

GM3036 DATA SHEET

FEATURES

- **DynamEQ® II flexibility**
- **six programmable parameters**
- **24 dB/oct state variable filter**
- **twin average detectors**
- **handles high input levels**
- **drives class D integrated receivers**

PACKAGING

Hybrid typical dimensions:

(0.209 in x 0.125 in x 0.100 in)
(5.31 mm x 3.18 mm x 2.54 mm)

Hybrid View

DEVICE DESCRIPTION

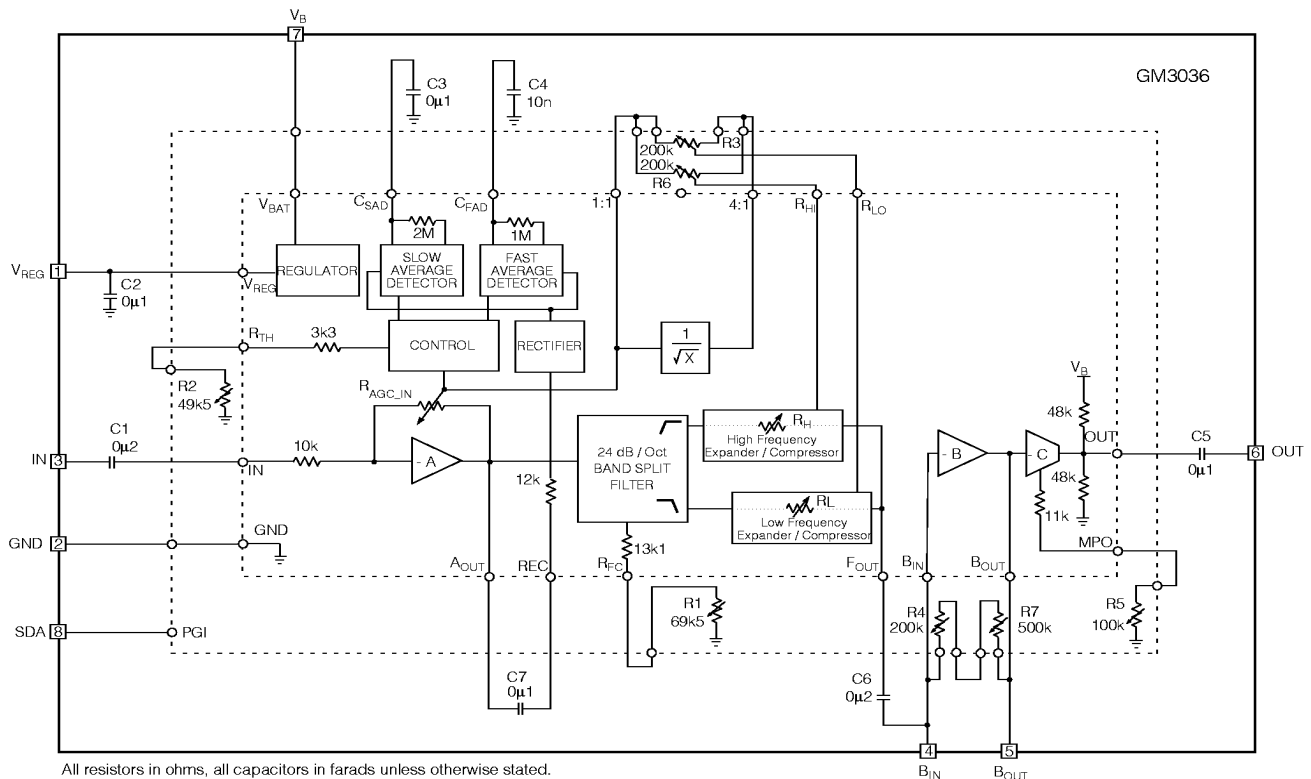
The GM3036 programmable hybrid is composed of a DynamEQ® II Wide Dynamic Range Compression signal processor and the GP522 controller memory chip. The hybrid incorporates 24 dB/oct filtering.

The gain and frequency response are dependent on the user's environment. The Twin Average Detector* circuit is optimized for sound quality during normal listening without sacrificing comfort during sudden loud sounds.

The GM3036 features six programmable parameters: independent compression ratio adjustment in the High and Low frequency channels, VC adjustment, threshold adjustment, crossover frequency adjustment and MPO adjustment.

The output stage is designed as a preamplifier for the class D integrated receiver.

* patent pending



FUNCTIONAL BLOCK DIAGRAM

ABSOLUTE MAXIMUM RATINGS

PARAMETER	VALUE / UNITS
Supply Voltage	3 VDC
Power Dissipation	25 mW
Operating Temperature Range	-10° C to 40° C
Storage Temperature Range	-20° C to 70° C
CAUTION CLASS 1 ESD SENSITIVITY 	

PAD CONNECTION



ELECTRICAL CHARACTERISTICS

Conditions: Supply Voltage $V_B = 1.3$ V, Frequency = 1 kHz, Temperature = 25°C.

