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Operational Amplifiers

Input/Output Full Swing Low Supply Current CMOS Operational Amplifiers

BU7241G BU7241SG BU7242xxx BU7242Sxxx BU7244xx BU7244Sxx

General Description

BU7241G, BU7242xxx, BU7244xx are CMOS operational amplifier of the input/output full swing low voltage operation. Also, BU7241SG, BU7242Sxxx, BU7244Sxx which expanded the operating temperature range perform a lineup. It is most suitable for a sensor amplifier and a battery-powered equipment to have a low input bias current, the characteristic of the low supply current.

Features

- Operable with Low Voltage
- Operable Input-Output Full Swing
- Wide Temperature Range
- Low Supply Current
- Low Input Bias Current

Applications

- Sensor Amplifier
- Battery Powered Equipment
- Portable Equipment
- Consumer Equipment

Key Specifications

- Operating Supply Voltage Range: +1.8V to +5.5V
- Operating Temperature Range:
  BU7241G, BU7242xxx, BU7244xx -40°C to +85°C
  BU7241SG, BU7242Sxxx, BU7244Sxx -40°C to +105°C
- Supply Current:
  BU7241, BU7241S 70µA (Typ)
  BU7242, BU7242S 180µA (Typ)
  BU7244, BU7244S 360µA (Typ)
- Input Offset Current: 1pA (Typ)
- Input Bias Current: 1pA (Typ)

Packages

	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
MSOP8	2.90mm x 4.00mm x 0.90mm
VSON008X2030	2.00mm x 3.00mm x 0.60mm
SOP14	8.70mm x 6.20mm x 1.71mm
SSOP-B14	5.00mm x 6.40mm x 1.35mm

Simplified Schematic

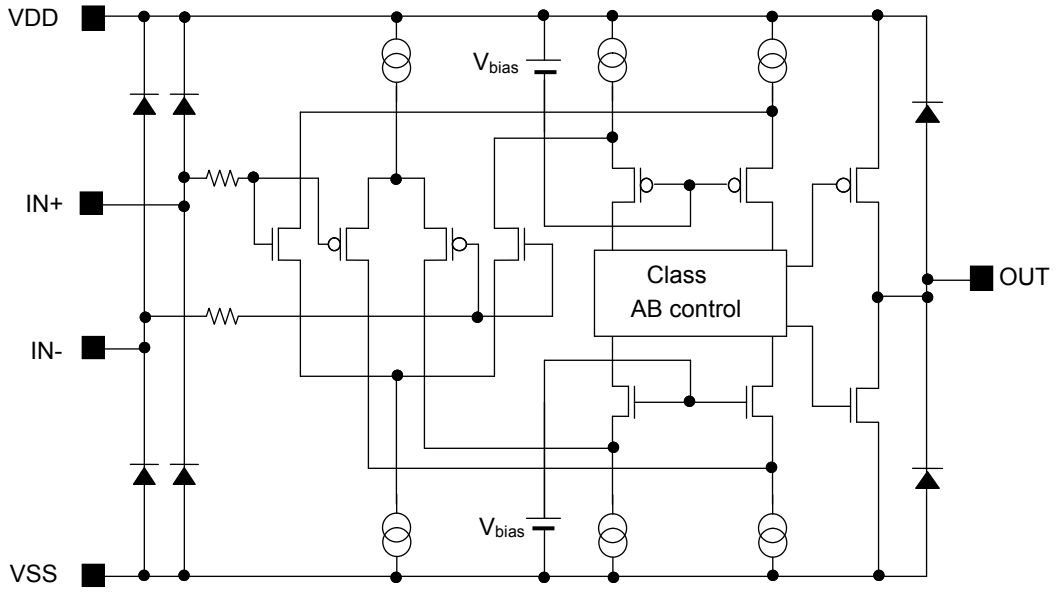
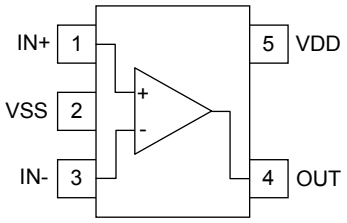


Figure 1. Simplified Schematic (1ch Only)

○Product structure : Silicon monolithic integrated circuit ○This product has no designed protection against radioactive rays.

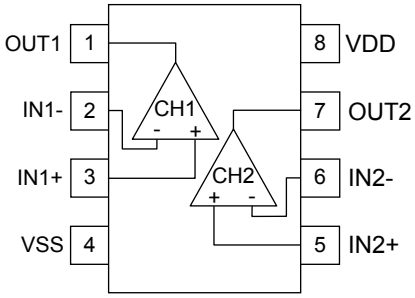
Pin Configuration

BU7241G, BU7241SG : SSOP5



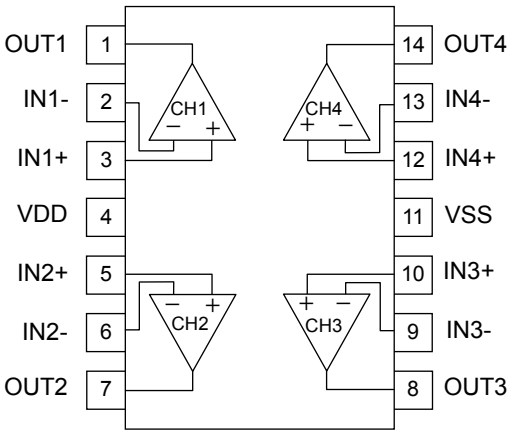
Pin No.	Pin Name
1	IN+
2	VSS
3	IN-
4	OUT
5	VDD

BU7242F, BU7242SF : SOP8
BU7242FVM, BU7242SFVM : MSOP8
BU7242NUX, BU7242SNUX : VSON008X2030



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

BU7244F, BU7244SF : SOP14
BU7244FV, BU7244SFV : SSOP-B14



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	VSON008X2030	MSOP8	SOP14	SSOP-B14
BU7241G BU7241SG	BU7242F BU7242SF	BU7242NUX BU7242SNUX	BU7242FVM BU7242SFVM	BU7244F BU7244SF	BU7244FV BU7244SFV

Ordering Information

B U 7 2 4 x x x x x - x x

Part Number
BU7241G
BU7241SG
BU7242xxx
BU7242Sxxx
BU7244xx
BU7244Sxx

Package
G : SSOP5
F : SOP8, SOP14
FV : SSOP-B14
FVM : MSOP8
NUX : VSON008X2030

Packaging and forming specification
E2: Embossed tape and reel
(SOP8/SOP14/SSOP-B14)
TR: Embossed tape and reel
(SSOP5/MSOP8/VSON008X2030)

Line-up

Operating Temperature Range	Channels	Package		Orderable Part Number
-40°C to +85°C	1ch	SSOP5	Reel of 3000	BU7241G-TR
	2ch	SOP8	Reel of 2500	BU7242F-E2
		MSOP8	Reel of 3000	BU7242FVM-TR
		VSON008X2030	Reel of 4000	BU7242NUX-TR
	4ch	SOP14	Reel of 2500	BU7244F-E2
		SSOP-B14	Reel of 2500	BU7244FV-E2
-40°C to +105°C	1ch	SSOP5	Reel of 3000	BU7241SG-TR
	2ch	SOP8	Reel of 2500	BU7242SF-E2
		MSOP8	Reel of 3000	BU7242SFVM-TR
		VSON008X2030	Reel of 4000	BU7242SNUX-TR
	4ch	SOP14	Reel of 2500	BU7244SF-E2
		SSOP-B14	Reel of 2500	BU7244SFV-E2

Absolute Maximum Ratings (T_A=25°C)

Parameter	Symbol		Rating			Unit
			BU7241G	BU7242xxx	BU7244xx	
Supply Voltage	VDD-VSS		+7			V
Power Dissipation	P_D	SSOP5	0.54 (Note 1,7)	-	-	W
		SOP8	-	0.55 (Note 2,7)	-	
		MSOP8	-	0.47 (Note 3,7)	-	
		VSON008X2030	-	0.41 (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	V_{ICM}		(VSS - 0.3) to (VDD + 0.3)			V
Input Current (Note 9)	I_I		±10			mA
Operating Supply Voltage Range	V_{opr}		+1.8 to +5.5			V
Operating Temperature Range	T_{opr}		-40 to +85			°C
Storage Temperature Range	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 T_A=25°C reduce 4.7mW/°C.
(Note 4) To use at temperature above T_A=25°C reduce 4.1mW/°C.
(Note 5) To use at temperature above T_A=25°C reduce 4.5mW/°C.
(Note 6) To use at temperature above T_A=25°C reduce 7.0mW/°C.
(Note 7) Mounted on a FR4 glass epoxy PCB 70mm×70mm×1.6mm (Copper foil area less than 3%).
(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 less than VSS-0.6V are applied.
The input current can be set to less than the rated current by adding a limiting resistor.
Caution: Operating the IC over the absolute maximum ratings may damage the IC. The damage can either be a short circuit between pins or an open circuit between pins and the internal circuitry. Therefore, it is important to consider circuit protection measures, such as adding a fuse, in case the IC is operated over the absolute maximum ratings.

Absolute Maximum Ratings (T_A=25°C) **- continued**

Parameter	Symbol		Rating			Unit
			BU7241SG	BU7242Sxxx	BU7244Sxx	
Supply Voltage	VDD-VSS		+7			V
Power Dissipation	P_D	SSOP5	0.54 (Note 10,16)	-	-	W
		SOP8	-	0.55 (Note 11,16)	-	
		MSOP8	-	0.47 (Note 12,16)	-	
		VSON008X2030	-	0.41 (Note 13,16)	-	
		SOP14	-	-	0.45 (Note 14,16)	
		SSOP-B14			0.70 (Note 15,16)	
Differential Input Voltage (Note 17)	V_{ID}		VDD - VSS			V
Input Common-mode Voltage	V_{ICM}		(VSS - 0.3) to (VDD + 0.3)			V
Input Current (Note 18)	I_I		±10			mA
Operating Supply Voltage Range	V_{opr}		+1.8 to +5.5			V
Operating Temperature Range	T_{opr}		-40 to +105			°C
Storage Temperature Range	T_{stg}		-55 to +125			°C
Maximum Junction Temperature	T_{Jmax}		+125			°C

(Note 10) To use at temperature above T_A=25°C reduce 5.4mW/°C.
(Note 11) To use at temperature above T_A=25°C reduce 5.5mW/°C.
(Note 12) To use at temperature above T_A=25°C reduce 4.7mW/°C.
(Note 13) To use at temperature above T_A=25°C reduce 4.1mW/°C.
(Note 14) To use at temperature above T_A=25°C reduce 4.5mW/°C.
(Note 15) To use at temperature above T_A=25°C reduce 7.0mW/°C.
(Note 16) Mounted on a FR4 glass epoxy PCB 70mm×70mm×1.6mm (Copper foil area less than 3%).
(Note 17) 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 18) An excessive input current will flow when input voltages of more than VDD+0.6V or less than VSS-0.6V are applied.
The input current can be set to less than the rated current by adding a limiting resistor.
Caution: Operating the IC over the absolute maximum ratings may damage the IC. The damage can either be a short circuit between pins or an open circuit between pins and the internal circuitry. Therefore, it is important to consider circuit protection measures, such as adding a fuse, in case the IC is operated over the absolute maximum ratings.

