

### OPERATIONAL AMPLIFIER WITH 75 Ω DRIVER

#### FEATURES

- Fixed Gain (6 dB typ.)
- Internal 75 Ω Driver
- Active High ON/OFF Control with Internal Pull-up
- Very Low Standby Current (typ.  $I_{STBY} \leq 25 \mu A$ )
- Very Small Output Capacitor Using SAG Function Pin
- Very Small SOT23-6 Package
- Single +5 V Power Supply Operation

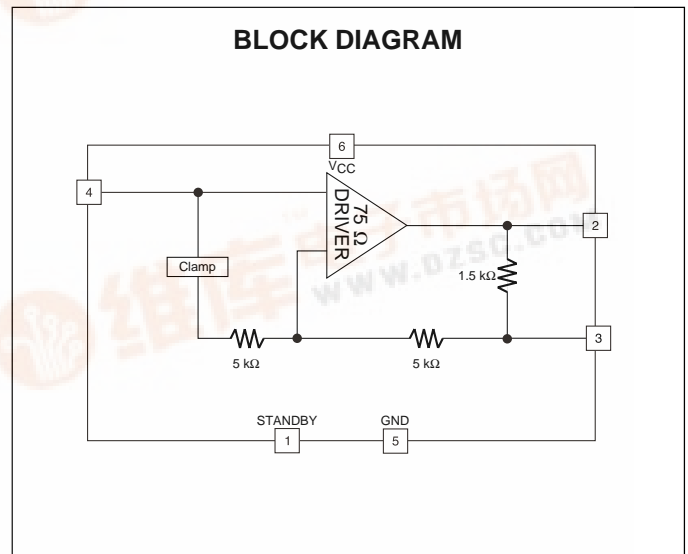
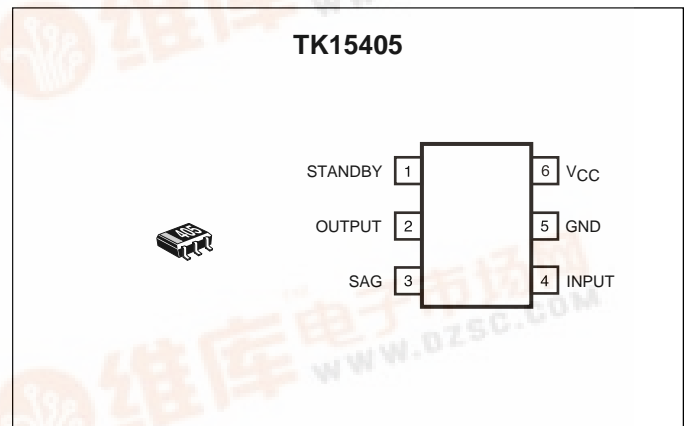
#### APPLICATIONS

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

#### DESCRIPTION

Operating from a single +5 V supply, the TK15405 is a single-channel video line driver IC that takes a standard video analog input and provides a buffered analog output for driving a 150 Ω load. The standard video input signal (1 V<sub>P-P</sub> typical) is internally clamped at 1.25 V and amplified 6 dB to produce 2 V<sub>P-P</sub> (typical) into a series 75 Ω resistor and 75 Ω cable load. The internal 1.5 k SAG function resistor provides gain compensation for low frequency signals. During standby (Pin 1 grounded), the TK15405 consumes only 120 μW of power. Nominal power dissipation (no input) is typically 38 mW.

The TK15405M is available in the very small SOT23-6 surface mount package.



