



MIC2196 Evaluation Board

400kHz SO-8 Boost Control IC

Introduction

MIC2196 is a high efficiency PWM boost control IC housed in a SO-8 package. The MIC2196 is optimized for low input voltage applications. With its wide input voltage range of 2.9V to 14V, the MIC2196 can be used to efficiently boost voltages in 3.3V, 5V and 12V systems.

The MIC2196 is ideal for space sensitive applications. The device is housed in the space saving SO-8 package, whose low pin-count minimizes external components. Its fixed 400kHz PWM operation allows the use of small inductor and small output capacitors and is ideal for noise-sensitive telecommunication applications. Efficiencies over 90 % are achievable over a wide range of load conditions.

MIC2196 Evaluation Board Input/Output Voltages and Load Current

The MIC2196 evaluation board is designed for the following input/output voltages:

Input Voltage (V)	Output Voltage (V)	Load Current (A)
3.3	5	4
5	9	3
5	12*	2.5

* Power MOSFET is Si4888DY (Drain to source=30V)

The MIC2196 evaluation board can be programmed to some other output voltage by inserting JP1 in pin 7-8 and populating resistor R6 per the following equation:

$$R6 = \frac{10k\Omega}{\left(\frac{V_{OUT_Desired}}{1.245V}\right) - 1}$$

Quick-Start Guide

Refer to Figure 1 for the following:

1. Connect the positive terminal from the power supply to V_{IN} post (J1) on the MIC2196 evaluation board.
2. Connect the GND terminal of the input power supply to GND (J2).
3. Connect a digital voltmeter across V_{OUT} (J3) and GND (J4) to measure output voltage.
4. Program the output voltage by selecting jumper JP1 to be in 5V, 9V, 12V position.
5. JP2 jumper should be open to enable the part.
6. After turning the input supply on, the output voltage should read 5V, 9V, or 12V.

