Ordering number:ENN4609A

Thick Film Hybrid IC

STK4201 Ⅱ

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

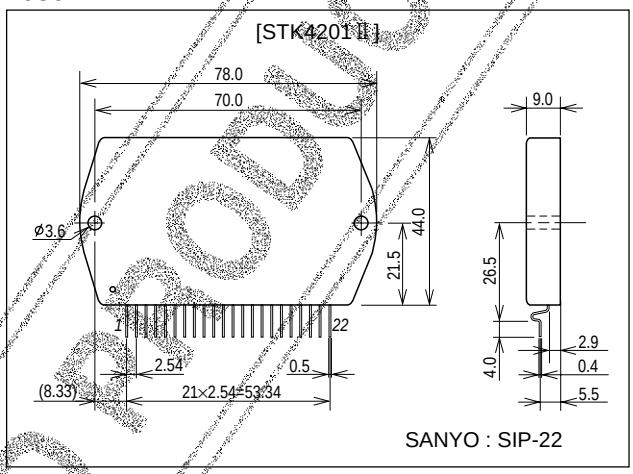
Features

- 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



Specifications

Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		±55	V
Thermal resistance	θj-c		1.5	˚C/W
Junction temperature	Tj		150	˚C
Operating substrate temperature	Tc		125	˚C
Storage temperature	Tstg		–30 to +125	˚C
Available time for load short-circuit	t_S	V_{CC}=±38V, R_L=8Ω, f=50Hz, P_O=60W	1	s

Recommended Operating Conditions at Ta = 25˚C

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

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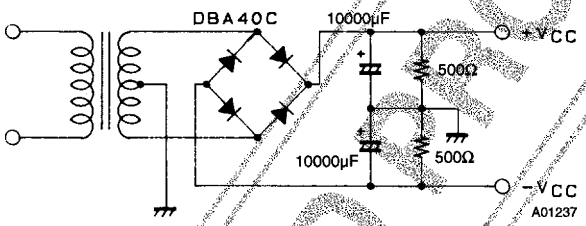
Operating Characteristics at Ta = 25˚C, V_{CC}=±38V, R_L=8Ω (noninductive load), Rg=600Ω, VG=40dB

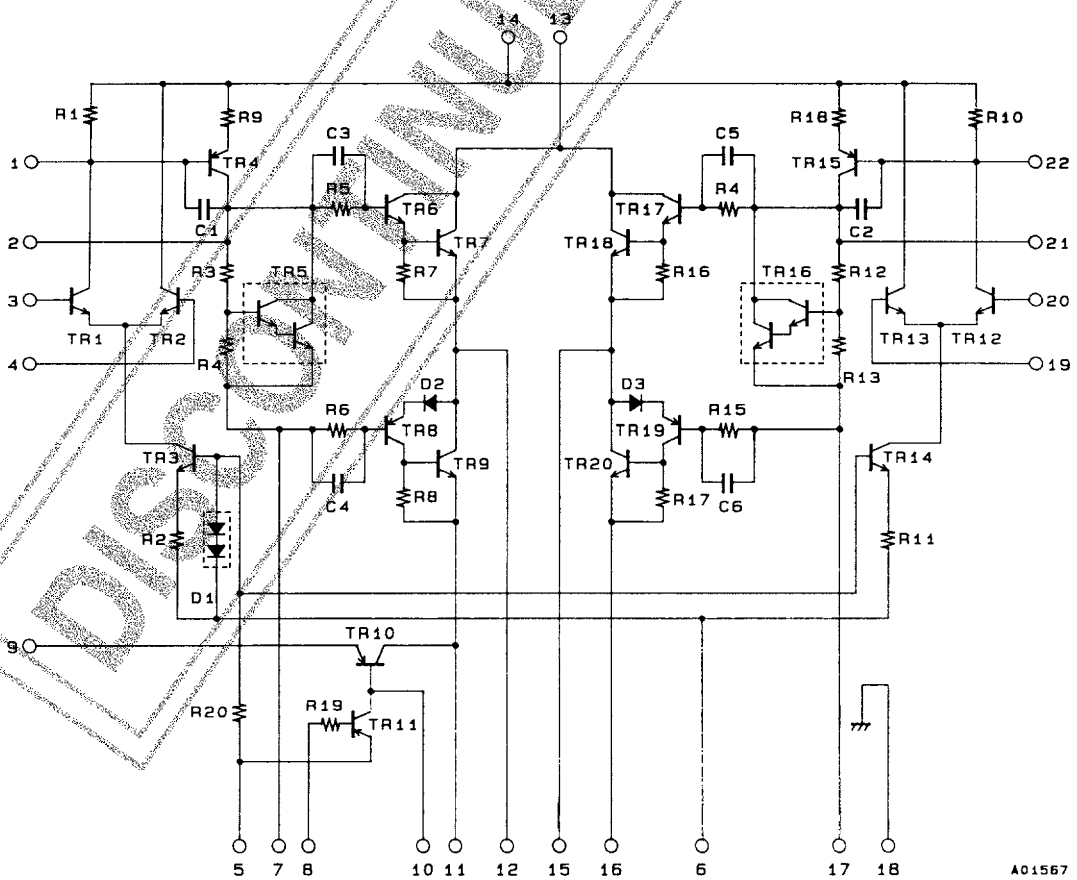
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	I_{CCO}	V_{CC}=±46V	20	40	100	mA
Output power	P_O	THD=0.4%, f=20Hz to 20kHz	60			W
Total harmonic distortion	THD	P_O=1.0W, f=1kHz			0.3	%
Frequency response	f_L, f_H	P_O=1.0W, $^{+0}_{-3}$ dB		20 to 50k		Hz
Input impedance	r_i	P_O=1.0W, f=1kHz		55		kΩ
Output noise voltage	V_{NO}	V_{CC}=±46V, Rg=10kΩ			1.2	mVrms
Neutral voltage	V_N	V_{CC}=±46V	–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.

