

i7CxxA-C03-EVK-S1; i7AxxA-C01-EVK-S1; i7X-C01-EVK-S0 *Evaluation Kit Manual for i7A, i7C, RGB, RGC Non-Isolated DC-DC Series*

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1. Introduction

This evaluation kit has been designed to provide an easy way to characterize the product performance and its features. It is intended to aid customers and determine the product suitability for the target application. The evaluation board incorporates the required external components to demonstrate the complete product functionality. It also includes other components (e.g. test points) to facilitate a successful end user experience. Not all these external components are required if the product features are not needed. Details of the external components, schematics, and PCB layout are provided in this documentation for reference only. Final design and qualification need to be verified at customer's end system level.

2. Ordering Information

TDK-Lambda offers a wide variety of non-isolated dc-dc power modules in the i7X series. Not every product is currently available in an evaluation kit. The table below includes description and ratings which should help in selecting the most applicable evaluation kit.

Evaluation Kit Part Number	Non-Isolated DC-DC Module <i>(Included and Mounted on the Evaluation Board)</i>					
	DC-DC Module Part Number	Type	I/P Range	O/P Range	O/P Current (max)	O/P Power (Max)
i7C08A-C03-EVK-S1	i7C4W008A120V-003-R	Buck-Boost	9 – 53 V	9.6 – 48 V	8 A	300 W
i7C12A-C03-EVK-S1	i7C4W012A050V-003-R	Buck-Boost	9 – 53 V	5.0 – 28 V	12.5 A	300 W
i7C20A-C03-EVK-S1	i7C2W020A120V-003-R i7C2W020A120V-0C3-R i7C2W020A120V-0F3-R	Buck-Boost	9 – 36 V	8.0 – 24 V	20 A	300 W
i7A20A-C01-EVK-S1	i7A48020A033V-001-R	Buck	28 – 60 V	3.6* – 32 V	20 A	500 W
i7A33A-C01-EVK-S1	i7A4W033A033V-001-R	Buck	18 – 60 V	3.6* – 24 V	33 A	500 W
i7A45A-C01-EVK-S1	i7A24045A033V-001-R	Buck	18 – 32 V	3.6* – 18 V	45 A	750 W
i7A60A-C01-EVK-S1	i7A12060A008V-001-R	Buck	9 – 18 V	1.0** – 8 V	60 A	400 W
i7X-C01-EVK-S0	No Module Installed	The evaluation board can be used for the RGB and RGC Series.				

* The installed power module can be adjusted to 3.3V. The standard EV kit configuration supports operation down to 3.6V. Contact technical support if lower voltage is needed.

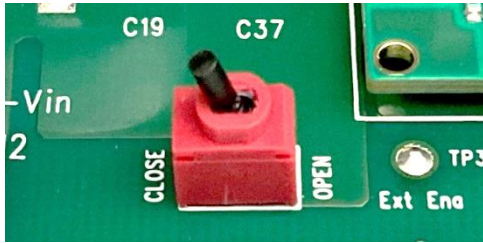
** The installed power module can be adjusted to 0.8V. The standard EV kit configuration supports operation down to 1.0V. Contact technical support if lower voltage is needed.



IMPORTANT INFORMATION

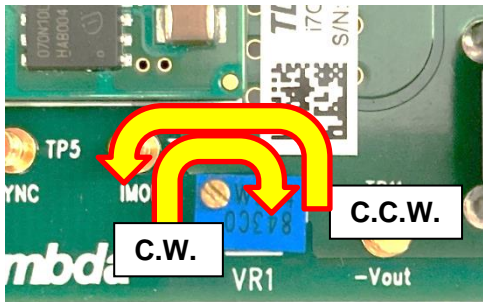
- Observe proper safety and laboratory procedures when testing electronic products. This list serves as general guide only and not a substitute for common sense and best practices.
- Before applying power, double check and ensure all connections to the evaluation board interface are correct (e.g., Input source polarity connections, etc...).
- This evaluation board is not populated with an input fuse. An input fuse can be populated in PCB location F1. Check the product specifications for the input fuse ratings and the evaluation board schematics included this manual. Make sure the existing jumper connections, BB4 and BB5, are removed when adding the fuse.
- Although highly efficient, these high-power density modules can dissipate significant amounts of power, especially at heavy load. Care should be taken to ensure adequate cooling is provided and the modules are operated within the thermal specifications outlined in the product data sheets. Heat sink and base plated versions of the i7X family are available for use in demanding environments.
- This evaluation kit is designed for general laboratory use. It is not intended for installation in end customer product or equipment.
- Please check the pertinent product (DC-DC Module) datasheets and specifications for complete information.

4. Turn-on / Turn-off module by switch



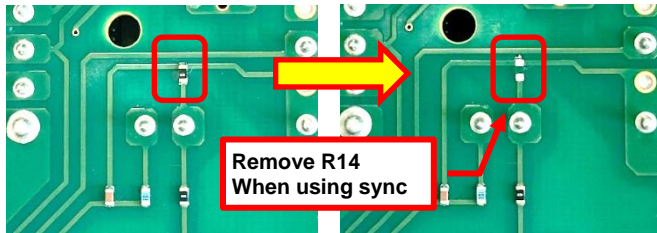
Change position of toggle switch "S1" to "CLOSE" turns-on the power supply unit.

