



LA5616

Microprocessor-Controlled Audio Power Supply

Overview

The LA5616 is appropriate for use in power supplies for microprocessor-controlled CD players, tuners, receivers, and similar audio equipment.

Functions

- Low-saturation 5-V, 400-mA power supply
- 7.0-V, 1.0-A power supply
- Output reset generation function
- The 5.0-V system can be controlled (on/off) from the provided active-high enable pin.

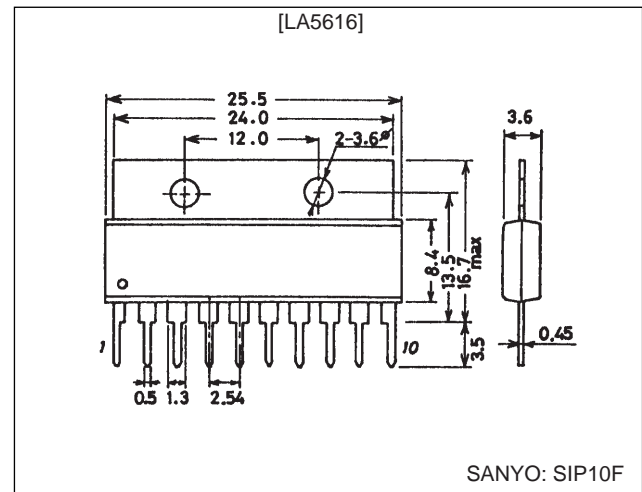
Features

- The reset output delay time can be set with an external capacitor.
- Sharp-cutoff current limiter circuit and thermal protection circuit
- Active pull-up element incorporated in reset output circuit for improved noise suppression.

Package Dimensions

unit: mm

3018A-SIP10F



Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	$V_{IN\ max}$		18	V
Enable pin voltage	$V_{EN\ max}$		$V_{IN\ max}$	V
Reset output pin voltage	$V_{\overline{RES}\ max}$		18	V
Allowable power dissipation	$P_{d\ max}$		2	W
Operating temperature	T_{opr}		-20 to +80	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

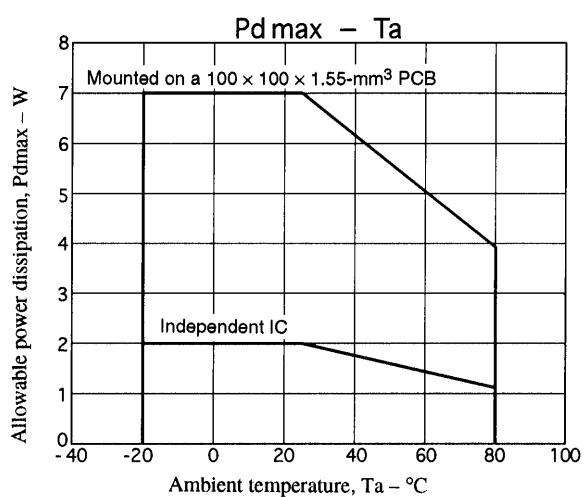
Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	V_{IN}		5.6 to 17	V
Output current	I_{OUT1}		0 to 400	mA
	I_{OUT2}		0 to 1.0	A
Reset output source current	I_{ORH}	High level	0 to 200	μA
Reset output sink current	I_{ORL}	Low level	0 to 2	mA

