盛微先進科技
SAVITECH.COM

SV7330E

8KV ESD, Low Ron, Wide Bandwidth, Low Power,
Quad SPDT Video Switch

v0.97

SAVITECH Corporation

SV7330E

8KV ESD, Low Ron, Wide Bandwidth, Low Power, Quad SPDT Video Switch

Features

- Seamless Bidirectional Data Switching
- Roboust ESD protection: HBM 8KV
- Low Turn-On Resistance: 4.5Ω (V_{CC}=5V)
- Wide Bandwidth: -3dB BW = 480MHz
- High Off Isolation: –60dB
- Extreme Low Power Consumption: 0.4uA
- Single Vcc Supply: +1.8V ~ +5V
- Vcc Supply Accuracy: +/-10%
- Control Input Pins are compatible with TTL and 5V/3.3V CMOS
- Pb-free & Green Package: QSOP-16, SOP-16, TSSOP-16

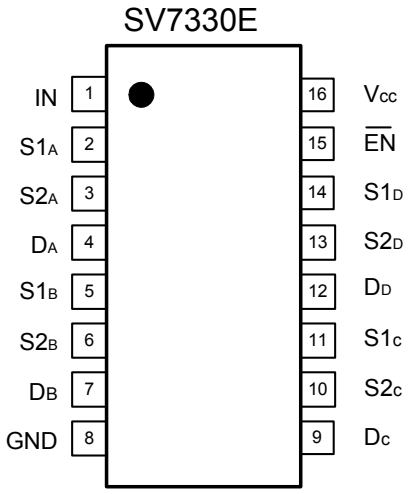
Description

The SV7330E is a high quality, low power, high-speed analog video switch. It features wide bandwidth, low turn-on resistance and low crosstalk that make it ideal for seamless composite and RGB SD and HD video switching applications

It can also function as a 4-bit 1-of-2 MUX/DEMUX for other high-speed data switching applications. A single switch-enable ($\overline{EN}$) input is used to enable or disable the switch. When $\overline{EN}$ is set at logic 'L', the D-port is connected to the S-port that shows low-Ron between D-port and S-port that enables the switch. When $\overline{EN}$ is set at logic 'H', the high-impedance state exists between the D and S ports that disable the switch. The select (IN) pin controls the input data path of the MUX/DEMUX. The device spec at high off- isolation, so it will maintain isolation during power down.

It is powered by a single +1.8 to +5V rail typically and consumes extremely low power.

Pin connection



QSOP-16/SOP-16/TSSOP-16

Pin Description

PIN	DESCRIPTION
S1,S2	Analog video I/Os
D	Analog video
IN	IN Select input
$\overline{EN}$	Switch-enable input

Function Table

INPUTS		INPUT/OUTPUT	FUNCTION
$\overline{EN}$	IN	D	
L	L	S1	D port = S1 port
L	H	S2	D port = S2 port
H	X	Z	Disconnected

Ordering Information

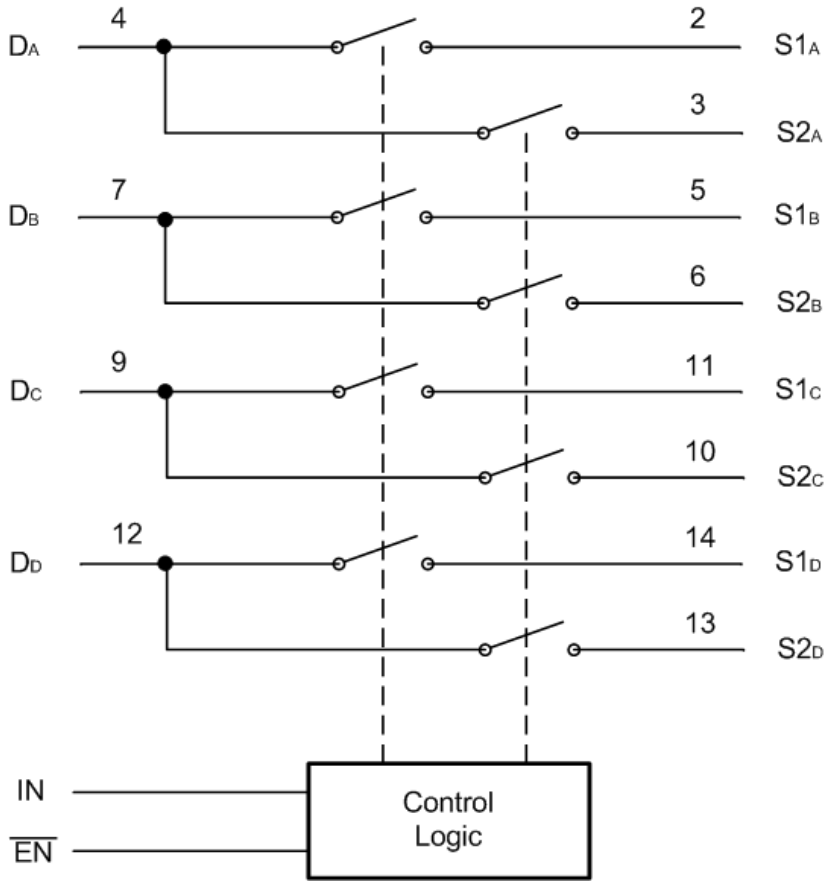
Ordering Code	Operation Range	Package	Packing
SV7330E-16QP-TR2	-40°C ~ +85°C	QSOP-16L	Tape & Reel, 2500pcs
SV7330E-16SP-TR2	-40°C ~ +85°C	SOP-16	Tape & Reel, 2500pcs
SV7330E-16TP-TR3	-40°C ~ +85°C	TSSOP-16	Tape & Reel, 3000pcs

Note:

SV - 7330SE - 16QP - TR2

- SV: SAVITECH
- 7330SE: Part Number
- 16QP: Package
  - 16QP: QSOP-16L
  - 16SP: SOP-16
  - 16TP: TSSOP-16
- TR2: Shipping
  - TR2: Tape & Reel, 2500pcs
  - TR3: Tape & Reel, 3000pcs

Function Diagram



Absolute maximum ratings

Parameter	Value	Unit
V_{CC} to GND, Supply Voltage,	7	V
Input Voltage	GND - 0.3 to (V_{CC}) +0.3	V
Storage Temperature Range	-65 to +150	°C
Continuous current through V_{DD} or GND	100	mA
ESD Susceptibility: HBM	>8000	V
ESD Susceptibility: MM	400	V

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

CAUTION

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SAVITECH recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.
ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

Electrical characteristics

(V_{CC} = +4.5V, GND = 0V, T_A = +25°C unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC CHARACTERISTICS						
On-Resistance	R_{ON}	V_{CC} =4.5V, Vin=0V, I_D=26mA		5.5		Ω
		V_{CC} =4.5V, Vin=2V, I_D =26mA		7.5		Ω
		V_{CC} =4.5V, Vin=4.5V, I_D =26mA		19		Ω
Input High Voltage	V_{IH}	V_{CC} =5.0V	V_{DD} * 0.6	2.34	V_{DD} * 0.4	V
Input Low Voltage	V_{IL}	V_{CC} =5.0V		2.33	0.5	V
Input High Current	I_{IH}	V_{CC} = 5.5V, V_{IN} and V_{EN}= V_{CC}		±1	2.5	μA
Input Low Current	I_{IL}	V_{CC} = 5.5V, V_{IN} and V_{EN}= 0V		±1	2.5	μA
Analog Output Leakage Current	I_O	V_{CC} = 5.5V, V_{S1} or V_{S2}= 0.3V/1.2V, V_D= 1.2V/0.3V		±1		μA
Clamp Diode Voltage	V_{IK}	I_{IN}= -1.8mA		-0.78		V
DYNAMIC CHARACTERISTICS						
Turn-On Time	T_{ON}	R_L= 75Ω, C_L= 20pF		22		ns
Turn-Off Time	T_{OFF}			4.8		ns
Off Isolation	O_{ISO}	Sync in 1080i 60Hz schema, DC couple		-60.8		dB
		2T pulse in 1080i 60Hz schema, DC couple		-59.0		dB
Channel- to Channel Crosstalk	X_{TALK}	f = 10MHz		-66.0		dB
–3dB Bandwidth	BW			480		MHz
Input/Enable Capacitance	C_{IN}	f = 1MHz		4		pF
Differential Gain	D_G	V_{CC}=5.0V, 5 Step Modulation Pattern in PAL schema		0.64		% p-p
Differential Phase	D_P	V_{CC}=5.0V, 5 Step Modulation Pattern in PAL schema		0.15		% deg.
POWER REQUIREMENTS						
Power Supply Current	I_{CC}	V_{CC} = 5.5V, V_{IN} = 0V or V_{CC}		0.4	3	μA
Supply Current per Input @ TTL HIGH	ΔI_{CC}	V_{CC} = 5.5V, V_{IN} = 3.4V			2.5	mA

