

# AXPM49484x



## 1A/4A High Side Power Load Switch

Datasheet — Aug 2022

### Description

The AXPM49484x is a cost-effective, low-voltage, single N-MOSFET high-side Power Switch IC for USB application. Low switch-on resistance and low supply current are realized in this IC. The AXPM49484x integrates an over-current protection circuit, a short fold back circuit, a thermal shutdown circuit and an under-voltage lockout circuit for overall protection. The AXPM49484 is an ideal solution for USB power supply and can support flexible applications.

### Features


- Input voltage range: 2.7V to 6.0V
- 90mΩ N-MOSFET Switch
- Reverse Blocking Current
- Under Voltage Lockout
- Thermal Protection with Fold-back
- Short Circuit Protection
- Over Current Protection
  - AXPM49484A 1A
  - AXPM49484B 4A

### Applications

- Camera supply
- Mobile phones
- Tablets
- Battery-powered systems

Table 1 Device Summary

Order code	
AXPM49484x	AXPM49484A 1A AXPM49484B 4A



DFN 4  
(1.2 x 1.6 x 0.5mm)

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# 1 Block Diagram and Application Circuit

Figure 1 Block Diagram

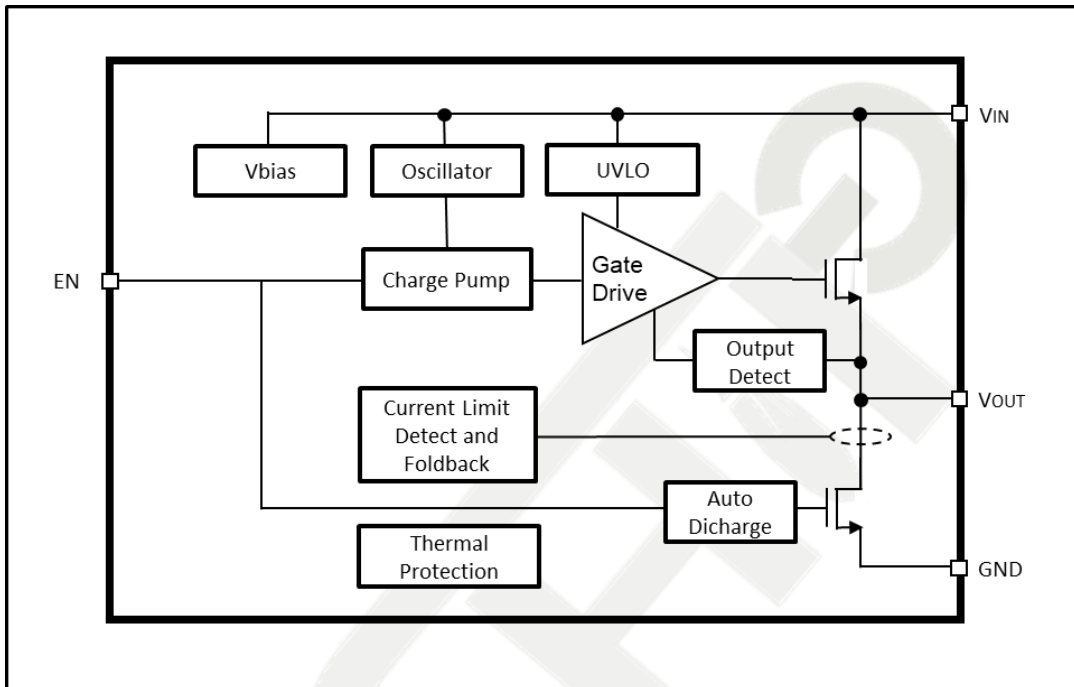
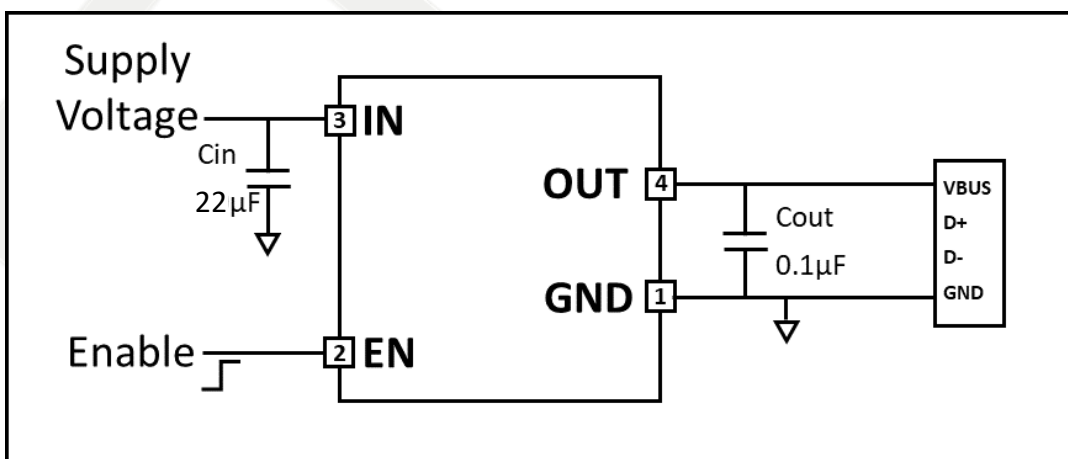


