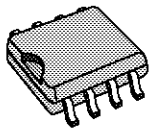
SGS-THOMSON MICROELECTRONICS

LK115D00 SERIES

VERY LOW DROP WITH INHIBIT VOLTAGE REGULATORS

PRELIMINARY DATA

- VERY LOW DROPOUT VOLTAGE (0.2V TYP.)
- VERY LOW QUIESCENT CURRENT (TYP. 0.01µA IN OFF MODE, 280µA IN ON MODE)
- OUTPUT CURRENT UP TO 100 mA
- TWO LOGIC-CONTROLLED ELECTRONIC SHUTDOWNS
- OUTPUT VOLTAGES OF 2; 2.5; 3; 3.3; 4; 4.75; 4.85; 5; 5.5V
- INTERNAL CURRENT AND THERMAL LIMIT
- ONLY 2.2µF FOR STABILITY
- V_{OUT} TOLLERANCE ± 3% AT 25 °C
- SUPPLY VOLTAGE REJECTION: 80 db (TYP.)
- TEMPERATURE RANGE: -40 TO 125 °C

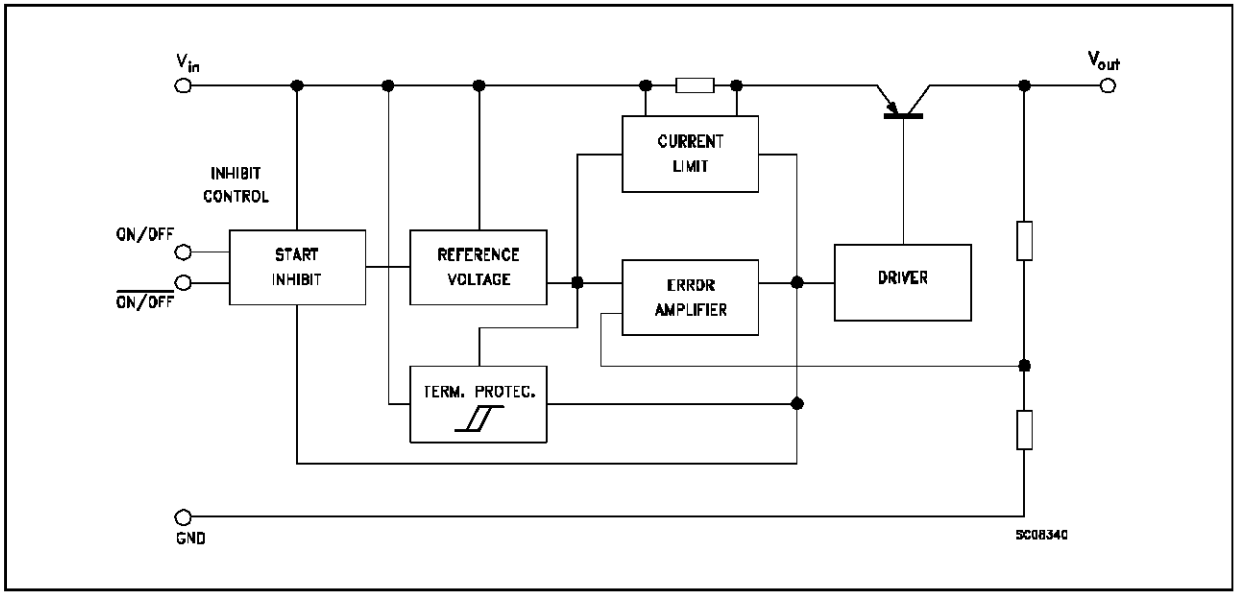


SO-8

DESCRIPTION

The LK115D00 series are very Low Drop regulators available in SO-8 package and in a wide range of output voltages.
The very Low Drop voltage (0.2V) and the very low quiescent current (0.01µA in OFF MODE, 280µA in ON MODE) make them particularly suitable for Low Noise, Low Power applications and specially in battery powered systems.
Both active HIGH and active LOW shutdown Logic Control are available (pin2 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 requires only a 2.2 µF capacitor for stability allowing space and cost saving.

