

## 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**

## STANDARD 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)

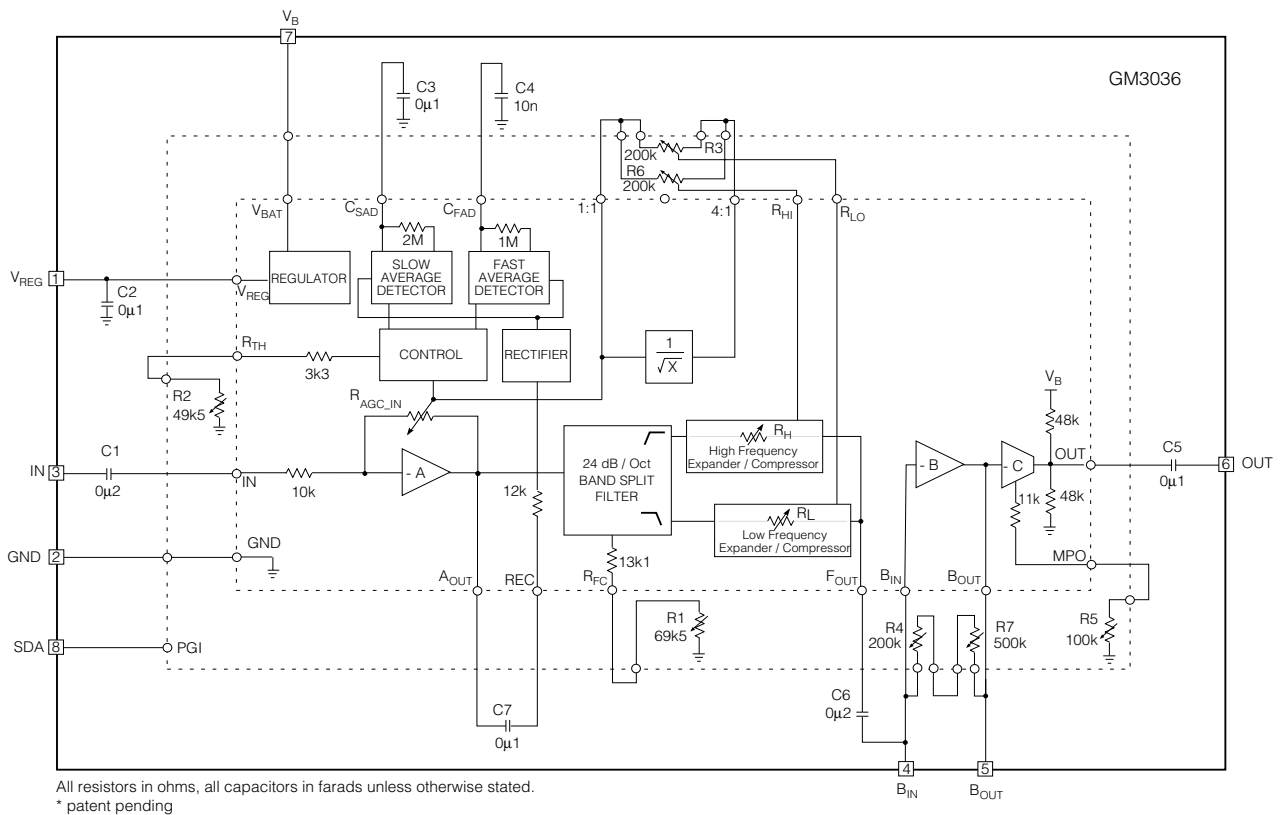
## DESCRIPTION

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.



## BLOCK DIAGRAM

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	VALUE
Supply Voltage	1.4VDC
Power Dissipation	25mW
Operating Temperature Range	-10°C to 40°C
Storage Temperature Range	-20°C to 70°C

