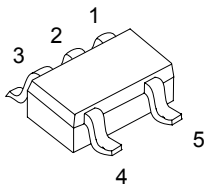
LR1102

CMOS IC

LOW NOISE 150mA LDO REGULATOR



SOT-25

*Pb-free plating product number: LR1102L

■ DESCRIPTION

The UTC **LR1102** families are CMOS-based voltage regulator ICs with extremely low supply current, high output voltage accuracy, high Ripple Rejection and chip enable circuit.

These ICs performance are excellent and with SOT-25 package, thus these ICs are very suitable for hand-held communication equipment.

■ FEATURES

* Ultra-low supply current : Typ. 35μA
* Standby mode: typ. 0.1μA
* Low dropout voltage: Typ. 0.2V (I_{OUT} = 100mA)
* Excellent Line Regulation: Typ. 0.05%/V
* High Ripple Rejection: Typ. 70dB (f = 1kHz)

■ ORDERING INFORMATION

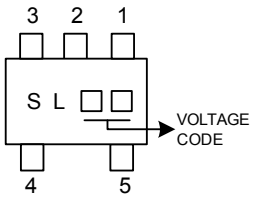
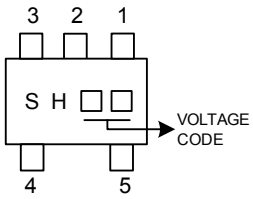
Order Number		Package	Pin Assignment					Packing
Normal	Lead Free Plating		1	2	3	4	5	
LR1102x-xx-AF5-R	LR1102xL-xx-AF5-R	SOT-25	I	G	C	N	O	Tape Reel

Note: Pin Assignment: I:V_{DD} O:V_{OUT} G:GND C: CE/$\overline{CE}$ N: No Connection

LR1102xL-xx-AF5-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) AF5: SOT-25
(3)Output Voltage Code	(3) xx: refer to Marking Information
(4)Lead Plating	(4) L: Lead Free Plating Blank: Pb/Sn
(5)Active	(5) A: Low B: High

