XC221A1200MR

1.2V Input / Output Rail To Rail CMOS Op Amp

- **Operating Voltage Range (Single Cell) 1.2V to 10V**
- **Input / Output Rail To Rail Operation**
- **Gain Bandwidth 550kHz**
- **Slew Rate 0.5V / μS**
- **Low Power Consumption 100μA**
- **SOT - 25 Ultra Small Package**

Applications

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

General Description

The XC221A1200MR 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.
Bandwidths of 550kHz and slew rates of 0.5V can be achieved even with power consumption as low as 100μA.
Even with large capacitance levels of C_L = 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)
Output Signal : 0.1 to 2.9V (3V single cell, R_L=2k)
Gain Bandwidth : 550kHz
Slew Rate : 0.5v / μS
High Capacitance Load : C_L=200pF
Low Supply Current : 100μA

Pin Assignment

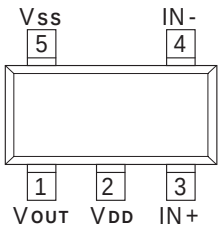
PIN NUMBER	SYMBOL	FUNCTION
1	V_{OUT}	Output Pin
2	V_{DD}	Positive Power Supply Pin
3	IN+	Positive Input
4	IN-	Negative Input
5	V_{SS}	Negative Power Supply Pin

Absolute Maximum Ratings

Ta = 25° C, V_{SS} = 0V

PARAMETER	SYMBOL	RATINGS	UNITS
V_{DD} pin voltage	V_{DD}	-0.3 to 12	V
OUT pin voltage	V_{OUT}	-0.3 to 12	V
IN pin voltage	V_{IN+}	- 0.3 to V_{DD} + 0.3	V
IN/ pin voltage	V_{IN-}	- 0.3 to V_{DD} + 0.3	V
OUT pin current	I_{OUT}	±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



SOT-25
(TOP VIEW)

■ Electrical Characteristics

XC221A1200

I_{DD}=100 μA, V_{OF}=20.0 mV Ta = 25°C

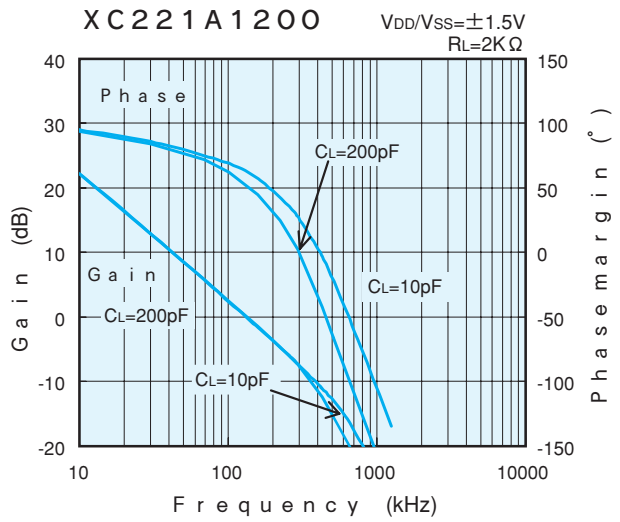
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Power Supply Voltage Range	V_{DD}		1.2	-	10	V
Supply Current	I_{DD}	V_{DD} = 3V	67	100	150	μA
		V_{DD} = 1.2V	16.75	50	150	μA
Input Offset Voltage	V_{OF}		-	-	20.0	mV
Input Offset Current	I_{OF}		-	1	-	pA
Input Bias Current	I_B		-	1	-	pA
Input Resistance	R_{IN}		-	1	-	TΩ
Large Signal Voltage Gain	AVD		75	110	-	dB
Common Mode Rejection Ratio	CMRR	0 < VCM <3.0V	60	75	-	dB
Power Supply Rejection Ratio	PSRR +	V_{DD} = 3 to 10V, V_{SS} = 0V, V_{OUT} = 1.5V	60	75	-	dB
	PSRR -	V_{SS} = -3 to -10V, V_{DD} = 0V, V_{OUT} = -1.5V	60	75	-	dB
Output Voltage Range	V_{OUT}	R_L = ∞	0.05	-	V_{DD} - 0.05	V
		V_{DD} = 1.2V, R_L = 47kΩ (to V_{DD}/2)	0.10	-	1.10	V
		V_{DD} = 3V, R_L = 2kΩ (to V_{DD}/2)	0.10	-	2.90	V
		V_{DD} = 5V, R_L = 2kΩ (to V_{DD}/2)	0.10	-	4.90	V
		V_{DD} = 10V, R_L = 2kΩ (to V_{DD}/2)	0.10	-	9.80	V
Gain Bandwidth	FT	V_{DD} = 3V	-	550	-	kHz
Slew Rate	SR	V_{DD} = 3V	-	0.50	-	V / μs

