



No. 4609A

STK4201II

2ch AF Power Amplifier (Split Power Supply)
(60W + 60W min, THD = 0.4%)

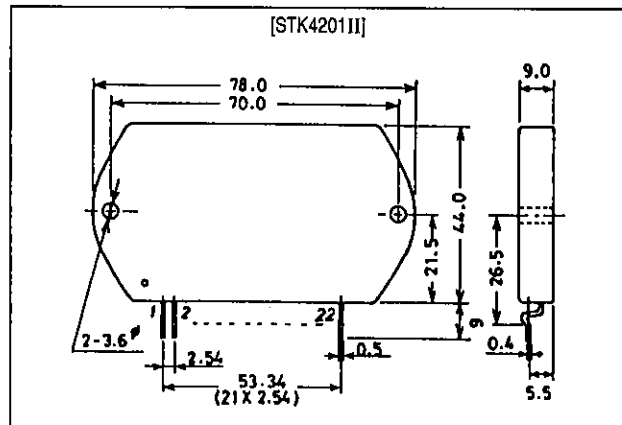
Features

- Muting circuit built-in to isolate all types of shock noise
- Current mirror circuit for low 0.4% total harmonic distortion
- Pin compatible with the STK4201V series (THD = 0.08%) and the STK4141X series (THD = 0.02%)

Package Dimensions

unit: mm

4086A



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Specifications

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

| Parameter | Symbol | Conditions | Ratings | Unit |
|---------------------------------------|----------------------|-----------------------------------------------------------------------------------------|-------------|--------------------|
| Maximum supply voltage | $V_{CC \text{ max}}$ | | ± 55 | V |
| Thermal resistance | θ_{j-c} | | 1.5 | $^\circ\text{C/W}$ |
| Junction temperature | T_j | | 150 | $^\circ\text{C}$ |
| Operating substrate temperature | T_c | | 125 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | | -30 to +125 | $^\circ\text{C}$ |
| Available time for load short-circuit | t_s | $V_{CC} = \pm 38\text{V}$, $R_L = 8\Omega$, $f = 50\text{Hz}$, $P_O = 60\text{W}$ | 1 | s |

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

| Parameter | Symbol | Conditions | Ratings | Unit |
|----------------------------|----------|------------|----------|----------|
| Recommended supply voltage | V_{CC} | | ± 38 | V |
| Load resistance | R_L | | 8 | Ω |

Operating Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = \pm 38\text{V}$, $R_L = 8\Omega$ (noninductive load), $R_g = 600\Omega$, $V_G = 40\text{dB}$

| Parameter | Symbol | Conditions | min | typ | max | Unit |
|---------------------------|------------|------------------------------------------------------|-----|-----------|-----|------------------|
| Quiescent current | I_{CCO} | $V_{CC} = \pm 46\text{V}$ | 20 | 40 | 100 | mA |
| Output power | P_O | THD = 0.4%, $f = 20\text{Hz}$ to 20kHz | 60 | — | — | W |
| Total harmonic distortion | THD | $P_O = 1.0\text{W}$, $f = 1\text{kHz}$ | — | — | 0.3 | % |
| Frequency response | f_L, f_H | $P_O = 1.0\text{W}$, $+3_{-3}\text{dB}$ | — | 20 to 50k | — | Hz |
| Input impedance | r_i | $P_O = 1.0\text{W}$, $f = 1\text{kHz}$ | — | 55 | — | $\text{k}\Omega$ |
| Output noise voltage | V_{NO} | $V_{CC} = \pm 46\text{V}$, $R_g = 10\text{k}\Omega$ | — | — | 1.2 | mVrms |
| Neutral voltage | V_N | $V_{CC} = \pm 46\text{V}$ | -70 | 0 | +70 | mV |
| Muting voltage | V_M | | -2 | -5 | -10 | V |

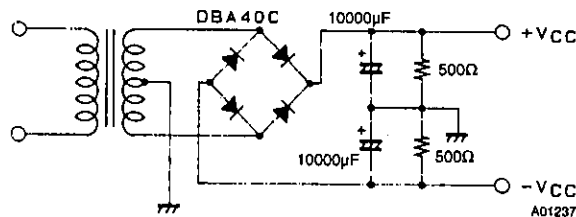
Notes.