Electrical Characteristics

○BU7241 (Unless otherwise specified VDD=+3V, VSS=0V, T_A=25℃)

Parameter	Symbol	Temperature Range	Limit			Unit	Conditions
			Min	Typ	Max		
Input Offset Voltage (Note 19, 20)	V_{IO}	25℃	-	1	9	mV	VDD=1.8 to 5.5V
		Full range	-	-	10		
Input Offset Current (Note 19)	I_{IO}	25℃	-	1	-	pA	-
Input Bias Current (Note 19)	I_B	25℃	-	1	-	pA	-
Supply Current (Note 20)	I_{DD}	25℃	-	70	150	μA	R_L=∞, A_V=0dB IN+=1.5V
		Full range	-	-	250		
Maximum Output Voltage(High)	V_{OH}	25℃	VDD-0.1	-	-	V	R_L=10kΩ
Maximum Output Voltage(Low)	V_{OL}	25℃	-	-	VSS+0.1	V	R_L=10kΩ
Large Signal Voltage Gain	A_V	25℃	70	95	-	dB	R_L=10kΩ
Input Common-mode Voltage Range	V_{ICM}	25℃	0	-	3	V	VSS to VDD
Common-mode Rejection Ratio	CMRR	25℃	45	60	-	dB	-
Power Supply Rejection Ratio	PSRR	25℃	60	80	-	dB	-
Output Source Current (Note 21)	I_{SOURCE}	25℃	4	10	-	mA	OUT=VDD-0.4V
Output Sink Current (Note 21)	I_{SINK}	25℃	5	12	-	mA	OUT=VSS+0.4V
Slew Rate	SR	25℃	-	0.4	-	V/μs	C_L=25pF
Gain Bandwidth	GBW	25℃	-	0.9	-	MHz	C_L=25pF, A_V=40dB
Phase Margin	θ	25℃	-	50	-	deg	C_L=25pF, A_V=40dB
Total Harmonic Distortion + Noise	THD+N	25℃	-	0.05	-	%	OUT=0.8V_{P-P}, f=1kHz

(Note 19) Absolute value
(Note 20) Full range: BU7241: T_A=-40℃ to +85℃ BU7241S: T_A=-40℃ to +105℃
(Note 21) 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

○BU7242 (Unless otherwise specified VDD=+3V, VSS=0V, T_A=25℃)

Parameter	Symbol	Temperature Range	Limit			Unit	Conditions
			Min	Typ	Max		
Input Offset Voltage (Note 22, 23)	V_{IO}	25℃	-	1	9	mV	VDD=1.8 to 5.5V OUT=VDD/2
		Full range	-		10		
Input Offset Current (Note 22)	I_{IO}	25℃	-	1	-	pA	-
Input Bias Current (Note 22)	I_B	25℃	-	1	-	pA	-
Supply Current (Note 23)	I_{DD}	25℃	-	180	360	μA	R_L=∞, All Op-Amps A_V=0dB, IN+=1.5V
		Full range	-	-	600		
Maximum Output Voltage(High)	V_{OH}	25℃	VDD-0.1	-	-	V	R_L=10kΩ
Maximum Output Voltage(Low)	V_{OL}	25℃	-	-	VSS+0.1	V	R_L=10kΩ
Large Signal Voltage Gain	A_V	25℃	70	95	-	dB	R_L=10kΩ
Input Common-mode Voltage Range	V_{ICM}	25℃	0	-	3	V	VSS to VDD
Common-mode Rejection Ratio	CMRR	25℃	45	60	-	dB	-
Power Supply Rejection Ratio	PSRR	25℃	60	80	-	dB	-
Output Source Current (Note 24)	I_{SOURCE}	25℃	4	10	-	mA	OUT=VDD-0.4V
Output Sink Current (Note 24)	I_{SINK}	25℃	5	12	-	mA	OUT=VSS+0.4V
Slew Rate	SR	25℃	-	0.4	-	V/μs	C_L=25pF
Gain Bandwidth	GBW	25℃	-	0.9	-	MHz	C_L=25pF, A_V=40dB
Phase Margin	θ	25℃	-	50	-	deg	C_L=25pF, A_V=40dB
Total Harmonic Distortion + Noise	THD+N	25℃	-	0.05	-	%	OUT=0.8 V_{P-P}, f=1kHz
Channel Separation	CS	25℃	-	100	-	dB	A_V=40dB, OUT=1Vrms

(Note 22) Absolute value
(Note 23) Full range: BU7242: T_A=-40℃ to +85℃ BU7242S: T_A=-40℃ to +105℃
(Note 24) 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

○BU7244 (Unless otherwise specified VDD=+3V, VSS=0V, T_A=25℃)

Parameter	Symbol	Temperature Range	Limit			Unit	Conditions
			Min	Typ	Max		
Input Offset Voltage (Note 25, 26)	V_{IO}	25℃	-	1	9	mV	VDD=1.8 to 5.5V OUT=VDD/2
		Full range	-	-	10		
Input Offset Current (Note 25)	I_{IO}	25℃	-	1	-	pA	-
Input Bias Current (Note 25)	I_B	25℃	-	1	-	pA	-
Supply Current (Note 26)	I_{DD}	25℃	-	360	750	μA	R_L=∞, All Op-Amps A_V=0dB, IN+=1.5V
		Full range	-	-	1200		
Maximum Output Voltage(High)	V_{OH}	25℃	VDD-0.1	-	-	V	R_L=10kΩ
Maximum Output Voltage(Low)	V_{OL}	25℃	-	-	VSS+0.1	V	R_L=10kΩ
Large Signal Voltage Gain	A_V	25℃	70	95	-	dB	R_L=10kΩ
Input Common-mode Voltage Range	V_{ICM}	25℃	0	-	3	V	VSS to VDD
Common-mode Rejection Ratio	CMRR	25℃	45	60	-	dB	-
Power Supply Rejection Ratio	PSRR	25℃	60	80	-	dB	-
Output Source Current (Note 27)	I_{SOURCE}	25℃	4	10	-	mA	OUT=VDD-0.4V
Output Sink Current (Note 27)	I_{SINK}	25℃	5	12	-	mA	OUT=VSS+0.4V
Slew Rate	SR	25℃	-	0.4	-	V/μs	C_L=25pF
Gain Bandwidth	GBW	25℃	-	0.9	-	MHz	C_L=25pF, A_V=40dB
Phase Margin	θ	25℃	-	50	-	deg	C_L=25pF, A_V=40dB
Total Harmonic Distortion + Noise	THD+N	25℃	-	0.05	-	%	OUT=0.8 V_{P-P}, f=1kHz
Channel Separation	CS	25℃	-	100	-	dB	A_V=40dB, OUT=1Vrms

(Note 25) Absolute value
(Note 26) Full range: BU7244: T_A=-40℃ to +85℃ BU7244S: T_A=-40℃ to +105℃
(Note 27) 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 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 fluctuation)

(10) Output Source Current / Output Sink Current (I_{SOURCE}/I_{SINK})
The maximum current that can be output under specific output conditions, it is divided into output source current and output sink current. The output source current indicates the current flowing out of the IC, and the output sink current 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) Gain Bandwidth (GBW)
The product of the open-loop voltage gain and the frequency at which the voltage gain decreases 6dB/octave.

(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

○BU7241G, BU7241SG

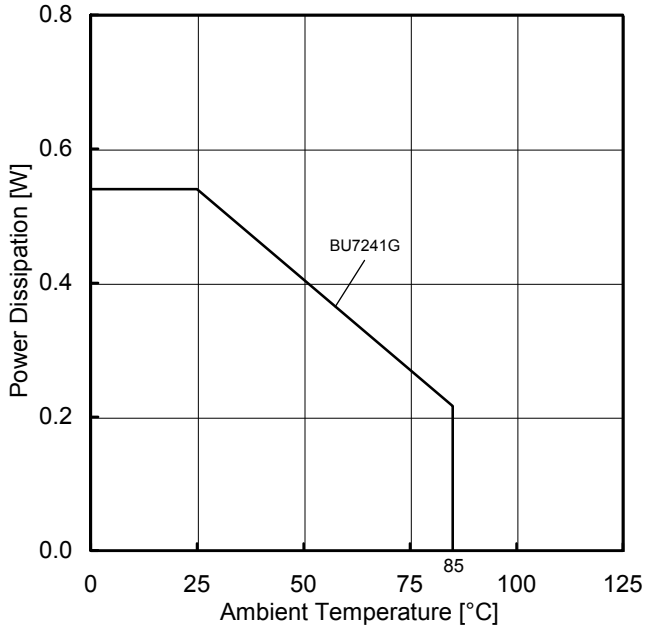


Figure 2.
Power Dissipation vs Ambient Temperature
(Derating Curve)

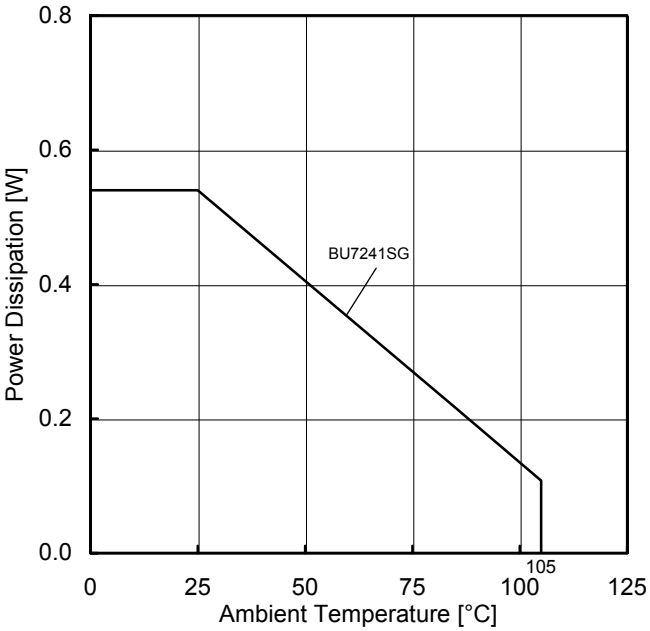


Figure 3.
Power Dissipation vs Ambient Temperature
(Derating Curve)

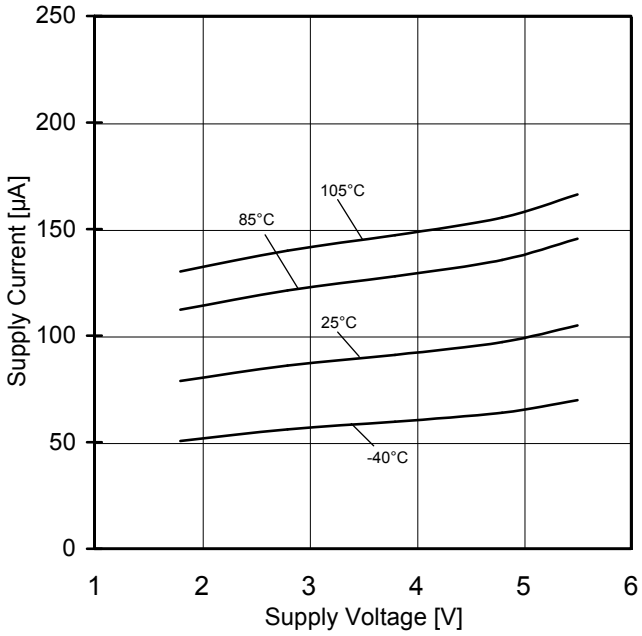


Figure 4.
Supply Current vs Supply Voltage

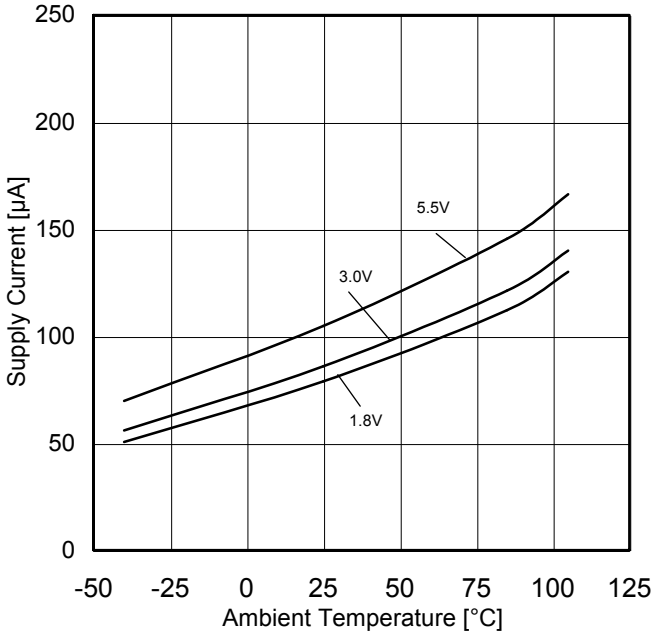


Figure 5.
Supply Current vs Ambient Temperature

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7241G: -40℃ to +85℃ BU7241SG: -40℃ to +105℃

Typical Performance Curves - Continued

○BU7241G, BU7241SG

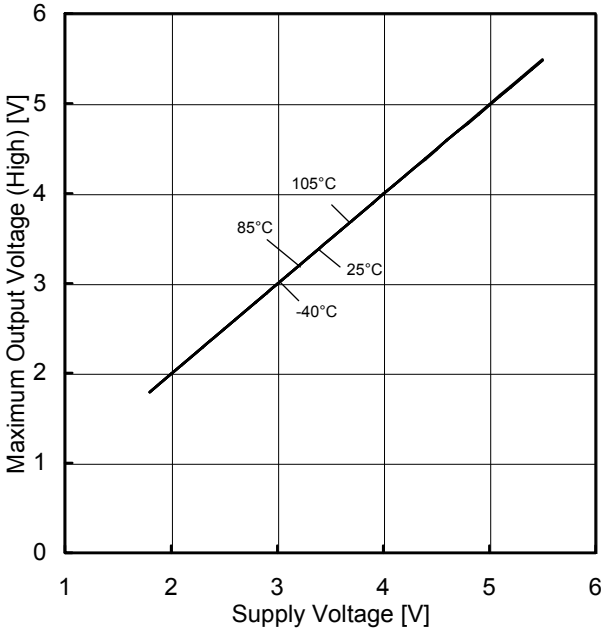


Figure 6.
Maxixmum Output Voltage (High) vs Supply Voltage
(R_L=10kΩ)

