Ordering number : EN4090D

SANYO Semiconductors
DATA SHEET

# LA4450

Monolithic Linear IC

## For Bus and Track in Car Stereo
## 2-Channel Power Amplifier

## Overview

The LA4450 is a single package 2-channel power Amplifier that supports an operating voltage of 26V. It is particularly well suited for use as the bus and track power IC in car stereo applications. Additionally, since the LA4450 can drive 4Ω loads, it can be used effectively in high-power high-end products. Furthermore, since it supports a high operating voltage and has low distortion, it is also optimal for use in TV and home audio products.

## Features

- Two channels in a single package
- $P_O$ = 12W×2 ($V_{CC}$ = 26.4V, $R_L$ = 8Ω, THD = 10%)
- $P_O$ = 20W×2 ($V_{CC}$ = 26.4V, $R_L$ = 4Ω, THD = 10%)
- Can drive 4Ω speakers
- Built-in standby switch
- Minimizes impulse noises

## Functions

- Standby switch (active on high (+5V) input)
- On-chip impulse noise protection circuit
- On-chip thermal protection circuit
- On-chip overvoltage and surge protection circuits

## Specifications

### Maximum Ratings at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Maximum supply voltage | $V_{CC}$ max | Rg = 0 (no signal) | 37 | V |
| Maximum output current | $I_O$ peak | | 4 | A |
| Allowable power dissipation | Pd max | Infinite heat sink* | 25 | W |
| Operating temperature | Topr | | –35 to +80 | °C |
| Storage temperature | Tstg | | –40 to +150 | °C |

Note : * Set $V_{CC}$ and $R_L$ within ranges that do not cause Pd max to exceed 25W.
(When $V_{CC}$ is 37V, $R_L$ should be 6Ω or larger and when $V_{CC}$ is 35V, $R_L$ should be 4Ω or larger.)

**Operating Conditions** at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Recommended supply voltage | $V_{CC}$ | | 26.4 | V |
| Recommended load resistance | $R_L$ | | 8 | Ω |
| Operating supply voltage range | $V_{CC}$ op | | 10 to 30 | V |

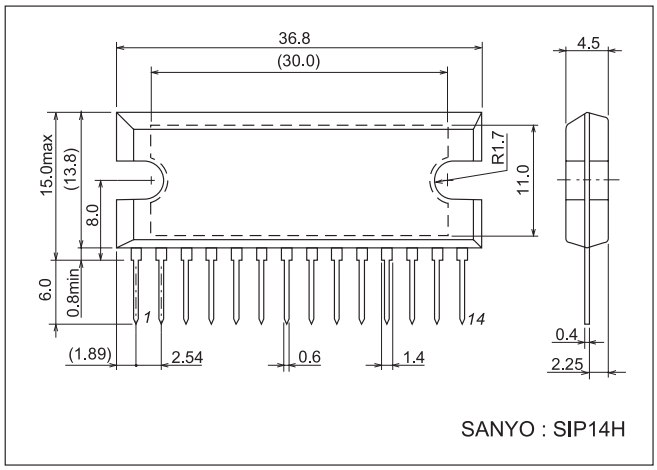
**Electrical Characteristics** at Ta = 25°C, $V_{CC}$ = 26.4V, $R_L$ = 8Ω, f = 1kHz, Rg = 600Ω