All tests are measured using a regulated voltage supply unless otherwise specified.

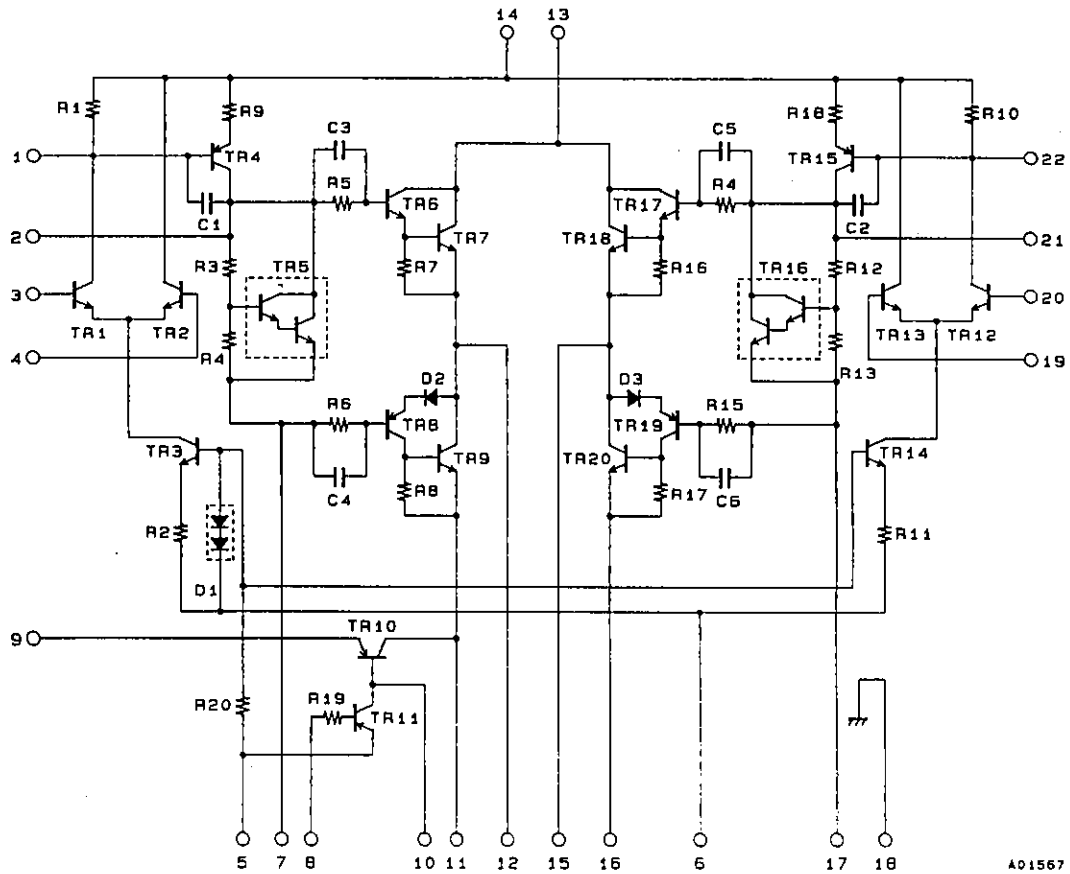
Available time for load short-circuit and output noise voltage are measured using the transformer supply specified below.

The output noise voltage is the peak value of an average-reading meter with an rms value scale (VTVM). A regulated AC supply (50Hz) should be used to eliminate the effects of AC primary line flicker noise.

