

**SANYO**

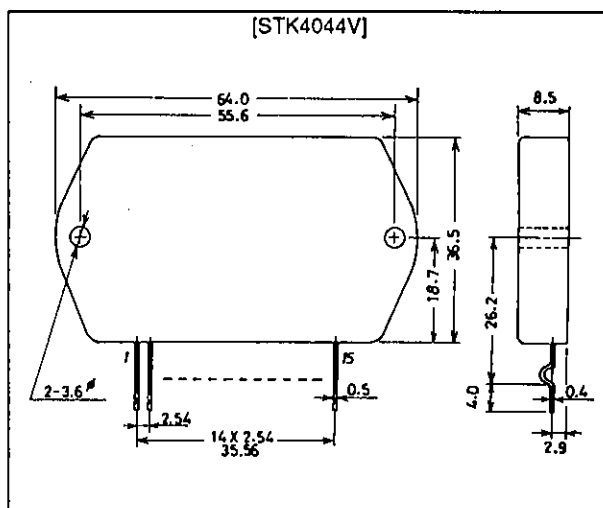
No. 4391A

**STK4044V****AF Power Amplifier (Split Power Supply)**  
**(100 W min, THD = 0.08 %)****Features**

- Compact packaging supports slimmer set designs
- Series designed from 20 up to 100 W (200 W) and pin-compatibility (120 to 200 W have 18 pins)
- Simpler heat sink design facilitates thermal design of slim stereo sets
- Current mirror circuit application reduces distortion to 0.08%
- Supports addition of electronic circuits for thermal shutdown and load-short protection circuit as well as pop noise muting which occurs when the power supply switch is turned on and off

**Package Dimensions**

unit : mm

**4075****Specifications****Maximum Ratings at Ta = 25°C**

|                                 |                      |                                                                                     | Unit |
|---------------------------------|----------------------|-------------------------------------------------------------------------------------|------|
| Maximum supply voltage          | $V_{CC \text{ max}}$ | $\pm 73$                                                                            | V    |
| Thermal resistance              | $\theta_{j-c}$       | 1.1                                                                                 | °C/W |
| Junction temperature            | $T_j$                | 150                                                                                 | °C   |
| Operating substrate temperature | $T_c$                | 125                                                                                 | °C   |
| Storage temperature             | $T_{stg}$            | -30 to +125                                                                         | °C   |
| Available time for load shorted | $t_s \leq 1$         | $V_{CC} = \pm 51 \text{ V}, R_L = 8 \Omega, f = 50 \text{ Hz}, P_O = 100 \text{ W}$ | s    |

**Recommended Operating Conditions at Ta = 25°C**

|                            |          |          | Unit     |
|----------------------------|----------|----------|----------|
| Recommended supply voltage | $V_{CC}$ | $\pm 51$ | V        |
| Load resistance            | $R_L$    | 8        | $\Omega$ |

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# Operating Characteristics

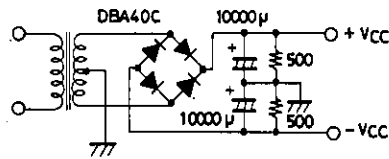
at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = \pm 51\text{V}$ ,  $R_L = 8\Omega$ ,  $V_G = 40\text{dB}$ ,  $R_g = 600\Omega$ , 100k LPF ON,  $R_L$  (noninductive)

|                           |               |                                                      | min | typ       | max  | Unit              |
|---------------------------|---------------|------------------------------------------------------|-----|-----------|------|-------------------|
| Quiescent current         | $I_{CCO}$     | $V_{CC} = \pm 61\text{V}$                            | 15  |           | 120  | mA                |
| Output power              | $P_O$         | THD = 0.08%, $f = 20\text{Hz}$ to $20\text{kHz}$     | 100 |           |      | W                 |
| Total harmonic distortion | THD           | $P_O = 1.0\text{W}$ , $f = 1\text{kHz}$              |     |           | 0.08 | %                 |
| Frequency response        | $f_L, f_H$    | $P_O = 1.0\text{W}$ , $+0_{-3}\text{dB}$             |     | 20 to 50k |      | Hz                |
| Input resistance          | $r_i$         | $P_O = 1.0\text{W}$ , $f = 1\text{kHz}$              |     | 55        |      | k $\Omega$        |
| Output noise voltage      | $V_{NO}^{*2}$ | $V_{CC} = \pm 61\text{V}$ , $R_g = 10\text{k}\Omega$ |     |           | 1.2  | mV <sub>rms</sub> |
| Neutral voltage           | $V_N$         | $V_{CC} = \pm 61\text{V}$                            | -70 | 0         | +70  | mV                |

• Use rated power supply for test unless otherwise specified.

