



LR1121B

CMOS IC

HIGH RIPPLE-REJECTION LDO REGULATOR

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.

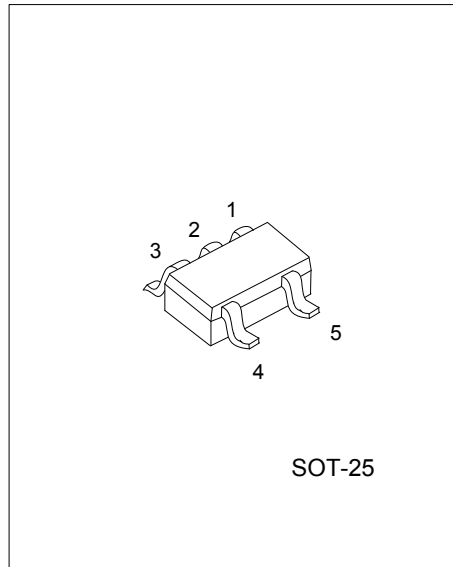
FEATURES

- * 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} ≥ V_{OUT(S)} + 1.0 V)

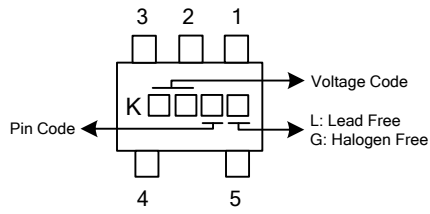
ORDERING INFORMATION

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

<p>LR1121BL-xx-AF5-A-R</p>	<p>(1)Packing Type (2)Pin Code (3)Package Type (4)Output Voltage Code (5)Lead Free</p>	<p>(1) R: Tape Reel (2) refer to Pin Description (3) AF5: SOT-25 (4) xx: refer to Marking Information (5) L: Lead Free, G: Halogen Free</p>
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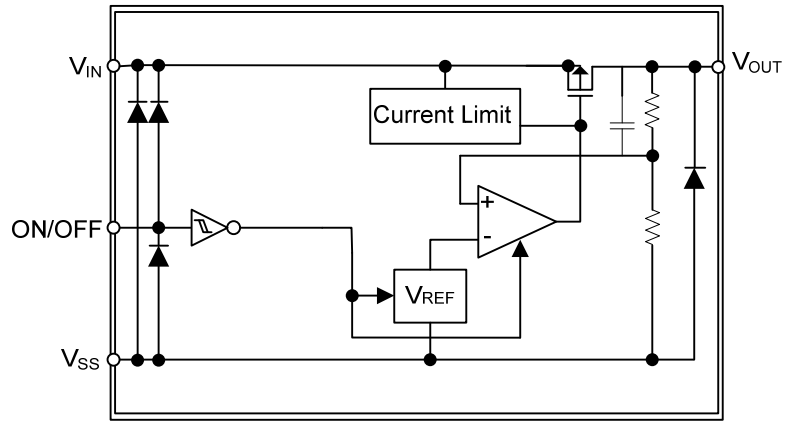
MARKING INFORMATION

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

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 (Ta=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.

