

5.5V, 1MHz, 2A Synchronous Step-Down Converter

FEATURES

- High Efficiency: Up to 95% (@3.3V_{OUT})
- 1MHz Constant Frequency Operation
- 2A Output Current
- 2.5V to 5.5V Input Voltage Range
- Output Voltage as Low as 0.6V
- PFM Mode for High Efficiency in Light Load
- 100% Duty Cycle in Dropout Operation
- Low Quiescent Current: 40μA
- Short Hiccup Protection
- Thermal Fault Protection
- Inrush Current Limit and Soft Start
- Input over voltage protection (OVP)
- <1μA Shutdown Current
- SOT23-5 Package

APPLICATIONS

- Set Top Box
- Wireless and DSL Modems
- Portable Instruments
- Digital Still and Video Cameras
- PC Cards

GENERAL DESCRIPTION

The TMI3410 is a 1MHz constant frequency, current mode step-down converter. It is ideal for portable equipment requiring very high current up to 2A from single-cell Lithium-ion batteries or other input source from 2.5V to 5.5V input voltage and the output voltage can be regulated as low as 0.6V. The TMI3410 also can run at 100% duty cycle for low dropout operation, extending battery life in portable systems while light load operation provides very low output ripple for noise sensitive applications. The high switching frequency minimizes the size of external components while keeping switching losses low. The internal slope compensation setting allows the device to operate with smaller inductor values to optimize size and provide efficient operation. The TMI3410 is offered in a 5-pin, SOT package, and is available in an adjustable version. This device offers two operation modes, PWM control and PFM Mode switching control, which allows a high efficiency over the wider range of the load.

TYPICAL APPLICATION

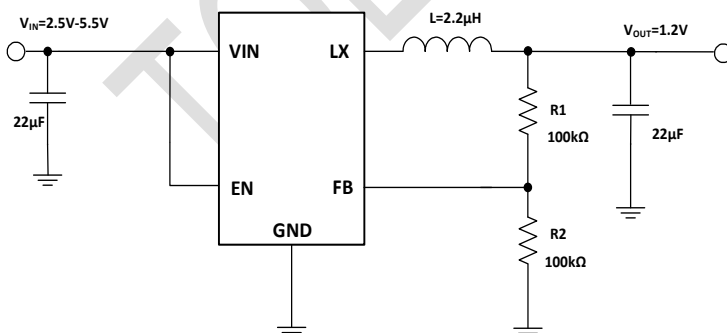
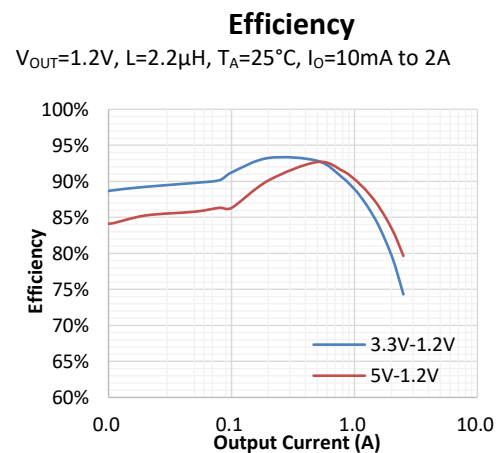


Figure 1. Basic Application Circuit

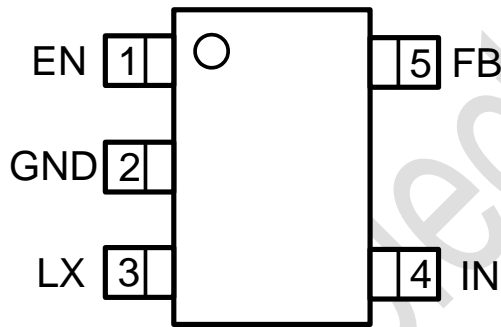


TMI3410

ABSOLUTE MAXIMUM RATINGS (Note 1)

