IEEE 802.3bt Class 6 PoE 12V / 51W Flyback Regulator

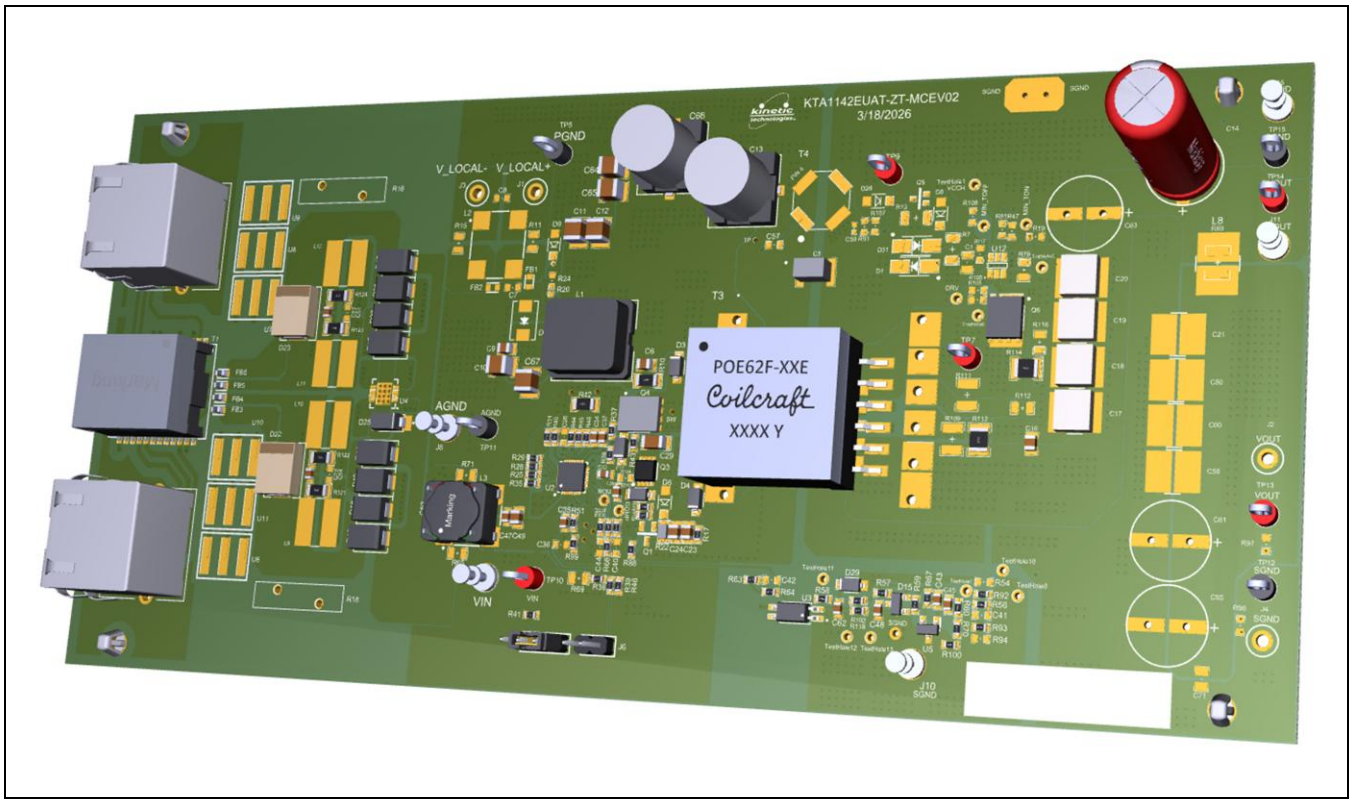
Brief Description

This Evaluation (EVAL) Kit is used to demonstrate and evaluate the KTA1142 functionality, performance, and PCB layout for a Class 6 PoE 12V/51W flyback regulator configuration. The kit includes a fully assembled and tested PCB with the KTA1142 IC installed. The KTA1142 is an IEEE 802.3bt compliant fully integrated PoE PD and DC-DC voltage regulation controller. This KTA1142 application evaluation board can support many different flyback regulator circuit configurations. This evaluation board has been designed to demonstrate basic operation for a PoE powered 12V, 51W flyback topology implementing a low cost and simplified rectification using diodes in the secondary side. The KTA1142 evaluation board may be powered from an IEEE 802.3bt compliant Type3 (60W) or Type4 (90W) Power Sourcing Equipment (PSE) or by direct connection to a 38V to 57V DC power supply. Signal I/O connections with an array of test points allow for test and observation of circuit operation.

Ordering Information

Part Number	Description	IC Package
KTA1142EUAT-ZT-MCEV02	KTA1142 EVAL Kit – 12V, 51W Output w/ active clamp flyback topology.	WQFN44-32 (4mm x 4mm)

3D CAD Image



EVAL Kit Physical Contents

Item #	Description	Quantity
1	KTA1142 (flyback topology) Evaluation board fully assembled PCB	1
2	Anti-static bag	1
3	KTA1142 (flyback topology) Quick Start Guide, printed 1 page (A4 or US Letter)	1
4	EVAL Kit box	1

QR Links for Documents

IC Datasheet	EVAL Kit Landing Page
https://www.kinet-ic.com/kta1142/	https://www.kinet-ic.com/kta1142euat-zt-mcev02/

User-Supplied Equipment

Required Equipment

1. IEEE 802.3bt compliant Type3 or Type4 Power Sourcing Equipment (PSE), PoE power injector or a PoE powered network switch that can source 48V at 60W or greater.
    a. Alternatively, A bench DC Power Supply may be substituted for a PoE power injector, but this will bypass the KTA1142 IEEE 802.3bt control functionality. Such a supply should provide 38V-57V up to 2A as needed for the intended application.
2. CAT-5, CAT-5e or CAT-6 RJ-45 M/M ethernet cable, 1m length or shorter.
3. Digital Multimeters, two required – used to measure input/output voltages and current.
4. Load, any of the following may be used:
    a. Electronic load capable of sinking 4.25A at 12V (51W)
    b. Power Resistor: 2.8Ω / 51W or greater value is required
    c. Actual system load that does not exceed 51W at 12V
5. Test leads:
    a. One pair of test leads to connect a voltmeter to the eval board VIN/AGND to monitor the input DC supply voltage
    b. Additional pairs of test leads to connect PVOUT/SGND to an applied load, voltmeter to monitor the flyback regulator output voltage or a current meter to monitor the current to the applied load.

