

**SANYO**

No. 4391A

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

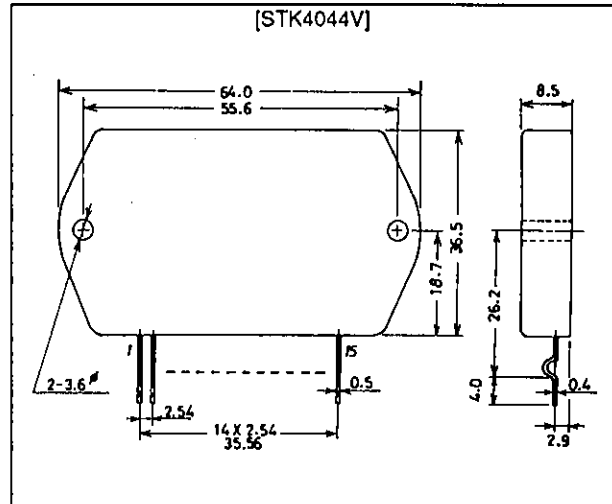
## Features

- 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 <sub>CC max</sub>	±73	V
Thermal resistance	θ <sub>j-c</sub>	1.1	°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 shorted	t <sub>s</sub> *1	V <sub>CC</sub> =±51V, R <sub>L</sub> =8Ω, f=50Hz, P <sub>O</sub> =100W	1
			s

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

			Unit
Recommended supply voltage	V <sub>CC</sub>	±51	V
Load resistance	R <sub>L</sub>	8	Ω

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**Operating Characteristics**

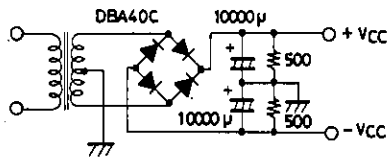
at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = \pm 51\text{V}$ ,  $R_L = 8\Omega$ ,  $V_G = 40\text{dB}$ ,  $R_g = 600\Omega$ , 100k LPF ON,  $R_L$  (noninductive)

			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.

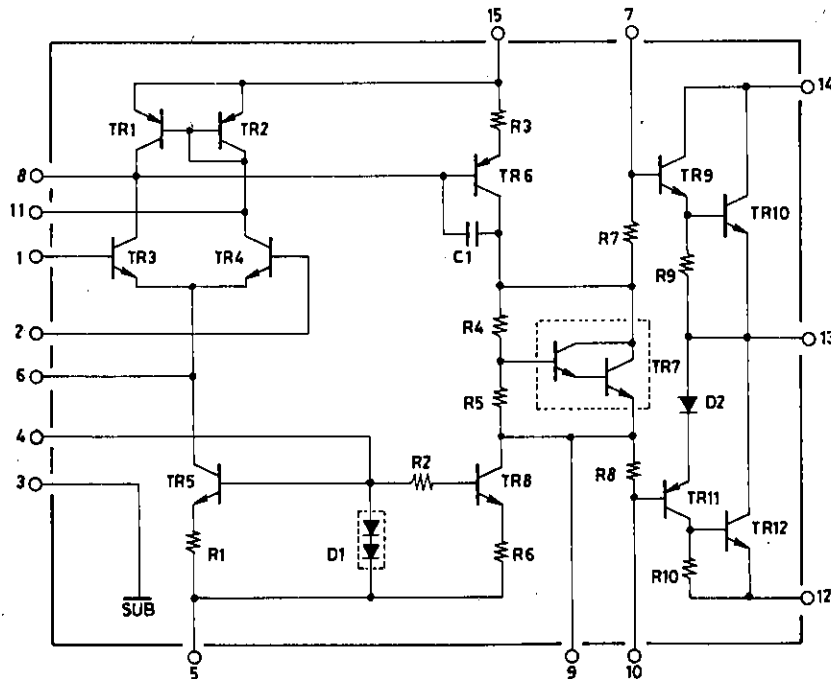
\*2 Output noise voltage represents the peak value on the rms scale (VTVM). The noise voltage waveform does not include the pulse noise.



