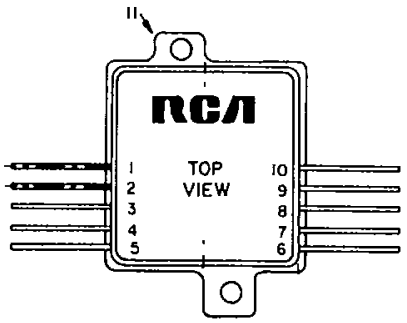
Multi-Purpose 7-Ampere Operational Amplifier

Linear Amplifiers for Applications in Industrial and Commercial Equipment

Features:

- *Bandwidth: 30 kHz at 60 W*
- *High power output: up to 100 W(rms)*
- *Built-in load-line-limiting circuit*
- *Reactive-load fault protection*
- *Provision for feedback control*

TERMINAL DESIGNATIONS



92CS-40377

The RCA-HC2000H is a complete solid-state hybrid operational amplifier in a metal hermetic package. The HC2000H is intended for military and critical industrial applications and can be supplied in accordance with applicable portions of MIL-STD.883.

The amplifier employs a quasi-complementary-symmetry class B output circuit with built-in load-fault protection.

Type HC2000H is recommended for the following applications: servo-amplifiers (ac, dc, PWM): deflection amplifiers; power operational amplifiers; audio amplifiers; voltage regulators; and driven inverters.

Additional information on hybrid power amplifiers is contained in RCA Application Notes AN-4483 and AN-4782. Single copies of these publications are available upon request from RCA Solid State Division, Box 3200, Somerville, N.J. 08876.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

V_S:
Between leads 1 and 10 ..... 75 V
I_{OM} ..... 7 A
P_T:
Per Output Device ..... See Fig. 4 & 5
T_{stg} ..... -55 to +125°C
T_J ..... -55 to +150°C
T_L (During Soldering):
At distances ≥ 1/8 in. (3.17 mm) from case for 10 s max. ..... 235°C
ϕL (Min):
At distance ≥ 0.075 (1.91 mm) from case ..... 0.04 in. (1.02 mm)

ELECTRICAL CHARACTERISTICS, *At Case Temperature (T_C) = 25°C*

CHARACTERISTIC	TEST CONDITIONS				LIMITS			UNITS
	V_S –V	f –kHz	P_O –W	R_L –Ω	MIN.	TYP.	MAX.	
$\frac{V_{OUT}}{V_{IN}}$ Open-Loop	±37.5	4	25	4	–	2000	–	
Closed-Loop (See Fig. 3)	±37.5	1	1	4	26	30	–	
Z_{IN} Measured between leads 7 & 8 (See Fig. 3)	–	–	–	–	16	18	–	kΩ
I_O	±37.5	–	–	–	15	–	30	mA
V_{IO} Measured between leads 4 & 5 (See Fig. 3)	±37.5	–	–	4	0	±30	±250	mV
V_{OUT}	±37.5	1	100	4	28	32	–	V
f_H (See Figs. 3 & 8)	±37.5	–	1	4	43	–	–	kHz
THD (See Figs. 3 & 9)	±37.5	1	60	4	–	0.4	0.5	%
I_S (See Fig. 11)	±37.5	1	–	0	±2	–	±3.85	A
S/N Z_G = 600 Ω	±37.5	–	–	–	–	78	–	dB
SR (Unity gain, I_{OM} = 4A)	±37.5	1	100	4	5	–	–	V/μs
$R_{\theta JC}$ Per Output Device (See Figs. 4 & 5)	–	–	–	–	–	–	2	°C/W

