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LINFINITY
A MICROSEMI COMPANY

LX8815

Dual Channel 1A Low Dropout Regulator

PRELIMINARY

DESCRIPTION

The LX8815 is a dual channel positive-voltage linear regulator. This dual regulator has either one fixed output coupled with an adjustable output or two fixed outputs. Each channel features low-dropout and high accuracy.

The LX8815 provides designers with a flexible power management solution, minimal printed circuit board area, and shorter design cycles.

Each channel can supply up to one amp independently with a regulator design optimized for system efficiency by consuming minimal ground current and directing quiescent current to the load.

The LX8815 features on-chip trimming of the internal voltage reference enabling precise output voltages, typically ±1% of it's specified value, while the BiPolar output transistor has a low dropout voltage even at full output current (V_{DO} < 1.1V typ. @ 1A).

Thermal and Short Circuit Current Protection are integrated on-chip and operate independently for each regulator output.

The LX8815 regulator is stable with a low-value output capacitor, typically 3.3µF tantalum or 4.7µF ceramic on the outputs, allowing designers flexibility in external component selection.

Linfinity's S-PAK power package offers maximum power dissipation and ease of assembly using surface mount technology.

IMPORTANT: For the most current data, consult *MICROSEMI*'s website: **http://www.microsemi.com**

