

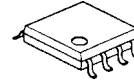
VOLTAGE AND CURRENT CONTROL IC

■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

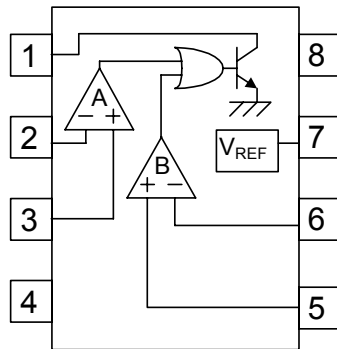


NJM2346RB1

■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 (Ta=25°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 | °C |
| Storage Temperature Range | T_{STG} | -50 ~ +150 | °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⁺=5V, Ta=25°C)

GENERAL CHARACTERISTICS

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

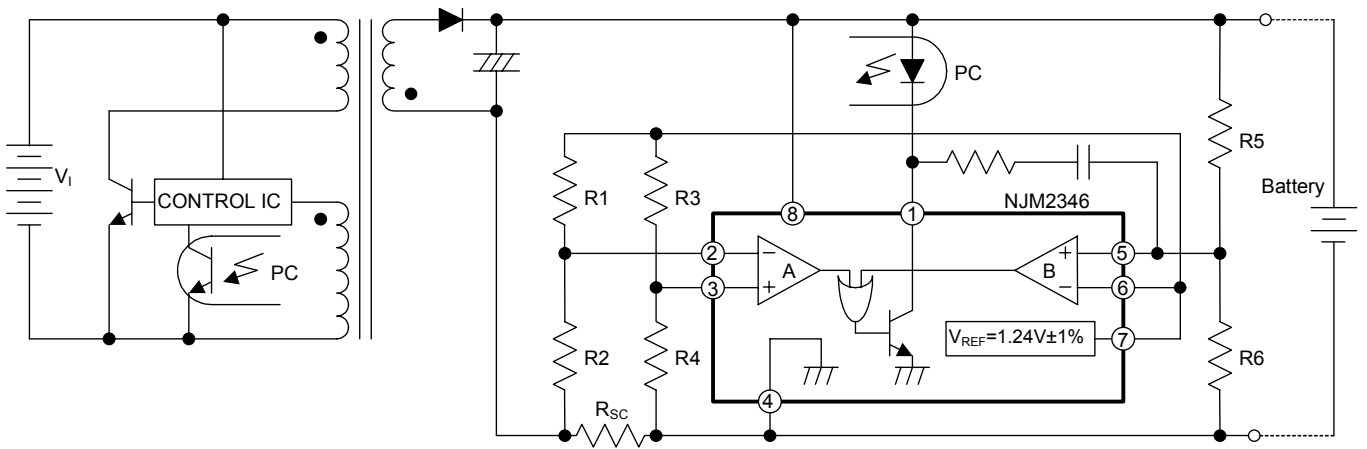
[Ach]

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---------------------------------|------------------|----------------|------------|------|------|------|
| Input Offset Voltage | V _{IO} | | – | 0.5 | 2 | mV |
| Input Offset Current | I _{IO} | | – | 10 | 50 | nA |
| Input Bias Current | I _B | | – | 40 | 160 | nA |
| Large Signal Voltage Gain | A _V | | – | 80 | – | dB |
| Input Common Mode Voltage Range | V _{ICM} | | -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]

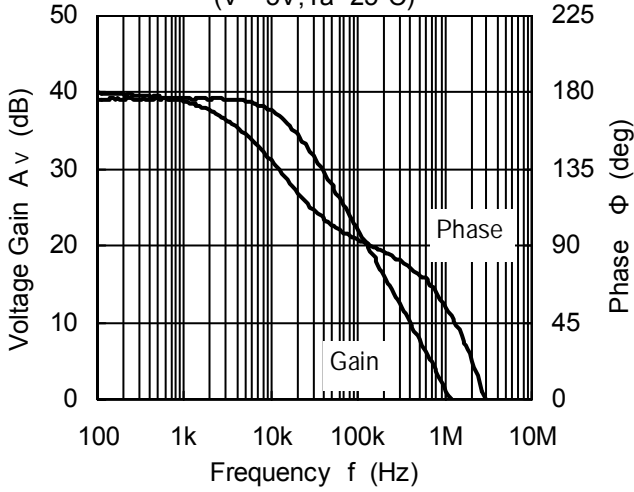
| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---------------------------------|------------------|----------------|-----------|------|------|------|
| Input Offset Voltage | V _{IO} | | – | 0.5 | 2 | mV |
| Input Offset Current | I _{IO} | | – | 10 | 50 | nA |
| Input Bias Current | I _B | | – | 20 | 80 | nA |
| Large Signal Voltage Gain | A _V | | – | 80 | – | dB |
| Input Common Mode Voltage Range | V _{ICM} | | 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