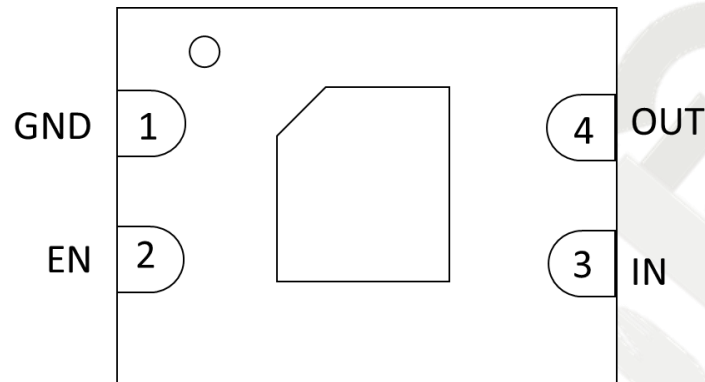
Figure 2 Application Circuit



## 2 Pin Description

### 2.1 Pin Names

Figure 3 Pin Connection (Top View)



### 2.2 Pin Functions

Table 2 Pin Functions

Pin number	Pin name	Description
1	GND	Ground
2	EN	Chip Enable (Active High)
3	IN	Input Supply Voltage
4	OUT	Output Voltage
Epad		Connect to Ground

## 3 Electrical Specifications

### 3.1 Absolute Maximum Ratings

Table 3 Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
IN, OUT	Input voltage, Output Voltage	-0.3 to +7	V
EN	Enable Voltage	-0.3 to +7	V
Tj	Junction temperature	+150	°C
Tstg	Storage temperature range	-55 to +150	°C

Note: Absolute maximum ratings are those values beyond which damage to the device may occur. The functional operation at or over these absolute maximum ratings is not assured.

### 3.2 Thermal Data

Table 4 Thermal Data

Symbol	Parameter	Value	Unit
Rth j-case	Thermal resistance junction-to-case	70	°C/W

### 3.3 ESD and Latch Up

Table 5 ESD and Latch Up

Symbol	Parameter	Value	Unit	
All pins	Electronics Static Discharge protection voltage	HBM	±2,000	V
		CDM	±500	V
All pins	Latch Up JESD78, Class A	≥ 100	mA	

### 3.4 Electrical Characteristics

IN = 5V, CIN = 10μF, COUT = 0.1μF, TA = 25°C, unless otherwise specified

**Table 6 Electrical Characteristics**

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I <sub>q</sub>	Input Quiescent Current	Switch On, OUT = open		30	40	μA
I <sub>SHDN</sub>	Input Shutdown Current	IN = 5V, No Load on OUT, Device OFF, VEN = 0V		0.1	1	μA
R <sub>DS(on)</sub>	Switch On Resistance			90		mΩ
I <sub>LIM</sub>	Current Limit	AXPM49484A. OUT = 1V	1.0	1.1	1.2	A
		AXPM49484B OUT = 1V	4.0	4.4	4.8	
V <sub>IH</sub>	Enable Logic High Voltage	IN = 2.7V to 6V	2.0			V
V <sub>IL</sub>	Enable Logic Low Voltage	IN = 2.7V to 6V			0.8	V
I <sub>EN</sub>	EN Input Current	VEN = 0V		0.5		μA
I <sub>LEAKAGE</sub>	Output Leakage Current	VEN = 0V, R <sub>LOAD</sub> = 0Ω		0.5	1.0	μA
TON_RISE	Output Turn-On Rise Time	10% to 90% of OUT Rising		500		μs
R <sub>DISCHARGE</sub>	Shutdown Auto-Discharge Resistance	VEN = 0V		10		Ω
V <sub>UVLO</sub>	Under-voltage Lockout	IN Rising			2.4	V
V <sub>UVHYT</sub>	Under-voltage Hysteresis	IN Decreasing		0.1		V
TSD	Thermal Shutdown Protection			150		°C
TSDHYT	Thermal Shutdown Hysteresis			20		°C

