

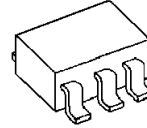
Battery Charger IC

■ GENERAL DESCRIPTION

The NJM2336 is a voltage and current control IC which contains precision voltage reference.

It is suitable for battery charger, second controller of switching regulator systems, and other battery systems.

■ PACKAGE OUTLINE

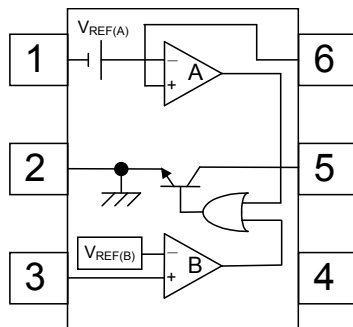


NJM2336AF1/BF1/CF1

■ FEATURES

- | | |
|--|-------------|
| ● Operating Voltage | 2.2V to 13V |
| ● Internal Precision Voltage Reference | 1.24V±1% |
| ● Photo Coupler (PC) Drive Current | 20mA max. |
| ● Operating Current | 280µA max. |
| ● Bipolar Technology | |
| ● Package Outline | SOT23-6-1 |

■ PIN CONFIGURATION



Pin Function

1. A-INPUT
2. GND
3. B +INPUT
4. V⁺
5. PC
6. A +INPUT

NJM2336

■ 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
Power Dissipation	P_D	200	mW
PC Terminal Current	I_{PC}	20	mA
Operating Temperature Range	T_{opr}	-40 to +85	°C
Storage Temperature Range	T_{stg}	-50 to +150	°C

■ RECOMMENDED OPERATING CONDITIONS (Ta=25°C)

PARAMETER	SYMBOL	OPERATING CONDITIONS	UNIT
Operating Voltage	V_{opr}	2.2 to 13	V

■ ELECTRICAL CHARACTERISTICS ($V^+=5V$, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{CC}	$I_{PC}=off$	–	200	280	μA
Leakage Current	I_{PCLEAK}	$V^+=V_{PC}=13V$	–	–	1	μA
Saturation Voltage	$V_{PC(SAT)}$	$I_{PC}=20mA$	–	0.1	0.3	V

[A ch]

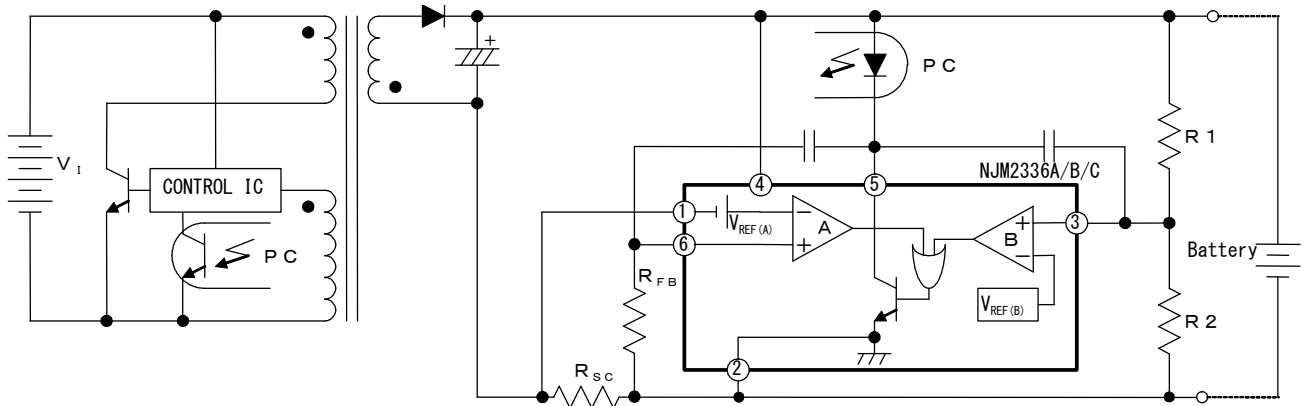
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Reference Voltage	$V_{REF(A)}$	A version	69	72	75	mV
		B version	105	109	113	mV
		C version	145	151	157	mV
Input Bias Current	I_B		–	40	160	nA
Large Signal Voltage Gain	A_V		–	80	–	dB
Input Common Mode Voltage Range	V_{ICM}		–	-0.2 to 3.0	–	V
Common Mode Rejection Ratio	CMR		–	70	–	dB
Supply Voltage Rejection Ratio	SVR		–	80	–	dB
Slew Rate	SR		–	0.5	–	V/μs
Gain Bandwidth Product	GB	f=10kHz	–	1	–	MHz