5. Change Output Voltage



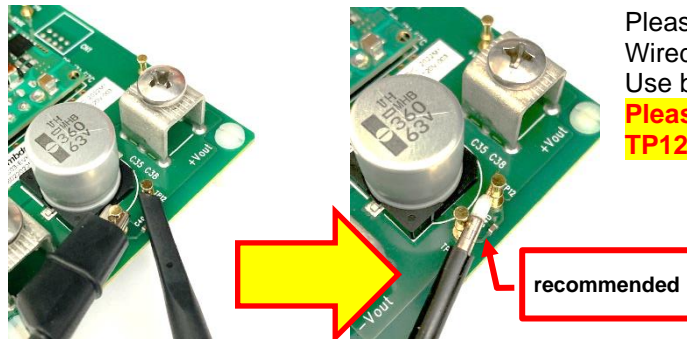
Turn screw on trimmer pot "VR1" to change the output voltage.
Turn clockwise to decrease output voltage.
Turn counter clockwise to increase output voltage.

6. When using external clock (SYNC function only for i7C)



SYNC function default setting is disabled. Please remove resistor "R14" on bottom side of the board to enable the SYNC function.

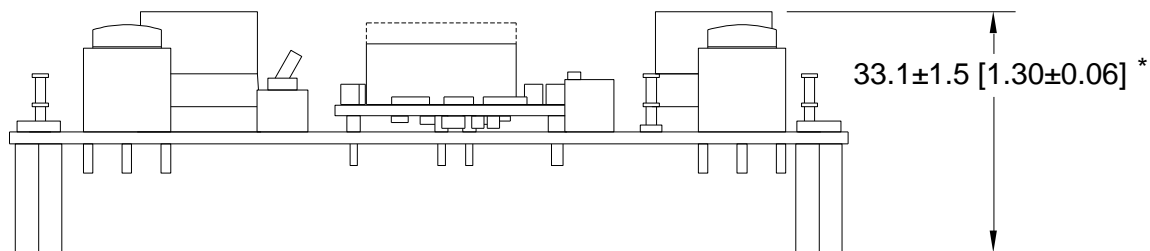
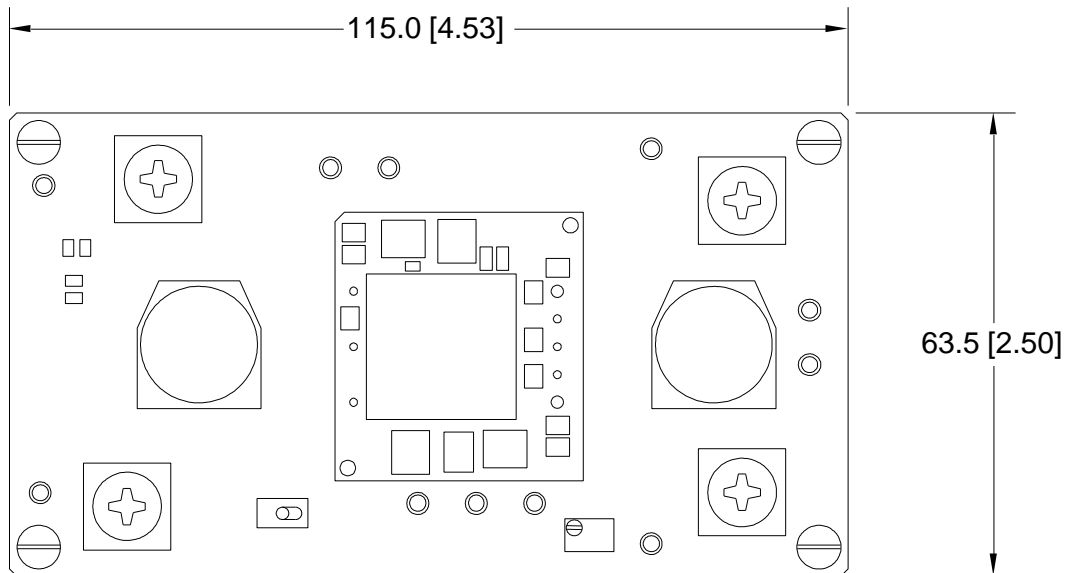
7. Capture output ripple/noise waveform



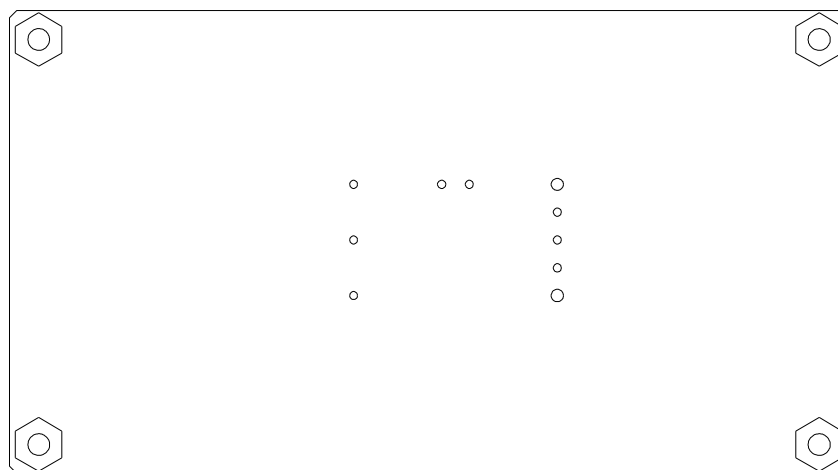
Please use TP12 and TP13 to measure output ripple/spike.
Wired GND clip may pick up higher spike noise.
Use bare probe to minimize spike noise.

