

High Speed Single Supply Quad Operational Amplifier

■ GENERAL DESCRIPTION

The **NJM2744** is a high-speed single supply quad operational amplifier. The low V_{OL} enables to treat small output signal on a single supply.

It has wide supply voltage range, +3V to +32V and high slew rate.

The **NJM2744** is suitable for power supply and motor driver units.

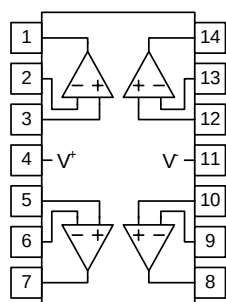
■ FEATURES

- Slew Rate 10V/ μ s typ.
- Capacitive Load Tolerance 1000pF typ.
- Output Voltage range 0.2V~3.7V at $V^+=+5V$, $R_L=2k\Omega$
- Operating Voltage 3V~32V
- Single Supply operation
- Bipolar Technology
- Package Outline DIP14, DMP14, SSOP14

■ APPLICATIONS

- Low side current sensing, Inverter motor control
- Power monitor module: UPS, PSU etc.
- Line driver, AD/DA buffer, FET driver

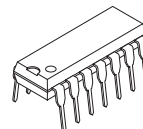
■ PIN CONFIGURATION



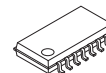
Pin Function

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

■ PACKAGR OUTLINE



NJM2744D



NJM2744M



NJM2744V

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C, unless otherwise noted.)

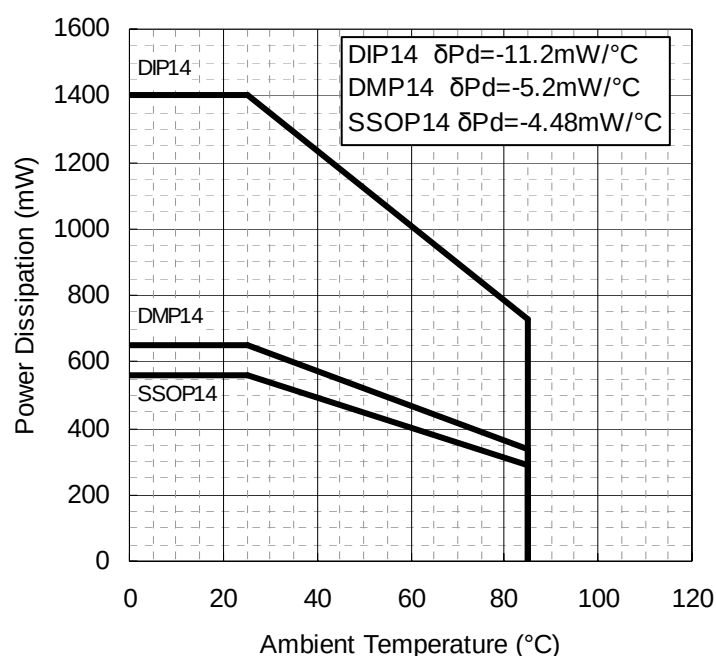
PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V ⁺	+36	V
Common Mode Input Voltage Range	V _{ICM}	-0.3 ~ +36(Note1)	V
Differential Input Voltage Range	V _{ID}	±36(Note1)	V
Power Dissipation (Note3)	P _D	1400(DIP14) (Note2) 650(DMP14) (Note2) 560(SSOP14) (Note2)	mW
Operating Temperature Range	T _{opr}	-40~+85	°C
Storage Temperature Range	T _{stg}	-50~+150	°C

(Note1) For supply voltage less than +36V, the absolute maximum input voltage is equal to supply voltage.

(Note2) On the PCB "EIA/JEDEC (76.2×114.3×1.6mm, 2 layers, FR-4)"

(Note3) See Figure.1 "Power Dissipation Derating Curve" when ambient temperature is over 25°C.

Figure.1 Power Dissipation Derating Curve



■ RECOMMENDED OPERATING CONDITION (Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V ⁺		3.0	-	32	V