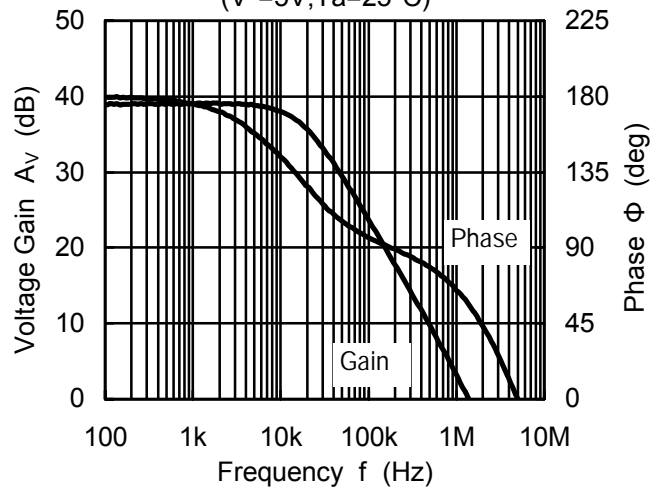


■ TYPICAL CHARACTERISTICS

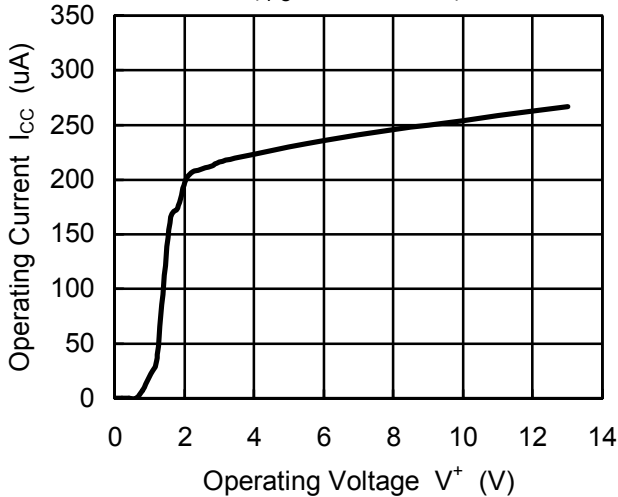
Ach Voltage Gain · Phase vs. Frequency
($V^+ = 5V, T_a = 25^\circ C$)



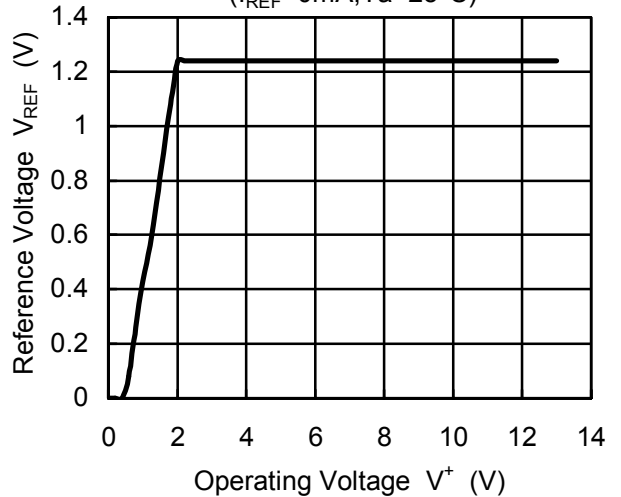
Bch Voltage Gain · Phase vs. Frequency
($V^+ = 5V, T_a = 25^\circ C$)



