

FEATURES

- unique twin average detectors
- dual channel signal processing
- adjustable AGC threshold levels
- MPO range externally adjustable
- handles high input levels (up to 100 mVRMS) cleanly
- designed for CIC instruments
- 2:1 compression of high frequencies
- designed to drive class D integrated receivers
- 65% smaller by volume than DynamEQ® I (GS3011)
- 50% smaller by volume than DynamEQ® I (GS3021)

STANDARD PACKAGING

- Hybrid Typical Dimensions
0.180 in x 0.115 in x 0.080 in
(4.57 mm x 2.92 mm x 2.03 mm)

DESCRIPTION

DynamEQ® I (GS3023) hybrid is a dual channel level dependent input compression amplifier.

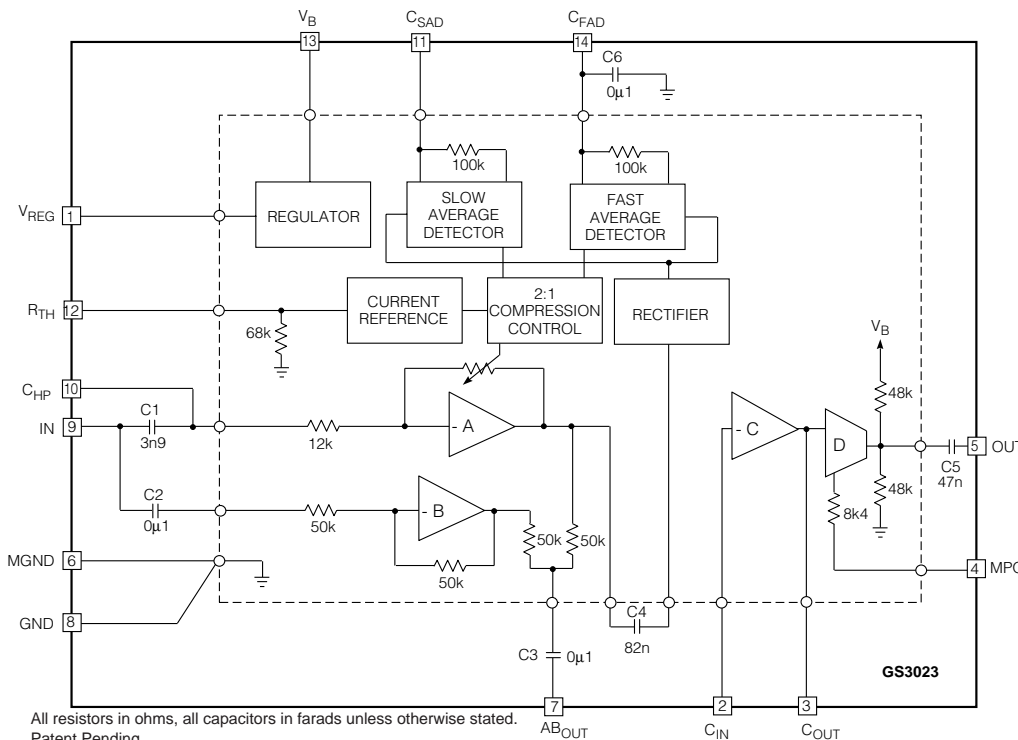
This WDRC (Wide Dynamic Range Compression) system can be easily configured to provide either a TILL (Treble Increases at Low Level) or wideband response.

Twin averaging detector circuits drastically reduce the pumping effects associated with traditional fast attack/slow release systems. The fast detection circuitry cuts in to control the output level during impulsive sounds, but quickly backs out of the way during normal operation.

Low distortion, large signal handling capabilities and constant corner frequency make it ideal for providing loudness growth compensation for many of the mild to moderate cases.

The size of the hybrid and variety of electrical access points, offers system design flexibility perfect for ITC and CIC applications.

Stage A is a highpass channel with 2:1 compression, Stage B is a wideband unity gain buffer. The sum of the two paths gives a high frequency boost to low level signals, which gradually compresses to a flat response at high input levels. Stage C is used for volume control adjustment, while stage D is a fixed gain stage with MPO control designed to drive class D integrated receivers.



