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Operational Amplifiers Series

Ground Sense High Speed Low Voltage CMOS Operational Amplifiers

BU7485G BU7485SG BU7486xxx BU7486Sxxx BU7487xx BU7487Sxx

General Description

BU7485G/BU7486xxx/BU7487xx are CMOS operational amplifiers with input ground sense and full swing output. This series has extended operational amplifiers BU7485SG/BU7486Sxxx/BU7487Sxx which can operate over a wider temperature range (-40°C to +105°C).
These ICs have wide band, high slew rate, low voltage operation and low input bias current, making the operational amplifiers suitable for portable equipment and sensor application.

Features

- High Slew Rate
- Wide Bandwidth
- Low Input Bias Current
- Output Full Swing

Application

- Battery-powered Equipment
- General Purpose Electronics

Key Specifications

- Operating Power Supply Voltage Range (Single Supply): +3.0V to +5.5V
- Slew Rate: 10.0V/µs(Typ)
- Temperature Range:
  - BU7485G: -40°C to +85°C
  - BU7486xxx: -40°C to +85°C
  - BU7487xx: -40°C to +85°C
  - BU7485SG: -40°C to +105°C
  - BU7486Sxxx: -40°C to +105°C
  - BU7487Sxx: -40°C to +105°C
- Input Bias Current: 1pA (Typ)
- Input Offset Current: 1pA (Typ)

Package

	W(Typ) x D(Typ) x H(Max)
SSOP5	2.90mm x 2.80mm x 1.25mm
SOP8	5.00mm x 6.20mm x 1.71mm
SSOP-B8	3.00mm x 6.40mm x 1.35mm
MSOP8	2.90mm x 4.00mm x 0.90mm
SOP14	8.70mm x 6.20mm x 1.71mm
SSOP-B14	5.00mm x 6.40mm x 1.35mm

Simplified schematic

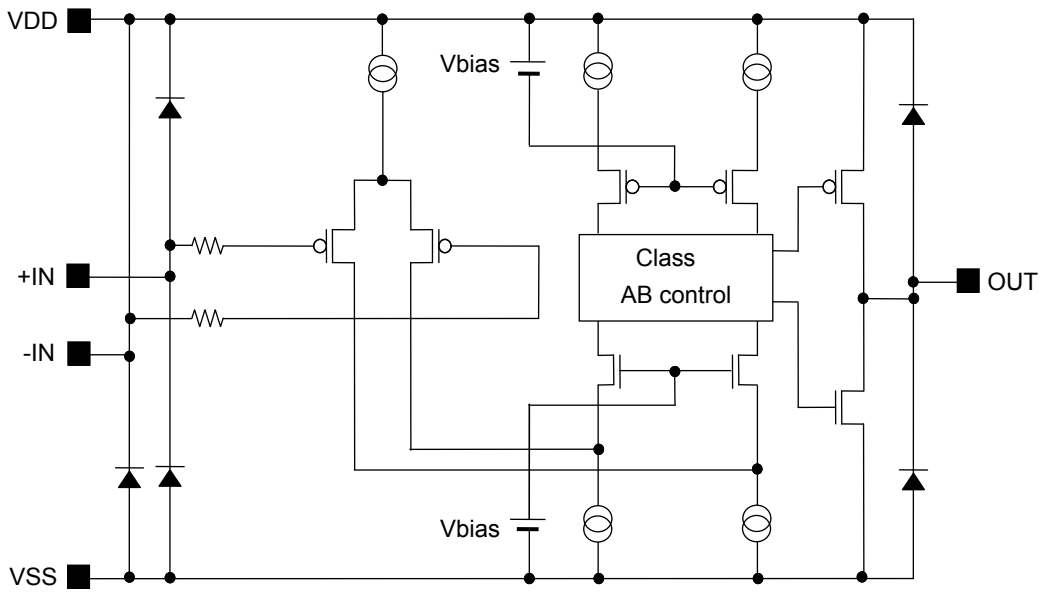
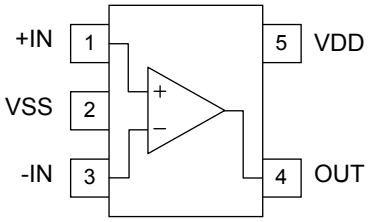


Figure 1. Simplified schematic (1 channel only)

○Product structure : Silicon monolithic integrated circuit ○This product is not designed protection against radioactive rays.

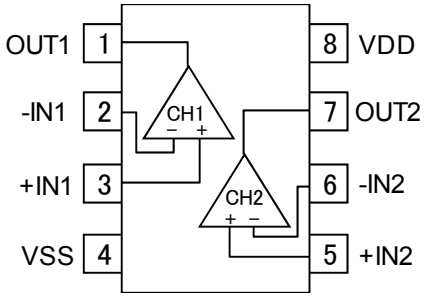
Pin Configuration

BU7485G, BU7485SG : SSOP5



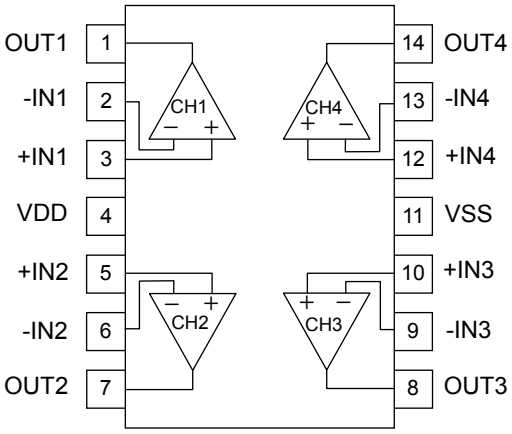
Pin No.	Pin Name
1	+IN
2	VSS
3	-IN
4	OUT
5	VDD

BU7486F, BU7486SF : SOP8
BU7486FV, BU7486SFV : SSOP-B8
BU7486FVM, BU7486SFVM : MSOP8



Pin No.	Pin Name
1	OUT1
2	-IN1
3	+IN1
4	VSS
5	+IN2
6	-IN2
7	OUT2
8	VDD

BU7487F, BU7487SF : SOP14
BU7487FV, BU7487SFV : SSOP-B144



Pin No.	Pin Name
1	OUT1
2	-IN1
3	+IN1
4	VDD
5	+IN2
6	-IN2
7	OUT2
8	OUT3
9	-IN3
10	+IN3
11	VSS
12	+IN4
13	-IN4
14	OUT4

Package					
SSOP5	SOP8	SSOP-B8	MSOP8	SOP14	SSOP-B14
BU7485G BU7485SG	BU7486F BU7486SF	BU7486FV BU7486SFV	BU7486FVM BU7486SFVM	BU7487F BU7487SF	BU7487FV BU7487SFV

Ordering Information

B U 7 4 8 x x x x x - x x

Part Number
BU7485G
BU7485SG
BU7486xxx
BU7486Sxxx
BU7487xx
BU7487Sxx

Package
G: SSOP5
F: SOP8
SOP14
FV: SSOP-B8
SSOP-B14
FVM: MSOP8

Packaging and forming specification
E2: Embossed tape and reel
(SOP8/SSOP-B8/SOP14/ SSOP-B14)
TR: Embossed tape and reel
(SSOP5/MSOP8)

Line-up

Topr	Package		Operable Part Number
-40°C to +85°C	SSOP5	Reel of 3000	BU7485G-TR
	SOP8	Reel of 2500	BU7486F-E2
	SSOP-B8	Reel of 2500	BU7486FV-E2
	MSOP8	Reel of 3000	BU7486FVM-TR
	SOP14	Reel of 2500	BU7487F-E2
	SSOP-B14	Reel of 2500	BU7487FV-E2
-40°C to +105°C	SSOP5	Reel of 3000	BU7485SG-TR
	SOP8	Reel of 2500	BU7486SF-E2
	SSOP-B8	Reel of 2500	BU7486SFV-E2
	MSOP8	Reel of 3000	BU7486SFVM-TR
	SOP14	Reel of 2500	BU7487SF-E2
	SSOP-B14	Reel of 2500	BU7487SFV-E2

Absolute Maximum Ratings (T_A=25°C)

Parameter	Symbol		Ratings		Unit
			BU7485G/BU7486xxx /BU7487xx	BU7485Sx/BU7486Sxxx /BU7487Sxx	
Supply Voltage	VDD-VSS		+7		V
Power dissipation	P_D	SSOP5	0.54(Note 1,7)		W
		SOP8	0.55(Note 2,7)		
		SSOP-B8	0.50(Note 3,7)		
		MSOP8	0.47(Note 4,7)		
		SOP14	0.45(Note 5,7)		
		SSOP-B14	0.70(Note 6,7)		
Differential Input Voltage(Note 8)	V_{ID}		VDD – VSS		V
Input Common-mode Voltage Range	V_{ICM}		(VSS - 0.3) to VDD + 0.3		V
Input Current(Note 9)	I_I		±10		mA
Operating Supply Voltage	V_{opr}		+3.0 to +5.5		V
Operating Temperature	T_{opr}		-40 to +85	-40 to +105	°C
Storage Temperature	T_{stg}		-55 to +125		°C
Maximum Junction Temperature	T_{Jmax}		+125		°C

(Note 1) To use at temperature above T_A=25°C reduce 5.4mW/°C.
(Note 2) To use at temperature above T_A=25°C reduce 5.5mW/°C.
(Note 3) To use at temperature above Ta=25°C reduce 5.0mW.
(Note 4) To use at temperature above Ta=25°C reduce 4.7mW.
(Note 5) To use at temperature above Ta=25°C reduce 4.5mW.
(Note 6) To use at temperature above Ta=25°C reduce 7.0mW.
(Note 7) Mounted on a FR4 glass epoxy PCB(70mm×70mm×1.6mm).
(Note 8) The voltage difference between inverting input and non-inverting input is the differential input voltage. Then input pin voltage is set to more than VSS.
(Note 9) An excessive input current will flow when input voltages of more than VDD+0.6V or lesser than VSS-0.6V are applied. The input current can be set to less than the rated current by adding a limiting resistor.

Electrical Characteristics

○BU7485G, BU7485SG（Unless otherwise specified VDD=+3V, VSS=0V, T_A=25°C）

Parameter	Symbol	Temperature Range	Limits			Unit	Condition
			Min	Typ	Max		
Input Offset Voltage(Note 10)	V_{IO}	25°C	-	1	9.5	mV	-
Input Offset Current(Note 10)	I_{IO}	25°C	-	1	-	pA	-
Input Bias Current(Note 10)	I_B	25°C	-	1	-	pA	-
Supply Current(Note 11)	I_{DD}	25°C	-	1500	2000	μA	R_L =∞ Av=0dB, IN=0.8V
		Full range	-	-	2400		
Maximum Output Voltage (High)	V_{OH}	25°C	VDD-0.1	-	-	V	R_L =10kΩ
Maximum Output Voltage (Low)	V_{OL}	25°C	-	-	VSS+0.1	V	R_L =10kΩ
Large Signal Voltage Gain	A_V	25°C	70	105	-	dB	R_L =10kΩ
Input Common-mode Voltage Range	V_{ICM}	25°C	0	-	1.6	V	VSS ~ VDD-1.4V
Common-mode Rejection Ratio	CMRR	25°C	45	60	-	dB	-
Power Supply Rejection Ratio	PSRR	25°C	60	80	-	dB	-
Output Source Current (Note 12)	I_{SOURCE}	25°C	4	8	-	mA	VDD-0.4V
Output Sink Current (Note 12)	I_{SINK}	25°C	7	12	-	mA	VSS+0.4V
Slew Rate	SR	25°C	-	10	-	V/μs	C_L =25pF
Unity Gain Frequency	f_T	25°C	-	10	-	MHz	C_L =25pF, Av=40dB
Phase Margin	θ	25°C	-	50	-	deg	C_L =25pF, Av=40dB
Total Harmonic Distortion +Noise	THD+N	25°C	-	0.03	-	%	OUT=0.7V_{P-P}, f=1kHz

(Note 10) Absolute value
(Note 11) Full range BU7485G: T_A =-40°C to +85°C BU7485SG: T_A =-40°C to +105°C
(Note 12) Under the high temperature environment, consider the power dissipation of IC when selecting the output current.
When the terminal short circuits are continuously output, the output current is reduced to climb to the temperature inside IC.

Electrical Characteristics - continued

○BU7486xxx, BU7486Sxxx（Unless otherwise specified VDD=+3V, VSS=0V, T_A =25°C）

Parameter	Symbol	Temperature Range	Limits			Unit	Condition
			Min	Typ	Max		
Input Offset Voltage(Note 13)	V_{IO}	25°C	-	1	9.5	mV	-
Input Offset Current(Note 13)	I_{IO}	25°C	-	1	-	pA	-
Input Bias Current(Note 13)	I_B	25°C	-	1	-	pA	-
Supply Current(Note 14)	I_{DD}	25°C	-	3000	4000	μA	R_L =∞ Av=0dB, IN=0.8V
		Full range	-	-	4500		
Maximum Output Voltage (High)	V_{OH}	25°C	VDD-0.1	-	-	V	R_L =10kΩ
Maximum Output Voltage (Low)	V_{OL}	25°C	-	-	VSS+0.1	V	R_L =10kΩ
Large Signal Voltage Gain	A_V	25°C	70	105	-	dB	R_L =10kΩ
Input Common-mode Voltage Range	V_{ICM}	25°C	0	-	1.6	V	VSS ~ VDD-1.4V
Common-mode Rejection Ratio	CMRR	25°C	45	60	-	dB	-
Power Supply Rejection Ratio	PSRR	25°C	60	80	-	dB	-
Output Source Current (Note 15)	I_{SOURCE}	25°C	4	8	-	mA	VDD-0.4V
Output Sink Current (Note 15)	I_{SINK}	25°C	7	12	-	mA	VSS+0.4V
Slew Rate	SR	25°C	-	10	-	V/μs	C_L =25pF
Unity Gain Frequency	f_T	25°C	-	10	-	MHz	C_L =25pF, Av=40dB
Phase Margin	θ	25°C	-	50	-	deg	C_L =25pF, Av=40dB
Total Harmonic Distortion +Noise	THD+N	25°C	-	0.03	-	%	OUT=0.7V_{P-P}, f=1kHz
Channel Separation	CS	25°C	-	100	-	dB	Av=40dB

(Note 13) Absolute value
(Note 14) Full range BU7486xxx: T_A =-40°C to +85°C BU7486Sxxx: T_A =-40°C to +105°C
(Note 15) Under the high temperature environment, consider the power dissipation of IC when selecting the output current.
When the terminal short circuits are continuously output, the output current is reduced to climb to the temperature inside IC.

