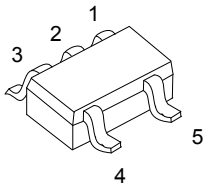
LR1121B

CMOS IC

HIGH RIPPLE-REJECTION LDO REGULATOR



SOT-25

■ DESCRIPTION

The UTC **LR1121B** is CMOS-based voltage regulator ICs with high output voltage accuracy, extremely low current, low ON-resistance, and high Ripple Rejection.

An ON/OFF circuit enables the output to be turned off, ensuring a long battery life. a built-in low on-resistance transistor provides a low dropout voltage and large output current, and a built-in overcurrent protector prevents the load current from exceeding the current capacitance of the output transistor.

The line transient response and load transient of the UTC **LR1121B** is excellent.

■ FEATURES

* Ultra-Low Supply Current :
  During Operation: 30μA TYP.
  During Standby: 0.1μA Typ.
* Output Voltage: 2.1V ~ 5.5V, Selectable in 0.1 V Steps.
* High Output Voltage Accuracy: ±2.0%
* Low Dropout Voltage: 180 mV Typ. (2.8 V Output Product, I_{OUT} = 100 mA)
* High Ripple Rejection: 70 dB TYP. (@ 1.0 kHz)
* Low Temperature-Drift Coefficient of Output Voltage: ±100ppm/°C TYP.
* High Peak Current Capability: 150 mA Output is Possible (@ $V_{IN} \geq V_{OUT(S)}$ + 1.0 V)

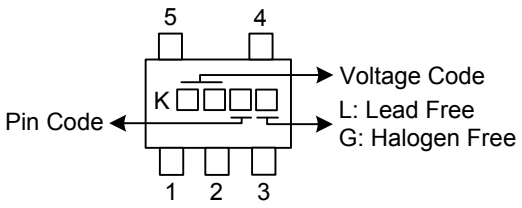
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR1121BL-xx-AF5-A-R	LR1121BG-xx-AF5-A-R	SOT-25	Tape Reel
LR1121BL-xx-AF5-B-R	LR1121BG-xx-AF5-B-R	SOT-25	Tape Reel

LR1121BL-xx-AF5-A-R
(1)Packing Type
(2)Pin Code
(3)Package Type
(4)Output Voltage Code
(5)Lead Free

(1) R: Tape Reel
(2) refer to Pin Description
(3) AF5: SOT-25
(4) xx: refer to Marking Information
(5) G: Halogen Free, L: Lead Free

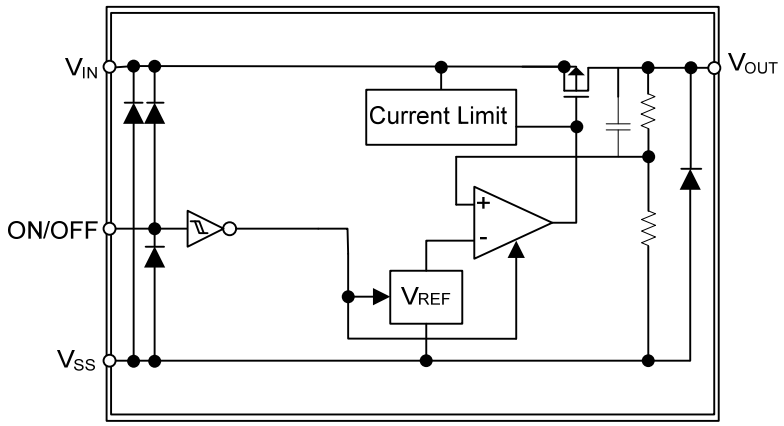
■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE				MARKING
SOT-25	21:2.1V 22:2.2V 23:2.3V 24:2.4V 25:2.5V 26:2.6V 27:2.7V 28:2.8V 2J:2.85V 29:2.9V	30:3.0V 31:3.1V 32:3.2V 33:3.3V 34:3.4V 35:3.5V 36:3.6V 37:3.7V 38:3.8V 39:3.9V	40:4.0V 41:4.1V 42:4.2V 43:4.3V 44:4.4V 45:4.5V 46:4.6V 47:4.7V 48:4.8V 49:4.9V	50:5.0V 51:5.1V 52:5.2V 53:5.3V 54:5.4V 55:5.5V	

