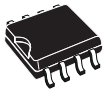
LK115D00 SERIES

VERY LOW DROP WITH INHIBIT VOLTAGE REGULATORS

- VERY LOW DROPOUT VOLTAGE (0.2 V TYP.)
- VERY LOW QUIESCENT CURRENT (TYP. 0.01µA IN OFF MODE, 280µA IN ON MODE)
- OUTPUT CURRENT UP TO 100mA
- TWO LOGIC-CONTROLLED ELECTRONIC SHUTDOWNS
- OUTPUT VOLTAGES OF 2; 2.5; 3.0; 3.3; 4; 4.75; 4.85; 5; 5.5 V
- INTERNAL CURRENT AND THERMAL LIMIT
- ONLY 2.2µF FOR STABILITY
- V_{OUT} TOLLERANCE ± 3% AT 25°C
- SUPPLY VOLTAGE REJECTION: 80dB (TYP)
- TEMPERATURE RANGE: -40°C TO 125°C



SO-8

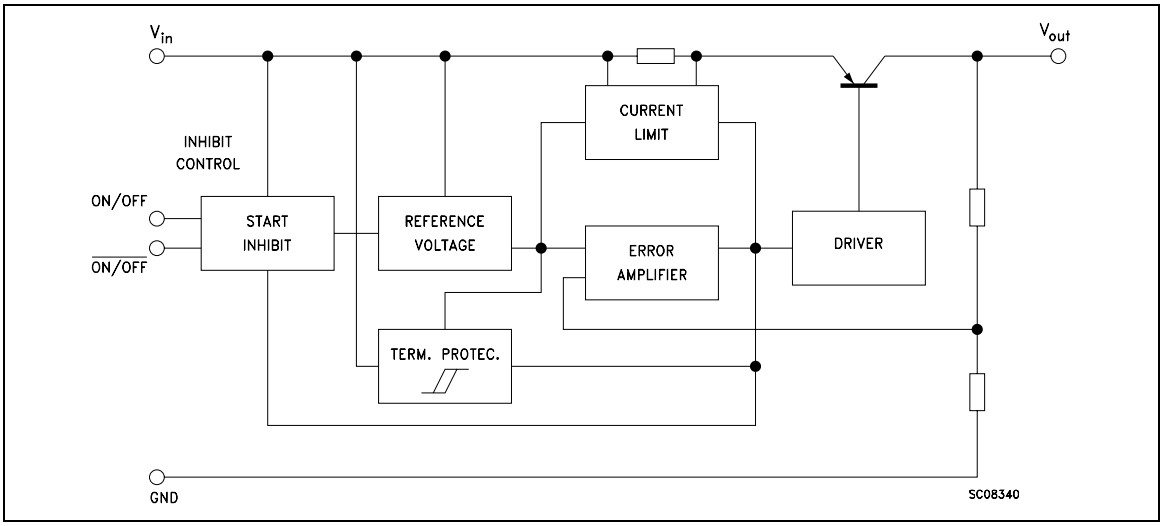
DESCRIPTION

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

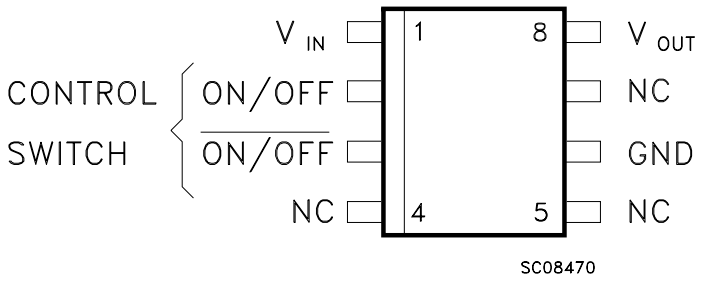


ABSOLUTE MAXIMUM RATINGS

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	°C
T_{op}	Operating Junction Temperature Range	-40 to 125	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

CONNECTION DIAGRAM (top view)