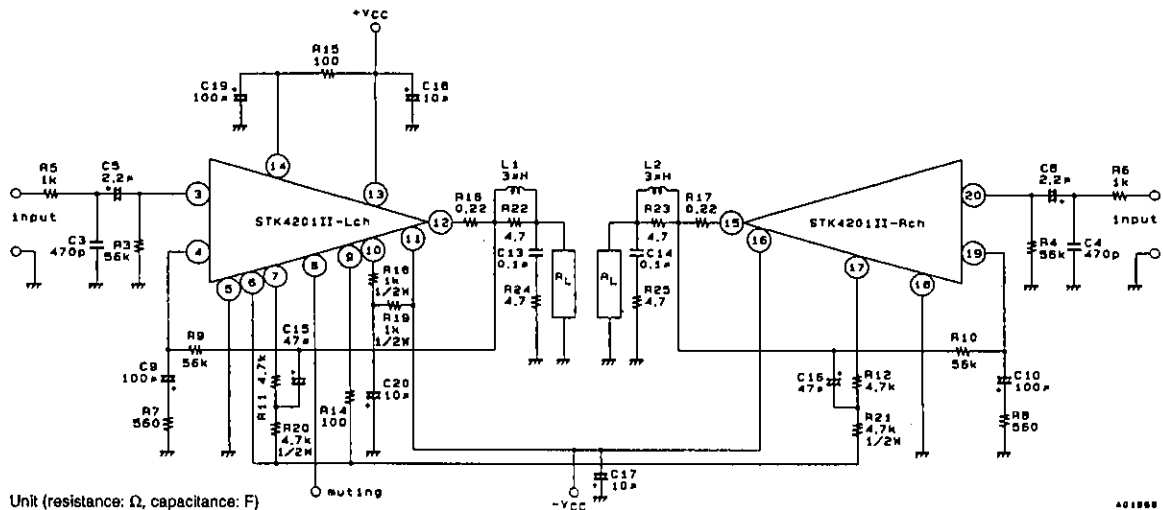
Specified Transformer Supply (MG-200 or Equivalent)



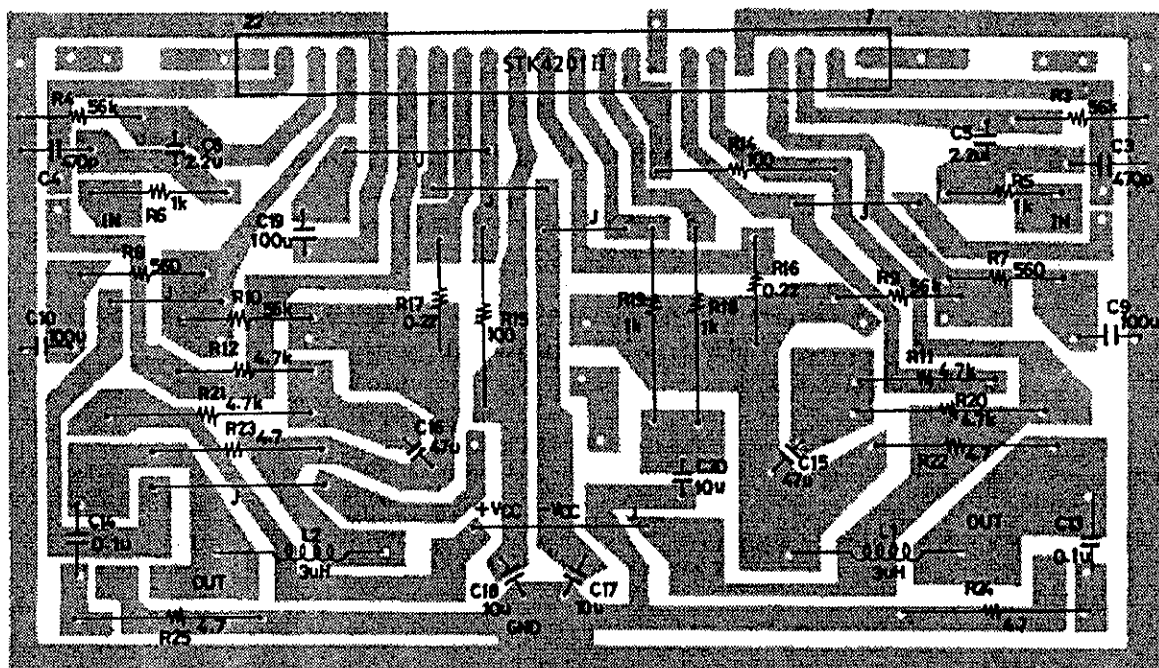
Equivalent Circuit



Sample Application Circuit (60W min 2-Channel AF Power Amplifier)



