

STK4030V

AF Power Amplifier (Split Power Supply) (35 W min, THD = 0.08%)

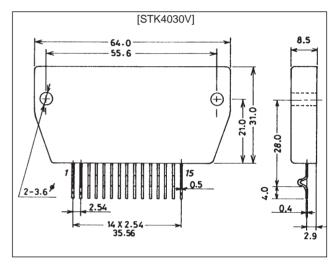
Features

- Compact packaging supports slimmer set designs (up to 70 W)
- Series designed for 20 up to 100 W (200 W) and pincompatibility (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

4062



Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max		±45	V
Thermal resistance	θј-с		2.1	°C/W
Junction temperature	Tj		150	°C
Operating substrate temperature	Tc		125	°C
Storage temperature	Tstg		-30 to +125	°C
Available time for load shorted	t _S *	$V_{CC} = \pm 30 \text{ V}, R_L = 8 \Omega, f = 50 \text{ Hz}, P_O = 35 \text{ W}$	2	S

Note: Use a constant-voltage power supply as the test power supply unless otherwise specified.

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

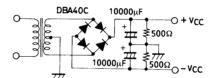
Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V _{cc}		±30	V
Load resistance	R _L		8	Ω

^{*} Use the transformer power supply shown on the next page when measuring the available time for load shorted and the output noise voltage.

Operating Characteristics at Ta = 25°C, V_{CC} = ± 30 V, R_L = 8 Ω , VG = 40 dB, Rg = 600 Ω , 100 k LPF on, R_L (non-inductive)

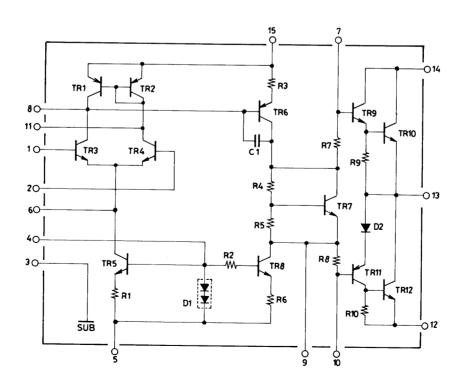
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max] UIIII
Quiescent current	I _{cco}	V _{CC} = ±36 V	15		120	mA
Output power	P ₀ (1)	THD = 0.08%, f = 20 Hz to 20 kHz	35			w
	P ₀ (2)	V_{CC} = ±27 V, THD = 0.2%, R_L = 4 Ω , f = 1 kHz	40			•
Total harmonic distortion	THD	P _O = 1.0 W, f = 1 kHz			0.08	%
Frequency response	f _L , f _H	$P_0 = 1.0 \text{ W}, \frac{+0}{-3} \text{ dB}$		20 to 50 k		Hz
Input resistance	ri	P _O = 1.0 W, f = 1 kHz		55		kΩ
Output noise voltage	V _{NO} *	$V_{CC} = \pm 36 \text{ V}, \text{ Rg} = 10 \text{ k}\Omega$		1.2	mVrms	
Neutral voltage	V _N	V _{CC} = ±36 V	-70	0	+70	mV

Equivalent Circuit

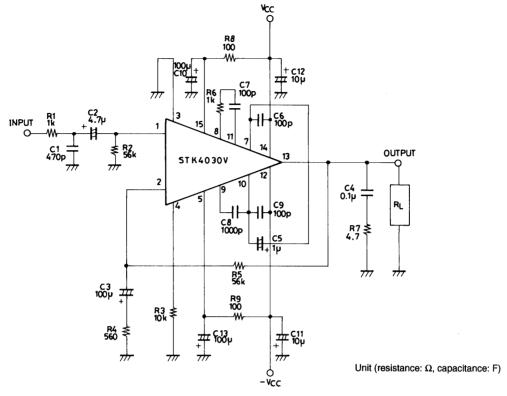


Specified Transformer Power Supply (RP-25 Equivalent)

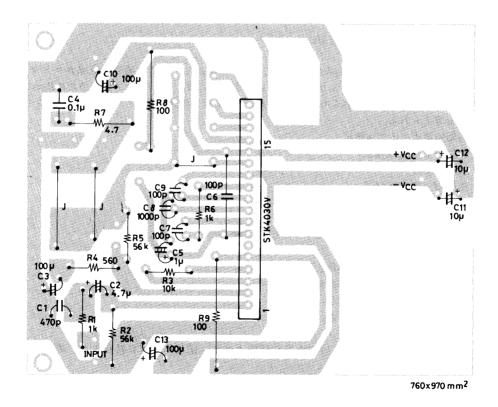
Equivalent Circuit



Application Circuit: 35W min Single Channel AF Power Amplifier



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



Unit (resistance: Ω , capacitance: F)

Description of External Parts

 R_1, C_1 : Input filter circuit

• Reduces high-frequency noise.

C₂ : 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.

R₂ : Input bias resistor

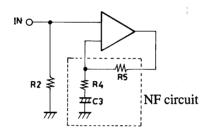
• Biases the input pin to zero.

 \bullet Effects $V_{\rm N}$ stability (refer to NF circuit).

• Due to differential input, input resistance is more or less determined by this resistance value.

R₄, R₅ : NFB circuit (AC NF circuit). Use of resistor with 1% error is suggested.

 $C_3(R_2)$



C₃ : AC NF capacitor R₄, R₅ : Used for VG setting.

• VG settings are obtained using R₄ and R₅ according to the following equation:

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

• Low-frequency cutoff frequency settings are obtained using R₄ and C₃ according to the following equation:

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

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.

R₃: 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

C₈ : For oscillation suppression and phase compensation applications

(Oscillation suppression before power step clip)

C₅: For oscillation suppression and distortion improvement applications

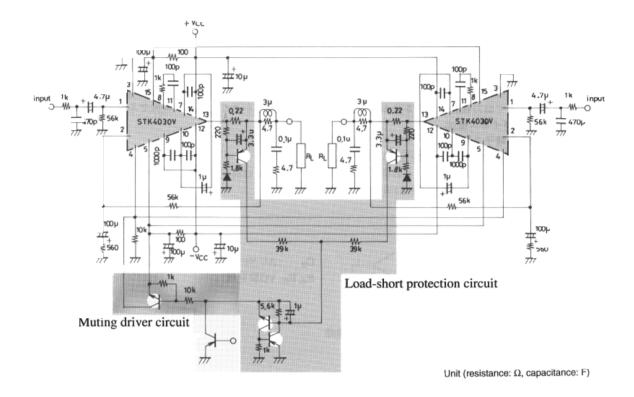
 R_8, C_{10} : Ripple filter circuit on positive (+) side.

 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.

Sample Application Circuit (Protection circuit and muting circuit)



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