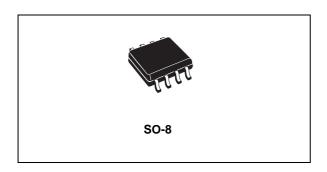


Very low drop voltage regulators with inhibit

Datasheet - production data



Features

- Very low-dropout voltage (0.2 V typ.)
- Very low quiescent current (typ. 0.01 μA in OFF mode, 280 μA in ON mode)
- Output current up to 100 mA
- Two logic-controlled electronic shutdowns
- Output voltages of 3.0; 3.3; 5.0 V
- Internal current and thermal limit
- A 2.2 µF capacitor for stability
- V_{OUT} tolerance ± 3% at 25 °C
- Supply voltage rejection: 80 dB (typ.)
- Temperature range: -40 °C to 125 °C

Description

The LK115 is a series of very low drop voltage regulators, available in SO-8 package.

The very low drop voltage (0.2 V) and very low quiescent current (0.01 μA in OFF mode, 280 μA in ON mode) make it particularly suitable for low noise, low power applications and especially in battery-powered systems.

Both active high and active low shutdown logic control are available (pin 2 and 3). This means that when the device is used as a local regulator, it is possible to put a part of the board in standby, decreasing the total power consumption.

It only requires a 2.2 μF capacitor for stability saving space and costs.

Table 1. Device summary

Order codes	Output voltages
LK115D33-TR	3.3 V
LK115D50-TR	5 V

Contents LK115

Contents

1	Diagram 3
2	Pin configuration
3	Maximum ratings
4	Test circuits 6
5	Electrical characteristics
6	Package mechanical data 9
7	Packaging mechanical data
8	Revision history

Diagram LK115

Diagram 1

Figure 1. Schematic diagram V_{in} $V_{\rm out}$ CURRENT LIMIT INHIBIT CONTROL ON/OFF REFERENCE INHIBIT DRIVER VOLTAGE ERROR ON/OFF AMPLIFIER TERM. PROTEC. O-GND SC08340

Pin configuration LK115

2 Pin configuration

Figure 2. Pin connection (top view)

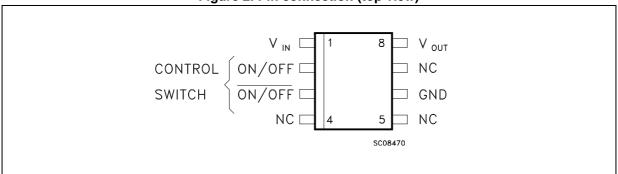


Table 2. Truth table

ON/OFF (pin 2)	ON/OFF (pin 3)	Status
Н	L	ON
Н	Н	OFF
L	L	OFF
L	Н	Not allowed

Note: Logic levels are those defined in the electrical characteristics.

LK115 Maximum ratings

3 Maximum ratings

Table 3. Absolute maximum ratings

Symbol	Parameter	Value	Unit
VI	DC input voltage	20	V
Io	Output current	Internally limited	
P _{TOT}	TOT Power dissipation Internally limit		
T _{STG} Storage temperature range -40 to 150		-40 to 150	°C
T _{OP}	Operating junction temperature range	-40 to 125	°C

Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

Test circuits LK115

4 Test circuits

Figure 3. Supply current (ON mode)

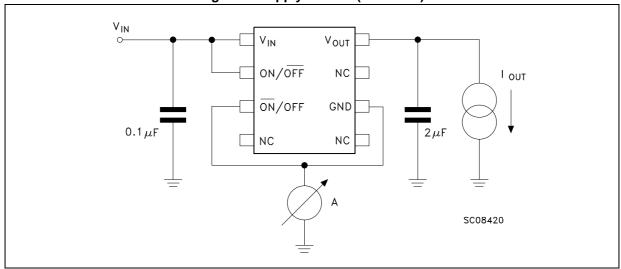
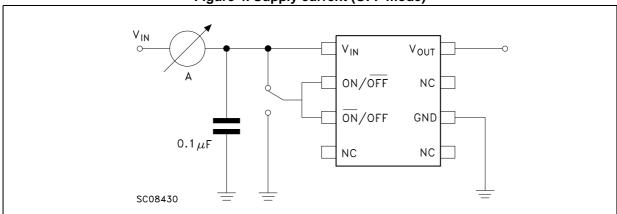


Figure 4. Supply current (OFF mode)



Note: The switch emulates two possibilities to set the regulator in OFF mode.

5 Electrical characteristics

(Refer to test circuits, T_J = 25 °C, C_I = 0.1 μ F, C_O = 2.2 μ F unless otherwise specified)

