

### DESCRIPTION

The EV2228-J-00A demonstrates MPS's MP2228, a high-frequency, synchronous, rectified, step-down converter with built-in high-side and low-side power MOSFETs. The MP2228 offers a very compact solution to achieve a 2A continuous output current with excellent load and line regulation over a wide input supply range. The MP2228 has synchronous mode operation for higher efficiency over the output current load range.

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

Full protection features includes over-current protection and thermal shutdown.

The MP2228 is available in a space-saving 8-pin TSOT23 package.

### ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	$V_{IN}$	6 – 16	V
Output Voltage	$V_{OUT}$	3.3	V
Output Current	$I_{OUT}$	2	A

### FEATURES

- Wide 6V to 16V Operating Input Range
- 100mΩ/40mΩ Low  $R_{DS(ON)}$  Internal Power MOSFET
- Proprietary Switching-Loss-Reduction Technique
- High-Efficiency Synchronous Mode Operation
- Default 800kHz Switching Frequency
- AAM Power-Save Mode
- Internal Soft-Start
- OCP Protection and Hiccup
- Thermal Shutdown
- Output Adjustable from 0.8V
- Available in an 8-pin TSOT-23 Package

### APPLICATIONS

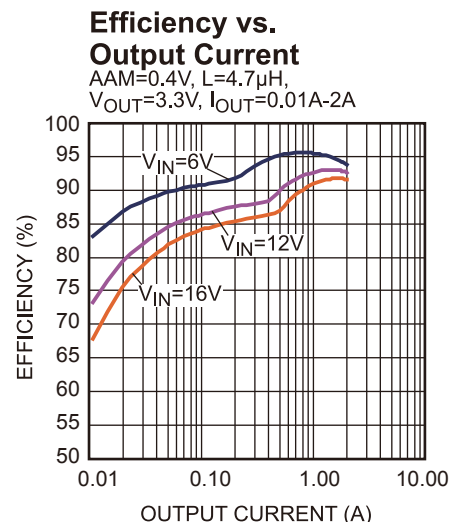
- Notebook System and I/O Power
- Digital Set-Top Boxes
- Flat-Panel Television and Monitors
- Distributed Power Systems

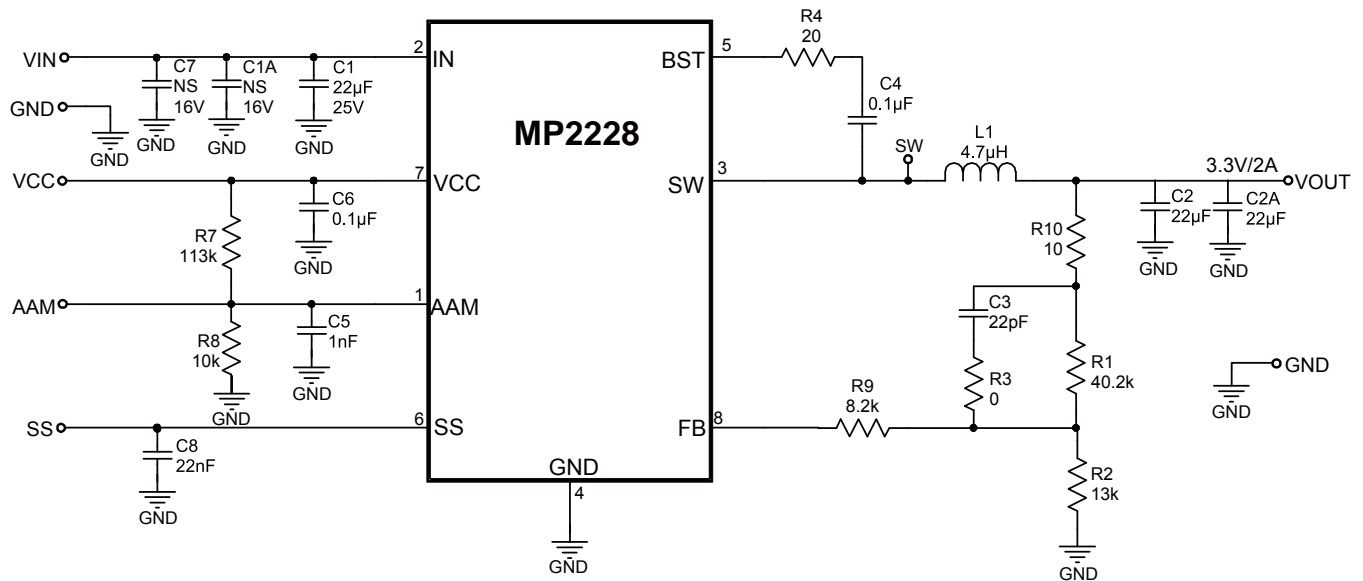
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### EV2228-J-00A EVALUATION BOARD