Optional Equipment

1. Oscilloscope with 10x probes to monitor switching regulator waveforms

Recommended Operating Conditions

Parameter	Description	Value	Units
Input Voltage	PoE Injector to the J1 RJ-45 connector	48	V
	Bench Supply applied to VIN (J5) and AGND (J8)	38-57	V
Output Voltage	PVOUT (J11) to SGND (J15)	12	V
Output Current	Max Load = 51W (12V @ 4.25A)	4.25	A

Quick Start Procedures

The output voltage of this board is set to 12V by the KTA1142 DC-DC controller. There are two methods to power KTA1142 12V/51W flyback regulator evaluation board:

Method 1: Connect to a IEEE802.3 compliant PSE

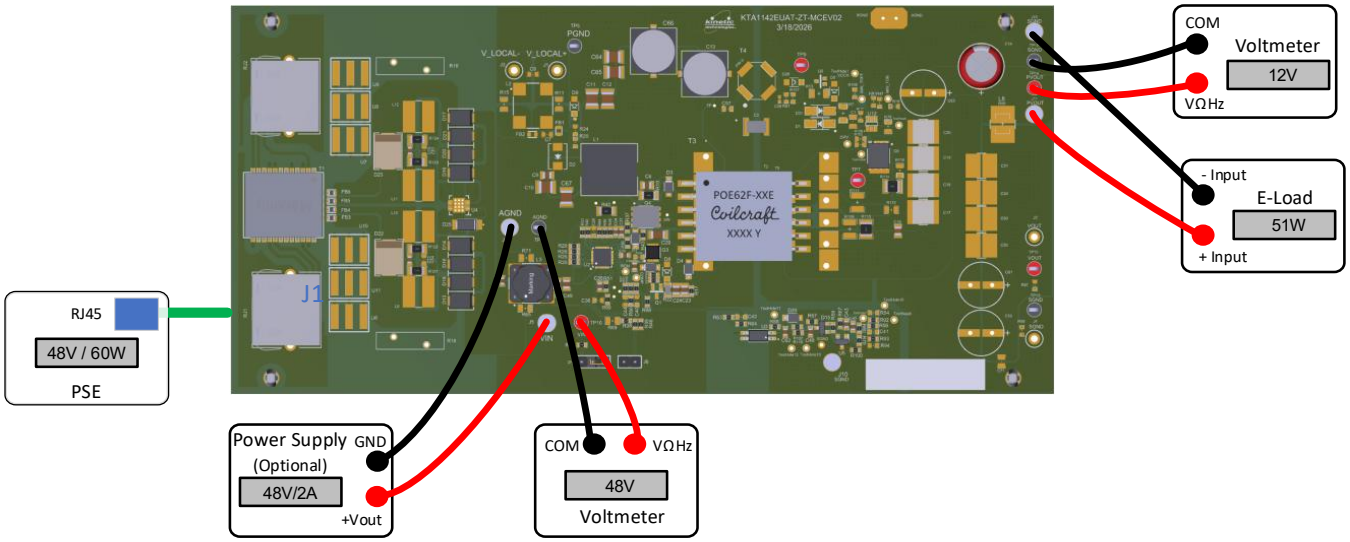
1. Connect a voltmeter between the VIN voltage monitoring test point (TP10) and the AGND test pint (TP11) to monitor the input supply voltage.
2. Connect a voltmeter to the PVOUT voltage monitoring test point (TP14) and SGND (TP15) output ground test point to monitor the regulated output voltage.
3. Connect the RJ-45 ethernet cable from the PSE to the evaluation board ethernet input Jack RJ1. The board will automatically start up and 12V should be present on the PVOUT terminal. Disconnect the PSE after correct 12V output operation has been verified.
4. Connect the electronic load, load resistor or application system circuit to the eval board output PVOUT (J11) and SGND (J15) output terminals.
5. Connect the RJ-45 ethernet cable from the PSE to the evaluation board ethernet input Jack RJ1. The board will automatically start up. 12V flyback regulator operation can now be observed on the output under load conditions.

Method 2: Connect a DC Power Supply directly to VIN and AGND, bypassing the PoE input jack and rectifier diodes. Connecting a DC power supply to the VIN/AGND input terminals also bypasses the KTA1142 PD functions, however the KTA1142 DC-DC controller and hot swap switch are enabled and will provide a regulated output voltage.

1. Before connecting the EVAL Kit to the bench DC power supply, turn on the supply and adjust the voltage to 48V with a current limit of 2A. When the correct voltage and current limit are set, disable the power supply output.
2. With the DC power supply disabled, connect the DC power supply positive test lead to the VIN terminal (J5) and negative test lead to the input AGND terminal (J8).
3. Connect a voltmeter to the VIN test point (TP10) and AGND test point (TP11) to monitor the input supply voltage.
4. Connect a voltmeter to the PVOUT test point (TP14) and SGND test point (TP15) to monitor the regulated output voltage.
5. Enable the VIN bench DC power supply and verify 12 Volts is present at the PVOUT and SGND output test points. After the correct output voltage has been verified, disable the input supply.
6. Connect the electronic load, load resistor or application system circuit to the PVOUT (J9) and SGND (J15) output test points.
7. Enable the input DC power supply to observe the 12V flyback regulator operation under load conditions.

Typical Test Setup

The figure below shows a typical setup for KTA1142 (flyback topology) EVB. Input voltage can be applied as described in the Connector Functionality table above.



