

Rail-to-Rail Input/Output Quad Operational Amplifier

■ GENERAL DESCRIPTION

NJM2734 is a Rail-to-Rail Input/Output quad operational amplifier featuring Low power, low noise and operation from 1.8V.

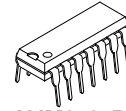
Rail-to-Rail Input/Output provides wide dynamic range, is from ground to power supply level. In addition to ground sensing applications, NJM2734 enable to be applied to Hi-side sensing applications.

The features are low noise and low operating voltage for battery management, portable audio applications, and others.

■ FEATURES

- Operating Voltage 1.8 to 6.0V
- Rail-to-Rail Input $V_{ICM} = 0$ to 5.0V, at $V^+ = 5V$
- Rail-to-Rail Output $V_{OH} \geq 4.9V / V_{OL} \leq 0.1V$, at $V^+ = 5V, R_L = 20k\Omega$
- Load Drivability $V_{OH} \geq 4.75V / V_{OL} \leq 0.25V$, at $V^+ = 5V, R_L = 2k\Omega$
- Offset Voltage 5mV max.
- Slew Rate 0.4V/ μ s typ.
- Low Input Voltage Noise 10nV/ $\sqrt{\text{Hz}}$ typ.
- Adequate phase margin $\Phi_M = 75\text{deg.}$ typ., at $R_L = 2k\Omega$
- Bipolar Technology
- Package Outline DIP14, DMP14, SSOP14

■ PACKAGE OUTLINE



NJM2734D

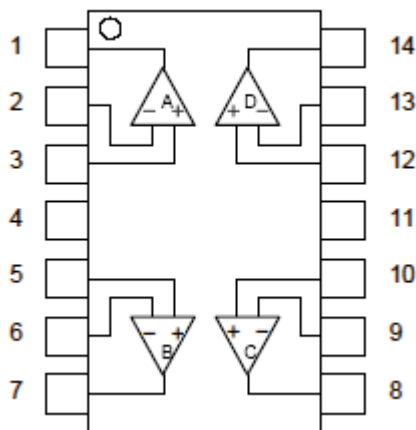


NJM2734M



NJM2734V

■ PIN CONFIGURATION



PIN FUNCTION

1. A OUTPUT	8. C -INPUT
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

NJM2734D
 NJM2734M
 NJM2734V

NJM2734

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺	7.0	V
Differential Input Voltage Range	V _{ID}	±1.0 (Note1)	V
Common Mode Input Voltage Range	V _{IC}	0 ~ 7.0 (Note1)	V
Power Dissipation	P _D	(DIP14) 700 (DMP14) 520 (Note2) (SSOP14) 450 (Note2)	mW
Operating Temperature Range	T _{opr}	-40~+85	°C
Storage Temperature Range	T _{stg}	-40~+125	°C

(Note1) For supply voltage less than 7V, the absolute maximum input voltage is equal to the supply voltage.

(Note2) On the PCB " EIA/JEDEC (76.2×114.3×1.6mm, two layers, FR-4) "

■ RECOMMENDED OPERATING CONDITION

(Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V ⁺	1.8 to 6.0	V

■ ELECTRICAL CHARACTERISTICS (V⁺=5V, Ta=25°C)

●DC CHARACTERISTICS

(V⁺=5V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I _{CC}	No signal applied	-	1.2	1.8	mA
Input Offset Voltage	V _{IO}		-	1	5	mV
Input Bias Current	I _B		-	50	250	nA
Input Offset Current	I _{IO}		-	5	100	nA
Large Signal Voltage Gain	A _V	R _L =2kΩ to 2.5V	60	85	-	dB
Common Mode Rejection Ratio	CMR	CMR+: 2.5V≤V _{CM} ≤5V (Note3) CMR -: 0V≤V _{CM} ≤2.5V (Note3)	55	70	-	dB
Supply Voltage Rejection Ratio	SVR	V ⁺ /V=±2.0V ~ ±3.0V	70	85	-	dB
Maximum Output Voltage 1	V _{OH1}	R _L =20kΩ to 2.5V	4.9	4.95	-	V
	V _{OL1}	R _L =20kΩ to 2.5V	-	0.05	0.1	V
Maximum Output Voltage 2	V _{OH2}	R _L =2kΩ to 2.5V	4.75	4.85	-	V
	V _{OL2}	R _L =2kΩ to 2.5V	-	0.15	0.25	V
Input Common Mode Voltage Range	V _{ICM}	CMR≥55dB	0	-	5	V

(Note3) CMR is represented by either CMR+ or CMR- has lower value.

CMR+ is measured with 2.5V≤V_{CM}≤5.0 and CMR- is measured with 0V≤V_{CM}≤2.5V.

●AC CHARACTERISTICS

(V⁺=5V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Unity Gain Bandwidth	GB	R _L =2kΩ to 2.5V	-	1	-	MHz
Phase Margin	Φ _M	R _L =2kΩ to 2.5V	-	75	-	Deg
Equivalent Input Noise Voltage	V _{NI}	f=1kHz	-	10	-	nV/√Hz
Amp to Amp Separation	CS	f=1kHz R _L =2kΩ to 2.5V, V _o =1.2Vrms	-	133	-	dB

●TRANSIENT CHARACTERISTICS

(V⁺=5V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Slew Rate	SR	R _L =2kΩ to 2.5V	-	0.4	-	V/μs

■ ELECTRICAL CHARACTERISTICS ($V^+=3V$, $T_a=25^\circ C$)

●DC CHARACTERISTICS

($V^+=3V$, $T_a=25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{CC}	No signal applied	-	1	1.8	mA
Input Offset Voltage	V_{IO}		-	1	5	mV
Input Bias Current	I_B		-	50	250	nA
Input Offset Current	I_{IO}		-	5	100	nA
Large Signal Voltage Gain	A_V	$R_L=2k\Omega$ to 1.5V	60	84	-	dB
Common Mode Rejection Ratio	CMR	CMR+: $1.5V \leq V_{CM} \leq 3V$ (Note4) CMR -: $0V \leq V_{CM} \leq 1.5V$ (Note4)	48	63	-	dB
Supply Voltage Rejection Ratio	SVR	$V^+V = \pm 1.2V \sim \pm 2.0V$	68	83	-	dB
Maximum Output Voltage 1	V_{OH1}	$R_L=20k\Omega$ to 1.5V	2.9	2.95	-	V
	V_{OL1}	$R_L=20k\Omega$ to 1.5V	-	0.05	0.1	V
Maximum Output Voltage 2	V_{OH2}	$R_L=2k\Omega$ to 1.5V	2.75	2.85	-	V
	V_{OL2}	$R_L=2k\Omega$ to 1.5V	-	0.15	0.25	V
Input Common Mode Voltage Range	V_{ICM}	CMR \geq 48dB	0	-	3	V

(Note4) CMR is represented by either CMR+ or CMR- has lower value.

CMR+ is measured with $1.5V \leq V_{CM} \leq 3.0$ and CMR- is measured with $0V \leq V_{CM} \leq 1.5V$.