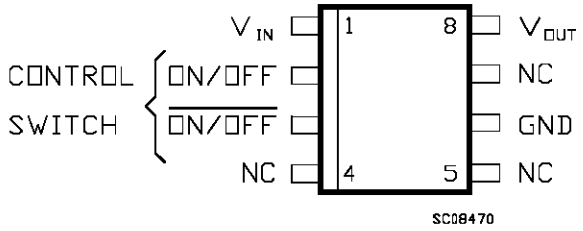
SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_i	DC Input Voltage	20	V
I_o	Output Current	Internally limited	
P_{tot}	Power Dissipation	Internally limited	
T_{stg}	Storage Temperature Range	- 40 to 150	^oC
T_{op}	Operating Junction Temperature Range	- 40 to 125	^oC

CONNECTION DIAGRAM (top view)

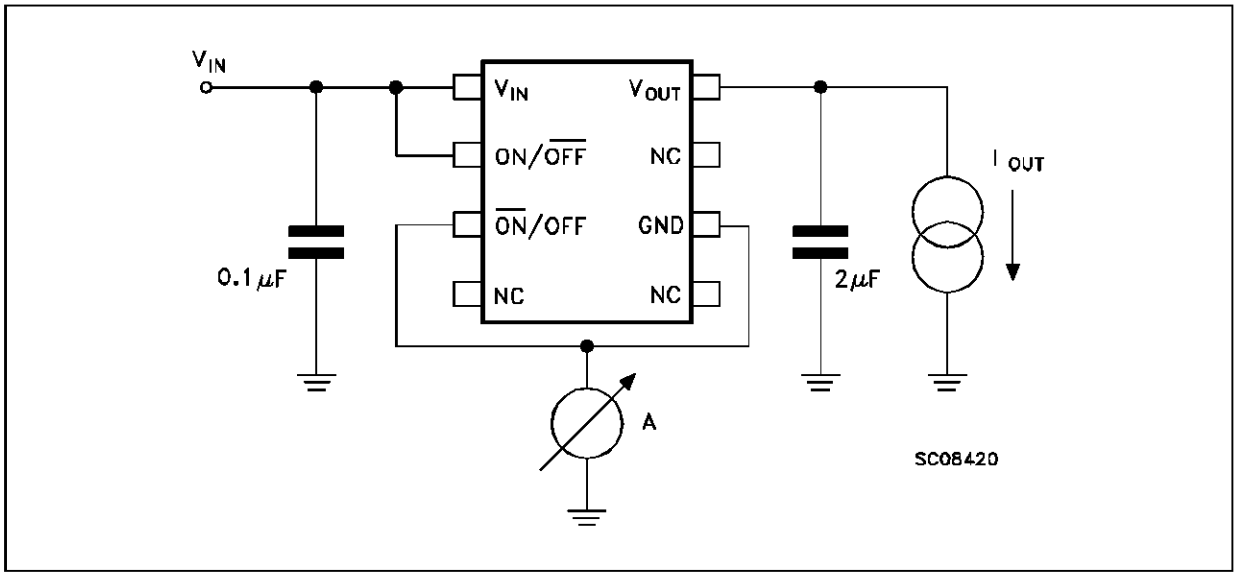


ORDERING NUMBERS

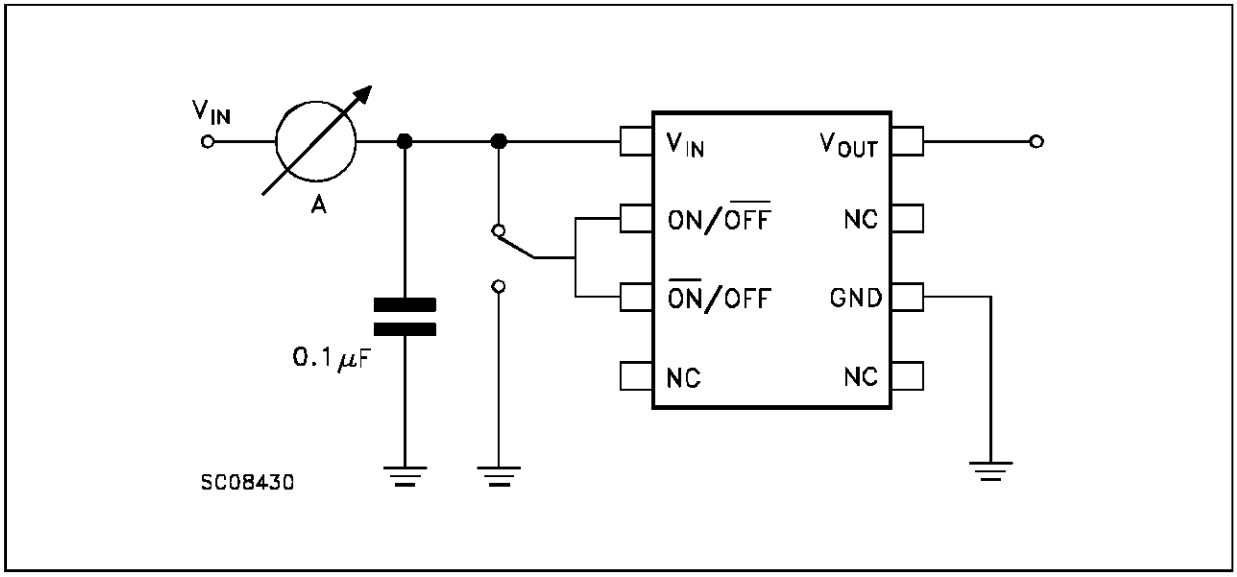
Type	Output Voltage
LK115D20	2 V
LK115D25	2.5 V
LK115D30	3 V
LK115D33	3.3 V
LK115D40	4 V
LK115D47	4.75 V
LK115D48	4.85 V
LK115D50	5 V
LK115D55	5.5 V

(*) Available on request

TEST CIRCUITS: Supply Current (ON MODE)



TEST CIRCUITS: Supply Current (OFF MODE)



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

THRUTH TABLE

ON/$\overline{OFF}$ (PIN 2)	$\overline{ON}$/OFF (PIN 3)	STATUS
H	L	ON
H	H	OFF
L	L	OFF
L	H	NOT ALLOWED

NOTES: Logic Levels are those defined in the electrical characteristics

