



LA5603

Multifunction, Multiple Voltage Power Supply

Overview

The LA5603 is a multifunction, low dropout voltage, multiple voltage power supply for use in microcomputer controlled audio equipment such as CD players and minicomponent stereo systems.

The LA5603 features a 5.6V, 0.5A supply, a 7.5V, 1.0A supply and a -7.5V, -1.0A supply each with an on/off switch, a 4.8V ($I_{OA2}=0.1A$, $I_{OA1}=0$) supply with a reverse current prevention diode and a 5.6V ($I_{OA1}=0.1A$, $I_{OA2}=0$) supply enabling it to power both analog and digital components.

The LA5603 incorporates reset, mute and power-on functions for generating signals for the component(s) being powered and an adjustable startup delay function for controlling the sequence in which system components are powered up.

The LA5603 operates from a ± 8.5 to $\pm 16V$ dual supply and is available in 18-pin SIPs.

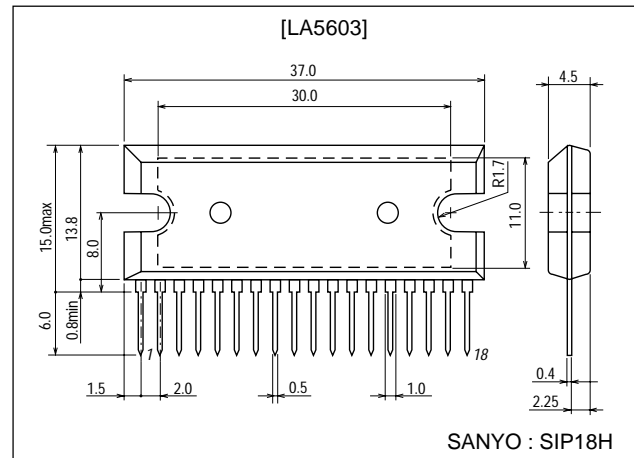
Features

- Low dropout voltage power supply.
- 5.6V, 0.5A supply with on/off switch.
- 7.5V, 1.0A and -7.5V, -1.0A supplies with on/off switches.
- 4.8V ($I_{OA2}=0.1A$, $I_{OA1}=0$) supply with diode to prevent reverse currents.
- 5.6V ($I_{OA1}=0.1A$, $I_{OA2}=0$) supply.
- Reset function.
- Mute function.
- Auto power-on function.
- Powers both analog and digital components.
- ± 8.5 to $\pm 16V$ dual supply.
- 18-pin SIP.

Package Dimensions

unit:mm

3109-SIP18H



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Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V _{CC} /V _{EE} max		±16	V
QUICK IN input voltage	V _{QUICK IN}		16	V
Allowable power dissipation	P _d max		15	W
Operating temperature	T _{opr}		-20 to +85	°C
Storage temperature	T _{stg}		-55 to +150	°C

Recommended Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V _{CC} /V _{EE}		±8.5 to ±16	V
Output current 1	I _{O1}		0 to 500	mA
Output current 2	I _{O2}		0 to 1.0	A
Output current 3	I _{O3}		-1.0 to 0	A
MUTE output current	I _{MUTE}		0 to 10	mA
RES low-level output sink current	I _{ORL}		0 to 2	mA
RES high-level output source current	I _{ORH}		0 to 200	µA
Auxiliary power total supply output current	I _{OA1} , I _{OA2}	I _{OA1} +I _{OA2}	0 to 100	mA

