

LM2852

2A 500/1500kHz Synchronous SIMPLE SWITCHER® Buck Regulator

General Description

The LM2852 SIMPLE SWITCHER® synchronous buck regulator is a high frequency step-down switching voltage regulator capable of driving up to a 2A load with excellent line and load regulation. The LM2852 can accept an input voltage between 2.85V and 5.5V and deliver an output voltage that is factory programmable from 0.8V to 3.3V in 100mV increments. The LM2852 is available with a choice of two switching frequencies - 500kHz (LM2852Y) or 1.5MHz (LM2852X). It also features internal, type-three compensation to deliver a low component count solution. The exposed-pad TSSOP-14 package enhances the thermal performance of the LM2852.

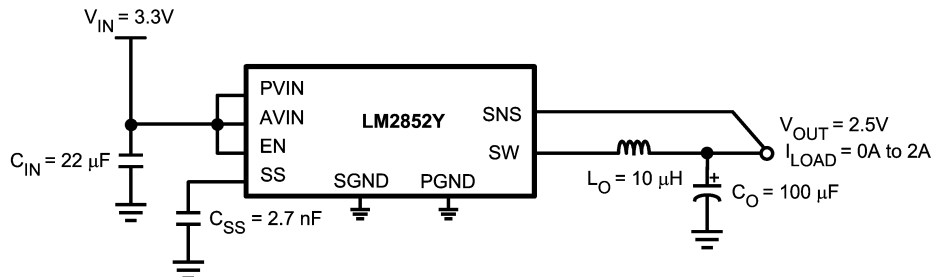
Features

- Input voltage range of 2.85 to 5.5V
- Factory EEPROM set output voltages from 0.8V to 3.3V in 100mV increments
- Maximum load current of 2A
- Voltage Mode Control
- Internal type-three compensation
- Switching frequency of 500kHz or 1.5MHz
- Low standby current of 10µA
- Internal 60 mΩ MOSFET switches
- Standard voltage options 0.8/1.0/1.2/1.5/1.8/2.5/3.3 volts

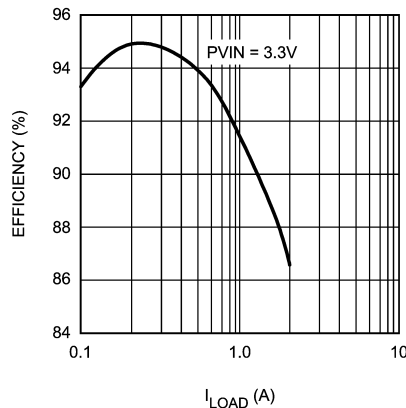
Applications

- Low voltage point of load regulation
- Local solution for FPGA/DSP/ASIC core power
- Broadband networking and communications infrastructure
- Portable computing

Typical Application Circuit



20127001



20127002

Ordering Information

Order Number	Frequency	Voltage Option	Package Type	Package Drawing	Supplied As
LM2852YMXA-0.8	500kHz	0.8	TSSOP-14 exposed pad	MXA14A	94 Units, Rail
LM2852YMXAX-0.8					2500 Units, Tape and Reel
LM2852YMXA-1.0		1.0			94 Units, Rail
LM2852YMXAX-1.0					2500 Units, Tape and Reel
LM2852YMXA-1.2		1.2			94 Units, Rail
LM2852YMXAX-1.2					2500 Units, Tape and Reel
LM2852YMXA-1.5		1.5			94 Units, Rail
LM2852YMXAX-1.5					2500 Units, Tape and Reel
LM2852YMXA-1.8		1.8			94 Units, Rail
LM2852YMXAX-1.8					2500 Units, Tape and Reel
LM2852YMXA-2.5		2.5			94 Units, Rail
LM2852YMXAX-2.5					2500 Units, Tape and Reel
LM2852YMXA-3.0		3.0			94 Units, Rail
LM2852YMXAX-3.0					2500 Units, Tape and Reel
LM2852YMXA-3.3		3.3			94 Units, Rail
LM2852YMXAX-3.3					2500 Units, Tape and Reel
LM2852XMXA-0.8	1500kHz	0.8	TSSOP-14 exposed pad	MXA14A	94 Units, Rail
LM2852XMXAX-0.8					2500 Units, Tape and Reel
LM2852XMXA-1.0		1.0			94 Units, Rail
LM2852XMXAX-1.0					2500 Units, Tape and Reel
LM2852XMXA-1.2		1.2			94 Units, Rail
LM2852XMXAX-1.2					2500 Units, Tape and Reel
LM2852XMXA-1.5		1.5			94 Units, Rail
LM2852XMXAX-1.5					2500 Units, Tape and Reel
LM2852XMXA-1.8		1.8			94 Units, Rail
LM2852XMXAX-1.8					2500 Units, Tape and Reel
LM2852XMXA-2.5		2.5			94 Units, Rail
LM2852XMXAX-2.5					2500 Units, Tape and Reel
LM2852XMXA-3.0		3.0			94 Units, Rail
LM2852XMXAX-3.0					2500 Units, Tape and Reel
LM2852XMXA-3.3		3.3			94 Units, Rail
LM2852XMXAX-3.3					2500 Units, Tape and Reel

