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ULTRA WIDE BAND, HIGH SLEW RATE SINGLE OPERATIONAL AMPLIFIER

■ GENERAL DESCRIPTION

The NJM2136, NJM2137 and NJM2138 are single, dual and quad operational amplifiers operated from low voltage (±1.35V). A 200MHz gain bandwidth and 45V/μs high slew rate make them suitable for use as active filter, high-speed analog and digital signal processor, industrial measurement equipment and others.

It can also suitable to portable communication items because of low operating voltage and low operating current.

■ FEATURES

- Operating Voltage ±1.35V~±6V
- Wide Bandwidth 200MHz typ.
- High Slew Rate 45V/μs typ.
- Input Offset Voltage Balance (only NJM2136)
- Operating Current NJM2136: 0.63mA typ.
  NJM2137: 1.14mA typ.
  NJM2138: 2.27mA typ.
- Bipolar Technology
- Package Outline NJM2136: DMP8, SSOP8
  NJM2137: DIP8, DMP8, SSOP8
  NJM2138: DMP14, SSOP14

■ PACKAGE OUTLINE

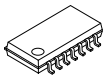
NJM2136M

NJM2136V

NJM2137D

NJM2137M

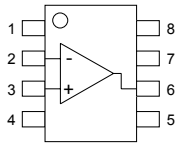
NJM2137V



NJM2138M

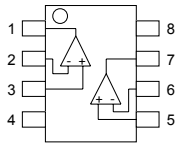
NJM2138V

■ PIN CONFIGURATION



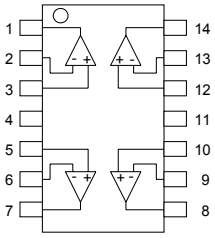
NJM2136M
NJM2136V

PIN FUNCTION
1.BAL
2.–INPUT
3.+INPUT
4.V^-
5.NC
6.OUTPUT
7. V^+
8.BAL



NJM2137D
NJM2137M
NJM2137V

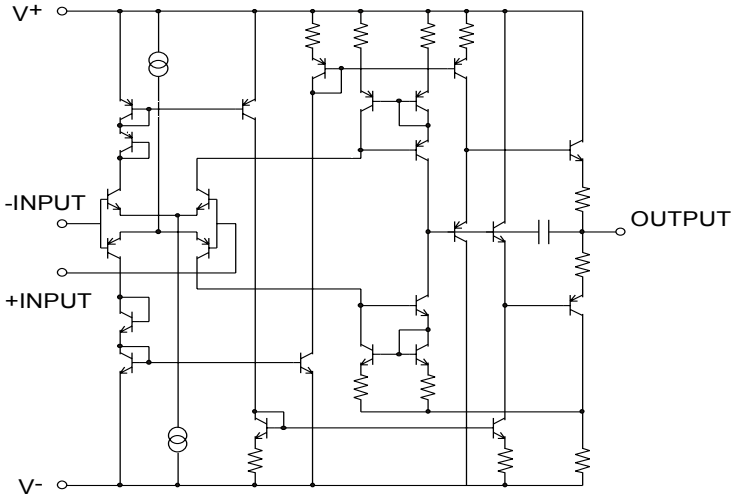
PIN FUNCTION
1.A OUTPUT
2.A –INPUT
3.A +INPUT
4.V^-
5.B +INPUT
6.B -INPUT
7.B OUTPUT
8.V^+



NJM2138M
NJM2138V

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

■ EQUIVALENT CIRCUIT (each amplifier)



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25˚C)

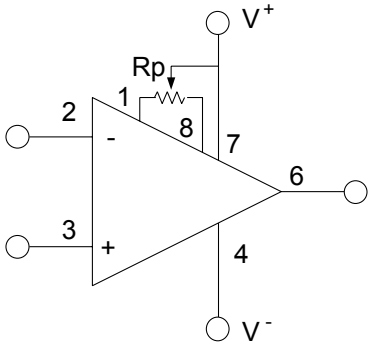
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+/V^-	± 6.75	V
Differential Input Voltage	V_{ID}	± 3	V
Power Dissipation	P_D	(DIP8) 500 (DMP8) 300 (SSOP8) 250 (DMP14) 300 (SSOP14) 300	mW
Operating Temperature Range	T_{opr}	-40~+85	˚C
Storage Temperature Range	T_{stg}	-50~+125	˚C