\*1 When measuring available time for load shorted and output noise voltage, use transformer power supply indicated below.

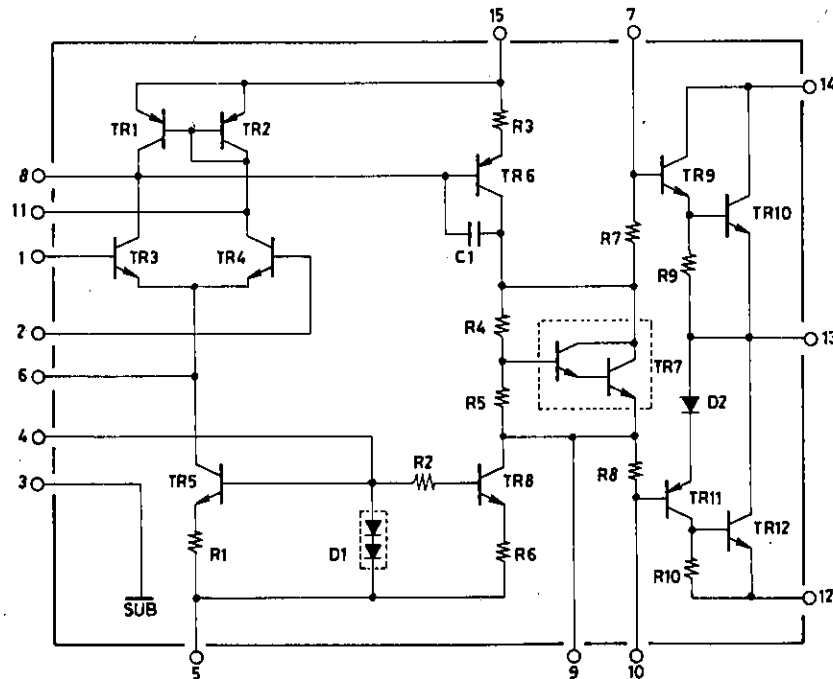
\*2 Output noise voltage represents the peak value on the rms scale (VTVM). The noise voltage waveform does not include the pulse noise.



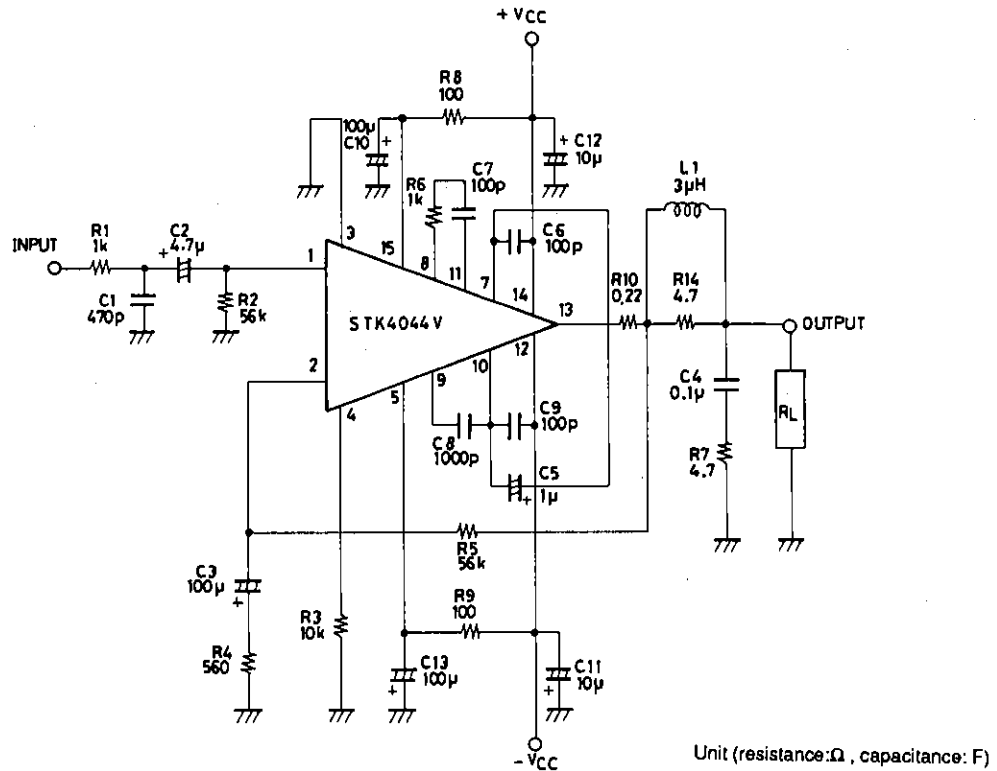
Specified Transformer Power Supply  
(MG-200 Equivalent)

