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

### ■ GENERAL DESCRIPTION

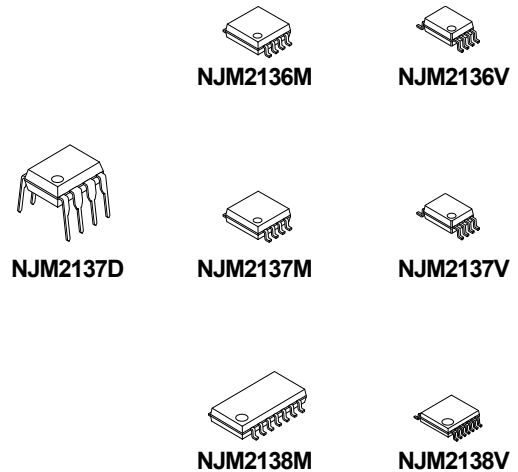
The NJM2136, NJM2137 and NJM2138 are single, dual and quad operational amplifiers operated from low voltage ( $\pm 1.35V$ ). A 200MHz gain bandwidth and  $45V/\mu s$  high slew rate make them suitable for use as active filter, high-speed analog and digital signal processor, industrial measurement equipment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

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

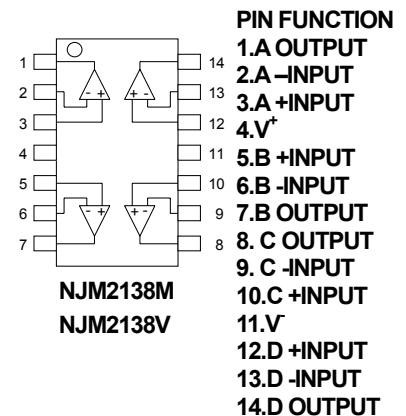
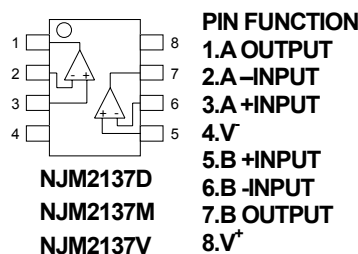
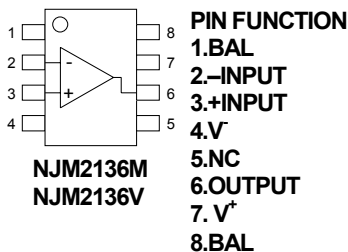
### ■ FEATURES

- 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

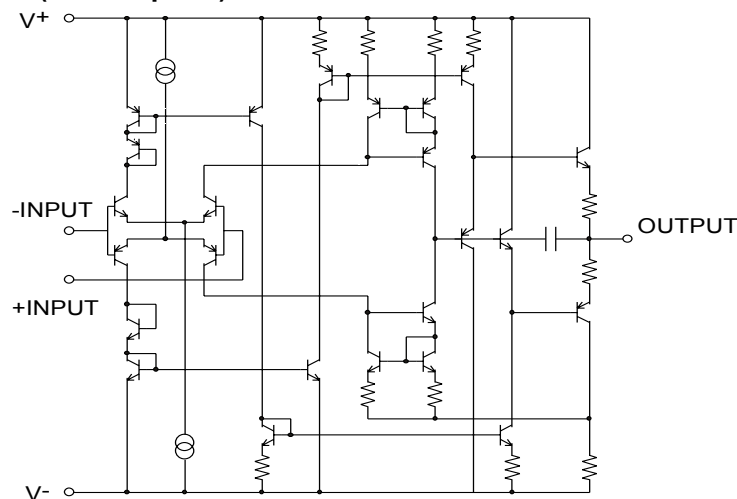
### ■ PACKAGE OUTLINE



### ■ PIN CONFIGURATION



### ■ EQUIVALENT CIRCUIT (each amplifier)



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## ■ ABSOLUTE MAXIMUM RATINGS

( Ta=25°C )