Typical KTA1142 12V/51W Flyback EVB Test Setup

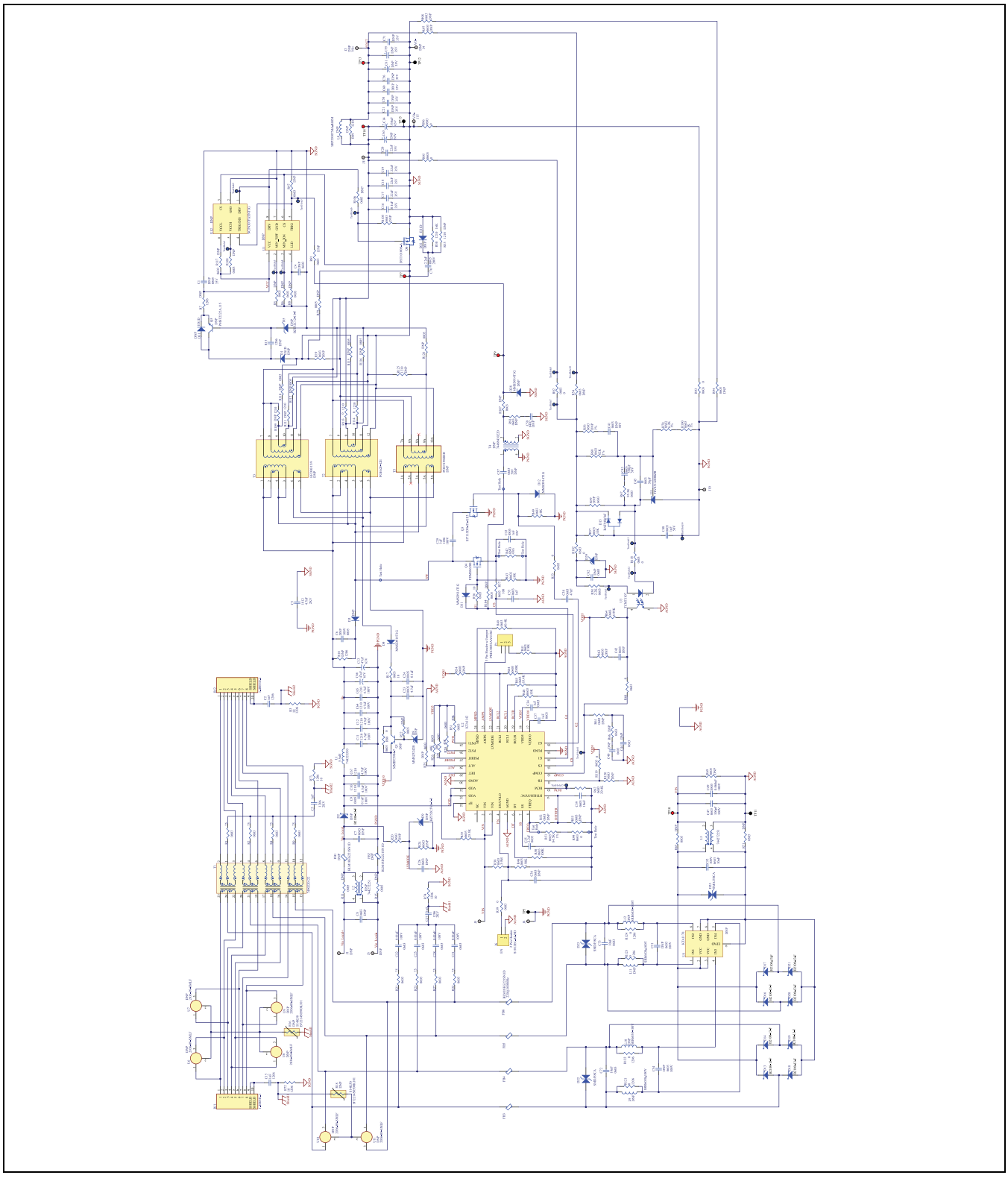
Connector Function

Connector	Name	Description
RJ1		Ethernet power input connector (RJ45 style connector)
RJ2		Ethernet data port connector (RJ45 style connector)
J1	V_LOCAL+	Positive local input (not used in this design)
J2	VOUT	Regulated DC voltage output when EVB output filter is installed (Not used)
J3	V_LOCAL-	Negative local input (not used in the design)
J4	SGND	System output ground (Isolated from the input AGND)
J6	EN	Enable Jumper header connector. Leave open to enable the KTA1142, short to disable.
J5	VIN	DC Supply Input
J8	AGND	Input DC Supply Ground
J10	SGND	Auxiliary secondary side system ground
J11	PVOUT	Regulated DC voltage output (Isolated from the input supply)
J15	SGND	System output ground (Isolated from the input AGND)
P1	AMP	POE BT maintain power signature (MPS) enable pin. Leave open to disable MPS feature.

Test Setup

1. The “Typical Test Setup Diagram” shows a nominal setup for the KTA1142 12V/51W flyback regulator evaluation board. Input voltage can be applied as described in the “Recommended Operating Conditions” Table in this document.
2. When a PSE PoE injector or PoE capable switch is used to source VIN power, the KTA1142 will automatically start up and 12V may be observed on the output PVOUT (J11) / SGND (J15) pins.
3. If an external bench power supply is used to source power directly to the VIN / AGND input pins, the KTA1142 PD control functionality will be bypassed. However, when power is applied to this input, the KTA1142 flyback regulator will start up and supply 12V to the output and loads may be applied.
4. Digital multimeters may be used to monitor the input voltage level (VIN to AGND) and output voltage levels at PVOUT and SGND.
5. A load may be applied to the output at PVOUT and SGND. The load should not exceed 51W (4.25A at 12V).
6. To observe the KTA1142 DC-DC switching regulator primary side switching waveform, an oscilloscope probe may be connected to the “SW” test point located adjacent to Q4, the primary side switch MOSFET. The oscilloscope probe may be grounded to the TP5 PGND test point.
7. Care should be taken with test equipment grounding to assure the evaluation board flyback regulator primary side and secondary side remain isolated.

Electrical Schematic



Typical Characteristic Data

The following data plots have been measured on the KTA1142 Class 6 PoE 12V/51W Flyback Evaluation board to demonstrate expected circuit performance for this POE flyback regulator design.

Start-Up from PSE, DC-DC Start-Up and VOUT Response

Start-Up response for the KTA1142 12V/51W Flyback regulator can be observed using an oscilloscope. The following waveforms show Class 6 BT start up response into a 3A load.

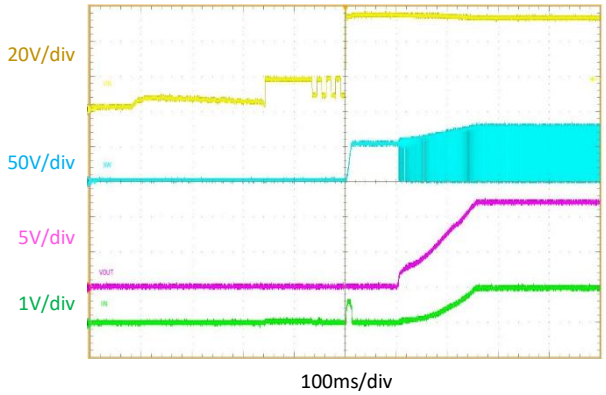


Figure 1. PSDBT PST Detect for PD Class5-6, bt PSE

Shutdown Response

The KTA1142 will shut down when either the enable pin (EN) is transitioned to a logic low state or when the PSE source is switched off or removed. The following plots show examples of expected shutdown response:

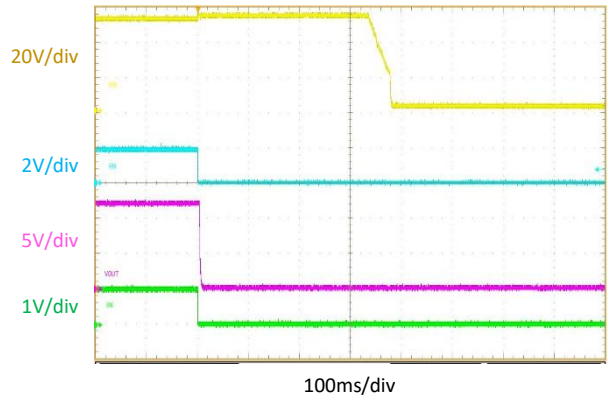


Figure 2. Shutdown from Enable with Following PSE Disable

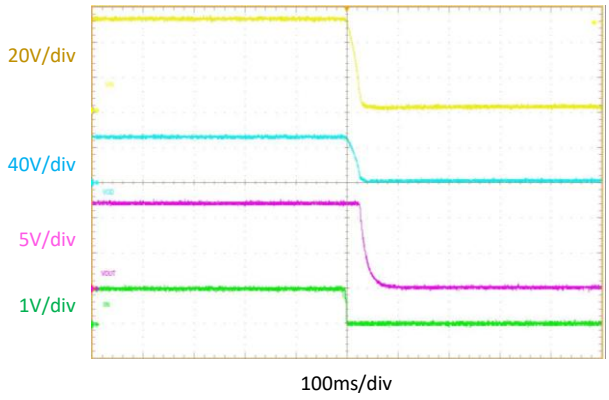


Figure 3. Downstream Shutdown from PSE

Efficiency Measurement:

The KTA1142 12V/51W flyback regulator design on this evaluation board can achieve power conversion efficiencies up to 90%. Efficiency is measured from the VIN/AGND input supply terminals, passing the POE input rectifiers to allow accurate input voltage and current measurements. An electronic load with a series connected current meter is attached to the PVOUT/SGND output terminals. To assure precise input and output voltage

measurements for accurate efficiency calculations, volt meters for VIN and VOUT should be attached to the respective VIN(TP10)/AGND(TP11) and PVOUT(TP14)/SGND(TP15) kelvin test points. The following graph shows efficiency measurements for the full output load current range for input supply levels from 38V to 57V. Care should be taken to make sure the input DC power supply, current meter and voltmeter grounds (AGND) on the primary side to the flyback regulator circuit remain isolated from the secondary side output load, voltmeter and current meter connected to the output ground (SGND).

