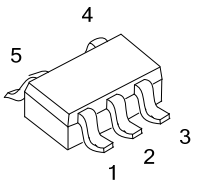
LR1122B

CMOS IC

LOW NOISE 200 mA LDO REGULATOR



SOT-25

■ DESCRIPTION

The UTC **LR1122B** is a typical LDO (linear regulator) with the features of High output voltage accuracy, low supply current, low ON-resistance, and high ripple rejection.

During operation of the UTC **LR1122B**, the dropout voltage is very low and the response of line transient and load transient are very well.

Internally, there're many functions of UTC **LR1122B** which can be seen in the block figure. There are a voltage reference unit, an error amplifier, resistor-net for voltage setting, a current limit circuit, and a chip enable circuit in each UTC **LR1122B**.

The UTC **LR1122B** can be used as an ideal of the power supply for hand-held communication equipment, such as: power source for portable communication equipment, power source for electrical appliances, for example, cameras, VCRs and camcorders and power source for battery-powered equipment.

■ FEATURES

*Ultra Supply Current: 18μA (Typ.)
*Standby Mode: 0.1μA (Typ.)
*Very Low Dropout Voltage: 0.13V (Typ.) @I_{OUT} =150mA, V_{OUT} =2.85V
*Ripple Rejection: 75dB (Typ.) @f=1kHz,V_{OUT}=2.85V
*Temperature-Drift Coefficient of Output Voltage: ±30ppm/°C (Typ.)
*Well Line Regulation: 0.02%/ V (Typ.)
*Output Voltage Accuracy: ±0.8% (Typ.)
*Internal Fold Back Protection Circuit: 40mA (Typ.) @ short mode
*C_{IN}=C_{OUT}=1μF or more (Ceramic capacitors) are Recommended to be used with this IC

■ ORDERING INFORMATION

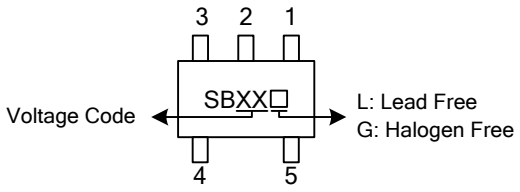
Ordering Number	Package	Packing
LR1122BG-xx-AF5-R	SOT-25	Tape Reel

Note: xx: Output Voltage, refer to Marking Information.

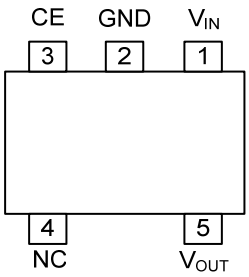
LR1122BG-xx-AF5-R

(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)Halogen Free	(4) G: Halogen Free

■ MARKING

PACKAGE	VOLTAGE CODE	MARKING
SOT-25	16:1.6V 20:2.0V 25:2.5V 2J:2.85V 30:3.0V 33:3.3V	

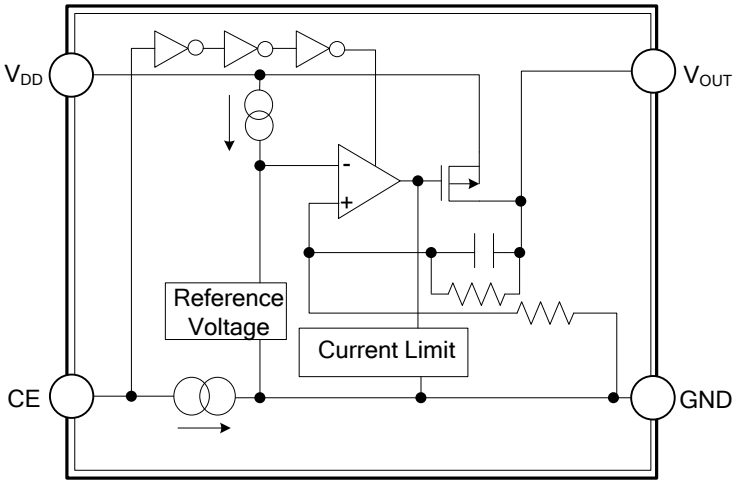
■ PIN CONFIGURATION



■ PIN DESCRIPTIONS

PIN NO.	PIN NAME	DESCRIPTION
1	V_{DD}	Input Pin
2	GND	Ground Pin
3	CE	Chip Enable Pin. Active when this Pin is high.
4	NC	No Connection
5	V_{OUT}	Output Pin

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	6.0	V
Input Voltage(CE Pin)	V_{CE}	6.0	V
Output Voltage	V_{OUT}	-0.3~ V_{IN}+0.3	V
Output Current	I_{OUT}	300	mA
Power Dissipation	P_D	420	mW
Junction Temperature	T_J	+125	°C
Operating Temperature	T_{OPR}	-40~+85	°C
Storage Temperature	T_{STG}	-55~+125	°C

Note: 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.