Sample Application Circuit PCB Layout (Copper Foil Surface)



Unit (resistance: Ω ; capacitance: F)

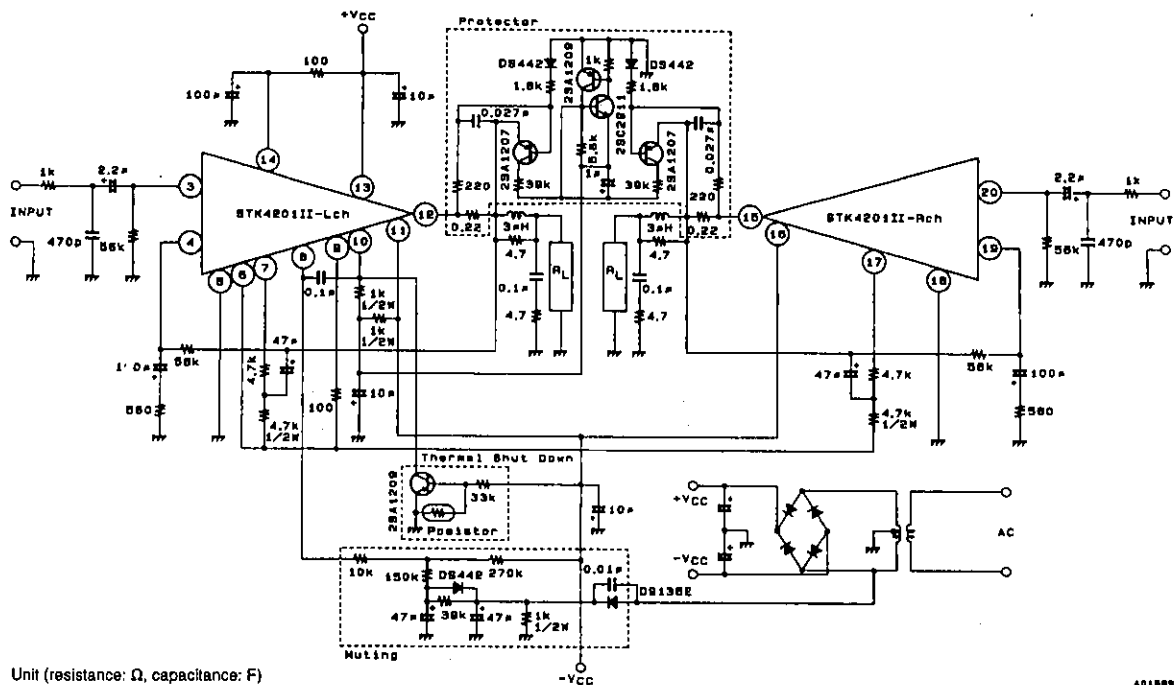
External Component Description

| | |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C3, C4 | Input filter capacitors. These, together with R5 and R6, form filters to reduce high-band noise. |
| C5, C6 | Input coupling capacitors. For DC blocking. Since capacitor reactance becomes larger at lower frequencies, the output noise can be adversely affected by signal source resistance-dependent $1/f$ noise. In this case, a lower reactance value should be chosen. In order to remove pop noise at power-on, larger values of capacitance should be chosen for C5 and C6, which determine the input time constant, and smaller values for C9 and C10 in the NF circuit. |
| C9, C10 | NF capacitors. These determine the low-side cut-off frequency. $f_L = \frac{1}{2\pi \times C9 \times R7} \text{ [Hz]}$ A large value should be chosen for C9 to maintain voltage gain at low frequencies. However, because this would tend to increase the shock noise at power-on, a value larger than absolutely necessary should be avoided. |
| C19 | Decoupling capacitors. This removes shock noise and ripple voltage from the supply. |
| C15, C16 | Bootstrap capacitors. If these capacitors are made small, then the total harmonic distortion at low frequencies increases significantly. |
| C17, C18 | Oscillation prevention capacitors. These should be inserted as close as possible to the IC supply pins to reduce supply impedance and hence provide stable IC operation. Electrolytic capacitors are recommended. |
| C20 | Ripple filter capacitor. This forms a ripple filter in combination with internal transistor TR10. |
| C13, C14 | Oscillation prevention capacitors. Mylar capacitors are recommended for their excellent thermal and frequency characteristics. |
| R5, R6 | Input filter resistors. |
| R3, R4 | Input bias resistors. These are used to bias the input pins at zero potential. The input impedance is largely determined by this resistance. |
| R7, R9 (R8, R10) | Voltage-gain VG setting resistors. VG = 40dB is recommended using R7, R8 = 560 Ω , and R9, R10 = 56k Ω . Gain adjustments are best made using R7 or R8. If gain adjustments are made using R7 or R8, then set R3, R4 = R9, R10 to maintain V_N balance stability. |
| R11, R20 (R12, R21) | Bootstrap resistors. These resistors determine the quiescent current. Values of 4.7k Ω and 4.7k Ω are recommended. |

