



## **High Voltage Isolated/Non-Isolated Power Supply Reference Designs**

***Disclaimer:***

It is up to the individual designer to ensure fitness of purpose when selecting and modifying the attached circuits.

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**Description: +27V input, dual +9.05V 45mA output isolated Flyback converter**

Simple, low cost, dual output flyback converter using a MAX50520 50% duty cycle current mode controller.

**Specification:**

$V_{in} = +19.2V < V_{in} < 35V$

$V_{out1} = +9.05V \pm 10\%$ ,  $V_{out2} = +9.05V \pm 10\%$

$I_{out} = 10mA$  to  $45mA$  / output

$P_{out} = 832mW$  nominal

Frequency =  $275kHz$  fixed.

Efficiency  $\geq 60\%$

Output Ripple  $\leq 50mV$  pp

Brown-out hold time =  $1ms$  from  $19.2V$

Input protection = reverse polarity.

Output Dynamic =  $< 300mV$  for  $700mA$  current step.

Output short circuit protection = yes

Height =  $5.1mm$ ,  $2.5mm$ .

Operating Temperature =  $0^{\circ}C$  to  $+70^{\circ}C$  no cooling, still air.

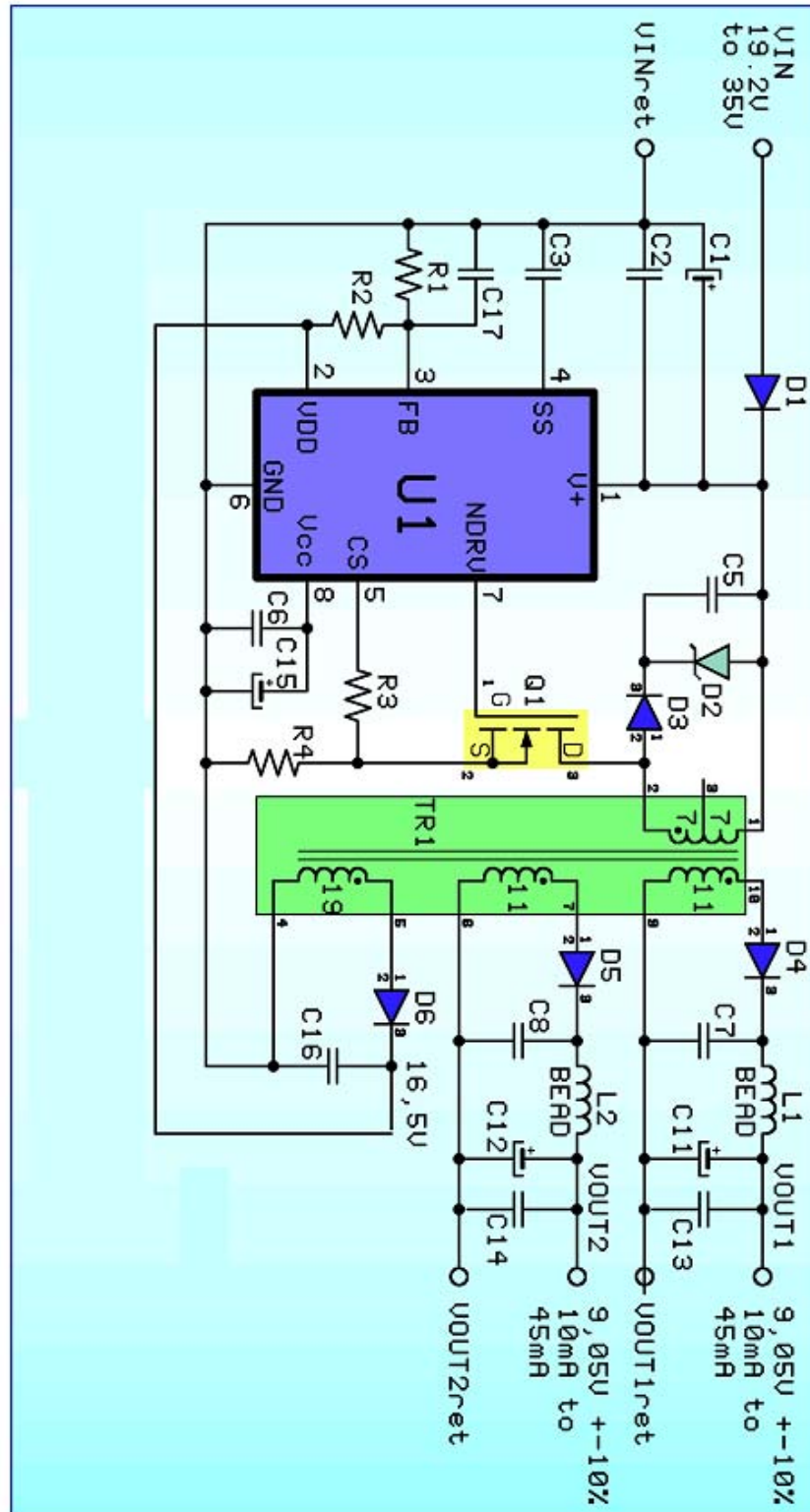
Isolation =  $1500V$  primary-secondary;  $500V$  secondary-to-secondary.

**Parts List:**

CCT ID	Value	Voltage TOL	Outline	Description & Comments
R1	620	1%	805	100mW Metal Film Resistor
R2	3K6	1%	805	100mW Metal Film Resistor
R3	100	5%	805	100mW Metal Film Resistor
R4	0R82	5%	805	100mW Metal Film Resistor - non-inductive type
C1	22 $\mu$ F	35V	E case	EPCOS B45196H6226K509 ESR 0,8 Ohm max
C2	220nF	50V	805	X7R Ceramic Capacitor
C3	220nF	16V	805	X7R Ceramic Capacitor (or 10V in 0604)
C4				Unused
C5	10nF	50V	805	X7R Ceramic Capacitor
C6	100nF	50V	805	X7R Ceramic Capacitor
C7	2,2 $\mu$ F	16V	1206	X7R Ceramic Capacitor
C8	2,2 $\mu$ F	16V	1206	X7R Ceramic Capacitor
C9				Unused
C10				Unused
C11	4,7 $\mu$ F	25V	C case	Low ESR EPCOS B45197A5475K03 100mOhm max
C12	4,7 $\mu$ F	25V	C case	Low ESR EPCOS B45197A5475K03 100mOhm max
C13	470nF	16V	805	X7R Ceramic Capacitor
C14	470nF	16V	805	X7R Ceramic Capacitor
C15	4,7 $\mu$ F	16V	B case	EPCOS B45196H3475K209 ESR 3,5 Ohm max
C16	100nF	50V	805	X7R Ceramic Capacitor
C17	100nF	50V	805	X7R Ceramic Capacitor
U1	MAX5020ESA	110V	SO8	MAXIM PWM Control IC Fsw=275Khz +-10%
Q1	2N7002	60V	SOT23-3	5 ohms max - 60V VDSS
L1	0,68 $\mu$ H	10%	805	MURATA LQG21N 150mA 0,7 ohm
L2	0,68 $\mu$ H	10%	805	MURATA LQG21N 150mA 0,7 ohm

TR1	250nH/t	10%	ER11	AL = 250nH/t Primary = 2*7 turns 49 $\mu$ H leff = 160mA Retro-supply winding: 19 turns Outputs windings 2* 11 turns 30,25 $\mu$ H leff 85mA
D1	BYG22D	200V	SMA	IFSM=35A
D2	BZV55-C22	22V	SOD-80c	500mW Zener
D3	BAV70	70V	SOT23-3	IFRM=450mA
D4	BAV70	70V	SOT23-3	IFRM=450mA
D5	BAV70	70V	SOT23-3	IFRM=450mA
D6	BAV70	70V	SOT23-3	IFRM=450mA

**Circuit Diagram: +27V input, dual +9.05V 45mA output isolated Flyback converter**



**Description: -39V to -57V input, +3V/ 3.3W output isolated Flyback converter.**

This is a continuous flyback converter using a MAX5015 50% max duty cycle current mode controller.. Although the inductance value is higher than discontinuous design, the transformer fits on a low cost ER11 core. No auxiliary winding is used to power the MAX5015. An optional snubber (R9-C12) is used to damp a 25MHz ringing on Q1's (100V) drain terminal. D1 is used to dissipate the leakage inductance spike. C10-L1 at the input limits the reflected current, whilst C11 buffers the input line length. R10-C13 optionally damps a 100MHz ringing on D3's anode. L2-C6 network provides additional EMI filtering at the output.

**Specification**

$V_{in} = -57V < V_{in} < -39V$

$V_{out} = 3V \pm 5\%$

$I_{out} = 200mA$  to 1100mA

$P_{out} = 832mW$  nominal

Frequency = 275kHz fixed.

Efficiency  $\geq 75\%$

Output Ripple  $\leq 30mV$  pp

Input protection = none

Input reflected ripple = 5mA

Output Dynamic  $\leq 60mV$  for 900mA current step

Output Protection = short circuit

Height = 16mm

Operating Temperature = 0°C to +45°C no cooling, still air.

Isolation = 500V

**Parts List:**

CCT ID	Value	Voltage/TOL	Footprint	Description & Comments
R1	4K7	5%	0603	63mW Metal Film Resistor
R2	3K0	5%	0603	63mW Metal Film Resistor
R3	510R	5%	0603	63mW Metal Film Resistor
R4	1R0	1%	1206	Vishay CRCW1206 100 1R0 Non-inductive
R5	430R	5%	0603	63mW Metal Film Resistor
R6	1K0	5%	0603	63mW Metal Film Resistor
R7	8K20	1%	0603	63mW Metal Film Resistor
R8	2K00	1%	0603	63mW Metal Film Resistor
R9	270R	5%	0603	63mW Metal Film Resistor
R10	51R	5%	0603	63mW Metal Film Resistor
R11	33R	5%	0603	63mW Metal Film Resistor
R12	10K0	5%	0603	63mW Metal Film Resistor
C1	4,7nF	50V	0603	X7R Ceramic Capacitor
C2	330nF	100V	1210	X7R Ceramic Capacitor TDK C3225X7R2A334M
C3	10 $\mu$ F	16V	1210	X5R Ceramic Capacitor TDK C3225X5R1C106M
C4	220nF	16V	0603	X7R Ceramic Capacitor TDK C1608X7R1C224M
C5	33 $\mu$ F	6,3V	1210	X5R Ceramic Capacitor TDK C3225X5R0J336M
C6	1800 $\mu$ F	6,3V	D10H16	Needs 1.1A rms. Aluminium Rubycon MBZ series 19m $\Omega$ max
C7	2,2nF	50V	0603	X7R Ceramic Capacitor

C8	470pF	2000V	D8,5e5	HV Ceramic Capacitor BC Components 2252 712 14416
C9	100nF	25V	0603	X7R Ceramic Capacitor TDK C1608X7R1E104K
C10	100nF	100V	1206	X7R Ceramic Capacitor TDK C3216X7R2A104M
C11	56 $\mu$ F	63V	D8H11,5	Needs 0.2A rms: Aluminium Rubycon ZL series 220m $\Omega$ max 0.5A rms
C12	68pF	100V	0603	NPO Ceramic Capacitor Primary snubber (optional)
C13	120pF	50V	0603	NPO Ceramic Capacitor Secondary snubber (optional)
C14	100nF	25V	0603	X7R Ceramic Capacitor TDK C1608X7R1E104K
L1	33 $\mu$ H	0.7A	6*6*2,8 mm	TDK SLF6028-330MR69 Shielded Input filter meeting 5mA pp reflected current
L2	>30nH	NC	PCB	Output filter, made with a printed circuit trace
U1	MAX5015ESA	110V	SO-8	MAXIM PWM Control IC Fsw=275Khz $\pm$ 10%
U2	SFH6156-2	70V	DIP4smd	Guaranteed CTR at Ie=1mA (Vishay Telefunken)
U3	MAX8515EXK	28V	SC70-5	1% initial accuracy Low Voltage shunt regulator
TR1	160nH/t 3% TRTER11.5- E001C004 (TDK)	1500V	ER11 SMD Carrier	<b>See joined specifications.</b> <b>PC44 or 3F3 (or equivalent) Ferrite on 10-pins SMD</b> coil former. 1500V DC isolation between primaries & secondary <b>Primary: 2 layers of 17 turns in series</b> sandwiching the secondary. Leakage < 1.6%. Ieff=0.19A. L=186 $\mu$ H $\pm$ 5% R<4 $\Omega$ <b>Secondary : 5 turns</b> Ieff=1.6A L=4.04 $\mu$ H $\pm$ 5% R<60m $\Omega$
Q1	Si2328DS	100V	SOT23-3	0.25 ohms @ 10V 25°C. Or ZXMN10A07F (Zetex)
Q2	TN0205A	20V	SC70-3	RDSon < 2 $\Omega$
D1	MMSZ36	36V	SOD-123	500mW Zener
D2	BAS21	150V	SOT23-3	50ns Trr
D3	MBRS130LT3	30V	SMB	2A @ 110°C case

**Transformer:**

Primary/secondary isolation = 1500V DC

ER11 core with AL=160nH/t  $\pm$  3%

Material 3F3 or PC44 or equivalent F=275Khz

**Primary:** 34 turns around the secondary in two layers of 17 turns. Suggested wire: external diameter 0.095 mm, 4.4Ohm/m. Layers 1 & 3.