■ ELECTRICAL CHARACTERISTICS

($Ta=25°C$, V_{IN}=Set V_{OUT}+1V, I_{OUT}=1mA, C_I =C_O=1μF, unless otherwise specified)

LR1122B-1.6V

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage		V_{OUT}	V_{IN} = Set V_{OUT}+1V	1.587		1.613	V
Input Voltage (Note)		V_{IN}				5.0	V
Load Regulation		$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	1mA≤I_{OUT}≤150mA		20	40	mV
Output Current		I_{OUT}		200			mA
Supply Current		I_{SS}	I_{OUT}=0A		18	25	μA
Supply Current (Standby)		I_{ST-BY}	V_{CE}=0V		0.1	2	μA
Short Current Limit		I_{LIMIT}	V_{OUT}=0V		40		mA
CE Pull-down Current		I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}		1.5			V
	Low	V_{CEL}				0.3	V
Output Noise		eN	B_W=10Hz to 100kHz, I_{OUT} =30mA		30		μVrms
Ripple Rejection		RR	f=1kHz, Ripple 0.2V_{P-P} V_{IN}=Set V_{OUT}+1V, I_{OUT}=30mA (In case that V_{OUT}=2.0V, V_{IN}=3V)		75		dB
Dropout Voltage		V_D	I_{OUT}=150mA		0.24	0.38	V
Line Regulation		$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Set V_{OUT}+0.5V≤V_{IN}≤5V		0.02	0.10	%/V
Output Voltage Temperature Coefficient		$\frac{\Delta V_{OUT}}{\Delta T}$	-40°C≤T_{OPR}≤85°C		±30		ppm/°C

■ ELECTRICAL CHARACTERISTICS(Cont.)

LR1122B-2.0V

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage		V_{OUT}	V_{IN} = Set V_{OUT}+1V	1.984		2.016	V
Input Voltage (Note)		V_{IN}				5.0	V
Load Regulation		$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	1mA≤I_{OUT}≤150mA		20	40	mV
Output Current		I_{OUT}		200			mA
Supply Current		I_{SS}	I_{OUT}=0A		18	25	μA
Supply Current (Standby)		I_{ST-BY}	V_{CE}=0V		0.1	2	μA
Short Current Limit		I_{LIMIT}	V_{OUT}=0V		40		mA
CE Pull-down Current		I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}		1.5			V
	Low	V_{CEL}				0.3	V
Output Noise		eN	B_W=10Hz to 100kHz, I_{OUT}=30mA		30		μVrms
Ripple Rejection		RR	f=1kHz, Ripple 0.2V_{P-P} V_{IN}=Set V_{OUT}+1V, I_{OUT}=30mA (In case that V_{OUT}=2.0V, V_{IN}=3V)		75		dB
Dropout Voltage		V_D	I_{OUT}=150mA		0.17	0.30	V
Line Regulation		$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Set V_{OUT}+0.5V≤V_{IN}≤5V		0.02	0.10	%/V
Output Voltage Temperature Coefficient		$\frac{\Delta V_{OUT}}{\Delta T}$	-40°C≤T_{OPR}≤85°C		±30		ppm/°C