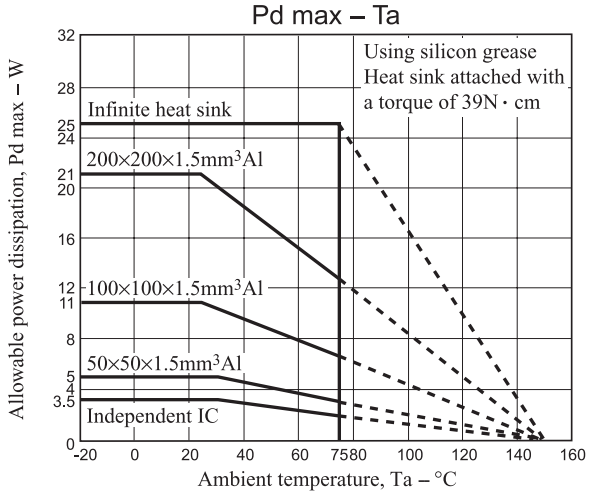
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Standby current | Ist | Standby switch off | | 1 | 30 | μA |
| Quiescent current | $I_{CCO}$ | Rg = 0 | 50 | 80 | 140 | mA |
| Output power | $P_{O1}$ | THD = 10% | 10 | 12 | | W |
| | $P_{O2}$ | THD = 10%, $R_L$ = 4Ω | | 20 | | W |
| Voltage gain | VG | $V_O$ = 0dBm | 49 | 51 | 53 | dB |
| Total harmonic distortion | THD | $P_O$ = 1W | | 0.07 | 0.4 | % |
| Output noise voltage | $V_{NO}$ | Rg = 0, BPF-BW = 20Hz to 20kHz | | 0.4 | 1.0 | mV |
| Ripple exclusion ratio | SVRR | Rg = 0, $f_R$ = 100Hz, $V_R$ = 0dBm | 45 | 55 | | dB |
| Channel separation | CHsep | $V_O$ = 0dBm, Rg = 10kΩ | 45 | 55 | | dB |
| Standby control voltage | Vst | With a 10kΩ resistor connected at pin 12 | 2.5 | | $V_{CC}$ | V |

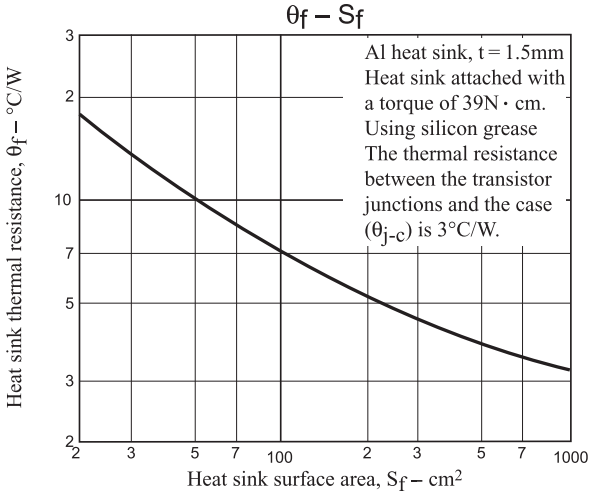
## Package Dimensions

unit : mm (typ)

