

## ULTRA WIDE BAND, HIGH SLEW RATE SINGLE OPERATIONAL AMPLIFIER

### ■ GENERAL DESCRIPTION

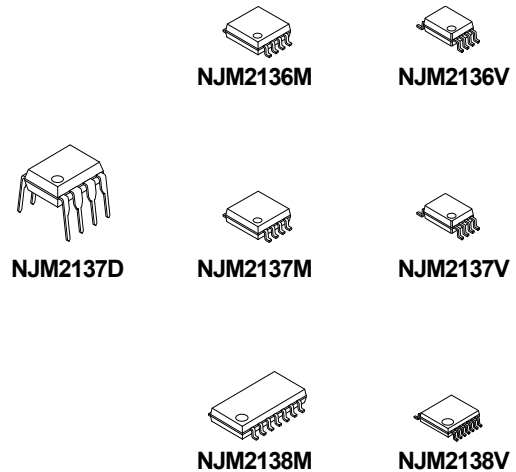
The NJM2136, NJM2137 and NJM2138 are single, dual and quad operational amplifiers operated from low voltage ( $\pm 1.35V$ ). A 200MHz gain bandwidth and  $45V/\mu s$  high slew rate make them suitable for use as active filter, high-speed analog and digital signal processor, industrial measurement equipment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

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

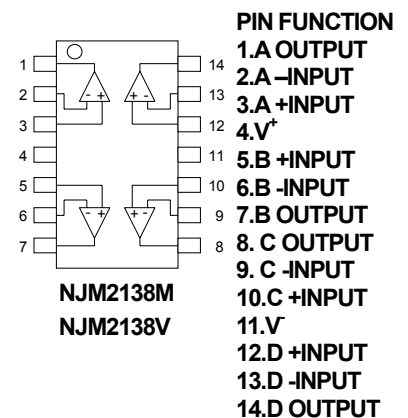
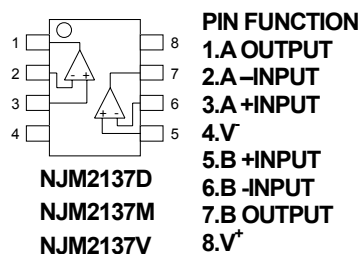
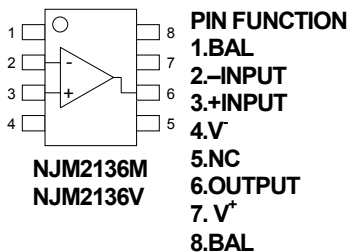
### ■ FEATURES

- Operating Voltage  $\pm 1.35V \sim \pm 6V$
- Wide Bandwidth 200MHz typ.
- High Slew Rate  $45V/\mu s$  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

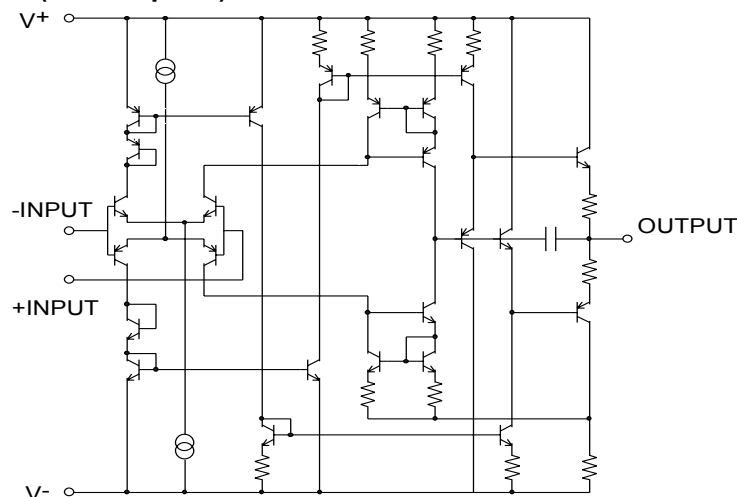
### ■ PACKAGE OUTLINE



### ■ PIN CONFIGURATION



### ■ EQUIVALENT CIRCUIT (each amplifier)



# NJM2136/37/38

## ■ ABSOLUTE MAXIMUM RATINGS

( Ta=25°C )

