



SANYO Semiconductors

## DATA SHEET

LA5613

Monolithic Linear IC

For VCR

## Regulator and Control Amplifier

## Overview

The LA5613 is an IC that includes an independently on/off switchable 5V/0.7A low-saturation regulator, an 11.3V/0.3A ripple filter, and a control amplifier on chip. It is optimal for use in VCR and similar products.

## Function

- 5V/0.7A low-saturation regulator (Includes an on/off function.)
- 11.3V/0.3A ripple filter (Includes an on/off function.)
- Switching regulator control amplifier
- Includes input overvoltage and thermal protection circuits on chip.

## Specifications

Maximum Ratings at  $T_a = 25^\circ\text{C}$ 

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC1 \text{ max}}$		14	V
	$V_{CC2 \text{ max}}$	$V_{CC1} \geq V_{CC2}$	$V_{CC1}$	V
Allowable power dissipation	$P_d \text{ max}$	No heat sink	1.7	W
Operating temperature	$T_{op}$		-20 to +80	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-40 to +150	$^\circ\text{C}$

Operating Conditions at  $T_a = 25^\circ\text{C}$ 

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	$V_{CC1}$		$12.3 \pm 0.4$	V
	$V_{CC2}$		$6 \pm 0.5$	V
Output current 1	$I_{O1}$		0 to 0.3	A
Output current 2	$I_{O2}$		0 to 0.7	A

■ Any and all SANYO Semiconductor Co.,Ltd. products described or contained herein are, with regard to "standard application" intended for the use as general electronics equipment (home appliances, AV equipment, communication device, office equipment, industrial equipment etc.). The products mentioned herein shall not be intended for use for any "special application" (medical equipment whose purpose is to sustain life, aerospace instrument, nuclear control device, burning appliances, transportation machine, traffic signal system, safety equipment, etc.) that shall require extremely high level of reliability and can directly threaten human lives in case of failure or malfunction of the product or may cause harm to human bodies, nor shall they grant any guarantee thereof. If you should intend to use our products for applications outside the standard applications of our customer who is considering such use and/or outside the scope of our intended standard applications, please consult with us prior to the intended use. If there is no consultation or inquiry before the intended use, our customer shall be solely responsible for the use.

■ Specifications of any and all SANYO Semiconductor Co.,Ltd. products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

SANYO Semiconductor Co., Ltd.

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

# LA5613

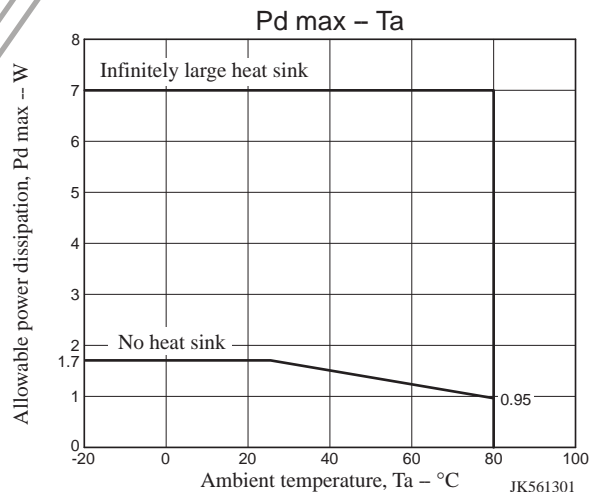
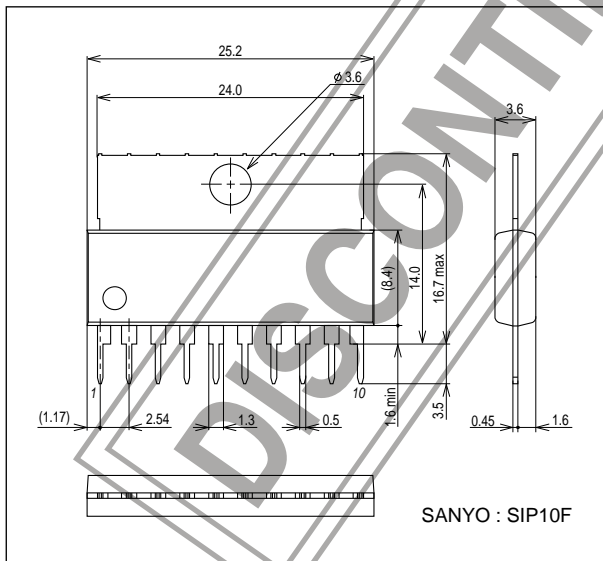
## Electrical Characteristics at Ta = 25°C, in the specified Test Circuit