FUNCTIONAL BLOCK DIAGRAM

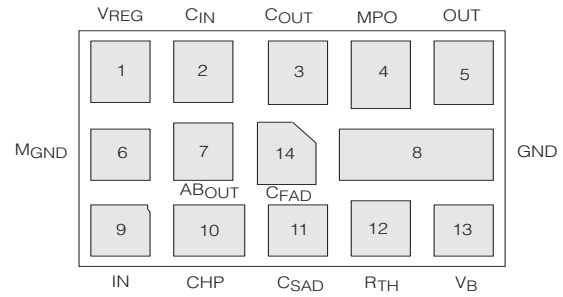
ABSOLUTE MAXIMUM RATINGS

| 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: Input Level $V_{IN} = -97\text{dBV}$, Frequency = 5 kHz, Temperature = 25°C, Supply Voltage $V_B = 1.3\text{ V}$

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|----------------------------|--------------------|--|--------|--------|--------|------------------|
| Hybrid Current | I_{AMP} | $V_{IN} = 0\text{VRMS}$, $RMPO = 50\text{k}\Omega$ | 120 | 230 | 380 | μA |
| Minimum Voltage | V_B | | 1.1 | - | - | V |
| Total Harmonic Distortion | THD | $R_{VC} = 15\text{k}\Omega$; $V_{IN} = -40\text{dBV}$ at 1kHz | - | 0.1 | 1 | % |
| Input Referred Noise | IRN | NFB 0.2 to 10kHz at 12dB/oct | - | 2.5 | - | μVRMS |
| Total System Gain | A_V | | 45 | 48 | 51 | dB |
| AGC | | | | | | |
| Compression Ratio | COMP | $V_{IN} = -60\text{dBV}$ & -80dBV | 1.74:1 | 1.95:1 | 2.11:1 | Ratio |
| Threshold | | | - | -94 | - | dBV |
| Compression Gain Range | A_{RANGE} | $R_{VC} = 10\text{k}\Omega$; Note 1 | 26 | 28 | - | dB |
| High Pass Corner Frequency | f_{HPC} | C_{HP} - Not Connected | - | 3.4 | - | kHz |
| System Gain in Compression | A_{80} | $V_{IN} = -80\text{dBV}$ | 38 | 40 | 42 | dB |
| OUTPUT STAGE | | | | | | |
| Maximum Output Level | MPO | $V_{IN} = -20\text{dBV}$, $RMPO = 0\Omega$ | -14.3 | -12.3 | -10.3 | dBV |
| MPO Range | ΔMPO | $V_{IN} = -20\text{dBV}$, $RMPO = 0$ to $50\text{k}\Omega$ | 13.8 | 15.8 | 17.8 | dB |
| Stage D Gain | A_D | | - | 16 | - | dB |
| REGULATOR | | | | | | |
| Regulator Voltage | V_{REG} | | 0.89 | 0.94 | 0.99 | V |

All parameters remain as shown in the Test Circuit unless otherwise stated in CONDITIONS column

Notes: 1. $A_{RANGE} = V_{P3}[V_{IN} = -97\text{dBV}] - V_{P3}[V_{IN} = -20\text{ dBV}] + 77\text{dBV}$

