LTC4415EMSE
Dual 4A Ideal Diodes with Adjustable Current Limit

DESCRIPTION

Demonstration circuit 1819A features the LTC®4415EMSE dual ideal diodes. Each independent ideal diode can be used to replace a standard diode for improved low forward drop in applications requiring maximum headroom and overall system efficiency.

The input supply voltage ranges are from 1.7V to 5.5V for each input/output pair. As initially configured, LTC4415 can provide a maximum current limit of 4A for each diode, but is jumper-selectable up to 6A (internal current limit). The voltage of the current limit pins, CLIM1 and CLIM2, can also be monitored for a scaled representation of the output current.

For evaluation, each diode can be controlled by the ENABLE CONTROL jumper, JP1, or by the enable input pins, EN1 and $\overline{EN2}$. As initially configured, by setting to BOTH the user can apply input voltages and loads on each diode independently. Selecting PRIORITY allows the LTC4415 to automatically switch over between inputs when the proper input voltage threshold on IN1 is achieved.

Status and warning LEDs and test points are provided for the logic output pins $\overline{STAT1}$, $\overline{STAT2}$ and $\overline{WARN1}$, $\overline{WARN2}$, respectively.

Optionally, the LTC4415EDHC version can also be used for evaluation. It is a pin-compatible drop-in replacement.

Design files for this circuit board are available at http://www.linear.com/demo

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PERFORMANCE SUMMARY (T_A = 25°C)

PARAMETER	CONDITIONS	VALUE
Minimum Input Voltage	VINx	1.7V
Maximum Input Voltage	VINx	5.5V
Maximum Output Current	CLIMx Resistor-Adjustable	4A
	CLIMx Internal Limit	6A
CLIMx Clamp Voltage	Current Limit	0.5V
Forward Voltage Drop	VINx = 3.6V, IOUTx = 1A	50mV Typ
Reverse Turn-Off Voltage	VINx – VOUTx	–30mV
Enable Threshold	EN1 and $\overline{EN2}$	800mV

QUICK START PROCEDURE

Demonstration circuit 1819A is easy to set up to evaluate the performance of the LTC4415. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below.

1. Set the jumpers as below:

JP1	JP2	JP3
BOTH	4A	4A

2. With all power off, connect input 1 and 2 (VIN1 and VIN2) power supplies capable of at least 4A each, the loads (VOUT1 and VOUT2), and meters as shown in Figure 1.
3. Preset the system loads to 0A and the input supplies to 0V, 0A current limit.
4. Turn on the supplies, setting the current limit above 4A. Adjust the voltages to the desired value, up to 5.5V.
5. Turn on the loads and adjust as necessary.
6. Monitor CLIM1 and CLIM2 pin voltages for a scaled representation of the output currents.
7. Adjust the supply voltages further and observe how the output states change accordingly. $\overline{\text{STAT1}}$ and $\overline{\text{STAT2}}$ will change state if the input voltage drops below the UVLO threshold.
8. Adjust the loads into current limit and observe how the $\overline{\text{WARN1}}$ and $\overline{\text{WARN2}}$ states change accordingly.

Optional

1. For prioritization enable switchover set jumper JP1 to PRIORITY.
2. For independent, external control of the enable pins, remove the shunt on jumper JP1. Apply the logic control signal on EN1 and $\overline{\text{EN2}}$ as necessary.
3. With all power off, change the CLIM1 and CLIM2 settings on jumpers JP2 and JP3 for different current limits.
4. For load sharing or evaluation of the diode-OR function, connect the two diode outputs, OUT1 and OUT2, together. The source of highest voltage will appear at the output.
5. For independent path control from a common input, connect the two diode inputs, IN1 and IN2, together.

QUICK START PROCEDURE

Figure 1. Proper Measurement Equipment Setup

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	4	C1, C2, C3, C4	CAP, CHIP, X5R,10µF, ±10%, 16V, 0805	MURATA, GRM21BR61C106KE15L
2	1	R1	RES, CHIP, 100k, ±1%, 1/16W, 0402	VISHAY, CRCW0402100KFKED
3	1	R2	RES, CHIP, 2k, ±1%, 1/16W, 0402	VISHAY, CRCW04022K00FKED
4	1	R3	RES, CHIP, 21.5k, ±1%, 1/10W, 0402	VISHAY, CRCW040221K5FKED
5	2	R9, R10	RES, CHIP, 1k, ±1%, 1/16W, 0402	VISHAY, CRCW04021K00FKED
6	1	U1	IC, LTC4415EMSE	LINEAR TECH., LTC4415EMSE#PBF
Additional Demo Board Circuit Components				
1	4	C5, C6, C7, C8	CAP, CHIP, X5R,10µF, ±10%, 6.3V, 0603	TDK, C1608X5R0J106K
2	2	D1, D2	LED, SMT, GREEN, 0603	LITE-ON, LTST-C190KGKT
3	2	D3, D4	LED, SMT, YELLOW, 0603	LITE-ON, LTST-C190YKT
4	2	R4, R5	RES, CHIP, 10k, ±5%, 1/16W, 0402	VISHAY, CRCW040210K0JNED
5	2	R6, R13	RES, CHIP, 143Ω, ±1%, 1/16W, 0402	VISHAY, CRCW0402143RFKED
6	2	R8, R12	RES, CHIP, 332Ω, ±1%, 1/16W, 0402	VISHAY, CRCW0402332RFKED
7	4	R14, R15, R16, R17	RES, CHIP, 1k, ±5%, 1/16W, 0402	VISHAY, CRCW04021K00JNED
8	2	R7, R11	RES, CHIP, 1k, ±1%, 1/16W, 0402	VISHAY, CRCW04021K00FKED
9	4	R18, R19, R20, R21	RES, CHIP, 1Ω, ±5%, 1/16W, 0402	VISHAY, CRCW04021R00JNED
Hardware/Components (For Demo Board Only)				
2	8	E1, E2, E5, E8, E14, E15, E16, E17	TEST POINT, TURRET, 0.094"	MILL-MAX, 2501-2-00-80-00-00-07-0
1	9	E3, E4, E6, E7, E9, E10, E11, E12, E13	TEST POINT, TURRET, 0.061"	MILL-MAX, 2308-2-00-80-00-00-07-0
3	1	JP1	3 Pin Jumper, 2mm	SAMTEC, TMM-103-02-L-S
4	2	JP2, JP3	2 × 5 Pin Jumper, 2mm	SAMTEC, TMM-105-02-L-D
5	3	JP1-3	SHUNT, 2mm	SAMTEC, 2SN-KB-G
6	4		STAND-OFF, NYLON, 0.500"	KEYSTONE, 8833

SCHEMATIC DIAGRAM

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