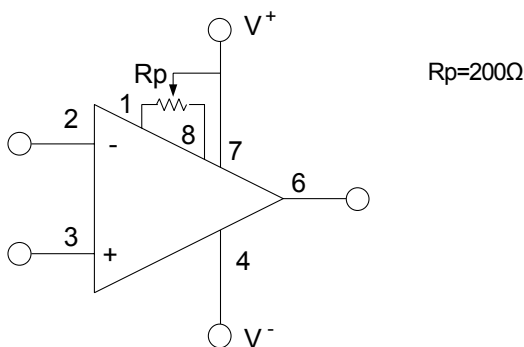
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup> /V <sup>-</sup>	± 6.75	V
Differential Input Voltage	V <sub>ID</sub>	± 3	V
Power Dissipation	P <sub>D</sub>	(DIP8) 500 (DMP8) 300 (SSOP8) 250 (DMP14) 300 (SSOP14) 300	mW
Operating Temperature Range	T <sub>opr</sub>	-40~+85	°C
Storage Temperature Range	T <sub>stg</sub>	-50~+125	°C

## ■ ELECTRICAL CHARACTERISTICS

( V<sup>+</sup>/V<sup>-</sup>=±2.5V, Ta=25°C )

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V <sup>+</sup> /V <sup>-</sup>		± 1.35	-	± 6.00	V
Input Offset Voltage	V <sub>IO</sub>	R <sub>S</sub> =0Ω	-	1.0	5.0	mV
Input Bias Current	I <sub>B</sub>		-	0.5	2.0	μA
Input Offset Current	I <sub>IO</sub>		-	20	200	nA
Large Signal Voltage Gain	A <sub>V</sub>	R <sub>L</sub> ≥2kΩ	65	75	-	dB
Input Common Mode Voltage Range	V <sub>ICM</sub>		±1.2	±1.5	-	V
Common Mode Rejection Ratio	CMR	-1V≤V <sub>cm</sub> ≤+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 <sub>OM</sub>	R <sub>L</sub> =1kΩ	1.1 -0.9	1.4 -1.2	-	V
Operating Current (all Amp.)	I <sub>CC</sub>	NJM2136, R <sub>L</sub> =∞	-	0.63	0.82	mA
		NJM2137, R <sub>L</sub> =∞	-	1.14	1.50	
		NJM2138, R <sub>L</sub> =∞	-	2.27	3.00	
Slew Rate	SR	A <sub>v</sub> =0dB	-	45	-	V/μs
Gain Bandwidth Product	GB	60dB • 500kHz	120	200	-	MHz
Phase Margin	∅ <sub>M</sub>	40dB	-	25	-	deg.
Unity Gain Bandwidth	f <sub>T</sub>	40dB	-	40	-	MHz

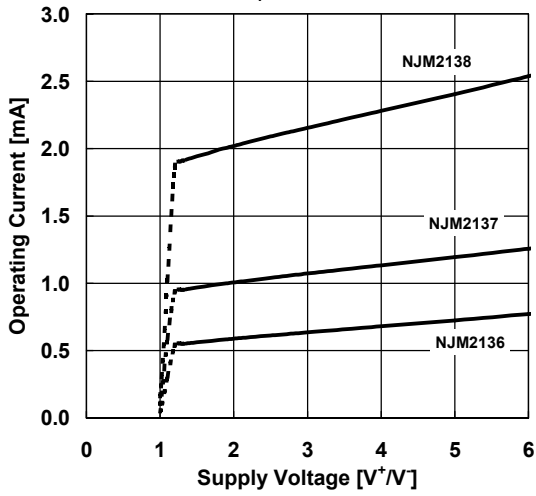
## ■ OFFSET ADJUSTMENT METHOD (only NJM2136)



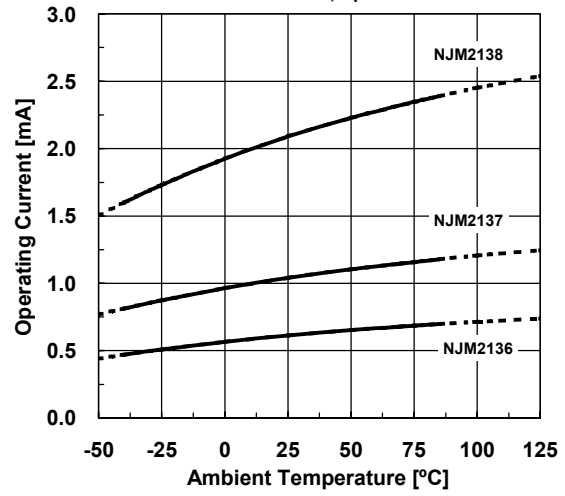
( note ) The electrical characteristics change a little, in case the R<sub>P</sub> is connected.

