

### General Description

The HM9702XX 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 HM9702XX 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 HM9702XX is an ideal solution for USB power supply and can support flexible applications since it is available in SOT-23-5L package.

### Features

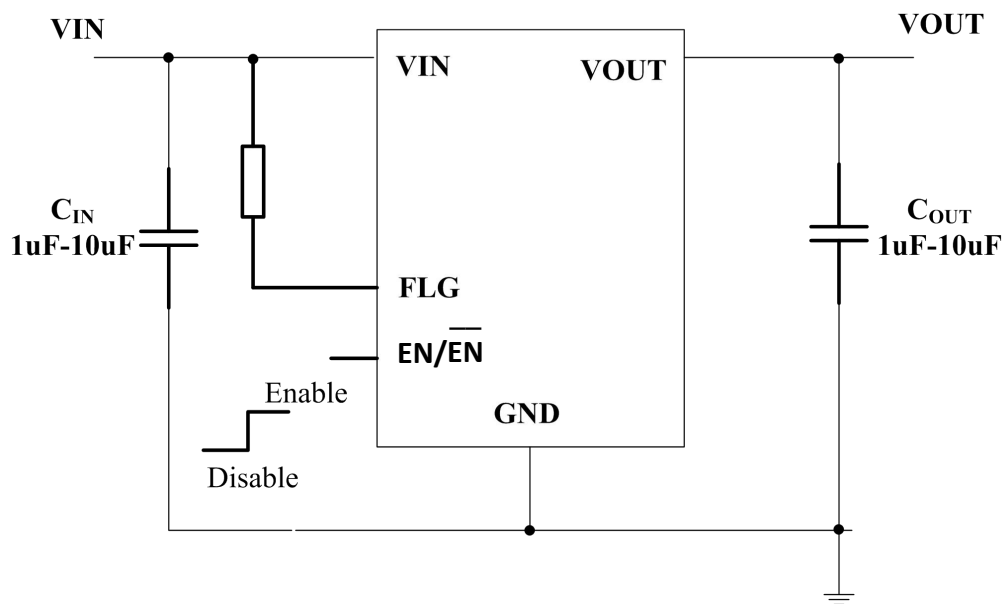
- ◆ Operating Range: 2.5V to 5.5V
- ◆ Reverse Blocking Current
- ◆ Under Voltage Lockout(Power On Reset)
- ◆ Deglitched Fault Report (FLG)
- ◆ Thermal Protection
- ◆ Over Current Protection with Fold-back
- ◆ 2uS Response for Short Circuit Protection
- ◆ Soft Start and Fast Turn off

### Applications

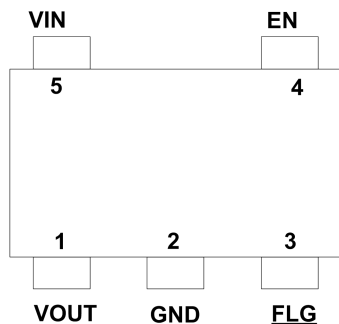
- ◆ USB Peripherals
- ◆ Notebook PCs
- ◆ Mini PCI Accessories