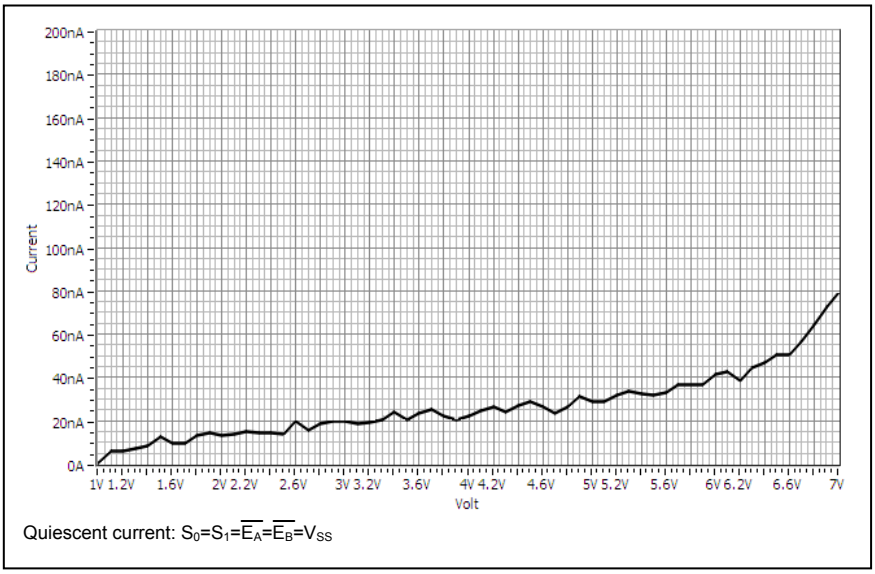
Specifications are subject to change without notice.

PARAMETER	DESCRIPTION
R_{ON}	Resistance between source and drain with switch in the ON state
I_O	Output leakage current measured at S1, S2, and D with the switch OFF
V_{IN}	Digital voltage at the IN pin that selects between S1 and S2 analog inputs
V_I	Voltage applied to the D or S1, S2 pins when D or S1, S2 is the switch input
V_{IK}	A Clamp Diode Voltage Drop
C_{IN}	Capacitance at the digital inputs
C_{OFF}	Capacitance at analog I/O (S1, S2, D) with switch OFF
C_{ON}	Capacitance at analog I/O (S1, S2, D) with switch ON
V_{IH}	Minimum input voltage for logic HIGH
V_{IL}	Minimum input voltage for logic LOW
$I_{IH\ (IL)}$	Input current of the digital input
T_{ON}	Propagation delay measured between 50% of the digital input to 90% of the analog output when switch is turned ON.
T_{OFF}	Propagation delay measured between 50% of the digital input to 90% of the analog output when switch is turned OFF.
BW	response of the switch in the ON state measured at 3dB down
D_G	Magnitude variation between analog input and output pins when the switch is ON and the dc offset of composite-video signal varies at the analog input pin. In the PAL standard, the frequency of the video signal is 4.43MHz.
D_P	Phase variation between analog input and output pins when the switch is ON and the dc offset of composite-video signal varies at the analog input pin. In the PAL standard, the frequency of the video signal is 4.43MHz.
O_{ISO}	Off isolation is the resistance (measured in 100IRE 2T 1080i pulse) between the input and output with the switch off (NO)

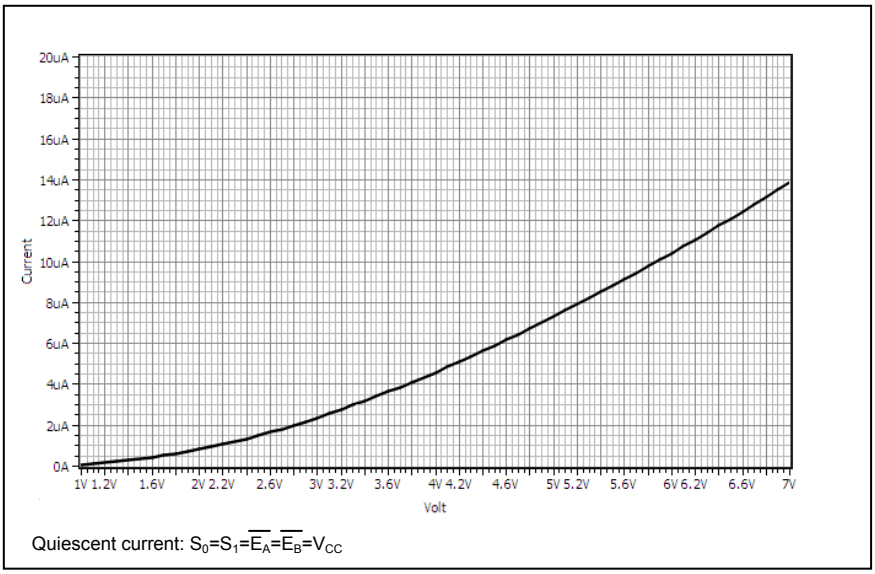
Typical Performance Characteristics

DC ELECTRICAL CHARACTERISTICS

Quiescent Power Supply Current (I_{CC})