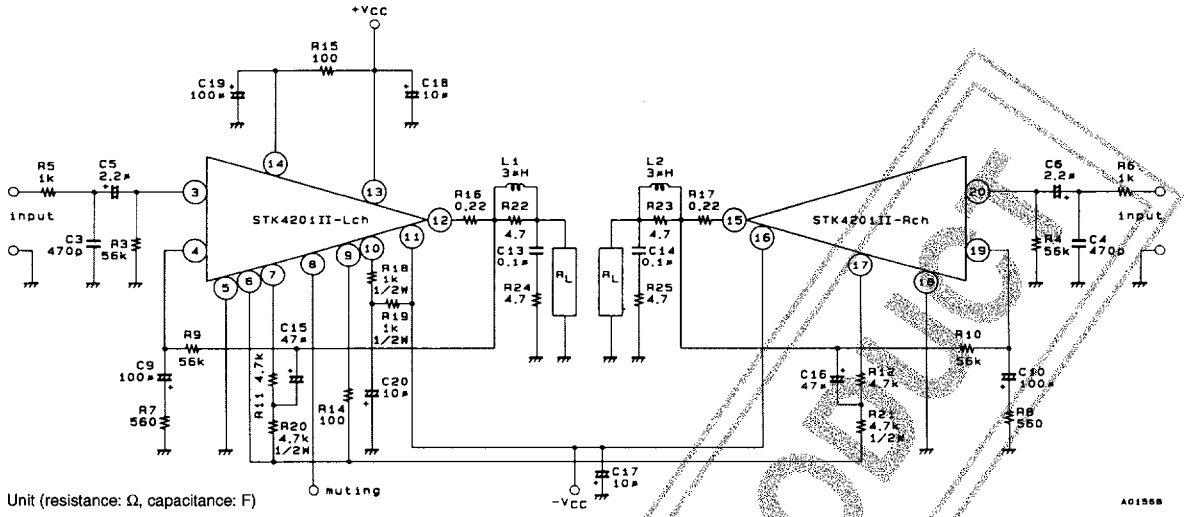
Specified Transformer Supply (MG-200 or Equivalent)



