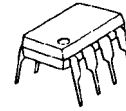


VOLTAGE AND CURRENT CONTROL IC

■ GENERAL DESCRIPTION

The **NJM2146B** is a voltage and current control IC which contains single-supply low offset voltage OP-AMP (2mV max.), low operating OP-AMP, and precision voltage reference. It is suitable for battery charger, second controller of switching regulator systems, and other battery systems.

■ PACKAGE OUTLINE



NJM2146BD



NJM2146BM

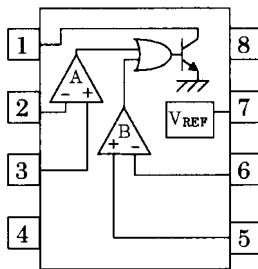


NJM2146BR

■ FEATURES

- Operating Voltage (2.5V to 18V)
- Internal Precision Voltage Reference (1.5V±1%)
- PC Terminal Current (60mA max.)
- Operating Current (3mA max.)
- Bipolar Technology
- Package Outline DIP8, DMP8, VSP8

■ PIN CONFIGURATION



PIN FUNCTION

1. PC
2. A-INPUT
3. A+INPUT
4. GND
5. B+INPUT
6. B-INPUT
7. V_{REF}
8. V^+

■ ABSOLUTE MAXIMUM RATINGS

($T_a=25^\circ\text{C}$)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	20	V
Differential Input Voltage	V_{ID}	(Ach) 20 (Bch) ±4	V
Power Dissipation	P_D	(DIP8) 500 (DMP8) 300 (VSP8) 320	mW
PC Terminal Current	I_{PC}	60	mA
Operating Temperature Range	T_{opr}	-40 to 85	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-50 to 150	$^\circ\text{C}$

(note) When the supply voltage is less than 20V, the absolute maximum input voltage is equal to the supply voltage.

■ RECOMMENDED OPERATING CONDITIONS

($T_a=25^\circ\text{C}$)

PARAMETER	SYMBOL	RATINGS	UNIT
Operating Voltage	V_{opr}	2.5 to 18	V

NJM2146B

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■ ELECTRICAL CHARACTERISTICS

($V^+ = 5V, T_a = 25^\circ C$)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{CC}	$I_{PC} = \text{off}$	-	1	3	mA
Leakage Current	I_{PCLEAK}	$V^+ = V_{PC} = 20V$	-	-	100	μA
Saturation Voltage	$V_{PC(SAT)}$	$I_{PC} = 50mA$	-	0.5	0.7	V
Reference Voltage	V_{REF}	$I_{REF} = 0mA$	1485	1500	1515	mV
Reference Voltage Load Regulation	$\Delta V_{REF} / \Delta I_{REF}$	$I_{REF} = 0 \text{ to } 5mA$	-	-	30	mV

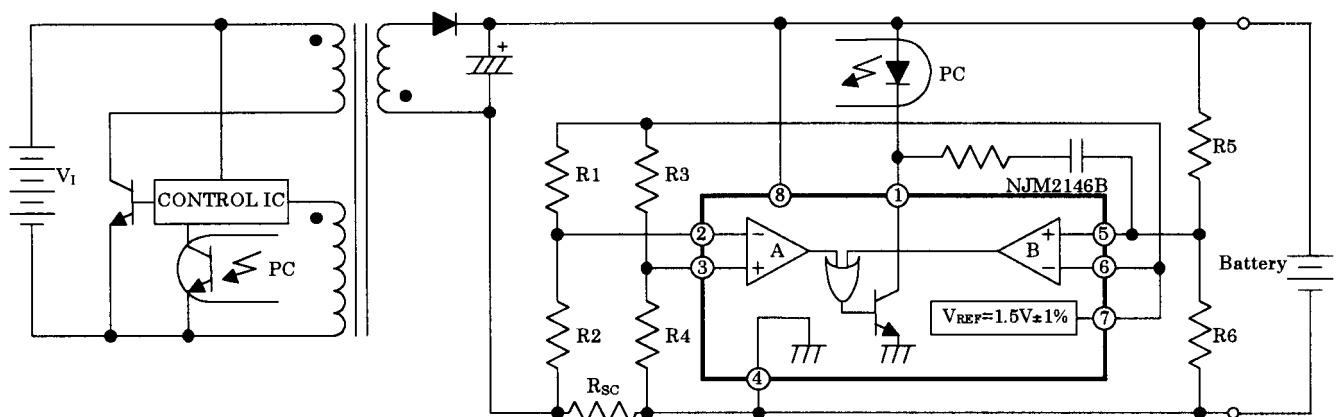
[Ach]