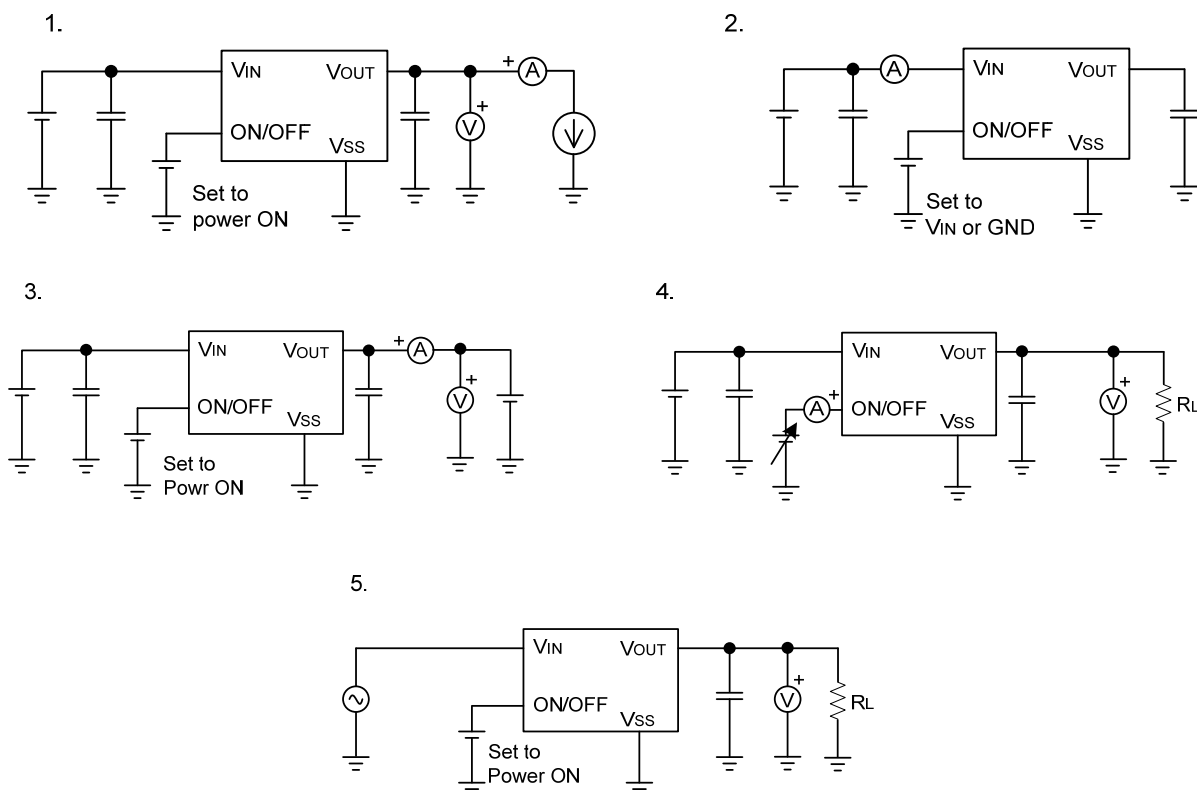
■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified.)

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	$\frac{\Delta V_{OUT(LINE)}}{\Delta V_{IN} \times V_{OUT}}$	1	V _{OUT} +0.5V ≤ V _{IN} ≤ 7V I _{OUT} =30mA		0.04	0.2	%/V	
Load Regulation	ΔV _{OUT(LOAD)}	1	V _{IN} =V _{OUT} +1.0V 1.0mA ≤ I _{OUT} ≤ 80mA		15	40	mV	
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	1	V _{IN} =V _{OUT} +1.0V, I _{OUT} =30mA -40°C ≤ T _A ≤ 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 (Ta=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



Note:

Input capacitor (C_{IN}): 1.0 μ F or more

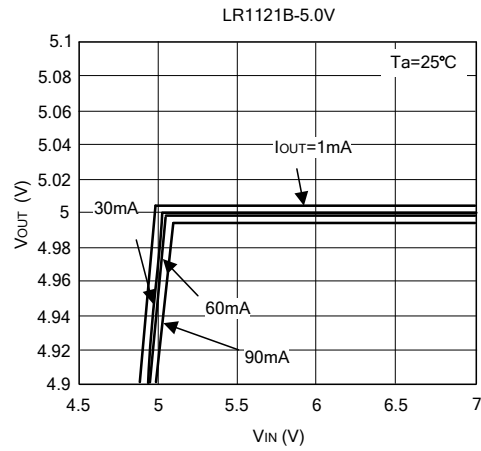
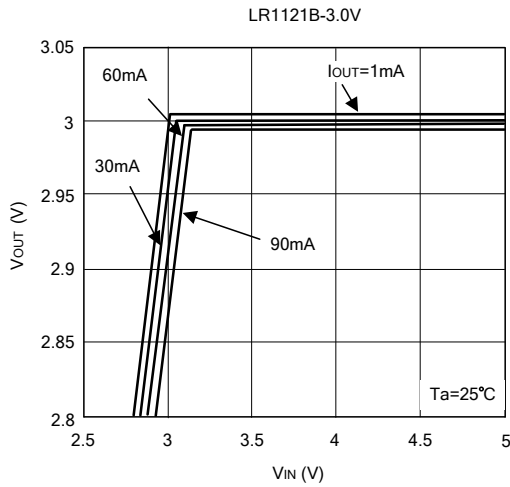
Output capacitor (C_L): 2.2 μ F or more (tantalum capacitor)

■ SELECTION OF OUTPUT CAPACITOR (C_L)

