MP1471

High-Efficiency, 3A Peak, 16V, 500kHz Synchronous, Step-Down Converter In a 6-Pin TSOT 23

The Future of Analog IC Technology

DESCRIPTION

The MP1471 is a high-frequency, synchronous, rectified, step-down, switch-mode converter with internal power MOSFETs. It offers a very compact solution to achieve a 3A peak output current over a wide input supply range, with excellent load and line regulation. The MP1471 has synchronous-mode operation for higher efficiency over the output current-load range.

Current-mode operation provides fast transient response and eases loop stabilization.

Protection features include over-current protection and thermal shutdown.

The MP1471 requires a minimal number of readily-available, standard, external components and is available in a space-saving 6-pin TSOT23 package.

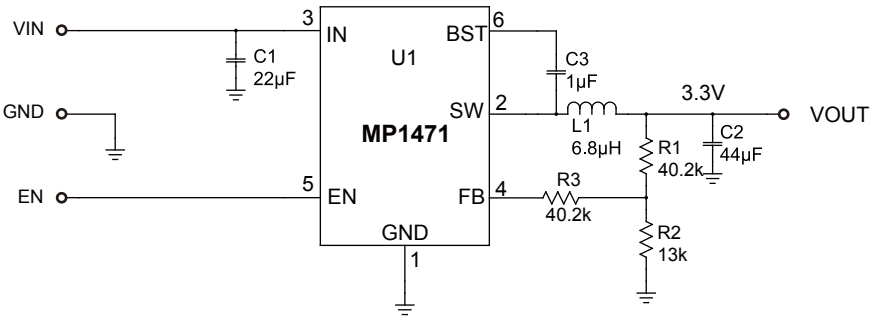
FEATURES

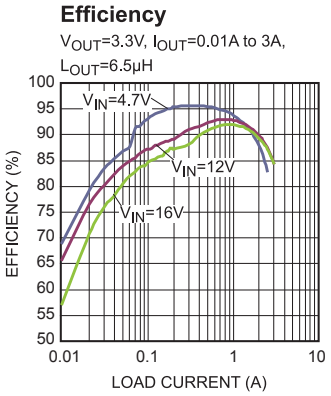
- Wide 4.7V-to-16V Operating Input Range
- 150mΩ/70mΩ Low-$R_{DS(ON)}$ Internal Power MOSFETs
- Proprietary Switching-Loss–Reduction Technology
- High-Efficiency Synchronous-Mode Operation
- Fixed 500kHz Switching Frequency
- Internal AAM Power-Save Mode for High Efficiency at Light Load
- Internal Soft-Start
- Over-Current Protection and Hiccup
- Thermal Shutdown
- Output Adjustable from 0.8V
- Available in a 6-pin TSOT-23 package

APPLICATIONS

- Game Consoles
- Digital Set-Top Boxes
- Flat-Panel Television and Monitors
- General Purposes

TYPICAL APPLICATION



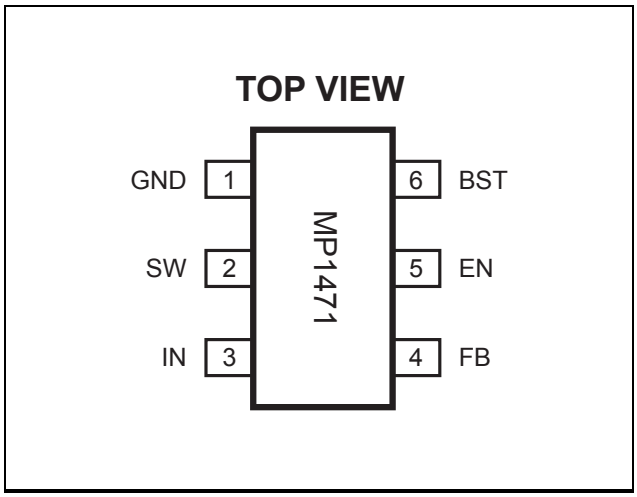


ORDERING INFORMATION

Part Number*	Package	Top Marking
MP1471GJ	TSOT23-6	AEJ

* For Tape & Reel, add suffix –Z (e.g. MP1471GJ–Z);

PACKAGE REFERENCE



ABSOLUTE MAXIMUM RATINGS (1)

V_{IN} .....-0.3V to 17V
V_{SW}.....
-0.3V (-5V for <10ns) to 17V (19V for <10ns)
V_{BS} ..... V_{SW}+6V
All Other Pins.....–0.3V to 6V
Continuous Power Dissipation (T_A = +25°C) (2)
..... 1.25W
Junction Temperature.....150°C
Lead Temperature .....260°C
Storage Temperature..... -65°C to 150°C

Recommended Operating Conditions (3)

Supply Voltage V_{IN} .....4.7V to 16V
Output Voltage V_{OUT}.....0.8V to 0.9V_{IN}
Operating Junction Temp. (T_J). -40°C to +125°C

Thermal Resistance (4)	θ_{JA}	θ_{JC}
TSOT-23-6	100	55 °C/W

Notes:
1) Exceeding these ratings may damage the device.
2) The maximum allowable power dissipation is a function of the maximum junction temperature T_J (MAX), the junction-to-ambient thermal resistance θ_{JA}, and the ambient temperature T_A. The maximum allowable continuous power dissipation at any ambient temperature is calculated by P_D (MAX) = (T_J (MAX)-T_A)/θ_{JA}. Exceeding the maximum allowable power dissipation will cause excessive die temperature, and the regulator will go into thermal shutdown. Internal thermal shutdown circuitry protects the device from permanent damage.
3) The device is not guaranteed to function outside of its operating conditions.
4) Measured on JESD51-7, 4-layer PCB.

ELECTRICAL CHARACTERISTICS (5)

V_{IN} = 12V, T_A = 25°C, unless otherwise noted.

Parameter	Symbol	Condition	Min	Typ	Max	Units
Supply Current (Shutdown)	I_{IN}	V_{EN} = 0V			1	μA
Supply Current (Quiescent)	I_q	V_{EN} = 2V, V_{FB} = 1V		0.83		mA
HS Switch-On Resistance	HS_{RDS-ON}	V_{BST-SW}=5V		150		mΩ
LS Switch-On Resistance	LS_{RDS-ON}	Vcc=5V		70		mΩ
Switch Leakage	SW_{LKG}	V_{EN} = 0V, V_{SW} =12V			1	μA
Current Limit (5)	I_{LIMIT}		3.5	4.2		A
Oscillator Frequency	f_{SW}	V_{FB}=0.75V	400	490	580	kHz
Maximum Duty Cycle	D_{MAX}	V_{FB}=700mV	88	92		%
Minimum On Time(5)	T_{ON_MIN}			90		ns
Feedback Voltage	V_{FB}		776	800	824	mV
EN Rising Threshold	V_{EN_RISING}		1.4	1.5	1.6	V
EN Falling Threshold	$V_{EN\_FALLING}$		1.23	1.32	1.41	V
EN Input Current	I_{EN}	V_{EN}=2V		1.6		μA
		V_{EN}=0		0		μA
V_{IN} Under-Voltage Lockout Threshold, Rising	$INUV_{Vth}$		3.85	4.2	4.55	V
V_{IN} Under-Voltage Lockout Threshold Hysteresis	$INUV_{HYS}$			340		mV
Soft-Start Period	T_{SS}			1		ms
Thermal Shutdown(5)				150		°C
Thermal Hysteresis(5)				20		°C

Notes:

5) Guaranteed by design.