



# STK4211 II

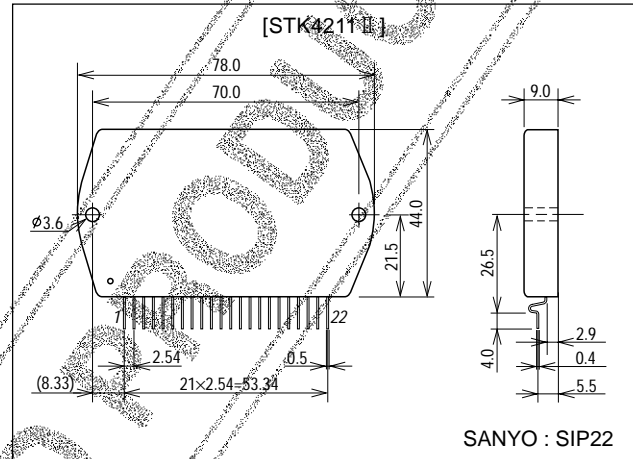
## 2ch AF Power Amplifier (Split Power Supply) (70W + 70W min, THD = 0.4%)

### 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



### Specifications

Maximum Ratings at Ta = 25°C

| Parameter                             | Symbol              | Conditions   | Ratings     | Unit |
|---------------------------------------|---------------------|--|-------------|------|
| Maximum supply voltage                | V <sub>CC max</sub> |  | ±60         | V    |
| Thermal resistance                    | θ <sub>J-C</sub>    |  | 1.5         | °C/W |
| Junction temperature                  | T <sub>J</sub>      |  | 150         | °C   |
| Operating substrate temperature       | T <sub>C</sub>      |  | 125         | °C   |
| Storage temperature                   | T <sub>stg</sub>    |  | -30 to +125 | °C   |
| Available time for load short-circuit | t <sub>s</sub>      | V <sub>CC</sub> =±42V, R <sub>L</sub> =8Ω, f=50Hz, P <sub>O</sub> =70W | 1           | s    |

Recommended Operating Conditions at Ta = 25°C

| Parameter                  | Symbol          | Conditions | Ratings | Unit |
|----------------------------|-----------------|------------|---------|------|
| Recommended supply voltage | V <sub>CC</sub> |            | ±42     | V    |
| Load resistance            | R <sub>L</sub>  |            | 8       | Ω    |

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**Operating Characteristics** at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = \pm 42\text{V}$ ,  $R_L = 8\Omega$  (non-inductive load),  $R_g = 600\Omega$ ,  $V_G = 40\text{dB}$

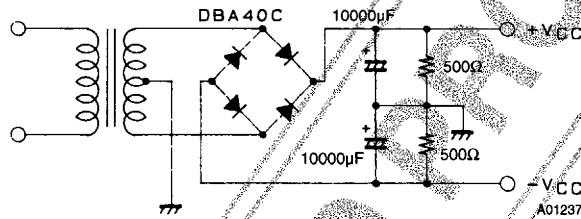
| Parameter                 | Symbol     | Conditions   | Ratings |           |     | Unit       |
|---------------------------|------------|--|---------|-----------|-----|------------|
|                           |            |  | min     | typ       | max |            |
| Quiescent current         | $I_{CCO}$  | $V_{CC} = \pm 50.5\text{V}$                            | 20      | 40        | 100 | mA         |
| Output power              | $P_O$      | THD=0.4%, $f=20\text{Hz}$ to $20\text{kHz}$            | 70      |           |     | W          |
| Total harmonic distortion | THD        | $P_O = 1.0\text{W}$ , $f = 1\text{kHz}$                |         |           | 0.3 | %          |
| Frequency response        | $f_L, f_H$ | $P_O = 1.0\text{W}$ , $+3, -3$ dB                      |         | 20 to 50k |     | Hz         |
| Input impedance           | $r_i$      | $P_O = 1.0\text{W}$ , $f = 1\text{kHz}$                |         | 55        |     | k $\Omega$ |
| Output noise voltage      | $V_{NO}$   | $V_{CC} = \pm 50.5\text{V}$ , $R_g = 10\text{k}\Omega$ |         |           | 1.2 | mVrms      |
| Neutral voltage           | $V_N$      | $V_{CC} = \pm 50.5\text{V}$                            | -70     | 0         | +70 | mV         |
| Muting voltage            | $V_M$      |  | -2      | -5        | -10 | V          |

Note.

