



Multi-Function Voltage Regulator for Radio Cassette Recorders with CD Player

Overview

The LA5609 is a multi-function multi-voltage power supply that includes a built-in on/off function. The LA5609 provides dedicated outputs for motors, audio systems, CD drive, radio, microprocessor, and loading drives, thus making it optimal for use as the system power supply in radio cassette recorders with CD player.

Functions

- Power supply systems for radio cassette recorders with CD player
- Miniature electronic equipment
- Low-saturation regulator (14.5 V/1.2 A, 9 V/300 mA, 7.5 V/800 mA)
- High-precision power supply (two 5 V/220 mA systems, 5 V/100 mA, 8 V/800 mA)
- Limiter power supply (9 V/60 mA)

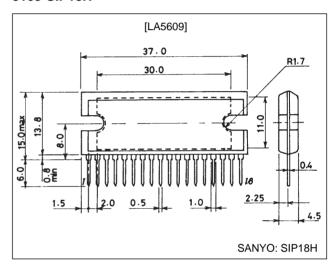
Features

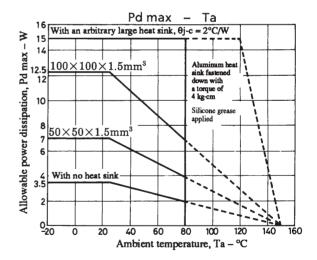
- Supports end-product miniaturization by the provision of built-in control circuits.
- Provides reduced internal power dissipation by the adoption of a low-saturation regulator.
- Built-in output current limiter prevents IC destruction due to output shorts.

Package Dimensions

unit: mm

3109-SIP18H





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Specifications

Maximum Ratings at $Ta = 25^{\circ}C$

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	V _{CC} max		24	V
V _{REF} pin voltage	V _{REF}		6	V
POWER CONT pin voltage	V _{CONT} max		6	V
AC STBY pin voltage	V _{AC} max		6	V
MODE SW pin voltage	V _{MODE} max		6	V
Allowable power dissipation	Pd max	With no heat sink	3.5	W
Operating temperature	Topr		-20 to +80	°C
Storage temperature	Tstg		-55 to +150	°C

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

Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	V _{CC}		6.5 to 22	V
Input voltage	V _{REF}		4.5 to 5.5	V
Motor 14.5 V output current	10 мот		0 to 1.2	А
Audio 9 V output current	I _{O AUD}		0 to 300	mA
Digital 5 V output current	I _{O DIGI}		0 to 220	mA
CD 5 V output current	I _{O CD5}		0 to 220	mA
CD 8 V output current	I _{O CD8}		0 to 0.8	А
Radio 5 V output current	I _{O RAD}		0 to 100	mA
Loading 7.5 V output current	I _{O LOAD}		0 to 0.8	А
9 V limiter output current	I _{O LIM}		0 to 60	mA

Operating Characteristics at $Ta = 25^{\circ}C$ in the specified test circuit

Parameter	Symbol	Conditions	min	typ	max	Unit		
[No Load Currents]			,					
V _{CC} quiescent current	I_{CC} quiescent current I_{CC} V_{CC} = 12 V, Power cont.: L, 5 V_{REF} : L							
Influx 1 V _{REF} 5 V input current	I _{REF1}	V _{CC} = 0 V, Power cont.: L			10	μΑ		
Influx 2 V _{REF} 5 V input current	I _{REF2}	V _{CC} = 12 V, Power cont. = 5 V			700	μA		
[Motor 14.5 V Regulator Block] V _C	_C = 16 V, I _{O M}	OT = 1.2 A, Power cont. = 5 V	·					
Output voltage	V _{O MOT}		14.0	14.5	15.0	V		
Dropout voltage		V _{CC} = 14 V, I _{O MOT} = 600 mA		0.4	0.8	V		
Line regulation	$\Delta V_{OLN-MOT}$	V _{CC} = 16 to 22 V		30	300	mV		
Load regulation	$\Delta V_{OLD-MOT}$	I _{O MOT} = 0 to 1.2 A		200	800	mV		
Peak output current	I _{OP-MOT}		1.2			Α		
Short circuit output current	I _{OSC-MOT}			300		mA		
[Audio 9 V Regulator Block] V _{CC} =	11 V, I _{O AUD}	= 300 mA, Power cont. = 5 V	·					
Output voltage	V _{O AUD}		8.5	9.0	9.5	V		
Dropout voltage		V _{CC} = 8.5 V, I _{O AUD} = 150 mA		0.2	0.8	V		
Line regulation	ΔV _{OLN-AUD}	V _{CC} = 11 to 22 V		100	400	mV		
Load regulation	$\Delta V_{OLD-AUD}$	I _{O AUD} = 0 to 300 mA		100	400	mV		
Peak output current	I _{OP-AUD}		300			mA		
Short circuit output current	I _{OSC-AUD}			50		mA		
Ripple rejection	R _{REJ-AUD}	$f = 120 \text{ Hz}, 10 \text{ V} \le \text{V}_{CC} \le 15 \text{ V}, C = 1 \mu\text{F}$		60		dB		

