

### FEATURES

- Triple Video Line Driver Chip With Y/C Inputs
- Composite and Y/C Outputs
- $R_L = 150 \Omega$  (75  $\Omega$  Back-Terminated Cable)
- Internal Clamping and Bias Circuitry
- Power-Down Standby Mode
- Very Small 5.0 x 4.4 mm Package
- Low Power Dissipation: 168 mW
- 1 V<sub>P-P</sub> Input Range
- 6 dB Voltage Gain
- Flat Response  $f_{IN} = 100$  kHz to 10 MHz (typical)
- Crosstalk -40 dB (Typical)
- Single +5 Volt Power Supply

### GENERAL DESCRIPTION

The SPT9400 is a triple video line driver chip that takes standard Y/C analog inputs and provides simultaneous Y/C and composite video analog outputs for driving 75  $\Omega$  lines. Internal summing of the Y and C inputs is performed to produce composite video output. It is possible to achieve composite output on both the Y and CVBS outputs simultaneously by inputting a composite signal on the Y input. The luminance input is clamped at 1.25 V and amplified 6 dB to produce a 2 V<sub>P-P</sub> (typical) into a series 75  $\Omega$  resistor and 75  $\Omega$

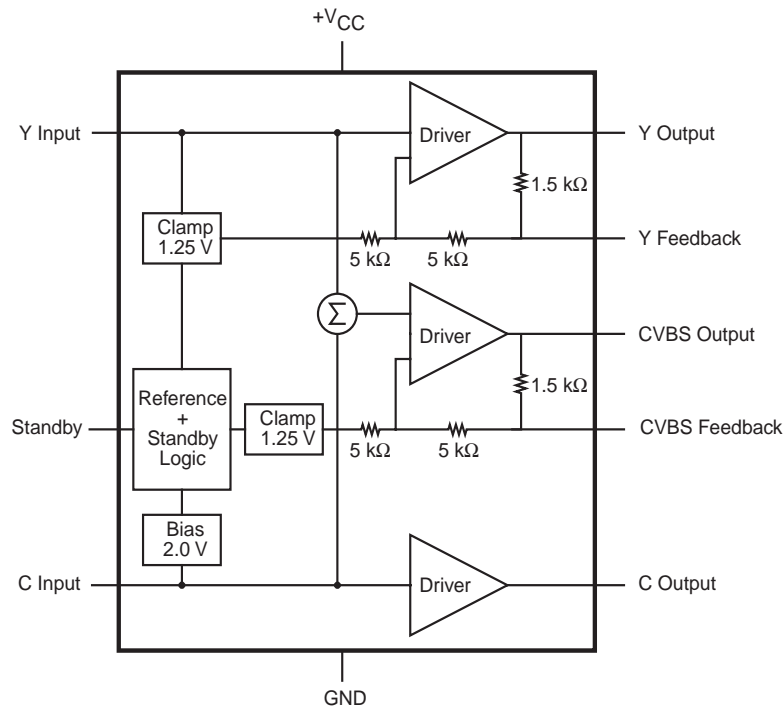
### APPLICATIONS

- Video Editing Equipment
- Video Capture/Playback Cards
- Video Tape Recorders
- TV Monitor Sources
- Multimedia PCs

cable load. The internal 1.5 k $\Omega$  resistor provides gain compensation for low frequency signals. The chrominance input is biased at 2.0 V and amplified 6 dB to produce a 1.2 V<sub>P-P</sub> (typical), into a series 75  $\Omega$  resistor and 75  $\Omega$  cable load.

The SPT9400 features a standby (active low) mode that draws only 113  $\mu$ W of power. Nominal power dissipation (no input) is typically 168 mW. It requires a single +5 V supply, operates over the commercial temperature range (0 to +70  $^{\circ}$ C) and is available in a very small (5.0 x 4.4 mm) 12-lead Shrink Small Outline Package (SSOP).

### BLOCK DIAGRAM



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## ABSOLUTE MAXIMUM RATINGS (Beyond which damage may occur)<sup>(1)</sup> 25 °C

### Supply Voltages

V<sub>CC</sub> ..... +6.0 V

### Maximum Power Dissipation

P<sub>D</sub> ..... 350 mW

### Thermal Impedance (T<sub>A</sub>=+25 °C and above)

θ<sub>CA</sub> ..... 2.8 mW/°C

### Temperature

Operating Temperature ..... 0 to +70 °C

Storage Temperature ..... -55 to +150 °C

**Note:** 1. Operation at any Absolute Maximum Rating is not implied. See Electrical Specifications for proper nominal applied conditions in typical applications.

