EVMPC22163-2891-Split-02A

130A, Two-Phase Intelli-Module™ with Quiet Switcher™ Technology Evaluation Board

DESCRIPTION

The EVMPC22163-2891-Split-02A is an evaluation board designed to demonstrate the capabilities of the MPC22163-130, a 130A, two-phase Intelli-Module™ with Quiet Switcher™ technology (QST).

The EVMPC22163-2891-Split-02A can deliver 130A of load current across a wide operating input voltage (V_{IN}) range. High efficiency can be achieved across a wide output current (I_{OUT}) load range.

The EVMPC22163-2891-Split-02A employs the MP2891 combined with two MPC22163-130 devices that form two power supply rails, which can operate independently.

Protections include configurable V_{IN} under-voltage lockout (UVLO) protection as well as V_{OUT} over-voltage protection (OVP), under-voltage protection, over-current limit (OCL) protection, and over-current protection (OCP).

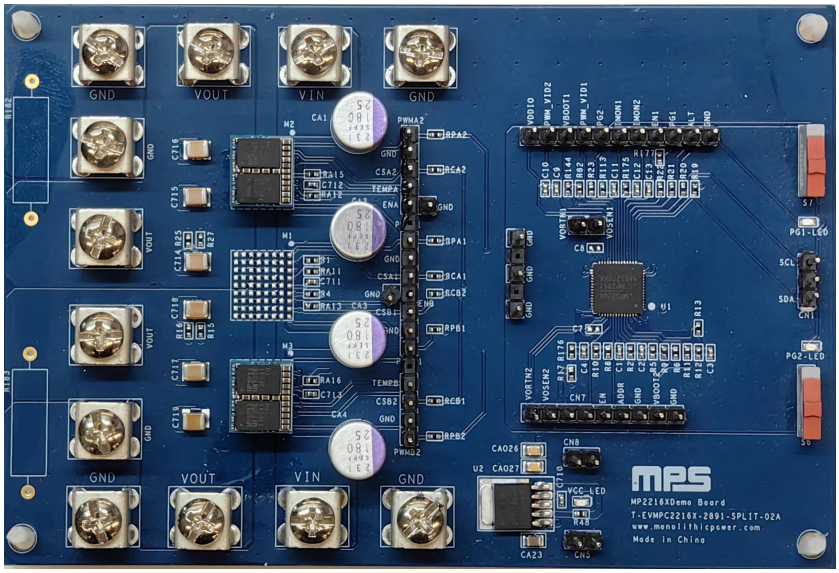
The MPC22163-130 is available in an LGA-72 (9mmx10mmx7.65mm) package. The EVMPC22163-2891-Split-02A can monitor the MPC22163-130's V_{IN}, output voltage (V_{OUT}), I_{OUT}, and temperature.

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C, unless otherwise noted.

Parameters	Conditions	Value
Input voltage (V_{IN}) range		10V to 16V
Output voltage (V_{OUT})	V_{IN} = 10V to 16V, I_{OUT} = 0A to 130A	V_{OUT} = 0.8V
Maximum output current (I_{OUT}) (1)	V_{IN} = 10V to 16V	130A
Switching frequency (f_{SW})		700kHz

EVMPC22163-2891-SPLIT-02A EVALUATION BOARD



LxWxH (12cmx8cmx2cm

Board Number	MPS IC Number
EVMPC22163-2891-Split-02A	MPC22163-130

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QUICK START GUIDE

The EVMPC22163-2891-Split-02A evaluation board has a 10V to 16V input voltage (V_{IN}) range. For proper measurement equipment set-up, refer to Figure 1. The EVMPC22163-2891-Split-02A has a start-up and shutdown sequence, described below: (1)

Start-Up Sequence

1. Set the input voltage (V_{IN}) between 10 and 16V.
2. Turn on the mechanical EN switches, S7 and S6, for rail A and rail B, respectively.
3. Turn on the EN commands in the GUI, VOUT1 and VOUT2, for rail A and rail B, respectively.

