

## DESCRIPTION

The EV4423A-Q-00A is an evaluation board for the MP4423A, MPQ4423A and MPQ4423A-AEC1, a high-frequency, synchronous, rectified, step-down, switch-mode converter with built-in power MOSFETs. It offers a very compact solution to achieve a 3A continuous output current with excellent load and line regulation over a wide input supply range. The MP4423A/MPQ4423A/MPQ4423A-AEC1 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 include over-current protection and thermal shut down.

The EV4423A-Q-00A uses a minimal number of readily-available standard components, and is assembled and tested in space-saving QFN-8 (3mmx3mm) package.

## ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	$V_{IN}$	36	V
Output Voltage	$V_{OUT}$	3.3	V
Output Current	$I_{OUT}$	3	A

## FEATURES

- Wide 4V to 36V Continuous Operating Input Range
- 85mΩ/55mΩ Low RDS(ON) Internal Power MOSFETs
- High-Efficiency Synchronous Mode Operation
- Default 410kHz Switching Frequency
- Synchronizes to a 200kHz to 2.2MHz External Clock
- High Duty Cycle for Automotive Cold-crank
- Forced CCM
- Internal Soft-Start
- Power Good
- OCP Protection and Hiccup
- Thermal Shutdown
- Output Adjustable from 0.8V
- Available in an QFN-8 (3mmx3mm) package
- Fully assembled and tested

## APPLICATIONS

- Automotive
- Industrial Control System
- Distributed Power Systems

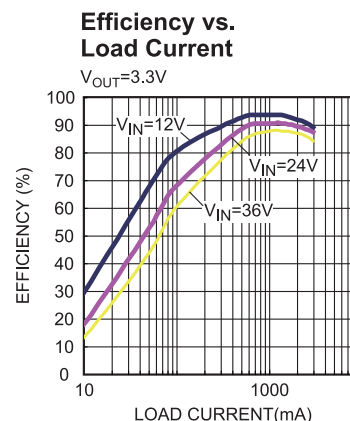
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## EV4423A-Q-00A EVALUATION BOARD