Operating Characteristics

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[Main power supply] at Ta=25°C, Tj=25°C, V _{CC} /V _{EE} =±8.5V, V _{OA1} =5.6V, V _{OA2} =4.8V, I _{OA1} =100mA, unless otherwise noted						
Output voltage	V _{OA1}	I _{OA2} =0 (I _{OA1} =100mA)	5.2	5.6	5.9	V
	V _{OA2}	I _{OA2} =100mA (I _{OA1} =0)	4.2	4.8	5.2	V
Dropout voltage	V _{DROP}			0.6	1.0	V
Line regulation	ΔV _{OA1 LN}	V _{CC} =7 to 12V, I _{OA1} =50mA		10	80	mV
Load regulation	ΔV _{OA1 LD}	I _{OA1} =1 to 100mA		20	100	mV
Peak output current	I _{OP}		100	200		mA
Output short-circuit current	I _{OSC}			10		mA
Output leakage current	I _{OA LEAK}	V _{CC} =0V, V _{OA2} =6V			2	µA
Current drain with positive power supply	I _{QP1}	I _{O1} , I _{O2} , I _{O3} , I _{OA1} and I _{MUTE} =0A		6.5	19.5	mA
	I _{QP2}	I _{O1} =200mA, I _{O2} =500mA, I _{O3} =0mA, I _{OA1} =100mA, I _{MUTE} =5mA		26	78	mA
Current drain with negative power supply	I _{OM1}	I _{O1} , I _{O2} , I _{O3} , I _{OA1} and I _{MUTE} =0A		-3.2	-9.6	mA
	I _{OM2}	I _{O1} , I _{O2} , I _{OA1} and I _{MUTE} =0A, I _{O3} =-500mA		-6.3	-19	mA
[Reset] at Ta=25°C, Tj=25°C, V _{CC} /V _{EE} =±8.5V						
Output high-level voltage	V _{ORH}	I _{ORH} =200µA	4.47	4.97	5.47	V
Output low-level voltage	V _{ORL}	I _{ORL} =2mA, C _d grounded		100	200	mV
Output voltage threshold	V _{RT}	I _{OA1} =5mA, V _{OA1} detection voltage low	3.7	3.9	4.1	V
Hysteresis voltage	V _{hys}	I _{OA1} =5mA		100	200	mV
Output delay time	t _d	C _d =1µF	240	300	360	ms
[5.6V power supply] at Ta=25°C, Tj=25°C, V _{CC} /V _{EE} =±8.5V, I _O =200mA unless otherwise noted						
Output voltage	V _{O1}		5.1	5.6	5.9	V
Dropout voltage	V _{DROP}			0.6	1.0	V
Line regulation	ΔV _{OLN}	V _{CC} =8.5 to 16V		20	100	mV
		V _{CC} =9.5 to 16V		20	100	mV
Load regulation	ΔV _{OLD}	I _O =5 to 500mA		50	150	mV
		I _O =5 to 100mA		20	100	mV
Peak output current	I _{OP}		500	750		mA
Output short-circuit current	I _{OSC}			80		mA
Output noise voltage	V _{NO}	f=10Hz to 100kHz		70		µV
Output voltage temperature coefficient	ΔV _O /ΔTa	Tj=25 to 85°C		-0.7		mV/°C
Ripple rejection ratio	R _{rej}	f=120Hz, V _{CC} =8.5 to 16V		74		dB
EN high-level output voltage	V _{ENH}	Main power source ON	0		0.3	V

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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[7.5V power supply] at Ta=25°C, Tj=25°C, VCC/VEE=±8.5V, IO=500mA, CO=100µF unless otherwise noted						
Output voltage	VO2		7.1	7.5	7.8	V
Dropout voltage	VDROP			0.6	1.0	V
		IO=300mA		0.4	0.8	V
Line regulation	ΔVOLN	VCC=8.5 to 16V		20	100	mV
Load regulation	ΔVOLD	IO=5mA to 1A		80	200	mV
Peak output current	IOP	VCC/VEE=±12V	1.0	1.5		A
Output short-circuit current	IOSC			0.1		A
Output noise voltage	VNO	f=10Hz to 100kHz		70		µVrms
Output voltage temperature coefficient	ΔVO/ΔTa	Tj=25 to 85°C		-0.5		mV/°C
Ripple rejection ratio	Rrej	f=120Hz, VCC=8.5 to 16V		60		dB
[-7.5V power supply] at Ta=25°C, Tj=25°C, VCC/VEE=±8.5V, IO=-500mA, CO=100µF unless otherwise noted						
Output voltage	VO3		-7.8	-7.5	-7.1	V
Dropout voltage	VDROP			0.6	1.0	V
		IO=-300mA		0.4	0.8	V
Line regulation	ΔVOLN	VEE=-16 to -8.5V		200	300	mV
Load regulation	ΔVOLD	IO=-1A to -5mA		80	200	mV
Peak output current	IOP	VCC/VEE=±12V		-1.5	-1.0	A
Output short-circuit current	IOSC			-0.3		A
Output noise voltage	VNO	f=10Hz to 100kHz		70		µV
Output voltage temperature coefficient	ΔVO/ΔTa	Tj=25 to 85°C		+0.5		mV/°C
Ripple rejection ratio	Rrej	f=120Hz, VCC=-16 to -8.5V		60		dB
[5.0V power supply with mute] at Ta=25°C, Tj=25°C, VCC/VEE=±8.5V, IO=-5mA						
MUTE ON output voltage	VMUTE ON		4.6	5.0	5.4	V
MUTE OFF output voltage	VMUTE OFF	VQUICK IN=5.5V		0.2	0.3	V
QUICK IN high-level input voltage	VQUICK IN H		7.5		VCC	V
QUICK IN low-level input voltage	VQUICK IN L				5.5	V
QUICK IN high-level current	IQUICK IN H	VQUICK IN=7.5V		240	480	µA