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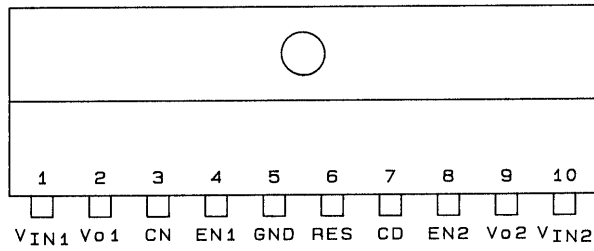
Electrical Characteristics at Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[5.0-V Power Supply Block] $V_{IN1} = V_{IN2}$, $C_{OUT2} = 47 \mu\text{F}$						
Output voltage	V_{OUT1}	$V_{IN1} = 12 \text{ V}$, $I_{OUT1} = 400 \text{ mA}$	4.75	5.0	5.25	V
Dropout voltage	V_{DROP1}	$V_{IN1} = 4.9 \text{ V}$, $I_{OUT1} = 400 \text{ mA}$		0.5	1.0	V
Line regulation	ΔV_{OLN1}	$5.6 \leq V_{IN1} \leq 17 \text{ V}$, $I_{OUT1} = 400 \text{ mA}$		20	100	mV
Load regulation	ΔV_{OLD1}	$5 \text{ mA} \leq I_O \leq 400 \text{ mA}$, $V_{IN1} = 12 \text{ V}$		50	150	mV
Peak output current	I_{OP1}	$V_{IN1} = 12 \text{ V}$	400	500		mA
Output shorted current	I_{OSC1}	$V_{IN1} = 12 \text{ V}$		100	400	mA
Output noise voltage	V_{N1}	$10 \text{ Hz} \leq f \leq 100 \text{ kHz}$		70		μVrms
Output voltage temperature coefficient	$\Delta V_O/\Delta T_a$	$T_j = 25 \text{ to } 125^\circ\text{C}$		1.6		$\text{mV}/^\circ\text{C}$
Ripple rejection	R_{ref1}	$f = 120 \text{ Hz}$, $6 \text{ V} \leq V_{IN1} \leq 17 \text{ V}$		60		dB
Output on control voltage	V_{ENH1}	$V_{IN1} = 12 \text{ V}$	2.6			V
Output off control voltage	V_{ENL1}	$V_{IN1} = 12 \text{ V}$			1.0	V
Low-level output voltage	$V_{O\ OFF1}$	$V_{IN1} = 12 \text{ V}$			0.3	V
[Reset Block] $V_{IN1} = V_{IN2} = 12 \text{ V}$						
High reset output voltage	V_{ORH}	$I_{ORH} = 200 \mu\text{A}$, Cd pin open	4.73	4.98	5.23	V
Low reset output voltage	V_{ORL}	$I_{SRL} = 2 \text{ mA}$, with Cd shorted to GND		100	200	mV
Reset threshold voltage	V_{RT}		3.95	4.2	4.45	V
Reset hysteresis voltage	V_{hys}		40	100	200	mV
Reset output delay time	t_d	Cd = 0.1 μF	7.5	10	12.5	ms
[7.0-V Power Supply Block] $V_{IN1} = V_{IN2}$, $C_{OUT2} = 47 \mu\text{F}$						
Output voltage	V_{OUT2}	$V_{IN2} = 12 \text{ V}$, $I_{OUT2} = 1 \text{ A}$	6.5	7.0	7.5	V
Dropout voltage	V_{DROP2}	$V_{IN2} = 6.5 \text{ V}$, $I_{OUT2} = 1 \text{ A}$		1.0	2.0	V
Line regulation	ΔV_{OLN2}	$9.0 \leq V_{IN2} \leq 17 \text{ V}$, $I_{OUT2} = 1 \text{ A}$			200	mV
Load regulation	ΔV_{OLD2}	$5 \text{ mA} \leq I_O \leq 1.0 \text{ A}$, $V_{IN2} = 12 \text{ V}$			300	mV
Peak output current	I_{OP2}	$V_{IN2} = 12 \text{ V}$	1.0			A
Output shorted current	I_{OSC2}	$V_{IN2} = 12 \text{ V}$		500		mA
Ripple rejection	R_{ref2}	$f = 120 \text{ Hz}$, $9.0 \text{ V} \leq V_{IN2} \leq 17 \text{ V}$		50		dB
Output on control voltage	V_{ENH2}	$V_{IN2} = 12 \text{ V}$	2.6			V
Output off control voltage	V_{ENL2}	$V_{IN2} = 12 \text{ V}$			1.0	V
Low-level output voltage	$V_{O\ OFF2}$	$V_{IN2} = 12 \text{ V}$			0.3	V