Inductance = 186 $\mu$ H  $\pm$  5% between 1-5

Leakage inductance < 1.5 $\mu$ H with 6-10 shorted in SS

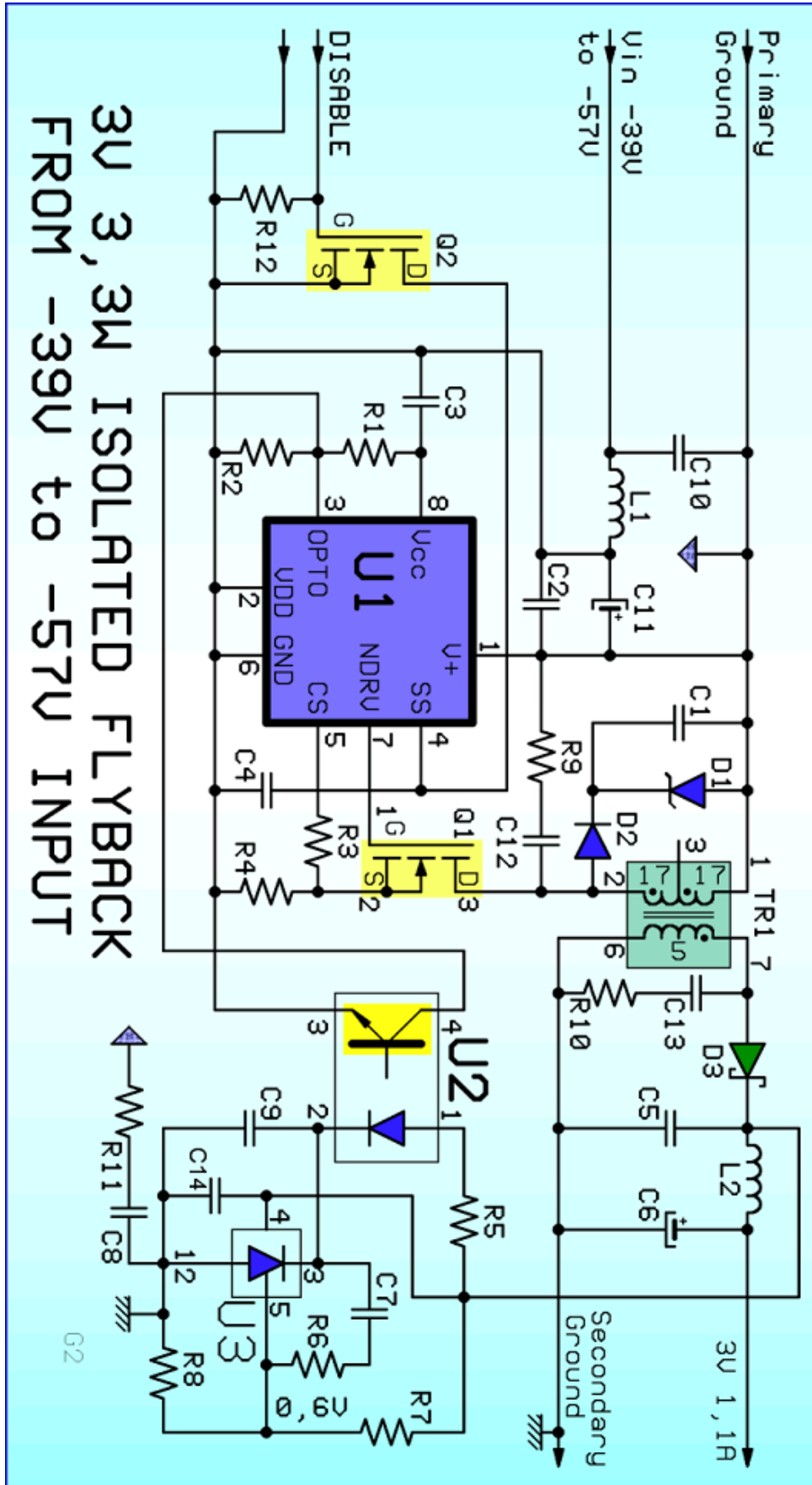
Pin 3 can be used as centre pin.

Rpri < 4 ohms

**Secondary:** 4.04 $\mu$ H  $\pm$ -5% between 6-10. Layer 2. Suggested wire: external diameter 0.301mm 350mOhm/m

Rsec < 60mOhm

**Circuit Diagram: -39V to -57V input, +3V/3.3W output isolated Flyback converter**



**Description: +14V to +35V input, +5.25V / 7.35W output isolated Flyback converter**

A low cost isolated flyback design, using the MAX5053A 50% max duty cycle current mode controller. Input to output isolation is 1500V. Height above PCB is 10mm.

**Specification:**

$V_{in} = +19.2V < V_{in} < +35V$

$V_{out} = 5.25V \pm 2\%$  static conditions

$I_{out} = 10mA$  to 1400mA

$P_{out} = 7.35W$  nominal

Frequency = 262kHz  $\pm 12\%$  fixed.

Efficiency =  $> 85\%$

Output Ripple = 100mV pp

Output Dynamic =  $< 150mV$  for 1000mA current step

Output Short Circuit Current  $< 2.5A$

Height = 10mm

Operating Temperature =  $0^{\circ}C$  to  $+85^{\circ}C$  no cooling, still air.

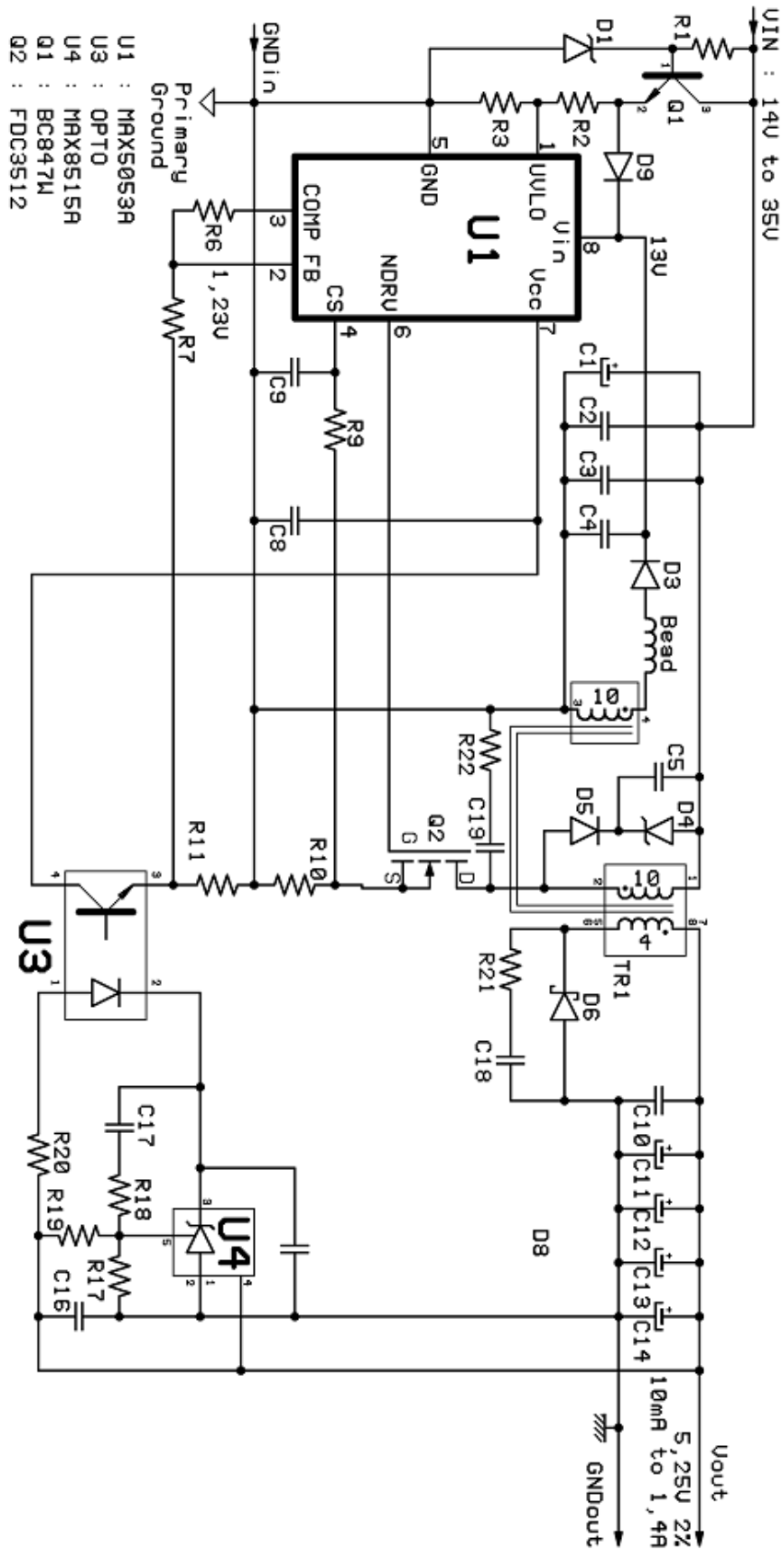
Isolation = 1500V

**Parts List:**

CCT ID	Value	Voltage/TOL	Footprint	Description & Comments
R1	33K	5%	0805	100mW Metal Film Resistor
R2	91K	1%	0805	100mW Metal Film Resistor
R3	15K	1%	0805	100mW Metal Film Resistor
R6	18K	1%	0805	100mW Metal Film Resistor
R7	18K	1%	0805	100mW Metal Film Resistor
R9	100R	5%	0805	100mW Metal Film Resistor
R10A	0R33	1%	0805	100mW Metal Film Resistor ie MEGGIT CRL 1220
R10B	0R33	1%	0805	100mW Metal Film Resistor ie MEGGIT CRL 1220
R11	2K4	5%	0805	100mW Metal Film Resistor
R17	10,6K	0.1%	0805	100mW Metal Film Resistor
R18	Short circuit	1%	0805	100mW Metal Film Resistor
R19	82K	0.1%	0805	100mW Metal Film Resistor
R20	1K0	5%	0805	100mW Metal Film Resistor
R21	15R0	5%	0805	100mW Metal Film Resistor
R22	150R	5%	0805	100mW Metal Film Resistor
C1	2*330 $\mu$ F	35V	D10H10,5	NIC NACZ series 0.52A rms @ $85^{\circ}C$ $< 90m\Omega$
C2	100nF	50V	0805	X7R Ceramic Capacitor
C3	470nF	50V	1812	X7R Ceramic Capacitor 0.52A rms @ $85^{\circ}C$ 20m $\Omega$
C4	470nF	16V	0805	X7R Ceramic Capacitor
C5	10nF	50V	0805	X7R Ceramic Capacitor
C8	470nF	16V	0805	X7R Ceramic Capacitor
C9	1nF	50V	0603	NPO Ceramic Capacitor
C10	10 $\mu$ F	10V	1206	X7R Ceramic Capacitor
C11	100 $\mu$ F	10V	D case	Low ESR EPCOS B45197A2107K409 100m $\Omega$ max
C12	100 $\mu$ F	10V	D case	Low ESR EPCOS B45197A2107K409 100m $\Omega$ max

