

## 75 Ω VIDEO LINE DRIVER

### FEATURES

- Fixed Gain (6 dB)
- Internal 75 Ω Driver with Bias Circuit
- Very Small Output Capacitor Using SAG Function Pin
- Active High ON/OFF Control
- Very Low Standby Current (typ.  $I_{STBY} \leq 25 \mu A$ )
- 2 Input/1 Output Video Switch
- Single +5 V Power Supply Operation

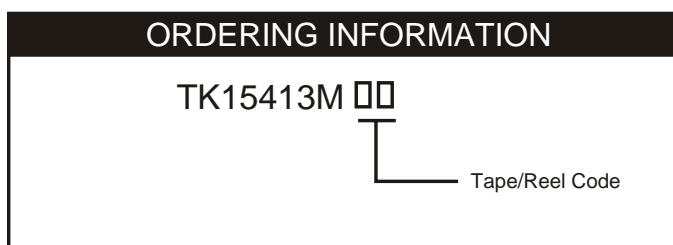
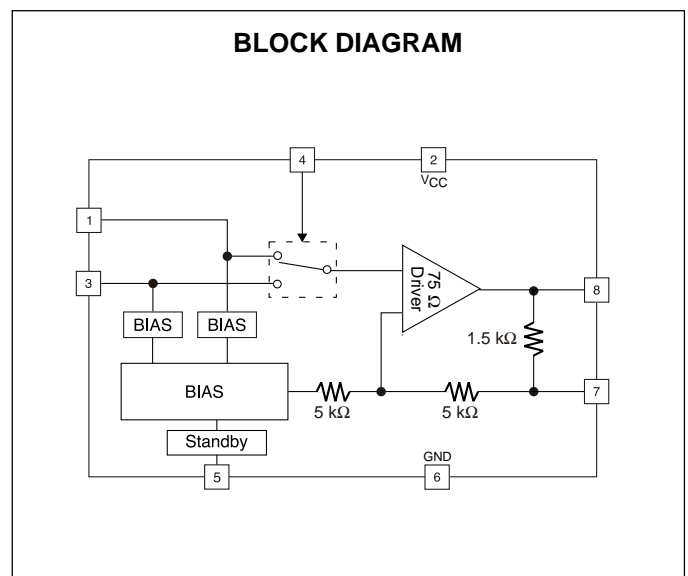
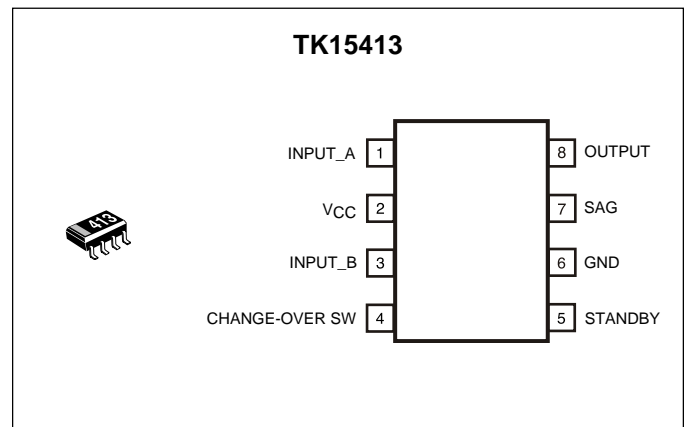
### DESCRIPTION

Operating from a single +5 V supply, the TK15413 is a single-channel video line driver IC that takes two standard video analog inputs and provides one buffered analog output for driving a 150 Ω load. The TK15413 features a built-in 2 input/1 output video switch on the input. The selected video input signal ( $1V_{P-P}$  typical) is internally biased at 2.0 V and amplified 6 dB to produce  $2 V_{P-P}$  (typical) into a series 75 Ω resistor and 75 Ω cable load. During standby (Pin 5 grounded), the TK15413 consumes only 125 μW of power. Nominal power dissipation (no input) is typically 58 mW.