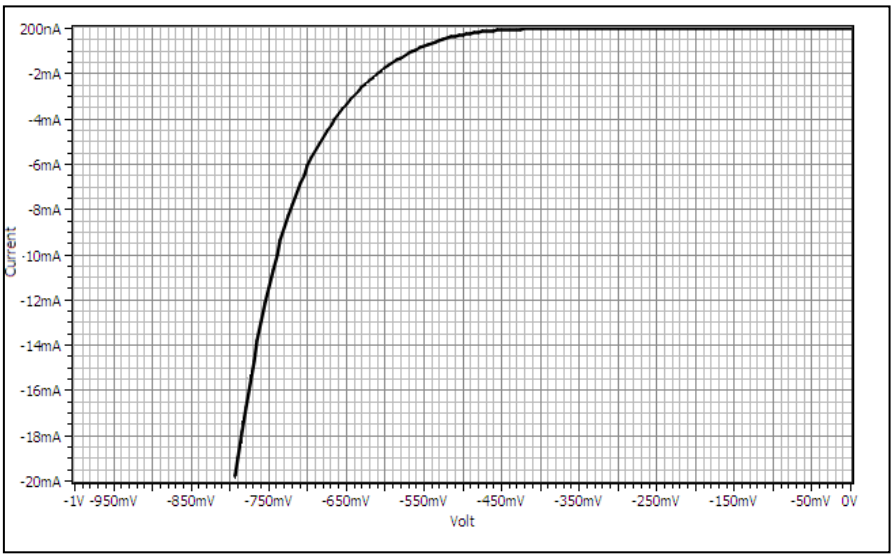


Quiescent current: $S_0=S_1=\overline{E_A}=\overline{E_B}=V_{SS}$

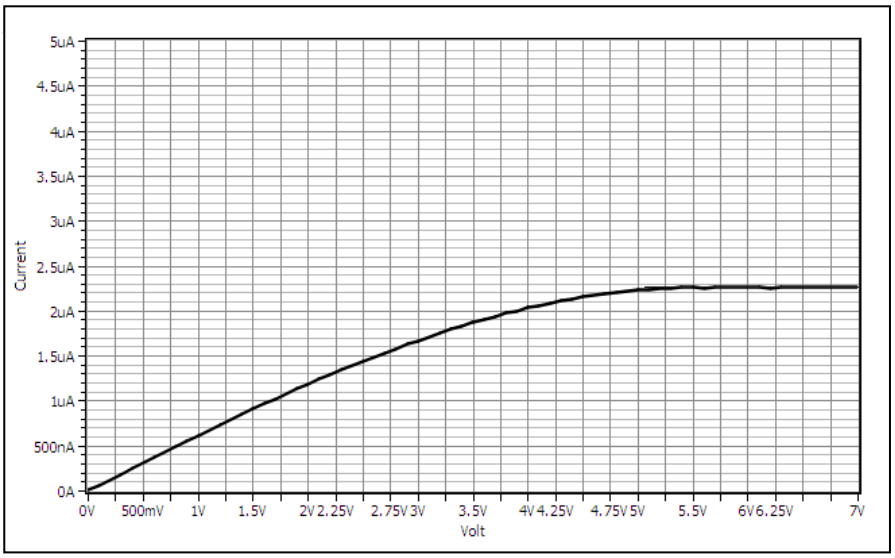


Quiescent current: $S_0=S_1=\overline{E_A}=\overline{E_B}=V_{CC}$

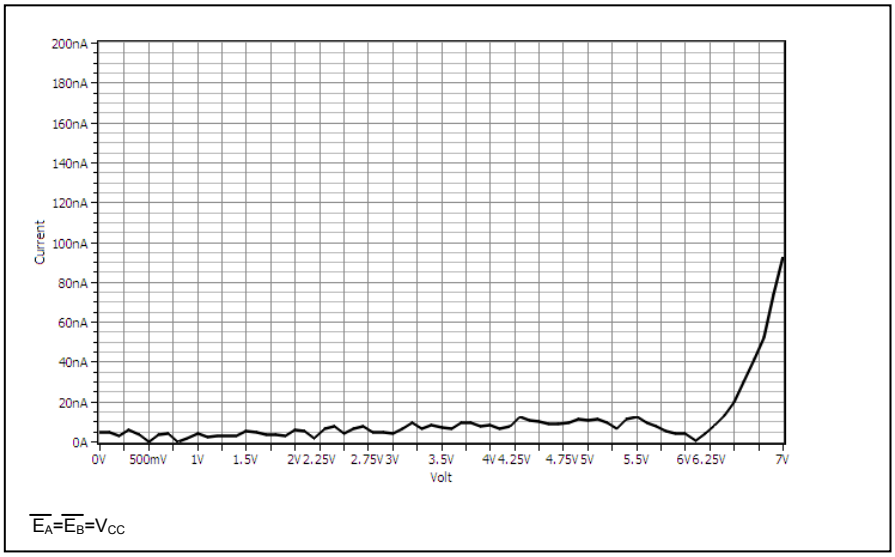
Clamp Diode Voltage (V_{IK})



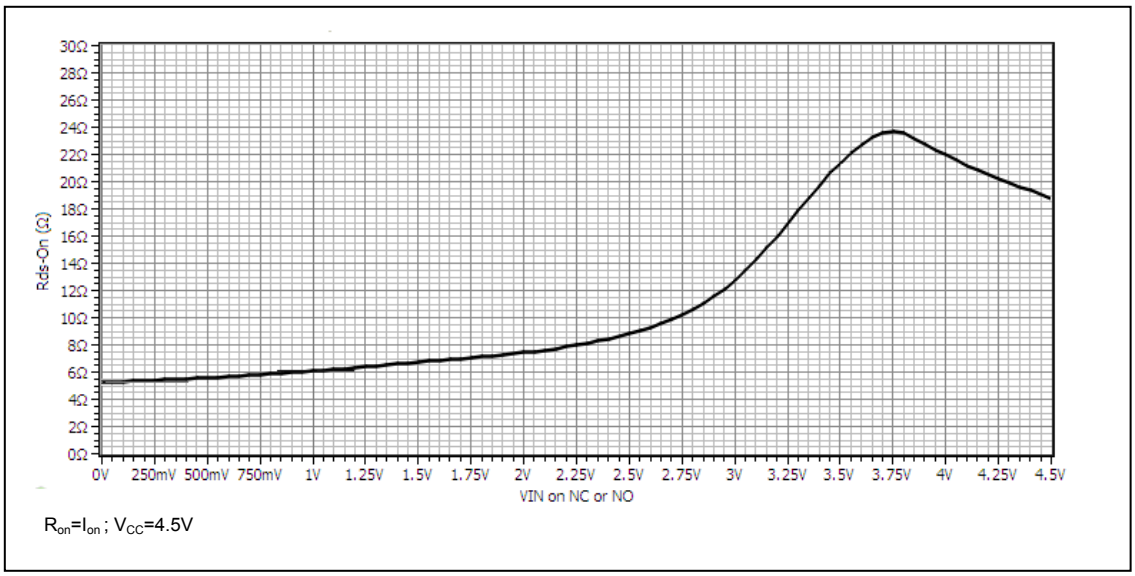
Control Input Leakage (I_{IH} and I_{IL}) for $\overline{S0}$, $\overline{S1}$, E_A and E_B



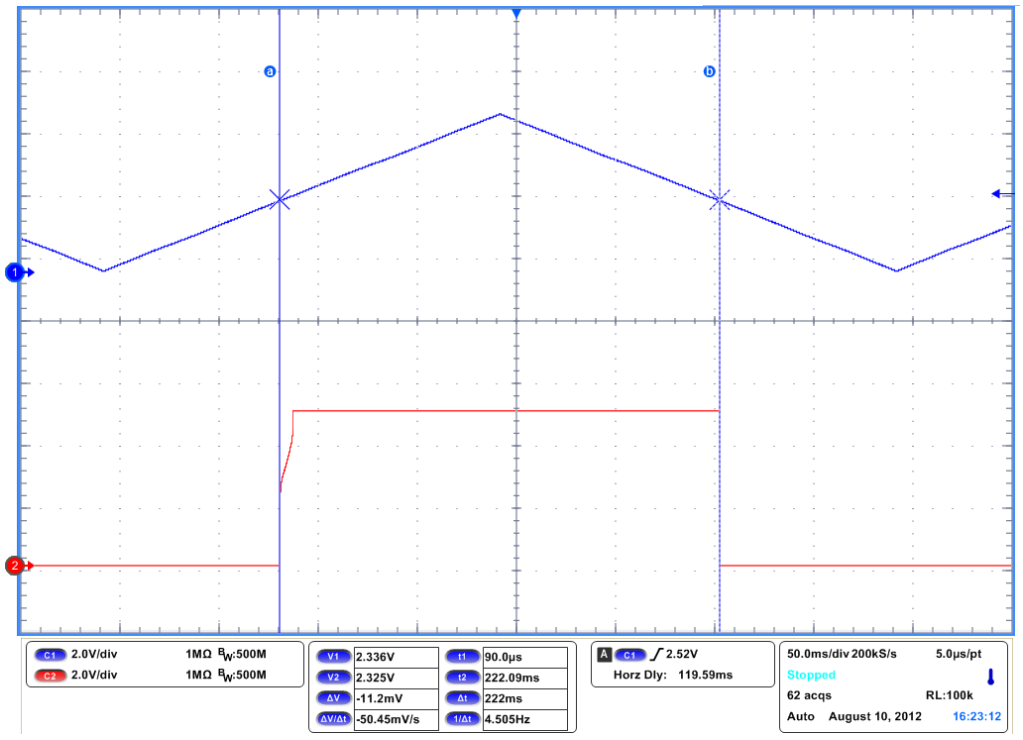
IO Input Leakage (I_O) for IAn, IBn, Y_A and Y_B



Switch ON Resistance (R_{ON})