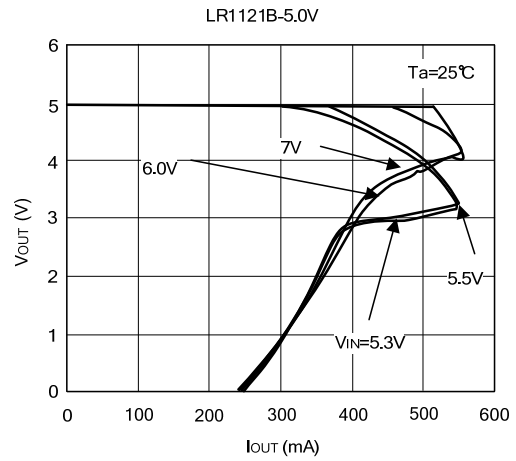
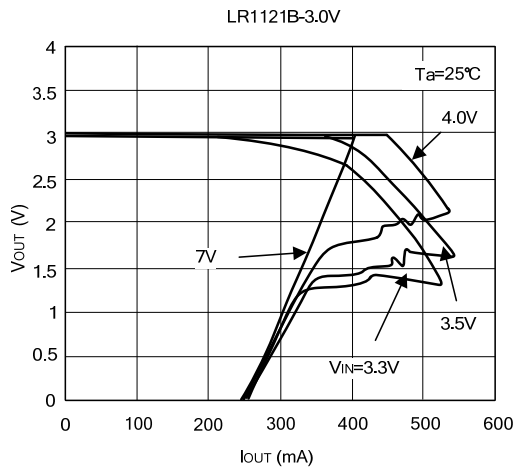
In this IC, phase compensation and the output capacitor is made for securing stable operation even if the load current is varied. Therefore, always place a capacitor (C_L) of 2.2 μ F or more between V_{OUT} and V_{SS} pins. Using a capacitor whose ESR is outside the optimum range (approximately 0.5 ~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

■ TYPICAL CHARACTERISTICS

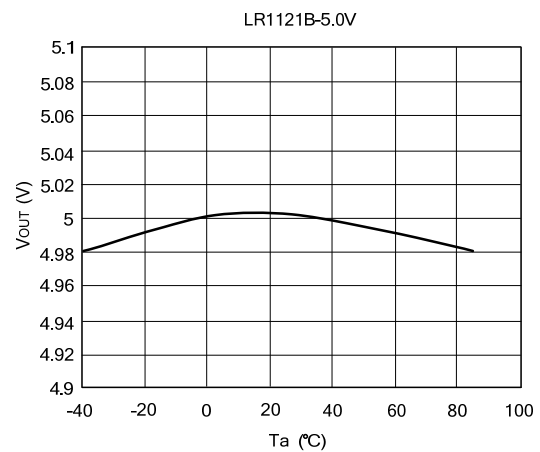
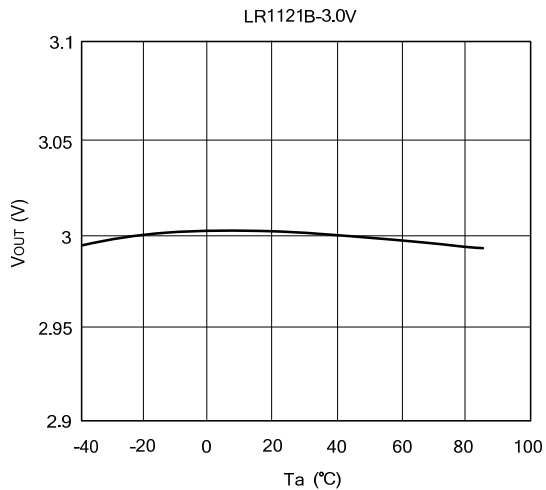
(1) Output voltage vs. Input voltage



