

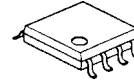
## VOLTAGE AND CURRENT CONTROL IC

### ■GENERAL DESCRIPTION

The **NJM2346** is a low power operation battery charger IC. It includes a voltage reference and two operational amplifiers for voltage and current control needed for a design of secondary circuit for battery chargers and switching regulators.

Low current consumption design contributes low standby power required for 1A class battery chargers.

### ■PACKAGE OUTLINE



**NJM2346M**

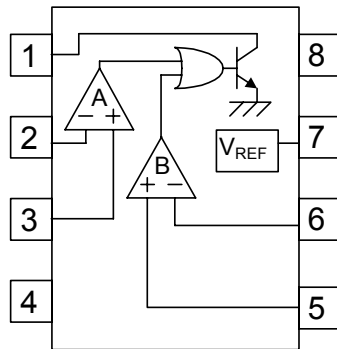


**NJM2346RB1**

### ■FEATURES

- Low Quiescent Current                    250uA typ.
- Precision AMP.                                 $V_{io}=0.5mV$  typ.
- Operating Voltage                            2.2V to 13V
- Precision Voltage Reference                 $1.24V \pm 1\%$
- PC pin Sink Current                         20mA max.
- Bipolar Technology
- Package Outline                                DMP8, TVSP8

### ■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 ( $T_a=25^\circ C$ )

PARAMETER	SYMBOL	MAXIMUM RATINGS	UNIT
Supply Voltage	$V^+$	14	V
Differential Input Voltage	$V_{ID}$	(Ach) 14 (Bch) 14	V
Common Mode Input Voltage	$V_{IC}$	(Ach) -0.3 ~ 14 (note) (Bch) -0.3 ~ 14 (note)	V
PC Terminal Current	$I_{PC}$	20	mA
Power Dissipation	$P_D$	(DMP 8) 300 (TVSP 8) 320	mW
Operating Temperature Range	$T_{OPR}$	-40 ~ +85	$^\circ C$
Storage Temperature Range	$T_{STG}$	-50 ~ +150	$^\circ C$

(note) When the supply voltage is less than 14V,  
the absolute maximum input voltage is equal to the supply voltage.

# NJM2346

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

PARAMETER	SYMBOL	MAXIMUM RATINGS	UNIT
Operating Voltage	Vopr	2.2 ~ 13	V

## ■ELECTRICAL CHARACTERISTICS (V<sup>+</sup>=5V, Ta=25°C)

### GENERAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I <sub>CC</sub>	I <sub>PC</sub> =off	–	250	350	μA
Leakage Current	I <sub>PCLEAK</sub>	V <sup>+</sup> =V <sub>PC</sub> =13V	–	–	1	μA
Saturation Voltage	V <sub>PC(SAT)</sub>	I <sub>PC</sub> =20mA	–	0.1	0.3	V
Reference Voltage	V <sub>REF</sub>	I <sub>REF</sub> =0mA	1227	1240	1253	mV
Reference Voltage Load Regulation	$\frac{\Delta V_{REF}}{\Delta I_{REF}}$	I <sub>REF</sub> =0mA ~ 1mA	–	–	10	mV