## 4 Functional Description

### 4.1 Overview

The AXPM49484x is a single N-MOSFET high-side power switch with enable input, optimized for self-powered and bus powered Universal Serial Bus (USB) applications. The AXPM49484x is equipped with a charge pump circuitry to drive the internal N-MOSFET switch.

### 4.2 Input and Output

IN (input) is the power source connection to the internal circuitry and the drain of the MOSFET. OUT (output) is the source of the MOSFET. In a typical application, current flows through the switch from IN to OUT toward the load. If OUT is greater than IN, current will flow from OUT to IN since the MOSFET is bidirectional when on. Unlike a normal MOSFET, there is no parasitic body diode between drain and source of the MOSFET, the AXPM49484x prevents reverse current flow if OUT is externally forced to a higher voltage than IN when the chip is disabled ( $V_{EN} < 0.8V$ ).

### 4.3 Chip Enable Input

The switch will be disabled when the EN pin is in a logic low/high condition. During this condition, the internal circuitry and MOSFET will be turned off. Floating the EN may cause unpredictable operation. EN should not be allowed to go negative with respect to GND. The EN pin may be directly tied to IN to keep the part on.

### 4.4 Soft-start for Hot Plug-in Applications

To eliminate the upstream voltage droop caused by the large inrush current during hot-plug events, the “soft-start” feature effectively isolates the power source from extremely large capacitive loads, satisfying the USB voltage droop requirements.

### 4.5 Under-voltage Lockout

Under-voltage lockout (UVLO) prevents the MOSFET switch from turning on until the input voltage exceeds 2.4V. If input voltage drops below the UVLO threshold, UVLO turns off the MOSFET switch. Under-voltage detection functions only when the switch is enabled.

### 4.6 Current Limiting and Short-circuit Protection

The current limit circuitry prevents damage to the MOSFET switch and the hub downstream port but can deliver load current up to the current limit threshold of 1A (AXPM49484A), or 4A (AXPM49484B). When a heavy load or short circuit is applied to an enabled switch, a large transient current may flow until the current limit circuitry responds. Once this current limit threshold is exceeded, the device enters constant current mode until the thermal shutdown occurs or the fault is removed.

### 4.7 Thermal Shutdown

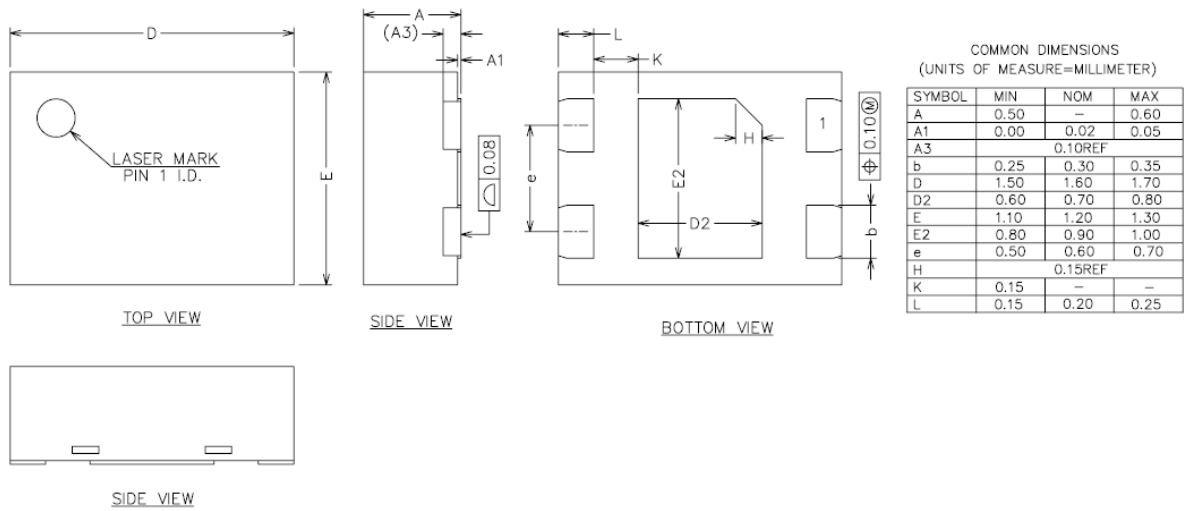
Thermal protection limits the power dissipation in AXPM49484x. When the operation junction temperature exceeds 150°C, the OTP circuit starts the thermal shutdown function and turns the pass element off. The pass element turns on again after the junction temperature cools to 130°C.