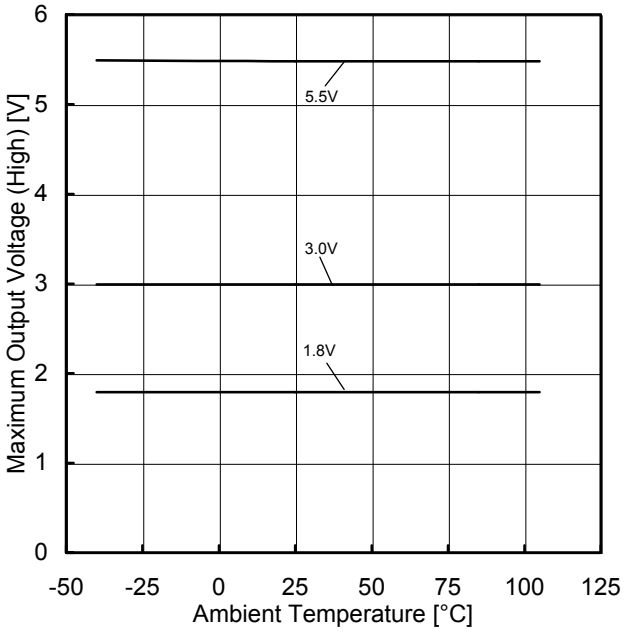


Figure 7.
Maximum Output Voltage (High) vs Ambient Temperature
(R_L=10kΩ)

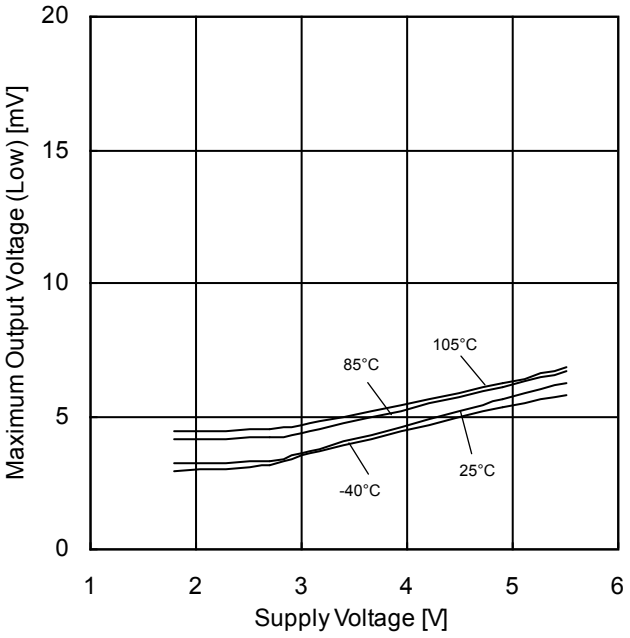


Figure 8.
Maximum Output Voltage (Low) vs Supply Voltage
(R_L=10kΩ)

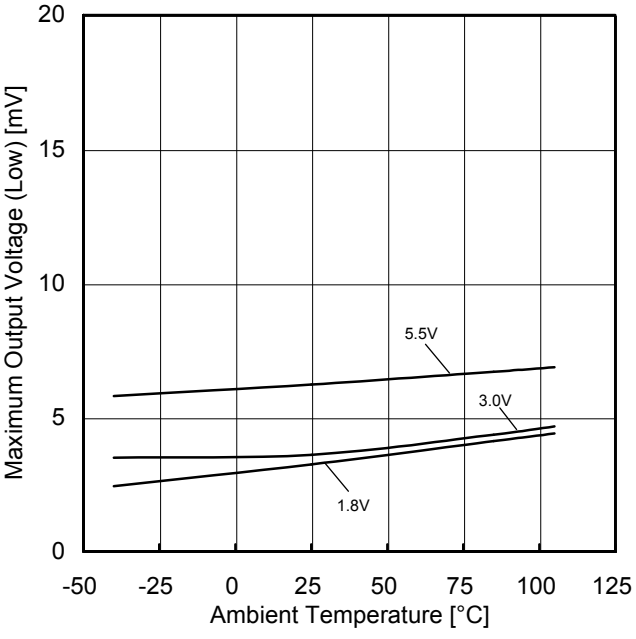


Figure 9.
Maximum Output Voltage (Low) vs Ambient Temperature
(R_L=10kΩ)

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7241G: -40℃ to +85℃ BU7241SG: -40℃ to +105℃

Typical Performance Curves - Continued

○BU7241G, BU7241SG

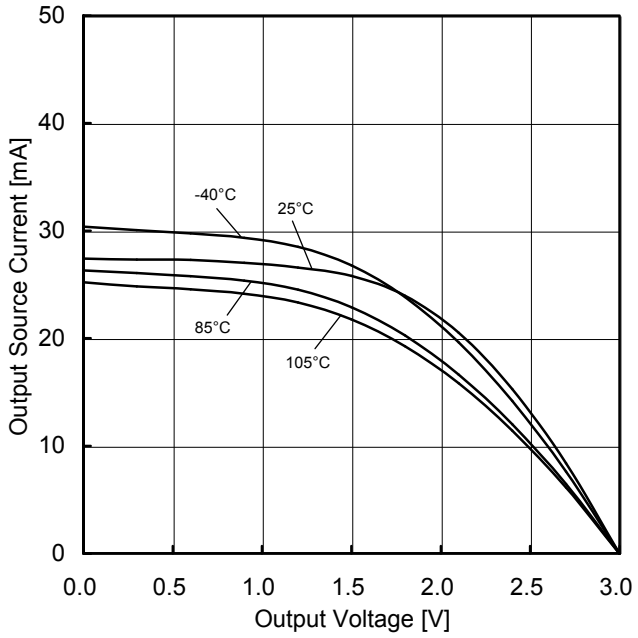


Figure 10.
Output Source Current vs Output Voltage
(VDD=3V)

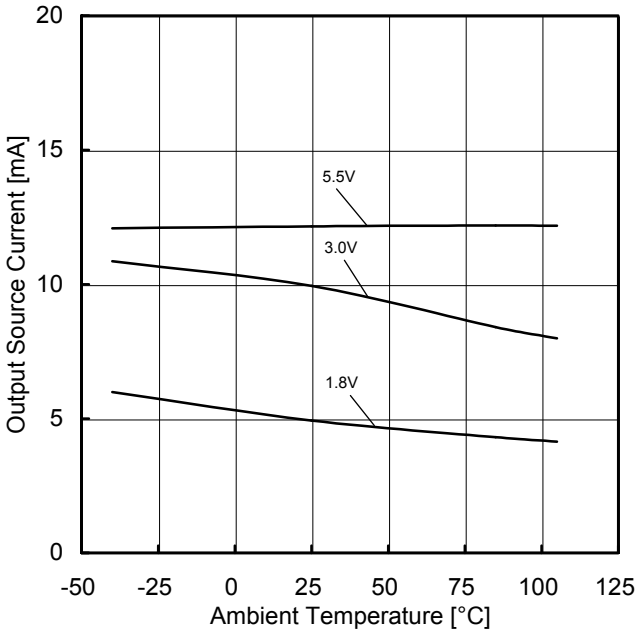


Figure 11.
Output Source Current vs Ambient Temperature
(OUT=VDD-0.4V)

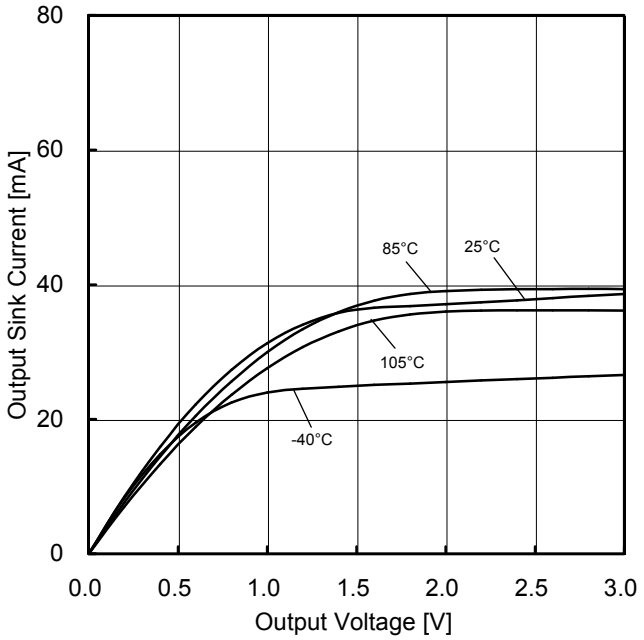


Figure 12.
Output Sink Current vs Output Voltage
(VDD=3V)

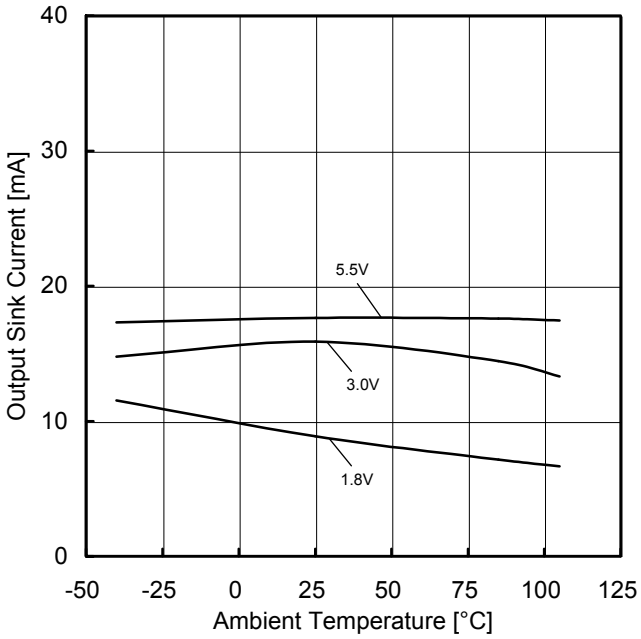


Figure 13.
Output Sink Current vs Ambient Temperature
(OUT=VSS+0.4V)

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7241G: -40℃ to +85℃ BU7241SG: -40℃ to +105℃

Typical Performance Curves - Continued

○BU7241G, BU7241SG

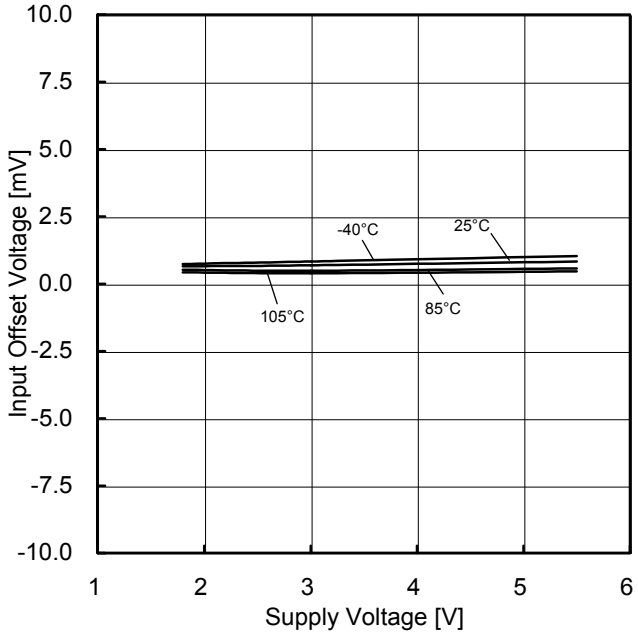


Figure 14.
Input Offset Voltage vs Supply Voltage
(V_{ICM}=VDD, E_K=-VDD/2)

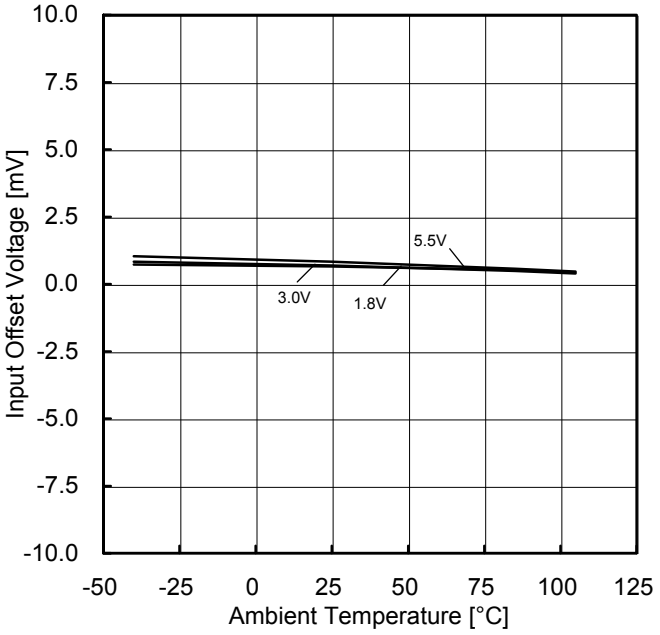


Figure 15.
Input Offset Voltage vs Ambient Temperature
(V_{ICM}=VDD, E_K=-VDD/2)