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}		-	0.5	2	mV
Input Offset Current	I_{IO}		-	5	50	nA
Input Bias Current	I_B		-	80	250	nA
Large Signal Voltage Gain	A_V		-	80	-	dB
Input Common Mode Voltage Range	V_{ICM}		0 to 3	-	-	V
Common Mode Rejection Ratio	CMR		-	90	-	dB
Supply Voltage Rejection Ratio	SVR		-	80	-	dB
Slew Rate	SR		-	0.8	-	V / μs
Gain Bandwidth Product	GB	$f = 10kHz$	-	2	-	MHz

[Bch]

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}		-	1	6	mV
Input Offset Current	I_{IO}		-	10	50	nA
Input Bias Current	I_B		-	100	300	nA
Large Signal Voltage Gain	A_V		-	80	-	dB
Input Common Mode Voltage Range	V_{ICM}		1.0 to 4.4	-	-	V
Common Mode Rejection Ratio	CMR		-	90	-	dB
Supply Voltage Rejection Ratio	SVR		-	80	-	dB
Slew Rate	SR	$A_V = 1, V_{IN} = 2.5V \pm 1V$	-	0.5	-	V / μs
Gain Bandwidth Product	GB	$f = 10kHz$	-	1	-	MHz

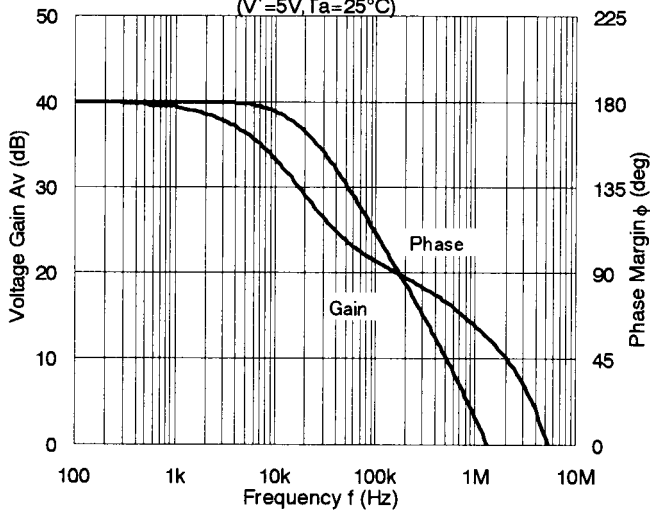
■ TYPICAL APPLICATION



■ TYPICAL CHARACTERISTICS

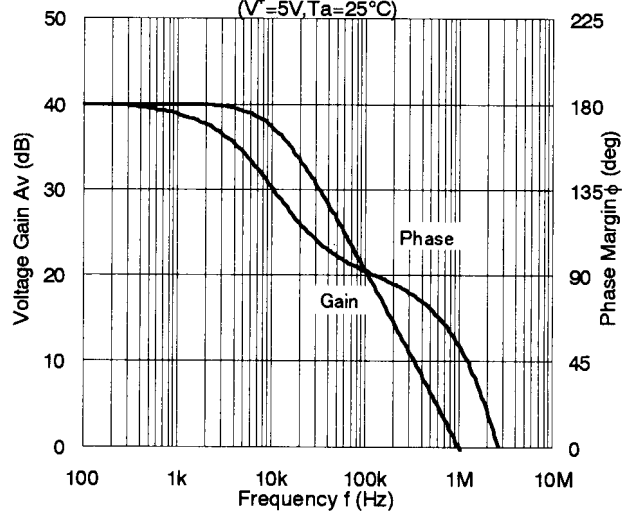
Ach Voltage Gain, Phase Margin vs. Frequency