●AC CHARACTERISTICS

($V^+=3V$, $T_a=25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Unity Gain Bandwidth	GB	$R_L=2k\Omega$ to 1.5V	-	1	-	MHz
Phase Margin	Φ_M	$R_L=2k\Omega$ to 1.5V	-	75	-	Deg
Equivalent Input Noise Voltage	V_{NI}	$f=1kHz$	-	10	-	nV/\sqrt{Hz}
Amp to Amp Separation	CS	$f=1kHz$ $R_L=2k\Omega$ to 1.5V, $V_o=0.7V_{rms}$	-	130	-	dB

●TRANSIENT CHARACTERISTICS

($V^+=3V$, $T_a=25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Slew Rate	SR	$R_L=2k\Omega$ to 1.5V	-	0.35	-	V/ μs

NJM2734

■ ELECTRICAL CHARACTERISTICS ($V^+=1.8V$, $T_a=25^\circ C$)

●DC CHARACTERISTICS

($V^+=1.8V$, $T_a=25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{CC}	No signal applied	-	0.9	1.6	mA
Input Offset Voltage	V_{IO}		-	1	5	mV
Input Bias Current	I_B		-	50	250	nA
Input Offset Current	I_{IO}		-	5	100	nA
Large Signal Voltage Gain	A_V	$R_L=2k\Omega$ to 0.9V	60	83	-	dB
Common Mode Rejection Ratio	CMR	CMR+: $0.9 \leq V_{CM} \leq 1.8V$ (Note5) CMR-: $0V \leq V_{CM} \leq 0.9V$ (Note5)	40	55	-	dB
Supply Voltage Rejection Ratio	SVR	$V^+V^-=\pm 0.9V \sim \pm 1.2V$	65	80	-	dB
Maximum Output Voltage 1	V_{OH1}	$R_L=20k\Omega$ to 0.9V	1.7	1.75	-	V
	V_{OL1}	$R_L=20k\Omega$ to 0.9V	-	0.05	0.1	V
Maximum Output Voltage 2	V_{OH2}	$R_L=2k\Omega$ to 0.9V	1.55	1.65	-	V
	V_{OL2}	$R_L=2k\Omega$ to 0.9V	-	0.15	0.25	V
Input Common Mode Voltage Range	V_{ICM}	CMR \geq 40dB	0	-	1.8	V

(Note5) CMR is represented by either CMR+ or CMR- has lower value.

CMR+ is measured with $0.9V \leq V_{CM} \leq 1.8$ and CMR- is measured with $0V \leq V_{CM} \leq 0.9V$.

●AC CHARACTERISTICS

($V^+=1.8V$, $T_a=25^\circ C$)

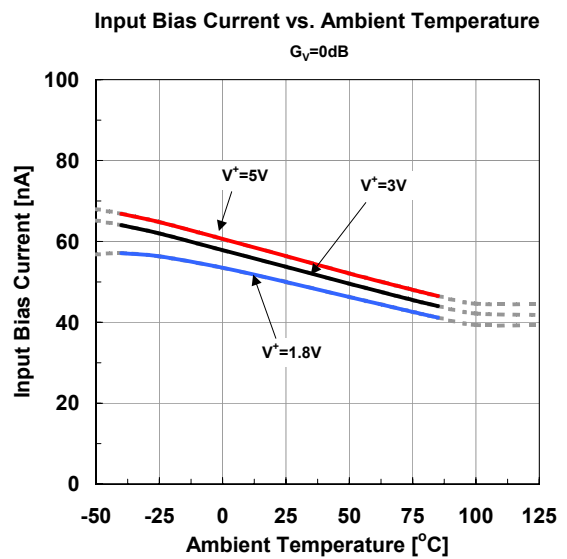
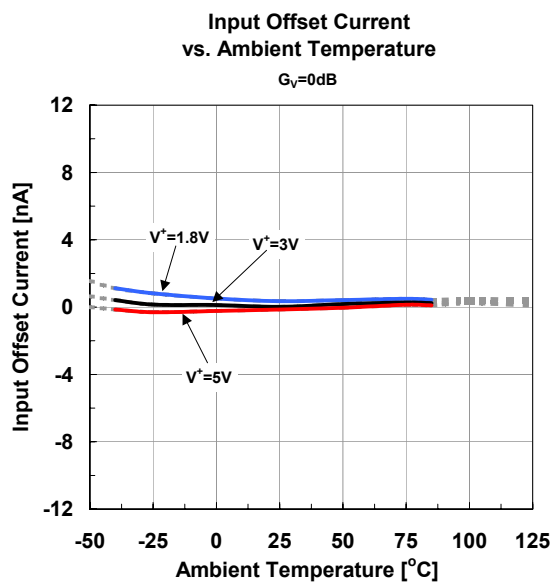
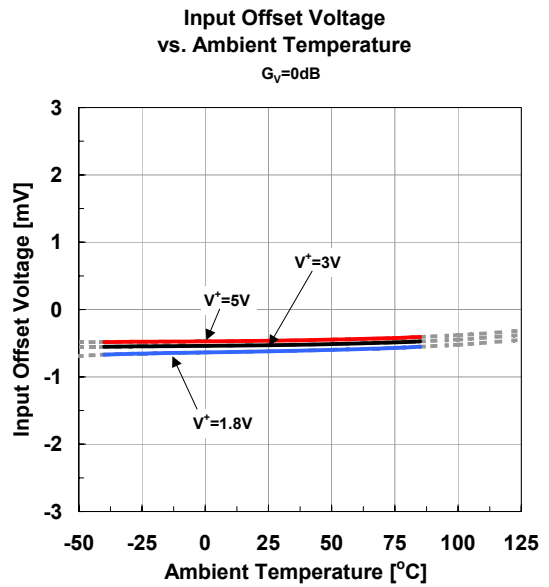
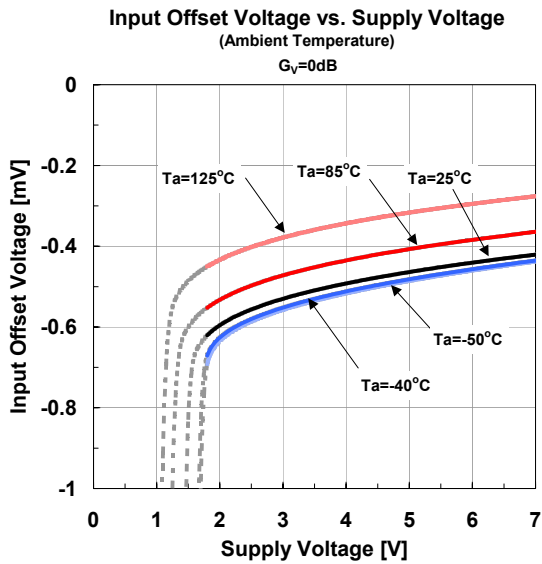
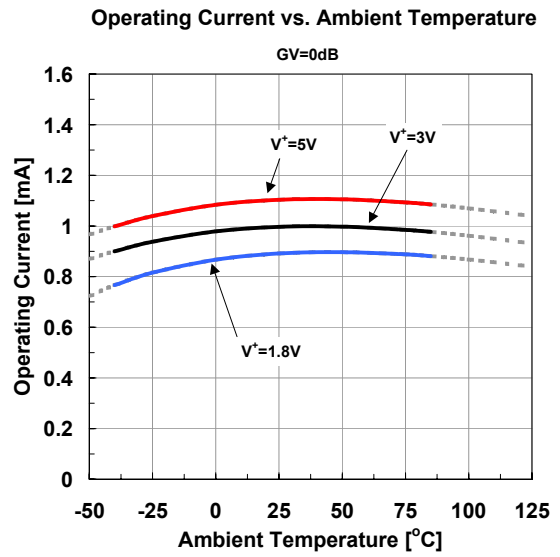
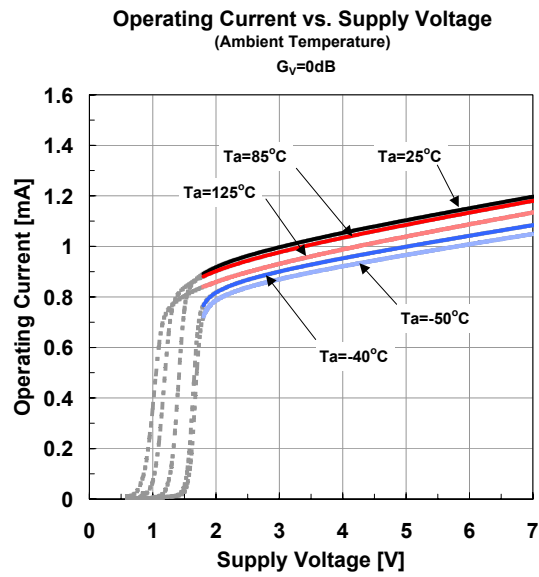
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Unity Gain Bandwidth	GB	$R_L=2k\Omega$ to 0.9V	-	1	-	MHz
Phase Margin	Φ_M	$R_L=2k\Omega$ to 0.9V	-	75	-	Deg
Equivalent Input Noise Voltage	V_{NI}	$f=1kHz$	-	10	-	nV/\sqrt{Hz}
Amp to Amp Separation	CS	$f=1kHz$ $R_L=2k\Omega$ to 0.9V, $V_o=0.4V_{rms}$	-	125	-	dB

