

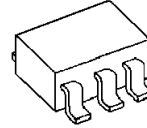
Battery Charger IC

■ 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

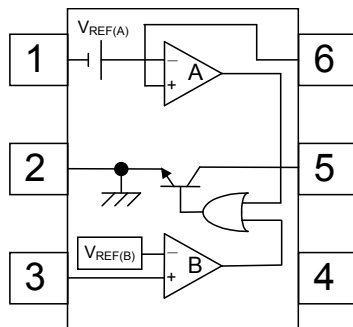


NJM2336AF1/BF1/CF1

■ 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]

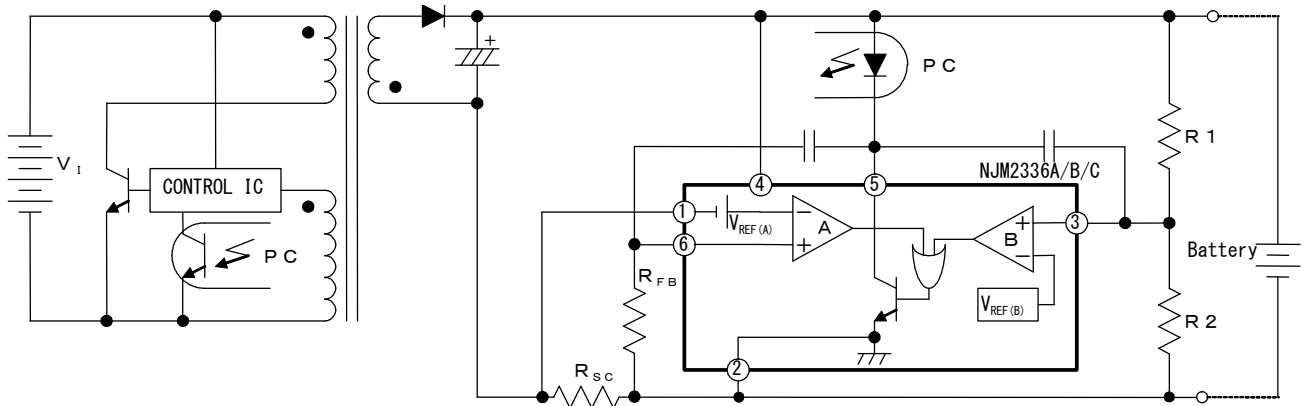
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Reference Voltage	$V_{REF(A)}$	A version	69	72	75	mV
		B version	105	109	113	mV
		C version	145	151	157	mV
Input Bias Current	I_B		–	40	160	nA
Large Signal Voltage Gain	A_V		–	80	–	dB
Input Common Mode Voltage Range	V_{ICM}		–	-0.2 to 3.0	–	V
Common 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