ORDERING CODES

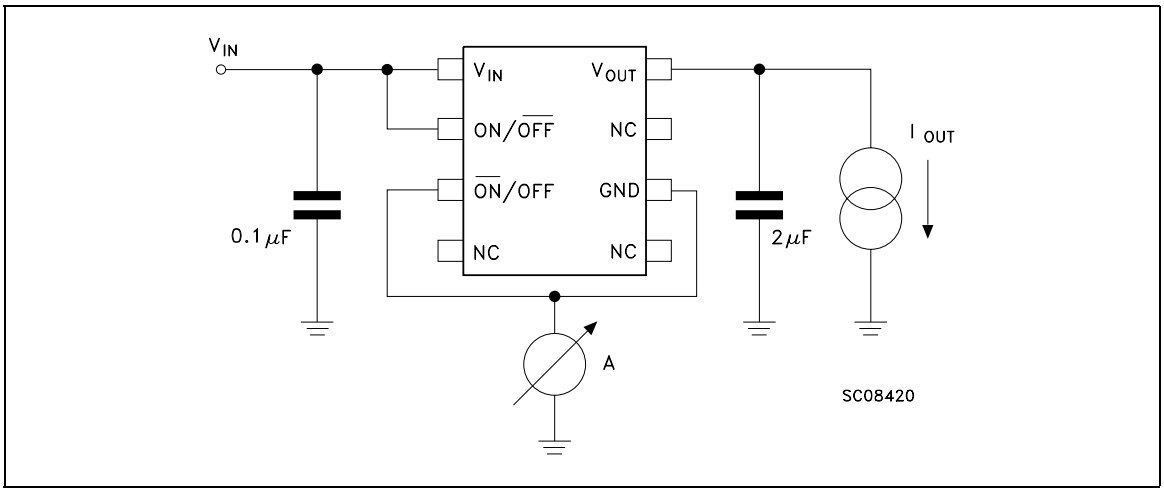
TYPE	OUTPUT VOLTAGE
LK115D20	2 V
LK115D25	2.5 V
LK115D30	3 V
LK115D33	3.3 V
LK115D40	4 V
LK115D47	4.75 V
LK115D48	4.85 V
LK115D50	5 V
LK115D55	5.5 V

TRUTH TABLE

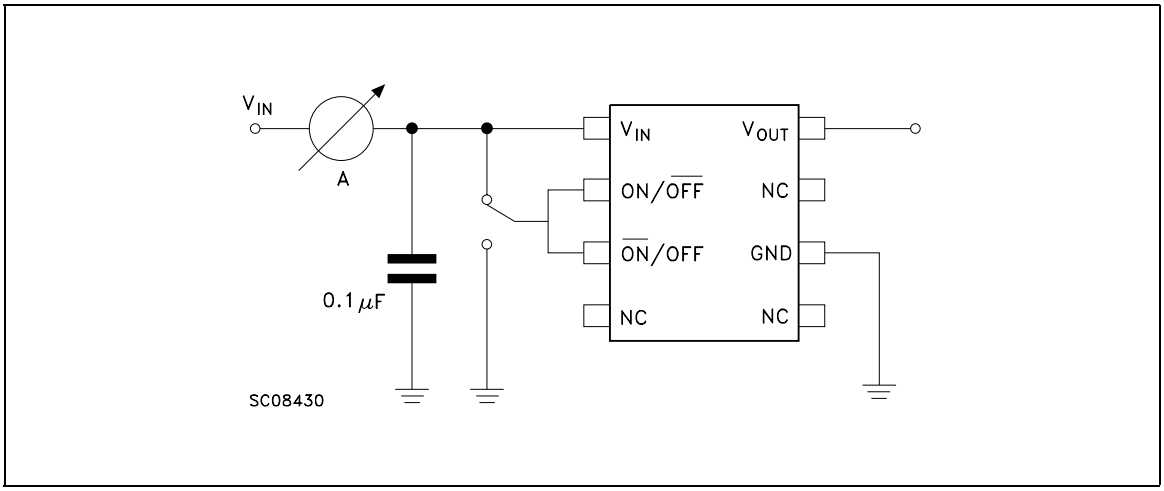
ON/$\overline{\text{OFF}}$ (PIN 2)	$\overline{\text{ON}}$/OFF (PIN 3)	STATUS
H	L	ON
H	H	OFF
L	L	OFF
L	H	NOT ALLOWED

NOTES: Logic Levels are those defined in the electrical characteristics.