C13	100 $\mu$ F	10V	D case	Low ESR EPCOS B45197A2107K409 100mOhm max
C14	100 $\mu$ F	10V	D case	Low ESR EPCOS B45197A2107K409 100mOhm max
C16	1 $\mu$ F	10V	0805	X7R Ceramic Capacitor
C17	4,7nF	50V	0805	X7R Ceramic Capacitor
C18	390pF	50V	0805	X7R Ceramic Capacitor
C19	47pF	50V	0805	X7R Ceramic Capacitor
TR1	318,3nH/t		RM5ILP	<b>3F3 Ferrite on 8-pins SMD</b> coil former. Gap=88 $\mu$ m (to be conf.) 100 $\mu$ m isolation between primaries & secondaries. <b>Primary:</b> 2 layers of 5 turns in series Outer diam : 0,315mm. Around 80m $\Omega$ . Leakage < 0,5%. Irms = 0.67A. (for reducing the leakage inductance, primary should sandwich the secondary) <b>Auxiliary Primary:</b> 10 turns of outer diameter 0.187mm around 230m $\Omega$ . Wired on top <b>Secondary:</b> 2 layers of 4 turns in   , wired within the primary. Outer diameter 0.395mm. Around 10m $\Omega$ Irms = 1.93A.
U1	MAX5053AEUA	24V	$\mu$ MAX-8	MAXIM PWM Control IC Fsw=262Khz $\pm$ 12%
U3	PC356NT	80V	7*3,6*H2,8	CTR=[100-400] at If=1mA Vce=5V SHARP
U4	MAX8515AEXK	28V	SC70-5	0.5% initial accuracy shunt regulator
Q1	BC847CW	45V	SC70-3	Beta $\geq$ 400
Q2	FDC3512	100V	SOT23-6	
D1	BZV55-C12	12V	SOD-80c	500mW Zener
D3	PMLL4448	70V	SOD-80c	
D4	BZV55-C36	36V	SOD-80c	500mW Zener (or 39V)
D5	ES1B	100V	SMA	Ultra-fast PN diode
D6	MBRS130LT3	30V	SMB	0.445V max @2AQ 25°C
D9	PMLL4448	70V	SOD-80c	Or double diode with D3

**Circuit Diagram: +14V to +35V input, +5.25V / 7.35W output isolated Flyback converter**



**Description: -48V input, +5V / 250mA output isolated Flyback converter**

Low cost multi-sourced component, isolated flyback design based on MAX5021 controller.

**Specification:**

$V_{in} = -60V < V_{in} < -36V$

$V_{out} = 5.0V \pm 5\%$  static conditions

$I_{out} = 10mA$  to 250mA

$P_{out} = 1.25W$  nominal

Frequency = 262kHz  $\pm 12\%$  fixed.

Efficiency  $\geq 72\%$

Output Ripple = 100mV pp

Input reflected ripple = EN5022 Class A (design target, not tested)

Output Dynamic  $\leq 30mV$  Overshoot

Output short circuit protection = Yes

Operating Temperature =  $-40^{\circ}C$  to  $+70^{\circ}C$  no cooling air flow

Height = 20mm max

Isolation = 500V

**Parts List:**

CCT ID	Value	Voltage TOL	Outline	Description & Comments
R1	100K	5%	0805	100mW Metal Film Resistor - start-up resistor
R2	10R	5%	0805	100mW Metal Film Resistor Spike-filter
R3	1R0	5%	0805	100mW Metal Film Resistor - non-inductive MEGGIT RL73
R6	43R	5%	0805	100mW Metal Film Resistor - Not fitted if D4 is a 60V model (ie ZHCS1006)
R7	430	5%	0805	100mW Metal Film Resistor
R8	5K6	5%	0805	100mW Metal Film Resistor
R9	6K2	1%	0805	100mW Metal Film Resistor
R10	6K2	1%	0805	100mW Metal Film Resistor
C1	470nF	100V	2220	X7R Ceramic Capacitor (or size 1810)
C2	1 $\mu$ F	100V	2220	X7R Ceramic Capacitor
C4	100nF	50V	0805	X7R Ceramic Capacitor
C5	10nF	50V	0805	X7R Ceramic Capacitor
C6	47nF	50V	0805	X7R Ceramic Capacitor
C8	4,7nF	50V	0805	X7R Ceramic Capacitor
C9	470pF	50V	0805	NPO or X7R Ceramic Capacitor
C10	2,2 $\mu$ F	10V	1206	X7R Ceramic Capacitor Phycomp or other
C11	470 $\mu$ F	10V	Diam 8, Hgt 11.5	Rubycon Low ESR ZL series 220mOhm MAX @ $-10^{\circ}C$ RESERVOIR
C12	47nF	50V	0805	X7R Ceramic Capacitor - Feedback compensation
C13	470pF	500V	1206	Phycomp 500V NPO AC Grounds connection
U1	MAX5021EUA	30V	$\mu$ MAX-8	Maxim Current Mode PWM Control IC $F_{sw}=275KHz \pm 12\%$
U2	SFH6156-2	70V	DIP-4	4 pin Opto isolator
U3	LM431AIM3	30V	SOT23-5	Adjustable 2.5V Zener 2% (National or TI or Zetex etc), $-40^{\circ}C$ to $+85^{\circ}C$
Q1	BSS123	100V	SOT23-3	6 ohm @ $25^{\circ}C$ (ON or Fairchild or INF or Zetex or ST etc...)
L1	Bead	20%	805	MEGGIT SIGMA BBMB2A1000LN2 1000Ohm@100Mhz

L2	Transformer	63nH/t	ER9,5	EPCOS or Ferroxcube 63nH/t gapped - No creepage - 500V insulation between all layers. <b>Primary</b> 36T L= 81,65 $\mu$ H Leakage $\leq$ 1% 2 centered layers of 0.1mm ext diameter 2.3 $\Omega$ typ. I <sub>eff</sub> = 110mA <b>Secondary</b> 11T L= 7.623 $\mu$ H made with an inner layer of 5t and an external layer of 6T. Ext diameter 0.3mm 75m $\Omega$ typ I <sub>rms</sub> = 450mA. <b>Tertiary</b> 32T of 0.1mm or lower ext diameter negligible loss. Centered layer
D1	BAV102	150V	SOD-80c	150V 200mA 50ns
D2	BZV55-C33	33V	SOD-80c	500mW Zener
D3	BAV102	150V	SOD-80c	150V 200mA 50ns
D4	ZHCS1000	40V	SOT23-3	1A Schottky (ZETEX) or Central Semiconductor Corp. with the CMPSH1-4) Note: if a ZHCS1006 (60V) is used, C9 & R6 can be omitted



**Description: -48V input, +30V 1.2A non-isolated inverter**

A buck-boost inverter, based upon a MAX5020 current mode controller. A cascode connection forms the main switch, and reduces turn-on and turn-off losses to near zero. Losses are restricted to CV2 losses (Q1 Coss, and D6 reverse capacitance).

**Specification:**

$V_{in} = -60V < V_{in} < -36V$

$V_{out} = 30V \pm 5\%$  static conditions

$I_{out} = 1.2A$  max

$P_{out} = 36W$  nominal

Frequency = 262kHz  $\pm 12\%$  fixed.

Efficiency =  $>90\%$

Output Ripple = 50mV pp

Output short circuit protection = yes

Height  $< 14mm$

Operating Temperature =  $+10^{\circ}C$  to  $+70^{\circ}C$  no cooling air flow.