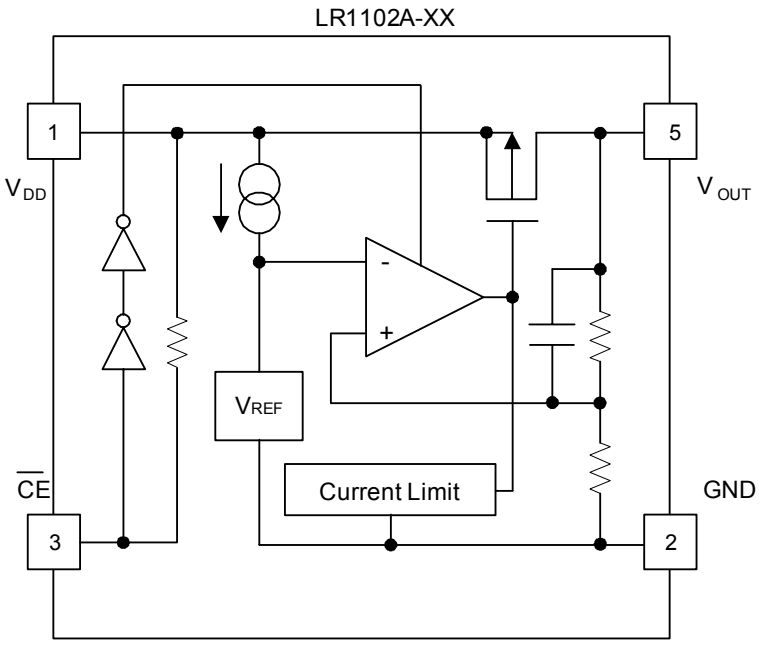
■ MARKING INFORMATION

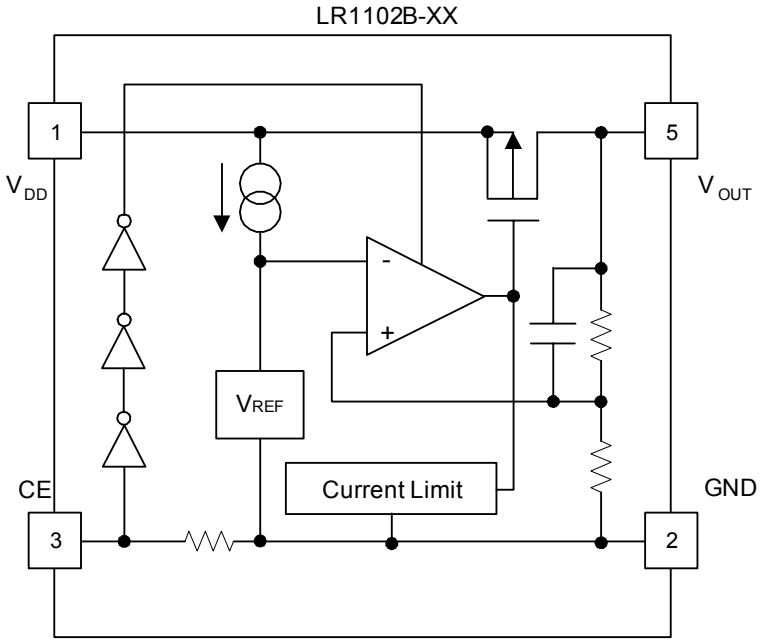
PACKAGE	VOLTAGE CODE	MARKING	
SOT-25	50:5.0V 35:3.5V 33:3.3V 30:3.0V 2J:2.85V 28:2.8V 27:2.7V 25:2.5V 18:1.8V 15:1.5V	For LR1102A-XX 	For LR1102B-XX 

■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V_{DD}	Input Pin
2	GND	Ground Pin
3	CE/$\overline{CE}$	Chip Enable Pin
4	NC	No Connection
5	V_{OUT}	Output Pin

■ BLOCK DIAGRAM





■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	9	V
Input Voltage	V_{CE}	-0.3 ~ V_{IN}+0.3	V
Output Voltage	V_{OUT}	-0.3 ~ V_{IN}+0.3	V
Output Current	I_{OUT}	200	mA
Power Dissipation	P_D	250	mW
Junction Temperature	T_J	+125	℃
Operating Temperature	T_{OPR}	-20 ~ +85	℃
Storage Temperature	T_{STG}	-40 ~ +150	℃

Note1.Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2.The device is guaranteed to meet performance specification within 0℃~+70℃ operating temperature range and assured by design from -20℃~+85℃.

■ ELECTRICAL CHARACTERISTICS

LR1102A-XX (T_{OPR}=25℃)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	V_{IN}=Set V_{OUT} + 1V, 1mA≤I_{OUT}≤30mA	V_{OUT}x0.98		V_{OUT}x1.02	V
Output Current	I_{OUT}	Refer to the Electrical Characteristics by Output Voltage				
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	V_{IN}=Set V_{OUT} + 1V, 1mA≤I_{OUT}≤80mA		12	40	mV
Dropout Voltage	V_{DIF}	Refer to the Electrical Characteristics by Output Voltage				
Supply Current	I_{SS}	V_{IN}=Set V_{OUT} + 1V		10	20	μA
Supply Current (Standby)	I_{ST-BY}	V_{IN}=V_{CE}=Set V_{OUT} + 1V		0.1	1.0	μA
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	Set V_{OUT} + 0.5V≤V_{IN}≤8V, I_{OUT}=30mA		0.05	0.20	%/V
Ripple Rejection	RR	f=1kHz, Ripple 0.5Vp-p V_{IN}=Set V_{OUT}+ 1V		70		dB
Input Voltage	V_{IN}		2		8	V
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T$	I_{OUT} = 30mA, -20℃≤T_{OPR}≤85℃		±100		ppm/℃
Short Current Limit	I_{LIMIT}	V_{OUT}=0V		200		mA
$\overline{CE}$ Pull-up Resistance	R_{PU}		2.5	5.0	10.0	MΩ
$\overline{CE}$ Input Voltage "H"	V_{CEH}		1.5		V_{IN}	V
$\overline{CE}$ Input Voltage "L"	V_{CEL}		0.00		0.25	V
Output Noise	eN	B_W = 10Hz ~ 100kHz		30		μVrms