■ ELECTRICAL CHARACTERISTICS

● DC CHARACTERISTICS ($V^+/V^- = \pm 15V$, $T_a = 25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current	I_{CC}	No Signal, $R_s = 50\Omega$	-	7.5	10	mA
Input Offset Voltage	V_{IO}	$R_s = 50\Omega$	-	2	12	mV
Input Bias Current	I_B	$R_s = 50\Omega$	-	80	400	nA
Input Offset Current	I_{IO}	$R_s = 50\Omega$	-	5	75	nA
Voltage Gain	A_V	$R_L \geq 2k\Omega$, $V_o = \pm 10V$	80	110	-	dB
Common Mode Rejection Ratio	CMR	$-15V \leq V_{ICM} \leq 12.5V$	55	75	-	dB
Supply Voltage Rejection Ratio	SVR	$3V \leq V^+ \leq 32V$	70	90	-	dB
Maximum Output Voltage1	V_{OM1}	$R_L \geq 10k\Omega$ to GND	13.7 -13.7	14 -14.8	-	V
Maximum Output Voltage2	V_{OM2}	$R_L \geq 2k\Omega$ to GND	13.5 -13.5	-	-	V
Source Output Current	I_{SOURCE}	$V_{IN+} = 1V$, $V_{IN-} = 0V$, $V_o = 0V$	10	30	-	mA
Sink Output Current	I_{SINK}	$V_{IN+} = 0V$, $V_{IN-} = 1V$, $V_o = 0V$	10	30	-	mA
Common Mode Input Voltage Range	V_{ICM}	CMR $\geq 55dB$	-15	-	12.5	V

● AC CHARACTERISTICS ($V^+/V^- = \pm 15V$, $T_a = 25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gain Bandwidth Product	GB		-	2	-	MHz
Slew Rate	SR		-	10	-	V/ μs
Equivalent Input Noise Voltage	V_{NI}	$f = 1kHz$	-	40	-	nV/ $\sqrt{Hz}$
Capacitive Load Tolerance	C_L		-	1000	-	pF

■ ELECTRICAL CHARACTERISTICS

● DC CHARACTERISTICS ($V^+ = +5V$, $V^- = 0V$, $T_a = 25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current	I_{CC}	No Signal, $R_s = 50\Omega$	-	5.5	9	mA
Input Offset Voltage	V_{IO}	$R_s = 50\Omega$	-	2	12	mV
Input Bias Current	I_B	$R_s = 50\Omega$	-	80	400	nA
Input Offset Current	I_{IO}	$R_s = 50\Omega$	-	5	75	nA
Voltage Gain	A_V	$R_L = 2k\Omega$, $V_o = \pm 1V$	80	110	-	dB
Common Mode Rejection Ratio	CMR	$0V \leq V_{ICM} \leq 2.8V$	50	60	-	dB
Supply Voltage Rejection Ratio	SVR	$3V \leq V^+ \leq 32V$	70	90	-	dB
Maximum Output Voltage1	V_{OH}	$R_L = 2k\Omega$ to GND	3.7	4	-	V
Maximum Output Voltage2	V_{OL}	$R_L = 2k\Omega$ to GND	-	0.1	0.2	V
Source Output Current	I_{SOURCE}	$V_{IN+} = 1V$, $V_{IN-} = 0V$, $V_o = 2.5V$	10	30	-	mA
Sink Output Current	I_{SINK}	$V_{IN+} = 0V$, $V_{IN-} = 1V$, $V_o = 2.5V$	10	30	-	mA
Common Mode Input Voltage Range	V_{ICM}	CMR $\geq 50dB$	0	-	2.8	V

● AC CHARACTERISTICS ($V^+ = +5V$, $V^- = 0V$, $T_a = 25^\circ C$, unless otherwise noted.)