Electrical Characteristics - continued

○BU7487xx, BU7487Sxx（Unless otherwise specified VDD=+3V, VSS=0V, T_A =25°C）

Parameter	Symbol	Temperature Range	Limits			Unit	Condition
			Min	Typ	Max		
Input Offset Voltage(Note 16)	V_{IO}	25°C	-	1	9.5	mV	-
Input Offset Current(Note 16)	I_{IO}	25°C	-	1	-	pA	-
Input Bias Current(Note 16)	I_B	25°C	-	1	-	pA	-
Supply Current(Note 17)	I_{DD}	25°C	-	6000	8000	μA	R_L =∞ Av=0dB, IN=0.8V
		Full range	-	-	9000		
Maximum Output Voltage (High)	V_{OH}	25°C	VDD-0.1	-	-	V	R_L =10kΩ
Maximum Output Voltage (Low)	V_{OL}	25°C	-	-	VSS+0.1	V	R_L =10kΩ
Large Signal Voltage Gain	A_V	25°C	70	105	-	dB	R_L =10kΩ
Input Common-mode Voltage Range	V_{ICM}	25°C	0	-	1.6	V	VSS ~ VDD-1.4V
Common-mode Rejection Ratio	CMRR	25°C	45	60	-	dB	-
Power Supply Rejection Ratio	PSRR	25°C	60	80	-	dB	-
Output Source Current (Note 18)	I_{SOURCE}	25°C	4	8	-	mA	VDD-0.4V
Output Sink Current (Note 18)	I_{SINK}	25°C	7	12	-	mA	VSS+0.4V
Slew Rate	SR	25°C	-	10	-	V/μs	C_L =25pF
Unity Gain Frequency	f_T	25°C	-	10	-	MHz	C_L =25pF, Av=40dB
Phase Margin	θ	25°C	-	50	-	deg	C_L =25pF, Av=40dB
Total Harmonic Distortion +Noise	THD+N	25°C	-	0.03	-	%	OUT=0.7V_{P-P}, f=1kHz
Channel Separation	CS	25°C	-	100	-	dB	Av=40dB

(Note 16) Absolute value
(Note 17) Full range BU7487xx: T_A =-40°C to +85°C BU7487Sxx: T_A =-40°C to +105°C
(Note 18) Under the high temperature environment, consider the power dissipation of IC when selecting the output current.
When the terminal short circuits are continuously output, the output current is reduced to climb to the temperature inside IC.

Description of Electrical Characteristics

Described below are descriptions of the relevant electrical terms used in this datasheet. Items and symbols used are also shown. Note that item name and symbol and their meaning may differ from those on another manufacturer's document or general document.

1. Absolute maximum ratings

Absolute maximum rating items indicate the condition which must not be exceeded. Application of voltage in excess of absolute maximum rating or use out of absolute maximum rated temperature environment may cause deterioration of characteristics.

(1) Supply Voltage (VDD/VSS)
Indicates the maximum voltage that can be applied between the VDD terminal and VSS terminal without deterioration or destruction of characteristics of internal circuit.

(2) Differential Input Voltage (V_{ID})
Indicates the maximum voltage that can be applied between non-inverting and inverting terminals without damaging the IC.

(3) Input Common-mode Voltage Range (V_{ICM})
Indicates the maximum voltage that can be applied to the non-inverting and inverting terminals without deterioration or destruction of electrical characteristics. Input common-mode voltage range of the maximum ratings does not assure normal operation of IC. For normal operation, use the IC within the input common-mode voltage range characteristics.

(4) Power Dissipation (P_D)
Indicates the power that can be consumed by the IC when mounted on a specific board at the ambient temperature 25°C (normal temperature). As for package product, P_D is determined by the temperature that can be permitted by the IC in the package (maximum junction temperature) and the thermal resistance of the package.

2. Electrical characteristics

(1) Input Offset Voltage (V_{IO})
Indicates the voltage difference between non-inverting terminal and inverting terminals. It can be translated into the input voltage difference required for setting the output voltage at 0 V.

(2) Input Offset Current (I_{IO})
Indicates the difference of input bias current between the non-inverting and inverting terminals.

(3) Input Bias Current (I_B)
Indicates the current that flows into or out of the input terminal. It is defined by the average of input bias currents at the non-inverting and inverting terminals.

(4) Supply Current (I_{DD})
Indicates the current that flows within the IC under specified no-load conditions.

(5) Maximum Output Voltage(High) / Maximum Output Voltage(Low) (V_{OH}/V_{OL})
Indicates the voltage range of the output under specified load condition. It is typically divided into maximum output voltage High and low. Maximum output voltage high indicates the upper limit of output voltage. Maximum output voltage low indicates the lower limit.

(6) Large Signal Voltage Gain (A_V)
Indicates the amplifying rate (gain) of output voltage against the voltage difference between non-inverting terminal and inverting terminal. It is normally the amplifying rate (gain) with reference to DC voltage.
Av = (Output voltage) / (Differential Input voltage)

(7) Input Common-mode Voltage Range (V_{ICM})
Indicates the input voltage range where IC normally operates.

(8) Common-mode Rejection Ratio (CMRR)
Indicates the ratio of fluctuation of input offset voltage when the input common mode voltage is changed. It is normally the fluctuation of DC.
CMRR = (Change of Input common-mode voltage)/(Input offset voltage fluctuation)

(9) Power Supply Rejection Ratio (PSRR)
Indicates the ratio of fluctuation of input offset voltage when supply voltage is changed.
It is normally the fluctuation of DC.
PSRR= (Change of power supply voltage)/(Input offset voltage fluctuation)

(10) Output Source Current/ Output Sink Current (I_{SOURCE} / I_{SINK})
The maximum current that can be output from the IC under specific output conditions. The output source current indicates the current flowing out from the IC, and the output sink current indicates the current flowing into the IC.

(11) Slew Rate (SR)
Indicates the ratio of the change in output voltage with time when a step input signal is applied.

(12) Unity Gain Frequency (f_T)
Indicates a frequency where the voltage gain of operational amplifier is 1.

(13) Phase Margin (θ)
Indicates the margin of phase from 180 degree phase lag at unity gain frequency.

(14) Total Harmonic Distortion+Noise (THD+N)
Indicates the fluctuation of input offset voltage or that of output voltage with reference to the change of output voltage of driven channel.

(15) Channel Separation (CS)
Indicates the fluctuation in the output voltage of the driven channel with reference to the change of output voltage of the channel which is not driven.

Typical Performance Curves

○BU7485G, BU7485SG

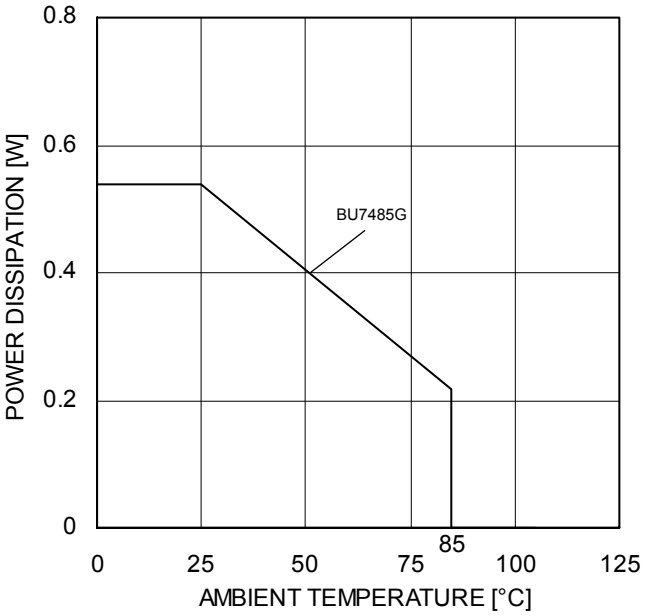


Figure 2.
Derating curve

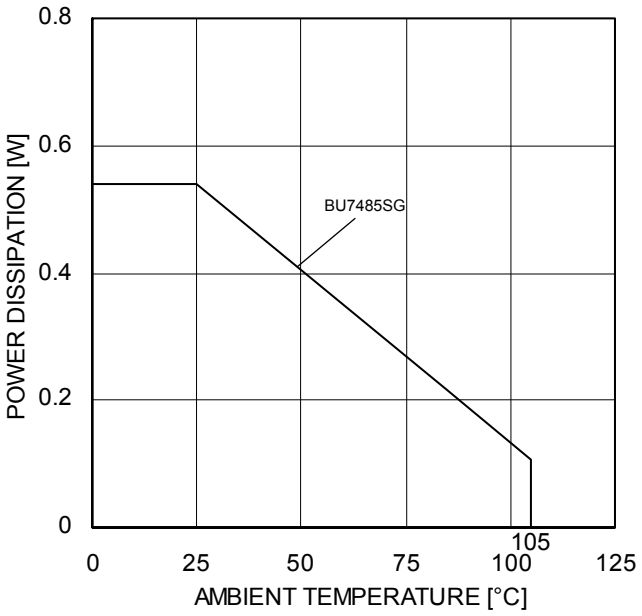


Figure 3.
Derating curve

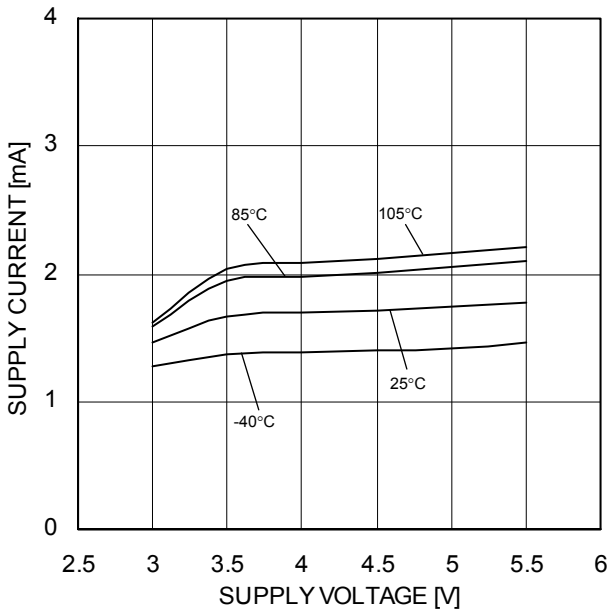


Figure 4.
Supply Current vs Supply Voltage

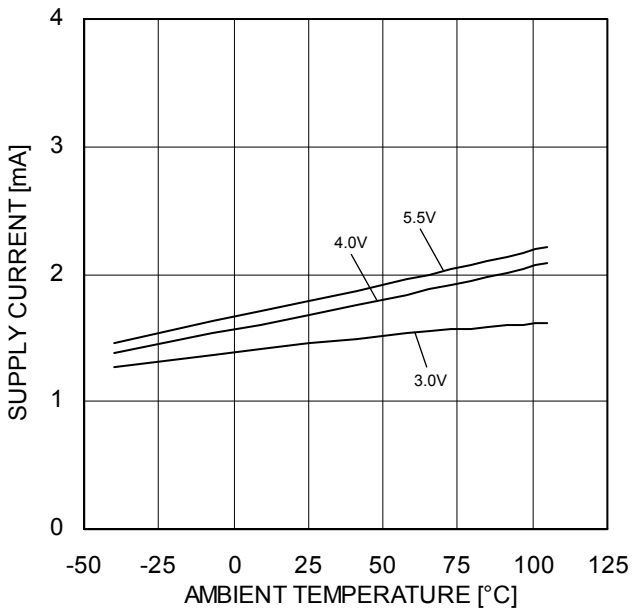


Figure 5.
Supply Current vs Ambient Temperature

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7485G: -40°C to +85°C BU7485SG: -40°C to +105°C

Typical Performance Curves - Continued

○BU7485G, BU7485SG

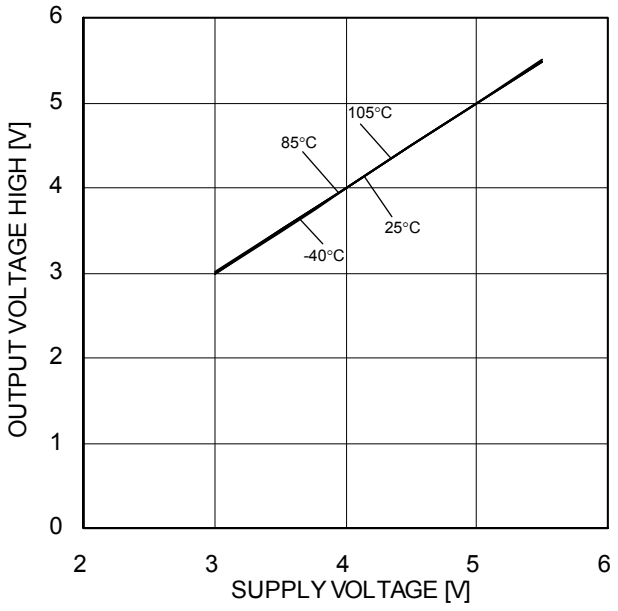


Figure 6.
Maximum Output Voltage High vs Supply Voltage
(R_L =10kΩ)

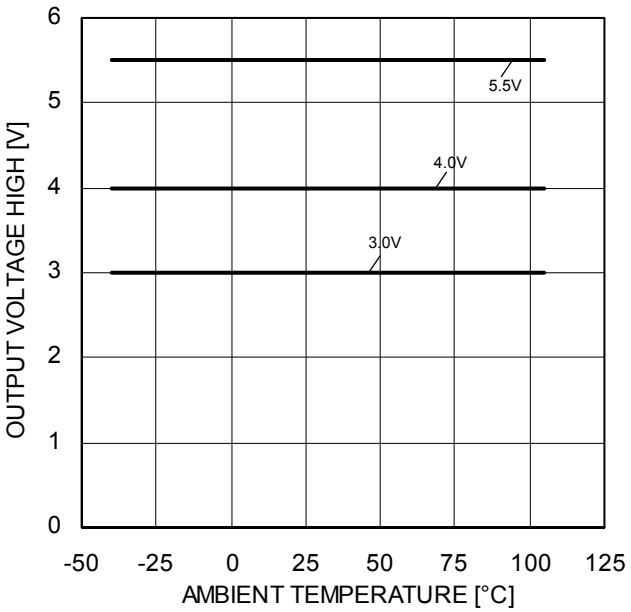


Figure 7.
Maximum Output Voltage High vs Ambient Temperature
(R_L =10kΩ)