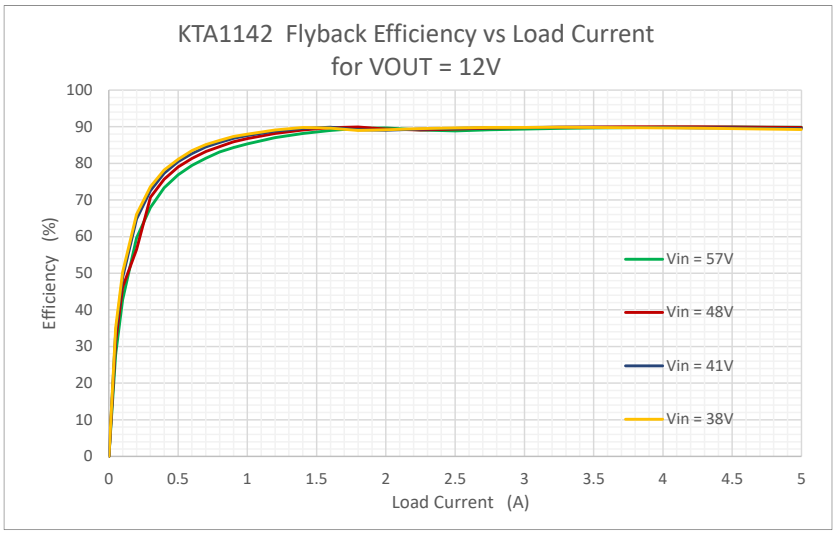


Figure 4. KTA1142 Class 6 12/51W Flyback Regulator Power Conversion Efficiency

Load Regulation

Load regulation data for the KTA1142 12V/51W flyback regulator measured across the PVOUT/SGND test points over the full 0 to 4.25A load range.

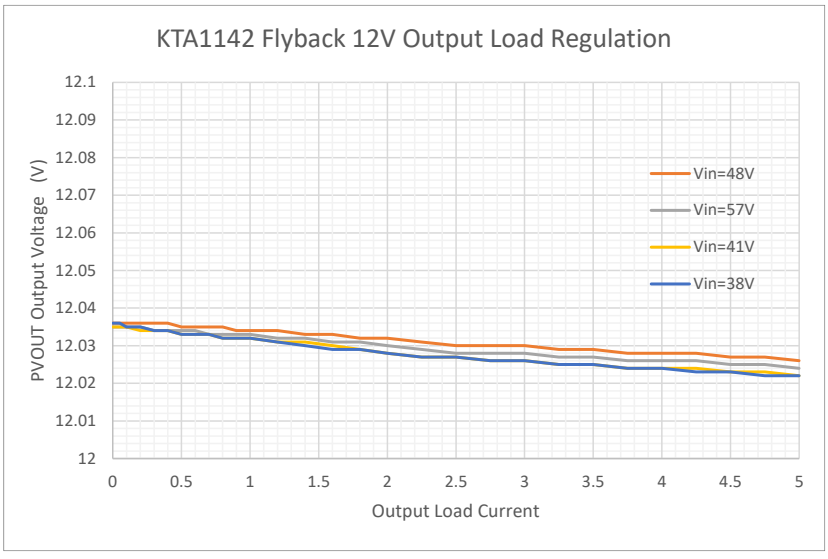


Figure 5. KTA1142 12V/51W Flyback Regulator Load Regulation Over a 0 to 4.25A Load Range

KTA1142 DC-DC Controller Switching Waveform

The switching waveform of the KTA1142 DC-DC controller on the flyback transformer primary can be observed by connecting an oscilloscope probe to the Q4 switch node test point “SW”. The oscilloscope probe ground should be referenced to PGND. The measured switching waveform verifies operating switching frequency (259.9kHz) and switching duty cycle (32.9%) for an applied 3A output load.

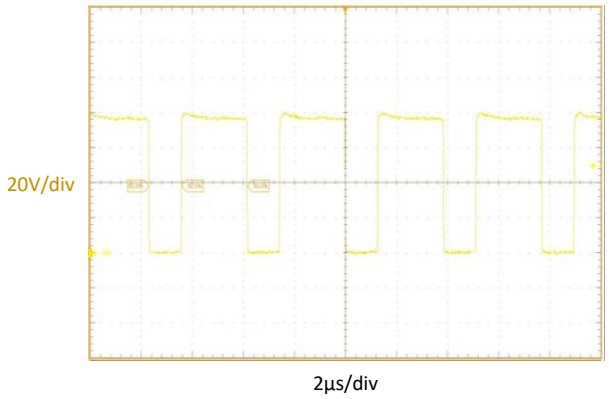


Figure 6. KTA1142 Q4 Switch Node (SW) Waveform for VIN = 48V with an Applied 3A Load

PVOUT Ripple

Output voltage ripple measured at the PVOUT/SGND test points. If a system application requires reduced ripple amplitude, an LC filter may be installed in the L8, C21, C50, C55, C60, C68 or C81 positions. The evaluation board output would the be taken from the VOUT(J2)/SGND(J4) terminals.

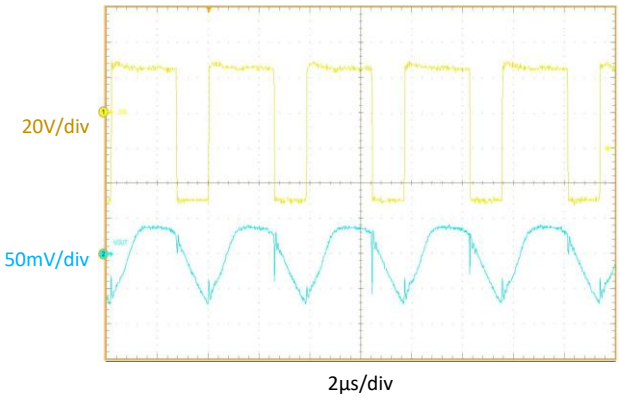


Figure 7. Measured PVOUT Ripple with the Primary MOSFET SW Switching Waveform.

Load Transient Response

A Load transient response measurement provides visual confirmation for DC-DC controller stability over a rapid change in PVOUT load conditions. For this maximum load step up to 4 amperes, the measurement also shows the minimum and maximum voltage variation to be expected under peak switching load load conditions.

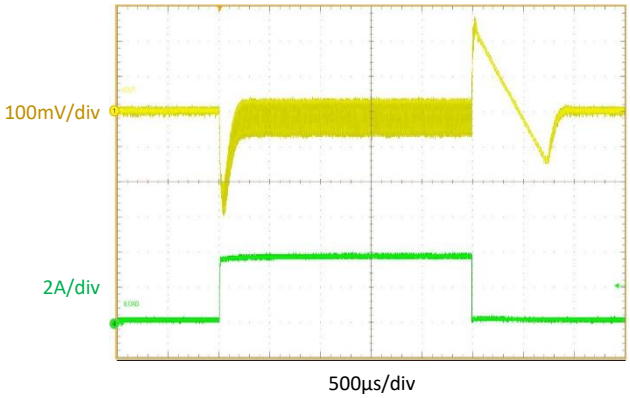


Figure 8. Measured Load Transient Response for a 100mA to 4A Load Step Applied to PVOUT

DC-DC Converter Loop Response

To assure stable operation for the KTA1142 flyback regulator DC-DC controller, loop response measurement bode plots may be performed by replacing R92 zero ohm jumper with a 20Ω resistor to effect a feedback loop stimulus input and measurement point. Connect a network analyzer / frequency response analyzer across the R92 20Ω resistor using TestPoint 7 and TestPoint 8 on the evaluation board. The frequency response analyzer should be set for a 1MΩ input impedance to minimize interference with the loop response measurement. Th following is an example KTA1142 Class6 12V/51W flyback regulator DC-DC controller loop response with a 6.09kHz bandwidth and 56.1 degrees of phase margin which will ensure stable circuit performance over all input supply and output load operating conditions.