**ORDERING INFORMATION**

TK15405M Tape/Reel Code

TAPE/REEL CODE  
TL: Tape Left



# TK15405

## TK15405M ABSOLUTE MAXIMUM RATINGS

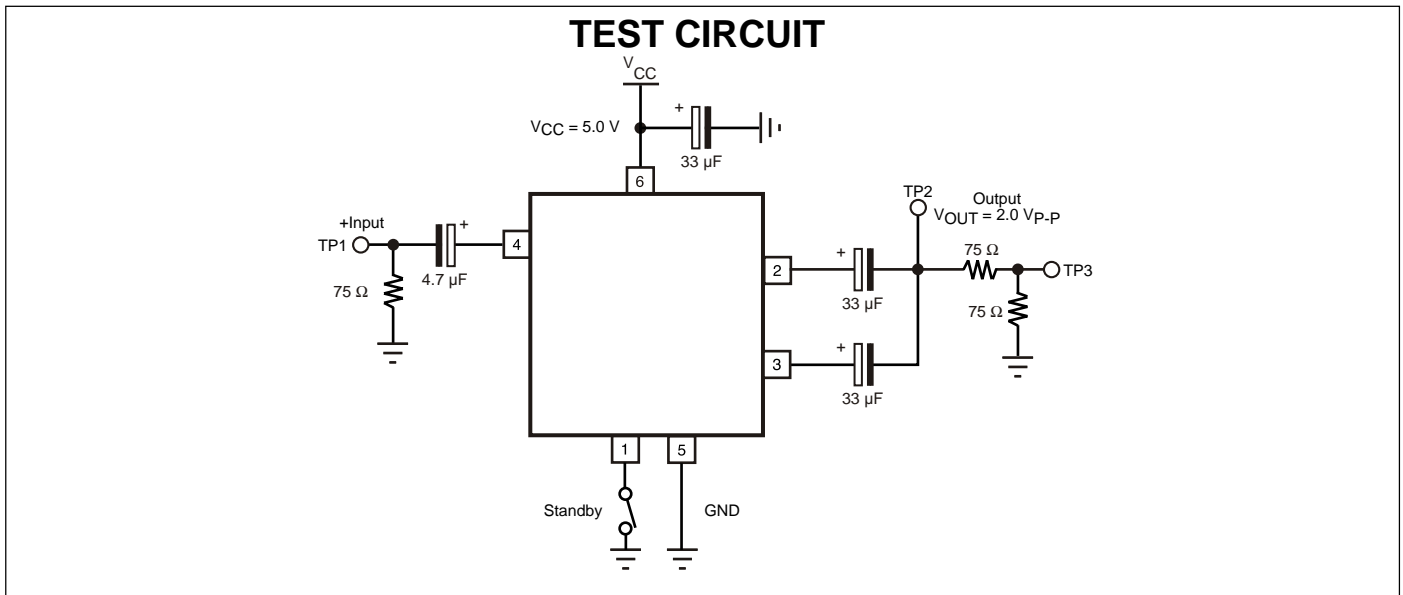
Supply Voltage ..... 6 V      Storage Temperature Range ..... -55 to +150 °C  
Operating Voltage ..... 4.5 to 5.5 V      Operating Temperature Range ..... -25 to +85 °C  
Power Dissipation (Note 1) ..... 150 mW

## TK15405M 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		7.5	10.0	mA
$I_{STBY}$	Standby Supply Current	Pin 1 Grounded		24.0	50.0	$\mu\text{A}$
$I_{OS}$	Standby Terminal Current	Pin 1 in Standby mode		24.0	50.0	$\mu\text{A}$
$V_{THL}$	Standby Threshold Voltage (High to Low)	Pin 1 Operating to Standby mode	GND	0.1	0.3	V
$V_{TLH}$	Standby Threshold Voltage (Low to High)	Pin 1 Standby to Operating mode	1.8	2.0	$V_{CC}$	V
$V_{CMP}$	Clamp Voltage	Pin 4 Input terminal	1.05	1.25	1.45	V
GVA	Voltage Gain	$f_{in} = 1\text{ MHz}$	5.4	5.9	6.4	dB
DG	Differential Gain	Staircase signal input	-3.0	-0.6	+3.0	%
DP	Differential Phase	Staircase signal input	-3.0	-0.2	+3.0	deg
fr	Frequency Response	$f_{IN} = 1\text{ MHz} / 5\text{ MHz}$		-0.5		dB

Note 1: Power dissipation is 150 mW in free air. Derate at 1.2 mW/°C for operation above 25°C.



## MEASUREMENT METHOD

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

The Pin 6 current is measured with no input signal and the Standby Pin (Pin 1) open.

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

The Pin 6 current is measured when the Standby Pin (Pin 1) is connected to ground.

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

The Pin 1 current is measured when Pin 1 is connected to ground.

