

DUAL HIGH SPEED SINGLE SUPPLY OPERATIONAL AMPLIFIER

■FEATURES

- Low Input Offset Voltage 3.5mV max.
- Low Input Offset Voltage Drift 3.5 μ V/ $^{\circ}$ C
- High Slew Rate 8.5V/ μ s
- High Unity Gain Frequency 3.5MHz
- Single Supply 3V~36V
- Operating Temperature Range -40 $^{\circ}$ C~+125 $^{\circ}$ C
- Low input voltage around GND level
- Unity-Gain Stable ($C_L=1000$ pF)
- Operating Current (All amplifiers) 4.3mA
- No Phase Reversal
- High EMI Immunity
- Output Short-Circuit Protection
- Package

NJM842 SOP8, SSOP8, VSP8

■GENERAL DESCRIPTION

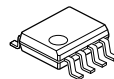
The NJM842 is a high slew rate, single supply Dual operational amplifier.

The NJM842 is suitable for active filter, buffer, and current control/detect circuits of inverter and motor driver.

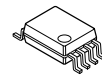
■APPLICATIONS

- Current Sensor
- Buffer Application Amplifier
- Active filter
- Battery Application

■PACKAGE OUTLINE



NJM842G
(SOP8)

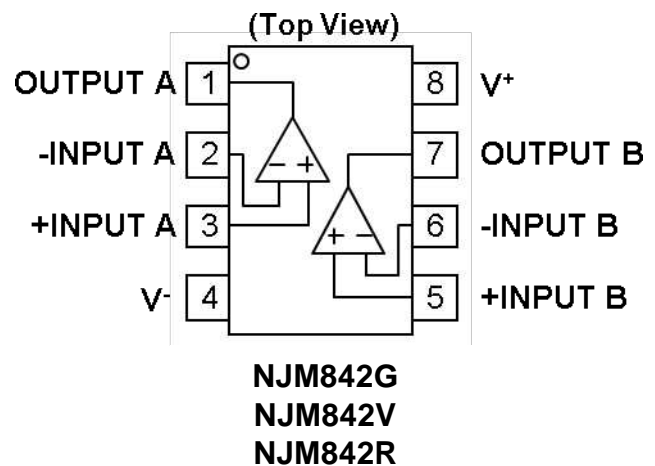


NJ842V
(SSOP8)



NJM842R
(VSP8)

