Ordering number : ENN6502

Two-Channel Audio Frequency Power Amplifier

Overview

The LA4629 is a 2-channel power amplifier developed for use in radio/cassette player products. The LA4629 reduces the number of required external components by 50% over earlier products (BS/NF capacitors and oscillation prevention RC components) and thus can contribute significantly to space saving in end products.

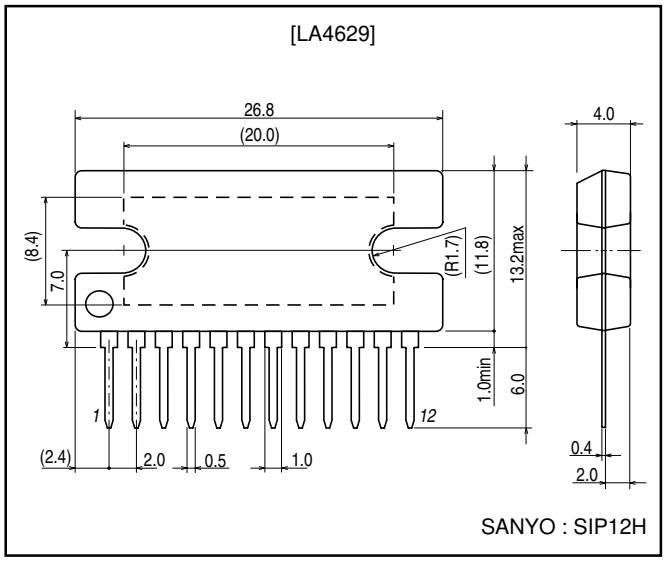
Features

- Provided in the SIP12H package.
- PO : 2.5 W × 2 (V_{CC} = 9 V, R_L = 3 Ω)
  4.5 W × 2 (V_{CC} = 12 V, R_L = 3 Ω)
  : 2.0 W × 2 (V_{CC} = 9 V, R_L = 4 Ω)
  4.0 W × 2 (V_{CC} = 12 V, R_L = 4 Ω)
- Standby function built in
  (supports direct microcontroller control).
- Built-in thermal protection circuit.

Package Dimensions

unit : mm

3049B-SIP12H



Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max	No input	24	V
Allowable power dissipation	Pd max	With an arbitrarily large heat sink	25	W
Operating temperature	Topr		-25 to +75	°C
Storage temperature	Tstg		-40 to +150	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		12	V
Operating voltage range	V_{CC} op	The range over which the package Pd is not exceeded.	5 to 22	V
Recommended operating load resistance	R_L op		2.7 to 8	Ω

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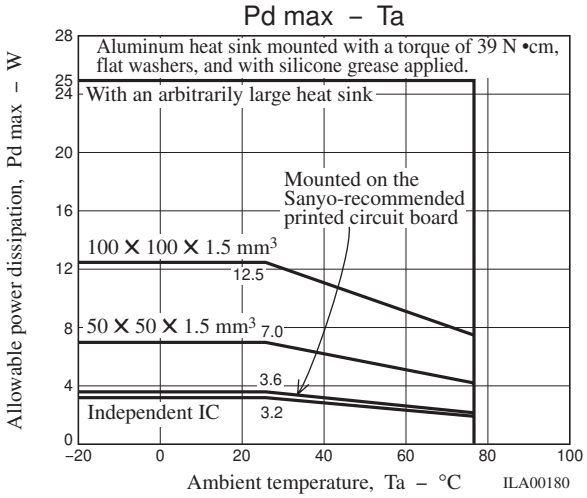
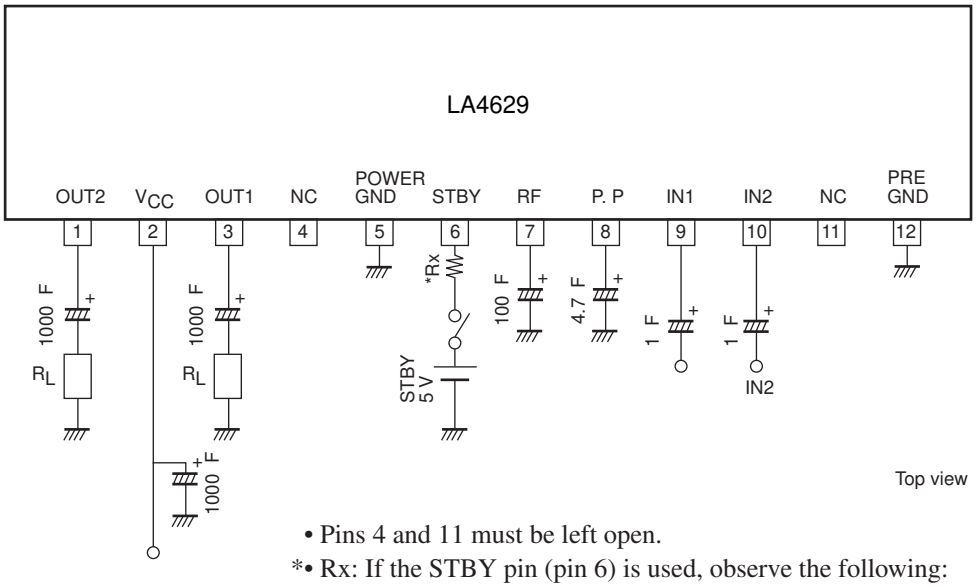
Operating Characteristics at Ta = 25°C, V_{CC} = 12V, R_L = 3 Ω, f = 1 kHz, Rg = 600 Ω

