

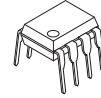
## SINGLE SUPPLY HI-SLEW RATE DUAL OPERATIONAL AMPLIFIER

### ■ GENERAL DESCRIPTION

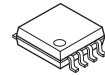
The NJM2717 is a high slew rate single supply dual operational amplifier. It offers excellent features of a 40V/us (typ.) high slew rate in a single supply and low operating voltage from 2.7V, which provide a benefit to buffer, filter and ground level signal detection circuit design. Therefore The NJM2717 is suitable for CCD buffer and AD/DA converter buffer using in facsimile/scanner, current detector in inverter controller, PWM motor controller and Tuner/Communication devices.

The NJM2717 is available in a wide variety packages 8-lead DIP, and 8-lead surface-mount packages of SOP (DMP), SSOP and MSOP (TVSP).

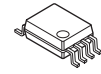
### ■ PACKAGE OUTLINE



**NJM2717D  
(DIP8)**



**NJM2717M  
(DMP8)**



**NJM2717V  
(SSOP8)**

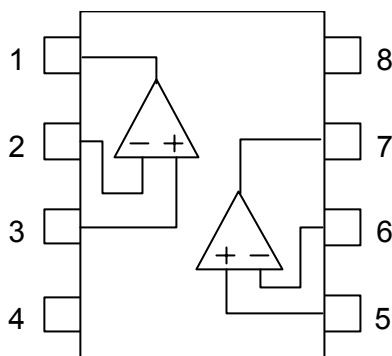


**NJM2717RB1  
(MSOP8 (TVSP8))**

### ■ FEATURES

- Single Supply
- Operating Voltage 2.7V to 12V
- High Slew Rate 40V/μs Typ. (at V<sup>+</sup>=5V)
- Operating Current 8mA typ. (at V<sup>+</sup>=5V)
- Output Voltage Range V<sub>OH</sub> ≥ 4.5V Typ. (at V<sup>+</sup>=5V, R<sub>L</sub>=4kΩ)  
V<sub>OL</sub> ≤ 0.05V Typ. (at V<sup>+</sup>=5V, R<sub>L</sub>=4kΩ)
- Bipolar Technology
- Package Outline DIP8,  
DMP8,  
SSOP8,  
MSOP8 (TVSP8) MEET JEDEC MO-187-DA/THIN TYPE

### ■ PIN CONFIGURATION



#### PIN FUNCTION

1. A OUTPUT
2. A-INPUT
3. A+INPUT
4. GND
5. B+INPUT
6. B-INPUT
7. B OUTPUT
8. V<sup>+</sup>

**NJM2717D  
NJM2717M  
NJM2717V  
NJM2717RB1  
(Top View)**

# NJM2717

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	15.0	V
Differential Input Voltage	V <sub>ID</sub>	± 3	V
Input Common Mode Voltage Range	V <sub>ICM</sub>	-0.3 to +15.0(Note 1)	V
Power Dissipation	P <sub>D</sub>	(DIP8) 500 (DMP8) 300 (SSOP8) 250 (MSOP8 (TVSP8)) 320	mW
Output Sink Current	I <sub>SINK</sub>	10	mA
Operating Temperature Range	T <sub>opr</sub>	-40 to +85	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +125	°C

(Note 1) For supply voltage less than 15V, the absolute maximum input voltage is equal to the supply voltage.

## ■ RECOMMENDED OPERATING CONDITION

(Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V <sup>+</sup>	2.7 to 12.0	V

## ■ ELECTRICAL CHARACTERISTICS

### ●DC CHARACTERISTICS

(V<sup>+</sup>=5V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Operating Current	I <sub>CC</sub>	R <sub>L</sub> =∞, no signal	-	8.0	11.0	mA
Input Offset Voltage	V <sub>IO</sub>	R <sub>S</sub> =0Ω	-	1	11	mV
Input Bias Current	I <sub>B</sub>		-	2	4.4	μA
Input Offset Current	I <sub>IO</sub>		-	0.2	0.5	μA
Voltage Gain	A <sub>V</sub>	R <sub>L</sub> ≥ 10kΩ, V <sub>O</sub> =1.5V to 3.5V	60	75	-	dB
Common Mode Rejection Ratio	CMR	0V ≤ V <sub>CM</sub> ≤ 3.8V	45	80	-	dB
Supply Voltage Rejection Ratio	SVR	V <sup>+</sup> =4V to 8V	50	85	-	dB
Output Voltage 1	V <sub>OH1</sub>	R <sub>L</sub> =4kΩ to GND	4.3	4.5	-	V
	V <sub>OL1</sub>		-	0.05	0.1	V
Output Voltage 2	V <sub>OH2</sub>	R <sub>L</sub> =4kΩ to 2.5V	4.5	4.7	-	V
	V <sub>OL2</sub>		-	0.1	0.5	V
Output Source Current	I <sub>SOURCE</sub>		1	2.5	-	mA
Output Sink Current	I <sub>SINK</sub>		2.5	6	-	mA
Input Common Mode Voltage Range	V <sub>ICM</sub>		0 to 3.8	-	-	V

### ●AC CHARACTERISTICS

(V<sup>+</sup>=5V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Unity Gain Bandwidth	f <sub>T</sub>		-	20	-	MHz

### ●TRANSIENT CHARACTERISTICS

(V<sup>+</sup>=5V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Slew Rate	SR		-	40	-	V/μs

