

## Audio Limiter

### ■ GENERAL DESCRIPTION

The **NJM2761** is the audio limiter for speaker protection.  
The limit level is adjustable by external resistor.  
It is suitable for PC, potable audio and others.

### ■ PACKAGE OUTLINE



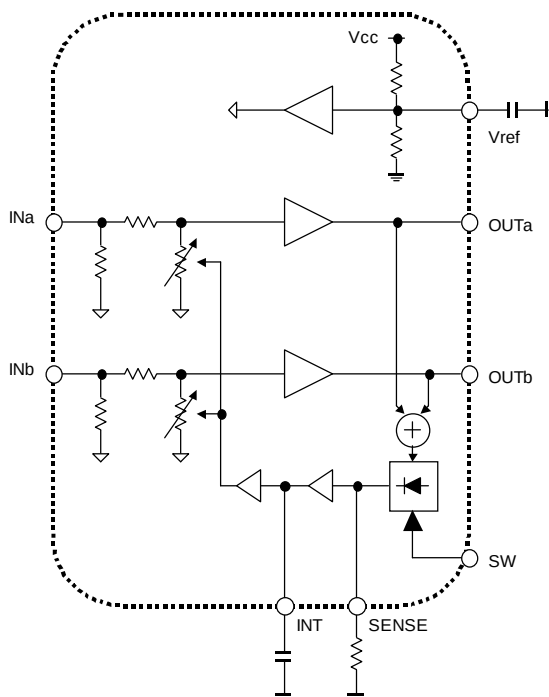
NJM2761RB2

NJM2761V

### ■ FEATURES

- |                                             |                 |
|---------------------------------------------|-----------------|
| ● Wide Operating Voltage                    | +2.7V to +13.0V |
| ● Variable Limit Level by external resistor | 0.2 to 1V       |
| ● Low Output Noise                          | -90dBV max.     |
| ● Bipolar Technology                        |                 |
| ● Package Outline                           | TVSP10, SSOP14  |