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
<b>No Load</b> : V <sub>STB</sub> = high, V <sub>CC1</sub> = 12.3V, V <sub>CC2</sub> = 6V, I <sub>O1</sub> and I <sub>O2</sub> = 0A						
Quiescent current	I <sub>IN1</sub>			20	30	mA
	I <sub>IN2</sub>			0.2	0.3	mA
<b>Output 1</b> : V <sub>STB</sub> = high, V <sub>CC1</sub> = 12.3V, V <sub>CC2</sub> = 6V, I <sub>O1</sub> = 0.3A						
Output voltage 1	V <sub>O1</sub>		10.9	11.3		V
Dropout voltage	V <sub>DROP1</sub>			1.0	1.4	V
Peak output current	I <sub>OP1</sub>		0.3			A
Output low-level voltage	V <sub>O1</sub> OFF				0.2	V
<b>Output 2</b> : V <sub>STB</sub> = high, V <sub>CC1</sub> = 12.3V, V <sub>CC2</sub> = 6V, I <sub>O2</sub> = 0.7A						
Output voltage 2	V <sub>O2</sub>		4.9	5.1	5.3	V
Dropout voltage	V <sub>DROP2</sub>			0.3	0.5	V
Line regulation	ΔV <sub>OLN2</sub>	6V ≤ V <sub>CC2</sub> ≤ 7V			20	mV
Load regulation	ΔV <sub>OLD2</sub>	0.1A ≤ I <sub>O2</sub> ≤ 0.7A			300	mV
Peak output current	I <sub>OP2</sub>		0.7			A
Output short-circuit current	I <sub>OSC2</sub>				0.75	A
Ripple rejection	R <sub>rej2</sub>	f = 120Hz, 6V ≤ V <sub>CC2</sub> ≤ 7V		50		dB
Output low-level voltage	V <sub>O2</sub> OFF				0.2	V
<b>Input Overvoltage Protection</b>						
Detection voltage	V <sub>HVTH</sub>		7.6	8.0	8.4	V
<b>Output 1 and Output 2 On/Off Control</b> : V <sub>CC1</sub> = 12.3V, V <sub>CC2</sub> = 6V						
Output off control voltage	V <sub>STBL</sub>	V <sub>O1</sub> and V <sub>O2</sub> : off			1.0	V
Output on control voltage	V <sub>STBH</sub>	V <sub>O1</sub> and V <sub>O2</sub> : on	3.0		V <sub>CC1</sub>	V
<b>Control Amplifier</b> : V <sub>CC1</sub> = 12.3V, V <sub>CC2</sub> = 6V						
Control output current (sink)	I <sub>CONT</sub>	V <sub>CC1</sub> = 12.8V	10			mA
Resistance ratio	K <sub>R</sub>	K <sub>R</sub> = R <sub>1</sub> /R <sub>2</sub> , V <sub>REF</sub> = 1.28V typ		8.61		
Output inverted input voltage	V <sub>CC1</sub> - ERR	I <sub>O1</sub> = 0.3A, I <sub>O2</sub> = 0.7A	11.9	12.3	12.7	V

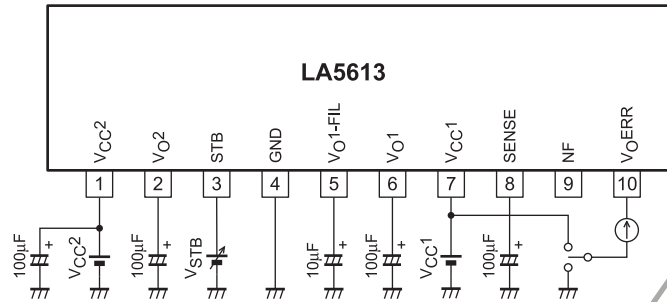
## Package Dimensions

unit : mm (typ)

3046D



Test Circuit



Pin Functions

Pin No.	Symbol	Function
1	V <sub>CC2</sub>	Low-voltage input
2	V <sub>O2</sub>	5.1V/0.7A regulator output, with on/off, current limiter thermal shutdown.
3	STB	V <sub>O1</sub> and V <sub>O2</sub> on/off control. Active high.
4	GND	Substrate of the LA5613 (minimum potential)
5	V <sub>O1-FIL</sub>	V <sub>O1</sub> ripple filter capacitor connection
6	V <sub>O1</sub>	Ripple filter 0.3A output, with on/off, current limiter thermal shutdown.
7	V <sub>CC1</sub>	High-voltage input
8	SENSE	V <sub>CC1</sub> voltage detection
9	NF	Phase compensation and V <sub>CC1</sub> adjustment. Connect resistors between this pin and SENSE or ground.
10	V <sub>OERR</sub>	Switching register control amplifier drive output

Notes: 1. CL: Current limiter 2. TSD: Thermal shutdown

Function Table (○ : built-in, × : not built-in)

Function	V <sub>O1</sub>	V <sub>O2</sub>	Control amplifier
Input line	V <sub>CC1</sub>	V <sub>CC2</sub>	V <sub>CC1</sub>
Output current protection	○	○	×
Thermal shutdown protection	○	○	×
On/off control	○	○	×
Overvoltage protection	○	○	○

Usage Notes

- (1) The relationship  $V_{CC1} \geq V_{CC2}$  must hold at all times when power is applied.
- (2) Power should be applied to V<sub>CC1</sub> and V<sub>CC2</sub> simultaneously. Do not use this IC with only one or the other voltage applied.
- (3) This IC will be destroyed if the V<sub>O1</sub> output load is shorted. Do not short the outputs of this IC.

Logic Table

Conditions: When  $V_{CC1} \geq V_{CC2}$

(However, the conditions  $V_{CC1} \geq 12V$  and  $V_{CC2} \geq 6V$  must also apply.)

STB	V <sub>O1</sub> , V <sub>O2</sub>
L or open	L
H	H

Notes : (1) "H" for STB denotes high level; "L" denotes low level.

(2) "H" for V<sub>O</sub> denotes output ON voltage; "L" denotes output OFF voltage.