LR1102B-XX (T_{OPR}=25℃)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	V_{IN}=Set V_{OUT} + 1V, 1mA≤I_{OUT}≤30mA	V_{OUT}x0.98		V_{OUT}x1.02	V
Output Current	I_{OUT}	Refer to the Electrical Characteristics by Output Voltage				
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	V_{IN}=Set V_{OUT} + 1V, 1mA≤I_{OUT}≤80mA		12	40	mV
Dropout Voltage	V_{DIF}	Refer to the Electrical Characteristics by Output Voltage				
Supply Current	I_{SS}	V_{IN}=Set V_{OUT} + 1V		10	20	μA
Supply Current (Standby)	I_{ST-BY}	V_{IN}= Set V_{OUT} + 1V, V_{CE}=GND		0.1	1.0	μA
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	Set V_{OUT} + 0.5V≤V_{IN}≤8V, I_{OUT}=30mA		0.05	0.20	%/V
Ripple Rejection	RR	f=1kHz, Ripple 0.5Vp-p V_{IN}=Set V_{OUT} + 1V		70		dB
Input Voltage	V_{IN}		2		8	V
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T$	I_{OUT} = 30mA, -20℃≤T_{OPR}≤85℃		±100		ppm/℃
Short Current Limit	I_{LIMIT}	V_{OUT}=0V		200		mA
CE Pull-down Resistance	R_{PD}		2.5	5.0	10.0	MΩ
CE Input Voltage "H"	V_{CEH}		1.5		V_{IN}	V
CE Input Voltage "L"	V_{CEL}		0.00		0.25	V
Output Noise	eN	B_W = 10Hz ~ 100kHz		30		μVrms

■ ELECTRICAL CHARACTERISTICS by OUTPUT VOLTAGE

(T_{OPR}=25℃)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Current	I_{OUT}	V_{IN} -V_{OUT} = 1.0V	1.5≤V_{OUT}≤1.7	100			mA
			1.8≤V_{OUT}≤5.0	150			mA
Dropout Voltage	V_D	I_{OUT} = 100mA	V_{OUT}=1.5V			0.8	V
			V_{OUT}=1.6V			0.7	V
			V_{OUT}=1.7V			0.5	V
			1.8≤V_{OUT}≤1.9		0.20	0.40	V
			2.0≤V_{OUT}≤2.4		0.20	0.35	V
			2.5≤V_{OUT}≤2.7		0.18	0.30	V
			2.8≤V_{OUT}≤3.3		0.18	0.25	V
			3.4≤V_{OUT}≤5.0		0.15	0.22	V