## ■ ELECTRICAL CHARACTERISTICS

### ●DC CHARACTERISTICS

( $V^+=12V, T_a=25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Operating Current	$I_{CC}$	$R_L = \infty$ , no signal	-	10.0	14.5	mA
Input Offset Voltage	$V_{IO}$	$R_S = 0\Omega$	-	1	12	mV
Input Bias Current	$I_B$		-	2.1	4.4	$\mu A$
Input Offset Current	$I_{IO}$		-	0.2	1	$\mu A$
Voltage Gain	$A_V$	$R_L \geq 10k\Omega, V_O = 2V$ to 10V	60	80	-	dB
Common Mode Rejection Ratio	CMR	$0V \leq V_{CM} \leq 10.8V$	45	80	-	dB
Supply Voltage Rejection Ratio	SVR	$V^+ = 8V$ to 12V	50	85	-	dB
Output Voltage 1	$V_{OH1}$ $V_{OL1}$	$R_L = 10k\Omega$ to GND	11.3 -	11.5 0.1	- 0.3	V V
Output Voltage 2	$V_{OH2}$ $V_{OL2}$	$R_L = 10k\Omega$ to 6V	11.5 -	11.7 0.1	- 0.5	V V
Output Source Current	$I_{SOURCE}$		1	3	-	mA
Output Sink Current	$I_{SINK}$		2.5	8	-	mA
Input Common Mode Voltage Range	$V_{ICM}$		0 to 10.8	-	-	V

### ●AC CHARACTERISTICS

( $V^+=12V, T_a=25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Unity Gain Bandwidth	$f_T$		-	21	-	MHz

### ●TRANSIENT CHARACTERISTICS

( $V^+=12V, T_a=25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Slew Rate	SR		-	45	-	V/ $\mu s$

# NJM2717

## ■ ELECTRICAL CHARACTERISTICS

### ●DC CHARACTERISTICS

( $V^+=2.7V, T_a=25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Operating Current	$I_{CC}$	$R_L=\infty$ , no signal	-	6	8.5	mA
Input Offset Voltage	$V_{IO}$	$R_S=0\Omega$	-	1	10	mV
Input Bias Current	$I_B$		-	1.7	4.4	$\mu A$
Input Offset Current	$I_{IO}$		-	0.2	0.5	$\mu A$
Voltage Gain	$A_V$	$R_L \geq 10k\Omega, V_O=0.85V$ to 1.85V	60	73	-	dB
Common Mode Rejection Ratio	CMR	$0V \leq V_{CM} \leq 1.5V$	45	80	-	dB
Supply Voltage Rejection Ratio	SVR	$V^+=2.7V$ to 4V	50	75	-	dB
Output Voltage 1	$V_{OH1}$	$R_L=4k\Omega$ to GND	2.5	2.6	-	V
	$V_{OL1}$		-	0.05	0.1	V
Output Voltage 2	$V_{OH2}$	$R_L=4k\Omega$ to 1.35V	2.6	2.65	-	V
	$V_{OL2}$		-	0.1	0.2	V
Output Source Current	$I_{SOURCE}$		1	2.5	-	mA
Output Sink Current	$I_{SINK}$		2.5	5	-	mA
Input Common Mode Voltage Range	$V_{ICM}$		0 to 1.5	-	-	V

### ●AC CHARACTERISTICS

( $V^+=2.7V, T_a=25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Unity Gain Bandwidth	$f_T$		-	19	-	MHz

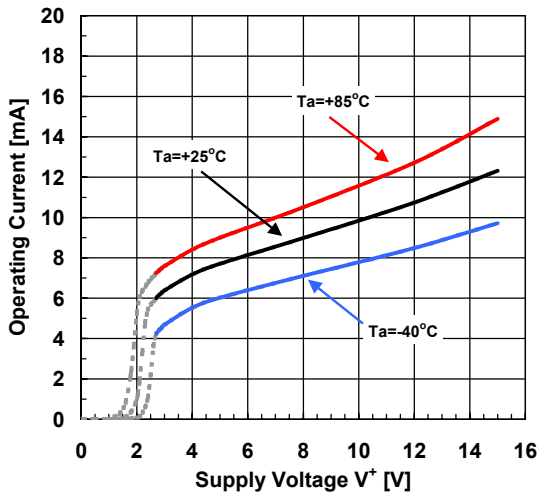
### ●TRANSIENT CHARACTERISTICS

( $V^+=2.7V, T_a=25^\circ C$ )

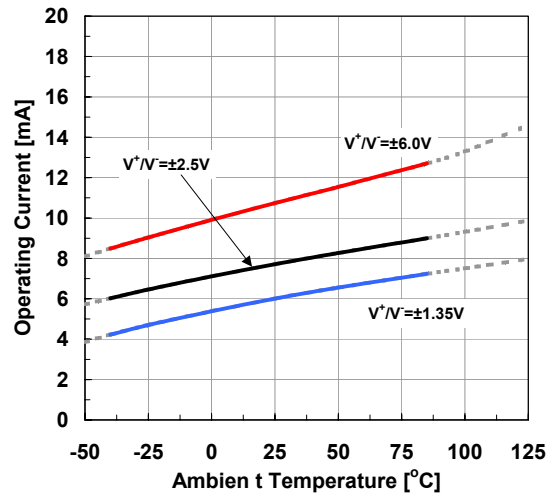
PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Slew Rate	SR		-	30	-	V/ $\mu s$

