

58mΩ, 2A High-Side Power Switch with Flag

General Description

The HM9715 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 HM9715 integrates an over-current protection circuit, a short fold back circuit, a thermal shutdown circuit and an under-voltage lockout circuit for overall protection. Besides, a flag output is available to indicate fault conditions to the local USB controller. Furthermore, the chip also integrates an embedded delay function to prevent miss-operation from happening due to inrush-current. The HM9715 is an ideal solution for USB power supply and can support flexible applications since it is available in SOT-23-5, SOT-23-3 and DFN2X2-6L package.

Ordering Information

Part Number	Package	Note
HM9715	SOT-23-5	EN (Active High)
HM9715A	SOT-23-5	EN Bar (Active Low)
HM9715B	SOT-23-3	
HM9715D	DFN2X2-6L	EN (Active High)

Features

- 58mΩ (typ.) N-MOSFET Switch
- Operating Range: 2.5V to 5.5V
- Reverse Blocking Current
- Under Voltage Lockout (Power On Reset)
- Deglitched Fault Report (FLG)
- Thermal Protection
- Over Current Protection with Fold-back

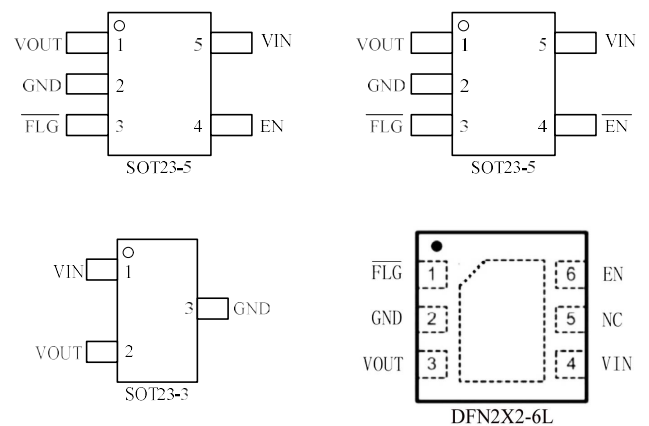
- 2uS Response for Short Circuit Protection
- Soft Start and Fast Turn off

