



Application Hint 61

MIC2196 Flyback for 48V Input to 3.3V & 1.8V

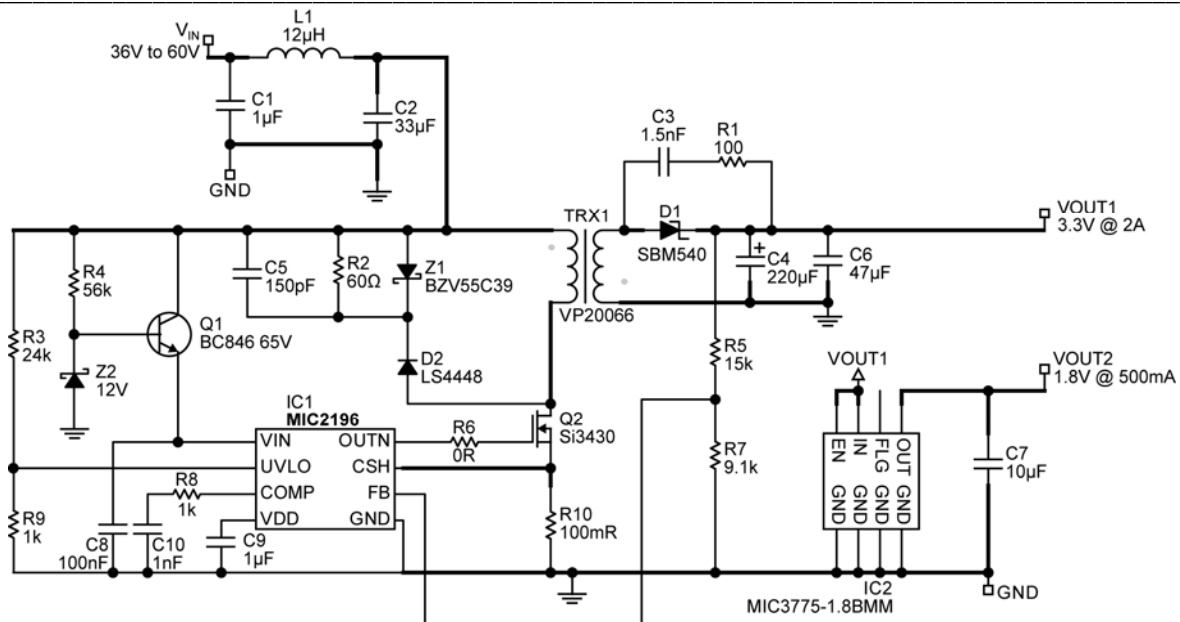
General Description

This circuit provides approximately 10W with two regulated outputs of 3.3v and 1.8v from a high voltage (48v) input using the Flyback topology. The control is by constant frequency, current mode PWM based on the versatile MIC2196 operating at 400 kHz. Using the Flyback topology offers greater protection of the load in the event of a switch failure whilst it is lower cost than the Forward topology; in addition, the fold back frequency feature of the MIC2196 prevents overheating during heavy overload conditions such as a short circuit. This circuit is therefore a good general purpose solution for 48v conversion and can also be used as a low cost converter for Power over Ethernet (PoE) applications. The addition of an input filter helps to reduce the input noise generated as the input current peaks flow in the input capacitor. This noise is present in all Buck, Flyback and Forward converter topologies.

The 1.8v rail is generated by just two additional components; The MIC3775 and a single 10uF ceramic capacitor.