Shutdown Sequence

1. Set V_{IN} to be below 10V or above 16V.
2. Turn off EN switches S7 and S6, or turn of EN commands in the GUI.

Note:

1) The evaluation board can also be shut down using V_{IN} over-voltage protection (OVP) and under-voltage protection (UVP), V_{OUT} OVP and UVP, over-current protection (OCP), or over-temperature protection (OTP). If a protection is triggered, the output can be recovered by cycling the power on the VIN or EN switches.

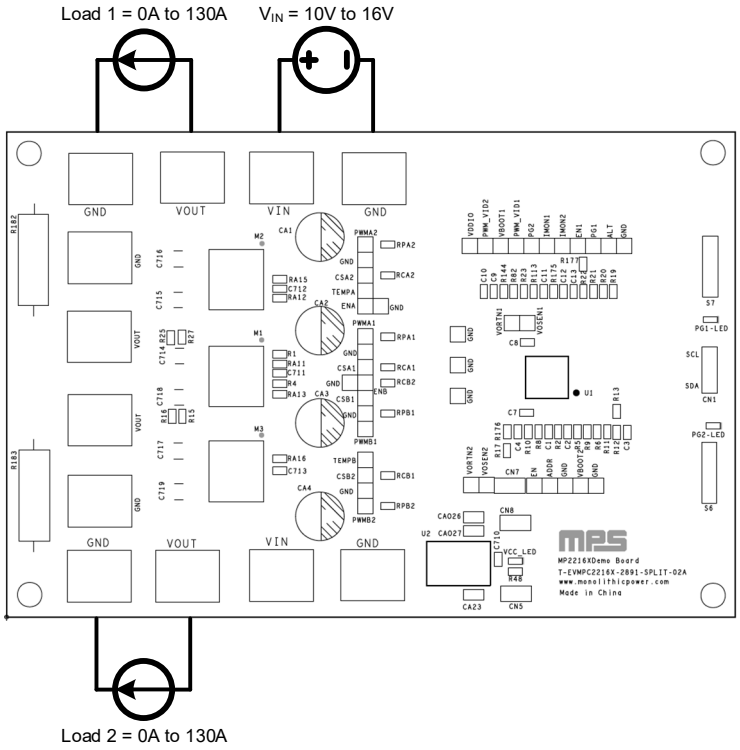

Figure 1: Measurement Equipment Set-Up

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EVALUATION BOARD SCHEMATIC

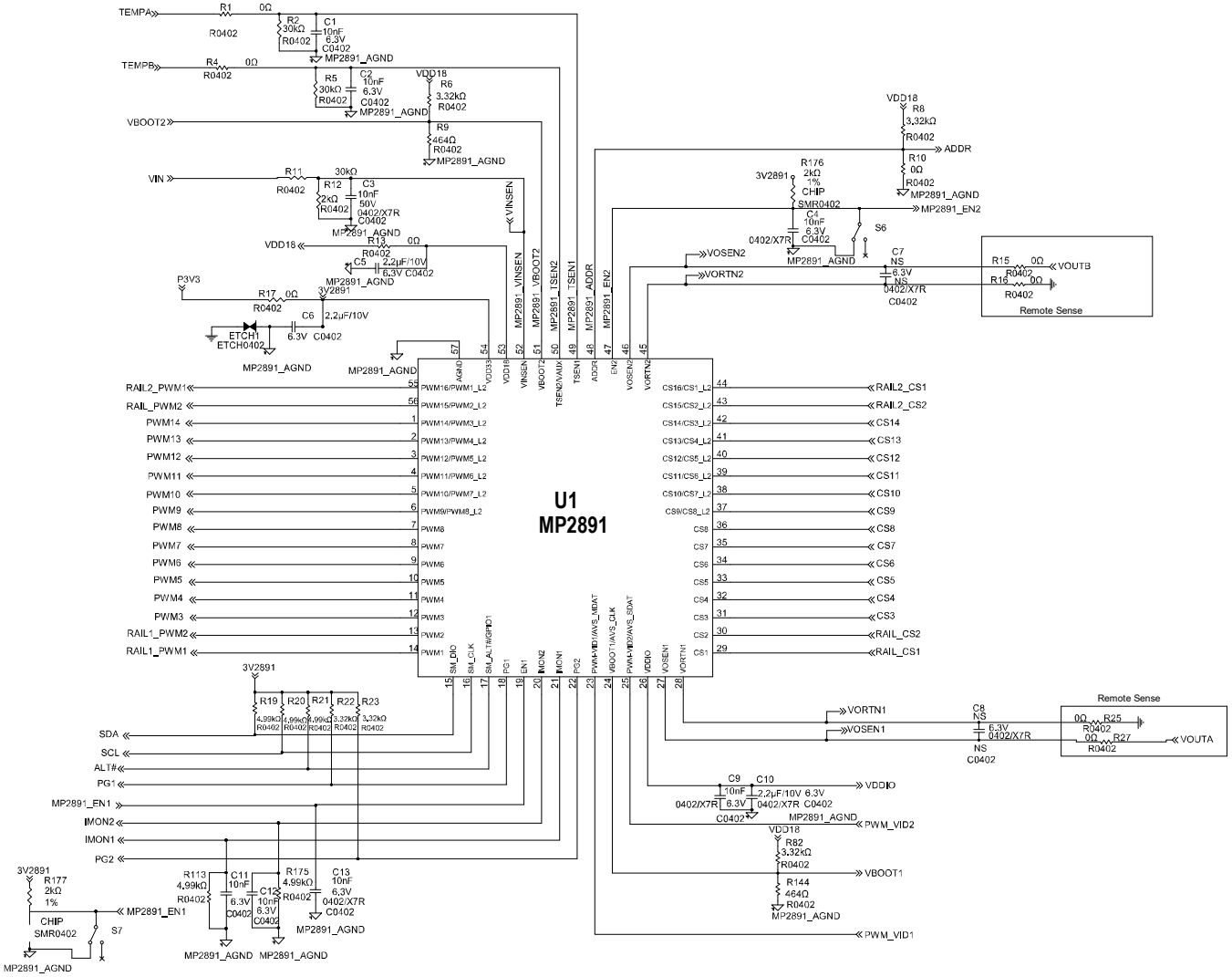

Figure 2: Evaluation Board Schematic (MP2891)

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EVALUATION BOARD SCHEMATIC *(continued)*