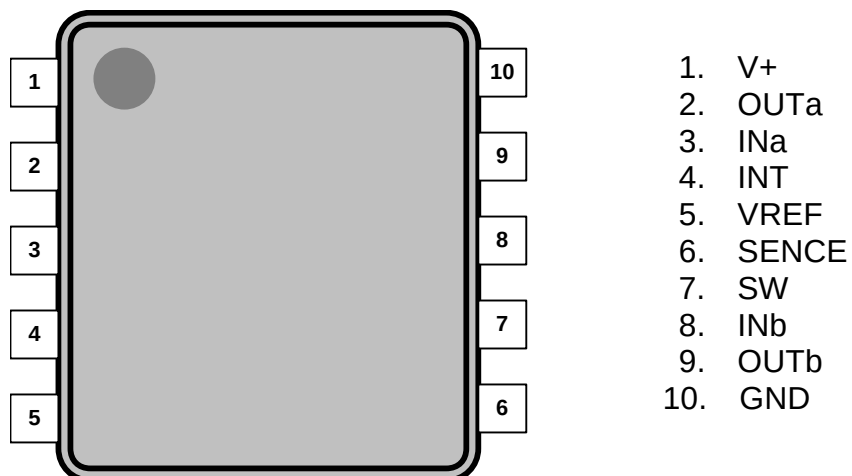
### ■ BLOCK DIAGRAM



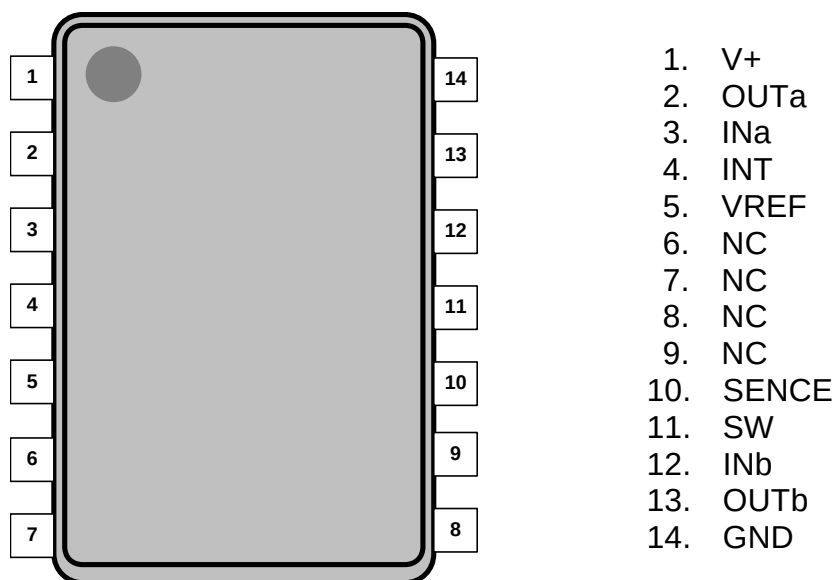
# NJM2761

## ■ PIN CONFIGURATION

TVSP10



SSOP14



## ■ABSOLUTE MAXIMUM RATING (Ta=25°C)

| PARAMETER                   | SYMBOL    | RATINGS                    | UNIT |
|-----------------------------|-----------|----------------------------|------|
| Supply Voltage              | $V^+$     | 14                         | V    |
| Power Dissipation           | $P_D$     | 320(TVSP10)<br>300(SSOP14) | mW   |
| Operating Temperature Range | $T_{opr}$ | -20 to +75                 | °C   |
| Storage Temperature Range   | $T_{stg}$ | -40 to +125                | °C   |

## ■ELECTRICAL CHARACTERISTICS

### ● POWER SUPPLY (Ta=25°C, $V^+=5V$ unless otherwise specified)

| PARAMETER         | SYMBOL    | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-------------------|-----------|----------------|------|------|------|------|
| Operating Voltage | $V^+$     | -              | 2.7  | 5.0  | 13.0 | V    |
| Operating Current | $I_{CC}$  | No Signal      | -    | 1.5  | 2.0  | mA   |
| Reference Voltage | $V_{ref}$ | No Signal      | 2.2  | 2.5  | 2.7  | V    |

### ● AC CHARACTERISTICS

(Ta=25°C,  $V^+=5V$ ,  $V_{IN}=1V_{rms}/f=1kHz$ ,  $R_{sense}=20k\Omega$ , BW=400-30kHz unless otherwise specified)

| PARAMETER                 | SYMBOL     | TEST CONDITION                                       | MIN. | TYP.         | MAX.          | UNIT                     |
|---------------------------|------------|------------------------------------------------------|------|--------------|---------------|--------------------------|
| Limit Level 1             | $G_{LIM1}$ |                                                      | 150  | 200          | 250           | mVrms                    |
| Limit Level 2             | $G_{LIM2}$ | $V^+=13V$ , $R_{sense}=4k\Omega$ , $V_{IN}=2V_{rms}$ | 0.7  | 1.0          | 1.3           | Vrms                     |
| Limit Off                 | $G_{OFF}$  | SW=2V                                                | 0.9  | 1.0          | 1.1           | Vrms                     |
| Output Noise              | $V_{NO}$   | $R_S=0\Omega$ , A-weighting,                         | -    | -100<br>(10) | -90<br>(31.6) | dBV<br>( $\mu V_{rms}$ ) |
| Total Harmonic Distortion | THD+N      |                                                      | -    | -            | 1             | %                        |
| Cross Talk                | CT         |                                                      | -    | -            | -70           | dB                       |
| Ripple Rejection          | RR         | $V_{ripple}=100mV_{rms}$ , $f=1kHz$                  | -    | -            | -70<br>(316)  | dBV<br>( $\mu V_{rms}$ ) |

### ● CONTROL CHARACTERISTICS (Ta=25°C, $V^+=5V$ unless otherwise specified)

| PARAMETER                | SYMBOL   | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|--------------------------|----------|----------------|------|------|------|------|
| Low Level Input Voltage  | $V_{IL}$ | -              | -    | -    | 0.5  | V    |
| High Level Input Voltage | $V_{IH}$ | -              | 2.0  | -    | -    | V    |

## ■CONTROL TERMINAL EXPLANATION

SW(TVSP10:7pin, SSOP14:11pin)

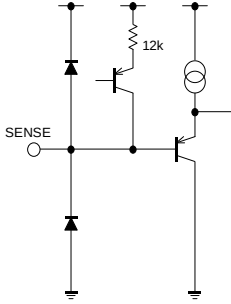
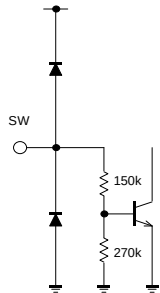
| MODE        | STATUS | NOTE                   |
|-------------|--------|------------------------|
| Limiter ON  | L      | Limiter is active.     |
| Limiter OFF | H      | Limiter is not active. |