Design Notes

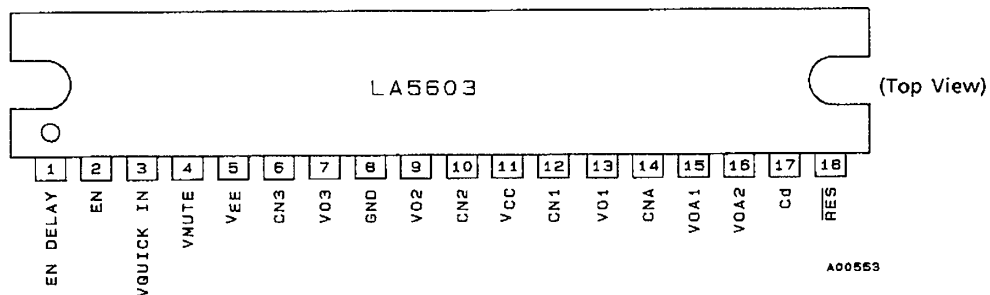
When the 5.6 (VO1), 7.5 and -7.5V output are ON, EN is high impedance.

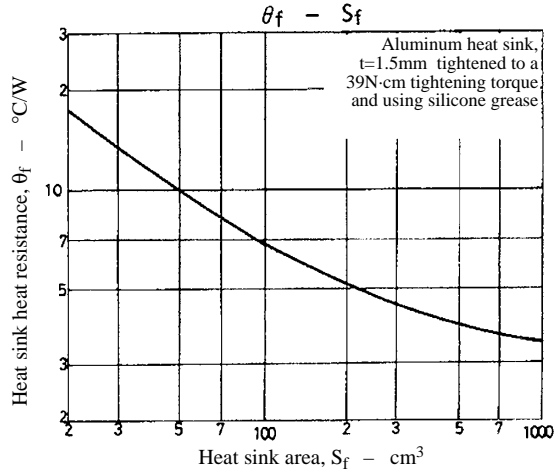
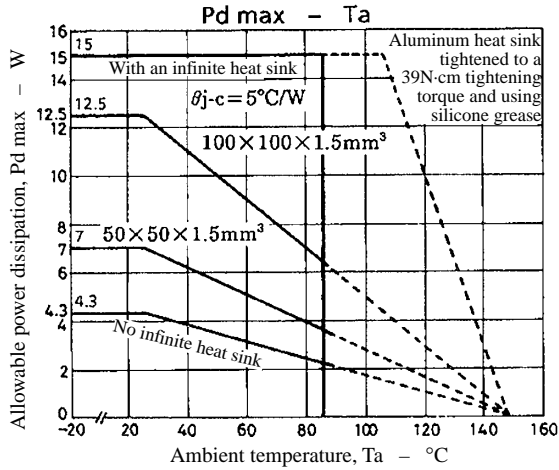
When QUICK IN is HIGH, mute mode is ON. When QUICK IN is LOW, mute mode is OFF.

The output capacitors for VO1, VOA1, and VOA2 should be 47µF or greater. The output capacitors for VO2 and VO3 should be 100µF or greater. The output capacitors and Cd, the startup delay capacitor, should have good temperature stability to prevent oscillations at low temperatures.

Capacitors CN1, CN2, CN3 and CNA suppress noise and improve ripple rejection.

Pin Assignment





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