Parameter	Min	Max	Unit
Input Supply Voltage	-0.3	6.0	V
LX Voltages	-0.3	6.0	V
EN, FB Voltage	-0.3	6.0	V
Storage Temperature Range	-65	150	°C
Junction Temperature (Note2)	-	155	°C
Power Dissipation	-	600	mW
Lead Temperature (Soldering,10s)	-	260	°C

PACKAGE/ORDER INFORMATION



SOT23-5

Top Mark: S15BXXX (S15B: Device Code, XXX: Inside Code)

Part Number	Package	Top Mark	Quantity/ Reel
TMI3410	SOT23-5	S15BXXX	3000

TMI3410 devices are Pb-free and RoHS compliant.

PIN DESCRIPTION

Pin	Name	Function
1	EN	Chip Enable Pin. Drive EN above 1.5V to turn on the part. Drive EN below 0.4V to turn it off. Do not leave EN floating.
2	GND	Ground pin.
3	LX	Power Switch Output. It is the switch node connection to Inductor. This pin connects to the drains of the internal P-ch and N-ch MOSFET switches.
4	IN	Power supply input pin.
5	FB	Output Voltage Feedback Pin.

ESD RATING

Items	Description	Value	Unit
V_{ESD_HBM}	Human Body Model for all pins	± 2000	V
V_{ESD_CDM}	Charge Device Model for all pins	± 1000	V

JEDEC specification JS-001

RECOMMENDED OPERATING CONDITIONS

Items	Description	Min	Max	Unit
Voltage Range	IN	2.5	5.5	V
T_J	Operating Junction Temperature Range	-40	125	°C

THERMAL RESISTANCE (Note 3)

Items	Description	Value	Unit
θ_{JA}	Junction-to-ambient thermal resistance	200	°C/W
θ_{JC}	Junction-to-case thermal resistance	62	°C/W

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ELECTRICAL CHARACTERISTICS

($V_{IN}=V_{EN}=3.6V$, $V_{OUT}=1.8V$, $T_A = 25^{\circ}C$, unless otherwise noted.)

Parameter	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range		2.5		5.5	V
Input OVP Threshold	V_{IN} rising		5.9	6.0	V
UVLO Threshold	V_{IN} rising		2.35		V
UVLO Hysteresis			0.4		V
Quiescent Current	$V_{EN}=2.0V$, $I_{OUT}=0A$, $V_{FB}=V_{REF} \times 105\%$		40	100	μA
Shutdown Current	$V_{EN}=0V$		0.2	1.0	μA
Feedback Voltage Accuracy	$T_A = 25^{\circ}C$, PWM Operation	0.588	0.600	0.612	V
Oscillation Frequency	$V_{OUT}=100\%$		1.0		MHz
	$V_{OUT}=0V$, During Hiccup Mode		350		kHz
On Resistance of PMOS	$I_{LX}=100mA$		120		m Ω
On Resistance of NMOS	$I_{LX}=-100mA$		70		m Ω
Peak Current Limit	$V_{IN}=5V$, $V_{OUT}=90\%$		2.5		A
EN High Level Input Voltage	可提供技术支持 完整规格书	1.5			V
EN Low Level Input Voltage	欢迎试样			0.4	V
EN Leakage Current	V: runzexi n-18			1.0	μA
LX Leakage Current	$V_{EN}=0V$, $V_{IN}=V_{LX}=5V$			1.0	μA
Thermal Shutdown Threshold (Note 4)			150		$^{\circ}C$
Thermal Shutdown Hysteresis (Note 4)			20		$^{\circ}C$

Note 1: Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

Note 2: T_J is calculated from the ambient temperature T_A and power dissipation P_D according to the following formula: $T_J = T_A + (P_D) \times \theta_{JA}$.

Note 3: Measured on JESD51-7, 4-layer PCB.

Note 4: Thermal shutdown threshold and hysteresis are guaranteed by design.