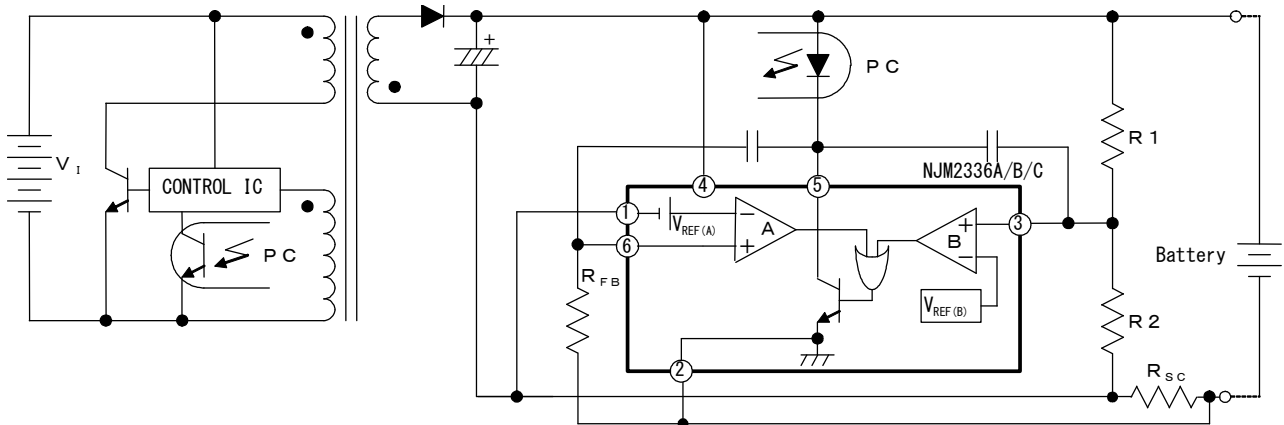
Application Circuit 1



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

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

Application Circuit 2



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

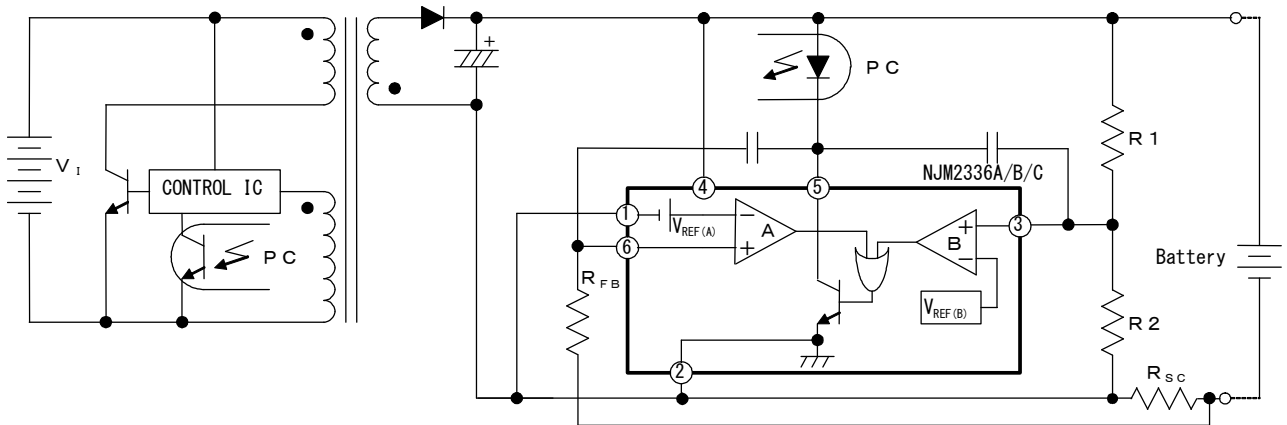
$$\text{CURRENT LIMIT} = \frac{V_{\text{REF(A)}}}{R_{\text{SC}}} \text{ [A]}$$

