



SANYO Semiconductors

DATA SHEET

LA5605 — Monolithic Linear IC For CD Radio Cassette Recorders Power Supply System

Overview

The LA5605 is an AC/DC power supply IC that incorporates a 7.5V/500mA low saturation regulator and a number of control functions. It is optimal for use as the power supply IC for CD radio cassette recorders and other applications.

Features

- Facilitates designing the AC/DC power supply system for CD radio cassette recorders.
- A wide variety of control circuits incorporated, which realizes further miniaturization in electronic products.
- The adoption of a low-saturation regulator circuit reduces internal power dissipation.

Functions

- Power supply system for CD radio cassette recorders
- For small electronic products
- Low saturation regulator (7.5V/500mA)
- Limiter power supply (9V/60mA)

Specifications

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

| Parameter | Symbol | Conditions | Ratings | Unit |
|---------------------------------------|----------------|------------|-------------|------------------|
| Input voltage | V_{CC} max | | 24 | V |
| VREF pin voltage | V_{REF} max | | 6 | V |
| Power Control pin voltage | V_{CONT} max | | 6 | V |
| Mute pin voltage | V_{MUTE} max | | 6 | V |
| Remote controller standby pin voltage | V_{REMO} max | | 6 | V |
| AC standby pin voltage | V_{AC} max | | 6 | V |
| Allowable power dissipation | P_d max | | 2.0 | W |
| Operating temperature | T_{opr} | | -20 to +80 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | | -55 to +150 | $^\circ\text{C}$ |

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70407 MS PC A8-9382 No.4459-1/6

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

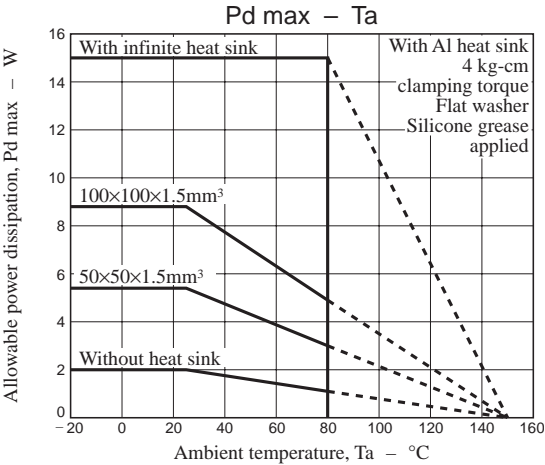
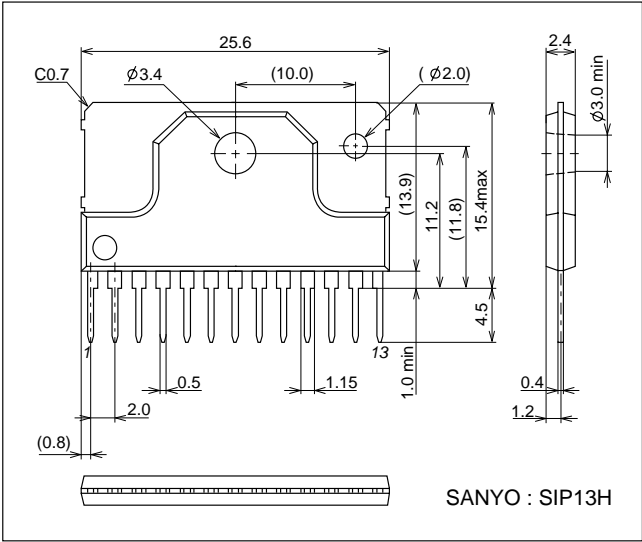
| Parameter | Symbol | Conditions | Ratings | Unit |
|--|------------|------------|------------|------|
| Input voltage | V_{CC} | | 9 to 22 | V |
| | V_{REF} | | 4.5 to 5.5 | V |
| 7.5V output current | $I_{O7.5}$ | | 0 to 500 | mA |
| 9V limiter output current | $I_{O9.0}$ | | 0 to 60 | mA |
| Remote controller standby output current | I_{OREM} | | 0 to 10 | mA |

Electrical Characteristics at $T_a = 25^{\circ}\text{C}$, in the specified test circuit

