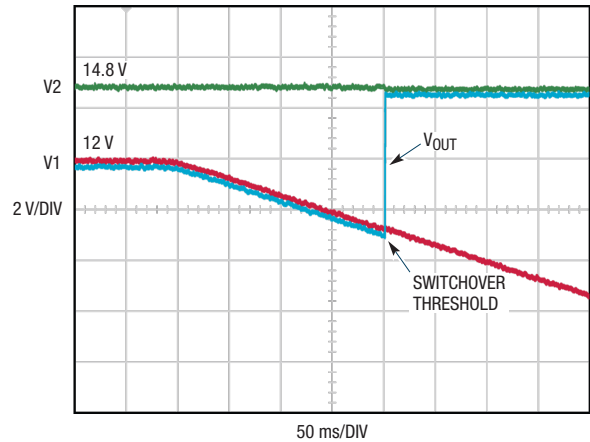
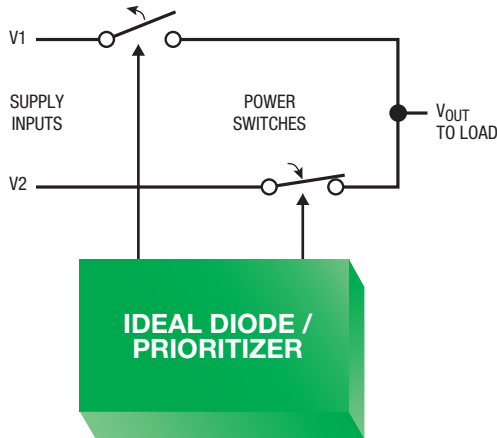


IDEAL DIODES AND PRIORITIZERS



Output Switchover to V2 on V1 Undervoltage

Active ORing

Backup Switchover

Supply Holdup

Ideal diodes and prioritizers simplify dynamic supply selection and switchover in high availability electronics employing sources such as wall adapters, USB ports, batteries, and redundant supplies. They reduce solution footprint by integrating the needed amplifiers, comparators, charge pumps, and control logic into a single device. Supplies are multiplexed either by highest voltage or by highest priority with MOSFETs acting as power switches, minimizing voltage and power loss between the supply and the load.

Benefits

- ▶ Seamless and oscillation-free switchover between supplies
- ▶ Supply selection based on voltage or priority
- ▶ Supplies protected from reverse and cross conduction currents
- ▶ Load protected from reversed supply input
- ▶ Low quiescent current extends battery run and standby time
- ▶ MOSFET power switch: internal or external, N-channel or P-channel, single or back-to-back
- ▶ Broad and growing portfolio covering wide voltage/current range and functions

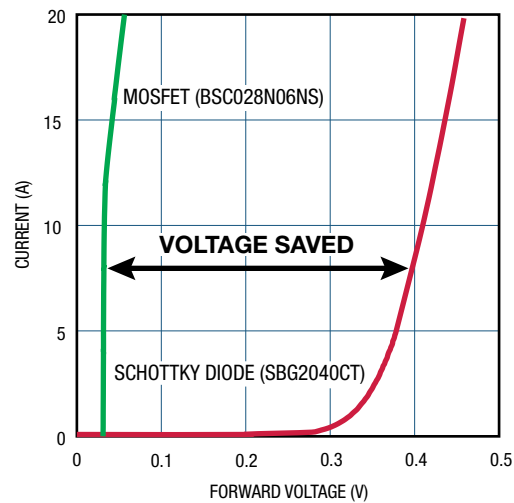
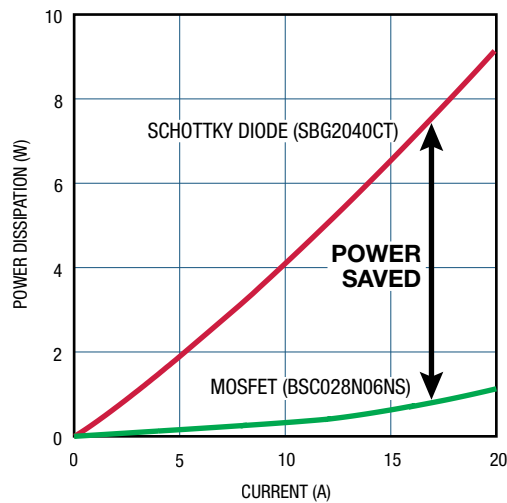
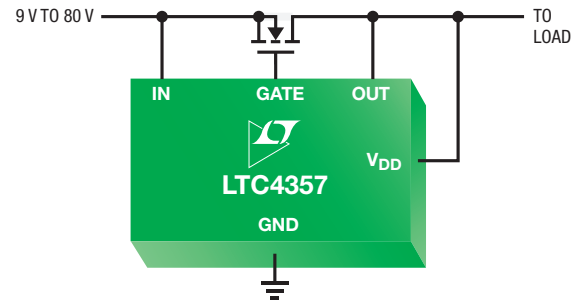
MOSFET Power Switch Configurations (V_{IN} to V_{OUT})