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.

ELECTRICAL CHARACTERISTICS FOR LK115D20 (refer to the test circuits, T_J = 25°C, C_I = 0.1µF, C_O = 2.2µF unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_O	Output Voltage	I_O = 10 mA, V_I = 4 V		1.940	2	2.060	V
		I_O = 10 mA, V_I = 4 V, T_a= -40 to 125°C		1.9		2.1	
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		0.28	0.5	mA
		V_I = 3 to 20 V	I_O = 100 mA		1.5	3	
	(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 = 120Hz		83		dB
			f = 1 KHz		78		
			f = 10 KHz		59		
eN	Output Noise Voltage (RMS)	B = 10 Hz to 100 KHz			44		µV
V_d	Dropout Voltage	I_O = 60 mA			0.17		V
V_{HIc}	ON/OFF Control (pin 2)	Pin 3 to GND	OFF	0		0.5	V
		Pin 3 to GND	ON	2.4		V_{in}	
V_{LIc}	ON/OFF Control (pin 3)	Pin 2 to V_{in}	OFF	V_{in}-0.2		V_{in}	V
		Pin 2 to V_{in}	ON	0		V_{in}-2.4	
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 = 0.1µF, C_O = 2.2µF unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_O	Output Voltage	I_O = 10 mA, V_I = 4.5 V		2.425	2.5	2.575	V
		I_O = 10 mA, V_I = 4.5 V, T_a= -40 to 125°C		2.375		2.625	
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		0.28	0.5	mA
		V_I = 3.5 to 20 V	I_O = 100 mA		1.5	3	
	(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 = 120Hz		81		dB
			f = 1 KHz		76		
			f = 10 KHz		58		
eN	Output Noise Voltage (RMS)	B = 10 Hz to 100 KHz			55		µV
V_d	Dropout Voltage	I_O = 60 mA			0.17		V
V_{HIc}	ON/OFF Control (pin 2)	Pin 3 to GND	OFF	0		0.5	V
		Pin 3 to GND	ON	2.4		V_{in}	
V_{LIc}	ON/OFF Control (pin 3)	Pin 2 to V_{in}	OFF	V_{in}-0.2		V_{in}	V
		Pin 2 to V_{in}	ON	0		V_{in}-2.4	
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 = 0.1µF, C_O = 2.2µF unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_O	Output Voltage	I_O = 10 mA, V_I = 5 V		2.910	3	3.090	V
		I_O = 10 mA, V_I = 5 V, T_a= -40 to 125°C		2.850		3.150	
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		0.28	0.5	mA
		V_I = 4 to 20 V	I_O = 100 mA		1.5	3	
	(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 = 120Hz		79		dB
			f = 1 KHz		74		
			f = 10 KHz		57		
eN	Output Noise Voltage (RMS)	B = 10 Hz to 100 KHz			66		µV
V_d	Dropout Voltage	I_O = 60 mA			0.17		V
V_{HIc}	ON/$\overline{OFF}$ Control (pin 2)	Pin 3 to GND	OFF	0		0.5	V
		Pin 3 to GND	ON	2.4		V_{in}	
V_{LIc}	$\overline{ON}$/OFF Control (pin 3)	Pin 2 to V_{in}	OFF	V_{in}-0.2		V_{in}	V
		Pin 2 to V_{in}	ON	0		V_{in}-2.4	
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 = 0.1µF, C_O = 2.2µF unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_O	Output Voltage	I_O = 10 mA, V_I = 5.3 V		3.2	3.3	3.4	V
		I_O = 10 mA, V_I = 5.3 V, T_a= -40 to 125°C		3.135		3.465	
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		0.28	0.5	mA
		V_I = 4.3 to 20 V	I_O = 100 mA		1.5	3	