**CAUTION**  
ELECTROSTATIC  
SENSITIVE DEVICES  
DO NOT OPEN PACKAGES OR HANDLE  
EXCEPT AT A STATIC-FREE WORKSTATION

**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	$\mu$ A
Minimum Voltage	Vb		1.1	-	-	V
Total Harmonic Distortion	THD	$V_{IN} = -40$ dBV at 1kHz	-	0.6	1.0	%
THD with Maximum Allowable Input	$THD_M$	$V_{IN} = -23$ dBV, $R_{vc} = 47$ k $\Omega$	-	2	10	%
Input Referred Noise	IRN	Aweighted filter	-	3.0	-	$\mu$ V <sub>RMS</sub>
Total System Gain	$A_V$	$V_{IN} = -90$ dBV	45	48	51	dB
Regulator Voltage	$V_{REG}$	$I_{LOAD} = 30$ $\mu$ A	890	930	1000	mV
<b>AGC</b>						
Lower Threshold	$TH_{LO}$		-88.5	-84.5	-80.5	dBV
Upper Threshold	$TH_{HI}$		-36	-32	-28	dBV
Compression Gain Range	$\Delta A$	Gain(-90dBV <sub>IN</sub> ) -Gain(-30dBV <sub>IN</sub> )	37.5	40.5	43.5	dB
System Gain in Compression	$A_{60}$	$V_{IN} = -60$ dBV	26	29	32	dB
Min. Compression Ratio	$CMP_{1:1}$	$V_{IN} = 3$ kHz, -60dBV to -40dBV, R3 - Tap 15; R6 - Tap 15	0.9	1.0	1.1	Ratio
Max. Comp. Ratio	$CMP_{4:1}$	$V_{IN} = 3$ kHz, -60dBV to -40dBV, R3 - Tap 0; R6 - Tap 0	3.6	4.0	4.3	Ratio
Fast Average Detector Time Constant	$\tau_{FAST}$		-	10	-	ms
Slow Average Detector Time Constant	$\tau_{SLOW}$		-	200	-	ms
<b>FILTER</b>						
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 Rolloff Rate			-	24	-	dB/oct

**ELECTRICAL CHARACTERISTICS continued**

Conditions: Supply Voltage  $V_B = 1.3V$ , Frequency = 1kHz, 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
<b>STAGE A and B</b>						
Open Loop Gain (B)	$A_{OL,B}$		-	52	-	dB
Input Impedance (A)	$R_{IN}$		8	10.6	12	k $\Omega$
<b>OUTPUT STAGE</b>						
Stage Gain	$A_C$	$V_{IN} = -30dBV$	7	9	11	dB
Max Output Level	MPO	$V_{IN} = -25dBV, R_{VCEXT} = 221k$	-20	-18	-16	dBV
MPO Range	$\Delta MPO$	R5 - Tap 15 to Tap 0, $R_{VCEXT} = 221k$	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.

