

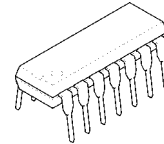
SINGLE SUPPLY QUAD OPERATIONAL AMPLIFIER

■ GENERAL DESCRIPTION

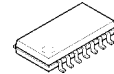
The NJM13403 is single-supply quad operational amplifier, which can operate from 2V supply. The features are low offset voltage, low bias current, high slew-rate, and free crossover distortion through the AB class output stage.

The package lineup is DIP, DMP and others compact, so that the NJM13403 is suitable for audio for low voltage operation and any other kind of signal amplifier.

■ PACKAGE OUTLINE



NJM13403D1



NJM13403M

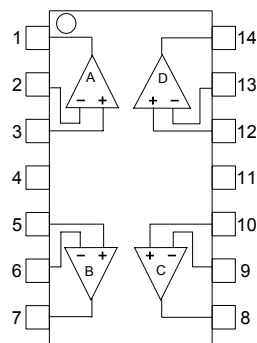


NJM13403V

■ FEATURES

- Operating Voltage (+2V~+14V)
- Slew Rate (1.2V/μs typ.)
- Operating Current (3.0mA typ.)
- Bipolar Technology
- Package Outline DIP14,DMP14,SSOP14

■ PIN CONFIGURATION

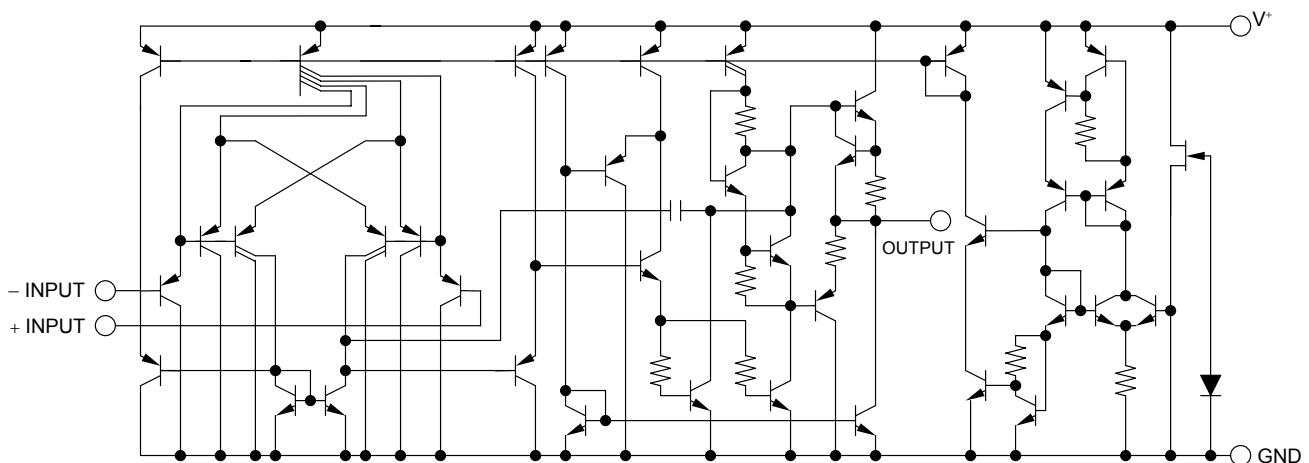


NJM13403D1, NJM13403M
NJM13403V

PIN FUNCTION

- | | |
|------------------|-------------|
| 1.A OUTPUT | 8.C OUTPUT |
| 2.A -INPUT | 9.C -INPUT |
| 3.A +INPUT | 10.C +INPUT |
| 4.V ⁺ | 11.GND |
| 5.B +INPUT | 12.D +INPUT |
| 6.B -INPUT | 13.D -INPUT |
| 7.B OUTPUT | 14.D OUTPUT |

■ EQUIVALENT CIRCUIT (1/4 Shown)



NJM13403

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-----------------------------|------------------|--------------------------------------------------|------|
| Supply Voltage | V ⁺ | 15 | V |
| Differential Input Voltage | V _{ID} | 14 | V |
| Input Voltage | V _{IC} | -0.3~+14 | V |
| Power Dissipation | P _D | (DIP14) 700 (DMP14) 300 (SSOP14) 300 | mW |
| Operating Temperature Range | T _{opr} | -40~+85 | °C |
| Storage Temperature Range | T _{stg} | -40~+125 | °C |