# NJM2761

## ■TERMINAL DESCRIPTION

| No,<br>TVSP10(SSOP14) | SYMBOL       | FUNCTION                                                       | EQUIVALENT CIRCUIT | VOLTAGE |
|-----------------------|--------------|----------------------------------------------------------------|--------------------|---------|
| 1                     | V+           | Power Supply Terminal                                          |                    | -       |
| 2<br>9(13)            | OUTa<br>OUTb | Ach Output Terminal<br>Bch Output Terminal                     |                    | V+/2    |
| 3<br>8(12)            | INa<br>INb   | Ach Input Terminal<br>Bch Input Terminal                       |                    | V+/2    |
| 4                     | INT          | Smoothing Capacitor<br>Connection<br>Terminal                  |                    | 0.7V    |
| 5                     | VREFIN       | Reference Voltage Stabilizing<br>Capacitor Connection Terminal |                    | V+/2    |

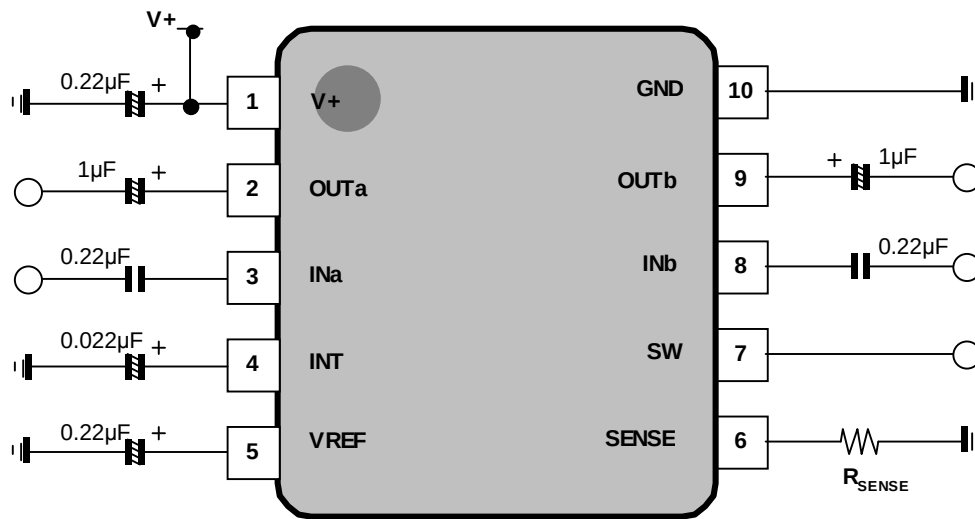
## ■ TERMINAL DESCRIPTION

| No.<br>TVSP10(SSOP14) | SYMBOL | FUNCTION                                                | EQUIVALENT CIRCUIT                                                                    | VOLTAGE |
|-----------------------|--------|---------------------------------------------------------|---------------------------------------------------------------------------------------|---------|
| 6(10)                 | SENSE  | Resister Connection Terminal<br>for Limit Level Setting |     | 0V      |
| 7(11)                 | SW     | Limiter ON/OFF Switch                                   |    | -       |
| 10(14)                | GND    | Ground Terminal                                         |  | -       |