## ■ Typical Characteristics

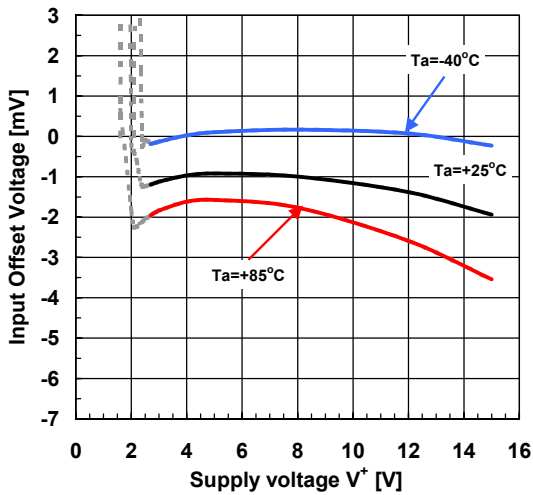
Operating Current vs. Supply Voltage



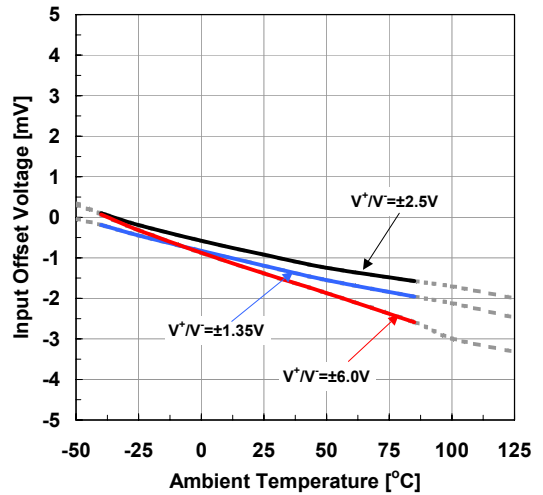
Operating Current vs. Ambient temperature



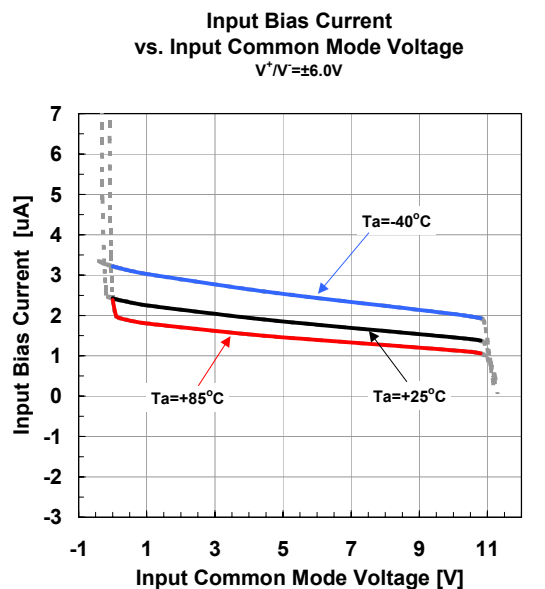
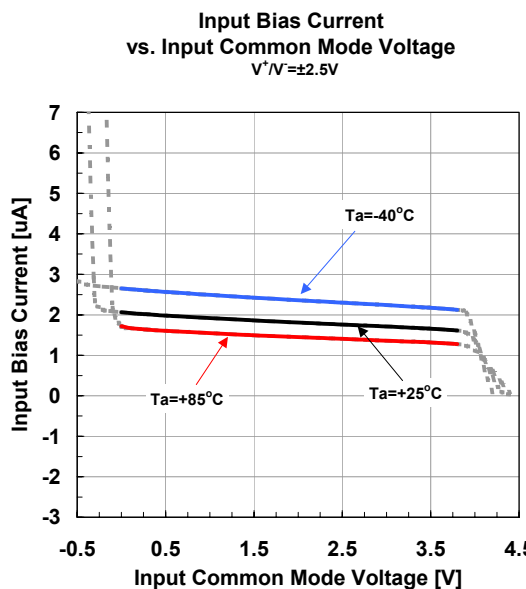
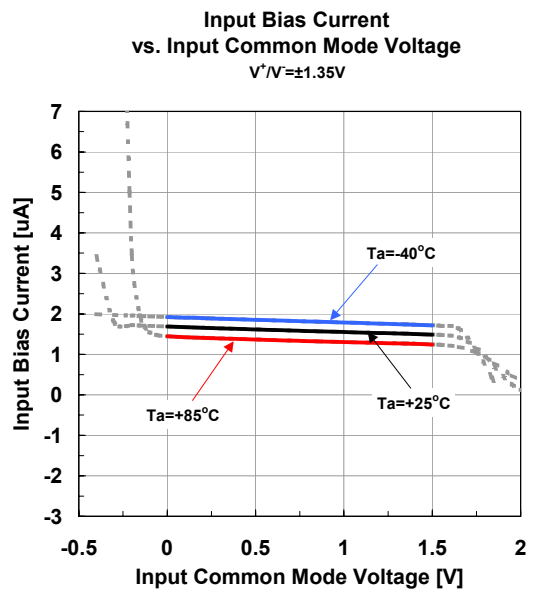
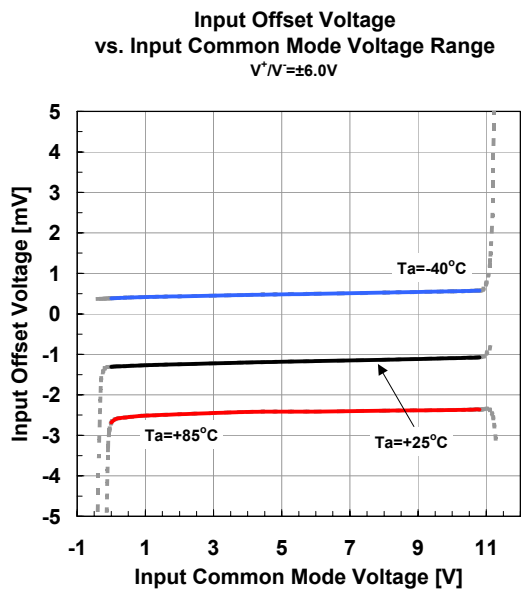
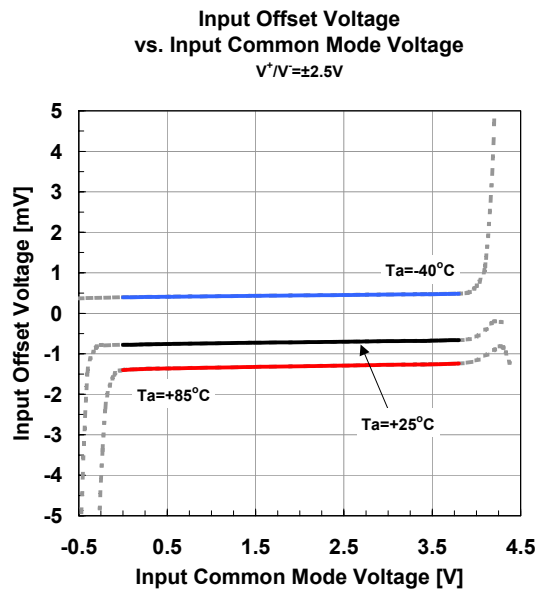
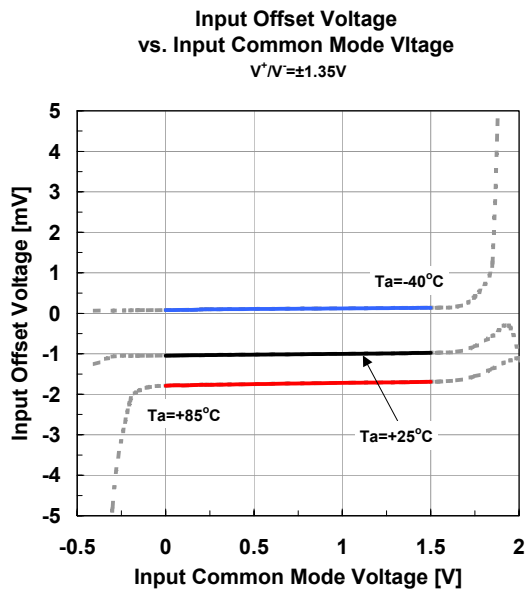
Input Offset Voltage vs. Supply Voltage