LA5609

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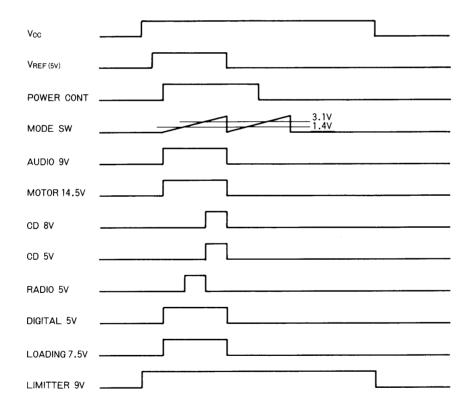
Digital S.D. Regulator Blook Power cont. = 5 \	Parameter	Symbol	Conditions	min	typ	max	Unit
Output voltages V o prior Voc. = 16 V. kg prigi = 100 mA 4.95 5.05 5.15 V Dropout voltage V December 1 Voc. = 149 V. kg prisig = 100 mA 0.08 1.14 V AVOLUS DIGIT VOC. = 16 V. kg prisig = 220 mA 0.08 1.4 V Line regulation AVOLUS DIGIT VOC. = 16 V. kg prisig = 200 mA -100 -70 0.0 AVOLUS DIGIT VOC. = 16 V. kg prisig = 00 mA -20 0.0 +20 mV AVOLUS DIGIT VOC. = 16 V. kg prisig = 100 mA -20 0.0 +20 mV AVOLUS DIGIT VOC. = 16 V. kg prisig = 100 mA -20 0.0 +20 mV AVOLUS DIGIT VOC. = 16 V. kg prisig = 100 mA -60 -40 0.0 mV Peak output current 1.00 mA -60 -40 0.0 mV CID 5.0 V Regulator Block) Flower comt. = 5 V. Modes SW = 5 V 220 200 mA CID 5.0 V Regulator Block) Flower comt. = 5 V. Modes SW = 5 V VOc. = 60 V. kg cps = 100 mA 4.9 5.0 5.1 V CID 5.0 V Regulator Block) Flower comt. = 5 V. Modes SW = 5 V VOc. = 60 V. kg cps = 100 m	[Digital 5.0 V Regulator Block] Pow	ver cont. = 5 V	,	1		1	1
Dropout voltage	Output voltage			4.95	5.05	5.15	V
AVOLANDOIG Voc = 16 to 20 V. Doigl = 220 mA	Dropout voltage				0.6	1.4	V
Monte regulation Monte Voc. 16 to 8 V. Vo. 10 to 20 V. 10 to 8 V. Vo. 10 to 20 V. 10 to 8 V. 10 to 10 V. 1				0	40	60	mV
Moore Mo				-100	-70	0	mV
MoUNL-Died Voc. = 16 to 8 V \ lo Diegi = 0 mA	Line regulation			-20	0	+20	mV
AVOLD1-DIGIS VCc = 16 V. I _O DIGIS = 100 to 220 mA				-20	0	+20	mV
Load regulation				0	40	60	mV
Peak output current Iop-Dics Voc = 6.5 V 220 280 mA	Load regulation			-60	-40	0	mV
Short circuit output current I_OSC_DIG V_CC = 6.5 V V_CC = 16 V, I_O CDS = 100 mA V_S = 0.5 V_S = 0.00 mA V_S = 0.5 V_S = 0.00 mA V_S = 0.5 V_S = 0.00 mA	Peak output current			220	260		mA
CD 5.0 V Regulator Block Power cont. = 5 V, Mode SW = 5 V Vocation Voc	Short circuit output current	0			260		mA
Output voltage V _O CDS V _{CC} = 16 V, I _O CDS = 110 mA 4.9 5.0 5.1 V Dropout voltage V _{DROP-CDS} V _{CC} = 6.9 V, I _O CDS = 110 mA 0.6 1.4 V Line regulation Δ*OLIN-CDS V _{CC} = 16 to 8 V, I _O CDS = 220 mA 0 40 60 m/V Δ*OLIN-CDS V _{CC} = 16 to 8 V, I _O CDS = 0 mA -20 0 +20 m/V Δ*OLIN-CDS V _{CC} = 16 to 8 V, I _O CDS = 0 mA -20 0 +20 m/V Δ*OLIN-CDS V _{CC} = 16 to 8 V, I _O CDS = 100 to 20 mA 0 40 60 m/V Δ*OLIN-CDS V _{CC} = 16 to 8 V, I _O CDS = 100 to 20 mA 0 40 60 m/V A*OLID-CDS V _{CC} = 16 to 8 V, I _O CDS = 100 to 20 mA 0 40 60 m/V A*OLID-CDS V _{CC} = 16 V, I _O CDS = 100 to 20 mA 0 40 60 m/V A*OLID-CDS V _{CC} = 16 V, I _O CDS = 100 to 20 mA 0 40 60 m/V Bake uptut current I _O CCDS V _{CC} = 6.5 V 220 20 20 0m/M Bake uptut current I _O CCDS + V _{CC} = 6.5 V 220 20 20 0m/M Duptu voltage V _O CDP-CDS V _{CC} = 5.5 V I _O CDS = 800 mA 7.5 8.0 8.5 V 8.5 V Line regulation Δ*OLID-CDS V _{CC} = 6.5 V I _O CDS = 4.0	[CD 5.0 V Regulator Block] Power			1			1