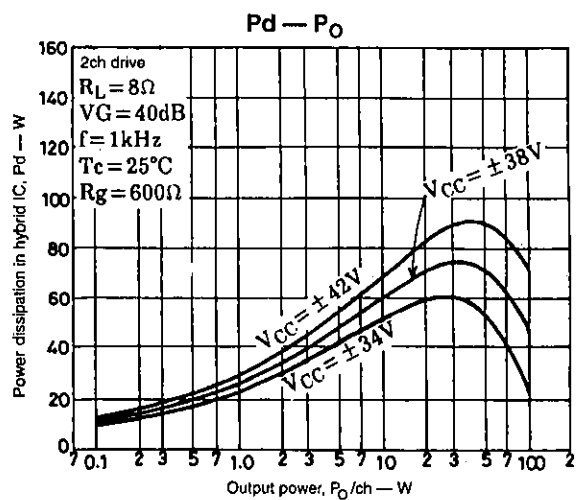
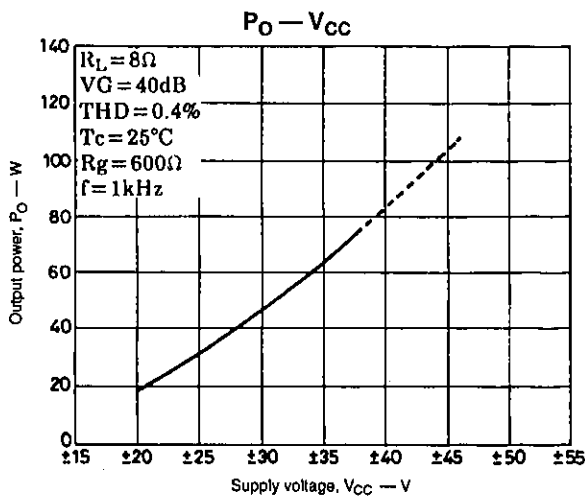
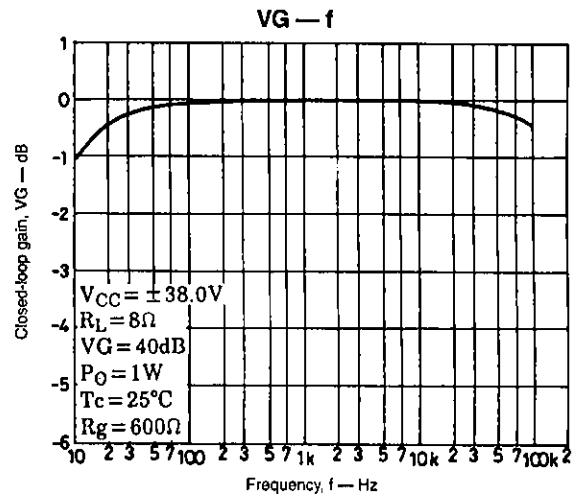