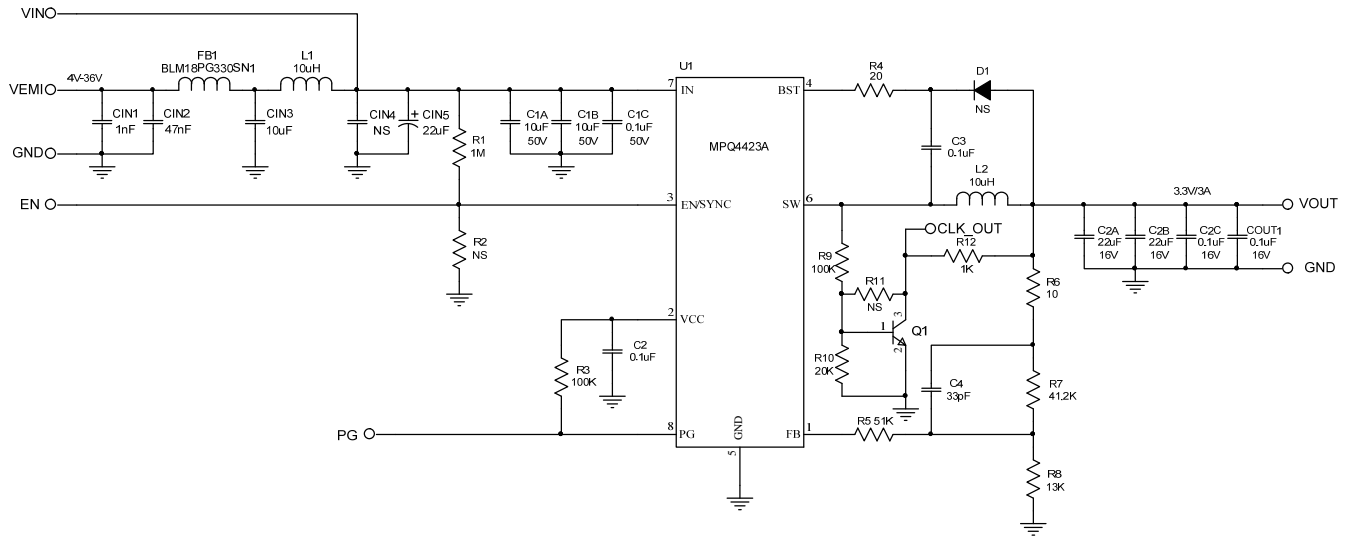


(L x W x H) 2.5" x 2.5" x 0.2"  
(6.35cm x 6.35cm x 0.5cm)

Board Number	MPS IC Number
EV4423A-Q-00A	MPQ4423AGQ-AEC1



### EVALUATION BOARD SCHEMATIC



**EV4423A-Q-00A BILL OF MATERIALS**

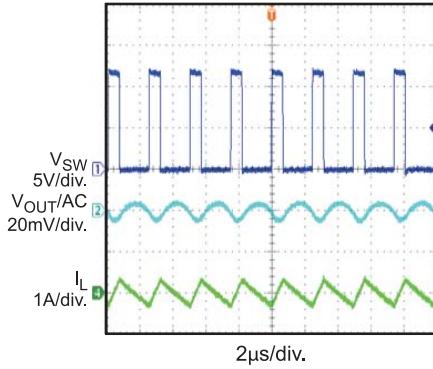
Qty	Ref	Value	Description	Package	Manufacture	Part Number
3	C1A,C1B,C13	10 $\mu$ F	Ceramic Cap., 50V, X7R	1210	muRata	GRM32ER71H106KA12L
1	C1C	0.1 $\mu$ F	Ceramic Cap., 50V, X7R	0603	muRata	GRM188R71H104KA93D
2	C2A,C2B	22 $\mu$ F	Ceramic Cap., 16V, X7R	1210	muRata	GRM32ER71C226KE79
4	C2,C2C, C3,COUT1	0.1 $\mu$ F	Ceramic Cap., 16V, X7R	0603	muRata	GRM188R71C104KA01D
1	C4	33pF	Ceramic Cap., 50V, C0G	0603	muRata	GRM1885C1H330JA01D
1	CIN1	1nF	Ceramic Cap., 50V, X7R	0603	muRata	GRM188R71H102KA01D
1	CIN2	47nF	Ceramic Cap., 50V, X7R	0603	muRata	GRM188R71H473KA61D
1	CIN5	22 $\mu$ F	Electrolytic Cap.	SMD	Jianghai	VTD-63V22
2	CIN4,COUT1	NS				
1	D1	NS				
1	FB1		Magnetic Bead, 3A	0603	muRata	BLM18PG330SN1
2	L1,L2	10 $\mu$ H	Inductor, 40.9mOhm DCR, 4.9A	SMD	Coilcraft	XAL5050-103ME
1	R1	1M	Film Res., 5%	0603	Yageo	RC0603JR-071ML
2	R3,R9	100k	Film Res., 1%	0603	Yageo	RC0603FR-07100KL
1	R4	20	Film Res., 1%	0603	Yageo	RC0603FR-0720RL
1	R5	51k	Film Res., 1%	0603	Yageo	RC0603FR-0751KL
1	R6	10	Film Res., 1%	0603	Yageo	RC0603FR-0710RL
1	R7	41.2k	Film Res., 1%	0603	Yageo	RC0603FR-0741K2L
1	R8	13k	Film Res., 1%	0603	Yageo	RC0603FR-0713KL
1	R10	20k	Film Res., 1%	0603	Yageo	RC0603FR-0720KL
1	R12	1k	Film Res., 1%	0603	Yageo	RC0603FR-071KL
2	R2,R11	NS				
1	Q1		Transistor, 40V, 0.2A	SOT-23	ON Semiconductor	MMBT3904LT1
1	U1		Step-Down Regulator	QFN3X3-8	MPS	MPQ4423AGQ-AEC1
5	VIN, VEMI, GND, VOUT, GND		2.0 Golden Pin		HZ	
5	EN/SYNC,GN D,PG,GND, CLK_OUT		1.0 Golden Pin		HZ	

## EVB TEST RESULTS

$V_{IN} = 12V$ ,  $V_{OUT} = 3.3V$ ,  $C_{OUT} = 2x22\mu F$ ,  $L = 10\mu H$ ,  $T_A = +25^\circ C$ , unless otherwise noted.