■ PIN DESCRIPTION

PIN NO.		SYMBOL	DESCRIPTION
A	B		
5	1	V_{OUT}	Output pin
2	2	V_{SS}	GND pin
1	3	V_{IN}	Input pin
3	4	ON/OFF	Chip enable pin
4	5	NC*	No connection (The NC pin is electrically open or connected to V_{IN} or V_{SS}.)

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	7	V
	$V_{ON/OFF}$	0.3 ~ V_{IN}+0.3	V
Output Voltage	V_{OUT}	-0.3 ~ V_{IN}+0.3	V
Power Dissipation	P_D	280	mW
Junction Temperature	T_J	125	°C
Operating Temperature	T_{OPR}	-40 ~ +85	°C
Storage Temperature	T_{STG}	-40 ~ +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 (T_A=25°C, unless otherwise specified.)

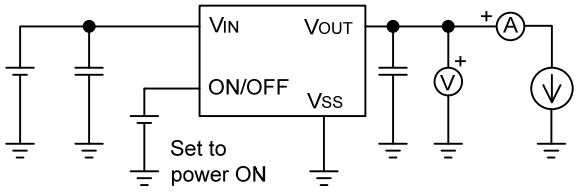
PARAMETER		SYMBOL	TEST CIRCUIT	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage		V_{OUT}	1	V_{IN}=V_{OUT}+1.0V, I_{OUT}=30mA	V_{OUT} ×0.98		V_{OUT} ×1.02	V
Output Current		I_{OUT}	3	V_{IN}≧V_{OUT}+1.0V	200			mA
Input Voltage		V_{IN}			2.0		7	V
Line Regulation		$\frac{\triangle V_{OUT(LINE)}}{\triangle V_{IN} \times V_{OUT}}$	1	V_{OUT}+0.5V≤V_{IN}≤7V I_{OUT}=30mA		0.04	0.2	%/V
Load Regulation		$\triangle V_{OUT(LOAD)}$	1	V_{IN}=V_{OUT}+1.0V 1.0mA≤I_{OUT}≤80mA		15	40	mV
Output Voltage Temperature Coefficient		$\frac{\triangle V_{OUT}}{\triangle Ta \times V_{OUT}}$	1	V_{IN}=V_{OUT}+1.0V, I_{OUT}=30mA -40°C ≤Ta≤85°C		±100		ppm/°C
Supply Current		I_{SS1}	2	V_{IN}=V_{OUT}+1.0V, ON/OFF pin=ON, no load		30	65	μA
Supply Current During standby		I_{SS2}	2	V_{IN}=V_{OUT}+1.0V, ON/OFF pin=OFF, no load		0.1	1.0	
Short Circuit Current		I_{SHORT}	3	V_{IN}=V_{OUT}+1.0V, ON/OFF pin=ON, V_{OUT}=0V		230		mA
Shutdown Pin Input Voltage	High	V_{SH}	4	V_{IN}=V_{OUT}+1.0V, R_L=10KΩ	1.6		V_{IN}	V
	Low	V_{SL}	4	V_{IN}=V_{OUT}+1.0V, R_L=10KΩ	0		0.3	
Shutdown Pin Input Current	High	I_{SH}	4	V_{IN}=7V, $V_{ON/OFF}$= V_{IN}	-0.1		0.1	μA
	Low	I_{SL}	4	V_{IN}=7V, $V_{ON/OFF}$= V_{SS}	-0.1		0.1	
Ripple Rejection		RR	5	V_{IN}=V_{OUT}+1.0V, f=1.0kHz Ripple 0.5Vp-p		70		dB