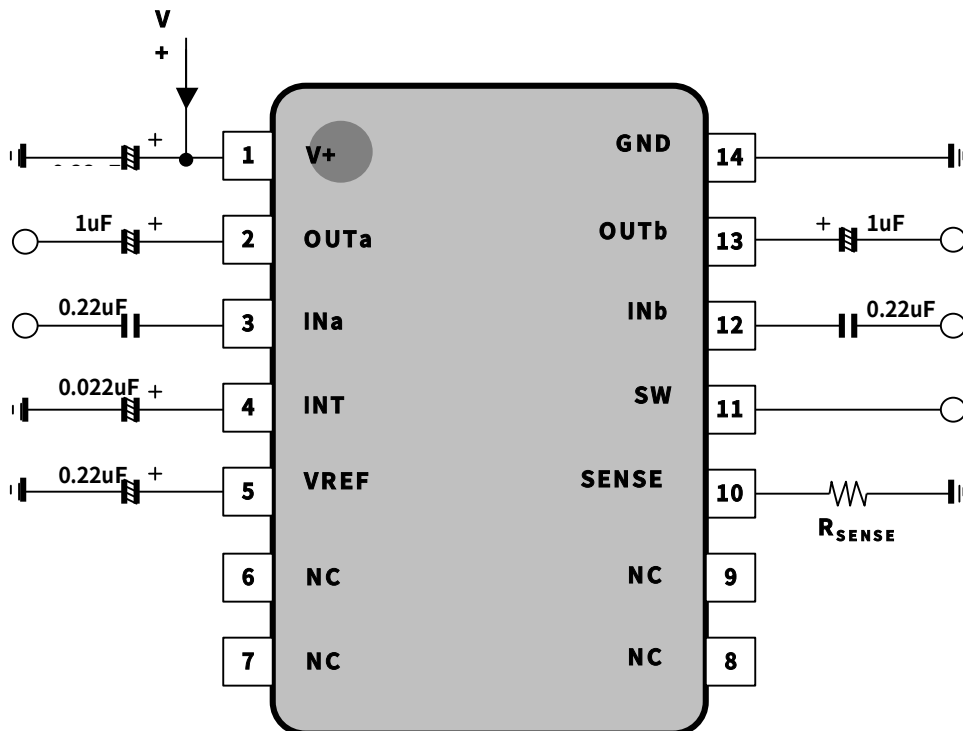
# NJM2761

## APPLICATION CIRCUIT

TVSP10



SSOP14



- \* The limit level is twice as much as set point when a signal is input into a either one channel of Ach or Bch.
- \* For the above reason, monaural signal should input both INa and INb.

