

Single Supply, Rail-to-Rail Output Single Operational Amplifier

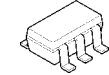
■ GENERAL DESCRIPTION

NJM2741 is a low noise Rail-to-Rail Output single operational amplifier.

Rail-to-Rail Output function provides wide dynamic range, is from ground to power supply level. And Input range rails from ground level.

It is suitable for audio section of portable sets, PCs and any General-purpose applications.

■ PACKAGE OUTLINE



NJM2741F

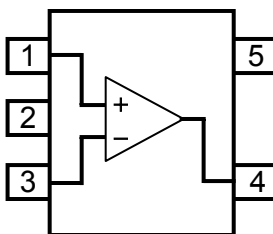


NJM2741F3

■ FEATURES

- Operating Voltage 2.5V to 14V
- Rail-to-Rail Output $V_{OH} \geq 4.9V$ Typ. (at $V^+ = 5V, R_L = 5k\Omega$)
 $V_{OL} \leq 0.1V$ Typ. (at $V^+ = 5V, R_L = 5k\Omega$)
- Offset Voltage 1mV Typ.
- Slew Rate 3.5V/ μ s Typ.
- Low Distortion 0.001% Typ. (at $V^+ = 5V, f = 1kHz$)
- Low Input Voltage Noise 10nV/ \sqrt{Hz} Typ. (at $f = 1kHz$)
- Bipolar Technology
- Package Outline MTP5, SC88A

■ PIN CONFIGURATION



NJM2741F
NJM2741F3
(Top View)

PIN FUNCTION

1. +INPUT
2. GND
3. -INPUT
4. OUTPUT
5. V^+

NJM2741

■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | RATINGS | UNIT |
|----------------------------------|-----------|---|--------------------|
| Supply Voltage | V^+ | 15 | V |
| Differential Input Voltage Range | V_{ID} | ± 15 (Note1) | V |
| Common Mode Input Voltage Range | V_{ICM} | 0 to 15 (Note1) | V |
| Power Dissipation | P_D | 390[MTP5] (Note2) 280[SC88A] (Note2) | mW |
| Operating Temperature Range | T_{opr} | -40 to +85 | $^{\circ}\text{C}$ |
| Storage Temperature Range | T_{stg} | -50 to +125 | $^{\circ}\text{C}$ |

(Note1) For supply voltage less than 15V, the absolute maximum input voltage is equal to the supply voltage.

(Note2) On the PCB "EIA/JEDEC (76.2x114.3x1.6mm, two layers, FR-4)"

■ OPERATING VOLTAGE ($T_a=25^{\circ}\text{C}$)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|----------------|--------|-----------|------|
| Supply Voltage | V^+ | 2.5 to 14 | V |

■ ELECTRICAL CHARACTERISTICS

● DC CHARACTERISTICS ($V^+=5\text{V}, T_a=25^{\circ}\text{C}$)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---------------------------------|-----------|---|------|------|------|------|
| Operating Current | I_{CC} | $R_L=\infty, V_{IN}=2.5\text{V}$, No Signal Apply | - | 2.2 | 3.3 | mA |
| Input Offset Voltage | V_{IO} | $R_S \leq 10\text{k}\Omega$ | - | 1 | 6 | mV |
| Input Bias Current | I_B | | - | 100 | 350 | nA |
| Input Offset Current | I_{IO} | | - | 5 | 100 | nA |
| Large Signal Voltage Gain | A_V | $R_L \geq 10\text{k}\Omega$ to 2.5V, $V_o=0.5\text{V}$ to 4.5V | 65 | 85 | - | dB |
| Common Mode Rejection Ratio | CMR | $0\text{V} \leq V_{CM} \leq 4\text{V}$ | 60 | 75 | - | dB |
| Supply Voltage Rejection Ratio | SVR | $V^+=2.5\text{V}$ to 14V, $V_{CM}=V^+/2$ | 60 | 80 | - | dB |
| Output Voltage | V_{OH} | $R_L=5\text{k}\Omega$ to 2.5V | 4.75 | 4.9 | - | V |
| | V_{OL} | $R_L=5\text{k}\Omega$ to 2.5V | - | 0.1 | 0.25 | V |
| Input Common Mode Voltage Range | V_{ICM} | CMR $\geq 60\text{dB}$ | 0 | - | 4 | V |