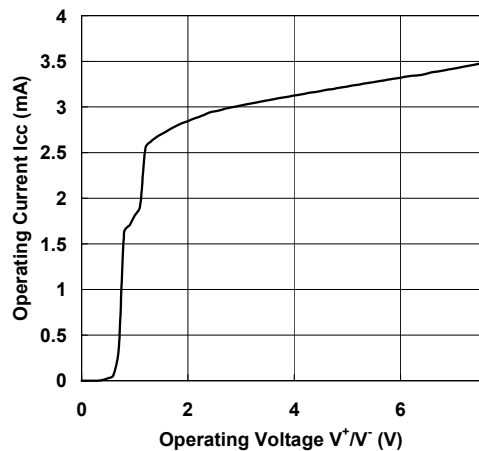
■ ELECTRICAL CHARACTERISTICS

(V⁺=5V, Ta=25°C)

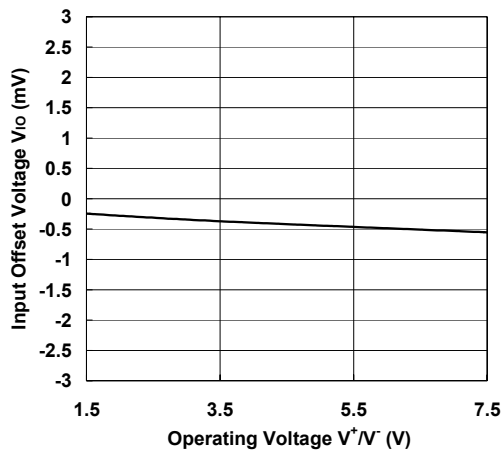
| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---------------------------------|---------------------|--------------------------------------------------------------------------------|-------|------|------|------|
| Operating Voltage | V _{opr} | | 2 | - | 14 | V |
| Input Offset Voltage | V _{IO} | R _S =0Ω | - | 0.5 | 4 | mV |
| Input Offset Current | I _{IO} | | - | 5 | 50 | nA |
| Input Bias Current | I _B | | - | 25 | 150 | nA |
| Large Signal Voltage Gain | A _V | R _L ≥2kΩ | 88 | 100 | - | dB |
| Maximum Output Voltage Swing | V _{OM} | R _L =2kΩ | 4.0 | 4.2 | - | V |
| Input Common Mode Voltage Range | V _{ICM} | | 0~3.5 | - | - | V |
| Common Mode Rejection Ratio | CMR | | 70 | 90 | - | dB |
| Supply Voltage Rejection Ratio | SVR | | 80 | 94 | - | dB |
| Output Source Current | I _{SOURCE} | V _{IN} ⁺ =1V, V _{IN} ⁻ =0V | 20 | 35 | - | mA |
| Output Sink Current | I _{SINK} | V _{IN} ⁺ =0V, V _{IN} ⁻ =1V | 10 | 30 | - | mA |
| Operating Current | I _{CC} | R _L =∞ | - | 3.0 | 5.0 | mA |
| Slew Rate | SR | V ⁺ /V=±2.5V, R _L =2kΩ, A _V =0dB, f=1kHz | - | 1.2 | - | V/μs |
| Unity Gain Bandwidth | f _T | R _L =2kΩ | - | 2.0 | - | MHz |
| Total Harmonic Distortion | THD | R _L =2kΩ, A _V =40dB, f=20kHz, V _O =1.0Vrms | - | 0.2 | - | % |

■ TYPICAL CHARACTERISTICS

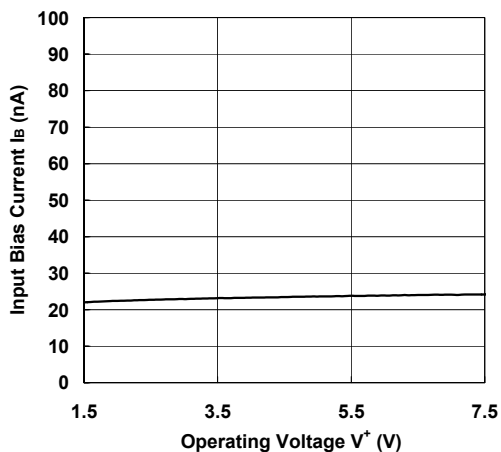
Operating Current vs. Operating Voltage
($T_a=25^\circ\text{C}$)



