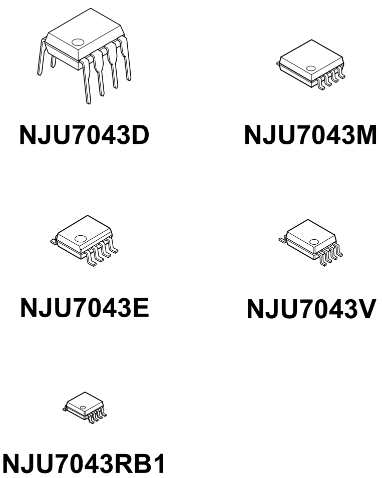
Input/Output Full-Swing
High Output Current Dual C-MOS Operational Amplifier

■GNERAL DESCRIPTION

The NJU7043 is a dual C-MOS operational amplifier permitting a full-swing input and output in under high load.

Based on C-MOS technology, there are excellent features such as high output current, low current consumption, and low operating voltage.

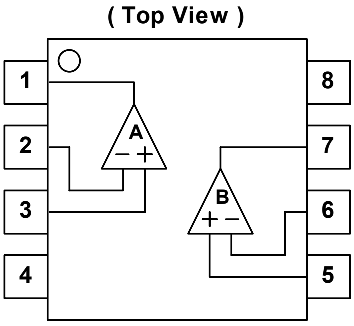
■PACKAGE OUTLINE



■FEATURES

● Operating Voltage	V_{DD}=1.8 to 5.0V	
● Input/Output Full-Swing		
● High Output Current	I_{sourse}≥40mA typ.	
	I_{sink}≤-40mA typ.	
● Input Offset Voltage	V_{IO}=10mV max.	
● Wide Input Common Mode Voltage Range	V_{SS} to V_{DD}	
● Operating Current	I_{DD}=300µA typ. (per Amplifier)	
● High Input Impedance	1TΩ typ.	
● Low Input Bias Current	I_{IB}=1pA typ.	
● Ground Sensing		
● Package	NJU7043D	DIP8
	NJU7043M	DMP8
	NJU7043E	EMP8
	NJU7043V	SSOP8
	NJU7043RB1	TVSP8

■PIN CONFIGURATION



PIN FUNCTION

1. OUTPUT A
2. −INPUT A
3. +INPUT A
4. V_{SS}
5. +INPUT B
6. −INPUT B
7. OUTPUT B
8. V_{DD}

■**ABSOLUTE MAXIMUM RATINGS** (Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V_{DD}	5.5	V
Power Dissipation	P_D	500 (DIP8) 300 (DMP8) 300 (EMP8) 250 (SSOP8) 320 (TVSP8)	mW
Operating Temperature Range	Topr	-40 ~ +85	°C
Storage Temperature Range	Tstg	-55 ~ +125	°C

(Note1) When supply voltage is less than 5.5.V, the absolute maximum input voltage is equal to the voltage.
(Note2) Decoupling capacitor should be connected between V_{DD} and V_{SS} due to the stabilized operation for the circuit.

■**RECOMMENDED OPERATION CONDITION** (Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V_{DD}	1.8 ~ 5.0	V

■**ELECTRICAL CHARACTERISTICS**

● DC CHARACTERISTICS (V_{DD}=3.0V, Ta=25°C)

PARAMETER	SYMBOL	RATING	MIN	TYP	MAX	UNIT
Operating Current	I_{DD}	No Signal, Dual Circuits	-	600	1,000	μA
Input Offset Voltage	V_{IO}		-	-	10	mV
Input Bias Current	I_B		-	1	-	pA
Input Offset Current	I_{IO}		-	1	-	pA
Voltage Gain	A_V	R_L=10kΩ	70	90	-	dB
Common Mode Rejection Ratio	CMR	0≤ V_{CM} ≤1.5V, 1.5≤V_{CM} ≤3.0V (note3)	42	60	-	dB
Supply Voltage Rejection Ratio	SVR	2.0V≤ V_{DD}≤ 5.0V, V_{CM}=V_{DD}/2	61	80	-	dB
H Level Output Voltage 1	V_{OH1}	R_L=10kΩ	2.95	-	-	V
L Level Output Voltage 1	V_{OL1}	R_L=10kΩ	-	-	0.05	V
H Level Output Voltage 2	V_{OH2}	R_L=600Ω	2.90	-	-	V
L Level Output Voltage 2	V_{OL2}	R_L=600Ω	-	-	0.10	V
Input Common Mode Voltage Range	V_{ICM}	CMR≥45dB	0	-	3	V

(Note3) CMR is represented by either CMR+ or CMR- which has lower value.
CMR+ is measured with 1.5V≤V_{CM}≤3V and CMR- is measured with 0V≤V_{CM}≤1.5V.