■ TEST CIRCUITS

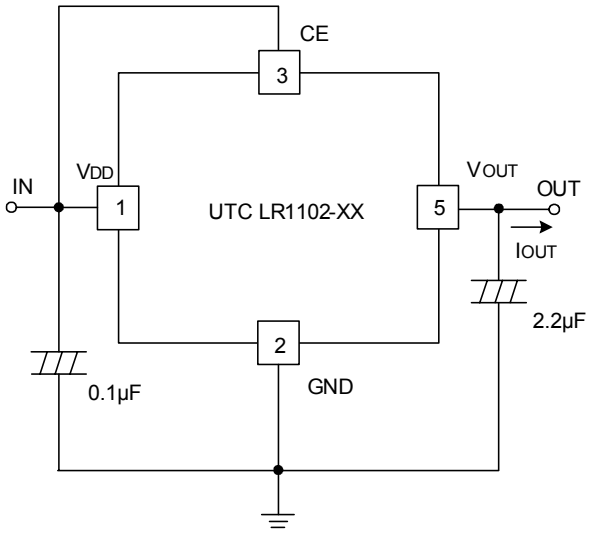


Fig.1 Standard Test Circuit

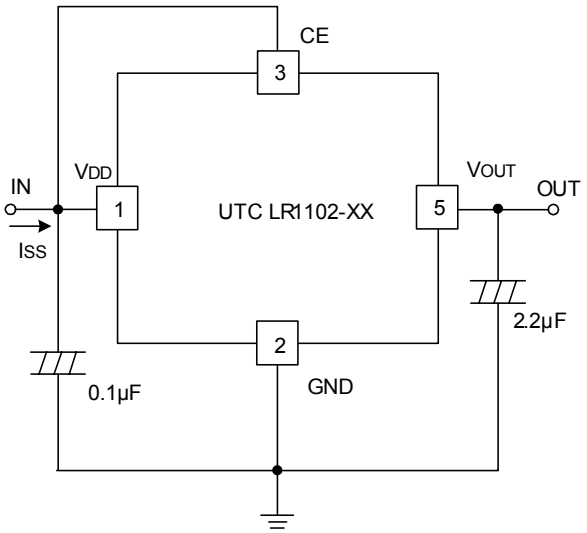


Fig.2 Supply Current Test Circuit

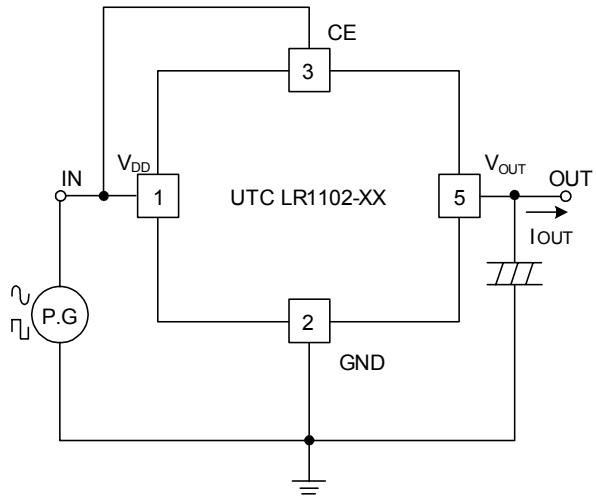


Fig.3 Ripple Rejection, Line Transient Response Test Circuit

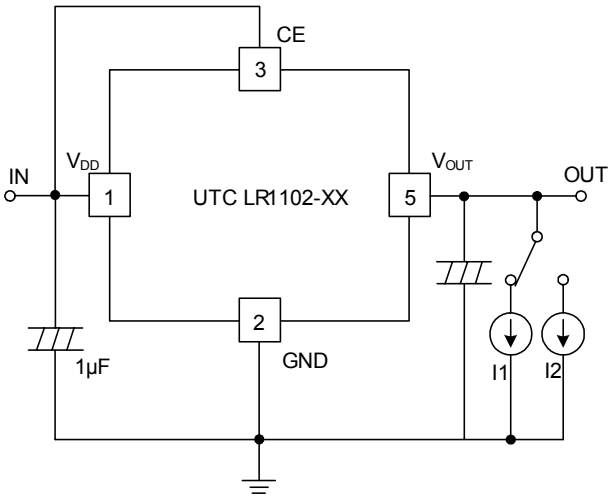
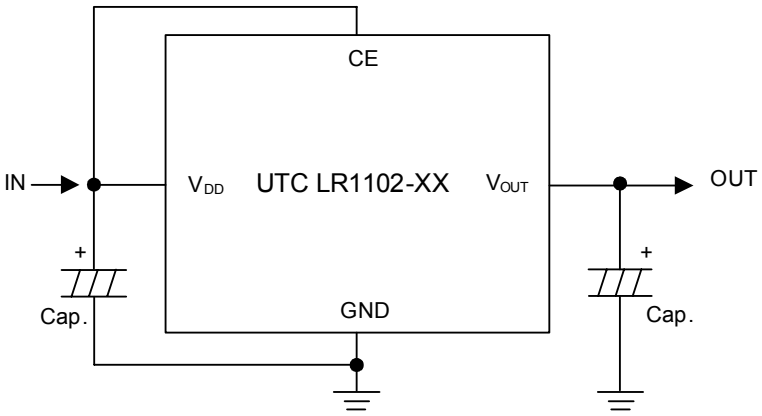