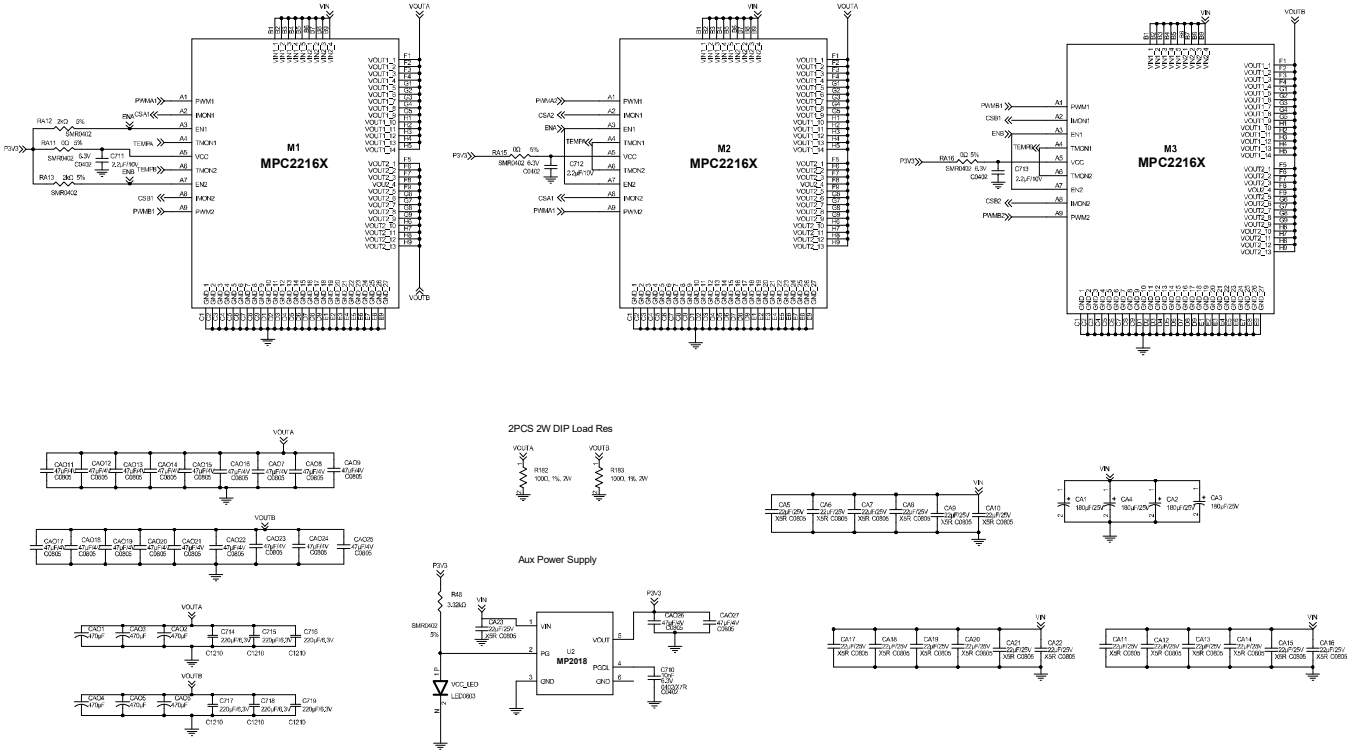

Figure 3: Evaluation Board Schematic (MPC2216x and Aux Power Supply)