Type	Single	Back-to-Back
N-Channel		
P-Channel		

Comparison	Ideal Diode	Prioritizer
Supply Selection	Highest voltage	Highest priority (if supply voltage is in valid range)
Typical Application	Redundant supply (similar voltage) ORing	Battery operated systems with various supply voltages
MOSFET Operating State	Forward voltage drop regulated below 50 mV	Fully on, forward voltage drop is $I_{LOAD} \cdot R_{ON}$
Load Sharing	Yes, droop sharing when supply voltages are close	None, only one supply path is on at a time
Similar Uses	Ideal diodes that block forward current with back-to-back MOSFETs can prioritize	Prioritizer in redundant supply application favors one supply over the rest

Ideal Diode Controller

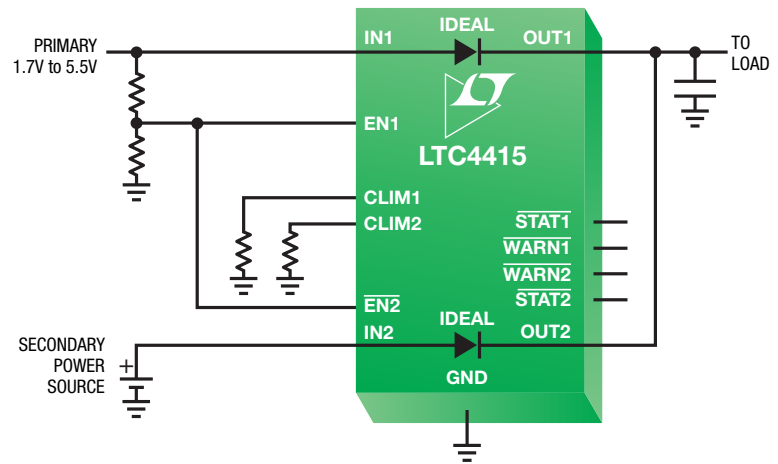
- Connects highest voltage supply to output
- Low forward turn-on voltage (< 50 mV)
- Controls external N-channel or P-channel MOSFETs
- Linear regulation of MOSFET forward voltage drop
- Conserves voltage and power over Schottky diodes
- Minimizes or eliminates heat sinks
- Works as high side load switch with back-to-back MOSFETs
- Blocks reversed inputs from load



Device	Supplies	V_{IN}	FET Type	I_Q	High Side Switch	Features	Package (mm x mm)
LTC4352	1	0 V to 18 V	N-channel	1.5 mA	•	0.5 μ s fast turn-on	3 x 3 DFN-12, MSOP-12
LTC4412	1	2.5 V to 36 V	P-channel	18 μ A	•	Blocks $-14 V_{IN}$	TSOT23-6
LTC4414	1	3 V to 36 V	P-channel	36 μ A	•	Drives large PFETs, blocks $-14 V_{IN}$	MSOP-8
LT8672	1	3 V to 42 V	N-channel	20 μ A		Rectifies 100 kHz, blocks $-40 V_{IN}$	MSOP-10
LTC4359	1	4 V to 80 V	N-channel	150 μ A	•	Blocks $-40 V_{IN}$	2 x 3 DFN-6, MSOP/SO-8
LTC4357	1	9 V to 80 V	N-channel	930 μ A		Separate bias input	2 x 3 DFN-6, MSOP-8
LTC4371	2	-4.5 V to > -100 V	N-channel	300 μ A		Floating topology for negative supplies	3 x 3 DFN-10, MSOP-10
LTC4353	2	0 V to 18 V	N-channel	1.6 mA		1 μ s fast turn-on	4 x 3 DFN-16, MSOP-16
LTC4370	2	0 V to 18 V	N-channel	2.3 mA		Load sharing	4 x 3 DFN-16, MSOP-16
LTC4416	2	3.6 V to 36 V	P-channel	70 μ A	•	Dual LTC4414	MSOP-10
LTC4355	2	9 V to 80 V	N-channel	2.6 mA		V_{IN} , fuse, MOSFET monitors	4 x 3 DFN-14, MSOP/SO-16