## ■ TYPICAL CHARACTERISTICS

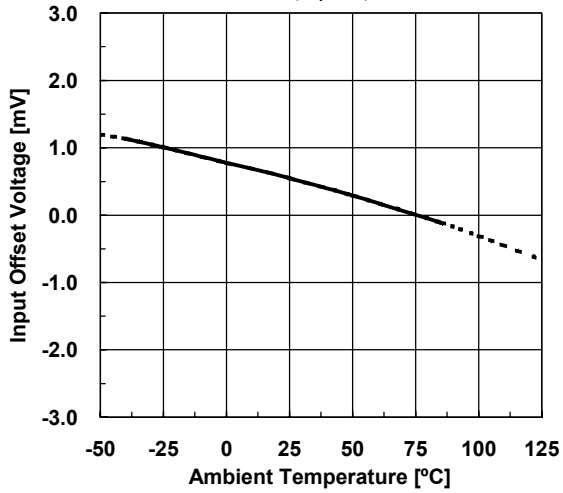
**Operating Current vs. Supply Voltage**  
 $G_v=0\text{dB}$ ,  $T_a=25^\circ\text{C}$



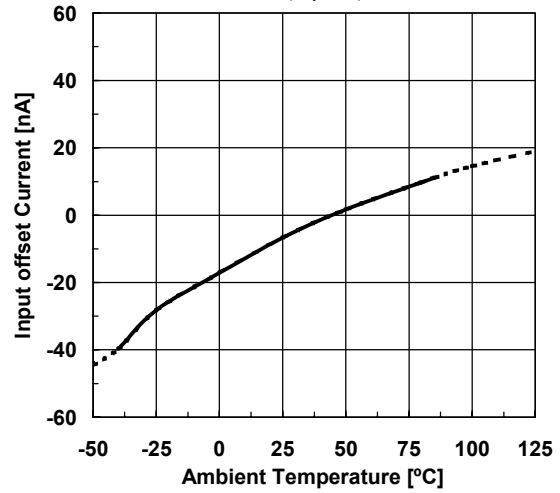
**Operating Current vs. Temperature**  
 $V^+/V^-=\pm 2.5\text{V}$ ,  $G_v=0\text{dB}$



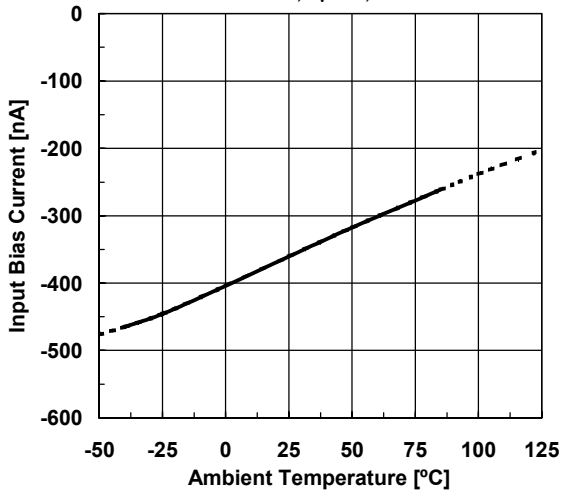
**Input Offset Voltage vs. Temperature**  
 $V^+/V^-=\pm 2.5\text{V}$ ,  $G_v=0\text{dB}$ ,  $T_a=25^\circ\text{C}$