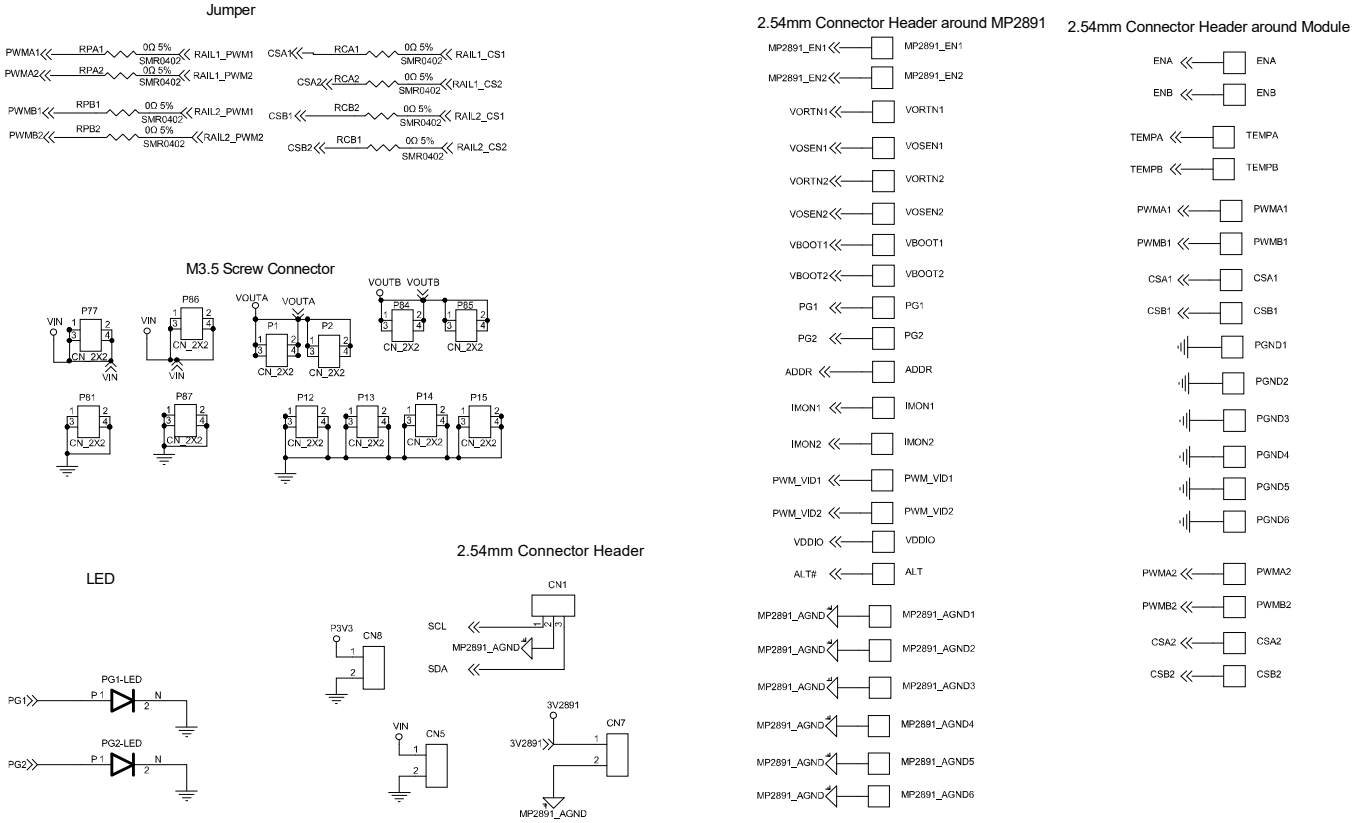

Figure 4: Evaluation Board Schematic (Connector)

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EVMPC22163-2891-02A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
4	CA1, CA2, CA3, CA4	180µF	Electrolytic capacitor, 25V	DIP	Panasonic	25SEPF180M
6	CAO1, CAO2, CAO3, CAO4, CAO5, CAO6	470µF	Polymer capacitor, 2.5V	7343	Panasonic	EEFGX0E471R
19	CA5, CA6, CA7, CA8, CA9, CA10, CA11, CA12, CA13, CA14, CA15, CA16, CA17, CA18, CA19, CA20, CA21, CA22, CA23	22µF	Multilayer ceramic capacitor, 25V, X5R	0805	Murata	GRM21BR61E226ME44
20	CAO7, CAO8, CAO9, CAO11, CAO12, CAO13, CAO14, CAO15, CAO16, CAO17, CAO18, CAO19, CAO20, CAO21, CAO22, CAO23, CAO24, CAO25, CAO26, CAO27	47µF	Multilayer ceramic capacitor, 4V, X6S	0805	Murata	GRM21BC80G476ME15
9	C1, C2, C3, C4, C9, C11, C12, C13, C710	10nF	Multilayer ceramic capacitor, 50V, X7R	0402	Murata	GRM155R71H103KA88
6	C5, C6, C10, C711, C712, C713	2.2µF	Multilayer ceramic capacitor, 10V, X6S	0402	Murata	GRM155C81A225ME44
2	C7, C8	NS				
6	C714, C715, C716, C717, C718, C719	220µF	Multilayer ceramic capacitor, 6.3V, X5R	1210	Murata	GRM32ER60J227ME05
20	RPB1, RPA1, RCB1, RCA1, R1, RPB2, RPA2, RCB2, RCA2, R4, R10, RA11, R13, RA15, R15, RA16, R16, R17, R25, R27	0Ω	Film resistor, 1%, 1/16W	0402	Yageo	RC0402FR-070RL
5	RA12, R12, RA13, R176, R177	2kΩ	Film resistor, 1%, 1/16W	0402	Yageo	RC0402FR-072KL
3	R2, R5, R11	30kΩ	Film resistor, 1%, 1/16W	0402	Yageo	RC0402FR-0730KL
6	R6, R8, R22, R23, R48, R82	3.32kΩ	Film resistor, 1%, 1/16W	0402	Yageo	RC0402FR-073K32L