Isolation = none

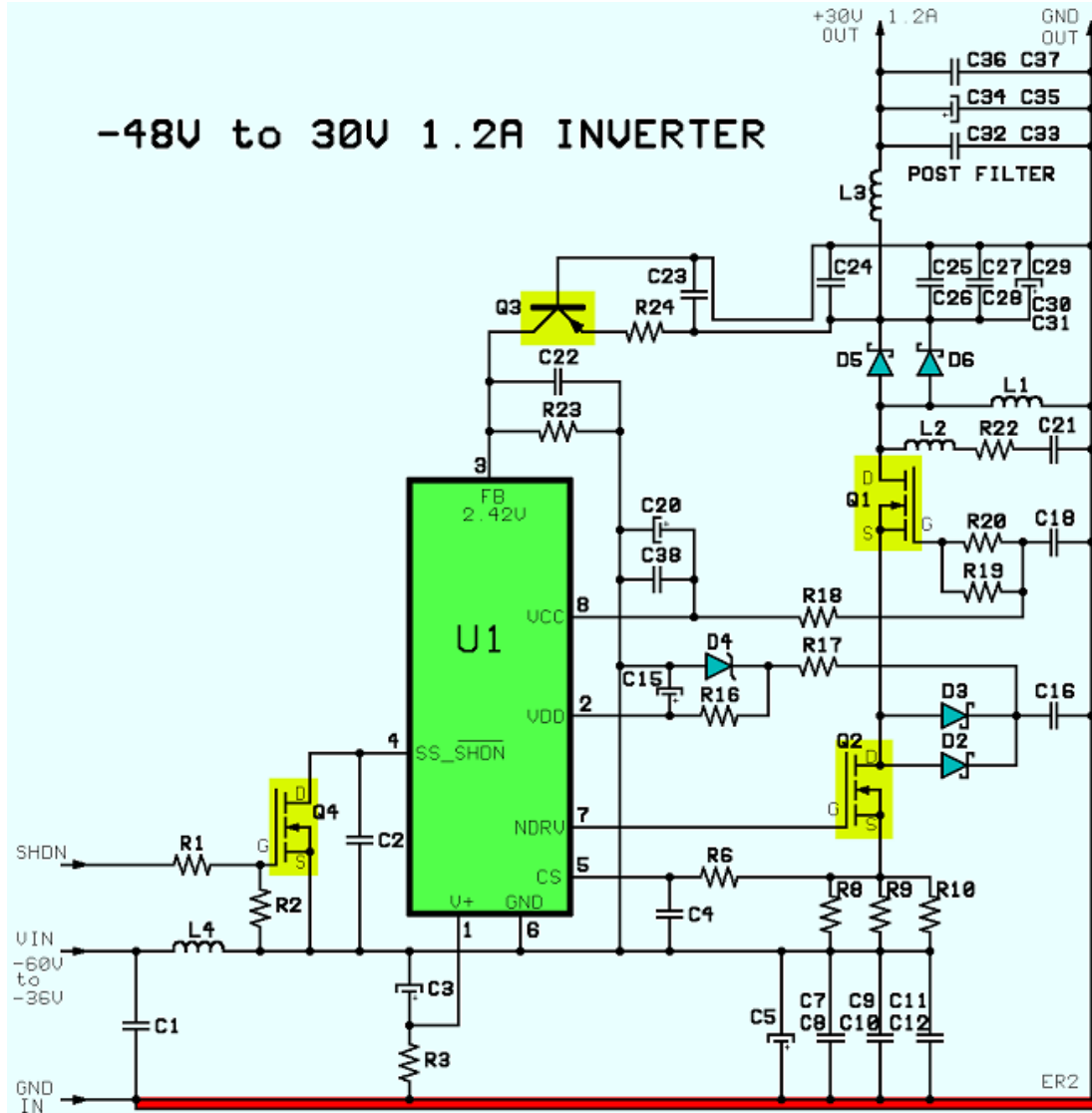
Logic controlled shutdown = yes

**Parts List:**

CCT ID	Value	Voltage TOL	Outline	Description
R1	4K7	5%	805	Metal Film Resistor 125mW
R2	47K	5%	805	Metal Film Resistor 125mW
R3	1K8	5%	1206	Metal Film Resistor 250mW U1's biasing
R6	100	5%	805	Metal Film Resistor - 125mW
R8	0R18	1%	805	125mW Current Sense Resistor MEGGIT CRL1220
R9	0R18	1%	805	125mW Current Sense Resistor MEGGIT CRL1220
R10	0R18	1%	805	125mW Current Sense Resistor MEGGIT CRL1220
R16	47	5%	805	Metal Film Resistor 125mW
R17	47	5%	805	Metal Film Resistor 125mW
R18	1K0	5%	805	Metal Film Resistor 125mW
R19	8R2	5%	805	Metal Film Resistor 125mW - Damping of Q1's gate
R20	8R2	5%	805	Metal Film Resistor 125mW - Damping of Q1's gate
R22	10	5%	1206	Metal Film Resistor 250mW - Q1's drain damping
R23	2K7	1%	805	Metal Film Resistor 125mW
R24	33K	1%	805	Metal Film Resistor 125mW
C1	470nF	100V	9x3.4x6.1H	Metallized Polyester B32560-2 S+M
C2	100nF	50V	805	X7R Ceramic Capacitor
C3	6,8 $\mu$ F	63V	D5.0xH11	Rubycon ZL ESR<1,4 ohm @100KHz
C4	470pF	50V	805	X7R Ceramic Capacitor
C5	330 $\mu$ F	63V	25x12.5	Rubycon Low ESR ZL series 43mOhm MAX
C7	470nF	100V	9x3.4x6.1H	Metallized Polyester B32560-2 S+M
C8	470nF	100V	9x3.4x6.1H	Metallized Polyester B32560-2 S+M
C9	100nF	100V	1210	X7R Ceramic Capacitor (prefer 1210 over 1206)
C10	100nF	100V	1210	X7R Ceramic Capacitor (prefer 1210 over 1206)
C11	47nF	100V	805	X7R Ceramic Capacitor
C12	10nF	100V	805	X7R Ceramic Capacitor
C15	15 $\mu$ F	25V	d4H7	Rubycon Low ESR ZL series 940mOhm MAX

C16	1 $\mu$ F	25V	1210	X7R Ceramic Capacitor (1210 has lower inductance than 1206)
C18	1 $\mu$ F	25V	1210	X7R Ceramic Capacitor (1210 has lower inductance than 1206)
C20	15 $\mu$ F	25V	d4H7	Rubycon Low ESR ZL series 940mOhm MAX
C21	100pF	100V	805	X7R Ceramic Capacitor Q1's drain snubber
C22	4,7nF	50V	805	X7R Ceramic Capacitor Feedback compensation
C23	100nF	50V	805	X7R Ceramic Capacitor
C24	100nF	50V	805	X7R Ceramic Capacitor
C25	470nF	100V	9*3,4*h6,1	Metallized Polyester B32560-2 S+M
C26	470nF	100V	9*3,4*h6,1	Metallized Polyester B32560-2 S+M
C27	47nF	50V	805	X7R Ceramic Capacitor
C28	10nF	50V	805	X7R Ceramic Capacitor
C29	470 $\mu$ F	35V	20*10	Rubycon Low ESR ZL series 23mOhm MAX
C30	470 $\mu$ F	35V	20*10	Rubycon Low ESR ZL series 23mOhm MAX
C31	470 $\mu$ F	35V	20*10	Rubycon Low ESR ZL series 23mOhm MAX
C32	470nF	100V	9*3,4*h6,1	Metallized Polyester B32560-2 S+M
C33	470nF	100V	9*3,4*h6,1	Metallized Polyester B32560-2 S+M
C34	470 $\mu$ F	35V	20*10	Rubycon Low ESR ZL series 23mOhm MAX
C35	470 $\mu$ F	35V	20*10	Rubycon Low ESR ZL series 23mOhm MAX
C36	100nF	50V	805	X7R Ceramic Capacitor
C37	47nF	50V	805	X7R Ceramic Capacitor
C38	100nF	50V	805	X7R Ceramic Capacitor
U1	MAX5020ESA	110V	SO-08	MAXIM PWM Control IC
Q1	IRF7474	100V	SO-08	RDSon 63mOhm@10V Coss 100pF@25V
	FDS3690	100V	SO-08	RDSon 64mOhm@10V Coss 82pF@25V
	Si4484EY	100V	SO-08	RSSon 34mOhm@10V Coss 200pF@25V
Q2	Si4412ADY	30V	SO-08	24mOhm 20nC @ Vgs=10V, 800mW max, 6cm2 2-sided printed circuit heatsink
	FDS6630A	30V	SO-08	38mOhm 14nC @ Vgs=10V, 800mW max, 6cm2 2-sided printed circuit heatsink
Q3	BC856B	80V	SOT23-3	PNP 80V 100mA
Q4	2N7002	60V	SOT23-3	5 Ohm N-Mosfet
H1	28 $^{\circ}$ c/W			Simple heatsink for SMC/SO8 for Q1
H2	28 $^{\circ}$ c/W			Simple heatsink for SMC/SO8 for D5
L1	10,24 $\mu$ H	3%	RM7	La=160nH/turn Ae=44.1mm <sup>2</sup> Ve= 1.32cm <sup>3</sup> material 3F3
L2	20nH	20%		Made with a printed circuit track
L3	0,15 $\mu$ H	20%	1210	Murata LQH3C 28mOhm max
L4	47 $\mu$ H	15%	12,7*12,7	MEGGIT SIGMA 3631 series 130mOhm max
D2&D3	MBRA140T3	40V	1A	Other packages, as SOT23-3 or Powermite have even lower parasitic inductance, which will lower the (normal) voltage overshoot at the off-time. (see ZHCS1000 & CMPSH1-4, or MBRM140T3)
D4	BZV55-C16	16V	SOD80-C	500mW Zener
D5&D6	SS3H100	100V	SMC	General Semiconductor 3A 100V 3nH Schottky with H2 heatsink if only one diode is used, no heatsink if two diodes are connected in parallel.
	30BQ100	100V	SMC	or I.R. 3A 100V 3nH Schottky
	STPS2H100U	100V	SMB	or 2A 100V 2nH Schottky

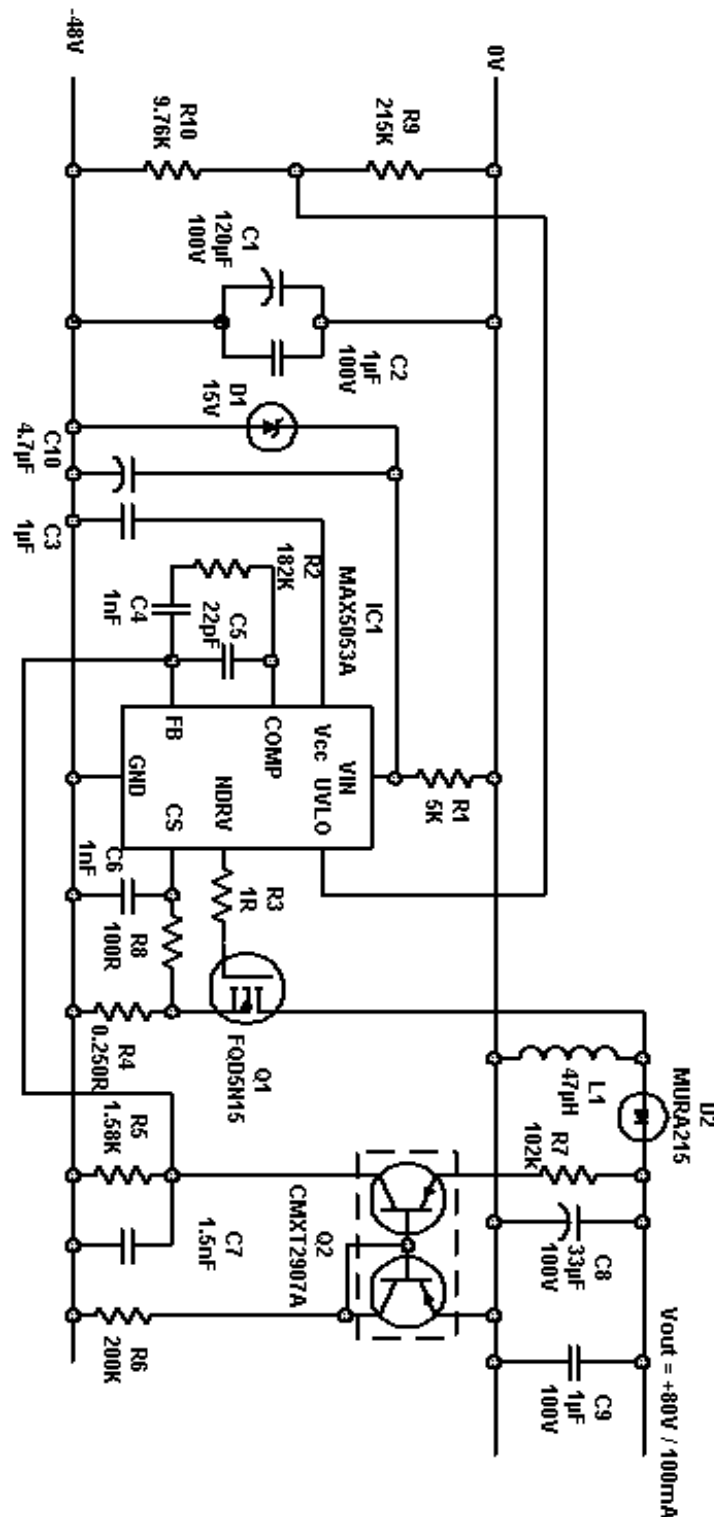
**Circuit Diagram: -48V input, +30V 1.2A non-isolated inverter**



**Description: -48V input, +80V / 100mA output non-isolated inverter (SLIC)**

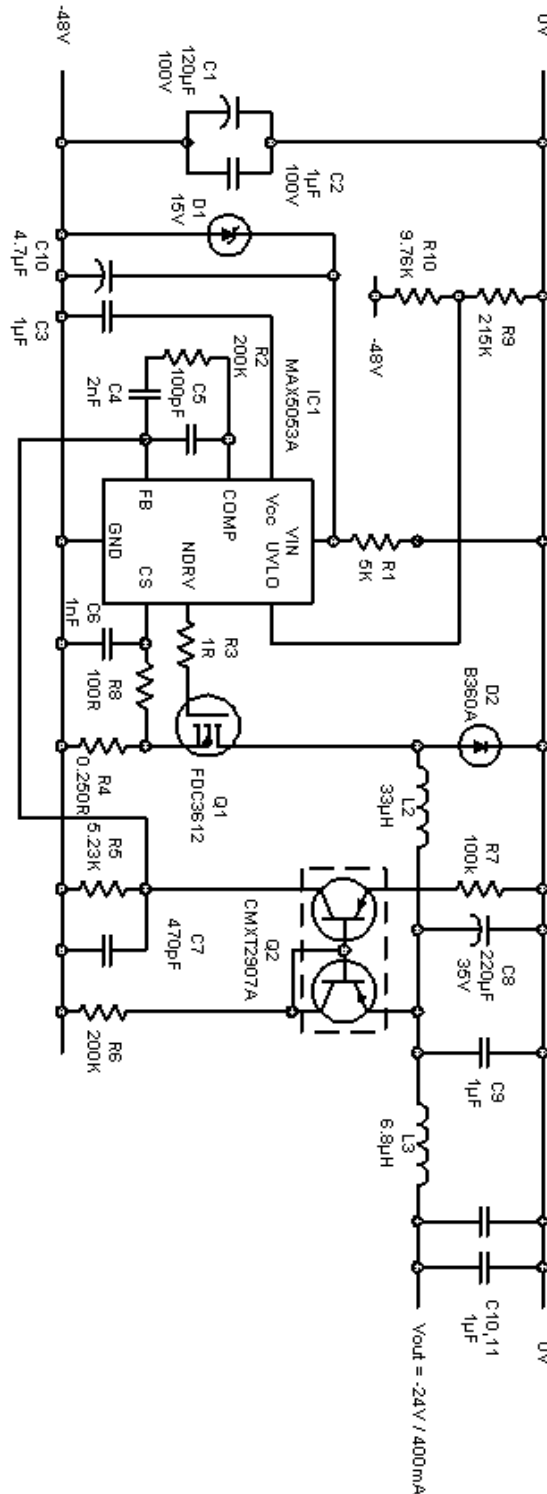
Buck-boost converter based upon the MAX5053A current mode controller.