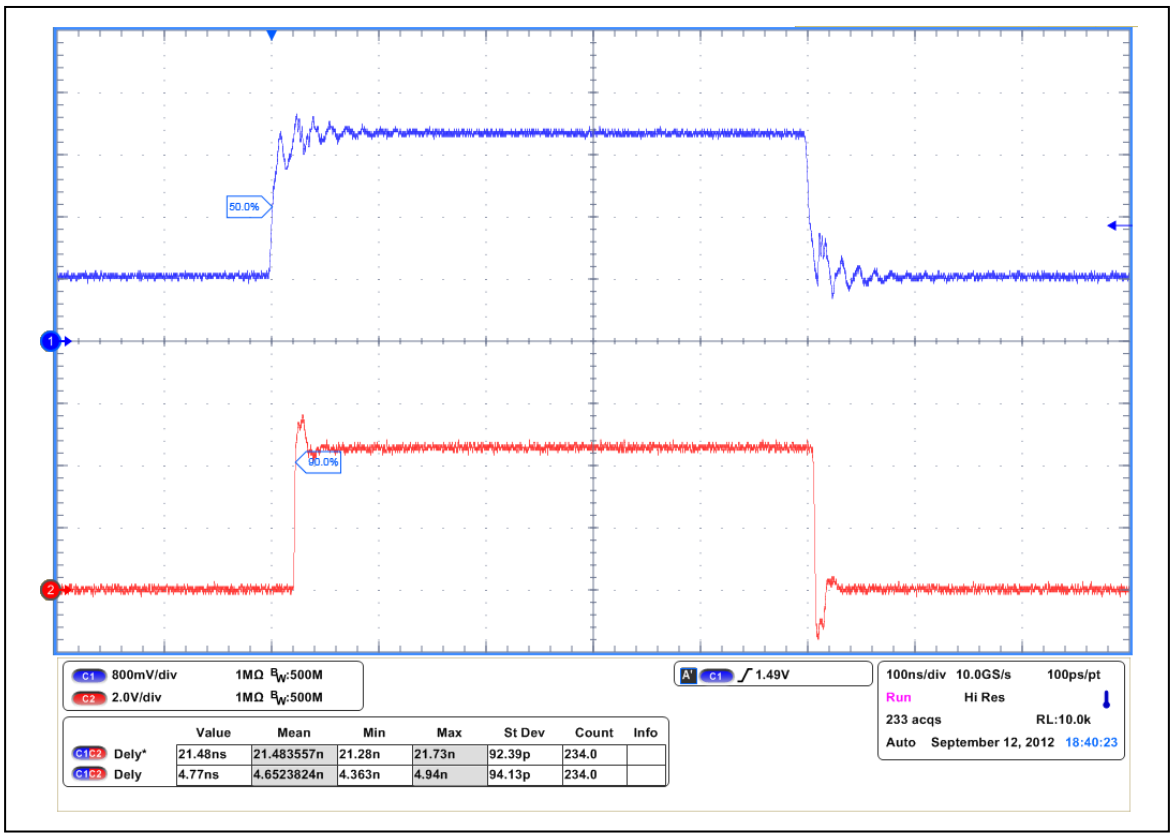
Input Logic Level (V_{IH}, V_{IL})



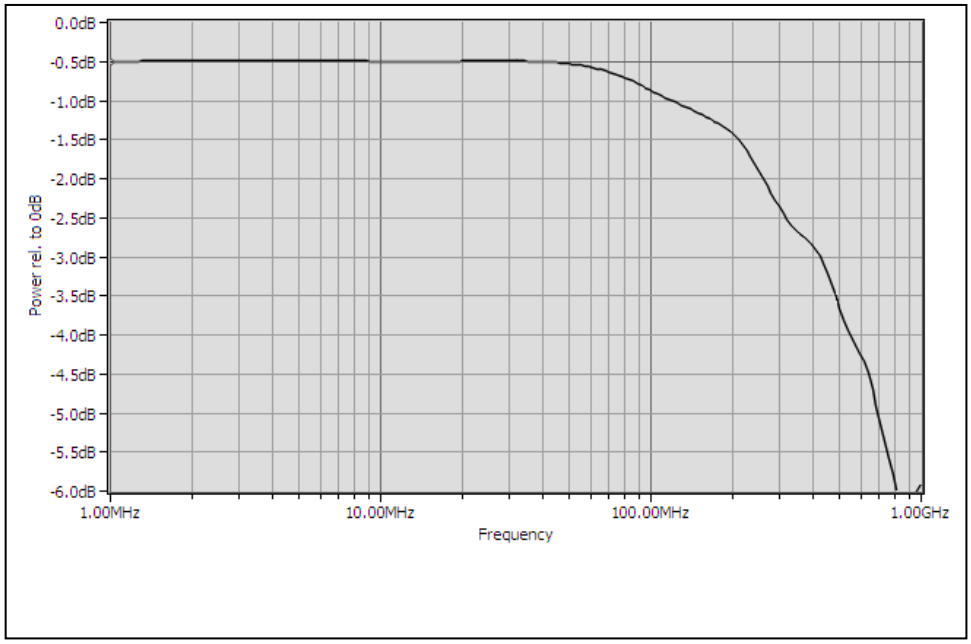
V_{IH} / V_{IL} under V_{CC}=5.0V

AC ELECTRICAL CHARACTERISTICS

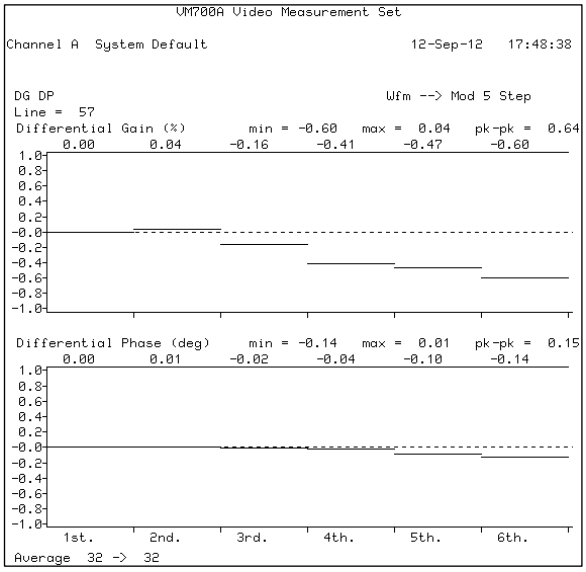
Turn ON/ Turn OFF Timing (T_{ON}, T_{OFF})

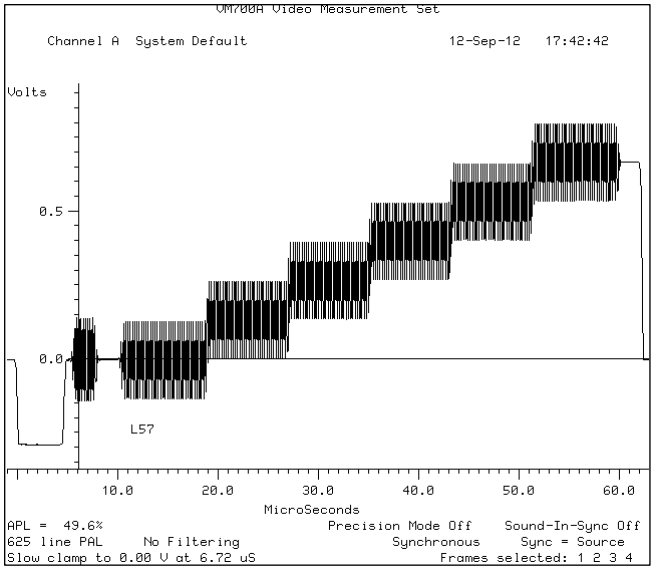


Bandwidth (-3dB Bandwidth, BW)