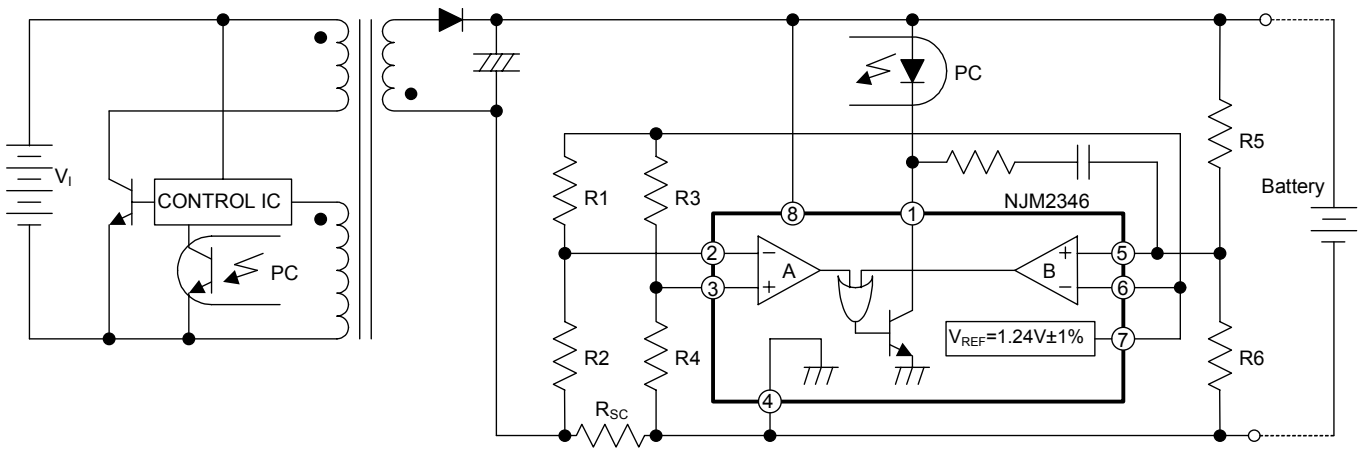
### [Ach]

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V <sub>IO</sub>		–	0.5	2	mV
Input Offset Current	I <sub>IO</sub>		–	10	50	nA
Input Bias Current	I <sub>B</sub>		–	40	160	nA
Large Signal Voltage Gain	A <sub>V</sub>		–	80	–	dB
Input Common Mode Voltage Range	V <sub>ICM</sub>		-0.2 ~ 3.0	–	–	V
Common Mode Rejection Ratio	CMR		–	80	–	dB
Supply Voltage Rejection Ratio	SVR		–	80	–	dB
Slew Rate	SR		–	0.5	–	V/μA
Gain Bandwidth Product	GB	f=10kHz	–	1	–	MHz

### [Bch]

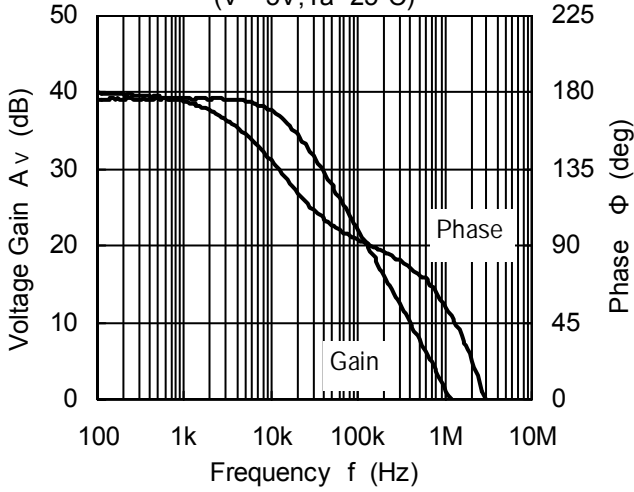
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V <sub>IO</sub>		–	0.5	2	mV
Input Offset Current	I <sub>IO</sub>		–	10	50	nA
Input Bias Current	I <sub>B</sub>		–	20	80	nA
Large Signal Voltage Gain	A <sub>V</sub>		–	80	–	dB
Input Common Mode Voltage Range	V <sub>ICM</sub>		0.5 ~ 4.0	–	–	V
Common Mode Rejection Ratio	CMR		–	80	–	dB
Supply Voltage Rejection Ratio	SVR		–	80	–	dB
Slew Rate	SR		–	0.5	–	V/μA
Gain Bandwidth Product	GB	f=10kHz	–	1	–	MHz