The TK15413M is available in the SOT23L-8 surface mount package.

### APPLICATIONS

- Video Equipment
- Digital Cameras
- CCD Cameras
- TV Monitors
- Video Tape Recorders
- LCD Projectors



TAPE/REEL CODE  
TL: Tape Left

# TK15413

## ABSOLUTE MAXIMUM RATINGS

Supply Voltage ..... 6 V      Storage Temperature Range ..... -55 to +150 °C  
 Operating Voltage Range ..... 4.5 to 5.5 V      Operating Temperature Range ..... -25 to +85 °C  
 Power Dissipation (Note 1) ..... 200 mW

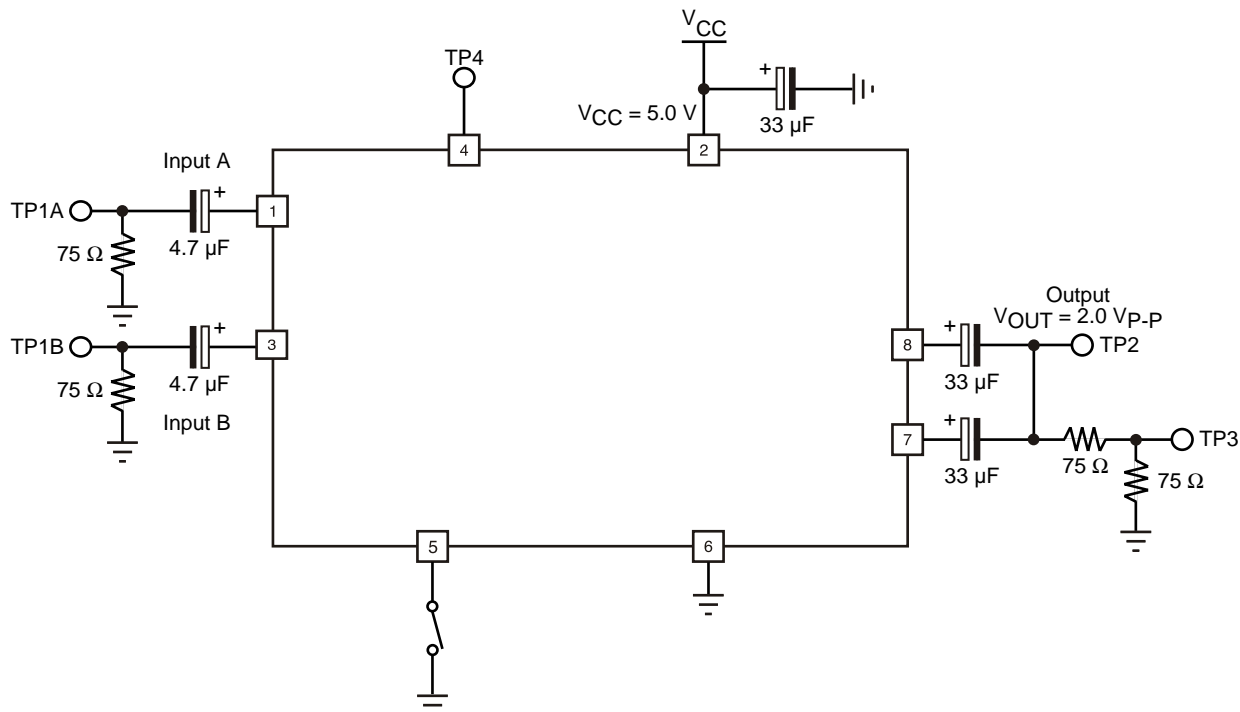
## TK15413M ELECTRICAL CHARACTERISTICS

Test conditions:  $V_{CC} = 5.0\text{ V}$ ,  $V_{IN} = 1.0\text{ V}_{P-P}$ ,  $R_L = 150\ \Omega$ ,  $T_A = 25\ ^\circ\text{C}$  unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
$I_{CC}$	Supply Current	No input		11.5	17.0	mA
$I_{STBY}$	Standby Supply Current	Pin 5 Grounded		25.0	50.0	$\mu\text{A}$
$I_{OS}$	Standby Terminal Current	Pin 5 in Standby mode		25.0	50.0	$\mu\text{A}$
$V_{THL(SW)}$	Switch Threshold Voltage (High to Low)	Pin 4	GND		0.80	V
$V_{TLH(SW)}$	Switch Threshold Voltage (Low to High)	Pin 4	2.00		$V_{CC}$	V
$V_{THL(STBY)}$	Standby Threshold Voltage (High to Low)	Pin 5 Operating to Standby mode	GND		0.60	V
$V_{TLH(STBY)}$	Standby Threshold Voltage (Low to High)	Pin 5 Standby to Operating mode	2.00		$V_{CC}$	V
$V_{BIAS}$	Bias Voltage	Pin 1, Pin 3 Input terminal	1.80	2.00	2.20	V
GVA	Voltage Gain	Pin 1, Pin 3 $f_{IN} = 1\text{ MHz}$	5.45	5.95	6.45	dB
DG	Differential Gain	Pin 1, Pin 3 Staircase signal	-3.0	+1.6	+3.0	%
DP	Differential Phase	Pin 1, Pin 3 Staircase signal	-3.0	+0.2	+3.0	deg
fr	Frequency Response	Pin 1, Pin 3 $f_{IN} = 1\text{ MHz} / 5\text{ MHz}$		-0.3		dB
CT1	Cross Talk 1	InputA - Output $f_{IN} = 1\text{ MHz}$		-42		dB
CT2	Cross Talk 2	InputB - Output $f_{IN} = 1\text{ MHz}$		-65		dB