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	I_{CCO}	Rg = 0	18	35	80	mA
Standby current	I_{ST}			1.0	10	μA
Voltage gain	V_G	V_O = 0 dBm	43	45	47	dB
Output power	P_O(1)	THD = 10 %	3.0	4.5		W
	P_O(2)	V_{CC} = 12 V, R_L = 4 Ω, THD = 10 %		4.0		W
	P_O(3)	V_{CC} = 9 V, R_L = 3 Ω, THD = 10 %	2.0	2.5		W
	P_O(4)	V_{CC} = 9 V, R_L = 4 Ω, THD = 10 %		2.0		W
Total harmonic distortion	THD	P_O = 1 W		0.2	0.8	%
Output noise voltage	V_{NO}	Rg = 0, DIN AUDIO		0.15	0.5	mV
Ripple rejection ratio	SVRR	Rg = 0, f_R = 100 Hz, Vr = 0 dBm, DIN AUDIO	45	55		dB
Channel separation	CHsep	Rg = 0, V_O = 0 dBm, DIN AUDIO	43	50		dB
Input resistance	Ri		20	30	40	kΩ
Standby pin voltage	V_{ST}	The pin 6 voltage such that the amplifier is on	1.5	5.0		V



Application Circuit



• Pins 4 and 11 must be left open.

*• Rx: If the STBY pin (pin 6) is used, observe the following: Insert the resistor Rx in series to limit the inflowing current. (The amplifier will be on when a voltage is applied to pin 6.)

