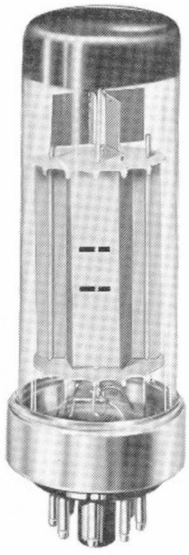

6CA7

(EL34)

Amplifiers which provide a nominal output of 20 W to handle music with high reserve peak powers or even higher powers for public address equipment, can include an output stage equipped with two 6CA7's in push-pull.

An interesting method of connecting the push-pull output stage (Fig. 1) has been used in a recently published amplifier design. The screen grids of the 6CA7 are connected to taps on the primary of the output transformer, so that the operating conditions lie somewhere between those of a triode ("tap" connected to plate) and those of a pentode (screen grid connected to primary centertap). Thus the low distortion of a triode is combined with the high sensitivity of a pentode. The tubes are said to be operated with distributed load. Two 6CA7's in the output stage illustrated can yield an output of 20 W at 0.8% total harmonic distortion, or 37 W at 1.3% distortion, with 430 V between each plate and ground.

For public address equipment, line voltages of up to 800 V can be used, and two 6CA7's in pentode push-pull with fixed bias give an output of up to 100 W.

The maximum plate dissipation of the 6CA7 is 25 W, and it has a high mutual conductance of 11,000 micromhos.

HEATER

Filament Voltage	6.3	V
Filament Current	1.5	A

CHARACTERISTICS

Plate Voltage	250	V
Grid No. 2 Voltage	250	V
Grid No. 3 Voltage	0	V
Plate Current	100	mA
Grid No. 2 Current	14.9	mA
Grid No. 1 Voltage	−13.5	V
Transconductance	11,000	micromhos
Plate Resistance	15	KΩ
Amplification Factor (Grid No. 1 to Grid No. 2)	11	

DESIGN CENTER MAXIMUM

Plate Voltage	800	V
Plate Dissipation	25	W
Plate Dissipation (max. signal speech & music)	27.5	W
Grid No. 2 Voltage	425	V
Grid No. 2 Dissipation	8.0	W
Cathode Current	150	mA
Grid Resistance (cathode bias)	700	KΩ
Grid Resistance (fixed bias)	500	KΩ
Filament to Cathode Voltage	100	V

TYPICAL OPERATING CONDITIONS

Operating Conditions for Two Tubes in Push-Pull

Distributed load conditions with screen-grid tapping at 43% of primary turn (see fig. 1)

Plate Voltage ($V_p + V_{Rk}$)	430	430	V
Grid No. 2 Resistor (R_{g2}) (per tube)	1	1	KΩ
Screen Voltage ($V_{g2} + V_{Rk}$)	425	425	V
Plate Current (zero signal)	2 x 62.5	2 x 62.5	mA
Plate Current (max. signal)	2 x 65	2 x 70	mA
Grid No. 2 Current (zero signal)	2 x 5.0	2 x 5.0	mA
Grid No. 2 Current (max. signal)	2 x 5.1	2 x 7.5	mA
Cathode Resistor (R_k) (per tube)	470	470	Ω
Signal Input Voltage (rms)	16	26	V
Plate to Plate Load Resistance	6.6	6.6	KΩ
Power Output	20	37	W
Percent Distortion	0.8	1.3	%

These operating conditions‡ apply with stabilized line voltages and allow for a 25 V drop in the primary winding of the output transformer at maximum signal. If there is an additional drop of 25 V in the line voltages at maximum signal, power output = 90 W. The optimum plate-to-plate load under these conditions is 11 KΩ.

Plate Supply Voltage	800	V
Grid No. 2 Supply Voltage	400	V
Grid No. 2 Resistor (R_{g2})*	750	Ω
Grid No. 3 Voltage	0	V
Zero Signal Plate Current	2 x 25	mA
Max. Signal Plate Current	2 x 91	mA
Zero Signal Grid No. 2 Current	2 x 3.0	mA
Max. Signal Grid No. 2 Current	2 x 19	mA
Grid No. 1 Voltage	−39	V
Plate to Plate Load Resistance	11	KΩ
Input Signal Voltage (rms)	23.4	V
Power Output	100	W
Percent Distortion	5.0	%

*Common to both tubes.

‡With separate screen-grid supply and fixed bias.