Input Offset Voltage vs. Ambient Temperature

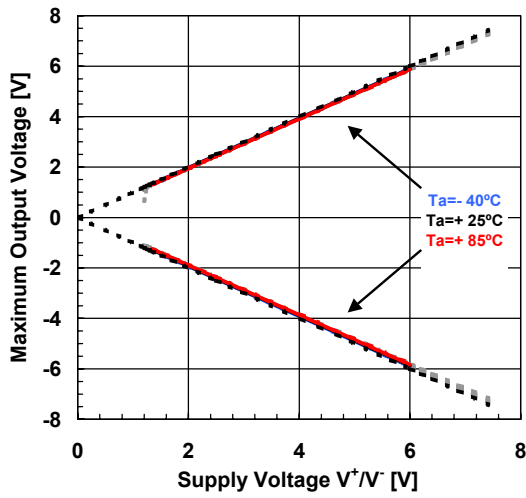


## ■ Typical Characteristics

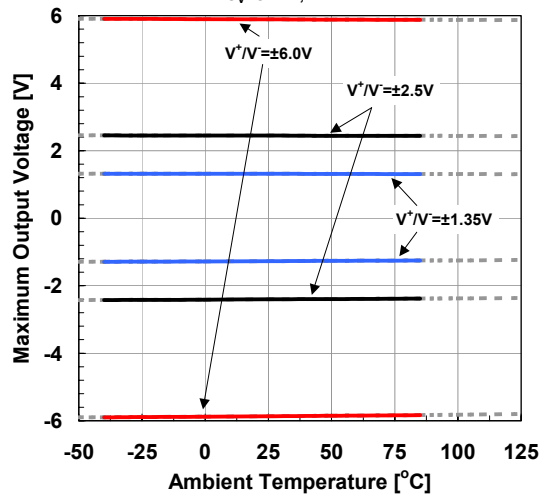


## ■ Typical Characteristics

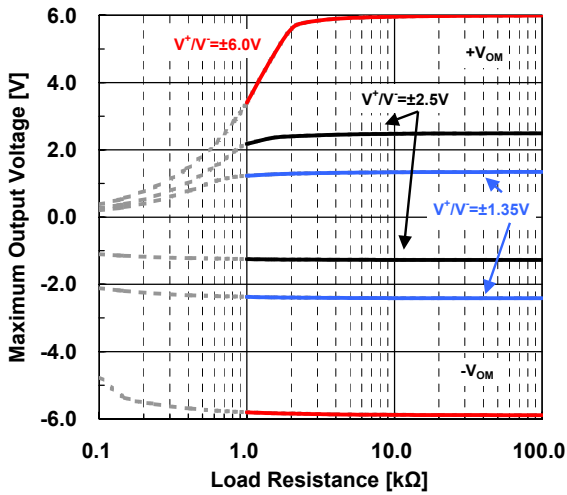
**Maximum Output Voltage vs. Supply Voltage**  
 $G_V=OPEN, R_L=4k\Omega$