Dropout voltage V _{DROP-CDS V_{CC} = 4.9 V, I_D CDS = 110 mA 0.6 1.4 V V_{DC MIN-CDS V_{CC} = 16 to 20 V, I_D CDS = 220 mA 0.0 4.0 60 mV V_{DC MIN-CDS V_{CC} = 16 to 20 V, I_D CDS = 220 mA 0.0 4.0 60 mV V_{DC MIN-CDS V_{CC} = 16 to 20 V, I_D CDS = 20 mA 0.0 4.0 60 mV V_{DC MIN-CDS V_{CC} = 16 to 20 V, I_D CDS = 0 mA 0.0 4.0 60 mV V_{DC MIN-CDS V_{CC} = 16 to 20 V, I_D CDS = 0 mA 0.0 4.0 60 mV V_{DC MIN-CDS V_{CC} = 16 to 8 V, I_D CDS = 0 mA 0.0 4.0 60 mV V_{DC MIN-CDS V_{CC} = 16 V, I_D CDS = 100 to 20 mA 0.0 4.0 60 mV V_{DC MIN-CDS V_{CC} = 16 V, I_D CDS = 100 to 20 mA 0.0 4.0 60 mV V_{DC MIN-CDS V_{CC} = 16 V, I_D CDS = 100 to 0 mA 0.0 0.0 mV V_{DC MIN-CDS V_{CC} = 16 V, I_D CDS = 100 to 0 mA 0.0 0.0 mV V_{DC MIN-CDS V_{CC} = 16 V, I_D CDS = 100 to 0 mA 0.0 0.0 mA V_{DC MIN-CDS V_{CC} = 16 V, I_D CDS = 100 to 0 mA 0.0 0.0 0.0 mA V_{DC MIN-CDS V_{CC} = 16 V, I_D CDS V_{CC} = 16 V, I_D CDS}}}}}}}}}}}}}}	Output voltage			4.9	5.0	5.1	V
Line regulation AVOLN1-CDS VCC = 16 to 20 V, I _{OCDS} = 220 mA	Dropout voltage				0.6	1.4	V
AVOLN2-CDS VCC = 16 to 8 V. lo CDS = 220 mA				0	40	60	mV
ΔV _{OLN3-CDS} V _{CC} = 16 to 20 V, I _{OCDS} = 0 mA				-100	-70	0	mV
ΔV _{OLIN4-CDS} V _{CC} = 16 to 8 V, I _O CDS = 0 mA	Line regulation			-20	0	+20	mV
Load regulation ΔV _{OLD2-CDS} V _{CC} = 16 V, I _{O CDS} = 100 to 220 mA 0 40 60 mV Peak output current I _{OP-CDS} V _{CC} = 61 V, I _{O CDS} = 100 to 0 mA -60 -40 0 mV Short circuit output current I _{OP-CDS} V _{CC} = 6.5 V 220 260 mA KDD 8.0 V Regulator Block) V _{CC} = 9.5 V, I _{O CDS} = 800 mA, Power cont. = 5 V, Mode SW = 5 V 260 mA Dutput voltage V _{O CDS} V _{CC} = 9.5 to 22 V 7.5 8.0 8.5 V Line regulation AV _{OLN-CDS} V _{CC} = 9.5 to 22 V 20 200 mV Load regulation AV _{OLN-CDS} V _{CC} = 9.5 to 22 V 20 200 mV Load regulation AV _{OLN-CDS} V _{CC} = 9.5 to 22 V 20 200 mV Load regulation AV _{OLN-CDS} V _{CC} = 9.5 to 22 V 20 200 mV Load regulation AV _{OLN-CDS} V _{CC} = 9.5 to 22 V 20 200 mV Read output current I _{OP-CDS} V _{CC} = 9.5 to 22 V 20 200 mV Read so 1 v Regulator Block Power cont. = 5 V 200 200 mA 40					0	+20	mV
Load regulation AV_OLD2-CD5 VCC = 16 V, I_O CD5 = 100 to 0 mA -60 -40 0 mV				0	40	60	mV