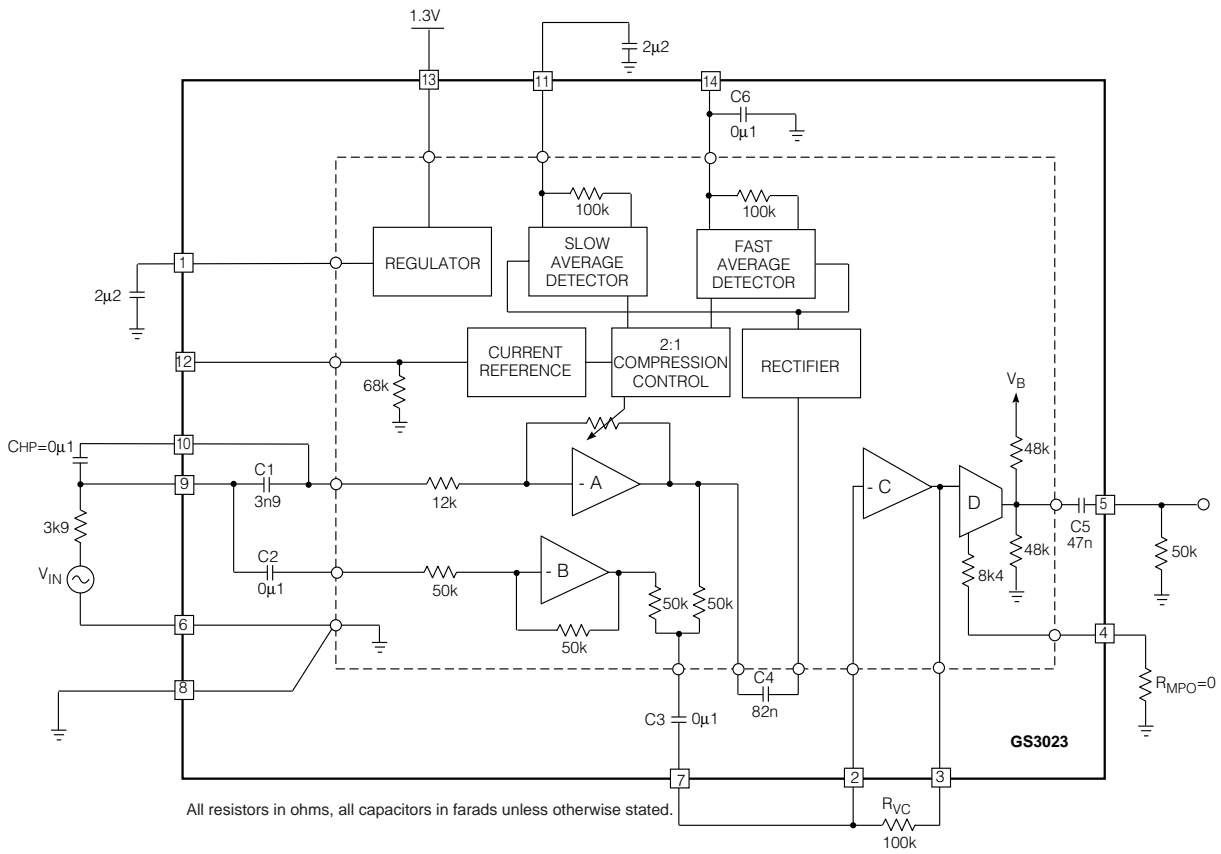


Fig.1 Production Test Circuit

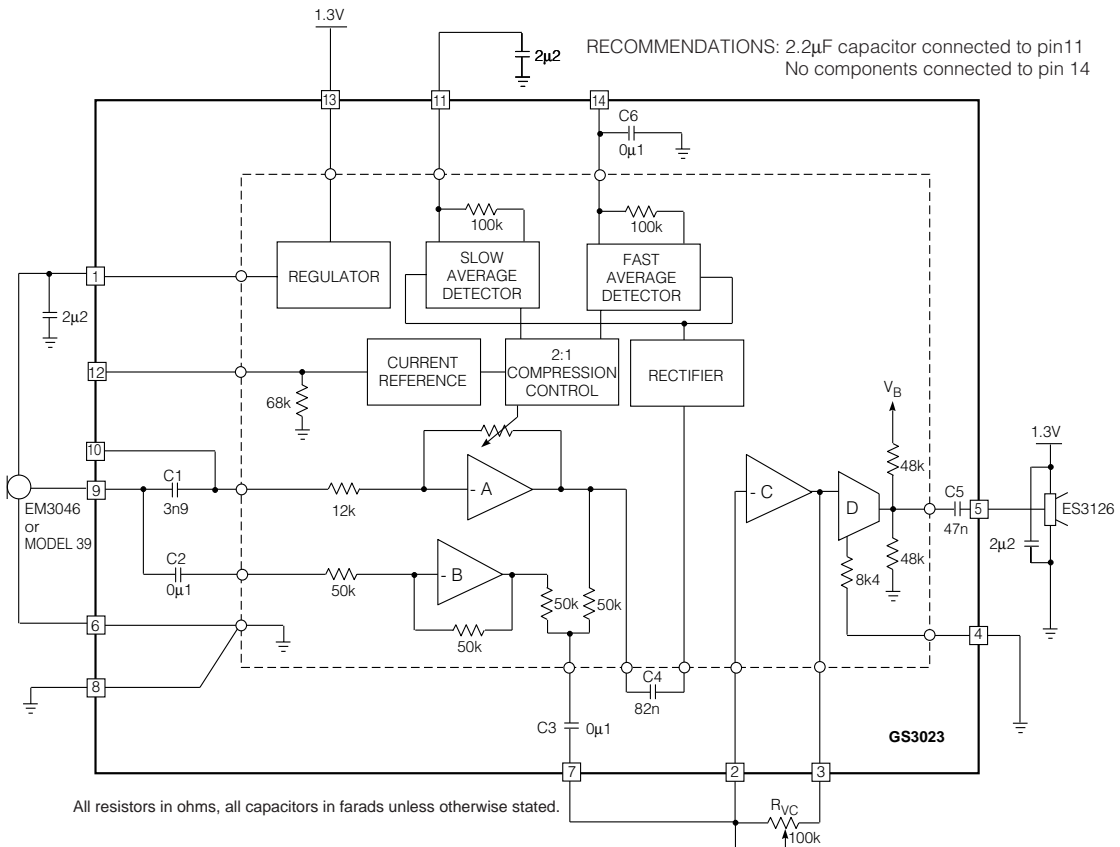