Note: Contact factory for other voltage options.

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

PVIN, AVIN, EN, SNS	-0.3V to 6.5V
ESD Susceptibility (Note 2)	2kV
Power Dissipation	Internally Limited
Storage Temperature Range	-65°C to +150°C
Maximum Junction Temp.	150°C
14-Pin Exposed Pad TSSOP	
Package	220°C
Infrared (15 sec)	215°C
Vapor Phase (60 sec)	260°C
Soldering (10 sec)	

Operating Ratings

PVIN to GND	1.5V to 5.5V
AVIN to GND	2.85V to 5.5V
Junction Temperature	-40°C to +125°C
θ_{JA}	38°C/W

Electrical Characteristics

AVIN = PVIN = 5V unless otherwise indicated under the **Conditions** column. Limits in standard type are for $T_J = 25^\circ\text{C}$ only; limits in **boldface type** apply over the junction temperature (T_J) range of -40°C to $+125^\circ\text{C}$. Minimum and Maximum limits are guaranteed through test, design, or statistical correlation. Typical values represent the most likely parametric norm at $T_J = 25^\circ\text{C}$, and are provided for reference purposes only.

Symbol	Parameter	Conditions	Min	Typ	Max	Units
SYSTEM PARAMETERS						
V_{OUT}	Voltage Tolerance ³	$V_{OUT} = 0.8\text{V}$ option	0.782		0.818	V
		$V_{OUT} = 1.0\text{V}$ option	0.9775		1.0225	
		$V_{OUT} = 1.2\text{V}$ option	1.1730		1.2270	
		$V_{OUT} = 1.5\text{V}$ option	1.4663		1.5337	
		$V_{OUT} = 1.8\text{V}$ option	1.7595		1.8405	
		$V_{OUT} = 2.5\text{V}$ option	2.4437		2.5563	
		$V_{OUT} = 3.0\text{V}$ option	2.9325		3.0675	
		$V_{OUT} = 3.3\text{V}$ option	3.2257		3.3743	
$\Delta V_{OUT}/\Delta AVIN$	Line Regulation ³	$V_{OUT} = 0.8\text{V}, 1.0\text{V}, 1.2\text{V}, 1.5\text{V}, 1.8\text{V}$ or 2.5V $2.85\text{V} \leq AVIN \leq 5.5\text{V}$		0.2	0.6	%
		$V_{OUT} = 3.3\text{V}$ $3.5\text{V} \leq AVIN \leq 5.5\text{V}$		0.2	0.6	%
$\Delta V_{OUT}/\Delta I_O$	Load Regulation	Normal operation		8		mV/A
V_{ON}	UVLO Threshold (AVIN)	Rising		2.47	2.85	V
		Falling Hysteresis	85	150	210	mV
$r_{DS(on)-P}$	PFET On Resistance	$I_{sw} = 2\text{A}$		75	140	m Ω
$r_{DS(on)-N}$	NFET On Resistance	$I_{sw} = 2\text{A}$		55	120	m Ω
R_{SS}	Soft-start resistance			400		k Ω
I_{CL}	Peak Current Limit Threshold	LM2852X	2.75	4	4.95	A
		LM2852Y	2.25	3	3.65	
I_Q	Operating Current	Non-switching		0.85	2	mA
I_{SD}	Shutdown Quiescent Current	EN = 0V		10	25	μA
R_{SNS}	Sense pin resistance			400		k Ω
PWM						
f_{osc}	LM2852X	1500kHz option.	1050	1500	1825	kHz
	LM2852Y	500kHz option.	325	500	625	