●TRANSIENT CHARACTERISTICS

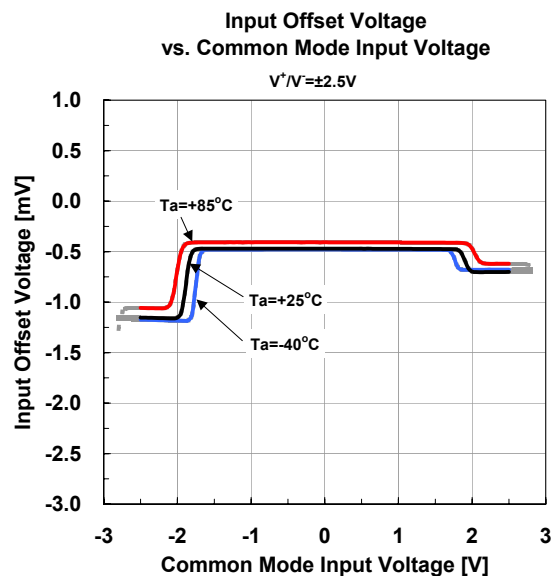
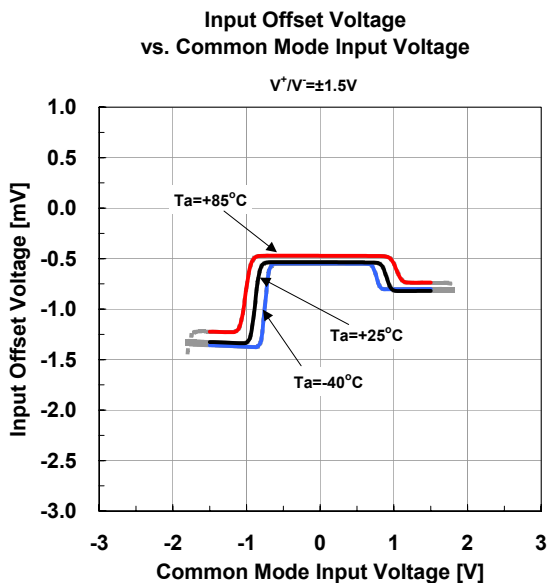
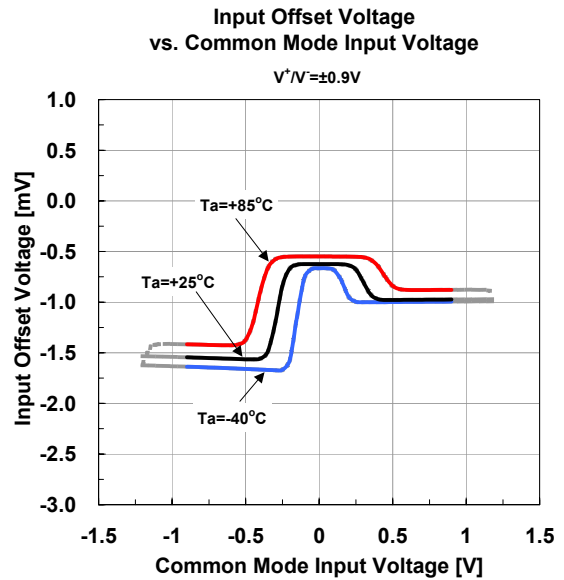
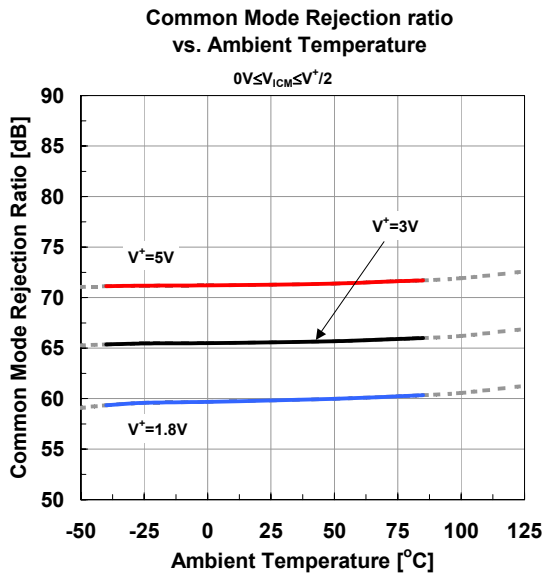
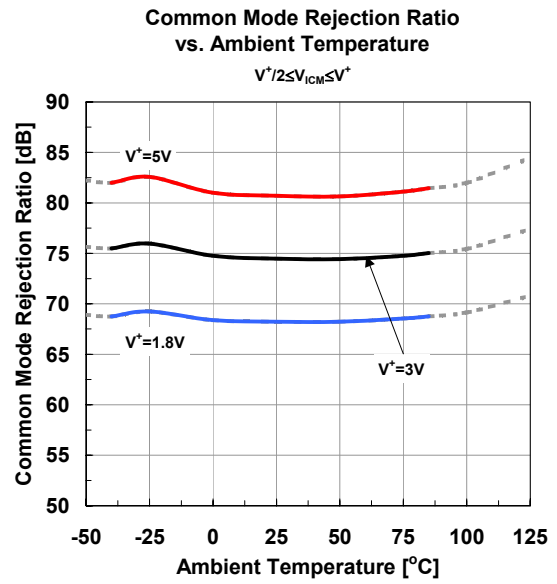
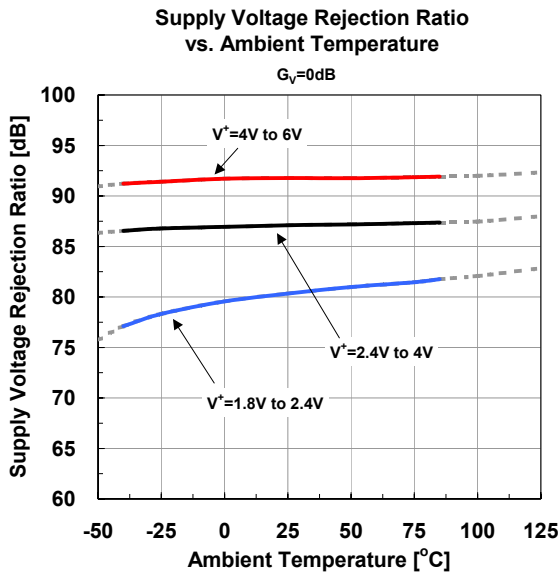
($V^+=1.8V$, $T_a=25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Slew Rate	SR	$R_L=2k\Omega$ to 0.9V	-	0.3	-	V/ μs