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EVMPC22163-2891-02A BILL OF MATERIALS *(continued)*

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
2	R9, R144	464Ω	Film resistor, 1%, 1/16W	0402	Yageo	RC0402FR-07464RL
5	R19, R20, R21, R113, R175	4.99kΩ	Film resistor, 1%, 1/16W	0402	Yageo	RC0402FR-074K99L
2	R182, R183	NS				
2	S6, S7	10mmx 2mm	EN1 switch	DIP	Any	
3	PG1-LED, PG2-LED, 12V_LED	0.2W	Green LED	0603	Baihong	BL-HGE36A-AV-TRB
12	P1, P2, P12, P13, P14, P15, P77, P81, P84, P85, P86, P87	6-32	Screw connector, 4-pin	DIP	Keystone Electronics	8191K-ND
45	VOSEN1, VORTN1, VBOOT1, PWM_VID1, PWMB1, PWMA1, PGND1, PG1, IMON1, CSB1, CSA1, VOSEN2, VORTN2, VBOOT2, PWM_VID2, PWMB2, PWMA2, PGND2, PG2, IMON2, CSB2, CSA2, PGND3, PGND4, PGND5, PGND6, EN1, EN2, AGND1, AGND2, AGND3, AGND4, AGND5, AGND6, VDDIO, TEMPB, TEMPA, ENB, ENA, ALT, ADDR, CN1, CN5, CN7. CN8	2.54mm	Pin header, single row	DIP	Any	
1	M1	NS				
2	M2, M3	MPC22163-130	Two-phase Intelli-Module™ with Quiet Switcher™ technology	LGA-72 (9mmx 10mmx 7.65mm)	MPS	MPC22163-130
1	U1	MP2891	Digital, 16-phase PWM-VID controller with PMBus	QFN-56 (7mmx 7mm)	MPS	MP2891GQN
1	U2	MP2018	16V, 3.3V output, 500mA, linear regulator	TO252-5	MPS	MP2018GZD-33

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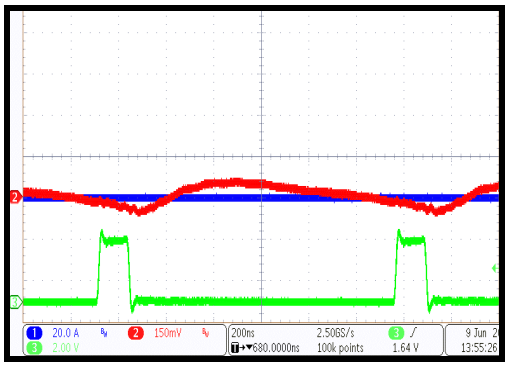
EVB TEST RESULTS

Performance curves and waveforms are tested on the evaluation board. V_{IN} = 12V, V_{OUT} = 0.8V, T_A = 25°C, unless otherwise noted.

