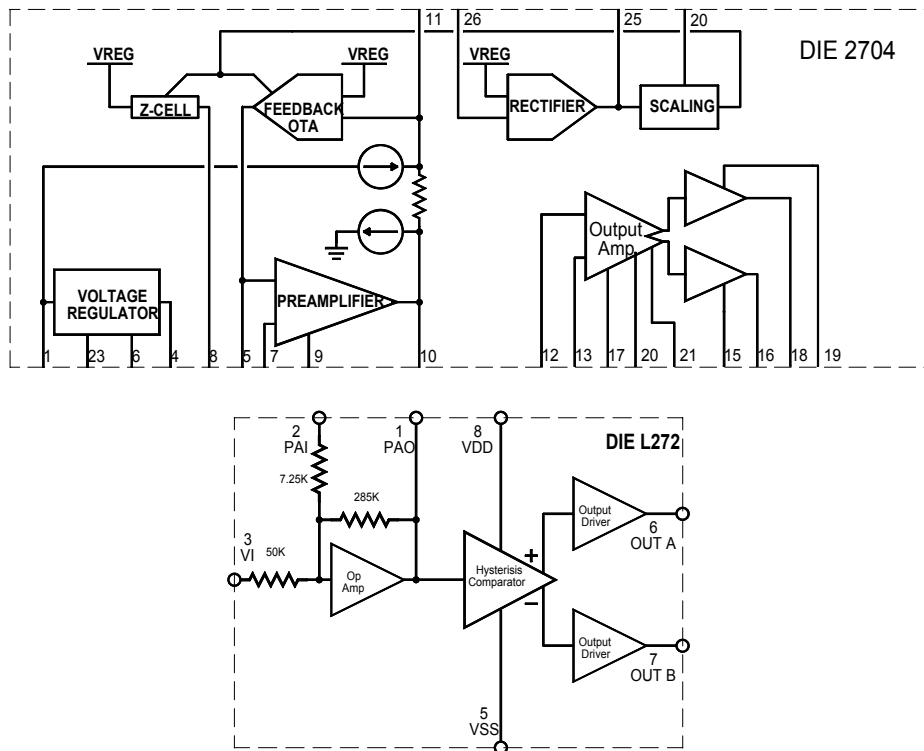


2704 Preamplifier / Clari-D[®] 272

Product Data Sheet - Preliminary

Features	Benefits
2704 AGC preamp and Clari-D L272 class D output stage	Low cost
Preamplifier capable of AGC, AGCO or linear operation	Clean sounding for high output levels, adjustable threshold allows trimmer adjusted MPO
44dB Gain preamplifier	Works well in all custom applications and low-cost BTE's
Built-in Regulator - no external capacitor required	Good end of life performance, good power supply rejection
Class D output stage	Clearer-sounding, efficient, low drain output amplifier

Block Diagram of 2704 and the L272 Class D IC



Resistance Technology, Inc.