● AC CHARACTERISTICS ($V^+=5\text{V}, T_a=25^{\circ}\text{C}$)

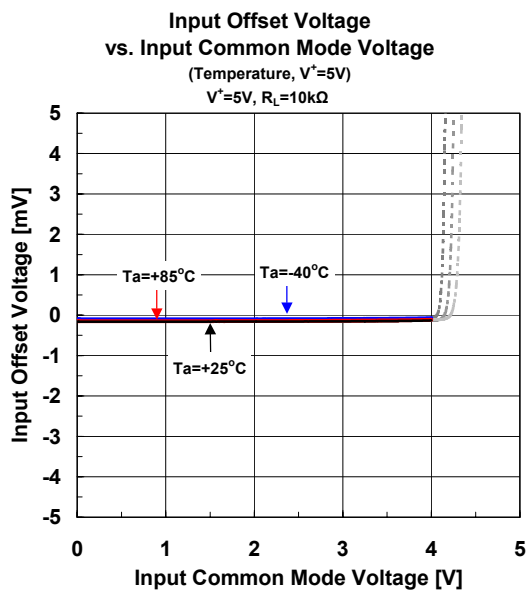
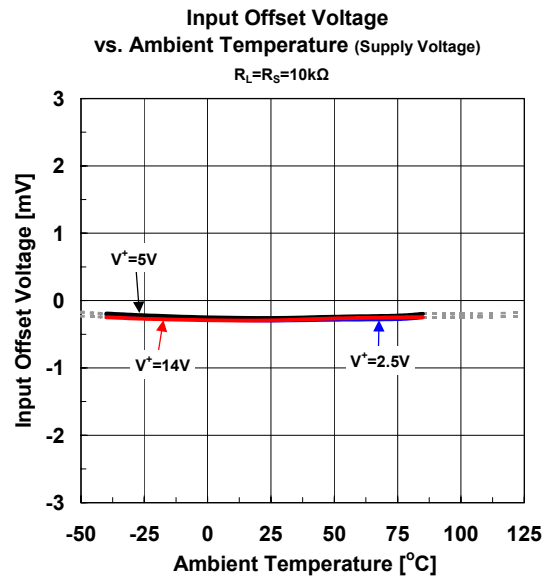
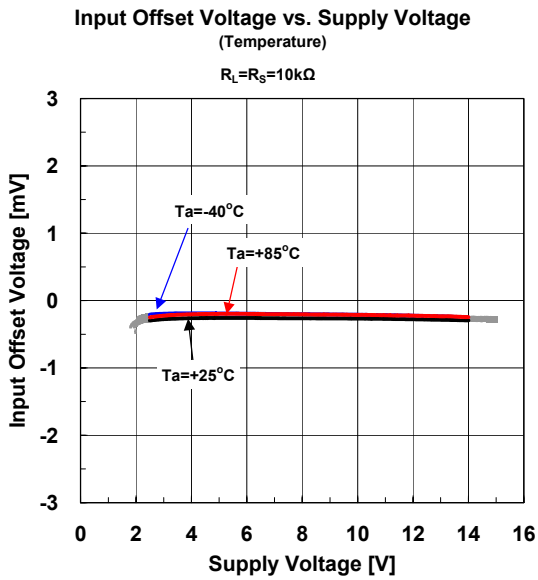
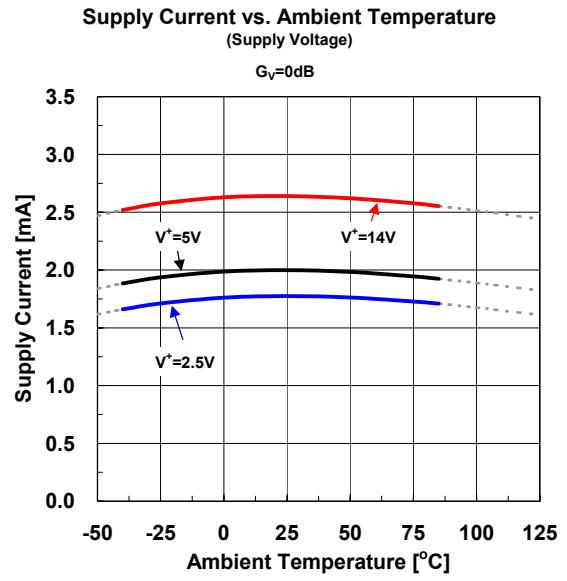
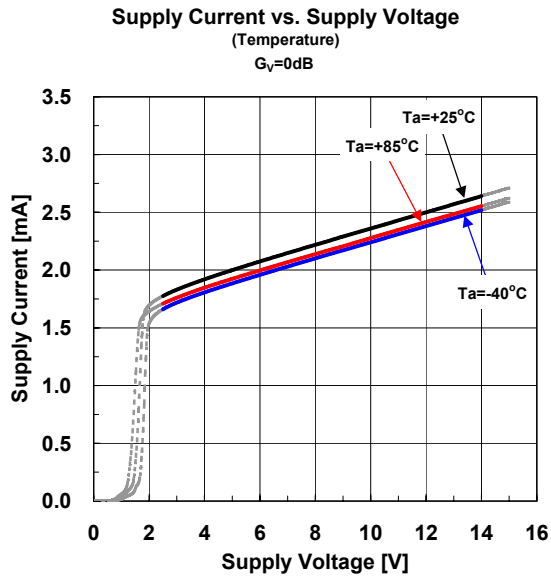
| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|--------------------------------|----------|--|------|-------|------|------------------------|
| Unity Gain Bandwidth | GB | $f=10\text{kHz}, R_L=10\text{k}\Omega$ to 2.5V | - | 10 | - | MHz |
| Phase Margin | Φ_M | $R_L=10\text{k}\Omega$ to 2.5V, $C_L=10\text{pF}$ | - | 75 | - | Deg |
| Equivalent Input Noise Voltage | V_{NI} | $f=1\text{kHz}, V_{CM}=2.5\text{V}$ | - | 10 | - | nV/ $\sqrt{\text{Hz}}$ |
| Total Harmonic Distortion | THD | $f=1\text{kHz}, A_V=+2$ $R_L=10\text{k}\Omega$ to 2.5V, $V_o=1.5\text{V}_{rms}$ | - | 0.001 | - | % |

