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. $I_{STBY} \leq 25$ µA)**
- **Very Small Output Capacitor Using SAG Function Pin**
- **Very Small SOT23-6 Package**
- **Single +5 V Power Supply Operation**

APPLICATIONS

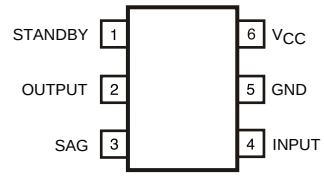
- **Video Equipment**
- **Digital Cameras**
- **CCD Cameras**
- **TV Monitors**
- **Video Tape Recorders**
- **LCD Projectors**

DESCRIPTION

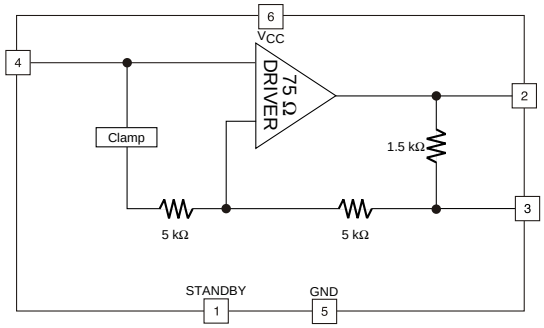
Operating from a single +5 V supply, the TK15405 is a single-channel video line driver IC that takes a standard video analog input and provides a buffered analog output for driving a 150 Ω load. The standard video input signal (1 V_{P-P} typical) is internally clamped at 1.25 V and amplified 6 dB to produce 2 V_{P-P} (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.

TK15405



BLOCK DIAGRAM



ORDERING INFORMATION

TK15405M □□

Tape/Reel Code

TAPE/REEL CODE
TL: Tape Left

TK15405M ABSOLUTE MAXIMUM RATINGS

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

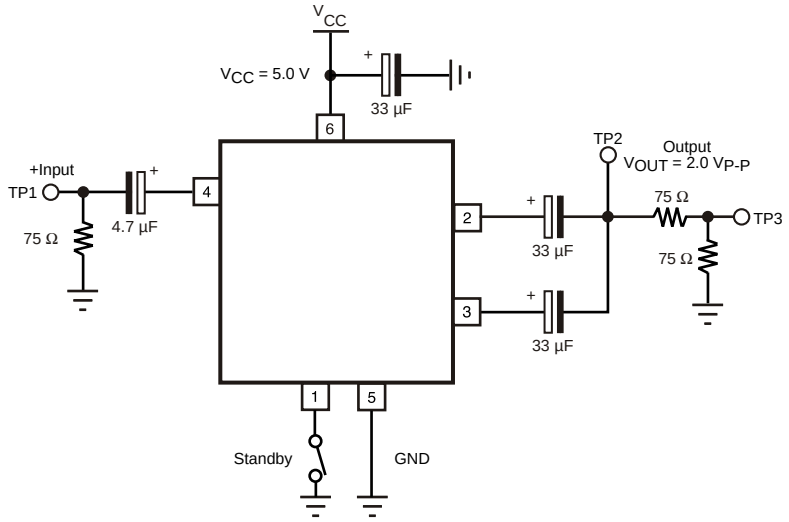
TK15405M ELECTRICAL CHARACTERISTICS

Test conditions: V_{CC} = 5.0 V, V_{IN} = 1.0 V_{P-P}, R_L = 150 Ω, T_A = 25 °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	µA
I_{OS}	Standby Terminal Current	Pin 1 in Standby mode		24.0	50.0	µA
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 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 MHz / 5 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.

TEST CIRCUIT



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.

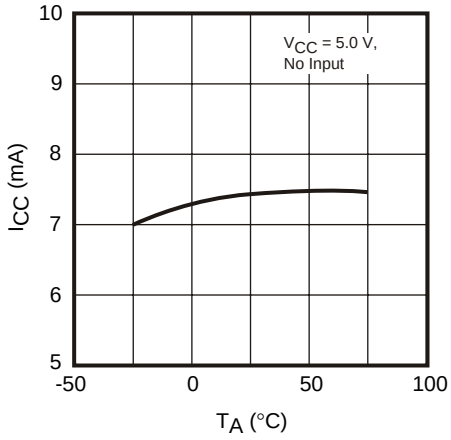
8. Differential Gain (DG)
The differential gain is measured at TP3 when a staircase waveform of 10 steps is applied to TP1.

9. Differential Phase (DP)
The differential phase is measured at TP3 when a staircase waveform of 10 steps is applied to TP1.