	(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 = 120Hz		79		dB
			f = 1 KHz		74		
			f = 10 KHz		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
V_{HIc}	ON/$\overline{OFF}$ Control (pin 2)	Pin 3 to GND	OFF	0		0.5	V
		Pin 3 to GND	ON	2.4		V_{in}	
V_{LIc}	$\overline{ON}$/OFF Control (pin 3)	Pin 2 to V_{in}	OFF	V_{in}-0.2		V_{in}	V
		Pin 2 to V_{in}	ON	0		V_{in}-2.4	
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 = 0.1µF, C_O = 2.2µF unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_O	Output Voltage	I_O = 10 mA, V_I = 6 V		3.880	4	4.120	V
		I_O = 10 mA, V_I = 6 V, T_a= -40 to 125°C		3.8		4.2	
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		0.28	0.5	mA
		V_I = 5 to 20 V	I_O = 100 mA		1.5	3	
	(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 = 120Hz		77		dB
			f = 1 KHz		72		
			f = 10 KHz		56		
eN	Output Noise Voltage (RMS)	B = 10 Hz to 100 KHz			88		µV
V_d	Dropout Voltage	I_O = 60 mA			0.17		V
V_{HIc}	ON/OFF Control (pin 2)	Pin 3 to GND	OFF	0		0.5	V
		Pin 3 to GND	ON	2.4		V_{in}	
V_{LIc}	ON/OFF Control (pin 3)	Pin 2 to V_{in}	OFF	V_{in}-0.2		V_{in}	V
		Pin 2 to V_{in}	ON	0		V_{in}-2.4	
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 = 0.1µF, C_O = 2.2µF unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_O	Output Voltage	I_O = 10 mA, V_I = 6.8 V		4.607	4.75	4.892	V
		I_O = 10 mA, V_I = 6.8 V, T_a= -40 to 125°C		4.513		4.987	
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		0.28	0.5	mA
		V_I = 5.8 to 20 V	I_O = 100 mA		1.5	3	
	(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 = 120Hz		75		dB
			f = 1 KHz		70		
			f = 10 KHz		55		
eN	Output Noise Voltage (RMS)	B = 10 Hz to 100 KHz			104.5		µV
V_d	Dropout Voltage	I_O = 60 mA			0.17		V
V_{HIc}	ON/OFF Control (pin 2)	Pin 3 to GND	OFF	0		0.5	V
		Pin 3 to GND	ON	2.4		V_{in}	
V_{LIc}	ON/OFF Control (pin 3)	Pin 2 to V_{in}	OFF	V_{in}-0.2		V_{in}	V
		Pin 2 to V_{in}	ON	0		V_{in}-2.4	
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 = 0.1µF, C_O = 2.2µF unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_O	Output Voltage	I_O = 10 mA, V_I = 6.9 V		4.705	4.85	4.966	V
		I_O = 10 mA, V_I = 6.9 V, T_a= -40 to 125°C		4.607		5.093	
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		0.28	0.5	mA
		V_I = 5.9 to 20 V	I_O = 100 mA		1.5	3	
	(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 = 120Hz		75		dB
			f = 1 KHz		70		
			f = 10 KHz		55		
eN	Output Noise Voltage (RMS)	B = 10 Hz to 100 KHz			106.7		µV
V_d	Dropout Voltage	I_O = 60 mA			0.17		V
V_{HIc}	ON/OFF Control (pin 2)	Pin 3 to GND	OFF	0		0.5	V
		Pin 3 to GND	ON	2.4		V_{in}	
V_{LIc}	ON/OFF Control (pin 3)	Pin 2 to V_{in}	OFF	V_{in}-0.2		V_{in}	V
		Pin 2 to V_{in}	ON	0		V_{in}-2.4	
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 = 0.1µF, C_O = 2.2µF unless otherwise specified)

