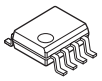
# Single Ultra-High speed and Wide Band Operational Amplifier

## ■ GENERAL DESCRIPTION

The **NJM2720** is a single, ultra-high speed and wide band operational amplifier that features 250V/μs slew rate and 150ohm load drive, at supply voltage of ±2.5V.

The NJM2720 is suitable for video signal processing, video line driver, video buffer, pulse amplifiers, ADC input buffer, measuring instrument, and digital communication.

## ■ PACKAGE OUTLINE



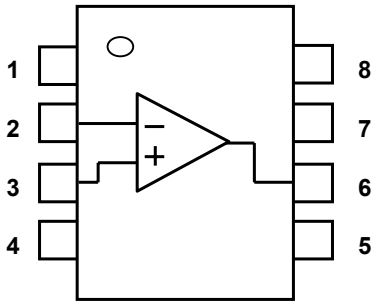
**NJM2720E**
**( SOP8 )**

## ■ FEATURES

| | |
|---|---|
| ●Operating Voltage | : ±2.5V to ±5.0V |
| ●Slew Rate | : 250V/μs Typ. (at $V^+/V^-$=±2.5V, $R_L$=150Ω) |
| ●Unity-Gain | : 120MHz Typ. |
| ●Output Voltage | : $V_{OH}$= +1.4V Typ. (at $V^+/V^-$=±2.5V, $R_L$=150Ω) |
| | : $V_{OL}$ = -1.4V Typ. (at $V^+/V^-$=±2.5V, $R_L$=150Ω) |
| ●Offset Voltage | : 1.5mV Typ. |
| ●Operating Current | : 9.0 mA Typ. |
| ●Adequate phase margin | : $\Phi_M$=60deg. Typ. (at $R_L$=2kΩ, voltage follower) |
| ●Bipolar Technology | |
| ●Package Outline | : SOP8 JEDEC 150mil |

## ■ PIN CONFIGRATION

**(Top View)**




**SOP8**

**PIN FUNCTION.**

**1. NC**
**2. - INPUT**
**3. +INPUT**
**4. $V^-$**
**5. NC**
**6. OUTPUT**
**7. $V^+$**
**8. NC**

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Supply Voltage | $V^+/V^-$ | ±5.5 | V |
| Power Dissipation | $P_D$ | SOP8 : 730 (Note1) | mW |
| Differential Input Voltage Range | $V_{ID}$ | ±3.0 | V |
| Common Mode Input Voltage Range | $V_{ICM}$ | ±5.5 (Note2) | V |
| Operating Temperature Range | $T_{opr}$ | -40 to +85 | °C |
| Storage Temperature Range | $T_{stg}$ | -40 to +125 | °C |

(Note 1) On the PCB " EIA/JEDEC (76.2x11.43x1.6mm, four layers, FR-4) "

(Note 2) For supply voltage less than ±5.5V,the absolute maximum input voltage is equal to the supply voltage.

## ■ RECOMMENDED OPERATING CONDITION

(Ta=25°C)

| PARAMETER | SYMBOL | RATING | UNIT |
|---|---|---|---|
| Supply Voltage | $V^+/V^-$ | ±2.5 to ±5.0 | V |

## ■ ELECTRICAL CHARACTERISTICS

●DC CHARACTERISTICS ($V^+/V^-$=±2.5V, Ta=25°C)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Operating Current | $I_{CC}$ | No Signal | - | 9.0 | 15.0 | mA |
| Input Offset Voltage | $V_{IO}$ | | - | 1.5 | 16.0 | mV |
| Input Bias Current | $I_B$ | | - | 7.5 | 30.0 | μA |
| Input Offset Current | $I_{IO}$ | | - | 100 | 900 | nA |
| Large Signal Voltage Gain | $A_V$ | $R_L$=2kΩ | 50 | 60 | - | dB |
| Input Common Mode Voltage Range | $V_{ICM}$ | | +1.7<br>-1.2 | +2.0<br>-1.5 | -<br>- | V<br>V |
| Common Mode Rejection Ratio | CMR | -1.2V≤$V_{ICM}$≤+1.7V | 60 | 80 | - | dB |
| Supply Voltage Rejection Ratio | SVR | ±2.5V≤$V^+/V^-$≤±5.0V | 55 | 65 | - | dB |
| Maximum Output Voltage Swing | $V_{OM}$ | $R_L$=150Ω | ±1.2 | ±1.4 | - | V |