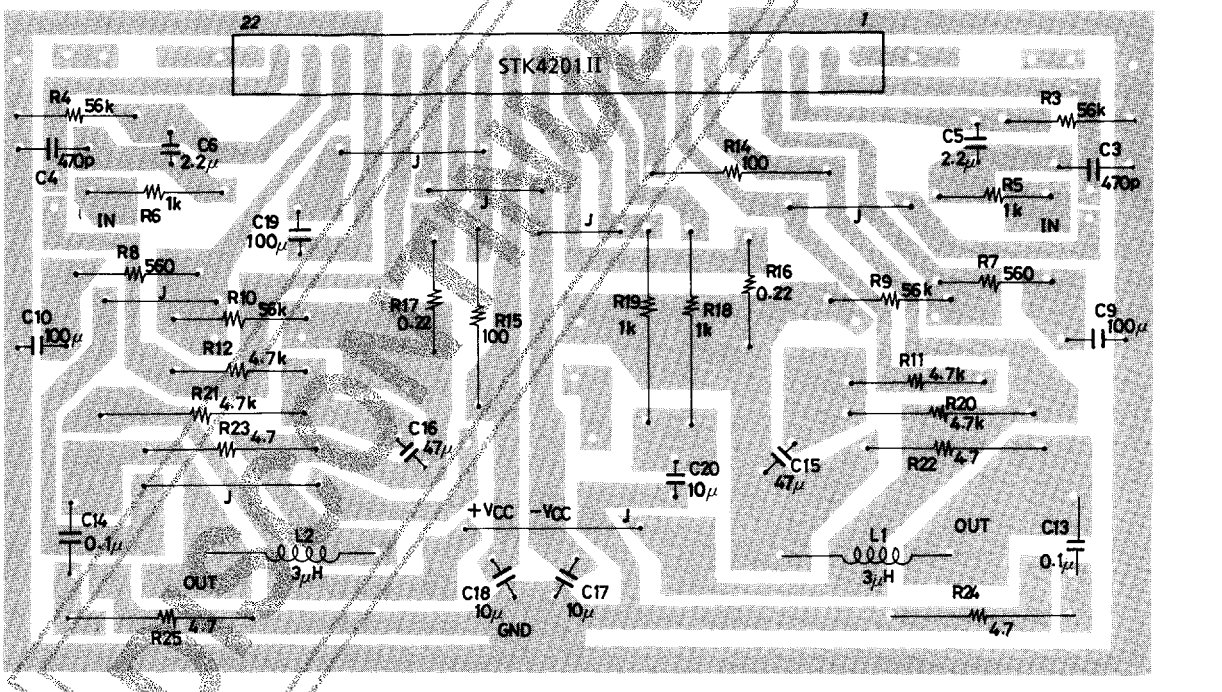
Equivalent Circuit



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



Sample Application Circuit PCB Layout (Copper Foil Surface)