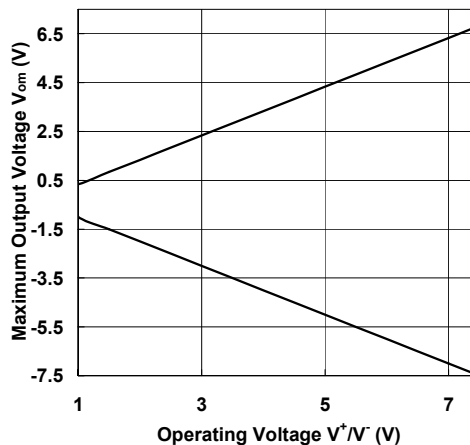
Input Offset Voltage vs. Operating Voltage
($T_a=25^\circ\text{C}$)



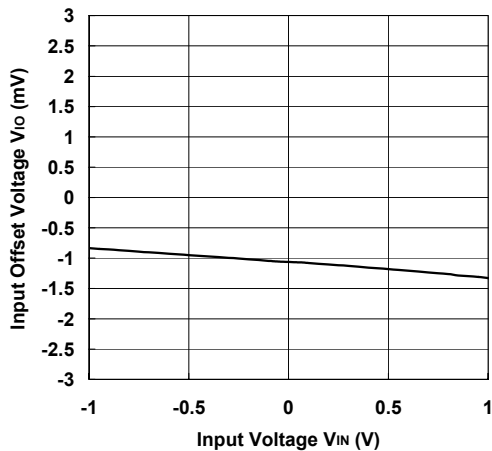
Input Bias Current vs. Operating Voltage
($T_a=25^\circ\text{C}$)



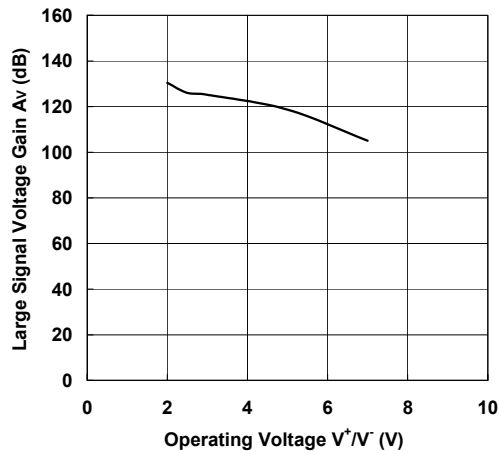
Maximum Output Voltage Swing vs. Operating Voltage
($T_a=25^\circ\text{C}$)



Input Common Mode Voltage Range
($V^+=5\text{V}$, $T_a=25^\circ\text{C}$)



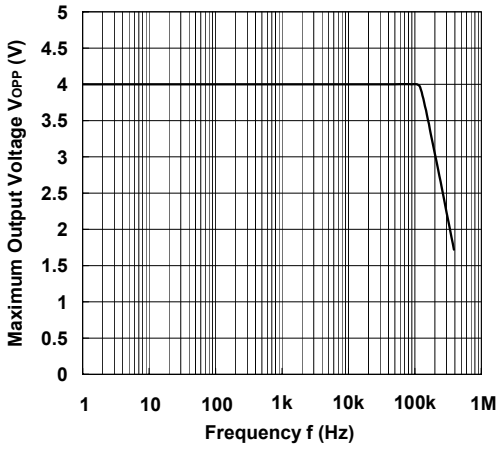
Large Signal Voltage Gain vs. Operating Voltage
($T_a=25^\circ\text{C}$, $R_L=2\text{k}\Omega$)