[B ch]

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Reference Voltage	$V_{REF(B)}$		1227	1240	1253	mV
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 to 4.0	–	V
Common Mode Rejection Ratio	CMR		–	80	–	dB
Supply Voltage Rejection Ratio	SVR		–	80	–	dB
Slew Rate	SR		–	0.5	–	V/μs
Gain Bandwidth Product	GB	f=10kHz	–	1	–	MHz

■ TYPICAL APPLICATIONS

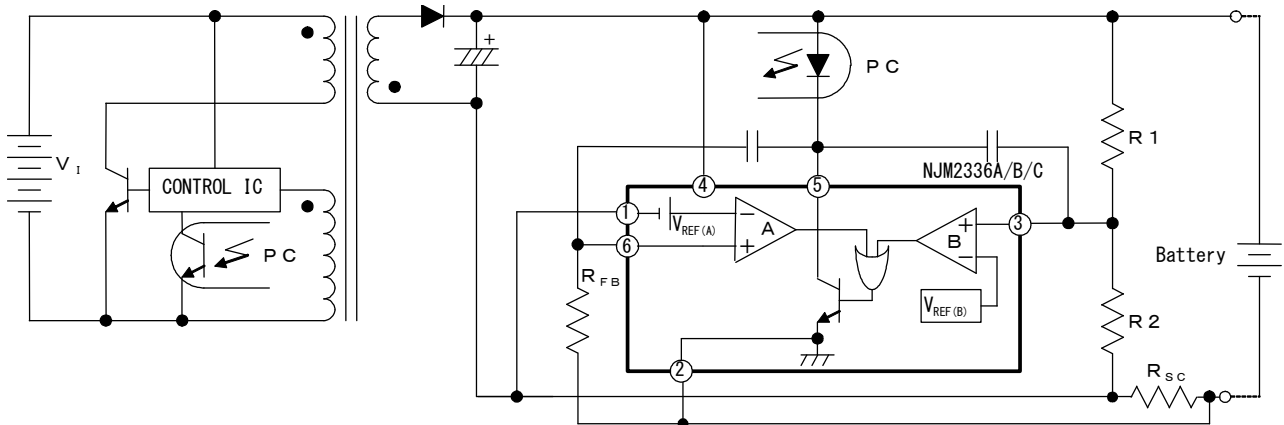
Application Circuit 1



$$\text{OUTPUT} = V_{\text{REF(B)}} \times \frac{R1+R2}{R2} \text{ [V]}$$

$$\text{CURRENT LIMIT} = \frac{V_{\text{REF(A)}}}{R_{\text{SC}}} \text{ [A]}$$

Application Circuit 2



$$\text{OUTPUT} = \{V_{\text{REF(B)}} + (I_L \times R_{\text{SC}})\} \times \frac{R1+R2}{R2} - (I_L \times R_{\text{SC}}) \text{ [V]}$$

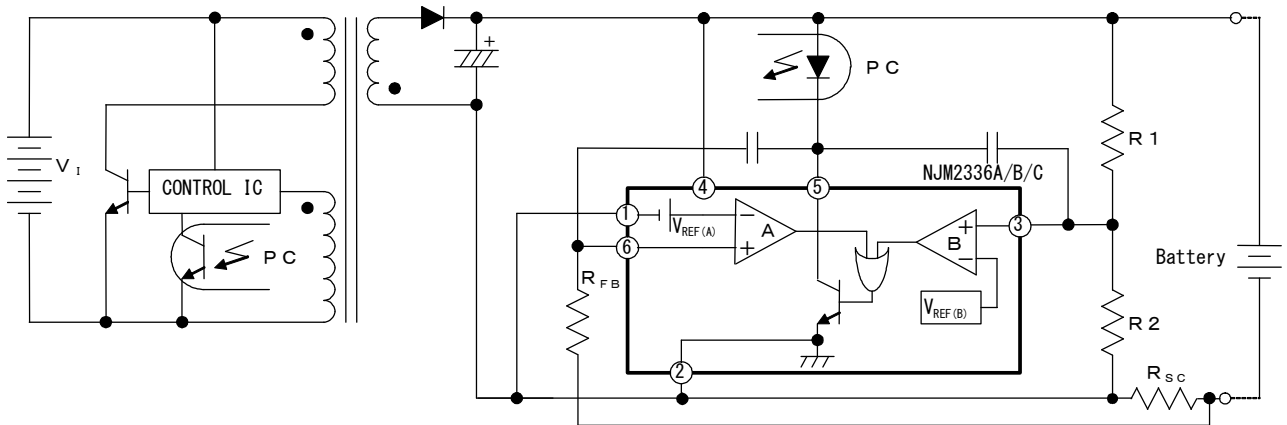
$$\text{CURRENT LIMIT} = \frac{V_{\text{REF(A)}}}{R_{\text{SC}}} \text{ [A]}$$