● AC CHARACTERISTICS (V_{DD}=3.0V, Ta=25°C)

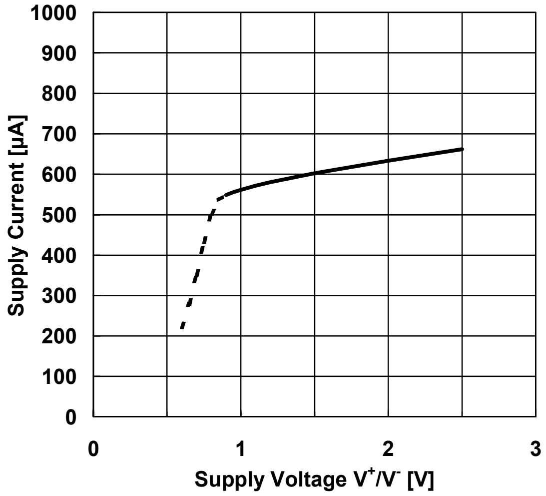
PARAMETER	SYMBOL	RATING	MIN	TYP	MAX	UNIT
Unity Gain Bandwidth	GB	R_L=10kΩ	-	0.8	-	MHz
Total Harmonic Distortion	THD	f=1kHz, Vin=1Vpp, A_V=0dB	-	0.05	-	%
Equivalent Input Noise Voltage	e_n	f=1kHz	-	40	-	nV/√Hz

● TRANSIENT CHARACTERISTICS (V_{DD}=3.0V, Ta=25°C)

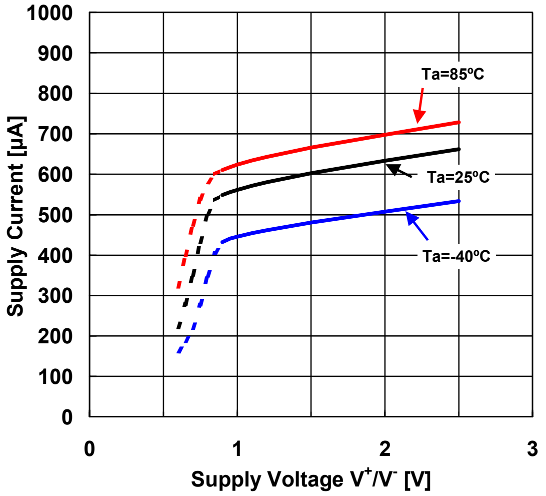
PARAMETER	SYMBOL	RATING	MIN	TYP	MAX	UNIT
Slew Rate	SR	R_L=10kΩ	-	0.7	-	V/μs

■TYPICAL CHARACTERISTICS

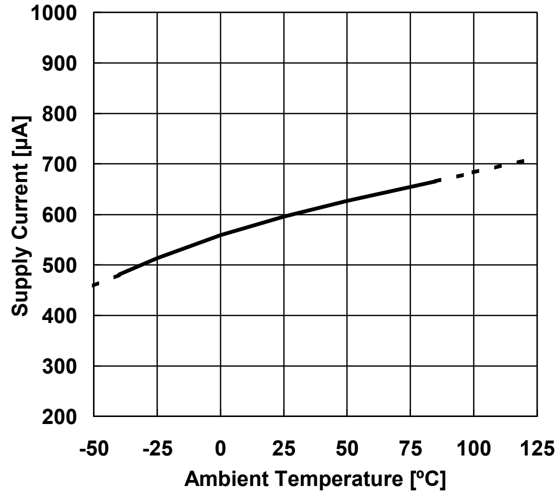
Supply Current vs. Supply Voltage
Gv = 0dB, Ta=25ºC



