

**LA5613****VCR Regulator and Control Amplifier****Overview**

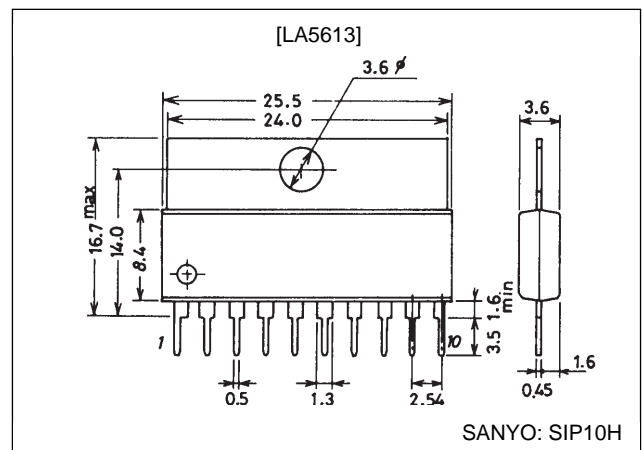
The LA5613 is an IC that includes an independently on/off switchable 5-V/0.7-A low-saturation regulator, an 11.3-V/0.3-A ripple filter, and a control amplifier on chip. It is optimal for use in VCR and similar products.

Functions and Features

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

Package Dimensions

unit: mm

3046B-SIP10F**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}	
Allowable power dissipation	$P_d \text{ max}$	No heat sink	1.7	W
Operating temperature	T_{opr}		-20 to +80	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +150	$^\circ\text{C}$

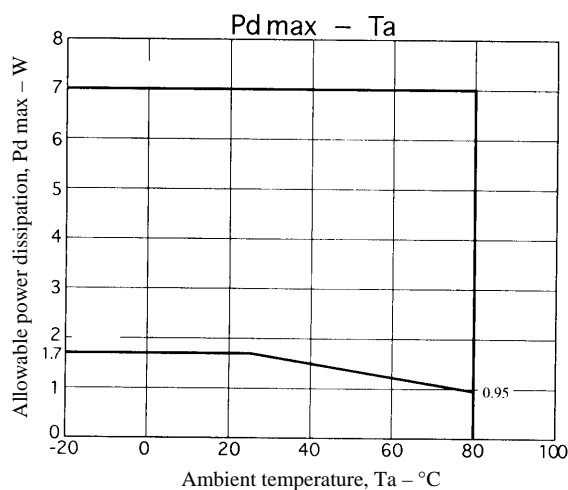
Operating Conditions at $T_a = 25^\circ\text{C}$

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

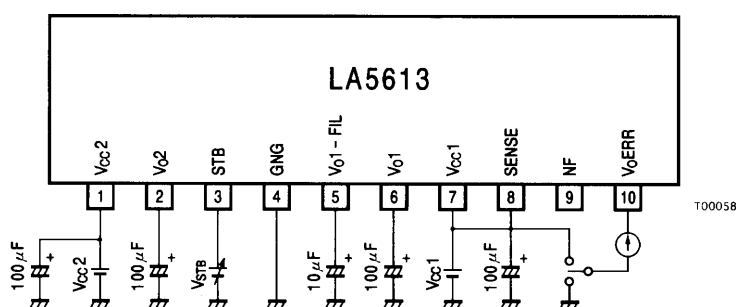
LA5613

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

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[No Load] V _{STB} = high, V _{CC1} = 12.3 V, V _{CC2} = 6 V, I _{O1} and I _{O2} = 0 A						
Quiescent current	I _{IN1}		–	20	30	mA
	I _{IN2}		–	0.2	0.3	mA
[Output 1] V _{STB} = high, V _{CC1} = 12.3 V, V _{CC2} = 6 V, I _{O1} = 0.3 A						
Output voltage 1	V _{O1}		10.9	11.3	–	V
Dropout voltage	V _{DROP1}		–	1.0	1.4	V
Peak output current	I _{OP1}		0.3	–	–	A
Output low-level voltage	V _{O1 OFF}		–	–	0.2	V
[Output 2] V _{STB} = high, V _{CC1} = 12.3 V, V _{CC2} = 6 V, I _{O2} = 0.7 A						
Output voltage 2	V _{O2}		4.9	5.1	5.3	V
Dropout voltage	V _{DROP2}		–	0.3	0.5	V
Line regulation	ΔV _{OLN2}	6 V ≤ V _{CC2} ≤ 7 V	–	–	20	mV
Load regulation	ΔV _{OLD2}	0.1 A ≤ I _{O2} ≤ 0.7 A	–	–	300	mV
Peak output current	I _{OP2}		0.7	–	–	A
Output short-circuit current	I _{OSC2}		–	–	0.75	A
Ripple rejection	R _{rej2}	f = 120 Hz, 6 V ≤ V _{CC2} ≤ 7 V	–	50	–	dB
Output low-level voltage	V _{O2 OFF}		–	–	0.2	V
[Input Overvoltage Protection]						
Detection voltage	V _{HVTH}		7.6	8.0	8.4	V
[Output 1 and Output 2 On/Off Control] V _{CC1} = 12.3 V, V _{CC2} = 6 V						
Output off control voltage	V _{STBL}	V _{O1} and V _{O2} : off	–	–	1.0	V
Output on control voltage	V _{STBH}	V _{O1} and V _{O2} : on	3.0	–	V _{CC1}	
[Control Amplifier] V _{CC1} = 12.3 V, V _{CC2} = 6 V						
Control output current (sink)	I _{CONT}	V _{CC1} = 12.8 V	10	–	–	mA
Resistance ratio	KR	KR = R1/R2, V _{REF} = 1.28 V typ	–	8.61	–	
Output inverted input voltage	V _{CC1} - ERR	I _{O1} = 0.3 A, I _{O2} = 0.7 A	11.9	12.3	12.7	V