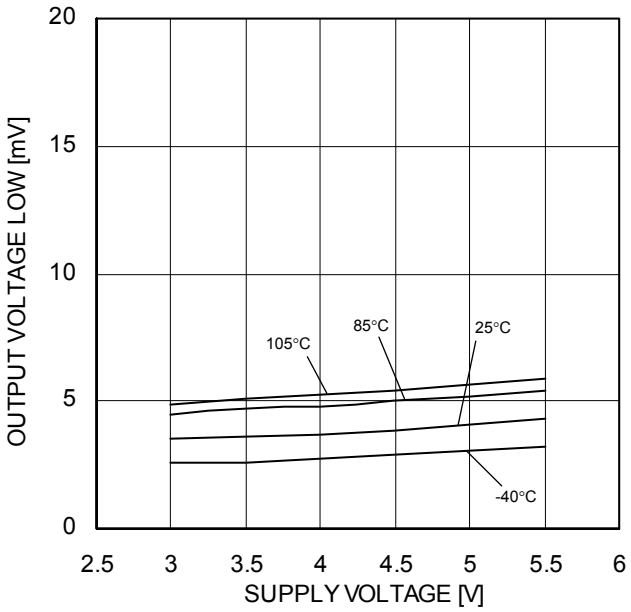


Figure 8.
Maximum Output Voltage Low vs Supply Voltage
(R_L =10kΩ)

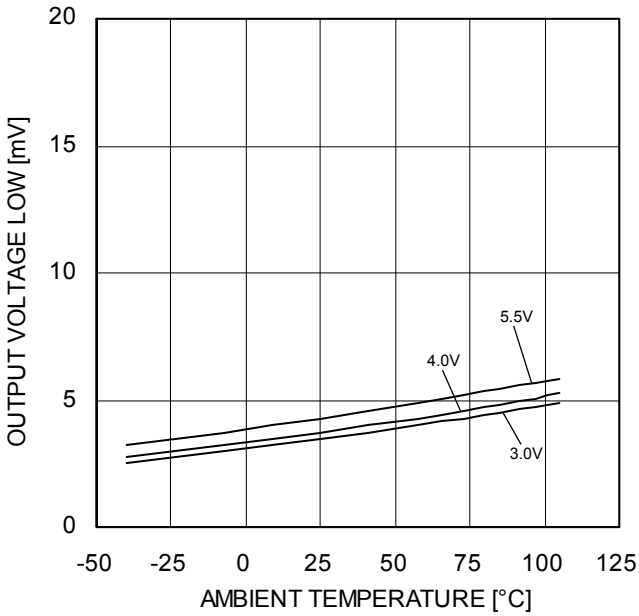


Figure 9.
Maximum Output Voltage Low vs Ambient Temperature
(R_L =10kΩ)

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7485G: -40°C to +85°C BU7485SG: -40°C to +105°C

Typical Performance Curves - Continued

○BU7485G, BU7485SG

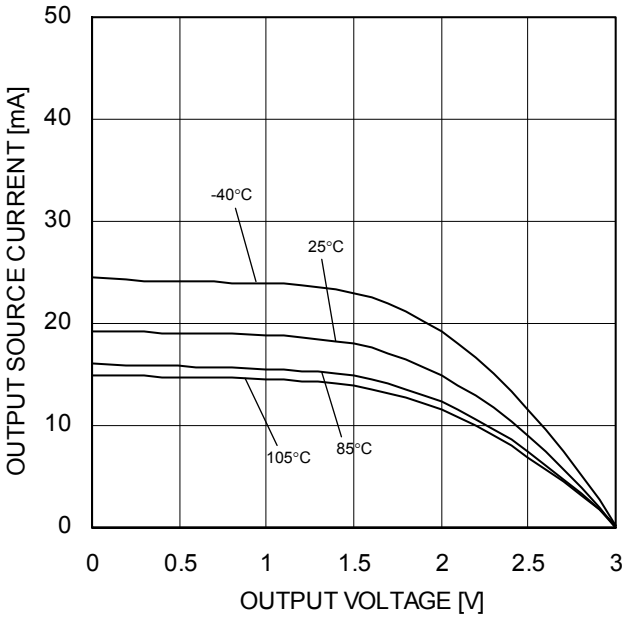


Figure 10.
Output Source Current vs Output Voltage
(VDD=3V)

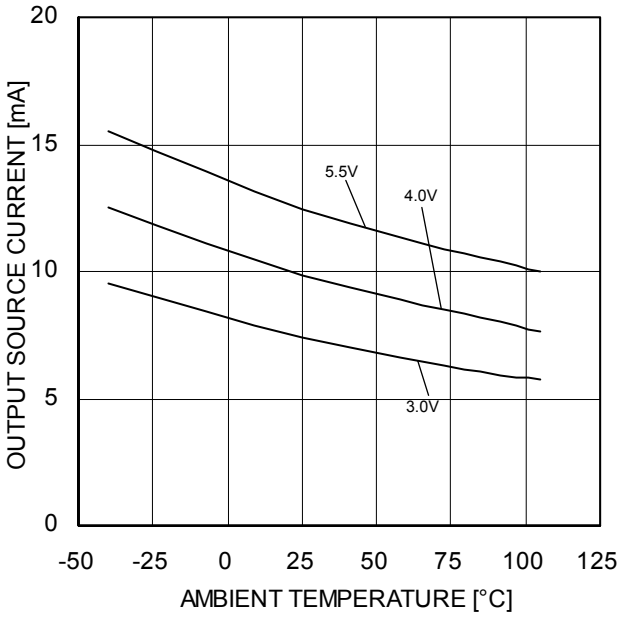


Figure 11.
Output Source Current vs Ambient Temperature
(OUT=VDD-0.4V)

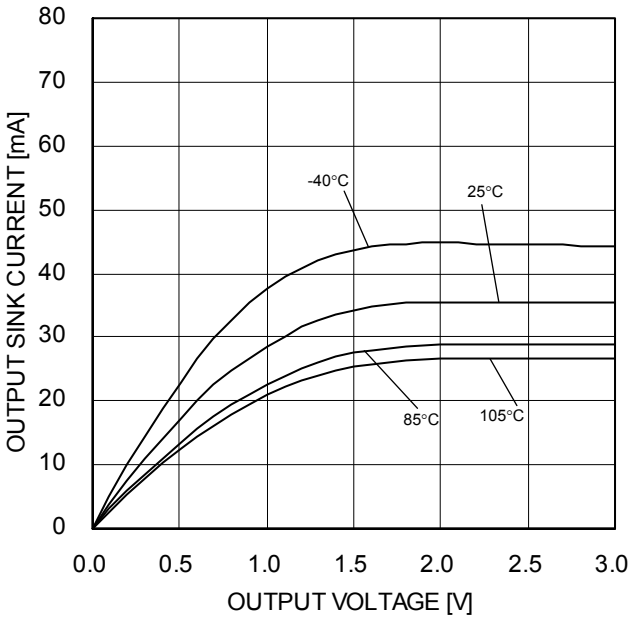


Figure 12.
Output Sink Current vs Output Voltage
(VDD=3V)

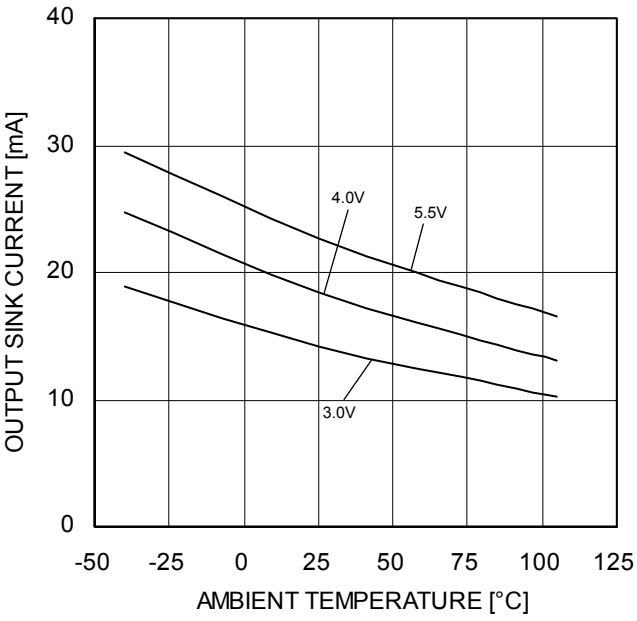


Figure 13.
Output Sink Current vs Ambient Temperature
(OUT=VSS+0.4V)

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7485G: -40°C to +85°C BU7485SG: -40°C to +105°C

Typical Performance Curves - Continued

○BU7485G, BU7485SG

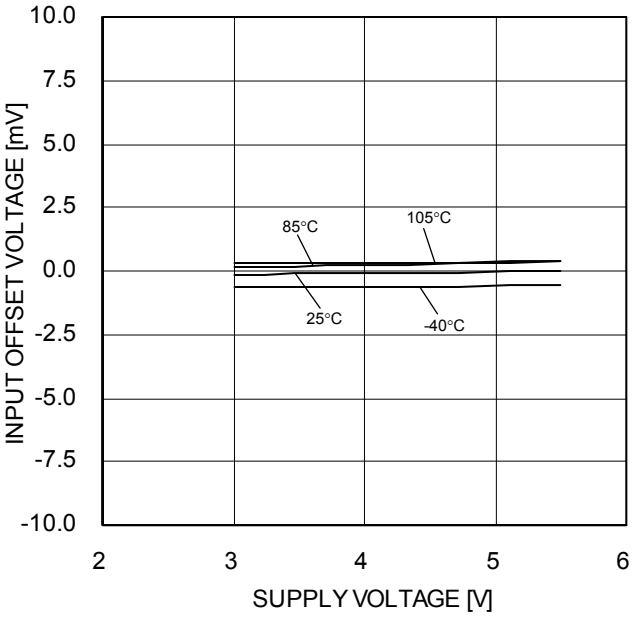


Figure 14.
Input Offset Voltage vs Supply Voltage
(V_{ICM} =VDD-1.4V, OUT=1.5V)

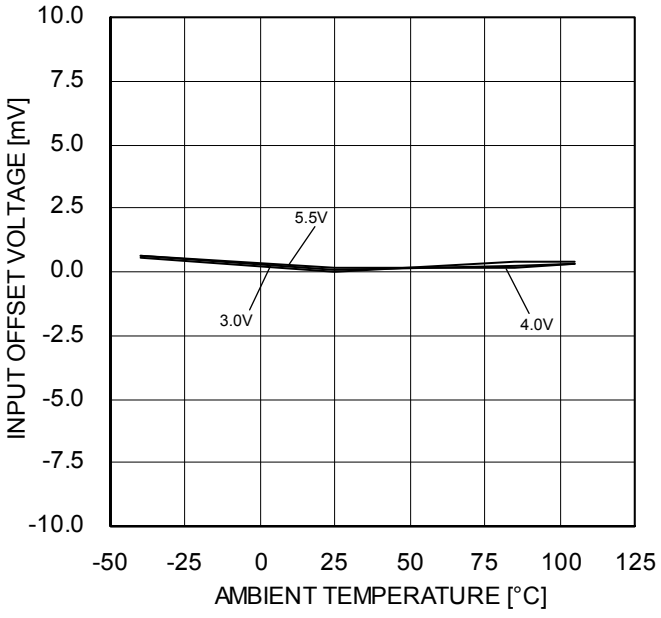


Figure 15.
Input Offset Voltage vs Ambient Temperature
(V_{ICM} =VDD-1.4V, OUT=1.5V)

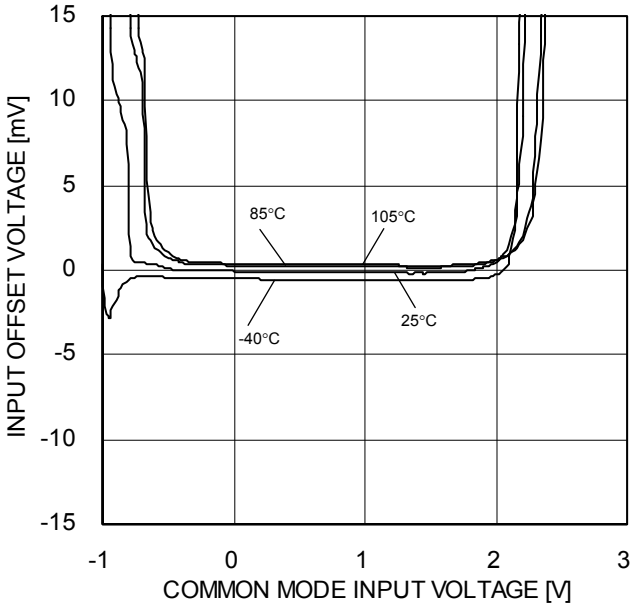


Figure 16.
Input Offset Voltage vs Common Mode Input Voltage
(VDD=3V)

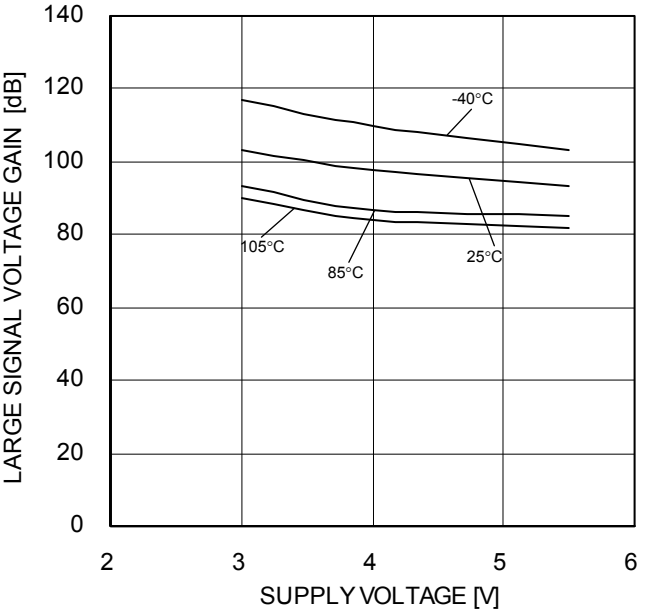


Figure 17.
Large Signal Voltage Gain vs Supply Voltage

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7485G: -40°C to +85°C BU7485SG: -40°C to +105°C