●AC CHARACTERISTICS ($V^+/V^-$=±2.5V, Ta=25°C)

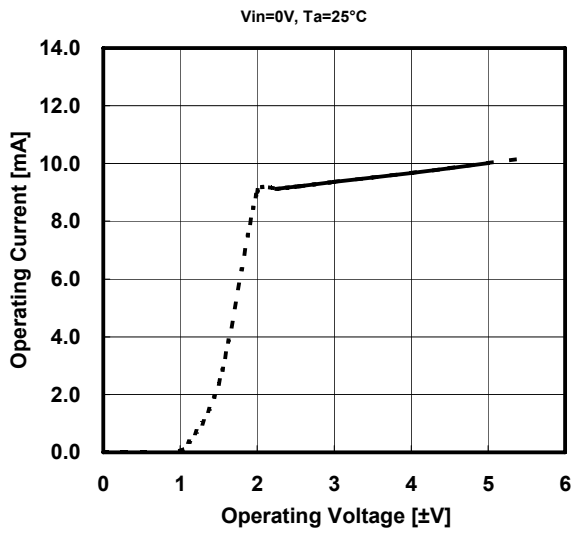
| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Unity Gain Frequency | $f_T$ | $A_V$=40dB, $R_F$=1.98kΩ<br>$R_G$=20Ω, $R_L$=∞, $C_L$=5pF | - | 120 | - | MHz |
| Phase Margin | $\Phi_M$ | $A_V$=40dB, $R_F$=1.98kΩ<br>$R_G$=20Ω, $R_L$=∞, $C_L$=5pF | - | 60.0 | - | Deg |

●AC CHARACTERISTICS ($V^+/V^-$=±2.5V, Ta=25°C)

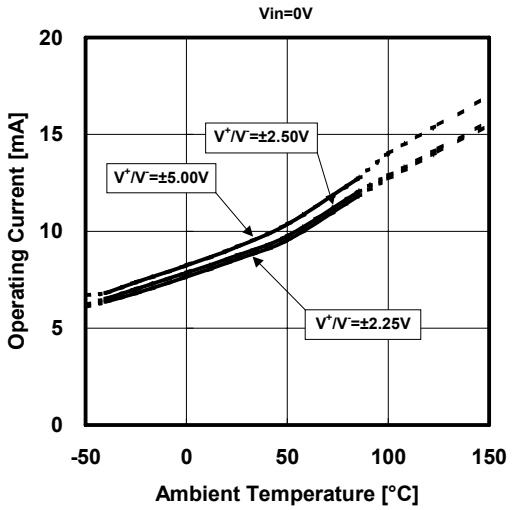
| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Slew Rate | SR | $A_V$=0dB, $R_F$=0Ω, $R_G$=∞<br>$R_L$=150Ω,$C_L$=5pF<br>$V_{IN}$=$2V_{PP}$ | - | 250 | - | V/μs |