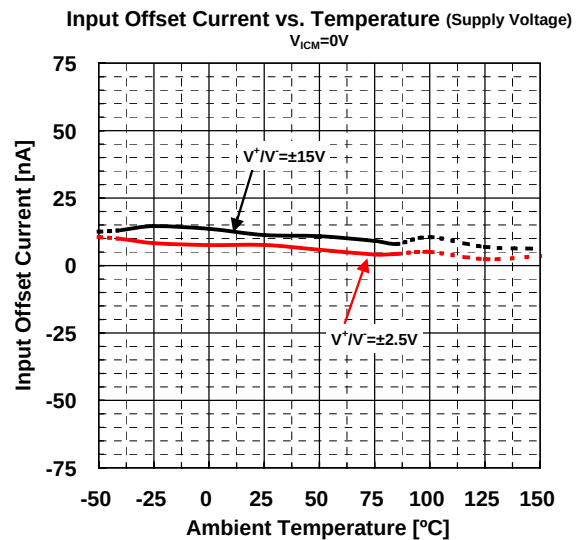
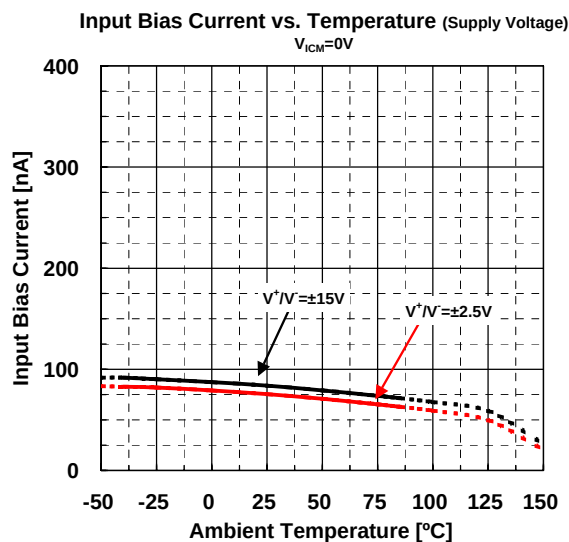
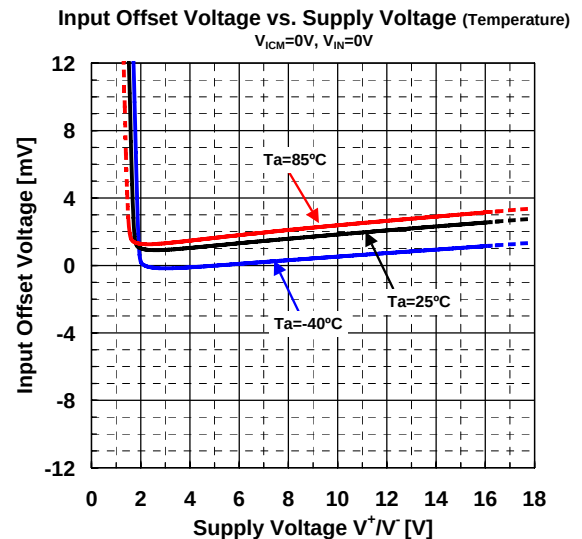
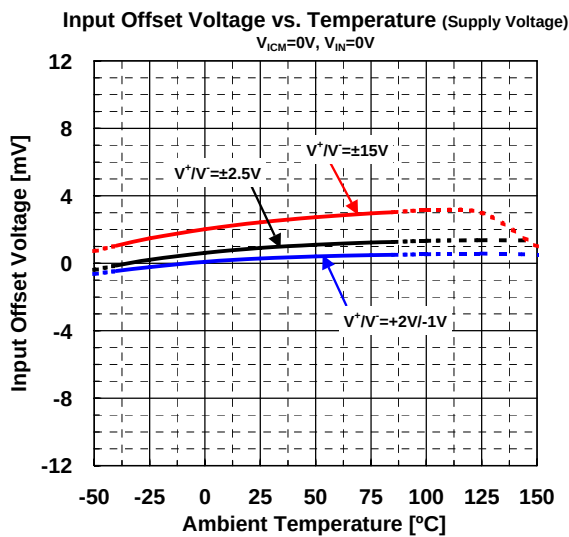
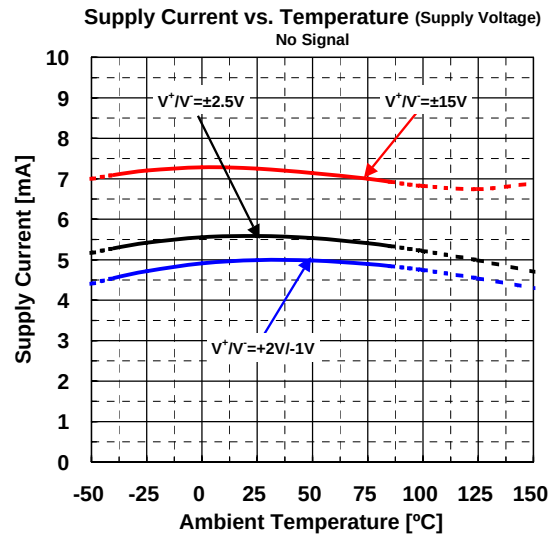
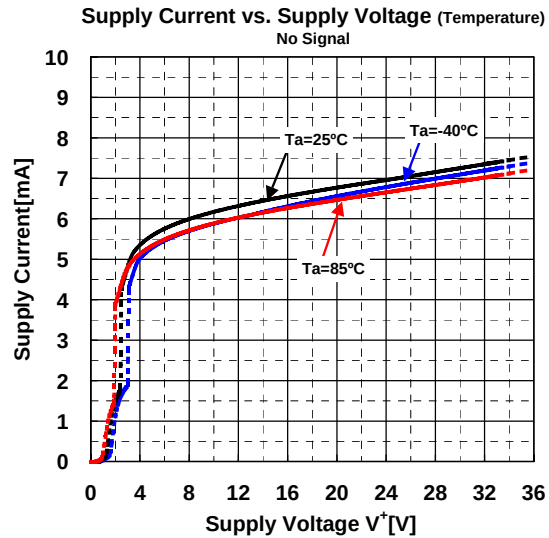
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gain Bandwidth Product	GB		-	2	-	MHz
Slew Rate	SR		-	7	-	V/ μs
Equivalent Input Noise Voltage	V_{NI}	$f = 1kHz$	-	40	-	nV/ $\sqrt{Hz}$
Capacitive Load Tolerance	C_L		-	1000	-	pF