The programmable parameters are adjusted to the following set values unless otherwise specified.

(MPO) R5 - Tap15; (TH) R2 - Tap 0; (FC) R1 - Tap 8; (HP) R6 - Tap 0; (LP) R3 - Tap 0; (VC) R4 - Tap 0, R7 - Tap 0.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Hybrid Current	I_{AMP}		-	395	580	μA
Minimum Voltage	V_b		1.1	-	-	V
Total Harmonic Distortion	THD	$V_{IN} = -40dBV$ at 1kHz	-	0.6	1.0	%
THD with Maximum Allowable Input	THD_M	$V_{IN} = -23dBV$, $R_{vc} = 47k\Omega$	-	2	10	%
Input Referred Noise	IRN	Aweighted filter	-	3.0	-	μV_{RMS}
Total System Gain	A_V	$V_{IN} = -90dBV$	44	47	50	dB
Regulator Voltage	V_{REG}	$I_{LOAD} = 30\mu A$	890	930	1000	mV
AGC						
Lower Threshold	TH_{LO}		-88.5	-84.5	-80.5	dBV
Upper Threshold	TH_{HI}		-36	-32	-28	dBV
Compression Gain Range	ΔA	Gain(-90dBV _{IN}) - Gain(-30dBV _{IN})	36.5	39.5	42.5	dB
System Gain in Compression	A_{60}	$V_{IN} = -60dBV$	26	29	32	dB
Min. Compression Ratio	$CMP_{1:1}$	$V_{IN} = 3kHz$, -60dBV to -40dBV, R3 - Tap 15; R6 - Tap 15	0.9	1.0	1.1	Ratio
Max. Comp. Ratio	$CMP_{4:1}$	$V_{IN} = 3kHz$, -60dBV to -40dBV, R3 - Tap 0; R6 - Tap 0	3.6	4.0	4.3	Ratio
Fast Average Detector Time Constant	τ_{FAST}		-	10	-	ms
Slow Average Detector Time Constant	τ_{SLOW}		-	200	-	ms
FILTER						
Maximum Crossover Frequency	$f_{c_{max}}$	R1 - Tap 15	3.0	3.9	-	kHz
Nominal Crossover Frequency	$f_{c_{nom}}$	R1 - Tap 8	1.5	1.9	2.3	kHz
Minimum Crossover Frequency	$f_{c_{min}}$	R1 - Tap 0	-	0.9	1.4	kHz
Filter Roll-off Rate			-	24	-	dB/oct

ELECTRICAL CHARACTERISTICS continued

Conditions: Supply Voltage $V_B = 1.3\text{ V}$, Frequency = 1 kHz, Temperature = 25°C

The programmable parameters are adjusted to the following set values unless otherwise specified.

(MPO) R5 - Tap 15; (TH) R2 - Tap 0; (FC) R1 - Tap 8; (HP) R6 - Tap 0; (LP) R3 - Tap 0; (VC) R4 - Tap 0, R7 - Tap 0.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
STAGE A and B						
Open Loop Gain (B)	A_{OL_B}		-	52	-	dB
Input Impedance (A)	R_{IN}		8	10.6	12	$k\Omega$
OUTPUT STAGE						
Stage Gain	A_C	$V_{IN} = -30\text{dBV}$	7	9	11	dB
Max Output Level	MPO	$V_{IN} = -25\text{dBV}$, $R_{VCEXT} = 221\text{k}$	-20	-18	-16	dBV
MPO Range	ΔMPO	R5 - Tap 15 to Tap 0, $R_{VCEXT} = 221\text{k}$	11.6	13.6	15.6	dB
Output Resistance	R_{OUT}		-	24	-	$k\Omega$

All conditions and parameters remain as shown in the Test Circuit unless otherwise specified in the CONDITIONS column.