**Please ensure proper polarity when connecting.
TP12 is Vout (+) / TP13 is GND.**

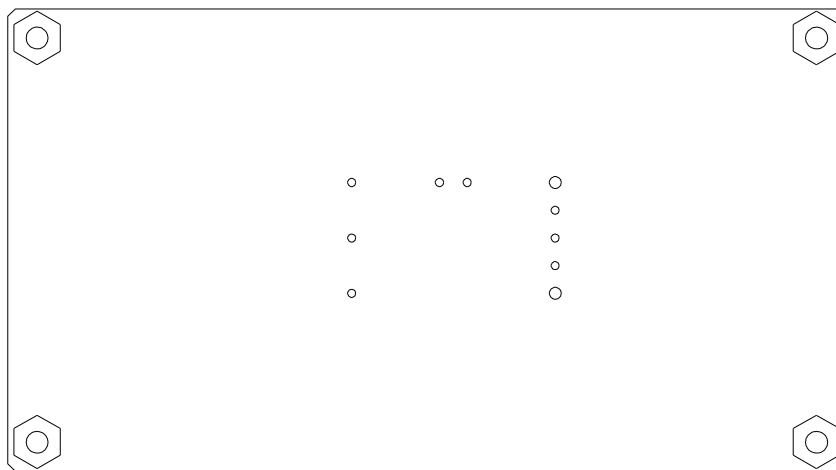
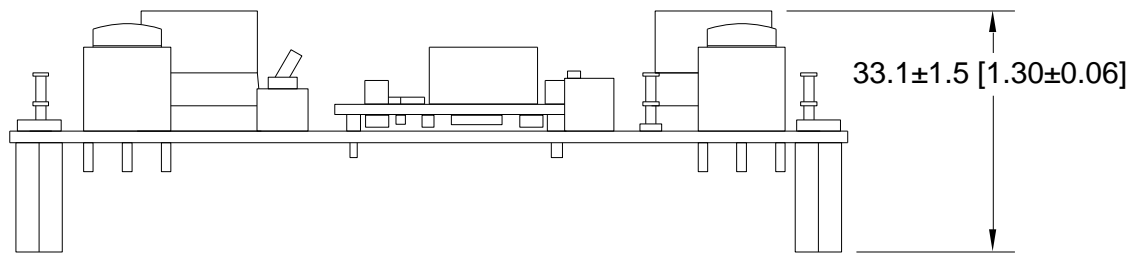
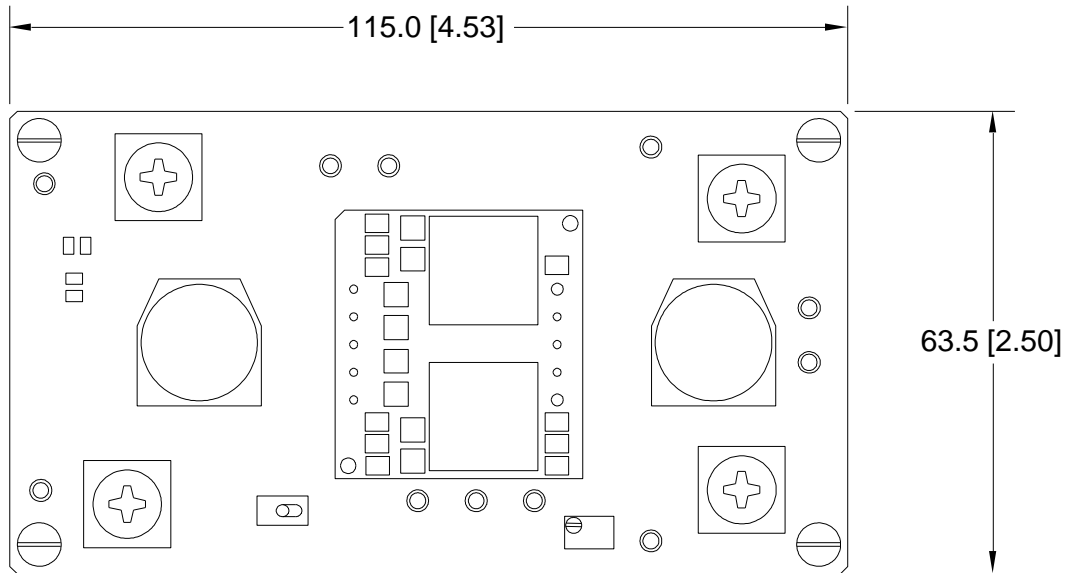
8. Mechanical Outline - i7CxxA-C03-EVK-S1 *