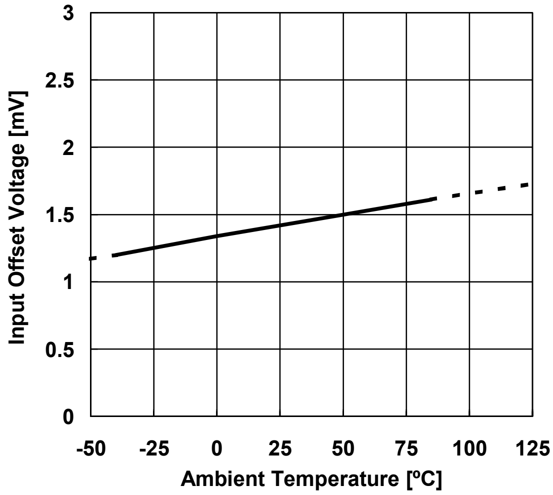
Supply Current vs. Supply Voltage
(Ambient Temperature)
Gv = 0dB



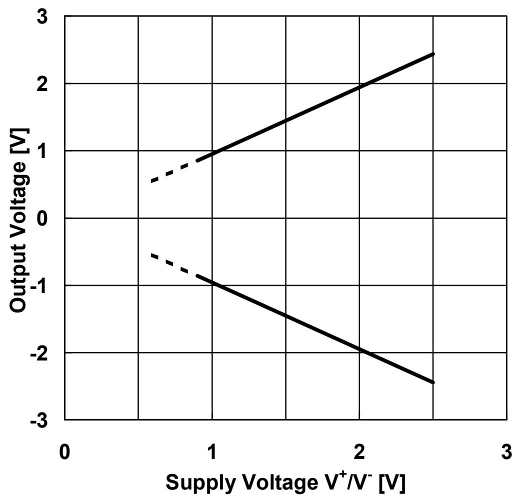
Supply Voltage vs. Ambient Temperature
V+/V-=±1.5V Gv = 0dB



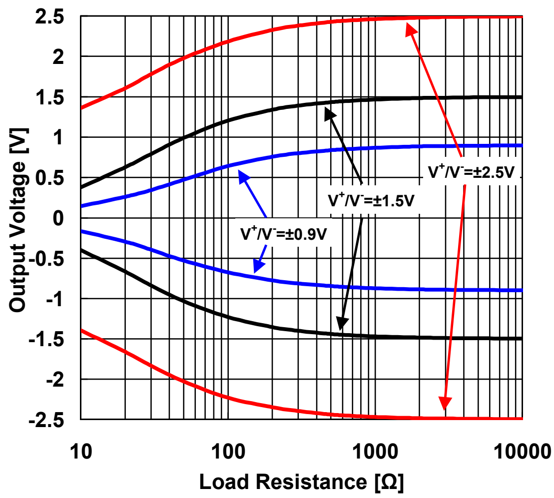
Input Offset Voltage vs. Ambient Temperature
V+/V-=±1.5V