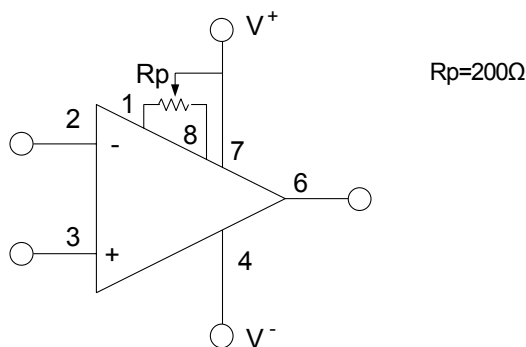
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ / V^-$	$\pm 6.75$	V
Differential Input Voltage	$V_{ID}$	$\pm 3$	V
Power Dissipation	$P_D$	(DIP8) 500 (DMP8) 300 (SSOP8) 250 (DMP14) 300 (SSOP14) 300	mW
Operating Temperature Range	$T_{opr}$	-40~+85	°C
Storage Temperature Range	$T_{stg}$	-50~+125	°C

## ■ ELECTRICAL CHARACTERISTICS

(  $V^+ / V^- = \pm 2.5V, Ta=25^\circ C$  )

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	$V^+ / V^-$		$\pm 1.35$	-	$\pm 6.00$	V
Input Offset Voltage	$V_{IO}$	$R_S=0\Omega$	-	1.0	5.0	mV
Input Bias Current	$I_B$		-	0.5	2.0	$\mu A$
Input Offset Current	$I_{IO}$		-	20	200	nA
Large Signal Voltage Gain	$A_V$	$R_L \geq 2k\Omega$	65	75	-	dB
Input Common Mode Voltage Range	$V_{ICM}$		$\pm 1.2$	$\pm 1.5$	-	V
Common Mode Rejection Ratio	CMR	$-1V \leq V_{cm} \leq +1V$	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	$V_{OM}$	$R_L=1k\Omega$	1.1 -0.9	1.4 -1.2	- -	V
Operating Current (all Amp.)	$I_{CC}$	NJM2136, $R_L=\infty$	-	0.63	0.82	mA
		NJM2137, $R_L=\infty$	-	1.14	1.50	
		NJM2138, $R_L=\infty$	-	2.27	3.00	
Slew Rate	SR	$A_V=0dB$	-	45	-	V/ $\mu s$
Gain Bandwidth Product	GB	60dB • 500kHz	120	200	-	MHz
Phase Margin	$\phi_M$	40dB	-	25	-	deg.
Unity Gain Bandwidth	$f_T$	40dB	-	40	-	MHz

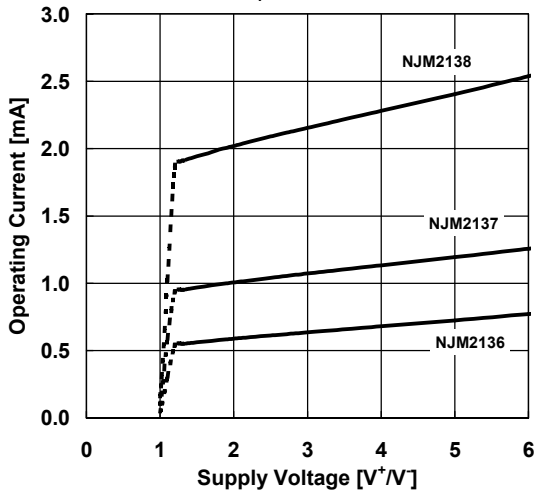
## ■ OFFSET ADJUSTMENT METHOD (only NJM2136)



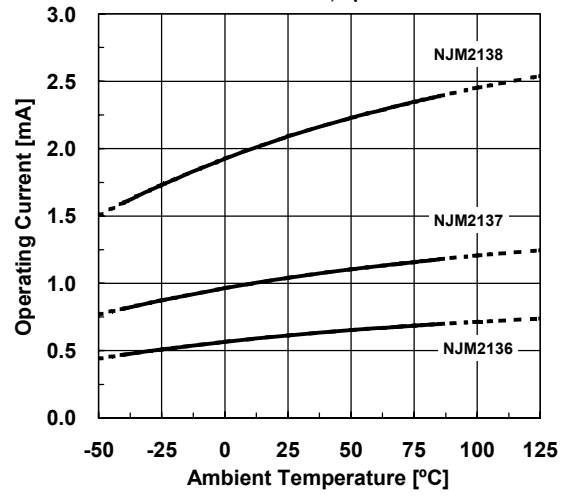
( note ) The electrical characteristics change a little, in case the  $R_P$  is connected.