LR1122B-2.5V

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage		V_{OUT}	V_{IN} = Set V_{OUT}+1V	2.484		2.516	V
Input Voltage (Note)		V_{IN}				5.0	V
Load Regulation		$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	1mA≤I_{OUT}≤150mA		20	40	mV
Output Current		I_{OUT}		200			mA
Supply Current		I_{SS}	I_{OUT}=0A		18	25	μA
Supply Current (Standby)		I_{ST-BY}	V_{CE}=0V		0.1	2	μA
Short Current Limit		I_{LIMIT}	V_{OUT}=0V		40		mA
CE Pull-down Current		I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}		1.5			V
	Low	V_{CEL}				0.3	V
Output Noise		eN	B_W=10Hz to 100kHz, I_{OUT}=30mA		30		μVrms
Ripple Rejection		RR	f=1kHz, Ripple 0.2V_{P-P} V_{IN}=Set V_{OUT}+1V, I_{OUT}=30mA (In case that V_{OUT}=2.0V, V_{IN}=3V)		75		dB
Dropout Voltage		V_D	I_{OUT}=150mA		0.14	0.25	V
Line Regulation		$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Set V_{OUT}+0.5V≤V_{IN}≤5V		0.02	0.10	%/V
Output Voltage Temperature Coefficient		$\frac{\Delta V_{OUT}}{\Delta T}$	-40°C≤T_{OPR}≤85°C		±30		ppm/°C

■ ELECTRICAL CHARACTERISTICS(Cont.)

LR1122B-2.85V

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage		V_{OUT}	V_{IN} = Set V_{OUT}+1V	2.834		2.866	V
Input Voltage (Note)		V_{IN}				5.0	V
Load Regulation		$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	1mA≤I_{OUT}≤150mA		20	40	mV
Output Current		I_{OUT}		200			mA
Supply Current		I_{SS}	I_{OUT}=0A		18	25	μA
Supply Current (Standby)		I_{ST-BY}	V_{CE}=0V		0.1	2	μA
Short Current Limit		I_{LIMIT}	V_{OUT}=0V		40		mA
CE Pull-down Current		I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}		1.5			V
	Low	V_{CEL}				0.3	V
Output Noise		eN	B_W=10Hz to 100kHz, I_{OUT}=30mA		30		μVrms
Ripple Rejection		RR	f=1kHz, Ripple 0.2V_{P-P} V_{IN}=Set V_{OUT}+1V, I_{OUT}=30mA (In case that V_{OUT}=2.0V, V_{IN}=3V)		75		dB
Dropout Voltage		V_D	I_{OUT}=150mA		0.13	0.23	V
Line Regulation		$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Set V_{OUT}+0.5V≤V_{IN}≤5V		0.02	0.10	%/V
Output Voltage Temperature Coefficient		$\frac{\Delta V_{OUT}}{\Delta T}$	-40°C≤T_{OPR}≤85°C		±30		ppm/°C

LR1122B-3.0V

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage		V_{OUT}	V_{IN} = Set V_{OUT}+1V	2.984		3.016	V
Input Voltage (Note)		V_{IN}				5.0	V
Load Regulation		$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	1mA≤I_{OUT}≤150mA		20	40	mV
Output Current		I_{OUT}		200			mA
Supply Current		I_{SS}	I_{OUT}=0A		18	25	μA
Supply Current (Standby)		I_{ST-BY}	V_{CE}=0V		0.1	2	μA
Short Current Limit		I_{LIMIT}	V_{OUT}=0V		40		mA
CE Pull-down Current		I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}		1.5			V
	Low	V_{CEL}				0.3	V
Output Noise		eN	B_W=10Hz to 100kHz, I_{OUT}=30mA		30		μVrms
Ripple Rejection		RR	f=1kHz, Ripple 0.2V_{P-P} V_{IN}=Set V_{OUT}+1V, I_{OUT}=30mA (In case that V_{OUT}=2.0V, V_{IN}=3V)		75		dB
Dropout Voltage		V_D	I_{OUT}=150mA		0.13	0.23	V
Line Regulation		$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Set V_{OUT}+0.5V≤V_{IN}≤5V		0.02	0.10	%/V
Output Voltage Temperature Coefficient		$\frac{\Delta V_{OUT}}{\Delta T}$	-40°C≤T_{OPR}≤85°C		±30		ppm/°C

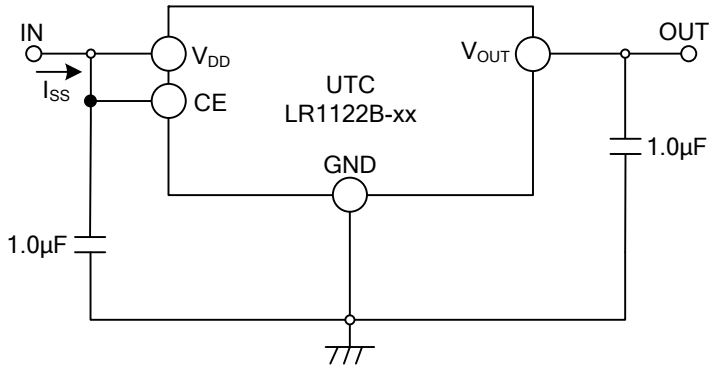
■ ELECTRICAL CHARACTERISTICS(Cont.)