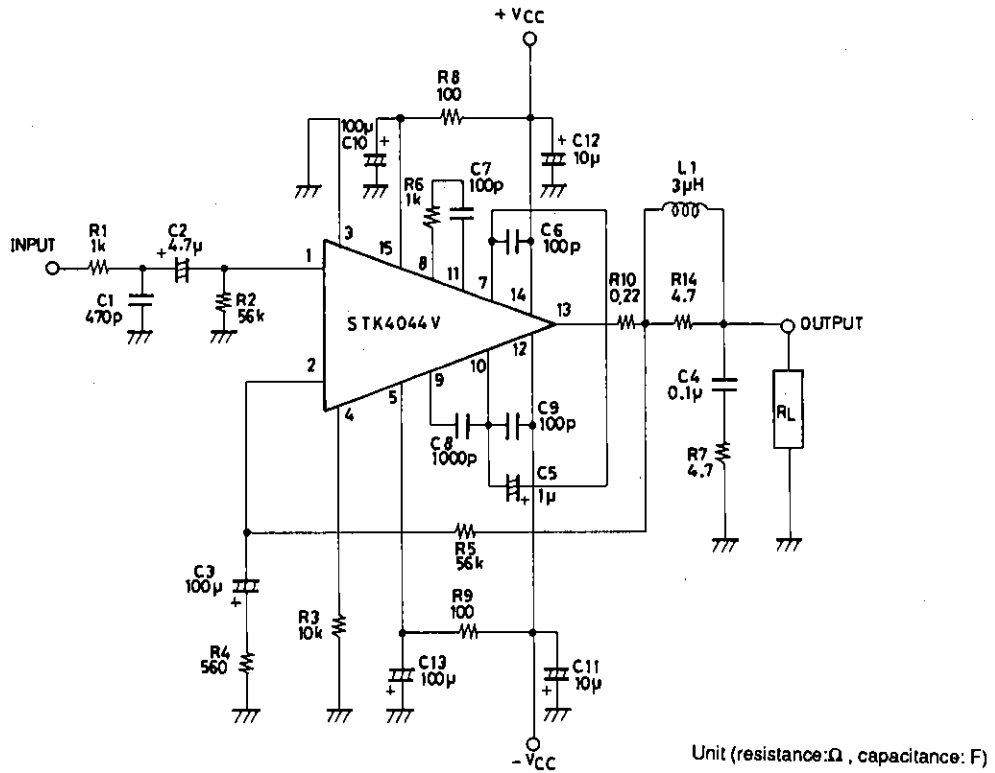
**Specified Transformer Power Supply**  
(MG-200 Equivalent)

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

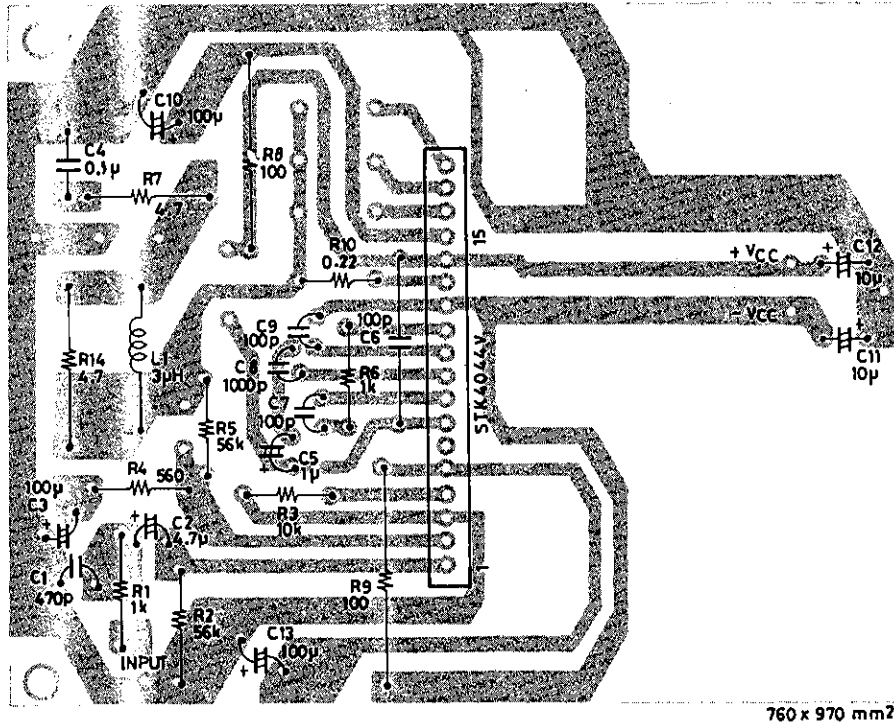
**Equivalent Circuit**



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



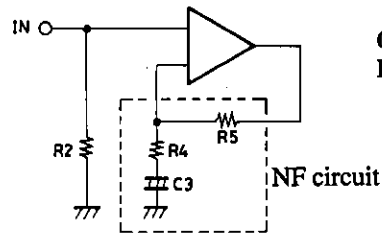
Sample Printed Circuit Pattern for Application Circuit (Copper-folled side)