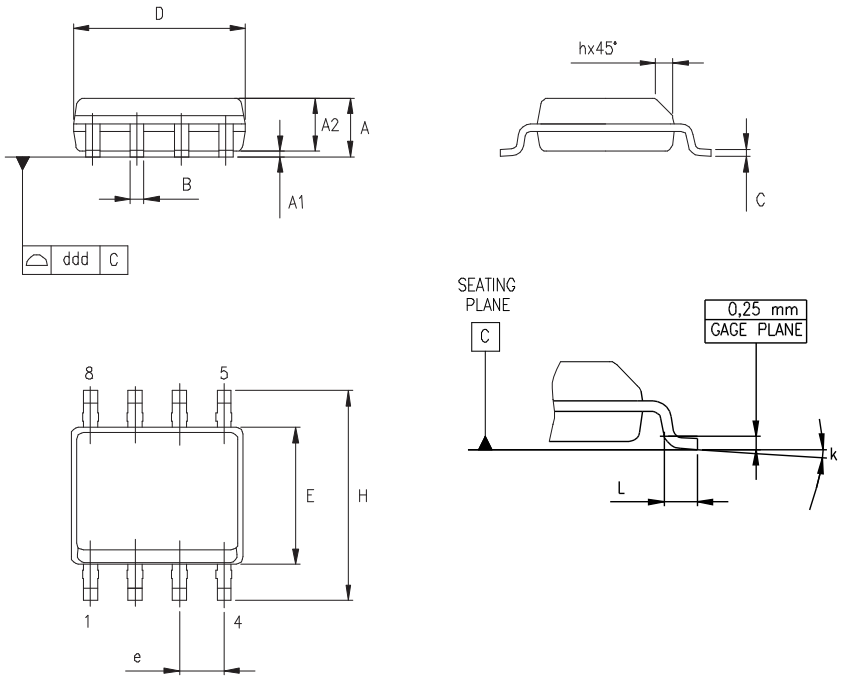
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_O	Output Voltage	I_O = 10 mA, V_I = 7 V		4.85	5	5.15	V
		I_O = 10 mA, V_I = 7 V, T_a= -40 to 125°C		4.75		5.25	
V_I	Operating Input Voltage	I_O = 100 mA				20	V
I_{out}	Output Current Limit			120	200		mA
ΔV_O	Line Regulation	V_I = 6 to 20 V	I_O = 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		0.28	0.5	mA
		V_I = 6 to 20 V	I_O = 100 mA		1.5	3	
	(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 = 120Hz		75		dB
			f = 1 KHz		70		
			f = 10 KHz		55		
eN	Output Noise Voltage (RMS)	B = 10 Hz to 100 KHz			110		µV
V_d	Dropout Voltage	I_O = 60 mA			0.17		V
V_{HIc}	ON/OFF Control (pin 2)	Pin 3 to GND	OFF	0		0.5	V
		Pin 3 to GND	ON	2.4		V_{in}	
V_{LIc}	ON/OFF Control (pin 3)	Pin 2 to V_{in}	OFF	V_{in}-0.2		V_{in}	V
		Pin 2 to V_{in}	ON	0		V_{in}-2.4	
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 = 0.1µF, C_O = 2.2µF unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_O	Output Voltage	I_O = 10 mA, V_I = 7.5 V		5.335	5.5	5.665	V
		I_O = 10 mA, V_I = 7.5 V, T_a= -40 to 125°C		5.225		5.775	
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		0.28	0.5	mA
		V_I = 6.5 to 20 V	I_O = 100 mA		1.5	3	
	(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 = 120Hz		74		dB
			f = 1 KHz		69		
			f = 10 KHz		55		
eN	Output Noise Voltage (RMS)	B = 10 Hz to 100 KHz			121		µV
V_d	Dropout Voltage	I_O = 60 mA			0.17		V
V_{HIc}	ON/$\overline{OFF}$ Control (pin 2)	Pin 3 to GND	OFF	0		0.5	V
		Pin 3 to GND	ON	2.4		V_{in}	
V_{LIc}	$\overline{ON}$/OFF Control (pin 3)	Pin 2 to V_{in}	OFF	V_{in}-0.2		V_{in}	V
		Pin 2 to V_{in}	ON	0		V_{in}-2.4	
C_O	Output Bypass Capacitance	ESR = 0.5 to 10 Ω,	I_O = 0 to 100 mA	2	10		µF