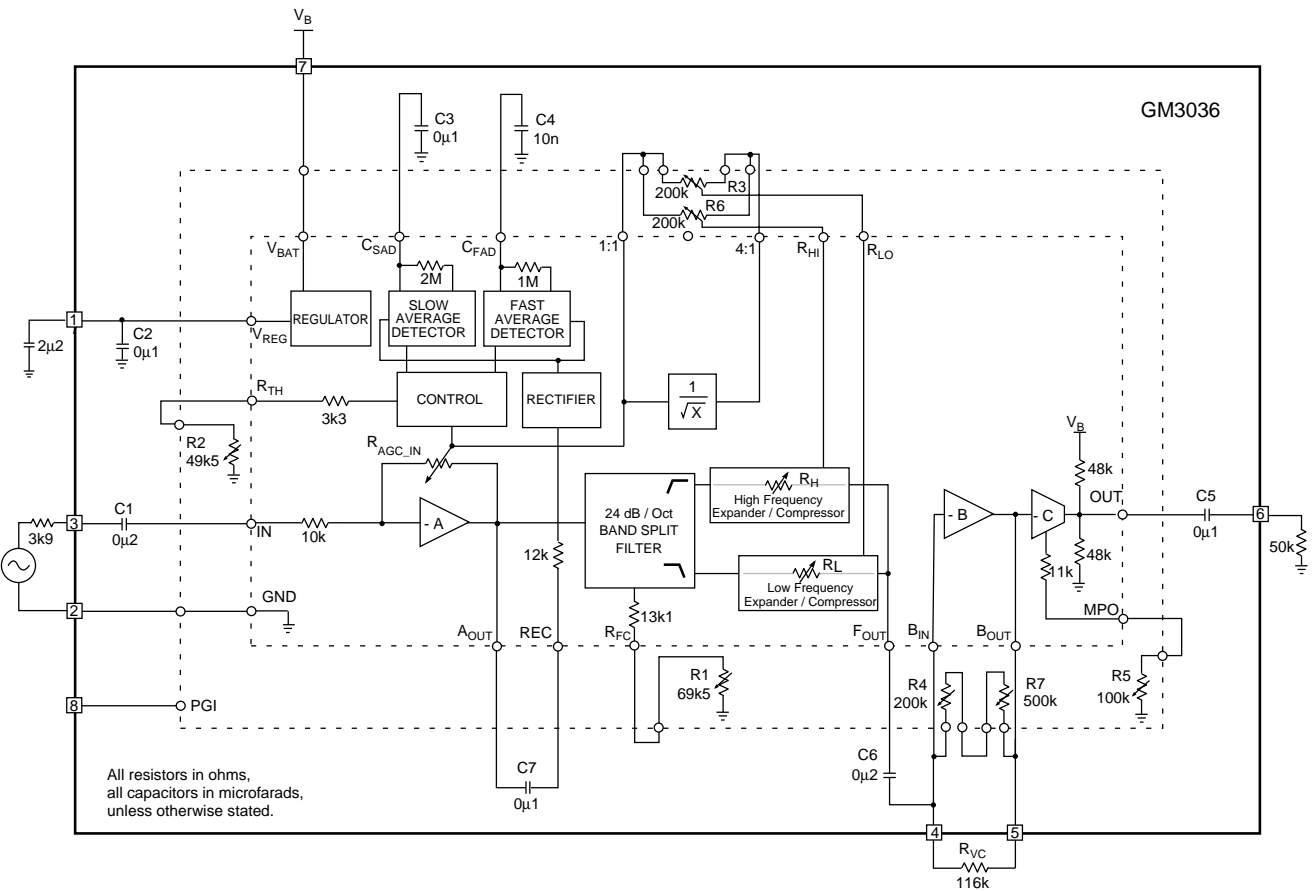


Fig. 1 Test Circuit

GM3036

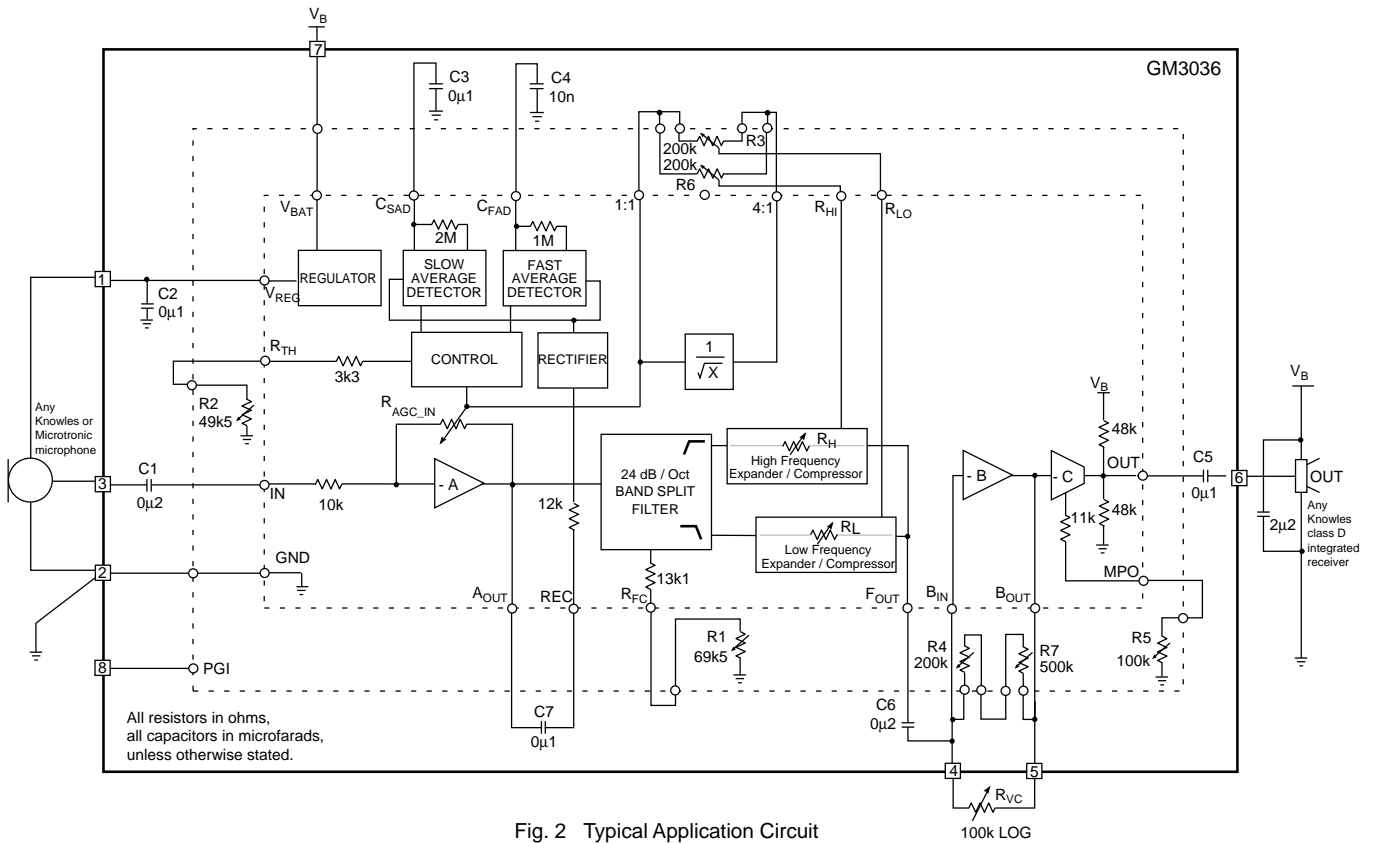


