DIO7320B

5.5V 3A Per-channel Load Switch with Slew Rate Control and Reverse Current Blocking

Features

- 1.8V to 5.5V operation voltage range
- Low quiescent current <1μA when disabled
- Reverse current blocking when switch is off
- Built-in 100Ω(typ) output discharge resistor
- 28mΩ N−MOSFET at Figure 2 application
- DC Current Up to 3A Per-channel
- Peak Current Up to 3.5A Per-channel
- Built−in Soft−Start 3ms
- Active High with Integrated Bridge
- Pb−Free Device EP-SOIC8

Applications

- Cell Phone and Digital Camera
- PDA and Notebook
- LCD Monitor
- TV and Set-Top Box

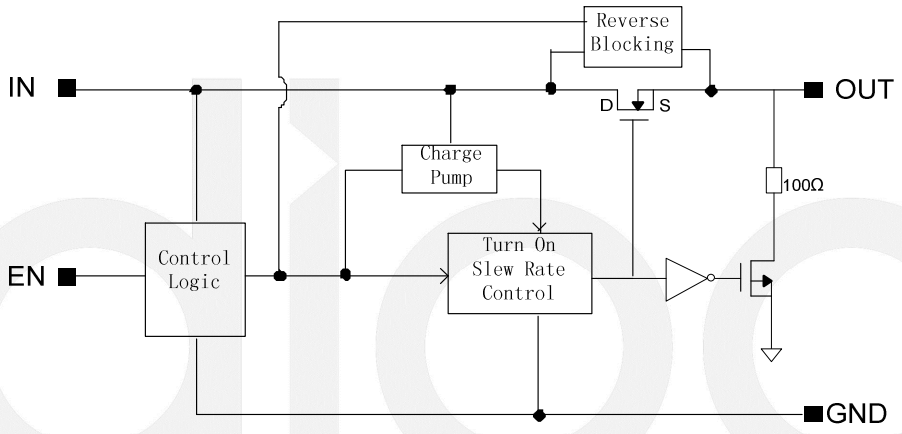
Descriptions

The DIO7320B is a dual Low On-Resistance N−channel MOSFET controlled by a soft−start sequence of 3ms for mobile applications.

The low R_{DS}(on) allows system supplying or battery charging up to DC 3A per-channel. The device is enable automatically if a power supply is connected on V_{IN} pin (active High) and maintained off if no power input(internal pull down).

Due to the current consumption optimization, the leakage current is drastically decreased from the battery connected to the device, which allows extending the battery life.

Block Diagram



Ordering Information

Order Part Number	Top Marking		T_A	Package	
DIO7320BXS8	DIO7320B	Green	-40 to +85°C	EP-SOIC-8	Tape & Reel, 2500

Pin Assignments

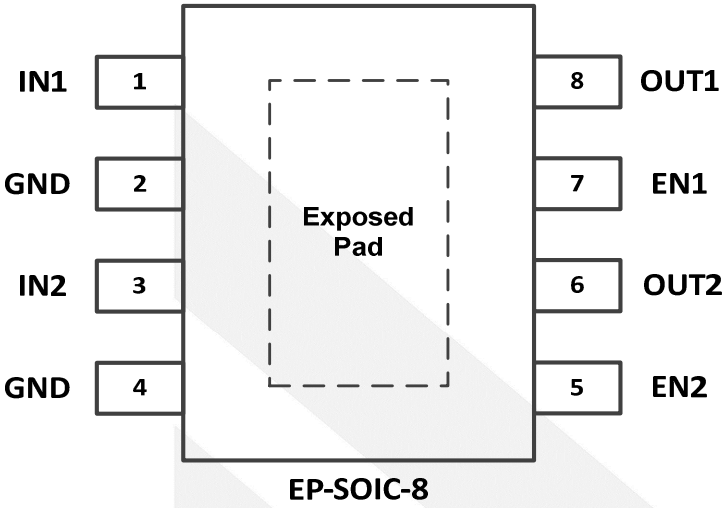


Figure 1 Pin Assignment

Pin Description

Pin	Name	Type	Description
1/3	IN1/2	Power	Switch Input voltage; connect a 1μF or greater ceramic capacitor from IN to GND as close as possible to the IC.
2/4	GND	Power	GND
5/7	EN1/2	Input	Enable input, logic high active.
6/8	OUT1/2	Output	Switch Output; connect a 1μF capacitor from OUT to GND as close as possible to the IC.
	Exposed Pad	Power	Exposed pad can be connected to GND plane for dissipation purpose or any other thermal plane.

Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Rating” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maxim rating conditions for extended periods may affect device reliability.