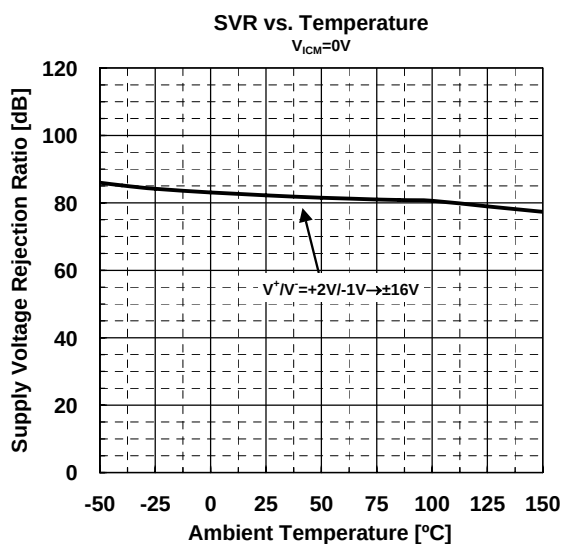
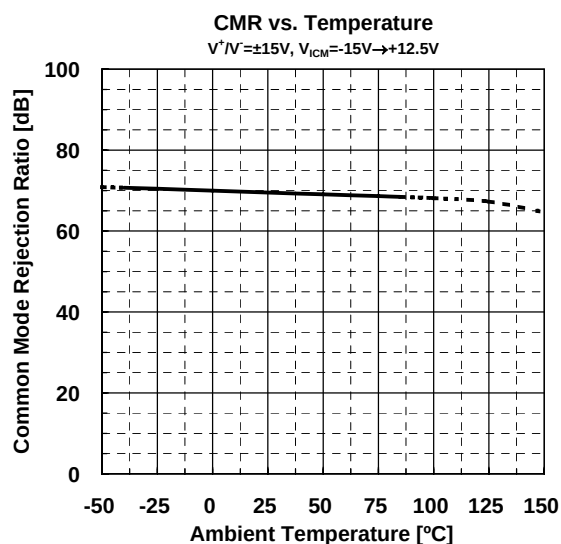
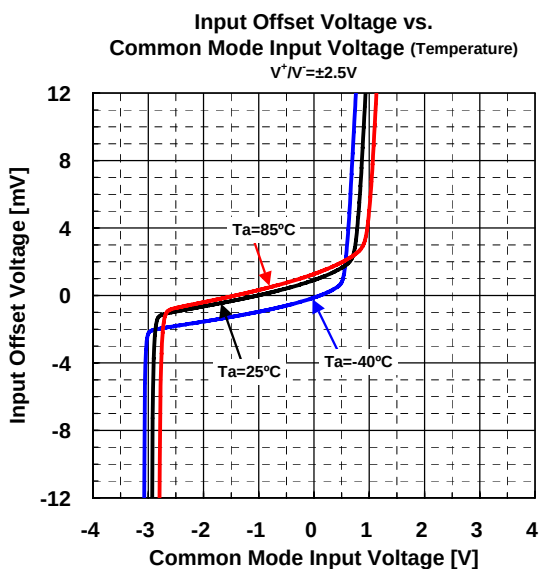
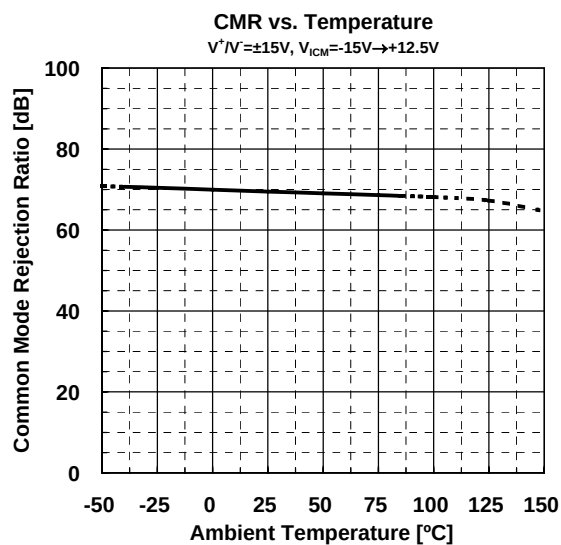
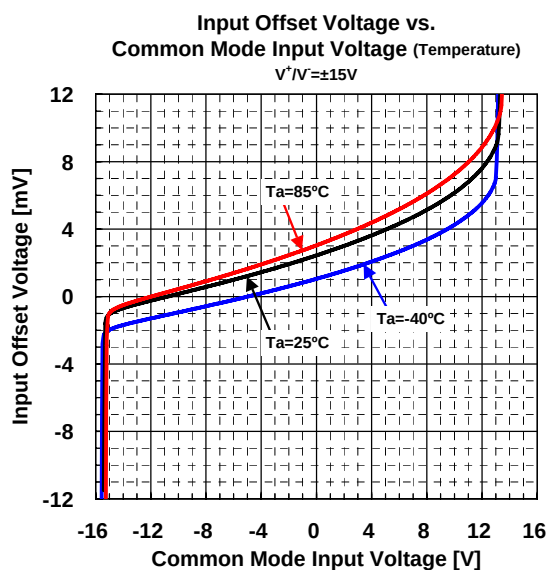
Note: The common mode input voltage range of NJM2744 is shifted toward the V^- for single supply use.