Applications

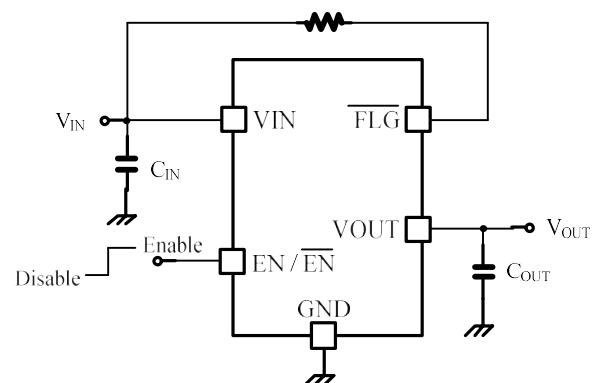
- USB Peripherals
- Notebook PCs



Pin Configuration



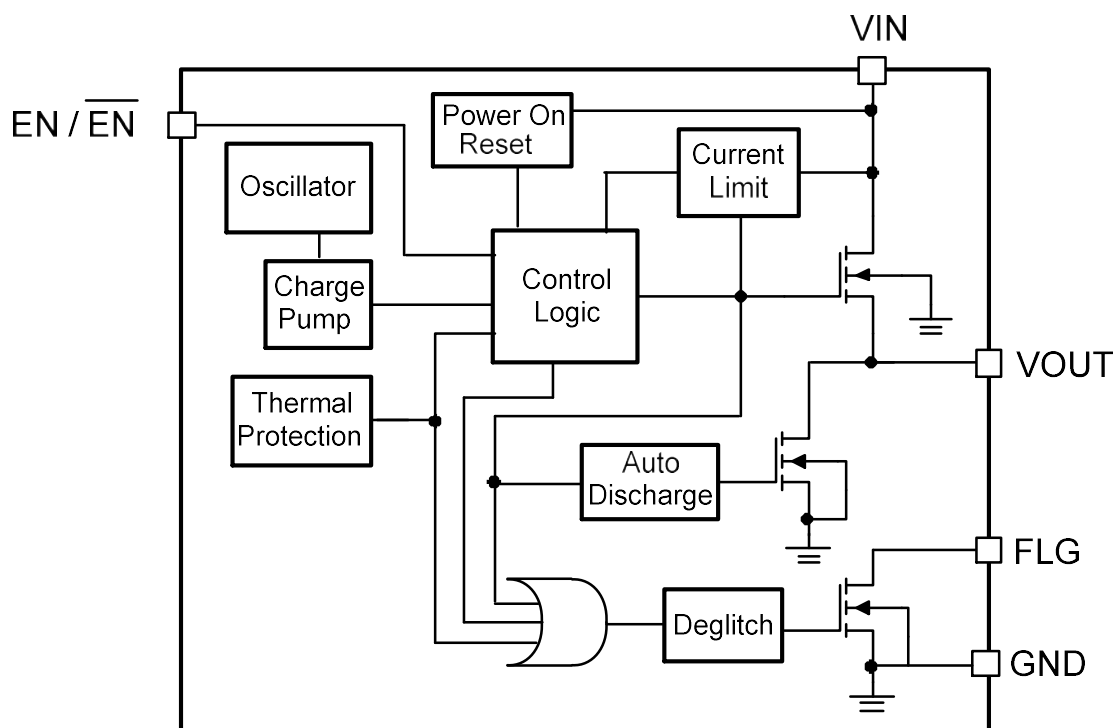
Typical Application Circuit



Pin Assignment

Pin Name	Pin No. SOT-23-5	Pin No. SOT-23-3	Pin Function
VOUT	1	2	Output Voltage
GND	2	3	Ground
FLGB	3	-	Fault FLAG Output Bar
EN / ENB	4	-	Chip Enable (Active High / Low)
VIN	5	1	Power Input Voltage

Function Block Diagram



Absolute Maximum Ratings (Note1)

- VIN ----- -0.3V to +6.0V
- EN ----- -0.3V to +6.0V
- Other pins ----- -0.3V to (VIN+0.3V)
- Junction Temperature----- 125°C
- Lead Temperature (Soldering, 10 sec.)----- 300°C
- Storage Temperature ----- -65°C to 150°C

Recommended Operating Conditions

- VIN ----- +2.5V to +5.5V
- EN ----- 0V to +5.5V
- Junction Temperature ----- 0°C to 125°C

Electrical Characteristics

VIN=5V, CIN=10uF, COUT=0.1uF, TJ=25°C, unless otherwise specified

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Input Voltage VIN Range	VIN		2.5	--	5.5	V
VIN POR Threshold	VINPOR		--	2.2	2.5	V
Quiescent Current	I _Q	I _{OUT} = 0mA	--	60	80	uA
Shutdown Current	I _{SD}	ENB = 5V	--	0.1	1	uA
R _{DS} ON	R _{DS(ON)}	I _{OUT} = 500mA	--	58	78	mΩ
Reverse Leakage Current	I _{REV}	Vin = 0V, Vout = 5V	--	0.1	2	uA
Soft Start Time	T _{SS}		--	1.5	2.5	mS
Enable High Level	V _{EN}		1.2	--	--	V
Shutdown Low Level	V _{SD}		--	--	0.5	V
EN input Current	I _{EN}	VIN=VCC= VEN =5V, IOUT=0A, VOUT=VREF	--	0.1	1	uA
FLG Output Resistor	R _{FLG}	I _{SINK} = 1mA	--	20	80	Ω
FLG Off Current	I _{FLG_OFF}	V _{FLG} = 5V	--	0.1	1	uA
FLG Delay Time	T _{DELAY}		8	15	22	mS
VOUT Discharge Resistor	R _{DIS}		--	100	--	Ω
Over Current Threshold	I _{OCP}		2.2	2.9	3.6	A
VOUT Short Circuit Current	I _{SC}			1.8		A
Thermal Shutdown Temperature	T _{SD}		--	160	--	°C
Thermal Shutdown Hysteresis	T _{SDHY}		--	30	--	°C