Fig. 2 Typical Application Circuit

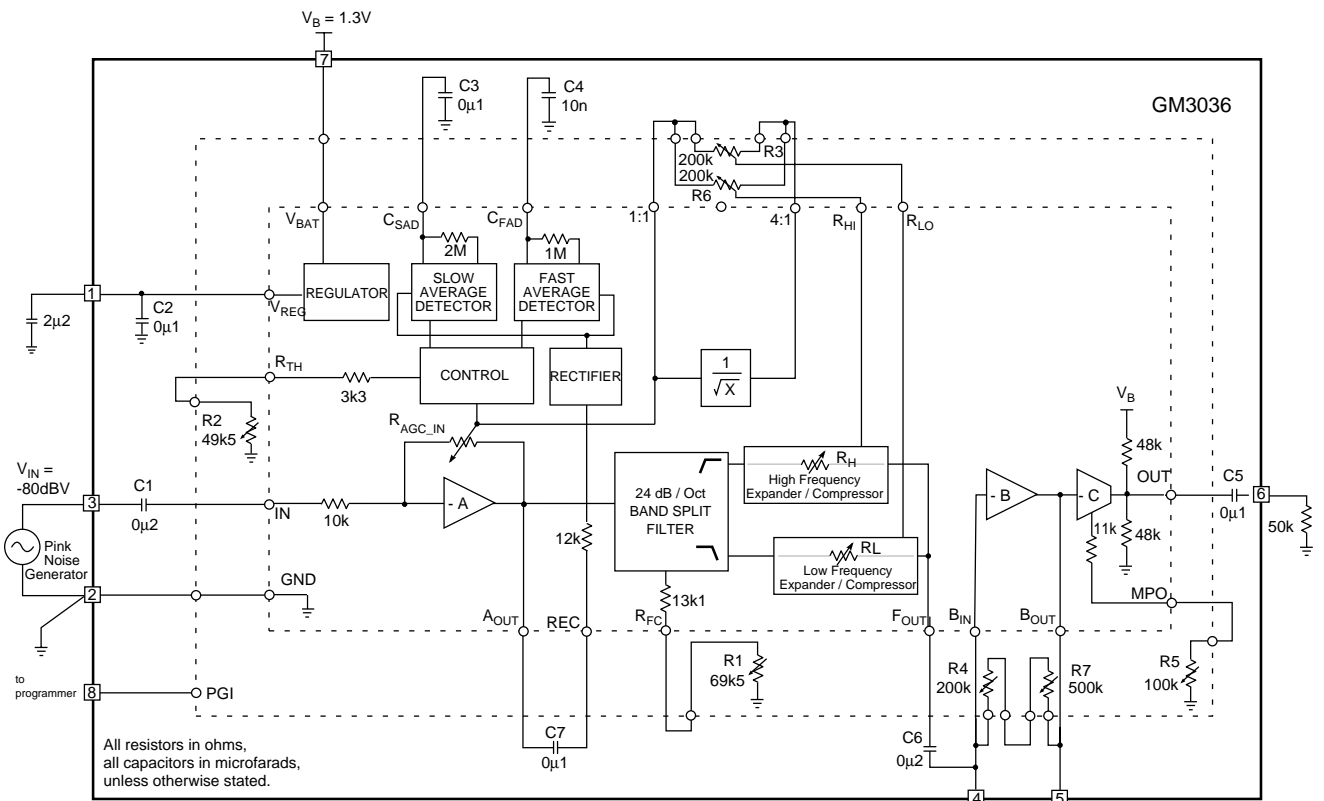


Fig. 3 Characterization Circuit (Used to generate typical curves)