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

The Pin 1 voltage is measured at the point which changes the device from operating mode into standby mode.

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

The Pin 1 voltage is measured at the point which changes the device from standby mode into operating mode.

### 6. Clamp Voltage ( $V_{CMP}$ )

The DC voltage at Pin 4 is measured with no input signal.

### 7. Voltage Gain (GVA)

The voltage gain equation is as follows:

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

Where V1 is the input voltage at TP1 and V2 is the measured output voltage at TP2.

### 8. Differential Gain (DG)

The differential gain is measured at TP3 when a staircase waveform of 10 steps is applied to TP1.

### 9. Differential Phase (DP)

The differential phase is measured at TP3 when a staircase waveform of 10 steps is applied to TP1.

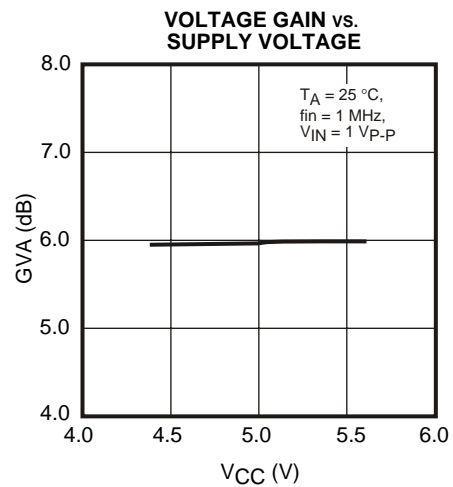
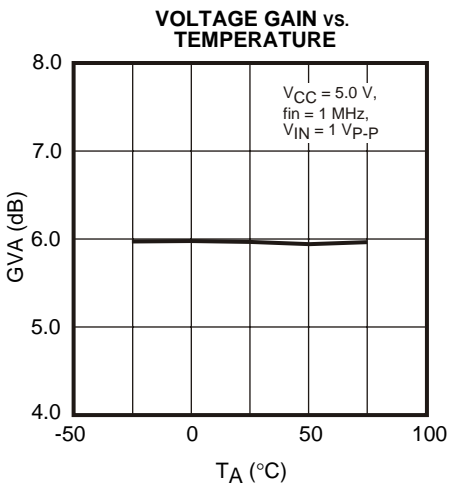
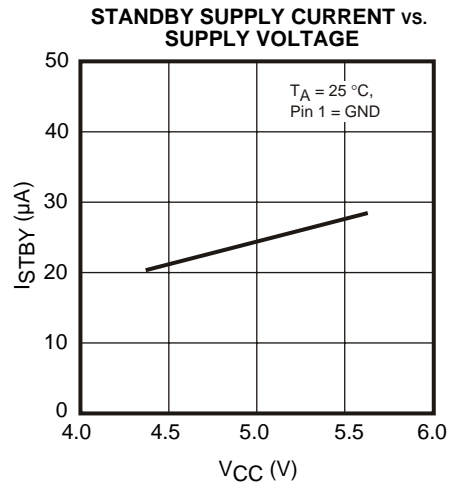
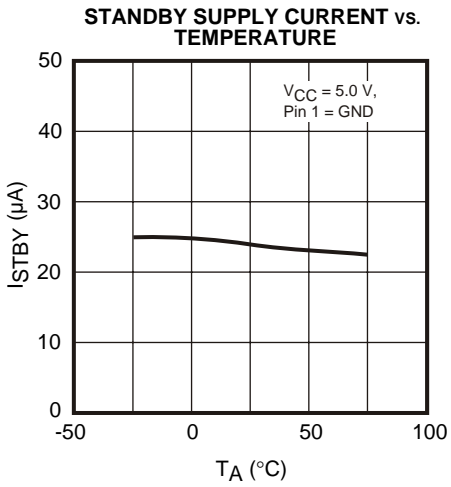
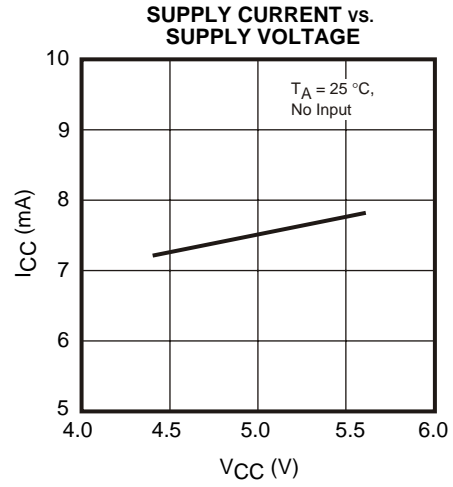
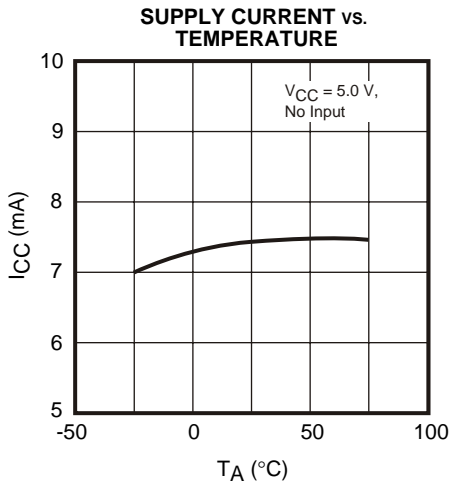
### 10. Frequency Response (fr)