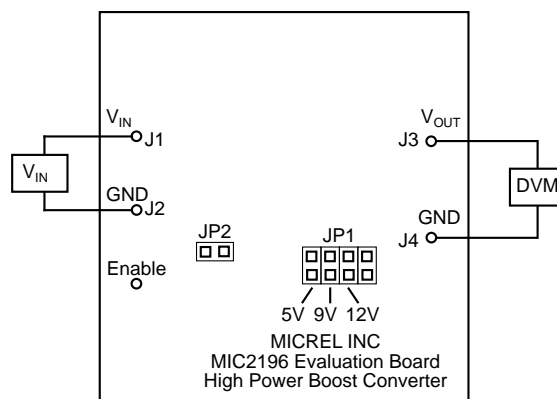
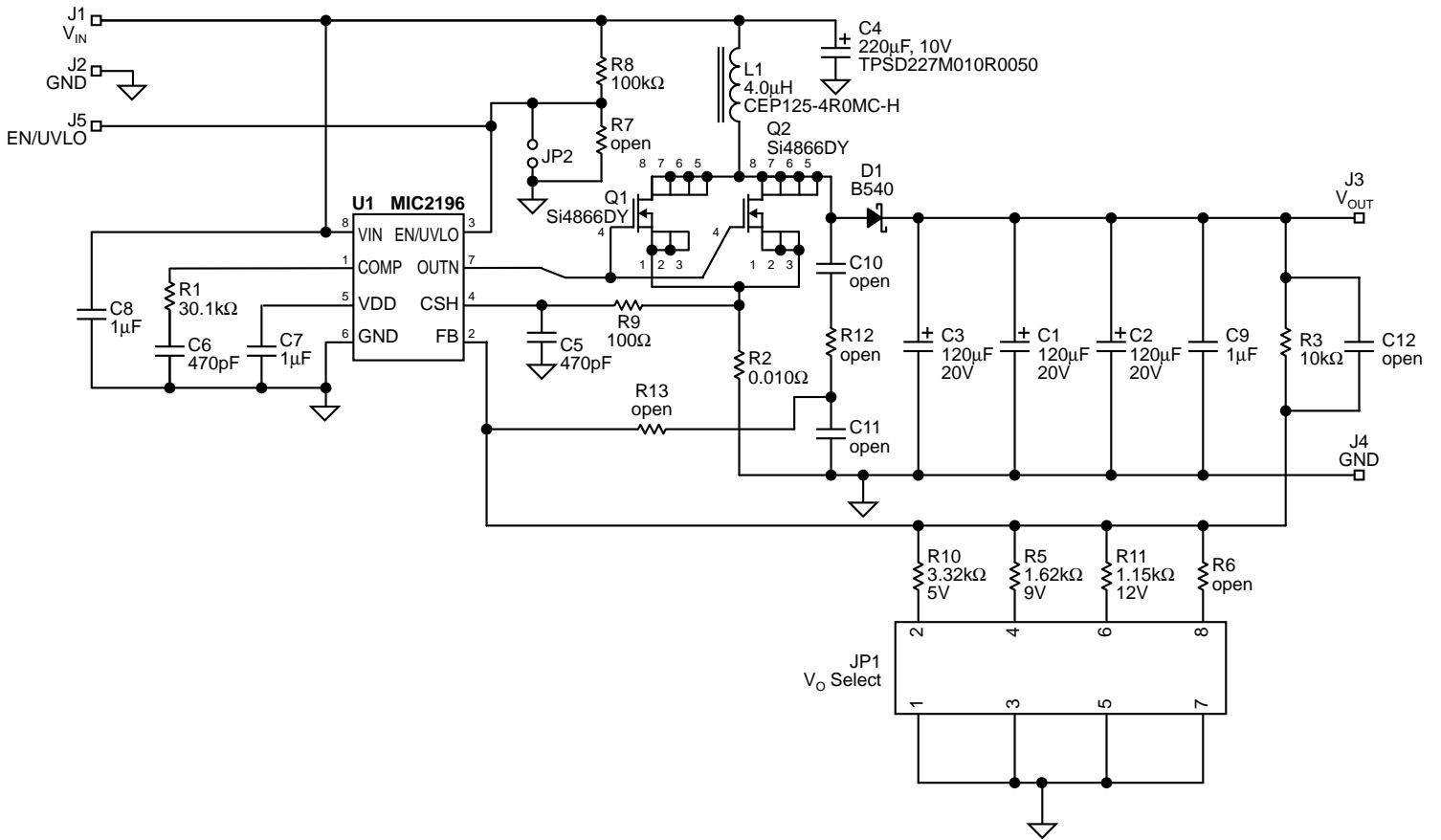


Figure 1. MIC2196 Evaluation Board Hook-up

Evaluation Board Schematic



Evaluation Board Efficiency

Figures 2, 3 and 4 show the MIC2196 efficiency for input voltages of 3.3V and 5V.

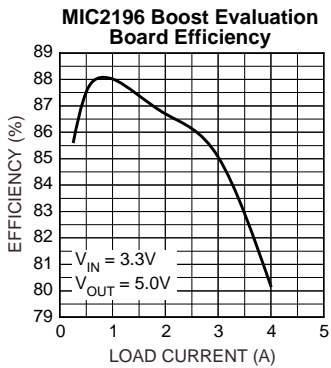


Figure 2. MIC2196 Boost Evaluation Board Efficiency

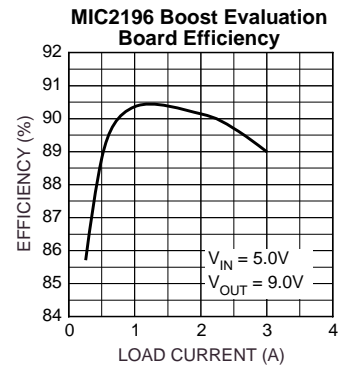


Figure 3. MIC2196 Boost Evaluation Board Efficiency

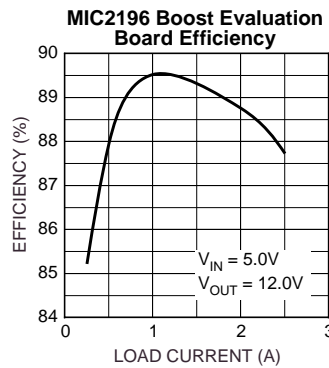


Figure 4. MIC2196 Boost Evaluation Board Efficiency

Transient Response

Figures 5 and 6 show the transient response and output voltage ripple for the MIC2196 evaluation board.