Fig. 2 Typical Hearing Instrument Application

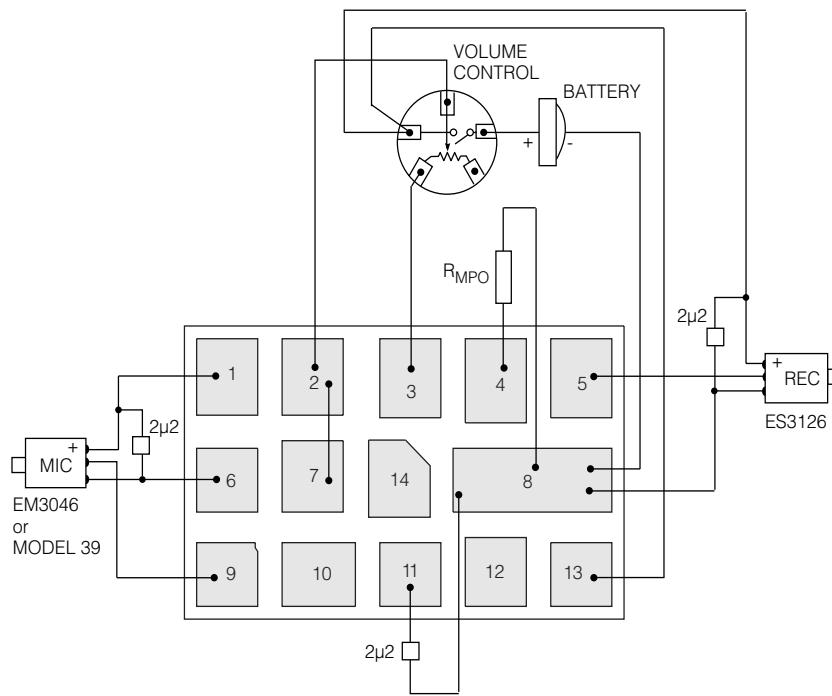


Fig. 3 Typical Assembly Diagram