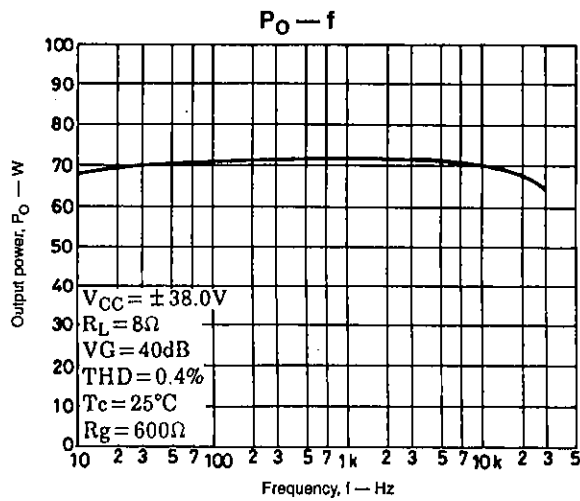
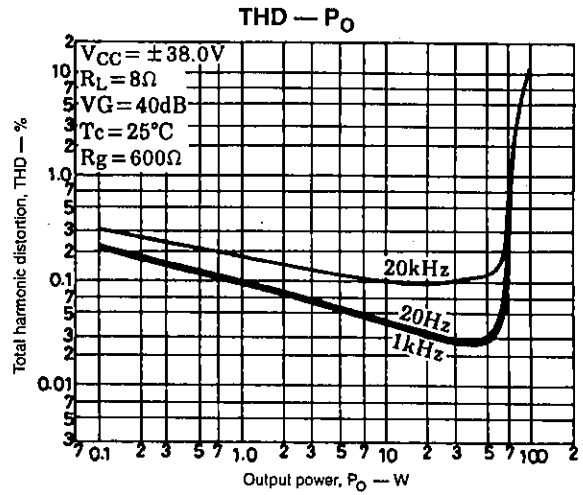
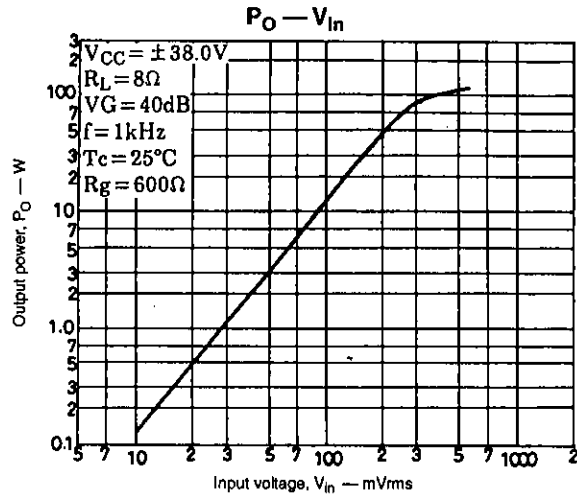
STK4201II

