



# 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.

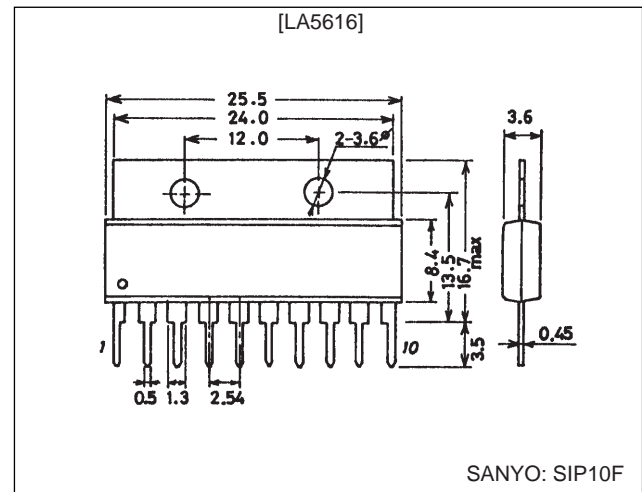
### Features

- 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	$^\circ\text{C}$

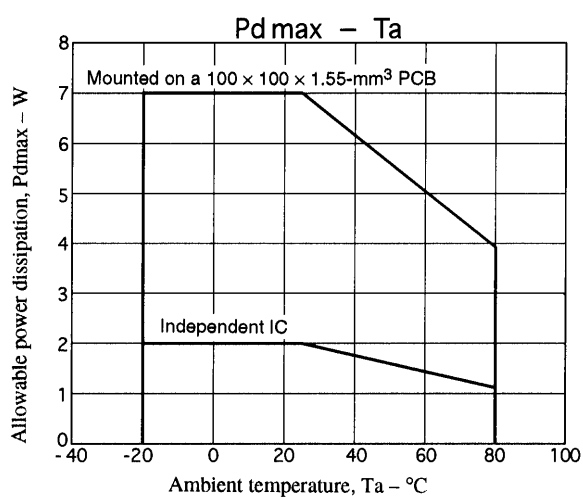
#### Operating Conditions at $T_a = 25^\circ\text{C}$

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	$\mu\text{A}$
Reset output sink current	$I_{ORL}$	Low level	0 to 2	mA

## LA5616

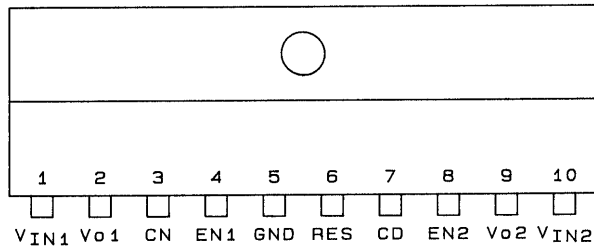
### Electrical Characteristics at Ta = 25°C

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	$\Delta V_{OLN1}$	$5.6 \leq V_{IN1} \leq 17 \text{ V}$ , $I_{OUT1} = 400 \text{ mA}$		20	100	mV
Load regulation	$\Delta V_{OLD1}$	$5 \text{ mA} \leq I_O \leq 400 \text{ mA}$ , $V_{IN1} = 12 \text{ V}$		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		$\mu\text{Vrms}$
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 $\mu\text{F}$	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	$\Delta V_{OLN2}$	$9.0 \leq V_{IN2} \leq 17 \text{ V}$ , $I_{OUT2} = 1 \text{ A}$			200	mV
Load regulation	$\Delta V_{OLD2}$	$5 \text{ mA} \leq I_O \leq 1.0 \text{ A}$ , $V_{IN2} = 12 \text{ V}$			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