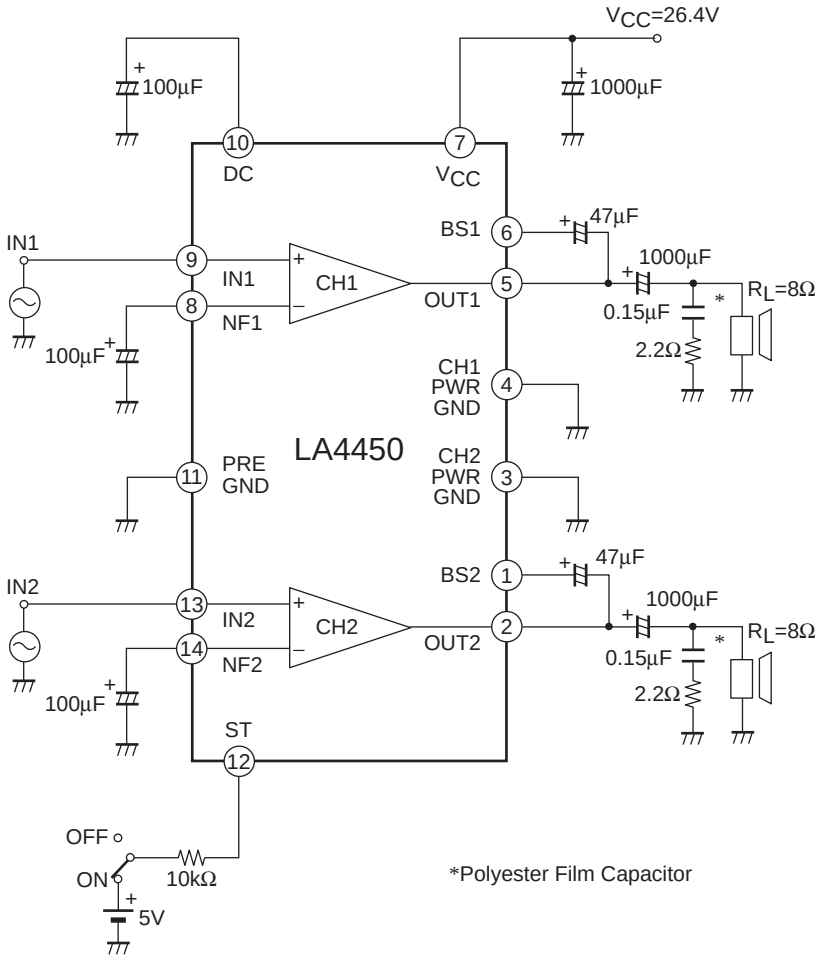
3023B



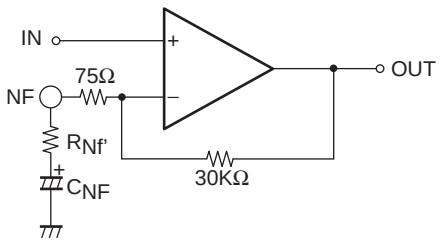



## Test Circuit




1. Features and Usage Notes

- Pin 12 is the standby pin. The IC operates when a voltage of 2V or higher is applied through the external resistor R1. Note that the maximum influx current to pin 12 is 500µA.
- Changing the voltage gain