Unit (resistance:Ω , capacitance: F)

**Description of External Parts**

- R<sub>1</sub>, C<sub>1</sub> : Input filter circuit
  - Reduces high-frequency noise.
- C<sub>2</sub> : 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<sub>2</sub> : Input bias resistor
  - Biases the input pin to zero.
  - Affects V<sub>N</sub> stability (refer to NF circuit).
  - Due to differential input, input resistance is more or less determined by this resistance value.
- R<sub>4</sub>, R<sub>5</sub> : NFB circuit (AC NF circuit). Use of resistor with 1% error is suggested.
- C<sub>3</sub> (R<sub>2</sub>)



- C<sub>3</sub> : AC NF capacitor
- R<sub>4</sub>, R<sub>5</sub> : Used for VG setting.

- VG settings are obtained using R<sub>4</sub> and R<sub>5</sub> according to the following equation:

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

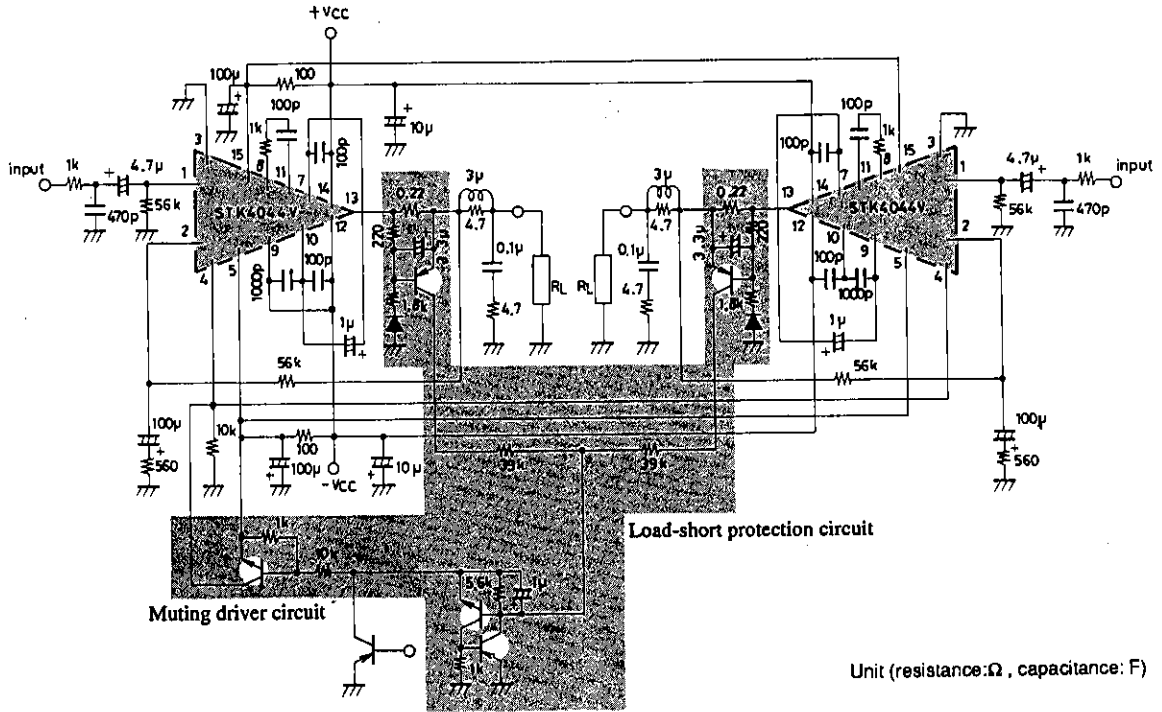
- Low-frequency cutoff frequency settings are obtained using R<sub>4</sub> and C<sub>3</sub> according to the following equation:

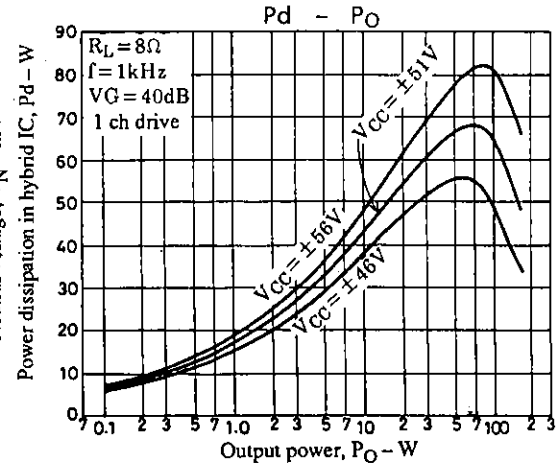
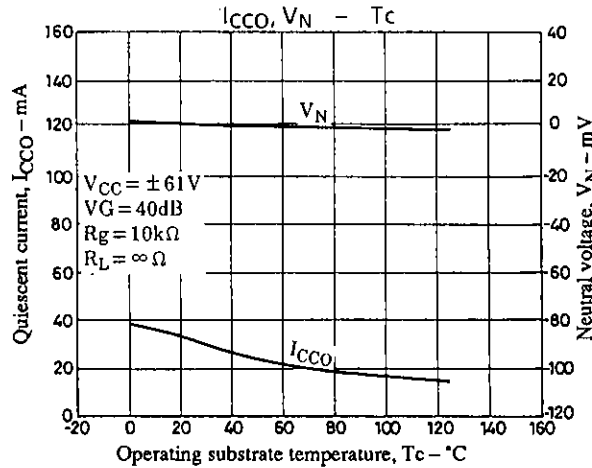
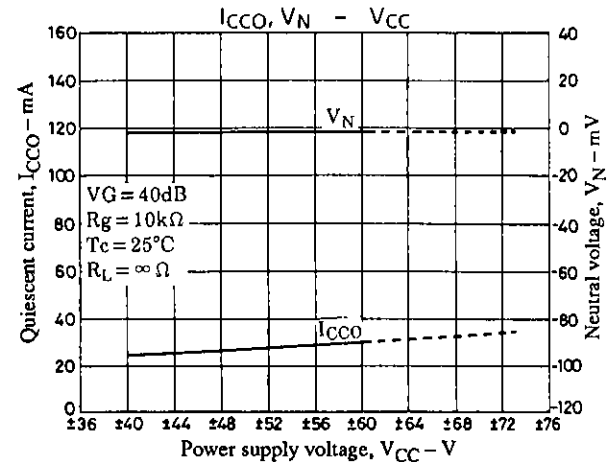
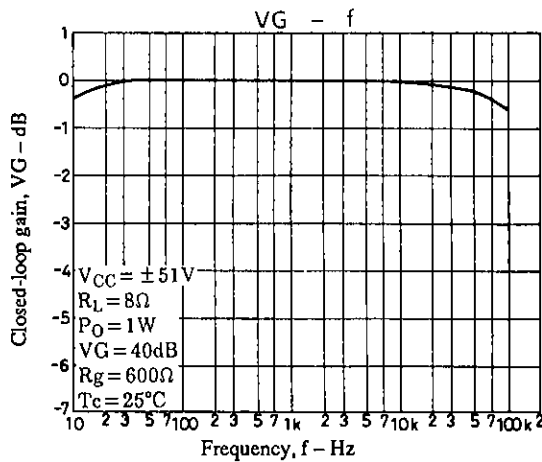
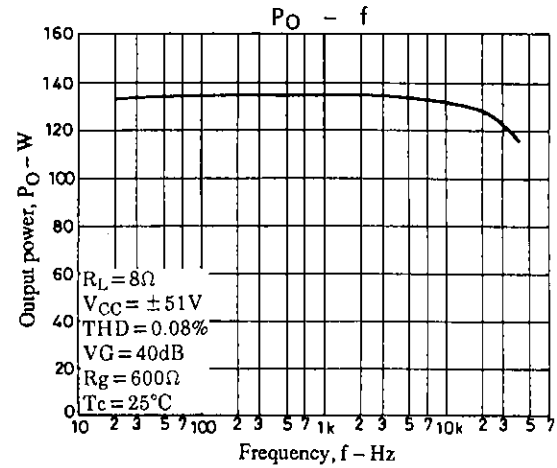
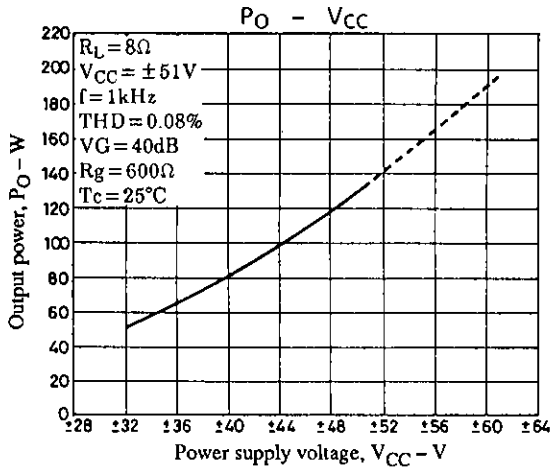
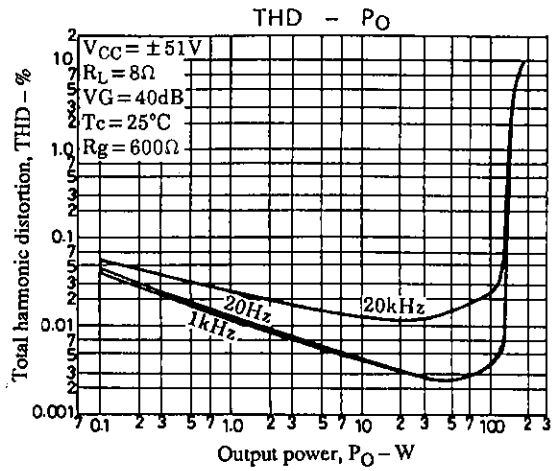
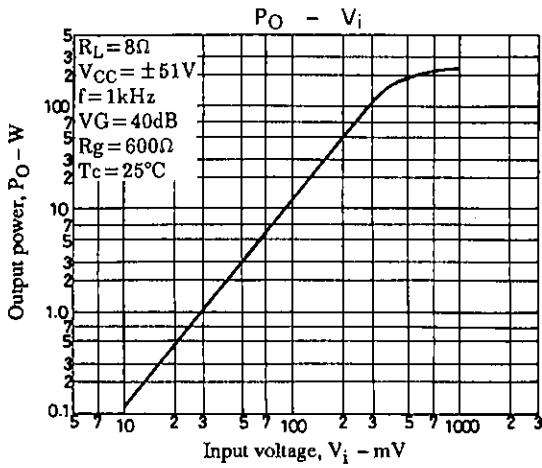
$$f_L = \frac{1}{2\pi \cdot R_4 \cdot C_3} \quad [\text{Hz}]$$