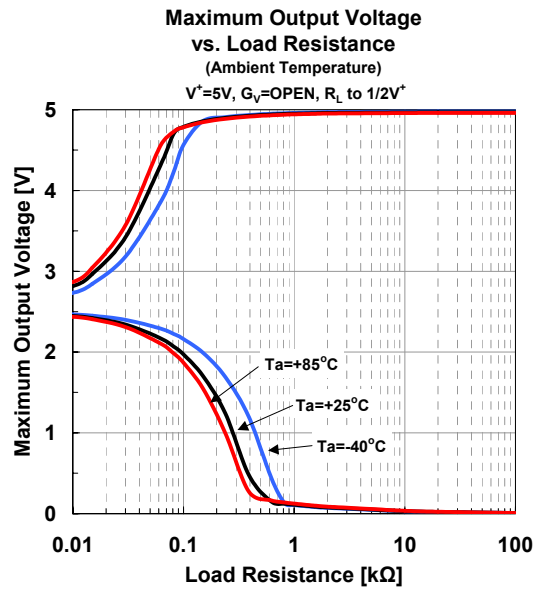
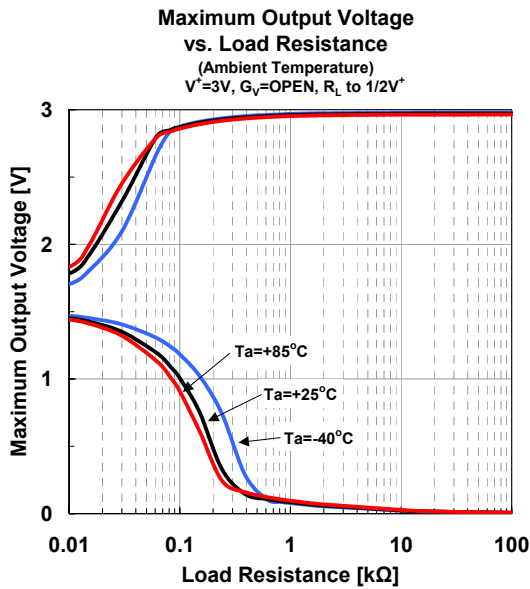
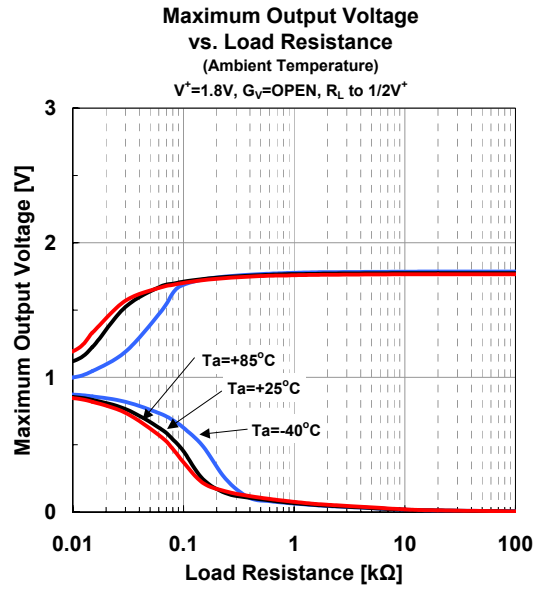
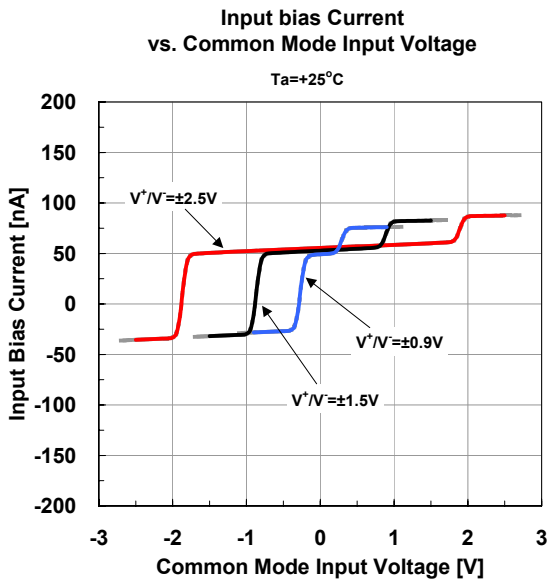
■ Typical Characteristics