■ ELECTRICAL CHARACTERISTICS OF DROPOUT VOLTAGE (T_A=25°C)

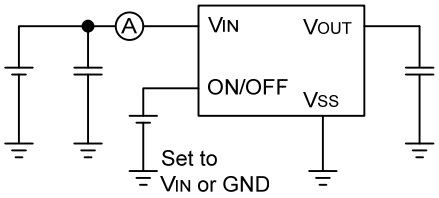
Output Voltage V_{OUT}(V)	V_D (Dropout Voltage)				
	Condition	MIN	TYP	MAX	UNIT
2.1V≤$V_{OUT(S)}$≤2.4V	I_{OUT}=100mA		0.22	0.70	V
2.5V≤$V_{OUT(S)}$≤2.7V			0.20	0.35	V
2.8V≤$V_{OUT(S)}$≤3.3V			0.18	0.30	V
3.4V≤$V_{OUT(S)}$≤5.5V			0.15	0.26	V

■ TEST CIRCUIT

1.



2.



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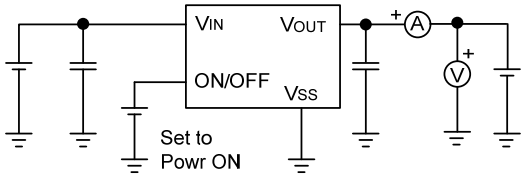

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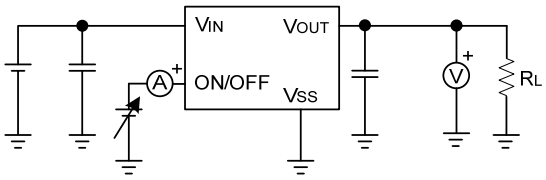

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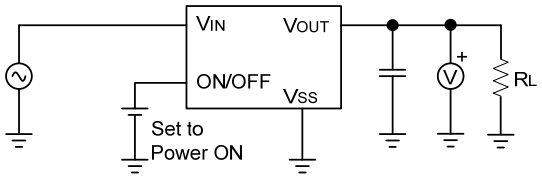


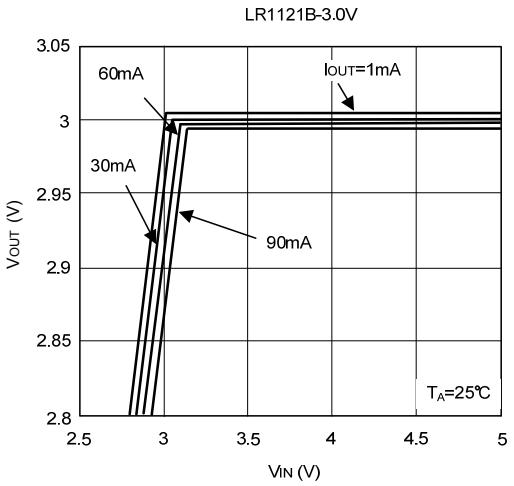
Note:
Input capacitor (C_{IN}): 1.0 μF or more
Output capacitor (C_L): 2.2μF or more (tantalum capacitor)

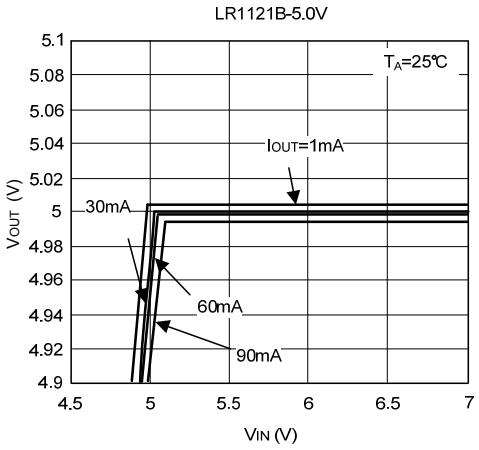
■ SELECTION OF OUTPUT CAPACITOR (C_L)

In this IC, phase compensation and the output capacitor is made for securing stable operation even if the load current is varied. Therefore, always place a capacitor (C_L) of 2.2 μF or more between V_{OUT} and V_{SS} pins. Using a capacitor whose ESR is outside the optimum range (approximately 0.5 ~ 5Ω), whether larger or smaller, may cause an unstable output, resulting in oscillation. For this reason, a tantalum electrolytic capacitor is recommended.