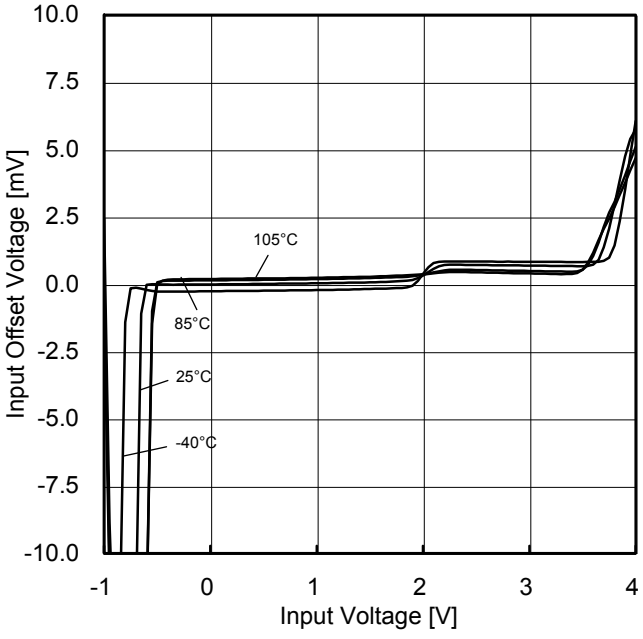


Figure16.
Input Offset Voltage vs Input Voltage
(VDD=3V)

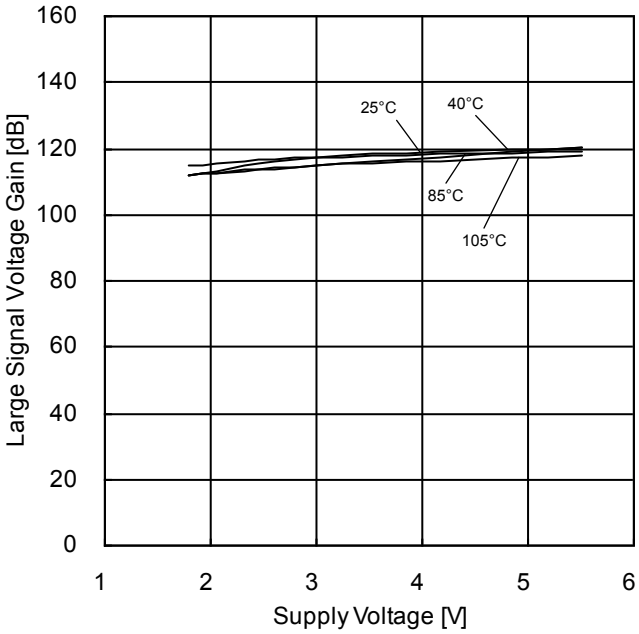


Figure 17.
Large Signal Voltage Gain vs Supply Voltage

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7241G: -40℃ to +85℃ BU7241SG: -40℃ to +105℃

Typical Performance Curves - Continued

○BU7241G, BU7241SG

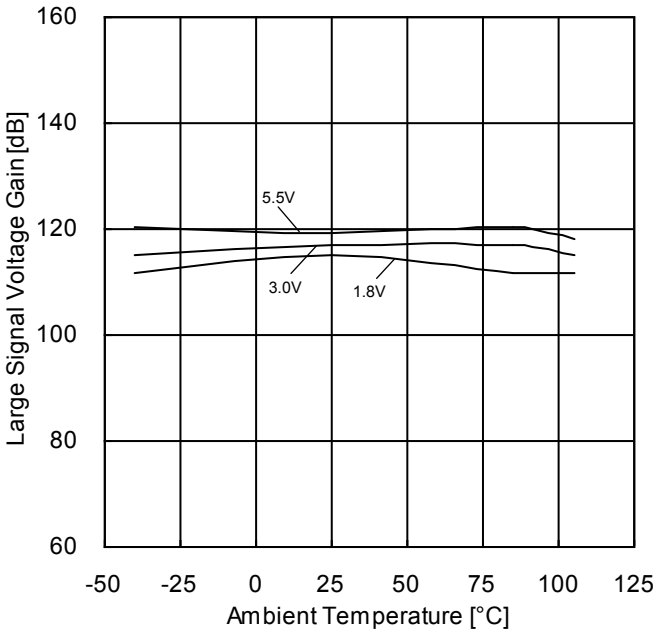


Figure 18.
Large Signal Voltage Gain vs Ambient Temperature

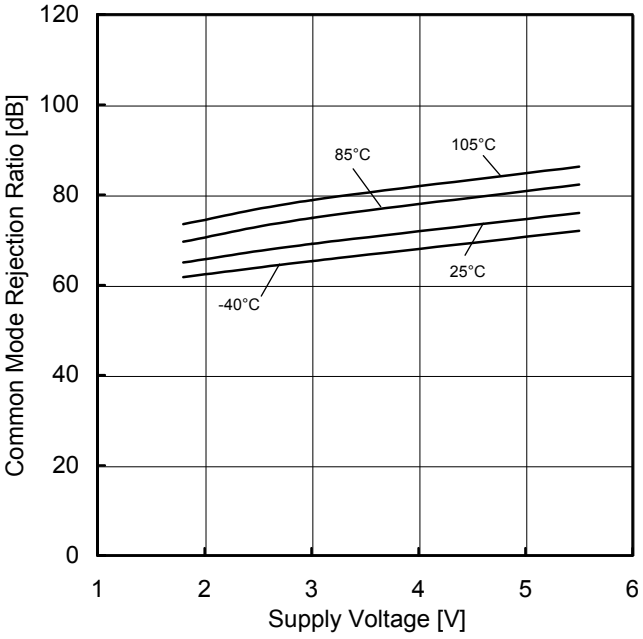


Figure 19.
Common Mode Rejection Ratio vs Supply Voltage

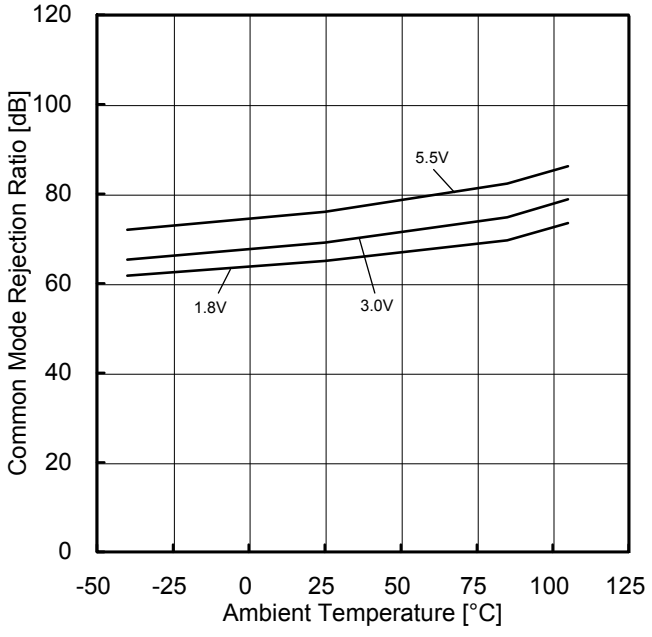


Figure 20.
Common Mode Rejection Ratio vs Ambient Temperature

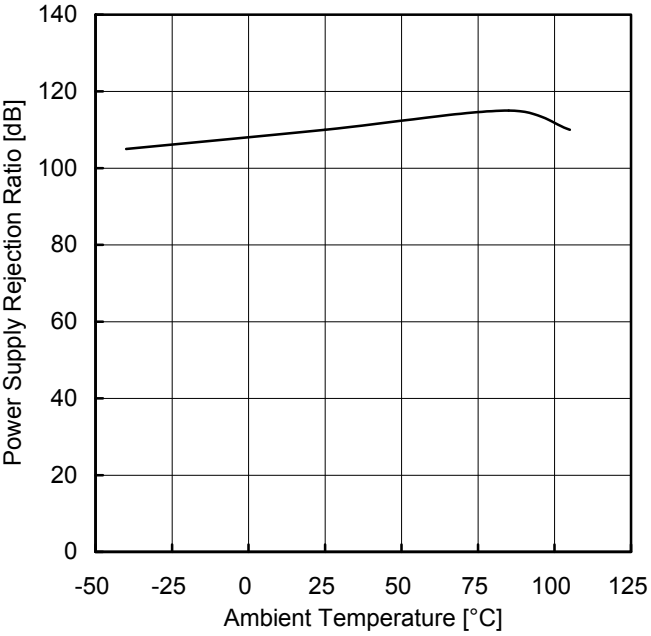


Figure 21.
Power Supply Rejection Ratio vs Ambient Temperature

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7241G: -40℃ to +85℃ BU7241SG: -40℃ to +105℃

Typical Performance Curves - Continued

○BU7241G, BU7241SG

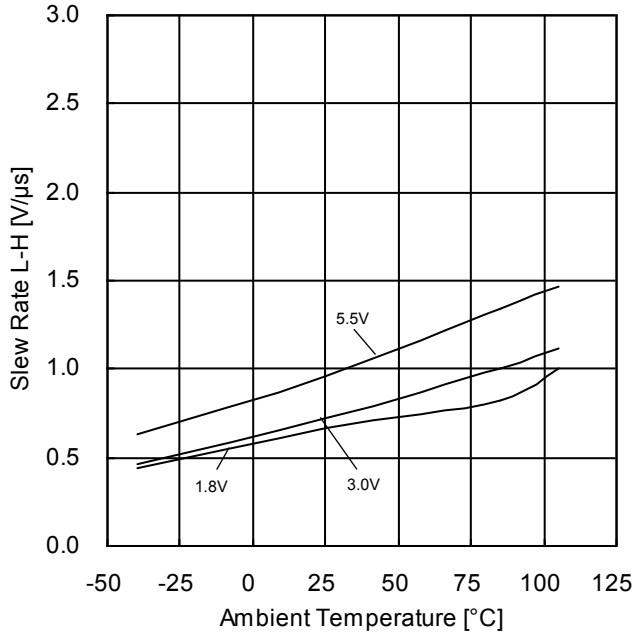


Figure 22.
Slew Rate L-H vs Ambient Temperature

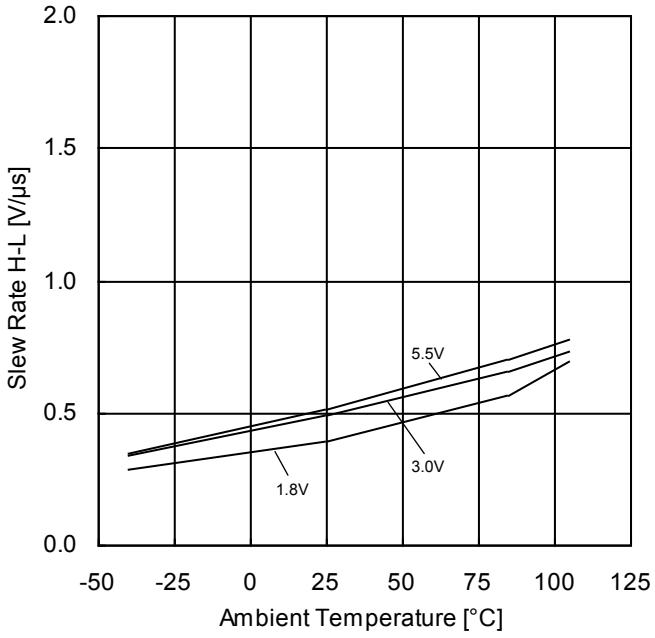


Figure 23.
Slew Rate H-L vs Ambient Temperature

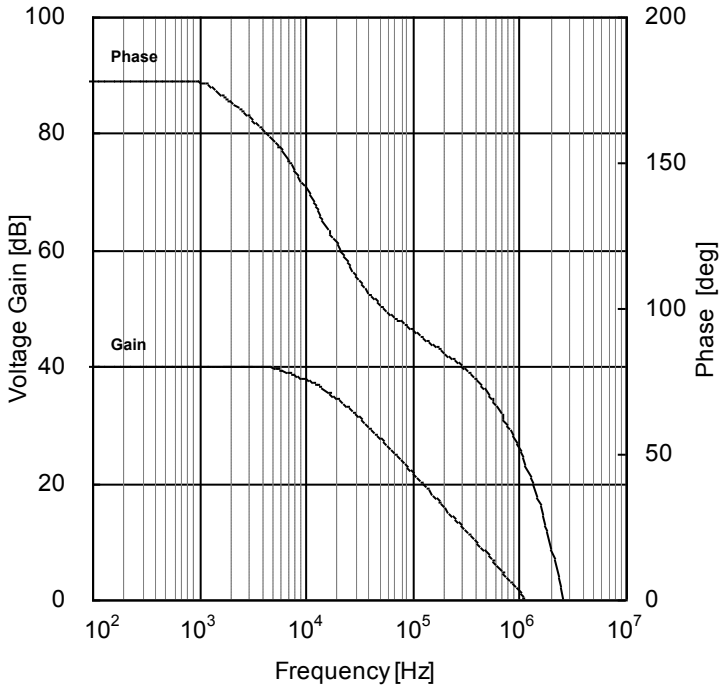


Figure 24.
Voltage Gain / Phase vs Frequency

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7241G: -40℃ to +85℃ BU7241SG: -40℃ to +105℃