Typical Performance Curves - Continued

○BU7485G, BU7485SG

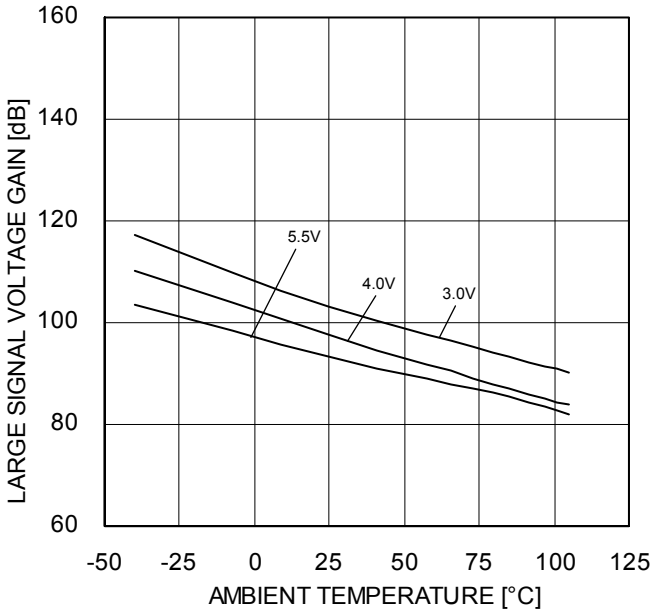


Figure 18
Large Signal Voltage Gain vs Ambient Temperature

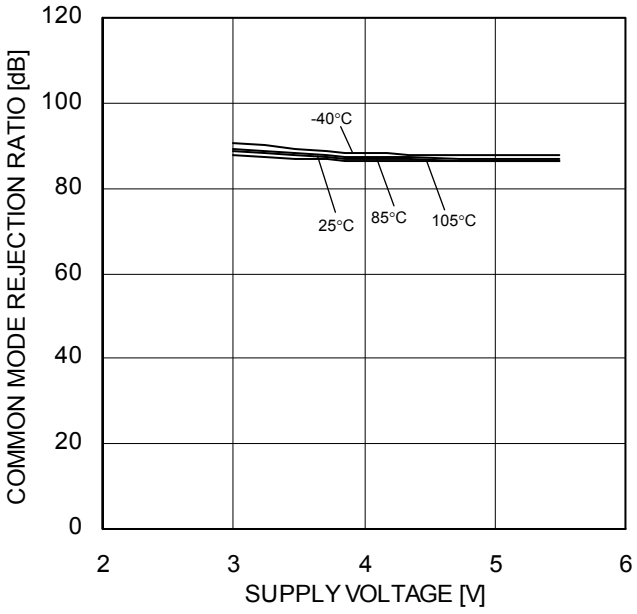


Figure 19.
Common Mode Rejection Ratio vs Supply Voltage

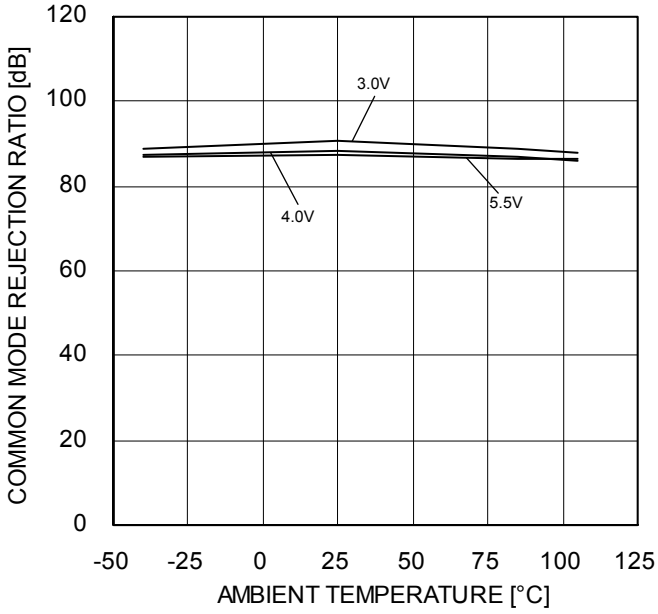


Figure 20.
Common Mode Rejection Ratio vs Ambient Temperature

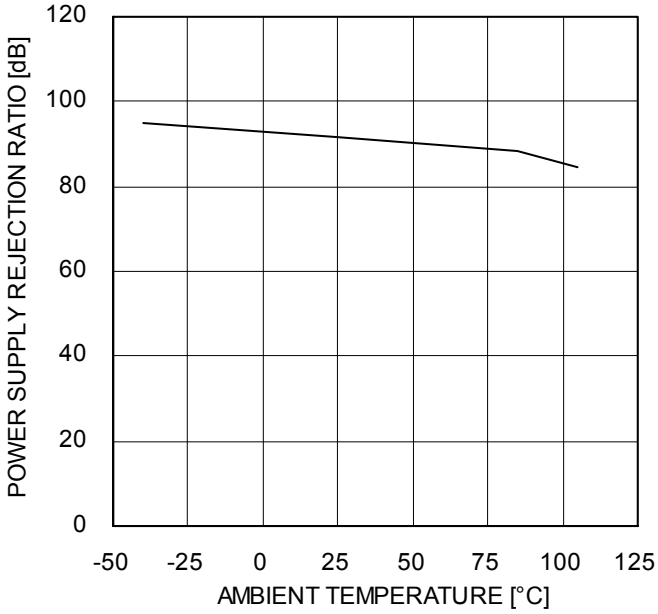


Figure 21.
Power Supply Rejection Ratio vs Ambient Temperature

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7485G: -40°C to +85°C BU7485SG: -40°C to +105°C

Typical Performance Curves - Continued

○BU7485G, BU7485SG

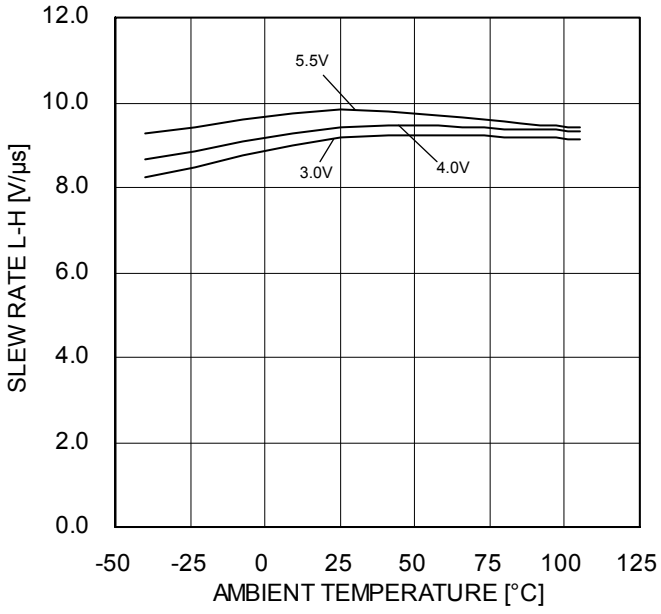


Figure 22.
Slew Rate L-H vs Ambient Temperature

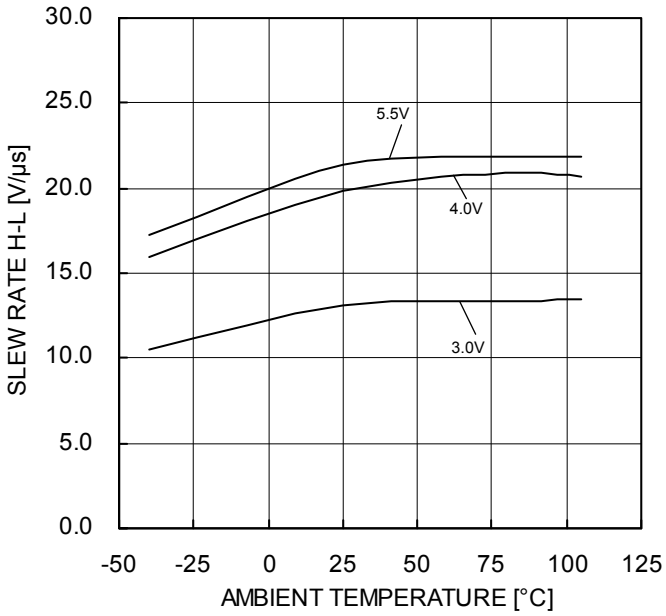


Figure 23.
Slew Rate H-L vs Ambient Temperature

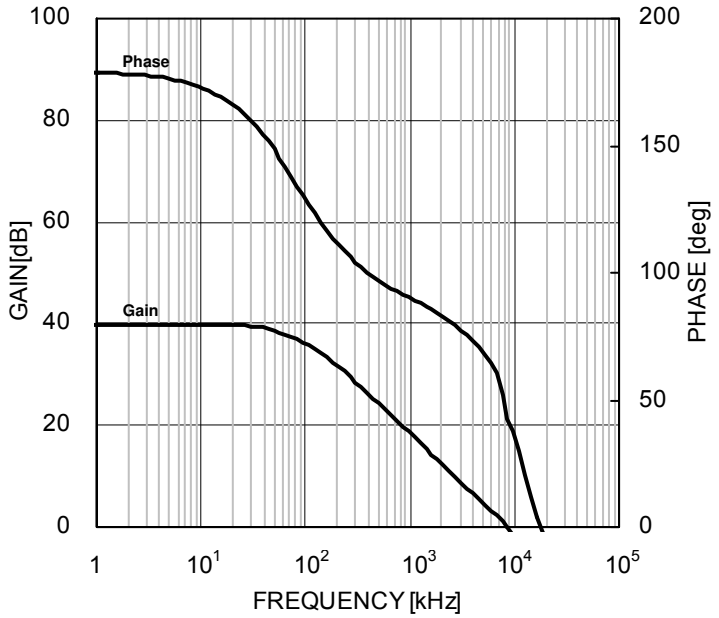


Figure 24.
Voltage Gain・Phase vs Frequency
（VDD=+3V. VSS=0V. T_A=25°C）

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7485G: -40°C to +85°C BU7485SG: -40°C to +105°C

Typical Performance Curves - Continued

○BU7486xxx, BU7486Sxxx

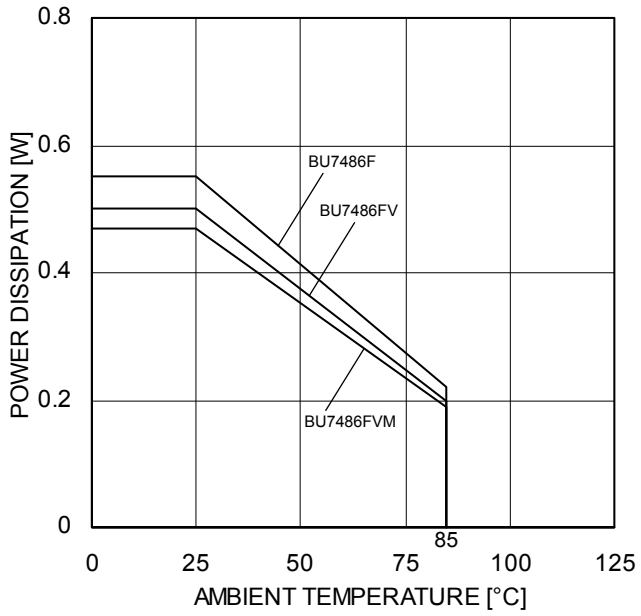


Figure 25.
Derating curve

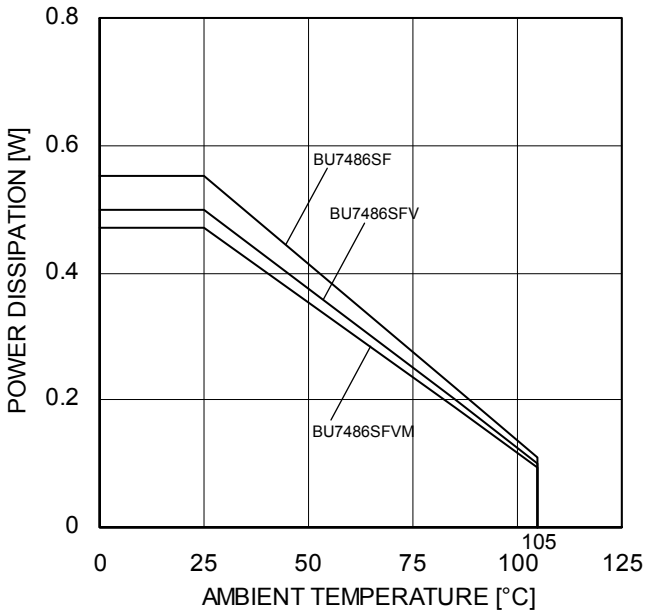


Figure 26.
Derating curve

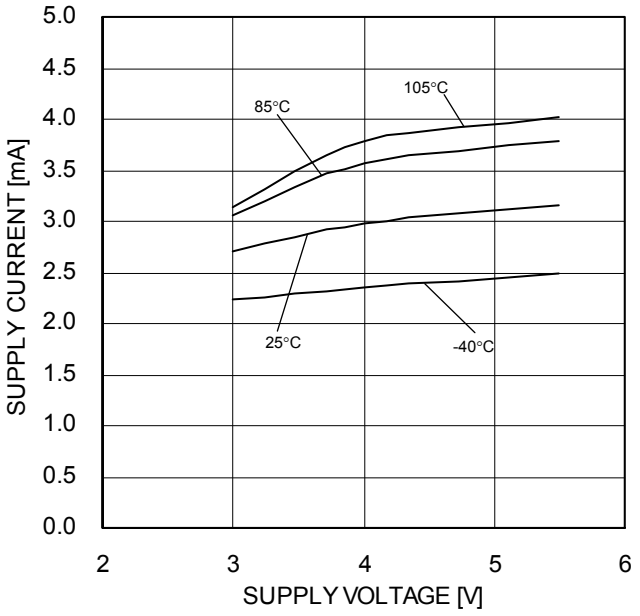


Figure 27.
Supply Current vs Supply Voltage

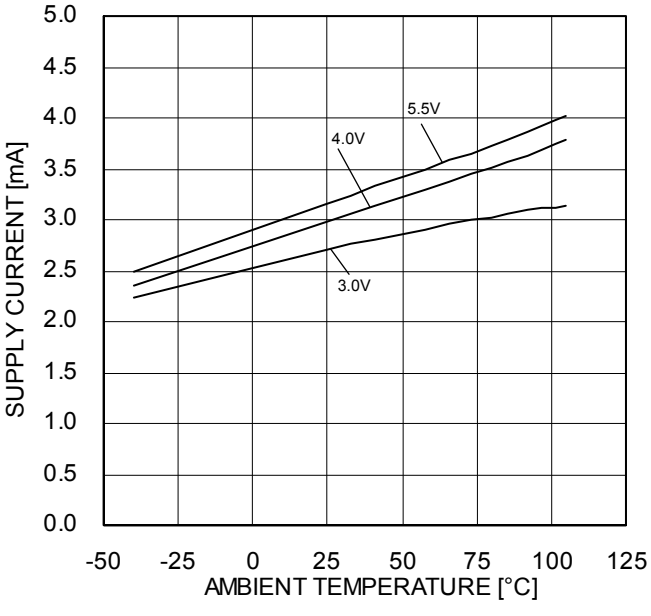


Figure 28.
Supply Current vs Ambient Temperature

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7486xxx: -40°C to +85°C BU7486Sxxx: -40°C to +105°C