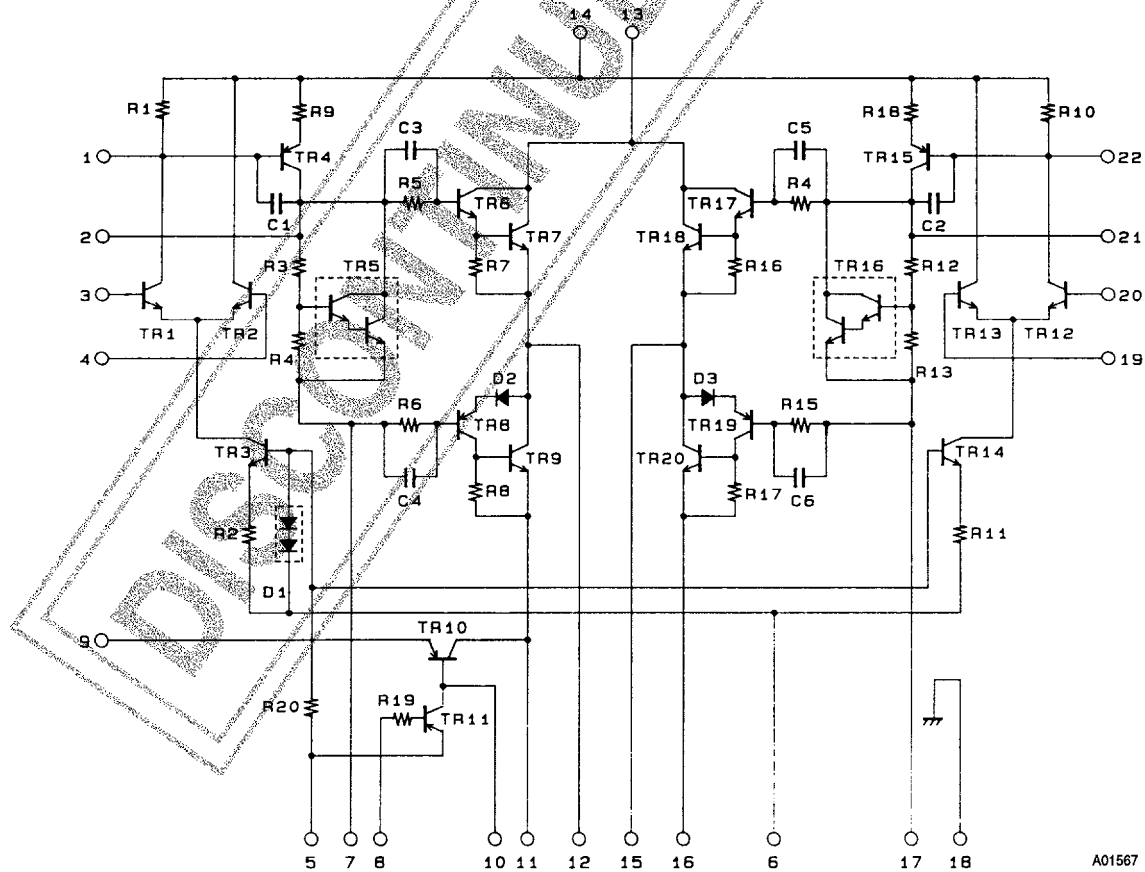
All tests are made using a constant-voltage supply unless otherwise specified.