## ELECTRICAL SPECIFICATIONS

T<sub>A</sub> = +25 °C, V<sub>CC</sub> = +5.0 V, V<sub>IN</sub> = 1.0 V<sub>P-P</sub> video signal, R<sub>L</sub> = 150 Ω, unless otherwise specified.

PARAMETERS	TEST CONDITIONS	TEST LEVEL	SPT9400			UNITS
			MIN	TYP	MAX	
Power Supply						
Supply Current (I <sub>CC</sub> )	No Input	I		33.5	45	mA
V <sub>CC</sub> Voltage		IV	4.5	5.0	5.5	V
Power Dissipation		I		168	225	mW
Standby Current	Pin 5 Grounded	I		22.5	50	μA
Standby Power Dissipation	Pin 5 Grounded	I		113		μW
Digital Input						
Digital Input (Low)	Standby Pin 5	I	0.0	0.1	0.3	V
Digital Input (High)	Standby Pin 5	I	1.8	2.0	V <sub>CC</sub>	V
Bias Voltages						
Clamp Voltage	Y Input Pin 2	I	1.05	1.25	1.45	V
Bias Voltage	C Input Pin 6	I	1.7	2.0	2.3	V
Dynamic Performance						
Voltage Gain		I	5.5	6.0	6.5	dB
Differential Gain	Ramp Input 3.58 MHz	I	-3.0	-1.5	+3.0	%
Differential Phase	Ramp Input 3.58 MHz	I	-3.0	+0.2	+3.0	Degrees
Frequency Response	f <sub>IN</sub> = 1 to 5 MHz	V		0.0		dB
Cross Talk	Y <sub>IN</sub> to C <sub>OUT</sub>	V		-40		dB
	C <sub>IN</sub> to Y <sub>OUT</sub>	V		-40		dB

### TEST LEVEL CODES

All electrical characteristics are subject to the following conditions:

All parameters having min/max specifications are guaranteed. The Test Level column indicates the specific device testing actually performed during production and Quality Assurance inspection. Any blank section in the data column indicates that the specification is not tested at the specified condition.

### TEST LEVEL

I  
II  
III  
IV  
V  
VI

### TEST PROCEDURE

100% production tested at the specified temperature.  
100% production tested at T<sub>A</sub> = +25 °C, and sample tested at the specified temperatures.  
QA sample tested only at the specified temperatures.  
Parameter is guaranteed (but not tested) by design and characterization data.  
Parameter is a typical value for information purposes only.  
100% production tested at T<sub>A</sub> = +25 °C. Parameter is guaranteed over specified temperature range.