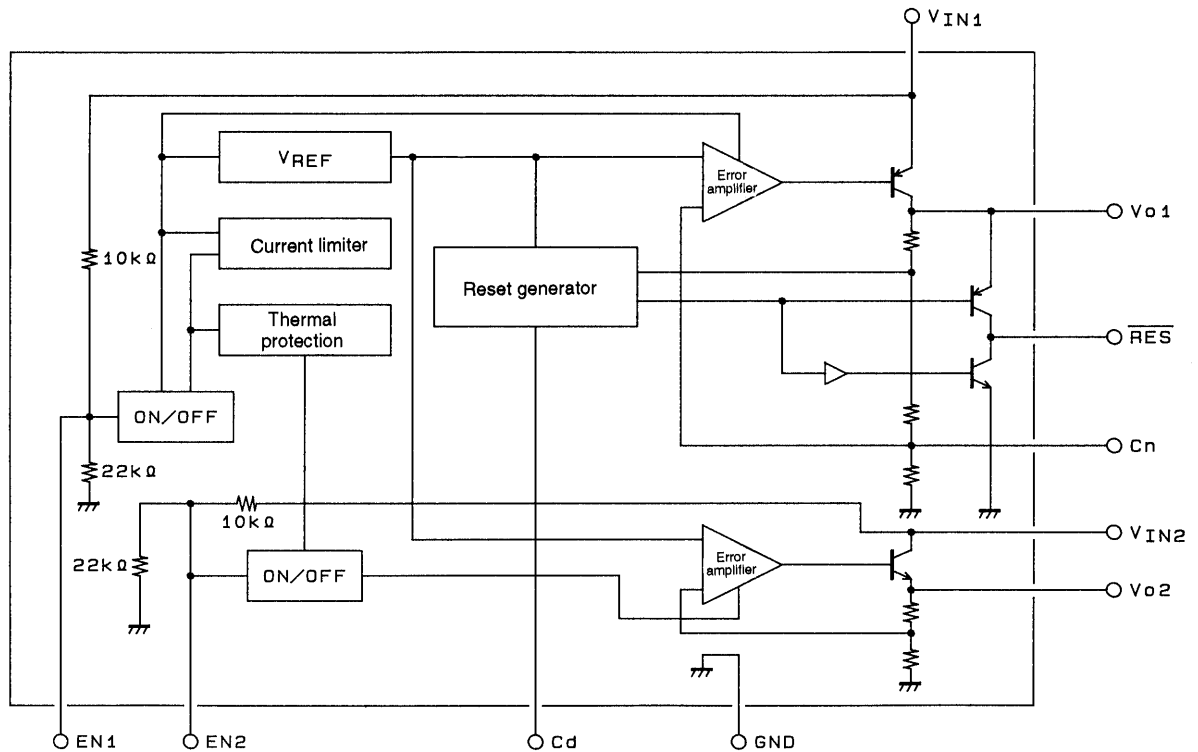
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Pin Assignment



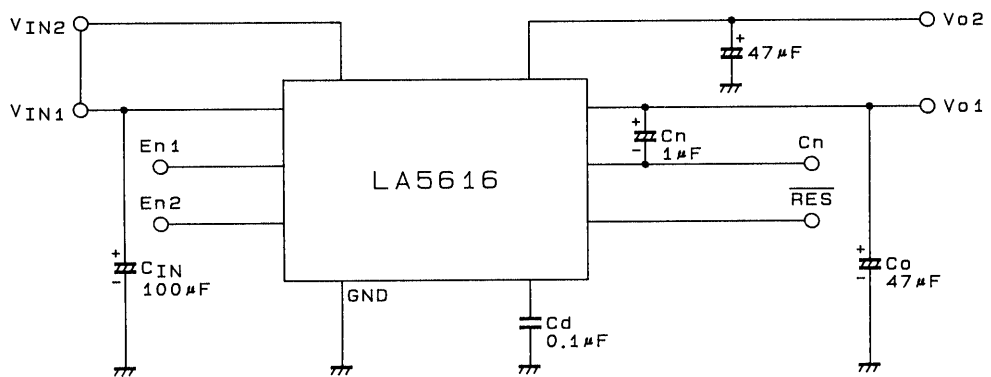
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Equivalent Circuit Block Diagram



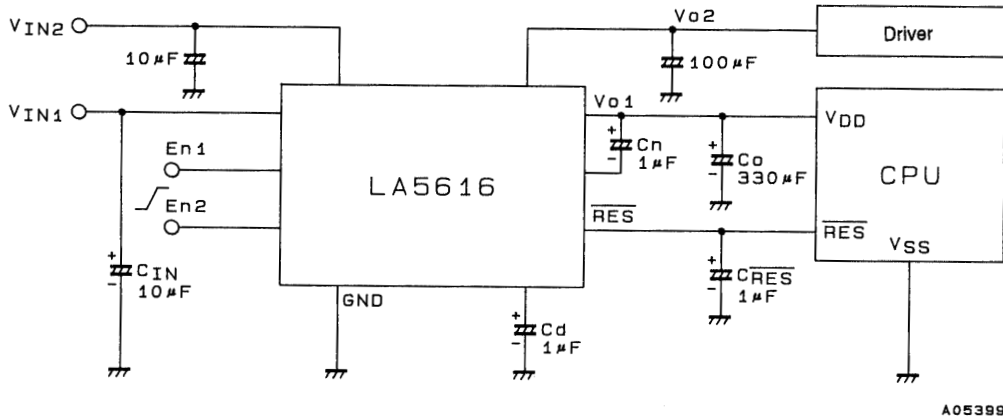
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Test Circuit Diagram