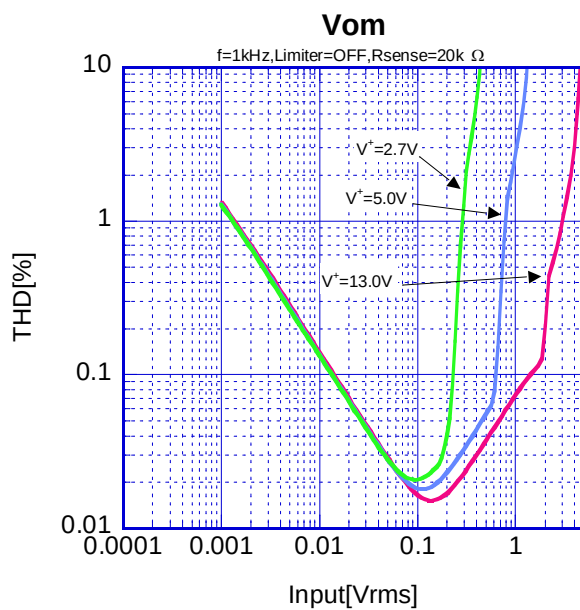
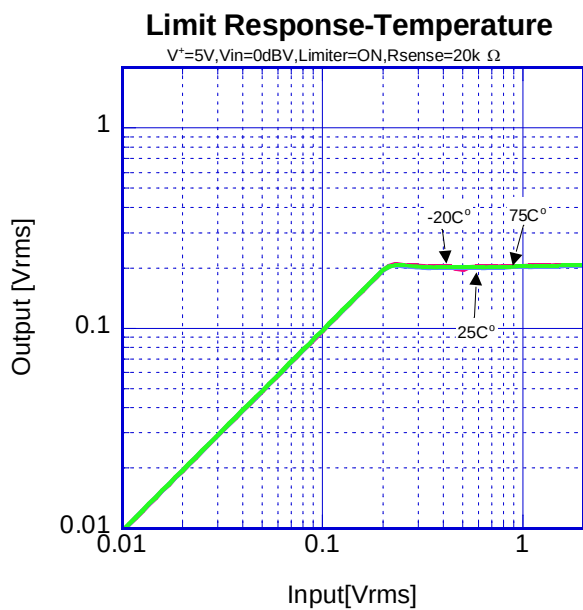
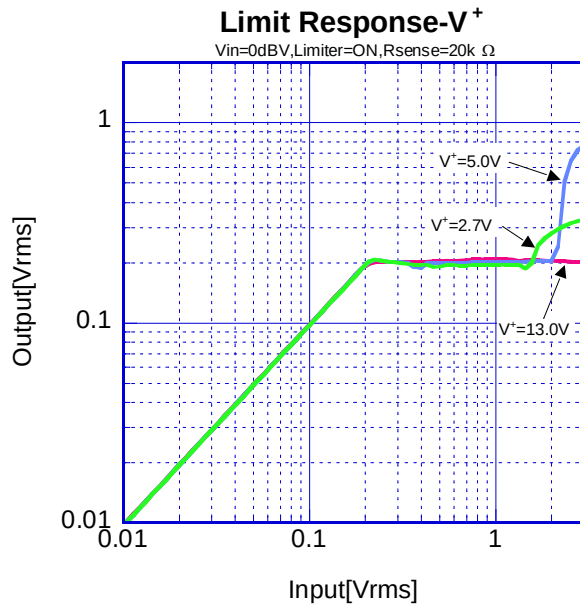
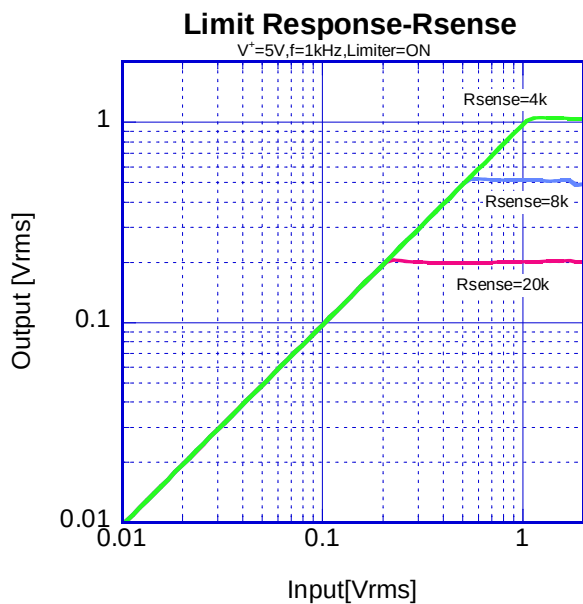
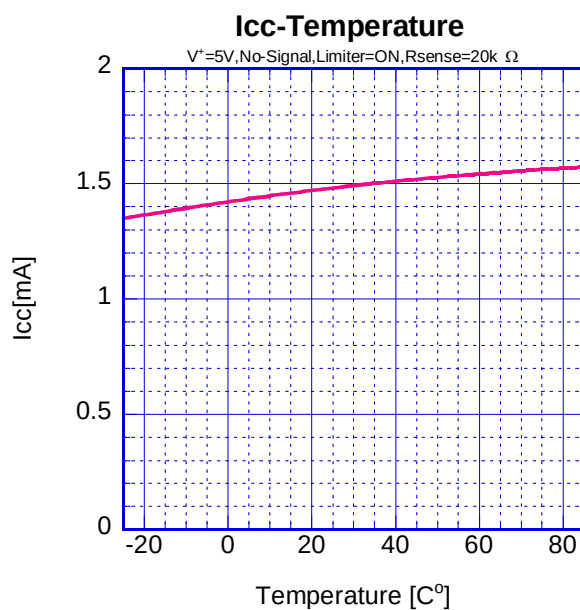
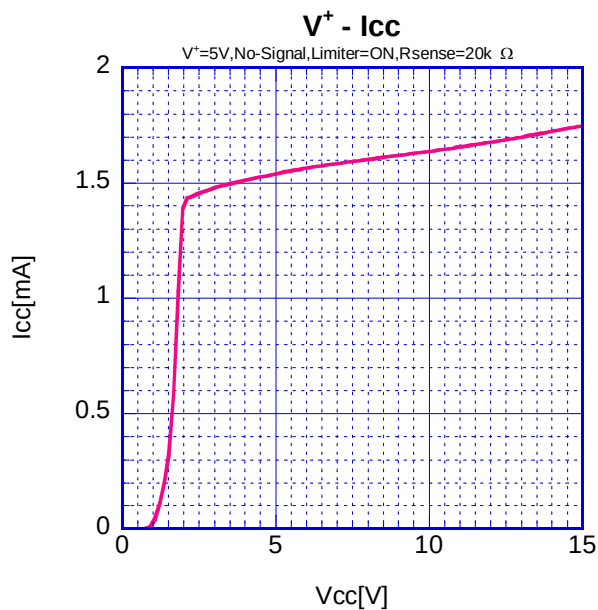
$$R_{SENSE} = 4000 / V_{lim} [\text{Ohm}]$$

$V_{lim}$ : Limit level (Vrms)