Output Voltage vs. Supply Voltage
Gv = OPEN R_L=600Ω Ta=25ºC

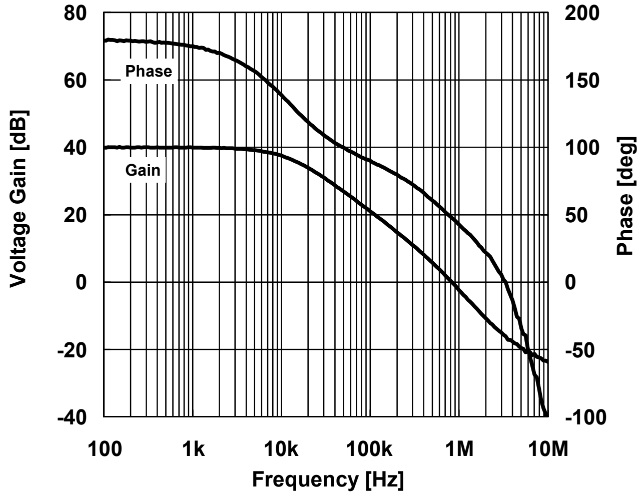


Output Voltage vs. Load Resistance (Supply Voltage)
Gv = OPEN Ta=25ºC

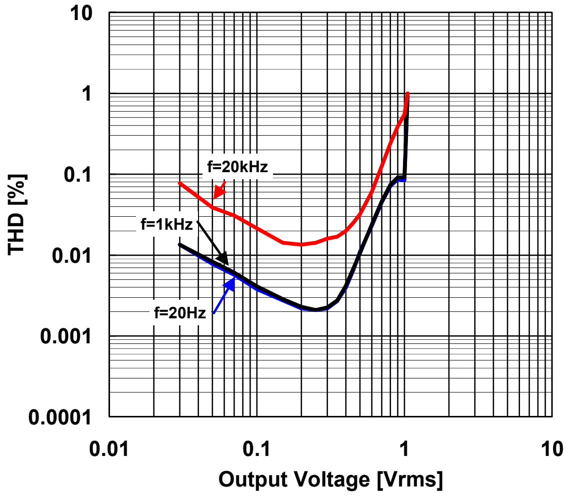


■TYPICAL CHARACTERISTICS

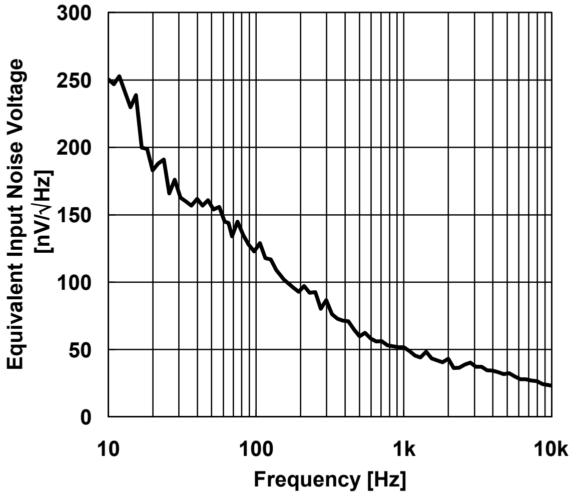
Gain/Phase vs. Frequency
V^+/V^-=±1.5V, Gv=40dB, R_F=100k, Rg=1k, C_L=0



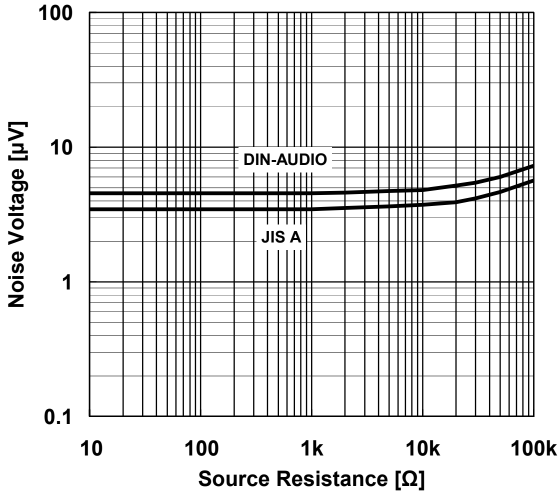
THD vs. Output Voltage
V^+/V^-=±1.5V, Gv=0dB, R_L=10k, Ta=25ºC



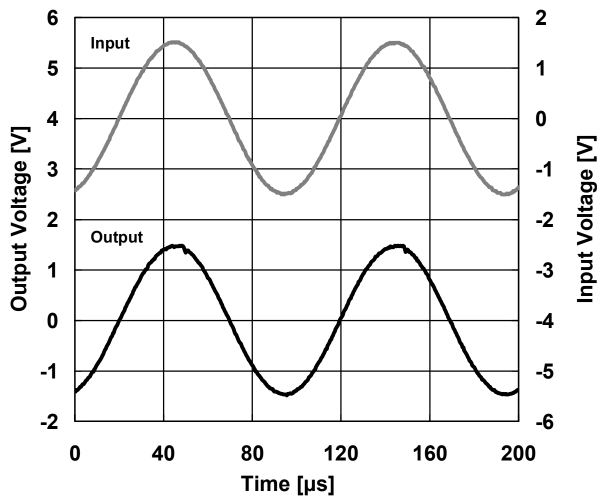
Equivalent Input Noise Voltage vs. Frequency
V^+/V^-=±1.5V, Gv=40dB, Rs=600, R_G=100, R_F=10k, Ta=25ºC