TABLE OF DEFAULTS

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

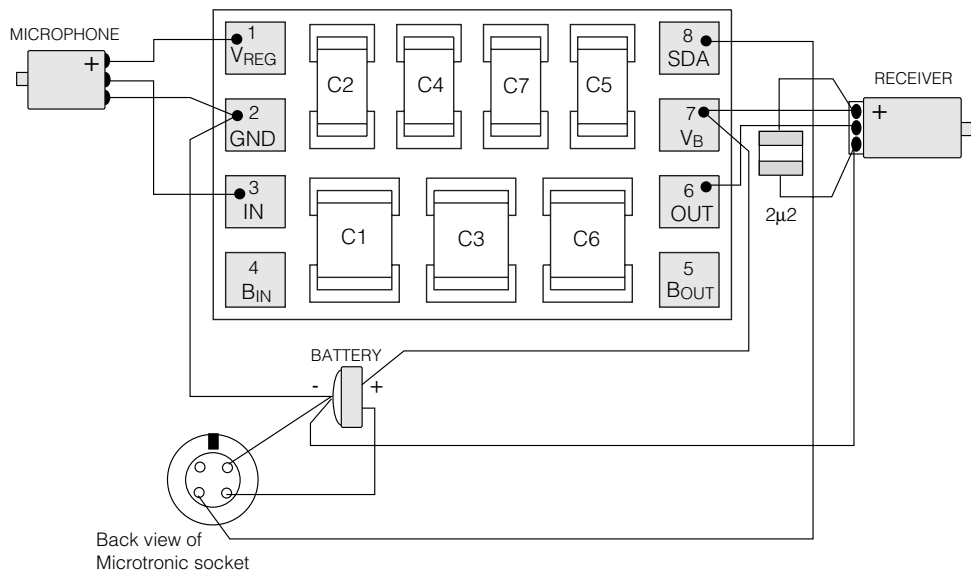


Fig. 4 Typical Assembly Diagram

**TYPICAL PERFORMANCE CURVES**

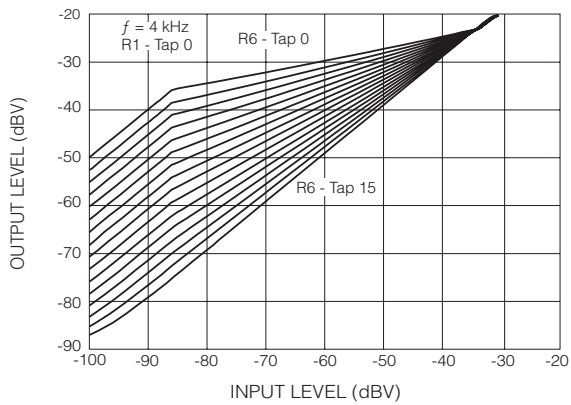


Fig. 5 I/O Transfer Function for Different Compression Ratios (High Frequency Channel)

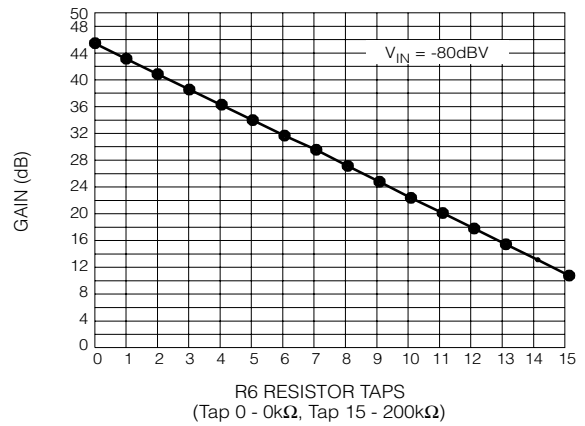


Fig. 6 High Frequency Gain (Compression Ratio Adjustment)

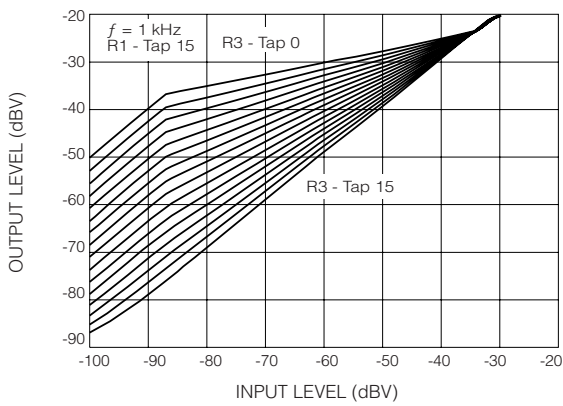


Fig. 7 I/O Transfer Function for Different Compression Ratios (Low Frequency Channel)

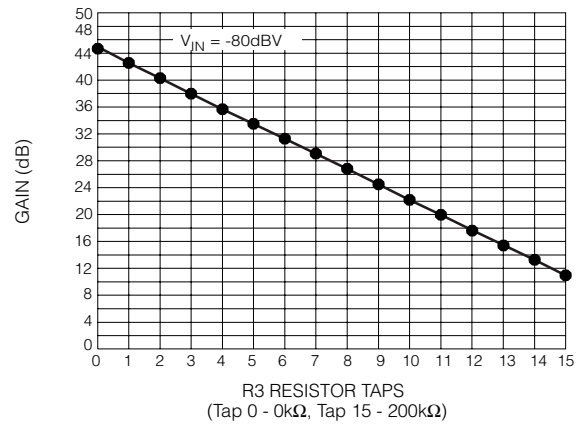


Fig. 8 Low Frequency Gain (Compression Ratio Adjustment)