Typical Performance Curves - Continued

○BU7486xxx, BU7486Sxxx

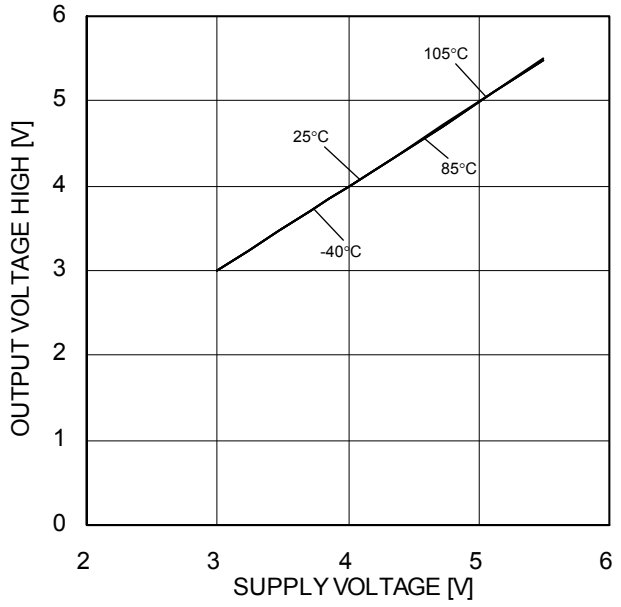


Figure 29.
Maximum Output Voltage High vs Supply Voltage
(R_L =10kΩ)

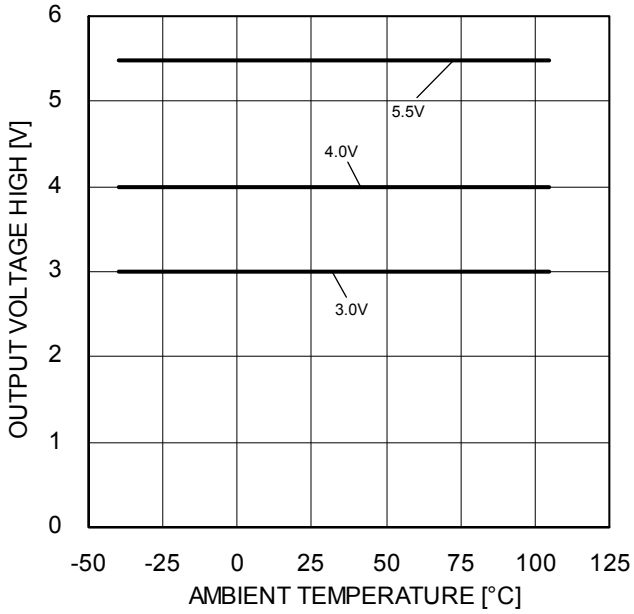


Figure 30.
Maximum Output Voltage High vs Ambient Temperature
(R_L =10kΩ)

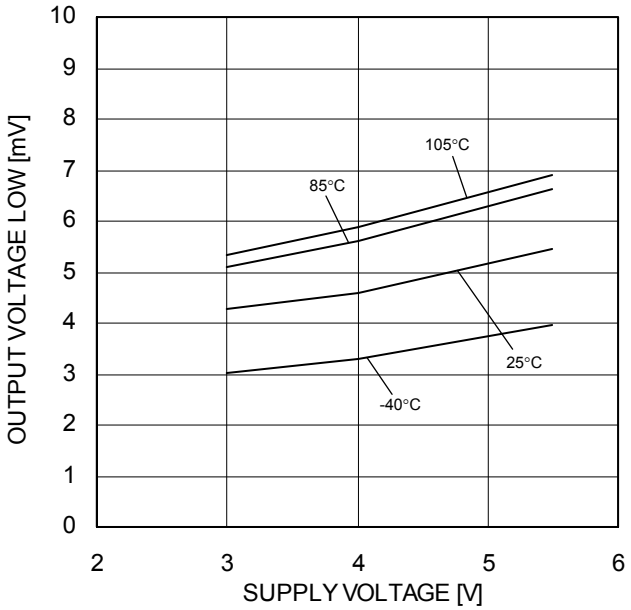


Figure 31.
Maximum Output Voltage Low vs Supply Voltage
(R_L =10kΩ)

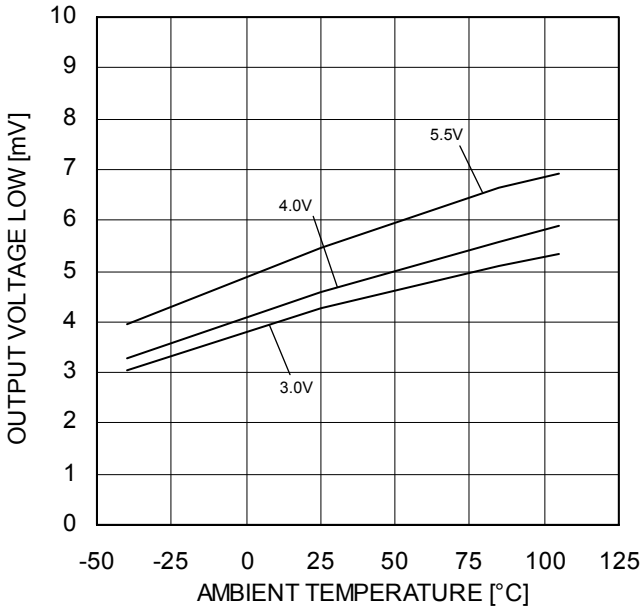


Figure 32.
Maximum Output Voltage Low vs Ambient Temperature
(R_L =10kΩ)

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7486xxx: -40°C to +85°C BU7486Sxxx: -40°C to +105°C

Typical Performance Curves - Continued

○BU7486xxx, BU7486Sxxx

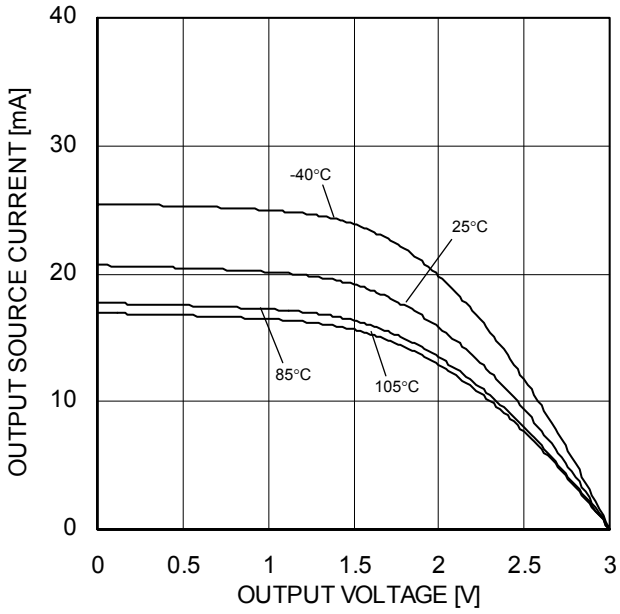


Figure 33.
Output Source Current vs Output Voltage
(VDD=3V)

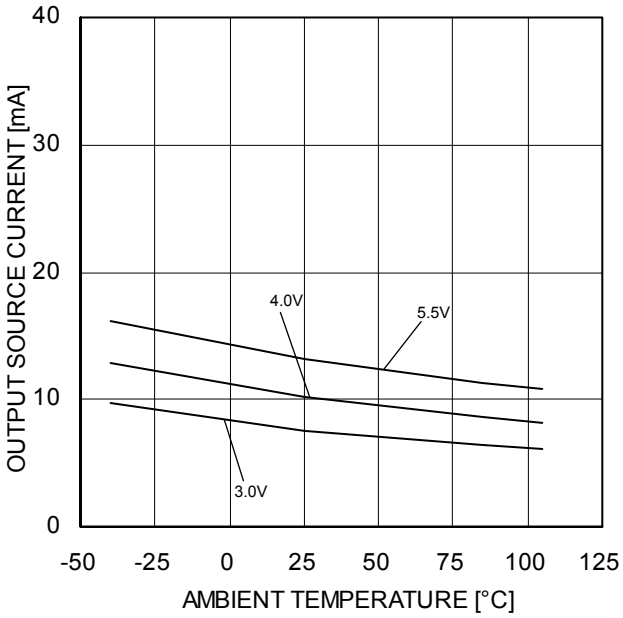


Figure 34.
Output Source Current vs Ambient Temperature
(OUT=VDD-0.4V)

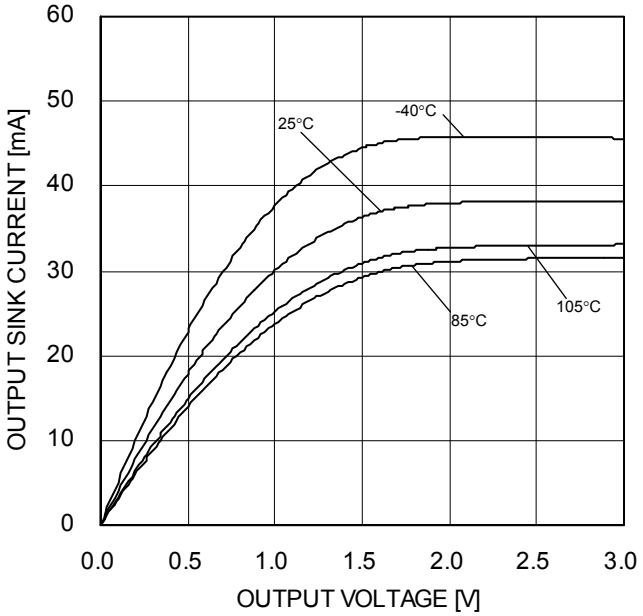


Figure 35.
Output Sink Current vs Output Voltage
(VDD=3V)

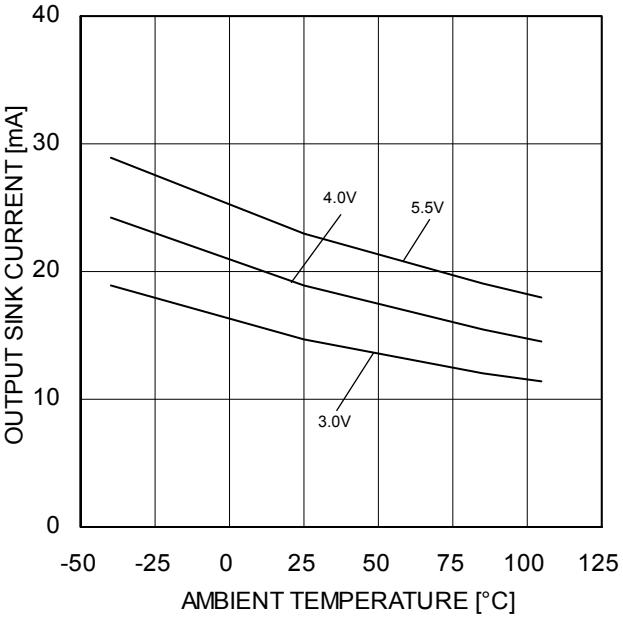


Figure 36.
Output Sink Current vs Ambient Temperature
(OUT=VSS+0.4V)

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7486xxx: -40°C to +85°C BU7486Sxxx: -40°C to +105°C

Typical Performance Curves - Continued

○BU7486xxx, BU7486Sxxx

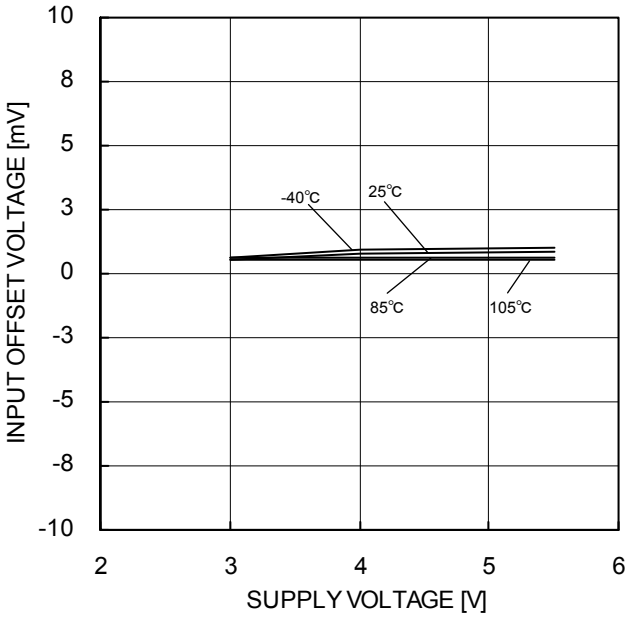


Figure 37.
Input Offset Voltage vs Supply Voltage

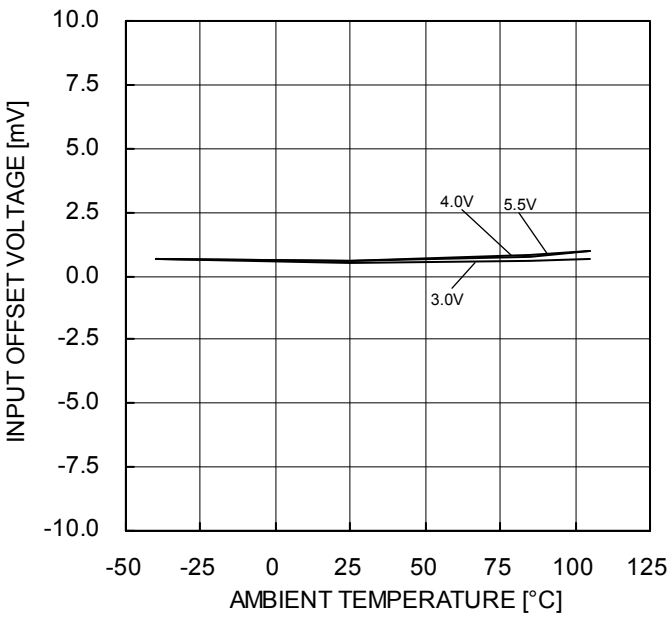


Figure 38.
Input Offset Voltage vs Ambient Temperature

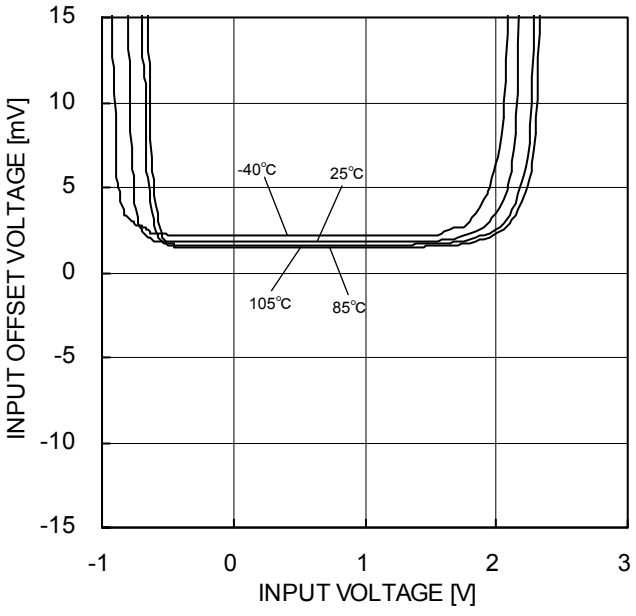


Figure 39.
Input Offset Voltage vs Common Mode Input Voltage
(VDD=3V)