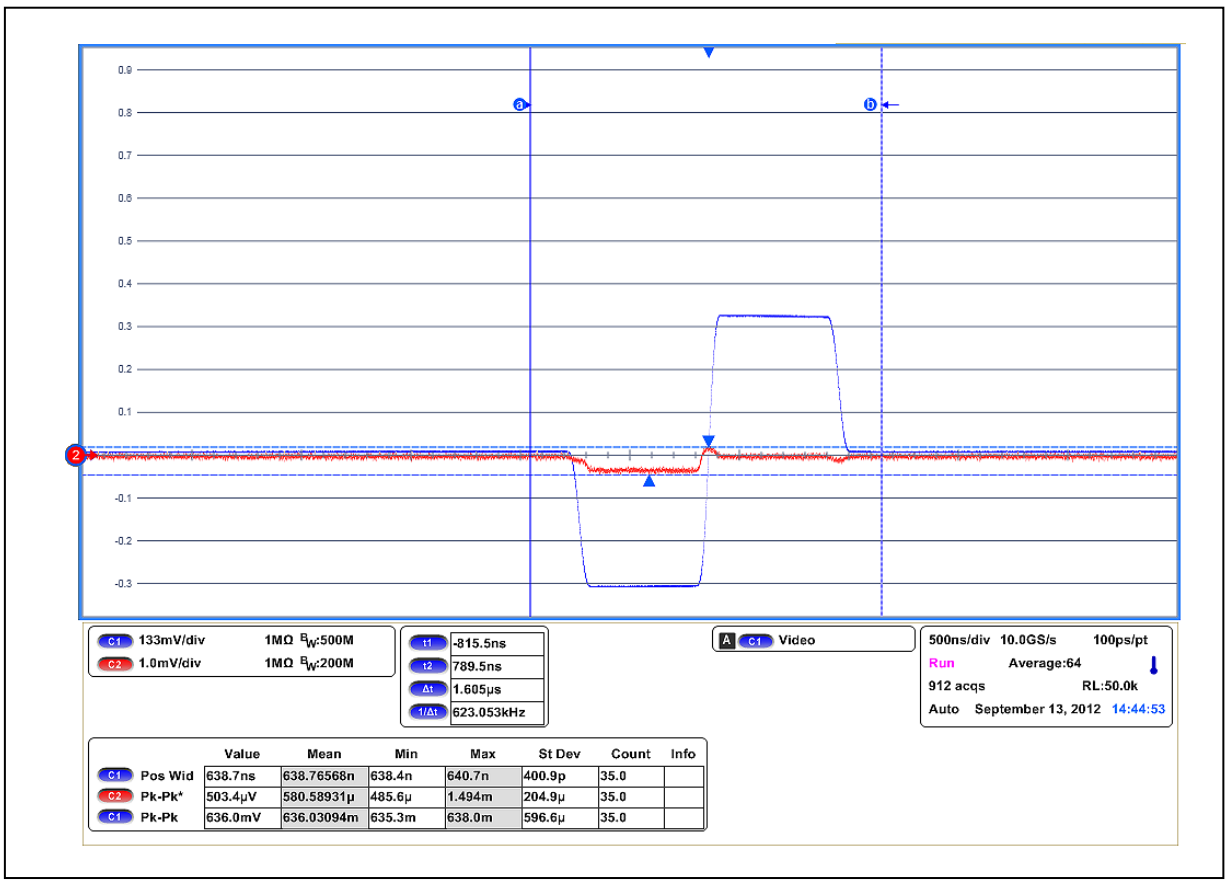


Differential Gain/ Phase (D_G, D_P)

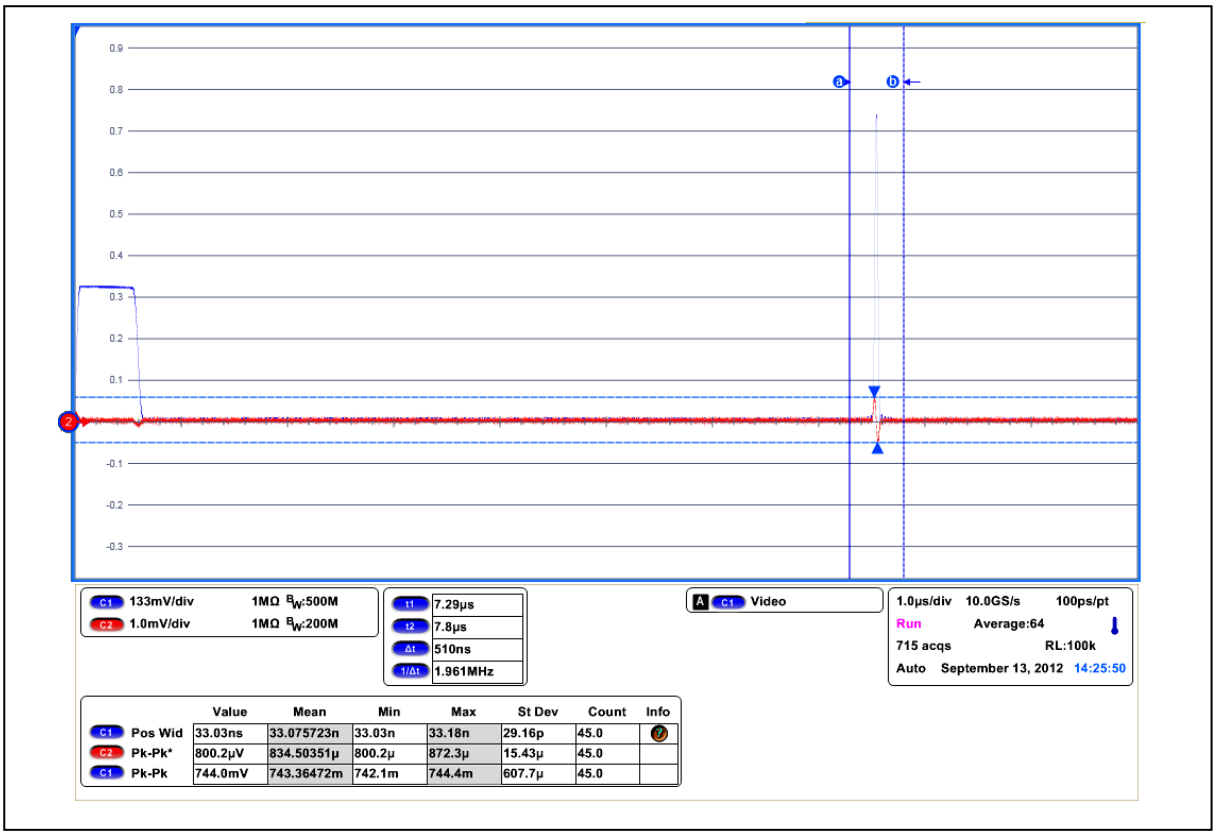




Video Off-Isolation (O_{ISO}): Sync Feed Through

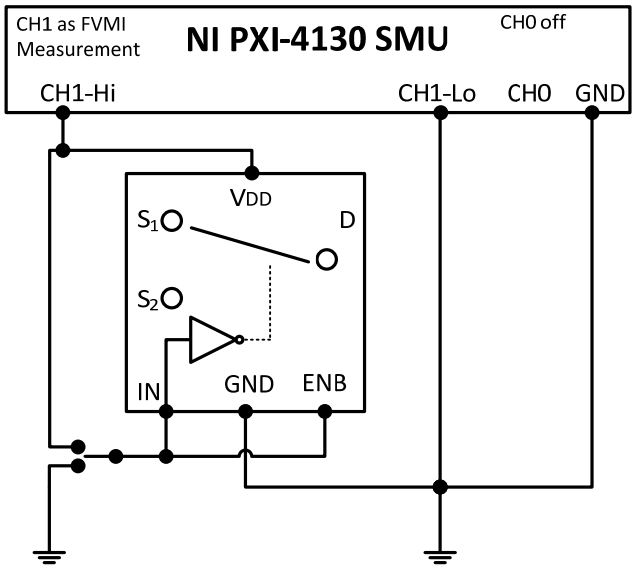


Video Off-Isolation (O_{ISO}): 2T Pulse Feed Through



Parameter Measurement Information

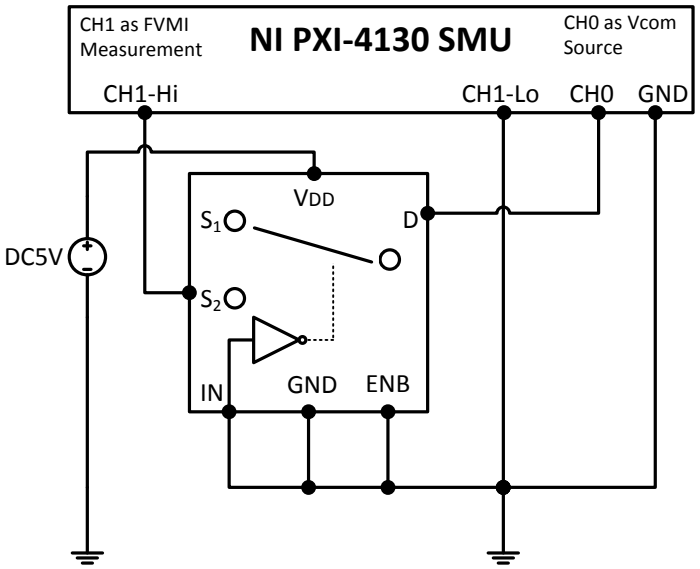
Power Supply Current (I_{CC})



Quiescent Power Supply Current (V_{IN}=V_{DD} or GND)

*FVMI = Force Voltage Measure Current mode.