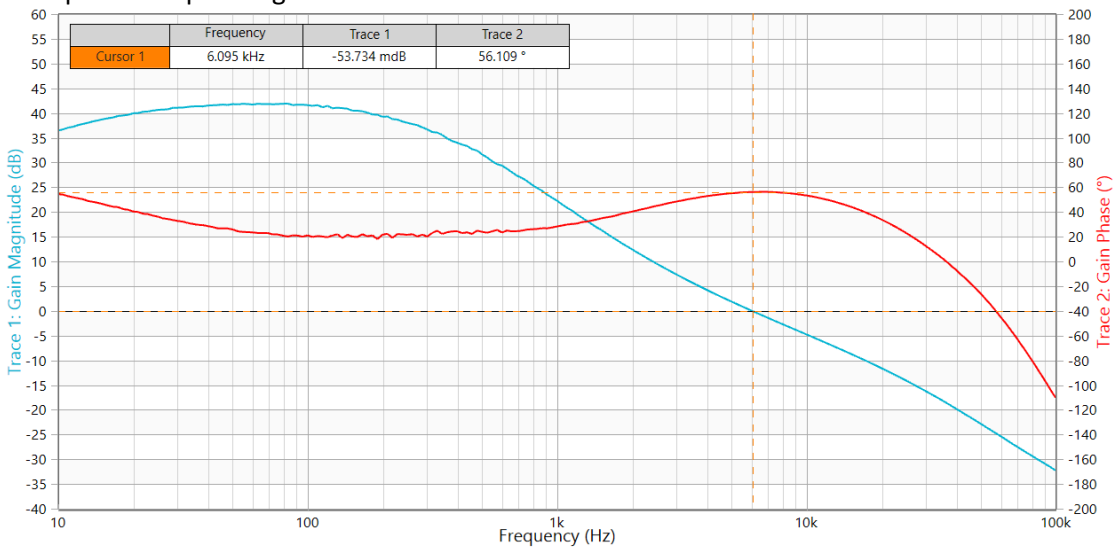
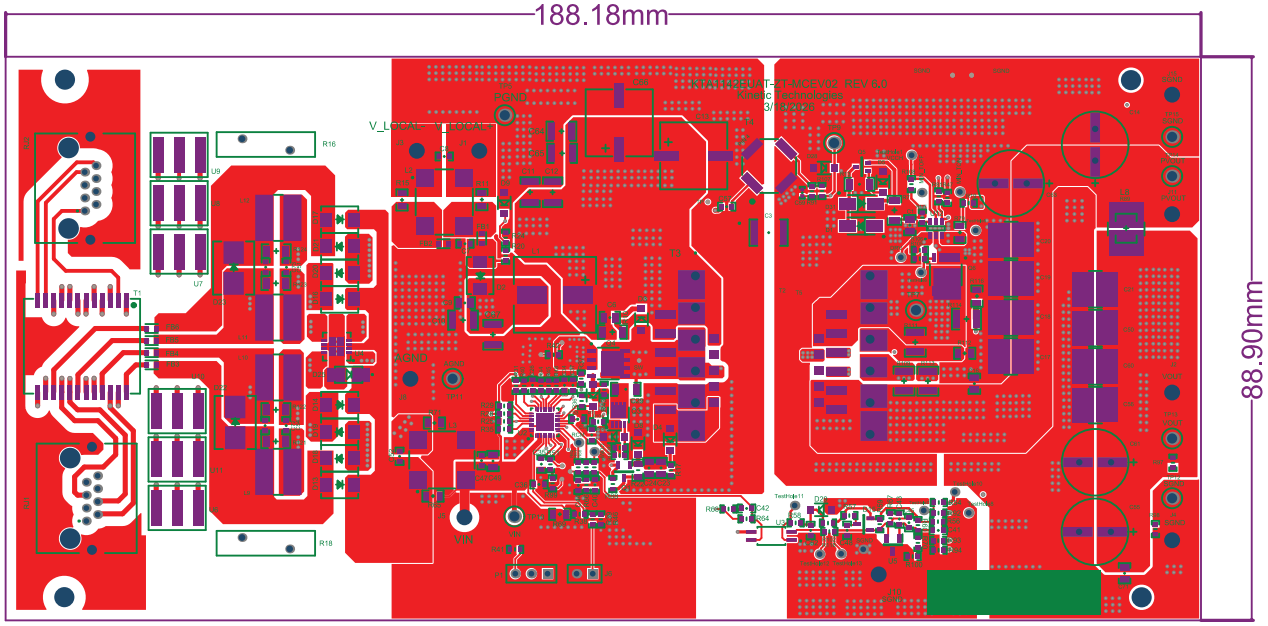


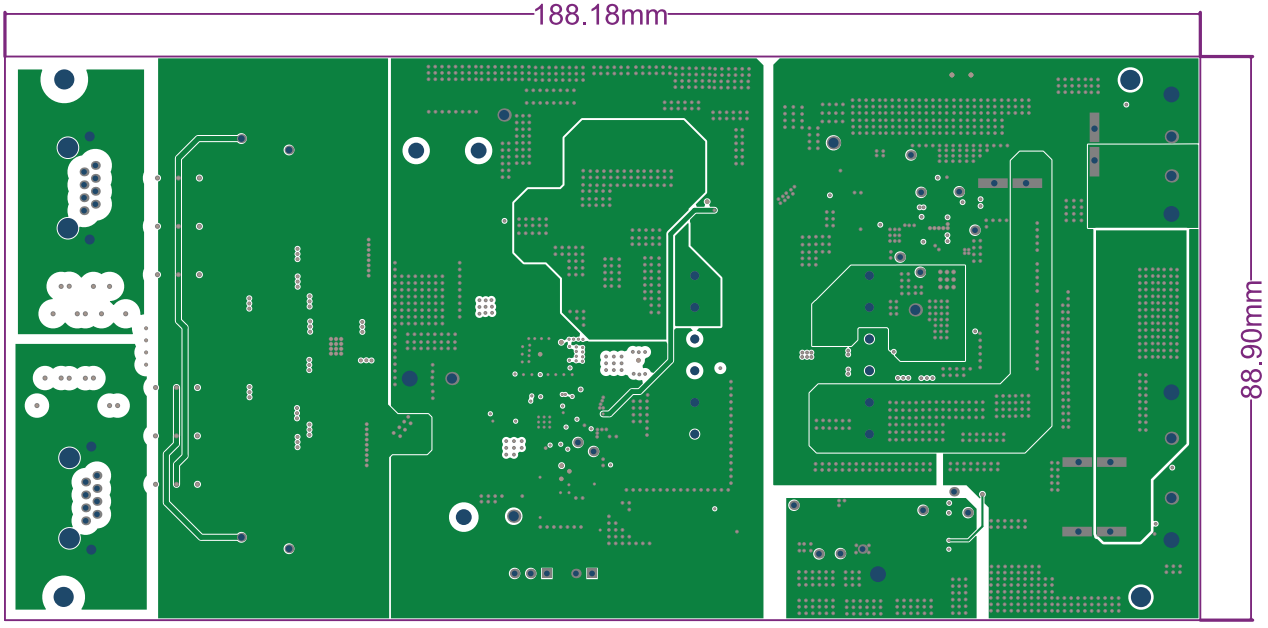
Figure 9. KTA1142 12V/51W Flyback DC-DC Controller Loop Response

Printed Circuit Board (PCB)