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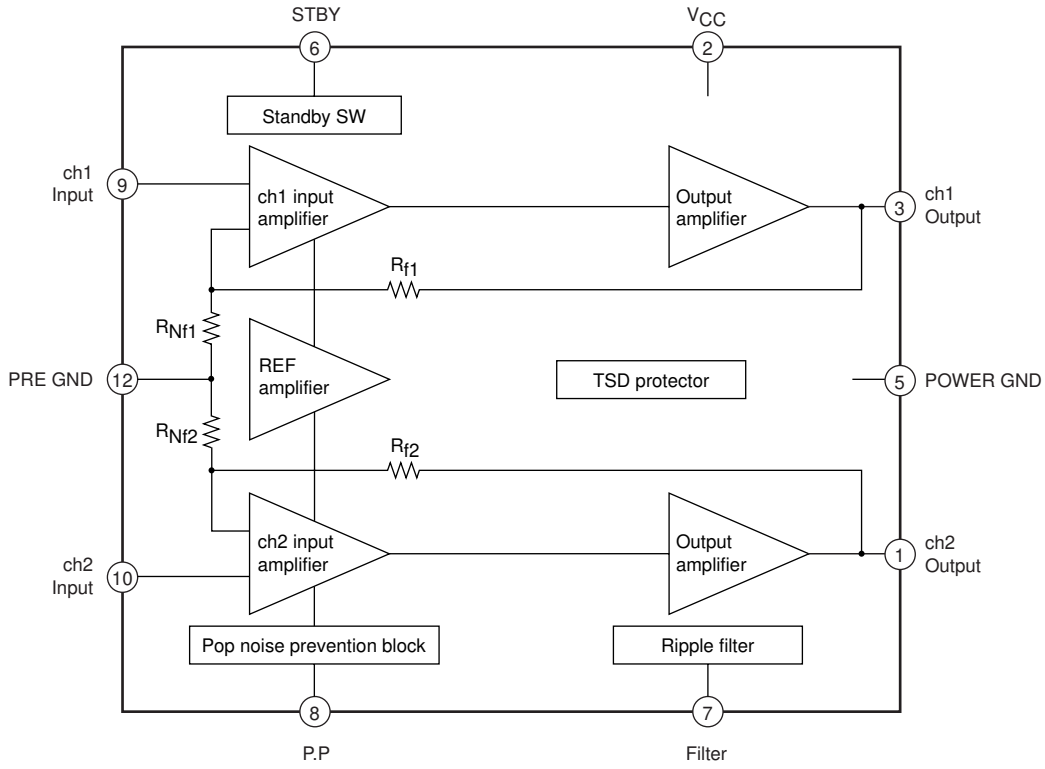
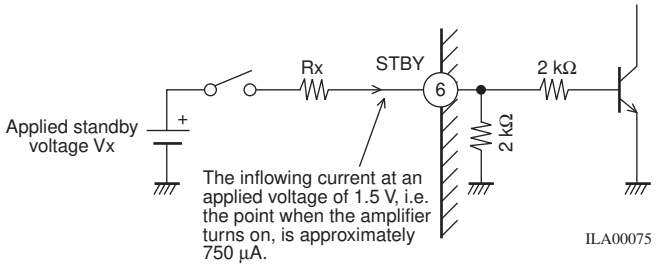
Block Diagram



Pin Functions

1. Standby switch function (pin 6)



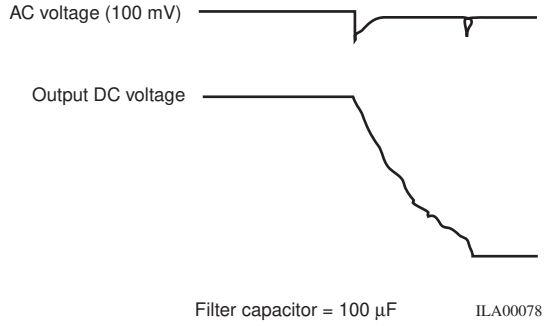
STBY pin applied voltage: 5 V
To hold the pin 6 inflow current to about 750 µA insert a resistor (Rx) of 4.7 kΩ
STBY pin applied voltage: 12 V
To hold the pin 6 inflow current to about 750 µA insert a resistor (Rx) of 14 kΩ (12 kΩ).
STBY pin applied voltage: Other value (Vx)
To hold the pin 6 inflow current to about 750 µA insert a resistor (Rx) of (Vx - 1.5 V)/750 µA.

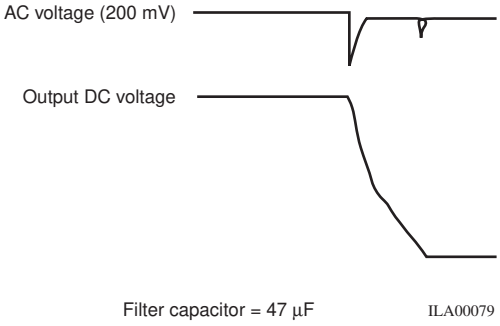
• If a microcontroller output signal is applied directly, insert a resistor in series and adjust the current to a level optimal for the drive capability of the microcontroller.

2. Input pins (pins 9 and 10)
The input pin voltage is about 2 V_{BE} (1.4 V).
The input pin impedance is about 30 kΩ.
• Although the recommended value for the input capacitor is 0.22 µF, the starting time can be modified by changing the value of this capacitor. (The time from the point a voltage is applied to the standby pin to the point sound is emitted.)