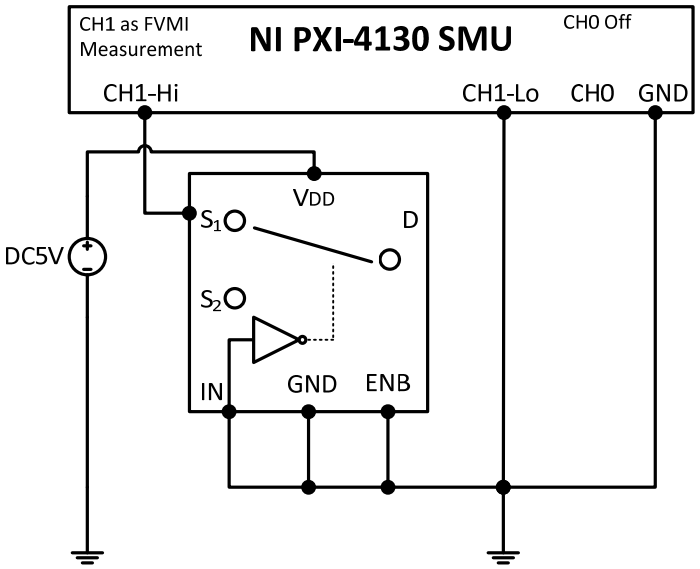
Off-State Leakage Current (I_O)



Off-State Leakage Current

*FVMI = Force Voltage Measure Current mode.

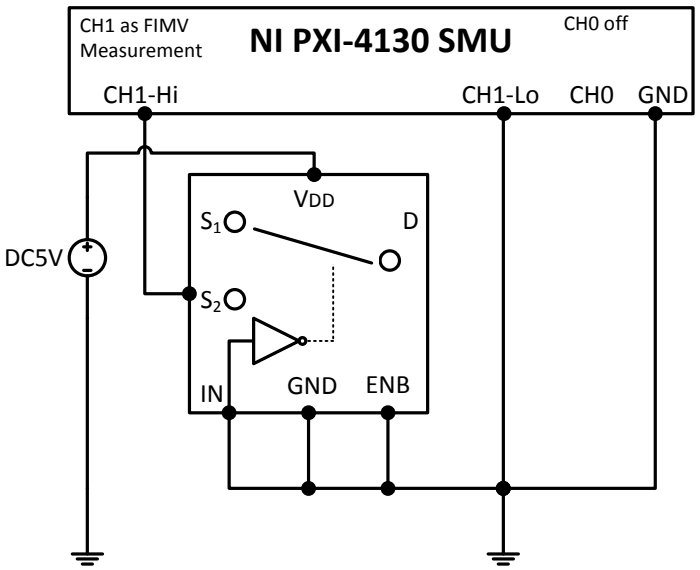
On-State Leakage Current (I_O)



On-State Leakage Current

*FVMI = Force Voltage Measure Current mode.

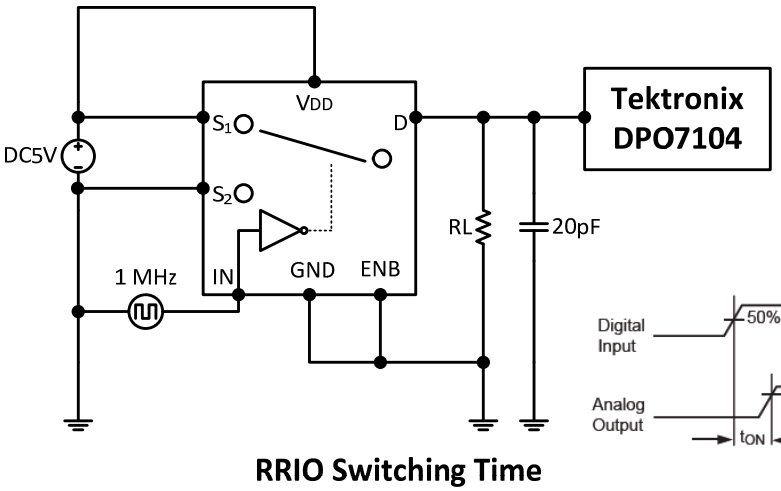
Clamp Diode Voltage (V_{IK})



Clamp Diode Voltage (V_{IK})

*FVMI = Force Voltage Measure Current mode.

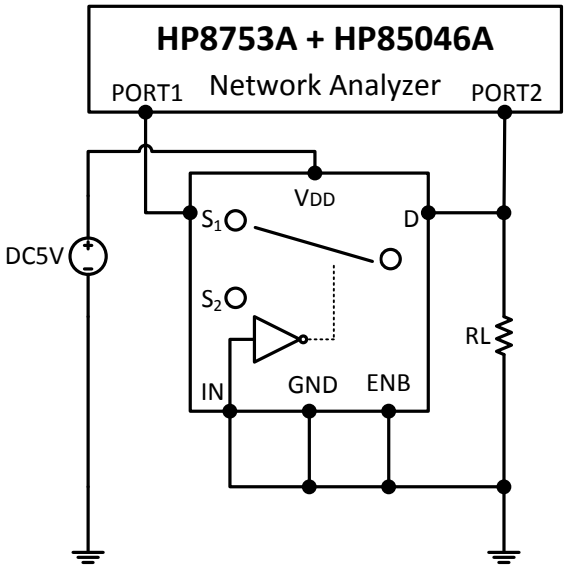
Rail to Rail Turn ON/Turn-OFF Timing (T_{ON}, T_{OFF})



RRIO Switching Time

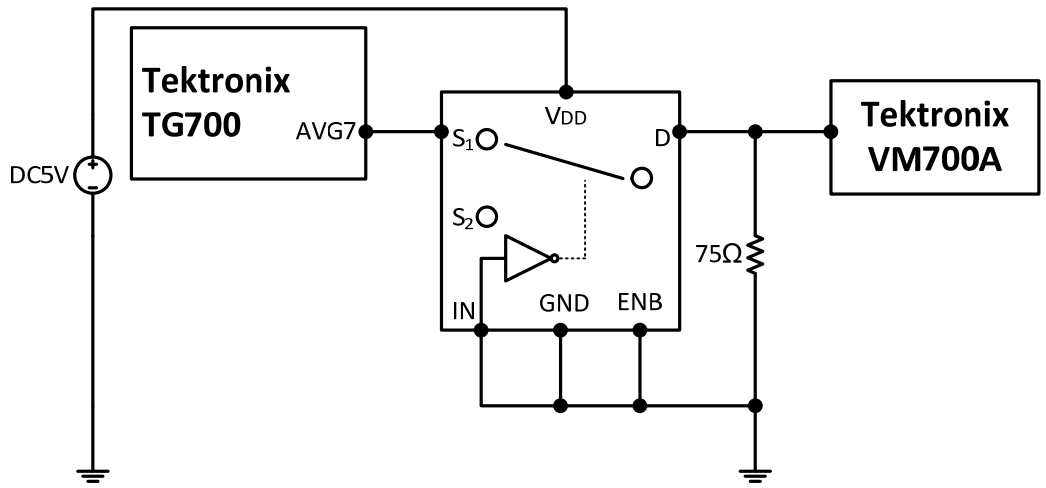
R_L = 75Ω, C_L=20pF include test jig and instrument parasitic capacitance.
Analog output swing was V_{SS} to V_{CC}.