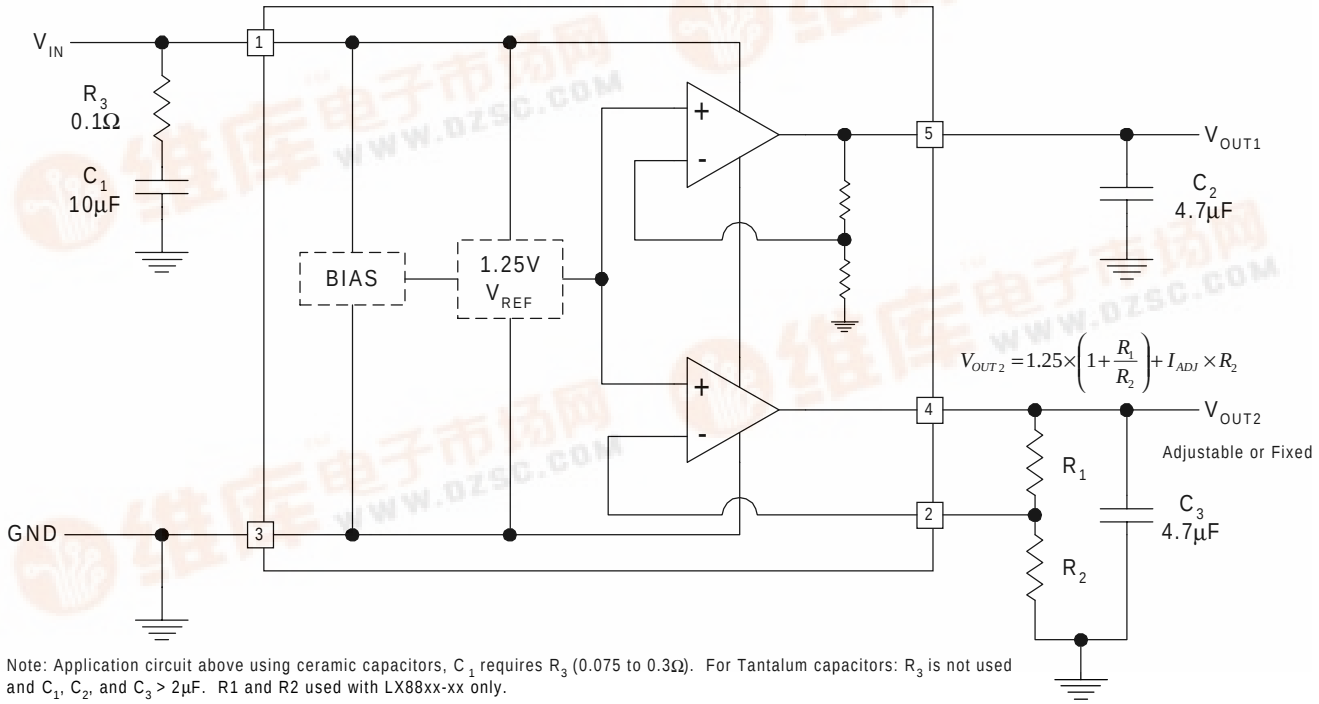
KEY FEATURES

- Two Independent Regulated Outputs
- Accurate Output Voltages
- Max. Dropout of 1.1V at Rated Current
- Independent Thermal and Current Limit Protection
- Low Profile 5 Lead SMT Power Package
- Low Tolerance Line (0.2%) and Load (0.4%) Regulation
- Wide DC Supply Voltage of 4.0V to 12.0V
- Loop Stability Independent of Output Capacitor Type

APPLICATIONS/BENEFITS

- 5V to 3.3V Linear Regulator
- Low Voltage Logic Supplies
- Active SCSI Terminators
- Battery Charging Circuits
- Instrumentation
- PC Peripherals

BLOCK DIAGRAM / APPLICATION CIRCUIT



Note: Application circuit above using ceramic capacitors, C_1 requires R_3 (0.075 to 0.3Ω). For Tantalum capacitors: R_3 is not used and C_1, C_2, and C_3 > 2µF. R1 and R2 used with LX88xx-xx only.

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PACKAGE ORDER INFO

T_J (°C)	OUTPUT V_1	OUTPUT V_2	DF Plastic S-PAK 5-PIN
0 to 125	3.3V	2.5V	LX8815-3325CDF
	3.3V	1.8V	LX8815-3318CDF
	3.3V	Adj	LX8815-3300CDF
	2.85V	Adj	LX8815-2800CDF
	2.5V	Adj	LX8815-2500CDF

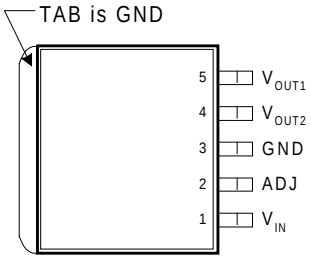
Note: Available in Tape & Reel.
Append the letter "T" to the part number. (i.e. LX8815-3325CDFT)

ABSOLUTE MAXIMUM RATINGS

Input Voltage (V_{BAT}) 13.5V
Load Current (Internally Limited) 1A
Power Dissipation ..... Internally Limited
Short-Circuit Protection ..... Indefinite
Operating Junction Temperature ..... 150°C
Lead Temperature (Soldering 180 seconds) ..... 235°C

Note: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of specified terminal.

PACKAGE PIN OUT



DF PACKAGE
(Top View)

THERMAL DATA

DF PACKAGE

THERMAL RESISTANCE-JUNCTION TO TAB, θ_{JT}	4.5°C/W
THERMAL RESISTANCE-JUNCTION TO AMBIENT, θ_{JA}	24.5°C/W

Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
The θ_{JA} numbers are guidelines for the thermal performance of the device/pc-board system. All of the above assume no ambient airflow. θ_{JA} can vary from 20°C/W to > 40°C/W depending on mounting technique. (See Application Notes Section: Thermal considerations)

FUNCTIONAL PIN DESCRIPTION

PIN NAME	DESCRIPTION
V_{IN}	Unregulated input voltage supply.
ADJ	Adjust control pin for regulator 2
GND	Common terminal for ground reference
V_{OUT1}	Fixed voltage regulator output (Regulator #1)
V_{OUT2}	Fixed or adjustable regulator output (Regulator #2)

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ELECTRICAL CHARACTERISTICS

Unless otherwise specified, the following specifications apply over the operating ambient temperature $0°C \leq T_A \leq 125°C$ except where otherwise noted and the following test conditions: V_{IN} = 5V, I_{OUT} = 10mA, C_1 = 4.7µF (Tantalum), C_2 = 4.7µF (Tantalum), and $T_J = T_A$ 25°C using low duty cycling methods.