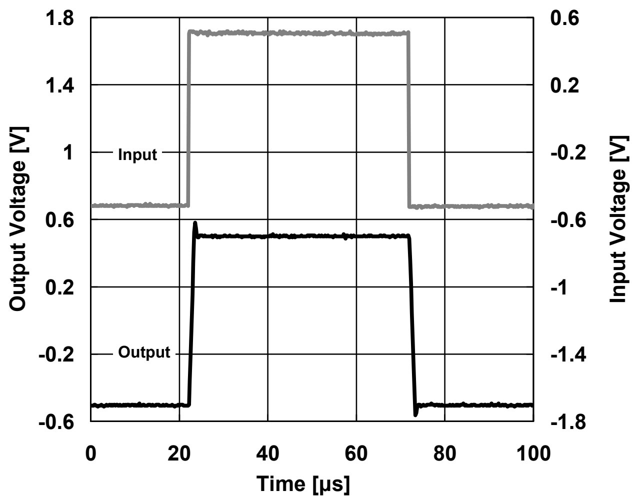
Noise Voltage vs. Source Resistance
V^+/V^-=±1.5V, Gv=40dB, R_G=100, R_F=1k, Ta=25ºC



Pulse Response
V^+/V^-=±1.5V, V_{IN}=3Vp-p, f=10kHz
Gv=0dB, Rs=50, R_L=10k, C_L=0F, Ta=25ºC

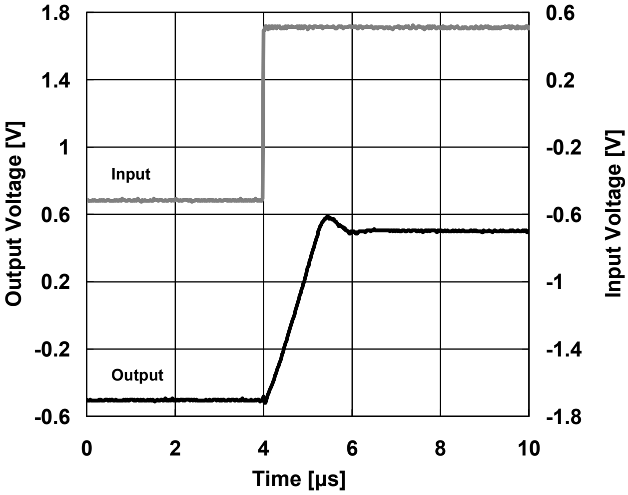


Pulse Response
V^+/V^-=±1.5V, V_{IN}=1Vp-p, f=10kHz
Gv=0dB, Rs=50, R_L=10k, C_L=0F, Ta=25ºC

