

- ◆ Operating Voltage Range (Single Cell) 1.2V to 10V
- ◆ Input / Output Rail To Rail Operation
- ◆ Gain Bandwidth 210kHz
- ◆ Slew Rate 0.07V / μ S
- ◆ Low Power Consumption 15 μ A
- ◆ SOT - 25 Ultra Small Package

Applications

- Palmtop computers, PDAs
- Cellular and portable phones
- Portable audio systems
- Various battery powered systems

General Description

The XC221A1100MR is an input / output rail to rail CMOS Op Amp. With rail to rail functions, operation is guaranteed from power supplies as low as 1.2V. Moreover, since the XC221 comes in an ultra small SOT-25 package, the series is particularly suited for use with various types of portable phones. Margins of 210kHz and slew rates of 0.07V can be achieved even with power consumption as low as 15 μ A. Even with large capacitance levels of CL = 200pF (unity gain connection), the XC221 will not be susceptible to oscillation.

Features

Operating Voltage Range : 1.2 to 10V (single cell)
 ± 0.6 to 5V (+ve / -ve supply)
Common Mode Input Voltage Range : VSS -0.2V to VDD +0.2V
Output Signal : 0.1 to 2.9V (3V single cell, RL=2k)
Gain Bandwidth : 210kHz
Slew Rate : 0.07v / μ S
High Capacitance Load : CL=200pF (500pF also available)
Low Supply Current : 15 μ A

Pin Assignment

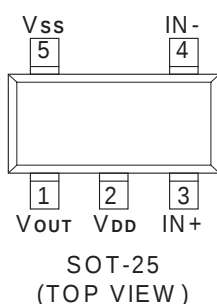
PIN NUMBER	SYMBOL	FUNCTION
1	VOUT	Output Pin
2	VDD	Positive Power Supply Pin
3	IN+	Positive Input
4	IN-	Negative Input
5	VSS	Negative Power Supply Pin

Absolute Maximum Ratings

Ta = 25°C, VSS = 0V

PARAMETER	SYMBOL	RATINGS	UNITS
VDD pin voltage	VDD	-0.3 to 12	V
OUT pin voltage	VOUT	-0.3 to 12	V
IN pin voltage	VIN+	-0.3 to VDD + 0.3	V
IN/ pin voltage	VIN-	-0.3 to VDD + 0.3	V
OUT pin current	IOU	± 100	mA
Continuous Total Power Dissipation	Pd	150	mW
Ambient Operating Temp.	Topr	-30 to +80	°C
Storage Temp.	Tstg	-40 to +125	°C

Pin Configuration



■ Electrical Characteristics

XC221A1100

$I_{DD} = 15\mu A$, $V_{OF} = 20.0mV$

$T_a = 25^\circ C$

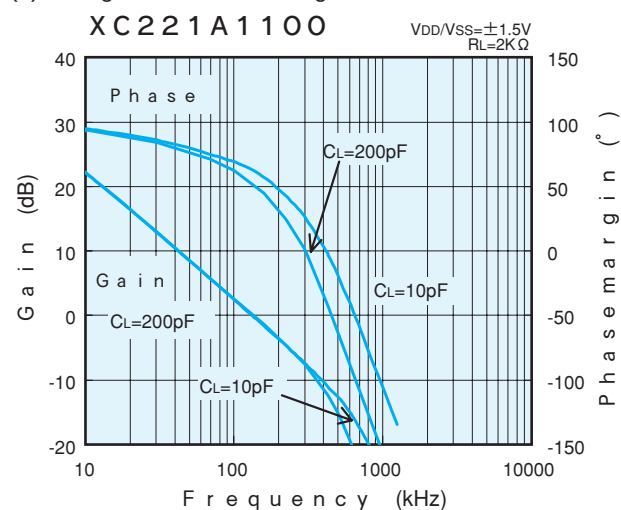
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Power Supply Voltage Range	V_{DD}		1.2	-	10	V
Supply Current	I_{DD}	$V_{DD} = 3V$	10	15	23	μA
		$V_{DD} = 1.2V$	2.5	8	23	μA
Input Offset Voltage	V_{OF}		-	-	20.0	mV
Input Offset Current	I_{OF}		-	1	-	pA
Input Bias Current	I_B		-	1	-	pA
Input Resistance	R_{IN}		-	1	-	$T\Omega$
Large Signal Voltage Gain	A_{VD}		75	110	-	dB
Common Mode Rejection Ratio	$CMRR$	$0 < V_{CM} < 3.0V$	60	75	-	dB
Power Supply Rejection Ratio	PSRR +	$V_{DD} = 3 \text{ to } 10V$, $V_{SS} = 0V$, $V_{OUT} = 1.5V$	60	75	-	dB
	PSRR -	$V_{SS} = -3 \text{ to } -10V$, $V_{DD} = 0V$, $V_{OUT} = -1.5V$	60	75	-	dB
Output Voltage Range	V_{OUT}	$R_L = \infty$	0.05	-	$V_{DD} - 0.05$	V
		$V_{DD} = 1.2V$, $R_L = 47k\Omega$ (to $V_{DD}/2$)	0.10	-	1.10	V
		$V_{DD} = 3V$, $R_L = 2k\Omega$ (to $V_{DD}/2$)	0.10	-	2.90	V
		$V_{DD} = 5V$, $R_L = 2k\Omega$ (to $V_{DD}/2$)	0.10	-	4.90	V
		$V_{DD} = 10V$, $R_L = 2k\Omega$ (to $V_{DD}/2$)	0.10	-	9.80	V
Gain Bandwidth	FT	$V_{DD} = 3V$	-	210	-	kHz
Slew Rate	SR	$V_{DD} = 3V$	0.04	0.07	-	V/ μs