($V^+=5V, T_a=25^\circ C$)



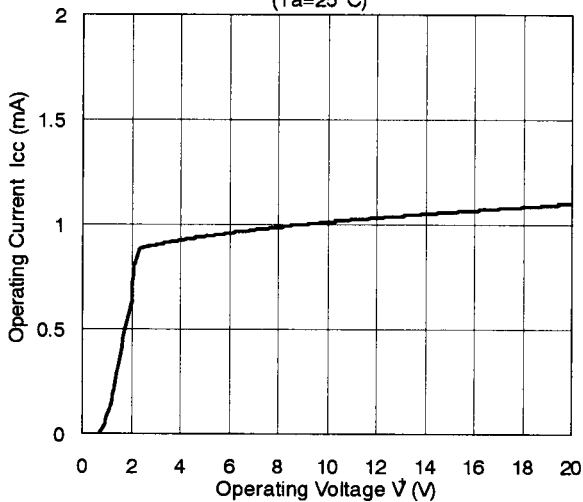
Bch Voltage Gain, Phase Margin vs. Frequency

($V^+=5V, T_a=25^\circ C$)



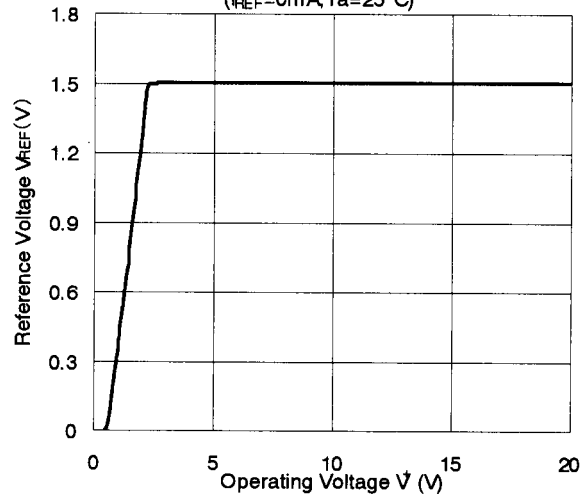
Operating Current vs. Operating Voltage

($T_a=25^\circ C$)



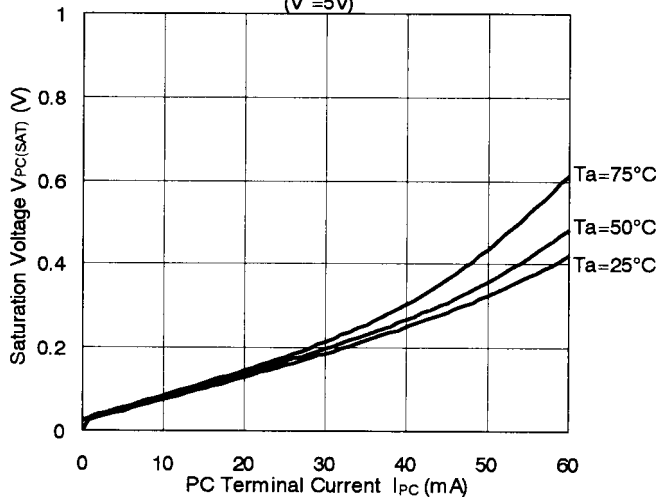
Reference Voltage vs. Operating Voltage

($I_{REF}=0mA, T_a=25^\circ C$)