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

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

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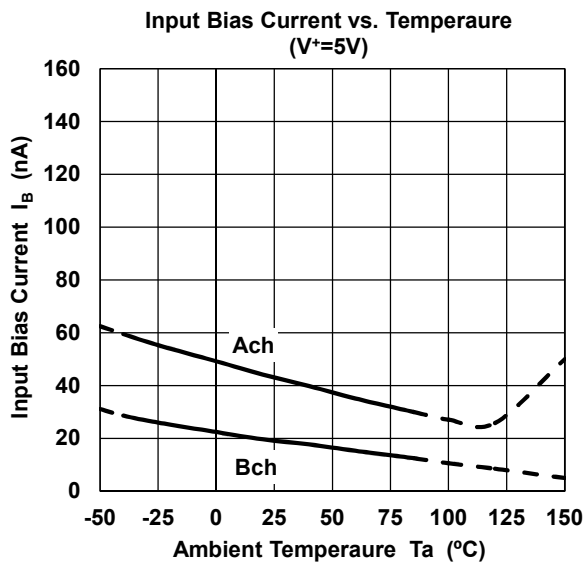
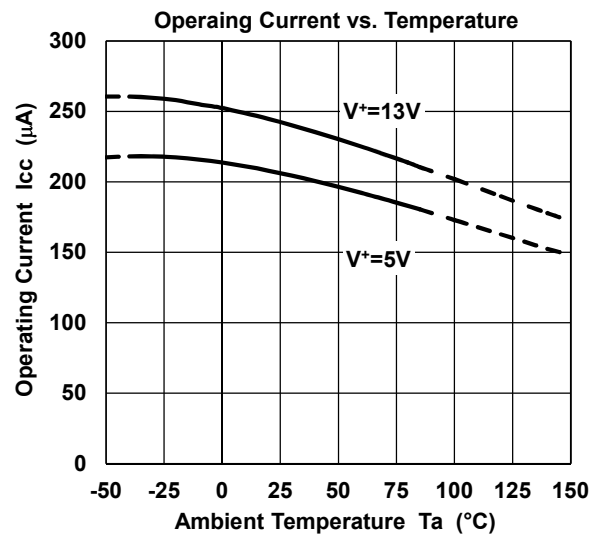
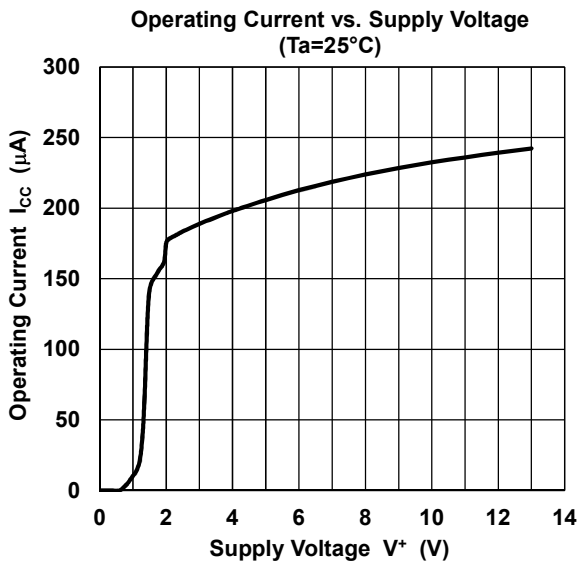
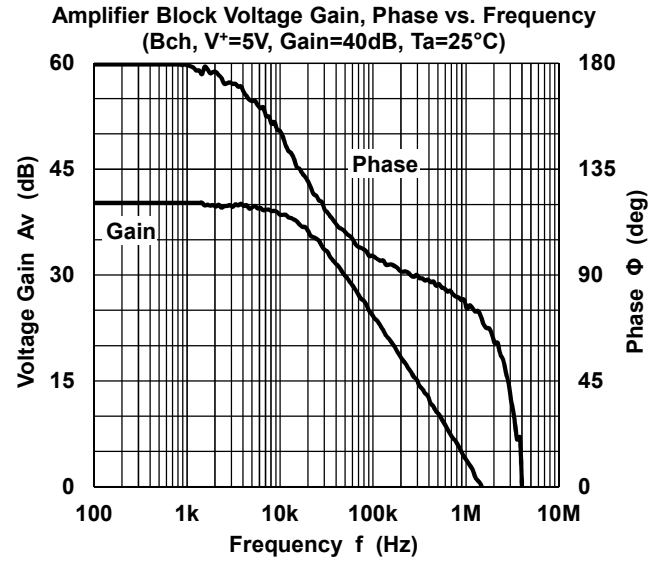
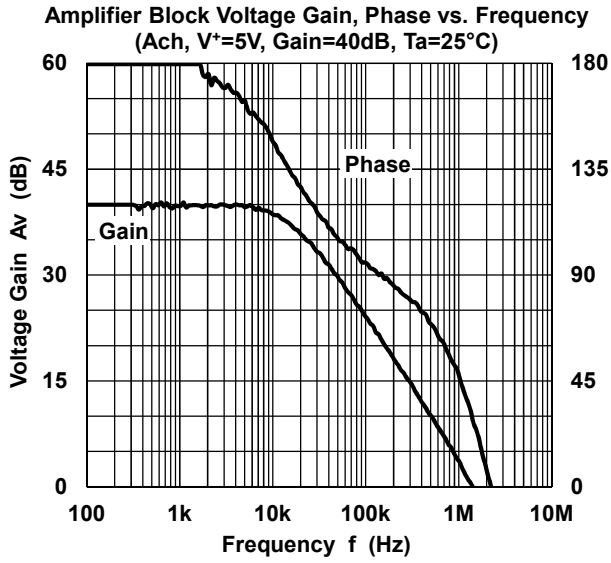
Application Circuit 3