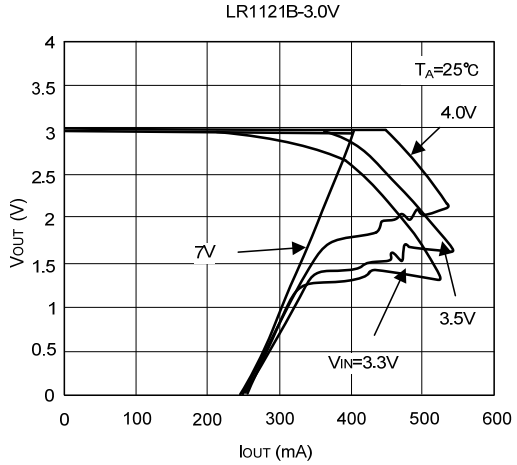
■ TYPICAL CHARACTERISTICS

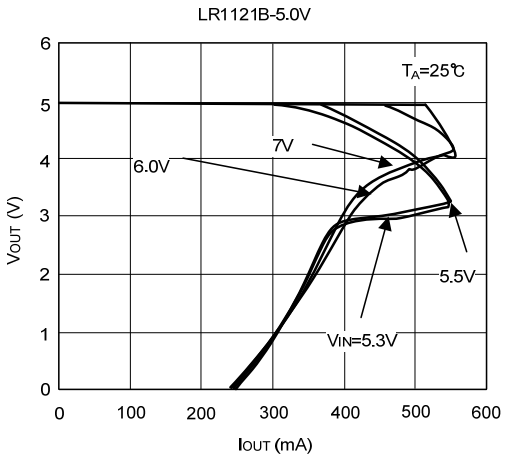
(1) Output voltage vs. Input voltage



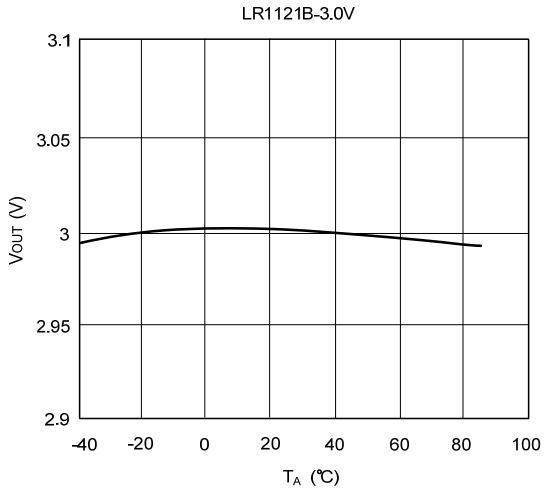


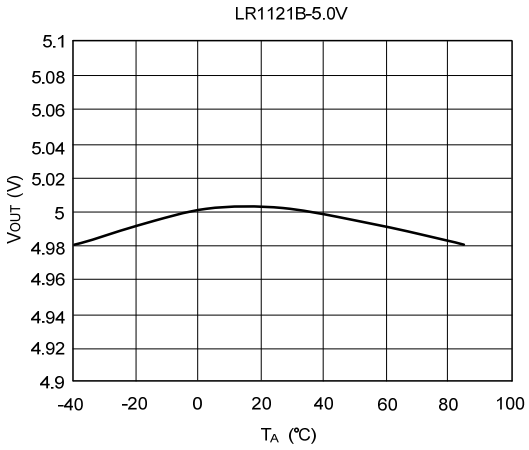