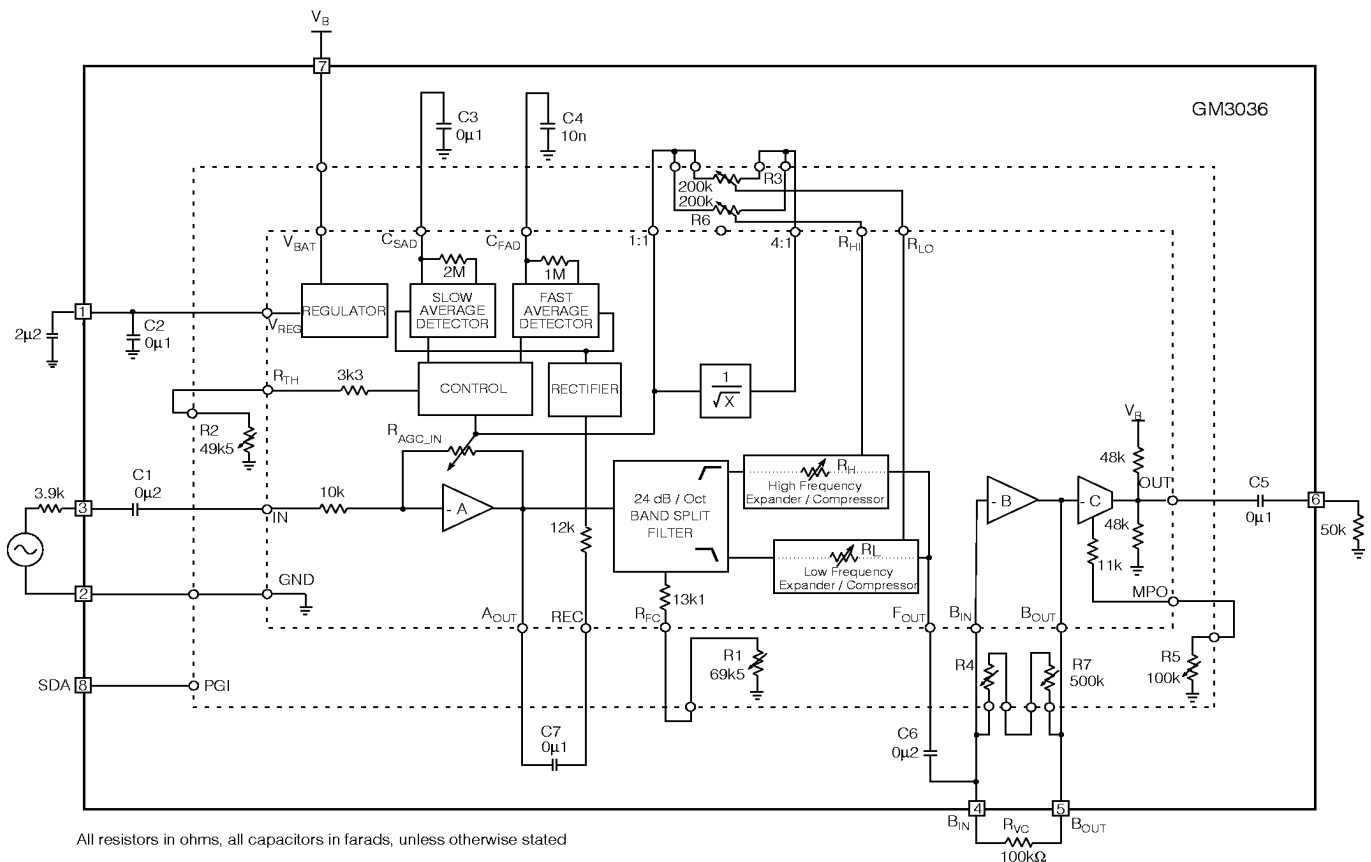


Fig. 1 Test Circuit

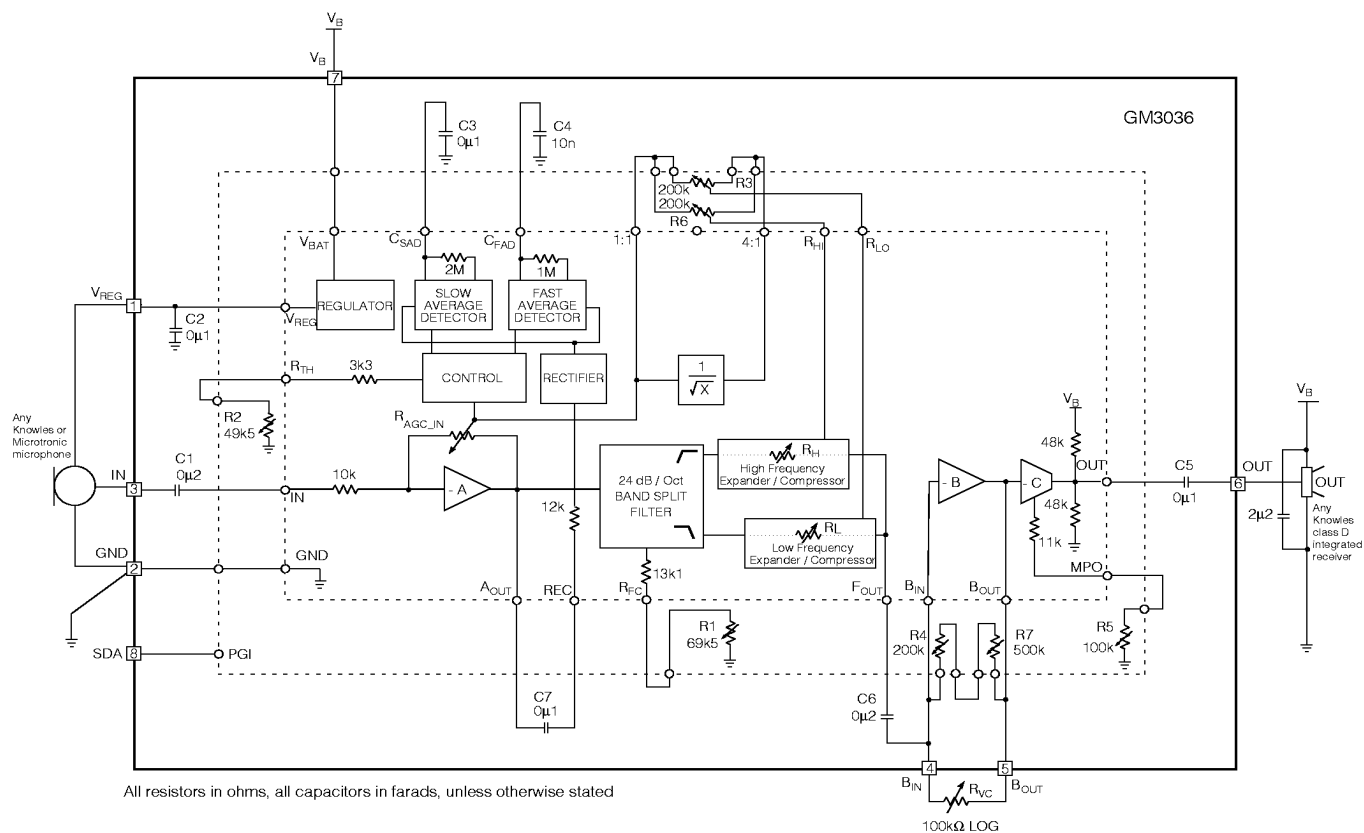


Fig. 2 Typical Application Circuit

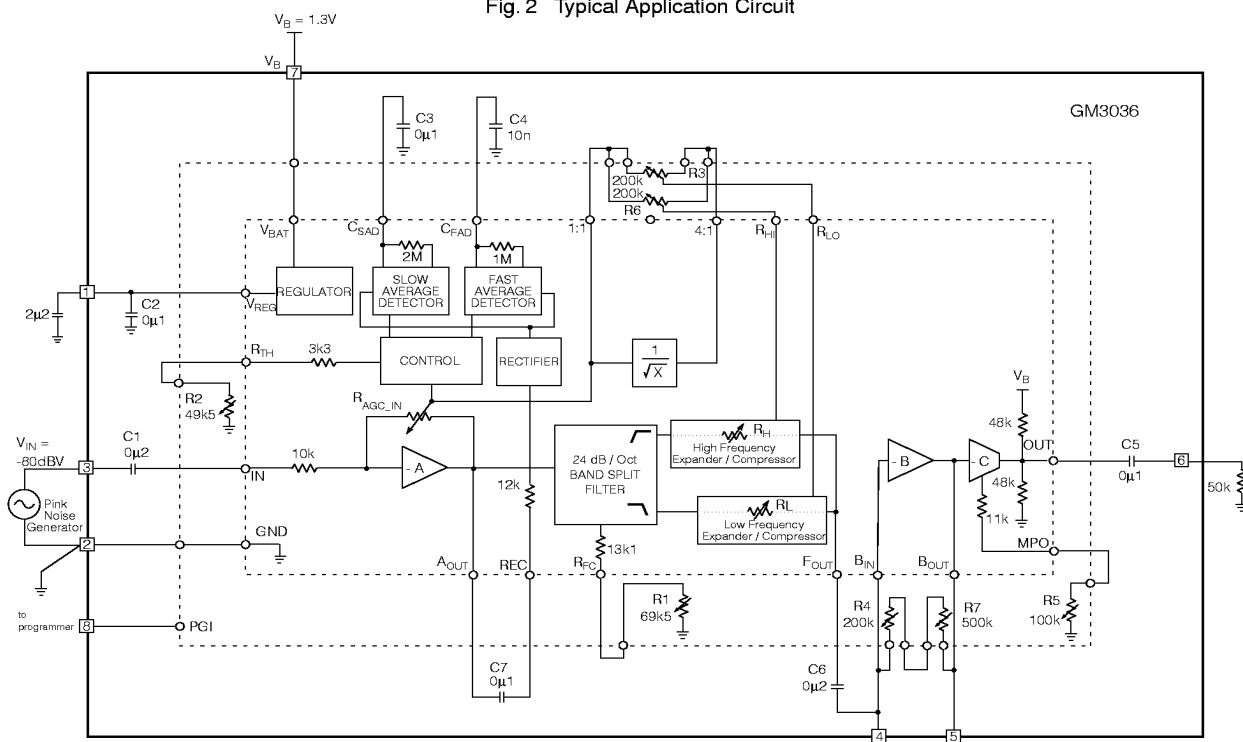


Table of Defaults

R1 - Tap 8
R2 - Tap 0
R3 - Tap 0
R4 - Tap 2
R5 - Tap 15
R6 - Tap 0
R7 - Tap 23

Fig. 3 Characterization Circuit (Used to generate typical curves)