(2) Output Voltage vs. Output current

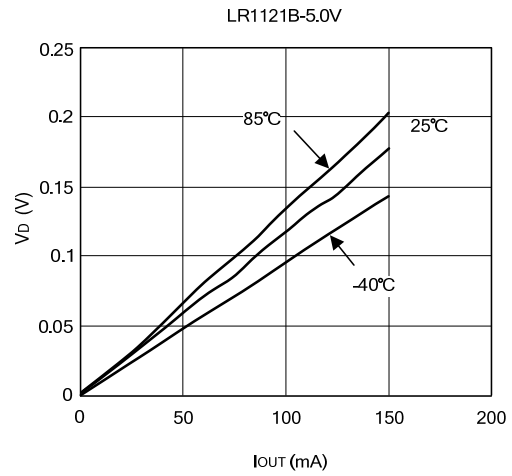
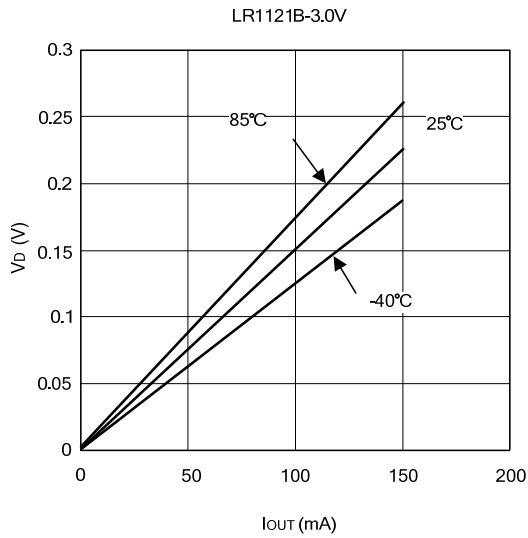


(3) Output voltage vs. Ambient temperature

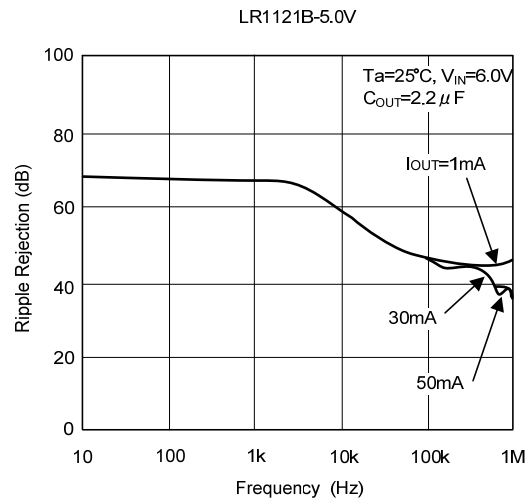
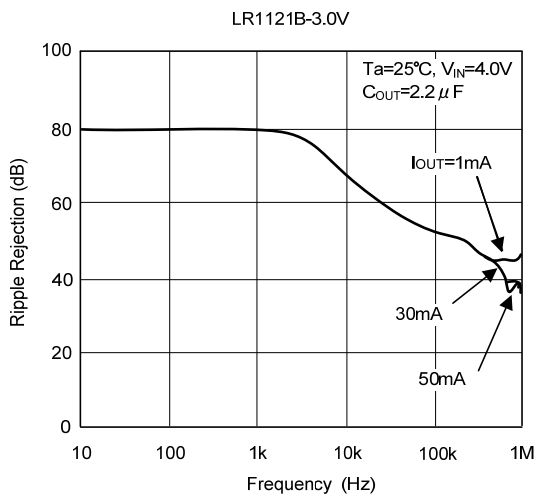


■ TYPICAL CHARACTERISTICS (Cont.)

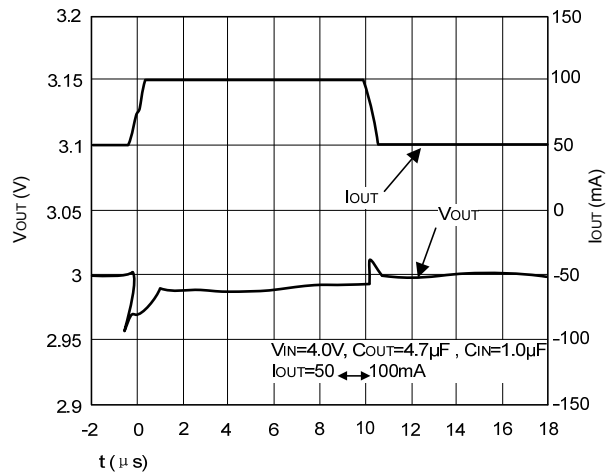
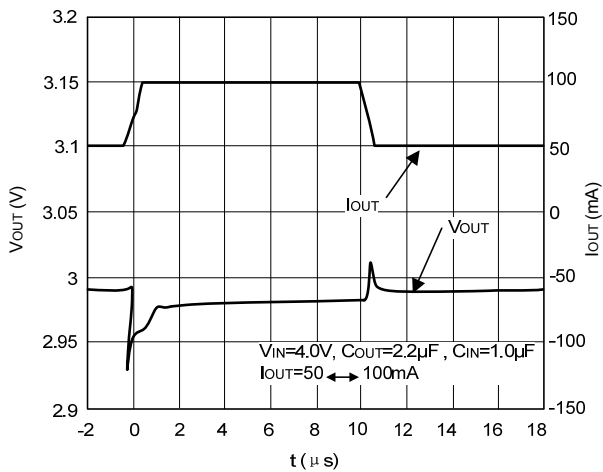
(4) Dropout voltage vs. Output current