The A-INPUT pin voltage will be the negative voltage for application circuit 1 and 2.

The underside common mode input voltage range ($V_{\text{ICM-}}$) of the Ach amplifier tends to be increased by high temperature operates. It may deviate from $V_{\text{ICM-}}$ depending on a reference voltage version.

NJM2336

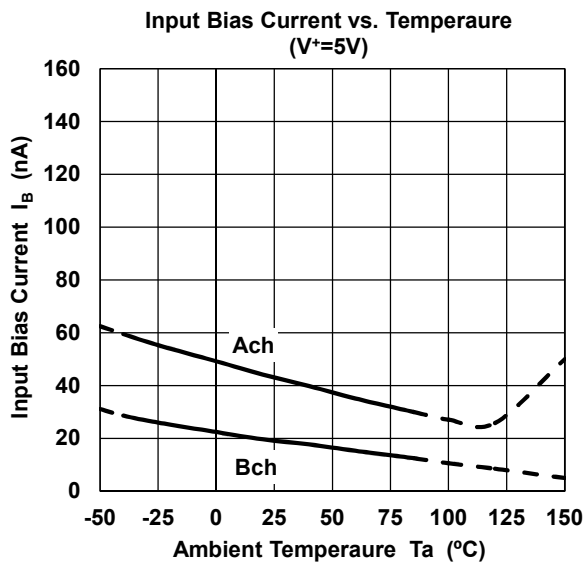
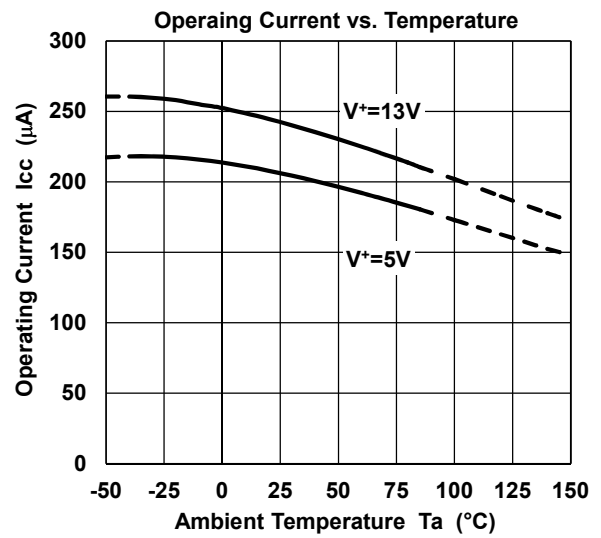
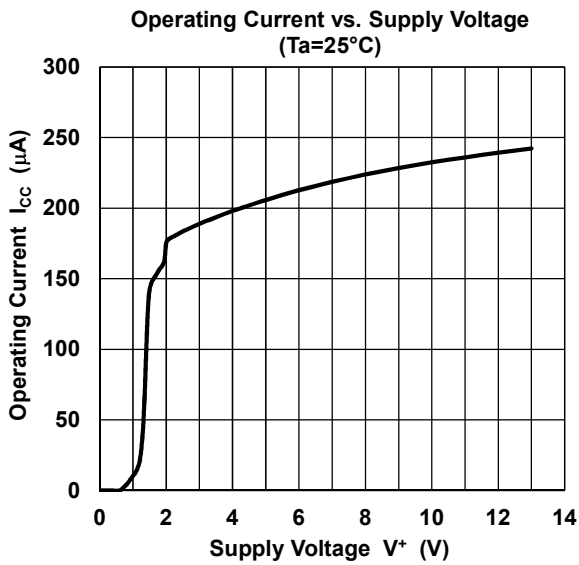
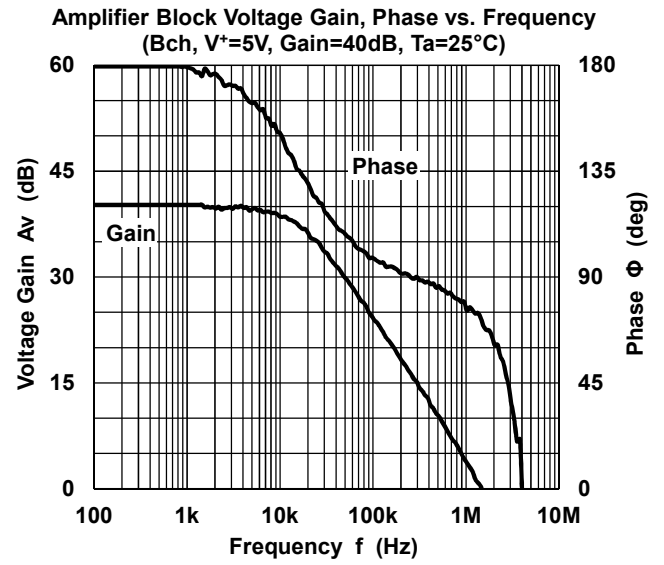
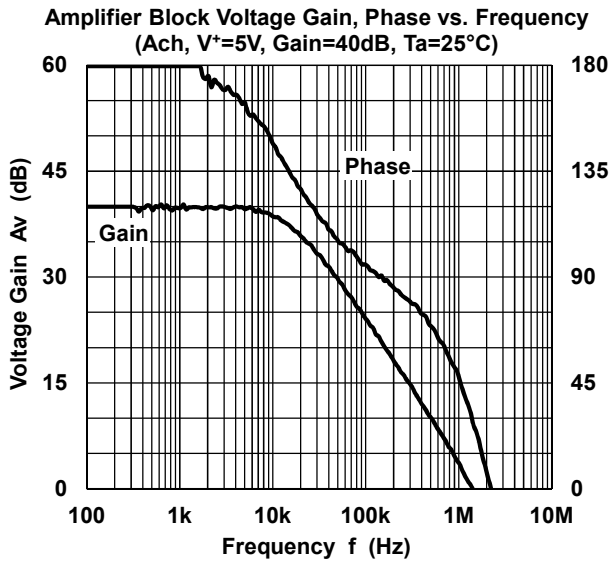
Application Circuit 3