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)

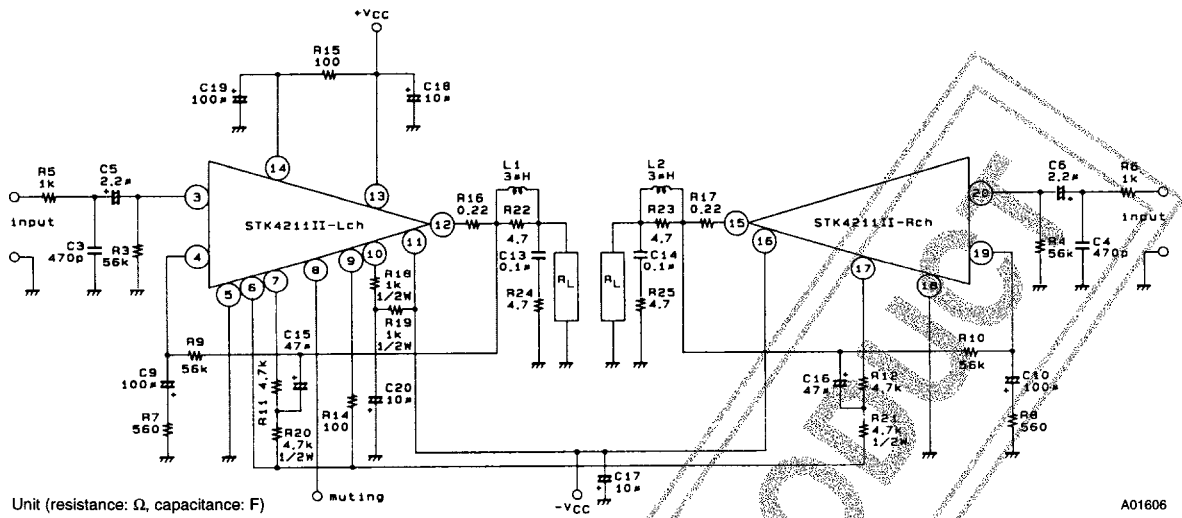


## Equivalent Circuit

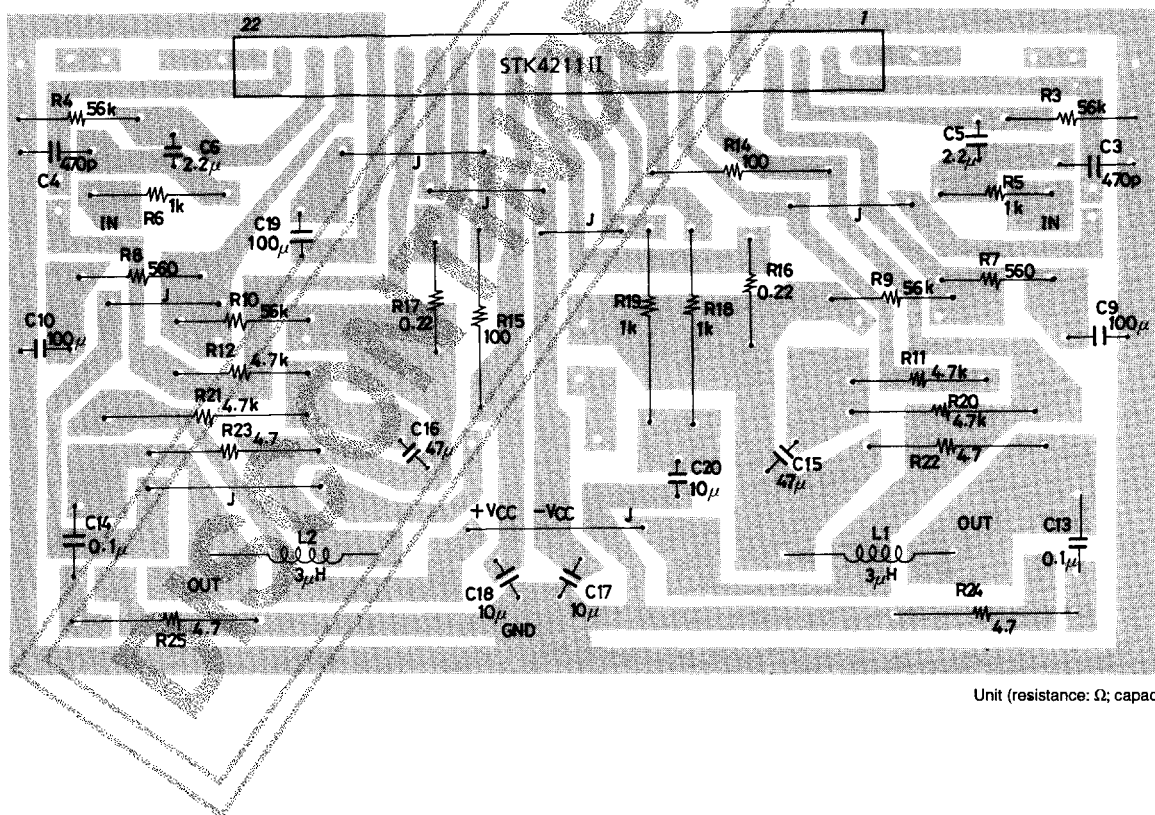


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## Sample Application Circuit (70W min, 2-Channel, AF Power Amplifier)



