CA810Q, CA810QM

Preliminary Data

7-Watt Audio Power Amplifier With Thermal Shut-Down

The RCA-CA810Q and CA810QM are monolithic audio amplifiers intended for class B operation. They are specifically designed for mobile equipment operating from 12-V battery supplies. They operate over a wide range of supply voltages (4 to 20 V) with very low harmonic and crossover distortion. The maximum repetitive peak output current is 2.5 A, and an integral thermal limiting circuit shuts the device down in case of output overload or excessive package temperature.

The CA810Q and CA810QM are supplied in modified 16-lead quad-in-line plastic packages ("Q" suffix) with integral wing-tab heat sinks. The tabs on the CA810Q are bent down for p.c. board insertion, and on the CA810QM they are flat and pierced for easy attachment to an external heat sink.

The CA810Q and CA810QM are electrically and mechanically equivalent to types TBA810S and TBA810AS, respectively. It should be noted that pin-numbering conventions for these devices may differ from manufacturer to manufacturer, however the devices are pin compatible and interchangeability is not affected.

MAXIMUM RATINGS, *Absolute Maximum Values at $T_A = 25^\circ C$*

SUPPLY VOLTAGE			20 V
PEAK OUTPUT CURRENT (non-repetitive)			3.5 A
PEAK OUTPUT CURRENT (repetitive)			2.5 A
DEVICE DISSIPATION:			
At $T_A = 70^\circ C$			1 W
At $T_{tab} = 100^\circ C$			5 W
AMBIENT TEMPERATURE RANGE:			
Operating			$-40^\circ C$ to (Refer to Fig. 7 for typical high-temperature limit)
Storage			-40 to $+150^\circ C$
THERMAL RESISTANCE:	CA810Q	CA810QM	
Junction to tab	12	10	°C/W
Junction to ambient	70*	80	°C/W

*Value obtained with tabs soldered to printed-circuit board

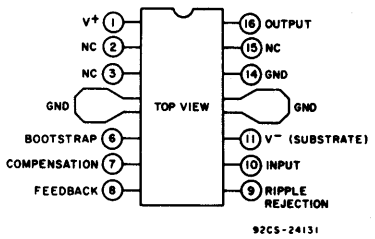

Fig. 1 – Terminal diagram of CA810Q and CA810QM. The wing tabs on the CA810Q are bent down, and on the CA810QM they are flat and pierced.

Features

- **Power output – 7 W with 4Ω load**
- **Supply voltage range – 4 to 20 V**
- **Peak output current – 2.5 A (max.)**
- **Very low harmonic and cross-over distortion**

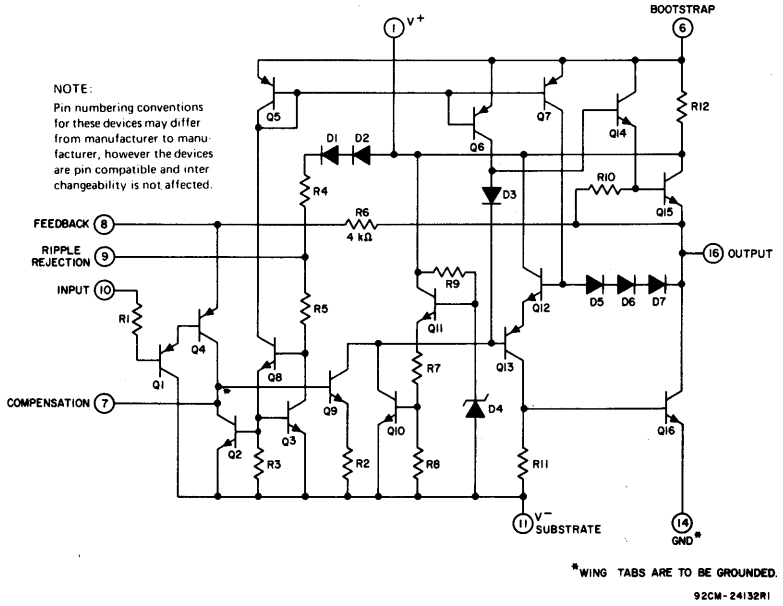

Fig. 2 – Schematic diagram of CA810Q, CA810QM.

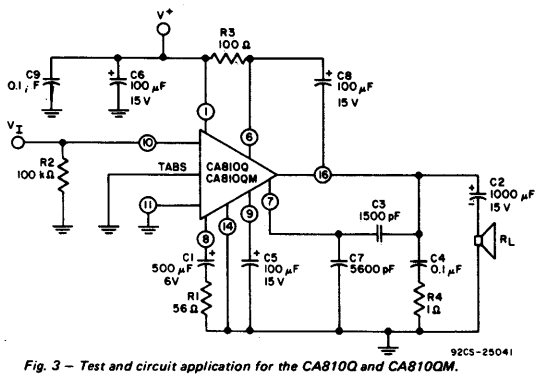

Fig. 3 – Test and circuit application for the CA810Q and CA810QM.