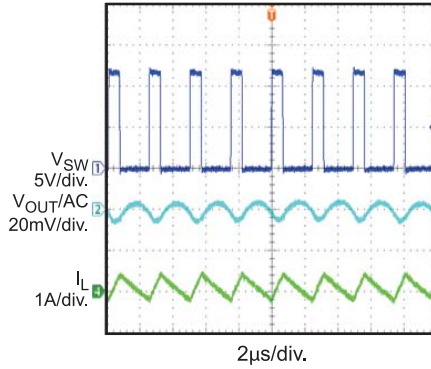
**Steady State**

$I_{OUT} = 0A$



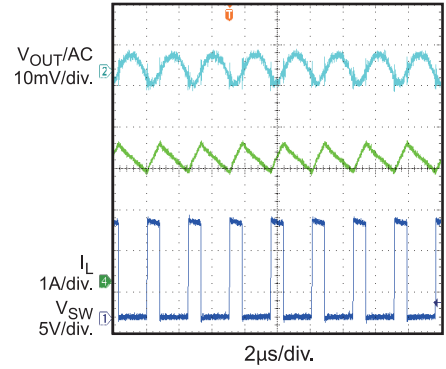
**Steady State**

$I_{OUT} = 0.1A$



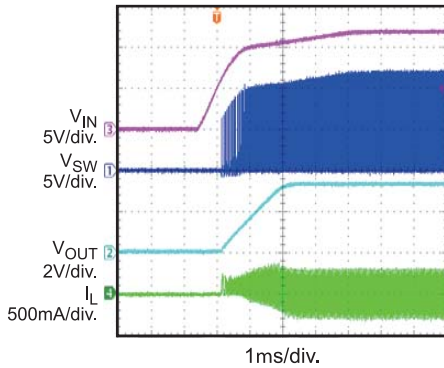
**Steady State**

$I_{OUT} = 3A$



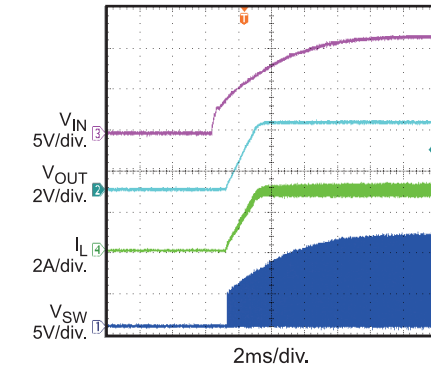
**Start-Up through  $V_{IN}$**

$I_{OUT} = 0A$



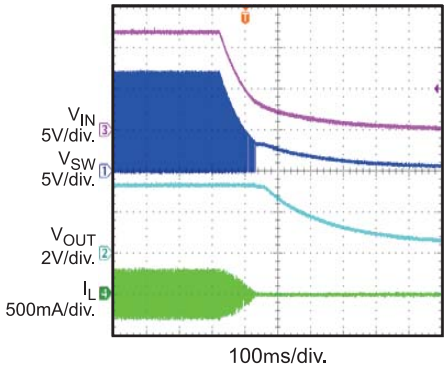
**Start-Up through  $V_{IN}$**

$I_{OUT} = 3A$



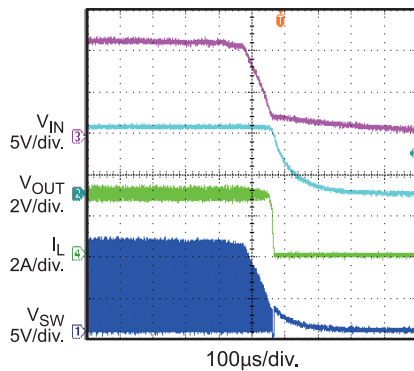
**Shutdown through  $V_{IN}$**

$I_{OUT} = 0A$



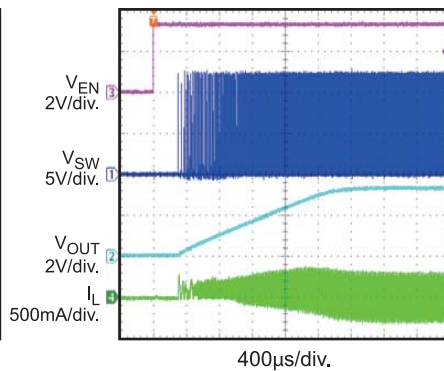
**Shutdown through  $V_{IN}$**

$I_{OUT} = 3A$