Typical Performance Curves – Continued

○BU7242xxx, BU7242Sxxx

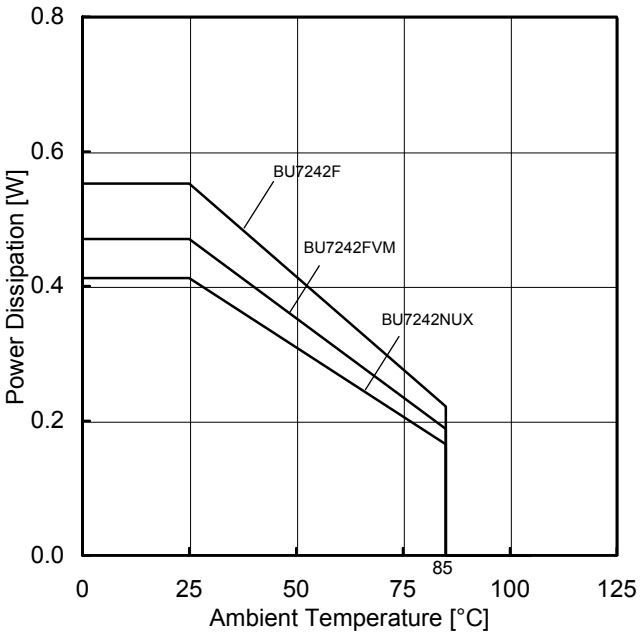


Figure 25.
Power Dissipation vs Ambient Temperature
(Derating Curve)

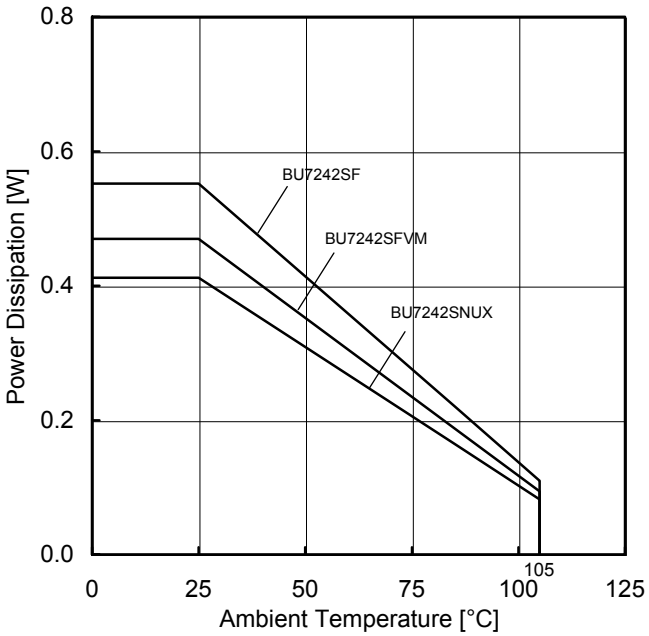


Figure 26.
Power Dissipation vs Ambient Temperature
(Derating Curve)

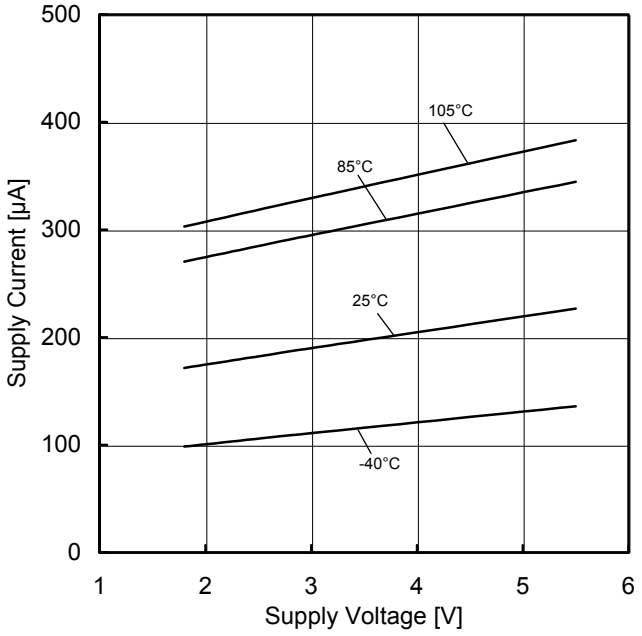


Figure 27.
Supply Current vs Supply Voltage

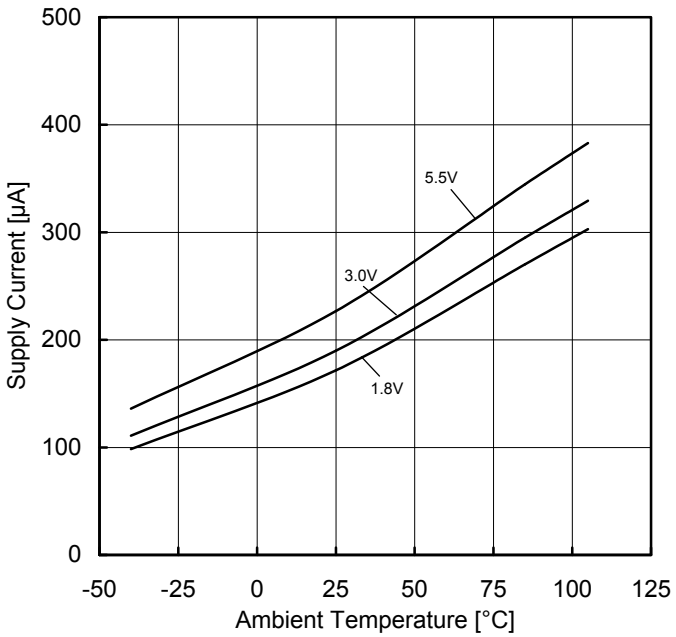


Figure 28.
Supply Current vs Ambient Temperature

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7242xxx: -40℃ to +85℃ BU7242Sxxx: -40℃ to +105℃

Typical Performance Curves – Continued

○BU7242xxx, BU7242Sxxx

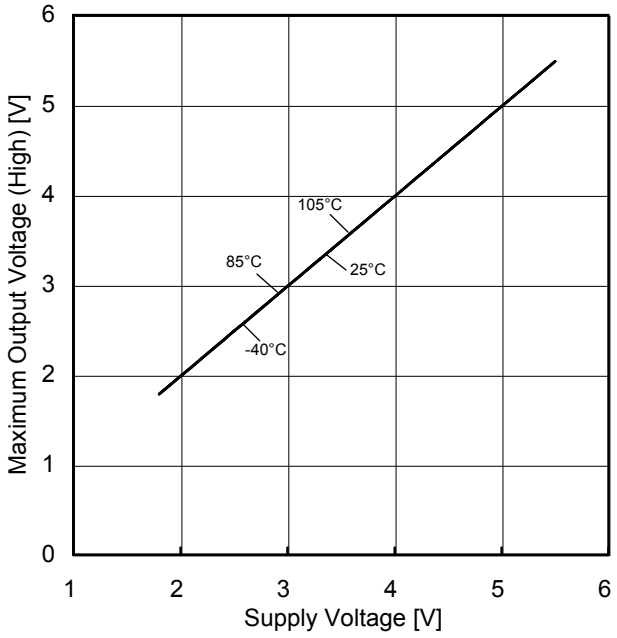


Figure 29.
Maximum Output Voltage (High) vs Supply Voltage
(R_L=10kΩ)

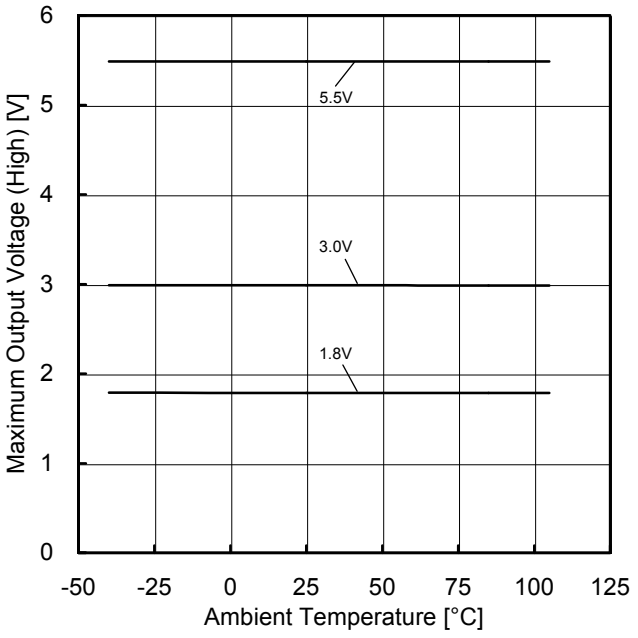


Figure 30.
Maximum Output Voltage (High) vs Ambient Temperature
(R_L=10kΩ)

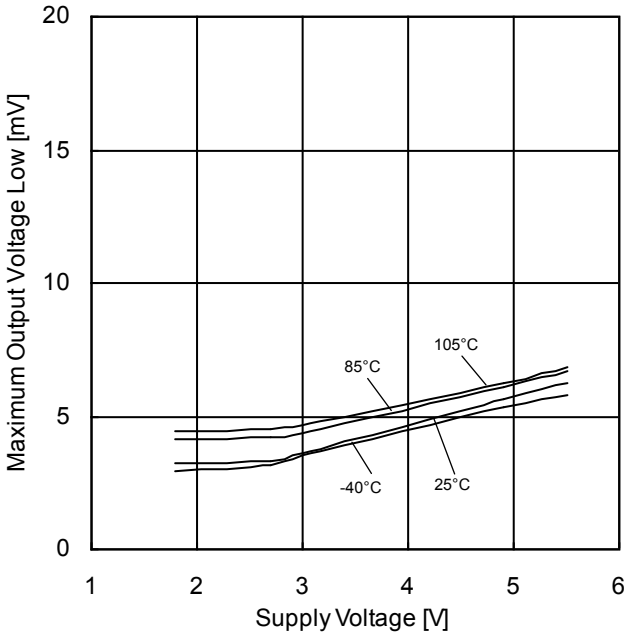


Figure 31.
Maximum Output Voltage (Low) vs Supply Voltage
(R_L=10kΩ)

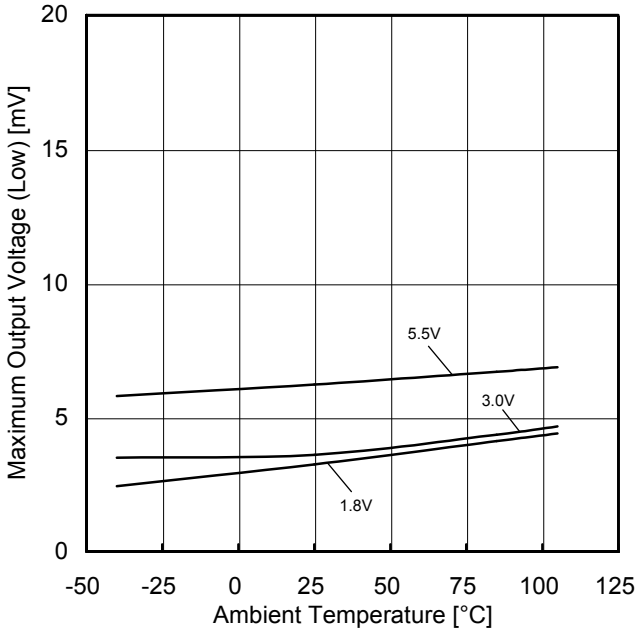


Figure 32.
Maximum Output Voltage (Low) vs Ambient Temperature
(R_L=10kΩ)

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7242xxx: -40℃ to +85℃ BU7242Sxxx: -40℃ to +105℃

Typical Performance Curves – Continued

○BU7242xxx, BU7242Sxxx

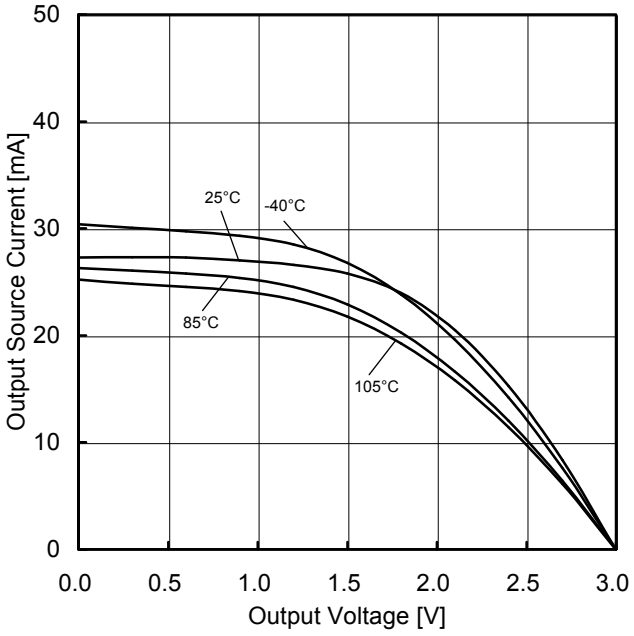


Figure 33.
Output Source Current vs Output Voltage
(VDD=3V)