■PIN CONFIGURATION

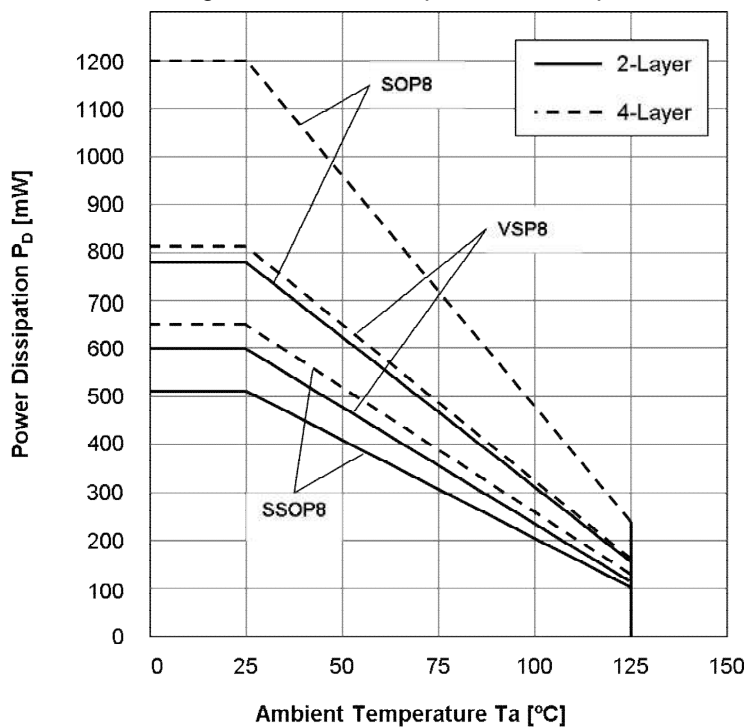


■ **ABSOLUTE MAXIMUM RATINGS** (Ta=25°C, unless otherwise noted.)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	$V^+ - V^-$	38 ⁽⁵⁾	V
Differential Input Voltage ⁽¹⁾	V_{ID}	± 36 ⁽²⁾	V
Input Voltage ⁽²⁾	V_{IN}	$V^- - 0.3$ to $V^+ + 36$	V
Output Terminal Input Voltage	V_O	$V^- - 0.3$ to $V^+ + 0.3V$	V
Power Dissipation ⁽³⁾	P_D	(2-layer / 4-layer)	mW
SOP8		780 / 1200	
SSOP8		510 / 650	
VSP8		600 / 810	
Output Short-Circuit Duration ⁽⁴⁾		infinite	
Operating Temperature Range	T_{opr}	-40 to +125	°C
Storage Temperature Range	T_{stg}	-55 to +150	°C

- (1) Differential voltage is the voltage difference between +INPUT and -INPUT.
- (2) Input voltage should be allowed to apply to the input terminal independent of the magnitude of V^+ . The normal operation will establish when any input is within the Common Mode Voltage Range of electrical characteristics.
- (3) Power dissipation is the power that can be consumed by the IC at Ta=25°C, and is the typical measured value based on JEDEC condition. When using the IC over Ta=25°C subtract the value [mW/°C]=PD/(Tstg(MAX)-25) per temperature.
 2-layer: EIA/JEDEC STANDARD Test board (76.2x114.3x1.6mm, 2layers, FR-4) mounting
 4-layer: EIA/JEDEC STANDARD Test board (76.2x114.3x1.6mm, 4layers, FR-4) mounting
- (4) Temperature and/or supply voltages must be limited to ensure the maximum dissipation rating is not exceeded.
- (5) Supply Voltage is the voltage difference between V^+ and V^- .

Figure1. Power Dissipation vs. Temperature



■ **RECOMMENDED OPERATING CONDITIONS** (Ta=25°C)