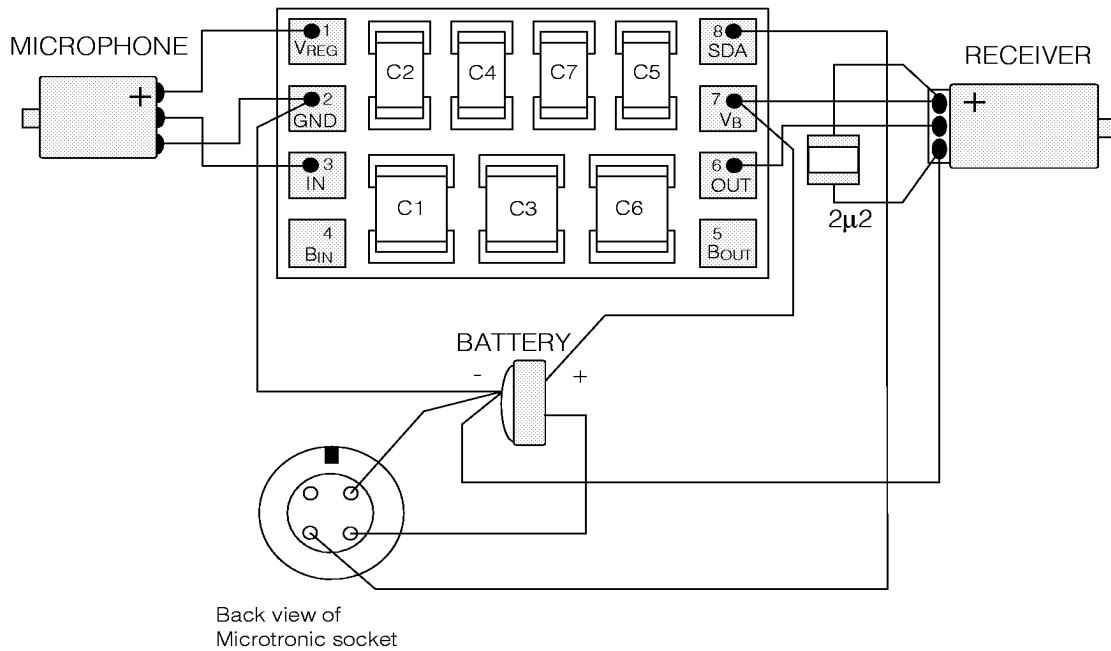


Fig. 4 Typical Assembly Diagram

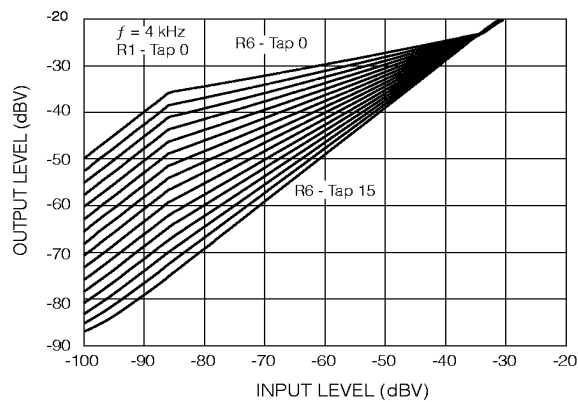


Fig. 5 I/O Transfer Function for Different Compression Ratios (High Frequency Channel)

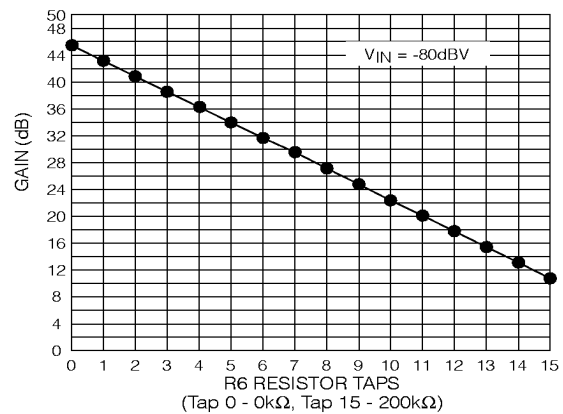


Fig. 6 High Frequency Gain (Compression Ratio Adjustment)