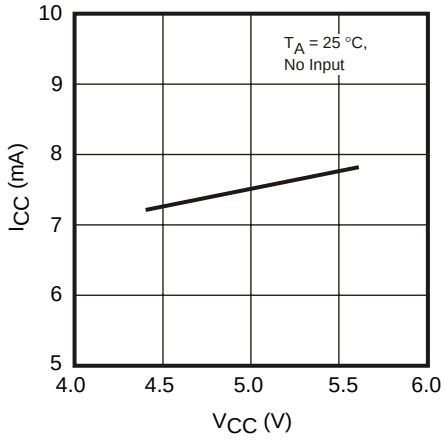
10. Frequency Response (fr)
The frequency response equation is as follows:
$fr = 20 \log_{10} V2/V1$
Where V1 is the measured TP3 voltage when the TP1 input frequency is set to 1 MHz and V2 is the measured TP3 voltage when the TP1 input frequency is set to 5 MHz.

TYPICAL PERFORMANCE CHARACTERISTICS

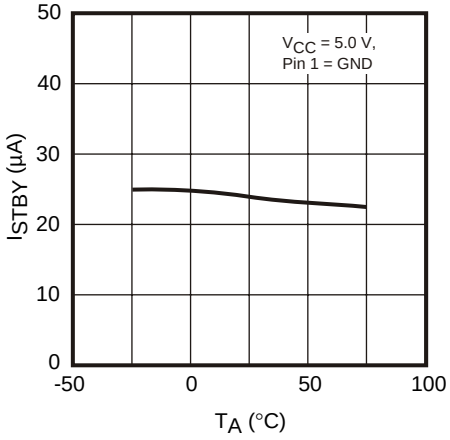
SUPPLY CURRENT vs. TEMPERATURE



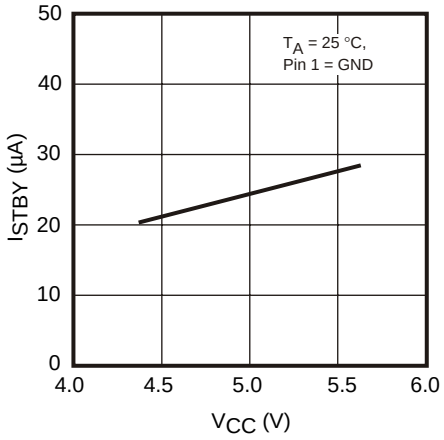
SUPPLY CURRENT vs. SUPPLY VOLTAGE



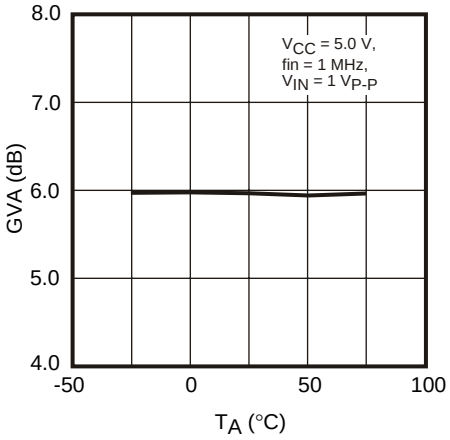
STANDBY SUPPLY CURRENT vs. TEMPERATURE



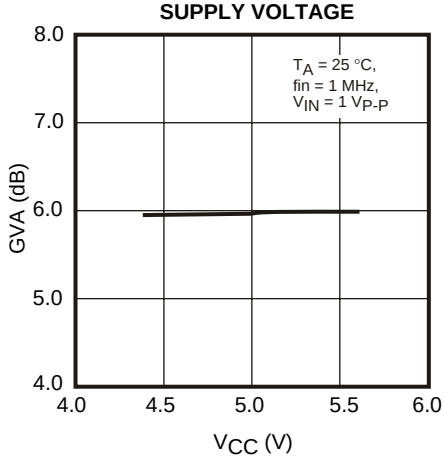
STANDBY SUPPLY CURRENT vs. SUPPLY VOLTAGE