Unit (resistance:  $\Omega$ , capacitance: F)

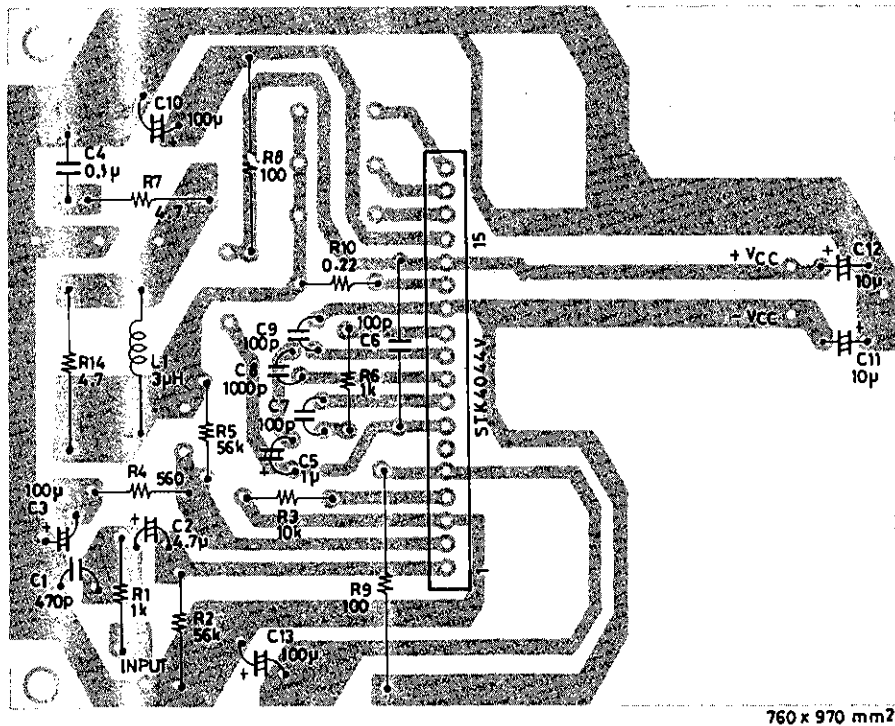
## Equivalent Circuit



Sample Application Circuit: 100W min Single-Channel AF Power Amplifier



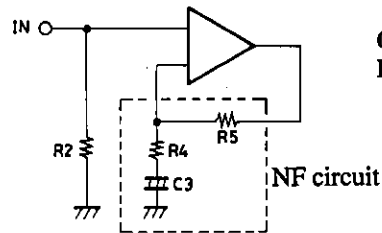
Sample Printed Circuit Pattern for Application Circuit (Copper-folied side)



Unit (resistance:Ω , capacitance: F)

## Description of External Parts

- $R_1, C_1$  : Input filter circuit  
 • Reduces high-frequency noise.
- $C_2$  : Input coupling capacitor  
 • DC current suppression. A reduction in reactance is effective because of increases in capacitor reactance at low frequencies and  $1/f$  noise dependence on signal source resistance which result in output noise worsening.
- $R_2$  : Input bias resistor  
 • Biases the input pin to zero.  
 • Affects  $V_N$  stability (refer to NF circuit).  
 • Due to differential input, input resistance is more or less determined by this resistance value.
- $R_4, R_5$  : NFB circuit (AC NF circuit). Use of resistor with 1% error is suggested.  
 $C_3 (R_2)$



- $C_3$  : AC NF capacitor  
 $R_4, R_5$  : Used for VG setting.