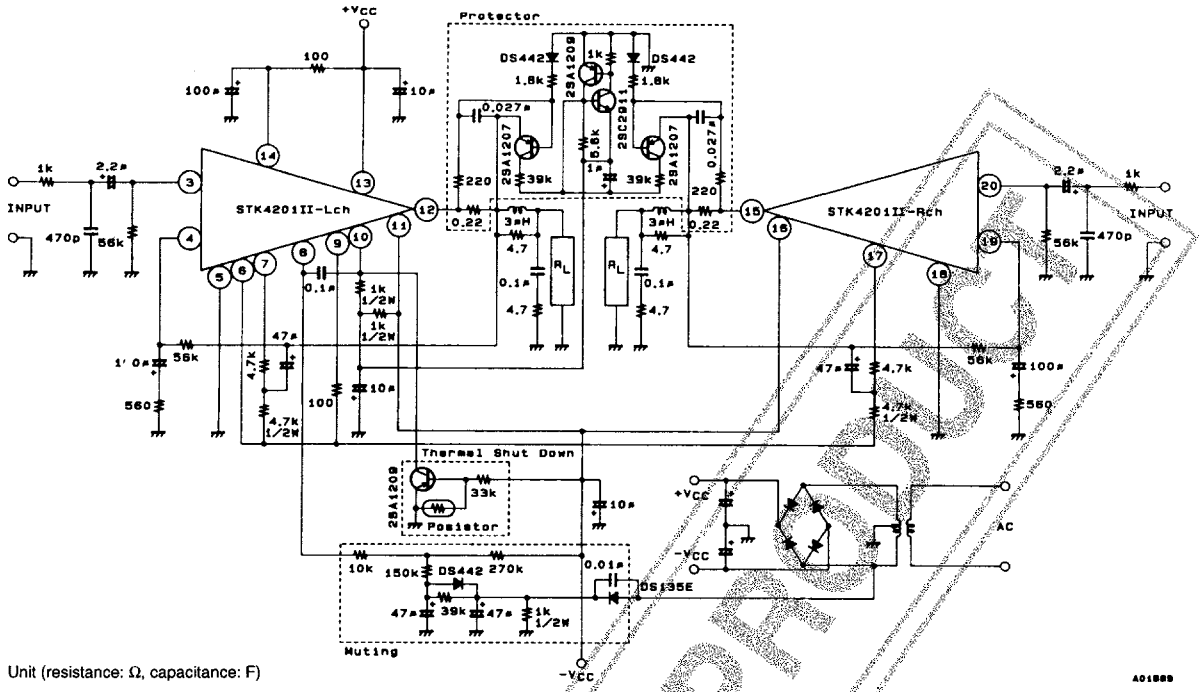


Unit (resistance: Ω; capacitance: F)

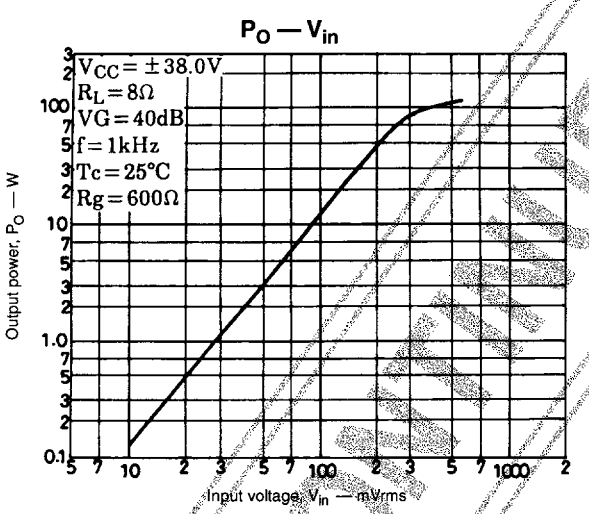
External Component Description

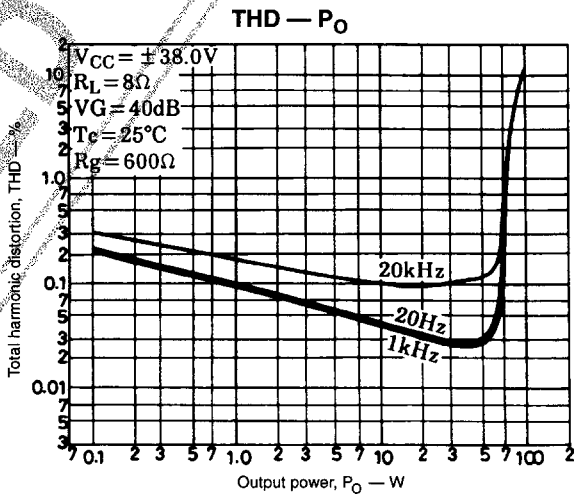
C3, C4	Input filter capacitors. These, together with R5 and R6, form filters to reduce high-band noise.
C5, C6	Input coupling capacitors. For DC blocking. Since capacitor reactance becomes larger at lower frequencies, the output noise can be adversely affected by signal source resistance-dependent 1/f noise. In this case, a lower rectance 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 determin the input time constant, and smaller values for C9 and C10 in the NF circuit.
C9, C10	NF capacitors. These determine the low-side cutoff frequency. $f_L = \frac{1}{2\pi \times C9 \times R7}$ [Hz] 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. 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. Electolytic capacitors are recommended.
C20	Ripple filter capacitor. This forms a ripple filter in combinatin 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 aero 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=560Ω, and R9, R10=56kΩ. Gain adjustments are best made using R7 and R8. If gain adjustments are made using R7 and 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 4.7kΩ and 4.7kΩ are recommended.
R15	Ripple filter tesistor. 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 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.