Figure 1 - Typical Interface Circuit

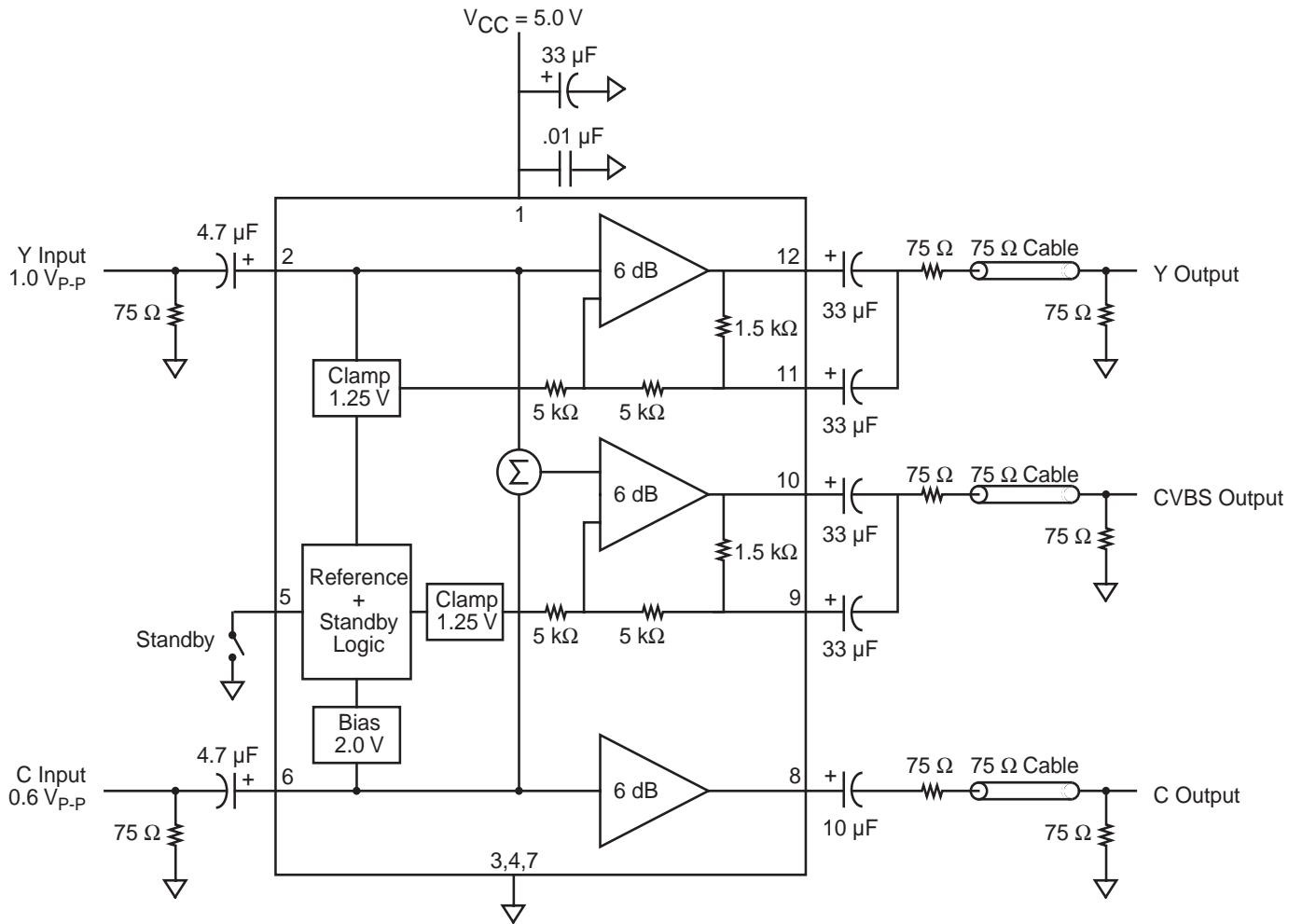


Figure 2 - CVBS Output (Multiburst Test)

VM700A Video Measurement Set

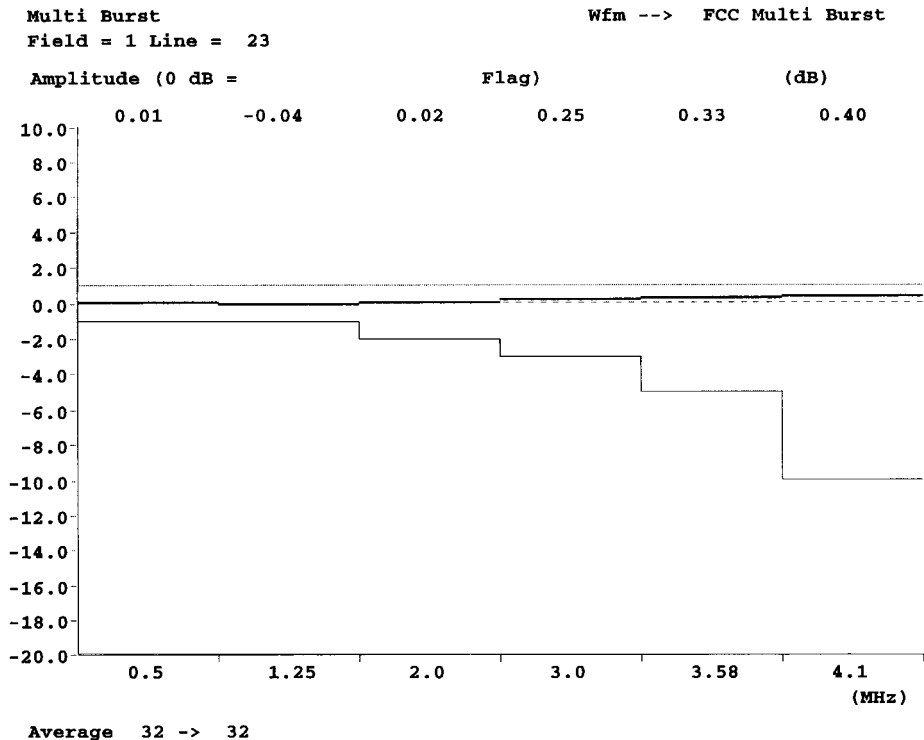


Figure 3 - CVBS Output (DP/DG)