● AC CHARACTERISTICS ($V^+=5\text{V}, T_a=25^{\circ}\text{C}$)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-----------|--------|---|------|------|------|------------------|
| Slew Rate | SR | (Note 3), $A_V=1, V_{IN}=2\text{V}_{pp}$ $R_L=10\text{k}\Omega$ to 2.5V, $C_L=10\text{pF}$ | - | 3.5 | - | V/ μs |

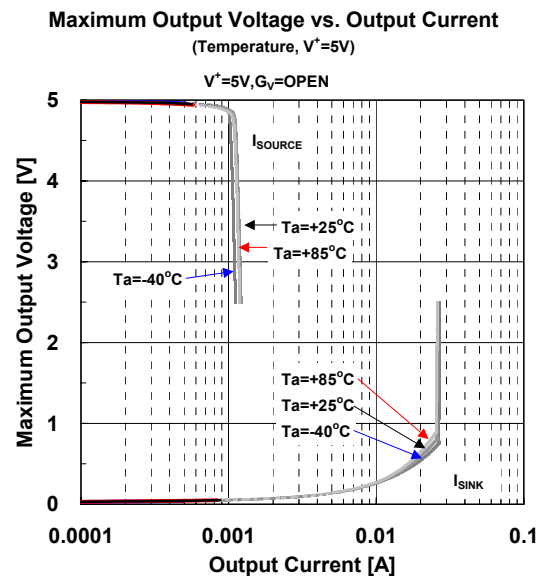
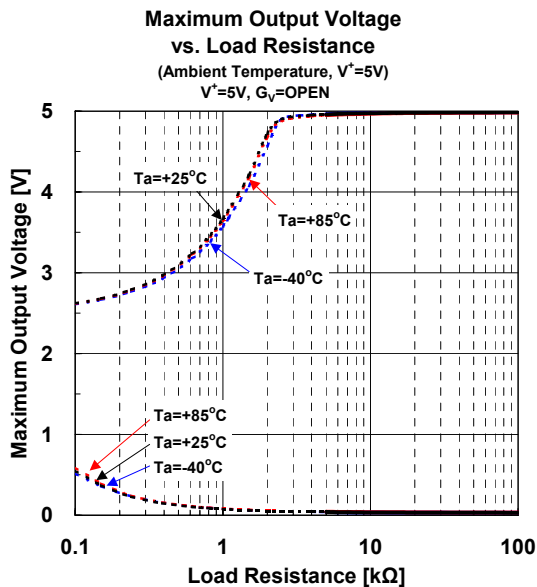
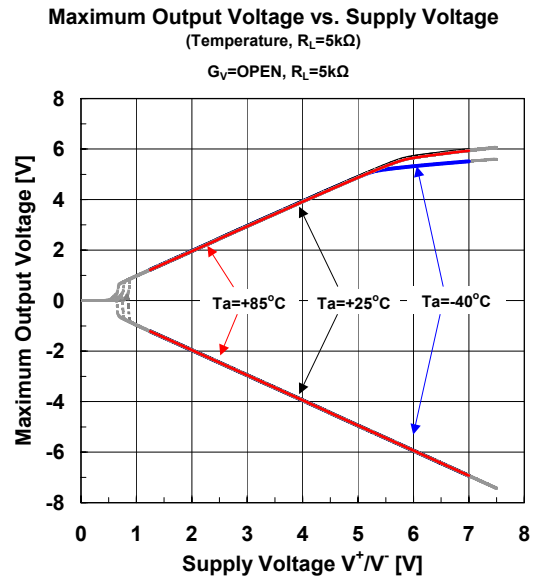
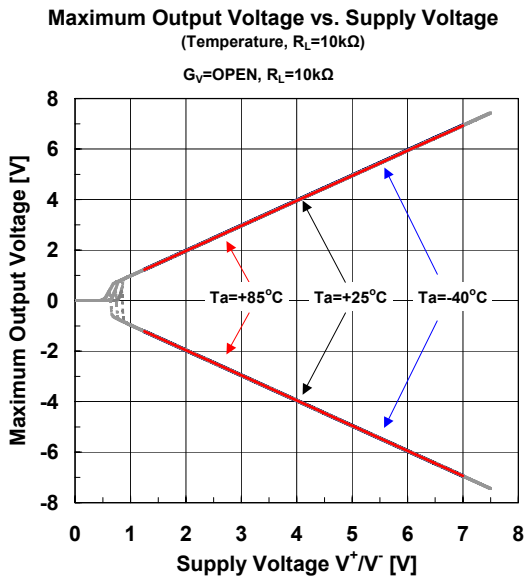
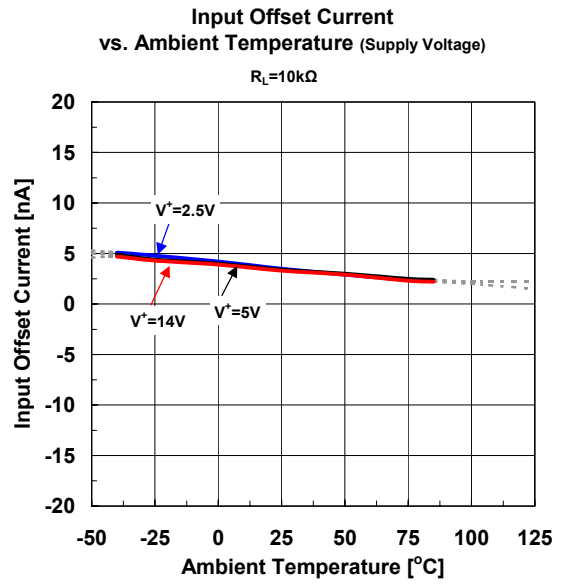
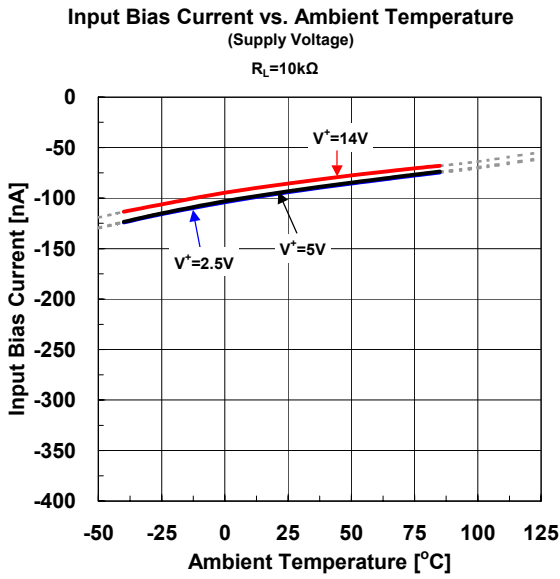
(Note 3) Number specified is the slower of the positive and negative slew rates.