(2) Output Voltage vs. Output current





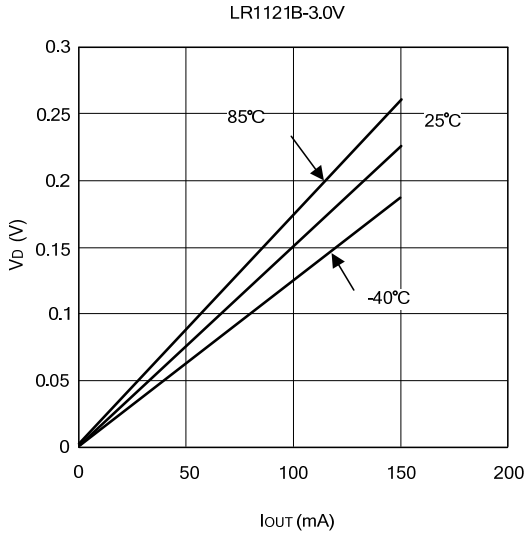
(3) Output voltage vs. Ambient temperature

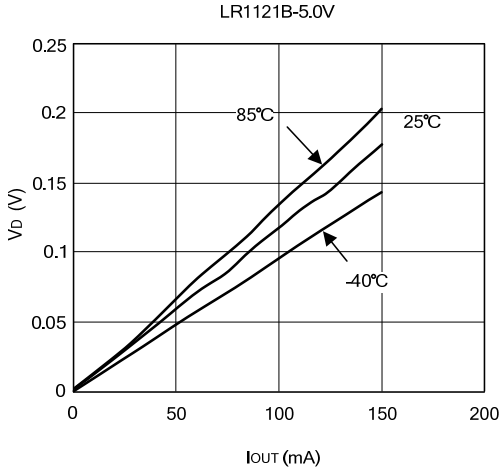




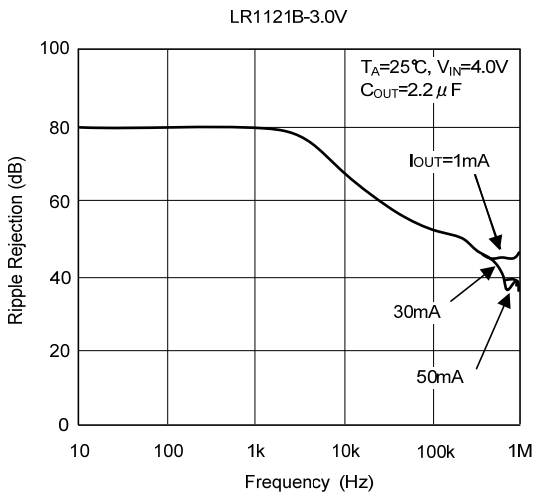
■ TYPICAL CHARACTERISTICS (Cont.)