Parameter	Symbol	Test Conditions	LX8815-xx00 Min	LX8815-xx00 Typ	LX8815-xx00 Max	Units
FIXED OUTPUT						
Output Voltage						
• LX8815-3300	V_1	V_{IN} = 5V, I_{OUT} = 5mA, T_J = 25°C	3.250	3.300	3.350	V
		5mA < I_1 < 1A, 4.50V < V_{IN} < 10V	3.234	3.300	3.366	
• LX8815-2800		V_{IN} = 5V, I_{OUT} = 5mA, T_J = 25°C	2.807	2.850	2.893	
		5mA < I_1 < 1A, 4.50V < V_{IN} < 10V	2.793	2.850	2.907	
• LX8815-2500		V_{IN} = 5V, I_{OUT} = 5mA, T_J = 25°C	2.462	2.500	2.537	
		5mA < I_1 < 1A, 4.50V < V_{IN} < 10V	2.450	2.500	2.550	
Line Regulation	$\Delta V_1(V_{IN})$	4.75V < V_{IN} < 10V, I_{OUT} = 5mA		0.01	0.2	$\%V_1$
Load Regulation	$\Delta V_1(I_1)$	5mA < I_1 < 1A, V_{IN} = 4.75V		0.01	0.4	$\%V_1$
Dropout Voltage	ΔV	I_{LOAD} = 1A, ΔV_1 = -2%		1.1	1.25	V
Current Limit	$I_{OUT\ (MAX)}$	(V_{IN} – V_1) = 5V	1.0	1.4		A
Minimum Load Current	I_L	Note 1		0	2	mA
ADJUSTABLE OUTPUT						
Reference Voltage	V_{REF}	V_{IN} = 5V, I_{OUT} = 10mA, T_J = 25°C	1.238	1.250	1.262	V
		5mA < I_1 < 1A, 4.50V < V_{IN} < 10V	1.231	1.250	1.269	
Line Regulation	$\Delta V_{REF}(V_{IN})$	4.75V < V_{IN} < 10V, I_{OUT} = 5mA		0.01	0.2	$\%V_1$
Load Regulation	$\Delta V_{REF}(I_2)$	5mA < I_1 < 1A, V_{IN} = 4.75V		0.01	0.4	$\%V_1$
Dropout Voltage	ΔV	V_{IN} > 4.5V, I_{LOAD} = 1A, ΔV_1 = -1%		1.1	1.3	V
Current Limit	$I_{OUT\ (MAX)}$	(V_{IN} – V_1) = 5V	1.0	1.4		A
Minimum Load Current	I_L	Note 1		1	3	mA
Adjust Pin Bias Current	I_{ADJ}			1	5	µA
ENTIRE REGULATOR						
Quiescent Current	I_Q	V_{IN} < 10V, I_1 = 5mA, I_2 = 5mA		1.8	5	mA
Ripple Rejection	PSRR	f=120Hz, V_{IN} = 5V	60	75		dB
RMS Output Noise (% of V_{OUT})	$V_{OUT\ (RMS)}$	10Hz < f < 10kHz		0.003		$\%V_1$
Thermal Shutdown	T_{JSD}			140		°C

Note 1: Minimum load current is defined as the amount of output current required to maintain regulation.

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ELECTRICAL CHARACTERISTICS

Unless otherwise specified, the following specifications apply over the operating ambient temperature 0°C ≤ T_A ≤ 125°C except where otherwise noted and the following test conditions: V_{IN} = 5V, I_{OUT} = 10mA, C_1 = 4.7µF (Tantalum), C_2 = 4.7µF (Tantalum), and T_J = T_A 25°C using low duty cycling methods.