**Parts List:** See circuit diagram(s) for component values. L1 = 47 $\mu$ F Coilcraft part number DO3340P-473

**Circuit Diagram: -48V input, +80V / 100mA output non-isolated inverter (SLIC)**

**Description: -48V input, -24V / 400mA output buck converter (SLIC)**

**Parts List:** See circuit diagram(s) for component values. L2 = 33 $\mu$ F Coilcraft part no DO3316P-333 L3 = 6.8 $\mu$ H Coilcraft part no 1812PS-682

**Circuit Diagram: -48V input, -24V / 400mA output buck converter (SLIC)**

**Description: +48V input, 14.35W multi output isolated high efficiency power supply**

A synchronous-rectifier, isolated, forward converter, using the MAX5015 current mode controller

**Specification:**

V<sub>in</sub> = +48V to +60VDC

V<sub>out1</sub> = +3.3V / 1.5A

V<sub>out2</sub> = +5.5V / 1A

V<sub>out3</sub> = 13V / 300mA

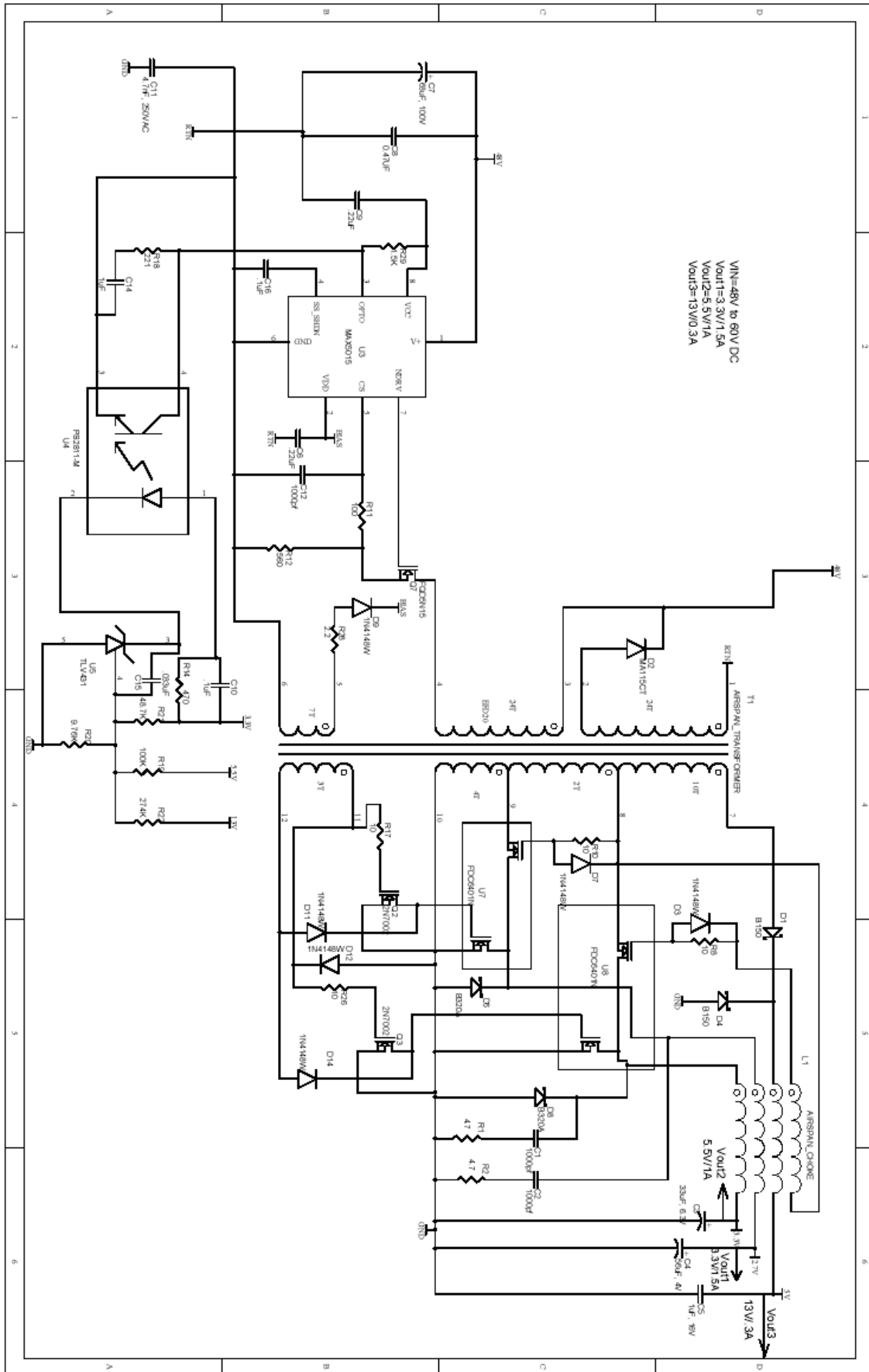
Isolation = 1500V

**Parts List:**

<b>Circuit Identifier</b>	<b>QTY</b>	<b>Description</b>
C1, C2, C12	3	Ceramic capacitor, 1000pf, 50V, X7R (0805)
C3	1	Specailty polymer capacitor, 33uf, 6.3V Panasonic EEFCD0J330R
C4	1	Specailty polymer capacitor, 56uF, 4V Panasonic EEFCD0G560R
C5, C14	2	Ceramic capacitor, 1uF, 16V, X7R (1206)
C6, C9	2	Ceramic capacitor, 0.22uF, 50V, X7R (0805)
C7	1	Electrolytic capacitor, 68uF, 100V Panasonic EEVFK1K151Q
C8	1	Ceramic capacitor 0.47uF, 100V (1210)
C10, C16	2	Ceramic capacitor 0.1uF, 50V, X7R (0805)
C11	1	Ceramic capacitor 4.7nF, 250VAC (2220) Murata
C15	1	Ceramic capacitor 0.033uF, 50V, X7R (0805)
R1, R2	2	Resistor 4.7ohms, 5% (0805)
R8, R10, R17, R26	4	Resistor 4.7ohms, 5% (0805)
R11	1	Resistor 100 ohms, 5% (0805)
R12	1	Resistor 0.560 ohm, 1% (1206)
R14	1	Resistor 470 ohms, 5% (0805)
R18	1	Resistor 221 ohms, 1% (0805)
R19	1	Resistor 100K, 1% (0805)
R20	1	Resistor 9.76K, 1% (0805)
R21	1	Resistor 48.7K, 1% (0805)
R22	1	Resistor 274K, 1% (0805)
R28	1	Resistor 2.2 ohms, 5% (0805)
R29	1	Resistor 1.5K, 1% (0805)
D1, D4	2	Diode Schottky !A, 50V (SMA) Diodes Inc B150
D2	1	Diode 0.2A, 150V (SMINI2) Panasonic MA115
D3, D7, D9, D11, D12, D14	6	Diode 0.1A, 75V, 1N4148W (SOD-323)
D6, D8	2	Diode Schottky, 3A, 20V (SMA) Diodes Inc B320A
L1	1	Custom choke
T1	1	Custom transformer
Q2, Q3	1	N channel small signal MOSFET (SOT23) 2N7002
U7, U8	2	N channel MOSFET 3A, 20V (SSOT-6) Fairchild Semi FDC6401N
Q7	1	N channel MOSFET 5A, 150V (DPAK) Fairchild Semi FQD5N150
U3	1	7Current mode PWM (SO8) MAX5015ESA

U4	1	Optocoupler (SO4) California Eastern Labs PS2811-1
U5	1	Precision reference 1.25V (SOT23-5) Texas Instruments TLV431

**Circuit Diagram: +48V input, 14.35W multi output isolated high efficiency power supply**



**Circuit Description: -48V input, 3.3V / 300mA output non-isolated Flyback converter**

A buck-boost inverter based upon a MAX5020 50% duty cycle current mode controller.

**Parts List:**

<b>CCT ID</b>	<b>Value</b>	<b>Description</b>
C1	0.1u	Ceramic Capacitor, 25V
C2	0.022u	Ceramic Capacitor, 25V
C3	15n	Ceramic Capacitor, 25V
C4	220u	Sanyo: 6SVPA220MAA
C5	4.7u	Ceramic Capacitor, 16V
C6	0.1u	Ceramic Capacitor, 100V
C7	0.22u	Ceramic Capacitor, 16V
C8	0.22u	Ceramic Capacitor, 16V
C9	4.7n	Ceramic Capacitor, 16V
D1	B1100	Diodes, Inc.: 100V Schottky
L1	68uH	Coilcraft: DO3308P-683 Or Equivalent
Q1	Si2328DS	Vishay: N-Ch MOSFET, SOT-23
Q2	MMBTA56	Small Signal PNP
Q3	MMBTA56	Small Signal PNP
Q4	MMBTA56	Small Signal PNP
R1	2.61K	Resistor 1%
R2	6.81K	Resistor 1%
R3	2.61K	Resistor 1%
R4	1	Resistor 1%
R5	1K	Resistor 1%
R6	1	Resistor 1%
R7	1.02K	Resistor 1%
R8	30	Resistor 1%
R9	1	Resistor 1%
R10	2	Resistor 1%
U1	MAX5020ESA	MAXIM: High Voltage SO-8 PWM IC



**Description: Isolated +48V to 3.3V 7A DC-DC Converter**

A single ended isolated forward converter with synchronous rectification using a MAX5052A current mode controller

**Specification:**

Input voltage +40V to +60VDC

Power supply dimensions: 1.79" x 0.95" x 0.60"

Output voltage: +3.3V  $\pm$  2%

Output current: 7A

Over-voltage 4V  $\pm$  5%

Over-current and short circuit protection

Remote sense

No damage should occur to the remote sense resistors if the connection of the remote sense is reversed.