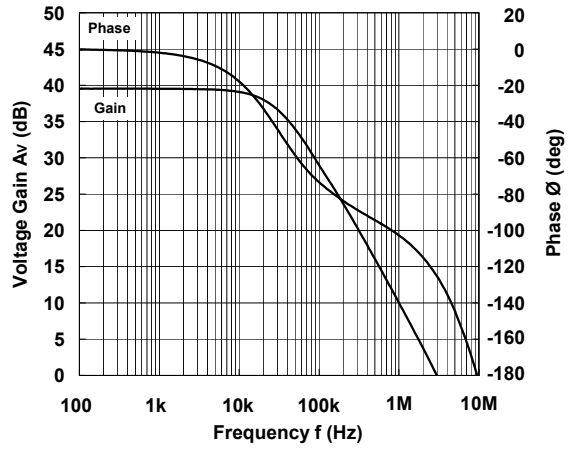
NJM13403

■ TYPICAL CHARACTERISTICS

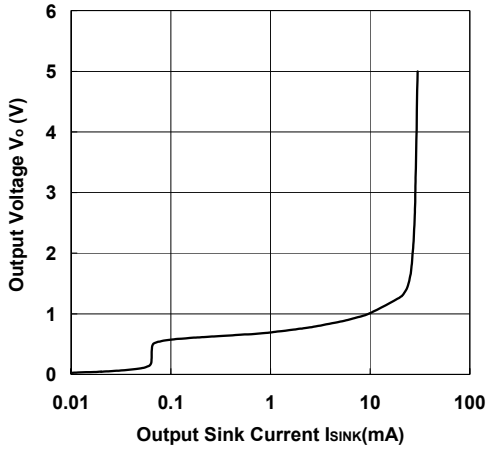
Maximum Output Voltage vs. Frequency
(Ta=25°C)



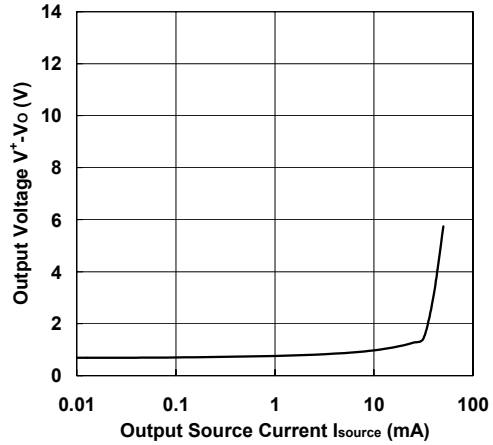
Gain/Phase vs. Frequency
(Ta=25°C)



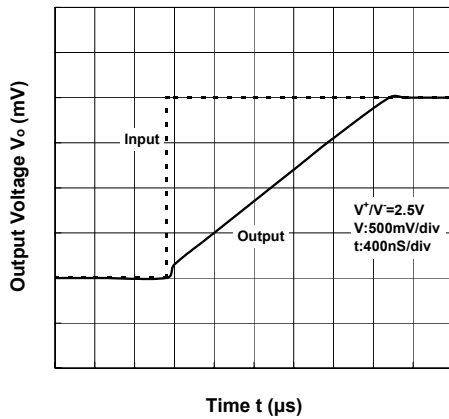
Output Voltage vs. Output Sink Current
(Ta=25°C)



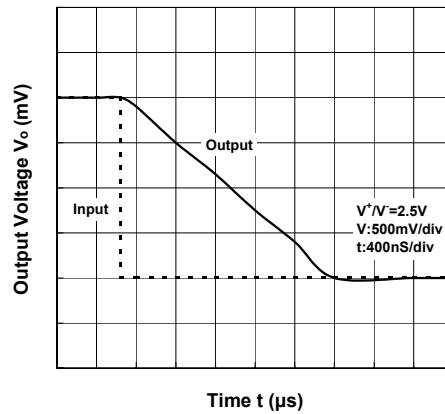
Output Voltage vs. Output Source Current
(Ta=25°C)