■ Typical Characteristics

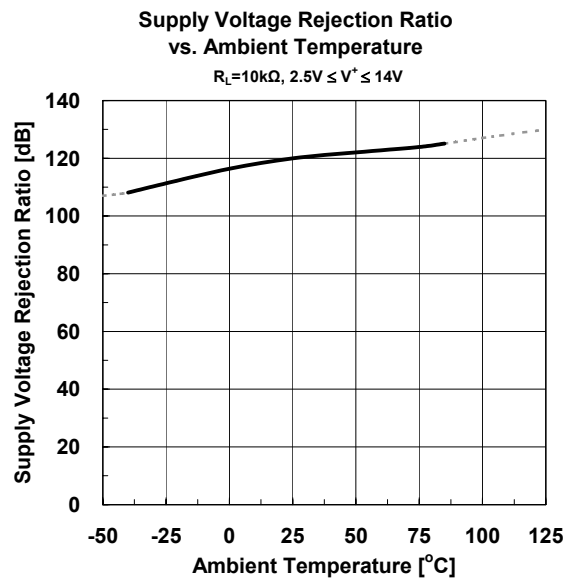
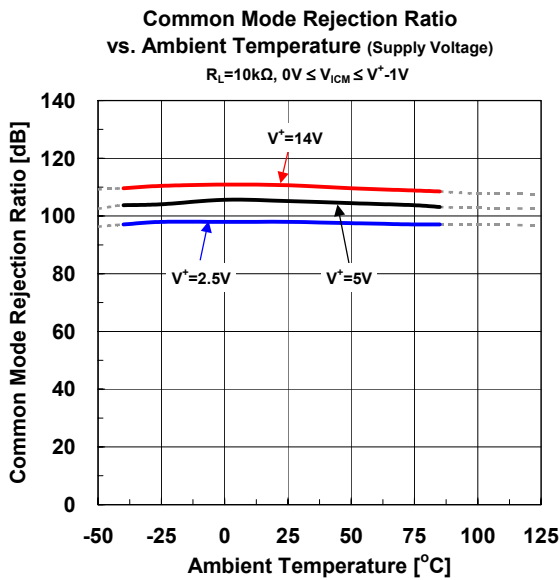
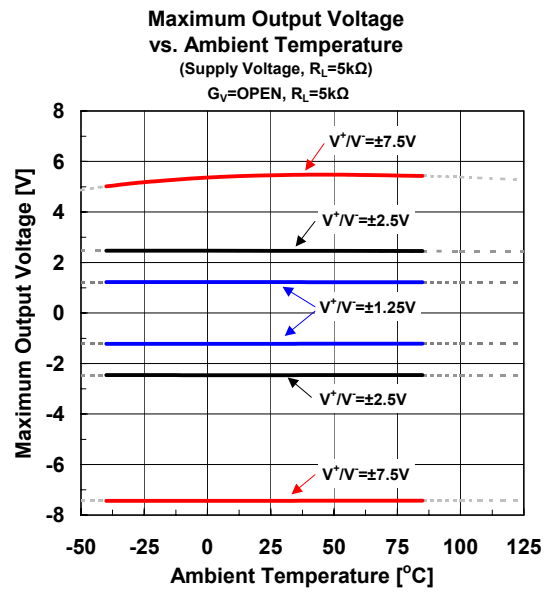
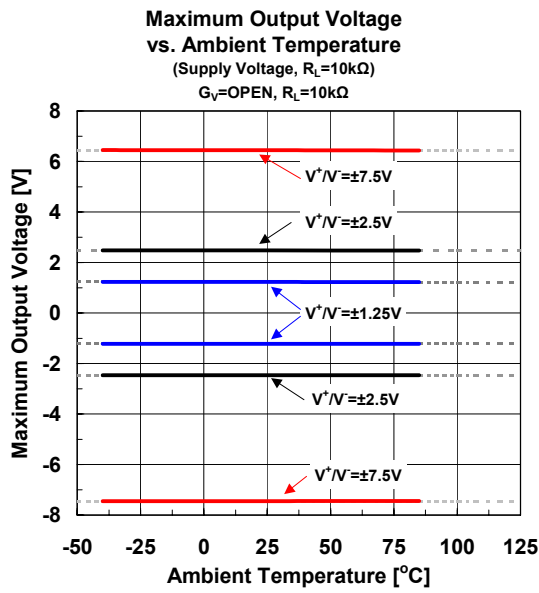