Measuring Conditions :

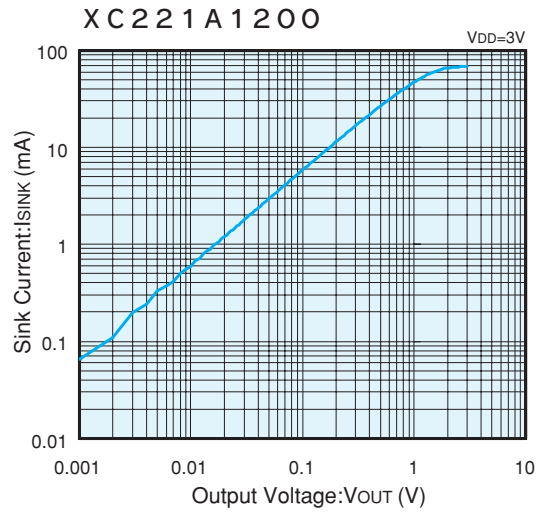
Unless otherwise stated, V_{DD} = 3.0V, V_{SS} = 0V, V_{CM} = V_{OUT} = V_{DD} / 2, R_L = 1MΩ (to V_{SS}), C_L = 10pF (to V_{SS})

■ XC221A1200 (100 μA) Electrical characteristics

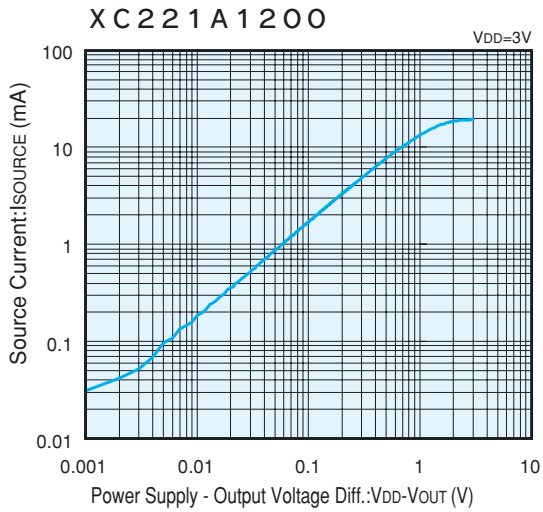
(1) Voltage Gain, Phase Margin



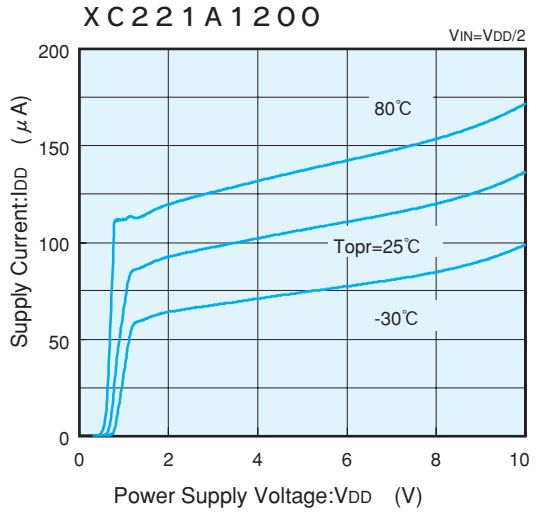
(2) Sink Current vs. Output Voltage



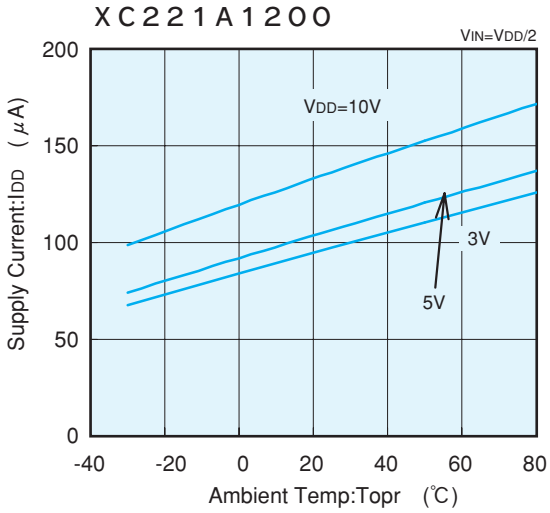
(3) Source Current vs. Output Voltage



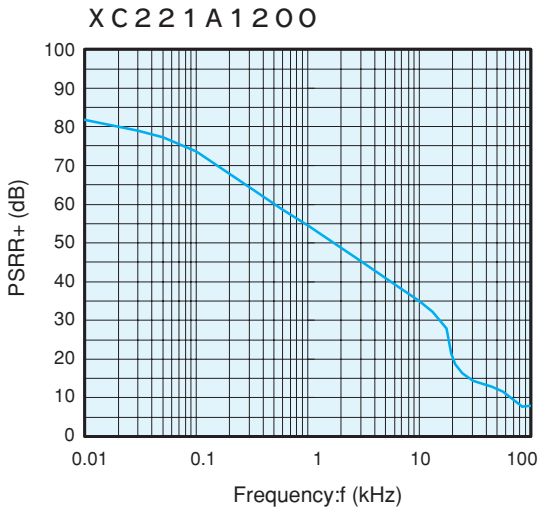
(4) Supply Current vs. Power Supply Voltage