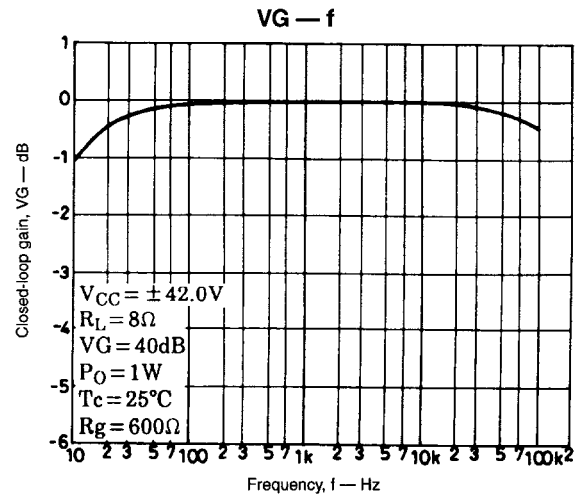
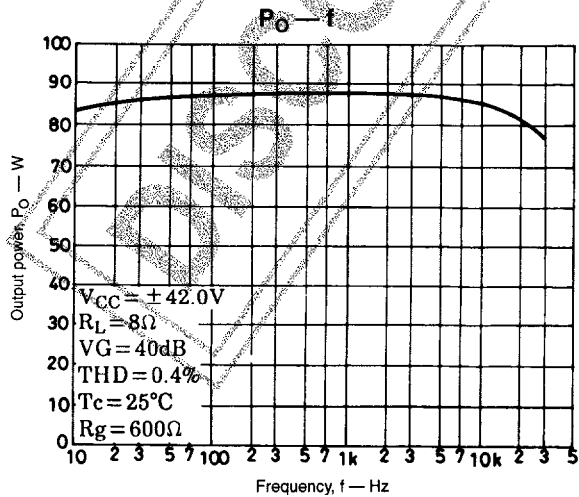
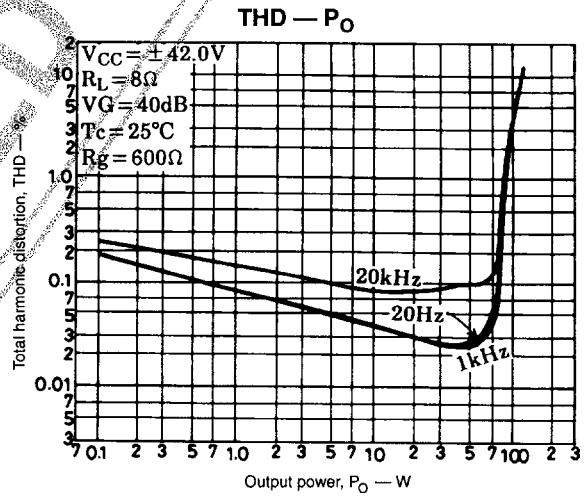