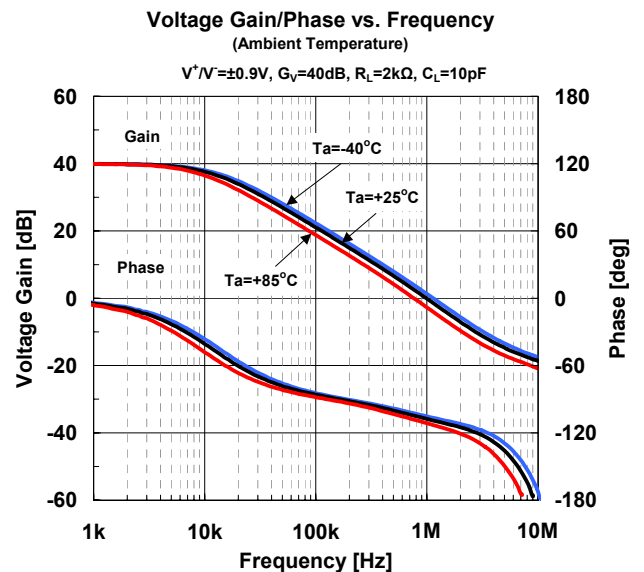
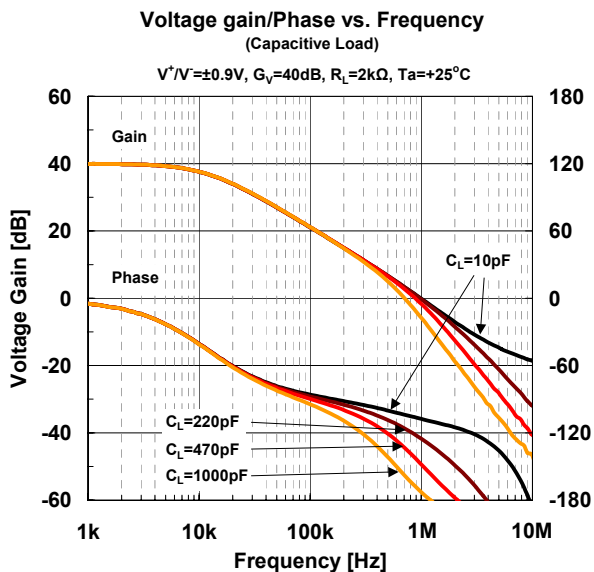
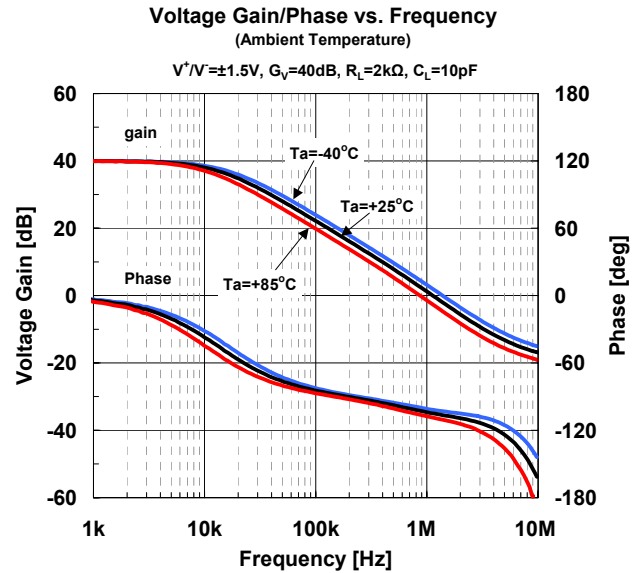
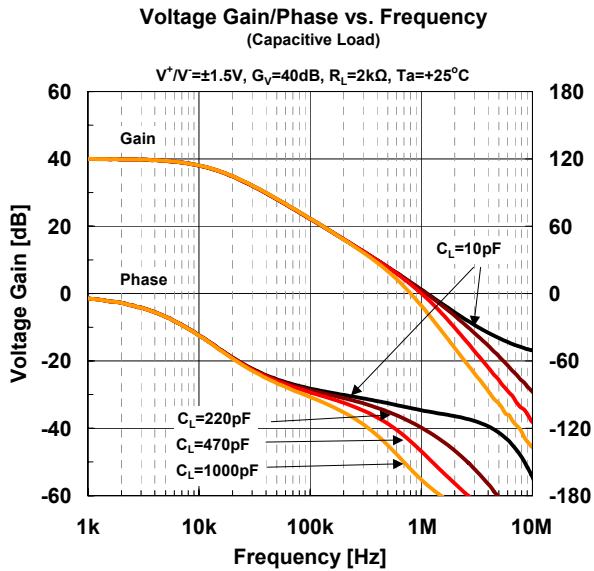
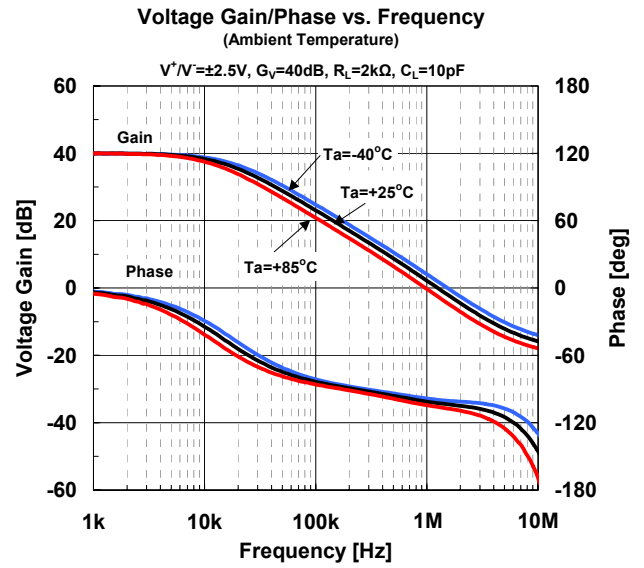
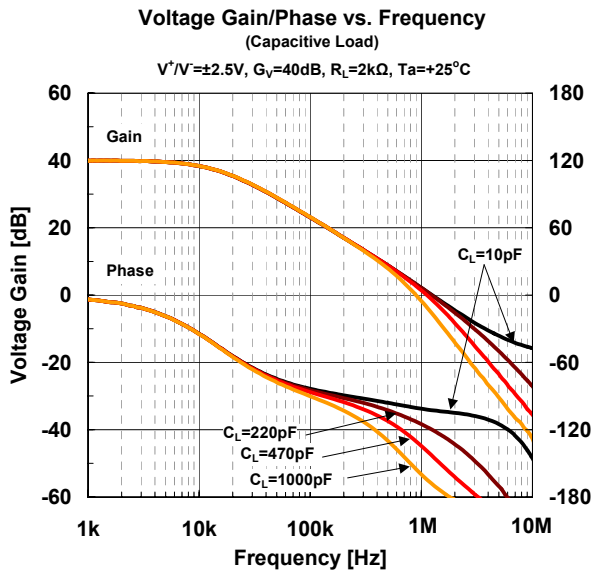
■ Typical Characteristics