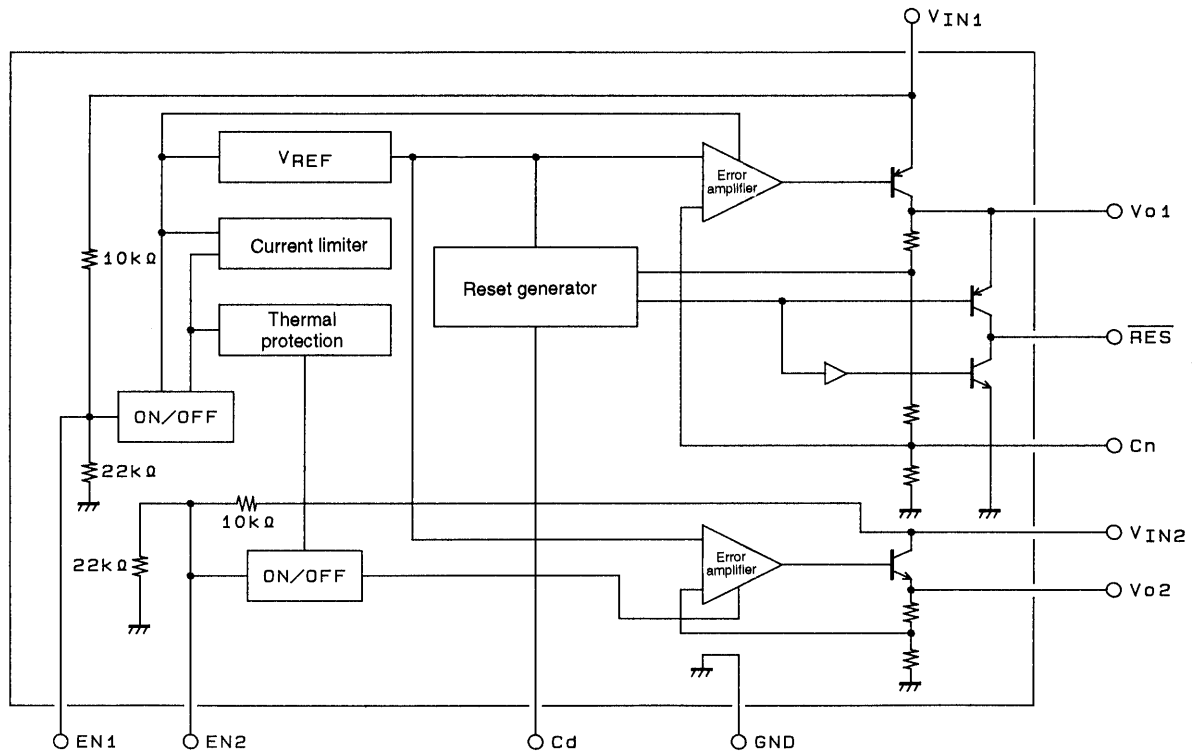
# LA5616

## Pin Assignment



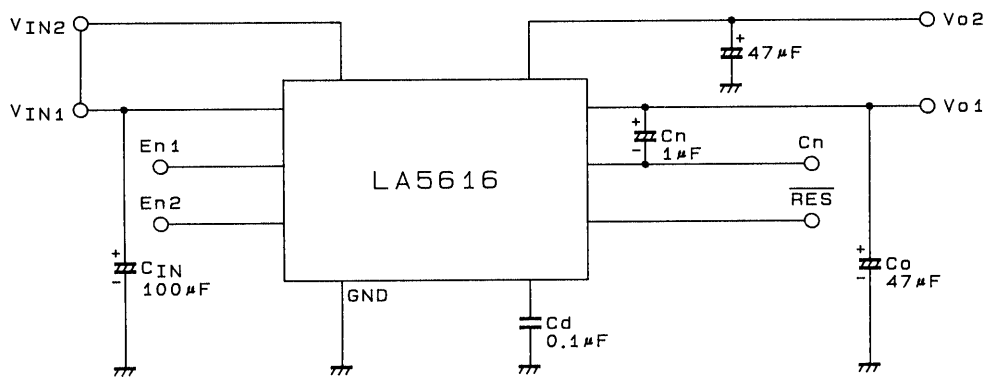
A05396

## Equivalent Circuit Block Diagram



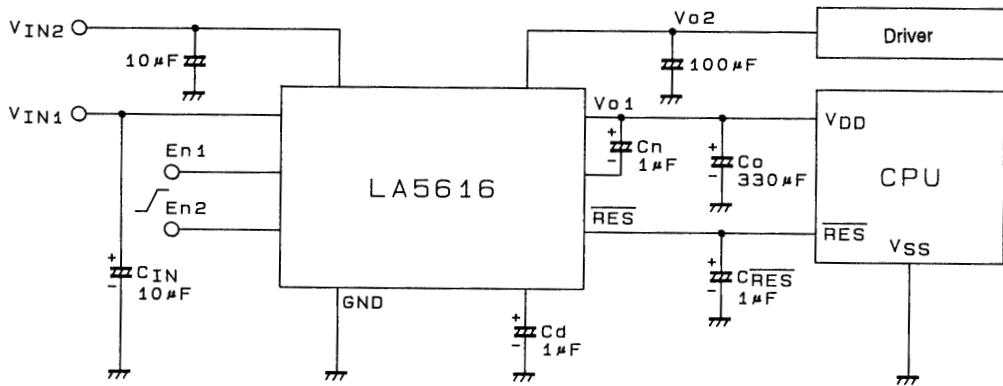
A05397

## Test Circuit Diagram



A05398

Application Circuit Example



A05399

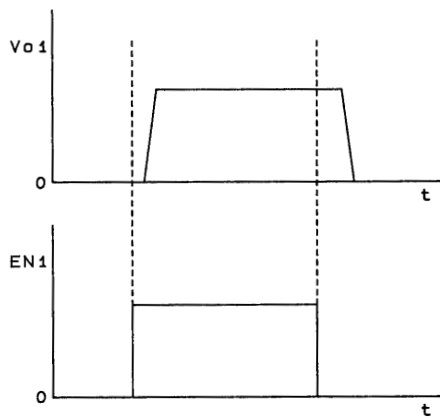
- Note: 1. The capacitors  $C_n$  and  $C_{RES}$  are only needed when external noise is a problem. If these capacitors are used, then capacitor  $C_o$  must have a value at least 1/3 that of capacitor  $C_{IN}$ . A certain amount of noise may occur when  $V_{IN}$  goes off due to differences in discharge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