The frequency response equation is as follows:

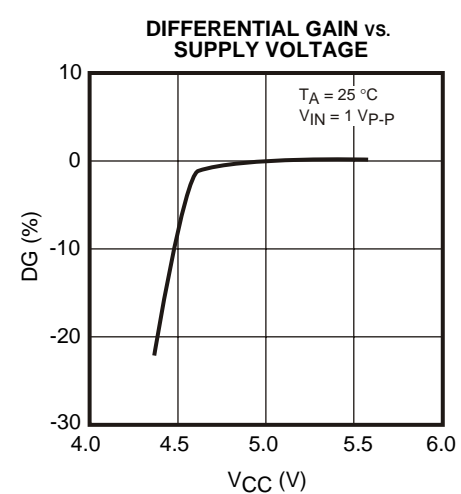
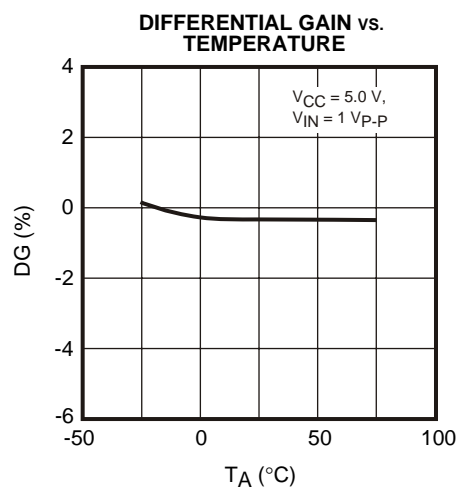
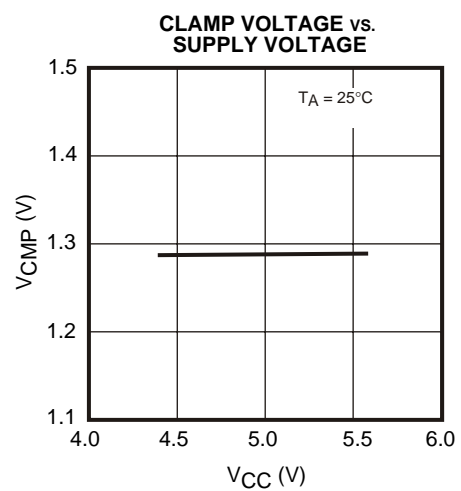
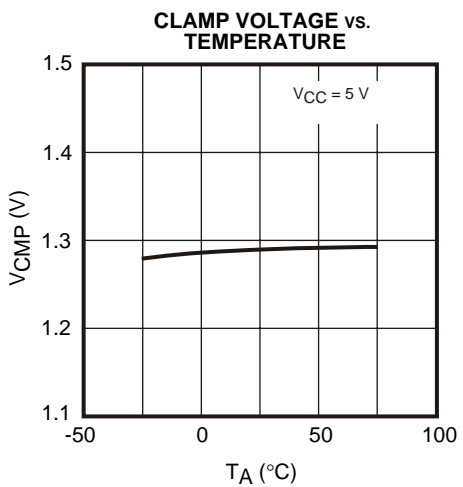
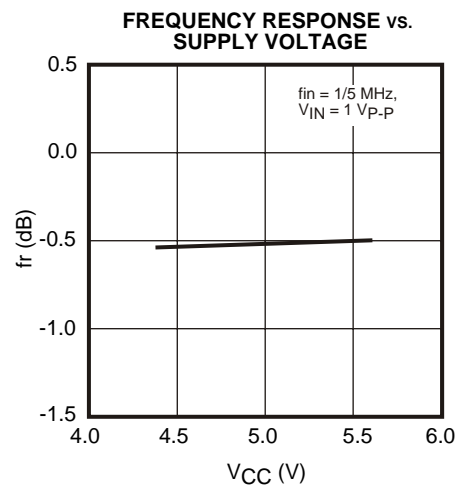
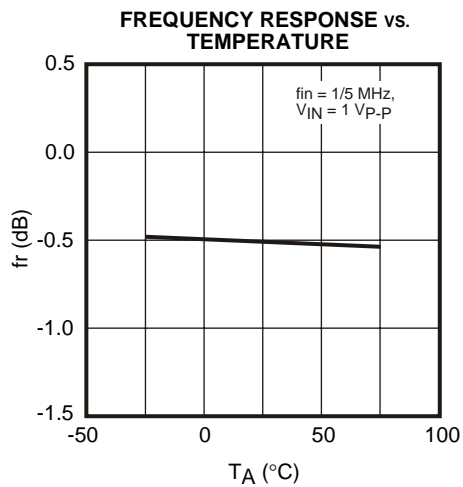
$$fr = 20 \log_{10} V2/V1$$