LR1122B-3.3V

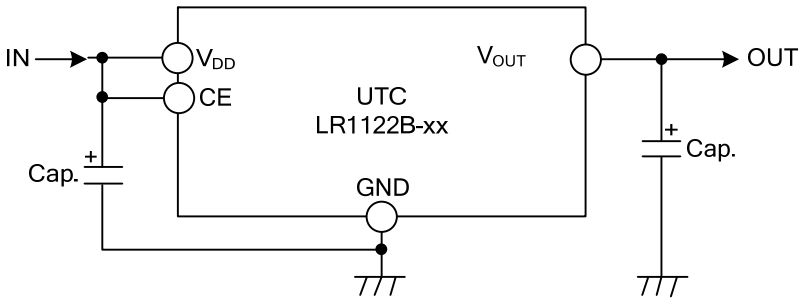
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage		V_{OUT}	V_{IN} = Set V_{OUT}+1V	3.284		3.316	V
Input Voltage (Note)		V_{IN}				5.0	V
Load Regulation		$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	1mA≤I_{OUT}≤150mA		20	40	mV
Output Current		I_{OUT}		200			mA
Supply Current		I_{SS}	I_{OUT}=0A		18	25	μA
Supply Current (Standby)		I_{ST-BY}	V_{CE}=0V		0.1	2	μA
Short Current Limit		I_{LIMIT}	V_{OUT}=0V		40		mA
CE Pull-down Current		I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}		1.5			V
	Low	V_{CEL}				0.3	V
Output Noise		eN	B_W=10Hz to 100kHz, I_{OUT} =30mA		30		μVrms
Ripple Rejection		RR	f=1kHz, Ripple 0.2V_{P-P} V_{IN}=Set V_{OUT}+1V, I_{OUT}=30mA (In case that V_{OUT}=2.0V, V_{IN}=3V)		75		dB
Dropout Voltage		V_D	I_{OUT}=150mA		0.13	0.23	V
Line Regulation		$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Set V_{OUT}+0.5V≤V_{IN}≤5V		0.02	0.10	%/V
Output Voltage Temperature Coefficient		$\frac{\Delta V_{OUT}}{\Delta T}$	-40°C≤T_{OPR}≤85°C		±30		ppm/°C