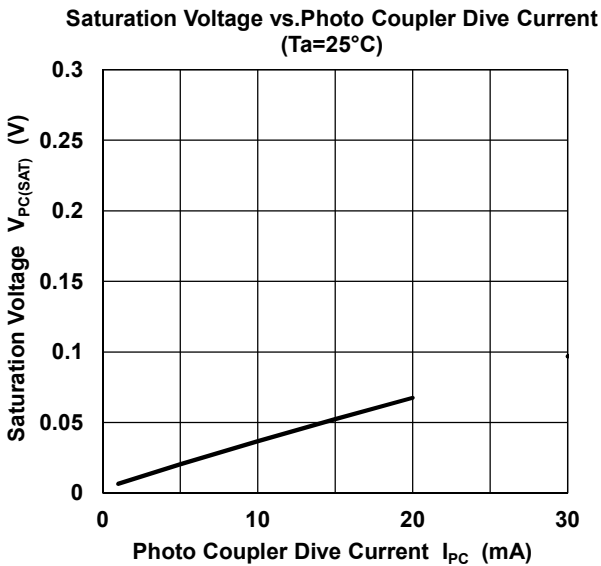
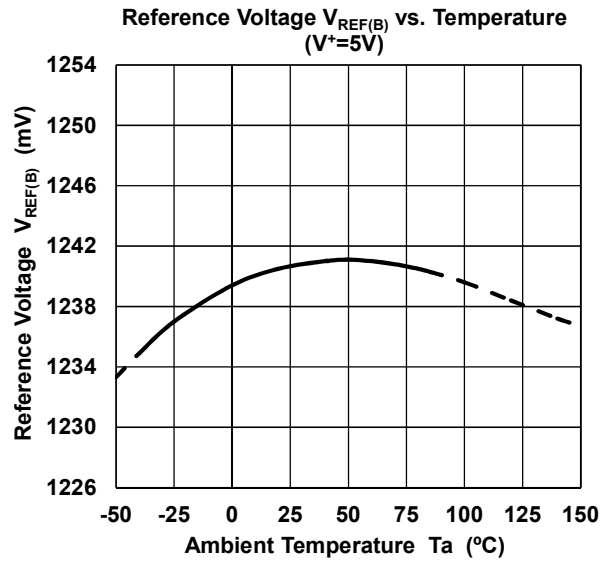
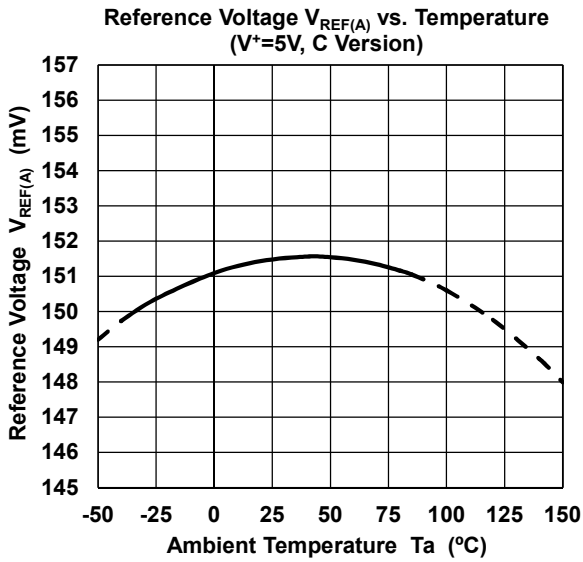
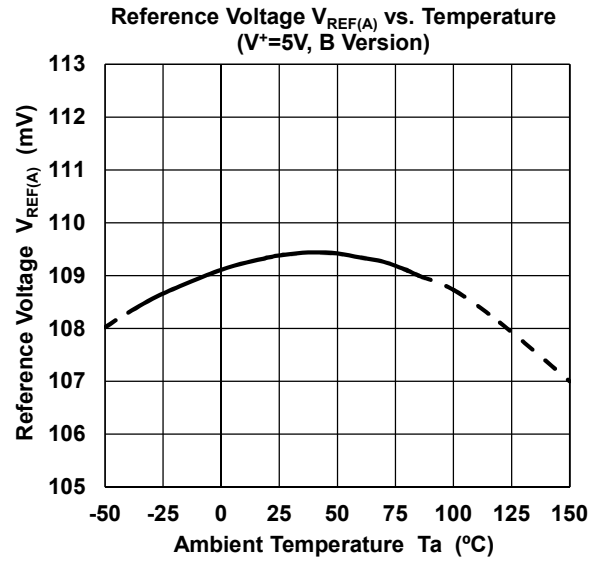
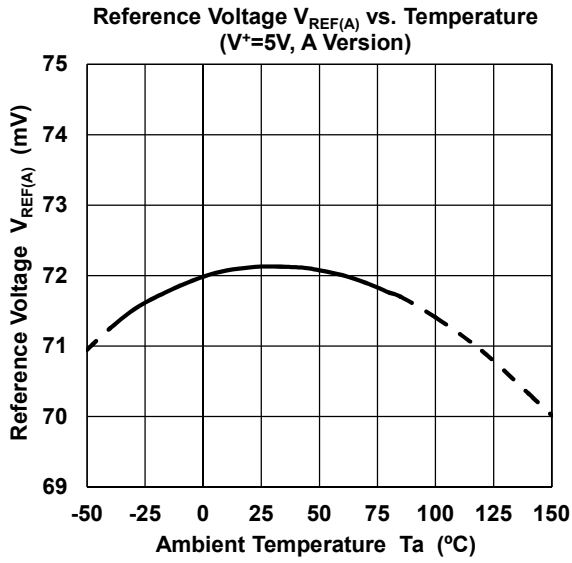
$$\text{OUTPUT} = V_{\text{REF(B)}} \times \frac{R1 + R2}{R2} - (I_L \times R_{\text{SC}}) \text{ [V]}$$