Package: SOT-23-5L

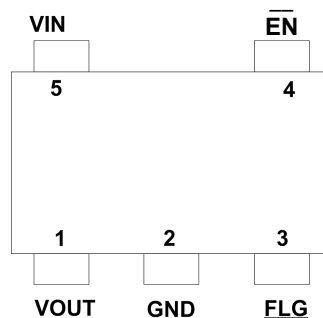
### Typical Application Circuit



### Pin Configuration



**SOT23-5L**



**SOT23-5L**

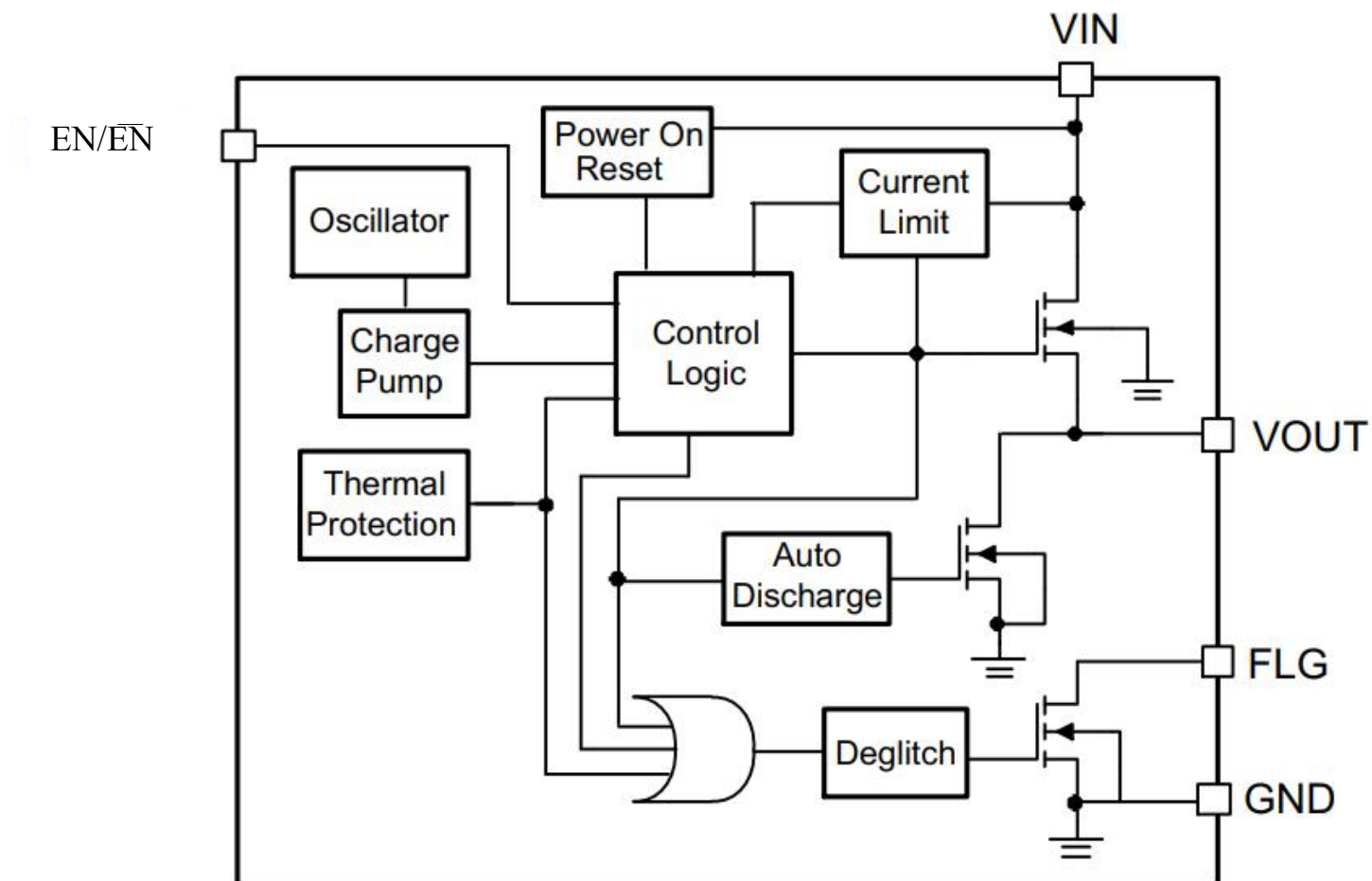
### Pin Assignment

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

### Ordering Information

Part Number	Over-Current	EN/EN
HM9702BA	2.5A	EN (Active High)
HM9702AA	2.5A	EN Bar (Active Low)
HM9702BB	3.5A	EN (Active High)
HM9702AB	3.5A	EN Bar (Active Low)