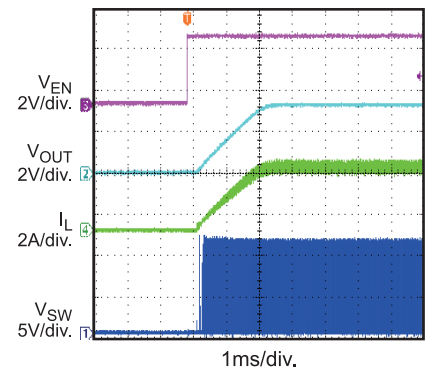
**Start-Up through  $EN$**

$I_{OUT} = 0A$



**Start-Up through  $EN$**

$I_{OUT} = 3A$



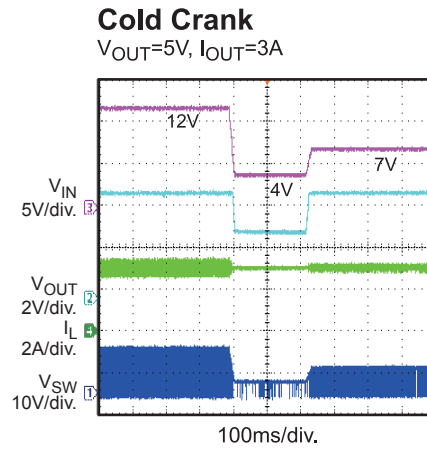
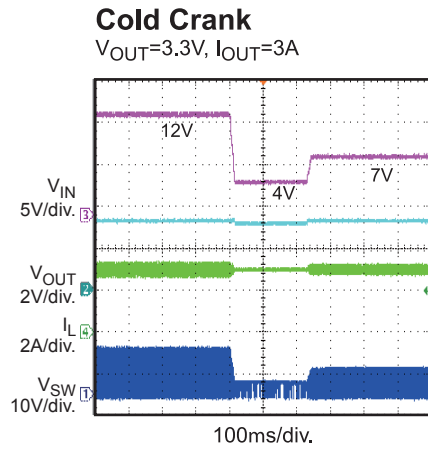
## EVB TEST RESULTS *(continued)*

$V_{IN} = 12V$ ,  $V_{OUT} = 3.3V$ ,  $C_{OUT} = 2x22\mu F$ ,  $L = 10\mu H$ ,  $T_A = +25^\circ C$ , unless otherwise noted.



## EVB TEST RESULTS *(continued)*

$V_{IN} = 12V$ ,  $V_{OUT} = 3.3V$ ,  $C_{OUT} = 2 \times 22\mu F$ ,  $L = 10\mu H$ ,  $T_A = +25^\circ C$ , unless otherwise noted.