Note 1: Power dissipation is 200 mW in free air. Derate at 1.6 mW/°C for operation above 25°C.

## TEST CIRCUIT



## Switch Truth Table

Pin 4	Output
L	Pin 1
H	Pin 3

## MEASUREMENT METHOD

1. Supply Current ( $I_{CC}$ )

The Pin 2 current is measured with no input signal and the Standby Pin (Pin 5) open.

2. Standby Supply Current ( $I_{STBY}$ )

The Pin 2 current is measured when the Standby Pin (Pin 5) is connected to ground.

3. Standby Terminal Current ( $I_{OS}$ )

The Pin 5 current is measured when the Standby Pin (Pin 5) is connected to ground.

4. Standby Threshold Voltage (High to Low) ( $V_{THL(STBY)}$ )

The Pin 5 voltage is measured at the point which changes the device from operating mode into standby mode.

5. Standby Threshold Voltage (Low to High) ( $V_{TLH(STBY)}$ )

The Pin 5 voltage is measured at the point which changes the device from standby mode into operating mode.

# TK15413

---

## MEASUREMENT METHOD (CONT.)

### 6. Switch Threshold Voltage (High to Low) ( $V_{THL(SW)}$ )

The TP4 voltage is decreased very slowly. The TP4 voltage level is measured at the point where the TP1A signal is applied to TP2 and the TP1B signal is stopped from TP2.

### 7. Switch Threshold Voltage (Low to High) ( $V_{TLH(SW)}$ )

The TP4 voltage is increased very slowly. The TP4 voltage level is measured at the point where the TP1A signal is stopped at TP2 and the TP1B signal is applied to TP2.

### 8. Bias Voltage ( $V_{BIAS}$ )

The DC voltage at Pin 1 and Pin 3 is measured with no input signal.

### 9. Voltage Gain (GVA)

The voltage gain equation is as follows:

$$GVA = 20 \log_{10} V2/V1$$

Where V1 is the input voltage at TP1A and TP1B, and V2 is the measured voltage at TP2.

### 10. Differential Gain (DG)

The differential gain is measured at TP3 when a staircase waveform of 10 steps is applied to TP1A and TP1B.