- VG settings are obtained using  $R_4$  and  $R_5$  according to the following equation:

$$\log 20 \cdot \frac{R_5}{R_4} \quad 40 \text{ dB is recommended.}$$

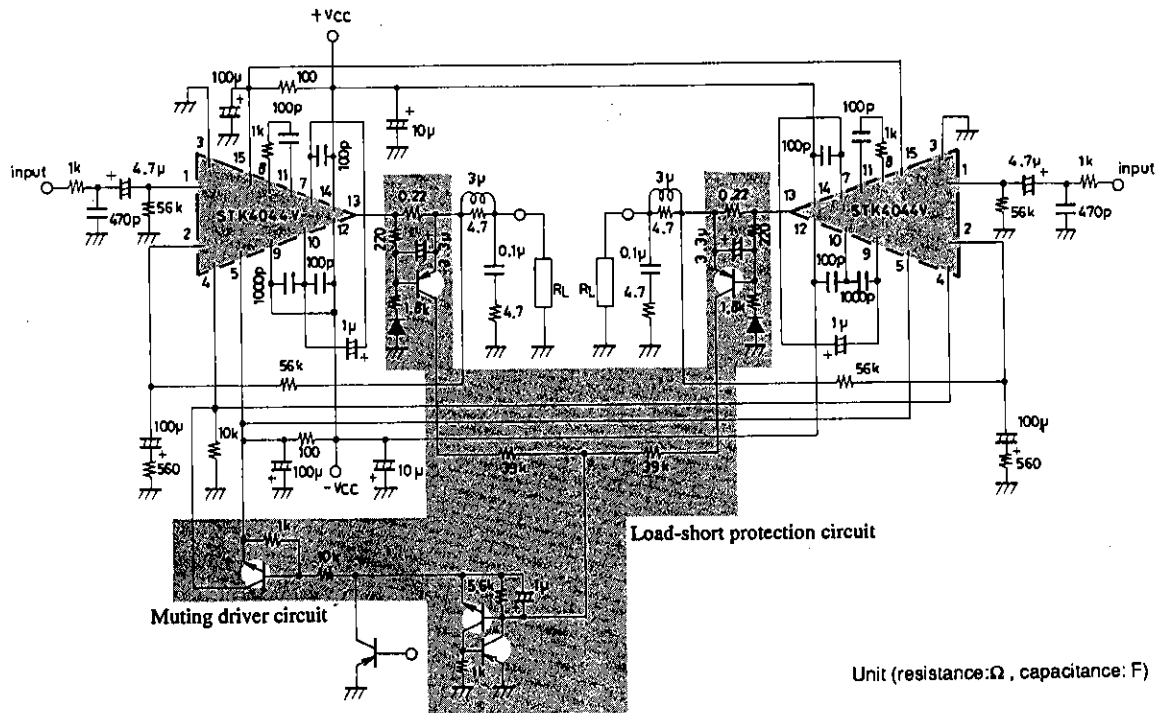
- Low-frequency cutoff frequency settings are obtained using  $R_4$  and  $C_3$  according to the following equation:

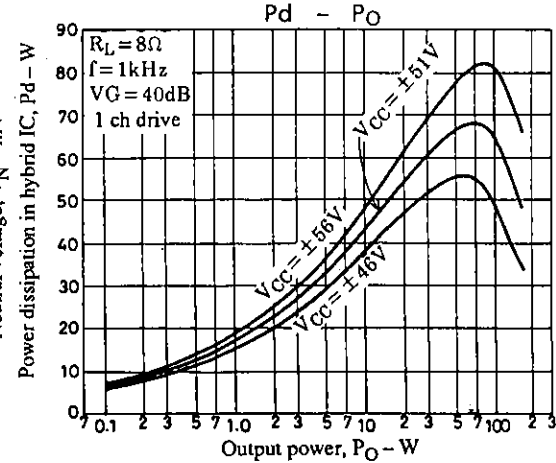
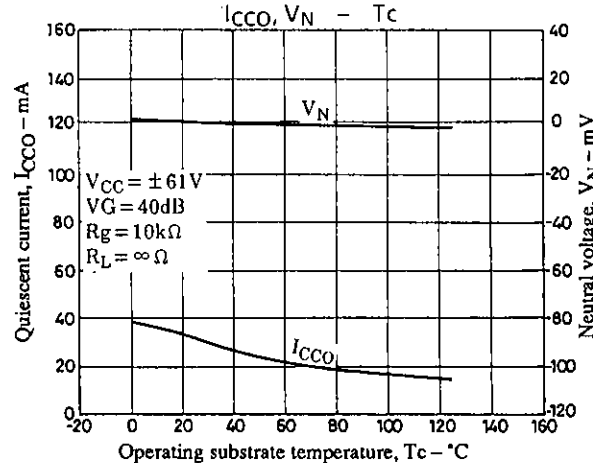
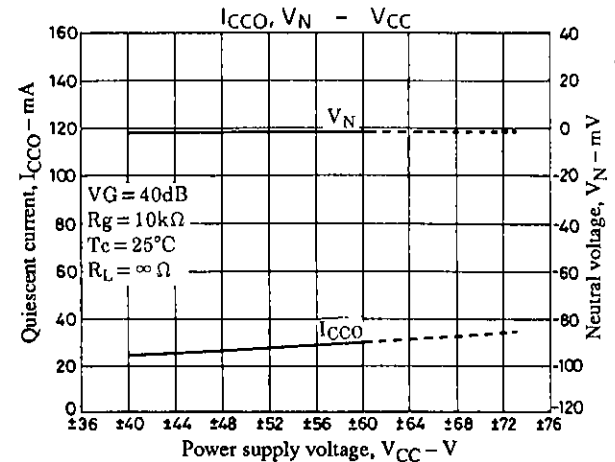
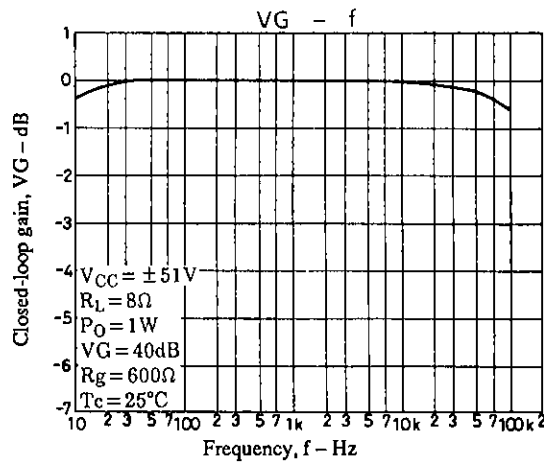
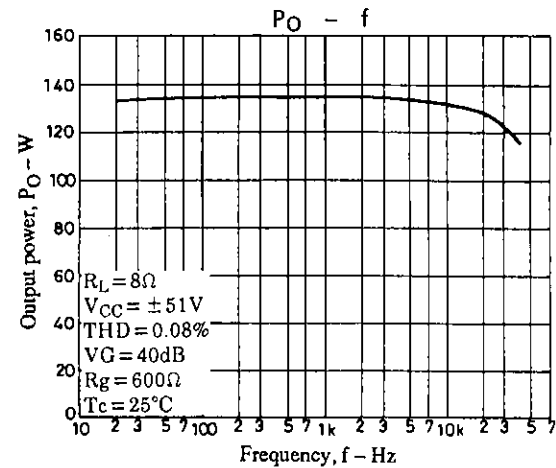
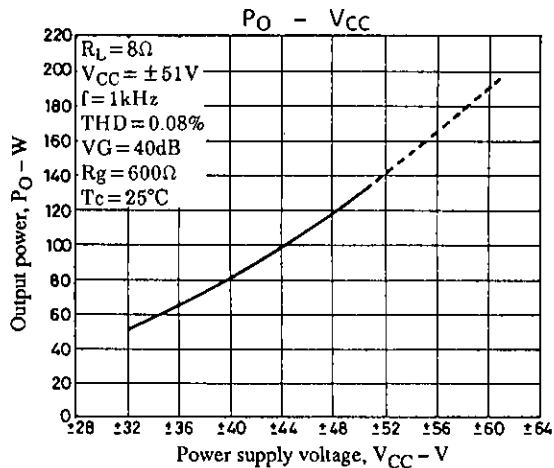
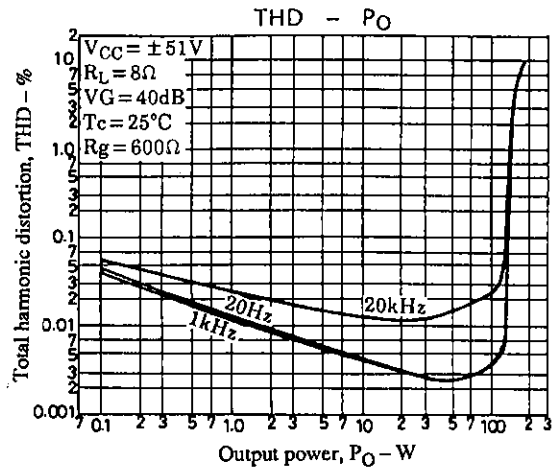
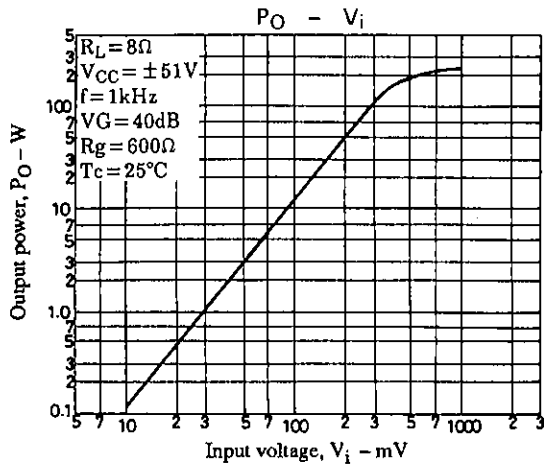
$$f_L = \frac{1}{2\pi \cdot R_4 \cdot C_3} \quad [\text{Hz}]$$