Peak output current I _{OP-CDS} Norticuit output current I _{OSC-CDS} V _{CC} = 6.5 V 220 260 mA Short circuit output current I _{OSC-CDS} V _{CC} = 6.5 V 260 mA (CD 8.0 V Regulator Block) V _{CC} = 9.5 V, I _{OCDB} = 800 mA, Power cont. = 5 V, Mode SW = 5 V V Output voltage V _{OCDB} V _{CC} = 7.5 V, I _{OCDB} = 400 mA 0.6 1.4 V Line regulation ΔV _{OLD-CDB} V _{CC} = 9.5 to 22 V 20 200 mV Load regulation ΔV _{OLD-CDB} V _{CC} = 9.5 to 22 V 20 200 mV Peak output current I _{OP-CDB} V _{CC} = 9.5 to 22 V 20 200 mV Readio 5.0 V Regulator Block) Power cont. = 5 V V 20 200 mV Output voltage V _{ORD-CDB} V _{CC} = 16 V, I _{ORD} = 50 mA 4.9 5.0 5.1 V Dropout voltage V _{DROP-RAD} V _{CC} = 4.9 V, I _{ORD} = 50 mA 4.9 5.0 5.1 V Line regulation ΔV _{CLN-RAD} V _{CC} = 16 to 20 V, I _{ORD} = 100 mA 0 20 40 mV Line regulation ΔV _{CLN-RAD} V _{CC} = 16 to 20 V, I _{ORD} = 0 mA -10	Load regulation			-60	-40	0	mV
Short circuit output current I_OSC-CDS V_CC = 6.5 V CD CDS V_CC = 9.5 V CD CDS V_CC = 9.5 V CDDS V_CC = 9.5 V V_CC = 9	Peak output current			220	260		mA
CD 8.0 V Regulator Block V _{CC} = 9.5 V, I _{O CD8} = 800 mA, Power cont. = 5 V, Mode SW = 5 V	Short circuit output current				260		mA
Output voltage V _O CD8 V _O CD8 7.5 8.0 8.5 V Dropout voltage V _{DROP-CD8} V _{CC} = 7.5 V, I _O CD8 = 400 mA 0.6 1.4 V Line regulation AV _{OLN-CD8} V _{CC} = 9.5 to 22 V 20 200 mV Load regulation ΔV _{OLN-CD8} V _{CC} = 9.5 to 22 V 20 200 mV Peak output current I _{OP-CD8} V _{CC} = 9.5 to 22 V 0.8 1.1 A (Radio 5.0 V Regulator Block) Power cont. = 5 V 0.8 1.1 A Output voltage V _O RAD V _{CC} = 16 V, I _O RAD = 50 mA 4.9 5.0 5.1 V Dropout voltage V _O RAD V _{CC} = 4.9 V, I _O RAD = 50 mA 0.6 1.4 V Dropout voltage V _{DROP-RAD} V _{CC} = 16 to 20 V, I _O RAD = 100 mA 0.6 1.4 V Line regulation ΔV _{OLN2-RAD} V _{CC} = 16 to 20 V, I _O RAD = 0 mA -10 0 +10 mV Line regulation ΔV _{OLN2-RAD} V _{CC} = 16 to 20 V, I _O RAD = 0 mA -10 0 +10 mV Load regulation ΔV _{OLN2-RAD} V _{CC} = 1	·						
Dropout voltage Vor. Vor. Vor. Vor. Vor. Vor. Vor. Vor.				7.5	8.0	8.5	V
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			V _{CC} = 7.5 V, I _{O CD8} = 400 mA		0.6	1.4	V
Load regulation ΔV _{OLD-CD8} l I _{OCD8} = 0 to 800 mA 100 250 mV Peak output current I _{OP-CD8} l 0.8 1.1 A A (Radio 5.0 V Regulator Block) Power cont. = 5 V V VCC = 16 V, I _{ORAD} = 50 mA 4.9 5.0 5.1 V Dropout voltage V _{DROP-RAD} V _{CC} = 46 to 20 V, I _{ORAD} = 50 mA 0.6 1.4 V Line regulation ΔV _{OLN3-RAD} V _{CC} = 16 to 20 V, I _{ORAD} = 100 mA 0 20 40 mV ΔV _{OLN3-RAD} V _{CC} = 16 to 8 V, I _{ORAD} = 0 mA -70 -40 0 mV ΔV _{OLN3-RAD} V _{CC} = 16 to 8 V, I _{ORAD} = 0 mA -10 0 +10 mV Load regulation ΔV _{OLD3-RAD} V _{CC} = 16 V, I _{ORAD} = 50 to 100 mA 0 20 40 mV Peak output current ΔV _{OLD3-RAD} V _{CC} = 16 V, I _{ORAD} = 50 to 100 mA 0 20 40 mV Peak output current I _{OSC-RAD} V _{CC} = 16 V, I _{ORAD} = 50 to 0 mA -40 -20 0 mV Short circuit output current I _{OSC-RAD} V _{CC} = 6.5 V 160 mA					20	200	mV