Fig.4 Load Transient Response Test Circuit

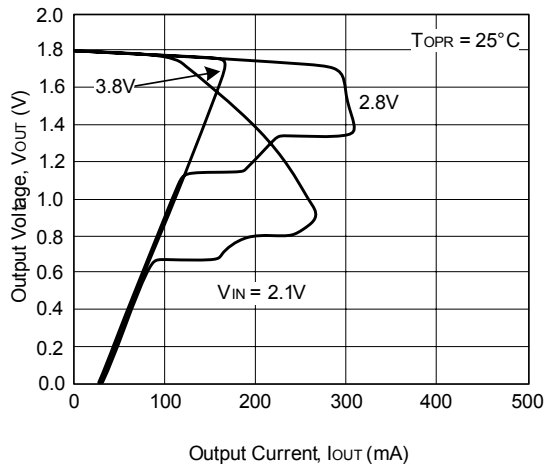
■ TYPICAL APPLICATION



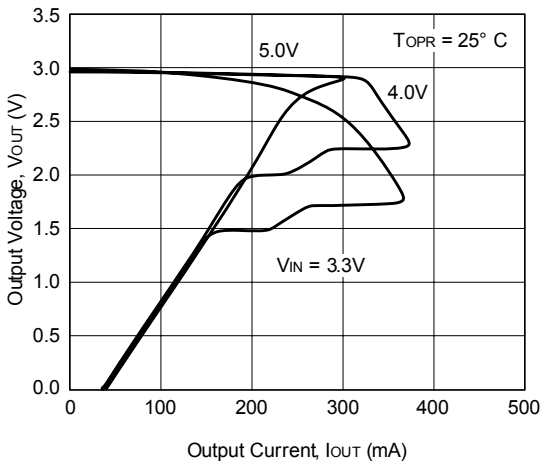
■ TYPICAL CHARACTERISTICS

1. Output Voltage vs. Output Current

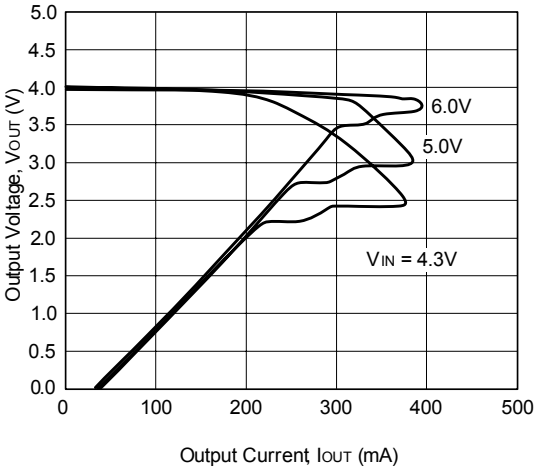
LR1102-1.8V



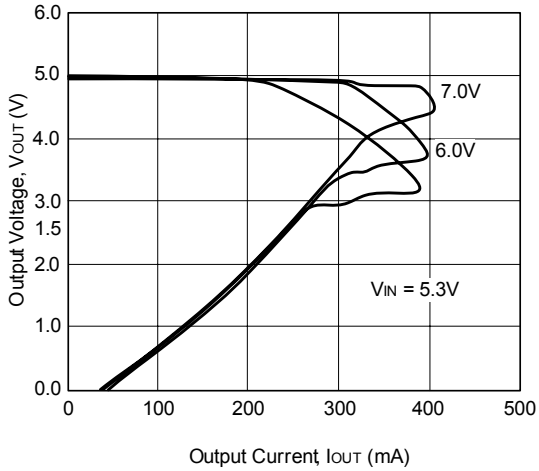