### 11. Differential Phase (DP)

The differential phase is measured at TP3 when a staircase waveform of 10 steps is applied to TP1A and TP1B.

### 12. Frequency Response (fr)

The frequency response equation is as follows:

$$fr = 20 \log_{10} V2/V1$$

Where V1 is the measured TP3 voltage when the input frequency is set to 1 MHz and V2 is the measured TP3 voltage when the input frequency is set to 5 MHz.

### 13. Cross Talk 1 (CT1)

The cross talk 1 equation is as follows:

$$CT1 = 20 \log_{10} V1/V2$$

When TP4 is connected to a High level, V1 is measured at TP2 when a 1 MHz 1  $V_{p-p}$  input signal is applied to TP1A. V2 is measured at TP2 when a 1 MHz 1  $V_{p-p}$  input signal is applied to TP1B.

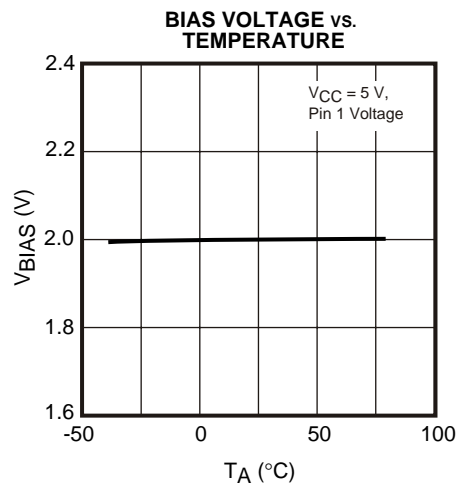
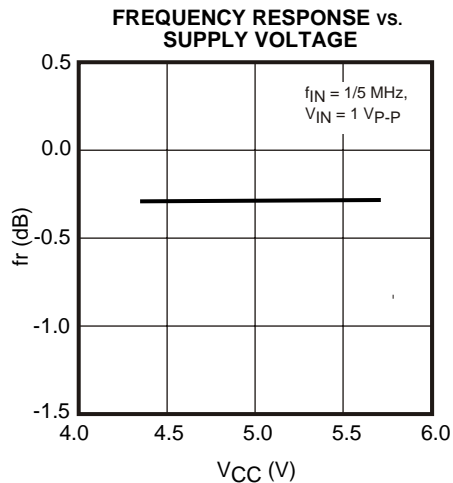
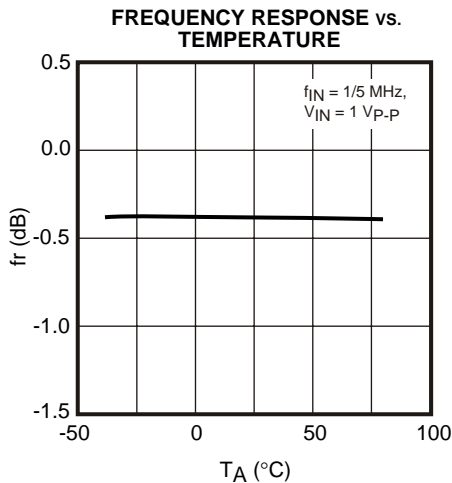
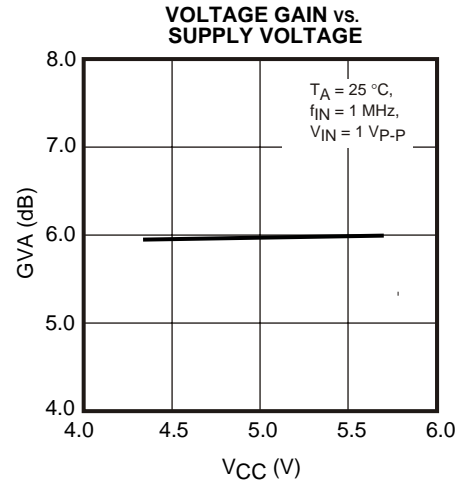
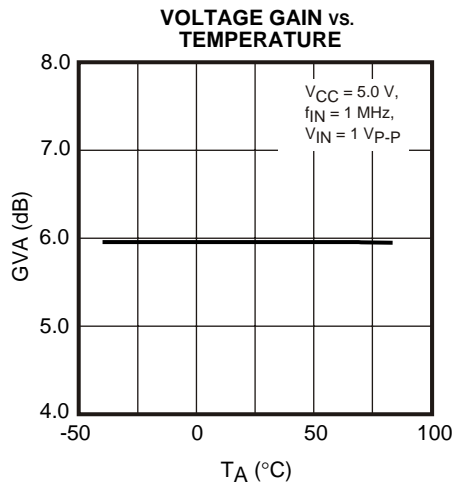
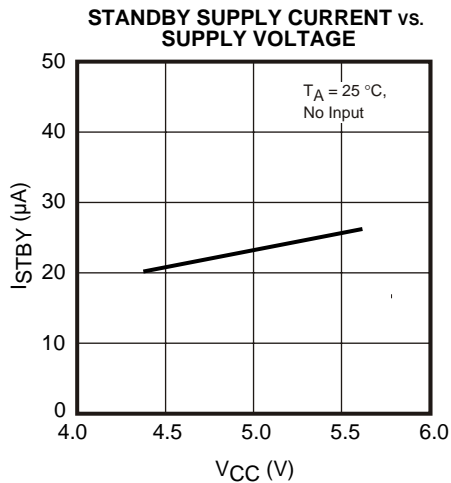
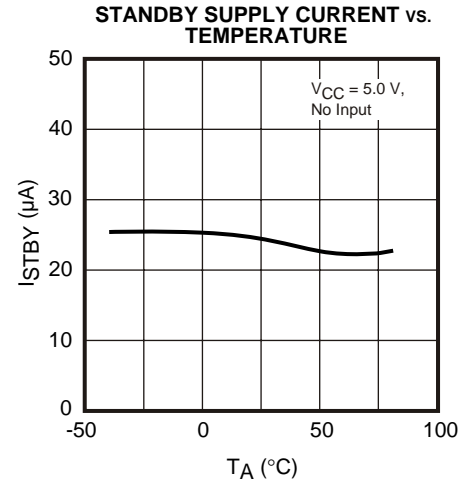
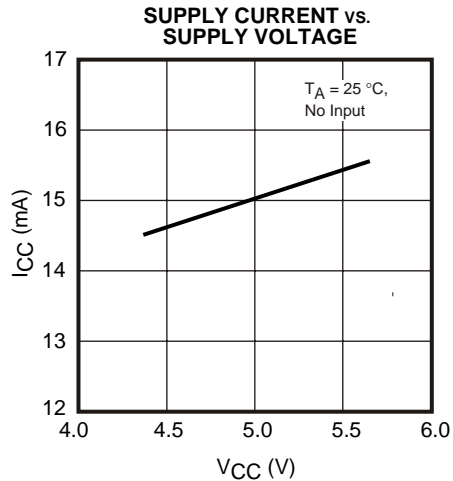
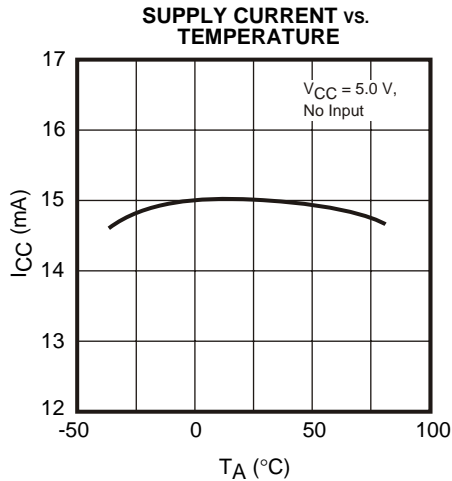
### 14. Cross Talk 2 (CT2)

The cross talk 2 equation is as follows:

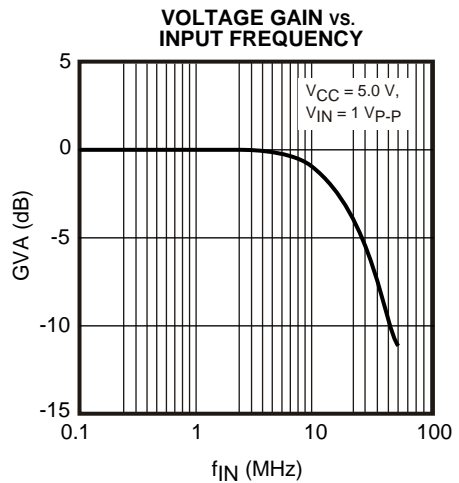
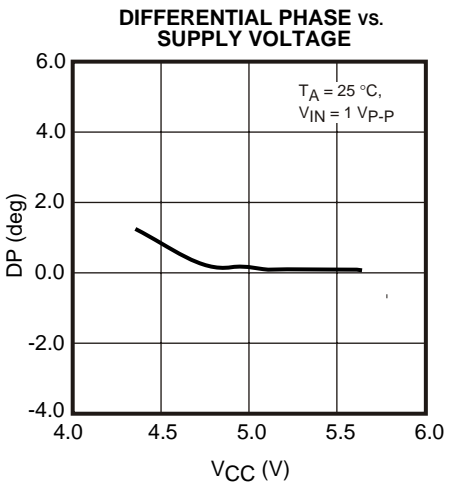
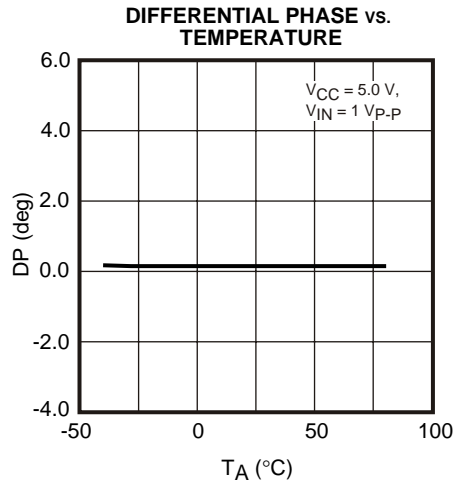
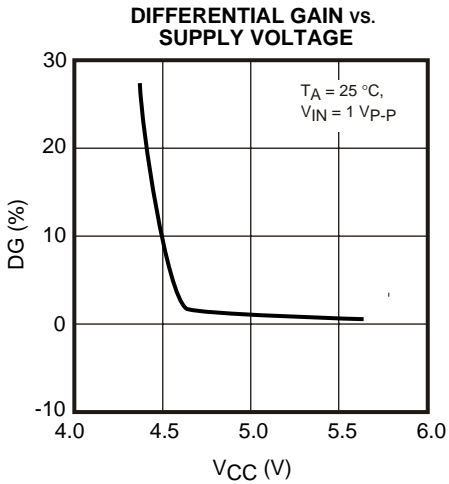
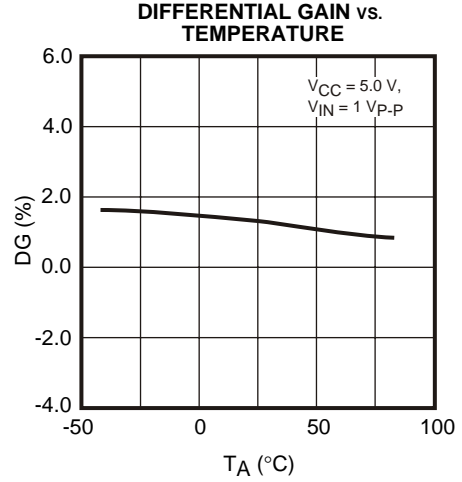
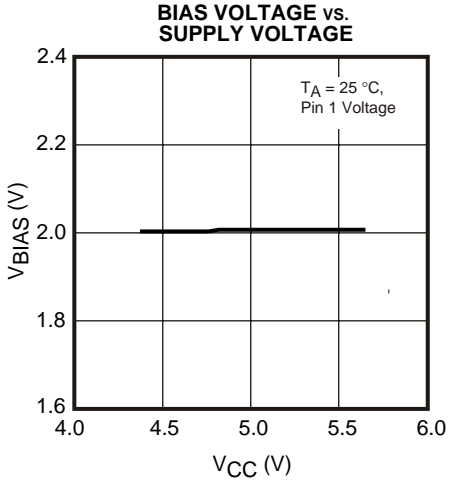
$$CT2 = 20 \log_{10} V1/V2$$