## ■ TYPICAL APPLICATIONS

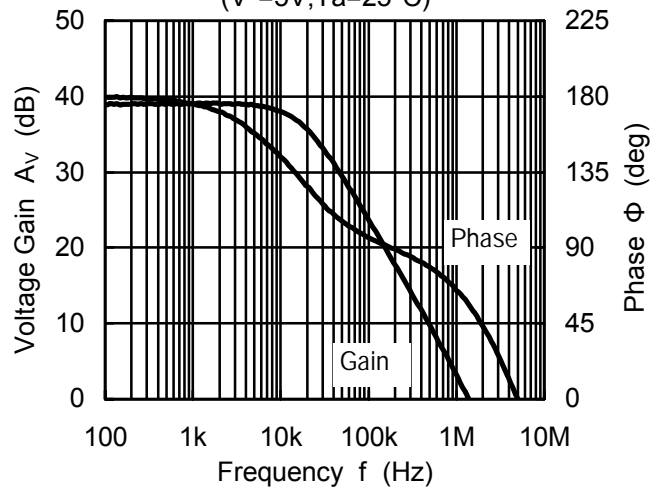


## ■ TYPICAL CHARACTERISTICS

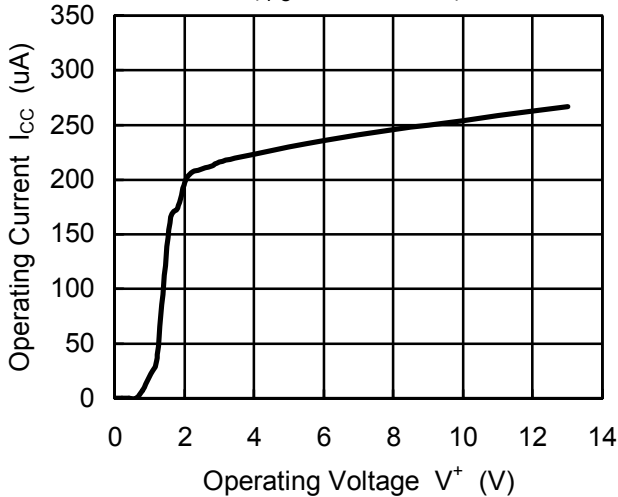
Ach Voltage Gain · Phase vs. Frequency  
( $V^+ = 5V, T_a = 25^\circ C$ )



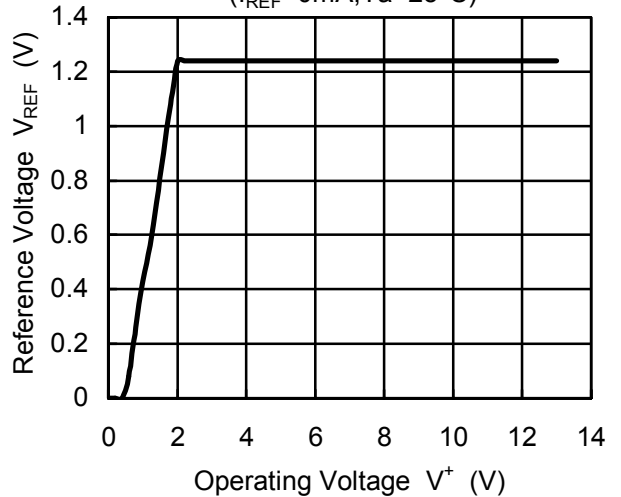
Bch Voltage Gain · Phase vs. Frequency  
( $V^+ = 5V, T_a = 25^\circ C$ )



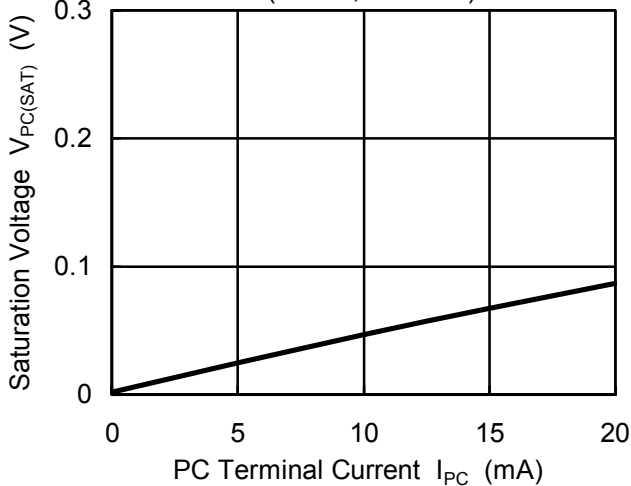
Operating Current vs. Operating Voltage  
( $I_{PC} = \text{off}, T_a = 25^\circ C$ )