At the low operating voltage, the center potential of the V^+ and V^- may be out of the common mode voltage range.

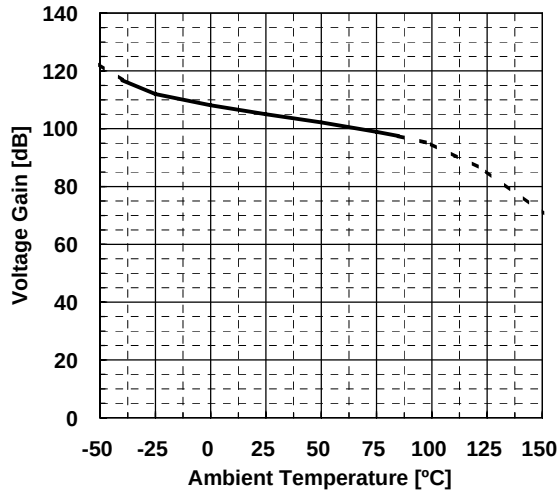
In this case, shift the common mode input voltage toward the V^- .

■ TYPICAL CHARACTERISTICS

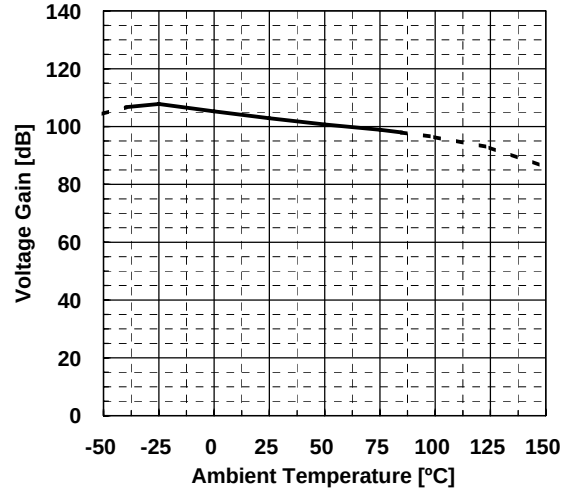




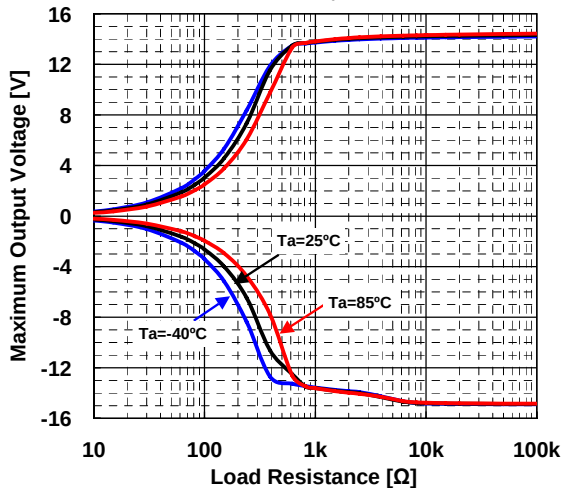
Gain vs. Temperature
 $V^+ / V^- = \pm 15V$, $R_L = 2k\Omega$ to $0V$,
 $C_L = 100p$ to $0V$, $V_O = -10V \rightarrow +10V$