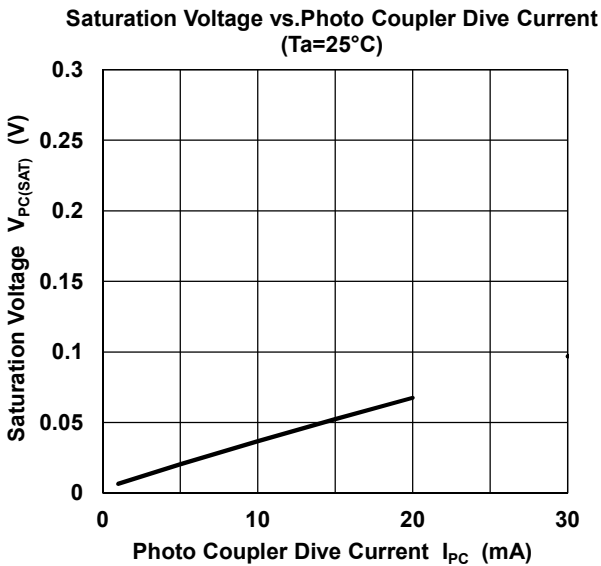
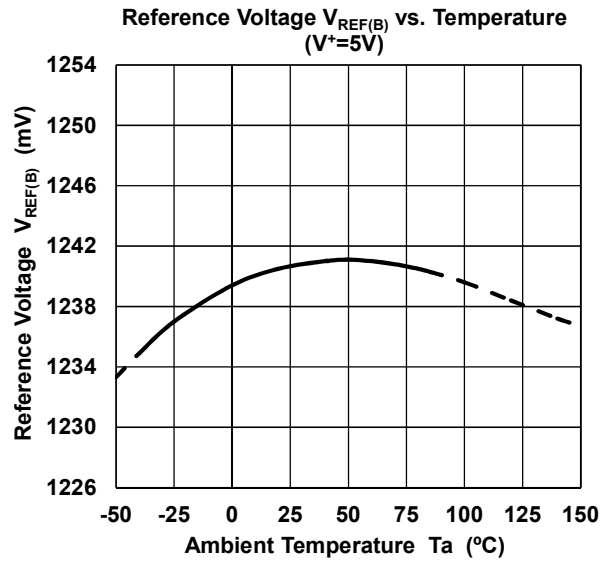
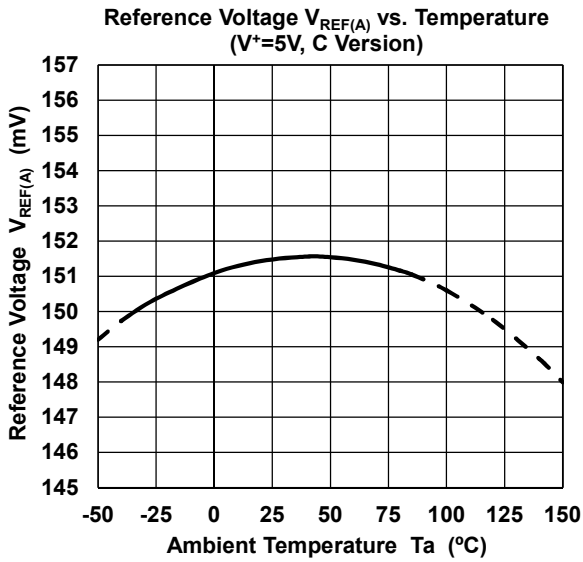
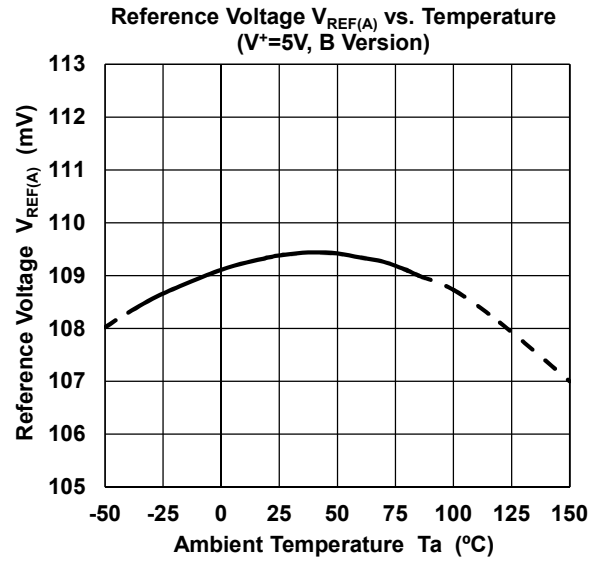
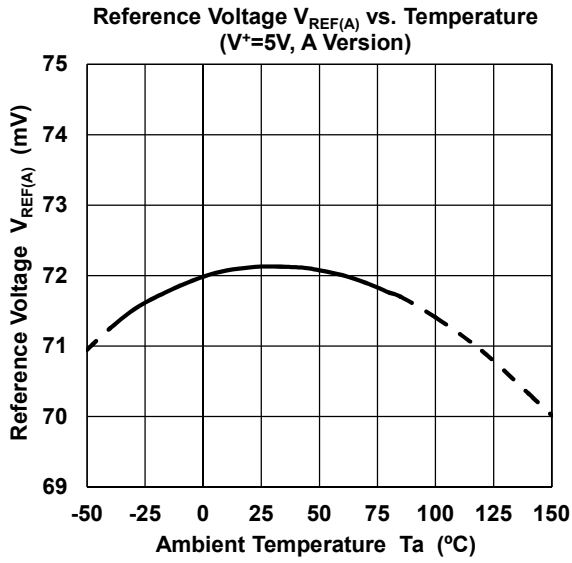
$$\text{OUTPUT} = V_{\text{REF(B)}} \times \frac{R1 + R2}{R2} - (I_L \times R_{\text{SC}}) \text{ [V]}$$