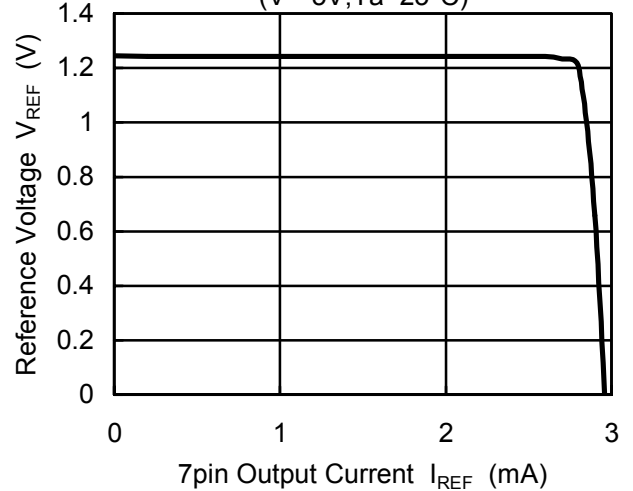
Reference Voltage vs. Operating Voltage  
( $I_{REF} = 0mA, T_a = 25^\circ C$ )



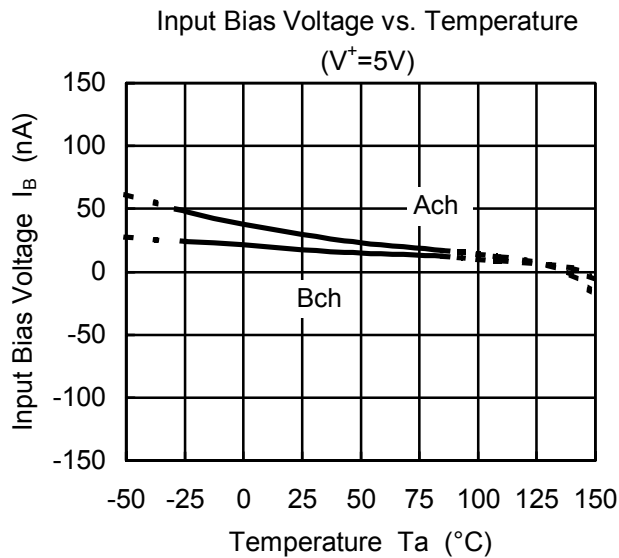
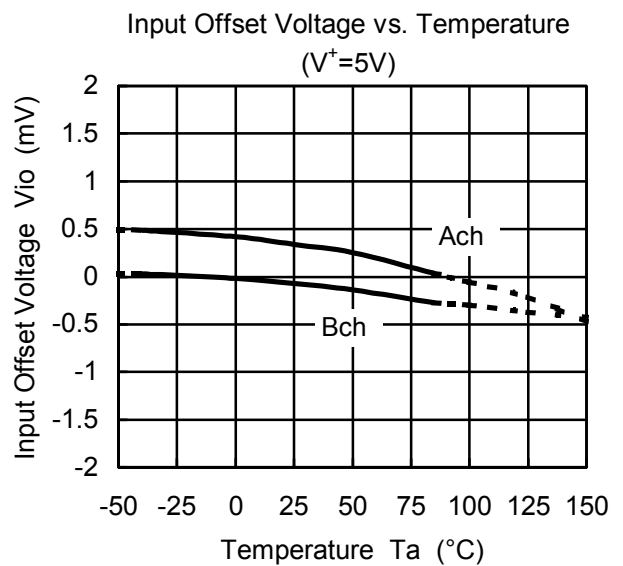
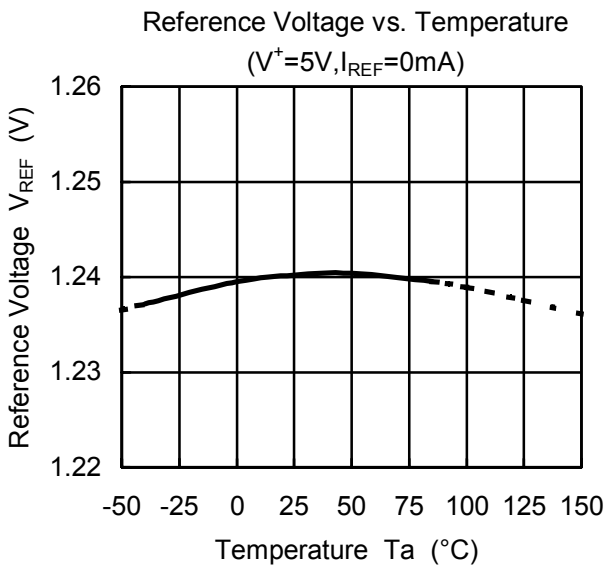
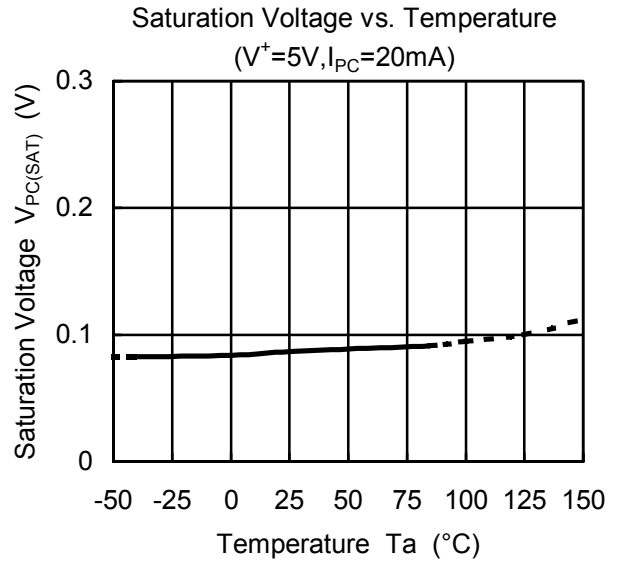