■ ELECTRICAL CHARACTERISTICS

(V^+/V^-=±2.5V,Ta=25˚C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V^+/V^-		± 1.35	-	± 6.00	V
Input Offset Voltage	V_{IO}	R_S=0Ω	-	1.0	5.0	mV
Input Bias Current	I_B		-	0.5	2.0	µA
Input Offset Current	I_{IO}		-	20	200	nA
Large Signal Voltage Gain	A_V	R_L≥2kΩ	65	75	-	dB
Input Common Mode Voltage Range	V_{ICM}		±1.2	±1.5	-	V
Common Mode Rejection Ratio	CMR	-1V≤Vcm≤+1V	45	60	-	dB
Supply Voltage Rejection Ratio	+SVR	NJM2136	70	80	-	dB
	-SVR		50	60	-	
	+SVR	NJM2137/NJM2138	50	60	-	
	-SVR		70	80	-	
Maximum Output Voltage Swing	V_{OM}	R_L=1kΩ	1.1	1.4	-	V
			-0.9	-1.2	-	
Operating Current (all Amp.)	I_{CC}	NJM2136, R_L=∞	-	0.63	0.82	mA
		NJM2137, R_L=∞	-	1.14	1.50	
		NJM2138, R_L=∞	-	2.27	3.00	
Slew Rate	SR	A_V=0dB	-	45	-	V/µs
Gain Bandwidth Product	GB	60dB • 500kHz	120	200	-	MHz
Phase Margin	$Ø_M$	40dB	-	25	-	deg.
Unity Gain Bandwidth	f_T	40dB	-	40	-	MHz

■ OFFSET ADJUSTMENT METHOD (only NJM2136)

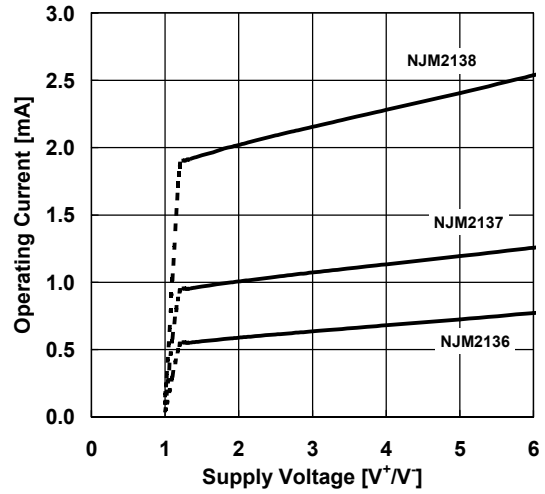


Rp=200Ω

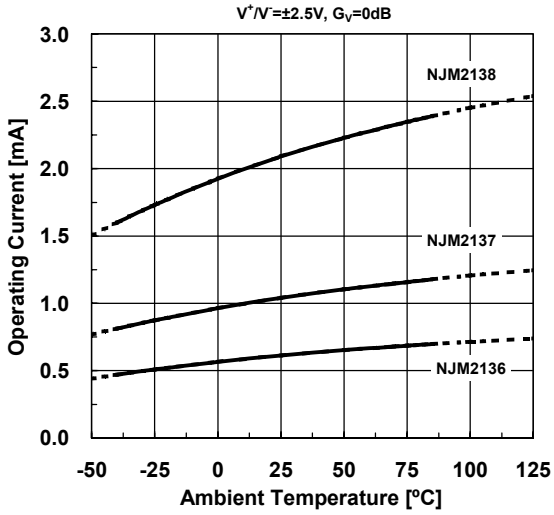
(note) The electrical characteristics change a little, in case the R_P is connected.

■ TYPICAL CHARACTERISTICS

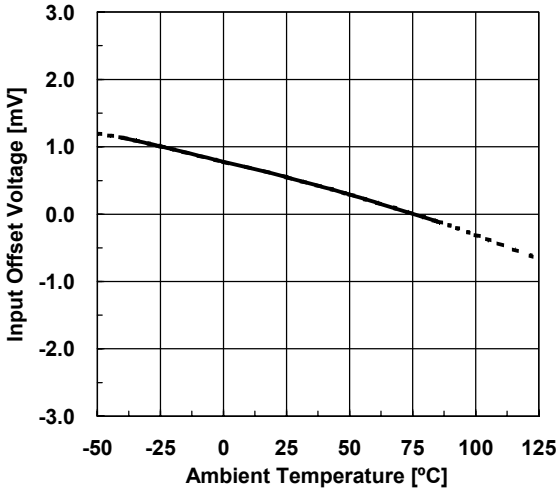
Operating Current vs. Supply Voltage
G_V=0dB, Ta=25ºC