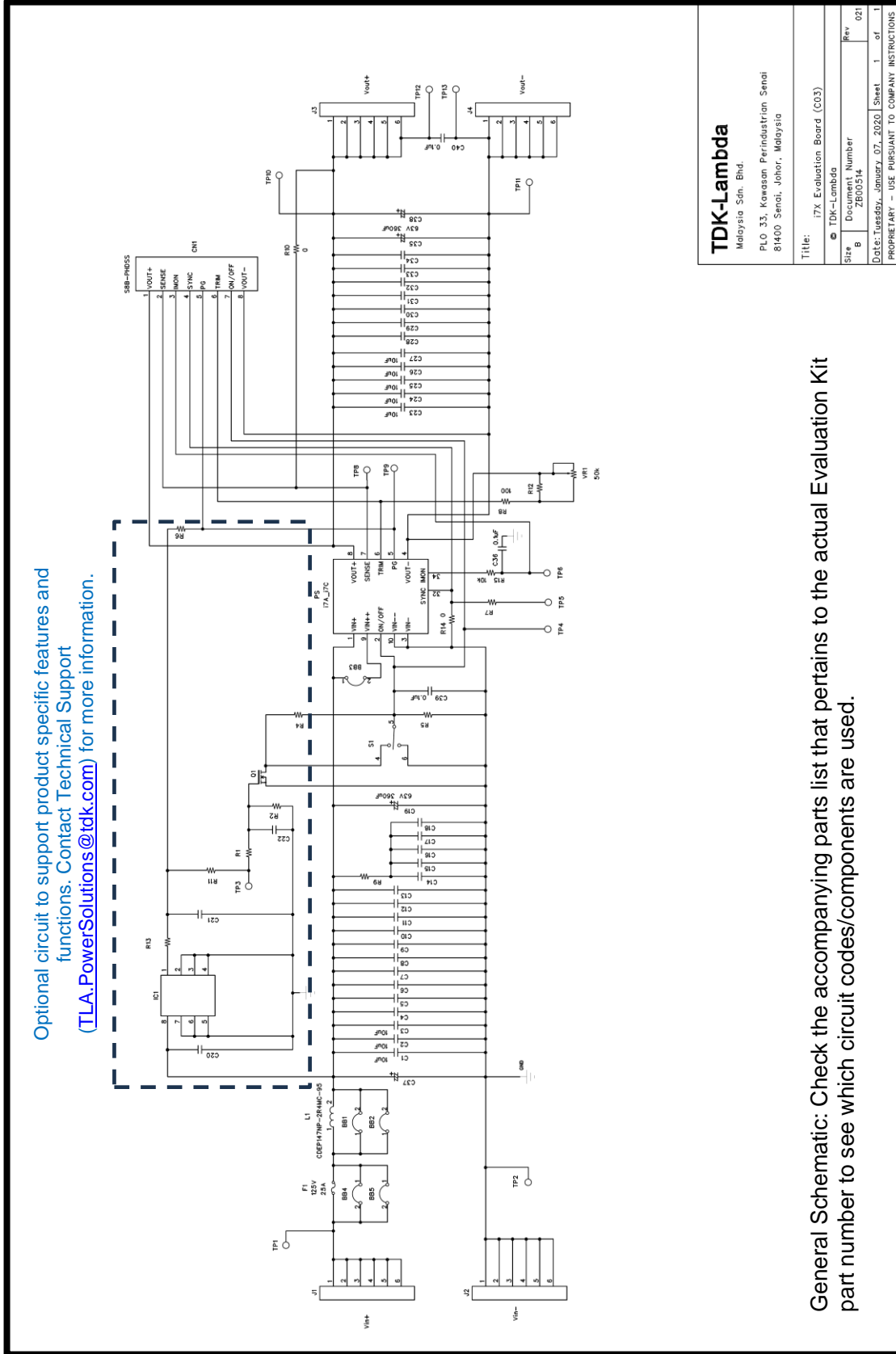
* The overall height for the evaluation kit pn: I7C20A-C03-EVK-S1 can vary up to 41.5 ± 1.5 mm [1.63 ± 0.06 in]. Specific height depends on the type of module installed, whether it's an openframe, heatsink or baseplate version.



9. Mechanical Outline - i7AxxA-C01-EVK-S1



10. Schematic



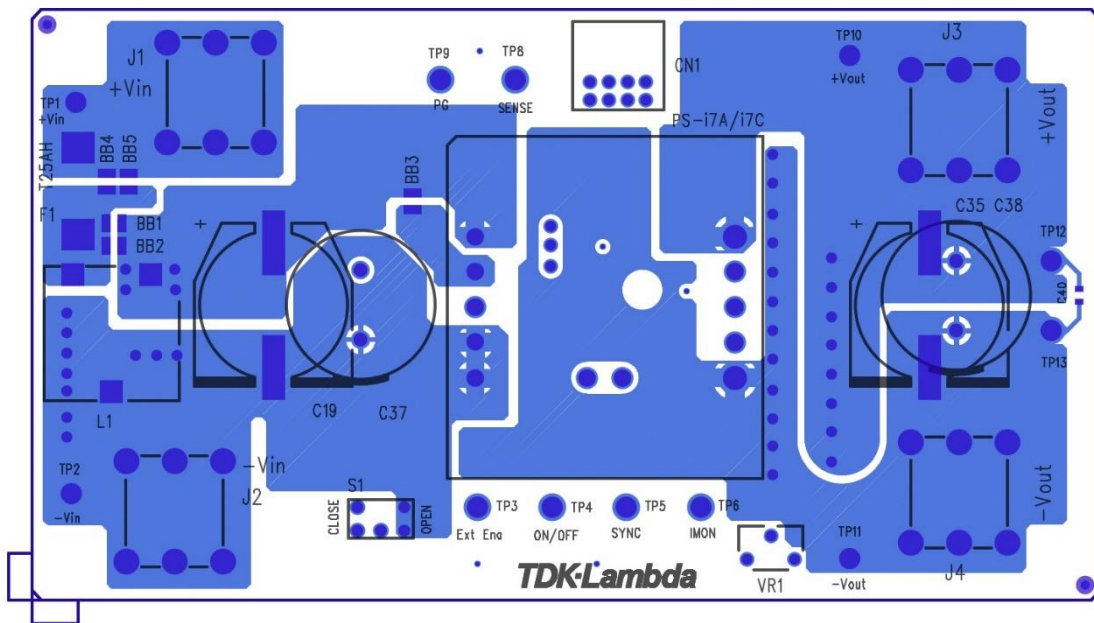
Optional circuit to support product specific features and functions. Contact Technical Support (TLA.PowerSolutions@tdk.com) for more information.

TDK-Lambda	
Malaysia Sdn. Bhd.	
PLO 33, Kawasan Perindustrian Semadi	
81400 Sereni, Johor, Malaysia	
Title: i7X Evaluation Board (C03)	
© TDK-Lambda	
Size	Document Number
B	Z800514
Rev	021
Date: Tuesday, January 07, 2020	Sheet 1 of 1
PROPRIETARY – USE PURSUANT TO COMPANY INSTRUCTIONS	