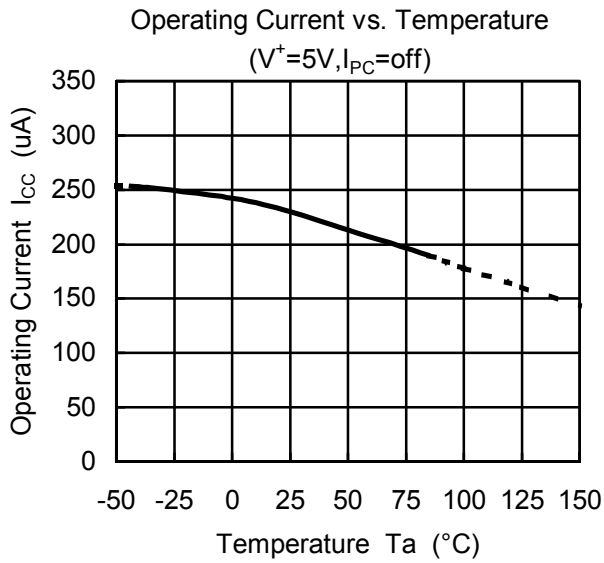
Saturation Voltage vs. PC Terminal Current  
( $V^+ = 5V, T_a = 25^\circ C$ )



Reference Voltage vs. 7pin Output Current  
( $V^+ = 5V, T_a = 25^\circ C$ )



## ■ TYPICAL CHARACTERISTICS



**[CAUTION]**

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