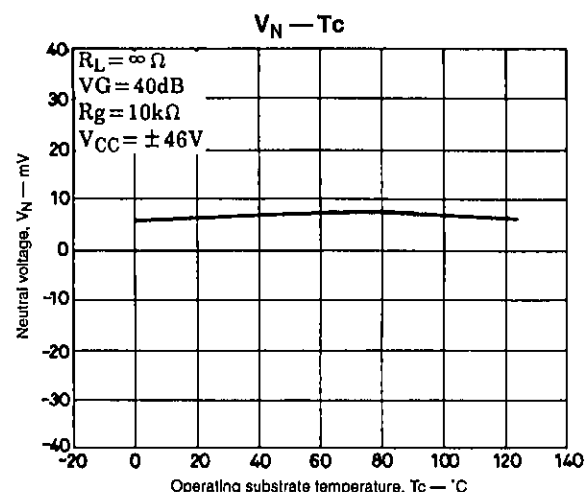
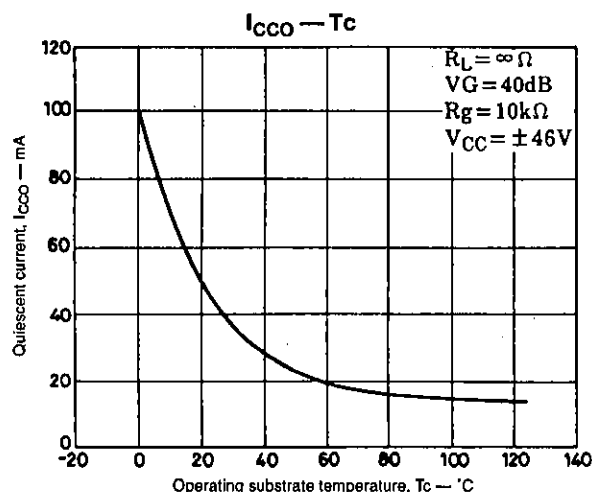
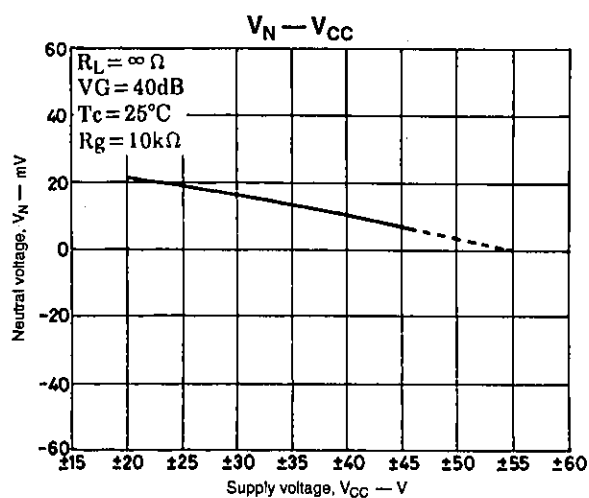
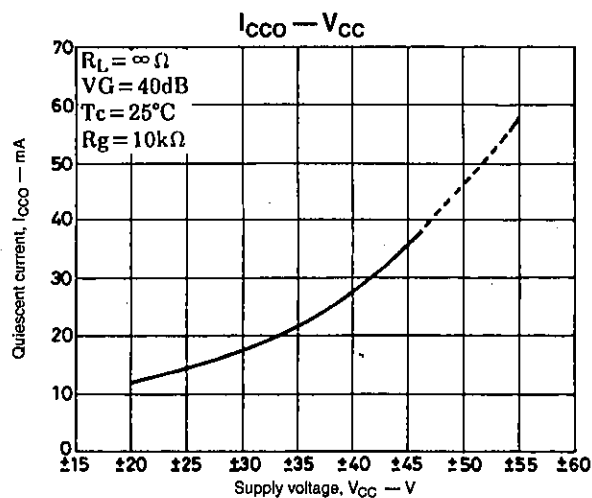
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|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R15 | Ripple filter resistor. This resistor performs as predriver transistor limiting resistor during load short circuits. |
| R14 | Clipping plus/minus balance resistor. |
| R18, R19 | Ripple filter resistors. When muting transistor TR11 is on, current flows from ground through TR11 to $-V_{CC}$. Values of $1k\Omega$ (1W) and $1k\Omega$ (1W) are recommended. |
| R24, R25 | Oscillation prevention resistors. |
| R16, R17 | Output limiting resistors. |
| R22, R23 | High-frequency oscillation prevention resistors. |
| L1, L2 | High-frequency oscillation prevention inductors. |

Sample Application Circuit (With Protection and Muting Circuits)



401509





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