Function Table

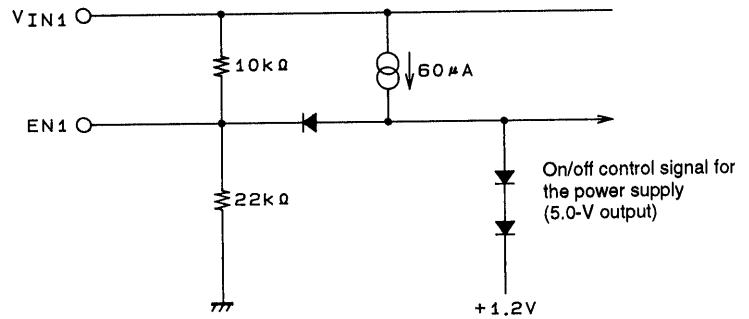
EN1, EN2	VO1
L	L
H	H

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

Enable Input Equivalent Circuit

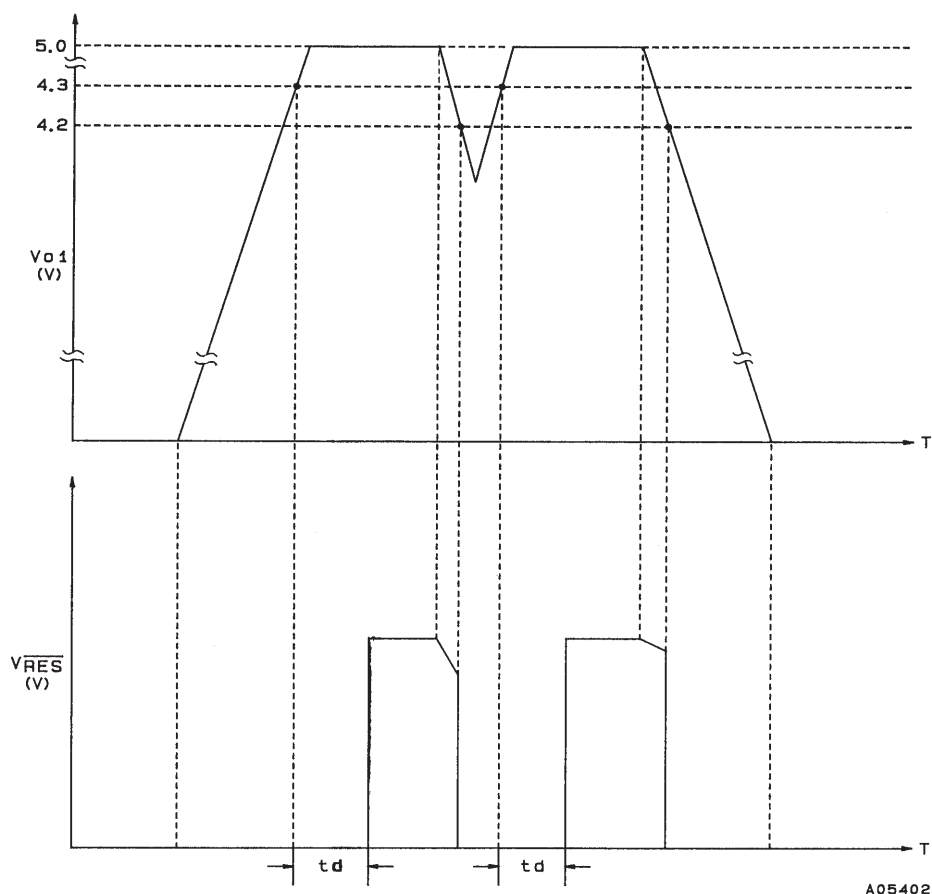


A05401



A05400

## Reset Operation



- No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.
- Anyone purchasing any products described or contained herein for an above-mentioned use shall:
  - ① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use:
  - ② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of December, 1997. Specifications and information herein are subject to change without notice.