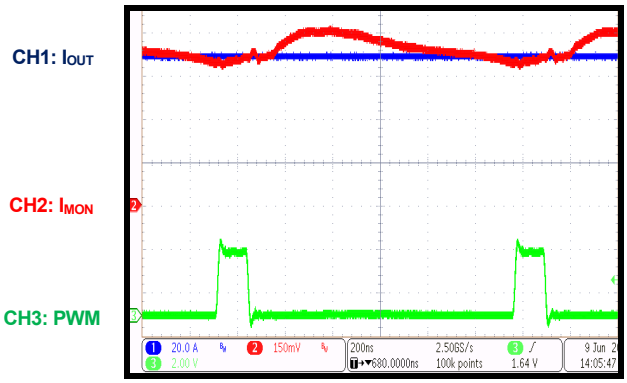
Steady State

IMON reporting, one phase, f_{SW} = 800kHz, I_{OUT} = 0A



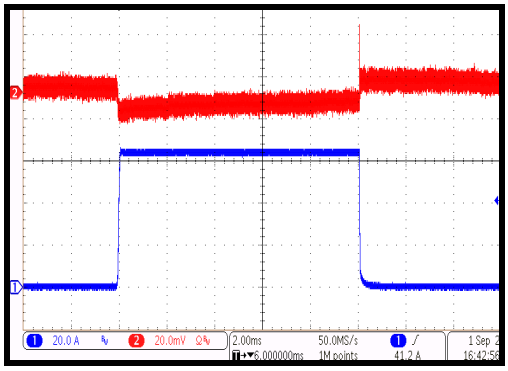
Steady State

IMON reporting, one phase, f_{SW} = 800kHz, I_{OUT} = 70A



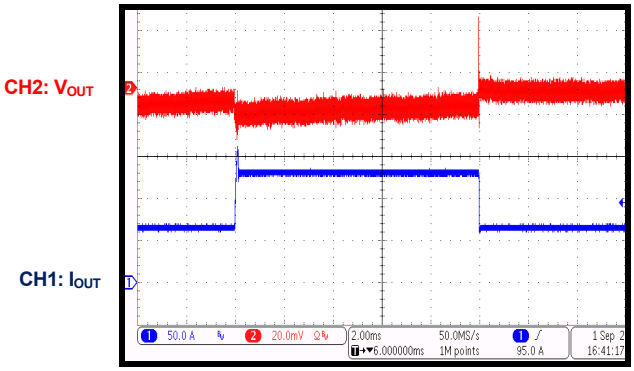
Load Transient

Two phases interleaved, f_{SW} = 700kHz, I_{OUT} = 0A to 65A



Load Transient

Two phases interleaved, f_{SW} = 700kHz, I_{OUT} = 65A to 130A



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PCB LAYOUT

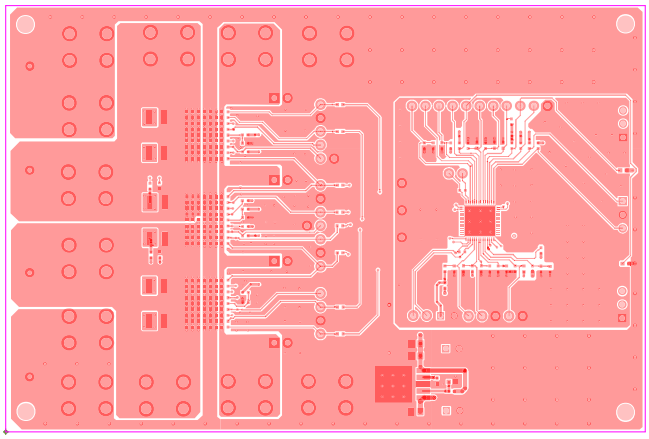

Figure 5: Top Layer

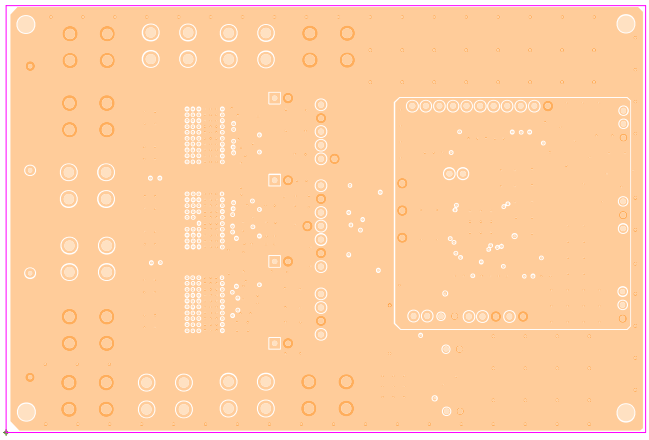