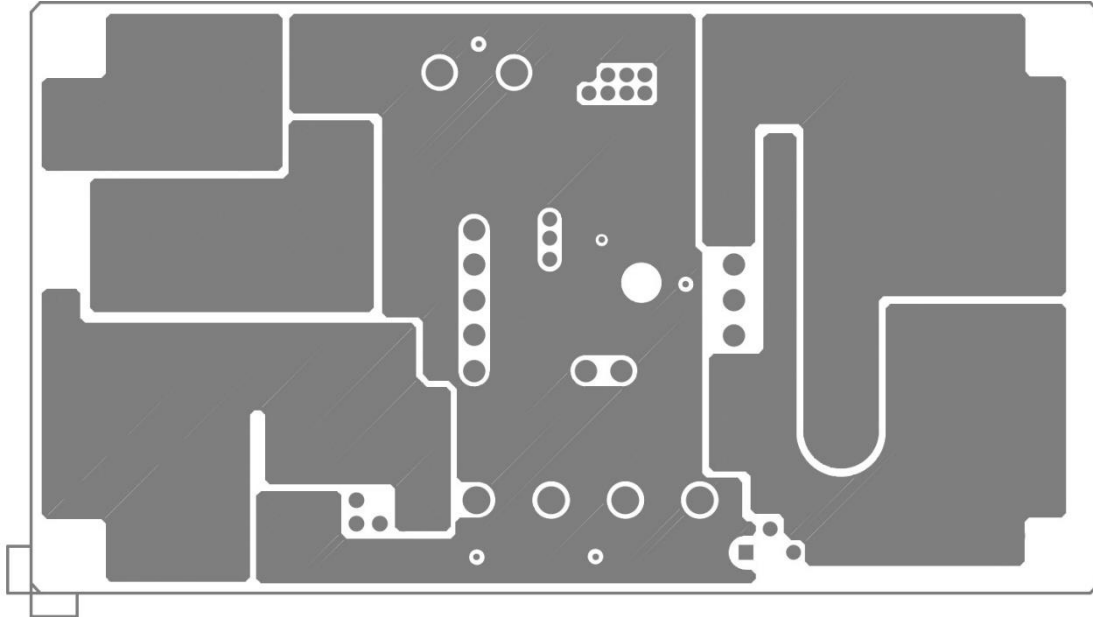
General Schematic: Check the accompanying parts list that pertains to the actual Evaluation Kit part number to see which circuit codes/components are used.