Input capacitor	1.0 µF	2.2 µF	3.3 µF	4.7 µF	10 µF
Starting time (ts)	0.2 s	0.3 s	0.5 s	0.65 s	1.5 s

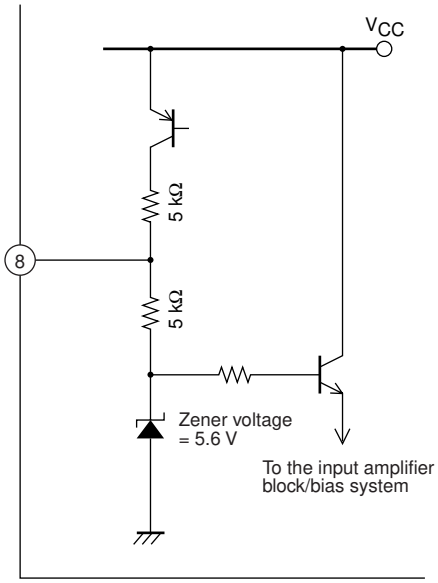
3. FILTER (decoupling) pin (pin 7)
The pin voltage is about 1/2 V_{CC}.
The recommended value for the filter capacitor is 100 µF.
The pulse noise that occurs when the standby pin is set low (power off) will be degraded if a value under 100 µF is used.





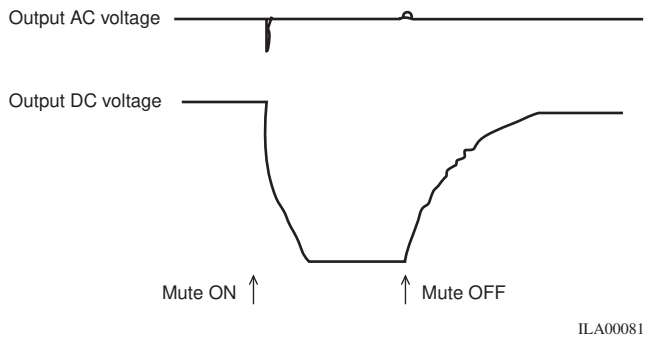
4. P.P (pulse noise) pin (pin 8)
Pin 8 pin voltage $\approx \frac{V_{CC} - V_{CE}\text{ (about 0.3 V)} - 5.6\text{ V}}{2\text{ k}\Omega} + 5.6\text{ V}$

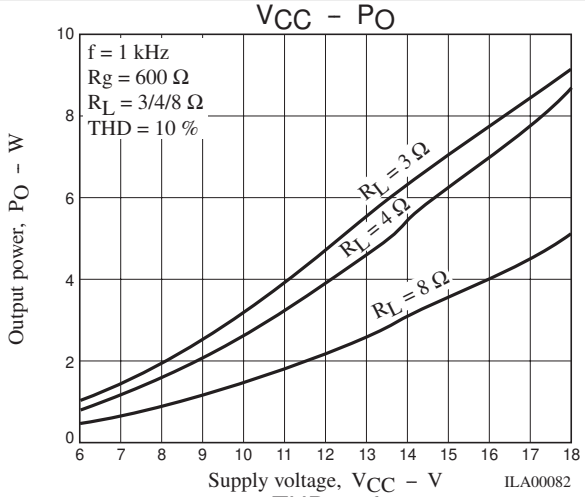
• The recommended value for the P.P capacitor is 4.7 µF.
The pulse noise that occurs when the standby pin is set low (power off) will be degraded if a value under 2.2 µF is used.
Furthermore, if a value over 10 µF is used, the signal may not be cut off and sound may remain audible when the standby pin is set low (power off).



5. MUTE (Muting)

The output signal can be controlled by shifting the pin 7 (FILTER) level towards ground with a 300 to 500 Ω resistor. However, note that the degree of suppression is reduced if a value of 750 Ω or more is used.