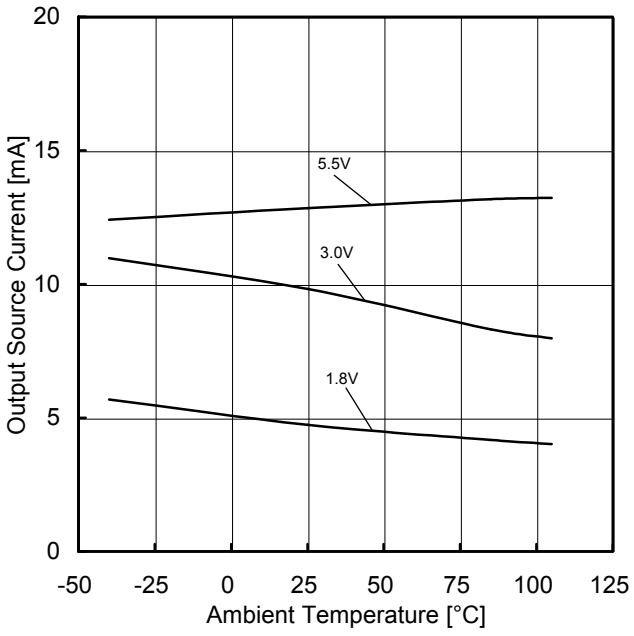


Figure 34.
Output Source Current vs Ambient Temperature
(OUT=VDD-0.4V)

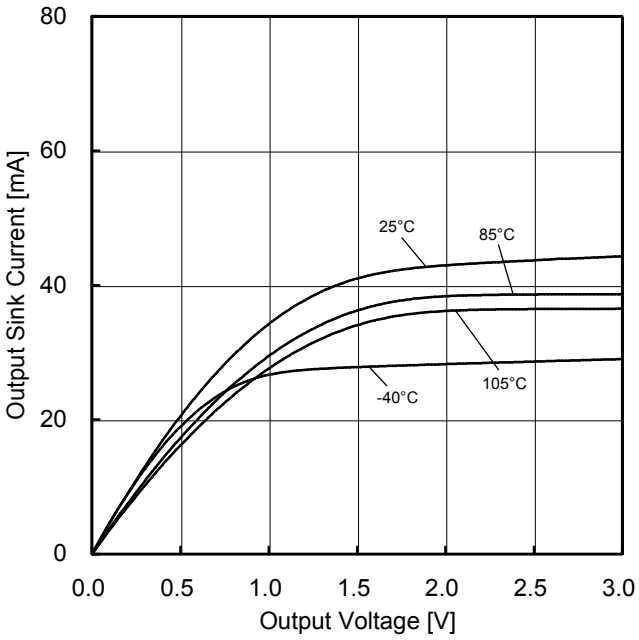


Figure 35.
Output Sink Current vs Output Voltage
(VDD=3V)

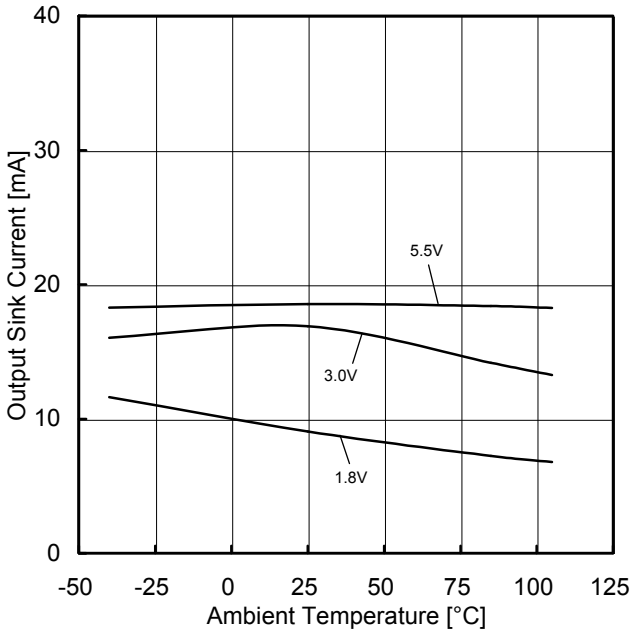


Figure 36.
Output Sink Current vs Ambient Temperature
(OUT=VSS+0.4V)

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7242xxx: -40℃ to +85℃ BU7242Sxxx: -40℃ to +105℃

Typical Performance Curves – Continued

○BU7242xxx, BU7242Sxxx

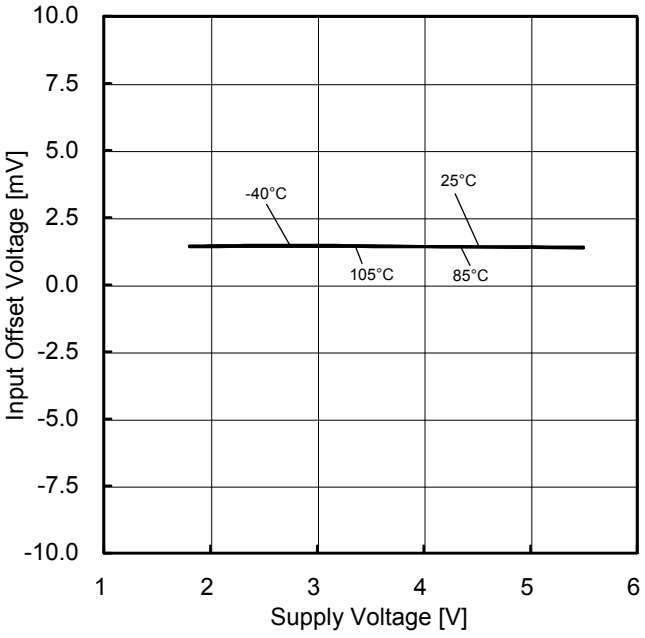


Figure 37.
Input Offset Voltage vs Supply Voltage
(V_{ICM}=VDD, E_K=-VDD/2)

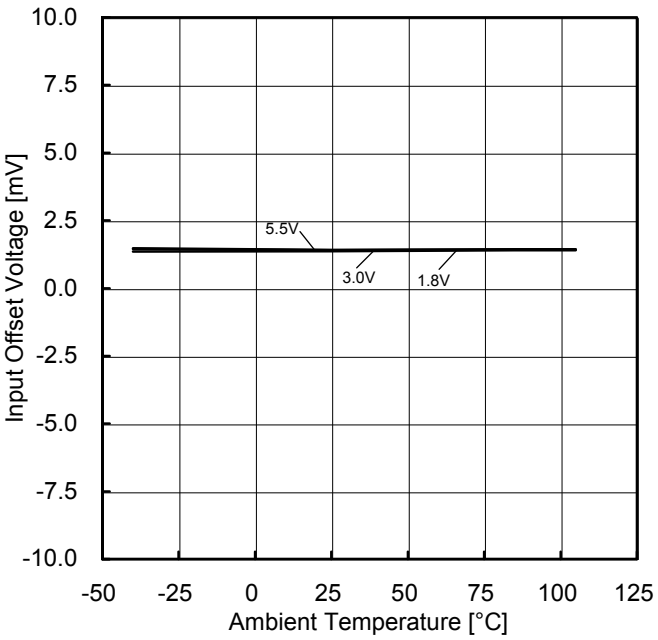


Figure 38.
Input Offset Voltage vs Ambient Temperature
(V_{ICM}=VDD, E_K=-VDD/2)

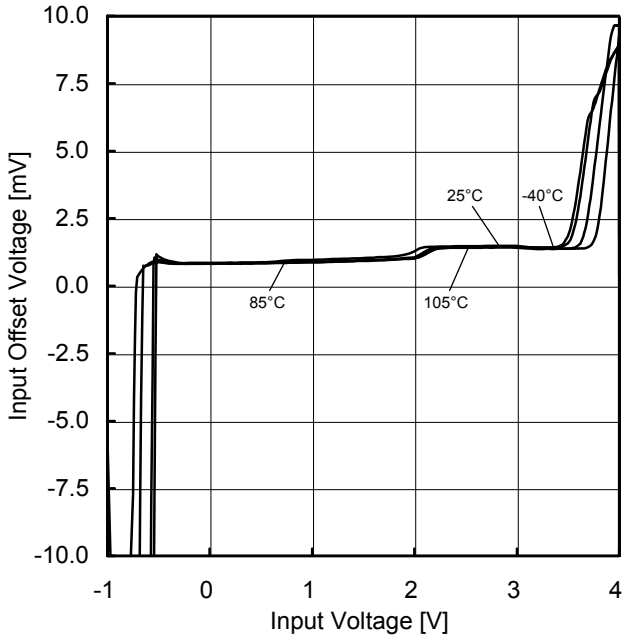


Figure 39.
Input Offset Voltage vs Input Voltage
(VDD=3V)

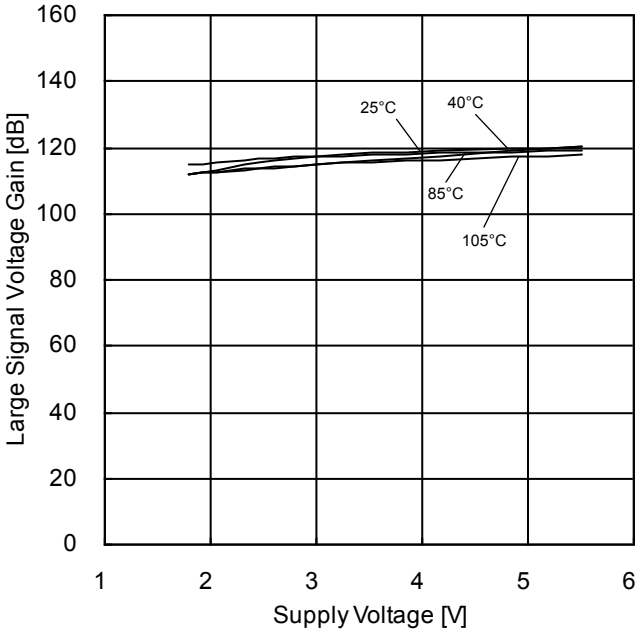


Figure 40.
Large Signal Voltage Gain vs Supply Voltage

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7242xxx: -40℃ to +85℃ BU7242Sxxx: -40℃ to +105℃

Typical Performance Curves – Continued

○BU7242xxx, BU7242Sxxx

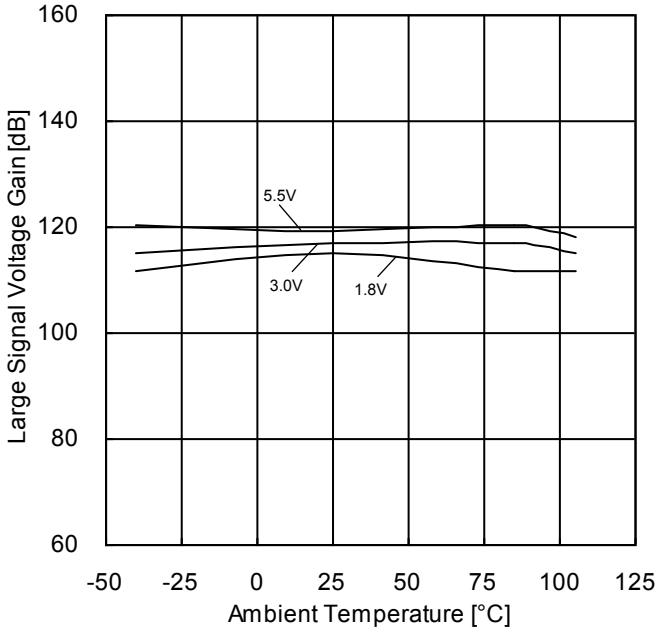


Figure 41.
Large Signal Voltage Gain vs Ambient Temperature

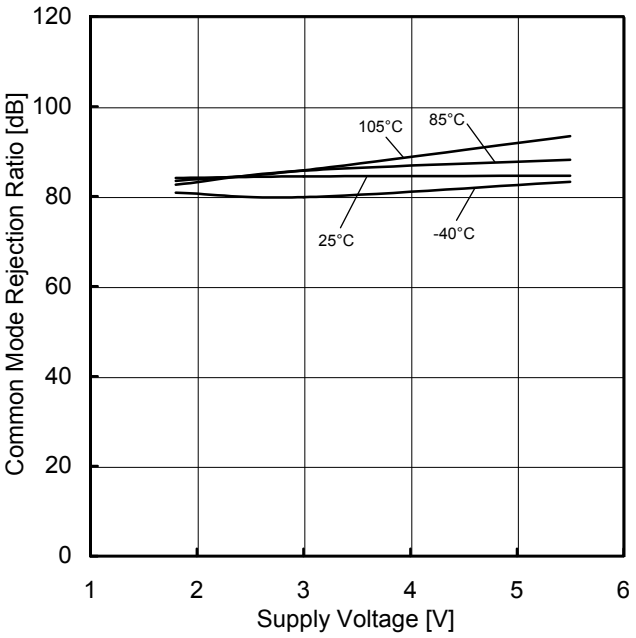


Figure 42.
Common Mode Rejection Ratio vs Supply Voltage
(VDD=3V)