**Input Offset Current vs. Temperature**  
 $V^+/V^-=\pm 2.5\text{V}$ ,  $G_v=0\text{dB}$ ,  $T_a=25^\circ\text{C}$

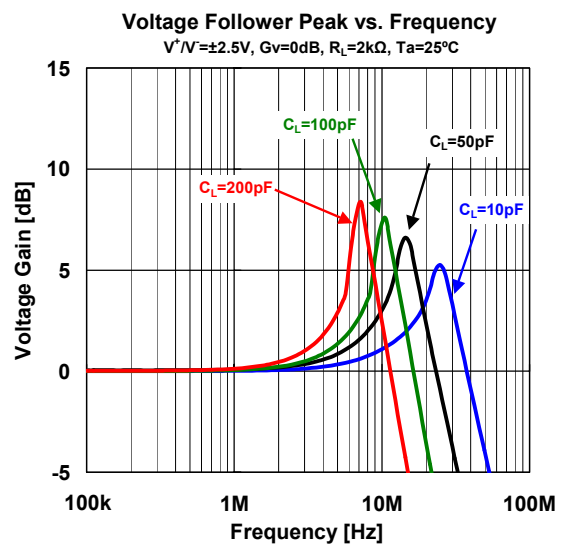
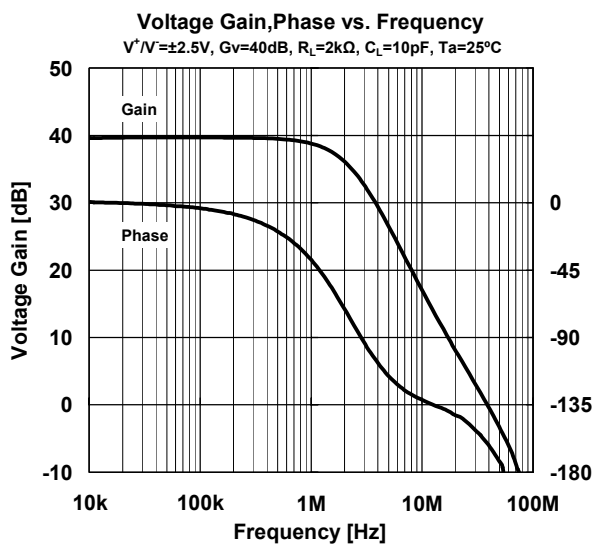
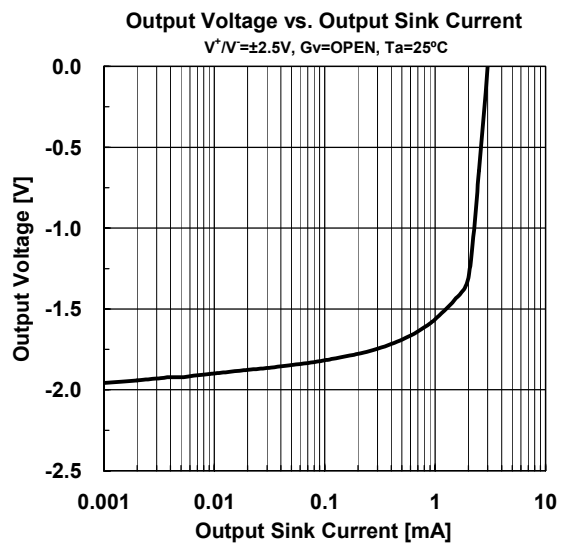
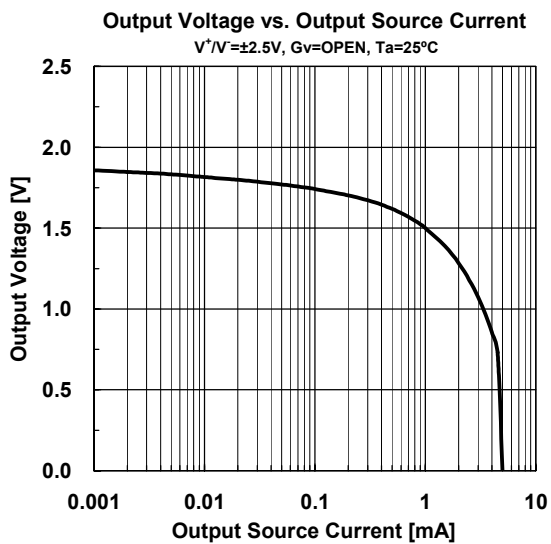
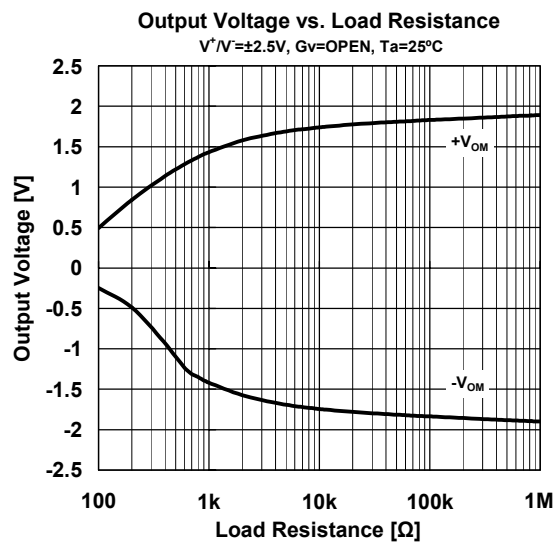
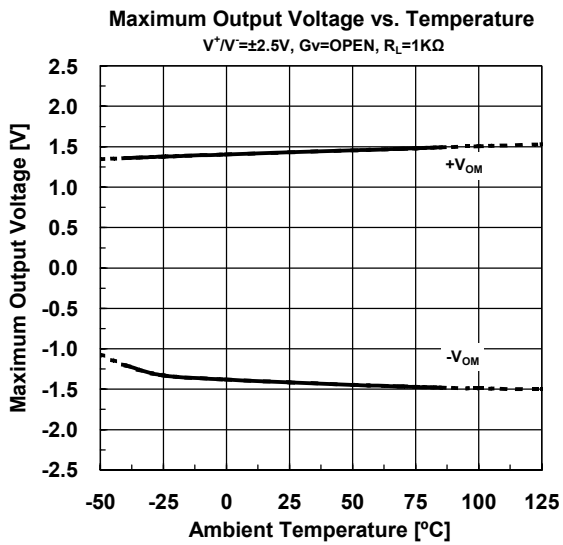