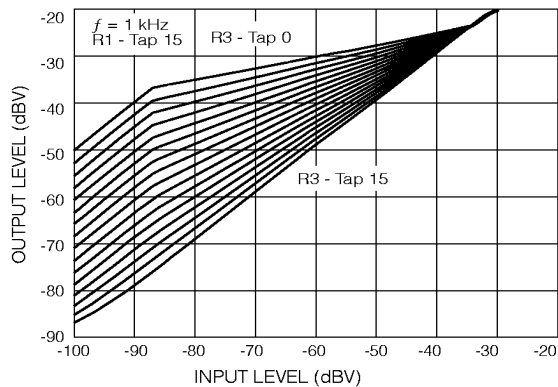


Fig. 7 I/O Transfer Function for Different Compression Ratios (Low Frequency Channel)

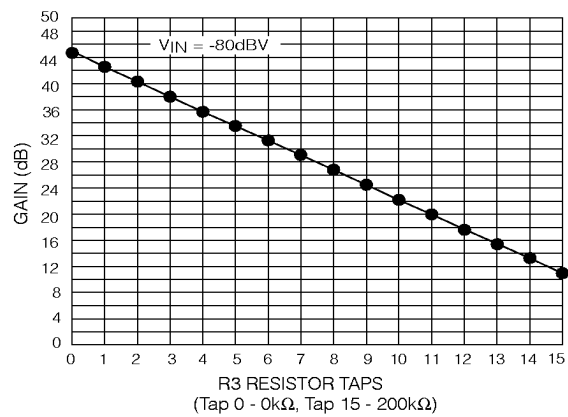


Fig. 8 Low Frequency Gain (Compression Ratio Adjustment)