ELECTRICAL CHARACTERISTICS FOR LK115D20 (refer to the test circuits, T_j = 25 °C, C_i = 0.1 µF, C_o = 2.2 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	I_o = 10 mA, V_i = 4 V I_o = 10 mA, V_i = 4 V, -40<T_a<125°C	1.940 1.9	2	2.060 2.1	V V
V_i	Operating Input Voltage	I_o = 100 mA			20	V
I_{out}	Output Current Limit		120	200		mA
ΔV_o	Line Regulation	V_i = 3 to 20 V, I_o = 0.5 mA		2	10	mV
ΔV_o	Load Regulation	V_i = 3 V I_o = 0.5 to 100 mA		4	20	mV
I_d	Quiescent Current	ON MODE V_i = 3 to 20 V I_o = 0 mA V_i = 3 to 20 V I_o = 100 mA		 0.28 1.5	 0.5 3	 mA mA
		OFF MODE V_i = 3 to 20 V		0.01	2	µA
SVR	Supply Voltage Rejection	I_o = 5 mA V_i = 4 V ± 1V f = 120 Hz f = 1 KHz f = 10 KHz		 83 78 59		 dB dB dB
eN	Output Noise Voltage	B = 10 Hz to 100 KHz		44		µV
V_d	Dropout Voltage	I_o = 60 mA		0.17		V
V_{Hlc}	ON/$\overline{OFF}$ Control (pin 2)	Pin 3 to GND OFF Pin 3 to GND ON	0 2.4		0.5 V_{in}	V V
V_{Llc}	$\overline{ON}$/OFF Control (pin 3)	Pin 2 to V_{in} OFF Pin 2 to V_{in} ON	V_{in} - 0.2 0		V_{in} V_{in} - 2.4	V V
C_O	Output Bypass Capacitance	ESR = 0.5 to 10 Ω, I_o = 0 to 100 mA	2	10		µF