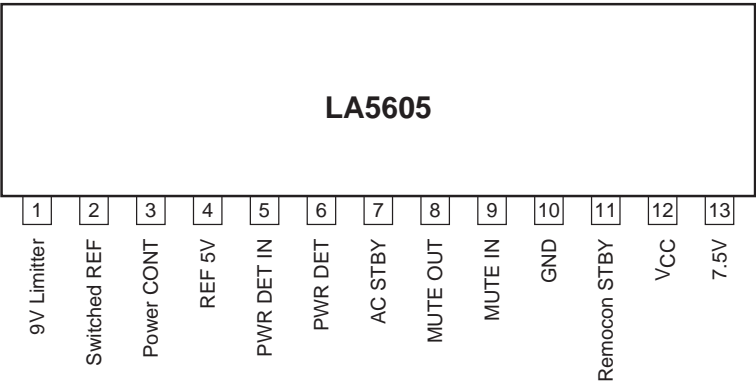
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|--|------------------------|--|---------|-----|-----|------|
| | | | min | typ | max | |
| No load current | | | | | | |
| V _{CC} inflow current | I _{CC} | POWER CONT : "L" | | | 450 | μA |
| Vref5V inflow current | I _{REF1} | V _{CC} = 0V, AC STBY : "L" MUTE IN : "L" | | | 10 | μA |
| | I _{REF2} | V _{CC} = 12V, AC STBY : "L" POWER CONT : "L" | | 5 | 10 | mA |
| 7.5V regulator block V _{CC} = 12V, I _{O7.5} = 500mA, POWER CONT = 5V | | | | | | |
| Output voltage | V _{O7.5} | | 7.3 | 7.5 | 7.7 | V |
| Dropout voltage | V _{DROP1-7.5} | | | 0.5 | 1.0 | V |
| | V _{DROP2-7.5} | I _{O7.5} = 250mA | | 0.4 | 0.8 | V |
| Line regulation | ΔV _{OLN-7.5} | V _{CC} = 9V to 22V | | | 200 | mV |
| Load regulation | ΔV _{OLD-7.5} | I _{O7.5} = 500mA | | | 200 | mV |
| Peak output current | I _{OP-7.5} | | 500 | 800 | | mA |
| Output short circuit current | I _{OSC-7.5} | | | 200 | | mA |
| 9.0V limiter block V _{CC} = 12V, I _{O9.0} = 60mA | | | | | | |
| Output voltage | V _{O9.0} | | 8.0 | 9.0 | 9.5 | V |
| Dropout voltage | V _{DROP1-9.0} | | | 1.0 | | V |
| Peak output current | I _{OP-9.0} | | 60 | 150 | | mA |
| Output short circuit current | I _{OSC-9.0} | | | 200 | | mA |
| Remote controller standby V _{CC} = 12V, I _O = 10mA | | | | | | |
| Output voltage | V _{OREM} | | 4.8 | 5.0 | 5.2 | V |
| Dropout voltage | V _{DROP1-REM} | | | 50 | 100 | mV |
| Peak output current | I _{OP-REM} | | 10 | 70 | | mA |
| Output short circuit current | I _{OSC-REM} | | | 70 | | mA |
| MUTE OUT V _{CC} = 12V, MUTE IN = 1.2V | | | | | | |
| Output residual voltage | V _{SAT-MUTE} | I _{OMUTE} = 50μA | | | 2 | V |
| Switched REF V _{CC} = 12V, POWSER CONT = 5V | | | | | | |
| Output residual voltage | V _{SAT-SWIT} | I _{OSWIT} = 1mA | | | 2 | V |
| PWR DET V _{CC} = 12V | | | | | | |
| Output residual voltage | V _{SAT-PWR} | I _{OPWR} = 1mA | | | 0.5 | V |
| Detection voltage | V _{DET} | R _{PWR} | | 8.0 | | V |
| Variable width | V _W | | -2.0 | | 2.0 | V |
| MUTE IN V _{CC} = 12V | | | | | | |
| Output on control voltage | V _{IMUTE-ON} | | 1.2 | | | V |
| Output off control voltage | V _{IMUTE-OFF} | | | | 0.6 | V |
| POWER CONT V _{CC} = 12V | | | | | | |
| Output on control voltage | V _{ICONT-ON} | | 3.0 | | | V |
| Output off control voltage | V _{ICONT-OFF} | | | | 2.0 | V |
| AC STBY V _{CC} = 12V | | | | | | |
| Output on control voltage | V _{IAC-ON} | | 2.0 | | | V |
| Output off control voltage | V _{IAC-OFF} | | | | 1.0 | V |