Parameter	Symbol	Test Conditions	LX8815-33xx Min	LX8815-33xx Typ	LX8815-33xx Max	Units
FIXED OUTPUT 1						
Output Voltage	V_1	V_{IN} = 5V, I_{OUT} = 5mA, T_J = 25°C 5mA < I_1 < 1A, 4.50V < V_{IN} < 10V	3.250 3.234	3.300 3.300	3.350 3.366	V
Line Regulation	$\Delta V_1(V_{IN})$	4.75V < V_{IN} < 10V, I_{OUT} = 5mA		0.3	5.0	mV
Load Regulation	$\Delta V_1(I_1)$	5mA < I_1 < 1A, V_{IN} = 4.75V		0.8	10	mV
Dropout Voltage	ΔV	I_{LOAD} = 1A, ΔV_1 = -2%		1.1	1.25	V
Current Limit	$I_{OUT\ (MAX)}$	(V_{IN} – V_1)	1.0	1.4		A
Minimum Load Current	I_L	Note 1		0	2	mA
FIXED OUTPUT 2						
Output Voltage • LX8815-3325 • LX8815-3318	V_1	 V_{IN} = 5V, I_{OUT} = 5mA, T_J = 25°C 5mA < I_1 < 1A, 4.50V < V_{IN} < 10V V_{IN} = 5V, I_{OUT} = 5mA, T_J = 25°C 5mA < I_1 < 1A, 4.50V < V_{IN} < 10V	 2.462 2.450 1.773 1.764	 2.50 2.50 1.80 1.80	 2.537 2.550 1.827 1.36	V
Line Regulation	$\Delta V_1(V_{IN})$	4.75V < V_{IN} < 10V, I_{OUT} = 5mA		0.02	0.15	%mV
Load Regulation	$\Delta V_1(I_1)$	5mA < I_1 < 1A, V_{IN} = 4.75V		0.04	0.3	%mV
Dropout Voltage	ΔV	V_{IN} > 4.5V, I_{LOAD} = 1A, ΔV_1 = -1%		1.1	1.3	V
Current Limit	$I_{OUT\ (MAX)}$	(V_{IN} – V_1)	1.0	1.4		A
Minimum Load Current	I_L	Note 1		1	2	mA
ENTIRE REGULATOR						
Quiescent Current	I_Q	V_{IN} < 10V, I_1 = 5mA, I_2 = 5mA		1.8	7	mA
Ripple Rejection	PSRR	f=120Hz, V_{IN} = 5V	60	75		dB
RMS Output Noise (% of V_{OUT})	$V_{OUT\ (RMS)}$	10Hz < f < 10kHz		0.003		%V_1
Thermal Shutdown	T_{JSD}			140		°C

Note 1: Minimum load current is defined as the amount of output current required to maintain regulation.

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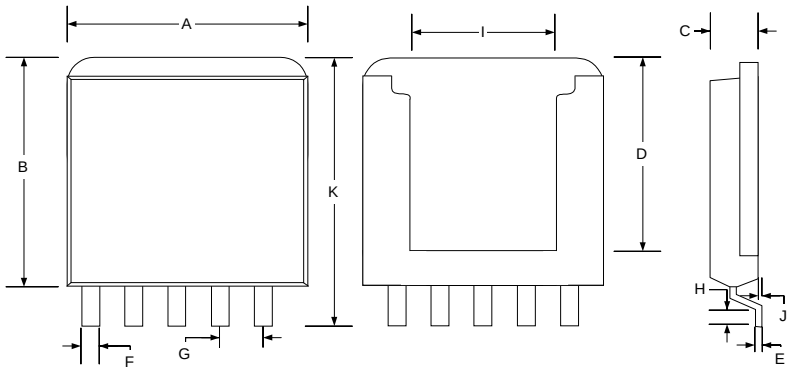
MECHANICAL DRAWINGS



Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.27	9.52	.365	.375
B	8.89	9.14	.350	.360
C	1.77	2.03	.070	.080
D	7.49	7.74	.295	.305
E	0.12	0.38	.005	.015
F	0.58	0.84	.023	.033
G	1.70 BSC		0.067 BSC	
H	0.79	1.04	.031	.041
I	4.31	6.86	.170	.270
J	0.03	0.13	.001	.005
K	10.41	10.67	.410	.420

Note:

1. Dimensions do not include mold flash or protrusions; these shall not exceed 0.155mm(.006") on any side. Lead dimension shall not include solder coverage.

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