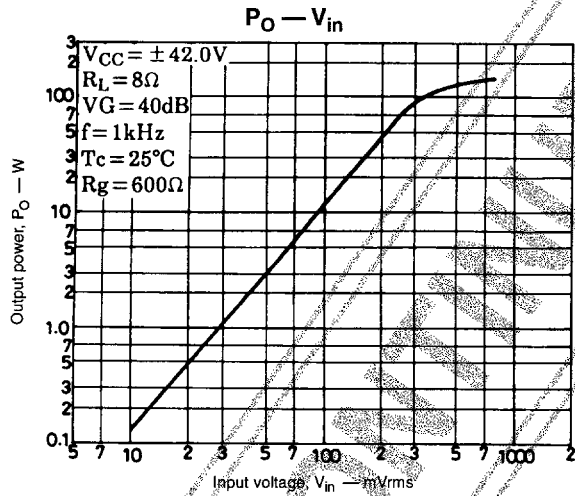
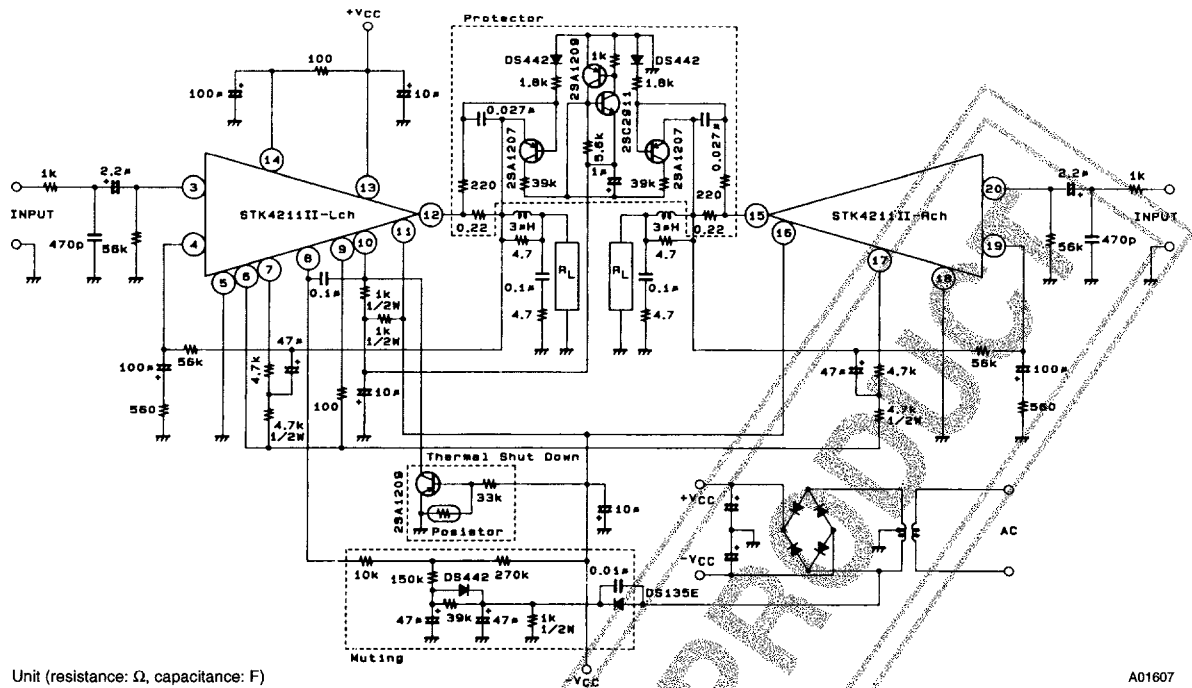
## Sample Application Circuit PCB Layout (Copper Foil Surface)