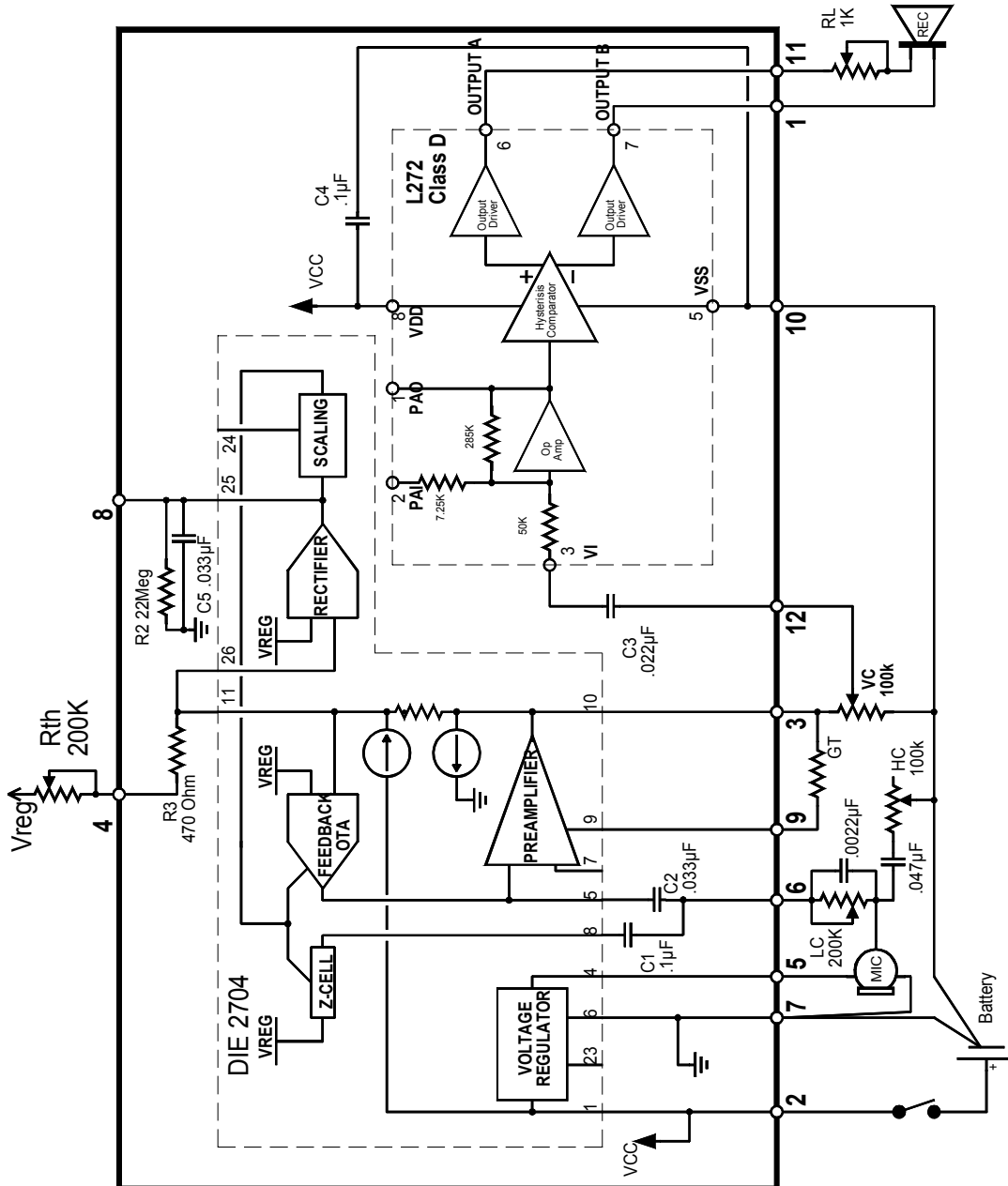
1260 Red Fox Road
 Arden Hills, MN 55112
 TEL: (651) 636-9770
 FAX: (651) 636-8944