When TP4 is connected to a Low level, V1 is measured at TP2 when a 1 MHz 1  $V_{p-p}$  input signal is applied to TP1B. V2 is measured at TP2 when a 1 MHz 1  $V_{p-p}$  input signal is applied to TP1A.

## TYPICAL PERFORMANCE CHARACTERISTICS



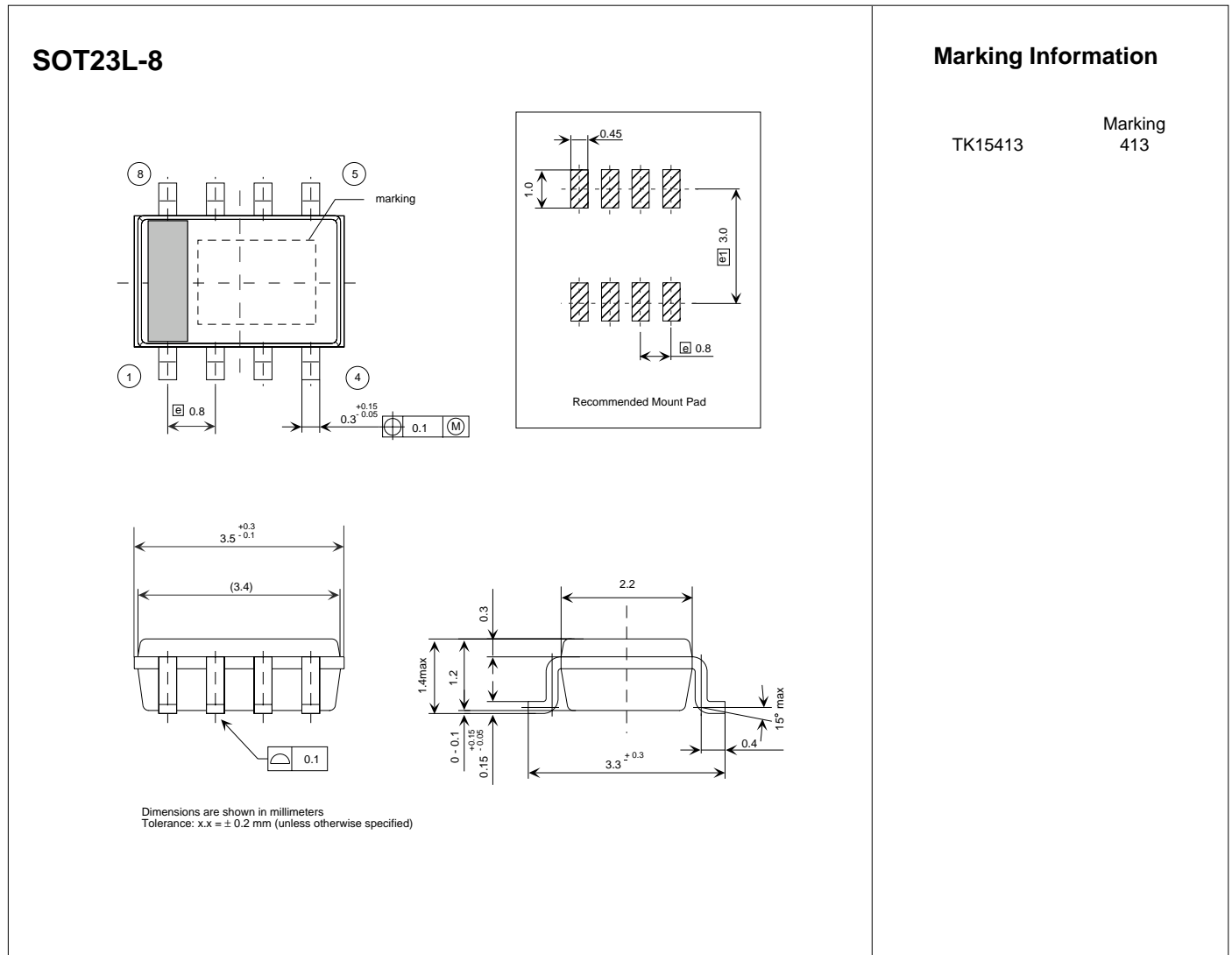
TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)