## PRINTED CIRCUIT LAYOUT

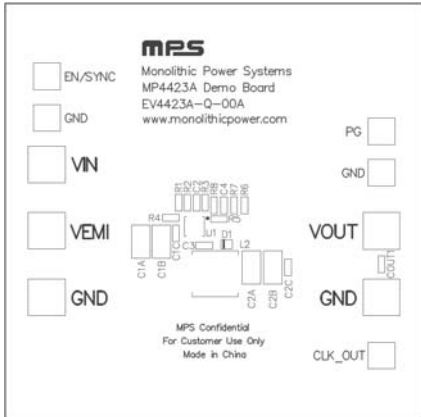


Figure1 – Top Silk Layer

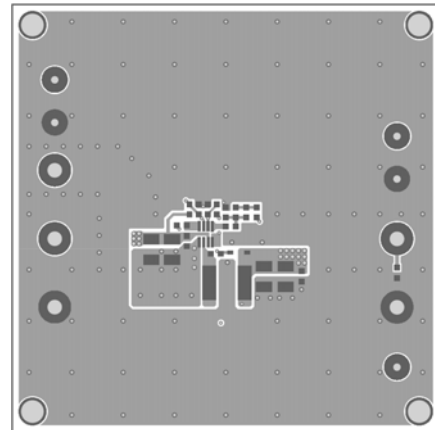


Figure 2 – Top Layer

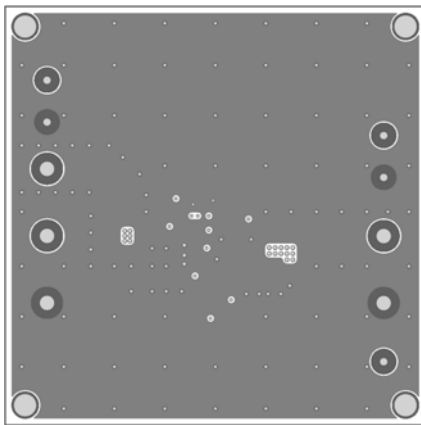


Figure3 – Inner Layer 1

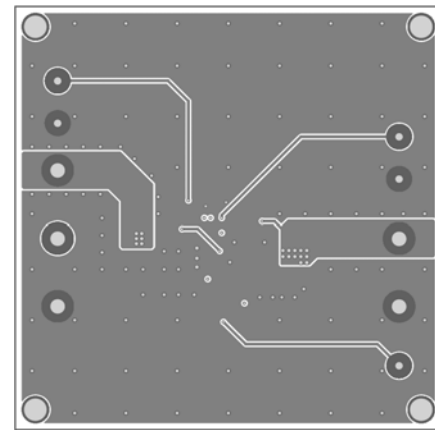


Figure 4 – Inner Layer 2

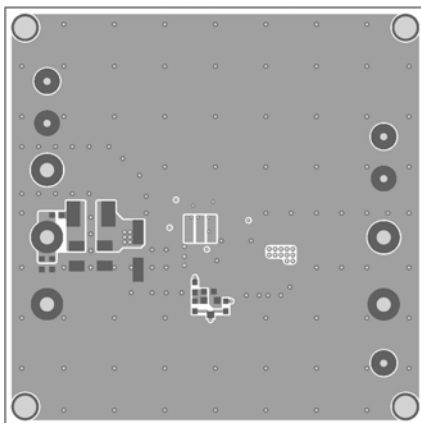


Figure5 – Bottom Layer

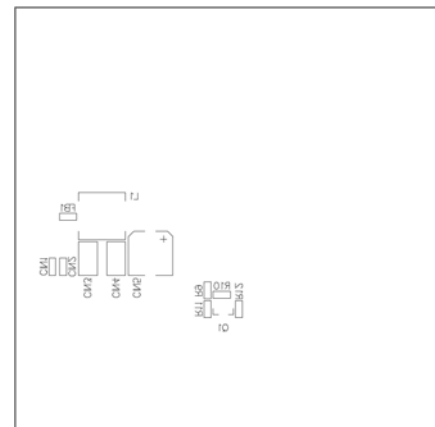


Figure 6 – Bottom Silk Layer