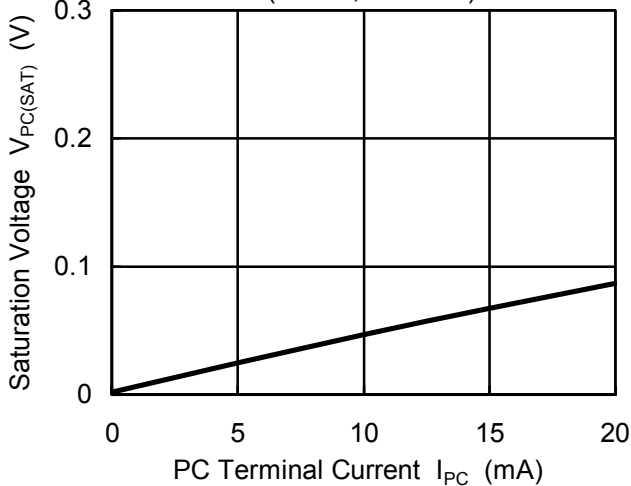
Operating Current vs. Operating Voltage
($I_{PC} = \text{off}, T_a = 25^\circ C$)



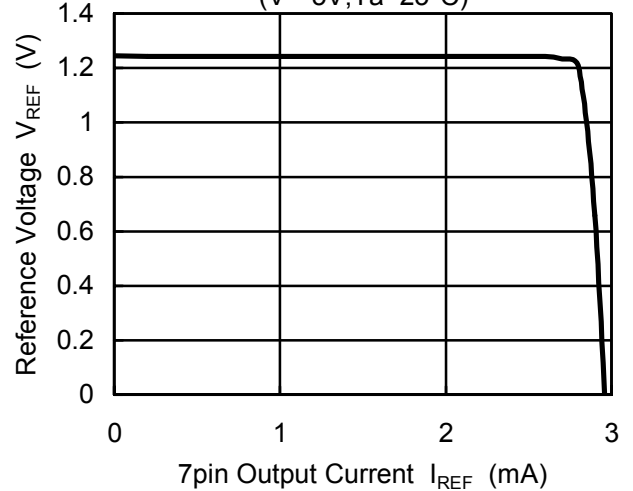
Reference Voltage vs. Operating Voltage
($I_{REF} = 0mA, T_a = 25^\circ C$)