PARAMETER	Supply Voltage	UNIT
Supply Voltage	+3 to +36 (±1.5 to ±18)	V

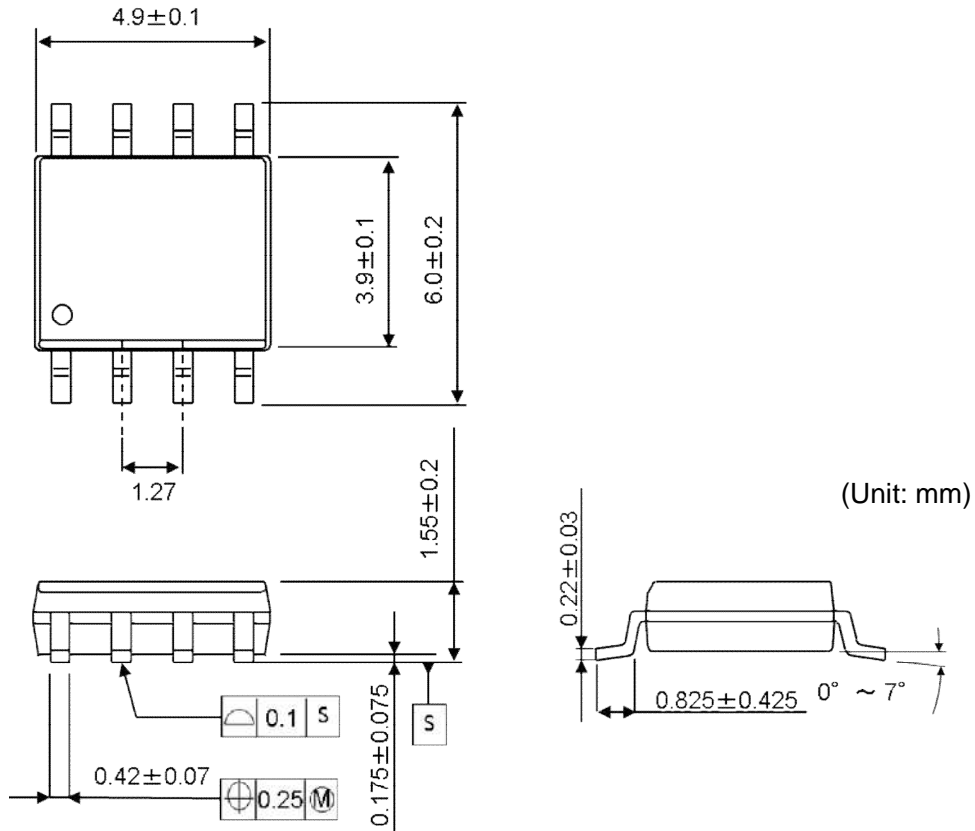
■ELECTRICAL CHARACTERISTICS ($V^+=+15V$, $V^-=-15V$, $V_{CM}=0V$, $T_a=25^\circ C$ unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
INPUT CHARACTERISTICS						
Input Offset Voltage	V_{IO}	$R_S=50\Omega$, $V_{CM}=0V$	-	0.8	3.5	mV
Input Offset Voltage Drift	$\Delta V_{IO}/\Delta T$	$T_a=-40^\circ C \sim +125^\circ C$	-	3.5	-	$\mu V/^\circ C$
Input Bias Current	I_B		-	120	500	nA
Input Offset Current	I_{IO}		-	6	75	nA
Open-Loop Voltage Gain	A_V	$V_O=\pm 10V$, $R_L=2k\Omega$ to $0V$	88	110	-	dB
Common Mode Rejection Ratio	CMR	$V_{ICM}=-15V$ to $13.2V$	70	86	-	dB
Common Mode Input Voltage Range	V_{ICM}	CMR ≥ 70 dB	V^-	-	$V^+-1.8$	V
OUTPUT CHARACTERISTICS						
High-level Output Voltage	V_{OH}	$R_L=10k\Omega$ to $0V$	13.7	14	-	V
		$R_L=2k\Omega$ to $0V$	13.5	14	-	
Low-level Output Voltage	V_{OL}	$R_L=10k\Omega$ to $0V$	-	-14.3	-13.7	V
		$R_L=2k\Omega$ to $0V$	-	-13.8	-13.5	
Output Source Current	I_{SOURCE}	$V_O=0V$, +Input= $+1V$, -Input= $0V$	10	40	-	mA
Output Sink Current	I_{SINK}	$V_O=0V$, +Input= $0V$, -Input= $+1V$	10	45	-	mA
POWER SUPPLY						
Supply Current (All amplifiers)	I_{SUPPLY}	No Signal, $R_L=\infty$	-	4.3	5.5	mA
Supply Voltage Rejection Ratio	SVR	$V^+/V^-=\pm 1.5V$ to $\pm 18V$, $V_{ICM}=0V$	70	93	-	dB
AC CHARACTERISTICS						
Gain Bandwidth Product	GBW	$R_L=2k\Omega$ to $0V$, $f=100kHz$	-	3.5	-	MHz
Slew Rate	SR	$G_V=0dB$, $R_L=2k\Omega$ to $0V$, $C_L=20pF$, $V_{in}=-10V$ to $+10V$	-	8.5	-	V/ μs
Phase Margin	ϕ_M	$R_L=2k\Omega$ to $0V$, $C_L=20pF$	-	90	-	deg
		$R_L=2k\Omega$ to $0V$, $C_L=330pF$	-	70	-	
Gain Margin	GM	$R_L=2k\Omega$ to $0V$, $C_L=20pF$	-	9	-	dB
		$R_L=2k\Omega$ to $0V$, $C_L=330pF$	-	8	-	
NOISE, THD						
Equivalent Input Noise Voltage	e_n	$f=1kHz$	-	32	-	nV/ \sqrt{Hz}
Total Harmonic Distortion + Noise	THD+N	$G_V=20dB$, $R_L=2k\Omega$ to $0V$, $C_L=20pF$, $f=1kHz$, $V_O=15V_{PP}$	-	0.003	-	%
Channel Separation	CS	$f=10kHz$, Equivalent Input value	-	120	-	dB