## 5 Package Information

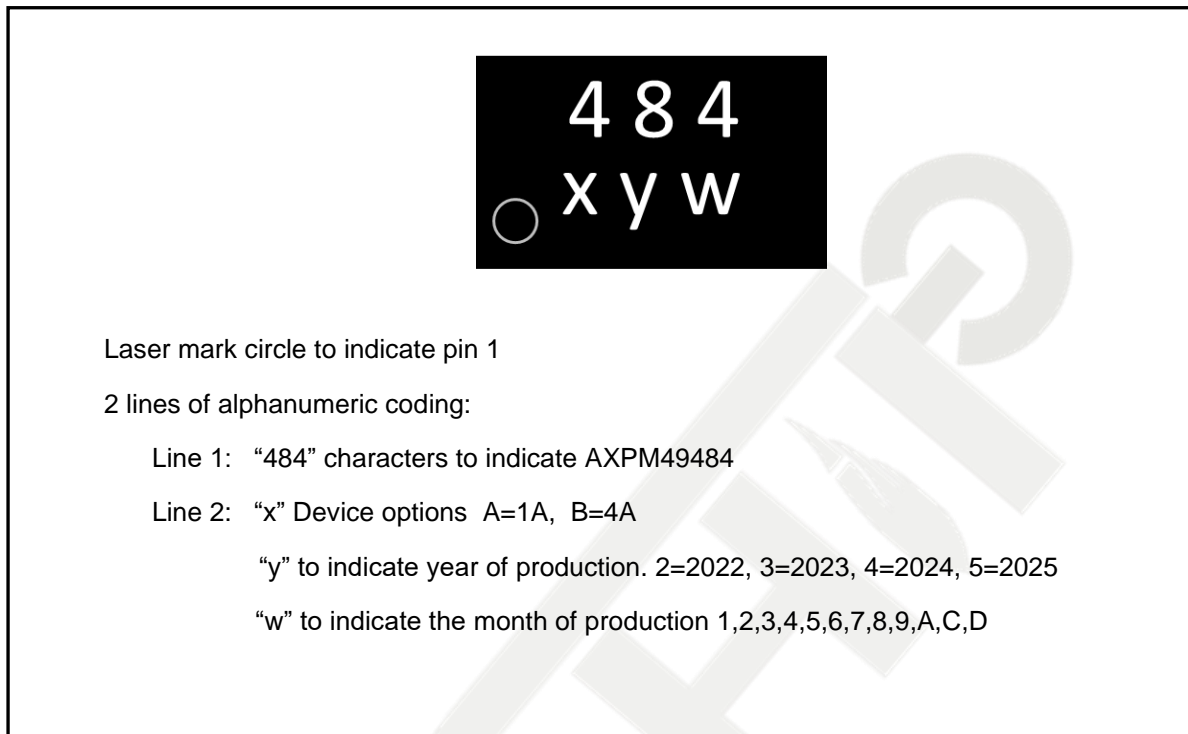
### 5.1 Package Dimensions

Figure 4 DFN4 1.2 x 1.6 x 0.5mm Mechanical Data and Package Dimensions



## 5.2 Marking Information

Figure 5 DFN4 Marking Information



## 6 Revision History

Table 7 Document Revision History

Date	Version	Description
Aug 2022	Draft	Preliminary Version.