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Typical Characteristics



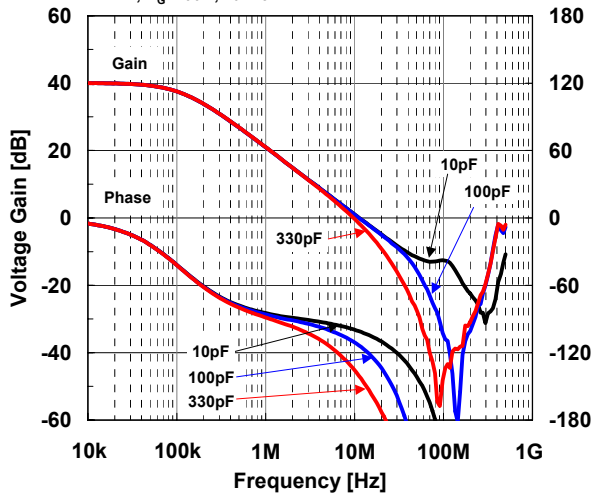
■ Typical Characteristics



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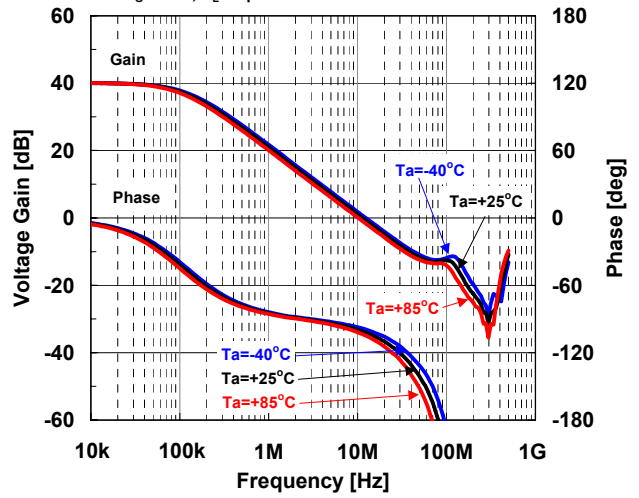
Gain/Phase vs. Frequency (capacitive Load)

$V^+=5V$, $V_{IN}=-30dBm$, $G_V=40dB$, $R_T=50\Omega$, $R_F=10k\Omega$, $R_G=100\Omega$, $T_a=25^\circ C$



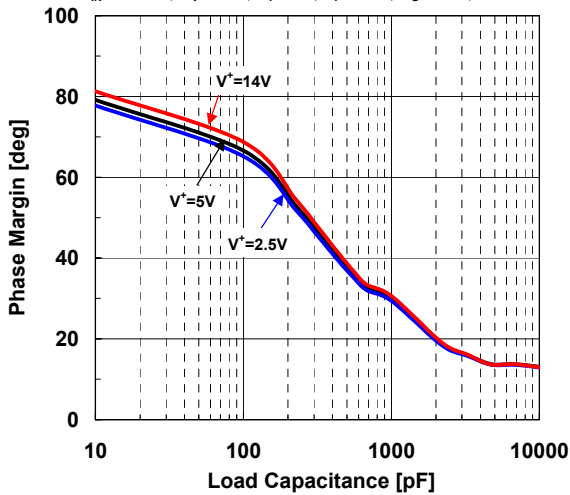
Gain/Phase vs. Frequency (Temperature)