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

■ TYPICAL CHARACTERISTICS

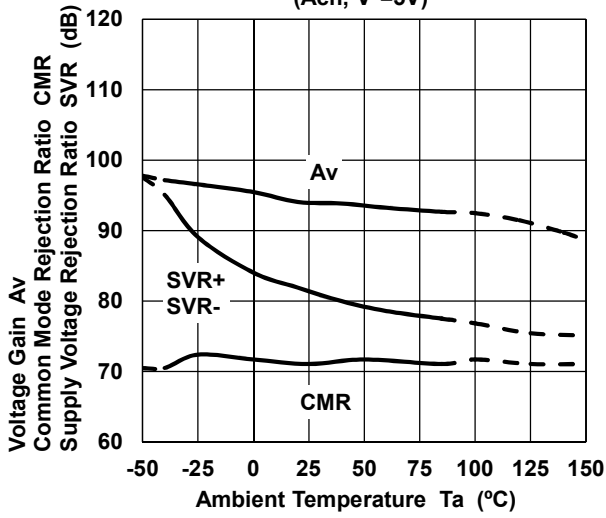


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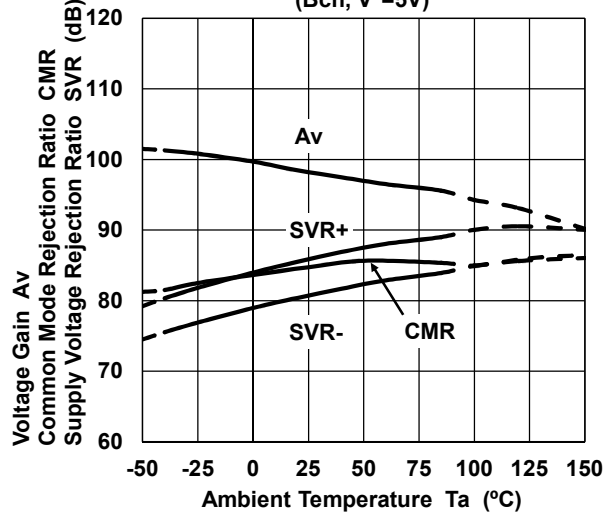


■ TYPICAL CHARACTERISTICS

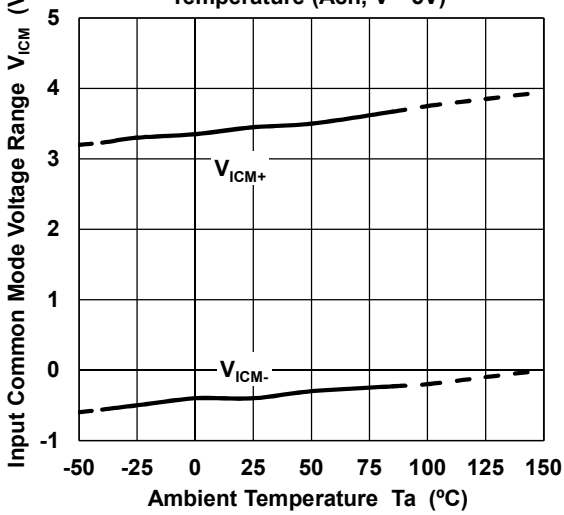
AMP Characteristics vs. Temperature
(Ach, $V^+=5V$)



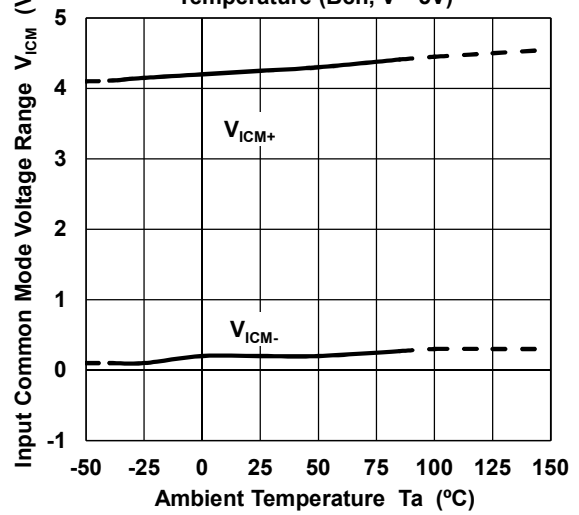
AMP Characteristics vs. Temperature
(Bch, $V^+=5V$)



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



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



[CAUTION]

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