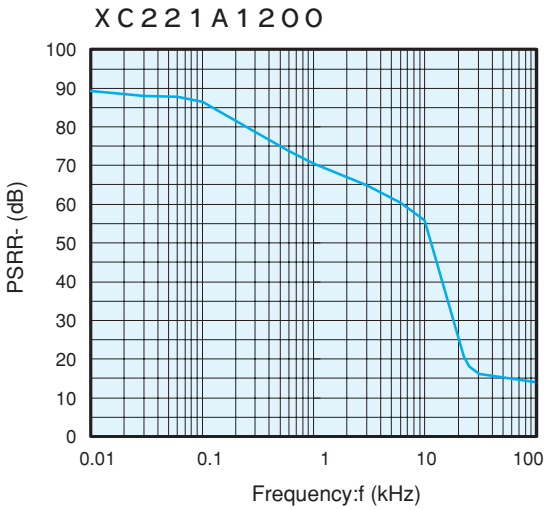


(5) Supply Current vs. Ambient Temperature

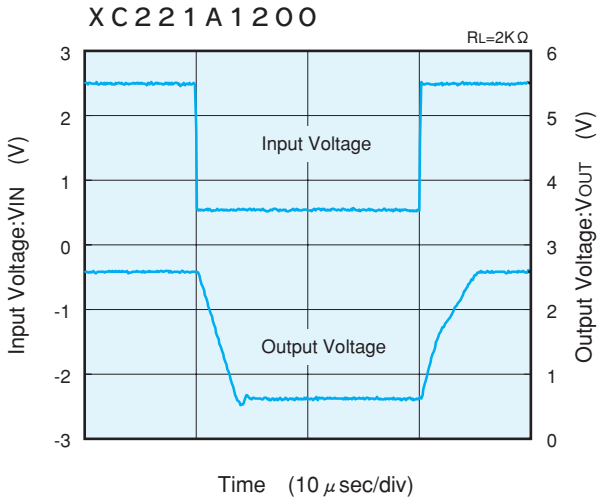


(6) Power Supply Rejection Ratio vs. Frequency

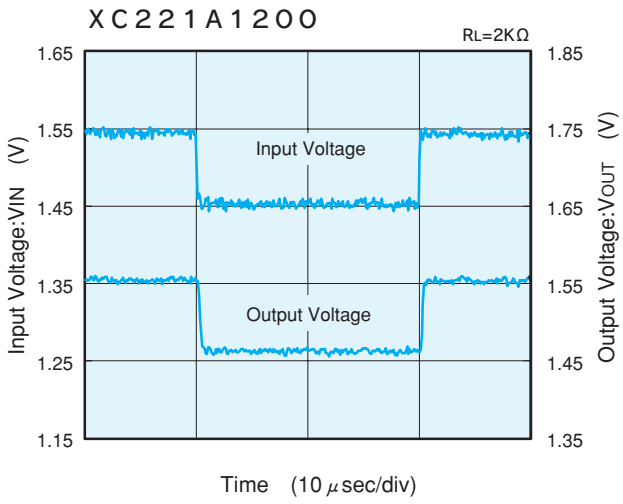




(7) Large Signal Input Response



(8) Small Signal Input Response



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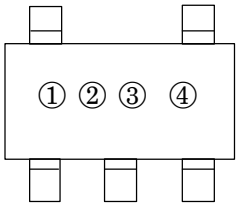
■ **Ordering Information**

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 : 2=100µA		
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
XC221A12	100µA	2

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)