11. PCB Layout

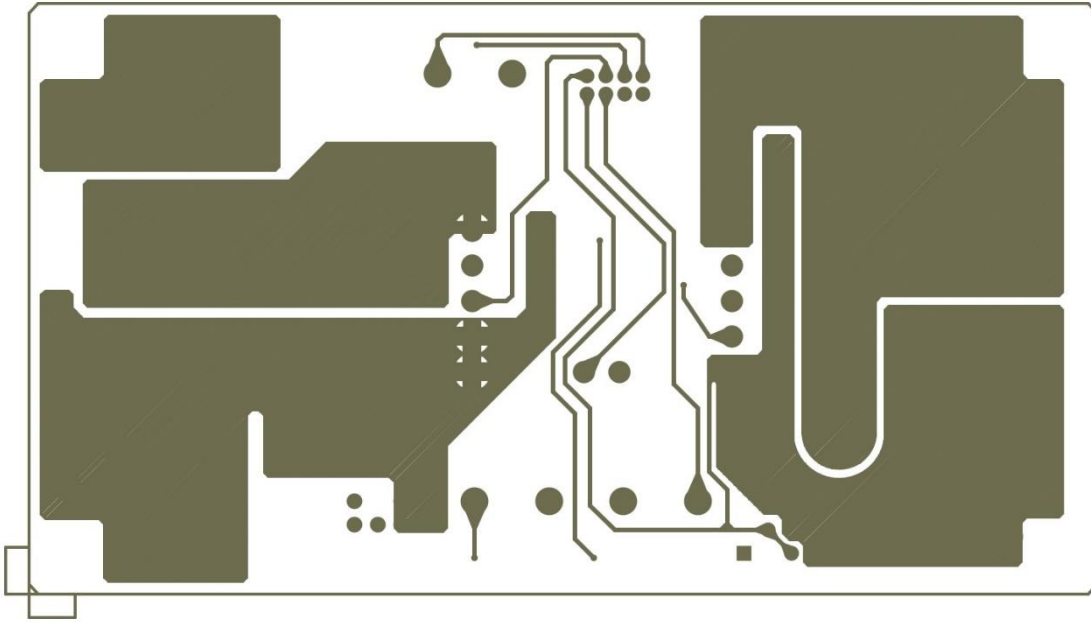
Top Layer



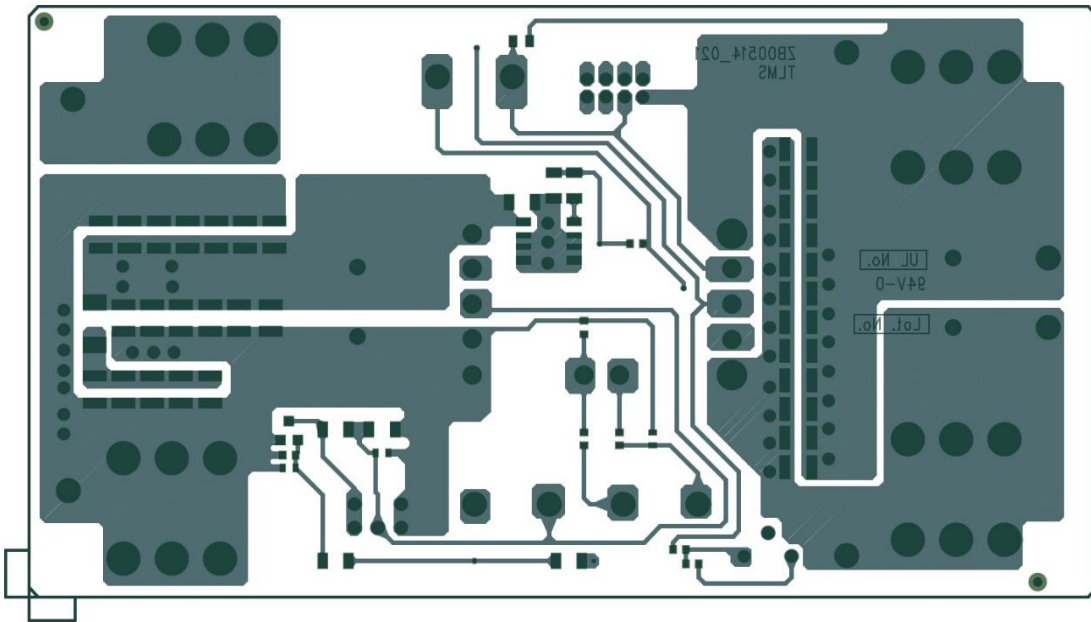
Layer 2



PCB Layout (continued) Layer 3



Bottom



12. Parts List: i7CxxA-C03-EVK-S1

Evaluation Kit Part Number		i7C08A-C03-EVK-S1		i7C12A-C03-EVK-S1		i7C20A-C03-EVK-S1	
Schematic Circuit Code	Part Type	Manufacturer (Mfr)	Mfr Part No.	Manufacturer (Mfr)	Mfr Part No.	Manufacturer (Mfr)	Mfr Part No.
i7A_i7C	DC-DC Module	TDK Lambda	i7C4W008A120V-003-R	TDK Lambda	i7C4W012A050V-003-R	TDK Lambda	i7C2W020A120V-003-R
Q1	Transister	OMIT		OMIT		OMIT	
C1	Capacitor	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L
C2	Capacitor	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L
C3	Capacitor	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L
C4-C13	Capacitor	OMIT		OMIT		MURATA	GRM32ER71J106MA12L
C14-C18	Capacitor	OMIT		OMIT		OMIT	
C19	Capacitor	NI-CHEMI	EMHB630ARA361MLH05	NI-CHEMI	EMHB630ARA361MLH05	Panasonic	EEEFK1H102AM
C20-C22	Capacitor	OMIT		OMIT		OMIT	
C23	Capacitor	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L
C24	Capacitor	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L
C25	Capacitor	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L
C26	Capacitor	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L
C27	Capacitor	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L	MURATA	GRM32ER71J106MA12L
C28-C34	Capacitor	OMIT		OMIT		MURATA	GRM32ER71J106MA12L
C35	Capacitor	NI-CHEMI	EMHB630ARA361MLH05	NI-CHEMI	EMHB630ARA361MLH05	Panasonic	EEEFK1H102AM
C36	Capacitor	TDK	C1608X7S2A104KT	TDK	C1608X7S2A104KT	TDK	C1608X7S2A104KT
C37-C38	Capacitor	OMIT		OMIT		OMIT	
C39	Capacitor	TDK	C1608X7S2A104KT	TDK	C1608X7S2A104KT	TDK	C1608X7S2A104KT
C40	Capacitor	TDK	C1608X7S2A104KT	TDK	C1608X7S2A104KT	TDK	C1608X7S2A104KT
F1	Fuse	OMIT		OMIT		OMIT	
BB1	Copper Pin	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01
BB2	Copper Pin	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01
BB3	Copper Pin	OMIT		OMIT		OMIT	
BB4	Copper Pin	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01
BB5	Copper Pin	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01
IC1	LDO	OMIT		OMIT		OMIT	
VR1	Resistor	BOURNS	3266W-1-204LF	BOURNS	3266W-1-503LF	BOURNS	3266W-1-503LF
L1	Inductor	OMIT		OMIT		OMIT	
R1-R6	Resistor	OMIT		OMIT		OMIT	
R7	Resistor	KOA	RK73Z1JTDD	KOA	RK73Z1JTDD	KOA	RK73Z1JTDD
R8	Resistor	KOA	RK73H1JTDD21R5F	KOA	RK73H1JTDD3010F	KOA	RK73H1JTDD51R0F
R9	Resistor	OMIT		OMIT		OMIT	
R10	Resistor	KOA	RK73Z2ATDD	KOA	RK73Z2ATDD	KOA	RK73Z2ATDD
R11	Resistor	OMIT		OMIT		OMIT	
R12	Resistor	KOA	RK73H1JTDD3323F	OMIT		KOA	RK73H1JTDD1002D
R13	Resistor	OMIT		OMIT		OMIT	
R14	Resistor	KOA	RK73Z1JTDD	KOA	RK73Z1JTDD	KOA	RK73Z1JTDD
R15	Resistor	KOA	RK73H1JTDD1002D	KOA	RK73H1JTDD1002D	KOA	RK73H1JTDD1002D
CN1	Connector	OMIT		OMIT		OMIT	
S1	Switch	LIGHT COUNTRY	2US1T1A1M2RES	LIGHT COUNTRY	2US1T1A1M2RES	LIGHT COUNTRY	2US1T1A1M2RES
J1	Terminal	KEystone	8196	KEystone	8196	KEystone	8196
J2	Terminal	KEystone	8196	KEystone	8196	KEystone	8196
J3	Terminal	KEystone	8196	KEystone	8196	KEystone	8196
J4	Terminal	KEystone	8196	KEystone	8196	KEystone	8196
TP1	Test Point	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP2	Test Point	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP3	Test Point	OMIT		OMIT		OMIT	
TP4	Test Point	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP5	Test Point	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP6	Test Point	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP8	Test Point	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP9	Test Point	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP10	Test Point	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP11	Test Point	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP12	Test Point	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP13	Test Point	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
SCR1	Screw	KEystone	9427	KEystone	9427	KEystone	9427
SCR2	Screw	KEystone	9427	KEystone	9427	KEystone	9427
SCR3	Screw	KEystone	9427	KEystone	9427	KEystone	9427
SCR4	Screw	KEystone	9427	KEystone	9427	KEystone	9427
SO1	Spacer	KEystone	1902C	KEystone	1902C	KEystone	1902C
SO2	Spacer	KEystone	1902C	KEystone	1902C	KEystone	1902C
SO3	Spacer	KEystone	1902C	KEystone	1902C	KEystone	1902C
SO4	Spacer	KEystone	1902C	KEystone	1902C	KEystone	1902C