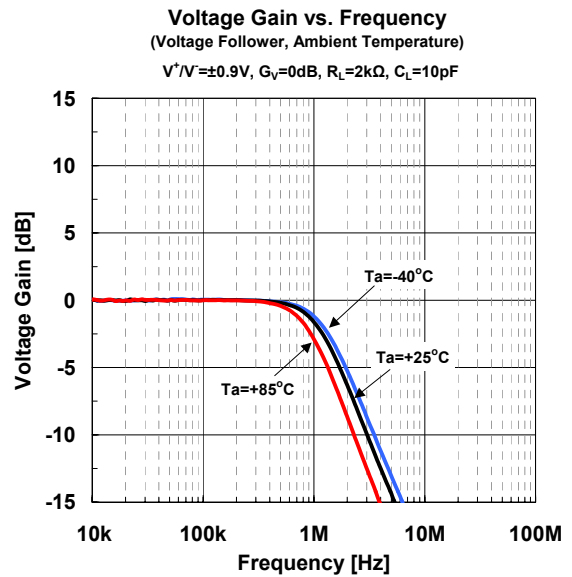
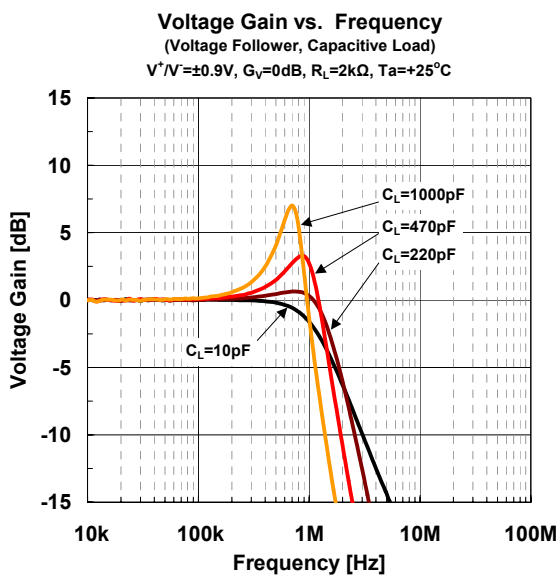
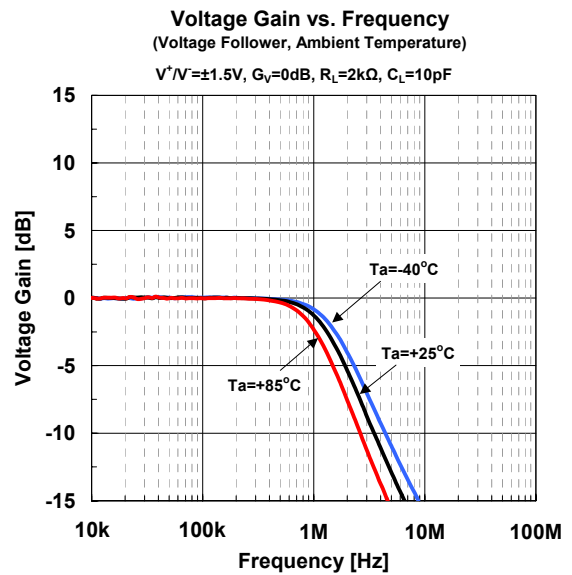
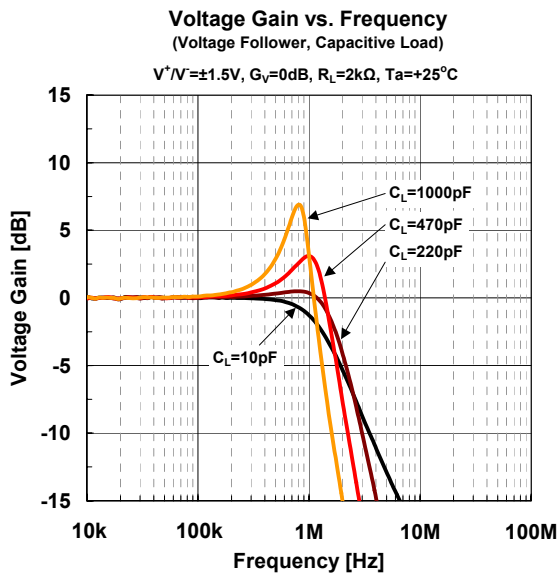
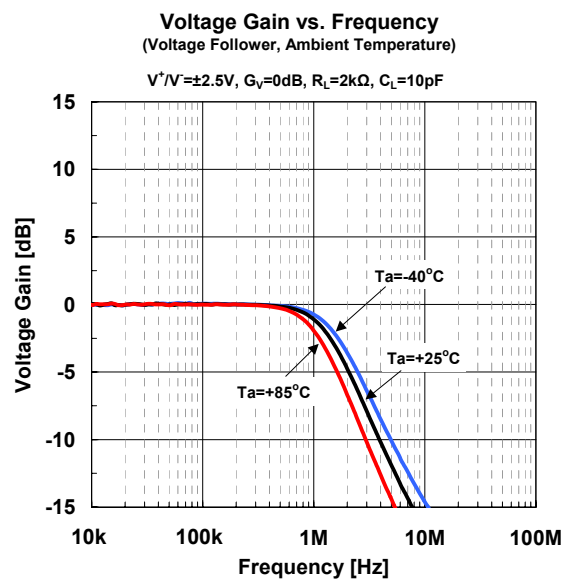
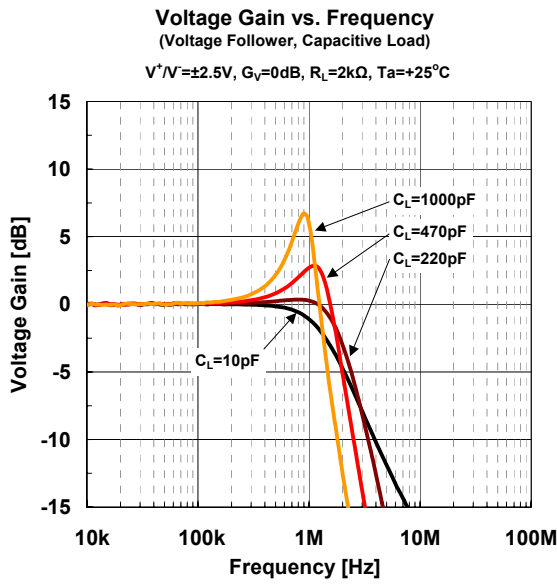
■ Typical Characteristics