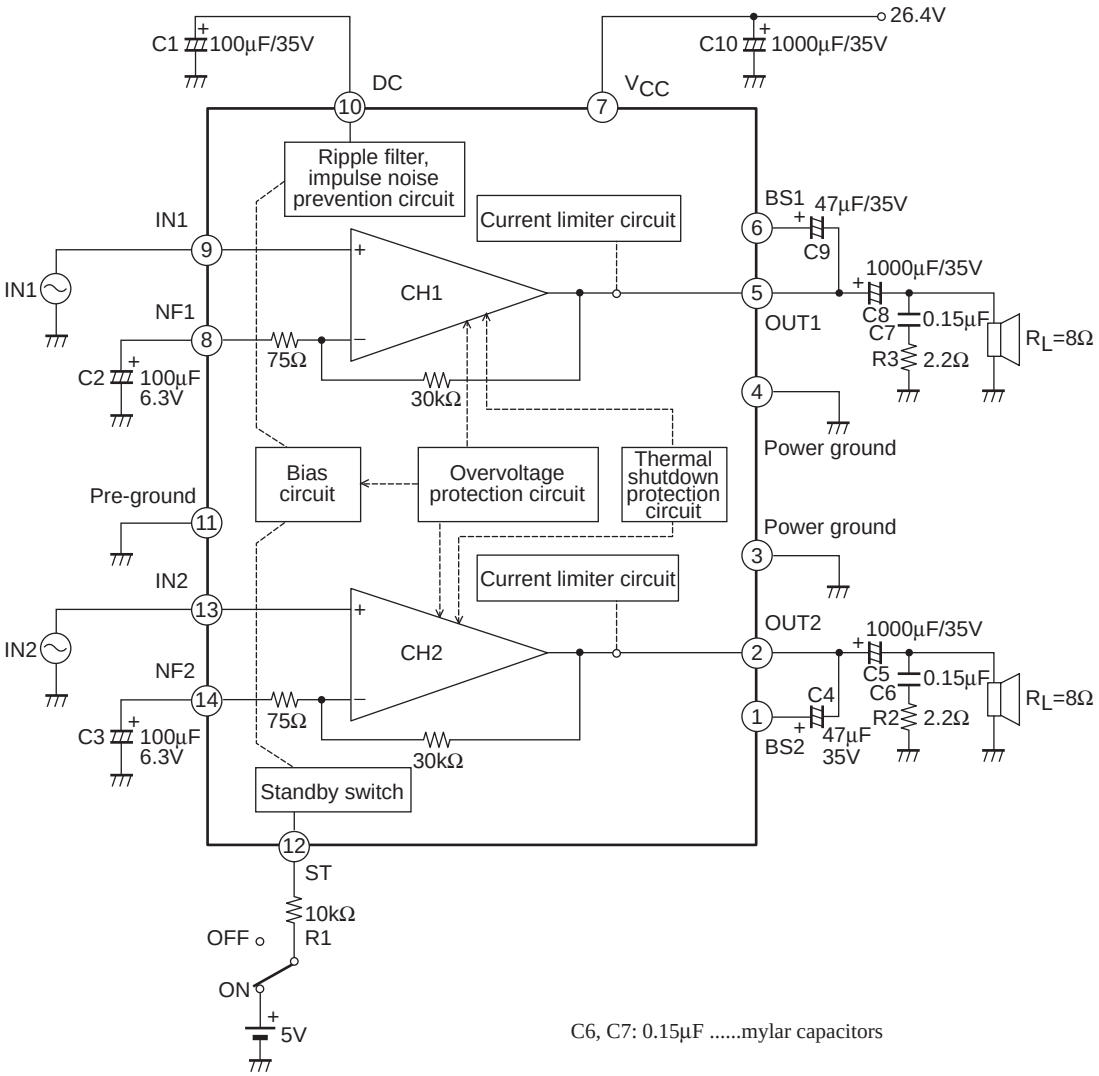

The voltage gain VG can be lowered by connecting an external resistor in series between the NF pin (pins 8 and 14) and $C_{NF}$.

$$VG = 20\log \frac{30k\Omega}{75+R_{Nf}},$$

However, since the IC may oscillate if VG is 30dB or lower, use a VG of 36dB or higher.

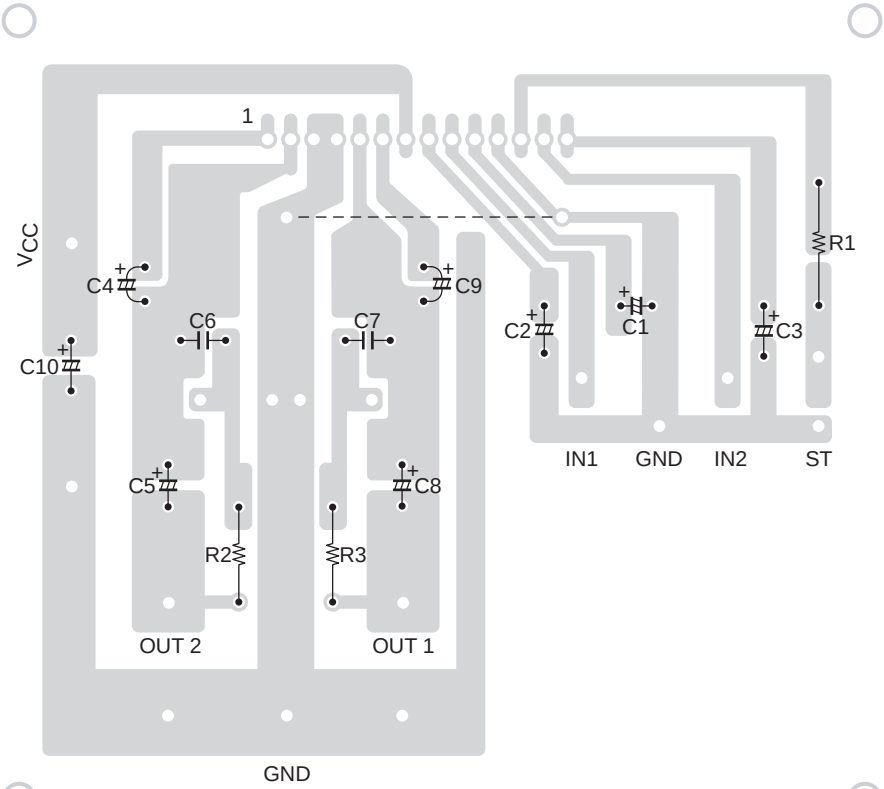
- The LA4450 includes a thermal protection circuit to prevent damage to or destruction of the IC due to abnormal overheating. As a result, the output may be attenuated or cut off if the application heat sinking is inadequate.
- The LA4450 includes an overvoltage protection circuit to protect the IC against power supply surges and abnormal voltages. This circuit has hysteresis characteristics : it operates at between 39 and 40V, and recovers at around 34V.
- Although the LA4450 includes a current limiter circuit to prevent damage due to abnormal currents, care must still be exercised to prevent load shorts and other excessive current conditions.