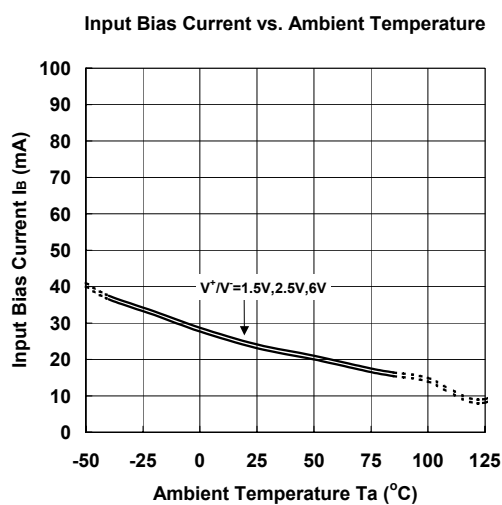
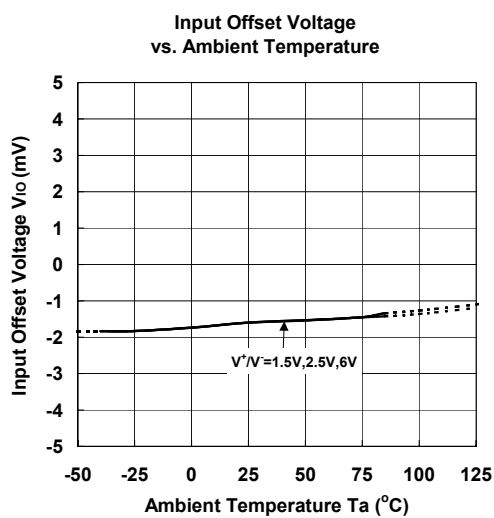
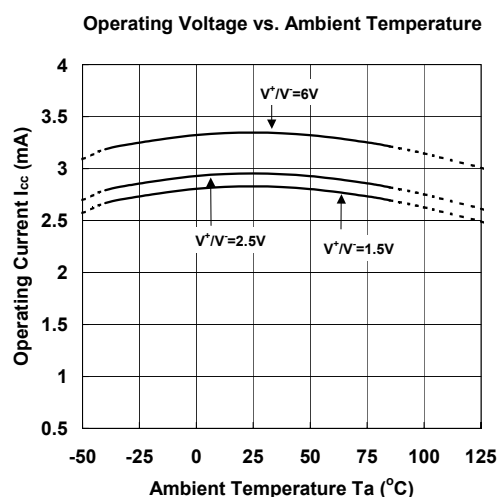
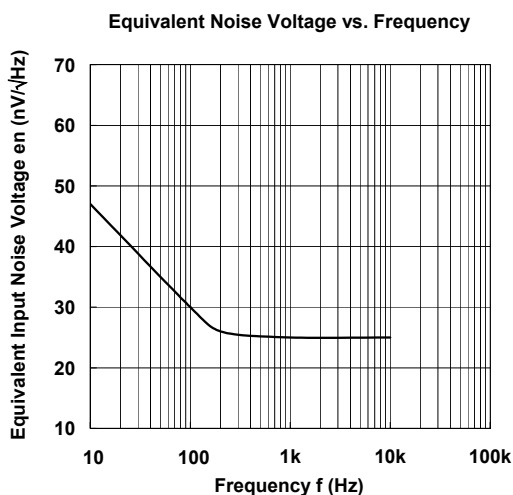
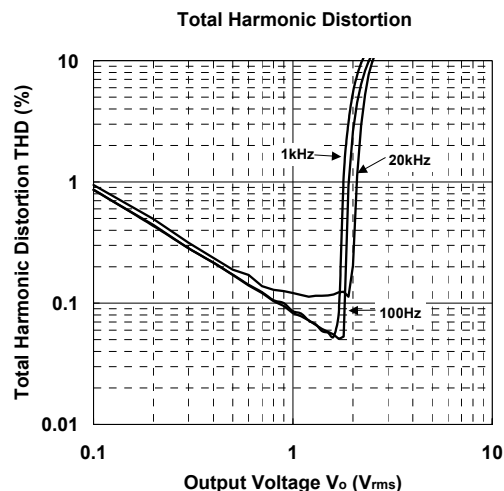
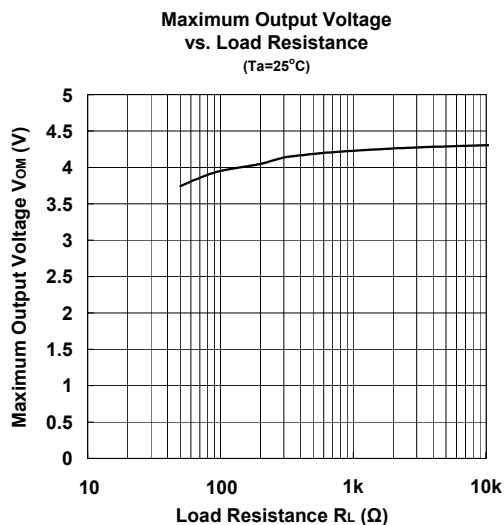
Slew Rate (Rise)