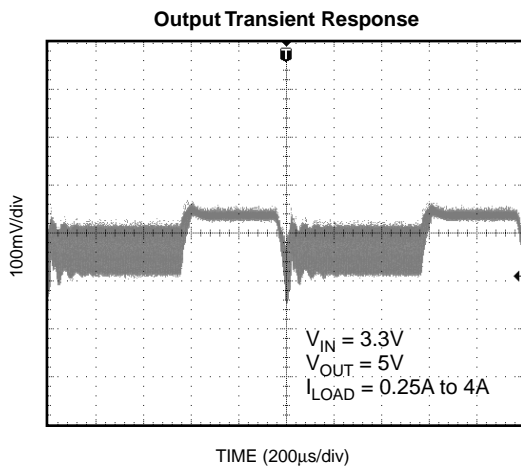


Figure 5. MIC2196 Output Transient Response for $V_{IN}=3.3V$, $V_{OUT}=5V$, $I_{LOAD}=0.25A$ to $4A$

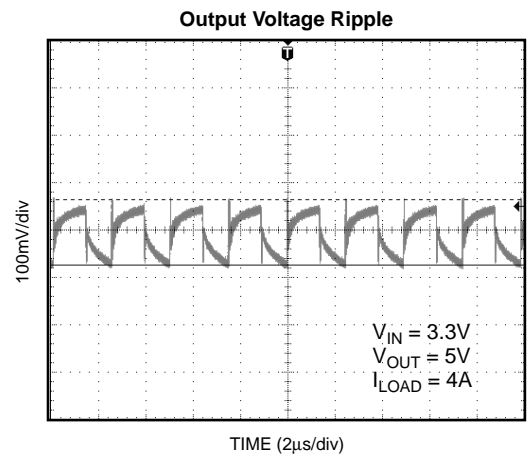


Figure 6. MIC2196 Output Voltage Ripple for $V_{IN}=3.3V$, $V_{OUT}=5V$, $I_{LOAD}=4A$

Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1, C2, C3	594D107X0020D2T	Vishay Sprague	100 μ F, 20V, Tantalum capacitor	3
C5, C6	VJ0805Y471KXAMT	Vishay Vitramon	470pF, 50V, X7R ceramic capacitor	2
C4	TPSD227M010R100	AVX	220 μ F, 10V Tantalum capacitor	1
C4	C4532X5R1C226M	TDK		OR
C4	594D227X0010D2T	Vishay Sprague		OR
C7, C8, C9	GRM21BR71C105KA01B	Murata	1 μ F/25V, ceramic capacitor	3
C7, C8, C9	VJ0805S105KXJAT	Vishay Vitramon		OR
C10, C11, C12			open location (0805 size)	3
D1	B540 (SMC Package)	Diodes, Inc.	5A, 40V Schottky diode	1
D1	SS53	Vishay Corp.		OR
D1	SK53	Micro Commercial Components		
L1	CEP125-4R0MC-H	Sumida	4.0 μ H, 9.9A inductor	1
Q1, Q2	Si4866DY	Vishay Siliconix	MOSFET	2
R1	CRCW08053012FRT1	Vishay Dale	30.1k Ω , size 0805, 1%	1
R2	WSL-2512-R010-F	Vishay Dale	0.010 Ω , size 2512, 1%	1
R3	CRCW08051002FRT1	Vishay Dale	10k Ω , size 0805, 1%	1
R5	CRCW08051621FRT1	Vishay Dale	1.62k Ω , size 0805, 1%	1
R6, R7, R12, R13			open location, size 0805	4
R8	CRCW08051003FRT1	Vishay Dale	100k Ω , size 0805, 1%	1
R9	CRCW08051000FRT1	Vishay Dale	100 Ω , size 0805, 1%	1
R10	CRCW08053321FRT1	Vishay Dale	3.32k Ω , size 0805, 1%	1
R11	CRCW08051151FRT1	Vishay Dale	1.15k Ω , size 0805, 1%	1
U1	MIC2196BM	Micrel, Inc.	Boost controller	1