LR1102-3.0V



LR1102-4.0V

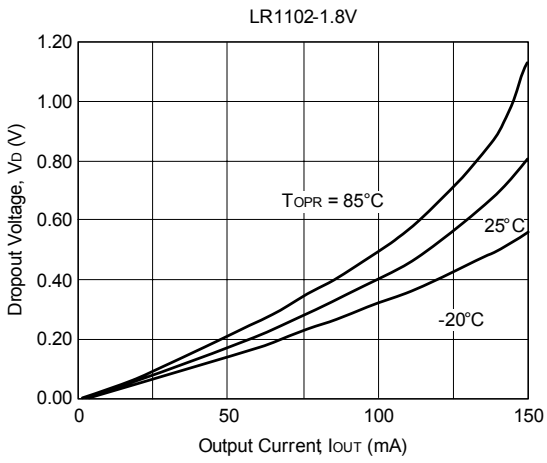


LR1102-5.0V

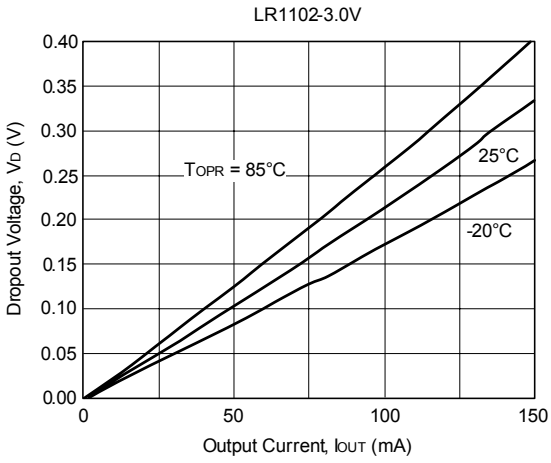


2. Dropout Voltage vs. Output Current

LR1102-1.8V

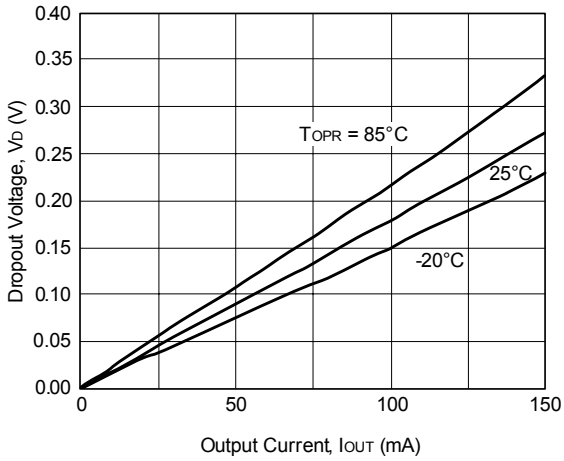


LR1102-3.0V

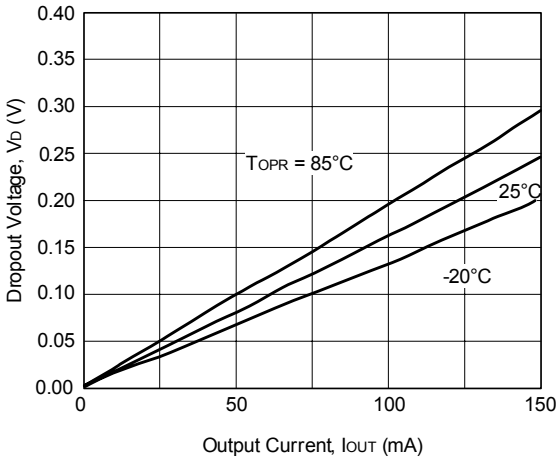


■ TYPICAL CHARACTERISTICS(Cont.)