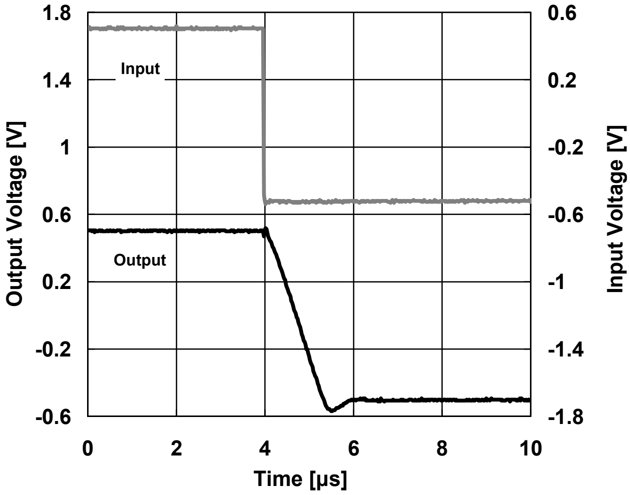


■TYPICAL CHARACTERISTICS

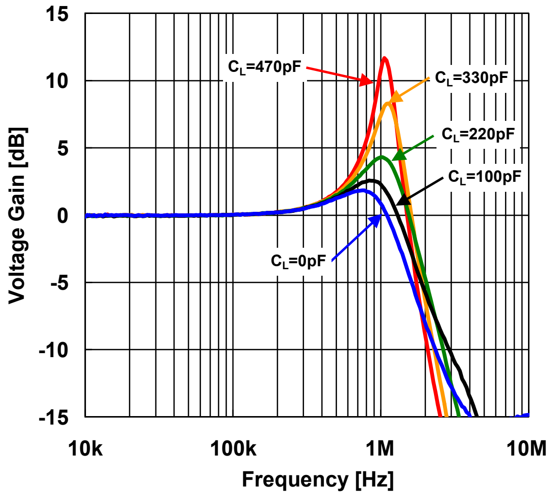
Pulse Response (Rise)
V^+/V^-=±1.5V, V_{IN}=1Vp-p, f=10kHz
Gv=0dB, Rs=50, R_L=10k, C_L=0F, Ta=25ºC



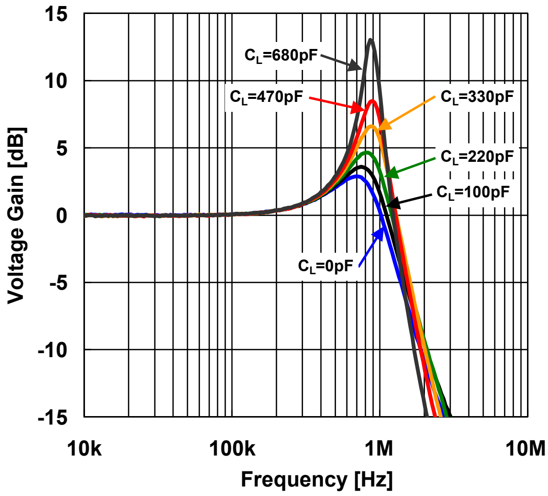
Pulse Response (Fall)
V^+/V^-=±1.5V, V_{IN}=1Vp-p, f=10kHz
Gv=0dB, Rs=50, R_L=10k, C_L=0F, Ta=25ºC



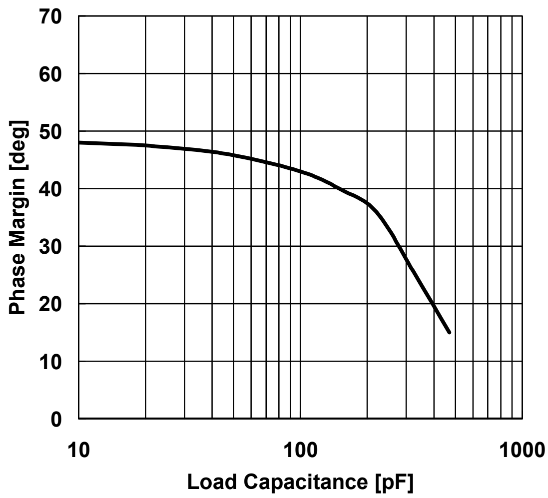
V.F.Peak vs. Frequency (Load Capacitance)
V^+/V^-=±1.5V, V_{IN}=-20dBm, Gv=0dB, R_L=10k, Ta=25ºC



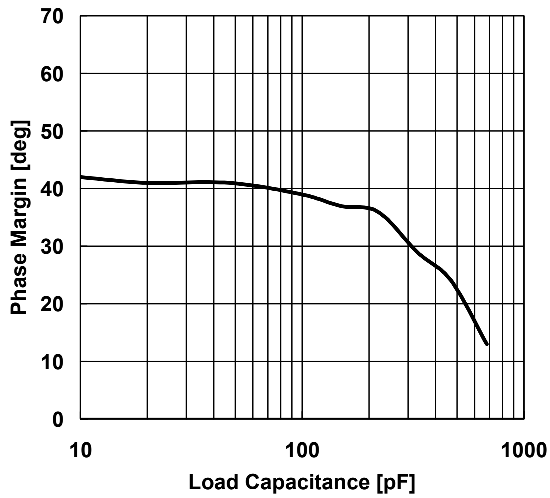
V.F.Peak vs. Frequency (Load Capacitance)
V^+/V^-=±1.5V, V_{IN}=-20dBm, Gv=0dB, R_L=600, Ta=25ºC



