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 Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit	
	V _{CC} 1 max		14		
Maximum supply voltage	V _{CC} 2 max	$V_{CC}1 \ge V_{CC}2$	V _{CC} 1	v	
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 $Ta = 25^{\circ}C$

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	V _{CC} 1		12.3 ± 0.4	V
Input voltage	V _{CC} 2		6 ± 0.5	V
Output current 1	I _O 1		0 to 0.3	Α
Output current 2	I _O 2		0 to 0.7	A

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Electrical Characteristics at $Ta = 25^{\circ}C$ in the specified Test Circuit

Parameter	Symbol	Symbol Conditions		Ratings			
Parameter	Symbol	Symbol Conditions		typ	max	Unit	
[No Load] V_{STB} = high, $V_{CC}1$ = 12.3 V, V	$V_{\rm CC}2 = 6$ V, I_01 and I_0	2 = 0 A		•			
Quiescent current	I _{IN} 1		-	20	30	mA	
Quiescent current	I _{IN} 2		-	0.2	0.3	mA	
[Output 1] V_{STB} = high, V_{CC} 1 = 12.3 V, V	$V_{\rm CC}2 = 6 \text{ V}, \text{ I}_{\rm O}1 = 0.3 \text{ /}$	A.					
Output voltage 1	V _O 1		10.9	11.3	-	V	
Dropout voltage	V _{DROP} 1		-	1.0	1.4	V	
Peak output current	I _{OP} 1		0.3	-	-	А	
Output low-level voltage	V _O 1 _{OFF}		-	-	0.2	V	
[Output 2] V_{STB} = high, V_{CC} 1 = 12.3 V, V	$V_{\rm CC}2 = 6 \text{ V}, \text{ I}_{\rm O}2 = 0.7 \text{ /}$	A.					
Output voltage 2	V _O 2		4.9	5.1	5.3	V	
Dropout voltage	V _{DROP} 2		-	0.3	0.5	V	
Line regulation	$\Delta V_{OLN} 2$	$6 \text{ V} \le \text{V}_{CC} 2 \le 7 \text{ V}$	-	-	20	mV	
Load regulation	$\Delta V_{OLD} 2$	$0.1 \text{ A} \le I_0 2 \le 0.7 \text{ A}$	-	-	300	mV	
Peak output current	I _{OP} 2		0.7	-	-	А	
Output short-circuit current	I _{OSC} 2		-	-	0.75	А	
Ripple rejection	Rrej2	f = 120 Hz, 6 V \leq V _{CC} 2 \leq 7 V	-	50	-	dB	
Output low-level voltage	V _O 2 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 _O 1 and V _O 2: off	-	-	1.0	V	
Output on control voltage	V _{STB} H	V _O 1 and V _O 2: on	3.0	-	V _{CC} 1		
[Control Amplifier] $V_{CC}1 = 12.3 \text{ V}, V_{CC}2$	= 6 V						
Control output current (sink)	ICONT	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 _O 1 = 0.3 A, I _O 2 = 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 _O 2	5.1-V/0.7-A regulator output, with on/off, current limiter thermal shutdown.
3	STB	V ₀ 1 and V ₀ 2 on/off control. Active high.
4	GND	Substrate of the LA5613 (minimum potential)
5	V _O 1-FIL	V ₀ 1 ripple filter capacitor connection
6	V _O 1	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 _O ERR	Switching register control amplifier drive output

Notes: 1. CL: Current limiter

2. TSD: Thermal shutdown

Function Table (o: built-in, x: not built-in)

Circuit block Function	V _O 1	V _O 2	Control amplifier
Input line	V _{CC} 1	V _{CC} 2	V _{CC} 1
Output current protection	0	О	×
Thermal shutdown protection	О	О	×
On/off control	О	О	×
Overvoltage protection	О	0	О

Usage Notes

- The relationship $V_{CC} 1 \ge V_{CC} 2$ 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 $V_{CC}1 \ge V_{CC}2$

(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 ₀ 1, V ₀ 2
L or open	L
Н	Н

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

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