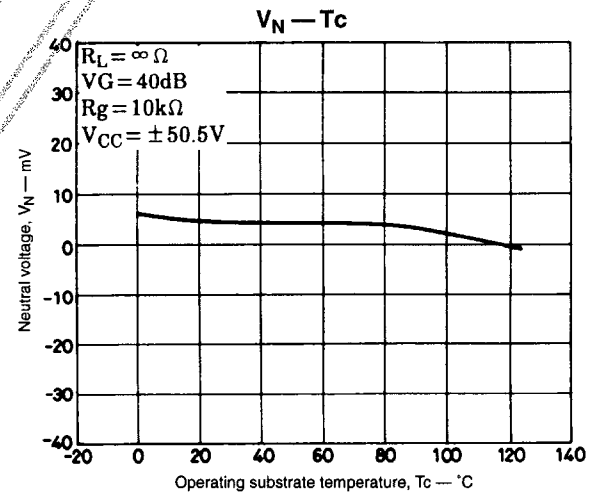
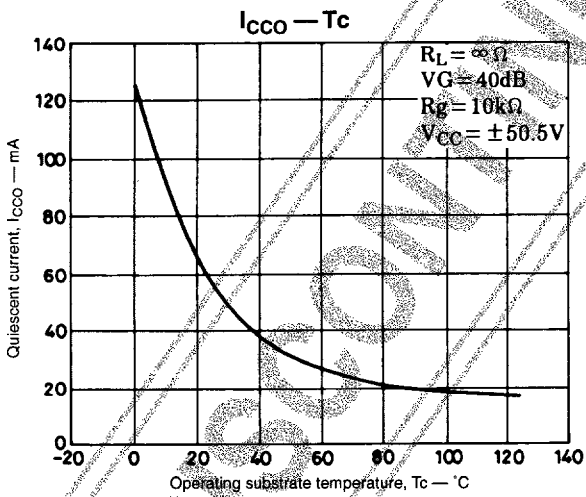
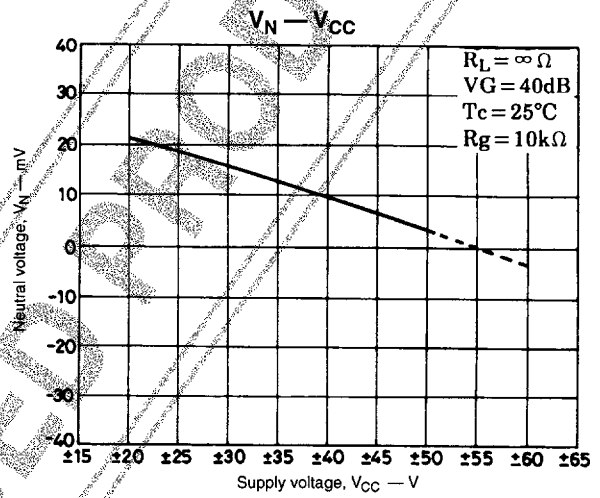
