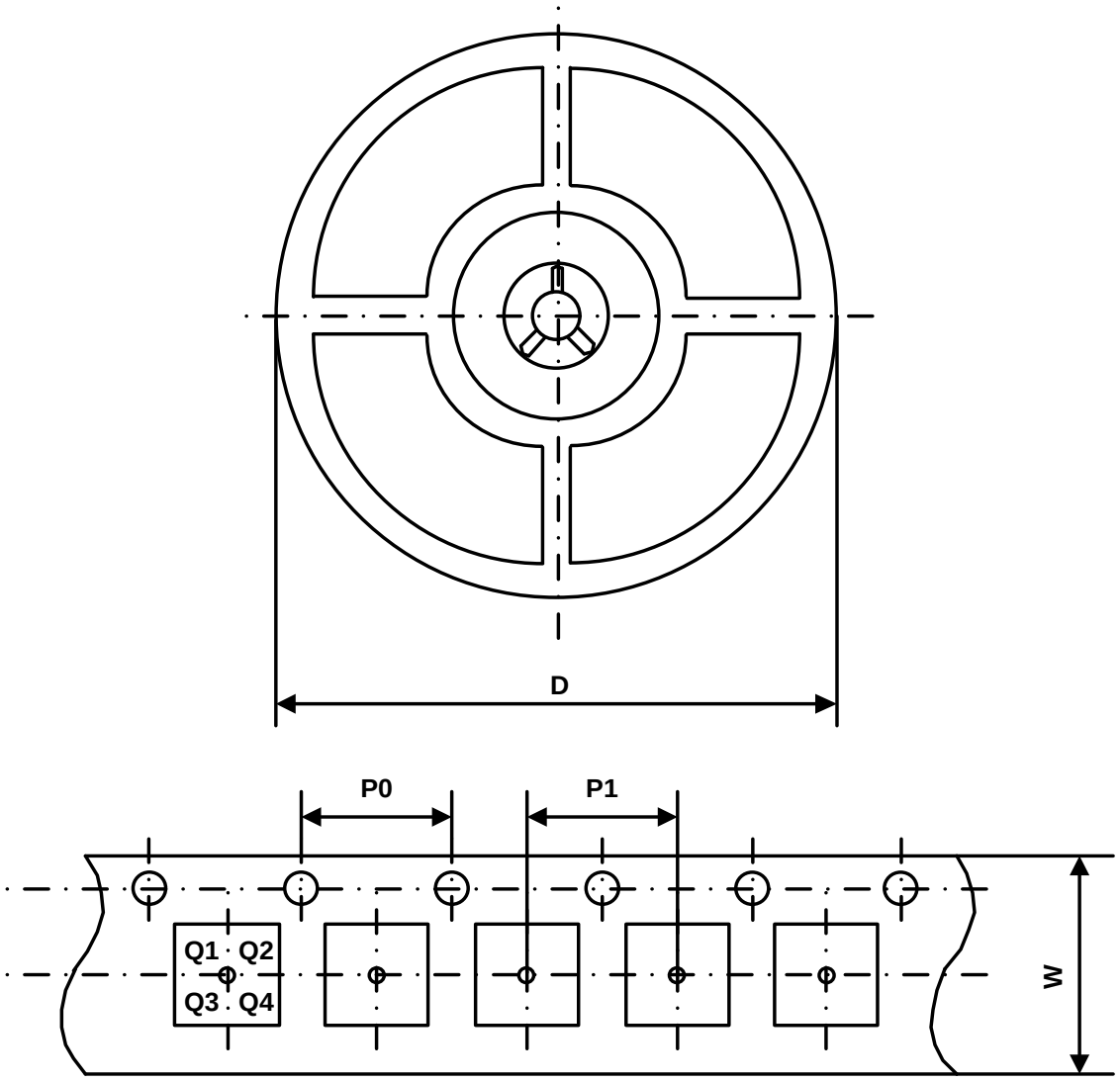
Symbol	DIMENSIONS					
	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	-	-	1.75	-	-	0.070
A1	0.10	-	0.25	0.004	-	0.010
A2	1.30	-	1.55	0.052	-	0.062
b	0.20	-	0.31	0.008	-	0.012
c	0.17	-	0.25	0.007	-	0.010
D	4.70	4.90	5.10	0.188	0.196	0.204
E	3.80	3.90	4.00	0.152	0.156	0.160
E1	5.80	6.00	6.20	0.232	0.24	0.248
e	0.635BSC			0.025BSC		
L	0.40	-	1.27	0.016	-	0.051
θ	0 °	-	8°	0°	-	8°

Land Pattern



NOTES:
1. Unit: mm.
2. General tolerance ±0.05mm unless otherwise specified.
3. The layout is just for reference.

Packing Information



Part Number	Package Type	Carrier Width (W)	Pitch (P0)	Pitch (P1)	Reel Size (D)	PIN 1 Quadrant
UM330AEESAE	SSOP16(0.635)	12 mm	4 mm	8 mm	330 mm	Q1

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