Ordering number : EN5669

Monolithic Linear IC

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

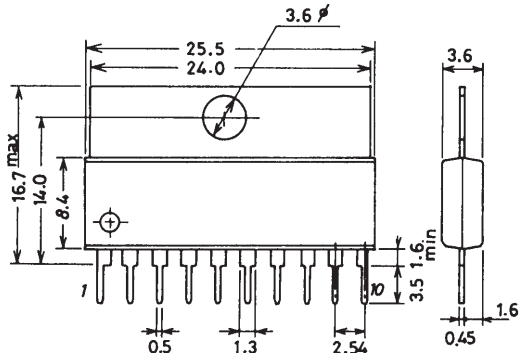
- 5-V/0.7-A low-saturation regulator
  (Includes an on/off function.)
- 11.3-V/0.3-A ripple filter (Includes an on/off function.)
- Switching regulator control amplifier
- Includes input overvoltage and thermal protection circuits on chip.

Package Dimensions

unit: mm

3046B-SIP10F

[LA5613]



SANYO: SIP10H

Specifications

Maximum Ratings at Ta = 25°C

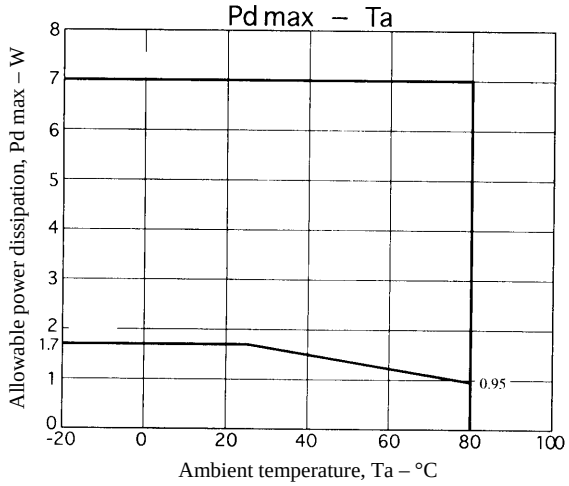
Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC}1$ max		14	V
	$V_{CC}2$ max	$V_{CC}1 \geq V_{CC}2$	$V_{CC}1$	
Allowable power dissipation	Pd max	No heat sink	1.7	W
Operating temperature	Topr		–20 to +80	°C
Storage temperature	Tstg		–40 to +150	°C

Operating Conditions at Ta = 25°C

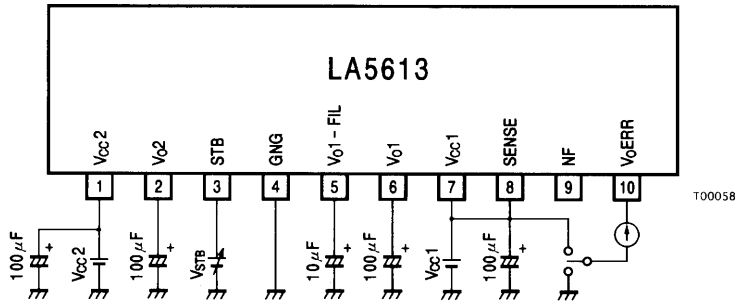
Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	$V_{CC}1$		12.3 ± 0.4	V
	$V_{CC}2$		6 ± 0.5	V
Output current 1	I_O1		0 to 0.3	A
Output current 2	I_O2		0 to 0.7	A

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

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[No Load] V_{STB} = high, $V_{CC}1$ = 12.3 V, $V_{CC}2$ = 6 V, I_O1 and I_O2 = 0 A						
Quiescent current	$I_{IN}1$		–	20	30	mA
	$I_{IN}2$		–	0.2	0.3	mA
[Output 1] V_{STB} = high, $V_{CC}1$ = 12.3 V, $V_{CC}2$ = 6 V, I_O1 = 0.3 A						
Output voltage 1	V_O1		10.9	11.3	–	V
Dropout voltage	$V_{DROP}1$		–	1.0	1.4	V
Peak output current	$I_{OP}1$		0.3	–	–	A
Output low-level voltage	V_O1 OFF		–	–	0.2	V
[Output 2] V_{STB} = high, $V_{CC}1$ = 12.3 V, $V_{CC}2$ = 6 V, I_O2 = 0.7 A						
Output voltage 2	V_O2		4.9	5.1	5.3	V
Dropout voltage	$V_{DROP}2$		–	0.3	0.5	V
Line regulation	$\Delta V_{OLN}2$	6 V ≤ $V_{CC}2$ ≤ 7 V	–	–	20	mV
Load regulation	$\Delta V_{OLD}2$	0.1 A ≤ I_O2 ≤ 0.7 A	–	–	300	mV
Peak output current	$I_{OP}2$		0.7	–	–	A
Output short-circuit current	$I_{OSC}2$		–	–	0.75	A
Ripple rejection	Rrej2	f = 120 Hz, 6 V ≤ $V_{CC}2$ ≤ 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] $V_{CC}1$ = 12.3 V, $V_{CC}2$ = 6 V						
Output off control voltage	$V_{STB}L$	V_O1 and V_O2: off	–	–	1.0	V
Output on control voltage	$V_{STB}H$	V_O1 and V_O2: on	3.0	–	$V_{CC}1$	
[Control Amplifier] $V_{CC}1$ = 12.3 V, $V_{CC}2$ = 6 V						
Control output current (sink)	I_{CONT}	$V_{CC}1$ = 12.8 V	10	–	–	mA
Resistance ratio	KR	KR = R1/R2, V_{REF} = 1.28 V typ	–	8.61	–	
Output inverted input voltage	$V_{CC}1$ - 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	$V_{CC}2$	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	$V_{CC}1$	High-voltage input
8	SENSE	$V_{CC}1$ voltage detection
9	NF	Phase compensation and $V_{CC}1$ 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)

Circuit block / Function	V_O1	V_O2	Control amplifier
Input line	$V_{CC}1$	$V_{CC}2$	$V_{CC}1$
Output current protection	❍	❍	×
Thermal shutdown protection	❍	❍	×
On/off control	❍	❍	×
Overvoltage protection	❍	❍	❍

Usage Notes

- The relationship $V_{CC}1 \geq V_{CC}2$ must hold at all times when power is applied.
- Power should be applied to $V_{CC}1$ and $V_{CC}2$ 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 $V_{CC}1 \geq V_{CC}2$
(However, the conditions $11.9\ V \leq V_{CC}1 \leq 12.7\ V$ and $5.5\ V \leq V_{CC}2 \leq 6.5\ V$ 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