13. Parts List: i7AxxA-C01-EVK-S1

Evaluation Kit Part Number		i7A33A-C01-EVK-S1		i7A45A-C01-EVK-S1		i7A60A-C01-EVK-S1	
Schematic Circuit Code	Part Type	Manufacturer (Mfr)	Mfr Part No.	Manufacturer (Mfr)	Mfr Part No.	Manufacturer (Mfr)	Mfr Part No.
i7A_i7C	DC-DC Module	TDK Lambda	i7A4W033A033V-001-R	TDK Lambda	i7A24045A033V-001-R	TDK Lambda	i7A12060A008V-001-R
Q1	Transistor	OMIT		OMIT		OMIT	
C1	Capacitor	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC
C2	Capacitor	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC
C3	Capacitor	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC
C4	Capacitor	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC
C5	Capacitor	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC
C6	Capacitor	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC
C7	Capacitor	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC
C8	Capacitor	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC
C9	Capacitor	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC
C10-C12	Capacitor	OMIT		OMIT		OMIT	
C13	Capacitor	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC	TDK	C3225X7R1N106M250AC
C14-C18	Capacitor	OMIT		OMIT		OMIT	
C19	Capacitor	NI-CHEMI	EMHS800ARA271MLHOS	NI-CHEMI	EMHS800ARA271MLHOS	NI-CHEMI	EMHB630ARA361MLHOS
C20-C22	Capacitor	OMIT		OMIT		OMIT	
C23	Capacitor	MURATA	GRM32ER7J1J106MA12L	MURATA	GRM32ER7J1J106MA12L	MURATA	GRM32ER7J1J106MA12L
C24	Capacitor	MURATA	GRM32ER7J1J106MA12L	MURATA	GRM32ER7J1J106MA12L	MURATA	GRM32ER7J1J106MA12L
C25	Capacitor	MURATA	GRM32ER7J1J106MA12L	MURATA	GRM32ER7J1J106MA12L	MURATA	GRM32ER7J1J106MA12L
C26	Capacitor	MURATA	GRM32ER7J1J106MA12L	MURATA	GRM32ER7J1J106MA12L	MURATA	GRM32ER7J1J106MA12L
C27	Capacitor	MURATA	GRM32ER7J1J106MA12L	MURATA	GRM32ER7J1J106MA12L	MURATA	GRM32ER7J1J106MA12L
C28	Capacitor	OMIT		OMIT		MURATA	GRM32ER7J1J106MA12L
C29	Capacitor	OMIT		OMIT		MURATA	GRM32ER7J1J106MA12L
C30-C34	Capacitor	OMIT		OMIT		OMIT	
C35	Capacitor	NI-CHEMI	EMHB630ARA361MLHOS	NI-CHEMI	EMHB630ARA361MLHOS	NI-CHEMI	EMHB630ARA361MLHOS
C36	Capacitor	OMIT		OMIT		OMIT	
C37-C38	Capacitor	OMIT		OMIT		OMIT	
C39	Capacitor	OMIT		OMIT		OMIT	
C40	Capacitor	TDK	C1608X7S2A104KT	TDK	C1608X7S2A104KT	TDK	C1608X7S2A104KT
F1	OMIT						
BB1	Copper Pin	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01
BB2	Copper Pin	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01
BB3	Copper Pin	OMIT		ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01
BB4	Copper Pin	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01
BB5	Copper Pin	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01	ROWLEY SPRING	ZP00185_01
IC1	OMIT						
VR1	Resistor	BOURNS	3266W-1-503LF	BOURNS	3266W-1-503LF	BOURNS	3266W-1-503LF
L1	OMIT						
R1-R7	OMIT						
R8	Resistor	KOA	RK73H1JTTD40R2F	KOA	RK73H1JTTD2490F	KOA	RK73H1JTTD1400F
R9	OMIT						
R10	Resistor	KOA	RK73H1JTTD1R00F	KOA	RK73H1JTTD1R00F	KOA	RK73H1JTTD1R00F
R11-R15	OMIT						
CN1	OMIT						
S1	Switch	LIGHT COUNTRY	2US1T1A1M2RES	LIGHT COUNTRY	2US1T1A1M2RES	LIGHT COUNTRY	2US1T1A1M2RES
J1-J4	Screws & Terminals	KEYSTONE	8196	KEYSTONE	8196	KEYSTONE	8196
TP1	Test Point: Vin(+)	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP2	Test Point: Vin(-)	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP3	OMIT						
TP4	Test Point: On/Off	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP5	OMIT						
TP6	OMIT						
TP8	Test Point: SENSE+	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP9	OMIT						
TP10	Test Point: Vout(+)	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP11	Test Point: Vout(-)	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP12	Test Point: Vout(+)	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
TP13	Test Point: Vout(-)	MAC8	WT-2-2	MAC8	WT-2-2	MAC8	WT-2-2
SCR1-SCR4	Screws for Standoffs	KEYSTONE	9427	KEYSTONE	9427	KEYSTONE	9427
SO1-SO4	Standoffs	KEYSTONE	1902C	KEYSTONE	1902C	KEYSTONE	1902C

Parts List: i7AxxA-C01-EVK-S1 (Continued)