Measuring Conditions :

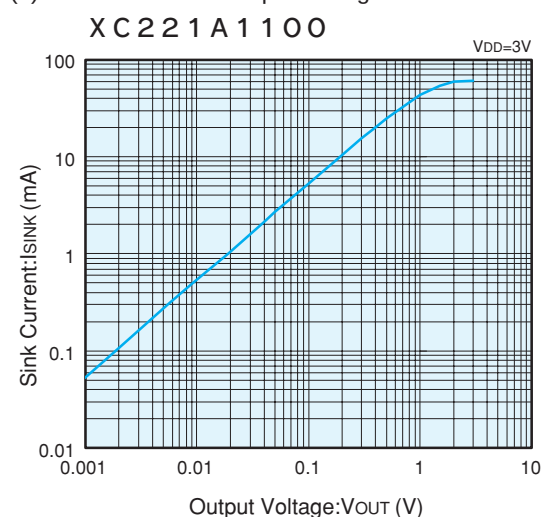
Unless otherwise stated, $V_{DD} = 3.0V$, $V_{SS} = 0V$, $V_{CM} = V_{OUT} = V_{DD} / 2$, $R_L = 1M\Omega$ (to V_{SS}), $C_L = 10pF$ (to V_{SS})

XC221A1100 (15 μ A) Electrical characteristics

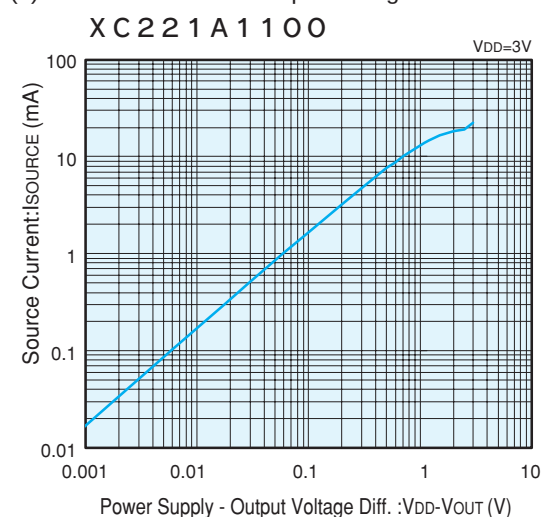
(1) Voltage Gain, Phase Margin



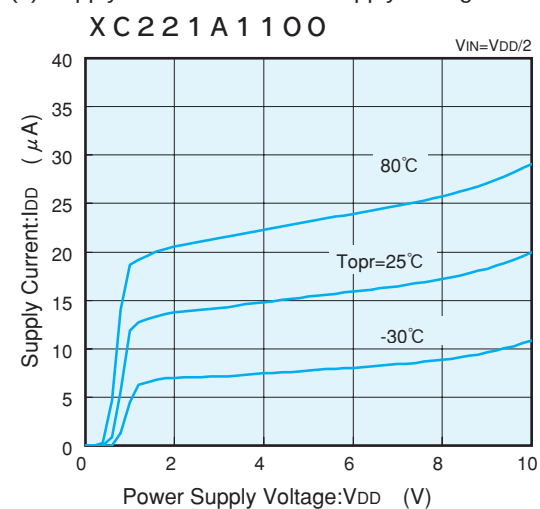
(2) Sink Current vs. Output Voltage



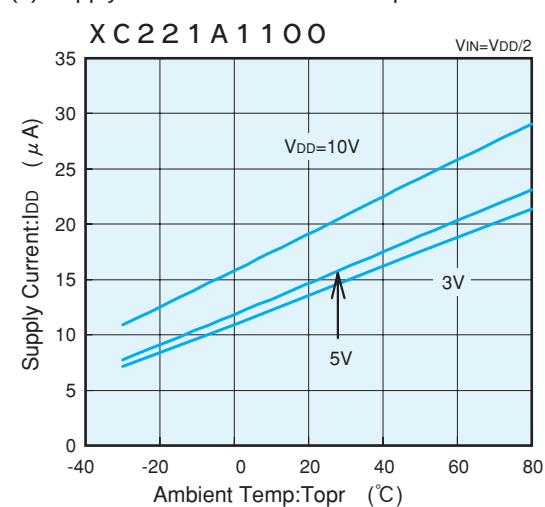
(3) Source Current vs. Output Voltage



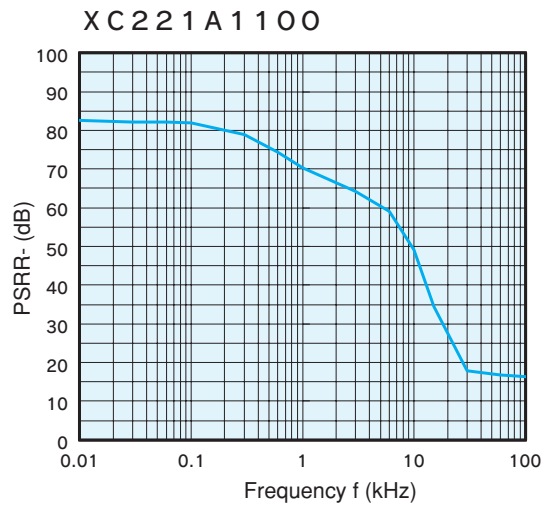
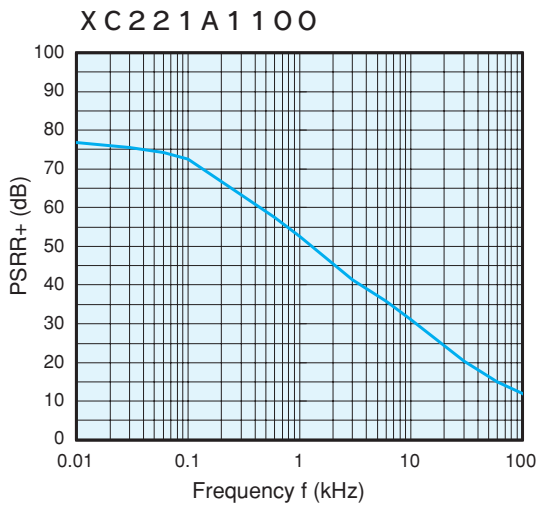
(4) Supply Current vs. Power Supply Voltage



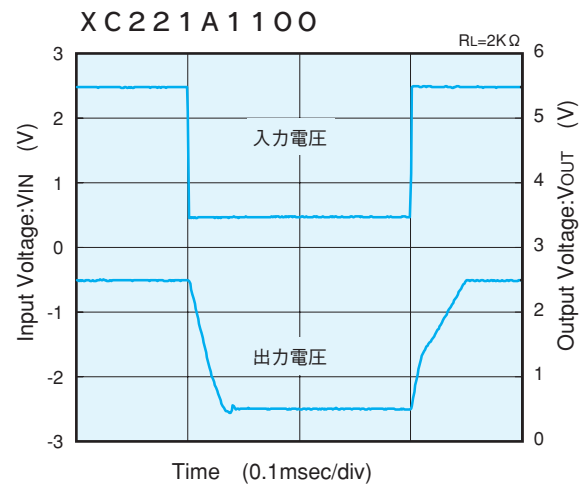
(5) Supply Current vs. Ambient Temperature



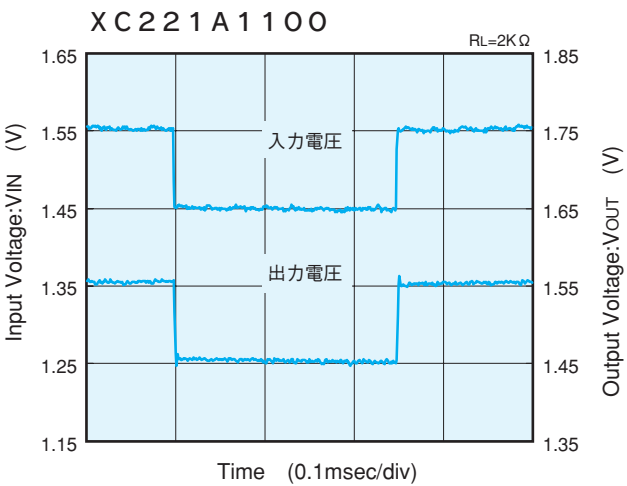
(6) Power Supply Rejection Ratio vs. Frequency



(7) Large Signal Input Response



(8) Small Signal Input Response

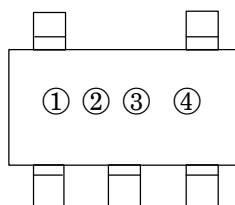


■ Ordering Information

XC221A x x x x x x
a b c d e f

DESIGNATOR	DESCRIPTION	DESIGNATOR	DESCRIPTION
a	Number of Channels : 1=one	e	Package Type : M = SOT-25
b	Consumption Current : 1=15μA		
c	0 = Internal standard	f	Device Orientation : R = Embossed Tape (Right) L = Embossed Tape (Left)
d	Load Capacitance : 0=200pF		

■ Marking



SOT-25
(TOP VIEW)

- ① Represents the part name and the consumption current level

PART	CURRENT	SYMBOL
XC221A11	15μA	1

- ② Based on internal standards

- ③ Represents load capacitance

CAPACITANCE	SYMBOL
200Pf	0

- ④ Represents the assembly lot no.
0 - 9, A - Z repeated (excluding G,I,J,O,Q & W)