## Application Circuit Example

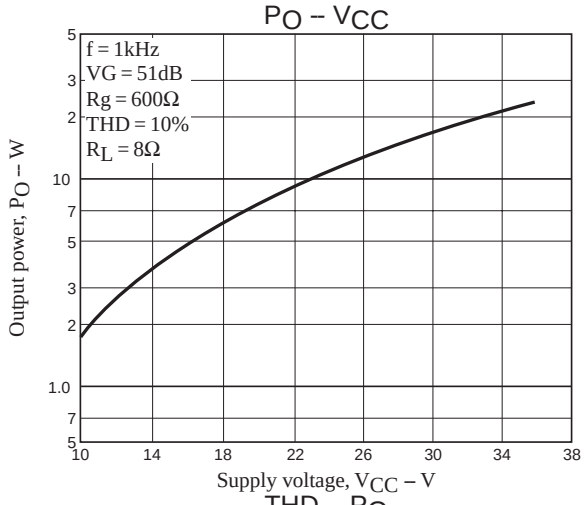


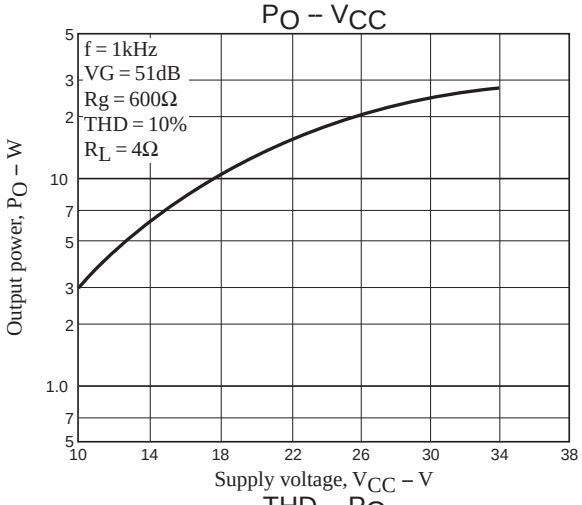

C6, C7: 0.15µF .....mylar capacitors

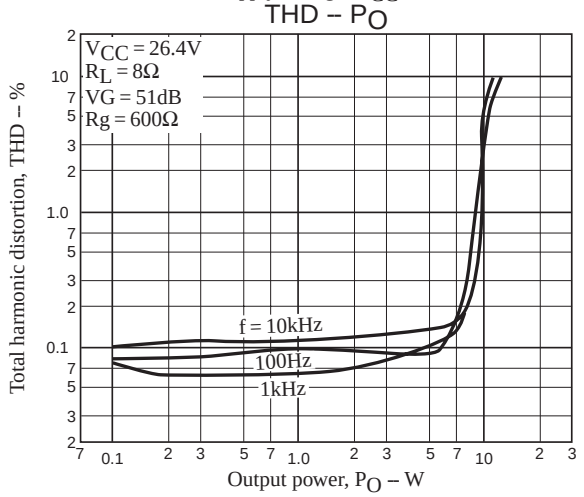
## Printed Circuit Board Pattern Example