Vendor Phone Numbers:

1. Vishay Corp. tel: 206-452-5664
2. AVX tel: 843-448-9411
3. TDK tel: 847-803-6100
4. Murata tel: 800-831-9172
5. Diodes, Inc. tel: 805-446-4800
6. Micro Commercial Components tel: 800-346-3371
7. Sumida tel: 408-321-9660
8. **Micrel Semiconductor** tel: 408-944-0800

Printed Circuit Board Layouts

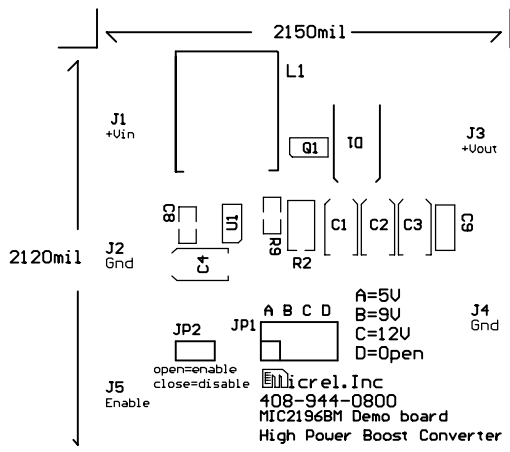


Figure 7a. Top Silkscreen

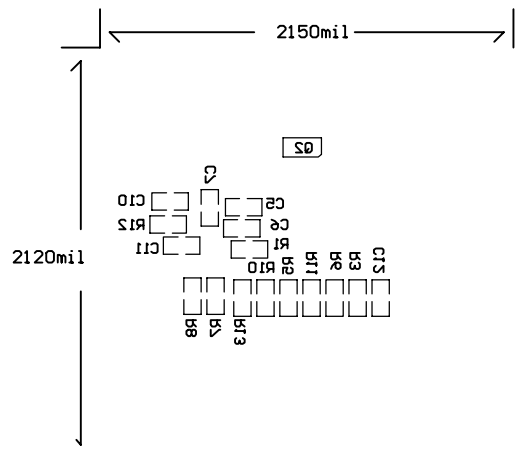


Figure 7c. Bottom Silkscreen

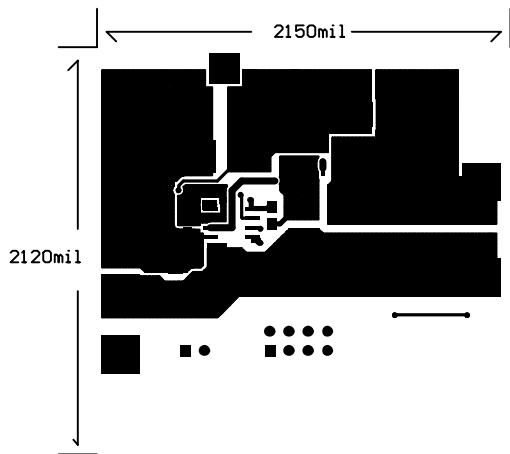


Figure 7b. Top Layer

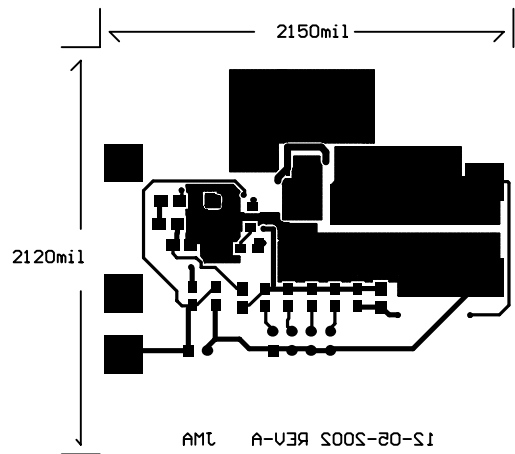


Figure 7d. Bottom Layer

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