## ■ TYPICAL CHARACTERISTICS

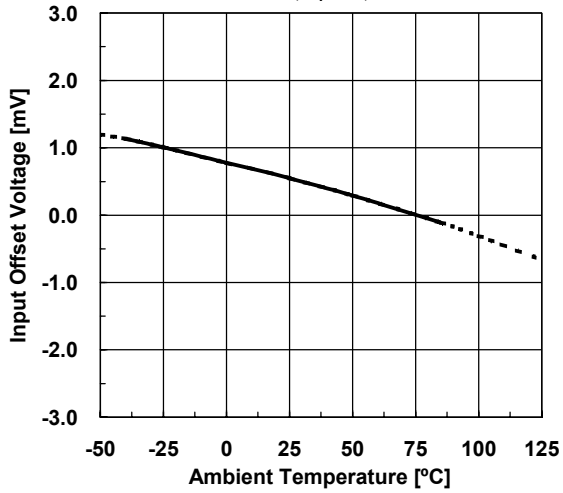
**Operating Current vs. Supply Voltage**  
 $G_V=0\text{dB}$ ,  $T_a=25^\circ\text{C}$



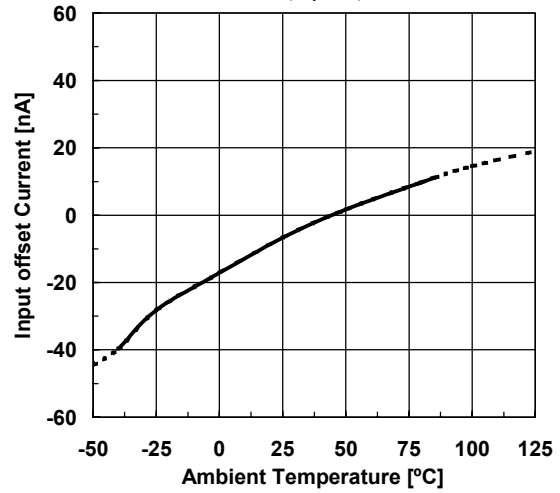
**Operating Current vs. Temperature**  
 $V^+/V^-=\pm 2.5\text{V}$ ,  $G_V=0\text{dB}$



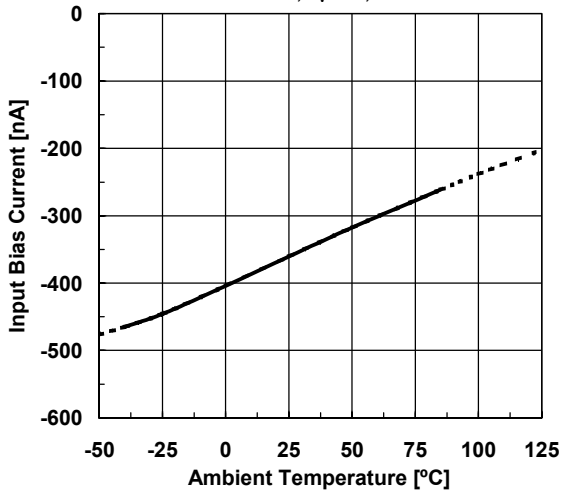
**Input Offset Voltage vs. Temperature**  
 $V^+/V^-=\pm 2.5\text{V}$ ,  $G_V=0\text{dB}$ ,  $T_a=25^\circ\text{C}$