## ■ TYPICAL CHARACTERISTICS

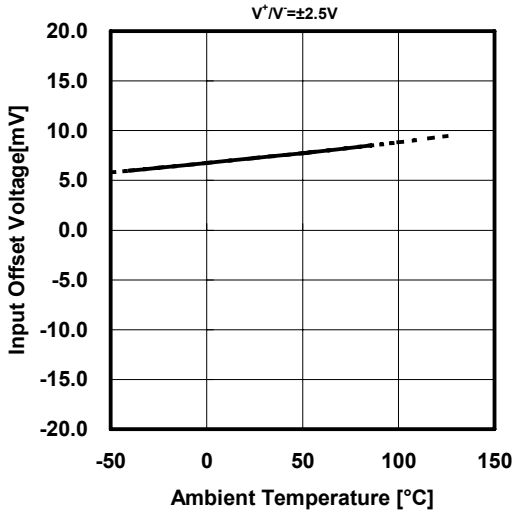
Operating Current vs. Operating Voltage



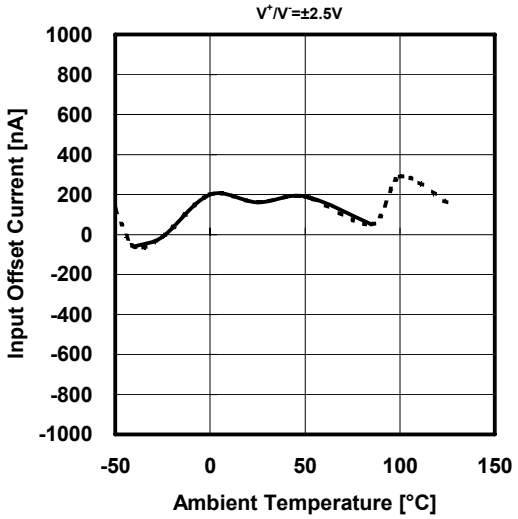

Operating Current vs. Ambient Temperature



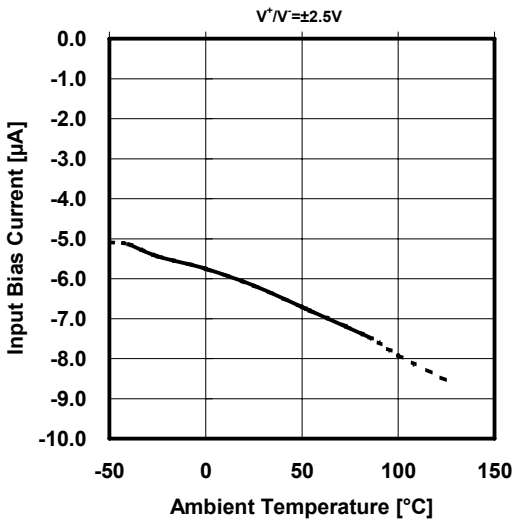

Input Offset Voltage vs. Ambient Temperature




Input Offset Current vs. Ambient Temperature



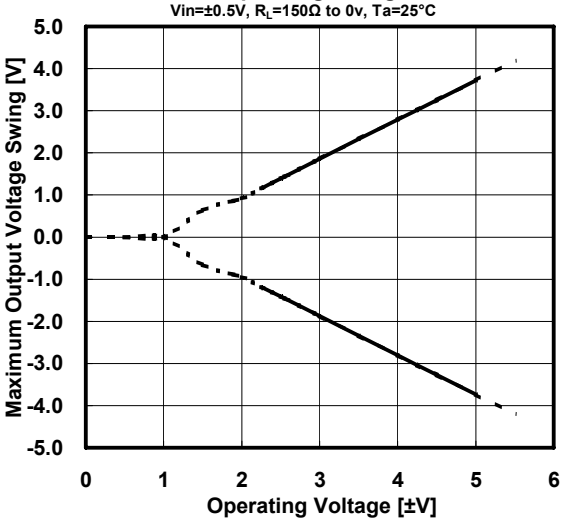

Input Bias Current vs. Ambient Temperature



## ■ TYPICAL CHARACTERISTICS

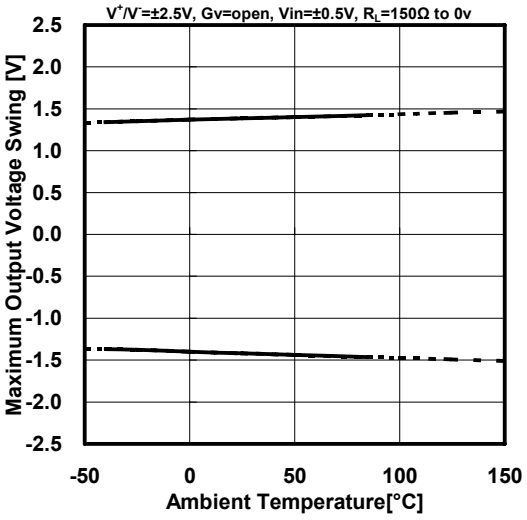
Maximum Output Voltage Swing vs Operating Voltage