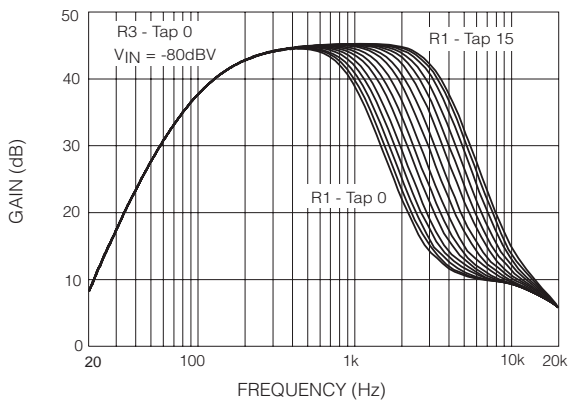


Fig. 9 Frequency Response for Different Crossover Frequency Steps

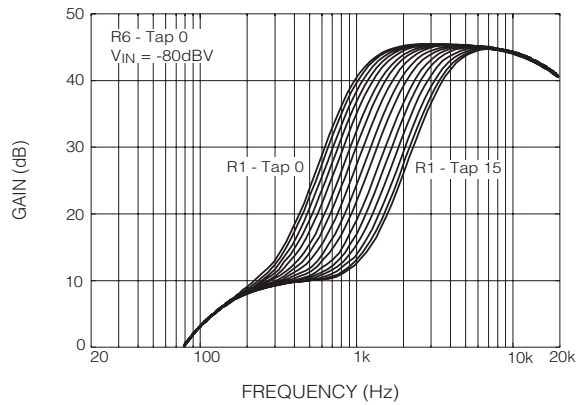


Fig. 10 Frequency Response for Different Crossover Frequency Steps

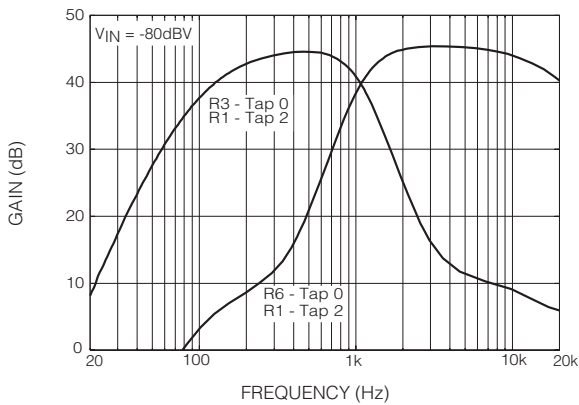


Fig. 11 Crossover Frequency Representation

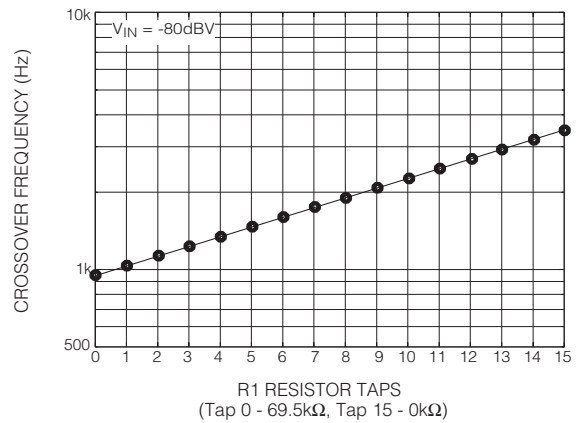


Fig. 12 Crossover Frequency Adjustment  
(Tap 0 - 69.5kΩ, Tap 15 - 0kΩ)