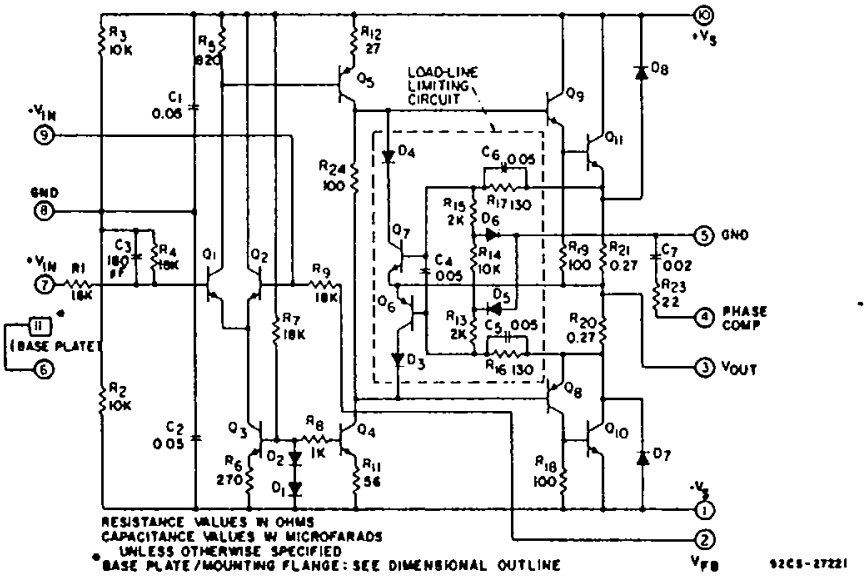


Fig. 1 – Schematic diagram of type HC2000H power hybrid circuit operational amplifier.

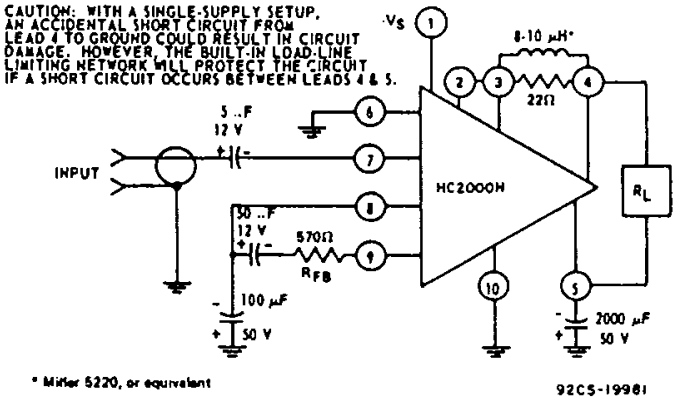


Fig. 2 – Type HC2000H power hybrid circuit with external connections for operation with a single power supply.

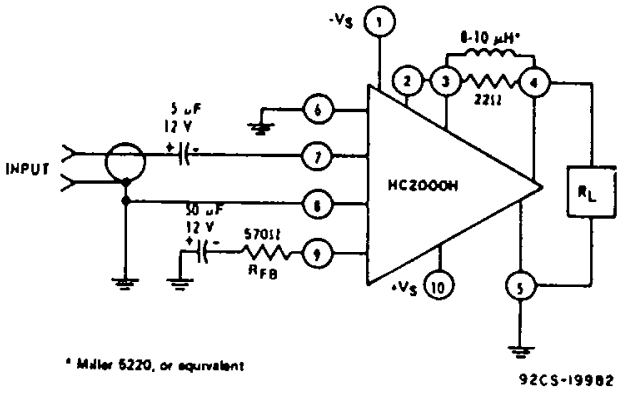


Fig. 3 – Type HC2000H power hybrid circuit with external connections (and split power supply) for measuring relative response and distortion; see Figs. 8 & 9.

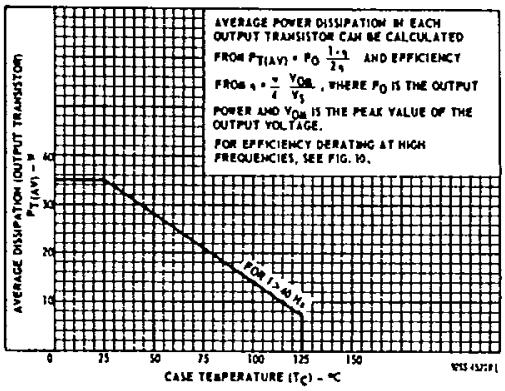


Fig. 4 – Dissipation (average) derating curve for each output transistor (for symmetrical waveforms with f > 40 Hz).