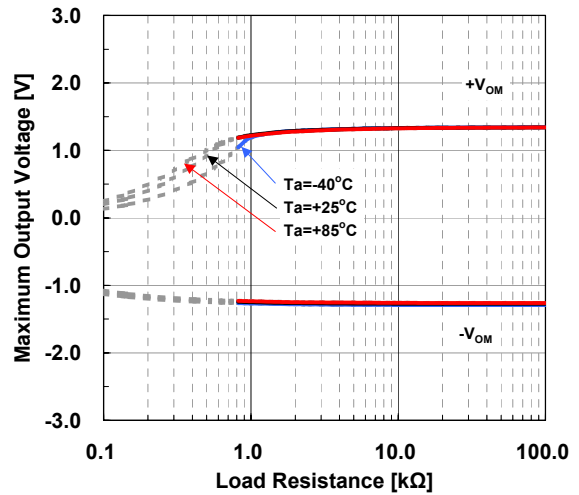
**Maximum Output Voltage vs. Ambient Temperature**  
 $G_V=OPEN, R_L=4k\Omega$



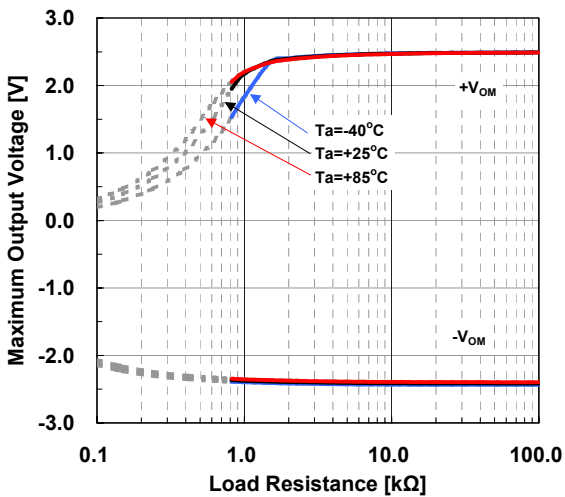
**Maximum Output Voltage vs. Load Resistance**  
 $G_V=OPEN, T_a=+25^\circ C$



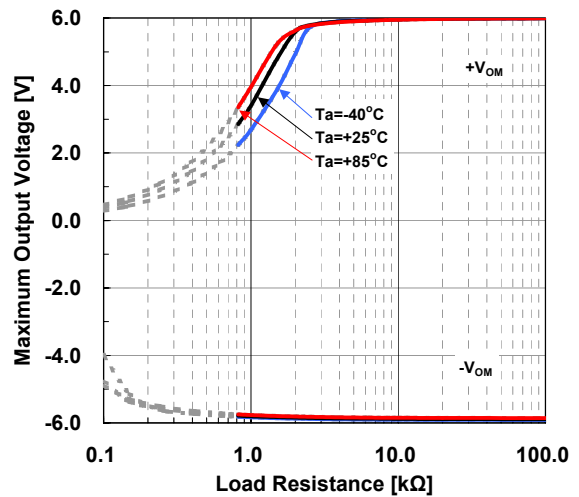
**Maximum Output Voltage vs. Load Resistance**  
 $V+V- = \pm 1.35V, G_V=OPEN$



**Maximum Output Voltage vs. Load Resistance**  
 $V+V- = \pm 2.5V, G_V=OPEN$

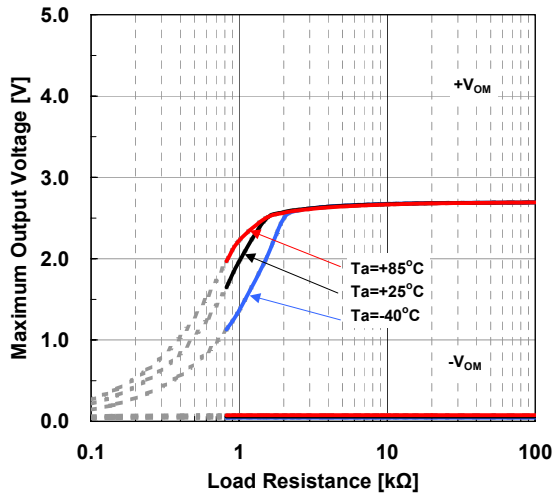


**Maximum Output Voltage vs. Load Resistance**  
 $V+V- = \pm 6.0V, G_V=OPEN$

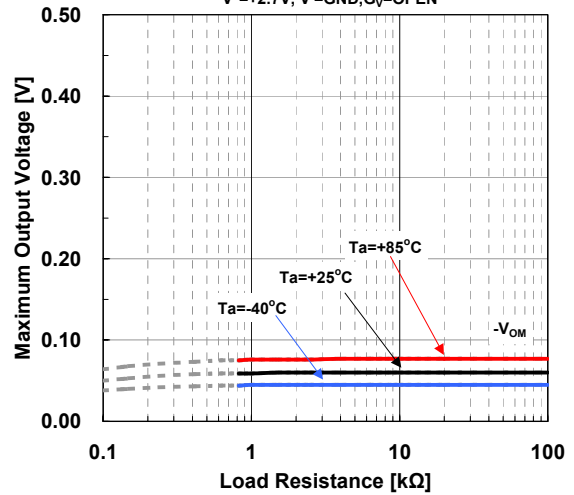


## Typical Characteristics

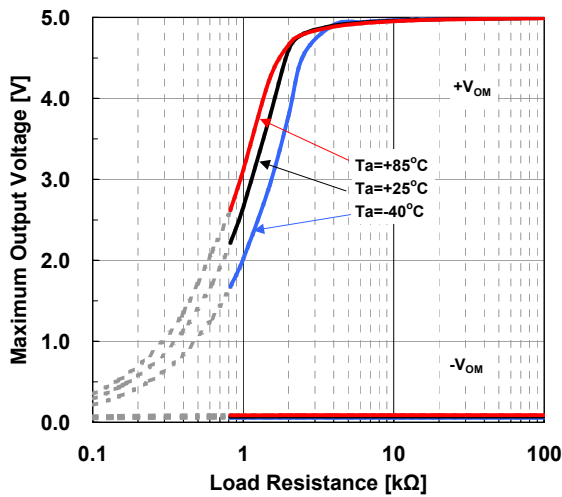
Maximum Output Voltage vs. Load Resistance  
 $V^+=2.7V, V=GND, G_V=OPEN$