## Function Block Diagram



## Absolute Maximum Ratings (Notes)

Parameter	Range
V <sub>IN</sub>	-0.3 to 6.0V
EN, $\overline{\text{EN}}$	-0.3 to 6.0V
Other Pins	-0.3 to (V <sub>IN</sub> +0.3V)
Junction Temperature	125°C
Lead Temperature (Soldering, 10 sec.)	300°C
Storage Temperature	-65°C to 150°C

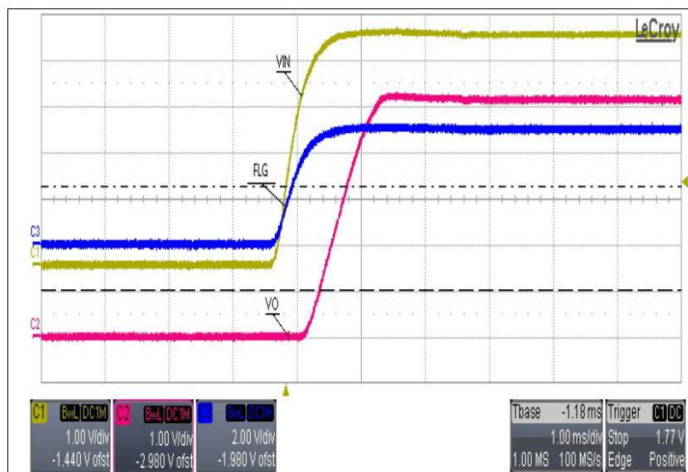
## Electrical Characteristics

V<sub>IN</sub>=5V, C<sub>IN</sub>=10uF, C<sub>OUT</sub>=0.1uF, T<sub>J</sub>=25°C, unless otherwise specified

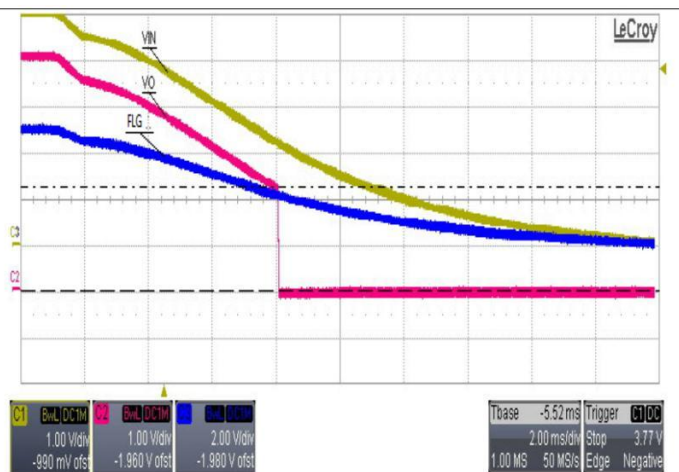
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V <sub>IN</sub>	Input Voltage V <sub>IN</sub> Range		2.5		5.5	V
V <sub>IN</sub> POR	V <sub>IN</sub> POR Threshold			2.2	2.5	V
I <sub>Q</sub>	Quiescent Current	I <sub>OUT</sub> = 0mA		38	50	uA
I <sub>SD</sub>	Shutdown Current	ENB =5V		0.1	1	uA
R <sub>DS ON</sub>	R <sub>DS ON</sub>	(HM9702BA)		70		mΩ
I <sub>REV</sub>	Reverse Leakage Current	V <sub>IN</sub> = 0V, V <sub>OUT</sub> = 5V		0.1	2	uA
T <sub>SS</sub>	Soft Start Time			1.5	1	mS
V <sub>EN</sub>	Enable High Level		1.2			V
V $\overline{\text{EN}}$	Shutdown Low Level				0.5	V
I <sub>EN</sub>	EN Input Current	V <sub>IN</sub> =V <sub>CC</sub> =V <sub>EN</sub> =5V, I <sub>OUT</sub> =0A, V <sub>OUT</sub> =V <sub>REF</sub>		0.1	1	uA
T <sub>ON</sub>	Turn-on Time	R <sub>L</sub> =10Ω, C <sub>OUT</sub> =1uF		130		uS
T <sub>OFF</sub>	Turn-off Time	R <sub>L</sub> =10Ω, C <sub>OUT</sub> =1uF		20		uS
R <sub>DIS</sub>	V <sub>OUT</sub> Discharge Resistor			120		Ω
I <sub>OC</sub> P	Over Current Threshold	(HM9702BA)	2.2	2.8	3.6	A
		(HM9702BB)	3.2	3.8	4.6	A
I <sub>SC</sub>	V <sub>OUT</sub> Short Circuit Current	(HM9702BA)	1.2	1.7		A
T <sub>SD</sub>	Thermal Shutdown Temperature			160		°C
T <sub>SDHY</sub>	Thermal Shutdown Hysteresis			30		°C