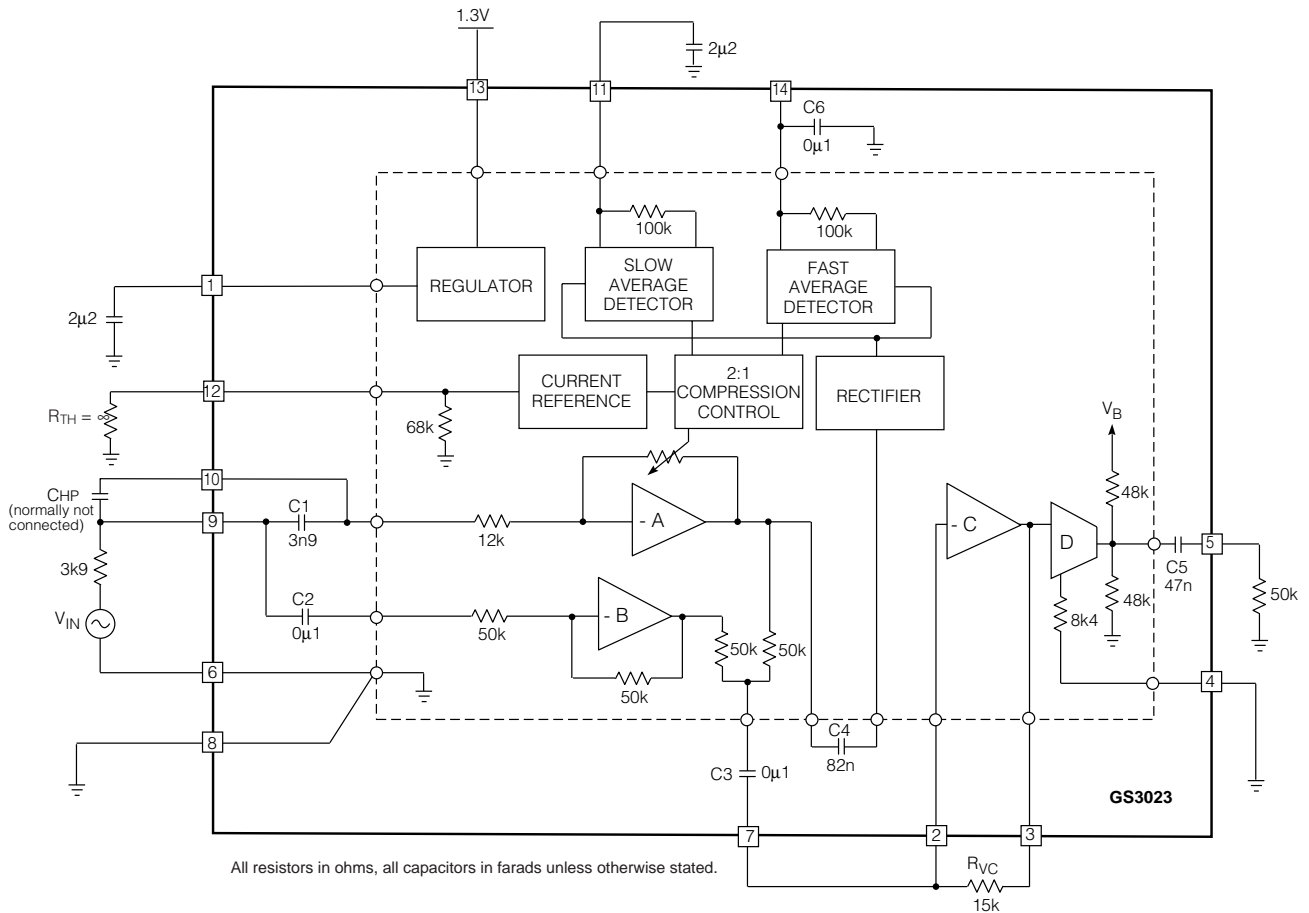


Fig. 4 Characterization Circuit (used to generate typical curves)