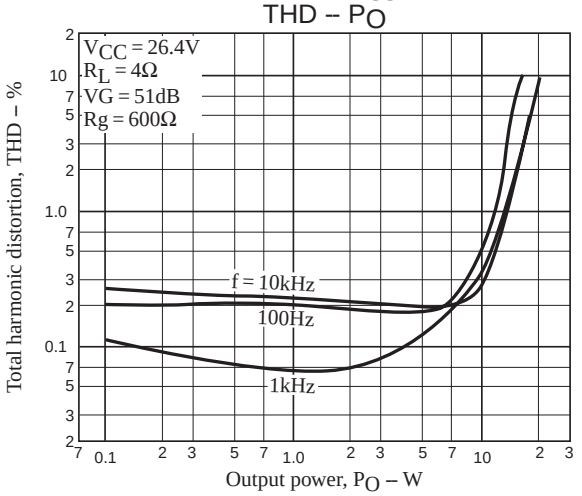



Copper foiled side 90×100mm²

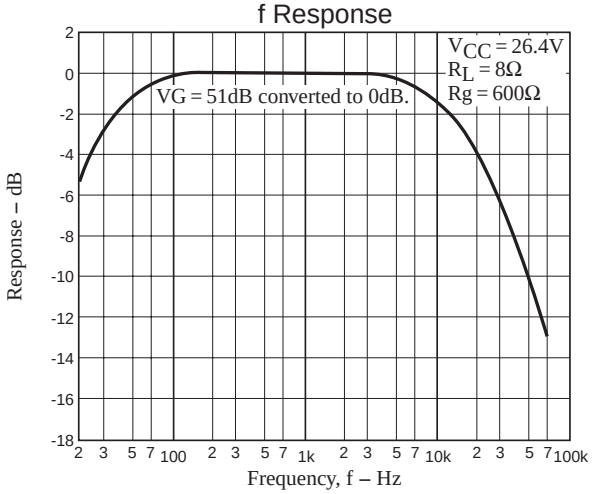


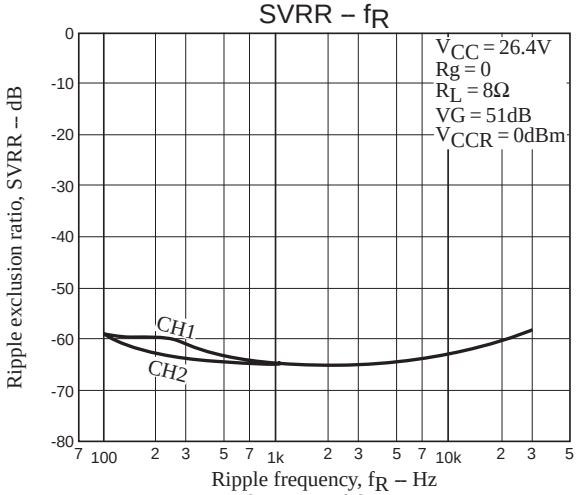



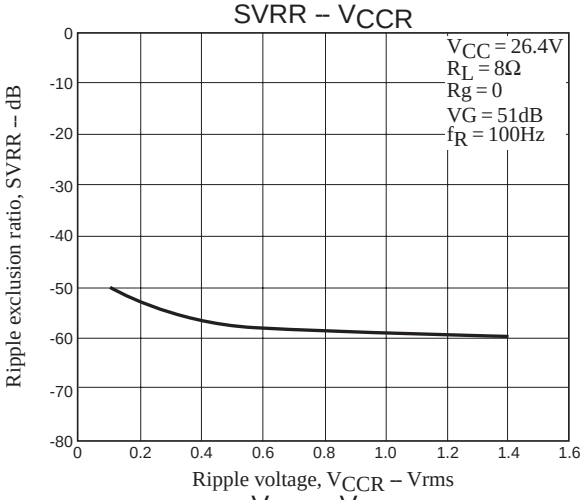
f Response



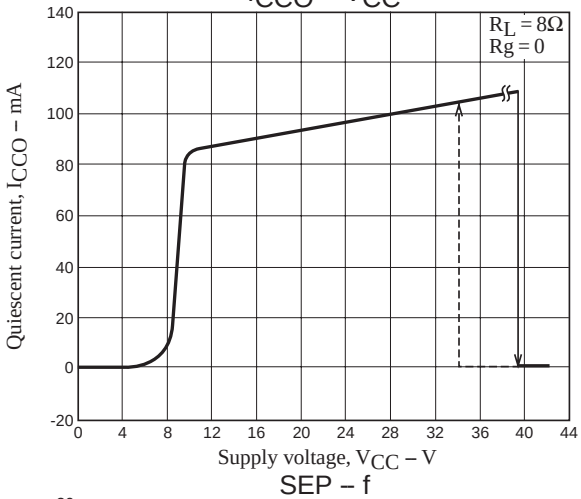