### Typical Characteristics

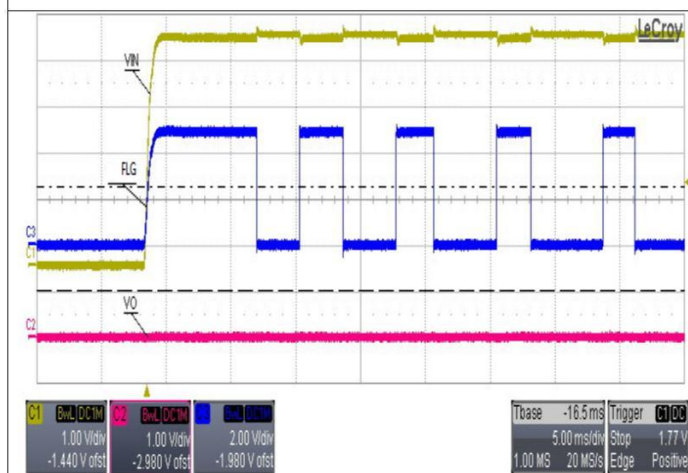
$V_{IN}=5V, C_{IN}=10\mu F, C_{OUT}=0.1\mu F, T_J=25^\circ C$ , unless otherwise specified



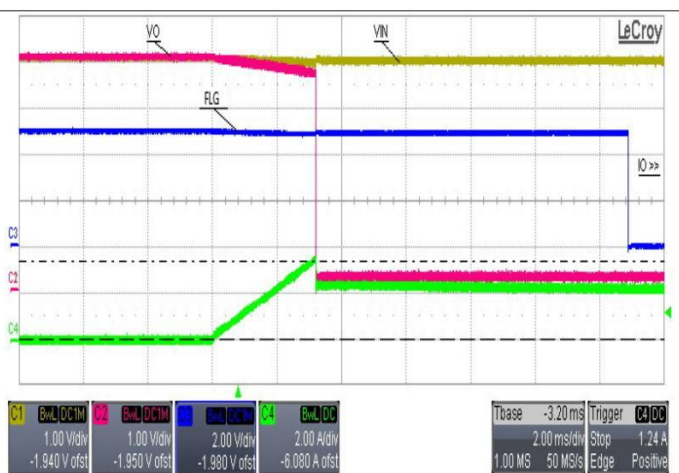
VIN Power ON



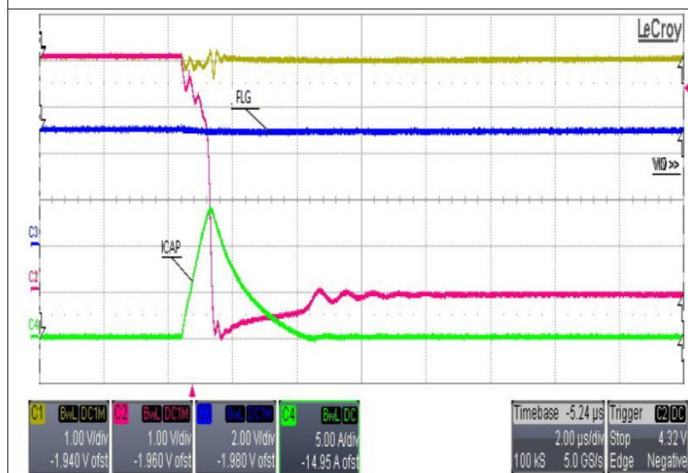
VIN Power OFF



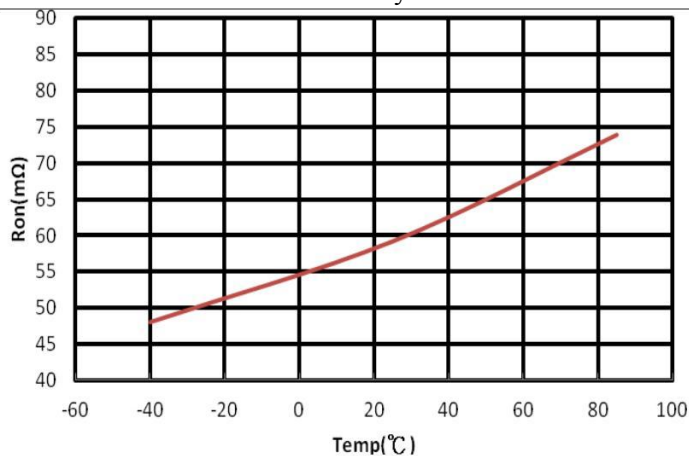
