DIO7063

5.5V Low Loss Power Distribution Switch

Features

- Input voltage: 2.7V to 5.5V
- Typical 75mΩ on-resistance
- 0.9A Continuous Current Capability
- Enable polarity:
  DIO7063A: Active high
  DIO7063B: Active Low
- Under voltage lockout
- Over current protection, short circuit protection and over temperature protection
- Reverse blocking (no body diode)
- No reverse current when power ON or power OFF
- Compact SOT23-5 and MSOP-8 packages

Applications

- USB Ports/Hubs
- Digital TV
- Set-Top Boxes
- VOIP Phones

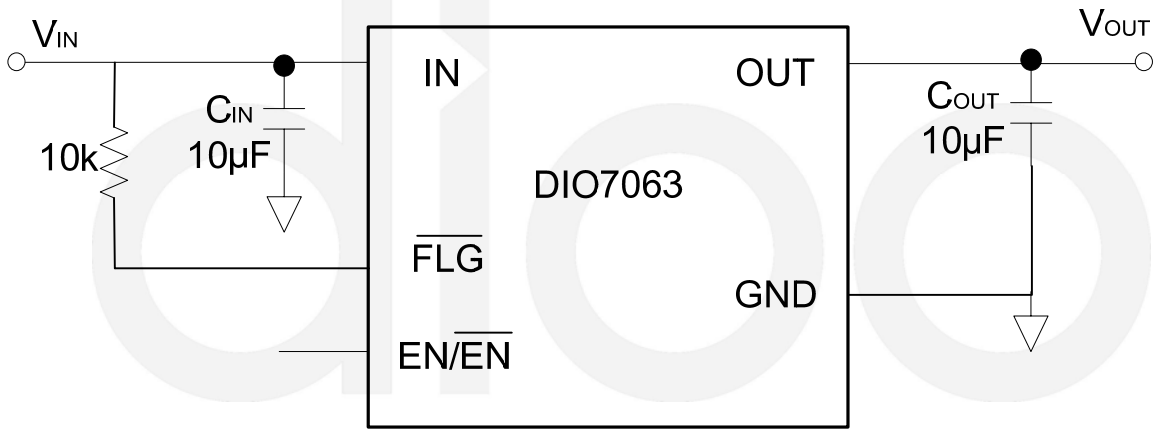
Descriptions

The DIO7063 power distribution switch is intended for applications where precision current limiting is required or heavy capacitive loads and short circuits are encountered. The power switch rising and falling times are controlled to minimize current surges during turning on/off. The DIO7063 provide 0.9A continuous current modes.

The DIO7063 device limits the output current under a safe level by using a constant current mode when the output load exceeds the current limit threshold.

The DIO7063 is available in the SOT23-5 and MSOP-8 packages. It is rated over the -40°C to +85°C temperature range.

Typical Application



Ordering Information

Order Part Number	Top Marking	Recommended Continuous Current		EN/$\overline{EN}$	Package	
DIO7063AST5	YW6A	900mA	Green	Active High	SOT23-5	Tape & Reel, 3000
DIO7063BST5	YW6B	900mA	Green	Active Low	SOT23-5	Tape & Reel, 3000
DIO7063AMP8	D63A	900mA	Green	Active High	MSOP-8	Tape & Reel, 3000
DIO7063BMP8	D63B	900mA	Green	Active Low	MSOP-8	Tape & Reel, 3000