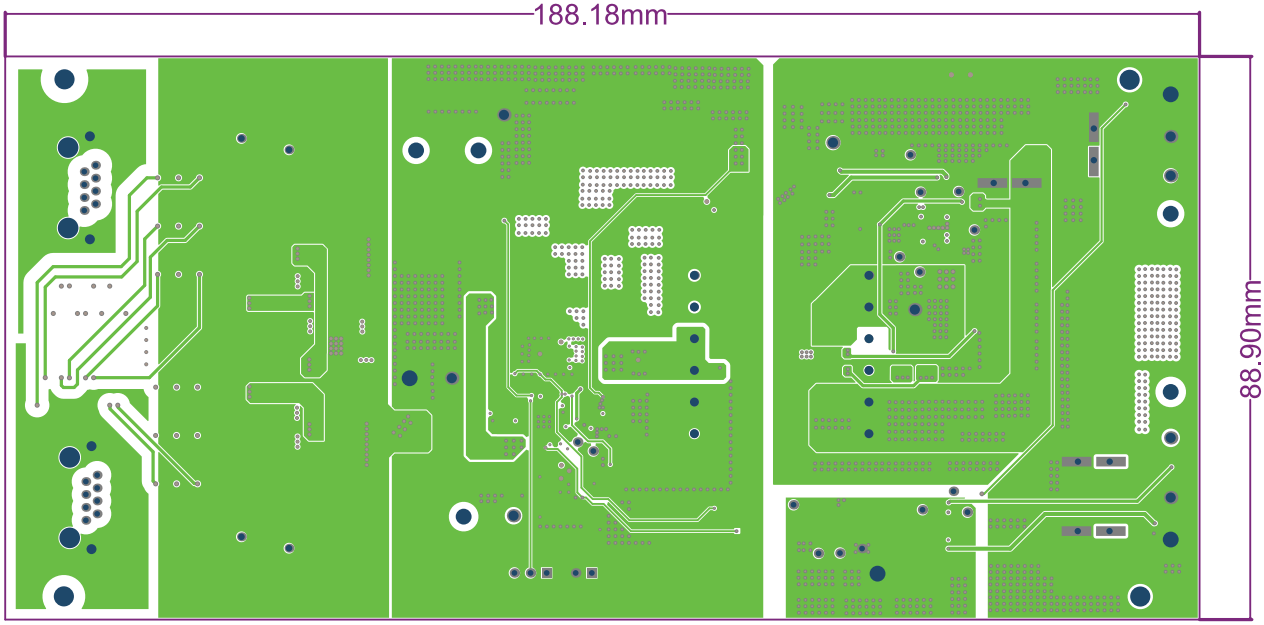
Top Side Layout/Routing



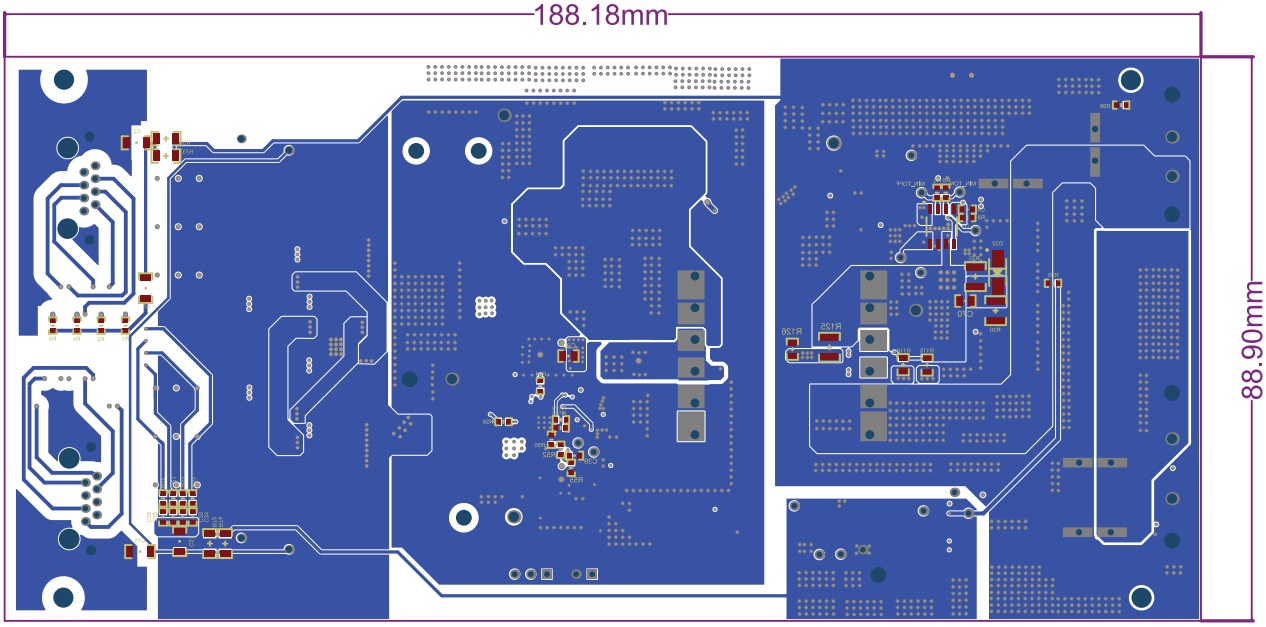
Layer Two Routing



Layer Three Routing



Bottom Layer Routing



Bill of Materials

Designator	Description	Quantity	Value	Manufacturer	Manufacturer Part Number
C1	CAP CER 2.2µF 35V X7R 0805	0	DNP	TDK	CGA4J1X7R1V225K125AC
C2, C15	CAP CER 1000PF 2KV X7R 1206	2	1nF	Samsung	CL31B102KJHNNNE
C3	CAP CER 4700pF 2KV X7R 1812	1	4.7nF	Yageo	CC1812KKX7RDBB472
C4	CAP CER 1000PF 50V X7R 0603	0	DNP	Samsung	CL10B102KB8NNNC
C5, C27	CAP CER 1000pF 2KV X7R 1206	2	1nF	Yageo	CC1206KKX7RDBB102
C6	CAP CER 0.022µF 100V X7R 0805	0	DNP	Yageo	CC0805KRX7R0BB223
C7, C8	CAP CER 100pF 100V X7R 0603	0	DNP	Yageo	CC0603KRX7R0BB101
C9	CAP CER 0.1µF 100V X7R 0805	1	0.1µF	Yageo	CC0805KKX7R0BB104
C10, C11, C12, C64, C65, C67	CAP CER 4.7µF 100V X7S 1210	6	4.7µF	Samsung	CL32Y475KCIVPNE
C13, C66	CAP ALUM POLY 47µF 20% 63V SMD	2	47µF	Nichicon	PCV1J470MCL2GS
C14	CAP ALUM 330µF 20% 63V RADIAL TH	1	330µF	Panasonic Electronic Components	ECA-1JHG331
C16	CAP CER 0.1µF 35V X5R 0805	1	0.1µF	KYOCERA AVX	KGM21KR51V104KU
C17, C18, C19, C20	CAP CER 22µF 35V X7R 2220	4	22µF	Chemi-Con	KTF350B226K55NHT00
C21, C50, C56, C60	CAP CER 22µF 35V X7R 2220	0	DNP	Chemi-Con	KTF350B226K55NHT00
C22, C25, C28, C31	CAP CER 0.01µF 100V X7R 0603	4	0.01µF	Samsung	CL10B103KC8NNNC
C23	CAP CER 4.7µF 25V X7R 0805	1	4.7µF	Samsung	CL21B475KAFNNNE
C24	CAP CER 0.1µF 25V X7R 0805	1	0.1µF	Yageo	CC0805KRX7R8BB104
C26, C36, C40, C42, C44	CAP 0603	0	DNP		
C29	CAP CER 1206 1µF 100V X7R 10%	1	1µF	Yageo	CC1206KKX7R0BB105
C32	CAP CER 1000PF 50V X7R 0805	1	1nF	Yageo	CC0805KRX7R9BB102
C33	CAP CER 1000PF 50V X7R 0603	1	1nF	Yageo	CC0603KRX7R9BB102
C34, C37	CAP CER 1µF 16V X7R 0603	2	1µF	Samsung	CL10B105KO8NNNC
C35	CAP CER 2.2µF 16V X5R 0603	1	2.2µF	Samsung	CL10A225KO8NNNC
C38	CAP CER 0.047µF 16V X7R 0603	1	47nF	Yageo	CC0603KRX7R7BB473
C39	CAP CER 10000PF 16V X7R 0603	1	10nF	Yageo	CC0603KRX7R7BB103
C41	CAP CER 560PF 50V C0G/NP0 0603	0	DNP	Samsung	CL10C561JB8NFNC
C43	CAP CER 390PF 50V X7R 0603	1	390pF	Yageo	CC0603KRX7R9BB391
C45	CAP CER 56PF 50V C0G/NP0 0603	1	56pF	Samsung	CL10C101JB8NNNC
C47	CAP CER 100pF 100V X7R 0603	1	100pF	Yageo	CC0603KRX7R0BB101
C48	CAP CER 1µF 50V X5R 0603	1	1µF	Yageo	CC0603KRX7R9BB105
C49	CAP CER 0.068µF 100V X7R 0805	1	0.068µF	Yageo	CC0805KKX7R0BB683
C51, C54	CAP CER 10000PF 100V X7R 0603	0	DNP	Murata Electronics	GCM188R72A103KA37D
C52	CAP CER 10000PF 100V X7R 0603	1	10nF	Murata Electronics	GCM188R72A103KA37D