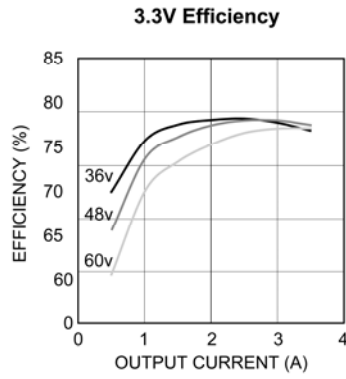
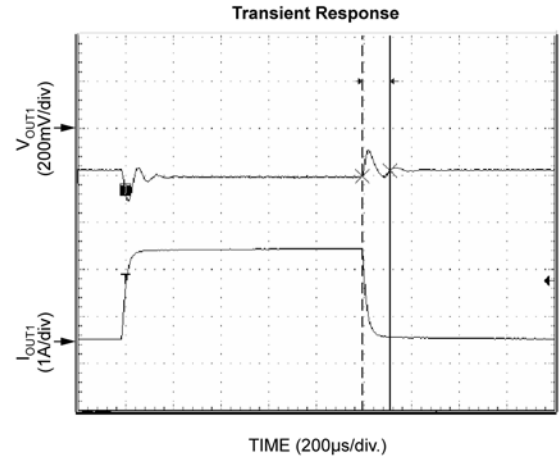
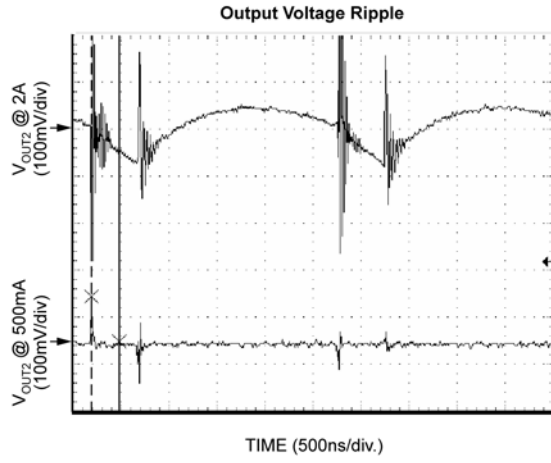
Specification summary

V _{IN}	36v to 60v
V _{OUT}	3.3v @ 2.25A (0.5A on V _{OUT2})
V _{OUT2}	1.8v @ 500mA
Efficiency	78% @ full load
Regulation.....	+/- 3%