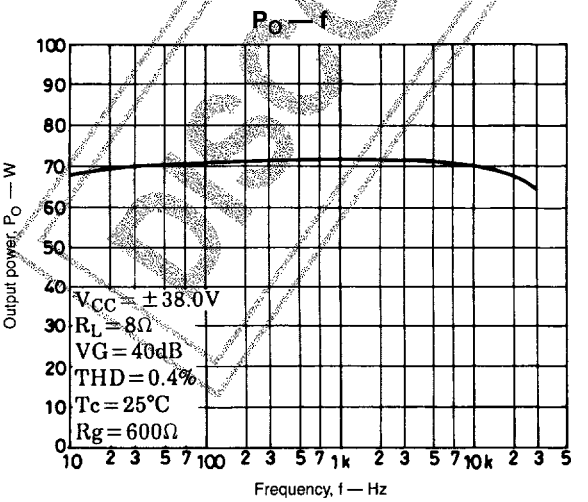
Sample Application Circuit (With Protection and Muting Circuit)

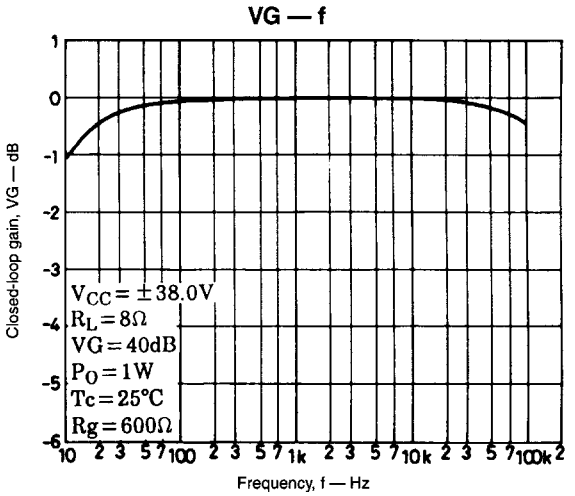


Unit (resistance: Ω, capacitance: F)