Board Number	MPS IC Number
EV2228-J-00A	MP2228DJ



**EVALUATION BOARD SCHEMATIC**

**EV2228-J-00A BILL OF MATERIALS**

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1	22 $\mu$ F	Ceramic Cap., 25V, 10%, X5R	1206	muRata	GRM31CR61E226KE15L
2	C1A, C7	NS				
2	C2, C2A	22 $\mu$ F	Ceramic Cap., 10V, X7R	1206	muRata	GRM21BR60J226ME39L
1	C3	22pF	Ceramic Cap., 50V, C0G	0603	muRata	GRM1885C1H220JA01D
2	C4, C6	0.1 $\mu$ F	Ceramic Cap., 16V, X7R	0603	muRata	GRM188R71C104KA01D
1	C5	1nF	Ceramic Cap., 50V, X7R	0603	muRata	GRM188R71H102KA01D
1	C8	22nF	Ceramic Cap., 16V, X7R	0603	muRata	GRM188R71C223KA01D
1	R1	40.2k	Thick Film Res., 1%	0603	ROYAL	RL0603FR-0740K2L
1	R2	13k	Thick Film Res., 1%	0603	ROYAL	RL0603FR-0713KL
1	R3	0 $\Omega$	Thick Film Res., 1%	0603	ROYAL	RL0603L000JT
1	R4	20 $\Omega$	Thick Film Res., 5%	0603	ROYAL	RL0603FR-0720RL
1	R7	113k	Thick Film Res., 1%	0603	ROYAL	RL0603FR-07113KL
1	R8	10k	Thick Film Res., 1%	0603	ROYAL	RL0603FR-0710KL
1	R9	8.2k	Thick Film Res., 1%	0603	ROYAL	RL0603FR-078K2L
1	R10	10 $\Omega$	Thick Film Res., 1%	0603	ROYAL	RL0603FR-0710RL
1	L1	4.7 $\mu$ H	Inductor, DCR=19.5m $\Omega$ , Is=7.0A	SMD	Wurth	744311470
1	U1	MP2228-J	Synchronous Step-Down Convert	TSOT23-8	MPS	MP2228-J

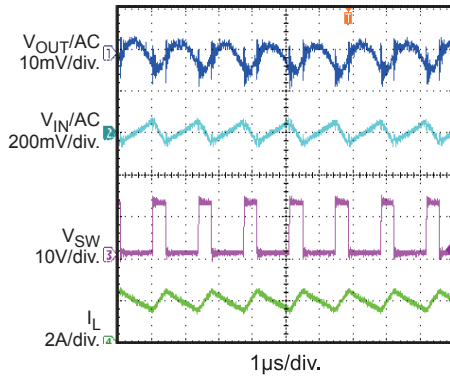
### EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

$V_{IN} = 12V$ ,  $V_{OUT} = 3.3V$ ,  $L = 4.7\mu H$ ,  $T_A = 25^\circ C$ , unless otherwise noted.

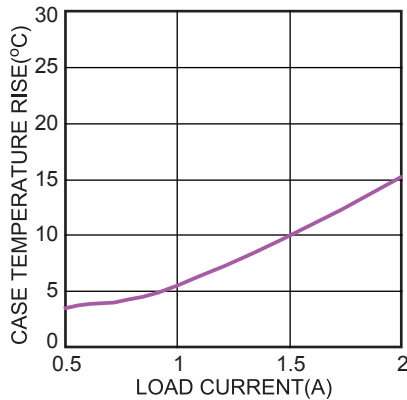
#### Input/Output Ripple

$I_{OUT} = 2A$



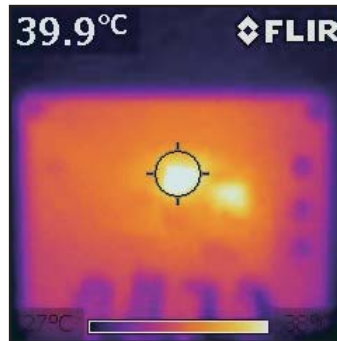
#### Case Temperature Rise vs. $I_{OUT}$