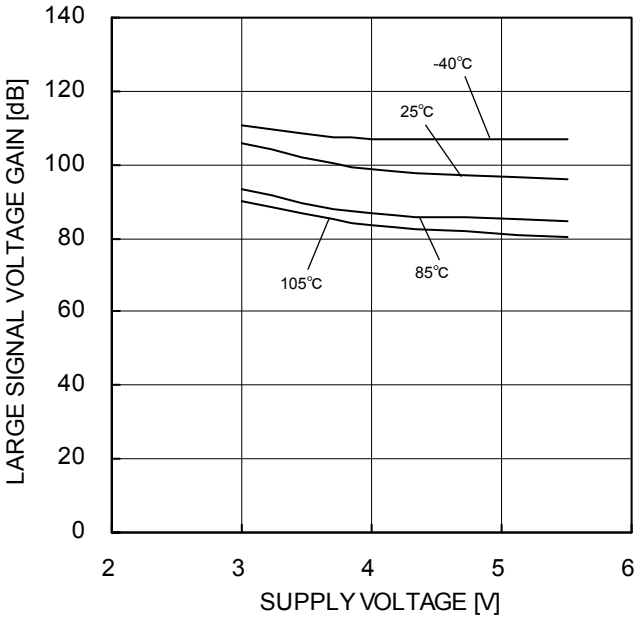


Figure 40.
Large Signal Voltage Gain vs Supply Voltage

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7486xxx: -40°C to +85°C BU7486Sxxx: -40°C to +105°C

Typical Performance Curves - Continued

○BU7486xxx, BU7486Sxxx

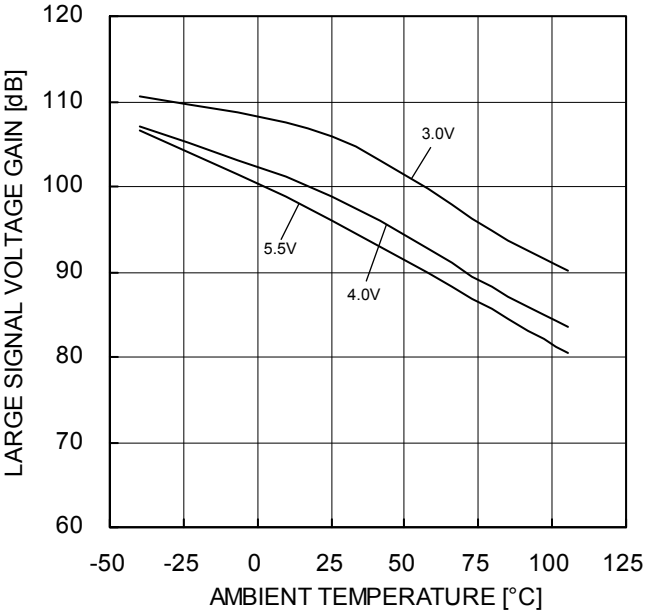


Figure 41.
Large Signal Voltage Gain vs Ambient Temperature

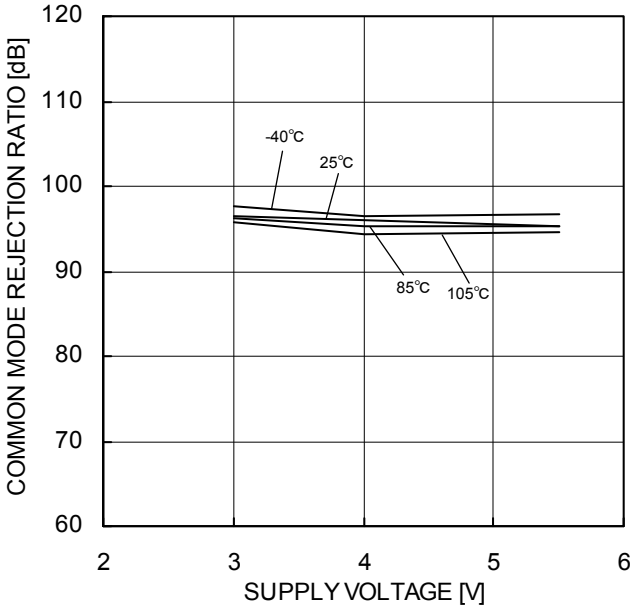


Figure 42.
Common Mode Rejection Ratio vs Supply Voltage

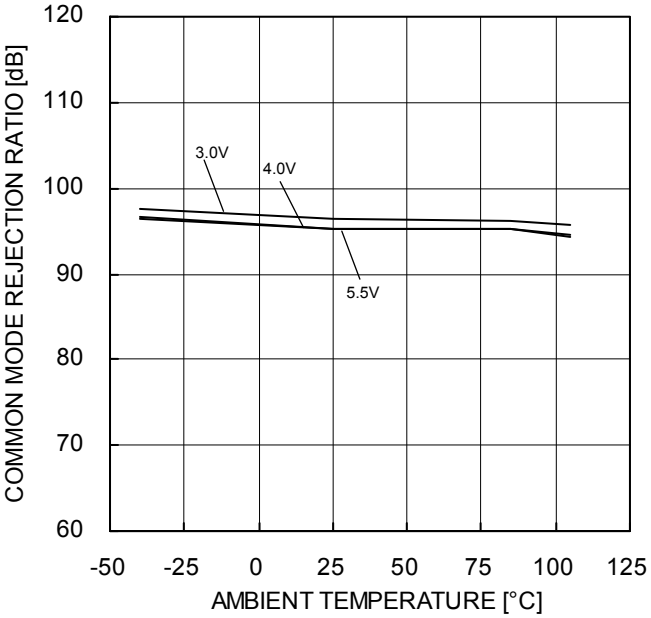


Figure 43.
Common Mode Rejection Ratio vs Ambient Temperature

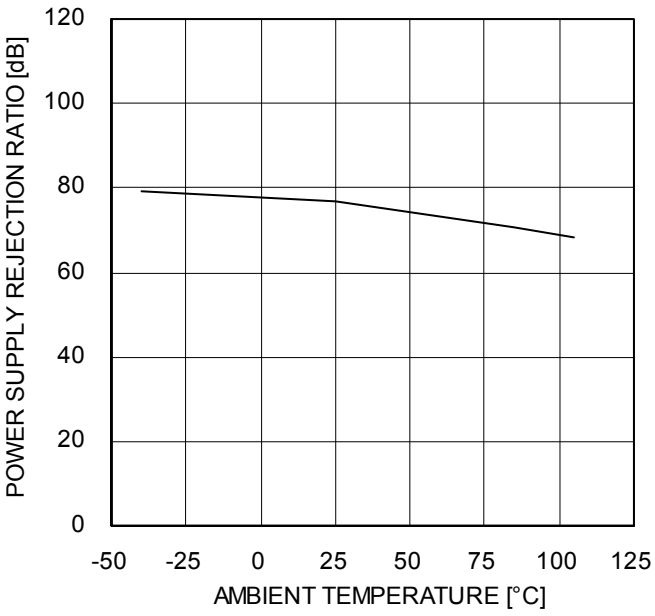


Figure 44.
Power Supply Rejection Ratio vs Ambient Temperature

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7486xxx: -40°C to +85°C BU7486Sxxx: -40°C to +105°C

Typical Performance Curves - Continued

○BU7486xxx, BU7486Sxxx

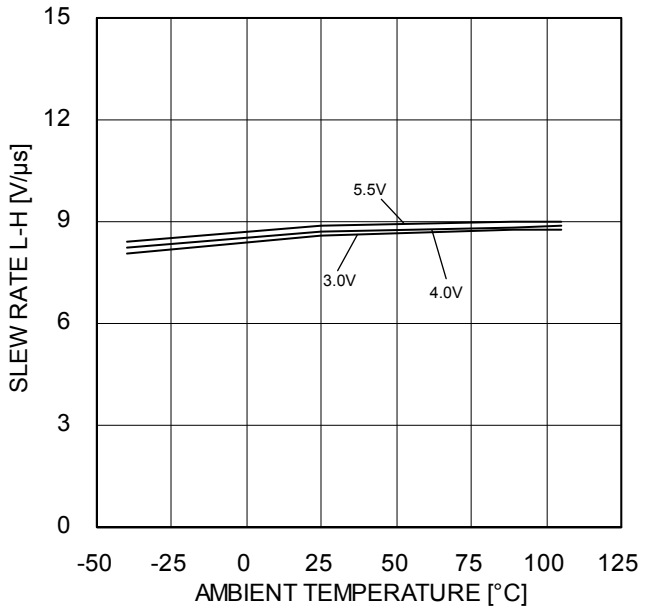


Figure 45.
Slew Rate L-H vs Ambient Temperature

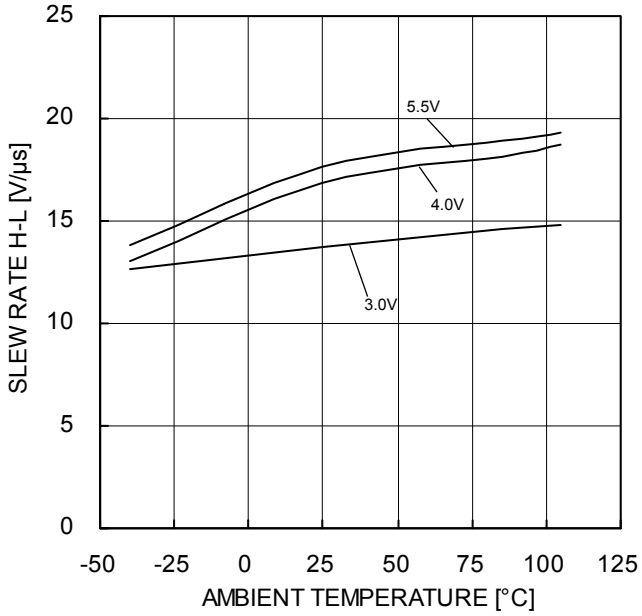


Figure 46.
Slew Rate H-L vs Ambient Temperature

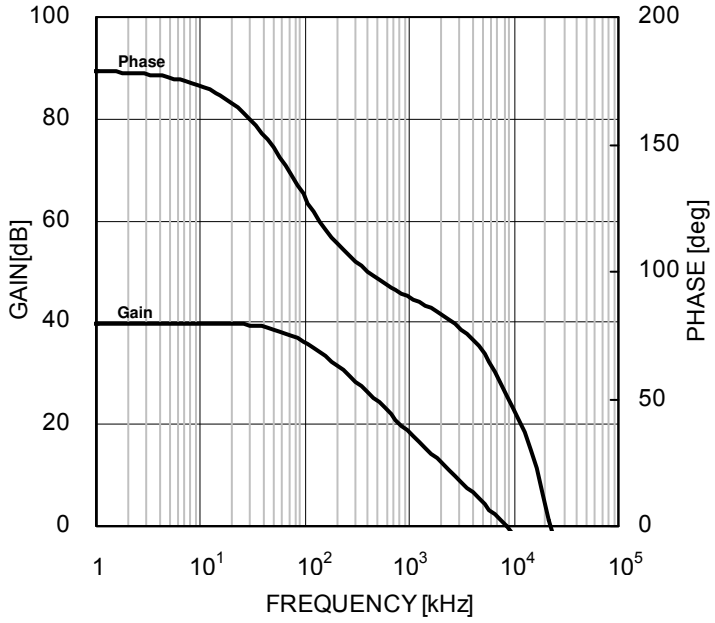


Figure 47.
Voltage Gain・Phase vs Frequency
（VDD=+3V, VSS=0V, T_A=25°C）

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7486xxx: -40°C to +85°C BU7486Sxxx: -40°C to +105°C