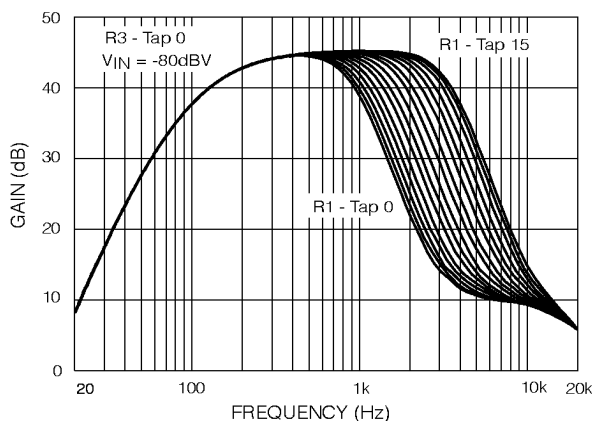


Fig. 9 Frequency Response for Different Crossover Frequency Steps

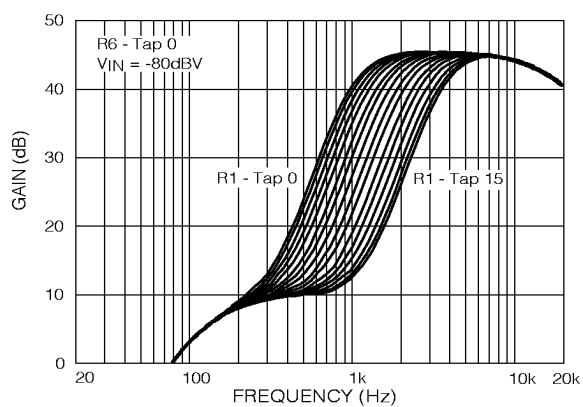


Fig. 10 Frequency Response for Different Crossover Frequency Steps

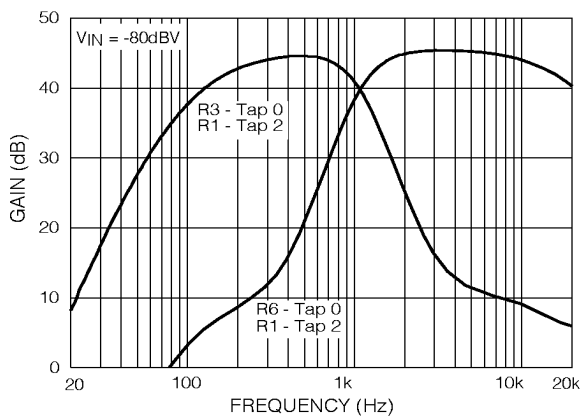


Fig. 11 Crossover Frequency Representation

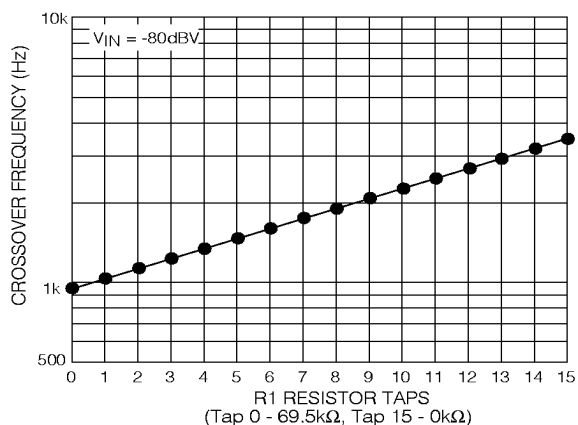


Fig. 12 Crossover Frequency Adjustment

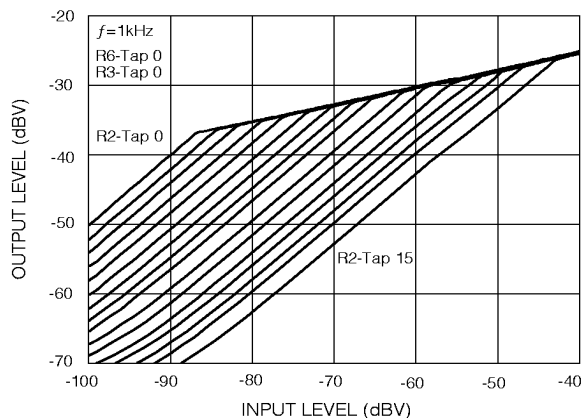


Fig. 13 I/O Transfer Function for Different Thresholds

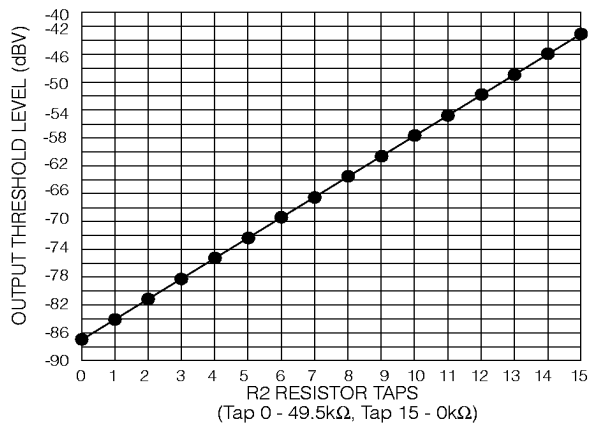


Fig. 14 Threshold Adjustment

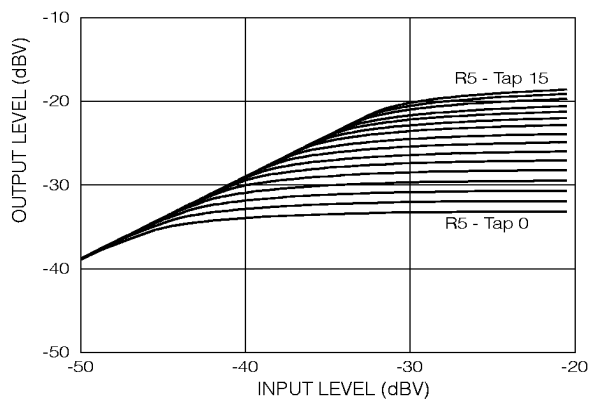


Fig. 15 I/O Transfer Function for Different MPO Steps

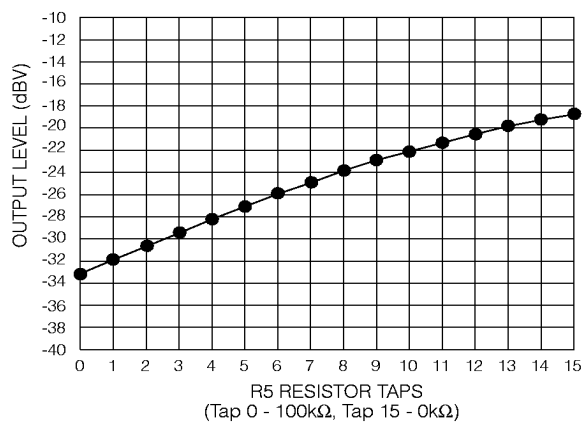


Fig. 16 MPO Adjustment

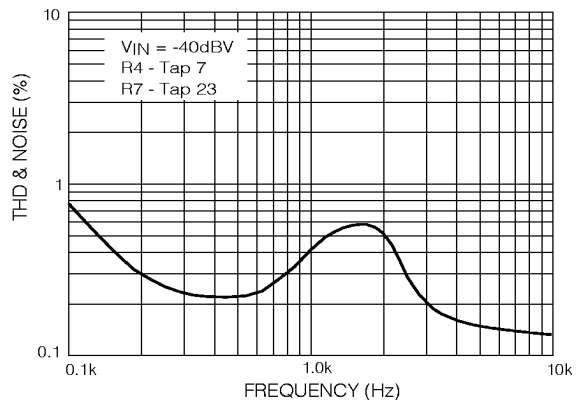


Fig. 17 THD and Noise vs Frequency

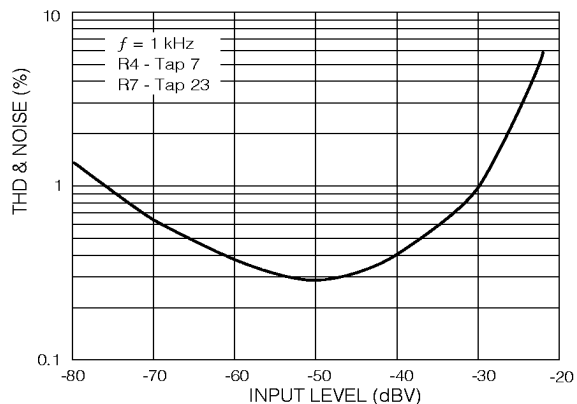


Fig 18 THD and Noise vs Input Level

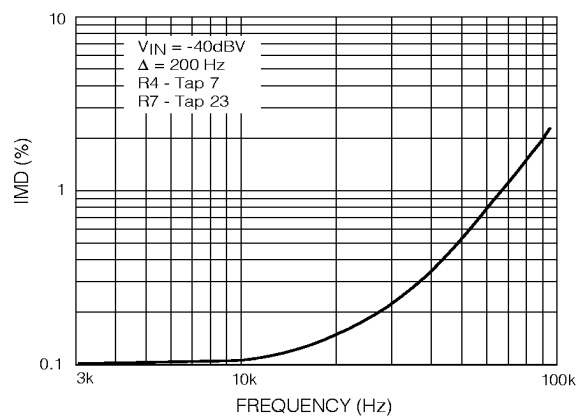


Fig. 19 Intermodulation Distortion (CCIF) vs Frequency

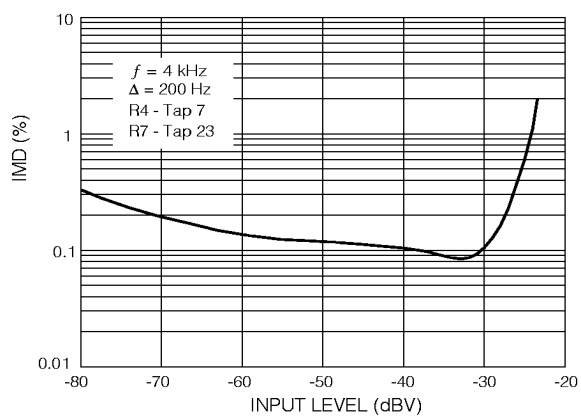


Fig. 20 Intermodulation Distortion (CCIF) vs Input Level

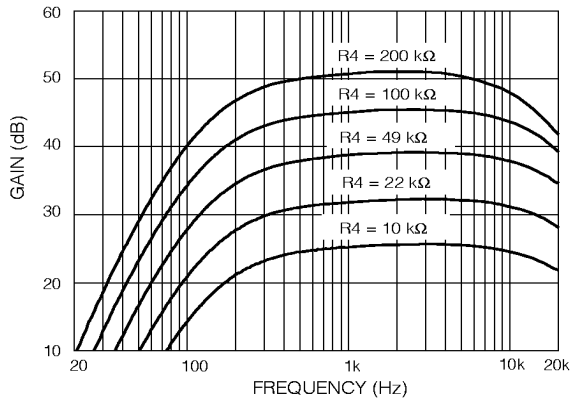