Visit our Web site at: www.rti-corp.com

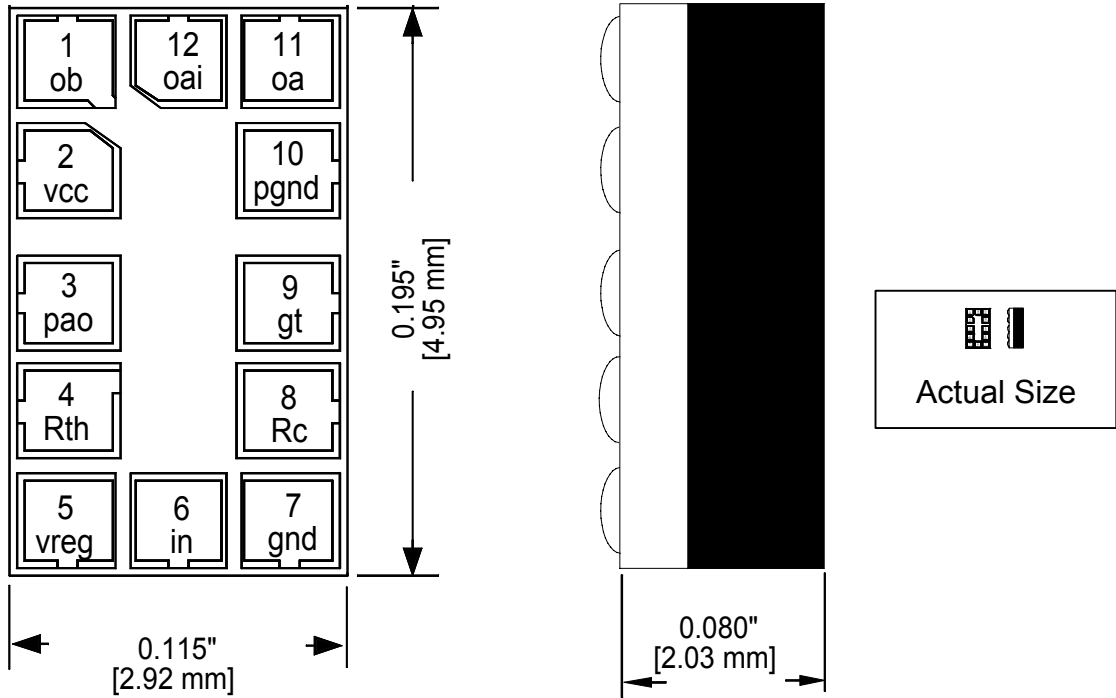
Resistance Technology GmbH

Kesselschmiedstrasse 10
 D-85354 Freising, Germany
 TEL: 049-8161-4804-0
 FAX: 049-8161-4804-18

Typical Full Feature Application of Hybrid PN 91310-000



Standard Hybrid Package - part number 91310-xxx



Electrical Performance Data

2704 AGC PRODUCT SPECIFICATIONS

2704 DIE	MIN.	TYP	MAX.	UNITS
Dropout Voltage	--	--	1.05	V dc
Quiescent Current (see Figure 1)	--	250	350	mA
2704 VOLTAGE REGULATOR				
Output Voltage	.86	--	.93	V dc
Power Supply Rejection Ratio @ 1kHz	60	70	--	dB
Noise (BW = 10kHz)	--	25	32	mV
Output Impedance @ 1kHz	.25	.50	1.50	Ω
Output Current	50	--	--	μ A
Temperature Coefficient of Output Voltage	-.17	-.12	-.07	%/ $^{\circ}$ C
2704 PREAMPLIFIER				
Equivalent Input Noise ⁱ	--	2.7	3.8	μ V rms
Input Impedance at Preamp Input Pin @ 1kHz	80	100	120	k Ω
Output Impedance @ 1kHz	35	75	250	Ω
Voltage Gain Preamp In to Preamp Out @ 1kHz	42	43	44	dB
Output Bias Voltage ⁱⁱ	350	--	750	mV
Output Voltage Swing (open loop)	600	--	--	mV p-p
Output Bandwidth ⁱⁱⁱ	3.0	4.8	--	kHz
Output Current Capability	300	--	--	μ A
Distortion (Input 1mV @ 1kHz)	--	--	2	%
2704 RECTIFIER (see Figure 4)				
Output Current ^{iv}	2.2	3.1	5.3	μ A
Threshold Voltage	10	14	19	mVpk
Compression Ratio ^v	3:1		10:1	
2704 OUTPUT AMPLIFIER (see Figure 5)				
Quiescent Current ^{vi}	--	90	320	μ A
Input Impedance	70	92	114	k Ω
Voltage Gain ^{vii}	27	30	32	dB
Output Current Capability	40	--	--	mA

USA PATENTS ISSUED: 4,743,833 4,764,733 4,973,917

RTI reserves the right to make changes at any time to improve reliability, function or design, in order to provide the best possible product.