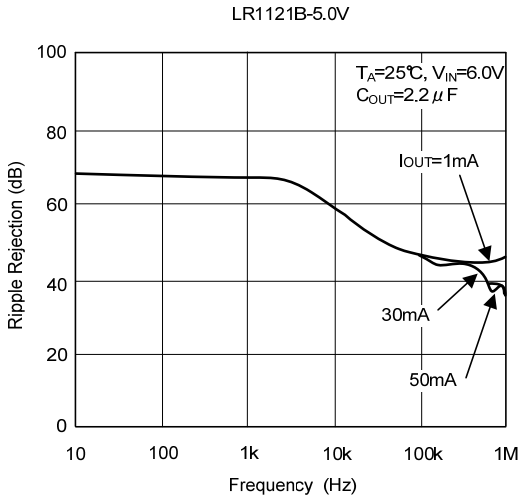
(4) Dropout voltage vs. Output current



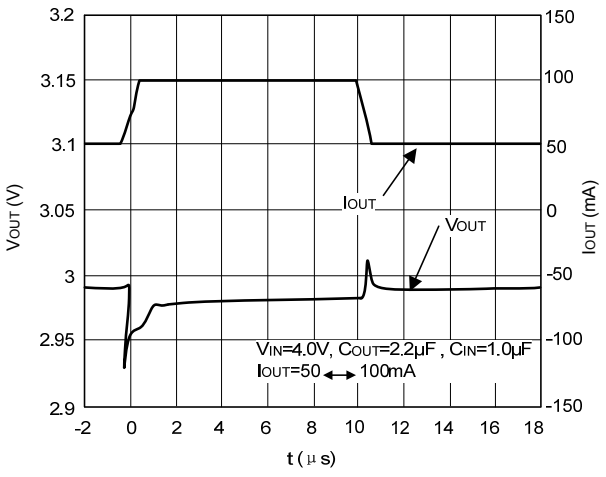


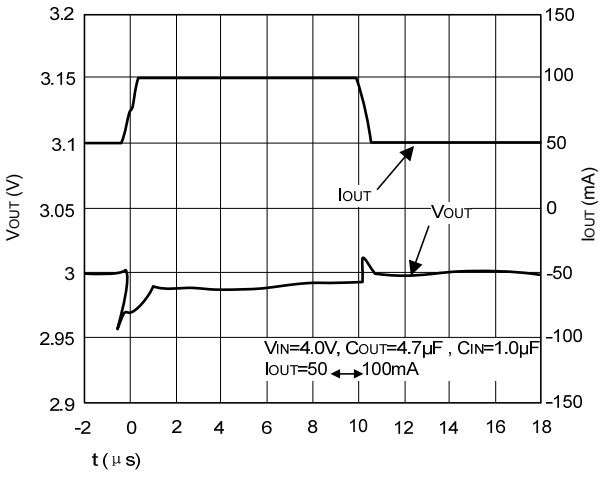
(5) Ripple rejection





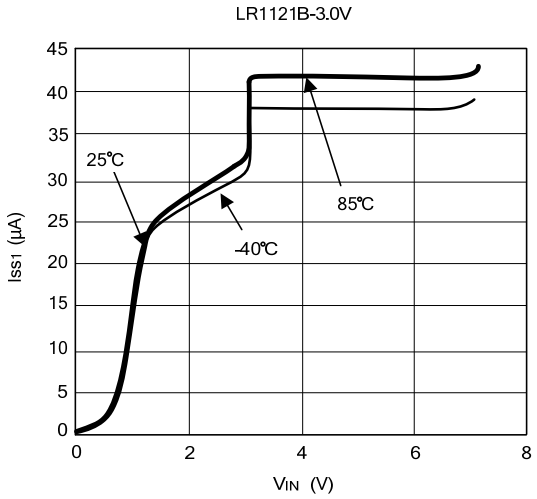
(6) Load transient response characteristics

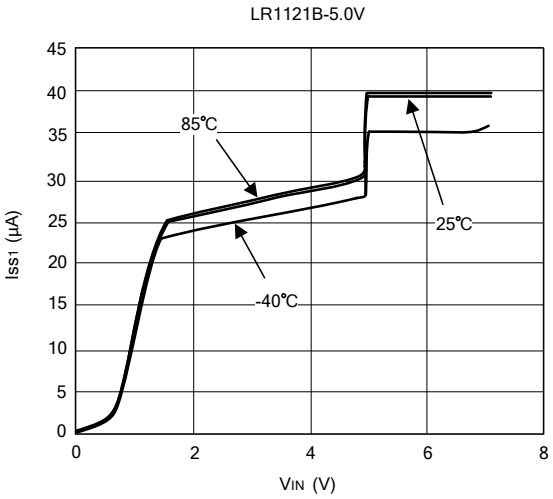




■ TYPICAL CHARACTERISTICS (Cont.)

(7) Current consumption vs. Input voltage





(8) Input transient response characteristics