Bandwidth (BW)



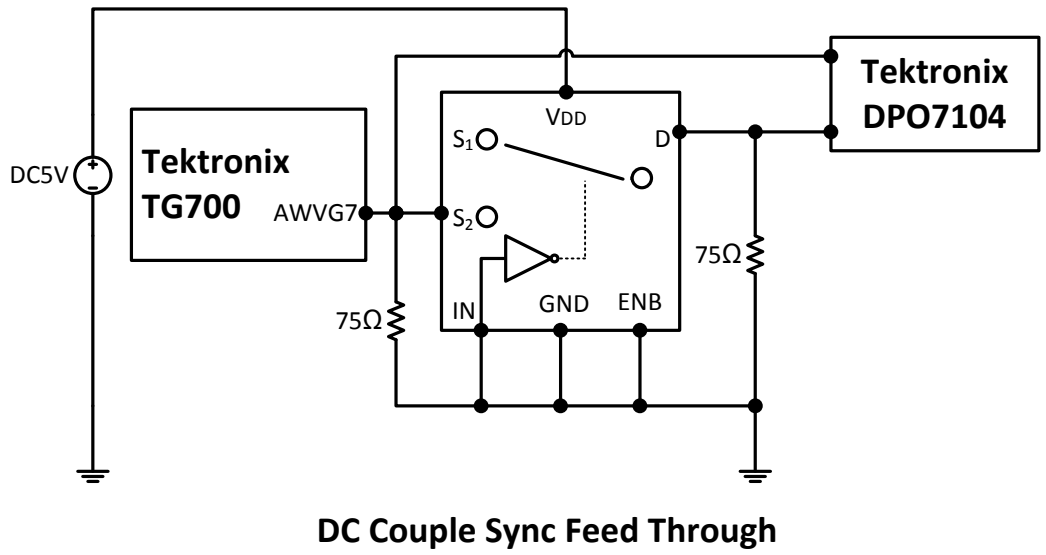
Bandwidth (0dBm)

Differential Gain/ Phase (D_G, D_P)



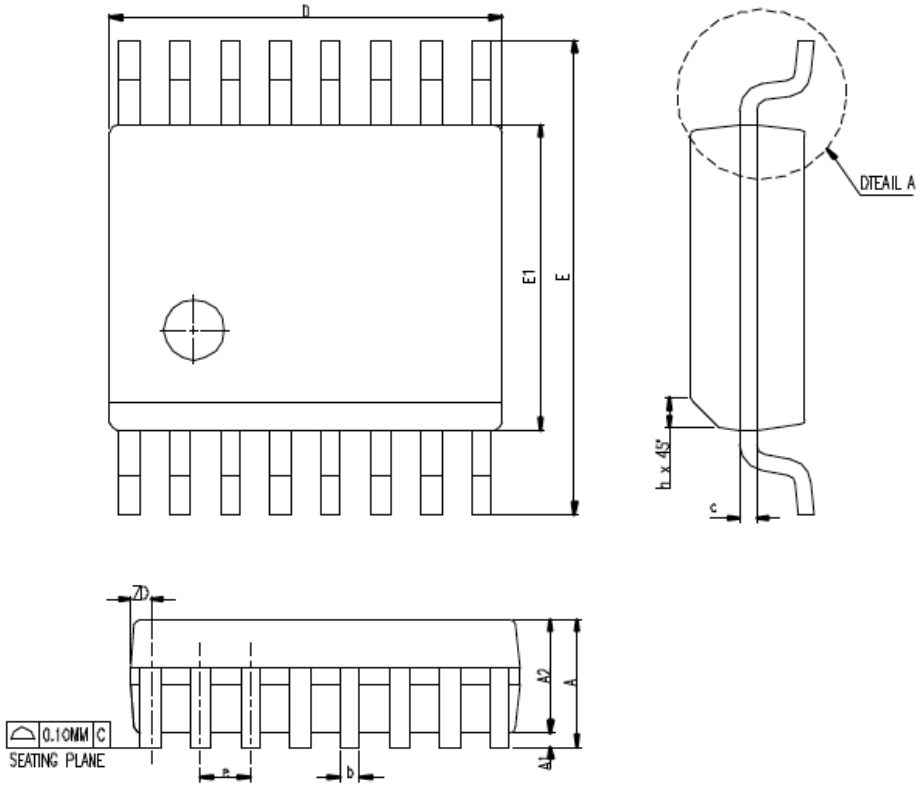
DC couple TV CVBS video signal input and output.
Test 5-step modulation composite TV signal in PAL format, burst frequency = 4.4336MHz.

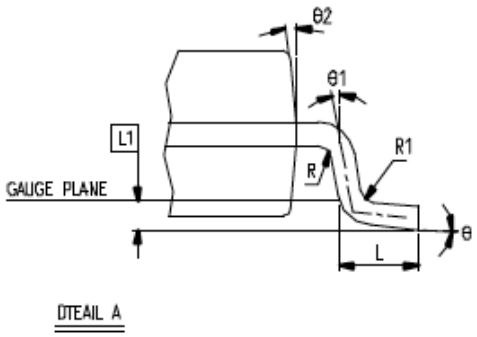
DC Couple Sync/ Pulse Feed-Through (Off-Isolation, O_{ISO})



Test 2T pulse and sync with component Y channel signal in HDTV 1080i 60Hz format.