Fig. 21 Frequency Response for Different R4 Values

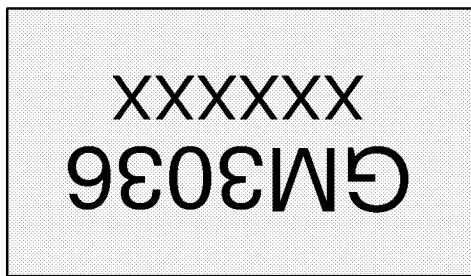


Fig. 22 Hybrid Layout & Dimensions

REVISION NOTES:

Re-centering of the following parameters
Total System Gain, Lower Threshold & Compression Gain Range.

Dimension units are in inches.

Dimensions in parenthesis are in millimetres converted from inches and include minor rounding errors. 1.0000 inches = 25.400 mm.

Pad sizes 0.024 x 0.022 (0.61 x 0.56).

Dimension ± 0.003 (± 0.08) unless otherwise stated.

XXXXXX - work order number.

This hybrid is designed for point to point soldering.

DOCUMENT IDENTIFICATION

PRODUCT PROPOSAL

This data has been compiled for market investigation purposes only, and does not constitute an offer for sale.

ADVANCE INFORMATION NOTE

The product is in a development phase and specifications are subject to change without notice. Gennum reserves the right to remove the product at any time. Listing the product does not constitute an offer for sale.

PRELIMINARY

The product is in a preproduction phase and specifications are subject to change without notice.

DATA SHEET

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