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Application Circuit Example



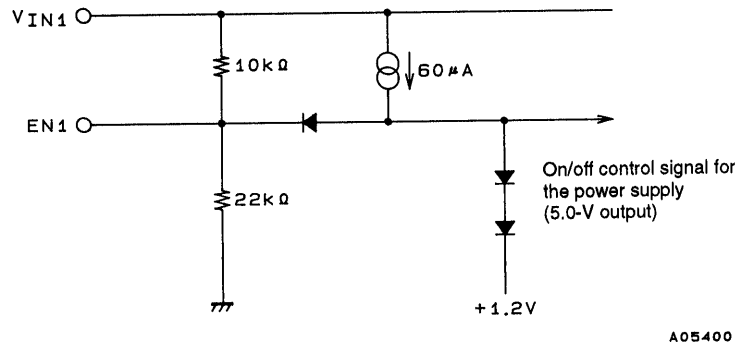
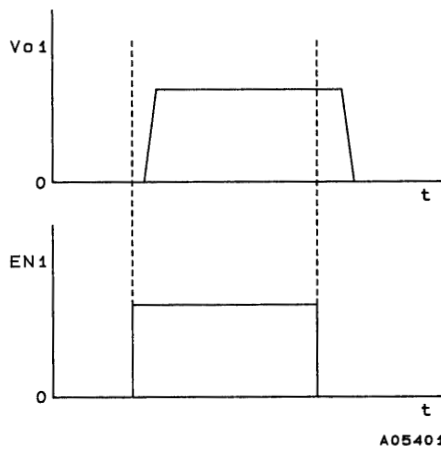
- Note: 1. The capacitors C_n and C_{RES} are only needed when external noise is a problem. If these capacitors are used, then capacitor C_o must have a value at least 1/3 that of capacitor C_{IN} . A certain amount of noise may occur when V_{IN} goes off due to differences in discharge timings between the capacitors.
2. A capacitor with a low temperature dependence must be used for the delay capacitor C_d .
3. The minimum value for the output capacitor C_o is 47 μF .
4. The input voltages must obey the relationship $V_{IN1} \leq V_{IN2}$, and must be brought up at the same time.

Function Table

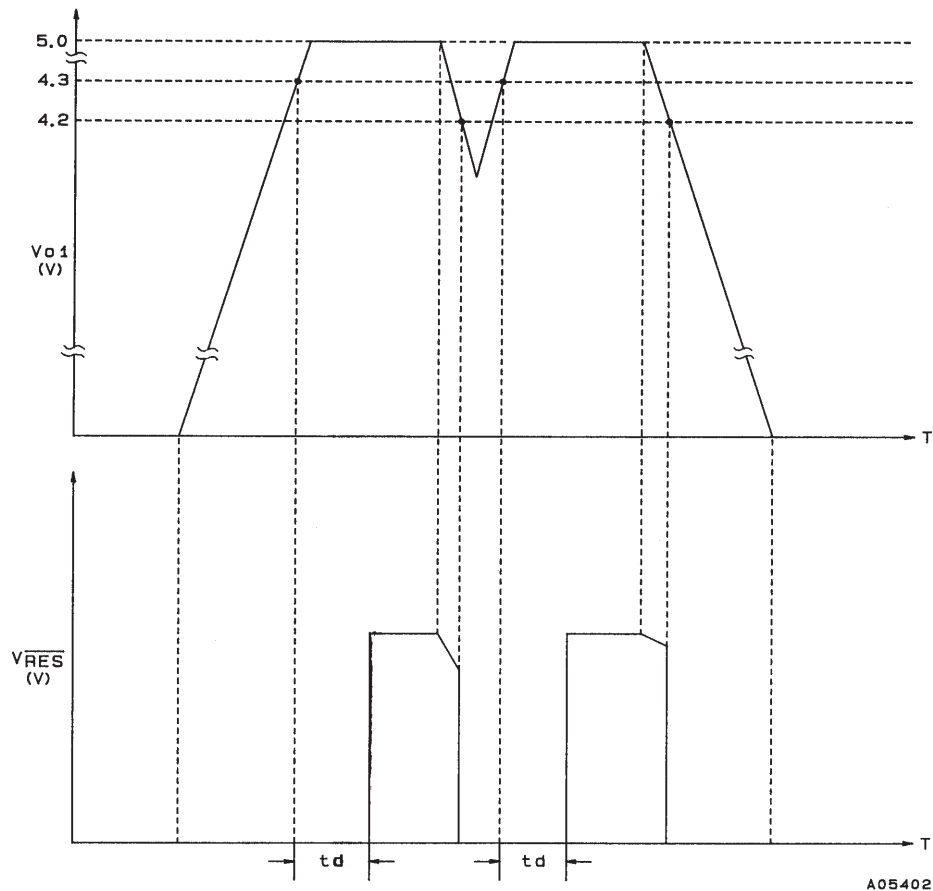
EN1, EN2	Vo1
L	L
H	H

Note: Open is also possible for the $V_{EN1} = V_{EN2} =$ high state. (EN_1, EN_2 is independent.)

Enable Input Equivalent Circuit



Reset Operation



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