Ordering Information Complimentary Note

Ordering number = Part No. +Enable Active Version +Package Code

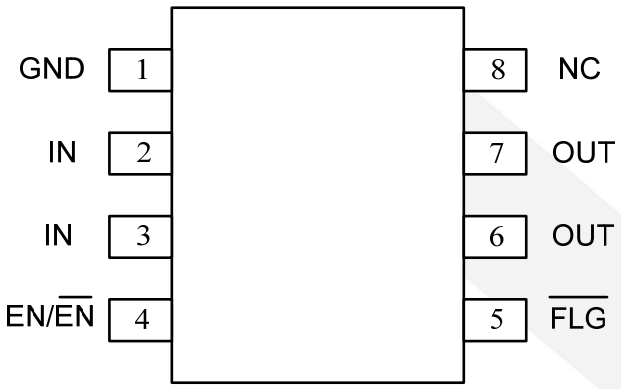
DIO7063

A: Enable Active High
B: Enable Active Low

ST5: Stands for SOT23-5
MP8: Stands for MSOP-8

Pin Assignments

MSOP-8(Top View)



SOT23-5(Top View)

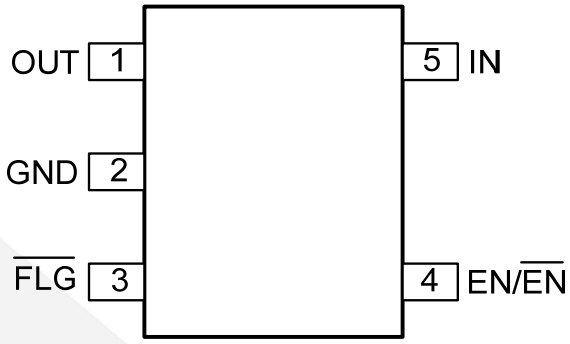


Figure 1 Pin Assignment

Pin Description

Pin Name	Pin Description
OUT	Output pin, decoupled with a 10μF capacitor to GND
GND	Ground pin
$\overline{FLG}$	Fault flag output
EN/$\overline{EN}$	Active high or Active low. Do not leave it floating
IN	Input pin, decoupled with a 10μF capacitor to GND

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
All pins		-0.3 to 6	V
Package Thermal Resistance	θ_{JA} ,SOT23-5	250	°C/W
	θ_{JA} , MSOP-8	166	
	θ_{JC}, SOT23-5	130	
	θ_{JC}, MSOP-8	44	
Junction Temperature Range		150	°C
Lead Temperature (Soldering, 10 sec)		260	°C
Storage Temperature Range (T_{STG})		-65 to 150	°C
ESD Susceptibility	HBM (Human Body Mode)	6	kV
	CDM (Charged Device Mode)	2	

Note: Input and output negative ratings may be exceeded if input and output diode current ratings are observed.

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.

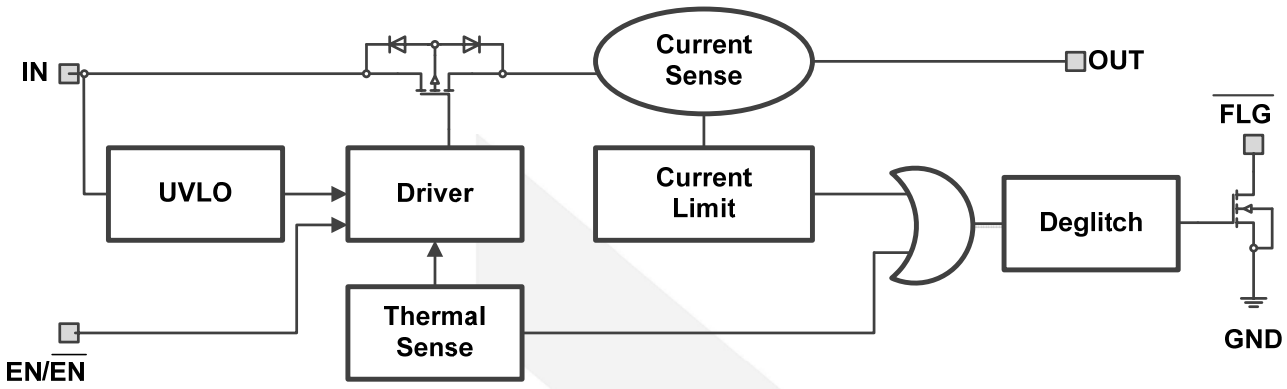
Parameter	Rating	Unit
IN	2.7 to 5.5	V
All other pins	0 to 5.5	V
Junction Temperature Range	-40 to 125	°C
Ambient Temperature Range	-40 to 85	°C