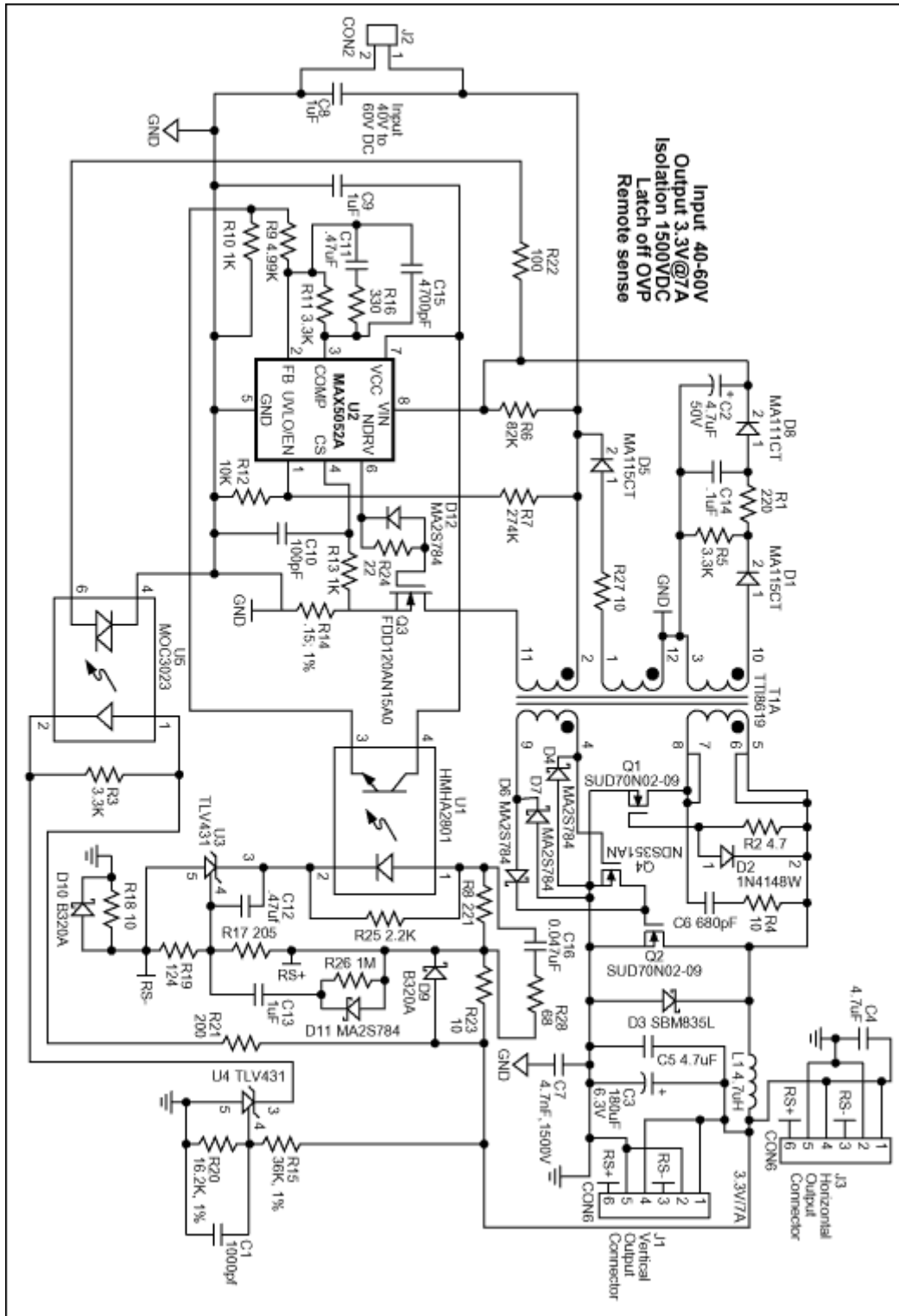
Isolation voltage, primary to secondary 1500VDC

**Parts List:**

Circuit Identifier	Qty.	Description
C1	1	Ceramic capacitor 1000pf, 25V, X7R (0402)
C2	1	Electrolytic capacitor, 4.7uF, 50V Panasonic EEVFK1H4R7R
C3	1	SP capacitor, 180uF, 6.3V Panasonic EEFUEOJ181R
C4, C5	2	Ceramic capacitor 4.7uF, X5R, 6.3V (0805)
C6	1	Ceramic capacitor 680pF, 50V, X7R (0603)
C7	1	Ceramic capacitor, 4700pF, 250vac, X7R(1812) Murata GA243DR7E2472MW01L
C8	1	Ceramic capacitor 1uF, 100V, X7R (1812)
C9	1	Ceramic capacitor, 1uF, 16V,X7R (0805)
C10	1	Ceramic capacitor, 100pF, 50V, COG (0402)
C11, C12	2	Ceramic capacitor 0.47uF, 10V, X5R (0603)
C13	1	Ceramic capacitor 1uF, 10V, X5R (0603)
C14	1	Ceramic capacitor 0.1uF, 50V, X7R (0603)
C15	1	Ceramic capacitor 4700pf, 50V, X7R (0402)
C16	1	Ceramic capacitor 0.047uF, 16V, X7R (0402)
R1	1	Resistor 220 ohms, 5%, (0603)
R2	1	Resistor 4.7 ohms, 5% (0603)
R3, R11	2	Resistor 3.30K ohms, 1% (0402)
R4	1	Resistor 10 ohms, 5% (0805)
R5	1	Resistor 3.3K ohms, 5% (1206)
R6	1	Resistor 82K ohms, 1% (0805)
R7	1	Resistor 274K ohms, 1% (0603)
R8	1	Resistor 221 ohms, 1% (0603)
R9	1	Resistor 4.99K ohms, 1% (0402)
R10, R13	2	Resistor 1K ohms, 1% (0402)
R12	1	Resistor 10K ohms, 1% (0402)
R14	1	Resistor .15 ohms, 1% (1206)
R15	1	Resistor 36K ohms, 1% (0402)
R16	1	Resistor 330 ohms, 1% (0402)
R17	1	Resistor 205 ohms, 1% (0402)
R18, R23	2	Resistor 10 ohms, 5% (0402)
R19	1	Resistor 124 ohms, 1% (0402)
R20	1	Resistor 16.2K ohms, 1% (0402)
R22	1	Resistor 100 ohms, 5% (0402)
R24	1	Resistor 22 ohms, 5% (0402)
R25	1	Resistor 2.2K ohms, 5% (0402)
R26	1	Resistor 1M ohms, 5% (0402)
R27	1	Resistor 10 ohms, 5% (0603)
R28	1	Resistor 68 ohms, 5% (0402)

T1	1	Power transformer, Transpower TTI8619
Q1, Q2	2	N channel MOSFET 20V (DPAK) Vishay SUD70N02-09
Q3	1	N channel MOSFET 150V (DPAK) Fairchild Semi FDD120AN15A0
Q4	1	N channel MOSFET 30V, SOT23 Fairchild NDS351AN
L1	1	Choke 4.7UH, Coilcraft DR0810-472
D1, D5	2	Diode 200V, 200mA Panasonic MA115CT
D2	1	Signal diode 100ma 75V Diodes Inc 1N4148W
D3	1	Schottky diode 8A, 35V (PowerMite) Diodes Inc SBM835L
D4, D6, D7, D11, D12	5	Schottky diode 30V, 100mA Panasonic MA2S784
D8	1	Diode 100V, 200 mA Panasonic MA111CT
D9, D10	2	Schottky diode, 3A, 20V Diodes Inc B320A
U1	1	Optocoupler Fairchild HMHA2801
U2	1	Current mode PWM MAXIM MAX5052AEUA
U3, U4	2	Precision reference 1.25V, 1% (SOT23-5) Texas Instruments TLV431ACDBVR
U5	1	Opto-coupler triac Fairchild MOC3023

***Circuit Diagram: Isolated +48V to +3.3V / 7A DC-DC Converter***



Efficiency Data: Isolated +48V to +3.3V / 7A DC-DC Converter

<b>Vin</b>	<b>Iin</b>	<b>Vout</b>	<b>Iout</b>	<b>Efficiency</b>
40V	0.32352A	3.2685V	3.5006A	88.4%
40V	0.45893A	3.2675V	5.0111A	89.2%
40V	0.6485A	3.2653V	7.0111A	88.25%
48.1V	0.2770A	3.2663V	3.5332A	86.4%
48.1V	0.38655A	3.2663V	5.0116A	88.0%
48.1V	0.54735A	3.26652V	7.044A	87.6%
60V	0.22912A	3.2657V	3.5010A	83.2%
60V	0.31670A	3.2657V	5.0116A	86.1%
60V	0.44163A	3.2647V	7.011A	86.4%

**Description: Single Output 8.25W or 12.5W Synchronous Rectified Isolated Power Supply with Input Hot Swap Protection for Power-Over-Ethernet Power Devices**