ELECTRICAL CHARACTERISTICS FOR LK115D25 (refer to the test circuits, T_j = 25 °C, C_i = 0.1 µF, C_o = 2.2 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	I_o = 10 mA, V_i = 4.5 V I_o = 10 mA, V_i = 4.5 V, -40<T_a<125°C	2.425 2.375	2.5	2.575 2.625	V V
V_i	Operating Input Voltage	I_o = 100 mA			20	V
I_{out}	Output Current Limit		120	200		mA
ΔV_o	Line Regulation	V_i = 3.5 to 20 V, I_o = 0.5 mA		2	10	mV
ΔV_o	Load Regulation	V_i = 3.5 V I_o = 0.5 to 100 mA		4	20	mV
I_d	Quiescent Current	ON MODE V_i = 3.5 to 20 V I_o = 0 mA V_i = 3.5 to 20 V I_o = 100 mA		 0.28 1.5	 0.5 3	 mA mA
		OFF MODE V_i = 3.5 to 20 V		0.01	2	µA
SVR	Supply Voltage Rejection	I_o = 5 mA V_i = 4.5 V ± 1V f = 120 Hz f = 1 KHz f = 10 KHz		 81 76 58		 dB dB dB
eN	Output Noise Voltage	B = 10 Hz to 100 KHz		55		µV
V_d	Dropout Voltage	I_o = 60 mA		0.17		V
V_{Hlc}	ON/$\overline{OFF}$ Control (pin 2)	Pin 3 to GND OFF Pin 3 to GND ON	0 2.4		0.5 V_{in}	V V
V_{Llc}	$\overline{ON}$/OFF Control (pin 3)	Pin 2 to V_{in} OFF Pin 2 to V_{in} ON	V_{in} - 0.2 0		V_{in} V_{in} - 2.4	V V
C_O	Output Bypass Capacitance	ESR = 0.5 to 10 Ω, I_o = 0 to 100 mA	2	10		µF

ELECTRICAL CHARACTERISTICS FOR LK115D30 (refer to the test circuits, T_j = 25 °C, C_i = 0.1 µF, C_o = 2.2 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	I_o = 10 mA, V_i = 5 V I_o = 10 mA, V_i = 5 V, -40<T_a<125°C	2.910 2.850	3	3.090 3.150	V V
V_i	Operating Input Voltage	I_o = 100 mA			20	V
I_{out}	Output Current Limit		120	200		mA
ΔV_o	Line Regulation	V_i = 4 to 20 V, I_o = 0.5 mA		2	10	mV
ΔV_o	Load Regulation	V_i = 4 V I_o = 0.5 to 100 mA		4	20	mV
I_d	Quiescent Current	ON MODE V_i = 4 to 20 V I_o = 0 mA V_i = 4 to 20 V I_o = 100 mA		 0.28 1.5	 0.5 3	 mA mA
		OFF MODE V_i = 4 to 20 V		0.01	2	µA
SVR	Supply Voltage Rejection	I_o = 5 mA V_i = 5 V ± 1V f = 120 Hz f = 1 KHz f = 10 KHz		 79 74 57		 dB dB dB
eN	Output Noise Voltage	B = 10 Hz to 100 KHz		66		µV
V_d	Dropout Voltage	I_o = 60 mA		0.17		V
V_{Hlc}	ON/$\overline{OFF}$ Control (pin 2)	Pin 3 to GND OFF Pin 3 to GND ON	0 2.4		0.5 V_{in}	V V
V_{Llc}	$\overline{ON}$/OFF Control (pin 3)	Pin 2 to V_{in} OFF Pin 2 to V_{in} ON	V_{in} - 0.2 0		V_{in} V_{in} - 2.4	V V
C_O	Output Bypass Capacitance	ESR = 0.5 to 10 Ω, I_o = 0 to 100 mA	2	10		µF

ELECTRICAL CHARACTERISTICS FOR LK115D33 (refer to the test circuits, T_j = 25 °C, C_i = 0.1 µF, C_o = 2.2 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	I_o = 10 mA, V_i = 5.3 V I_o = 10 mA, V_i = 5.3 V, -40<T_a<125°C	3.2 3.135	3.3	3.4 3.465	V V
V_i	Operating Input Voltage	I_o = 100 mA			20	V
I_{out}	Output Current Limit		120	200		mA
ΔV_o	Line Regulation	V_i = 4.3 to 20 V, I_o = 0.5 mA		2	10	mV
ΔV_o	Load Regulation	V_i = 4.3 V I_o = 0.5 to 100 mA		4	20	mV
I_d	Quiescent Current	ON MODE V_i = 4.3 to 20 V I_o = 0 mA V_i = 4.3 to 20 V I_o = 100 mA		 0.28 1.5	 0.5 3	 mA mA
		OFF MODE V_i = 4.3 to 20 V		0.01	2	µA
SVR	Supply Voltage Rejection	I_o = 5 mA V_i = 5.3 V ± 1V f = 120 Hz f = 1 KHz f = 10 KHz		 79 74 57		 dB dB dB
eN	Output Noise Voltage	B = 10 Hz to 100 KHz		72.6		µV
V_d	Dropout Voltage	I_o = 60 mA		0.17		V
V_{Hlc}	ON/$\overline{OFF}$ Control (pin 2)	Pin 3 to GND OFF Pin 3 to GND ON	0 2.4		0.5 V_{in}	V V
V_{Llc}	$\overline{ON}$/OFF Control (pin 3)	Pin 2 to V_{in} OFF Pin 2 to V_{in} ON	V_{in} - 0.2 0		V_{in} V_{in} - 2.4	V V
C_O	Output Bypass Capacitance	ESR = 0.5 to 10 Ω, I_o = 0 to 100 mA	2	10		µF