Note: Max. Input Voltage is 5.5V during 500hours

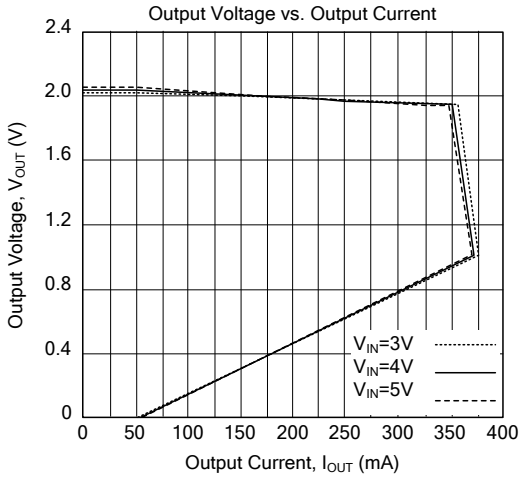
■ TEST CIRCUIT

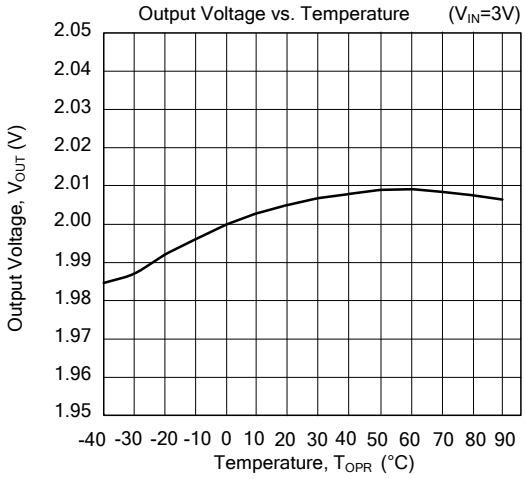


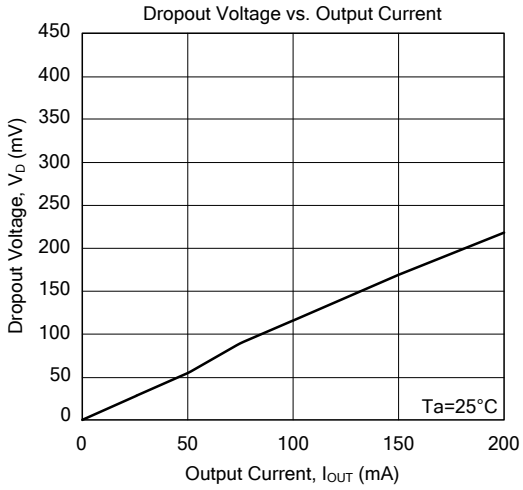
■ TYPICAL APPLICATION CIRCUIT

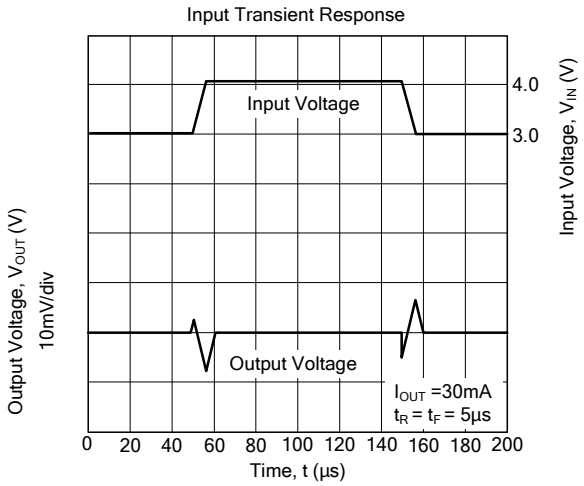


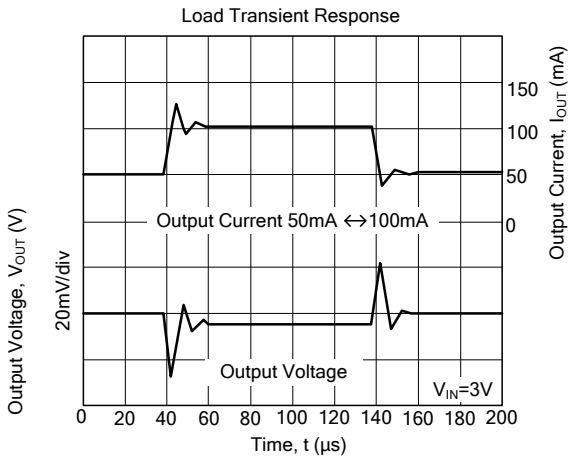
■ TYPICAL CHARACTERISTICS

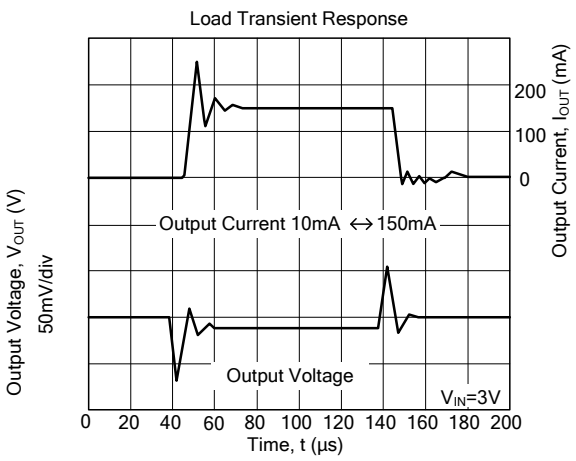












■ TYPICAL CHARACTERISTICS(Cont.)