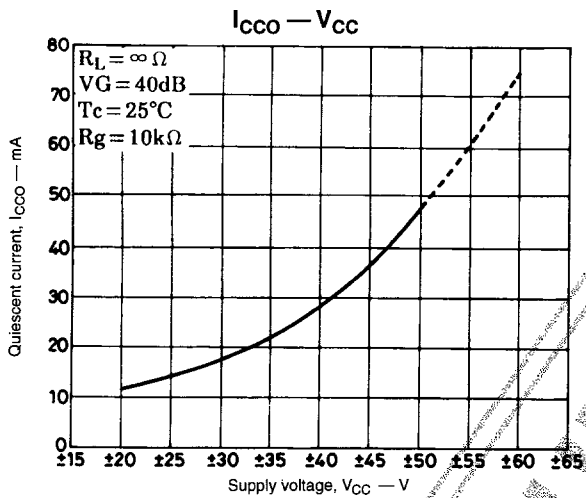
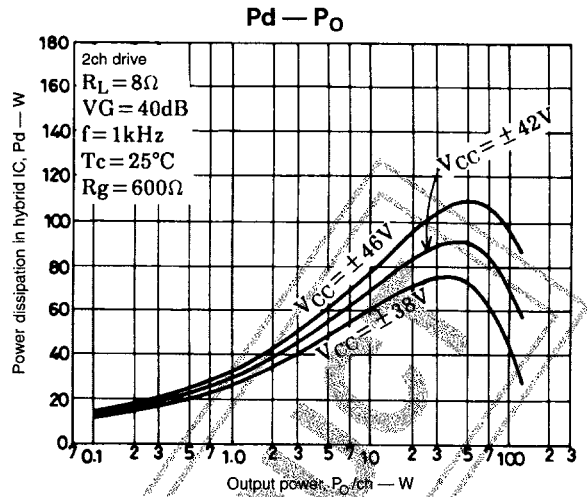
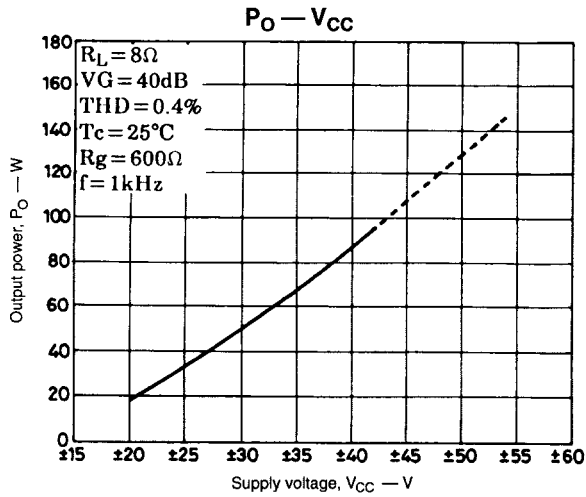