VCC – PO
f = 1 kHz
Rg = 600 Ω
RL = 3/4/8 Ω
THD = 10 %
RL = 3 Ω
RL = 4 Ω
RL = 8 Ω
Output power, PO – W
Supply voltage, VCC – V
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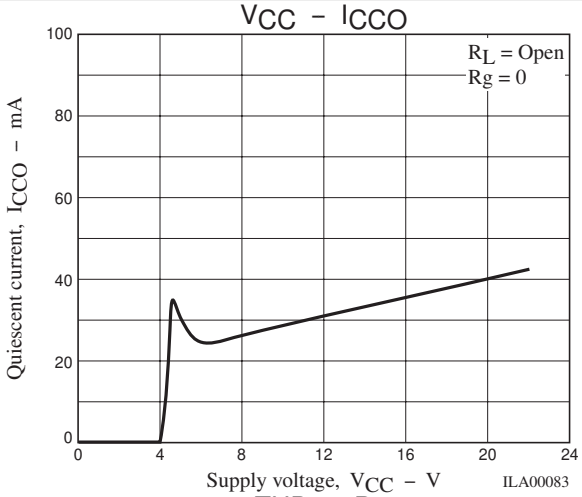
VCC – ICCO
RL = Open
Rg = 0
Quiescent current, ICCO – mA
Supply voltage, VCC – V
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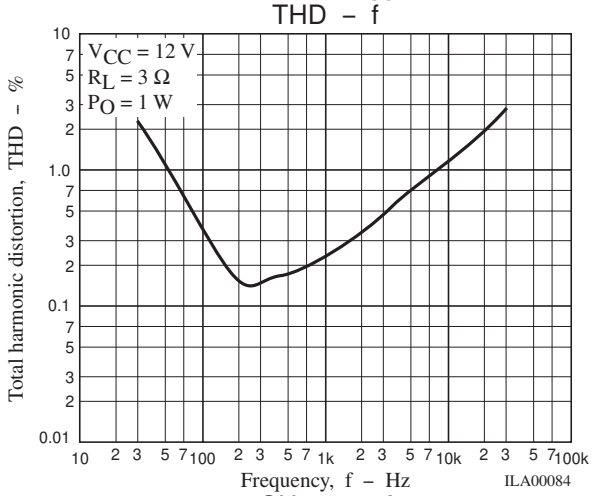
THD – f
VCC = 12 V
RL = 3 Ω
PO = 1 W
Total harmonic distortion, THD – %
Frequency, f – Hz
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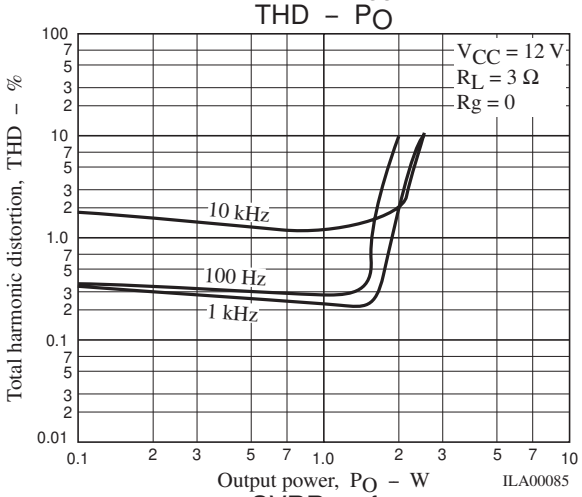
THD – PO
VCC = 12 V
RL = 3 Ω
Rg = 0
10 kHz
100 Hz
1 kHz
Total harmonic distortion, THD – %
Output power, PO – W
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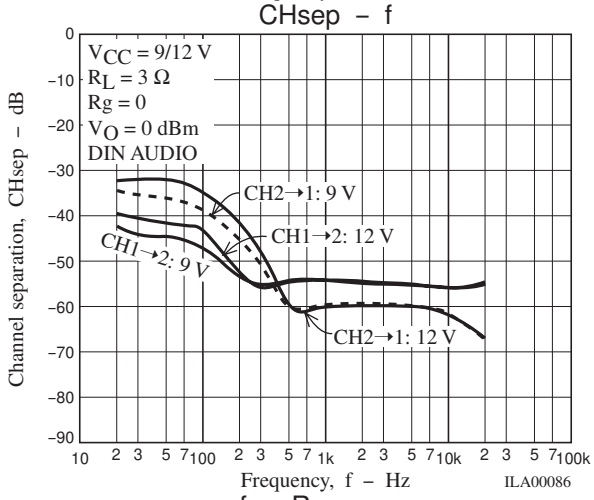
CHsep – f
VCC = 9/12 V
RL = 3 Ω
Rg = 0