Vout Short to GND



FLG Delay Time

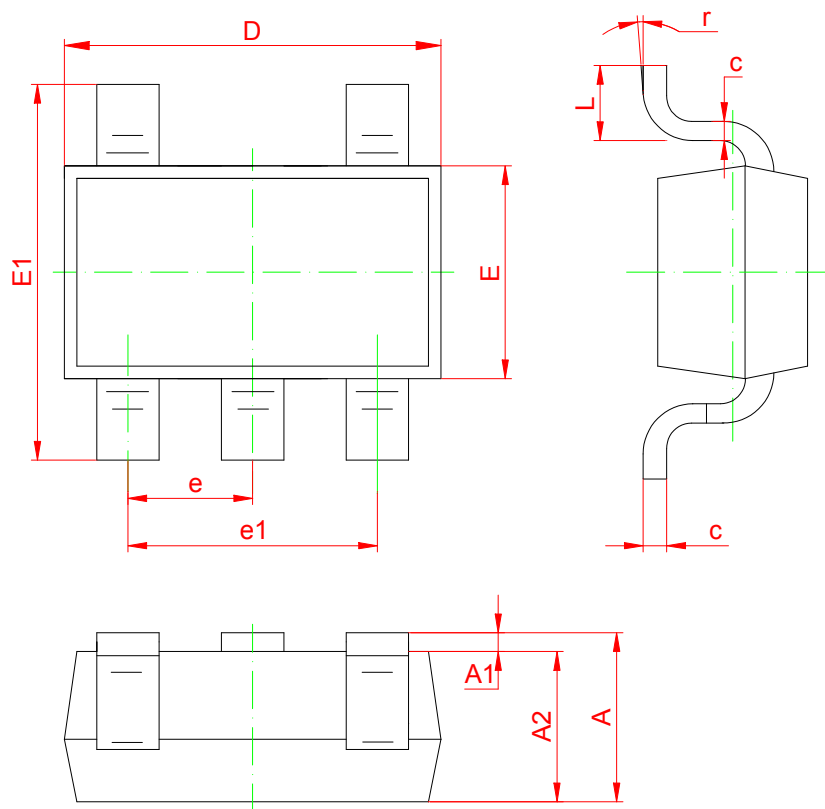


2uS Response for Vout Short



Ron vs Temperature

**Package Mechanical Data: SOT-23-5L**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 (BSC)		0.037 (BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
r	0°	8°	0°	8°