Ideal Diode

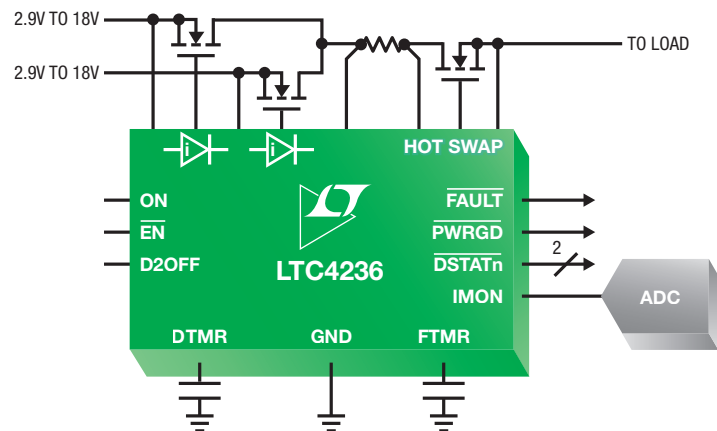
- ▶ Internal power MOSFET for compact solution footprint
- ▶ Load currents up to 5 A
- ▶ Low reverse leakage current
($< 1 \mu\text{A}$ at 25°C , $< 10 \mu\text{A}$ at 125°C)



Device	Supplies	V_{IN}	Max I_{LOAD}	R_{ON}	I_Q	High Side Switch	Features	Package (mm × mm)
LTC4411	1	2.6 V to 5.5 V	1.8 A	140 mΩ	40 μA	•	Current limit	TSOT23-5
LTC4358	1	9 V to 26.5 V	5 A	20 mΩ	780 μA		Separate bias supply input	4 × 3 DFN-14, TSSOP-16E
LTC4415	2	1.7 V to 5.5 V	4 A	50 mΩ	44 μA	•	Current monitor and limit (adjustable)	5 × 3 DFN-16, MSOP-16E
LTC4413	2	2.5 V to 5.5 V	1.8 A	140 mΩ	25 μA	•	Current limit	3 × 3 DFN-10

Ideal Diode and Hot Swap Controller

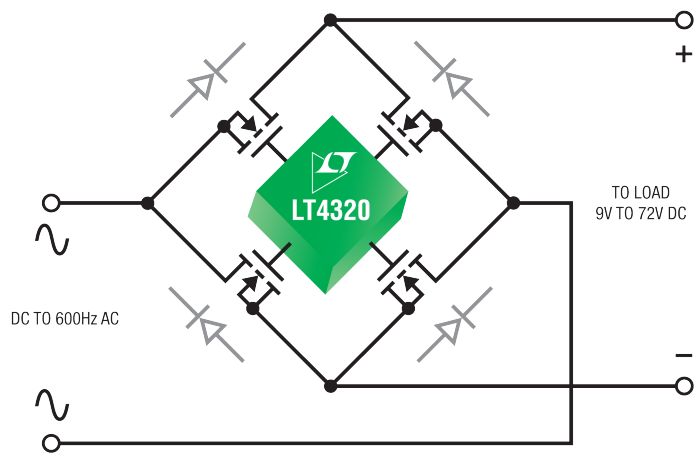
- ▶ Ideal Diode (ID) for redundant supply active ORing, reverse current blocking, and supply holdup
- ▶ Hot Swap (HS) for inrush current control, overcurrent and under/overvoltage protection (UV/OV)
- ▶ Fast 0.5 μs ideal diode turn-on and turn-off time
- ▶ Current-limited circuit breaker with adjustable delay
- ▶ Current monitoring (CM), power good, circuit breaker fault, and diode status (DS) outputs



Device	Configuration	V_{IN}	I_Q	OV	Output		Features	Package (mm × mm)
					CM	DS		
LTC4229	HS + ID	2.9 V to 18 V	2.5 mA	•		•	Prioritizer, adjustable debounce delay	4 × 5 QFN-24, SSOP-24
LTC4364	HS + ID	4 V to 80 V	483 μA	•			Surge stopper	4 × 3 DFN-14, MSOP-16, SO-16
LTC4227	HS + Dual ID	2.9 V to 18 V	3.3 mA				100 ms/1.6 ms debounce options	4 × 5 QFN-20, SSOP-16
LTC4236	HS + Dual ID	2.9 V to 18 V	3.6 mA		•	•	Prioritizer, adjustable debounce delay	4 × 5 QFN-28
LTC4235	HS + Dual ID	9 V to 14 V	3.6 mA		•		Preset 12 V power good threshold	4 × 5 QFN-20
LTC4228	Dual [HS + ID]	2.9 V to 18 V	3 mA			•	Complete dual for μTCA systems	4 × 5 QFN-28, SSOP-28