Electrical Characteristics

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{IN}	Input Voltage Range		2.7		5.5	V
I_{SHDN}	Shut down Input Current	Open load, IC Disabled		0.2	1	μA
I_Q	Quiescent Supply Current			50		μA
$R_{DS(ON)}$	FET R_{ON}			75		mΩ
$V_{EN(H)}$	EN Rising Threshold	Logic High Voltage	2			V
$V_{EN(L)}$	EN Falling Threshold	Logic low Voltage			0.8	V
I_{EN}	EN Leakage Current	V_{EN}=5.0V			1	μA
V_{IN_UVLO}	IN UVLO Threshold				2.5	V
V_{IN_HYS}	IN UVLO Hysteresis			240		mV
I_{LIM}	Over Current Limit	DIO7063A, DIO7063B	1.05	1.3	1.65	A
T_{ON}	Turn-on Time	R_L=10Ω, C_{OUT}=1μF		400		μs
T_{OFF}	Turn-off Time	R_L=10Ω, C_{OUT}=1μF		20		μs
T_{SD}	Thermal Shut down Temperature			140		°C
	Thermal Shut down Hysteresis			20		°C

Block Diagram



Application Information

Power Supply Considerations

A 10μF ceramic capacitor from V_{IN} to GND to prevent the input voltage from dropping during the hot-plug condition is strongly recommended. However higher capacitance could help reduce the voltage drop. Furthermore, bypassing the output with a 10μF ceramic capacitor improves the immunity of the device to short-circuit transients, because an output short will cause ringing on the input without the input capacitor. It could destroy the internal circuitry when the input transient voltage exceeds the absolute maximum supply voltage even for a short duration.

Under Voltage Lockout

A voltage sense circuit monitors the input voltage. When the input voltage is below approximately 2.4V, a control signal turns off the power switch.

Enable

The logic enable controls the power switch, the bias for the charge pump, driver, and other circuitry to reduce the supply current. The EN control pin must be driven to a logic high or logic low for a clearly defined signal input. Floating these control lines may cause unpredictable operation.

Over-Current Protection

The DIO7063 responds to over current conditions by limiting output current to the I_{LIM} levels.When an overcurrent condition is detected, the device maintains a constant output current and reduces the output voltage accordingly. Complete shut down occurs only if the fault is present long enough to activate thermal limit.

Two possible overload conditions can occur. In the first condition, an excessive load occurs while the device is enabled. When the excessive load occurs, very high currents may flow for a short time before the current limit circuit can react. After the current limit circuit has tripped (reached the overcurrent trip threshold) the device switches into constant current mode to limit the current close to I_{LIM}.

In the second condition, the load is gradually increasing beyond the recommended operating current. The current is permitted to rise until the current limit threshold (I_{LIM}) is reached or until the thermal limit of the device is exceeded. The DIO7063 is capable of delivering current up to the current limit threshold (I_{LIM}) without damaging the device. Once the threshold has been reached, the device switches into its constant current mode.

Thermal Protection

Thermal protection prevents damage to the IC when heavy overload or short circuit conditions are present for extended periods of time. The conditions force the DIO7063 into constant current mode, and under short circuit conditions, the voltage across the switch is equal to the input voltage. The increased dissipation causes the junction temperature to rise to high levels. The protection circuit senses the junction temperature of the switch and shuts it off. Hysteresis is built into the thermal sense circuit, and after the device has cooled approximately 20 degrees, the switch turns back on. The switch continues to cycle in this way until the overload or input power is removed.

FLG Output

An error Flag is an open-drained output of an N-channel MOSFET. Flag output is pulled low when the below conditions happen: input under voltage lockout, output current limit, output short circuit and over temperature shut down. The flag response delay time is 5ms typically.

CONTACT US

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