VO = 0 dBm
DIN AUDIO
CH2→1: 9 V
CH1→2: 12 V
CH1→2: 9 V
CH2→1: 12 V
Channel separation, CHsep – dB
Frequency, f – Hz
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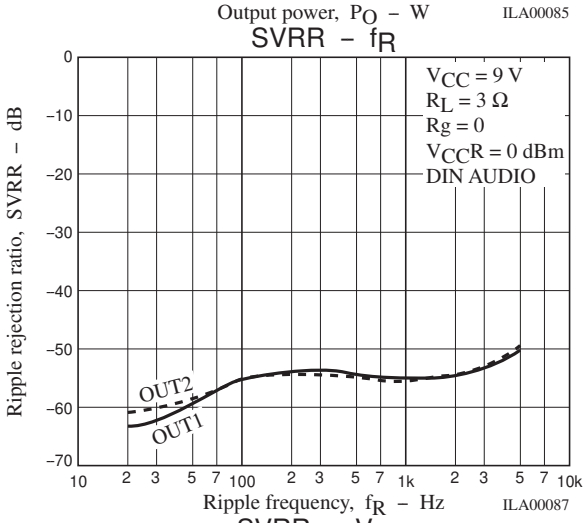
SVRR – fR
VCC = 9 V
RL = 3 Ω
Rg = 0
VCCR = 0 dBm
DIN AUDIO
OUT2
OUT1
Ripple rejection ratio, SVRR – dB
Ripple frequency, fR – Hz
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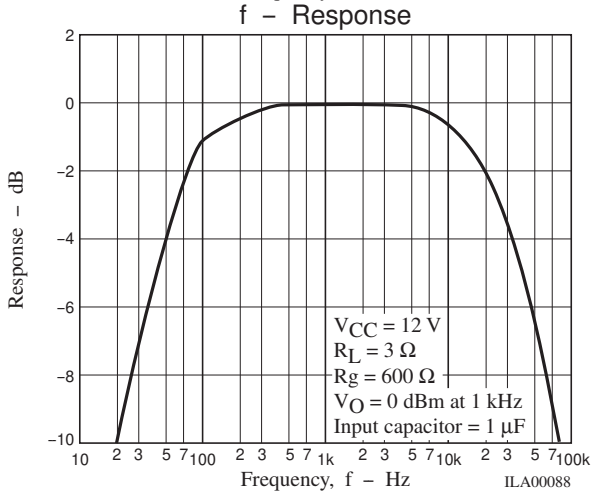
f – Response
VCC = 12 V
RL = 3 Ω
Rg = 600 Ω
VO = 0 dBm at 1 kHz
Input capacitor = 1 µF
Response – dB
Frequency, f – Hz
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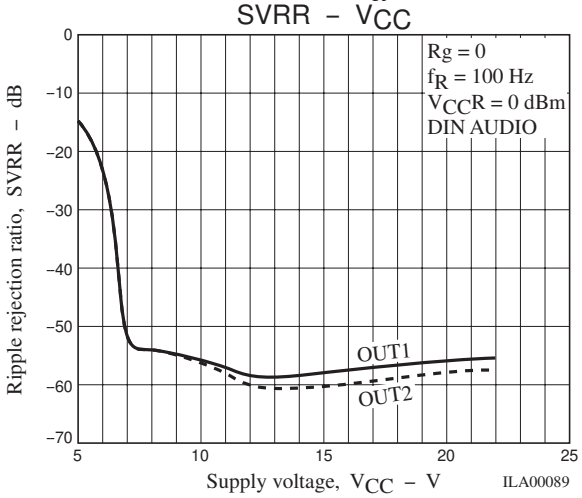
SVRR – VCC
Rg = 0
fR = 100 Hz
VCCR = 0 dBm
DIN AUDIO
OUT1
OUT2
Ripple rejection ratio, SVRR – dB
Supply voltage, VCC – V
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