Vin=±0.5V, $R_L$=150Ω to 0v, Ta=25°C



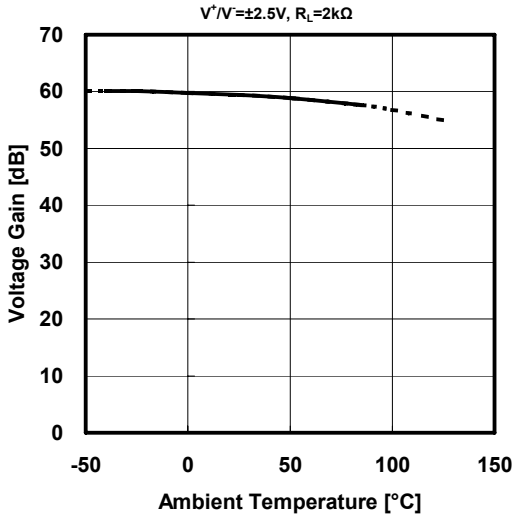

Maximum Output Voltage Swing vs. Ambient Temperature

$V^+/V^-$=±2.5V, Gv=open, Vin=±0.5V, $R_L$=150Ω to 0v



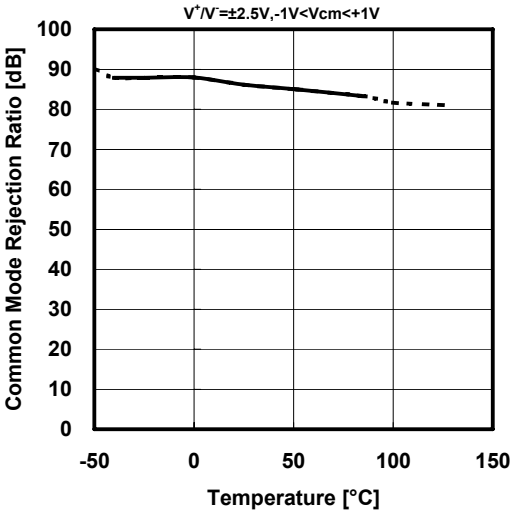

Voltage Gain vs. Ambient Temperature

$V^+/V^-$=±2.5V, $R_L$=2kΩ



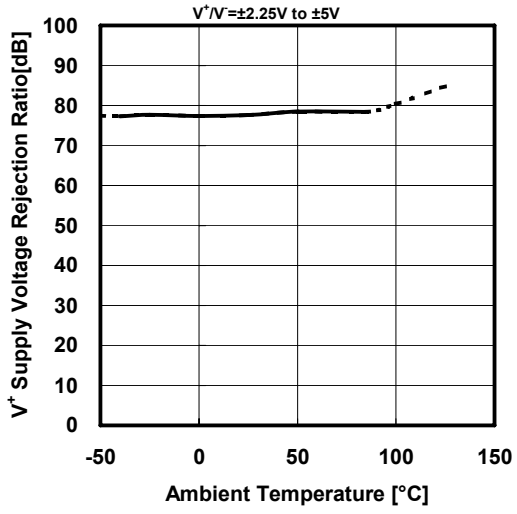

Common Mode Rejection Ratio vs. Ambient Temperature

$V^+/V^-$=±2.5V,-1V<Vcm<+1V




$V^+$ Supply Voltage Rejection Ratio vs. Ambient Temperature