ELECTRICAL CHARACTERISTICS FOR LK115D40 (refer to the test circuits, T_j = 25 °C, C_i = 0.1 µF, C_o = 2.2 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	I_o = 10 mA, V_i = 6 V I_o = 10 mA, V_i = 6 V, -40<T_a<125°C	3.880 3.8	4	4.120 4.2	V V
V_i	Operating Input Voltage	I_o = 100 mA			20	V
I_{out}	Output Current Limit		120	200		mA
ΔV_o	Line Regulation	V_i = 5 to 20 V, I_o = 0.5 mA		3	15	mV
ΔV_o	Load Regulation	V_i = 5 V I_o = 0.5 to 100 mA		4	20	mV
I_d	Quiescent Current	ON MODE V_i = 5 to 20 V I_o = 0 mA V_i = 5 to 20 V I_o = 100 mA		 0.28 1.5	 0.5 3	 mA mA
		OFF MODE V_i = 5 to 20 V		0.01	2	µA
SVR	Supply Voltage Rejection	I_o = 5 mA V_i = 5 V ± 1V f = 120 Hz f = 1 KHz f = 10 KHz		 77 72 56		 dB dB dB
eN	Output Noise Voltage	B = 10 Hz to 100 KHz		88		µV
V_d	Dropout Voltage	I_o = 60 mA		0.17		V
V_{Hlc}	ON/$\overline{OFF}$ Control (pin 2)	Pin 3 to GND OFF Pin 3 to GND ON	0 2.4		0.5 V_{in}	V V
V_{Llc}	$\overline{ON}$/OFF Control (pin 3)	Pin 2 to V_{in} OFF Pin 2 to V_{in} ON	V_{in} - 0.2 0		V_{in} V_{in} - 2.4	V V
C_O	Output Bypass Capacitance	ESR = 0.5 to 10 Ω, I_o = 0 to 100 mA	2	10		µF

ELECTRICAL CHARACTERISTICS FOR LK115D47 (refer to the test circuits, T_j = 25 °C, C_i = 0.1 µF, C_o = 2.2 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	I_o = 10 mA, V_i = 6.8 V I_o = 10 mA, V_i = 6.8 V, -40<T_a<125°C	4.607 4.513	4.75	4.892 4.987	V V
V_i	Operating Input Voltage	I_o = 100 mA			20	V
I_{out}	Output Current Limit		120	200		mA
ΔV_o	Line Regulation	V_i = 5.8 to 20 V, I_o = 0.5 mA		3	15	mV
ΔV_o	Load Regulation	V_i = 5.8 V I_o = 0.5 to 100 mA		4	20	mV
I_d	Quiescent Current	ON MODE V_i = 5.8 to 20 V I_o = 0 mA V_i = 5.8 to 20 V I_o = 100 mA		 0.28 1.5	 0.5 3	 mA mA
		OFF MODE V_i = 5.8 to 20 V		0.01	2	µA
SVR	Supply Voltage Rejection	I_o = 5 mA V_i = 6.8 V ± 1V f = 120 Hz f = 1 KHz f = 10 KHz		 75 70 55		 dB dB dB
eN	Output Noise Voltage	B = 10 Hz to 100 KHz		104.5		µV
V_d	Dropout Voltage	I_o = 60 mA		0.17		V
V_{Hlc}	ON/$\overline{OFF}$ Control (pin 2)	Pin 3 to GND OFF Pin 3 to GND ON	0 2.4		0.5 V_{in}	V V
V_{Llc}	$\overline{ON}$/OFF Control (pin 3)	Pin 2 to V_{in} OFF Pin 2 to V_{in} ON	V_{in} - 0.2 0		V_{in} V_{in} - 2.4	V V
C_O	Output Bypass Capacitance	ESR = 0.5 to 10 Ω, I_o = 0 to 100 mA	2	10		µF