ELECTRICAL CHARACTERISTICS, *at $T_A = 25^\circ C$*

CHARACTERISTIC	SYMBOL	TEST CONDITIONS		LIMITS CA810Q CA810QM MIN.	TYP.	MAX.	UNIT
		Supply Voltage (V^+) = 14.4 V Unless Otherwise Specified					
Supply Voltage	V^+			4	–	20	V
Input Voltage	V_I			–	–	220	mV
Input Sensitivity	e_I	P_O=6 W, R_L=4 Ω, R1 = 56 Ω, f = 1 kHz		–	80	–	mV
Quiescent Output Voltage	V_O			6.4	7.2	8	V
Quiescent Current Drain	I_O			–	12	20	mA
Input Noise Voltage	e_N	R_g=0, BW (–3 dB) =20 to 20,000 Hz		–	2	–	μV
Bias Current	I_{IB}			–	0.4	–	μA
Output Power	P_O	f=1 kHz, R_L=4Ω, THD = 10%	V^+= 14.4 V	–	6	–	W
			V^+= 6 V	–	1	–	
Input Resistance	R_I			–	5	–	MΩ
Total Harmonic Distortion	THD	P_O=50 mW to 3W, R_L 4 Ω, f = 1 kHz		–	0.3	–	%
Open-Loop Voltage Gain	A_{OL}	R_L = 4 Ω, f = 1 kHz		–	80	–	dB
Closed-Loop Voltage Gain	A	R_L = 4 Ω, f = 1 kHz, R1 = 56 Ω		34	37	40	dB
Efficiency	η	P_O = 5 W, R_L = 4 Ω, f = 1 kHz		–	70	–	%

CA810Q, CA810QM

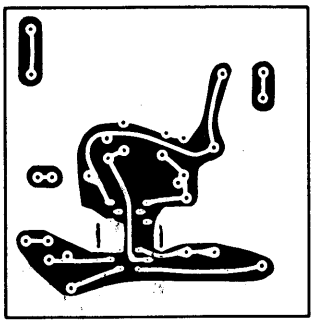

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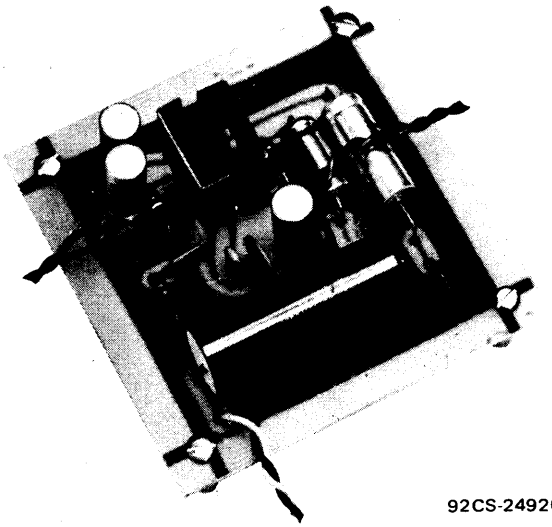
Fig. 4 – Bottom view of printed-circuit boards shown in Figs. 5 and 6.



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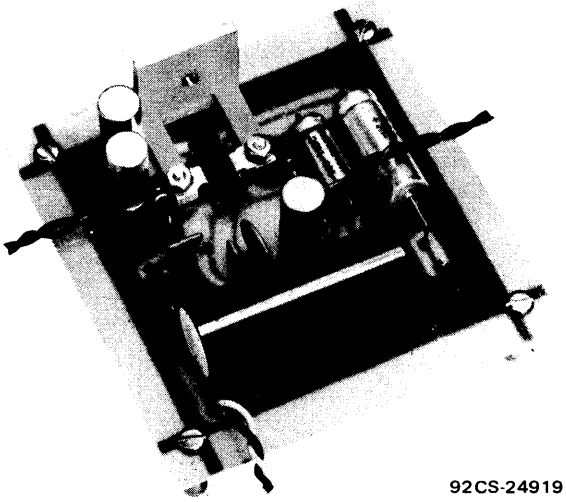
Circuit heat is dissipated by a combination of free air and printed-circuit board foil.

Fig. 5 – Component view of printed-circuit board for CA810Q.



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Circuit arrangement for use with chassis having a thermal resistance of $\leqslant 5^{o}C/W$. Vertical bracket should make good thermal contact to chassis.

Fig. 6 – Component view of printed-circuit board for CA810QM.

The thermal-limiting network incorporated in the CA810 Series circuits provides protection against damage due to excessive semiconductor temperatures that may result from high ambient temperatures and/or excessive dissipation, e.g., as encountered in sustained overloads. As indicated in Fig. 7, the thermal-limiting feature automatically reduces the supply current (and output power) at the higher temperatures.

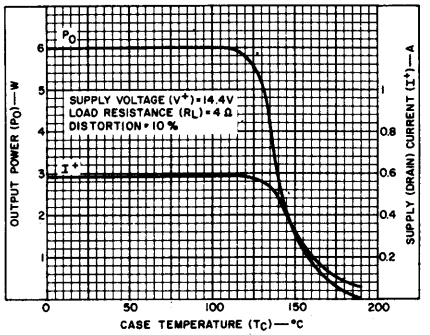

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Fig. 7 – Typical output power and drain current vs. case temperature.