ⁱ The preamplifier input is capacitor coupled to a 3.9k Ω load (to simulate the output impedance of a typical microphone), and the voltage spectral noise density, in dB, is measured at the output of the preamplifier. The dc gain of the preamplifier, in dB, is subtracted from the measured noise giving a referred input noise. The total referred input noise is calculated by piecewise integration (see Fig. 2 and 3). The noise can also be approximated with a noise floor of \approx 150dB, or \approx 31.6nV and if a frequency range of 100 to 10kHz is assumed then $EIN=31.6nV \cdot \sqrt{(9.9kHz)} \approx 3\mu V$.

ⁱⁱ The range of the bias voltage improves when the AGC loop is closed. In this case the output bias voltage minimum is 500mV and the maximum is 700mV.

ⁱⁱⁱ The preamplifier is a dc amplifier, which has been internally compensated to prevent oscillation. With this compensation the gain is guaranteed to be flat with a -3dB knee of \geq 3kHz.

^{iv} The maximum output with \pm 100mV of offset applied to the differential input of the rectifier (one side connected to Vreg).

^v The compression ratio is calculated by analyzing the slope of the curve (above the threshold knee) as seen on the ANSI I/O curve, where the ratio is the input dB change vs. the output dB change. Adjusted with Compression Ratio control (open is 10:1)

^{vi} The quiescent (no-signal) current will vary with the receiver impedance and the settings of the output drive control and the current feedback control.

^{vii} The voltage gain specification shown assumes that the boost function is not used to increase the gain, and that the current feedback or output drive control are not used to reduce the gain.

Absolute Maximum Ratings

Parameter	MIN.	MAX.	Units
Supply Voltage, Vcc		4	V dc
Operating Temperature	10	40	°C
Storage Temperature	-20	70	°C

Electrical Characteristics

Conditions: T = 25°C, Vcc = 1.25V, f = 1kHz, except where noted

Parameter	Conditions	MIN.	TYP	MAX.	Units
Overall					
Supply Voltage, Vcc		1.05	1.2		V dc
Quiescent Current	no load, no input		110	TBD	µA
Icc under load	Inductive load, see figure below				
Bandwidth, lower limit	half power limit	100			Hz
Bandwidth, upper limit	half power limit			16,000	Hz
Overall gain	Inductive load, see figure below	TBD	20	TBD	dB
Output Noise	total rms voltage, 100-10kHz		71	TBD	µV
Total harmonic distortion	200 < f < 10kHz, Vin = 100 mVp-p 100Ω load, preamp at 13 dB gain		0.5	1	%
Total harmonic distortion	200 < f < 10kHz, Vin = 200 mVp-p 100Ω load, preamp at 13 dB gain		1.5	3	%
Total harmonic distortion	200 < f < 10kHz, Vin = 250 mVp-p 100Ω load, preamp at 13 dB gain		10		%
Total harmonic distortion	F = 1 kHz, Vin = 250 mVp-p, 100Ω load, preamp at max gain		TBD	TBD	%
Gain variation vs. Vcc	1.1 ≤ Vcc ≤ 1.4 volts		0.2	TBD	dB
Preamplifier					
Gain [20*log(VPAO/VIN)]	PAO pad open		15		
Gain cut (relative to gain with PAO open)	PAI and PAO pads shorted	30	32		dB
Input resistance		35k	50k	65k	ohm
Output Stage					
Gain	Inductive load, see figure below	TBD	5	--	dB
Output drive transistors "ON" resistance	Total resistance through both FETs of the conducting part of the bridge		25		ohms
Free running oscillator frequency	no input, 1.1 ≤ Vcc ≤ 1.4 volts	100	120	150	kHz.
Duty cycle	No input, 100Ω resistive load	49	50	51	%

Items in grey are tested on a 100% basis at production.

Simulated Receiver Load