Ideal Diode Bridge Controller

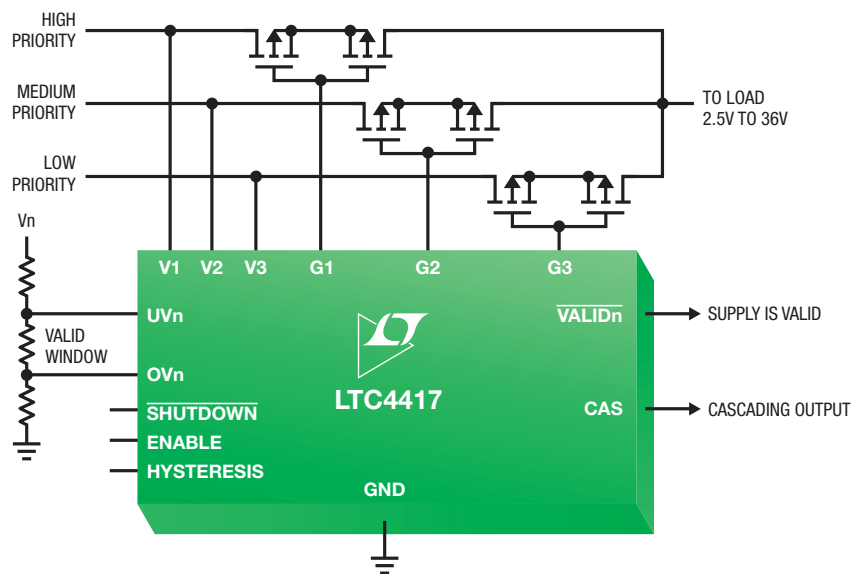
- ▶ Full-wave AC rectification or DC polarity correction
- ▶ Replaces diodes in full-wave bridge rectifier with N-channel MOSFETs
- ▶ Maximizes power efficiency and available voltage
- ▶ Minimizes heat to ease thermal design
- ▶ LT4321 for Power over Ethernet (PoE) Powered Device (PD) applications



Device	Supplies	Operating DC Voltage	Input Frequency Range	I_Q	Features	Package (mm × mm)
LT4320	1	9 V to 72 V	DC to 600 Hz	1.3 mA	3-phase AC with 3× LT4320	3 × 3 DFN-8, MSOP-12E, PDIP-8
LT4321	2	20 V to 80 V	DC only	0.5 mA	For PoE PD, IEEE 802.3 compliant	4 × 4 QFN-16

Prioritizer

- ▶ Connects highest priority valid supply to load
- ▶ Priority defined by pin assignment
- ▶ Valid window set by precise undervoltage and overvoltage thresholds
- ▶ Low quiescent current, shutdown mode, and freshness seal extends battery run and standby time
- ▶ Protects load from reversed input
- ▶ Cascadable to extend number of supply inputs



Device	Supplies	V_{IN}	Max I_{LOAD}	Reverse Input Protection	I_Q	Cascadable	Features	Package (mm × mm)
LTC4419	2	1.8V to 18V	0.5A	-15 V	3.6 μ A		Freshness seal	3 × 3 DFN-10, MSOP-12E
LTC4420	2	1.8V to 18V	0.5A	-15 V	3.6 μ A		LTC4419 + backup disconnect	3 × 3 DFN-12, MSOP-12E
LTC4418	2	2.5V to 40V	Ext PFET	-42 V	26 μ A	•	Adjustable validation time	4 × 4 QFN-20
LTC4417	3	2.5V to 36V	Ext PFET	-42 V	28 μ A	•	256 ms validation time	4 × 4 QFN-24, SSOP-24

Analog Devices, Inc. Worldwide Headquarters

Analog Devices, Inc.
One Technology Way
P.O. Box 9106
Norwood, MA 02062-9106
U.S.A.
Tel: 781.329.4700
(800.262.5643, U.S.A. only)
Fax: 781.461.3113

Analog Devices, Inc. Europe Headquarters

Analog Devices GmbH
Otto-Aicher-Str. 60-64
80807 München
Germany
Tel: 49.89.76903.0
Fax: 49.89.76903.157

Analog Devices, Inc. Japan Headquarters

Analog Devices, KK
New Pier Takeshiba
South Tower Building
1-16-1 Kaigan, Minato-ku,
Tokyo, 105-6891
Japan
Tel: 813.5402.8200
Fax: 813.5402.1064

Analog Devices, Inc. Asia Pacific Headquarters

Analog Devices
5F, Sandhill Plaza
2290 Zuchongzhi Road
Zhangjiang Hi-Tech Park
Pudong New District
Shanghai, China 201203
Tel: 86.21.2320.8000
Fax: 86.21.2320.8222

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