Where V1 is the measured TP3 voltage when the TP1 input frequency is set to 1 MHz and V2 is the measured TP3 voltage when the TP1 input frequency is set to 5 MHz.

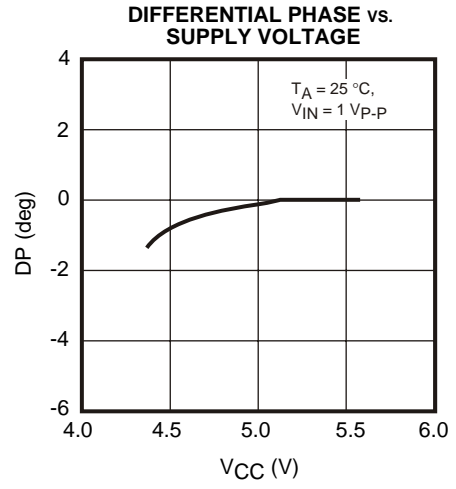
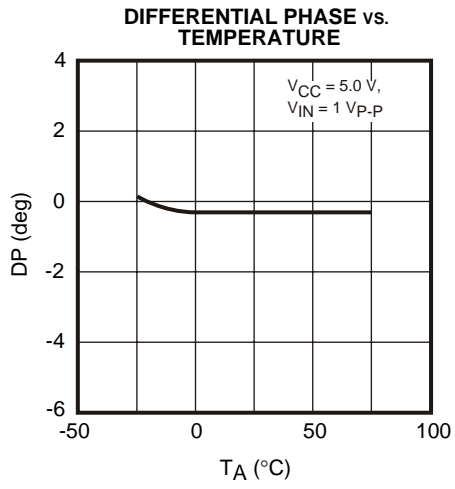
**TYPICAL PERFORMANCE CHARACTERISTICS**



## TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)



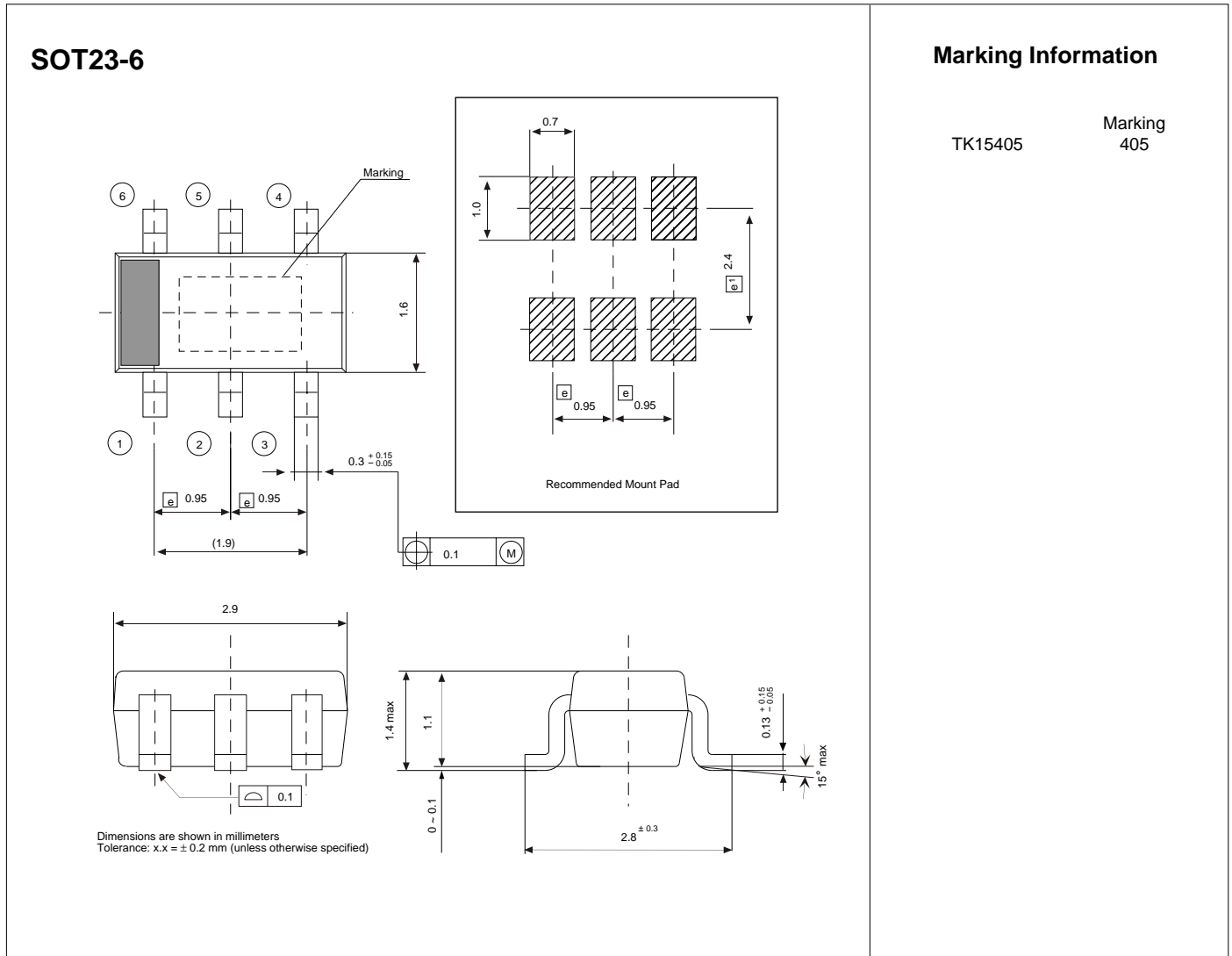
TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)



## PIN FUNCTION DESCRIPTION

TERMINAL			INTERNAL EQUIVALENT CIRCUIT	DESCRIPTION
PIN NO.	SYMBOL	VOLTAGE		
1	STANDBY	1.4 V		Standby Logic Terminal. The device is in the standby mode when Pin 1 is connected to Low. The device is in the operating mode when Pin 1 is connected to High or Open.
2 3	OUTPUT SAG	1.25 V 1.25 V		Pin 2: Output Terminal. Pin 2 is available to drive a $75 \Omega + 75 \Omega$ load.  Pin 3: SAG Terminal.
4	INPUT	1.25 V		Input Terminal. The luminance input signal is clamped at 1.25 V.
5	GND	GND		GND Terminal
6	$V_{CC}$	$V_{CC}$		Power Supply Terminal

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