**Specification:**

Input voltage +30 to +60V DC

Output voltage +3.3V or +5V DC

Output current 2.5A

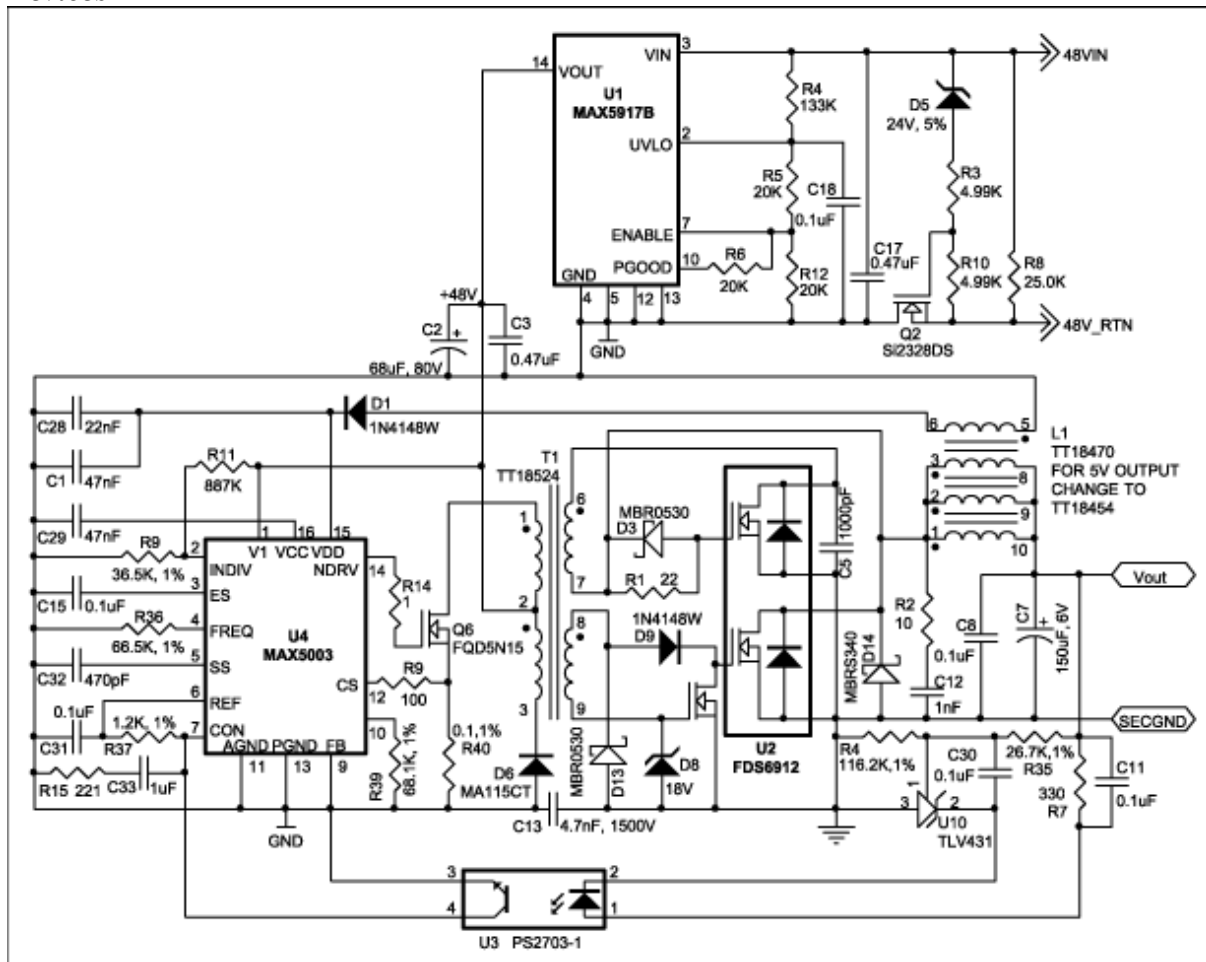
Isolation 1500VDC

**Parts List:**

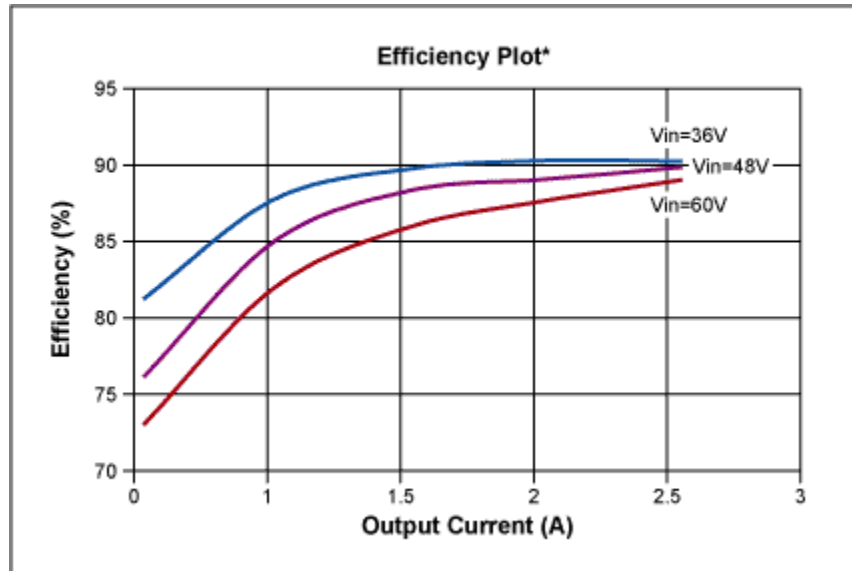
Circuit Identifier	Qty	Description
C1, C29	2	47nF ceramic capacitor (0805)
C2	1	Electrolytic capacitor 68 $\mu$ F; 80V Panasonic EEVFK1K680Q
C3, C17	3	Film capacitor 0.47 $\mu$ F, 100V Panasonic ECWU1474KCV
C5	1	Ceramic capacitor 1000pF (0805)
C7	1	Capacitor AO 150 $\mu$ F, 6V Kemet A 700X157M006A T
C8, C10, C11, C15, C31, C30	6	Ceramic capacitor .1 $\mu$ F (0805)
C33	1	Ceramic capacitor 1 $\mu$ F, 16V (0805)
C12	1	Ceramic capacitor 1nF, 100V (0805)
C13	1	Ceramic capacitor 4.7nF 1500V
C28	1	Ceramic capacitor 22nF (0805)
C32	1	Ceramic capacitor 470pF (0805)
D1, D9	1	Diode 100ma, 75V 1N4148W
D3, D13	2	Diode Schottky 0.5A, 30V MBRS0530
D5	1	Zener diode 24V, 5% SOD-123
D6	1	Diode 200ma. 200V Panasonic MA115CT
D8	1	Zener diode 18V, 5%
D14	1	Diode Schottky 3A, 40V MBRS340
L1	1	Output choke 6.8 $\mu$ H Transpower (TTI8470)/ change to TTI8454 for 5V
T1A	1	Transformer Transpower (TTI8524)
Q1	1	30V N-Channel MOSFET Fairchild FDN361AN (SOT23)
Q2	1	100V 1.5A N-Channel MOSFET SOT23
Q6	1	150V, 5A N-Channel MOSFET (DPAK) Fairchild FQD5N15
R1	1	Resistor 22 ohms (0805)
R2	1	Resistor 10 ohms (1206)
R3, R10	2	Resistor 4.99K, 1% (0805)
R4	1	Resistor 133K, 1% (0805)
R5, R16, R12	2	Resistor 20K 1% (0805)
R11	1	Resistor 887K, 1% (0805)
R7	1	Resistor 330 ohms 5% (0805)
R8	1	Resistor 25K 1% (1206)
R9	1	Resistor 36.5K 1% (0805)
R14	1	Resistor 1 ohm 5% (0805)
R15	1	Resistor 221, 1% (0805)
R35	1	Resistor 26.7K, 1% (0805)
R36	1	Resistor 66.5K, 1% (0805)
R37	1	Resistor 1.24K, 1% (0805)
R38	1	Resistor 100 ohms, 5% (0805)
R39	1	Resistor 68.1K, 1% (0805)
R40	1	Resistor 0.1 ohm 1% (1206)
R41	1	Resistor 16.2K, 1% (0805)/ change to 8.87K, 1% (0805) f or 5V
U1	1	Dual 30V MOSFETS FDS6912 (SO8)
U2	1	+65V Simple Swapper Hot Swap Switch MAX5917B
U3	1	Optocoupler California Eastern Labs PS2703-1

U4	1	Voltage mode PWM controller MAX5003
U10	1	Precision 1.25V reference TLV431

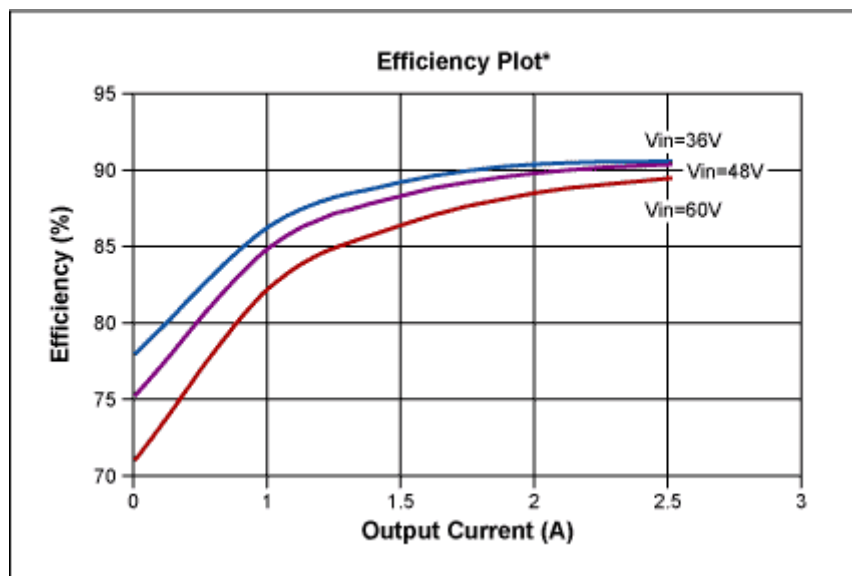
**Circuit Diagram: Single Output 8.25W or 12.5W Synchronous Rectified Isolated Power Supply and Input Hot Swap Protection for Power-Over-Ethernet Power Devices**



***Performance Data: Single Output 8.25W or 12.5W Synchronous Rectified Isolated Power Supply and Input Hot Swap Protection for Power-Over-Ethernet Power Devices***



***Efficiency plot for 3.3V output***



***Efficiency plot for 5V output***

\*Note: The efficiency data taken did not include the hot swap section.

***Description: Triple Output 14.2W High Efficiency Isolated Power Supply with Synchronous Rectification and Input Hot Swap Protection for Power-over-Ethernet Power Devices***

**Specification:**

Input voltage: +36 to +60V DC

Vout1 = +5V@2A  $\pm 2\%$  regulation

Vout2 = +7.5V@ 0.5A  $\pm 5\%$  regulation from 10% load to full load

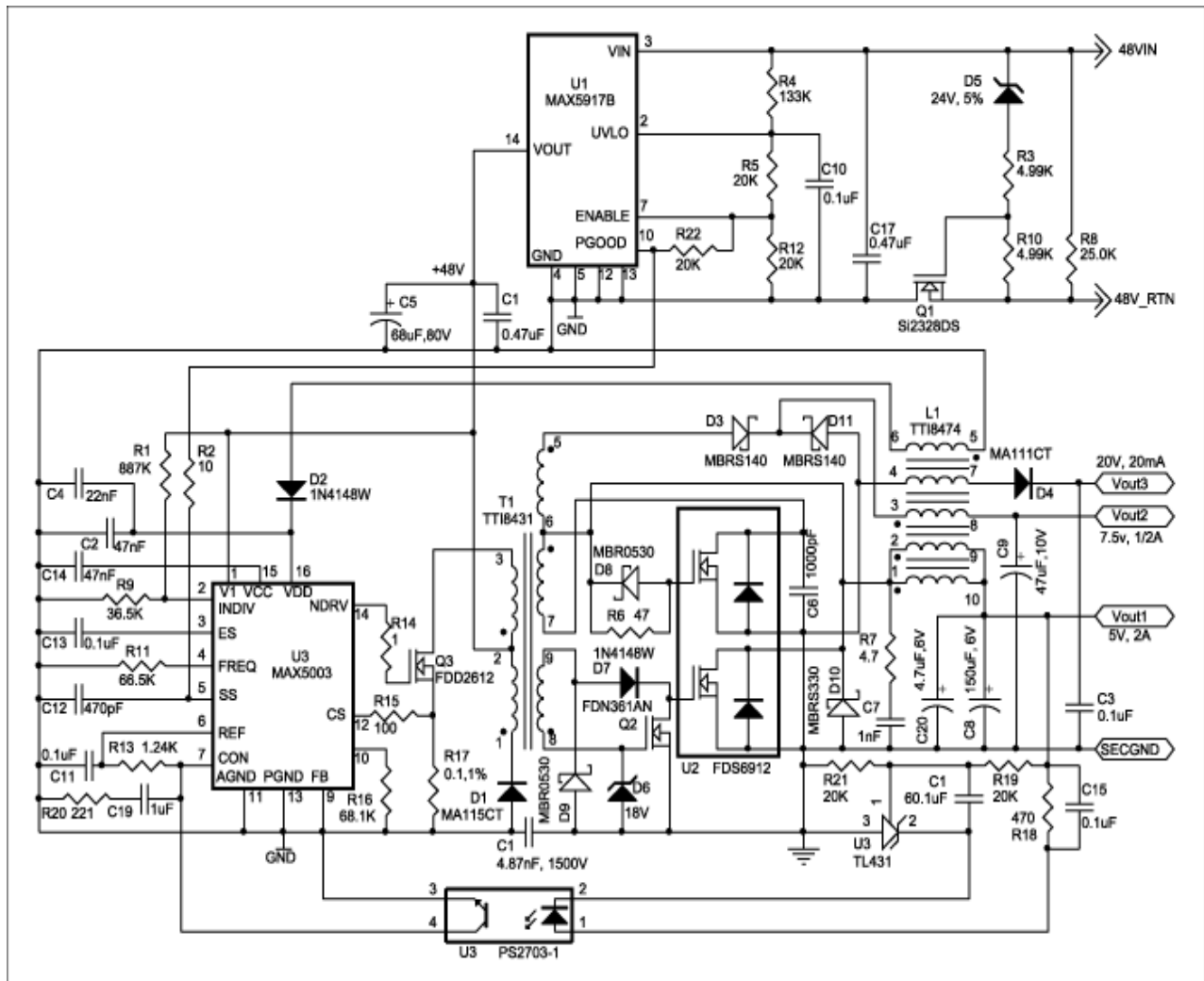
Vout3 = +22V@ 20mA  $\pm 5\%$  regulation from 10% load to full load