Parameter		Rating	Unit
V_{IN}		-0.3 to 6	V
V_{OUT},EN		-0.3 to 6	V
Storage Temperature		-65 to 150	°C
Maximum Junction Range		-40 to 145	°C
Thermal Resistance, θ_{JA}		50	°C/W
Latch Up Protection		200	mA
ESD	HBM, JEDEC: JESD22-A114	4	kV
	CDM, JEDEC : JESD22-C101	2	

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation to ensure optimal performance to the datasheet specifications. DIOO does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{IN}	Operational Power Supply		1.8		5.5	V
V_{EN}	Enable Voltage		0		5.5	V
C_{IN}	Decoupling input capacitor		1			μF
C_{OUT}	Decoupling output capacitor	USB port per Hub	1			μF
I_{OUT}	Maximum DC Current	Per-channel			3	A
I_{PEAK}	Maximum Peak Current	1ms pulse width at 217Hz , Per-channel			3.5	A
T_A	Ambient Temperature Range		-40	25	85	°C
T_J	Junction Temperature Range		-40	25	125	°C

Electrical Characteristics

T_A=25°C V_{IN} = 5V, unless otherwise noted.

Symbol	Parameter	Conditions		Min.	Typ.	Max.	Unit
POWER SWITCH							
$R_{DS(ON)}$	Static drain-source on-state resistance	V_{IN}=1.8~5.5V,T_A = 25°C.(See Figure 2 application)			28		mΩ
		I_{OUT}=200mA,-40°C< T_A <85°C, (See Figure 2 application)				50	mΩ
t_R	Switch turn-on edge rising time	V_{IN}=4.5V	C_{LOAD}=100μF,R_{LOAD}=150Ω	2	2.5	5	ms
t_F	Switch turn-off edge falling time	V_{IN}=4.5V	C_{LOAD}=100μF,R_{LOAD}=150Ω		3		ms
t_{DON}	Switch turn-on delay	V_{IN}=4.5V; C_{LOAD}=100μF	50% of EN pin to V_{OUT}=10% of fully on		1.5		ms
t_{DOFF}	switch turn-off delay	V_{IN}=4.5V; C_{LOAD}=100μF	50% of EN pin to V_{OUT}=90% of fully on		10		μs
ENABLE INPUT EN							
V_{IH}	High-level input voltage			1.45			V
V_{IL}	Low-level input voltage					0.85	V
R_{PD}	Pull-down resistance at EN pin	T_A = -45°C to +85°C			1		MΩ
REVERSE-LEAKAGE PROTECTION							
I_{REV}	Reverse-current protection	V_{IN}=0V, V_{OUT}=4.2V, -40°C< T_A <85°C, EN="0"			1	2	μA
QUIESCENT CURRENT							
I_Q	Current consumption per Channel	V_{IN}=5V, V_{OUT} floating, EN =5V			100	180	μA
I_{SDN}	shutdown current	V_{IN}=5V, En="0", V_{OUT}=GND, -40°C< T_A <85°C				1	μA

Note: This parameter is guaranteed by design and characterization.

Application information

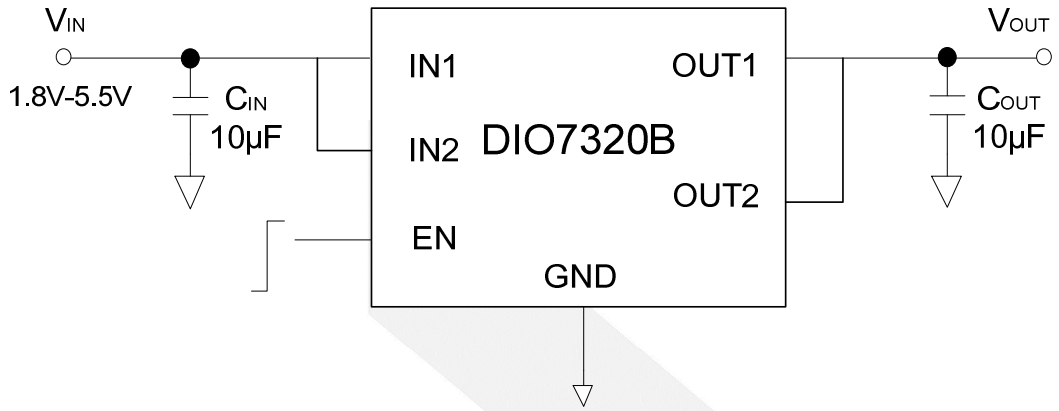


Figure 2 Typical Application Diagram

Enable

Enable pin voltage in the active high means on. This part is automatically turned on when the input voltage enables the device. In the other side, this part is turned off when the input voltage is not available, which limits current consumption from battery to OUT pin.

Input Capacitor

To limit the voltage drop on the input supply caused by transient inrush currents, an input capacitor is placed to the IN and GND as close as possible. The value of the input capacitor is recommended 1μF at least. Higher values capacitor can help to further reduce the voltage drop.

Output Capacitor

While the device works, a capacitor from 100nF to 1μF across OUT and GND is recommended to accommodate load transient condition. It also helps to prevent parasitic inductance forces OUT below GND when switching off. Output capacitor has the minimal effect on device's turn on slew rate time.

Blocking Control

The blocking control circuitry switches the bulk of the power NMOS. When the part is off (No IN or EN tied to GND externally), the body diode limits the leakage current I_{REV} from OUT to IN. In this condition, the anode of the body diode is connected to IN pin and the cathode is connected to OUT pin. During the operation, the anode of the body diode is connected to OUT pin and the cathode is connected to IN pin to prevent the discharge of the power supply.

CONTACT US

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