Package Dimensions

unit : mm (typ)
3107B



Pin Assignments



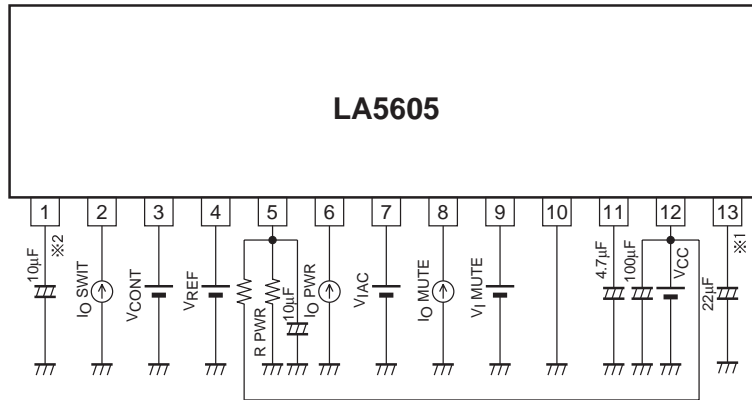


1. The capacitance of the C2 7.5V output capacitor must be 22μF (equivalent to a SANYO HW series aluminum electrolytic capacitor) or larger.
2. The capacitance of the C4 9.0V limiter output capacitor must be 10μF (equivalent to a SANYO HW series aluminum electrolytic capacitor) or larger.
3. C5 and C6 must always be connected to suppress noises that may occur during transient operations.

Pin Functions

| Pin No. | Symbol | Description | Remarks | Equivalent Circuit |
|---------|--------------|---|--|--------------------|
| 1 | 9V Limiter | <ul style="list-style-type: none"> Used with an external CMOS regulator to make up a backup power supply. Blocks current from flowing into the IC when V_{CC} is turned off. | | |
| 2 | Switched REF | <ul style="list-style-type: none"> Transistor switch that conducts current when Power CONT is set high. | <ul style="list-style-type: none"> For controlling external transistors. | |
| 3 | Power CONT | <ul style="list-style-type: none"> 7.5V regulator and Switched REF output control (high active) | <ul style="list-style-type: none"> On/off control of this pin is enabled when predefined voltage is present at the V_{CC} and REF 5V pins. | |
| 4 | REF 5V | <ul style="list-style-type: none"> Power source for the on/off and remote controller STBY circuits | <ul style="list-style-type: none"> Supplied from the backup power supply | |
| 5 | PWR DET IN | <ul style="list-style-type: none"> Input pin for detecting the source voltage The threshold level is determined by external resistors. | <ul style="list-style-type: none"> $V_{CC} (DET) = V_{ref} (1 + \frac{R2}{R1})$ $V_{ref} \approx 1.2V$ | |
| 6 | PWR DET | <ul style="list-style-type: none"> Supply voltage detection output | | |
| 7 | AC STBY | <ul style="list-style-type: none"> AC power monitoring input | | |
| 8 | MUTE OUT | <ul style="list-style-type: none"> Independent transistor switch (output) | <ul style="list-style-type: none"> Used for mute operation, etc. | |
| 9 | MUTE IN | <ul style="list-style-type: none"> Independent transistor switch (input) | | |
| 10 | GND | <ul style="list-style-type: none"> Lowest voltage level of this IC | | |
| 11 | Remocon STBY | <ul style="list-style-type: none"> Used to control the remote controller power supply via the Power DET and AC STBY pins. | <ul style="list-style-type: none"> Stops function of the remote controller when voltage drops. | |
| 12 | V_{CC} | <ul style="list-style-type: none"> External power supply input pin | | |
| 13 | 7.5V | <ul style="list-style-type: none"> 7.5V low saturation regulator output On/off of this pin is controlled by Power CONT. | | |

Designated Test Circuit Diagram



Function Tables

V_{CC} : On, REF 5V : On

| Power CONT | 7.5V Regulator | Switched REF * |
|------------|----------------|----------------|
| L | L | H |
| H | H | L |

* : When pulled up with a resistor

V_{CC} : On, REF 5V : On, Power CONT : High

| PWR Voltage Setting | AC STBY | Power DET * | Remocon STBY |
|---------------------|---------|-------------|--------------|
| V5 < 1.2V | L | H | L |
| V5 > 1.2V | L | L | H |
| V5 < 1.2V | H | H | H |
| V5 > 1.2V | H | L | H |

* : When pulled up with a resistor

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