ELECTRICAL CHARACTERISTICS FOR LK115D48 (refer to the test circuits, T_j = 25 °C, C_i = 0.1 µF, C_o = 2.2 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	I_o = 10 mA, V_i = 6.9 V I_o = 10 mA, V_i = 6.9 V, -40<T_a<125°C	4.705 4.607	4.85	4.966 5.093	V V
V_i	Operating Input Voltage	I_o = 100 mA			20	V
I_{out}	Output Current Limit		120	200		mA
ΔV_o	Line Regulation	V_i = 5.9 to 20 V, I_o = 0.5 mA		3	15	mV
ΔV_o	Load Regulation	V_i = 5.9 V I_o = 0.5 to 100 mA		4	20	mV
I_d	Quiescent Current	ON MODE V_i = 5.9 to 20 V I_o = 0 mA V_i = 5.9 to 20 V I_o = 100 mA		 0.28 1.5	 0.5 3	 mA mA
		OFF MODE V_i = 5.9 to 20 V		0.01	2	µA
SVR	Supply Voltage Rejection	I_o = 5 mA V_i = 6.9 V ± 1V f = 120 Hz f = 1 KHz f = 10 KHz		 75 70 55		 dB dB dB
eN	Output Noise Voltage	B = 10 Hz to 100 KHz		106.7		µV
V_d	Dropout Voltage	I_o = 60 mA		0.17		V
V_{Hlc}	ON/$\overline{OFF}$ Control (pin 2)	Pin 3 to GND OFF Pin 3 to GND ON	0 2.4		0.5 V_{in}	V V
V_{Llc}	$\overline{ON}$/OFF Control (pin 3)	Pin 2 to V_{in} OFF Pin 2 to V_{in} ON	V_{in} - 0.2 0		V_{in} V_{in} - 2.4	V V
C_O	Output Bypass Capacitance	ESR = 0.5 to 10 Ω, I_o = 0 to 100 mA	2	10		µF

ELECTRICAL CHARACTERISTICS FOR LK115D50 (refer to the test circuits, T_j = 25 °C, C_i = 0.1 µF, C_o = 2.2 µF unless otherwise specified)