LR1102-4.0V

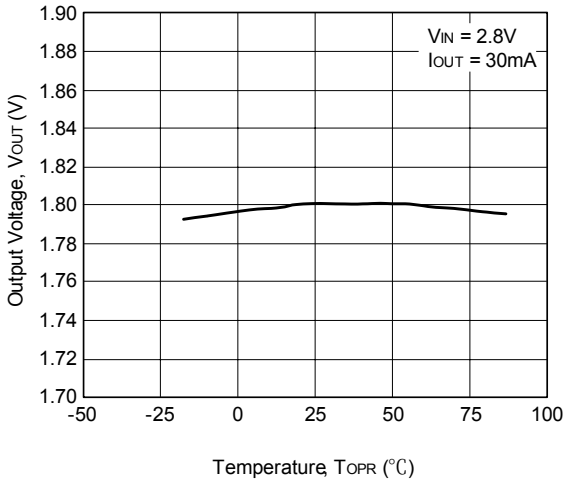


LR1102-5.0V

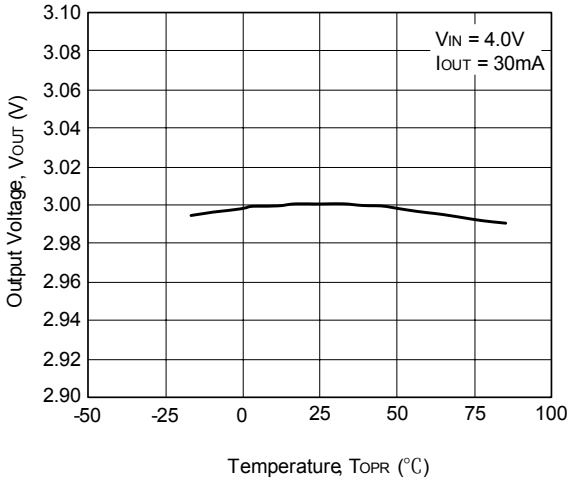


3. Output Voltage vs. Temperature

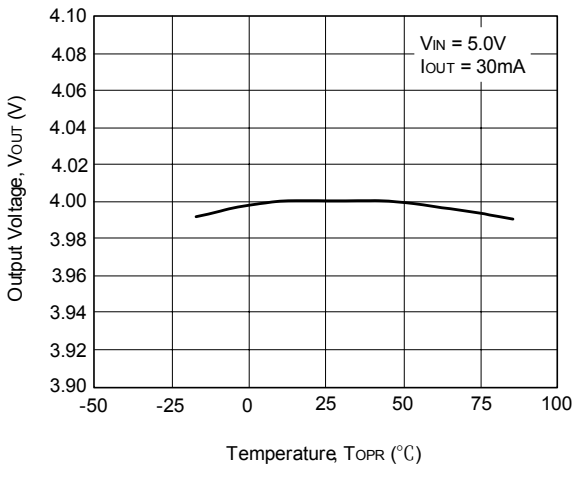
LR1102-1.8V



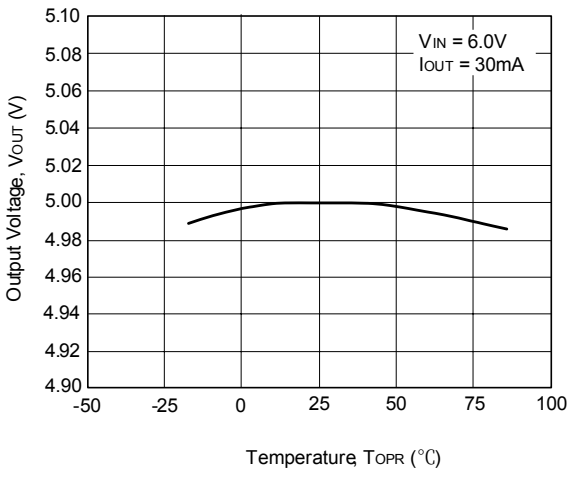
LR1102-3.0V



LR1102-4.0V

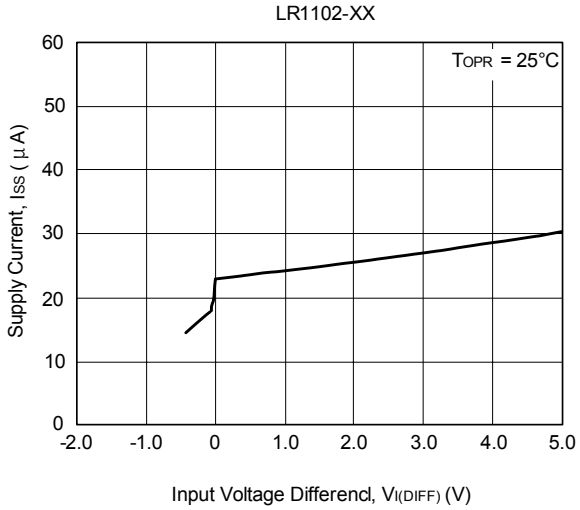


LR1102-5.0V

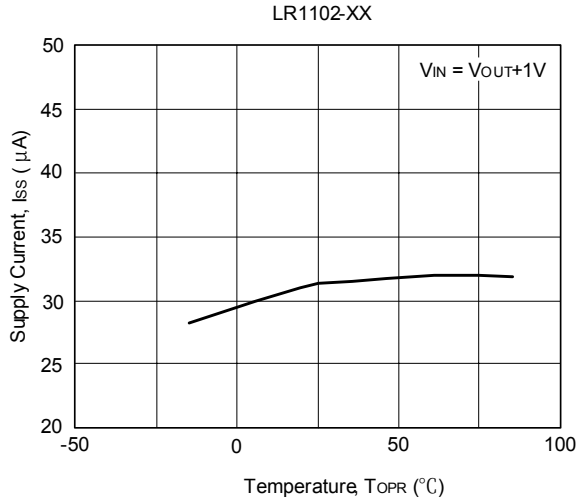


■ TYPICAL CHARACTERISTICS(Cont.)