Typical Characteristics

VIN=5V, C_{IN}=10uF, C_{OUT}=0.1uF, T_J=25°C, unless otherwise specified

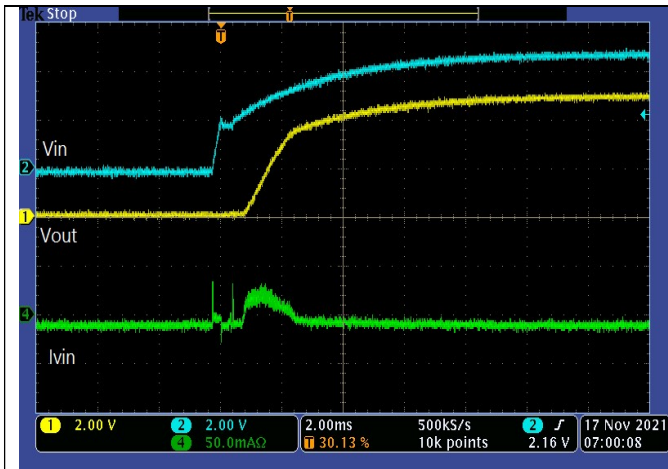


Fig 1. VIN Power ON (No load)

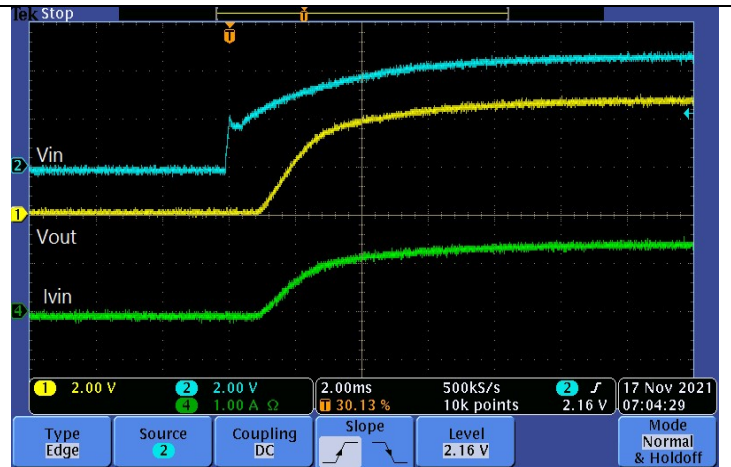


Fig 2. VIN Power ON (1.5A)

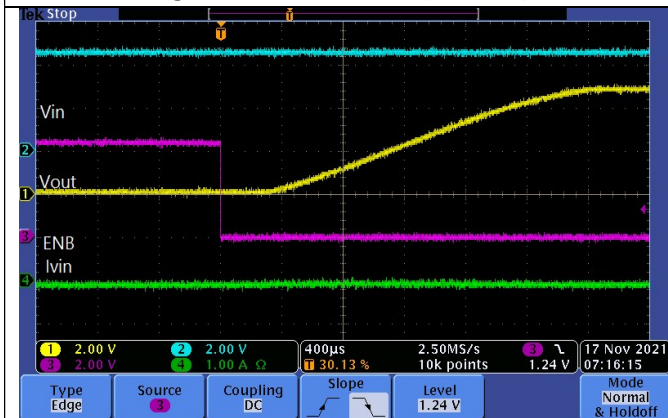


Fig 3. EN Power ON (No load)

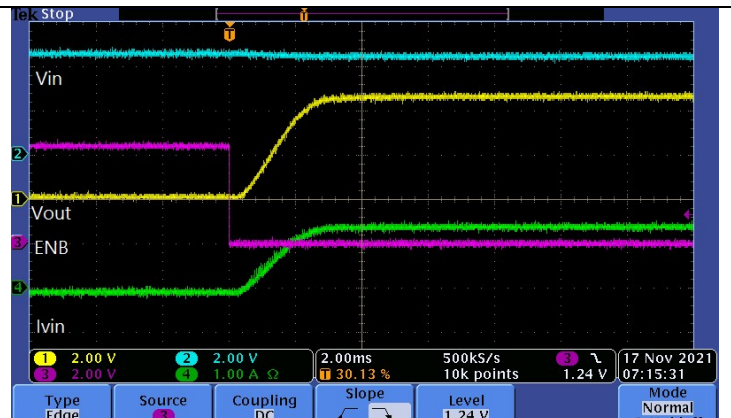


Fig 4. EN Power ON (1.5A)