VM700A Video Measurement Set

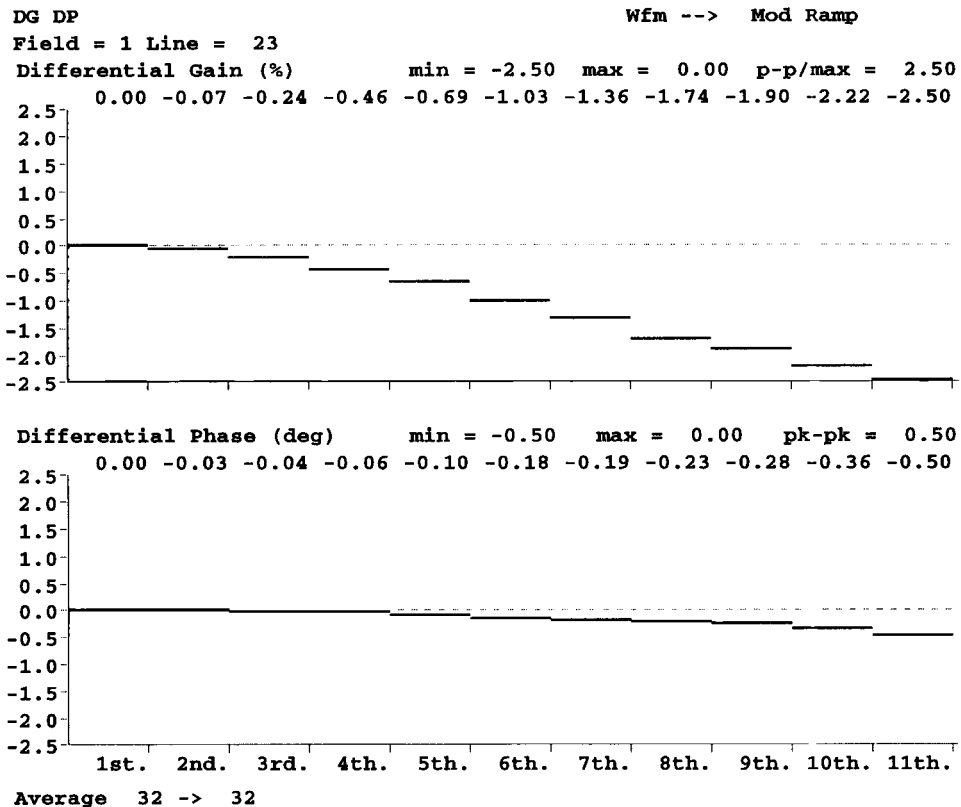


Figure 4 - CVBS Output (Vector Scope)