SVRR – $f_R$



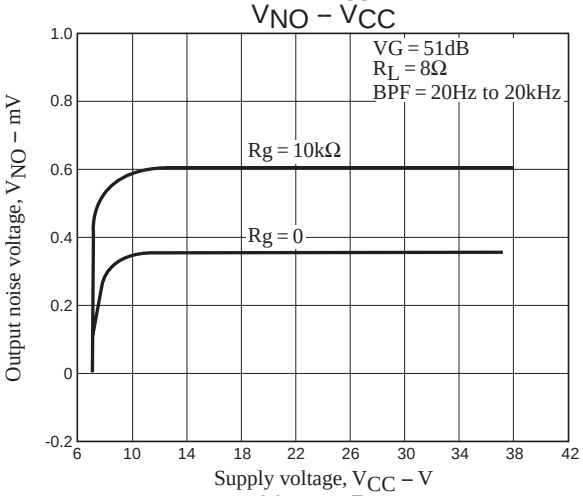

SVRR – $V_{CCR}$



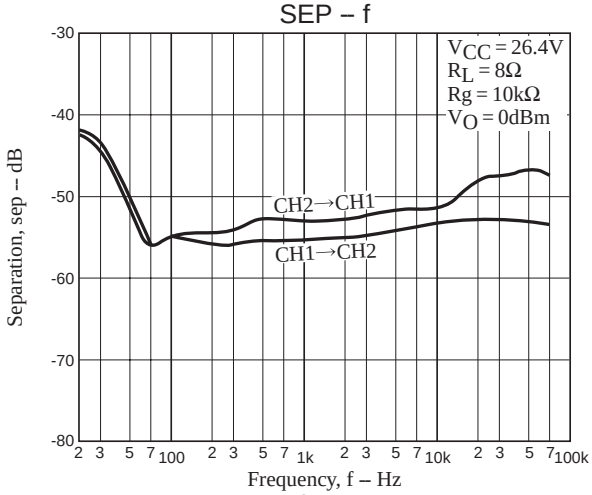

$I_{CCO}$ – $V_{CC}$



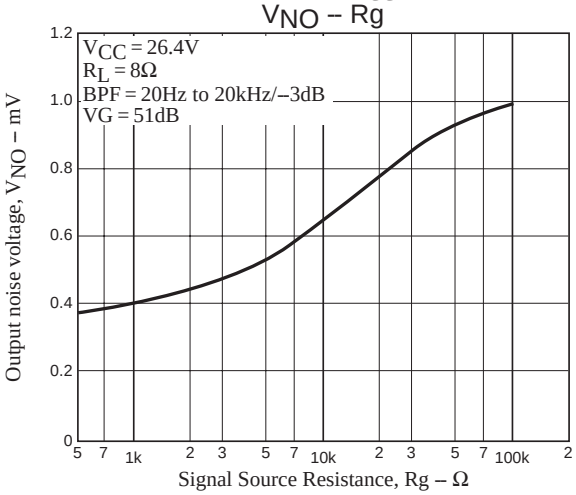

$V_{NO}$ – $V_{CC}$




SEP – f




$V_{NO}$ – Rg




Pd – $P_O$