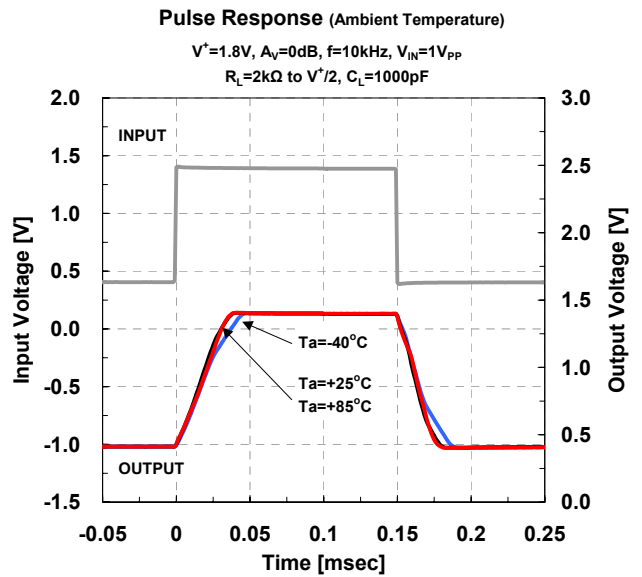
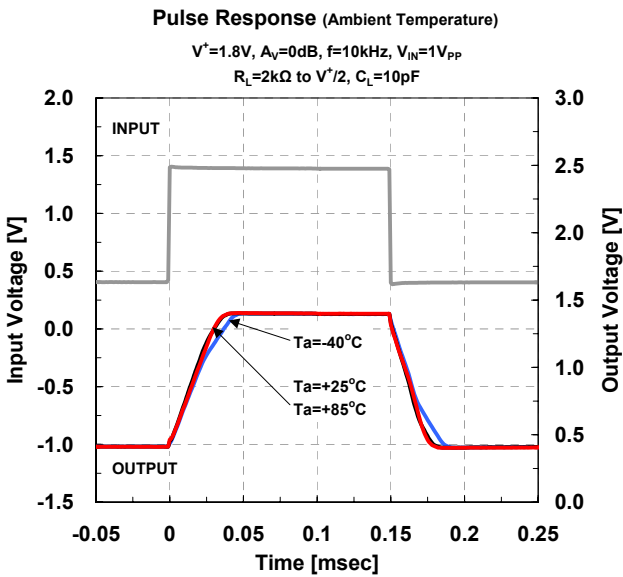
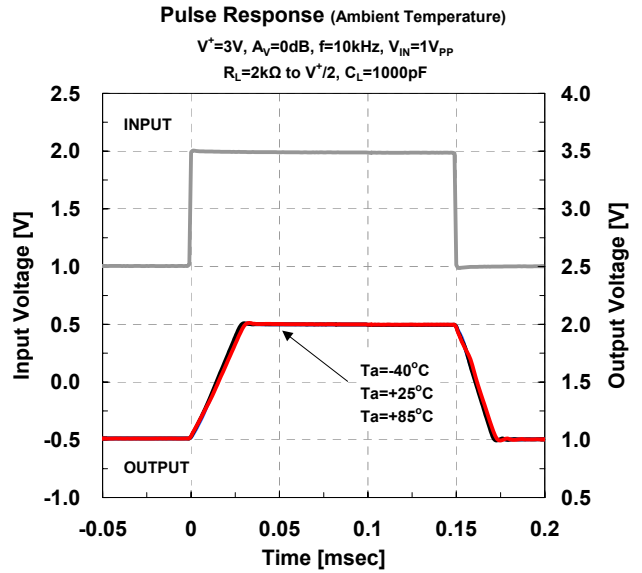
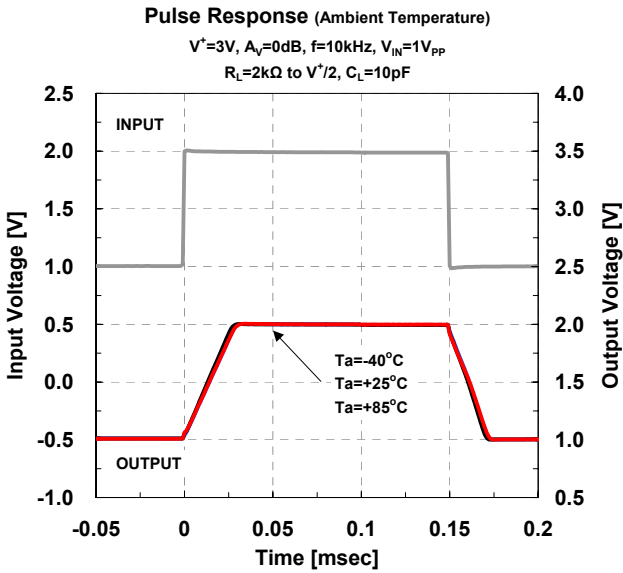
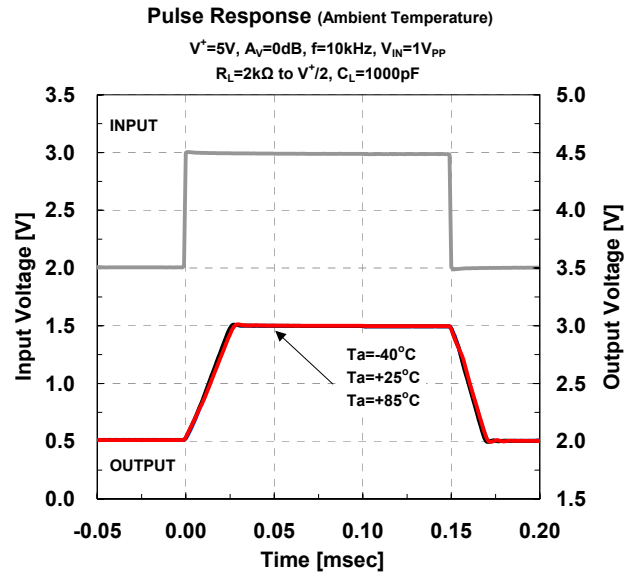
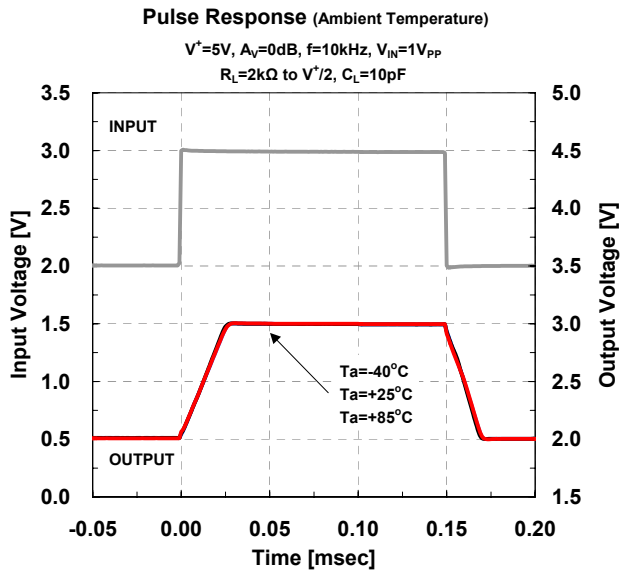
■ Typical Characteristics