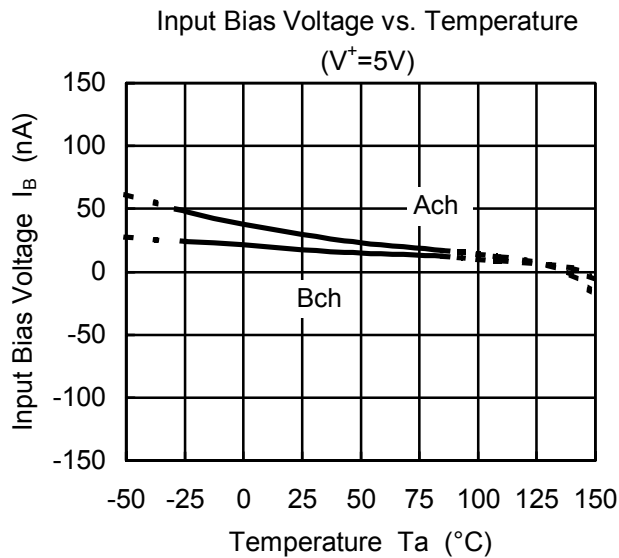
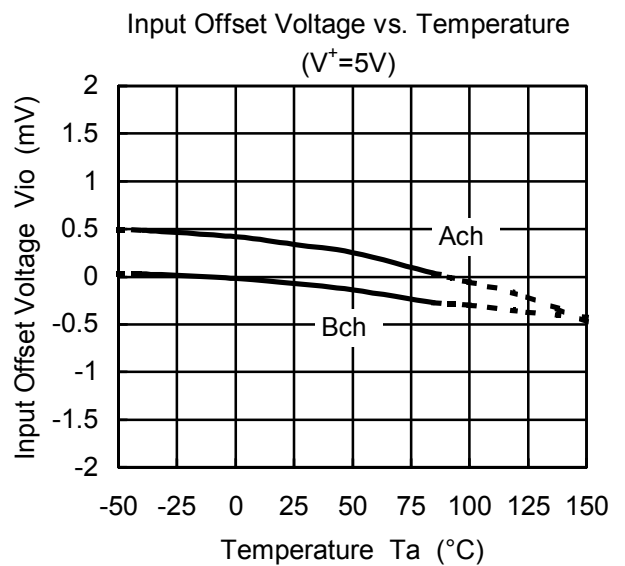
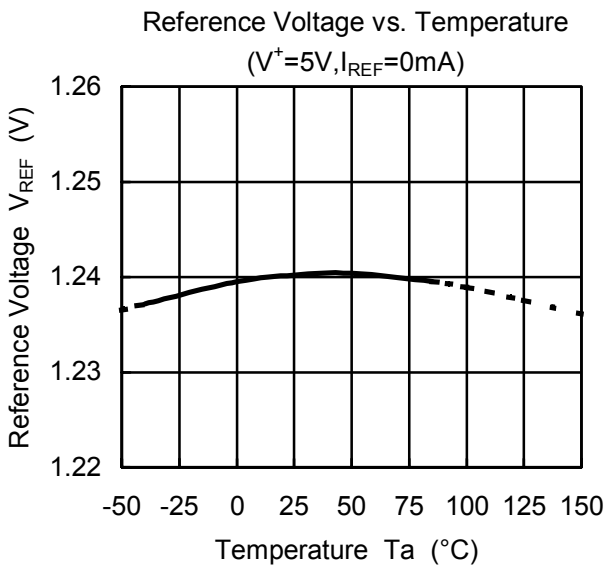
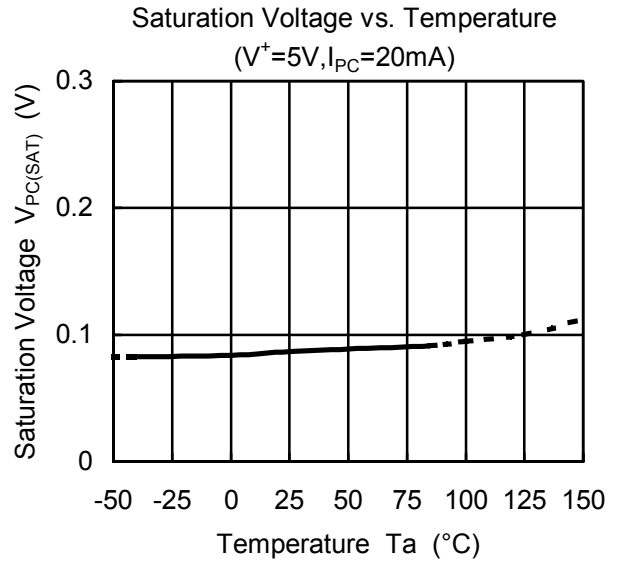
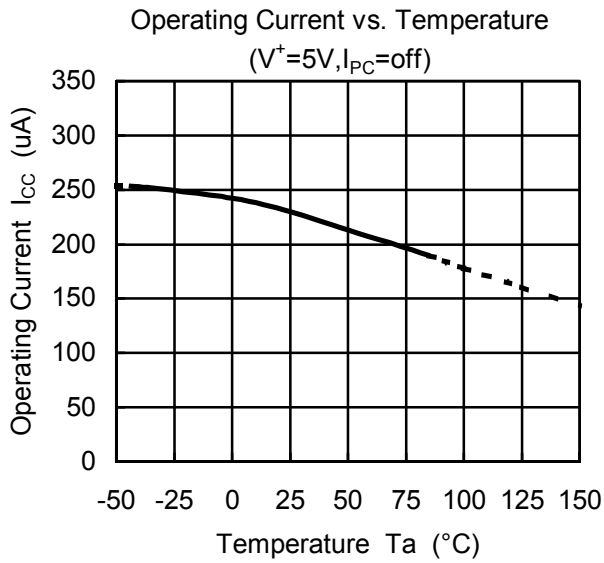
Saturation Voltage vs. PC Terminal Current
($V^+ = 5V, T_a = 25^\circ C$)



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



■ TYPICAL CHARACTERISTICS



[CAUTION]
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