(5) Ripple rejection

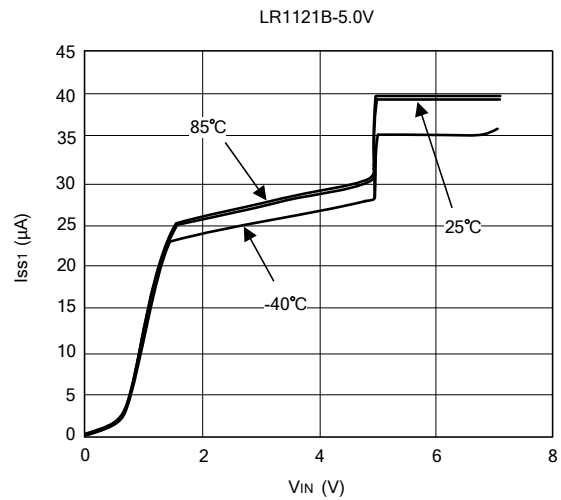
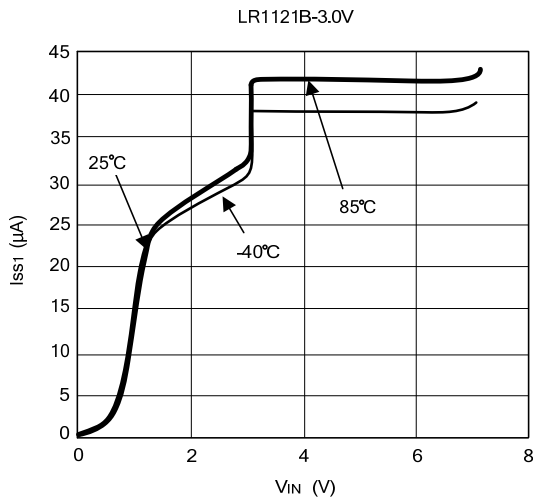


(6) Load transient response characteristics

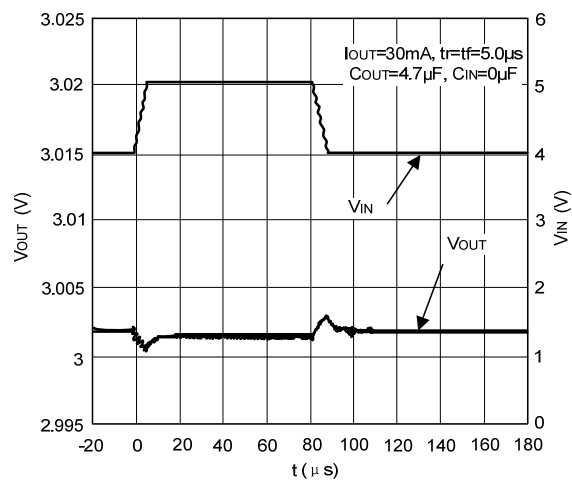
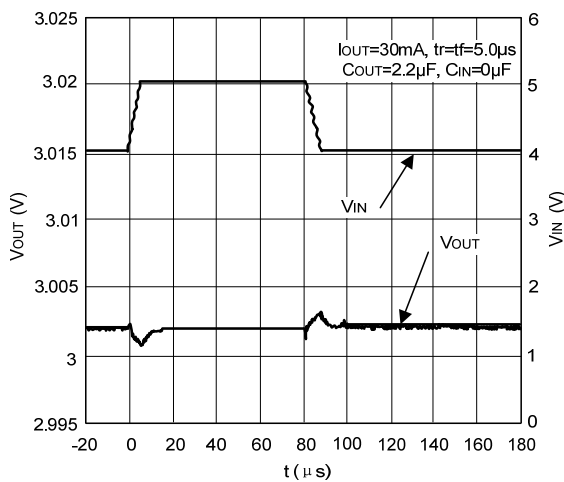


■ TYPICAL CHARACTERISTICS (Cont.)

(7) Current consumption vs. Input voltage



(8) Input transient response characteristics



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