Designator	Description	Quantity	Value	Manufacturer	Manufacturer Part Number
C55, C61	CAP ALUM 330µF 20% 35V RADIAL TH	0	DNP	Rubycon	35ZLH330MEFCT810X12.5
C57	CAP CER 20PF 50V C0G/NP0 0603	0	DNP	KEMET	C0603C200J5GACTU
C59	CAP CER 100PF 50V C0G/NPO 0402	0	DNP	Yageo	CC0402JRNPO9BN101
C62	CAP CER 10µF 10V X5R 0603	0	DNP	Samsung	CL10A106KP8NNNC
C63	CAP ALUM 330µF 20% 63V RADIAL TH	0	DNP	Panasonic Electronic Components	ECA-1JHG331
C70	CAP CER 0805 2.2NF 200V X7R	1	2.2nF	KEMET	C0805C222K2RECAUTO7210
C71	CAP CER 0.1µF 35V X5R 0805	0	DNP	KYOCERA AVX	KGM21KR51V104KU
C72, C73	CAP CER 10000PF 50V X7R 0603	2	10nF	Samsung	CL10B103KB8NNNC
D1, D31, D32	DIODE STANDARD 200V 1A DO214AC	0	DNP	onsemi	ES1D
D2	DIODE SCHOTTKY 100V 2A SMB	0	DNP	Diodes Incorporated	B2100-13-F
D3	DIODE GEN PURP 200V 200MA SOD123	0	DNP	Diodes Incorporated	BAV21W-7-F
D4, D11, D12	DIODE GEN PURP 100V 200MA SOD123	3		onsemi	MMSD914T1G
D5	DIODE ZENER 12V 500MW SOD123	0	DNP	Diodes Incorporated	BZT52C12-13-F
D8	ZENER SOD-123F 12V 0.5W 5%	0	DNP	Diotec Semiconductor	MMSZ5242B
D9, D29	DIODE ZENER 5.6V 500MW SOD123	0	DNP	Diodes Incorporated	BZT52C5V6-7-F
D13, D14, D16, D17, D18, D19, D20, D21	DIODE SCHOTTKY 100V 2A SMB	8		Diodes Incorporated	B2100-13-F
D15	DIODE ARRAY SCHOTTKY 30V SOT23-3	1		Diodes Incorporated	BAT54S-7-F
D22, D23	TVS DIODE 58VWM 93.6VC DO214AB	2	SMDJ58CA	Littelfuse Inc.	SMDJ58CA
D25	TVS DIODE 58VWM 93.6VC DO214AC	1		Littelfuse Inc.	SMAJ58CA
D28	DIODE STANDARD 100V 200MA SOD123	0	DNP	onsemi	MMSD914T1G
FB1, FB2	FERRITE BEAD 220Ω 0603 1LN	0	DNP	Murata Electronics	BLM18EG221SN1D
FB3, FB4, FB5, FB6	FERRITE BEAD 220Ω 0603 1LN	4	220	Murata Electronics	BLM18EG221SN1D
H1, H2, H3, H4	BRD SPT SNAP LOCK REST MNT 4MM	4		Essentra Components	PSD-4M-19
J1, J2, J3, J4	TERM TURRET SINGLE L=7.14MM TIN	0	DNP	Keystone Electronics	1514-2
J5, J8, J10, J11, J15	TERM TURRET SINGLE L=7.14MM TIN	5		Keystone Electronics	1514-2
J6	CONN HEADER VERT 2POS 2.54MM	1		Sullins Connector Solutions	PREC002SAAN-RC
L1	FIXED IND 5.5µH 10A 10.3MΩ SMD	1	5.5µH	Wurth Electronik	744325550
L2	WE-SL5 SMT Common Mode Line Filter, 250µH, 2A, 0.035Ω	0	DNP	Wurth Electronik	744272251
L3	WE-SL5 SMT Common Mode Line Filter, 250µH, 2A, 0.035Ω	1		Wurth Electronik	744272251
L8	IND METAL POWDER 0.68µH 4A	0	DNP	Bourns	SRP2010TMA-R68M

Designator	Description	Quantity	Value	Manufacturer	Manufacturer Part Number
L9, L10, L11, L12	FIXED IND 10µH 2A 38MΩ SMD	0	DNP	Bourns	SRR6038-100Y
P1	CONN HEADER VERT 3POS 2.54MM	1		Sullins Connector Solutions	PREC003SAAN-RC
Q1	TRANS NPN 40V 0.2A SOT23-3	0	DNP	Diotec Semiconductor	MMBT3904-7
Q3	MOSFET P-CH 150V 8.9A PPAK1212-8	1		Vishay Siliconix	SI7115DN-T1-GE3
Q4	MOSFET N-CH 150V 9.6A/35A 8PQFN	1		onsemi	FDMS86200
Q5	TRANS NPN 40V 0.6A SOT-323	0	DNP	Nexperia	PMST2222A,115
Q6	MOSFET N-CH 100V 44A/124A 8PQFN	1		onsemi	DST10100S-A
R1, R2, R4, R9, R21, R23, R27, R32	RES 75Ω 1% 1/10W 0603	8	75	Yageo	RC0603FR-0775RL
R3, R72, R73, R74	RES 10Ω 1% 1/4W 1206	4		Yageo	RC1206FR-1310RL
R5	RES 24.9KΩ 1% 1/10W 0603	0	DNP	Stackpole Electronics Inc	RMCF0603FT24K9
R6	RES 7.5KΩ 1% 1/10W 0603	0	DNP	Yageo	RC0603FR-077K5L
R7	RES SMD 3Ω 1% 1/8W 1206	0	DNP	Yageo	AC1206DR-073RL
R8	RES 90.9KΩ 1% 1/10W 0603	0	DNP	Yageo	RC0603FR-0790K9L
R10	RES 24.9KΩ 1% 1/4W 1206	0	DNP	Yageo	RC1206FR-0724K9L
R11, R15, R65, R69, R71, R79	RES 0805	0	DNP		
R13	CAP CER 22µF 25V X5R 1206	0	DNP	Samsung	CL31A226KAHNNNE
R16, R18	VARISTOR 82V 4.5KA DISC 14MM	0	DNP	EPCOS - TDK Electronics	B72214S0500K101
R17, R36	RES 10Ω 1% 1/10W 0603	2	10	Yageo	RC0603FR-0710RL
R19, R24, R54, R94, R97, R98, R104, R106, R107, R108, R117, R120	RES 0Ω JUMPER 1/10W 0603	0	DNP	Yageo	RC0603FR-070RL
R20	RES SMD 510KΩ 1% 1/10W 0603	0	DNP	Yageo	RT0603FRE07510KL
R22	RES 3.3KΩ 1% 1/8W 0805	0	DNP	Yageo	RC0805FR-073K3L
R25	RES SMD	0	DNP	Yageo	RC0603FR-070RL
R26, R28, R29, R31	RES 40KΩ 0.1% 1/10W 0603	4	40K	Yageo	RT0603BRD0740KL
R30	RES 16KΩ 1% 1/2W 1210	1	16K	Yageo	RC1210JR-0716KL
R33	RES 4.42Ω 1% 1/2W 1210	0	DNP	Yageo	RC1210FR-074R42L
R34, R52, R55, R61, R63, R66	RES 0603	0	DNP		
R35	RES 25.5KΩ 1% 1/10W 0603	1	25.5K	Yageo	RC0603FR-0725K5L
R37	RES 100Ω 1% 1/10W 0603	1	100	Yageo	RC0603FR-07100RL
R38	RES 3.9MΩ 1% 1/10W 0603	1	3.9M	Yageo	RC0603FR-073M9L