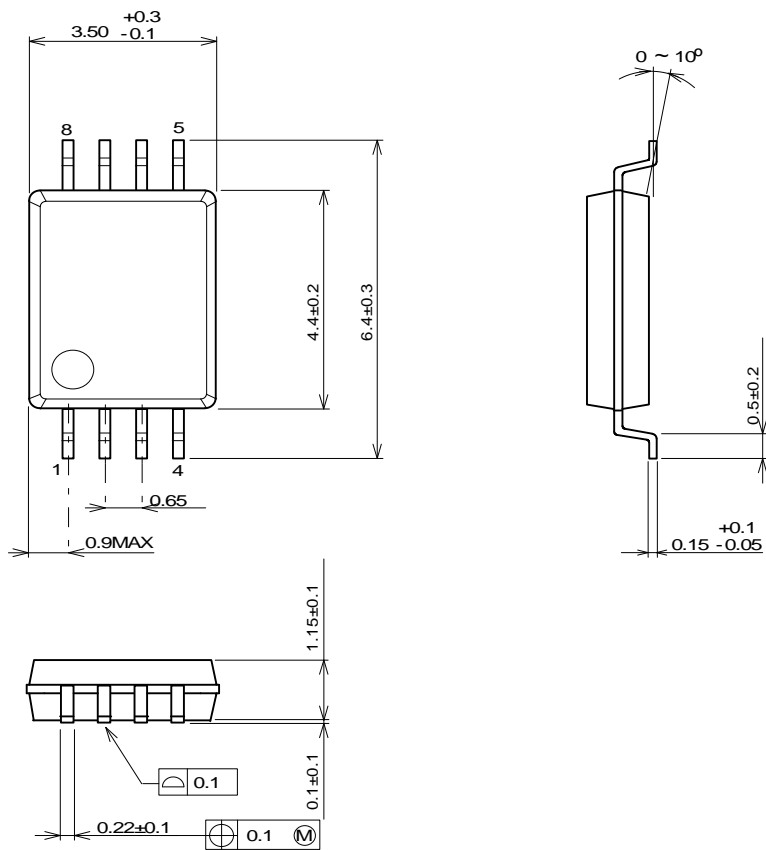
■ELECTRICAL CHARACTERISTICS ($V^+=+5V$, $V^-=0V$, $V_{CM}=2.5V$, $T_a=25^\circ C$ unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
INPUT CHARACTERISTICS						
Input Offset Voltage	V_{IO}	$R_S=50\Omega$, $V_{CM}=V^+/2$, $V_O=V^+/2$	-	0.5	3.5	mV
Input Offset Voltage Drift	$\Delta V_{IO}/\Delta T$	$T_a=-40^\circ C \sim +125^\circ C$	-	2.5	-	$\mu V/^\circ C$
Input Bias Current	I_B	$V_{CM}=V^+/2$, $V_O=V^+/2$	-	140	500	nA
Input Offset Current	I_{IO}	$V_{CM}=V^+/2$, $V_O=V^+/2$	-	6	75	nA
Open-Loop Voltage Gain	A_v	$V_O=1.5V$ to $3.5V$, $R_L=2k\Omega$ to $0V$	88	110	-	dB
Common Mode Rejection Ratio	CMR	$V_{CM}=0V$ to $3.2V$	70	80	-	dB
Common Mode Input Voltage Range	V_{ICM}	CMR \geq 70dB	V^-	-	$V^+-1.8$	V
OUTPUT CHARACTERISTICS						
High-level Output Voltage	V_{OH}	$R_L=2k\Omega$ to $0V$	3.7	4	-	V
Low-level Output Voltage	V_{OL}	$R_L=2k\Omega$ to $0V$	-	0	0	V
Output Source Current	I_{SOURCE}	$V_O=0V$, +Input= $+1V$, -Input= $0V$	10	30	-	mA
Output Sink Current	I_{SINK}	$V_O=5V$, +Input= $0V$, -Input= $+1V$	10	30	-	mA
POWER SUPPLY						
Supply Current (All amplifier)	I_{SUPPLY}	No Signal, $R_L=\infty$	-	3.3	4.5	mA
AC CHARACTERISTICS						
Gain Bandwidth Product	GBW	$R_L=2k\Omega$ to $0V$, $f=100kHz$	-	3.5	-	MHz
Slew Rate	SR	$G_v=0dB$, $R_L=2k\Omega$ to $0V$, $C_L=20pF$, $V_{in}=+0.5V$ to $+3V$	-	7	-	V/ μs
Phase Margin	ϕ_M	$R_L=2k\Omega$ to $0V$, $C_L=20pF$	-	80	-	deg
		$R_L=2k\Omega$ to $0V$, $C_L=330pF$	-	55	-	
Gain Margin	GM	$R_L=2k\Omega$ to $0V$, $C_L=20pF$	-	9	-	dB
		$R_L=2k\Omega$ to $0V$, $C_L=330pF$	-	7	-	
NOISE, THD						
Equivalent Input Noise Voltage	e_n	$f=1kHz$	-	30	-	nV/ \sqrt{Hz}