Test Circuit



Pin Functions

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

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

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

Function	Circuit block	V _{O1}	V _{O2}	Control amplifier
Input line		V _{CC1}	V _{CC2}	V _{CC1}
Output current protection		○	○	×
Thermal shutdown protection		○	○	×
On/off control		○	○	×
Overvoltage protection		○	○	○

Usage Notes

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

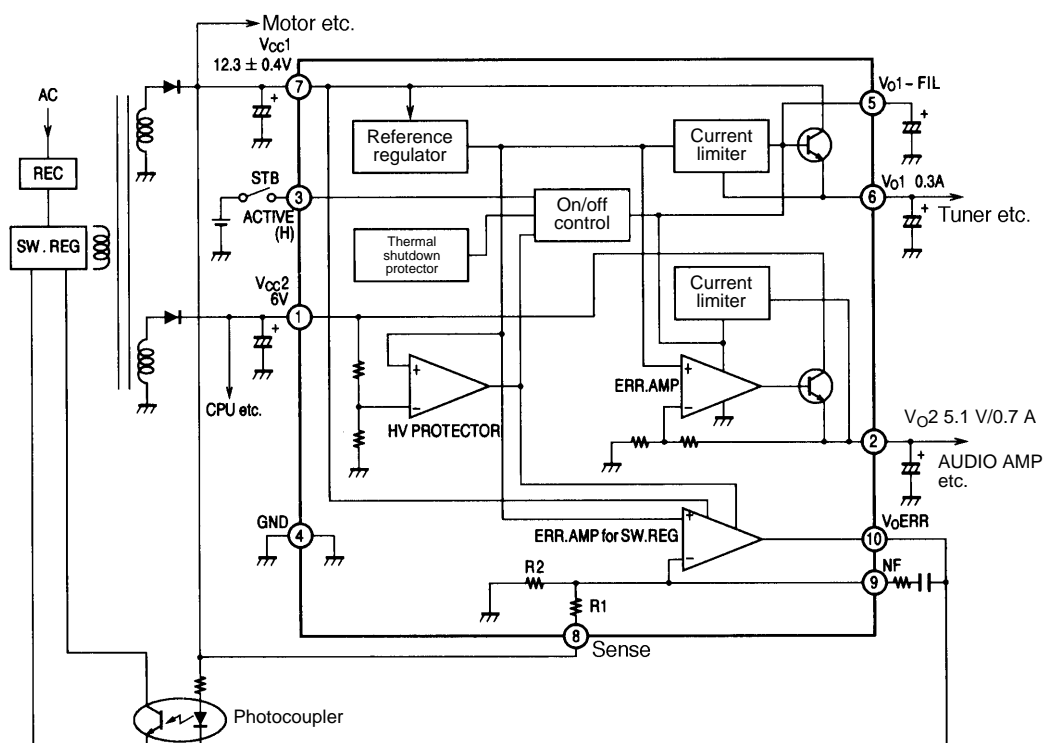
Logic Table

Conditions: When $V_{CC1} \geq V_{CC2}$
 (However, the conditions $11.9\text{ V} \leq V_{CC1} \leq 12.7\text{ V}$ and $5.5\text{ V} \leq V_{CC2} \leq 6.5\text{ V}$ must also apply.)

STB	V _{O1} , V _{O2}
L or open	L
H	H

Notes: 1. "H" for STB denotes high level; "L" denotes low level.
 2. "H" for V_O denotes output ON voltage; "L" denotes output OFF voltage.

Equivalent Circuit Block Diagram and Sample Application Circuit



T00057

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