SO-8 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	1.35		1.75	0.053		0.069
A1	0.10		0.25	0.04		0.010
A2	1.10		1.65	0.043		0.065
B	0.33		0.51	0.013		0.020
C	0.19		0.25	0.007		0.010
D	4.80		5.00	0.189		0.197
E	3.80		4.00	0.150		0.157
e		1.27			0.050	
H	5.80		6.20	0.228		0.244
h	0.25		0.50	0.010		0.020
L	0.40		1.27	0.016		0.050
k	8° (max.)					
ddd			0.1			0.04



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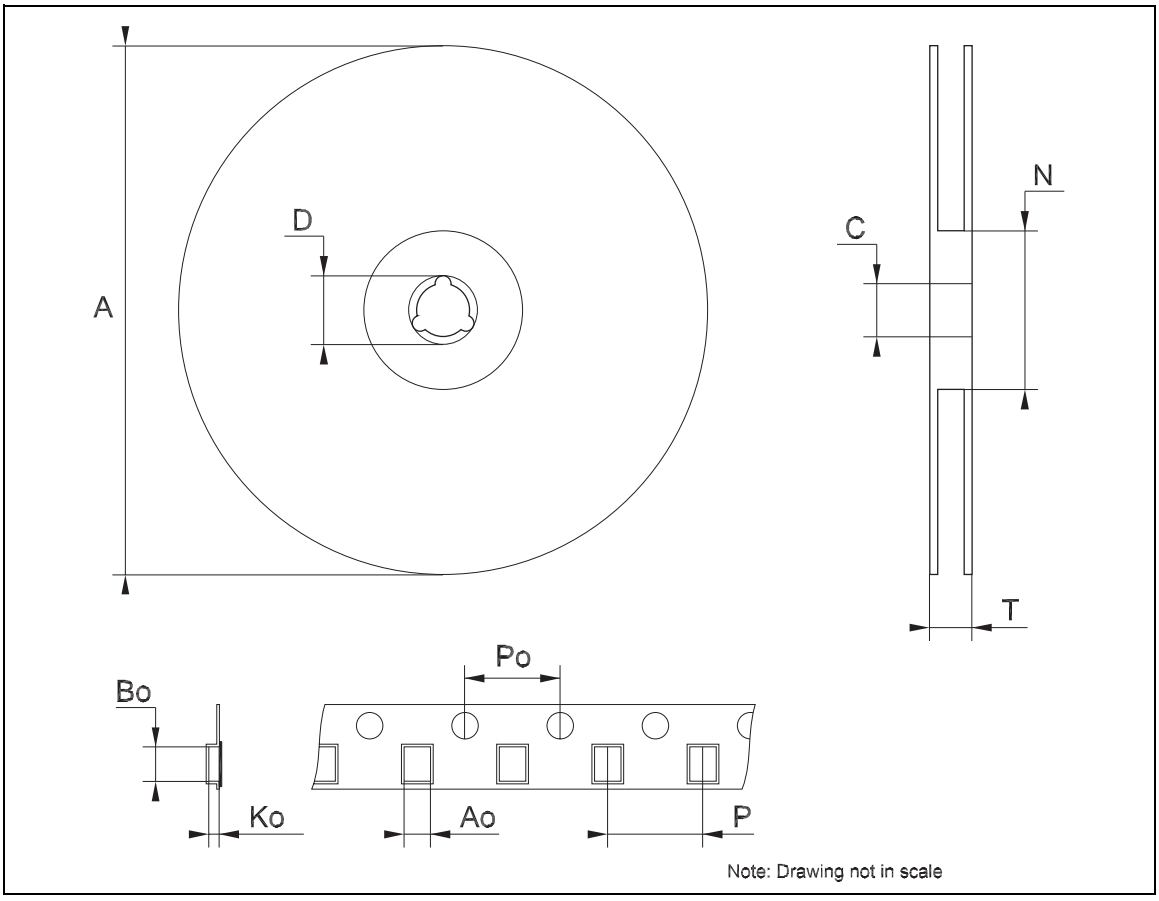
Tape & Reel SO-8 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			330			12.992
C	12.8		13.2	0.504		0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	8.1		8.5	0.319		0.335
Bo	5.5		5.9	0.216		0.232
Ko	2.1		2.3	0.082		0.090
Po	3.9		4.1	0.153		0.161
P	7.9		8.1	0.311		0.319



Note: Drawing not in scale