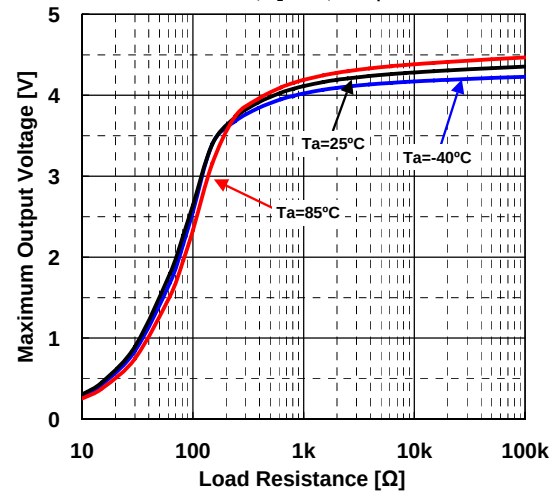
Gain vs. Temperature
 $V^+ / V^- = \pm 2.5V$, $R_L = 2k\Omega$ to $0V$,
 $C_L = 100p$ to $0V$, $V_O = -1V \rightarrow +1V$



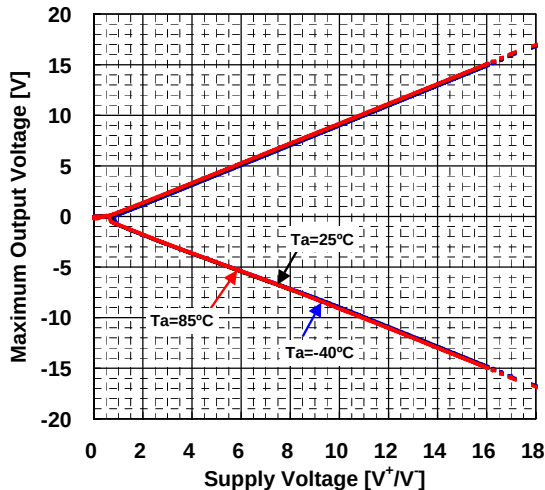
Maximum Output Voltage vs. Load Resistance (Temperature)
 $V^+ / V^- = \pm 15V$, $G_v = \text{open}$, R_L to $0V$



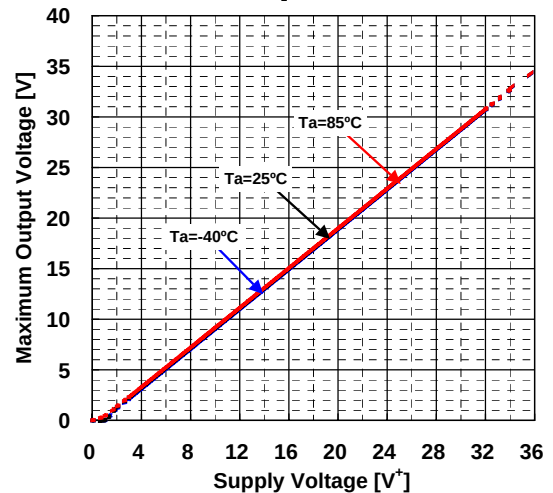
Maximum Output Voltage vs. Load Resistance (Temperature)
 $V^+ = +5V$, R_L to $0V$, $G_v = \text{open}$