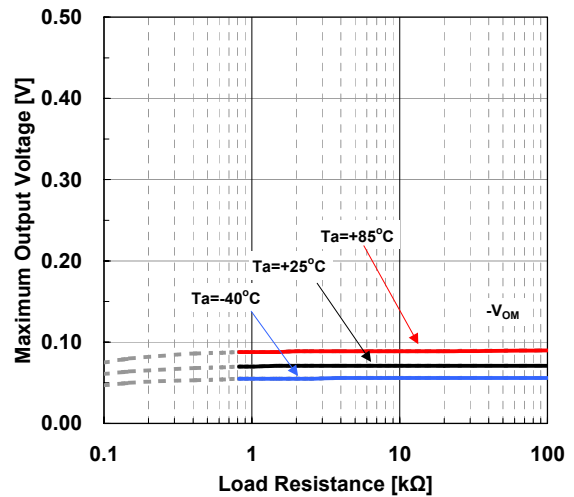
Maximum Output Voltage vs. Load Resistance  
 $V^+=2.7V, V=GND, G_V=OPEN$



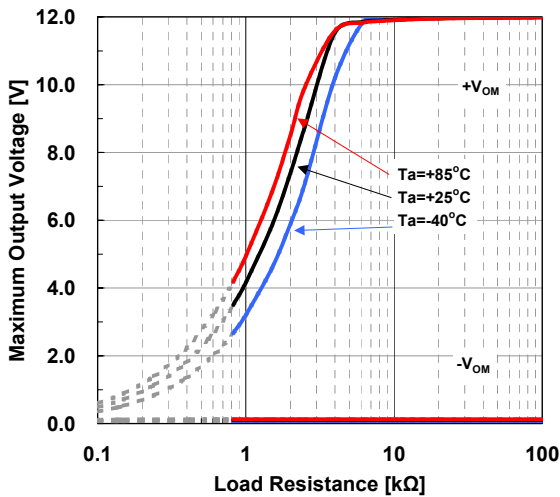
Maximum Output Voltage vs. Load Resistance  
 $V^+=5.0V, V=GND, G_V=OPEN$



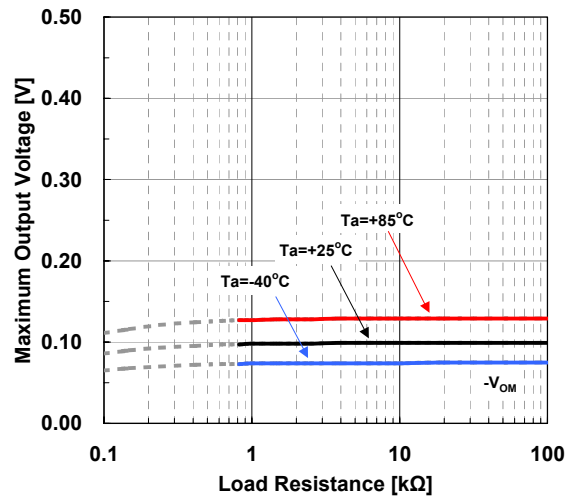
Maximum Output Voltage vs. Load Resistance  
 $V^+=5.0V, V=GND, G_V=OPEN$