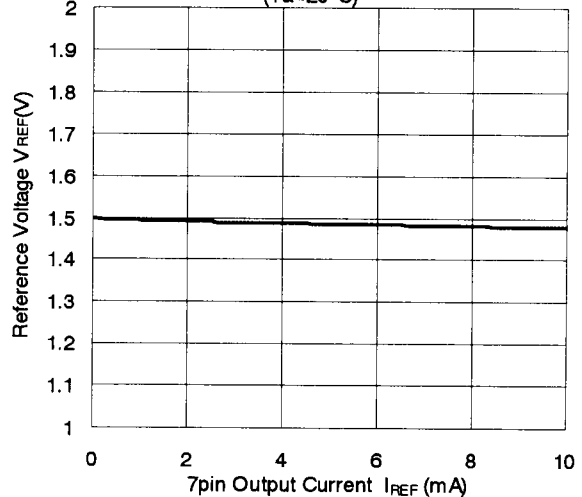
Saturation Voltage vs. PC Terminal Current

($V^+=5V$)



Reference Voltage vs. 7pin Output Current

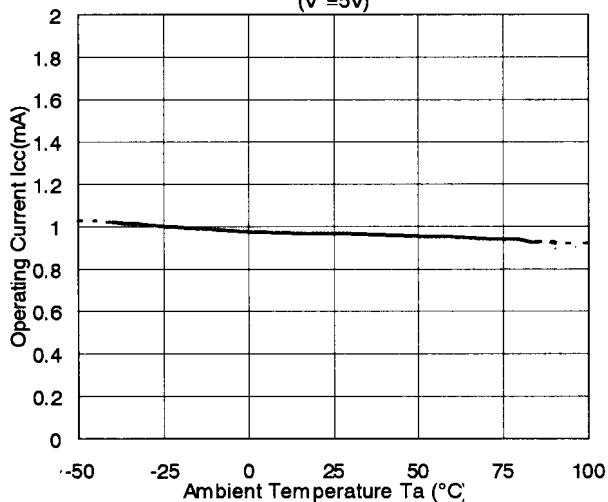
($T_a=25^\circ C$)



■ TYPICAL CHARACTERISTICS

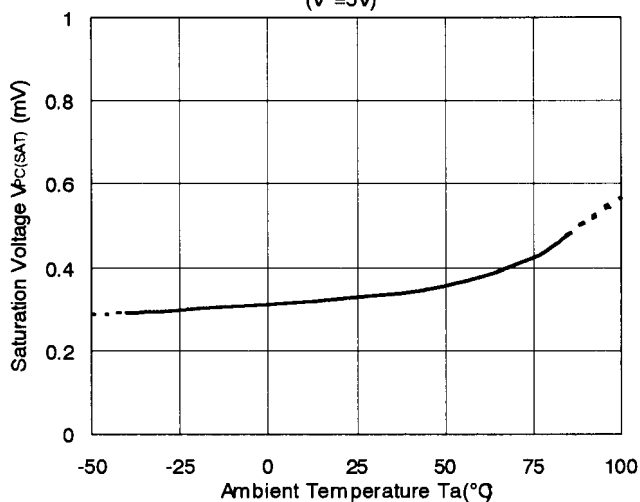
Operating Current vs. Temperature

($V^+ = 5V$)



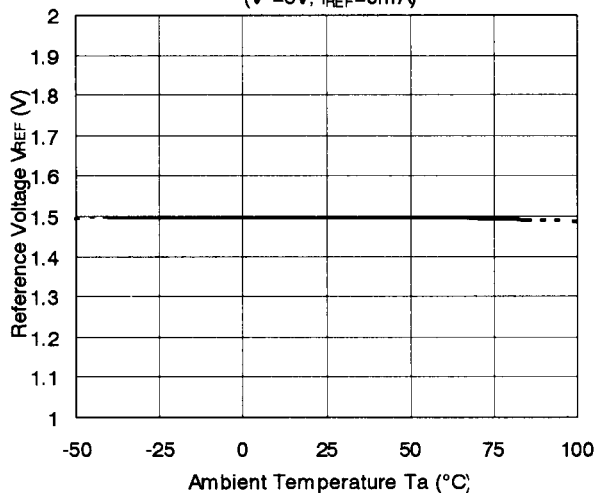
Saturation Voltage vs. Temperature

($V^+ = 5V$)