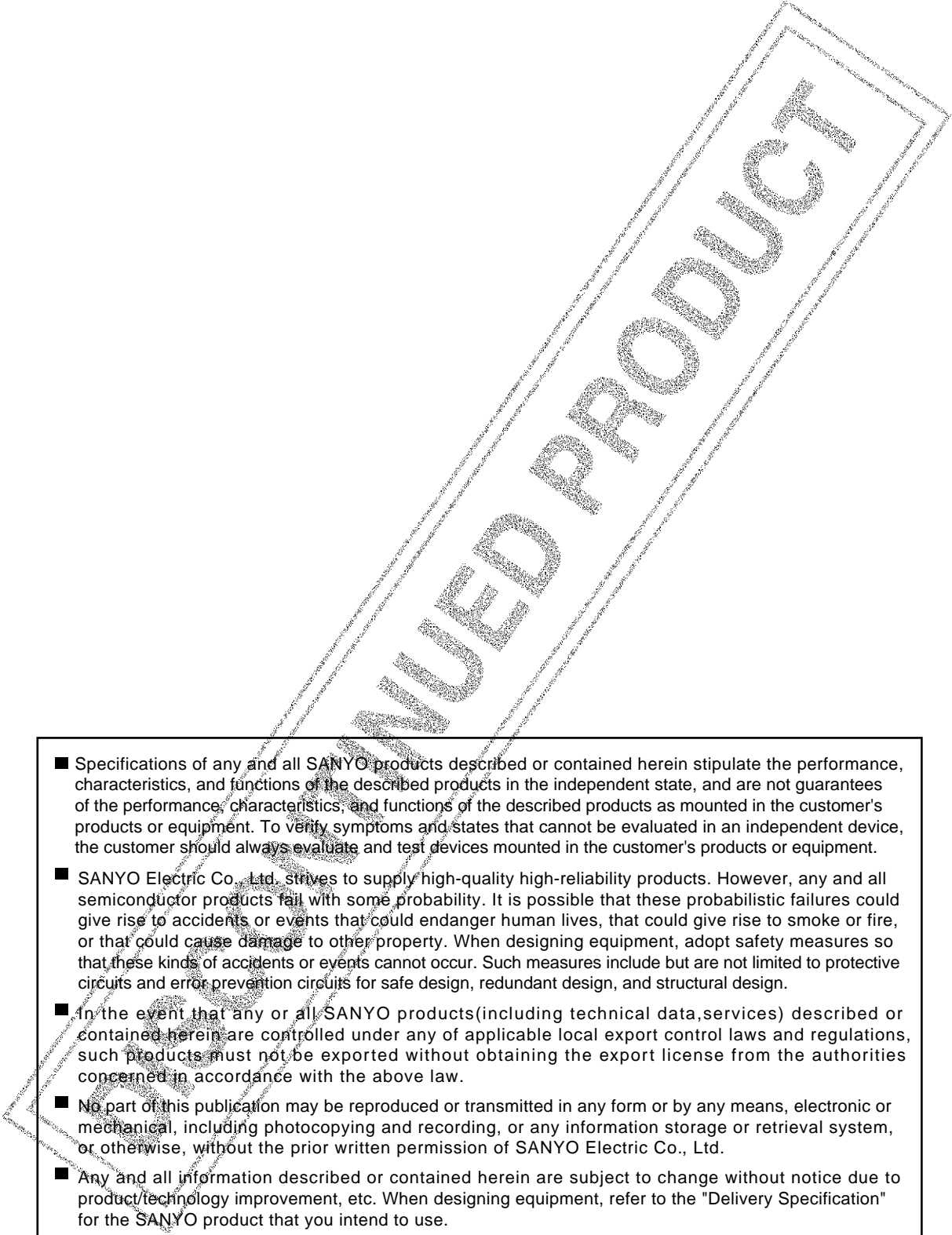
## External Component Description

|                        |  |
|------------------------|--|
| C3, C4                 | Input filter capacitors.<br>These, together with R5 and R6, form filters to reduce high-band noise.  |
| C5, C6                 | Input coupling capacitors.<br>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.<br>These determine the low-side cutoff frequency.<br>$f_L = \frac{1}{2\pi \times C9 \times R7} \text{ [Hz]}$<br>A large values 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 values larger than absolutely necessary should be avoided.  |
| C19                    | Decoupling capacitors.<br>This removes shock noise and ripple voltage from the supply.   |
| C15, C16               | Bootstrap capacitors.<br>If these capacitors are made small, then the total harmonic distortion at low frequencies increases significantly.  |
| C17, C18               | Oscillation prevention capacitors.<br>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.<br>This forms a ripple filter in combinatin with internal transistor TR10.  |
| C13, C14               | Oscillation prevention capacitors.<br>Mylar capacitors are recommended for their excellent thermal and frequency characteristics.  |
| R5, R6                 | Input filter resistors.  |
| R3, R4                 | Input bias resistors.<br>These are used to bias the input pins at zero potential. The input impedance is largely determined by this resistance.  |
| R7, R9<br>(R8, R10)    | Voltage-gain VG setting resistors.<br>VG=40dB is recommended using R7, R8=560Ω, and R9, R10=56kΩ. 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<br>(R12, R21) | Bootstrap resistors.<br>These resistors determine the quiescent current. Values of 4.7kΩ and 4.7kΩ are recommended.  |
| R15                    | Ripple filter resistor.<br>This resistor performs as predriver transistor limiting resistor during load short circuits.  |
| R14                    | Clipping plus/minus balance resistor.  |
| R18, R19               | Ripple filter resistors.<br>When muting transistor TR11 is on, current flows from ground through TR11 to $-V_{CC}$ . Values of 1kΩ (1W) and 1kΩ (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 Circuit)





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