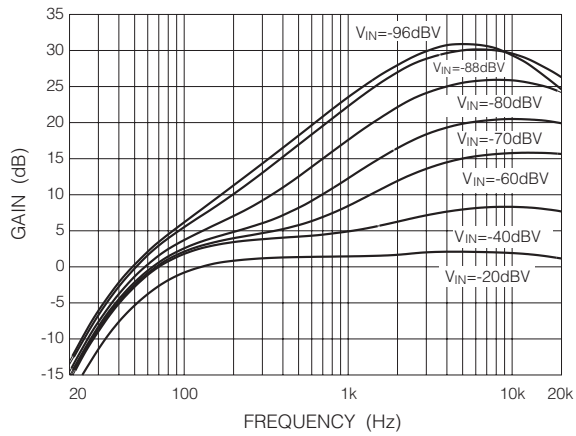


Fig. 5 Frequency Response for Different Input Levels

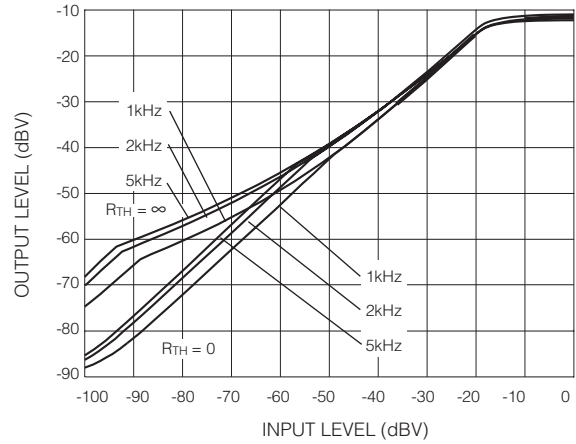


Fig. 6 I/O Transfer Function for Different Test Frequencies. Shown for Min/Max R_{TH} Resistors Values