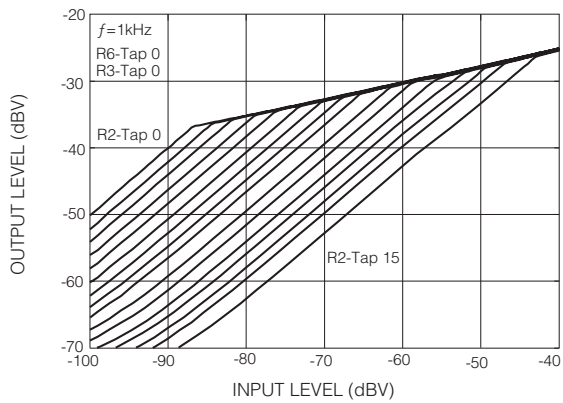


Fig. 13 I/O Transfer Function for Different Thresholds

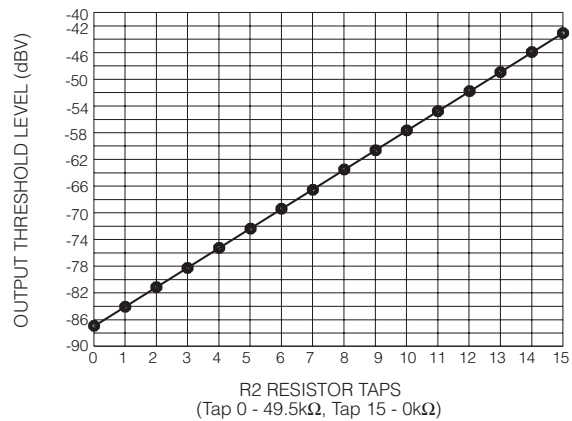


Fig. 14 Threshold Adjustment  
(Tap 0 - 49.5kΩ, Tap 15 - 0kΩ)