Maximum Output Voltage vs. Supply Voltage (Temperature)
 $R_L = 2k$ to $0V$

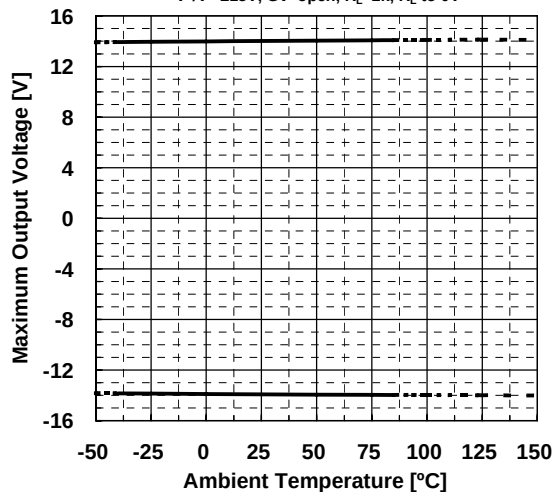


Maximum Output Voltage vs. Supply Voltage (Temperature)
 $R_L = 2k$ to $0V$



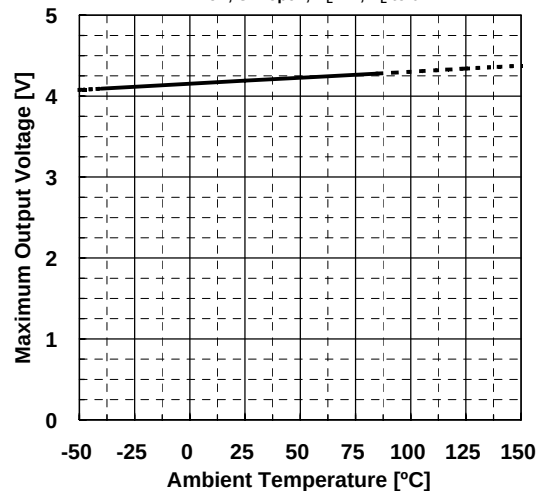
Maximum Output Voltage vs. Temperature

$V^+/V^- = \pm 15V$, $G_v = \text{open}$, $R_L = 2k$, R_L to 0V



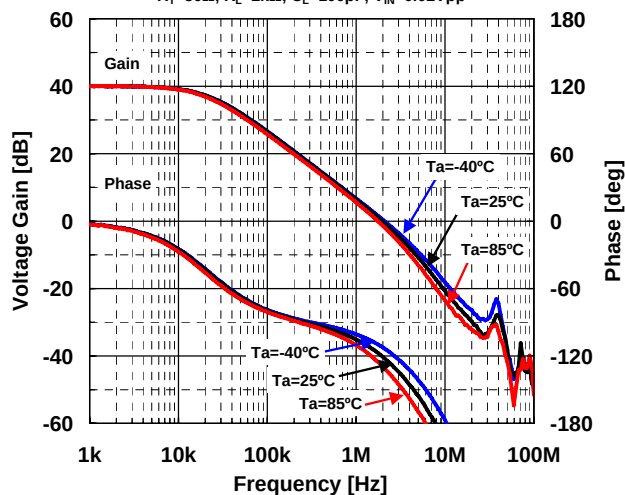
Maximum Output Voltage vs. Temperature

$V^+ = +5V$, $G_v = \text{open}$, $R_L = 2k$, R_L to 0V



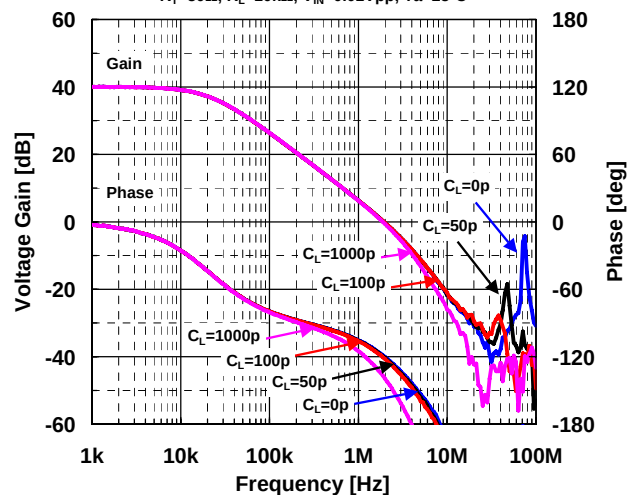
Gain vs. Frequency (Temperature)

$V^+/V^- = \pm 15V$, $G_v = 40dB$, $R_S = 20\Omega$, $R_F = 2k\Omega$, $R_I = 50\Omega$, $R_L = 2k\Omega$, $C_L = 100pF$, $V_{IN} = 0.02V_{pp}$



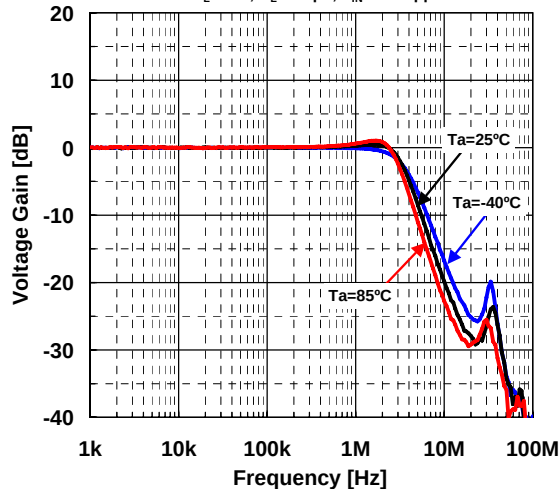
Gain vs. Frequency (Load Capacitance)

$V^+/V^- = \pm 15V$, $G_v = 40dB$, $R_S = 20\Omega$, $R_F = 2k\Omega$, $R_I = 50\Omega$, $R_L = 10k\Omega$, $V_{IN} = 0.01V_{pp}$, $T_a = 25^\circ C$