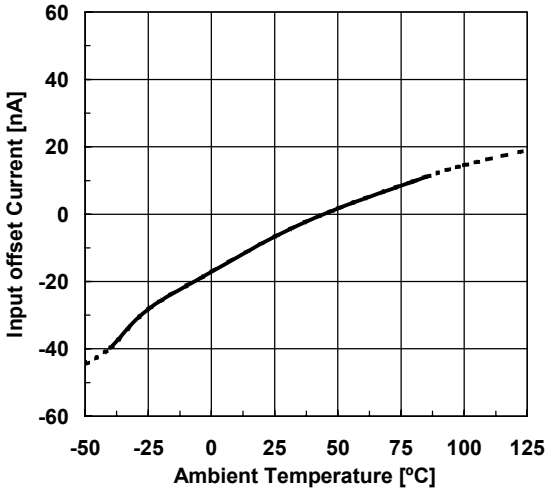
Operating Current vs. Temperature
V^+/V^-=±2.5V, G_V=0dB



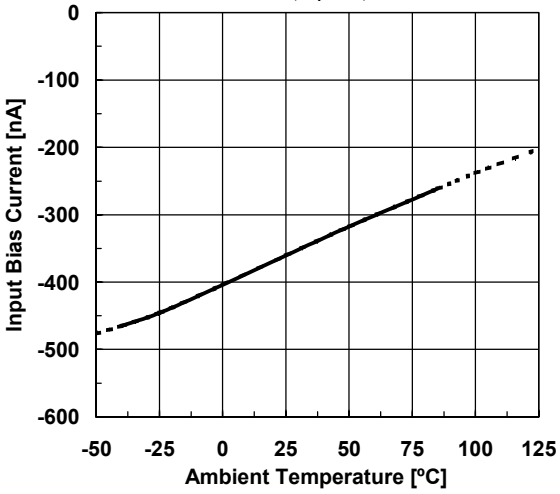
Input Offset Voltage vs. Temperature
V^+/V^-=±2.5V, G_V=0dB, Ta=25ºC



Input Offset Current vs. Temperature
V^+/V^-=±2.5V, G_V=0dB, Ta=25ºC



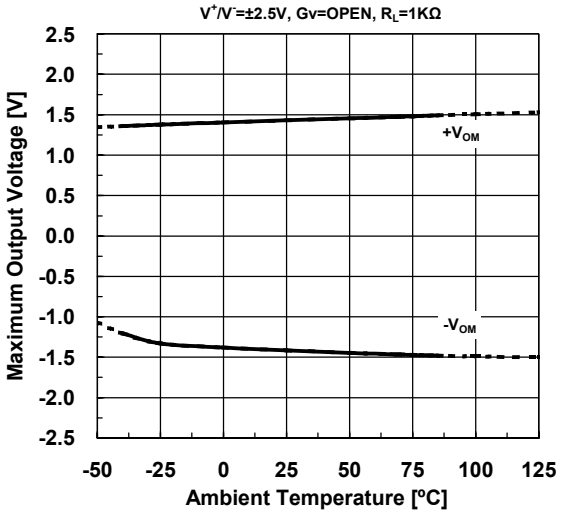
Input Bias Current vs. Temperature
V^+/V^-=±2.5V, G_V=0dB, Ta=25ºC