Phase Margin vs. Load Capacitance
V^+/V^-=±1.5V, V_{IN}=-30dBm, Gv=40dB,
R_L=10k, Rs=50, Rg=1k, R_F=100k, Ta=25ºC



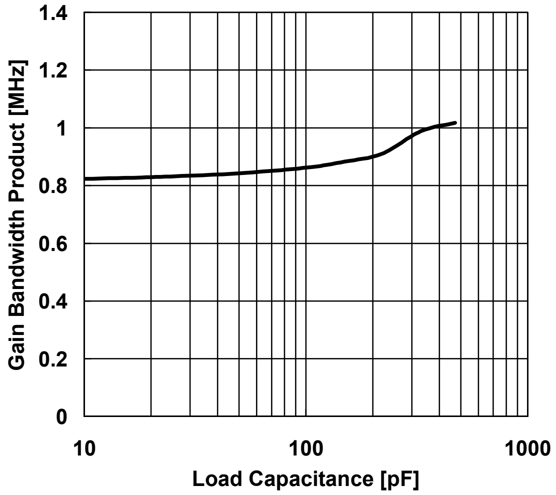
Phase Margin vs. Load Capacitance
V^+/V^-=±1.5V, V_{IN}=-30dBm, Gv=40dB,
R_L=600, Rs=50, Rg=1k, RF=100k, Ta=25ºC



■TYPICAL CHARACTERISTICS

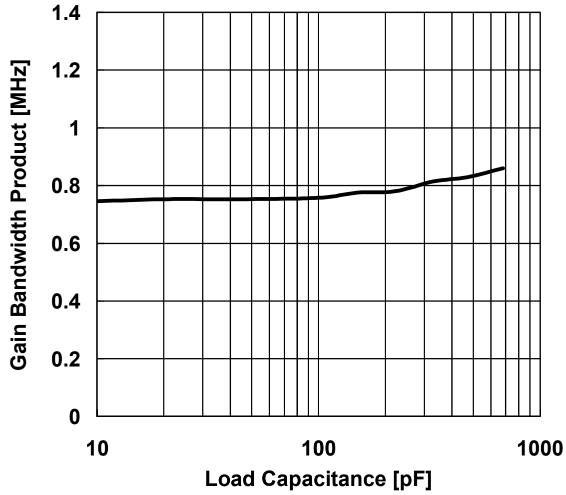
Gain Bandwidth Product vs. Load Capacitance

V^+/V^-=±1.5V, V_{IN}=-30dBm, Gv=40dB,
R_L=10k, Rs=50, Rg=1k, R_F=100k, Ta=25ºC



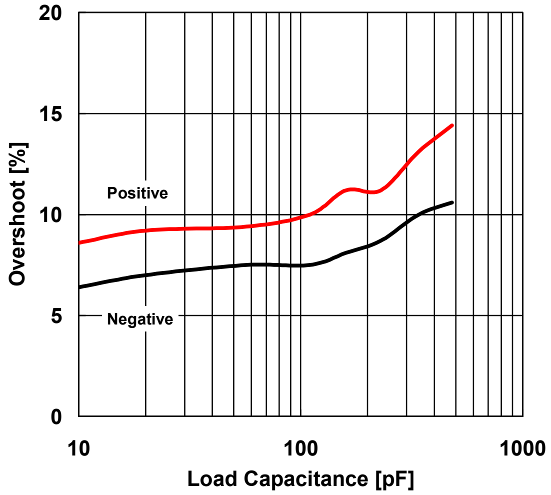
Gain Bandwidth Product vs. Load Capacitance

V^+/V^-=±1.5V, V_{IN}=-30dBm, Gv=40dB,
R_L=600, Rs=50, Rg=1k, R_F=100k, Ta=25ºC



Overshoot vs. Load Capacitance

V^+/V^-=±1.5V, V_{IN}=1Vp-p, f=10kHz
Gv=0dB, R_L=10k, Rs=50, Ta=25ºC



Overshoot vs. Load Capacitance

V^+/V^-=±1.5V, V_{IN}=1Vp-p, f=10kHz
Gv=0dB, R_L=600, Rs=50, Ta=25ºC