When changing the VG setting, you should change R<sub>4</sub> which requires a recheck of the low cutoff frequency setting. When the VG setting is changed using R<sub>5</sub>, the setting should ensure R<sub>2</sub> equals R<sub>5</sub> so that V<sub>N</sub> balance stability is maintained. If the resistor value is increased more than the existing value, V<sub>N</sub> balance may be disturbed and result in deterioration of V<sub>N</sub> temperature characteristics.

- R<sub>3</sub> : Differential constant-current bias resistor
- R<sub>6</sub>, R<sub>7</sub> : For oscillation suppression and phase compensation applications (For use with differential stage applications)
- R<sub>7</sub>, C<sub>4</sub> : For oscillation suppression and phase compensation applications (A Mylar capacitor is recommended for C<sub>4</sub> for use with output stage applications)
- C<sub>6</sub>, C<sub>9</sub> : For oscillation suppression and phase compensation applications  
Power stage (Must be connected near the pin)    C<sub>6</sub>: Positive (+) power    C<sub>9</sub>: Negative (-) power
- C<sub>8</sub> : For oscillation suppression and phase compensation applications (Oscillation suppression before power step clip)
- C<sub>5</sub> : For oscillation suppression and distortion improvement applications
- R<sub>8</sub>, C<sub>10</sub> : Ripple filter circuit on positive (+) side.
- R<sub>9</sub>, C<sub>13</sub> : Ripple filter circuit on negative (-) side.
- C<sub>11</sub>, C<sub>12</sub> : 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<sub>10</sub> : Output resistor  
Increases load short handling capability during times of high output.
- R<sub>14</sub>, L<sub>1</sub> : For oscillation suppression applications  
Increases oscillation stability against capacitance loads.

Sample Application Circuit (Protection circuit and muting circuit)





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