**Input Bias Current vs. Temperature**  
 $V^+/V^-=\pm 2.5\text{V}$ ,  $G_v=0\text{dB}$ ,  $T_a=25^\circ\text{C}$

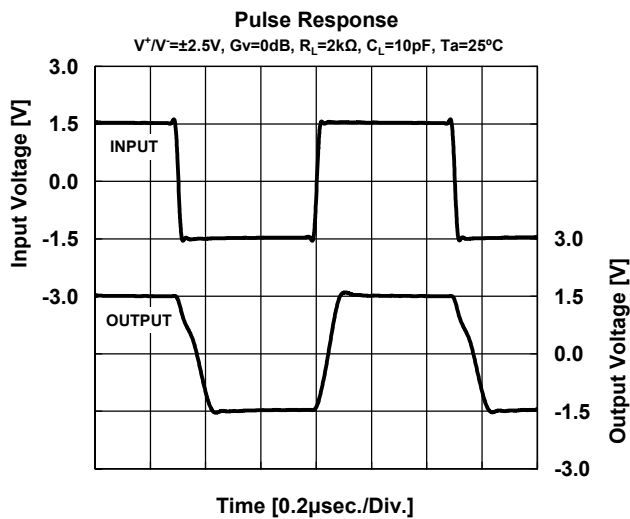
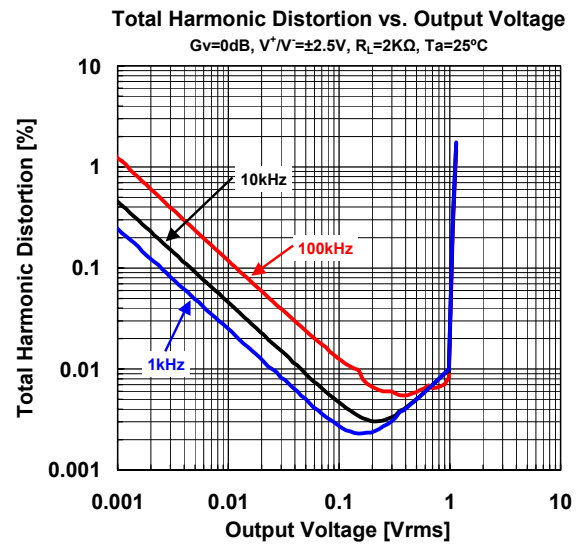
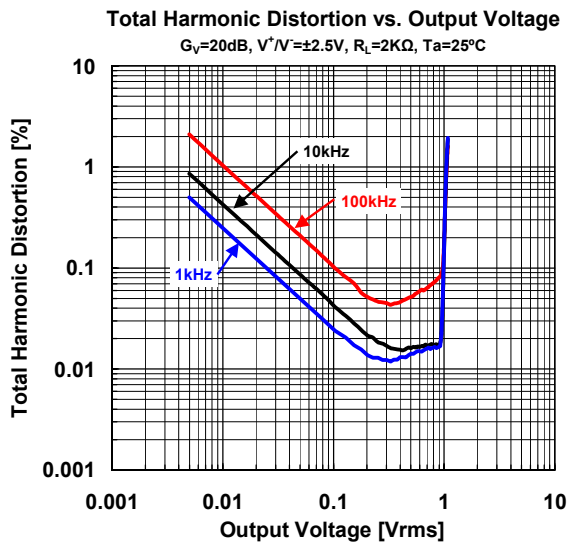


# NJM2136/37/38

## ■ TYPICAL CHARACTERISTICS



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**[CAUTION]**

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