Maximum Output Voltage vs. Load Resistance  
 $V^+=12.0V, V=GND, G_V=OPEN$

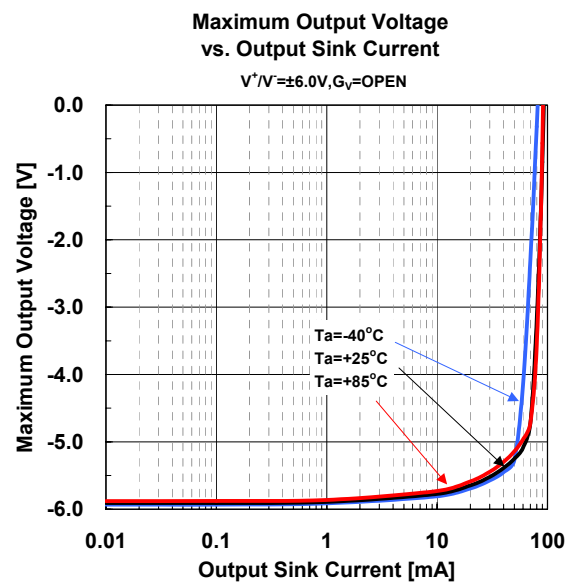
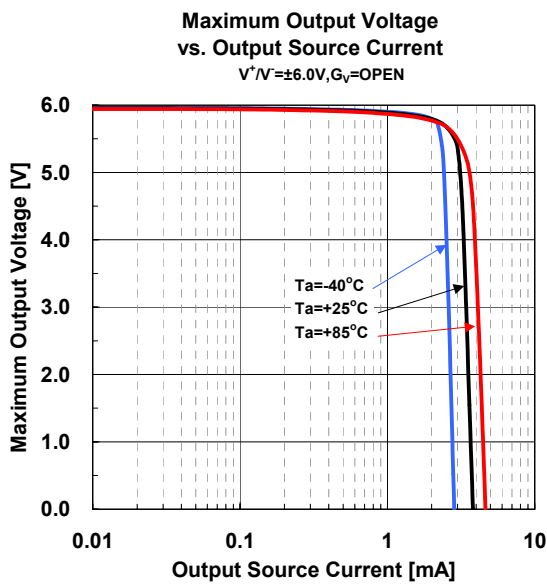
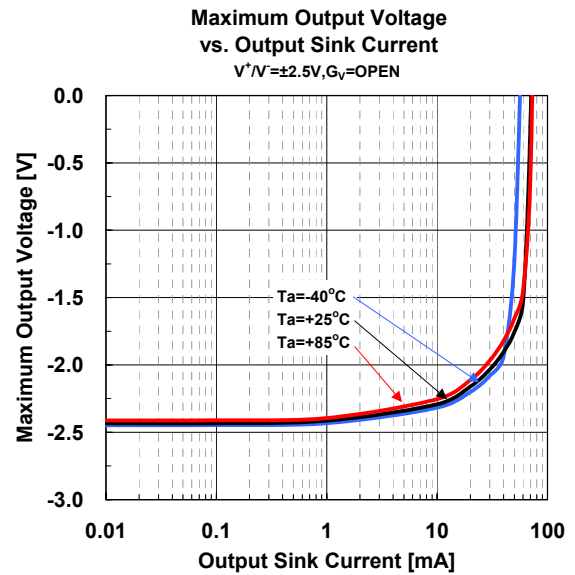
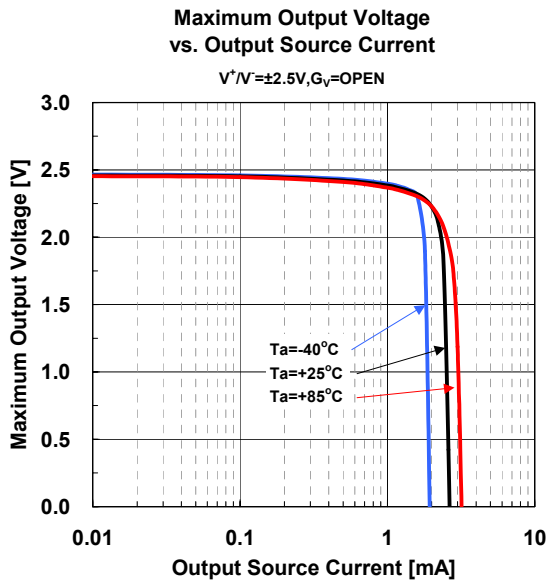
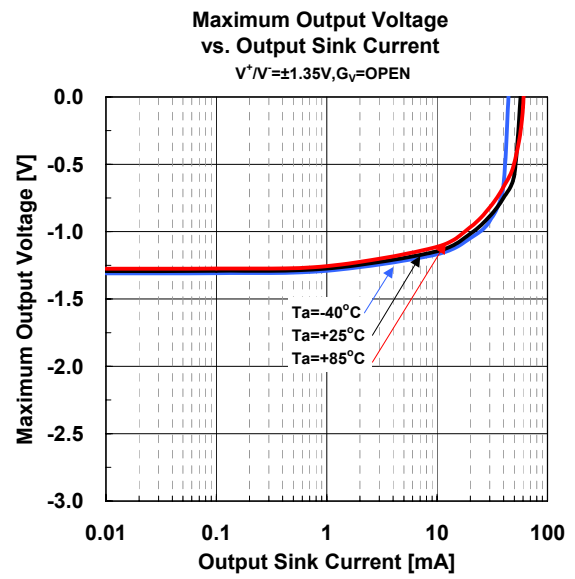
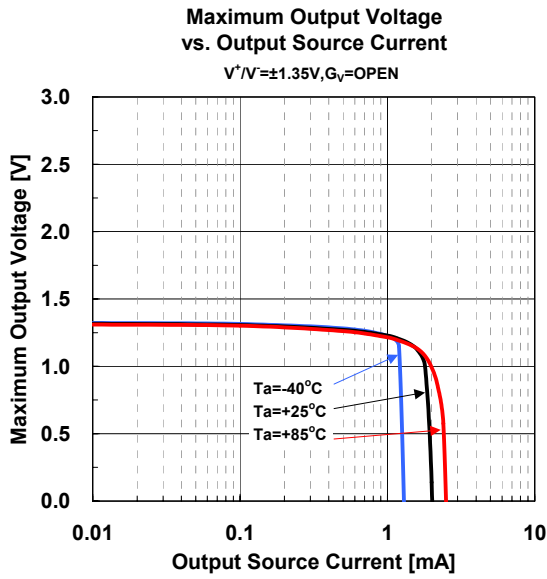