Peak output current Op-CD8	Load regulation				100	250	mV
Radio 5.0 V Regulator Block Power cont. = 5 V	Peak output current		0 000	0.8	1.1		Α
Disposit voltage VDROP-RAD VCC = 4.9 V, IO RAD = 50 mA 0.6 1.4 V	[Radio 5.0 V Regulator Block] Pow						1
Dropout voltage V_DROP-RAD V_CC = 4.9 V, I_O RAD = 50 mA 0.6 1.4 V	Output voltage	V _{O RAD}	V _{CC} = 16 V, I _{O RAD} = 50 mA	4.9	5.0	5.1	V
	Dropout voltage				0.6	1.4	V
				0	20	40	mV
				-70	-40	0	mV
$ \frac{\Delta V_{\text{OLN4-RAD}}}{\Delta V_{\text{OLD1-RAD}}} \begin{array}{c} V_{\text{CC}} = 16 \text{ to 8 V}, I_{\text{O RAD}} = 0 \text{ mA} \\ -10 & 0 & +10 & \text{mV} \\ \hline \\ \Delta V_{\text{OLD1-RAD}} \\ \Delta V_{\text{OLD1-RAD}} \\ V_{\text{CC}} = 16 \text{ V}, I_{\text{O RAD}} = 50 \text{ to 100 mA} \\ \Delta V_{\text{OLD2-RAD}} \\ V_{\text{CC}} = 16 \text{ V}, I_{\text{O RAD}} = 50 \text{ to 0 mA} \\ \hline \\ \Delta V_{\text{OLD2-RAD}} \\ V_{\text{CC}} = 6.5 \text{ V} \\ \hline \\ 100 & 160 \\ \hline \\ 100 & 160 \\ \hline \\ 100 & 160 \\ \hline \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $	Line regulation			-10	0	+10	mV
				-10	0	+10	mV
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				0	20	40	mV
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Load regulation			-40	-20	0	mV
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Peak output current			100	160		mA
Line regulation Line regulation Load regu	Short circuit output current				160		mA
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	[Loading 7.5 V Regulator Block] Po			1		1	1
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	REG SET voltage	V _{REGS}	V _{CC} = 16 V, I _{O LOAD} = 400 mA	1.27	1.31	1.35	V
	Dropout voltage				0.4	0.8	V
$ \frac{\Delta V_{\text{OLN2-LOAD}}}{\Delta V_{\text{OLN2-LOAD}}} \frac{V_{\text{CC}}}{V_{\text{CC}}} = 16 \text{ to } 9 \text{ V, } I_{\text{O LOAD}} = 800 \text{ mA} \\ \frac{\Delta V_{\text{OLN3-LOAD}}}{\Delta V_{\text{OLN3-LOAD}}} \frac{V_{\text{CC}}}{V_{\text{CC}}} = 16 \text{ to } 20 \text{ V, } I_{\text{O LOAD}} = 0 \text{ mA} \\ \frac{\Delta V_{\text{OLN4-LOAD}}}{\Delta V_{\text{OLN4-LOAD}}} \frac{V_{\text{CC}}}{V_{\text{CC}}} = 16 \text{ to } 9 \text{ V, } I_{\text{O LOAD}} = 0 \text{ mA} \\ \frac{\Delta V_{\text{OLD1-LOAD}}}{\Delta V_{\text{OLD1-LOAD}}} \frac{V_{\text{CC}}}{V_{\text{CC}}} = 