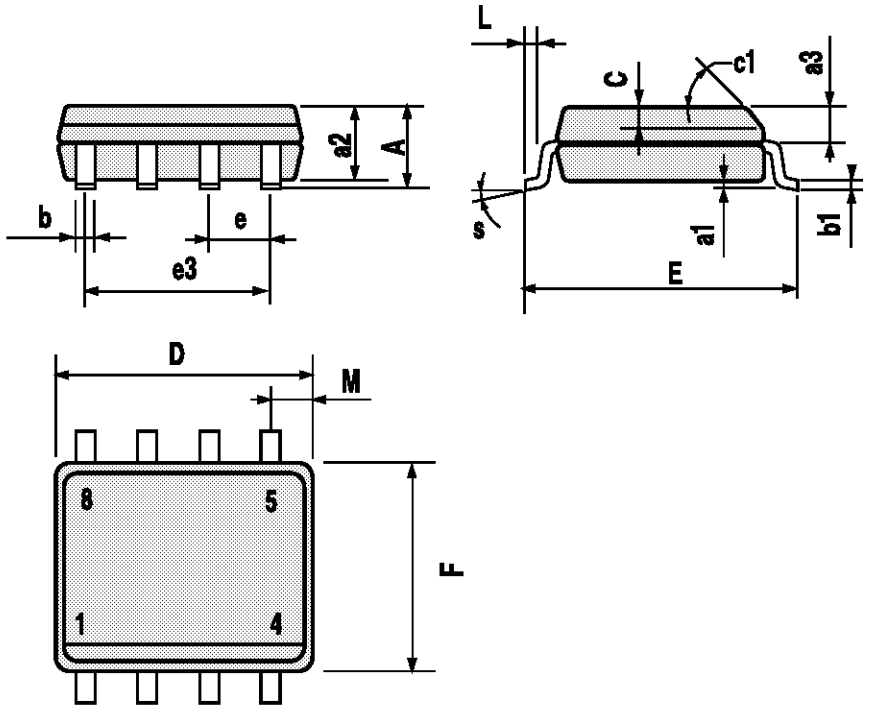
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	I_o = 10 mA, V_i = 7 V I_o = 10 mA, V_i = 7 V, -40<T_a<125°C	4.85 4.75	5	5.15 5.25	V V
V_i	Operating Input Voltage	I_o = 100 mA			20	V
I_{out}	Output Current Limit		120	200		mA
ΔV_o	Line Regulation	V_i = 6 to 20 V, I_o = 0.5 mA		3	15	mV
ΔV_o	Load Regulation	V_i = 6 V I_o = 0.5 to 100 mA		4	20	mV
I_d	Quiescent Current	ON MODE V_i = 6 to 20 V I_o = 0 mA V_i = 6 to 20 V I_o = 100 mA		 0.28 1.5	 0.5 3	 mA mA
		OFF MODE V_i = 6 to 20 V		0.01	2	µA
SVR	Supply Voltage Rejection	I_o = 5 mA V_i = 7 V ± 1V f = 120 Hz f = 1 KHz f = 10 KHz		 75 70 55		 dB dB dB
eN	Output Noise Voltage	B = 10 Hz to 100 KHz		110		µV
V_d	Dropout Voltage	I_o = 60 mA		0.17		V
V_{Hlc}	ON/$\overline{OFF}$ Control (pin 2)	Pin 3 to GND OFF Pin 3 to GND ON	0 2.4		0.5 V_{in}	V V
V_{Llc}	$\overline{ON}$/OFF Control (pin 3)	Pin 2 to V_{in} OFF Pin 2 to V_{in} ON	V_{in} - 0.2 0		V_{in} V_{in} - 2.4	V V
C_O	Output Bypass Capacitance	ESR = 0.5 to 10 Ω, I_o = 0 to 100 mA	2	10		µF

ELECTRICAL CHARACTERISTICS FOR LK115D55 (refer to the test circuits, T_j = 25 °C, C_i = 0.1 µF, C_o = 2.2 µF unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_o	Output Voltage	I_o = 10 mA, V_i = 7.5 V I_o = 10 mA, V_i = 7.5 V, -40<T_a<125°C	5.335 5.225	5.5	5.665 5.775	V V
V_i	Operating Input Voltage	I_o = 100 mA			20	V
I_{out}	Output Current Limit		120	200		mA
ΔV_o	Line Regulation	V_i = 6.5 to 20 V, I_o = 0.5 mA		3	15	mV
ΔV_o	Load Regulation	V_i = 6.5 V I_o = 0.5 to 100 mA		4	20	mV
I_d	Quiescent Current	ON MODE V_i = 6.5 to 20 V I_o = 0 mA V_i = 6.5 to 20 V I_o = 100 mA		 0.28 1.5	 0.5 3	 mA mA
		OFF MODE V_i = 6.5 to 20 V		0.01	2	µA
SVR	Supply Voltage Rejection	I_o = 5 mA V_i = 7.5 V ± 1V f = 120 Hz f = 1 KHz f = 10 KHz		 74 69 55		 dB dB dB
eN	Output Noise Voltage	B = 10 Hz to 100 KHz		121		µV
V_d	Dropout Voltage	I_o = 60 mA		0.17		V
V_{Hlc}	ON/$\overline{OFF}$ Control (pin 2)	Pin 3 to GND OFF Pin 3 to GND ON	0 2.4		0.5 V_{in}	V V
V_{Llc}	$\overline{ON}$/OFF Control (pin 3)	Pin 2 to V_{in} OFF Pin 2 to V_{in} ON	V_{in} - 0.2 0		V_{in} V_{in} - 2.4	V V
C_O	Output Bypass Capacitance	ESR = 0.5 to 10 Ω, I_o = 0 to 100 mA	2	10		µF

SO8 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.25	0.003		0.009
a2			1.65			0.064
a3	0.65		0.85	0.025		0.033
b	0.35		0.48	0.013		0.018
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.019
c1	45° (typ.)					
D	4.8		5.0	0.188		0.196
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.14		0.157
L	0.4		1.27	0.015		0.050
M			0.6			0.023
S	8° (max.)					



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