Evaluation Kit Part Number		i7A20A-C01-EVK-S1	
Schematic Circuit Code	Part Type	Manufacturer (Mfr)	Mfr Part No.
i7A_i7C	DC-DC Module	TDK Lambda	i7A48020A033V-001-R
Q1	Transistor	OMIT	
C1	Capacitor	TDK	C3225X7S2A475KT
C2	Capacitor	TDK	C3225X7S2A475KT
C3	Capacitor	TDK	C3225X7S2A475KT
C4	Capacitor	TDK	C3225X7S2A475KT
C5	Capacitor	TDK	C3225X7S2A475KT
C6	Capacitor	TDK	C3225X7S2A475KT
C7	Capacitor	TDK	C3225X7S2A475KT
C8	Capacitor	TDK	C3225X7S2A475KT
C9	Capacitor	TDK	C3225X7S2A475KT
C10-C12	Capacitor	TDK	C3225X7S2A475KT
C13	Capacitor	TDK	C3225X7S2A475KT
C14-C18	Capacitor	OMIT	
C19	Capacitor	NI-CHEMI	EMHB101ARA221MLN0S
C20-C22	Capacitor	OMIT	
C23	Capacitor	MURATA	GRM32ER71J106MA12L
C24	Capacitor	MURATA	GRM32ER71J106MA12L
C25	Capacitor	MURATA	GRM32ER71J106MA12L
C26	Capacitor	MURATA	GRM32ER71J106MA12L
C27	Capacitor	MURATA	GRM32ER71J106MA12L
C28	Capacitor	MURATA	GRM32ER71J106MA12L
C29	Capacitor	MURATA	GRM32ER71J106MA12L
C30-C34	Capacitor	OMIT	
C35	Capacitor	NI-CHEMI	EMHB630ARA361MLHOS
C36	Capacitor	OMIT	
C37-C38	Capacitor	OMIT	
C39	Capacitor	OMIT	
C40	Capacitor	TDK	C1608X7S2A104KT
F1	OMIT		
BB1	Copper Pin	ROWLEY SPRING	ZP00185_01
BB2	Copper Pin	ROWLEY SPRING	ZP00185_01
BB3	Copper Pin	OMIT	
BB4	Copper Pin	ROWLEY SPRING	ZP00185_01
BB5	Copper Pin	ROWLEY SPRING	ZP00185_01
IC1	OMIT		
VR1	Resistor	BOURNS	3266W-1-503LF
L1	OMIT		
R1-R7	OMIT		
R8	Resistor	KOA	RK73H1JTTD56R0F
R9	OMIT		
R10	Resistor	KOA	RK73H1JTTD1R00F
R11-R15	OMIT		
CN1	OMIT		
S1	Switch	LIGHT COUNTRY	2US1T1A1M2RES
J1-J4	Screws & Terminals	KEYSTONE	8196
TP1	Test Point: Vin(+)	MAC8	WT-2-2
TP2	Test Point: Vin(-)	MAC8	WT-2-2
TP3	OMIT		
TP4	Test Point: On/Off	MAC8	WT-2-2
TP5	OMIT		
TP6	OMIT		
TP8	Test Point: SENSE+	MAC8	WT-2-2
TP9	OMIT		
TP10	Test Point: Vout(+)	MAC8	WT-2-2
TP11	Test Point: Vout(-)	MAC8	WT-2-2
TP12	Test Point: Vout(+)	MAC8	WT-2-2
TP13	Test Point: Vout(-)	MAC8	WT-2-2
SCR1-SCR4	Screws for Standoffs	KEYSTONE	9427
SO1-SO4	Standoffs	KEYSTONE	1902C



TDK-Lambda France SAS

Tel: +33 1 60 12 71 65
 ttf.fr.powersolutions@tdk.com
 www.emea.lambda.tdk.com/fr



Italy Sales Office

Tel: +39 02 61 29 38 63
 ttf.it.powersolutions@tdk.com
 www.emea.lambda.tdk.com/it



Netherlands

tfn.nl.powersolutions@tdk.com
 www.emea.lambda.tdk.com/nl



TDK-Lambda Germany GmbH

Tel: +49 7841 666 0
 tlq.powersolutions@tdk.com
 www.emea.lambda.tdk.com/de



Austria Sales Office

Tel: +43 2256 655 84
 tlq.at.powersolutions@tdk.com
 www.emea.lambda.tdk.com/at



Switzerland Sales Office

Tel: +41 44 850 53 53
 tlq.ch.powersolutions@tdk.com
 www.emea.lambda.tdk.com/ch



Nordic Sales Office

Tel: +45 8853 8086
 tlq.dk.powersolutions@tdk.com
 www.emea.lambda.tdk.com/dk



TDK-Lambda UK Ltd.

Tel: +44 (0) 12 71 85 66 66
 tlu.powersolutions@tdk.com
 www.emea.lambda.tdk.com/uk



TDK-Lambda Ltd.

Tel: +9 723 902 4333
 tli.powersolutions@tdk.com
 www.emea.lambda.tdk.com/il-en



TDK-Lambda Americas

Tel: +1 800-LAMBDA-4 or 1-800-526-2324
 tla.powersolutions@tdk.com
 www.us.lambda.tdk.com



TDK Electronics do Brasil Ltda

Tel: +55 11 3289-9599
 sales.br@tdk-electronics.tdk.com
 www.tdk-electronics.tdk.com/en



TDK-Lambda Corporation

Tel: +81-3-6778-1113
 www.jp.lambda.tdk.com



TDK-Lambda (China) Electronics Co. Ltd.

Tel: +86 21 6485-0777
 tlc.powersolutions@tdk.com
 www.lambda.tdk.com.cn



TDK-Lambda Singapore Pte Ltd.

Tel: +65 6251 7211
 tfs.marketing@tdk.com
 www.sg.lambda.tdk.com



TDK India Private Limited, Power Supply Division

Tel: +91 80 4039-0660
 mathew.philip@tdk.com
 www.sg.lambda.tdk.com