QSOP-16 MECHANICAL DATA

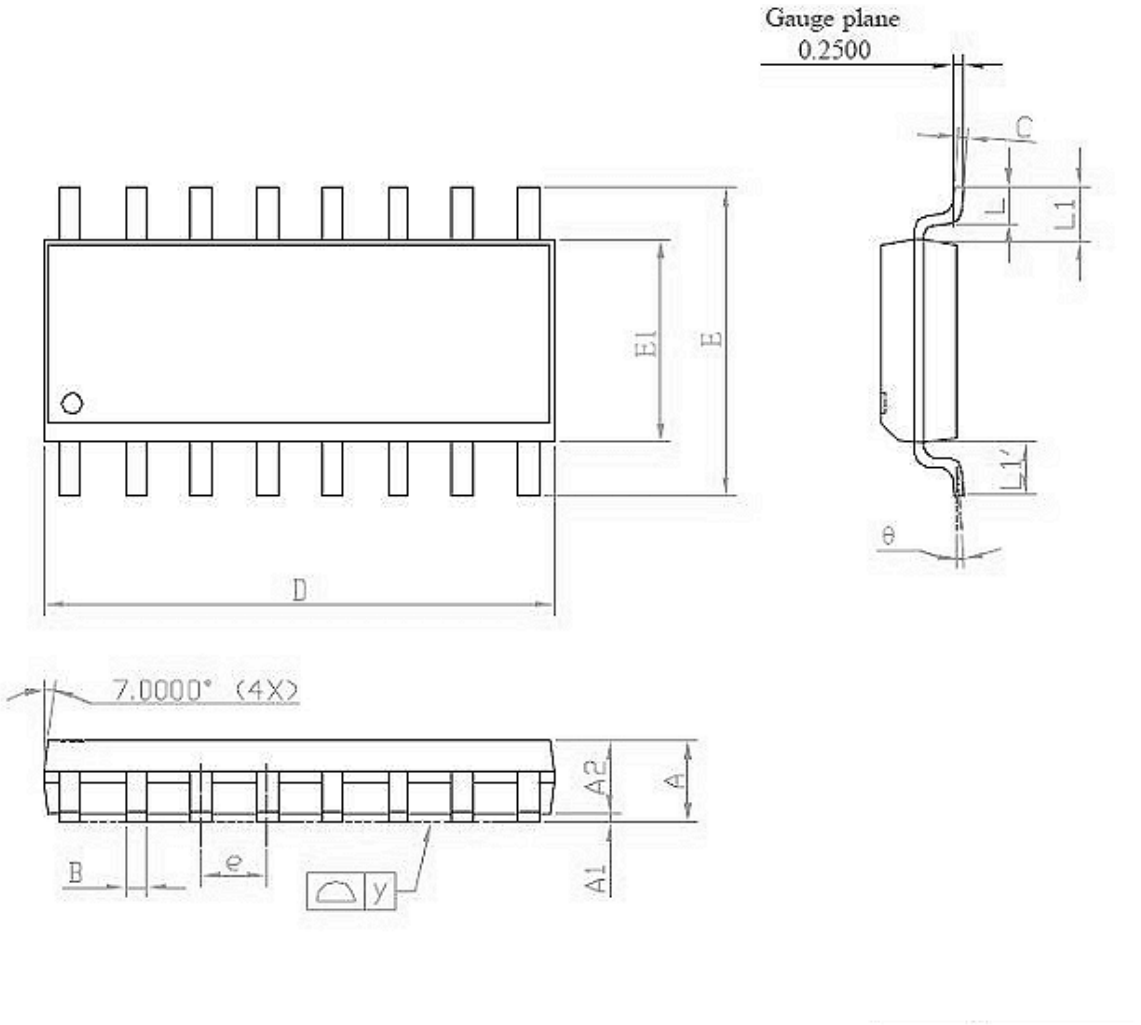




Symbol	Dimension in MM			Dimension in Inch		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.35	1.63	1.75	0.053	0.064	0.069
A1	0.10	0.15	0.25	0.004	0.006	0.010
A2			1.50			0.059
b	0.20		0.30	0.008		0.012
c	0.18		0.25	0.007		0.010
e	0.650 BASIC			0.025 BASEC		
D	4.80	4.90	5.00	0.189	0.193	0.197
E	5.79	5.99	6.20	0.228	0.236	0.244
E1	3.81	3.961	3.99	0.150	0.154	0.157
L	0.41	0.635	1.27	0.016	0.025	0.050
h	0.25		0.50	0.010		0.020
L1	0.254 BASIC			0.010 BASIC		
ZD	0.229 REF			0.009 REF		
R1	0.20		0.33	0.008		0.013
R	0.20			0.008		
Θ	0*		8*	0*		8*
Θ1	0*			0*		
Θ2	5*	10*	15*	5*	10*	15*
JEDEC	MO-137 (AB)					

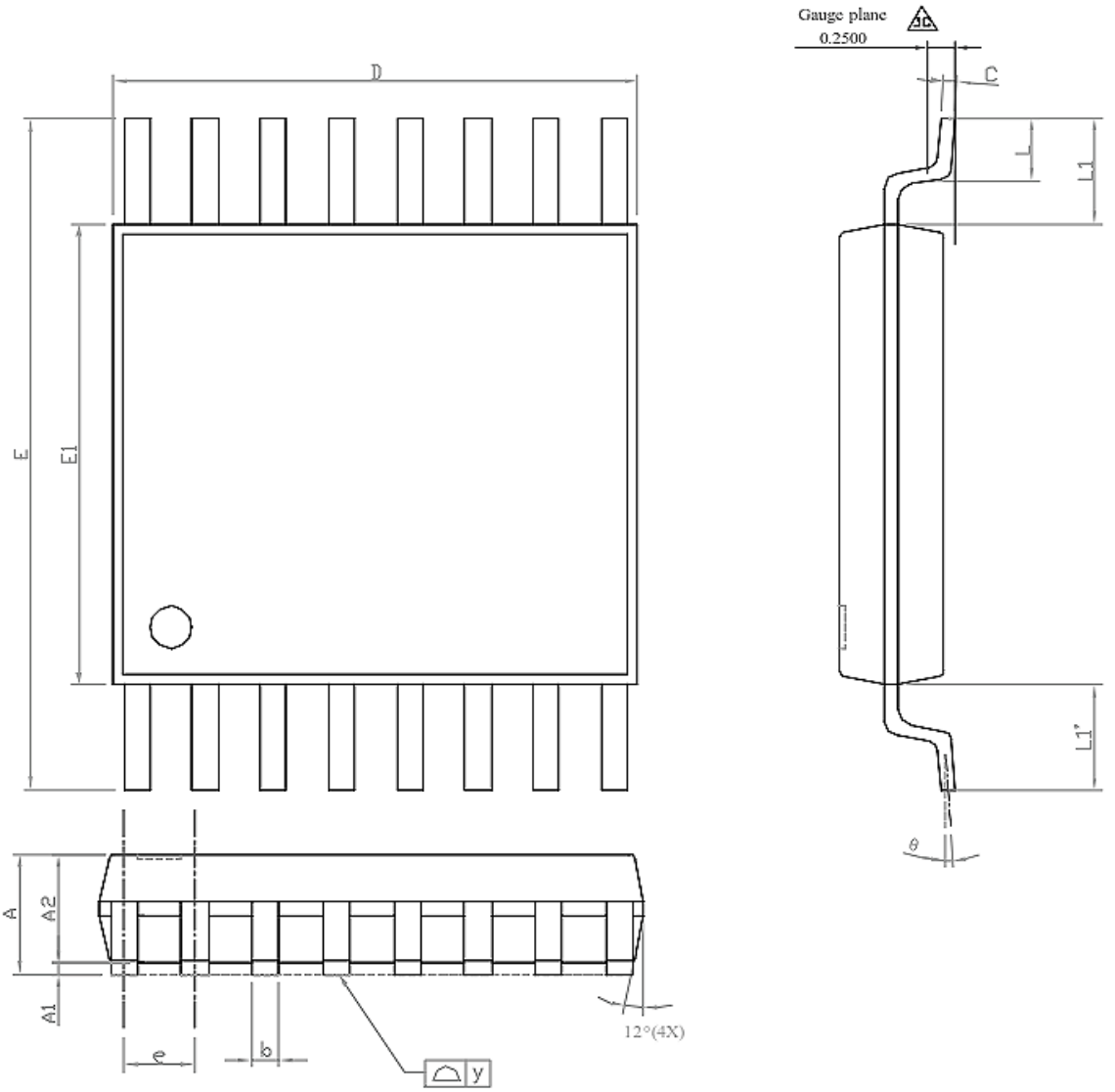
Note:
1. Dimension 0 does not include mold protrusions or gate burrs
2. Mold protrusions and gate burrs shall not exceed 0.006 inch per side.

SOP-16 MECHANICAL DATA



Symbol	Dimension in MM			Dimension in Inch		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.35	1.60	1.75	0.053	0.063	0.069
A1	0.10		0.25	0.004		0.010
A2		1.45			0.057	
B	0.33		0.51	0.013		0.020
C	0.19		0.25	0.007		0.010
D	9.80		10.00	0.386		0.394
E1	3.80	3.90	4.00	0.150		0.157
e		1.27				
E	5.80	6.00	3.20	0.228		0.244
L	0.40		1.27	0.016		0.050
y			0.10			0.004
Θ	0°		8°	0°		8°
|L1-L1'|			0.12			0.005
L1	1.04REF			0.041REF		

TSSOP-16 MECHANICAL DATA



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	—	—	1.20	—	—	0.048
A1	0.05	—	0.15	0.002	—	0.006
A2	0.80	1.00	1.05	0.031	0.039	0.041
b	0.19	—	0.30	0.007	—	0.012
C	0.09	—	0.20	0.004	—	0.008
D	4.90	5.00	5.10	0.193	0.197	0.201
E	6.20	6.40	6.60	0.244	0.252	0.260
E1	4.30	4.40	4.50	0.169	0.173	0.177
e	—	0.65	—	—	0.026	—
L	0.45	0.60	0.75	0.018	0.024	0.030
y	—	—	0.10	—	—	0.004
θ	0°	—	8°	0°	—	8°
|L1-L1'|	—	—	0.12	—	—	0.005
L1	1.00REF			0.039REF		

NOTE
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS
2. TOLERANCE ±0.1 mm UNLESS OTHERWISE SPECIFIED
3. COPLANARITY : 0.1 mm
4. LEAD BURR LESS THAN 5mil
5. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
6. FOLLOWED TO JEDEC MO-153

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