$V^+=5V$, $V_{IN}=-30dBm$, $G_V=40dB$, $R_T=50\Omega$, $R_F=10k\Omega$, $R_G=100\Omega$, $C_L=10pF$



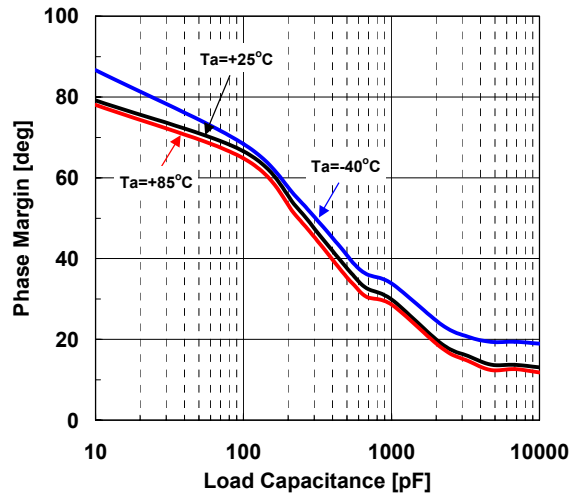
Phase Margin vs. Load Capacitance (Supply Voltage)

$V_{IN}=-30dBm$, $G_V=40dB$, $R_T=50\Omega$, $R_F=10k\Omega$, $R_G=100\Omega$, $T_a=25^\circ C$



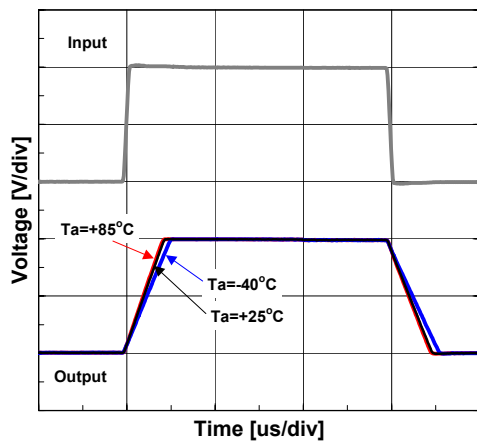
Phase Margin vs. Load Capacitance (Temperature)

$V^+=5V$, $V_{IN}=-30dBm$, $G_V=40dB$, $R_T=50\Omega$, $R_F=10k\Omega$, $R_G=100\Omega$



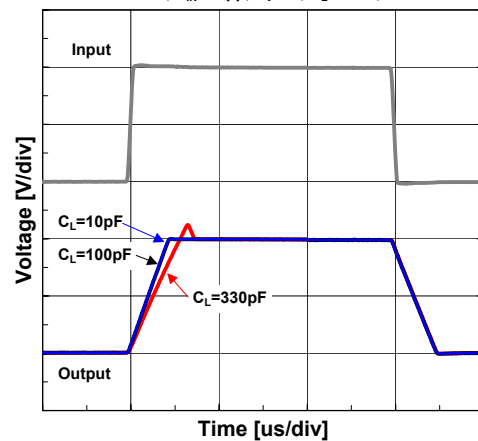
Pulse Response (Ambient Temperature, $V^+/V^-\pm 2.5V$)