Designator	Description	Quantity	Value	Manufacturer	Manufacturer Part Number
R39, R53, R68, R88, R92, R93, R95, R96, R102, R118, R119	RES 0Ω JUMPER 1/10W 0603	11	0	Yageo	RC0603FR-070RL
R40	RES 60.4KΩ 1% 1/10W 0603	1	60.4K	Yageo	RC0603FR-0760K4L
R41	RES SMD 118KΩ 1% 1/10W 0603	1	118K	Yageo	RC0603DR-07118KL
R42	RES 0.043Ω 1% 1/3W 0603	1	43m	Panasonic Electronic Components	ERJ-3BWFR043V
R43, R48, R49, R57	RES 10KΩ 1% 1/10W 0603	4	10K	Yageo	RC0603FR-0710KL
R44	RES 280KΩ 1% 1/10W 0603	1	280K	Yageo	RC0603FR-0790K9L
R45	RES 63.4KΩ 1% 1/10W 0603	1	63.4K	Yageo	RC0603FR-0763K4L
R46	RES 150KΩ 1% 1/10W 0603	1	150K	Yageo	RC0603FR-13150KL
R47	RES 4.7KΩ 1% 1/10W 0603	0	DNP	Yageo	RC0603FR-074K7L
R50	RES 100KΩ 1% 1/10W 0603	1	100K	Yageo	RC0603FR-07100KL
R51	RES 84.5KΩ 0.5% 1/10W 0603	1	84.5K	Yageo	AC0603DR-0784K5L
R56	RES 27.4KΩ 1% 1/10W 0603	0	DNP	Yageo	RC0603FR-0727K4L
R58	RES 2.2KΩ 1% 1/10W 0603	1	2.2K	Yageo	RC0603JR-072K2L
R59	RES 17.4KΩ 1% 1/10W 0603	0	DNP	Yageo	RC0603FR-0717K4L
R60	RES 62KΩ 1% 1/10W 0603	1	62K	Yageo	RC0603FR-0762KL
R62	RES 29.4KΩ 1% 1/10W 0603	1	29.4K	Yageo	RC0603FR-0729K4L
R64	RES 4.99KΩ 1% 1/10W 0603	1	4.99K	Yageo	RC0603FR-074K99L
R67	RES 95.3KΩ 1% 1/10W 0603	1	95.3K	Yageo	AC0603FR-0795K3L
R70	RES SMD 6.2KΩ 1% 1/10W 0603	1	6.2K	Yageo	AC0603FR-076K2L
R81	RES SMD 1KΩ 1% 1/8W 0603	0	DNP	Vishay Dale	CRCW06031K00FKEA
R89	Ω JUMPER 1/2W 1210	0	DNP	Yageo	RC1210JR-070RL
R91	RES 20Ω 1% 1/10W 0603	0	DNP	Yageo	RC0603FR-1020RL
R99	RES 0Ω 1% 1/10W 0603	1	0	Yageo	RC0603FR-070RL
R100	RES SMD 1KΩ 1% 1/8W 0603	1	1K	Vishay Dale	CRCW06031K00FKEA
R105	RES 10KΩ 1% 1/10W 0603	0	DNP	Yageo	RC0603FR-0710KL
R109, R111, R125	0Ω JUMPER 1/2W 1210	0	DNP	Yageo	RC1210JR-070RL
R110, R112, R115, R116, R126	RES 0Ω JUMPER 1/8W 0805	0	DNP	Yageo	RC0805JR-070RL
R113, R114	0Ω JUMPER 1/2W 1210	2	0	Yageo	RC1210JR-070RL
R121, R122, R123, R124	RES 0Ω JUMPER 1/4W 1206	4	0	Yageo	RC1206JR-070RL
RJ1, RJ2	Mod Jack; Right Angle; 8 Position; Cat 5; Shielded; Inverted; Panel & PCB Ground	2		TE Connectivity	1-406541-1

Designator	Description	Quantity	Value	Manufacturer	Manufacturer Part Number
T1	WE-LAN LAN Transformer, SMT, 1000 Base-T, 1 port	1		Wurth Electronik	7490220122
T2	High Power POE Flyback Tranformer	1		Coilcraft	POE62F-12E
T3	High Power POE Flyback Tranformer	0	DNP	Coilcraft	EFD30/15/9
T4	INDUCT ARRAY 2 COIL 22µH SMD	0	DNP	Wurth Electronik	74489430220
T5	High Power POE Flyback Tranformer	0	DNP	Wurth Electronik	POE51F-48ED
TP5, TP11, TP12, TP15	PC TEST POINT MULTIPURPOSE BLACK	4		Keystone Electronics	5011
TP7, TP9, TP10, TP13, TP14	PC TEST POINT MULTIPURPOSE RED	5		Keystone Electronics	5010
U1	NCP4306AADZZZADR2G	0	DNP	onsemi	NCP4306AADZZZADR2G
U2	IEEE 802.3bt-Compliant, PoE Powered Device With DC-DC Controller	1		Kinetic Technologies	KTA1142EUAT-TB
U3	Optoisolator Transistor Output 3750Vrms 1 Channel 4-SOP	1		Vishay Dale	TCMT1107
U4	Integrated Dual MOSFET Bridge Rectifier	0	DNP	Kinetic Technologies	KTA1170GVAE-TB
U5	IC VREF SHUNT ADJ 1% SOT23-3	1		Texas Instruments	TLV431AIDBZR
U6, U7, U9, U10, U11	GDT 90V 10KA 3 POLE SMD	0	DNP	Bourns	2036-09-SMLF
U8	10KA 3 POLE SMD	0	DNP	Bourns	2036-09-SMLF
U12	SECONDARY SIDE SYNCHRONOUS RECTI	0	DNP	onsemi	NCP4307FASNT1G

In order to realize a better power conversion efficiency (up to 1.2%), lower BOM count and PCB footprint, it is highly recommended to use Kinetic's KTA1170GVAE-TB integrated dual bridge rectifier instead of the discrete Schottky diodes.

Important Notices

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