VOLTAGE GAIN vs. TEMPERATURE

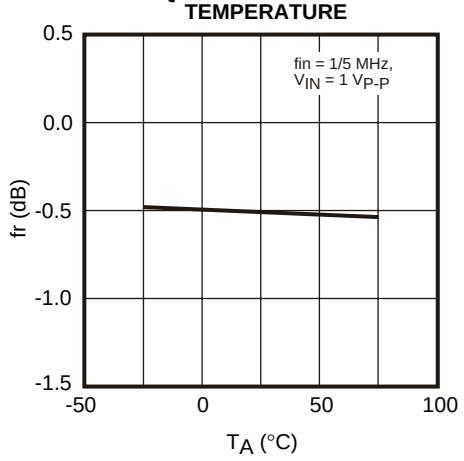


VOLTAGE GAIN vs. SUPPLY VOLTAGE

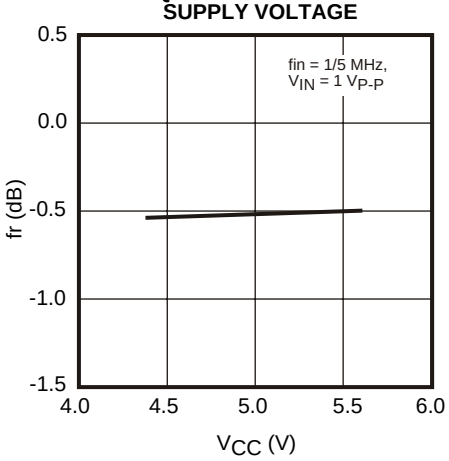


TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

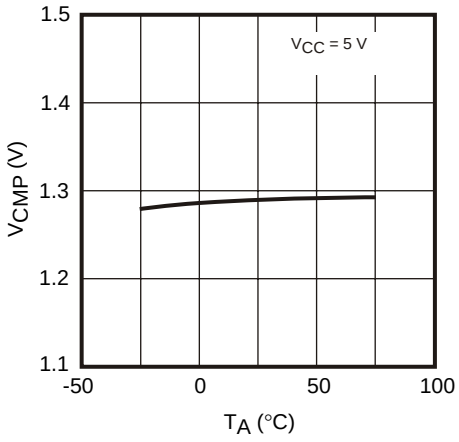
FREQUENCY RESPONSE vs. TEMPERATURE



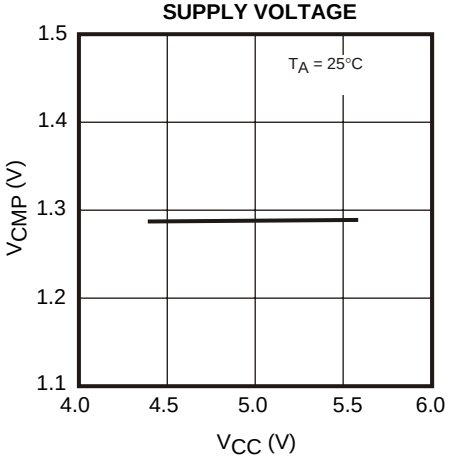
FREQUENCY RESPONSE vs. SUPPLY VOLTAGE



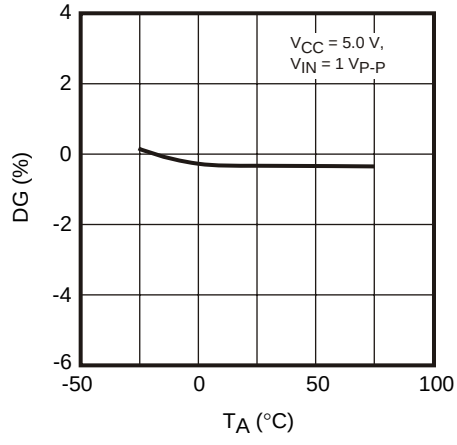
CLAMP VOLTAGE vs. TEMPERATURE



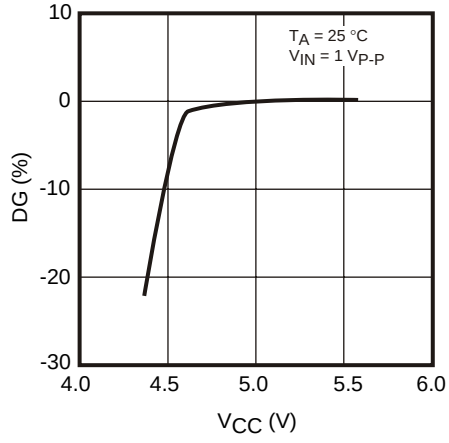
CLAMP VOLTAGE vs. SUPPLY VOLTAGE



DIFFERENTIAL GAIN vs. TEMPERATURE

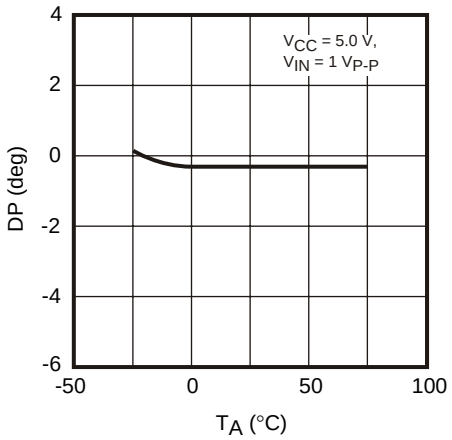


DIFFERENTIAL GAIN vs. SUPPLY VOLTAGE

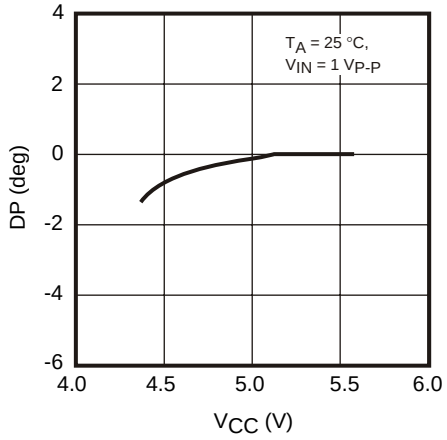


TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

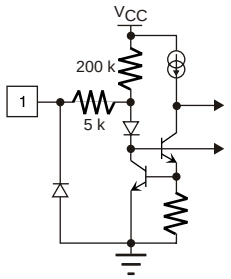
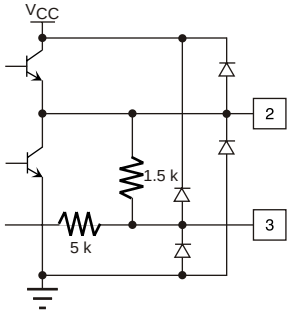
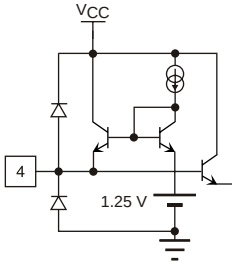
DIFFERENTIAL PHASE vs. TEMPERATURE



DIFFERENTIAL PHASE vs. SUPPLY VOLTAGE

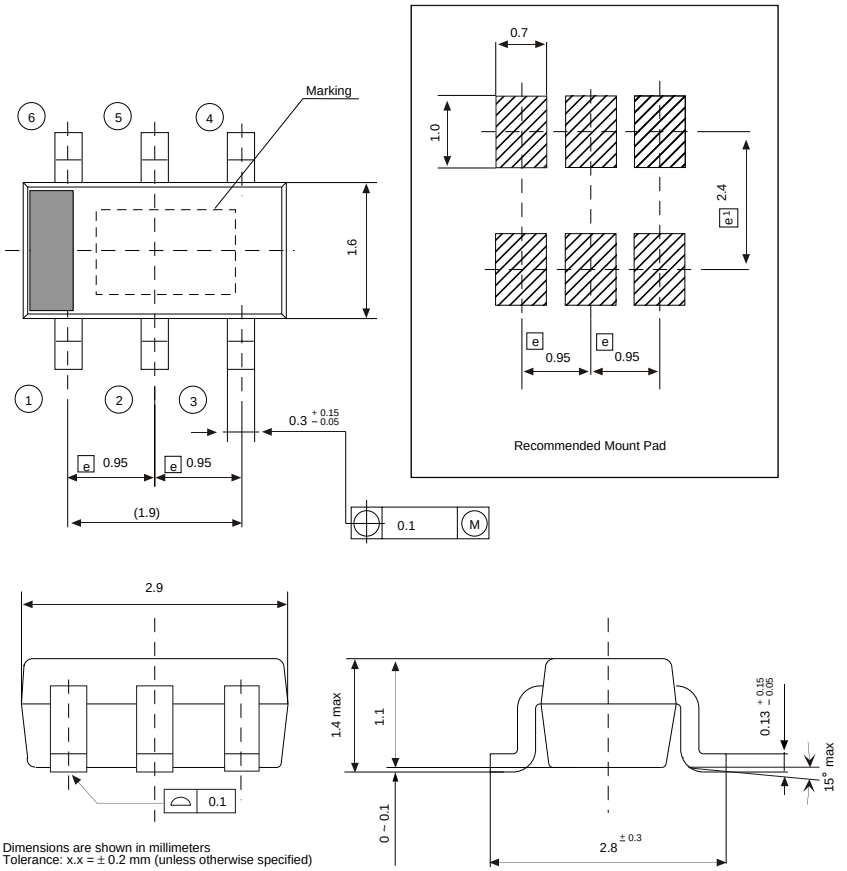


PIN FUNCTION DESCRIPTION

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 Ω + 75 Ω 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

PACKAGE OUTLINE

SOT23-6



Dimensions are shown in millimeters
Tolerance: x.x = ± 0.2 mm (unless otherwise specified)

Marking Information

	Marking
TK15405	405

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