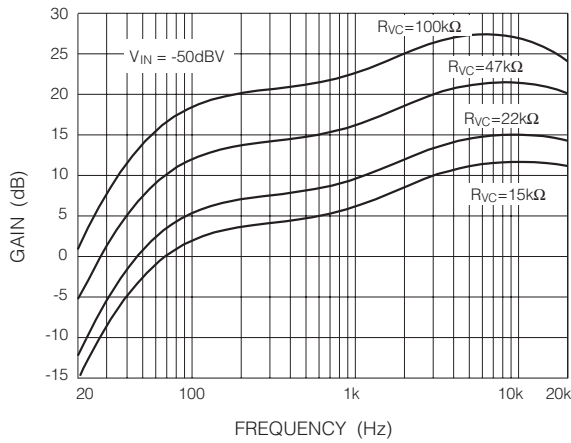


Fig. 7 Frequency Response for Different R_{VC} Values

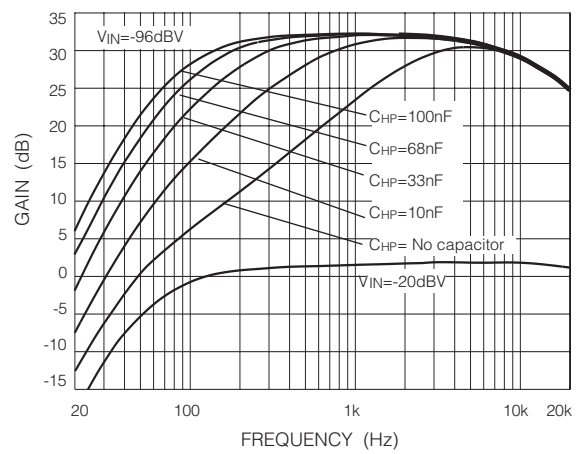


Fig. 8 Corner Frequency vs C_{HP} Capacitor Value

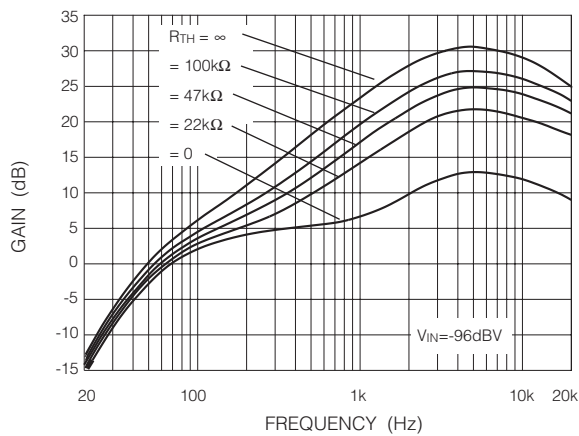


Fig. 9 Frequency Characteristics for Different R_{TH} Values

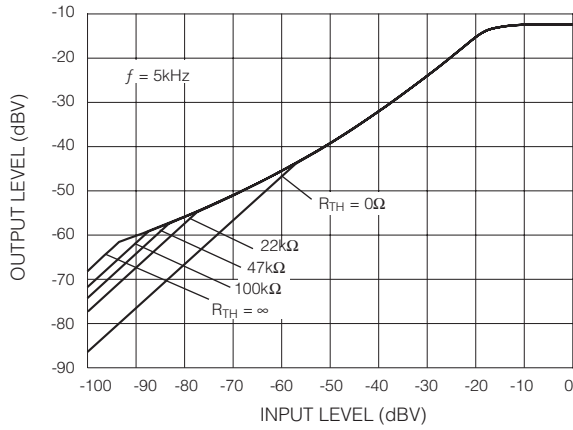


Fig. 10 I/O Transfer Function for Different R_{TH} Resistors

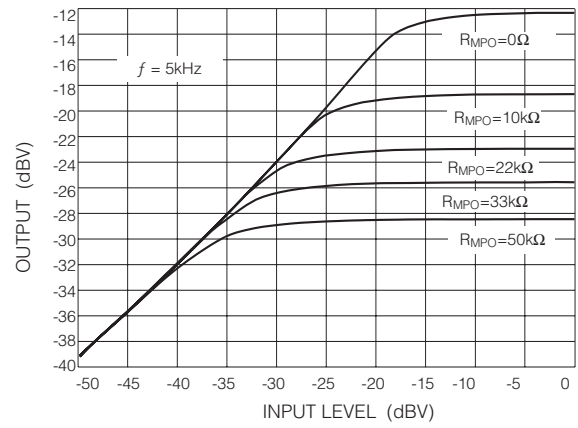


Fig. 11 I/O for Various R_{MPO} Settings

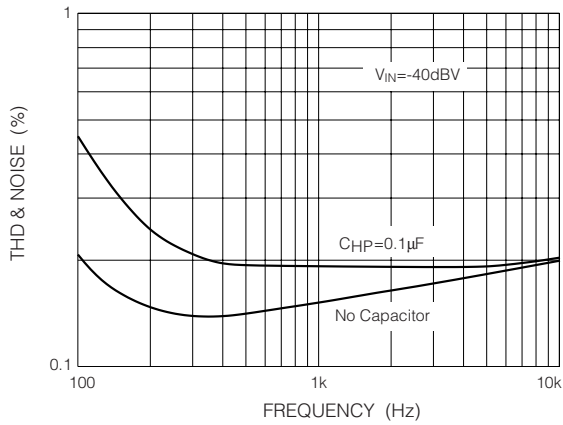


Fig. 12 THD & Noise vs Frequency

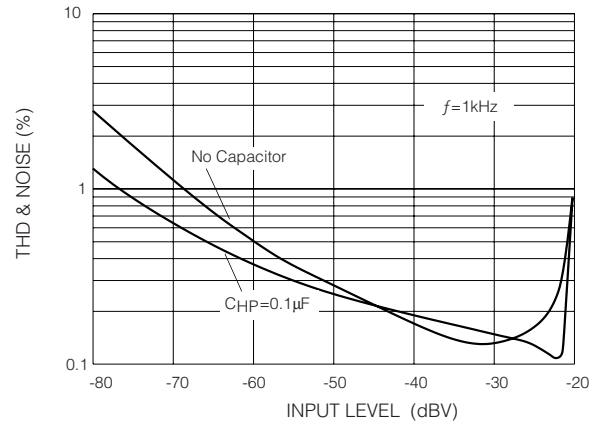


Fig. 13 THD & Noise vs Input Level

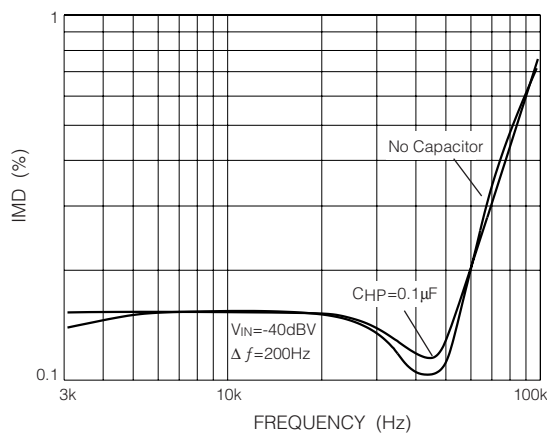


Fig. 14 Intermodulation Distortion (CCIF) vs Frequency

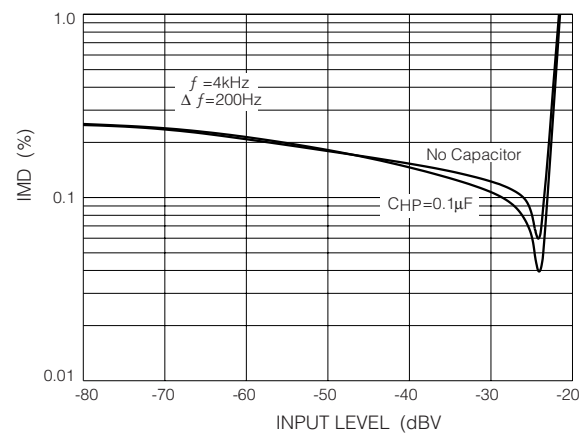