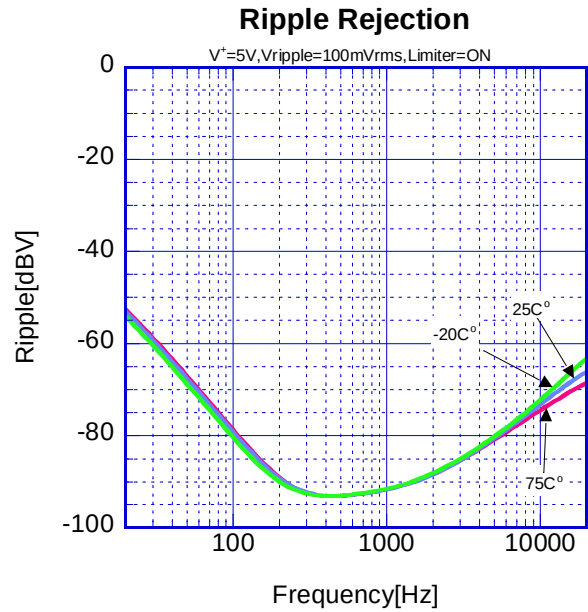
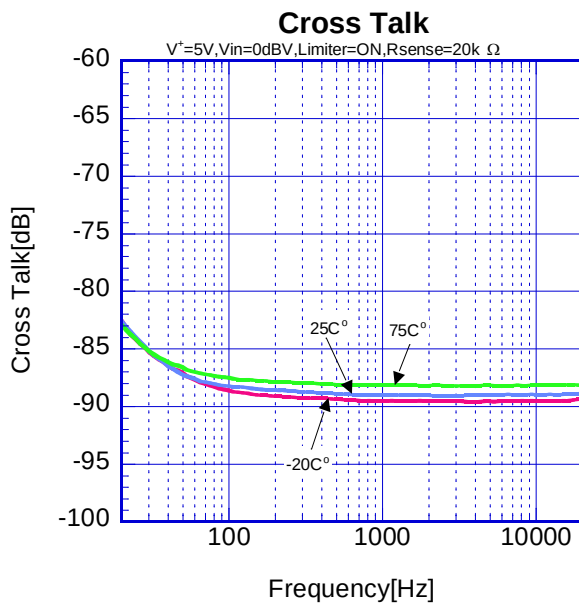
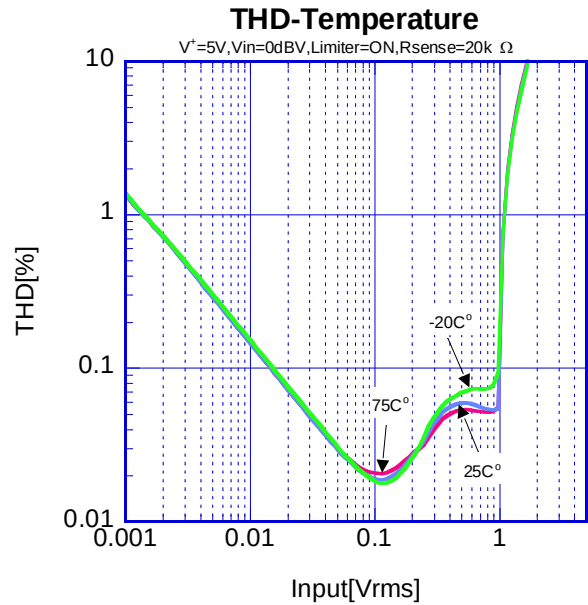
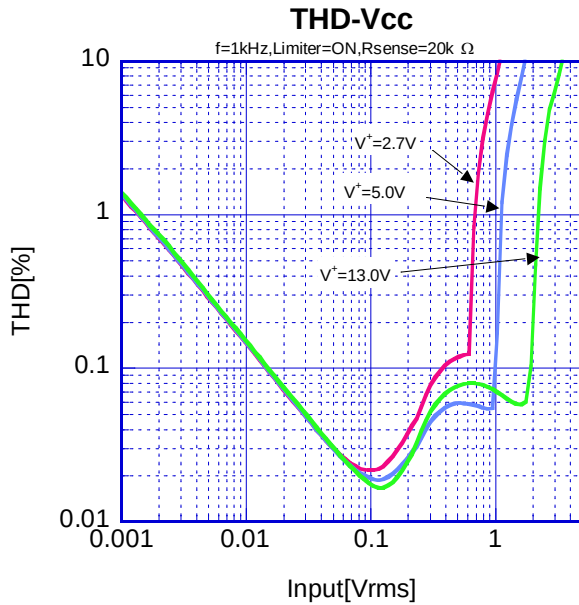
Limit range: 200mVrms to 1Vrms (20k to 4kOhm)

- \* Please be careful of leakage current from the surrounding wiring because the INT terminal is high impedance.

## TYPICAL CHARACTERISTICS



## TYPICAL CHARACTERISTICS



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