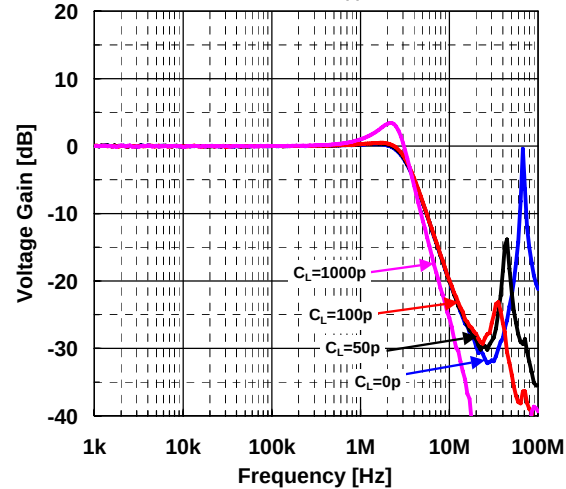
V.F. Peak vs. Frequency (Temperature)

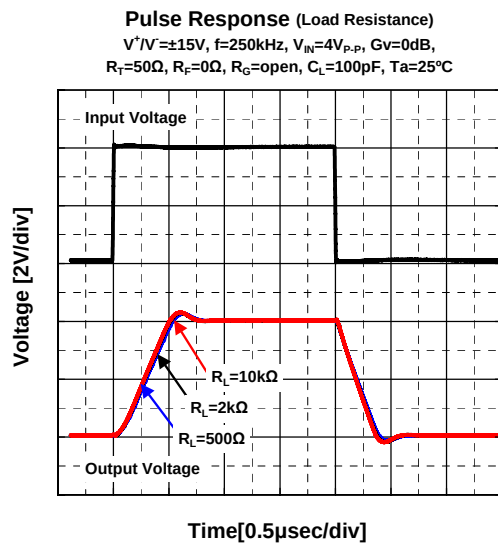
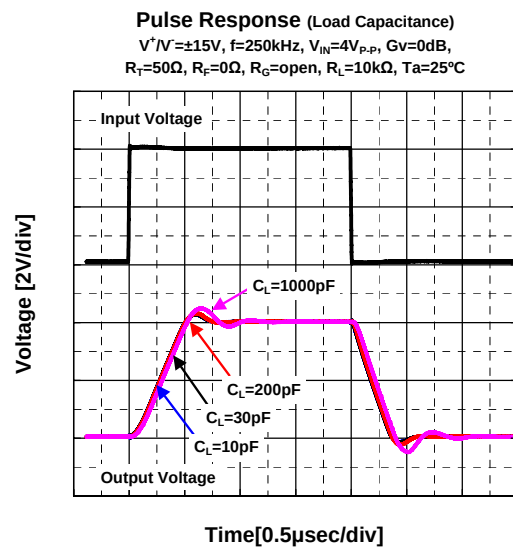
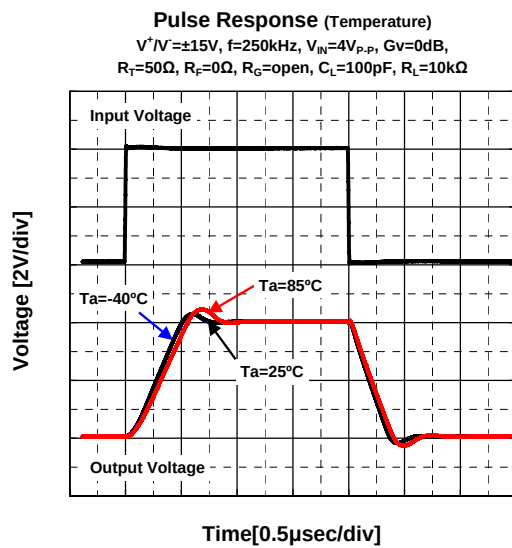
$V^+/V^- = \pm 15V$, $G_v = 0dB$, $R_S = \text{open}$, $R_F = 0$, $R_I = 50\Omega$, $R_L = 2k\Omega$, $C_L = 100pF$, $V_{IN} = 0.02V_{pp}$



V.F. Peak vs. Frequency (Load Capacitance)

$V^+/V^- = \pm 15V$, $G_v = 0dB$, $R_S = \text{open}$, $R_F = 0$, $R_I = 50\Omega$, $R_L = 10k\Omega$, $V_{IN} = 0.02V_{pp}$, $T_a = 25^\circ C$





■NOTE

[CAUTION]
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