$V^+/V^-\pm 2.5V$, $V_{IN}=1V_{pp}$, $A_V=+1$, $R_L=10k\Omega$, $C_L=10pF$

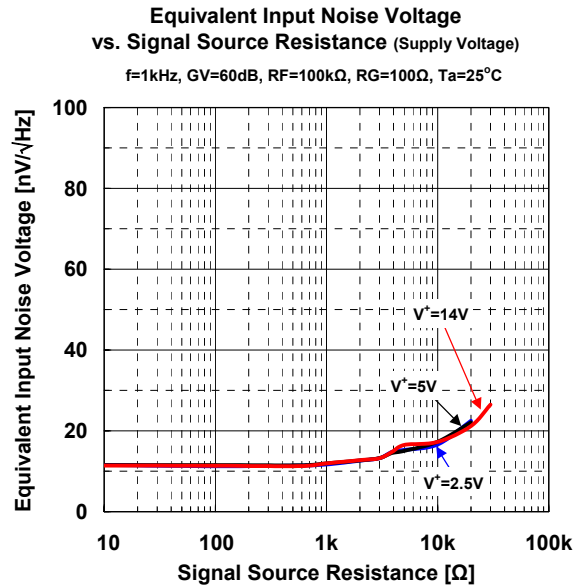
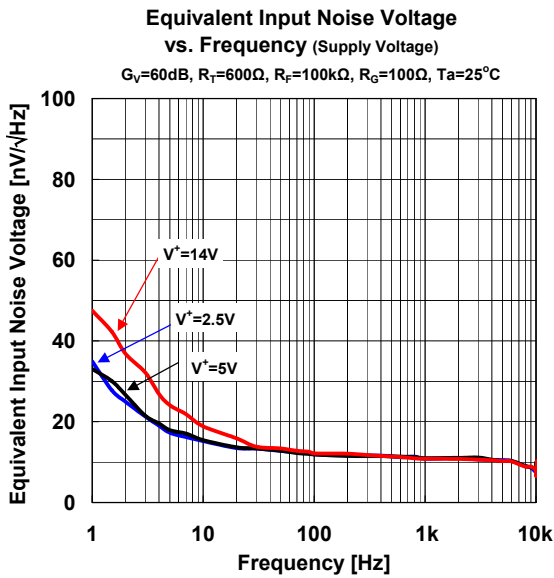
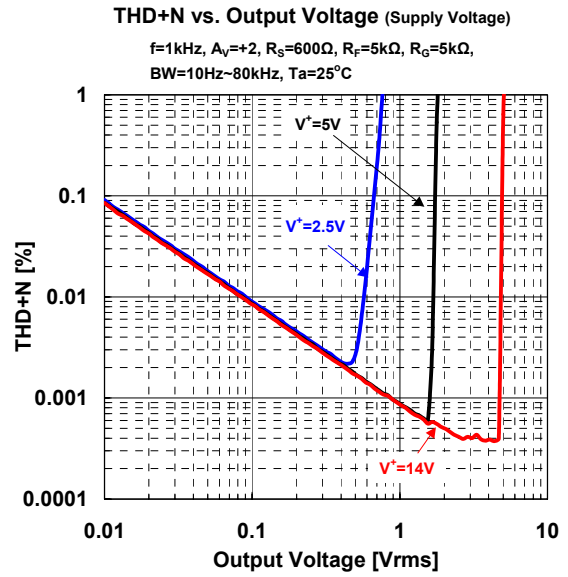
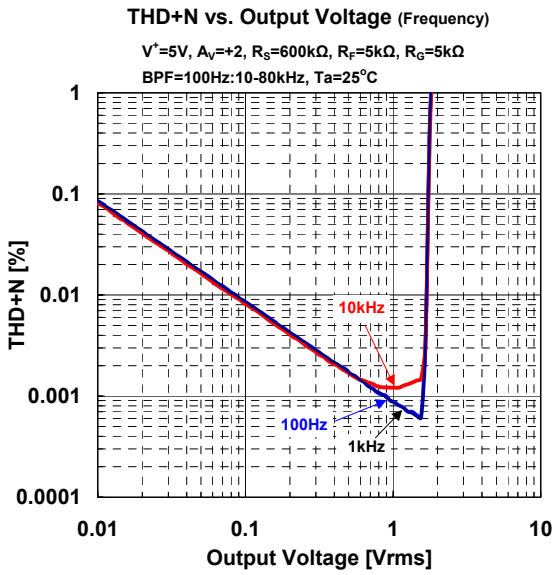


Pulse Response (Load Capacitance, $V^+/V^-\pm 2.5V$)

$V^+/V^-\pm 2.5V$, $V_{IN}=1V_{pp}$, $A_V=+1$, $R_L=10k\Omega$, $T_a=25^\circ C$



■ Typical Characteristics



■ MEMO

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