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

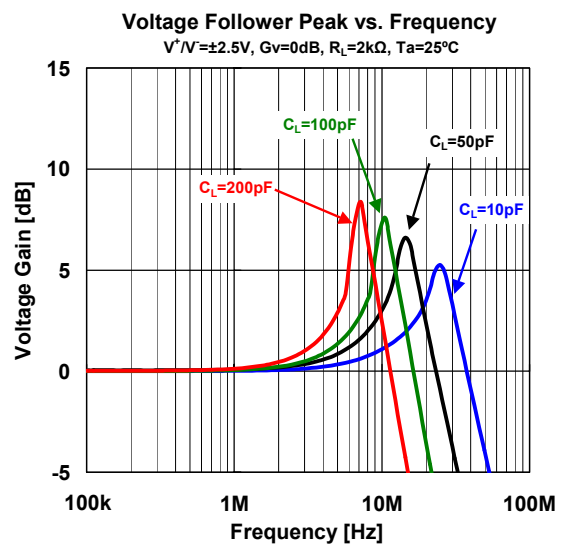
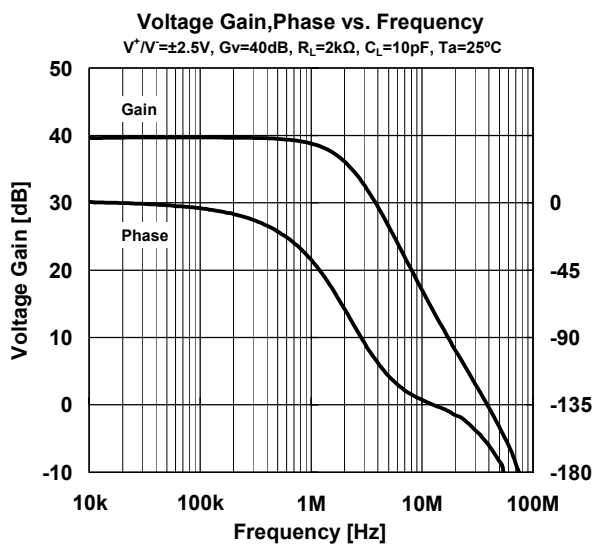
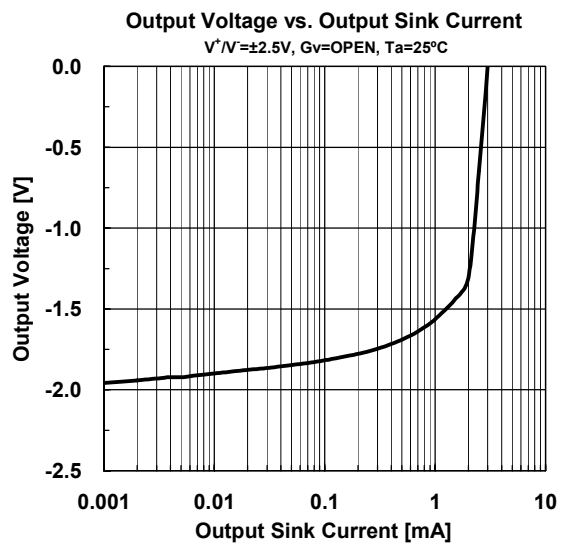
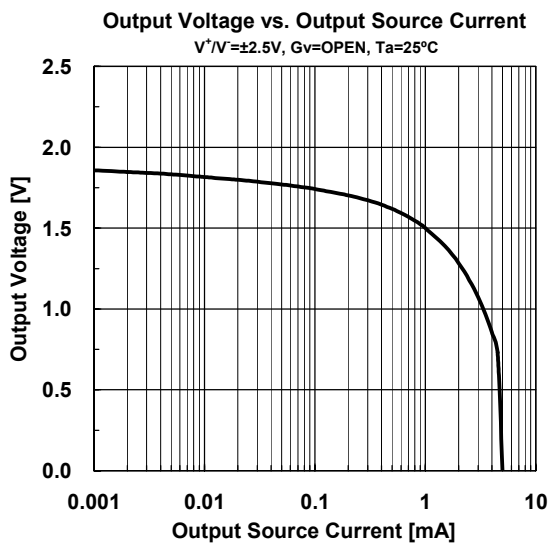
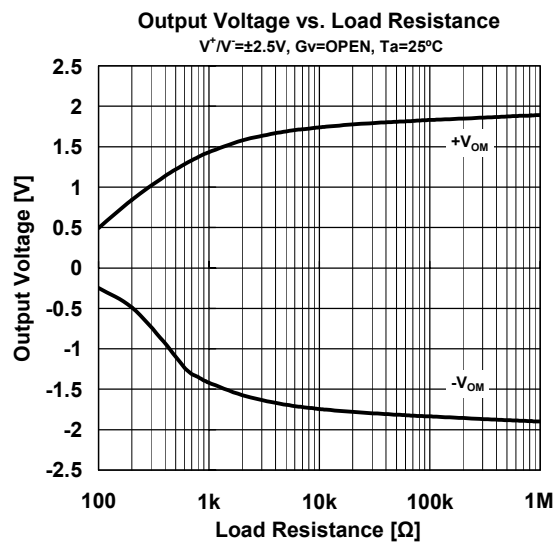
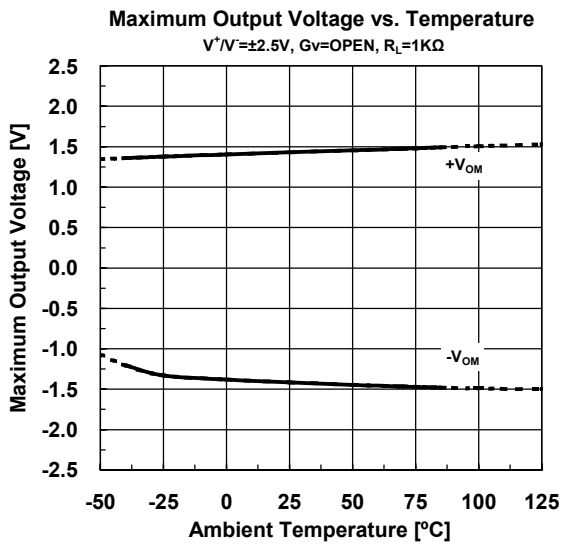