16 \text{ V, } I_{\text{O LOAD}} = 400 \text{ to } 800 \text{ mA} \\ \frac{\Delta V_{\text{OLD2-LOAD}}}{\Delta V_{\text{OLD2-LOAD}}} \frac{V_{\text{CC}}}{V_{\text{CC}}} = 16 \text{ V, } I_{\text{O LOAD}} = 400 \text{ to } 0 \text{ mA} \\ \frac{\Delta V_{\text{OLD2-LOAD}}}{\Delta V_{\text{CC}}} \frac{V_{\text{CC}}}{V_{\text{CC}}} = 16 \text{ V, } I_{\text{O LOAD}} = 400 \text{ to } 0 \text{ mA} \\ \frac{\Delta V_{\text{OLD2-LOAD}}}{\Delta V_{\text{CC}}} \frac{V_{\text{CC}}}{V_{\text{CC}}} = 9 \text{ V} \\ \frac{\Delta V_{\text{CC}}}{V_{\text{CC}}} = 9 \text{ V} \\ \frac{\Delta V_{\text{CC}}}{V_{$				0	10	20	mV
$ \frac{\Delta V_{\text{OLN3-LOAD}}}{\Delta V_{\text{OLN3-LOAD}}} \frac{V_{\text{CC}} = 16 \text{ to } 20 \text{ V, I}_{\text{O LOAD}} = 0 \text{ mA}}{V_{\text{O LOAD}} = 0 \text{ mA}} \frac{-10}{0} \frac{0}{0} + 10 \frac{\text{mV}}{10} \frac{1}{10} \frac{1}{1$	12			-20	-10	0	mV
$ \frac{\Delta V_{\text{OLN4-LOAD}}}{\Delta V_{\text{OLD1-LOAD}}} \frac{V_{\text{CC}}}{V_{\text{CC}}} = 16 \text{ to 9 V, I}_{\text{O LOAD}} = 0 \text{ mA} \\ \frac{\Delta V_{\text{OLD1-LOAD}}}{\Delta V_{\text{OLD1-LOAD}}} \frac{V_{\text{CC}}}{V_{\text{CC}}} = 16 \text{ V, I}_{\text{O LOAD}} = 400 \text{ to 800 mA} \\ \frac{\Delta V_{\text{OLD2-LOAD}}}{\Delta V_{\text{OLD2-LOAD}}} \frac{V_{\text{CC}}}{V_{\text{CC}}} = 16 \text{ V, I}_{\text{O LOAD}} = 400 \text{ to 0 mA} \\ \frac{\Delta V_{\text{OLD2-LOAD}}}{V_{\text{CC}}} \frac{V_{\text{CC}}}{V_{\text{CC}}} = 9 \text{ V} \\ \frac{V_{\text{CC}}}{V_{$	Line regulation			-10	0	+10	mV
$ \frac{\Delta V_{\text{OLD1-LOAD}}}{\Delta V_{\text{OLD2-LOAD}}} \ V_{\text{CC}} = 16 \ \text{V}, \ I_{\text{O LOAD}} = 400 \ \text{to } 800 \ \text{mA} \qquad \qquad 0 \qquad 10 \qquad 20 \qquad \text{mV} \\ \frac{\Delta V_{\text{OLD2-LOAD}}}{\Delta V_{\text{OLD2-LOAD}}} \ V_{\text{CC}} = 16 \ \text{V}, \ I_{\text{O LOAD}} = 400 \ \text{to } 0 \ \text{mA} \qquad \qquad -20 \qquad -10 \qquad 0 \qquad \text{mV} \\ \text{Peak output current} \qquad \qquad I_{\text{OP-LOAD}} \ V_{\text{CC}} = 9 \ \text{V} \qquad \qquad 0.8 \qquad \qquad A $				-10	0	+10	mV
$\Delta V_{\text{OLD2-LOAD}} V_{\text{CC}} = 16 \text{ V}, \text{ I}_{\text{O LOAD}} = 400 \text{ to 0 mA} \qquad -20 \qquad -10 \qquad 0 \qquad \text{mV}$ Peak output current $I_{\text{OP-LOAD}} V_{\text{CC}} = 9 \text{ V} \qquad 0.8 \qquad A$				0	10	20	mV
Peak output current I _{OP-LOAD} V _{CC} = 9 V 0.8 A	Load regulation			-20			
	Peak output current						
Short should surply surrout Ingrithal Ingrithal Indian Ind	Short circuit output current	I _{OSC-LOAD}	V _{CC} = 9 V		200		mA