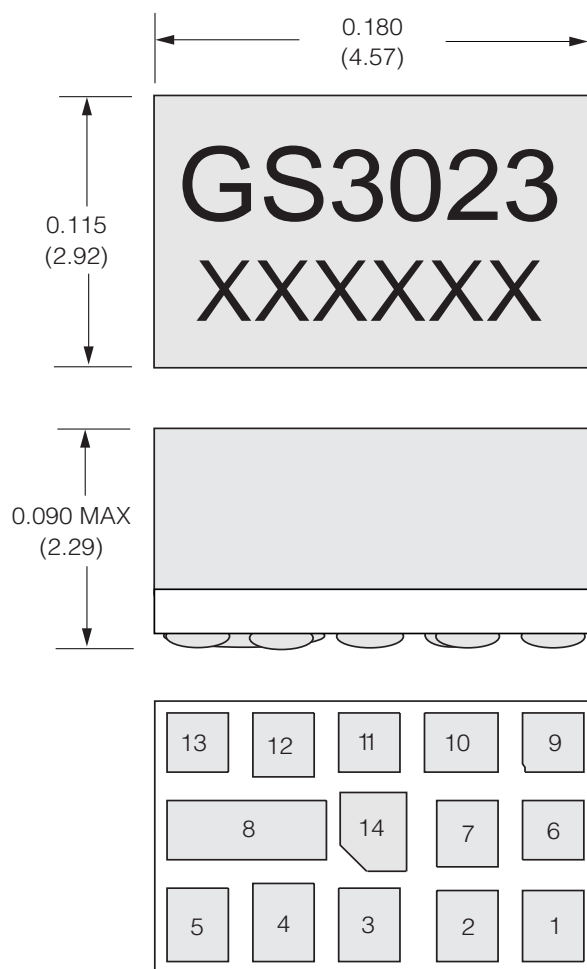


Fig. 15 Intermodulation Distortion (CCIF) vs Level



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.
 Dimension ± 0.005 (+0.13) unless otherwise stated.
 Pad numbers for illustration purposes only.
 Smallest pad 0.025 x 0.025 (0.64 x 0.64)
 Largest pad 0.025 x 0.065 (0.64 x 1.65)
 XXXXXX - work order number.
 This hybrid is designed for point to point soldering.

Fig. 16 Hybrid Layout & Dimensions

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| <p>DOCUMENT IDENTIFICATION: DATA SHEET The product is in production. Genum reserves the right to make changes at any time to improve reliability, function or design, in order to provide the best product possible.</p> |
| <p>REVISION NOTES: Updated to Data sheet</p> |