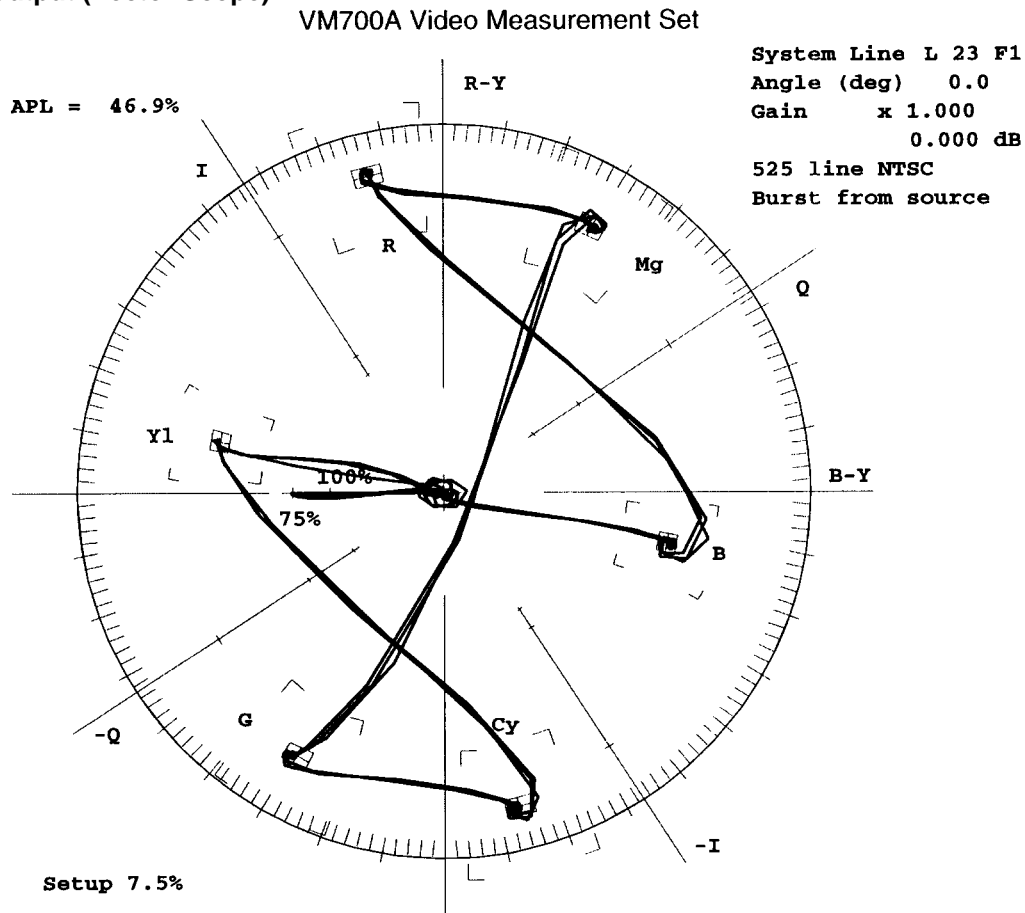
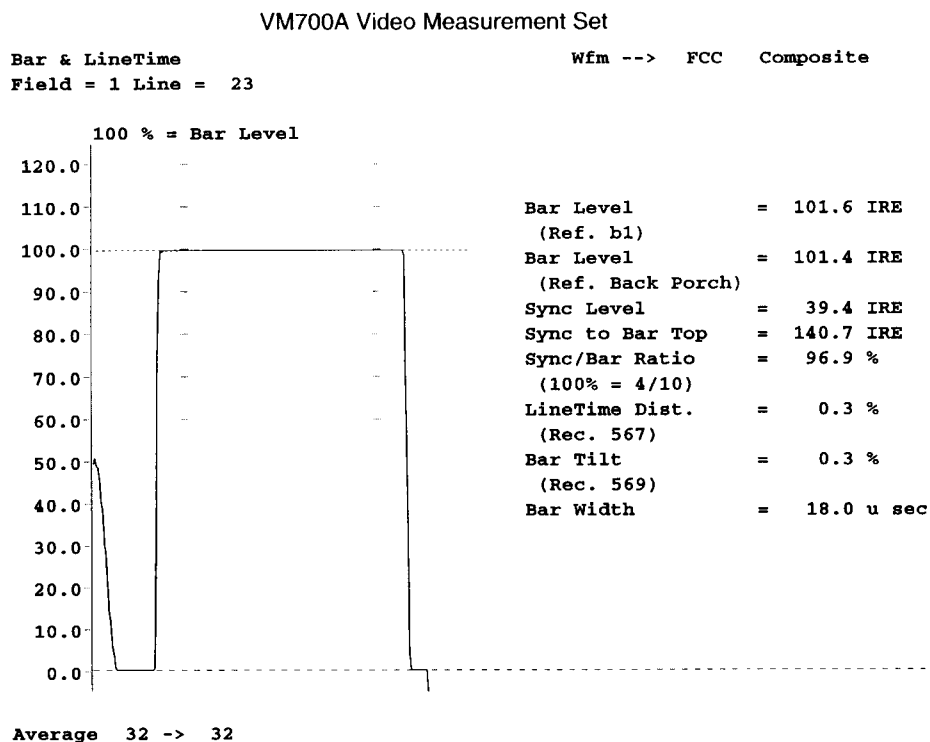
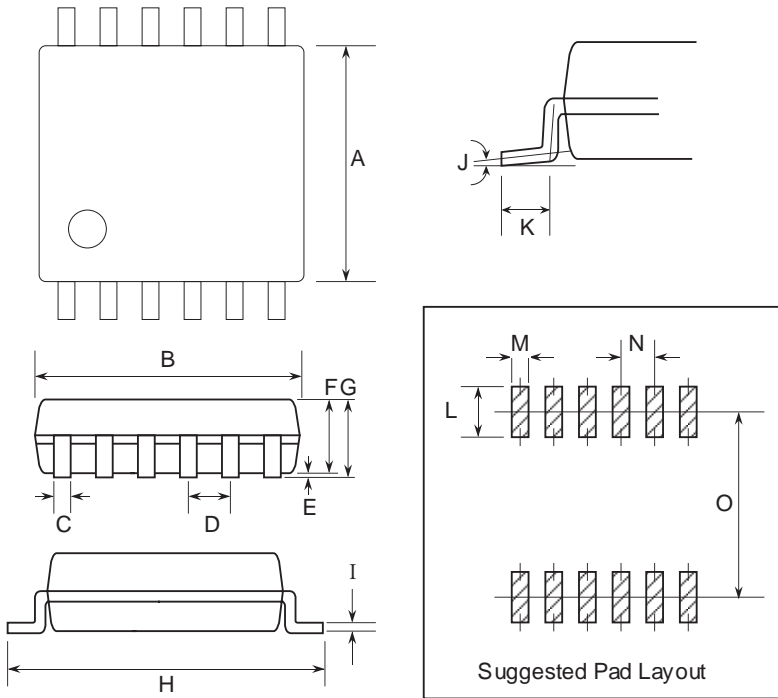