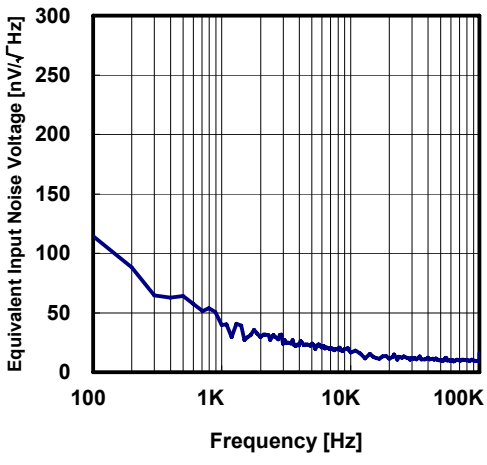
$V^+/V^-$=±2.25V to ±5V




Equivalent Input Noise Voltage vs. Frequency

$V^+/V^-$=±2.5V, $V_{IN}$=50Ω to GND, $G_V$=100, $R_S$=50Ω

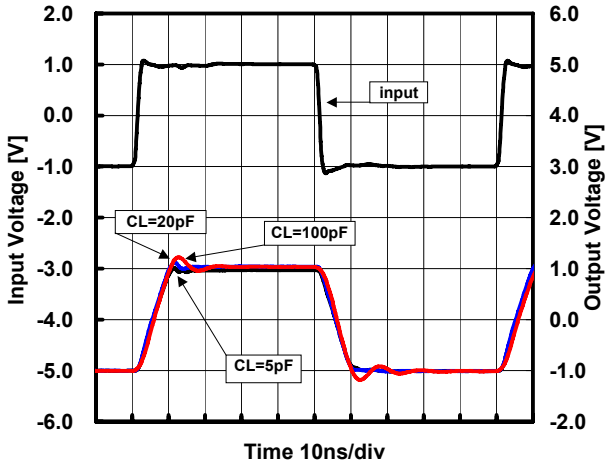
$R_F$=1.98kΩ, $R_G$=20Ω, $R_L$=∞, $C_L$=0pF, Ta=25°C



## ■ TYPICAL CHARACTERISTICS

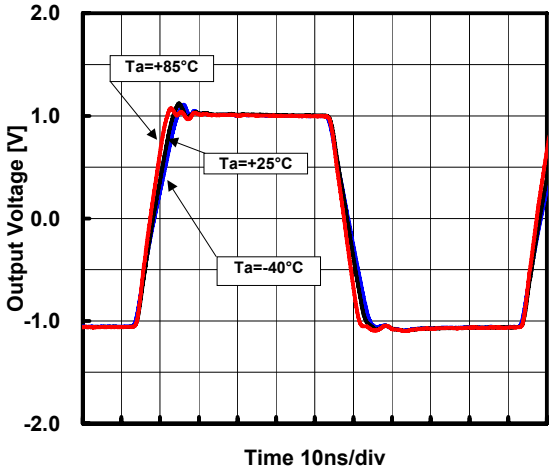
**Pulse Response (with Capacitive load)**

$V^+/V^-$=±2.5V, f=10MHz, $V_O$=2$V_{PP}$, $G_V$=0dB
$R_T$=50Ω, $R_F$=0Ω, $C_F$=0pF, $R_L$=150Ω to 0v, Ta=+25°C