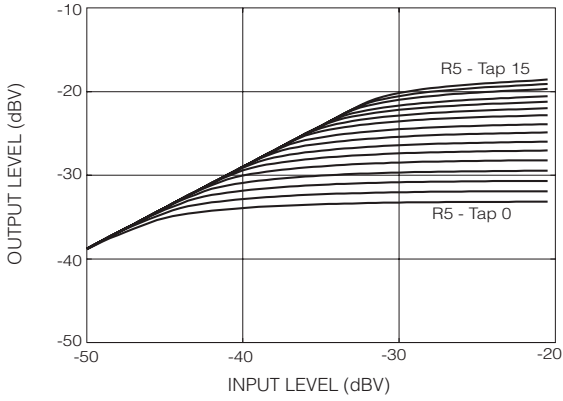


Fig. 15 I/O Transfer Function for Different MPO Steps

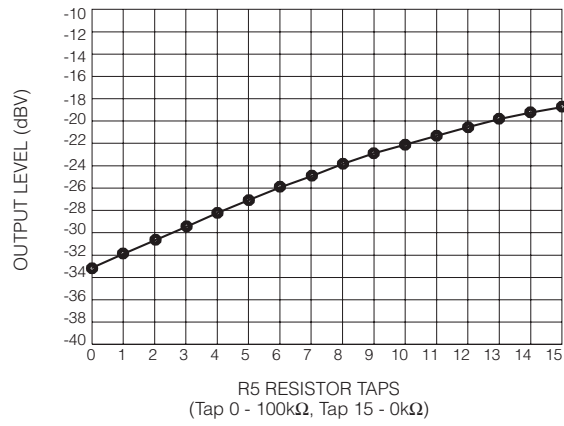


Fig. 16 MPO Adjustment

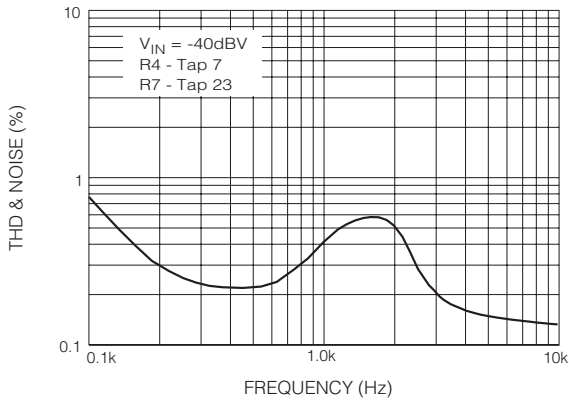


Fig. 17 THD and Noise vs Frequency

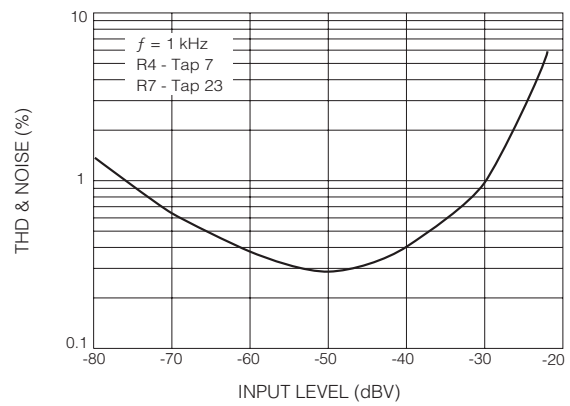


Fig. 18 THD and Noise vs Input Level

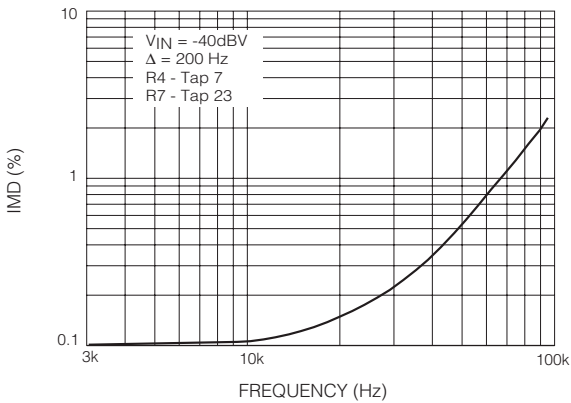


Fig. 19 Intermodulation Distortion (CCIF) vs Frequency

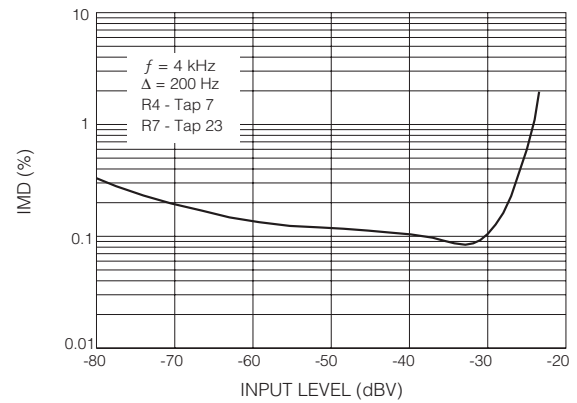


Fig. 20 Intermodulation Distortion (CCIF) vs Input Level

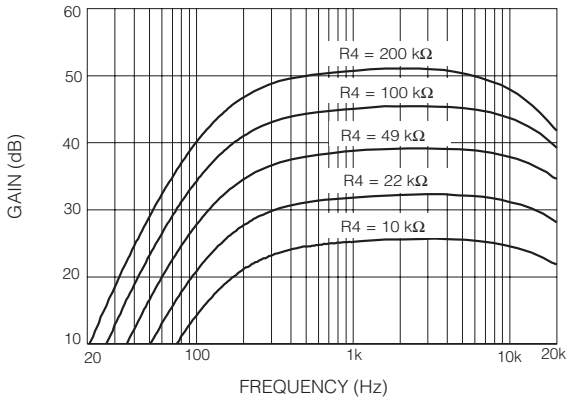
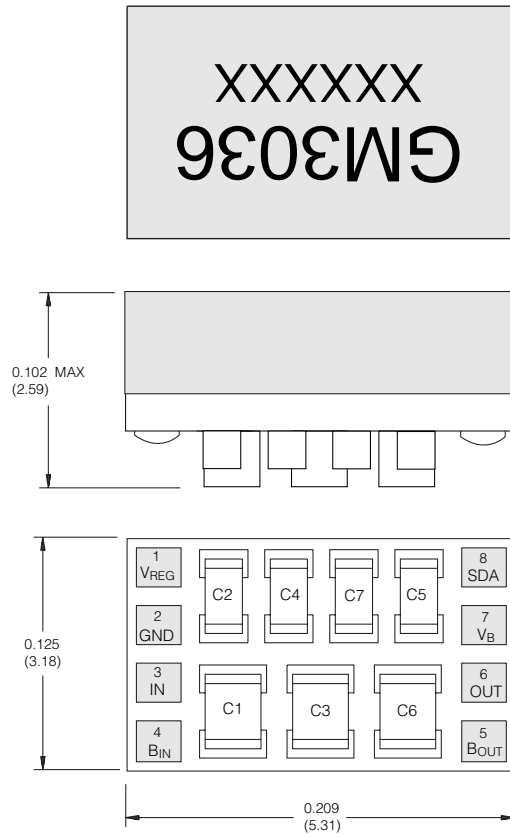


Fig. 21 Frequency Response for Different R4 Values

**PACKAGE DIMENSIONS**



Dimensions are in inches.  
 Dimensions in parenthesis are in millimetres converted from inches and include minor rounding errors.  
 1.0000 inches = 25.400 mm.  
 Dimension tolerances  $\pm 0.003$  ( $\pm 0.08$ ) unless otherwise stated.  
 Pad sizes 0.024 x 0.022 (0.61 x 0.56).  
 XXXXXX - work order number.  
 This hybrid is designed for point-to-point manual soldering.

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**DOCUMENT IDENTIFICATION:** DATA SHEET  
 The product is in production. Gennum reserves the right to make changes at any time to improve reliability, function or design, in order to provide the best product possible.

**REVISION NOTES:**  
 Correction to Lower Threshold minimum value.