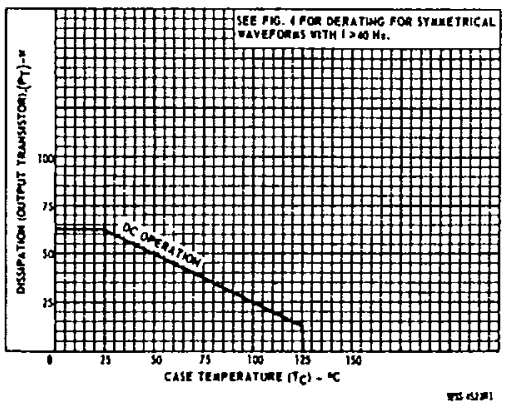


Fig. 5 – Dissipation (dc) derating curve for each output transistor.

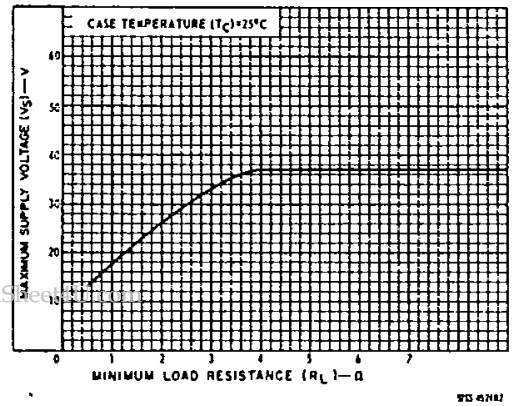


Fig. 6 – Maximum allowable supply voltage vs. load resistance.

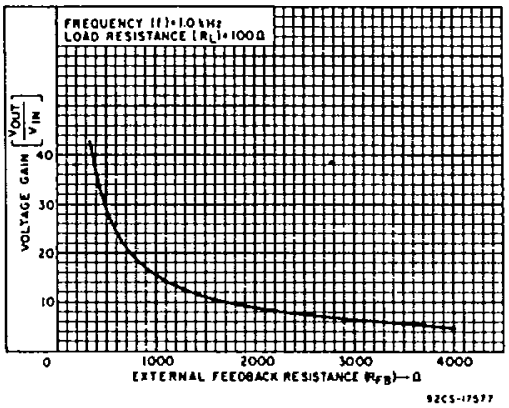


Fig. 7 – Closed-loop voltage gain vs. external feedback resistance.

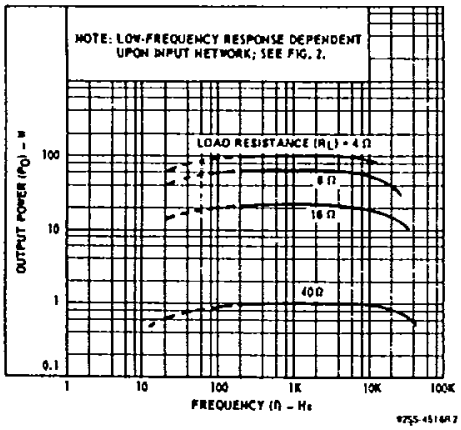


Fig. 8 – Output power vs. frequency.

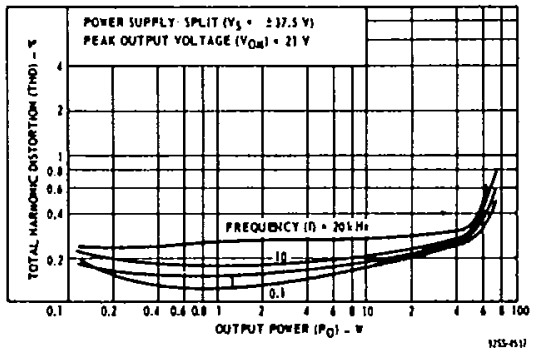


Fig. 9 – Total harmonic distortion with split power supply.