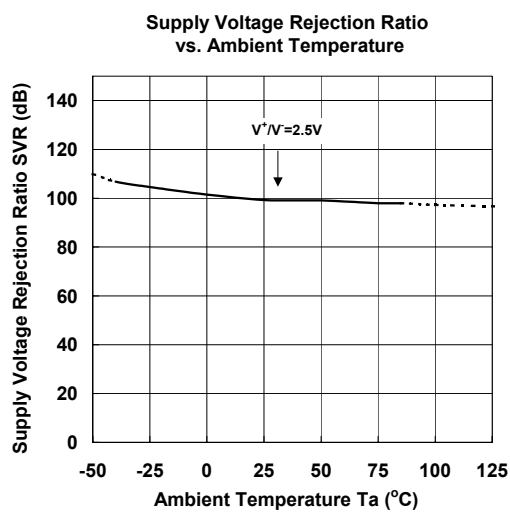
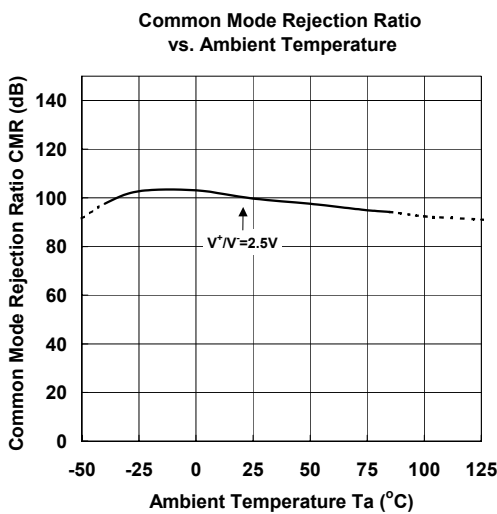
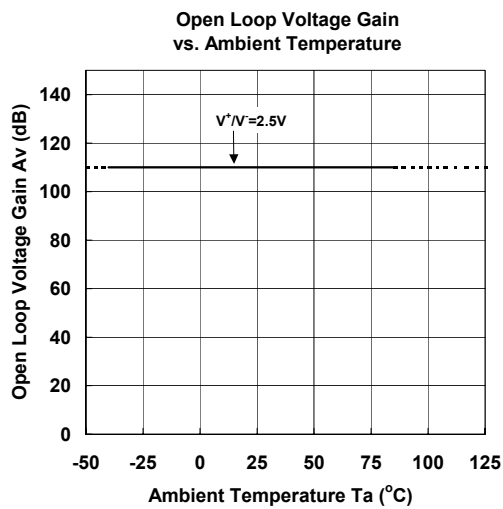
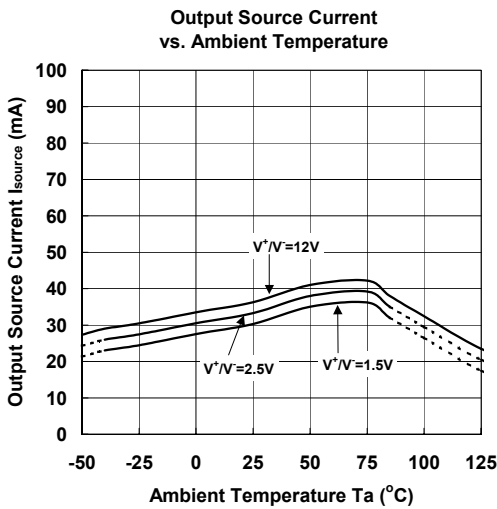
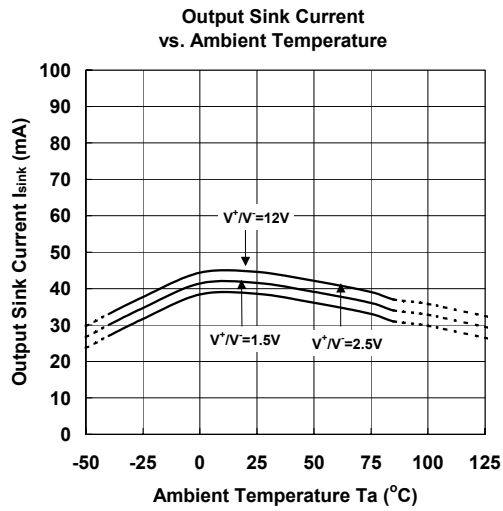
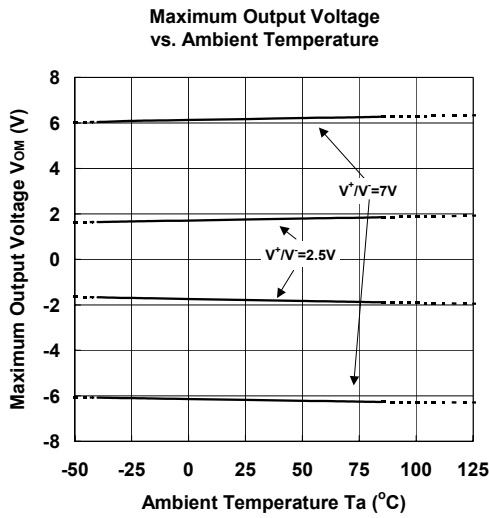
Slew Rate (Fall)



■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS



[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.