**Input Bias Current vs. Temperature**  
 $V^+/V^-=\pm 2.5\text{V}$ ,  $G_V=0\text{dB}$ ,  $T_a=25^\circ\text{C}$

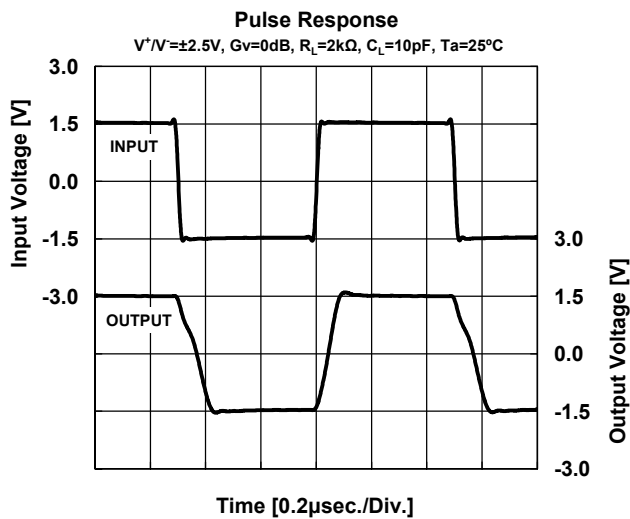
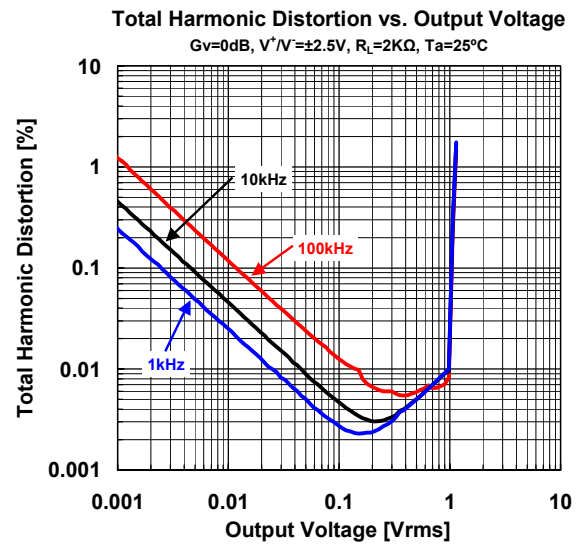
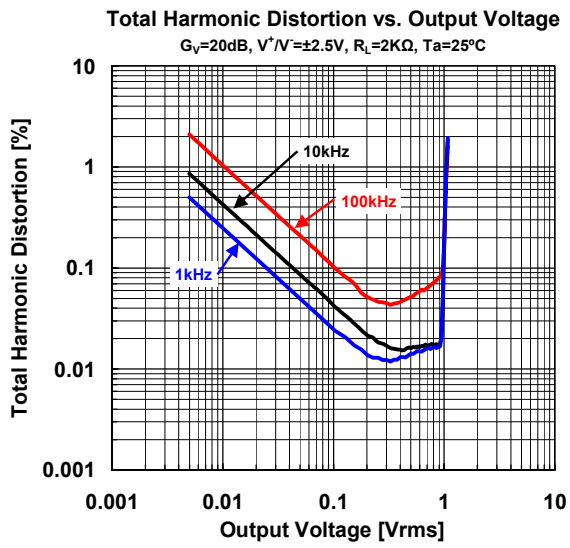


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## ■ TYPICAL CHARACTERISTICS



## ■ TYPICAL CHARACTERISTICS



**[CAUTION]**

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