Maximum Output Voltage vs. Load Resistance  
 $V^+=12.0V, V=GND, G_V=OPEN$

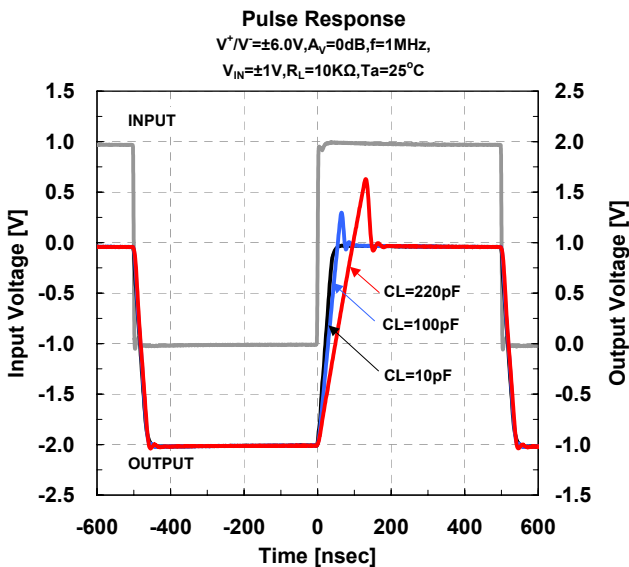
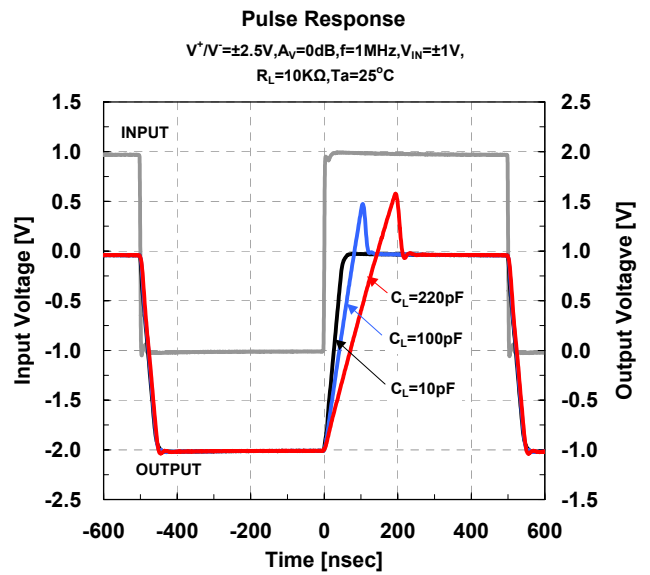
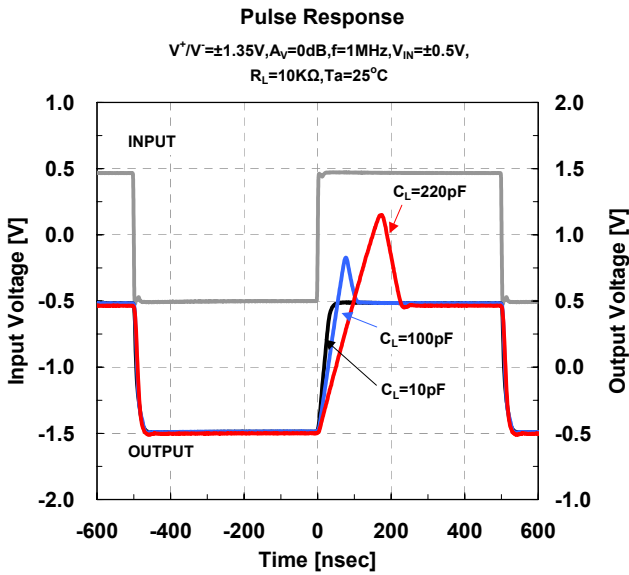
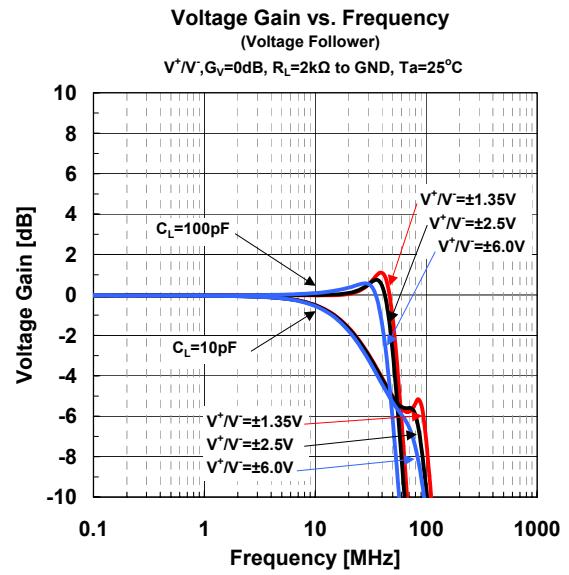
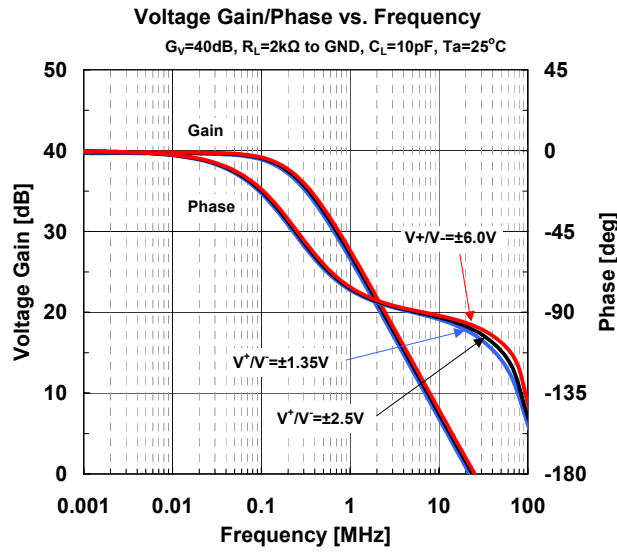




## ■ Typical Characteristics



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