■ TYPICAL CHARACTERISTICS

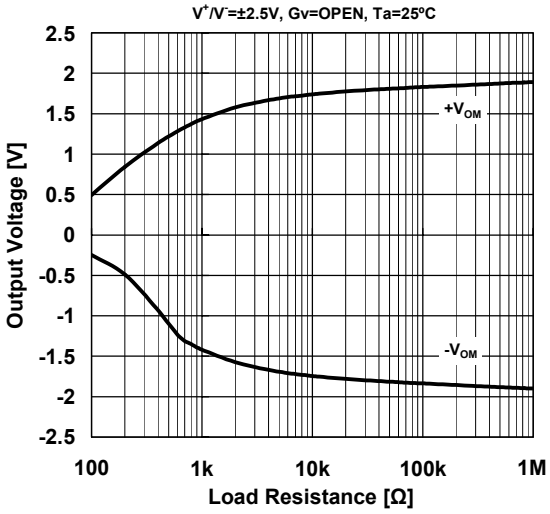
Maximum Output Voltage vs. Temperature

V^+/V^-=±2.5V, Gv=OPEN, R_L=1KΩ



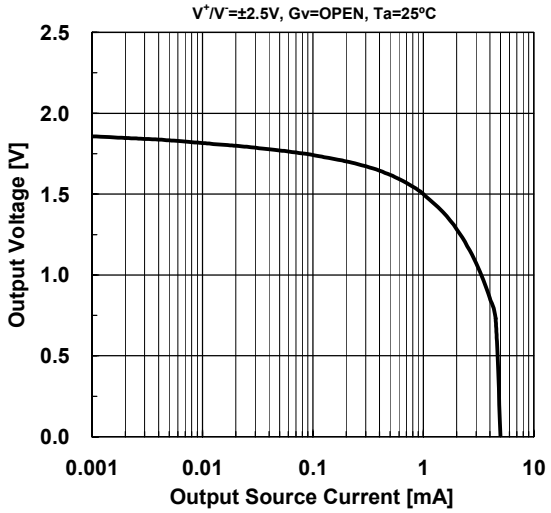
Output Voltage vs. Load Resistance

V^+/V^-=±2.5V, Gv=OPEN, Ta=25ºC



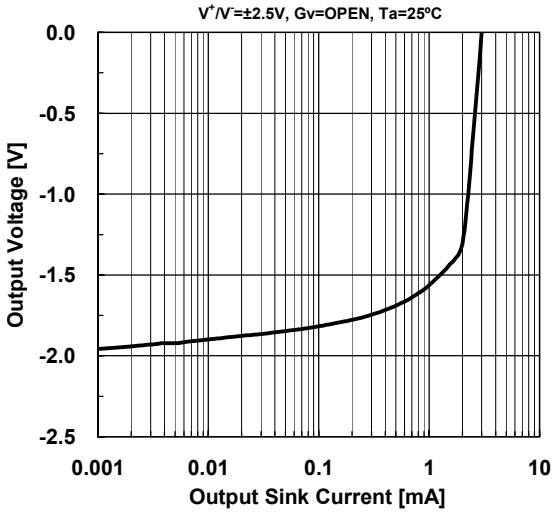
Output Voltage vs. Output Source Current

V^+/V^-=±2.5V, Gv=OPEN, Ta=25ºC



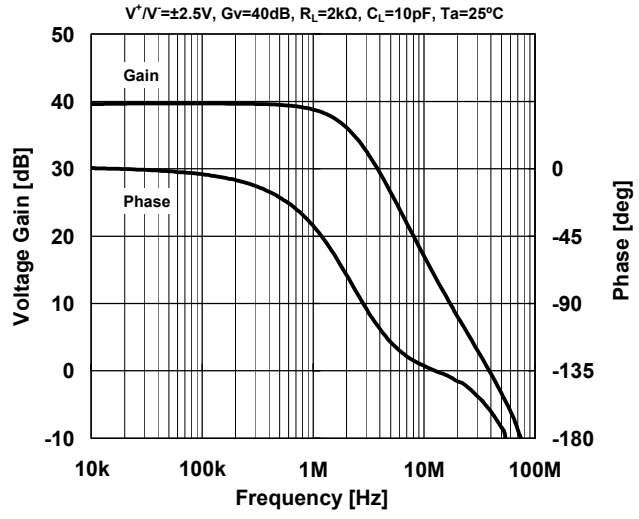
Output Voltage vs. Output Sink Current

V^+/V^-=±2.5V, Gv=OPEN, Ta=25ºC



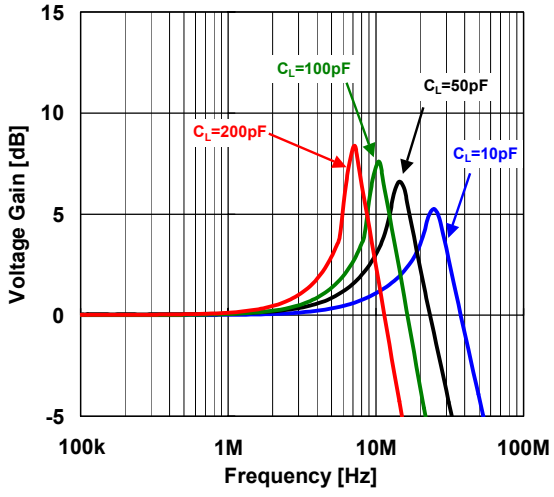
Voltage Gain,Phase vs. Frequency

V^+/V^-=±2.5V, Gv=40dB, R_L=2kΩ, C_L=10pF, Ta=25ºC



Voltage Follower Peak vs. Frequency

V^+/V^-=±2.5V, Gv=0dB, R_L=2kΩ, Ta=25ºC



■ TYPICAL CHARACTERISTICS