## PIN FUNCTION DESCRIPTION

TERMINAL			INTERNAL EQUIVALENT CIRCUIT	DESCRIPTION
PIN NO.	SYMBOL	VOLTAGE		
1 3	INPUT_A INPUT_B	1.25 V 1.25 V		<p>Chrominance Input Terminals.</p> <p>The chrominance input signal is biased to 2.0 V by a 10 kΩ resistor.</p>
2	$V_{CC}$	$V_{CC}$		Power Supply Terminal
4	CHANGE-OVER SW			<p>Change-Over Switch Terminal for selecting the chrominance signal at the output terminal.</p> <p>The input_A signal is applied to the output when Pin 4 is connected to Low.</p> <p>The input_B signal is applied to the output when Pin 4 is connected to High.</p>
5	STANDBY	2.1 V		<p>Standby Logic Terminal.</p> <p>The device is in the standby mode when Pin 5 is connected to Low.</p> <p>The device is in the operating mode when Pin 5 is connected to High or Open.</p>
6	GND	GND		GND Terminal
7 8	SAG OUTPUT	1.25 V 1.25 V		<p>Pin 7: SAG Terminal.</p> <p>Pin 8: Chrominance Output Terminal.</p> <p>The chrominance output is available to drive a 75 Ω + 75 Ω load.</p>

## PACKAGE OUTLINE



**Toko America, Inc. Headquarters**  
 1250 Feehanville Drive, Mount Prospect, Illinois 60056  
 Tel: (847) 297-0070 Fax: (847) 699-7864

### TOKO AMERICA REGIONAL OFFICES

**Midwest Regional Office**  
 Toko America, Inc.  
 1250 Feehanville Drive  
 Mount Prospect, IL 60056  
 Tel: (847) 297-0070  
 Fax: (847) 699-7864

**Western Regional Office**  
 Toko America, Inc.  
 2480 North First Street, Suite 260  
 San Jose, CA 95131  
 Tel: (408) 432-8281  
 Fax: (408) 943-9790

**Eastern Regional Office**  
 Toko America, Inc.  
 107 Mill Plain Road  
 Danbury, CT 06811  
 Tel: (203) 748-6871  
 Fax: (203) 797-1223

**Semiconductor Technical Support**  
 Toko Design Center  
 4755 Forge Road  
 Colorado Springs, CO 80907  
 Tel: (719) 528-2200  
 Fax: (719) 528-2375

Visit our Internet site at <http://www.tokoam.com>

The information furnished by TOKO, Inc. is believed to be accurate and reliable. However, TOKO reserves the right to make changes or improvements in the design, specification or manufacture of its products without further notice. TOKO does not assume any liability arising from the application or use of any product or circuit described herein, nor for any infringements of patents or other rights of third parties which may result from the use of its products. No license is granted by implication or otherwise under any patent or patent rights of TOKO, Inc.