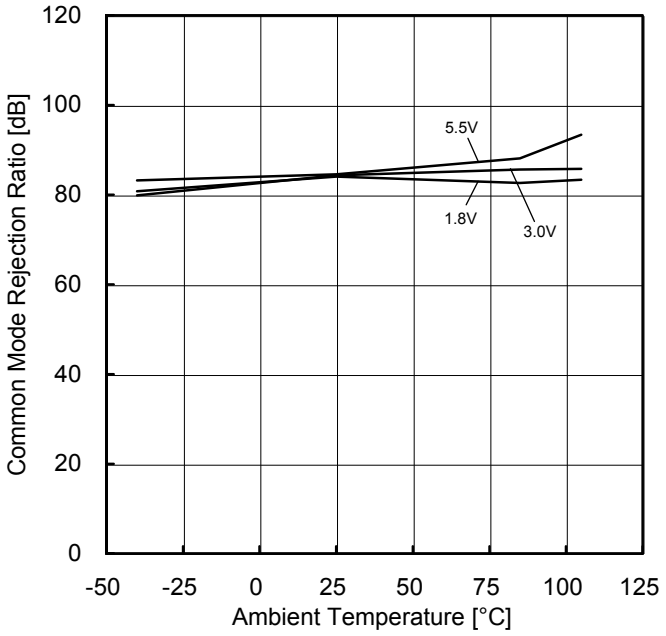


Figure 43.
Common Mode Rejection Ratio vs Ambient Temperature
(VDD=3V)

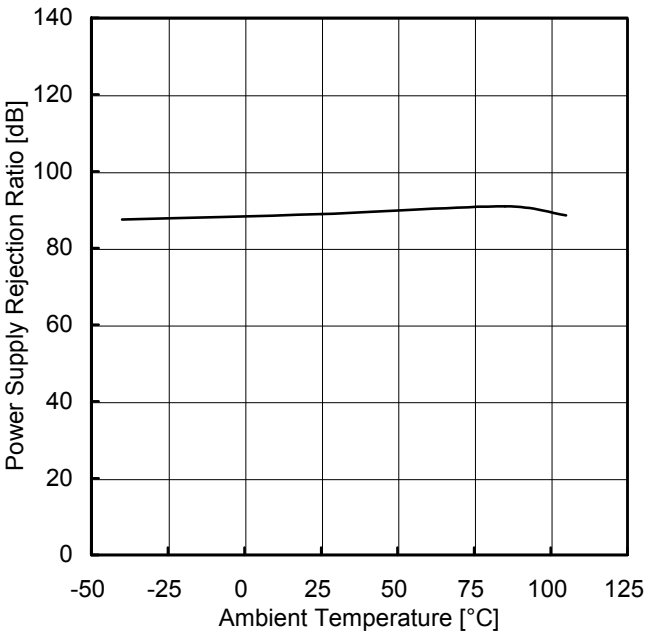


Figure 44.
Power Supply Rejection Ratio vs Ambient Temperature

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7242xxx: -40℃ to +85℃ BU7242Sxxx: -40℃ to +105℃

Typical Performance Curves – Continued

○BU7242xxx, BU7242Sxxx

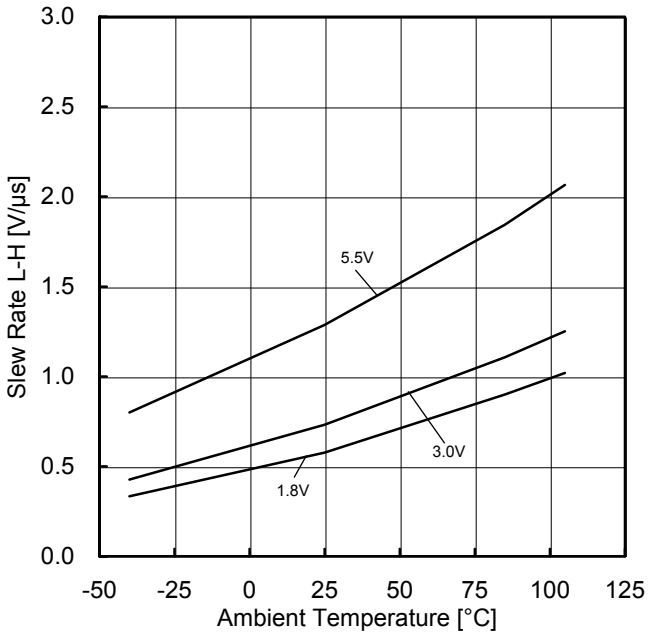


Figure 45.
Slew Rate L-H vs Ambient Temperature

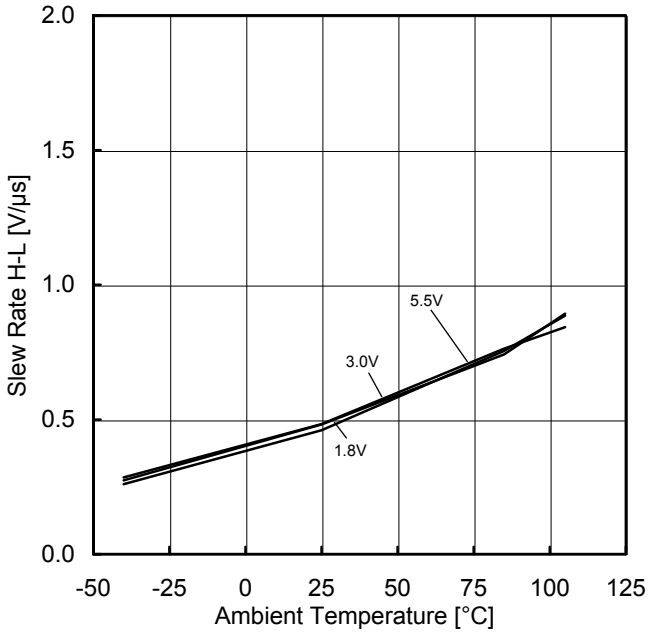


Figure 46.
Slew Rate H-L vs Ambient Temperature

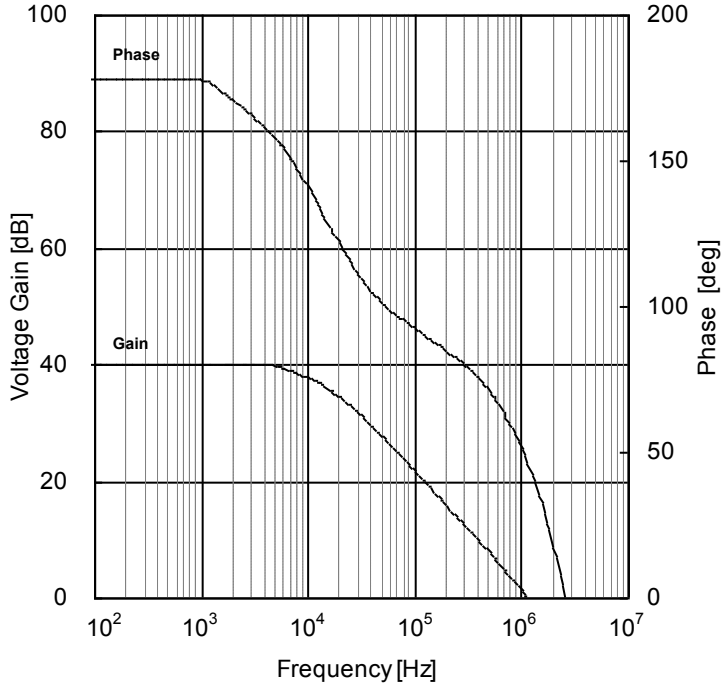


Figure 47.
Voltage Gain / Phase vs Frequency

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7242xxx: -40℃ to +85℃ BU7242Sxxx: -40℃ to +105℃

Typical Performance Curves – Continued

○BU7244xx, BU7244Sxx

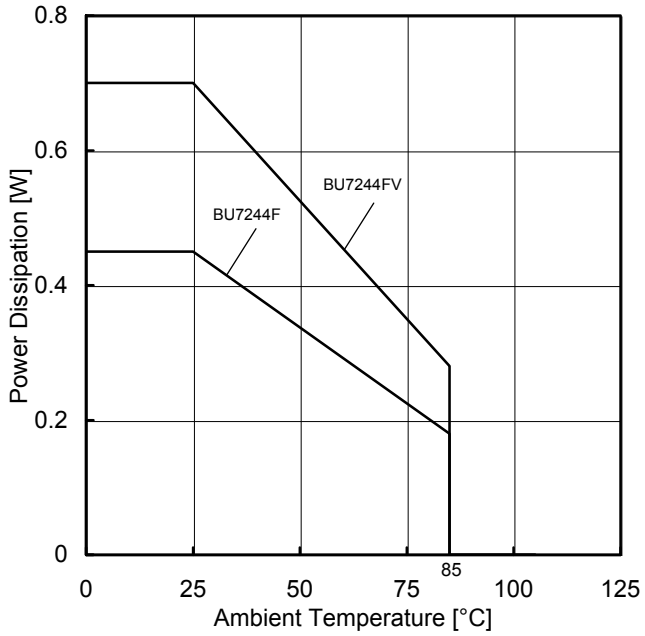


Figure 48.
Power Dissipation vs Ambient Temperature
(Derating Curve)

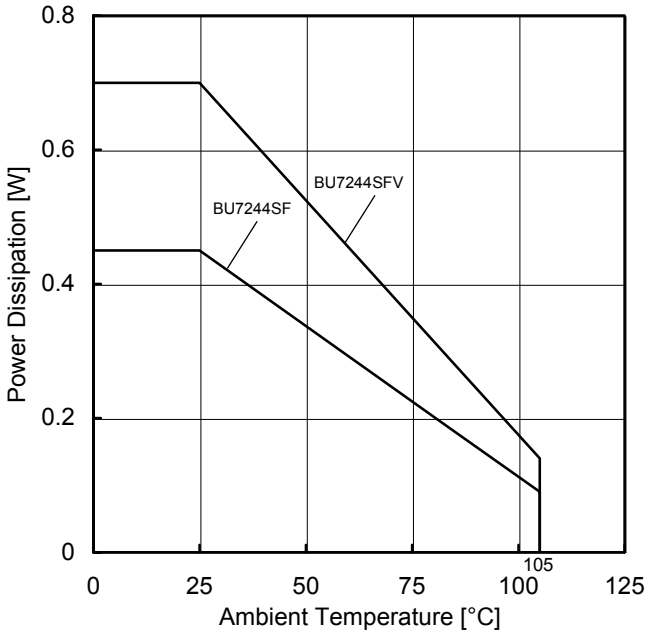


Figure 49.
Power Dissipation vs Ambient Temperature
(Derating Curve)

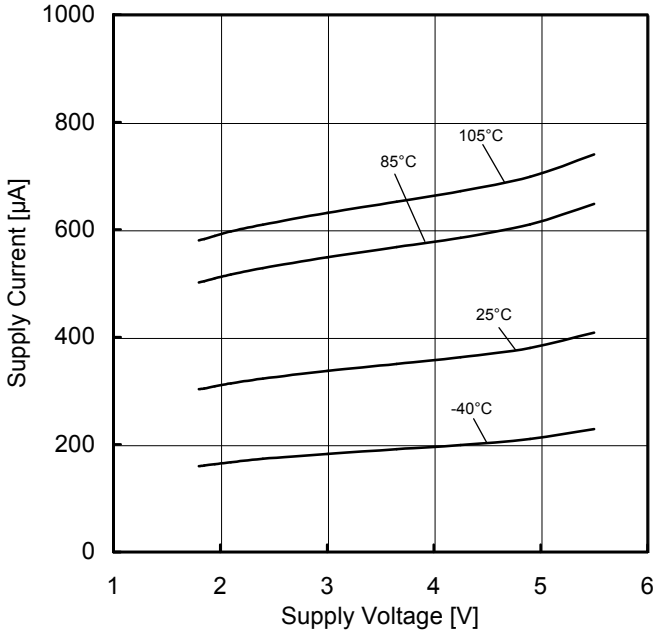


Figure 50.
Supply Current vs Supply Voltage

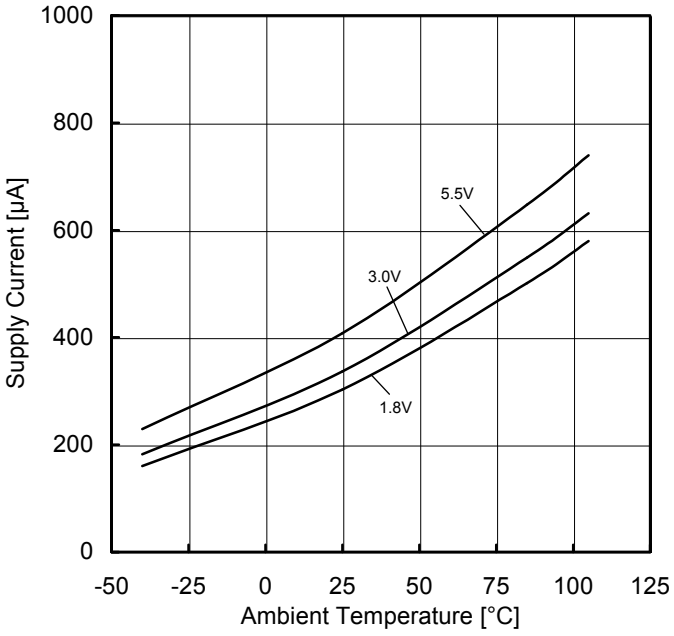


Figure 51.
Supply Current vs Ambient Temperature

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7244xx: -40℃ to +85℃ BU7244Sxx: -40℃ to +105℃