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Parameter	Symbol	Conditions	min	typ	max	Unit			
9.0 V Limiter Block] V _{CC} = 11 V, I _{O LIM} = 60 mA									
Output voltage	8.0	9.0	9.5	V					
Dropout voltage	V _{DROP-LIM}	V _{CC} = 8 V		1.0		V			
Peak output current	I _{OP-LIM}		60	150		mA			
Short circuit output current	I _{OSC-LIM}			200		mA			
[Mode Switch] V _{CC} = 12 V									
Voltage with radio mode on	V _{MTH H}	Voltage when the radio output is switched high	1.1	1.4	1.7	V			
Voltage with radio mode off	V _{MTH L}	Voltage when the radio output is switched low	2.9	3.1	3.3	V			
Voltage with CD mode on	V _{RTH H}	Voltage when the CD 5 V and CD 8 V are switched high	2.9	3.1	3.3	V			
Input impedance Z _I			16.8	24	31.2	kΩ			
[Power Control] V _{CC} = 12 V									
Output on control voltage	V _{I CONT-ON}		3.0			V			
Output off control voltage V _{I CONT-OFF}					2.0	V			
[AC standby]									
Output on control voltage	V _{I AC-ON}		2.0			V			
Output off control voltage	V _{I AC-OFF}				1.0	V			
[5 V System Regulator Block] V_{CC} = 16 V, $I_{O\ DIGI}$ = $I_{O\ CD5}$ = 100 mA, $I_{O\ RAD}$ = 50 mA									
Difference between output voltages	ΔV _{DEF}			0	0.15	V			