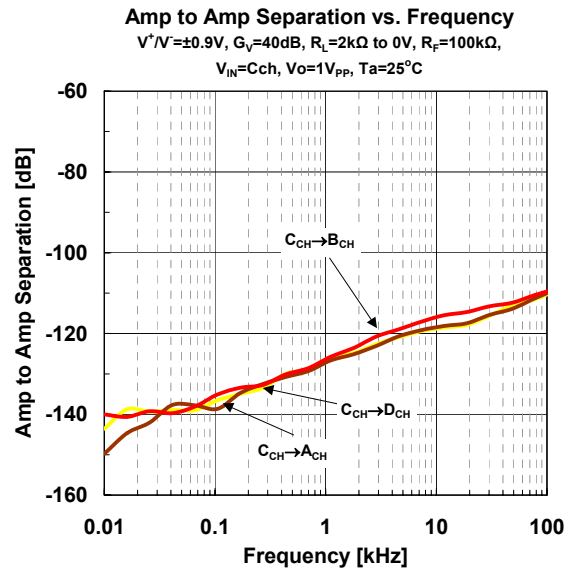
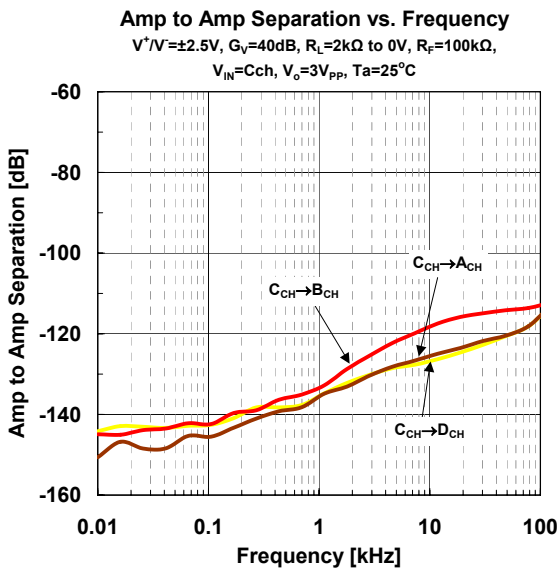
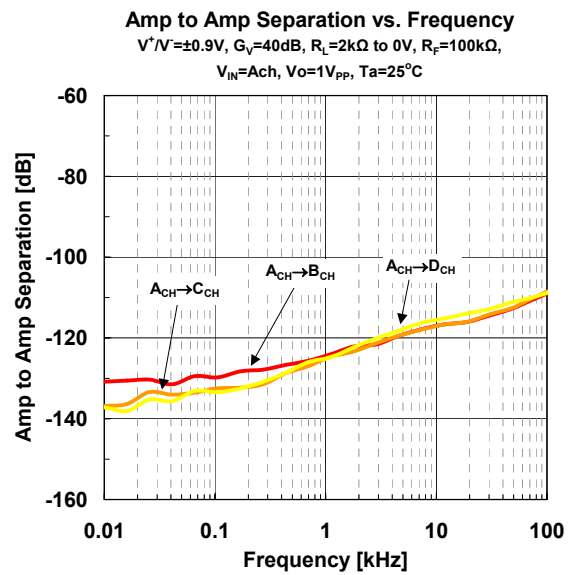
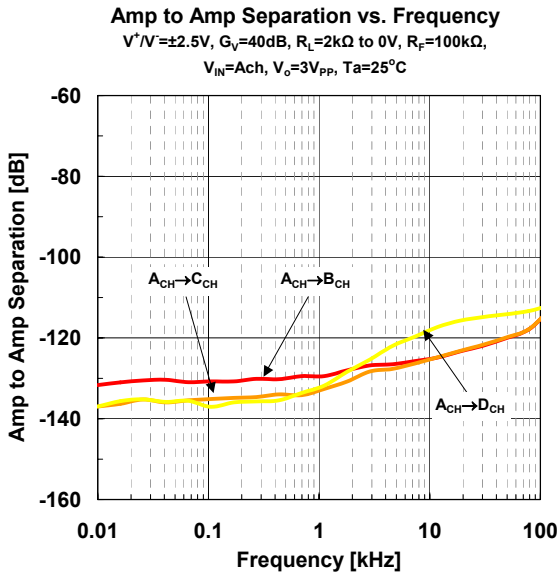
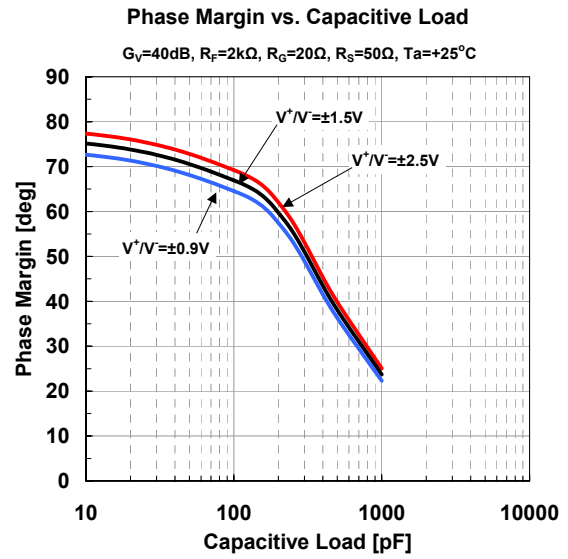
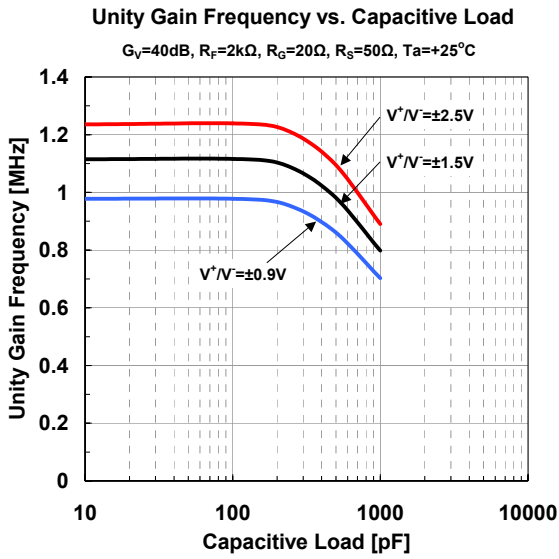
■ Typical Characteristics



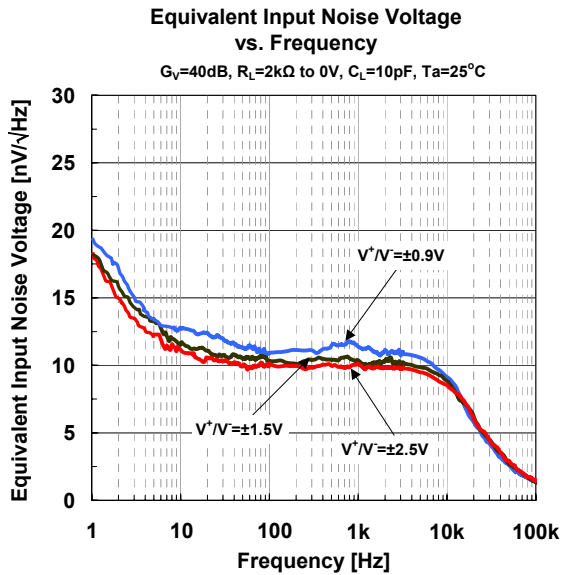
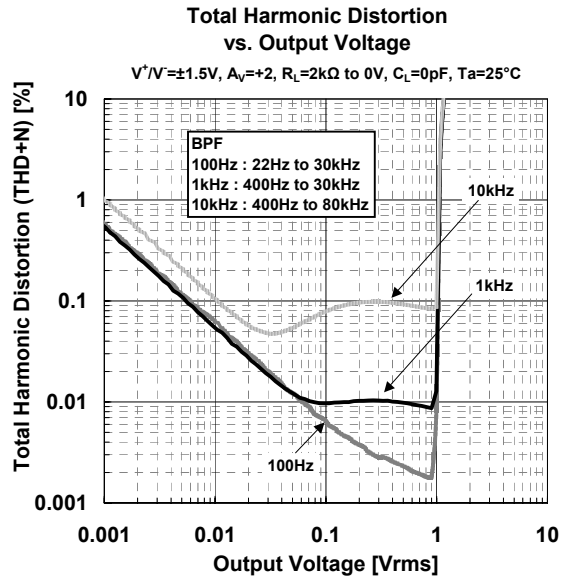
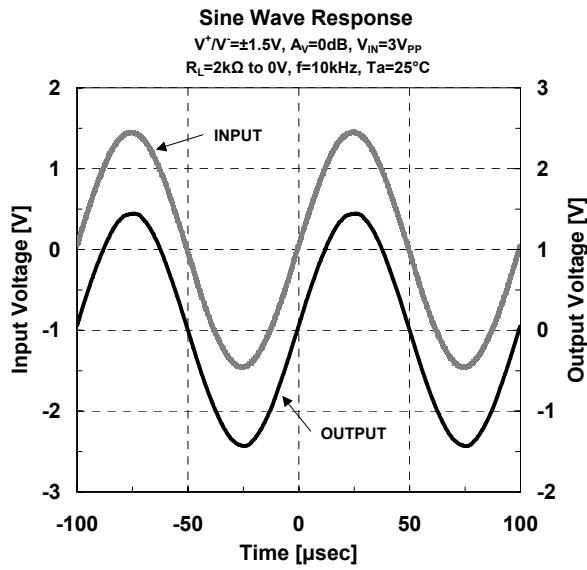
■ Typical Characteristics



■ Typical Characteristics



■ Typical Characteristics



[CAUTION]
 The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook 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:

[Nisshinbo Micro Devices:](#)

[NJM2734V-TE2](#)