Figure 6: Mid-Layer 1

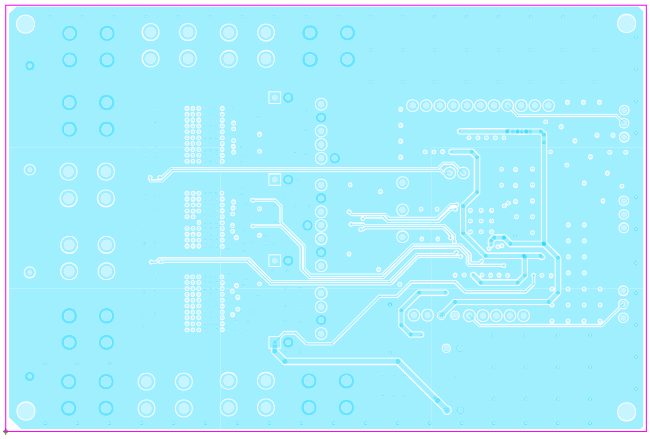

Figure 7: Mid-Layer 2

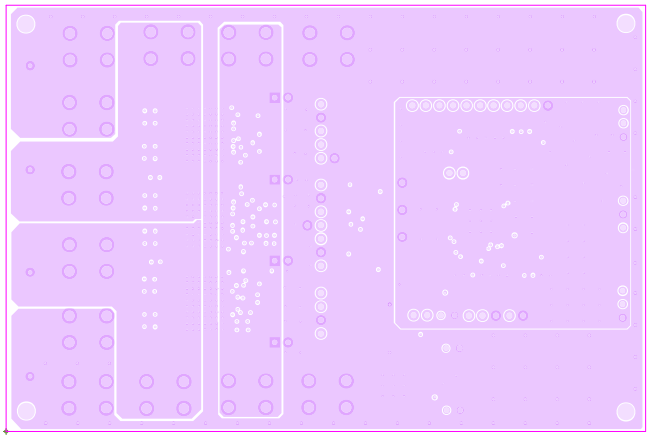

Figure 8: Mid-Layer 3

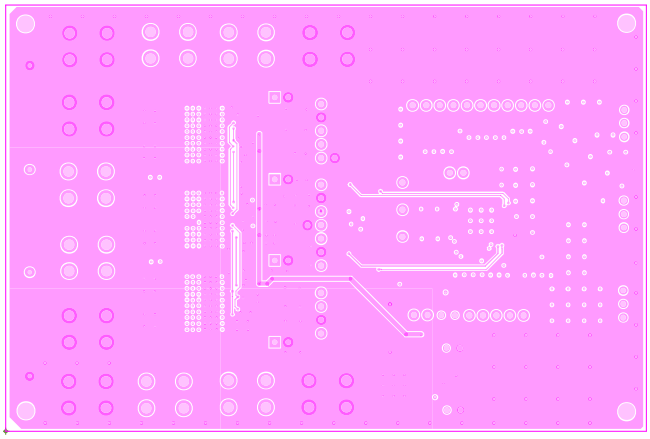

Figure 9: Mid-Layer 4

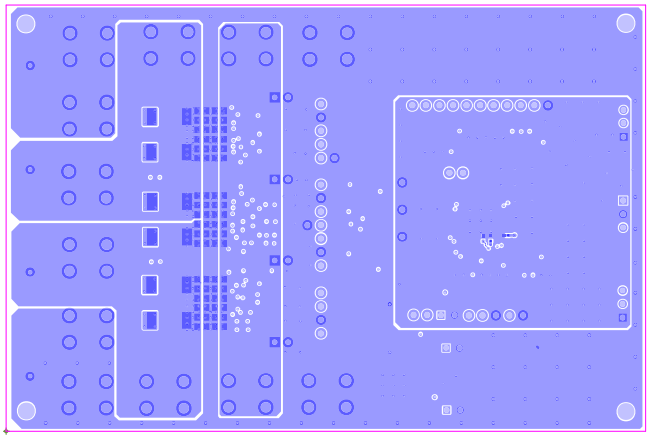

Figure 10: Bottom Layer

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REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	9/7/2023	Initial Release	-
1.01	11/14/2025	Corrected part number in headers.	2–9
		Updated EVMPC22163-2891-02A Bill of Materials section to remove confidential customer name.	6

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