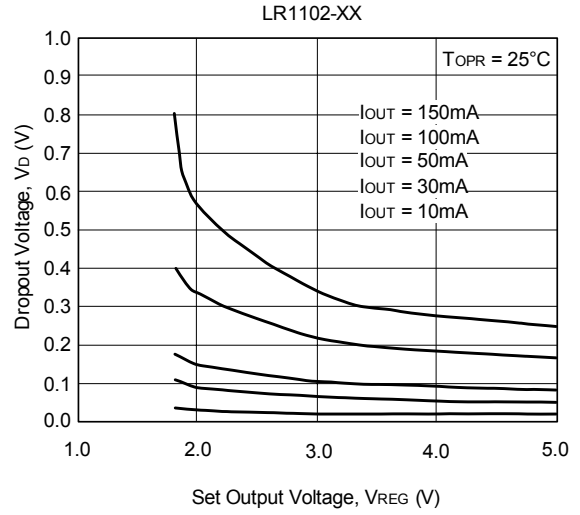
4. Supply Current vs. Input Voltage



5. Supply Current vs. Temperature

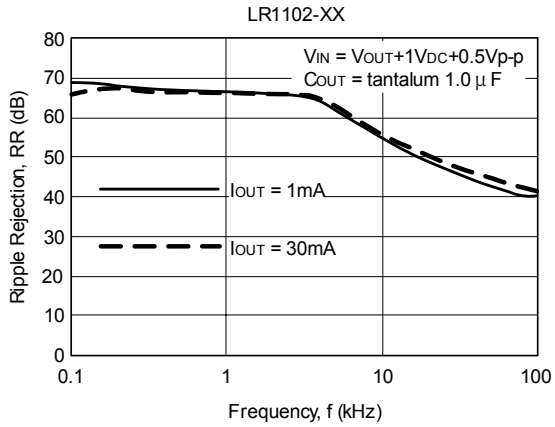


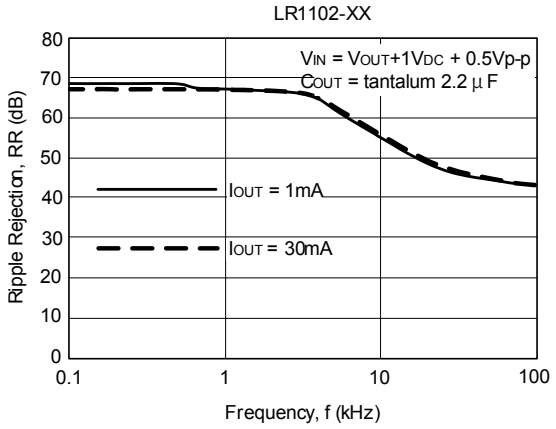
6. Dropout Voltage vs. Set Output Voltage



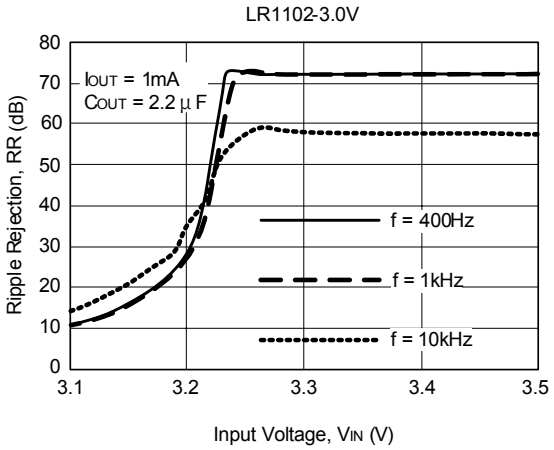
■ TYPICAL CHARACTERISTICS(Cont.)

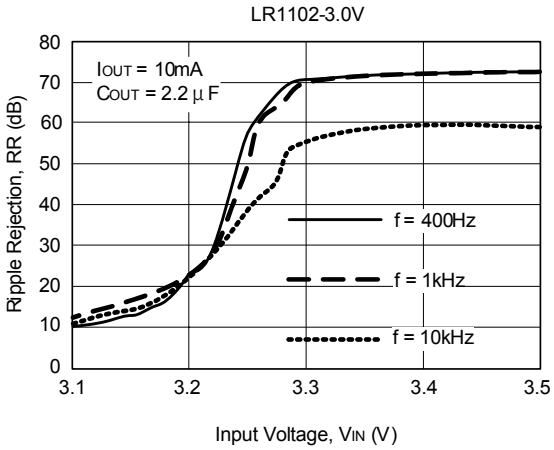
7. Ripple Rejection vs. Frequency





8. Ripple Rejection vs. Input Voltage (DC bias)





9. Load Transient Response