Figure 5 - CVBS Output (Bar and Line Time)



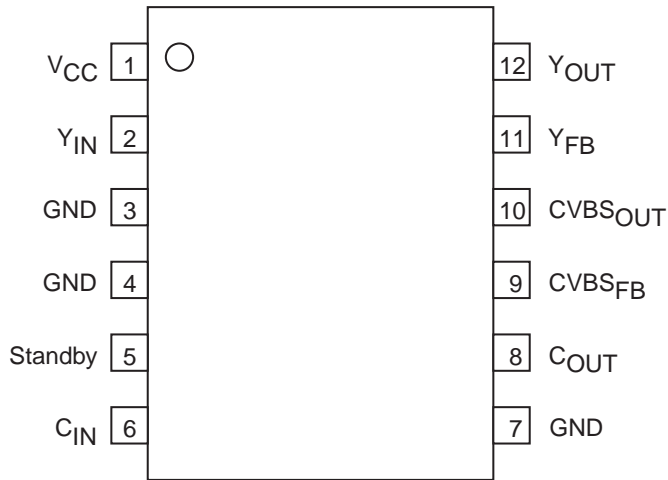
# PACKAGE OUTLINE

## 12-Lead SSOP



SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.165	0.181	4.2	4.6
B	0.189	0.205	4.8	5.2
C	0.012 typ		0.3 typ	
D	0.031 typ		0.8 typ	
E	0.000	0.008	0.0	0.2
F	0.047	0.063	1.2	1.6
G		0.067 max		1.7 max
H	0.264	0.248	6.7	6.3
I	0.004	0.010	0.10	0.25
J	0-10°		0-10°	
K	0.012	0.028	0.3	0.7
L	0.047 typ		1.2 typ	
M	0.016 typ		0.4 typ	
N	0.031 typ		0.8 typ	
O	0.213 typ		5.4 typ	

## PIN ASSIGNMENTS



## PIN FUNCTIONS

Name	Function
Y <sub>IN</sub>	Luminance (Y) Signal Input (typically 1 V <sub>P-P</sub> , AC coupled)
C <sub>IN</sub>	Chrominance (C) Signal Input (typically 0.62 V <sub>P-P</sub> , AC coupled)
Standby	Power Down Standby Mode Select (Low = Standby, Internal Pull-Up)
Y <sub>OUT</sub>	Luminance (Y) Output (typically 2.0 V <sub>P-P</sub> , R <sub>L</sub> = 150 Ω, AC coupled)
Y <sub>FB</sub>	Luminance Feedback Pin
CVBS <sub>OUT</sub>	Composite Video (CVBS) Output (typically 2.0 V <sub>P-P</sub> , R <sub>L</sub> = 150 Ω, AC coupled)
CVBS <sub>FB</sub>	Composite Video Feedback Pin
C <sub>OUT</sub>	Chrominance (C) Output (typically 1.3 V <sub>P-P</sub> , R <sub>L</sub> = 150 Ω, AC coupled)
V <sub>CC</sub>	+5.0 V Supply
GND	Ground

## ORDERING INFORMATION

PART NUMBER	TEMPERATURE RANGE	PACKAGE TYPE
SPT9400SCR	0 to +70°C	12-Lead SSOP

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Signal Processing Technologies believes that ultrasonic cleaning of its products may damage the wire bonding, leading to device failure. It is therefore not recommended, and exposure of a device to such a process will void the product warranty.