Isolation: 1500VDC

**Parts List:**

Circuit Identifier	Qty	Description
C1, C17	2	47 $\mu$ F, 100V ceramic capacitor (2220)
C3, C10, C11, C13, C15, C16	6	0.1 $\mu$ F, 50V ceramic capacitor (0805)
C4	1	22nF, 50V ceramic capacitor (0805)
C2, C14	2	47nF, 50V ceramic capacitor (0805)
C5	1	68 $\mu$ F, 80V Electrolytic capacitor Panasonic EEVFK1680Q
C6	1	1000pF, 50V ceramic capacitor(0805)
C9	1	47 $\mu$ F, 10V tantalum capacitor
C7	1	1nF, 100V ceramic capacitor (0805)
C8	1	150 $\mu$ F AO capacitor/120 $\mu$ F SP capacitor A700X157M006AT (Kemet) EEFUD0J121XR (Panasonic)
C12	1	470pF, 50V ceramic capacitor (0805)
C18	1	4.7nF, 1500V ceramic capacitor
C19	1	1 $\mu$ F, 10V ceramic capacitor (0805)
C20	1	4.7 $\mu$ F, 6.3V ceramic capacitor
D7, D2	2	100mA, 75V signal diode (SOT23) 1N4148W
D3, D11	2	1A, 40V Schottky Onsemi MBRS140
D4	1	200mA, 100V diode Panasonic MA111CT
D1	1	200mA, 200V diode Panasonic MA115CT
D5	1	24V, 5% Zener diode(SOD-123)
D6	1	18V, 5% Zener diode(SOD-123)
D8, D9	2	500ma, 30V Schottky Onsemi MBR0530
D10	1	3A, 30V Schottky Onsemi MBRS330
L1	1	Coupled choke, Transpower TTI8474
T1	1	Transformer, Transpower TTI8431
Q1	1	N-Channel MOSFET, 100V, 1.5A, Si2328DS
Q2	1	N-Channel MOSFET, 30V, 1.8A Fairchild FDN361AN
Q3	1	200V, 5A MOSFET Fairchild FDD2612 (DPAK)
R6	1	47 ohms 5% (0805)
R7	1	4.7 ohms 5% (1206)
R1	1	887K 1% (0805)
R18	1	470 ohms, 5% (0805)
R9	1	36.5K, 1% (0805)
R2	1	10 ohms, 5% (0805)
R13	1	1.24K, 1% (0805)
R4	1	133K, 1% (0805)
R14	1	1 ohm 5% (0805)
R15	1	100 ohms, 5% (0805)
R11	1	66.5K, 1% (0805)
R17	1	.1 ohm, 1% (1206)
R19, R21, R5, R12, R22	5	20K, 1% (0805)
R16	1	68.1K, 1% (0805)
R20	1	221 ohms, 1% (0805)
U1	1	+65V Simple Swapper Hot Swap Switch MAX5917B
U2	1	Dual MOSFET 30V Fairchild FDS6912 (SO8)
U3	1	High voltage power supply controller MAX5003CSE

U4	1	Optocoupler California Eastern Labs PS2703M-1
U5	1	Reference 2.5V (SOT23) Texas Instruments TL431

**Circuit diagram:****Triple Output 14.2W High Efficiency Isolated Power Supply with Synchronous Rectification and Input Hot Swap Protection for Power-over-Ethernet Power Devices****Performance Data: Triple Output 14.2W Isolated Converter**

Vin (V)	Iin (A)	Vo1 (V)	Io1(A)	Vo2(V)	Io2(A)	Vo3(v)	Io3(ma)	Eff(%)*
36	0.437	5.014	2.02	7.278	0.49	22.487	19.68	89.86171
48	0.33	5.014	2.02	7.297	0.49	22.691	19.85	89.35749
60	0.267	5.014	2.02	7.31	0.49	22.805	19.95	88.4216
72	0.226	5.014	2.02	7.32	0.49	22.91	20.04	87.10789
30	0.534	5.014	2.02	7.275	0.49	22.236	19.4	88.16734
30	0.1816	5.02	0.13	7.142	0.485	21.168	19.95	83.31079
36	0.149	5.021	0.13	7.141	0.485	21.415	20.2	84.80048
48	0.115	5.02	0.13	7.145	0.485	21.527	20.31	82.52062
60	0.0988	5.02	0.13	7.136	0.5	21.561	20.34	78.59566
72	0.086	5.02	0.13	7.139	0.495	21.623	20.39	74.73026
72	0.1718	5.014	2.02	7.821	0.05	24.74	2.04	85.44981
60	0.1996	5.014	2.02	7.871	0.05	24.79	2.05	88.28198
48	0.2459	5.014	2.02	7.724	0.05	24.06	1.99	89.48725
36	0.3237	5.014	2.02	7.588	0.05	23.341	1.93	90.55648

30 0.394 5.014 2.02 7.527 0.05 23 1.9 89.24137

\*Note: The efficiency data did not include the hot-swap section drops.

**Description: 6W Isolated Power Supply with Hot Swap Protection for Power-over-Ethernet Power Devices**

**Specification:**

V<sub>in</sub> = +36 to +56VDC

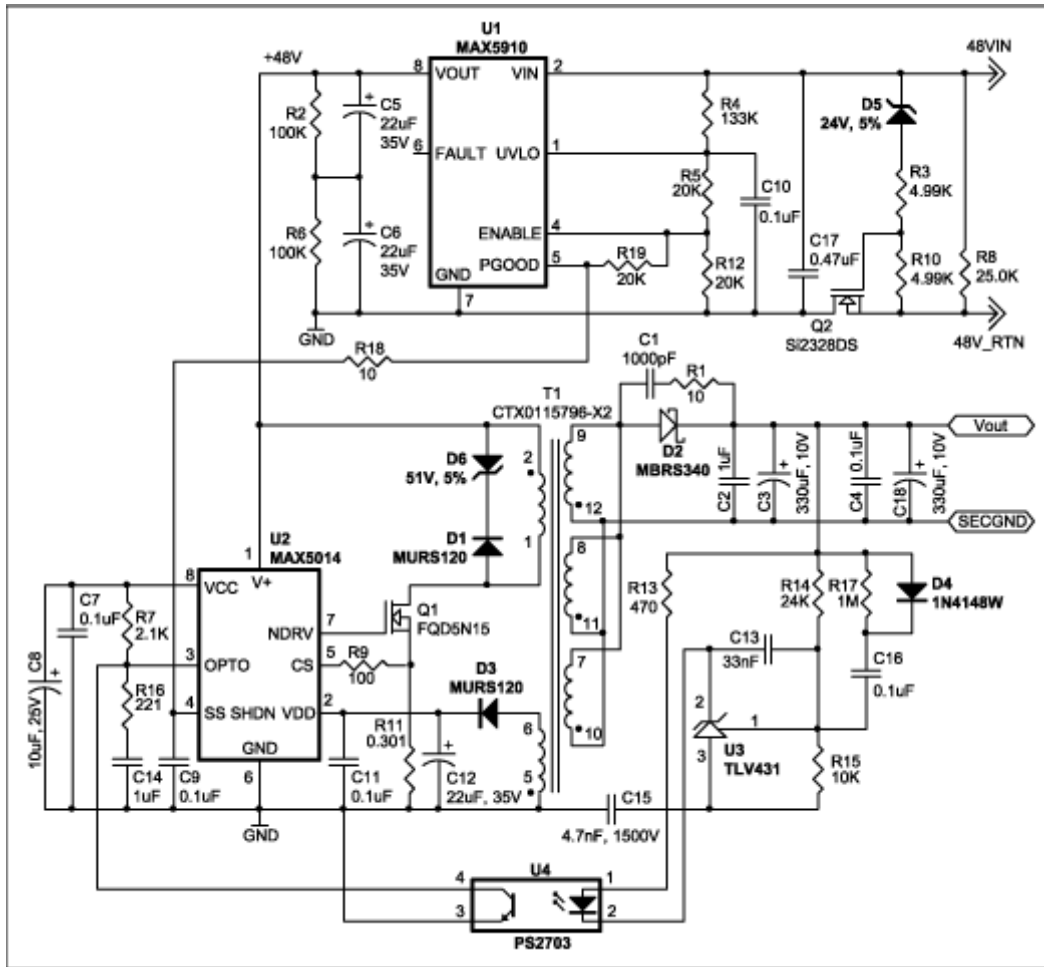
V<sub>out</sub> = 4.25V

I<sub>out</sub> = 1.4A Isolated power supply (1500VDC isolation)

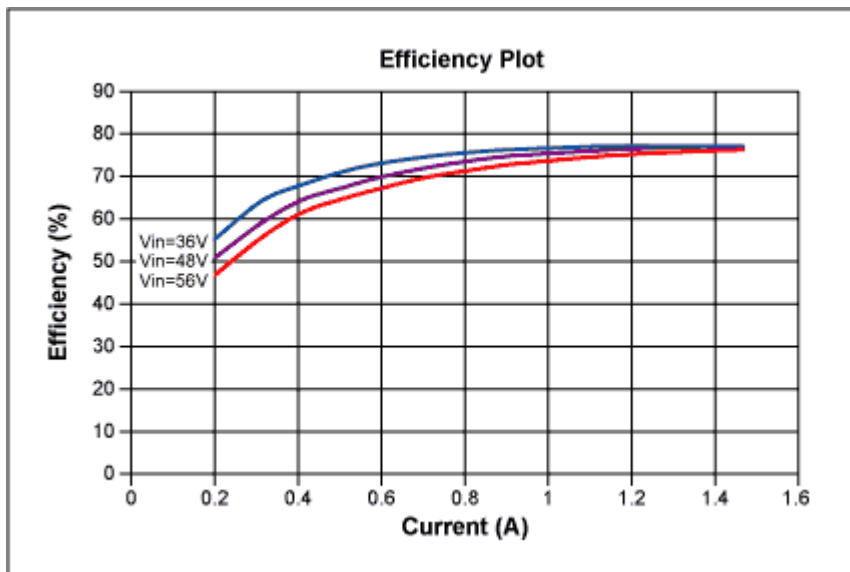
**Parts List**

Circuit Identifier	Qty	Description
C1	1	Ceramic capacitor 1000pf, 10%,50V, X7R (0805)
C2, C14	2	Ceramic capacitor 1 $\mu$ F, 10%, 50V, X7R (1206)
C3, C18	2	Tantalum capacitor 330 $\mu$ F,10V, 10% Kemet T494X337K010AS
C8	1	Tantalum capacitor 10 $\mu$ F, 25V, 10% Vishay 293D106X9025C2
C13	1	Ceramic capacitor 0.033 $\mu$ f, 10%, 50V, X7R (0805)
C15	1	4.7nF, 250VAC, X&R ceramic capacitor (3045) Murata GHM3045-X7R472K-GC
C17	1	Ceramic capacitor 0.47 $\mu$ f, 10%, 100V Panasonic ECW1474KCV
D1, D3	1	Diode 1A, 200V Onsemi MURS120
D2	1	Diode Schottky 3A, 40V Onsemi MBRS340
D4	1	Diode 75V, 100ma Diodes Inc 1N4148W
D5	1	Zener diode 24V, 5%, 150mw
D6	1	Zener diode 51V, 5%, 3W Vishay BZG05C51
Q1	1	150V, 5A N-channel MOSFET Fairchild FQD5N15
Q2	1	100V, 1.5A N-channel MOSFET SOT23 Si2328DS
R1	1	Resistor 10 ohms, 5% (0805)
R2, R6	2	Resistor 100K, 5% (0805)
R3, R10	2	Resistor 4.99K, 1% (0805)
R4	1	Resistor 133K, 1% (0805)
R5, R12	2	Resistor 20K, 1% (0805)
R7	1	Resistor 2.1K, 1% (0805)
R8	1	Resistor 25K, 5%, (1206)
R9	1	Resistor 100, 5% (0805)
R11	1	Resistor 0.301 ohm, 1% (0805)
R13	1	Resistor 470, 5% (0805)
R14	1	Resistor 24K, 1% (0805)
R15	1	Resistor 10K, 1% (0805)
R16	1	Resistor 221, 1% (0805)
R17	1	Resistor 1M, 5% (080)
R18	1	Resistor 10, 5% (0805)
T1	1	Transformer Coiltronics CTX0115796-X2 200 $\mu$ H, 1:0.1666:0.5
U1	1	+65V Simple Swapper Hot Swap Switch MAX5910ESA
U2	1	Current mode PWM controller MAX5014CSA
U3	1	1.24V precision shunt regulator (SOT23) Texas Instruments TLV431AIDBV
U4	1	Opto-coupler 4pin SOP California Eastern labs PS2703-1

**Circuit Diagram: 6W Isolated Power Supply with Input Hot Swap Protection for Power-over-Ethernet Power Devices**



**Performance Data: 6W Isolated Power Supply with Input Hot Swap Protection for Power-over-Ethernet Power Devices**



*Efficiency plots for circuit of 6W DC-DC converter + hot-swap section*