$I_{OUT} = 0.5A - 2A$



#### Infrared Thermal Image

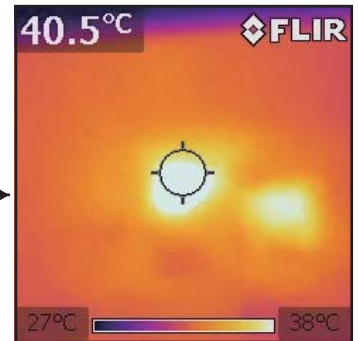
$I_{OUT} = 2A$



Zoom in

#### Infrared Thermal Image

$I_{OUT} = 2A$



## PRINTED CIRCUIT BOARD LAYOUT

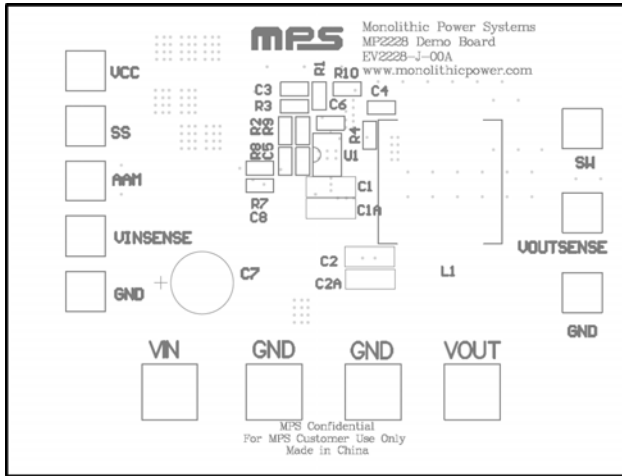


Figure 1—Top Silk Layer

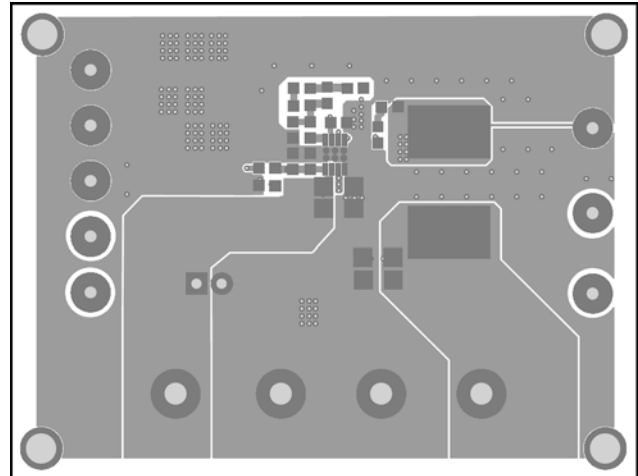


Figure 2—Top Layer

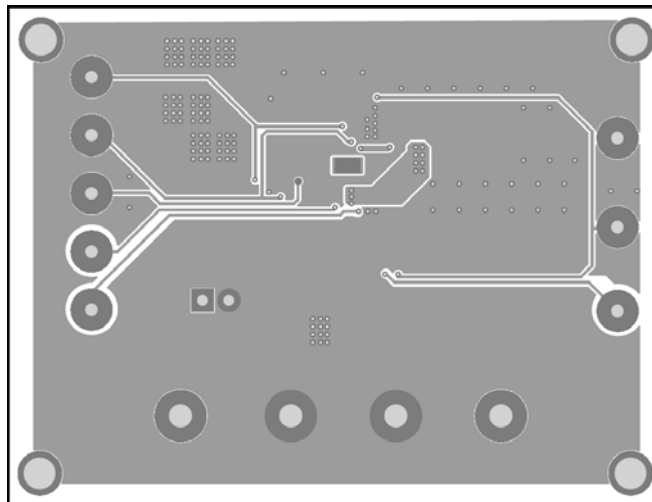


Figure 3—Bottom Layer