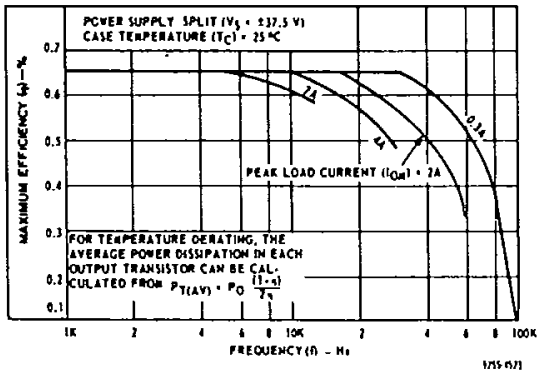


Fig. 10 – Maximum efficiency vs. frequency for several values of peak load current.

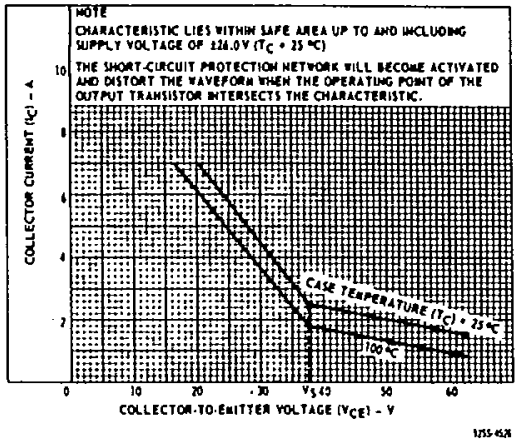


Fig. 11 – Characteristics of built-in load-line-limiting circuit.

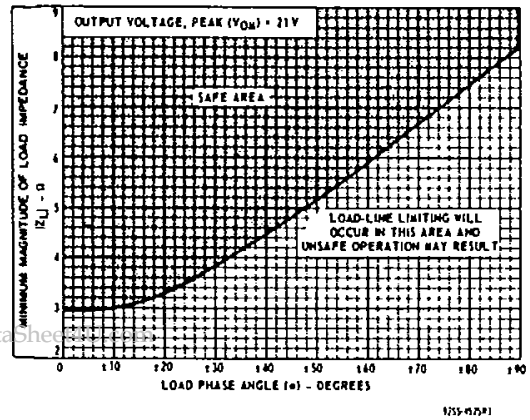


Fig. 12 – Minimum load impedance vs. load phase angle and safe area of operation.

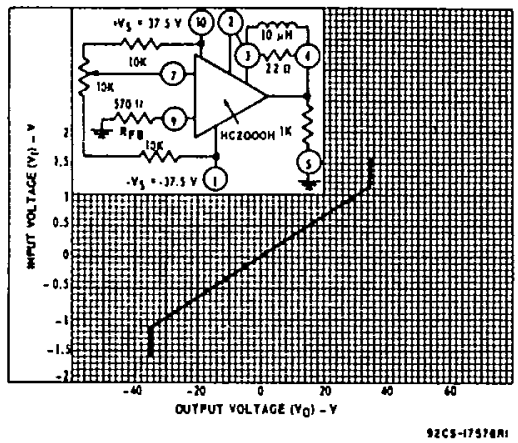


Fig. 13 – Gain linearity characteristic.

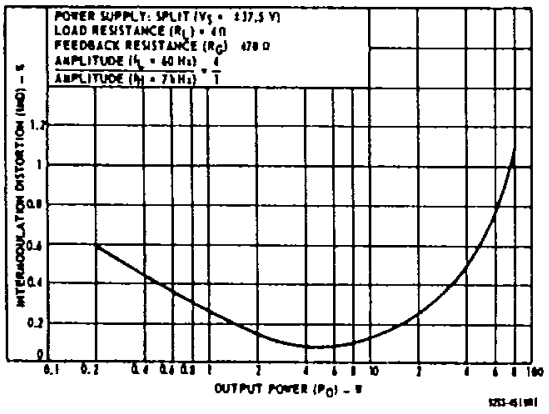


Fig. 14 — Intermodulation distortion with split supply and 4-ohm load.

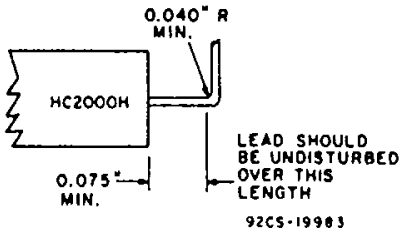


Fig. 15 — Recommended lead-bending specification.