Typical Performance Curves

○BU7487xx, BU7487Sxx

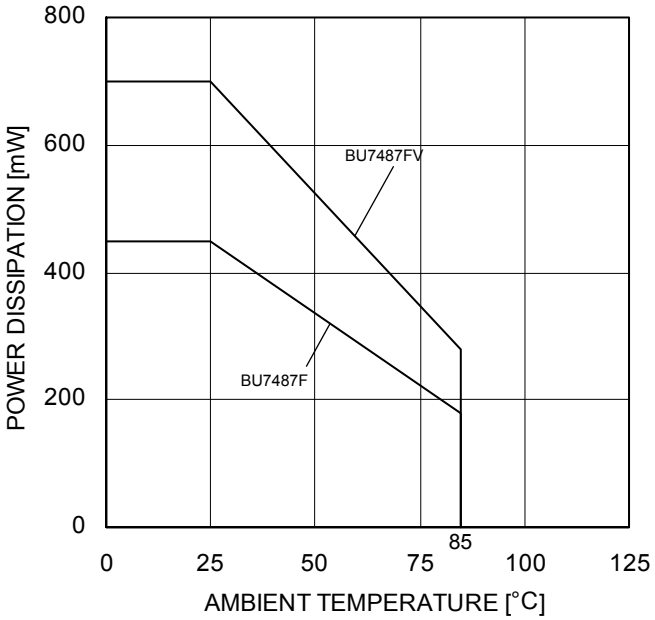


Figure 48.
Derating curve

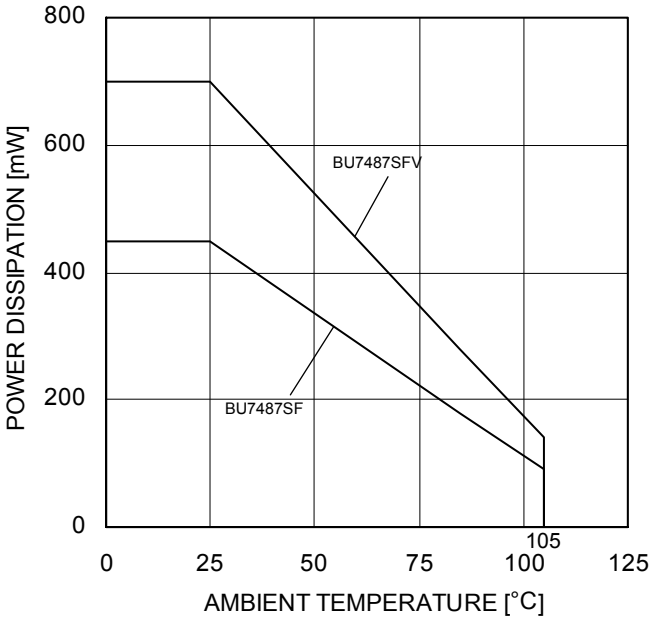


Figure 49.
Derating curve

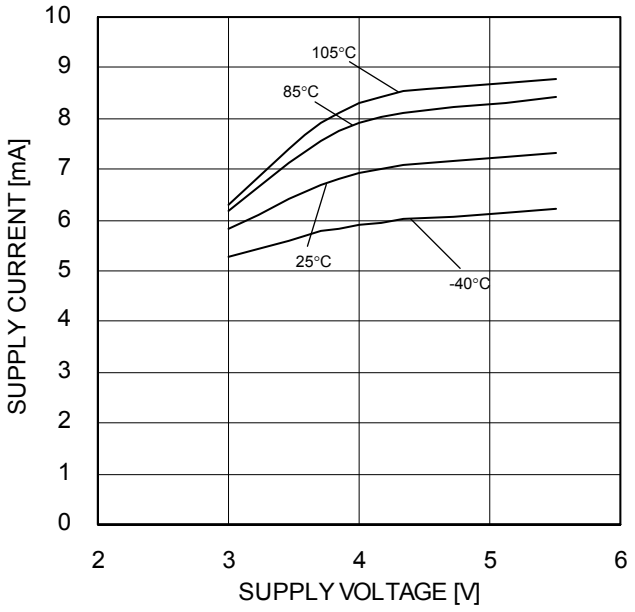


Figure 50.
Supply Current vs Supply Voltage

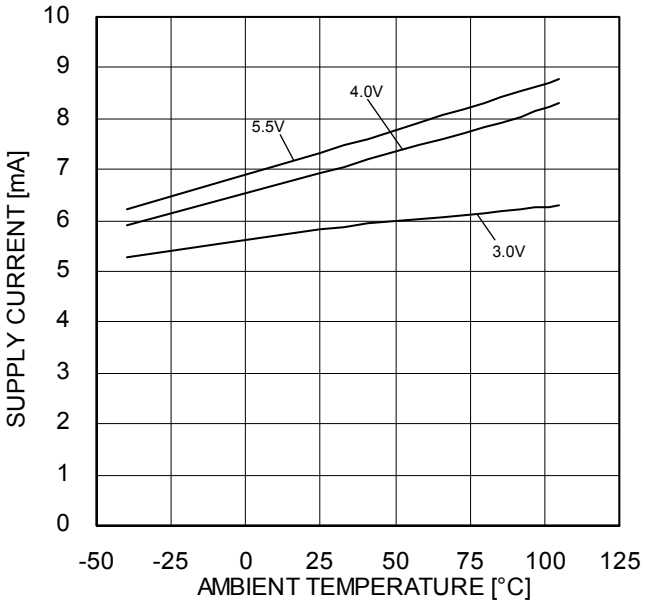


Figure 51.
Supply Current vs Ambient Temperature

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7487xx: -40°C to +85°C BU7487Sxx: -40°C to +105°C

Typical Performance Curves - Continued

○BU7487xx, BU7487Sxx

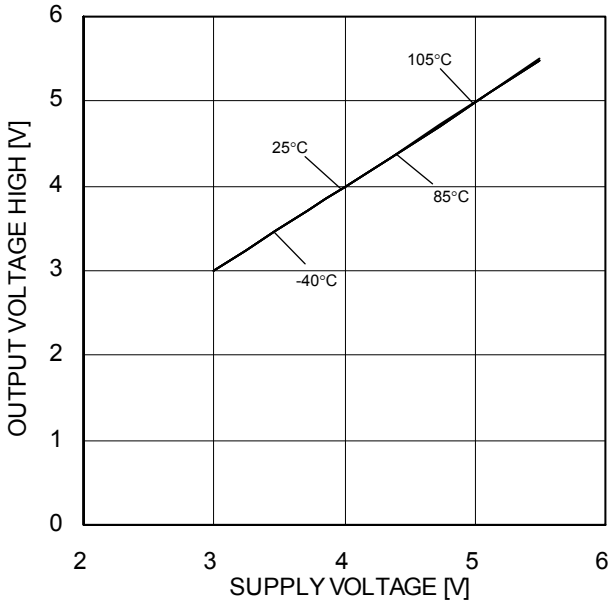


Figure 52.
Maximum Output Voltage High vs Supply Voltage
(R_L =10kΩ)

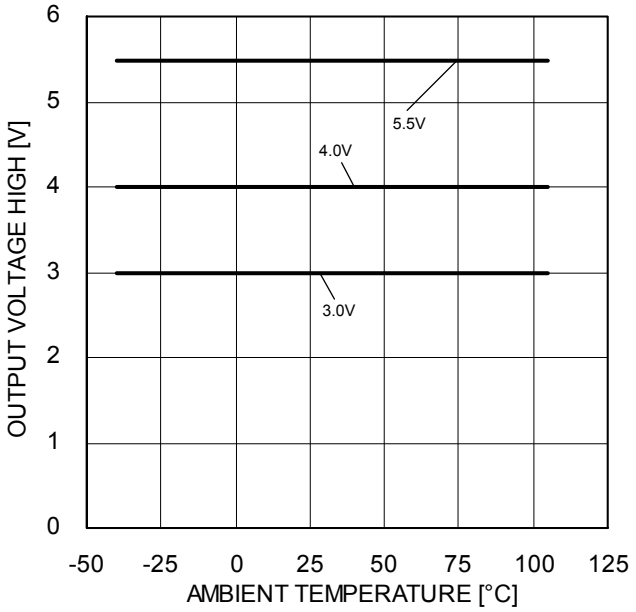


Figure 53.
Maximum Output Voltage High vs Ambient Temperature
(R_L =10kΩ)

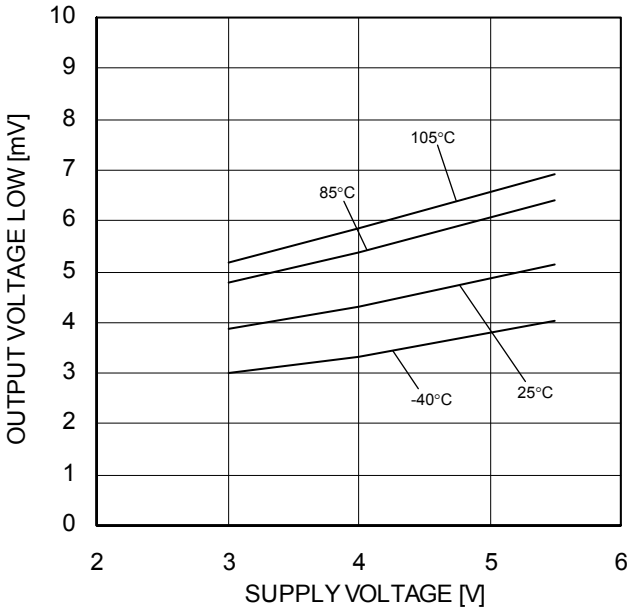


Figure 54.
Maximum Output Voltage Low vs Supply Voltage
(R_L =10kΩ)

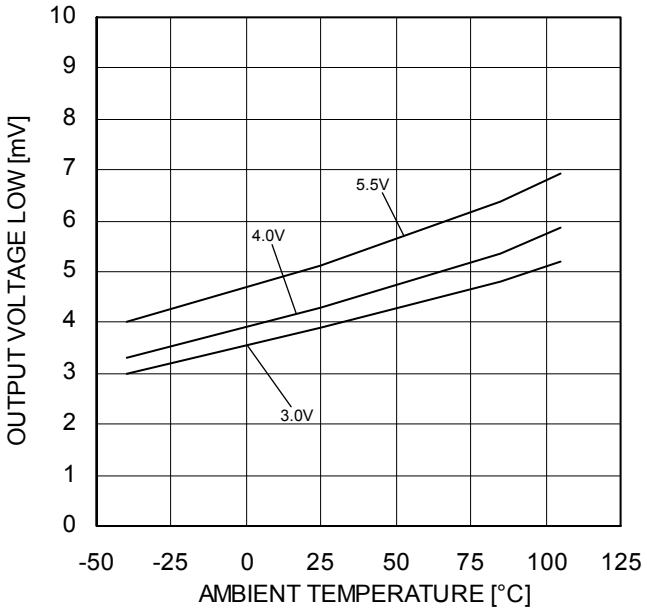


Figure 55.
Maximum Output Voltage Low vs Ambient Temperature
(R_L =10kΩ)

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7487xx: -40°C to +85°C BU7487Sxx: -40°C to +105°C

Typical Performance Curves - Continued

○BU7487xx, BU7487Sxx

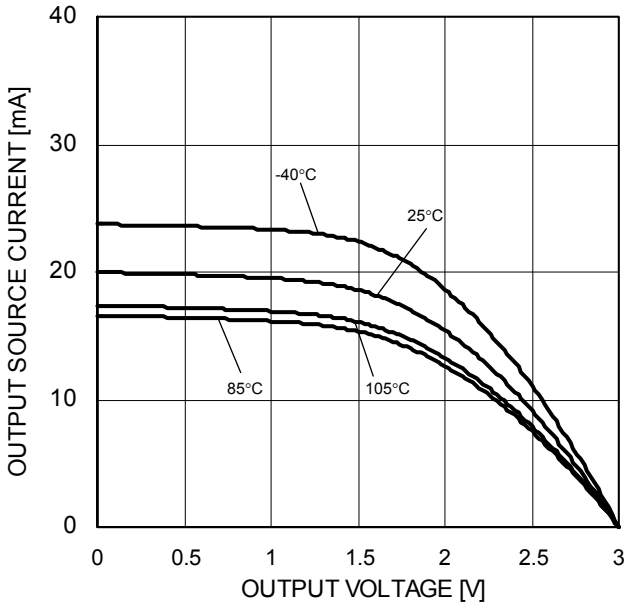


Figure 56.
Output Source Current vs Output Voltage
(VDD=3V)

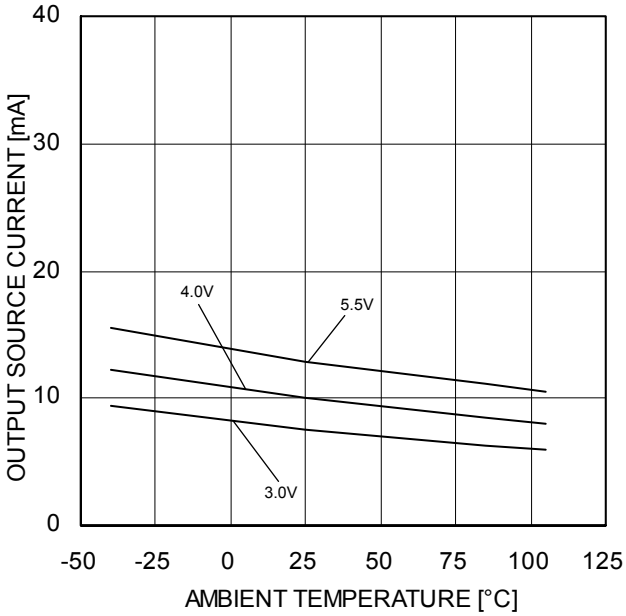


Figure 57.
Output Source Current vs Ambient Temperature
(OUT=VDD-0.4V)

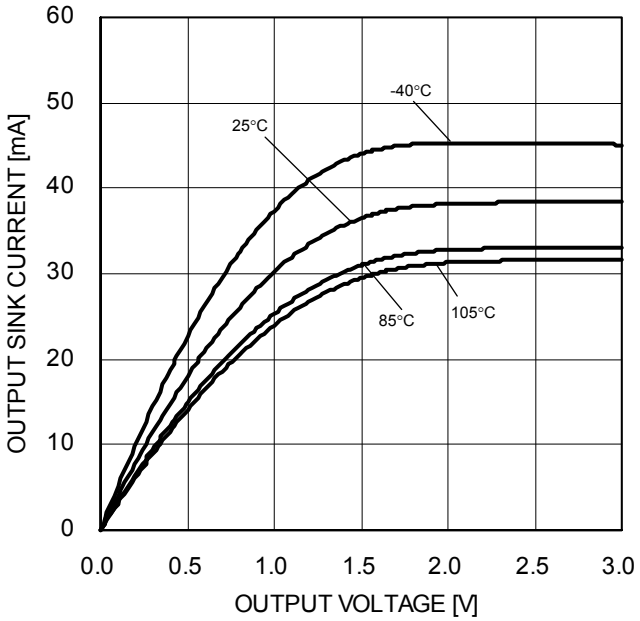


Figure 58.
Output Sink Current vs Output Voltage
(VDD=3V)

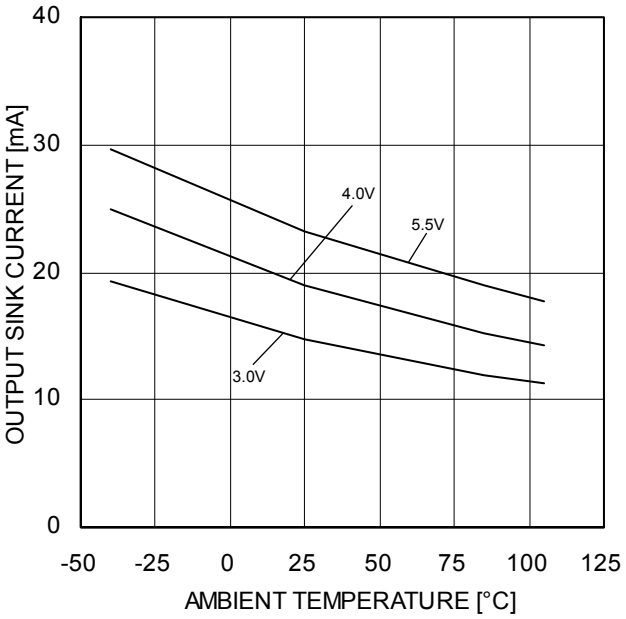


Figure 59.
Output Sink Current vs Ambient Temperature
(OUT=VSS+0.4V)

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7487xx: -40°C to +85°C BU7487Sxx: -40°C to +105°C