$$\text{CURRENT LIMIT} = \frac{V_{\text{REF(A)}}}{R_{\text{SC}}} \text{ [A]}$$

■ TYPICAL CHARACTERISTICS

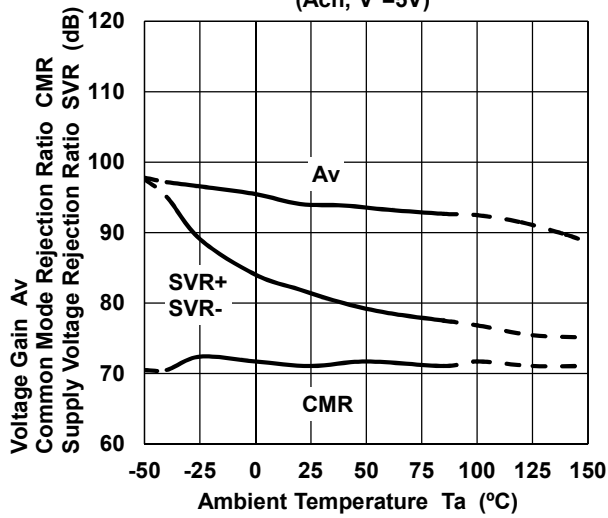


■ TYPICAL CHARACTERISTICS

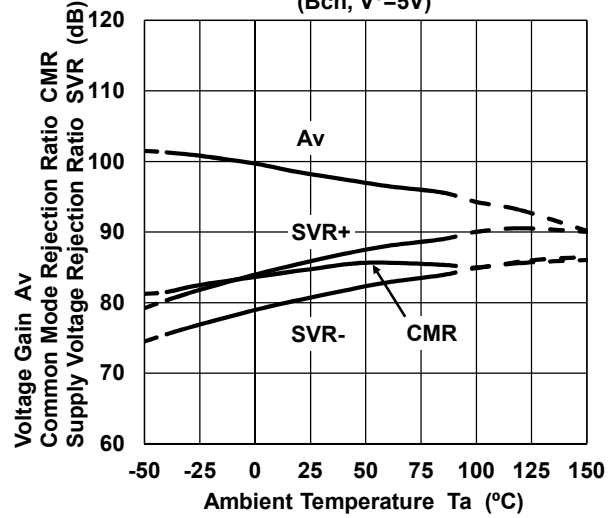


■ TYPICAL CHARACTERISTICS

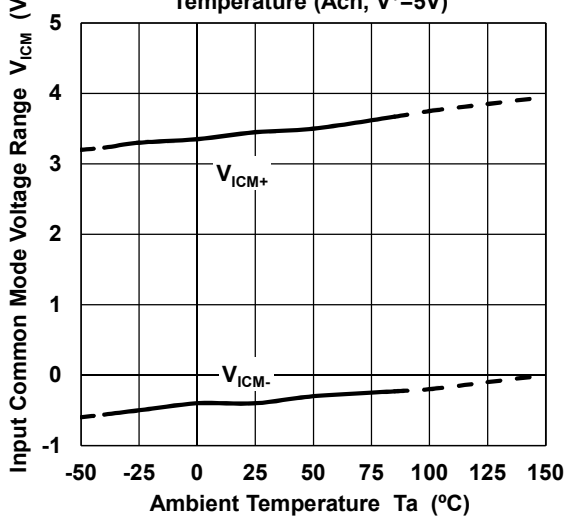
AMP Characteristics vs. Temperature
(Ach, $V^+=5V$)



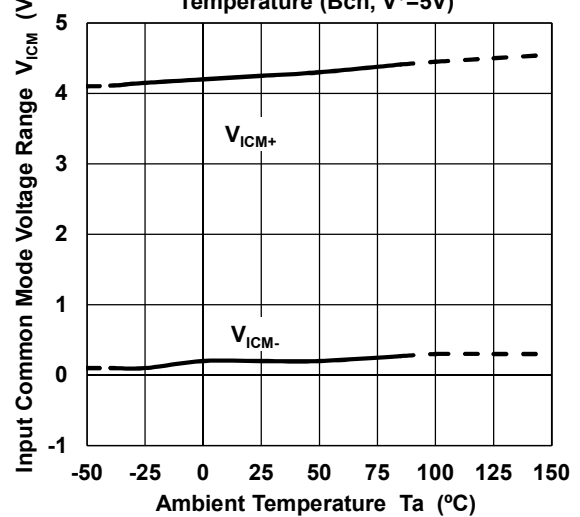
AMP Characteristics vs. Temperature
(Bch, $V^+=5V$)



Input Common Mode Voltage Range vs. Temperature
(Ach, $V^+=5V$)



Input Common Mode Voltage Range vs. Temperature
(Bch, $V^+=5V$)



[CAUTION]

The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.