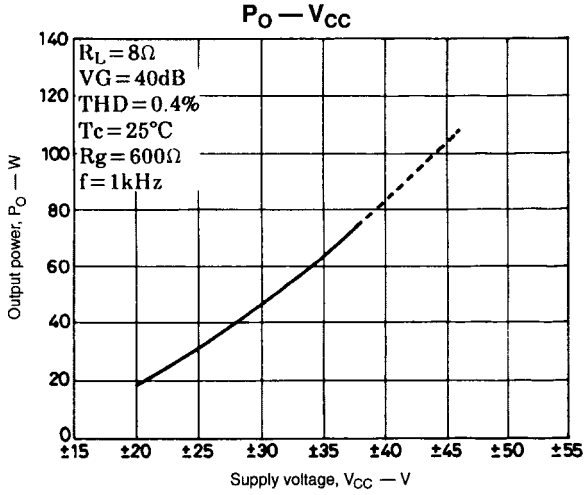




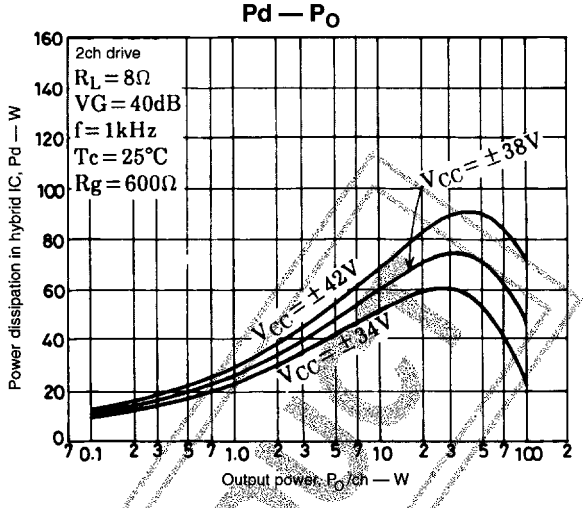




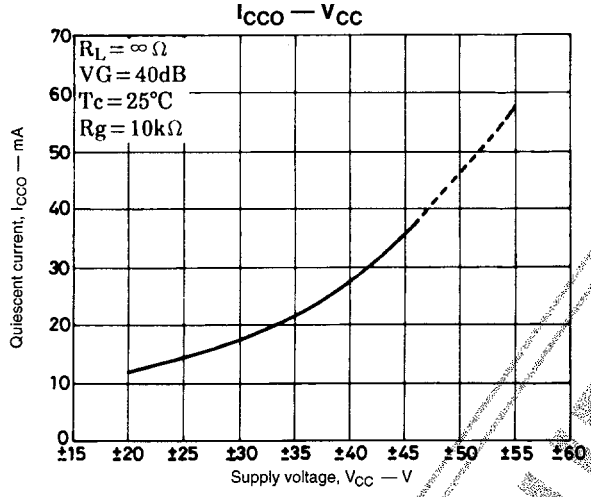
$P_O - V_{CC}$



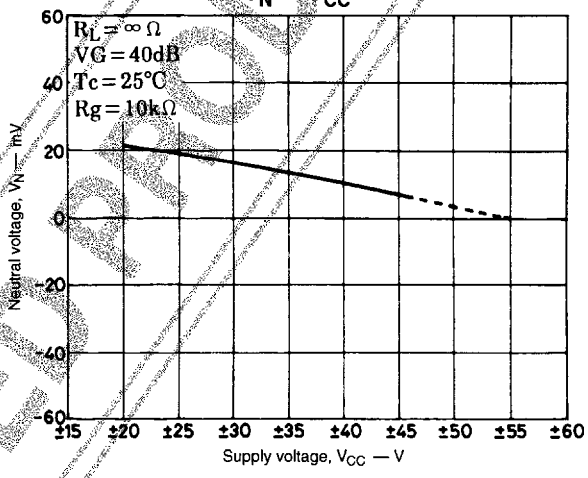
$Pd - P_O$



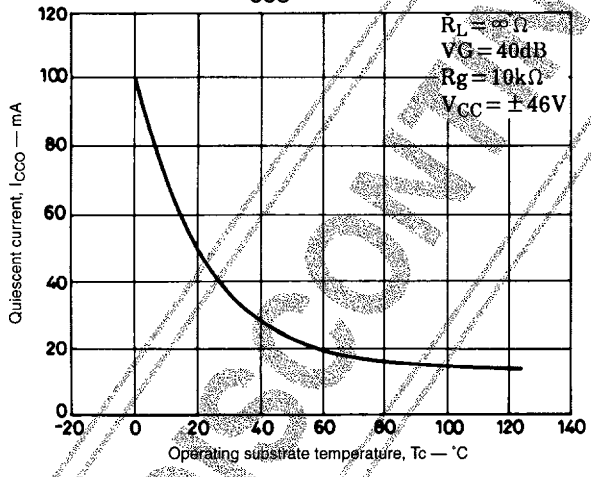
$I_{CCO} - V_{CC}$



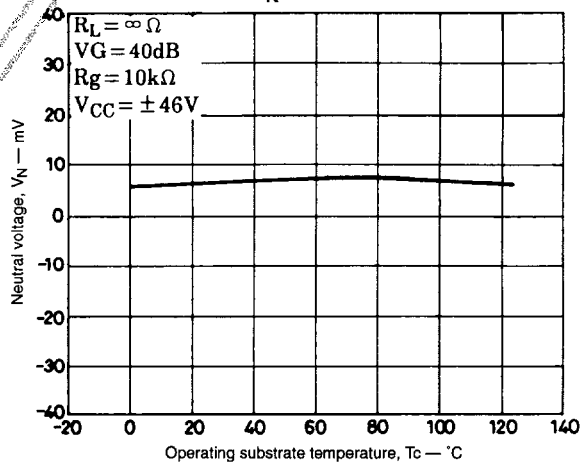
$V_N - V_{CC}$



$I_{CCO} - Tc$



$V_N - Tc$



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