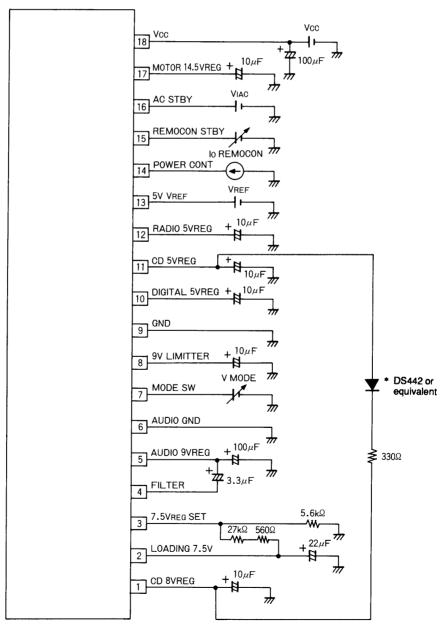
Timing Chart



Function Table

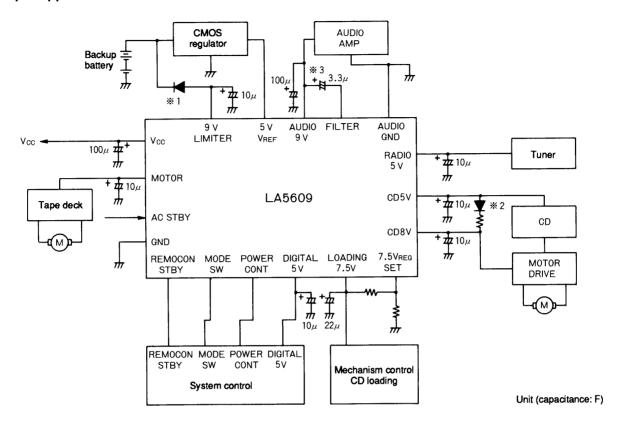
				V _{OUT}								
V _{REF}	V _{REF} Power cont.		ode SW	Audio 9 V	Motor 14.5 V	Digital 5 V	Loading 7.5 V	CD 8 V/ CD 5 V	Radio 5 V	Limitter 9 V		
				L	(0 V)		L	-		L	L	Н
	L	М	(2.5 V)		L	-		L	L	Н		
١.,		Н	(5 V)		L	-		L	L	Н		
L	Н	L	(0 V)		L	-		L	L	Н		
		н	М	(2.5 V)		L	-		L	L	Н	
		Н	(5 V)		L	-		L	L	Н		
	L	L	(0 V)		L	-		L	L	Н		
		М	(2.5 V)		L	-		L	L	Н		
Н		Н	(5 V)		L	-		L	L	Н		
"		L	(0 V)		H	1		L	L	Н		
		М	(2.5 V)		H	1		L	Н	Н		
		Н	(5 V)		H	1		Н	L	Н		

Test Circuit



Note: $\,^*\,$ This diode is required for bringing up the CD 8 V regulator.

Sample Application Circuit

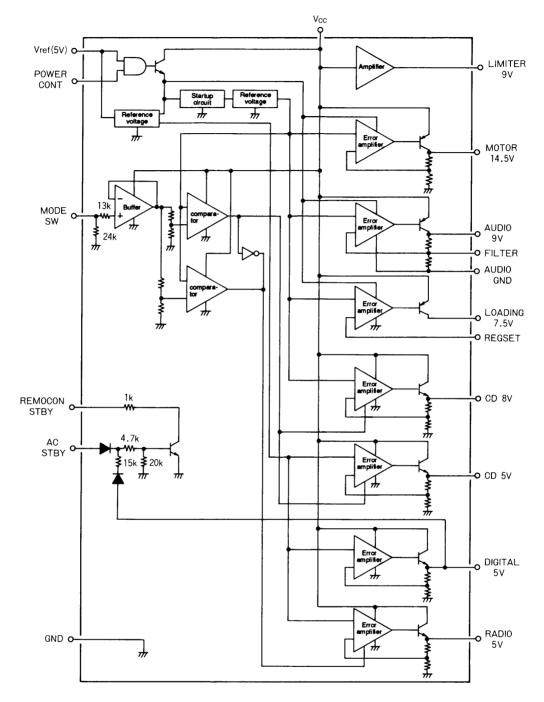


Note: 1. The diode in the 9 V limiter block must be added. It is required for preventing current from flowing into the 9 V limiter from the backup battery when V_{CC} is off.

2. The diode and resistor between the CD 5 V and CD 8 V blocks must be added. It is required to bring up the CD 8 V regulator.

- External noise can be limited and ripple rejection can be improved by adding an electrolytic capacitor between the audio 9 V and the filter circuits.
 The electrolytic capacitors between V_{CC} and GND and between each V0 and GND should have capacitances at least those shown in the diagram. Use Sanyo HW Series aluminum electrolytic capacitors or equivalent products.

Equivalent Circuit Block Diagram



Unit (resistance: Ω)

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