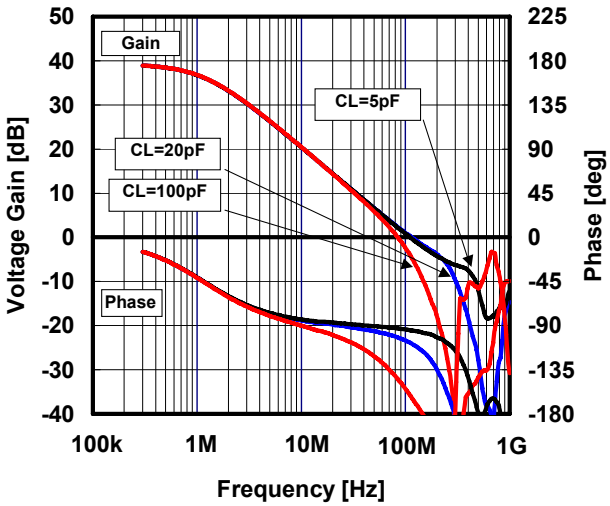

**Pulse Response (correlation with Ta)**

$V^+/V^-$=±2.5V, f=10MHz, $V_O$=2$V_{PP}$, $G_V$=0dB
$R_T$=50Ω, $R_F$=0Ω, $C_F$=0, $R_G$=∞Ω, $C_L$=5pF, $R_L$=150Ω to 0v



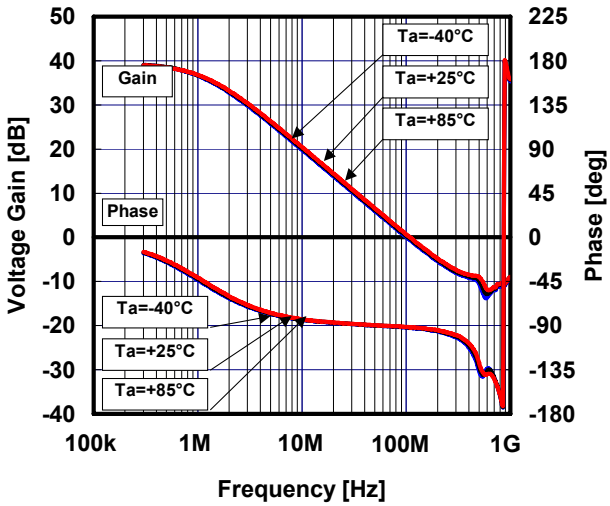

**Voltage Gain vs. Frequency (with Capacitive Load)**

$V^+/V^-$=±2.5V, $V_{IN}$=0.02Vpp, $G_V$=40dB, $R_T$=50Ω,
$R_F$=1.98kΩ, $R_G$=20Ω, $C_F$=0F, $R_L$=1kΩ, Ta=+25°C



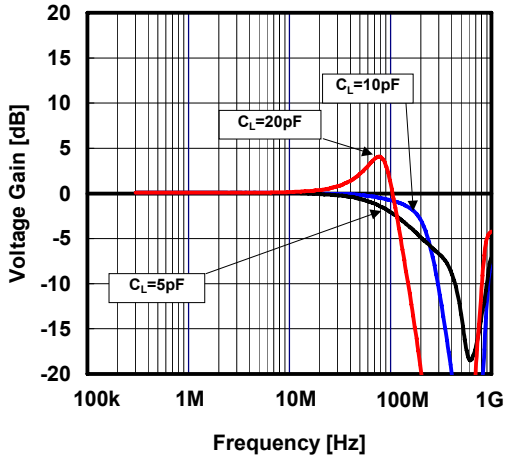

**Voltage Gain vs. Frequency (correlation with Ta)**

$V^+/V^-$=±2.5V, $V_{IN}$=0.02Vpp, $G_V$=40dB, $R_T$=50Ω
$R_F$=1.98kΩ, $R_G$=20Ω, $C_F$=0, $R_L$=150Ω, $C_L$=5pF



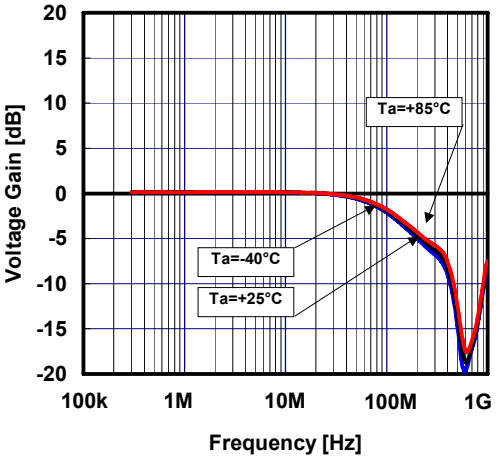

**Voltage Gain vs. Frequency (with Capacitive Load)**

$V^+/V^-$=±2.5V, $V_{IN}$=0.02Vpp, $G_V$=0dB, $R_T$=50Ω,
$R_F$=0Ω, RG=open, $C_F$=0pF, $R_L$=150Ω, Ta=+25°C




**Voltage Gain vs. Frequency (correlation with Ta)**

$V^+/V^-$=±2.5V, $V_{IN}$=0.02Vpp, $G_V$=0dB, $R_T$=50Ω
$R_F$=0Ω, $R_G$=open, $C_F$=0, $R_L$=150Ω, $C_L$=5pF



[CAUTION]
The specifications on this data book are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this data book are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

NJR:

NJM2720E NJM#2720E