Typical Performance Curves - Continued

○BU7487xx, BU7487Sxx

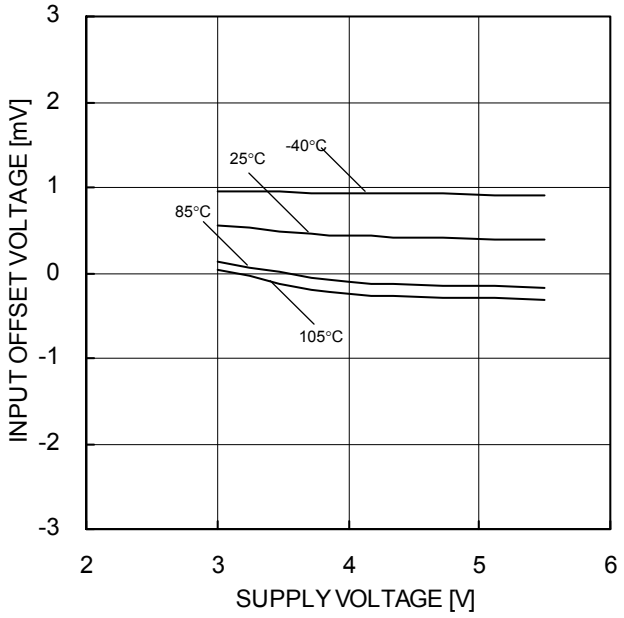


Figure 60.
Input Offset Voltage vs Supply Voltage

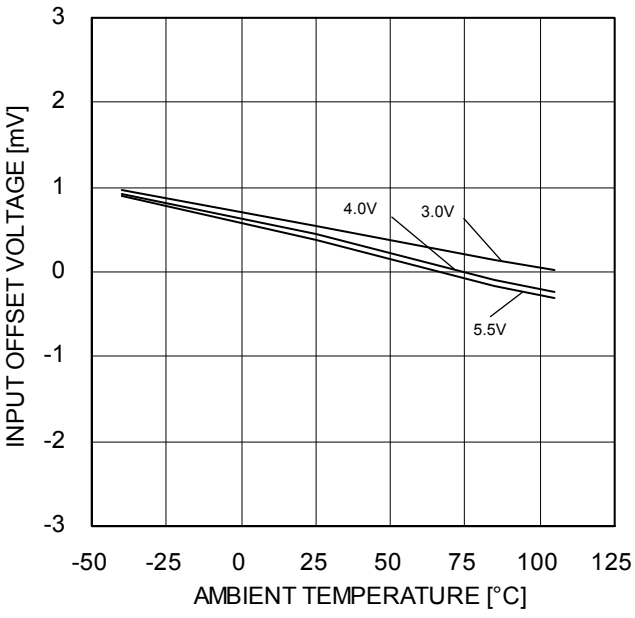


Figure 61.
Input Offset Voltage vs Ambient Temperature

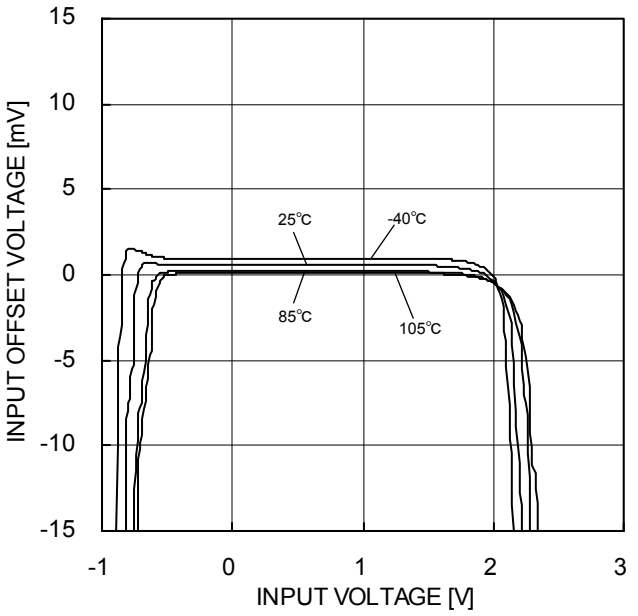


Figure 62.
Input Offset Voltage vs Common Mode Input Voltage
(VDD=3V)

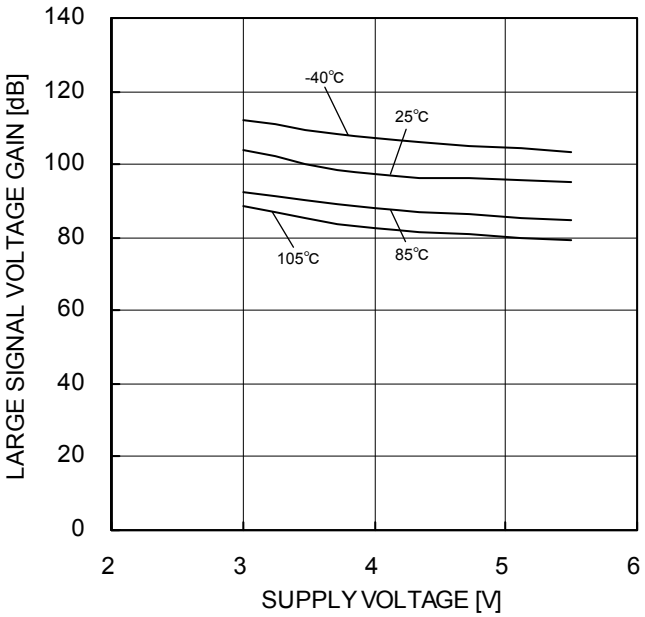


Figure 63.
Large Signal Voltage Gain vs Supply Voltage

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7487xx: -40°C to +85°C BU7487Sxx: -40°C to +105°C

Typical Performance Curves - Continued

○BU7487xx, BU7487Sxx

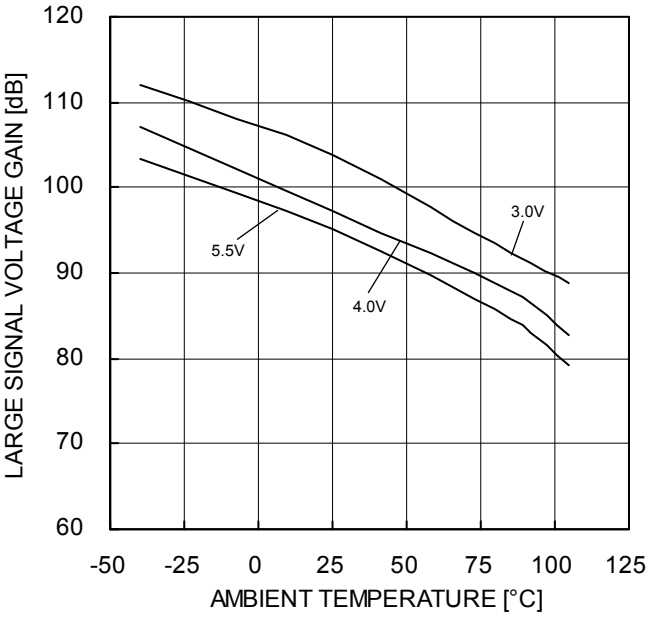


Figure 64.
Large Signal Voltage Gain vs Ambient Temperature

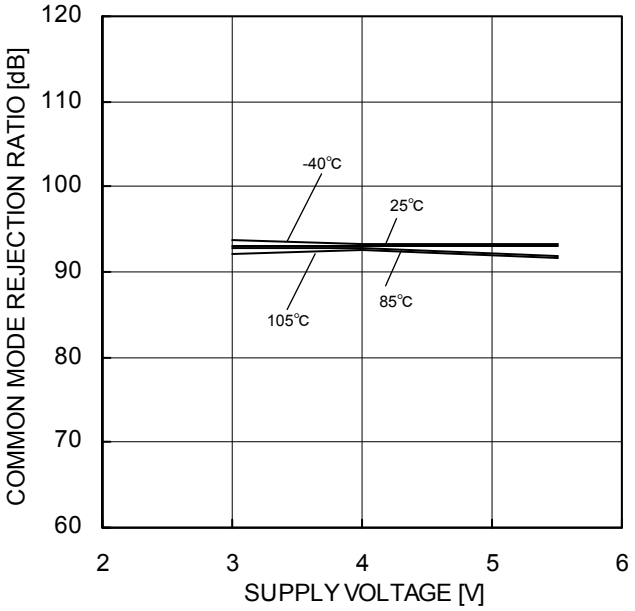


Figure 65.
Common Mode Rejection Ratio vs Supply Voltage

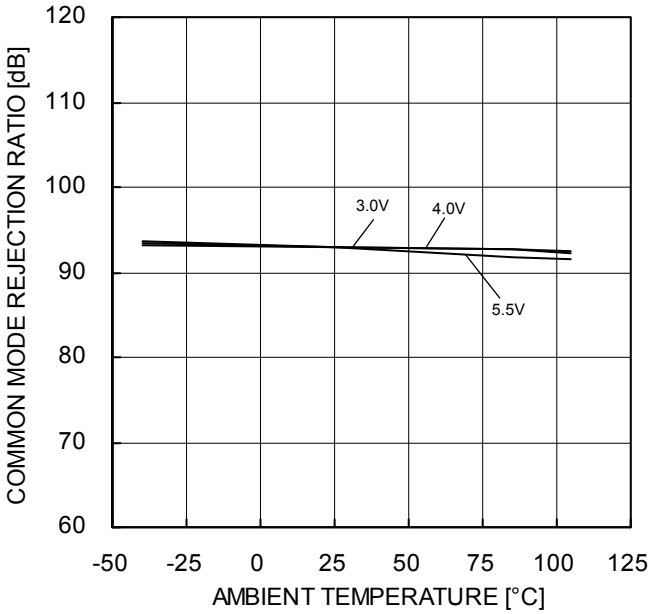


Figure 66.
Common Mode Rejection Ratio vs Ambient Temperature

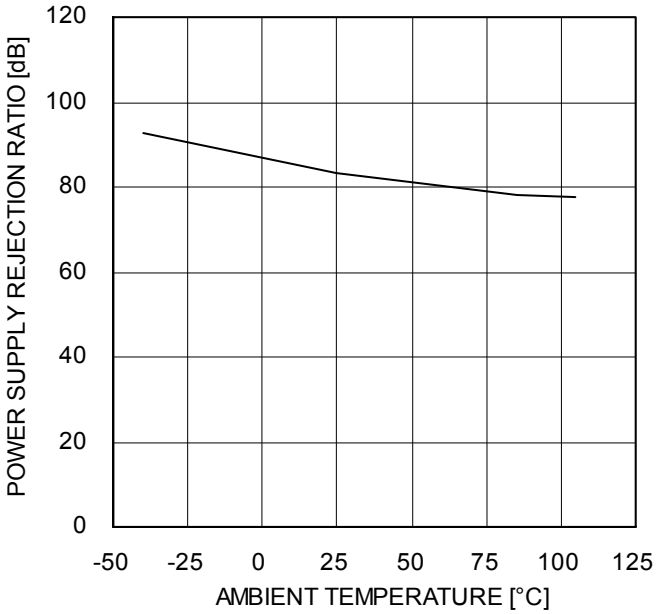


Figure 67.
Power Supply Rejection Ratio vs Ambient Temperature

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7487xx: -40°C to +85°C BU7487Sxx: -40°C to +105°C

Typical Performance Curves - Continued

○BU7487xx, BU7487Sxx

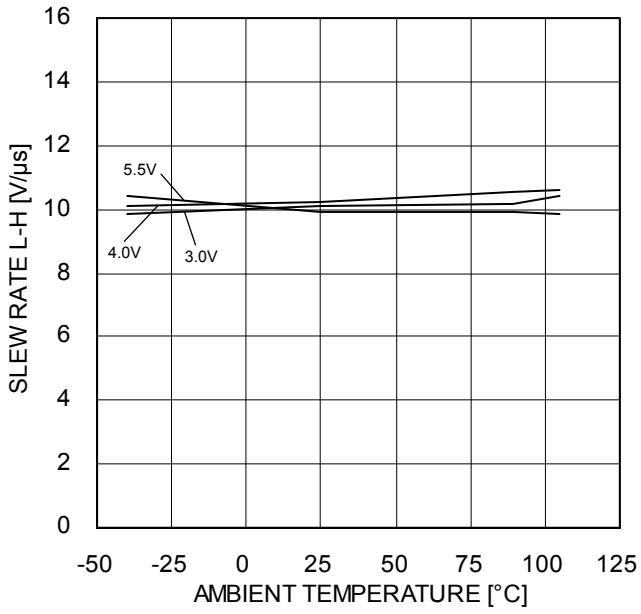


Figure 68.
Slew Rate L-H vs Ambient Temperature

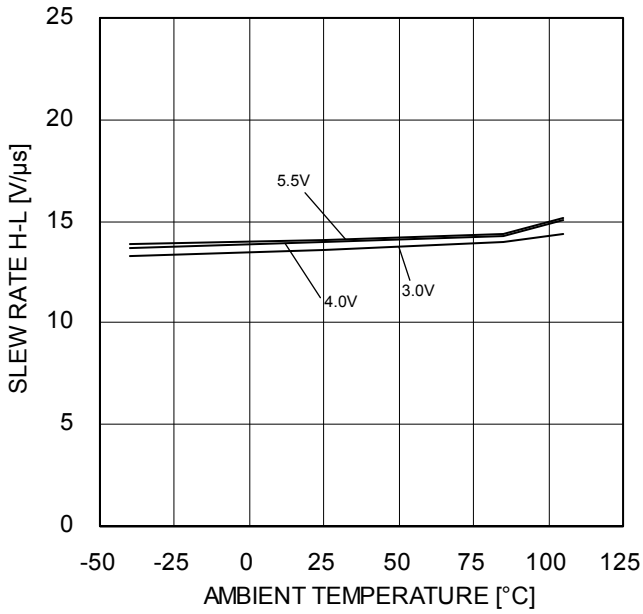


Figure 69.
Slew Rate H-L vs Ambient Temperature

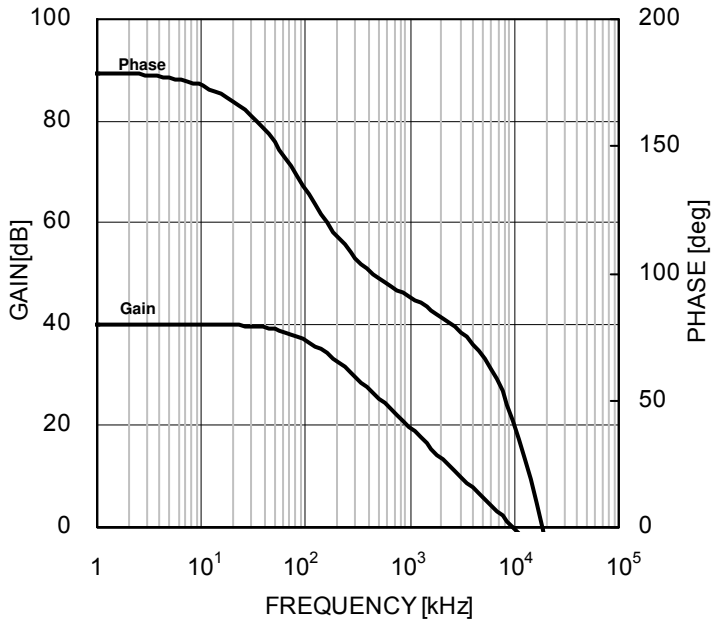


Figure 70.
Voltage Gain・Phase vs Frequency
（VDD=+3V, VSS=0V, T_A=25°C）

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7487xx: -40°C to +85°C BU7487Sxx: -40°C to +105°C