Electrical Characteristics

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Symbol	Parameter	Conditions	Min	Typ	Max	Units
D_{range}	Duty Cycle Range		0		100	%
ENABLE CONTROL⁴						
V_{IH}	EN Pin Minimum High Input		75			% of AVIN
V_{IL}	EN Pin Maximum Low Input				25	% of AVIN
I_{EN}	EN Pin Pullup Current	EN = 0V		1.2		μA
THERMAL CONTROLS						
T_{SD}	T_J for Thermal Shutdown			165		$^\circ\text{C}$
$T_{\text{SD-HYS}}$	Hysteresis for Thermal Shutdown			10		$^\circ\text{C}$

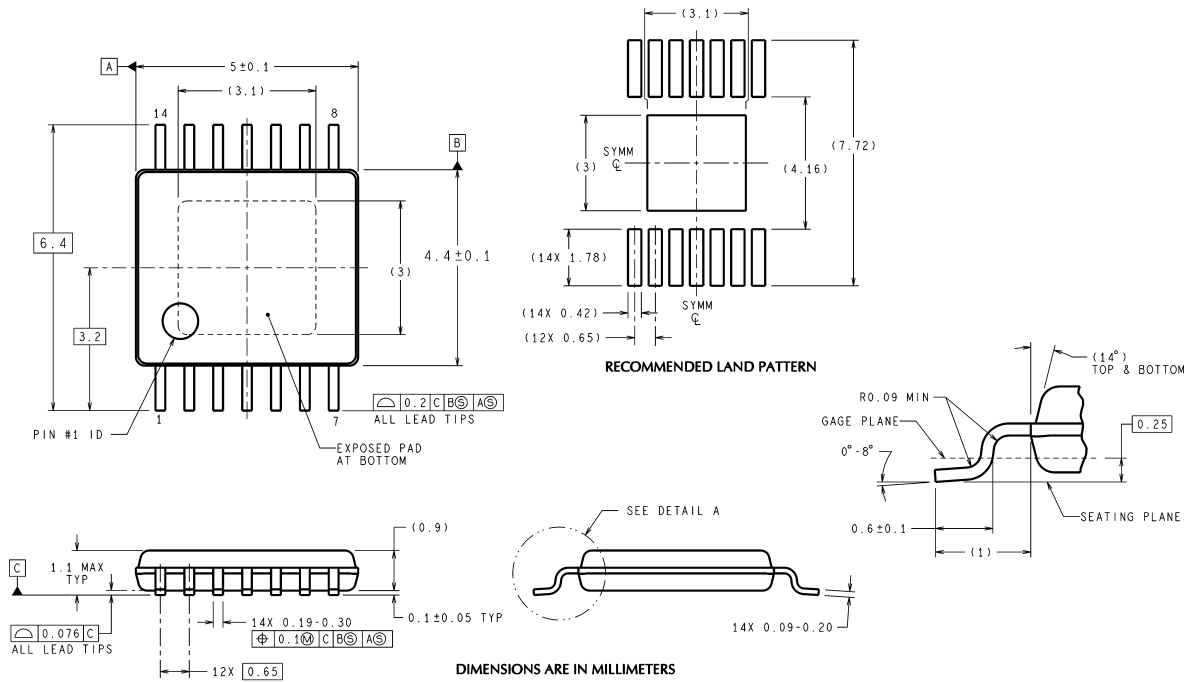
Note 1: Absolute maximum ratings indicate limits beyond which damage to the device may occur. Operating Range indicates conditions for which the device is intended to be functional, but does not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics.

Note 2: Human body model: $1.5\text{k}\Omega$ in series with 100pF . SW and PVIN pins are derated to 1.5kV

Note 3: V_{OUT} measured in a non-switching, closed-loop configuration at the SNS pin.

Note 4: The enable pin is internally pulled up, so the LM2852 is automatically enabled unless an external enable voltage is applied.

Physical Dimensions inches (millimeters) unless otherwise noted



14-Lead ETSSOP Package
NS Package Number MXA14A

MXA14A (Rev A)

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