Typical Performance Curves – Continued

○BU7244xx, BU7244Sxx

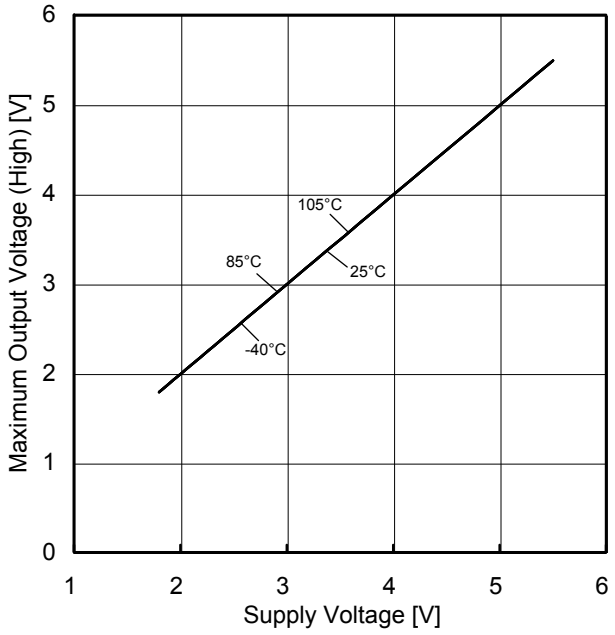


Figure 52.
Maximum Output Voltage (High) vs Supply Voltage
(R_L=10kΩ)

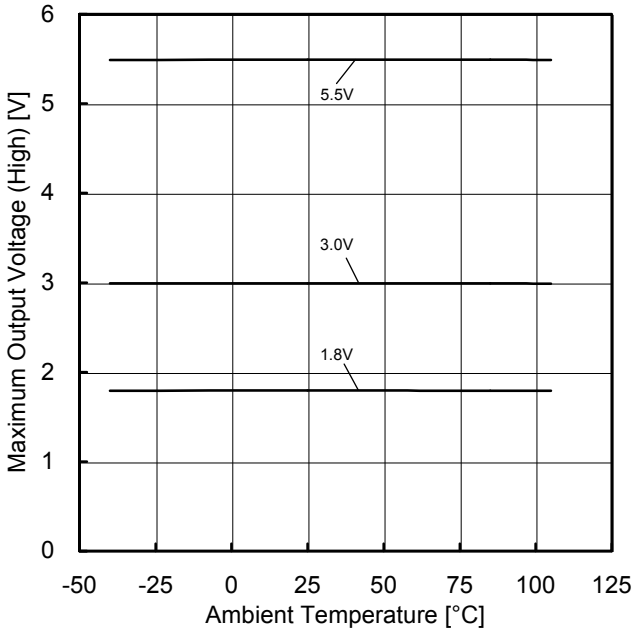


Figure 53.
Maximum Output Voltage (High) vs Ambient Temperature
(R_L=10kΩ)

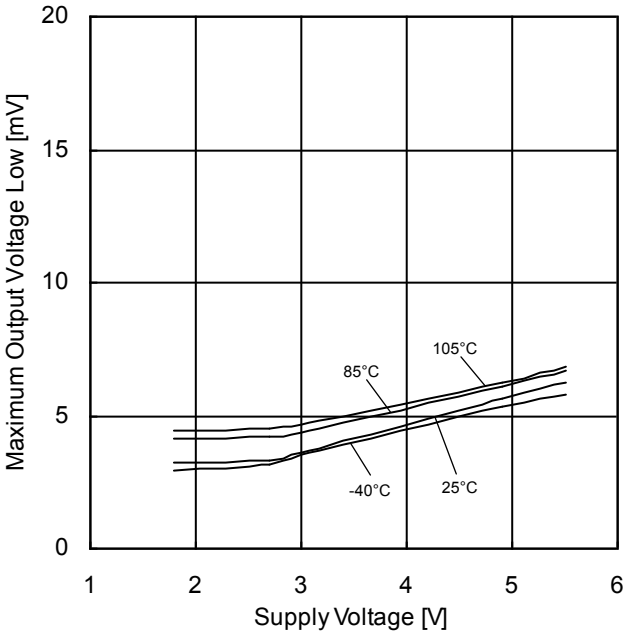


Figure 54.
Maximum Output Voltage (Low) vs Supply Voltage
(R_L=10kΩ)

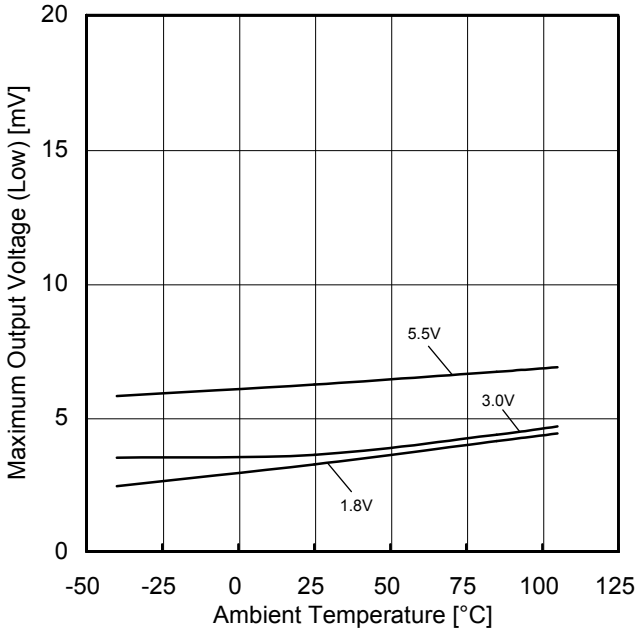


Figure 55.
Maximum Output Voltage (Low) vs Ambient Temperature
(R_L=10kΩ)

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7244xx: -40℃ to +85℃ BU7244Sxx: -40℃ to +105℃

Typical Performance Curves – Continued

○BU7244xx, BU7244Sxx

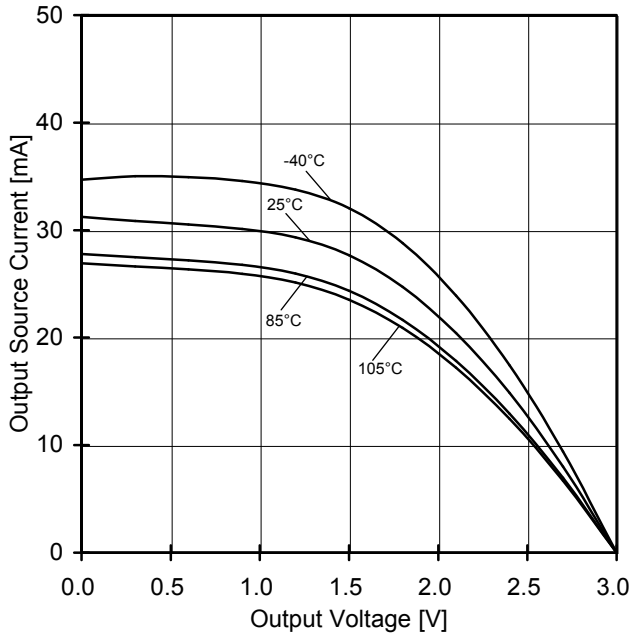


Figure 56.
Output Source Current vs Output Voltage
(VDD=3V)

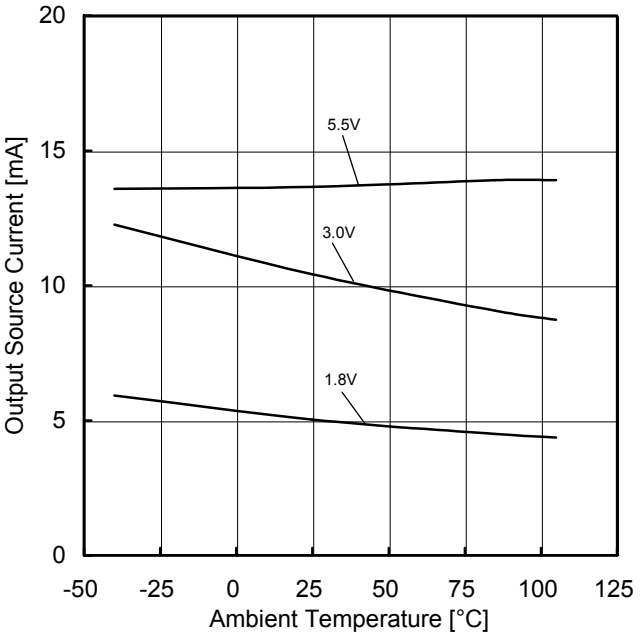


Figure 57.
Output Source Current vs Ambient Temperature
(OUT=VDD-0.4V)

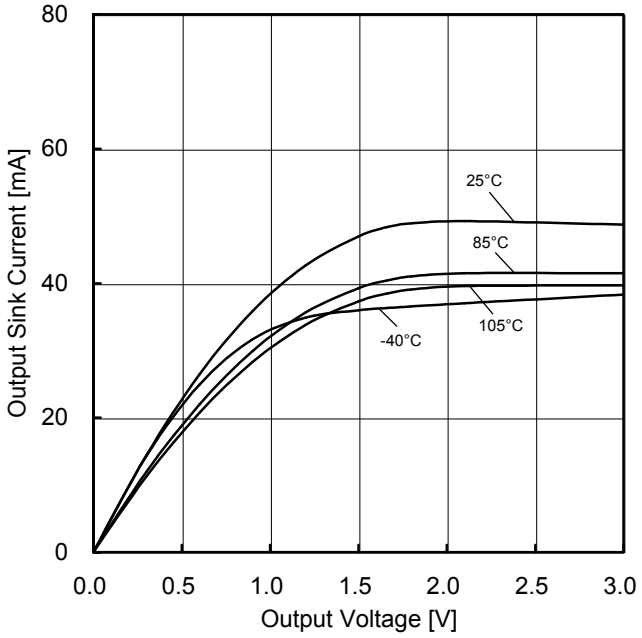


Figure 58.
Output Sink Current vs Output Voltage
(VDD=3V)

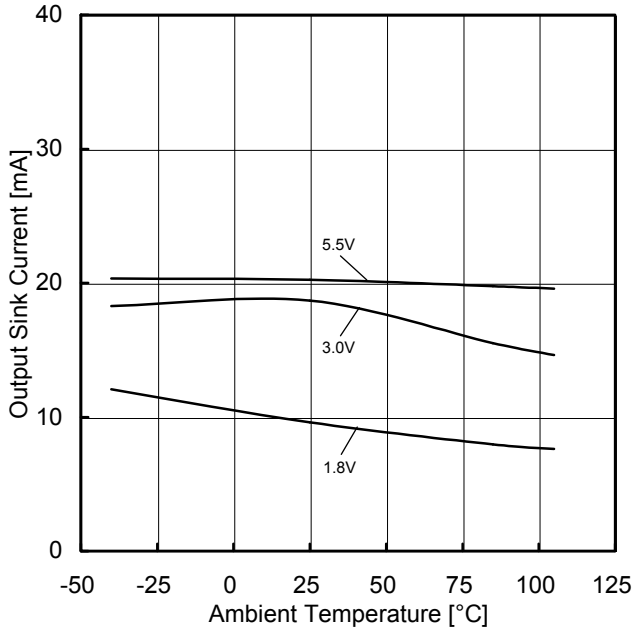


Figure 59.
Output Sink Current vs Ambient Temperature
(OUT=VSS+0.4V)

(*)The above characteristics are measurements of typical sample, they are not guaranteed.
BU7244xx: -40℃ to +85℃ BU7244Sxx: -40℃ to +105℃