■ PACKAGE DIMENSIONS



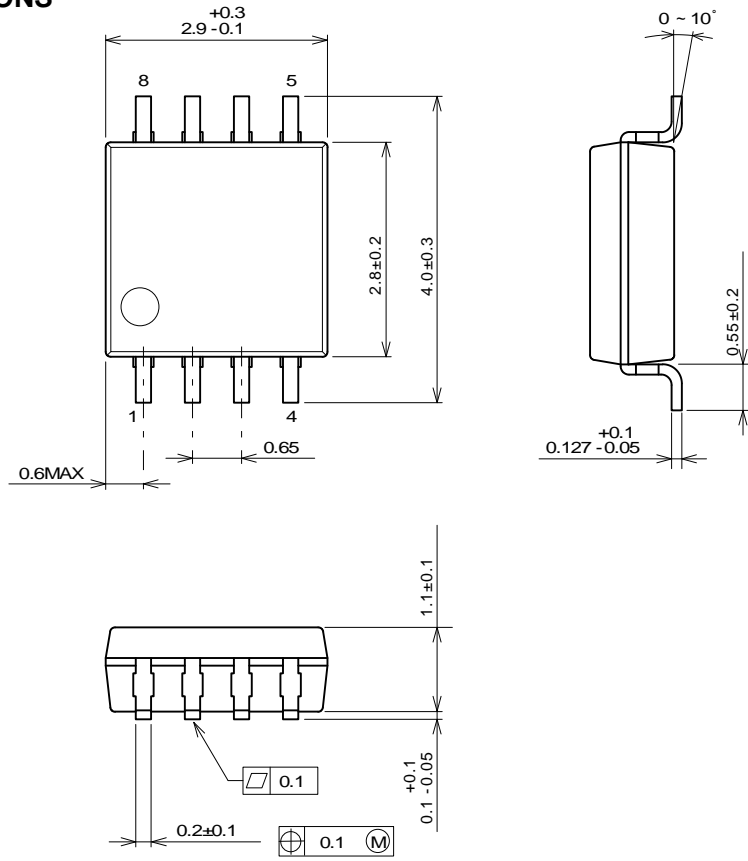
SOP8 Package



SSOP8 Package

(Unit: mm)

■ PACKAGE DIMENSIONS



(Unit: mm)

MSOP8 (TVSP8) JEDEC MO-187-DA / thin type Package

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