Table 4. LK115D33 electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
V	Output voltage	$I_O = 10 \text{ mA}, V_I = 5.3 \text{ V}$		3.2	3.3	3.4	V
Vo	Output voltage	$I_O = 10 \text{ mA}, V_I = 5.3 \text{ V}, T_a = -$	-40 to 125 °C	3.135		3.465	V
VI	Operating input voltage	I _O = 100 mA				20	V
l _{out}	Output current limit			120	200		mA
ΔV_{O}	Line regulation	$V_{I} = 4.3 \text{ to } 20 \text{ V}, I_{O} = 0.5 \text{ mA}$	1		2	10	mV
ΔV_{O}	Load regulation	$V_I = 4.3 \text{ V}, I_O = 0.5 \text{ to } 100 \text{ m}$	A		4	20	mV
	Quiescent current	$V_{I} = 4.3 \text{ to } 20 \text{ V}, I_{O} = 0$			0.28	0.5	mA
I _d	(ON mode)	$V_I = 4.3 \text{ to } 20 \text{ V}, I_O = 100 \text{ m/s}$	4		1.5	3	IIIA
	(OFF mode)	V _I = 4.3 to 20 V			0.01	2	μA
		$I_{O} = 5 \text{ mA}$ $V_{I} = 5.3 \text{ V} \pm 1 \text{ V}$ f = 120 Hz f = 1 kHz f = 10 kHz	f = 120 Hz		79		
SVR	Supply voltage rejection			74		dB	
				57			
eN	Output noise voltage (RMS)	B = 10 Hz to 100 kHz			72.6		μV
V _d	Dropout voltage	I _O = 60 mA			0.17		V
	Pin 3 to GND, OFF		0		0.5	V	
V _{HIc}	ON/OFF control (pin 2)	Pin 3 to GND, ON		2.4		V _{in}	V
\/	$ \frac{\overline{\text{ON}}/\text{OFF control (pin 3)}}{\overline{\text{ON}}/\text{OFF control (pin 3)}} \frac{\text{Pin 2 to V}_{\text{in}}, \text{OFF}}{\text{Pin 2 to V}_{\text{in}}, \text{ON}} $		V _{in} -0.2		V _{in}	V	
V _{LIc}				0		V _{in} -2.4	V
C _O	Output bypass capacitance	ESR = 0.5 to 10 Ω , I _O = 0 to 100 mA		2	10		μF

Electrical characteristics LK115

(Refer to test circuits, T_J = 25 °C, C_I = 0.1 μ F, C_O = 2.2 μ F unless otherwise specified)

Table 5. LK115D50 electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
\/	Outrot valtage	I _O = 10 mA, V _I = 7 V		4.85	5	5.15	M
Vo	Output voltage	$I_0 = 10 \text{ mA}, V_1 = 7 \text{ V}, T_2$	_a = -40 to 125 °C	4.75		5.25	V
VI	Operating input voltage	I _O = 100 mA				20	V
l _{out}	Output current limit			120	200		mA
ΔV_{O}	Line regulation	$V_I = 6 \text{ to } 20 \text{ V}, I_O = 0.5$	mA		3	15	mV
ΔV_{O}	Load regulation	$V_I = 6 \text{ V}, I_O = 0.5 \text{ to } 100$) mA		4	20	mV
	Quiescent current	$V_{I} = 6 \text{ to } 20 \text{ V}, I_{O} = 0$			0.28	0.5	A
I_{d}	(ON mode)	$V_I = 6 \text{ to } 20 \text{ V}, I_O = 100$	V _I = 6 to 20 V, I _O = 100 mA		1.5	3	mA
	(OFF mode)	V _I = 6 to 20 V	V _I = 6 to 20 V		0.01	2	μΑ
		$I_{O} = 5 \text{ mA}$ $V_{I} = 7 \text{ V} \pm 1 \text{ V}$ $f = 120 \text{ Hz}$ $f = 1 \text{ kHz}$ $f = 10 \text{ kHz}$	f = 120 Hz		75		
SVR	SVR Supply voltage rejection		f = 1 kHz		70		dB
				55			
eN	Output noise voltage (RMS)	B = 10 Hz to 100 kHz	B = 10 Hz to 100 kHz		110		μV
V_d	Dropout voltage	I _O = 60 mA	I _O = 60 mA		0.17		V
\/	ON/OFF control (pin 2)	Pin 3 to GND, OFF		0		0.5	V
V _{HIc} ON/OFF control (pin 2)		Pin 3 to GND, ON		2.4		V _{in}	V
		Pin 2 to V _{in} , OFF		V _{in} -0.2		V _{in}	V
V _{LIc}	ON/OFF control (pin 3)	Pin 2 to V _{in} , ON		0		V _{in} -2.4	V
Co	Output bypass capacitance	ESR = 0.5 to 10 Ω , I_O = 0 to 100 mA		2	10		μF

6 Package mechanical data

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Figure 5. SO-8 drawings

Table 6. SO-8 mechanical data

Dim		mm			
Dim.	Min.	Тур.	Max.		
А			1.75		
A1	0.10		0.25		
A2	1.25				
b	0.28		0.48		
С	0.17		0.23		
D	4.80	4.90	5.00		
Е	5.80	6.00	6.20		
E1	3.80	3.90	4.00		
е		1.27			
h	0.25		0.50		
L	0.40		1.27		
L1		1.04			
k	0°		8°		
ccc			0.10		

7 Packaging mechanical data

A Po Note: Drawing not in scale

Figure 6. SO-8 tape and reel dimensions

Table 7. SO-8 tape and reel mechanical data

Dim.		mm			
Dim.	Min.	Тур.	Max.		
Α			330		
С	12.8		13.2		
D	20.2				
N	60				
Т			22.4		
Ao	8.1		8.5		
Во	5.5		5.9		
Ko	2.1		2.3		
Po	3.9		4.1		
Р	7.9		8.1		

LK115 Revision history

8 Revision history

Table 8. Document revision history

Date	Revision	Changes	
07-Jun-2006	3	Order codes updated.	
07-Jul-2008	4	odded Table 1 on page 1.	
31-Jan-2014	5	Changed the LK115xx30, LK115xx33, LK115xx50 to LK115. Updated the description in cover page. Updated Section 5: Electrical characteristics, Section 6: Package mechanical data. Added Section 7: Packaging mechanical data. Minor text changes.	

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