When changing the VG setting, you should change  $R_4$  which requires a recheck of the low cutoff frequency setting. When the VG setting is changed using  $R_5$ , the setting should ensure  $R_2$  equals  $R_5$  so that  $V_N$  balance stability is maintained. If the resistor value is increased more than the existing value,  $V_N$  balance may be disturbed and result in deterioration of  $V_N$  temperature characteristics.

- $R_3$  : Differential constant-current bias resistor
- $R_6, R_7$  : For oscillation suppression and phase compensation applications  
 (For use with differential stage applications)
- $R_7, C_4$  : For oscillation suppression and phase compensation applications  
 (A Mylar capacitor is recommended for  $C_4$  for use with output stage applications)
- $C_6, C_9$  : For oscillation suppression and phase compensation applications  
 Power stage (Must be connected near the pin)  $C_6$ : Positive (+) power  $C_9$ : Negative (–) power
- $C_8$  : For oscillation suppression and phase compensation applications  
 (Oscillation suppression before power step clip)
- $C_5$  : For oscillation suppression and distortion improvement applications
- $R_8, C_{10}$  : Ripple filter circuit on positive (+) side.
- $R_9, C_{13}$  : Ripple filter circuit on negative (–) side.
- $C_{11}, C_{12}$  : For oscillation suppression applications  
 • Used for reducing power supply impedance to stable IC operation and should be connected near the IC pin. We recommend that you use an electrolytic capacitor.
- $R_{10}$  : Output resistor  
 Increases load short handling capability during times of high output.
- $R_{14}, L_1$  : For oscillation suppression applications  
 Increases oscillation stability against capacitance loads.

Sample Application Circuit (Protection circuit and muting circuit)





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