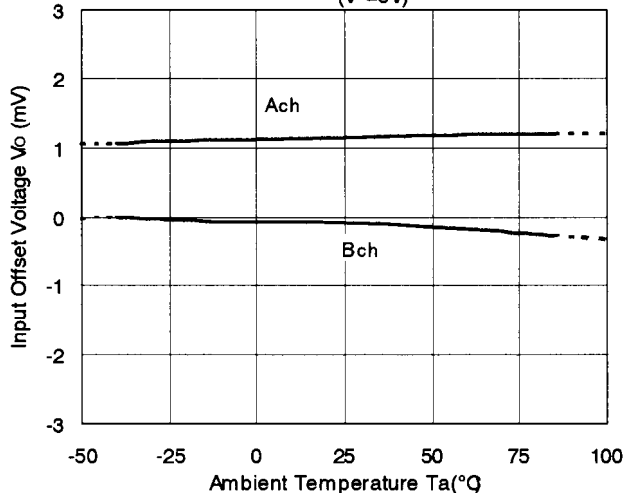
Reference Voltage vs. Temperature

($V^+ = 5V, I_{REF} = 0mA$)



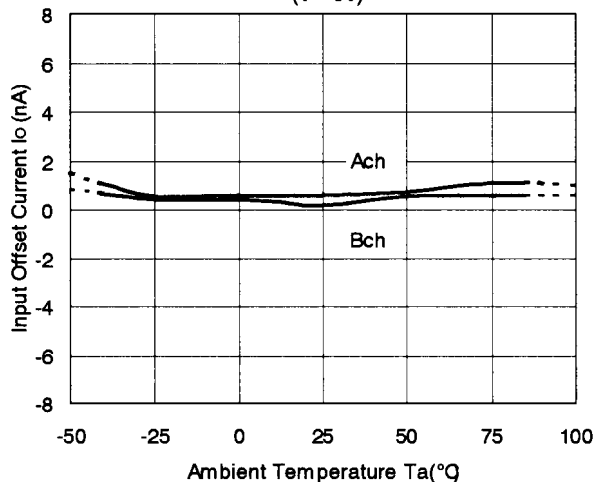
Input Offset Voltage vs. Temperature

($V^+ = 5V$)



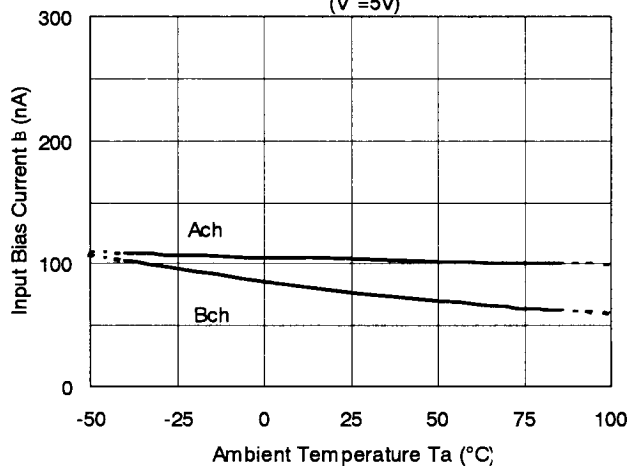
Input Offset Current vs. Temperature

($V^+ = 5V$)



Input Bias Current vs. Temperature

($V^+ = 5V$)



[CAUTION]

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