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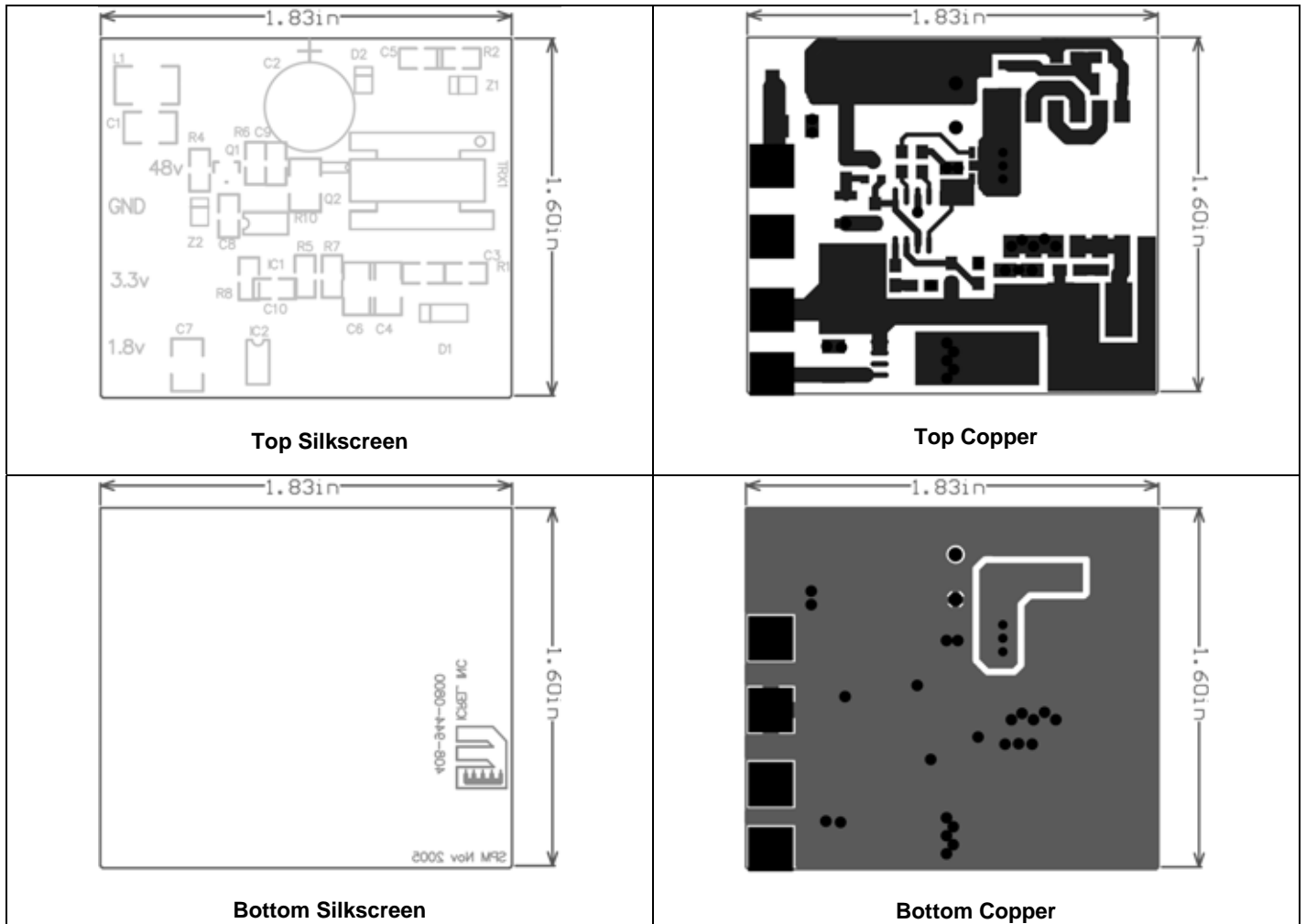
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Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1	muRata	GRM32ER72A105KA01L	1uF/100v,X7R 1210	1
	Vishay	VJ1206Y105KXBTW1BC		
	TAIYO YUEN	HMK325BJ105ML-T		
	AVX	12101C105KAZ1A		
C2	Vishay	517D336M100CC6A	33uF/100v, Radial	1
	Panasonic	EEUFC2A330		
C3	Vishay	C1608X7R1H152KT.	1.5nF/50v, 0603	1
	TDK	VJ0603Y152KXAAT.		
C4	AVX	TPSD227M006R0100	220uF/6.3v, Low ESR	1
	Vishay	594D227X06R3D2T		
C5	Vishay	VJ0805Y151MXBCW1BC	150pF/100v, 0805	1
C6	muRata	GRM32ER60J476ME20L	47uF/6.3v, X5R, 1210	1
	Vishay	VJ1206G476JXYTW1BC		
C7	TDK	C2012X5R0J106M	10uF/6.3v, X5R, 0805	1
C8	TDK	C1608X7R1H104KT.	Ceramic Capacitor	1
	Vishay	VJ0603Y104KXAAT.		
C9	muRata	GRM185R61A105KE36D	1uF/10v, X5R, 0603	1
	Vishay	JV0603G105KXQCW1BC		
C10	TDK	C1608COG1H102J.	1nF/50v, 0603	1
	Vishay Vitramon	VJ0603Y102KXAAT.		
D1	Diodes Inc	SBM540	5A, 40V Schottky Diode	1
D2	Vishay	LS4448	100v Switching Diode	1
IC1	Micrel	MIC2196BM	SO8 PWM controller	1
IC2	Micrel	MIC3775-1.8BMM	uCap LDO	1
L1	Coilcraft	1812LS-123XJBC	12uH, High Frequency	1
Q1	Central Semi	BC846B	65v NPN Bipolar	1
	Vishay	BC846B		
Q2	Vishay	SI3430DV	100V, 100mR N-Channel	1
R1	Vishay	CRCW0805100R0FRT1	100 Ohm, 0805	1
R2	Vishay	CRCW080560R0FRT1	60 Ohm, 0805	1
R3	Vishay	CRCW06032402FRT1	24k, 0603	1
R4	Vishay	CRCW08055602FRT1	56k, 0805	1
R5	Vishay	CRCW08051502FRT1	15k, 0805	1
R6	Vishay	CRCW080520R0FRT1	20 Ohm, 0805	1
R7	Vishay	CRCW06039091FRT1	9.1k, 0603	1
R8, R9	Vishay	CRCW06031001FRT1	1k, 0603	1
R10	Vishay	WSL-1206-R100-F	100mR, 1/4W resistor	1
TRX1	Coiltronics	VP2 0066	VersaPak Transformer	1
Z1	Diodes Inc	MMSZ5259B	39v, Zener Diode	1
Z2	Diodes Inc	MMSZ5224B	12v, Zener Diode	1

PCB Layout



Top Silkscreen

Top Copper

Bottom Silkscreen

Bottom Copper

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