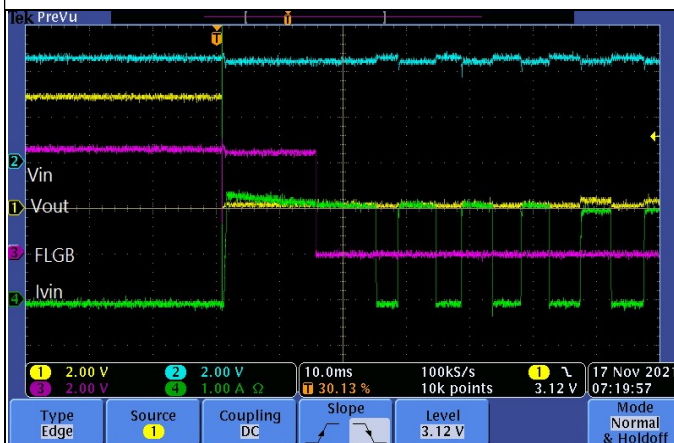


Fig 5. Vout Short to GND

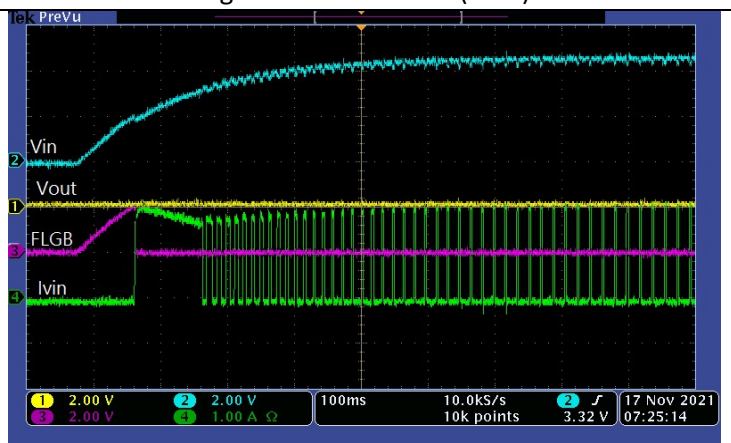


Fig 6. Vout Short to GND Start up

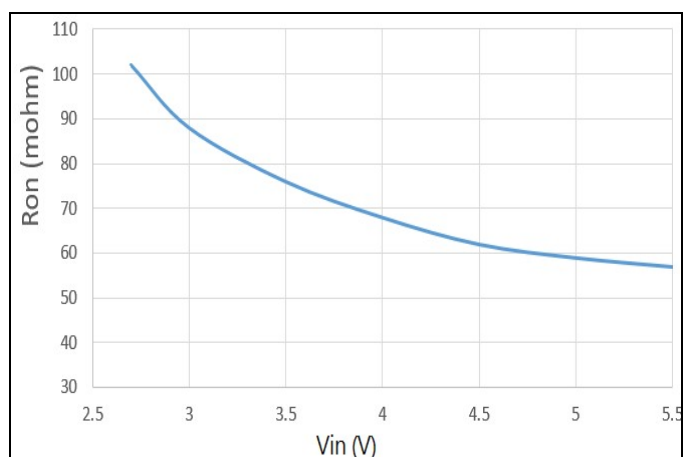


Fig 7. R_{on} vs V_{in}

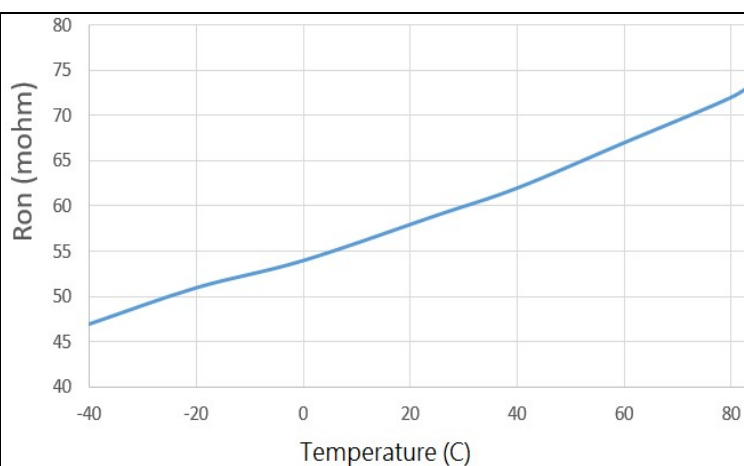


Fig 8. R_{on} vs Temperature