



The Future of Analog IC Technology®

# EV5921-V-01A

16V, 50A, 1mΩ (R<sub>ds\_on</sub>)  
HOT-SWAP INTELLI-FUSE SOLUTION

## DESCRIPTION

MP5921 is a monolithic integrated controller and switch. It contains a high-side MOSFET and other circuitry that enables it to work as stand-alone or to be controlled by a hot-swap controller. MP5921 drives up to 50 A of continuous current per device at room temperature, while with air flow, the continuous current can reach to 60A.

The MP5921 limits the inrush current to the load when a circuit card is inserted into a live backplane power source, thereby limiting the backplane's voltage drop. MP5921 limits the internal MOSFET current by controlling the gate voltage through the current limit reference input.

MP5921 offers many features to simplify the system design. It provides an integrated solution to monitor the output current and the die temperature, eliminating the need for an external current-sense power resistor, power MOSFET, and thermal sense device.

The MP5921 detects the power FET gate, source, and drain short conditions and feedback to controller. Also, MP5921 can be paralleled for higher current applications.

The MP5921 is available in 4mmx5mm QFN package.

## ELECTRICAL SPECIFICATIONS

Parameter	Value	Units
Input Voltage	12	V
Output Voltage	12	V
Current Limit Per MP5921	60	A
Active MP5921 Number	4	/

## FEATURES

- 4V to 16V Operating Input Range
- Maximum 50A Output Current
- Support 60A Output Current With Air Flow
- Integrated Switch with Lower R<sub>ds(on)</sub> 1mΩ
- Built-In MOSFET Driver
- 3.0V LDO Output
- Integrated Current Sensing with Sense Output
- Separate Current Sensing Output Used to Program Over-Current Value
- Built-In Insertion Delay
- Adjustable Soft Start
- Output Short-Circuit Protection
- Over-Temperature Protection
- Built-In Fuse Health Reporting
- Fault Signal Output
- Parallel Operation for Higher Current Applications
- Integrated Intelli-Fuse Temperature Sense
- Output Voltage Power Down Control
- Available in a FCQFN 4mmx5mm Package

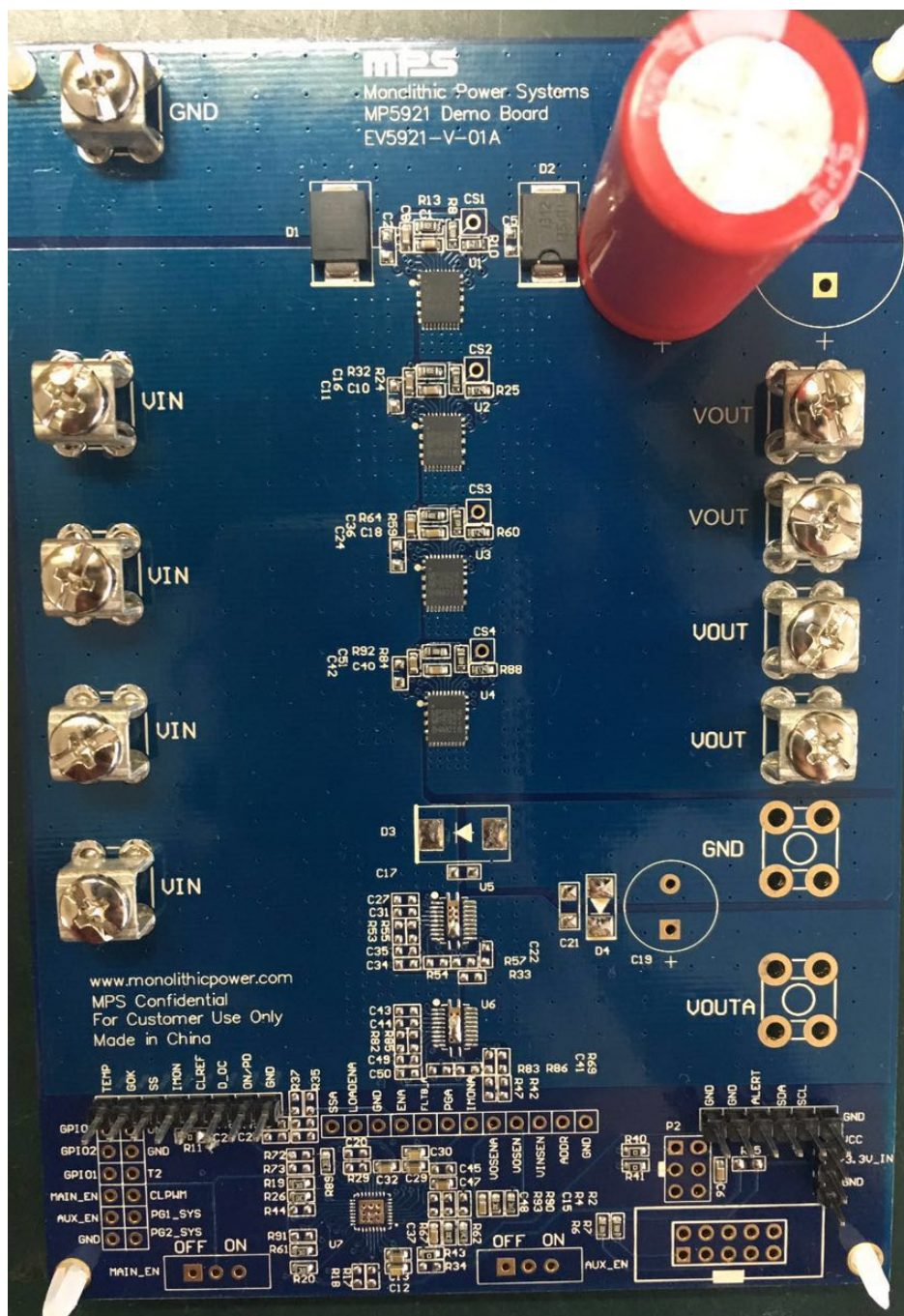
## APPLICATIONS

- Hot Swap
- PC Cards
- Disk Drives
- Servers
- Networking
- Laptops

All MPS parts are lead-free, halogen free, and adhere to the RoHS directive. For MPS green status, please visit MPS website under Quality Assurance.

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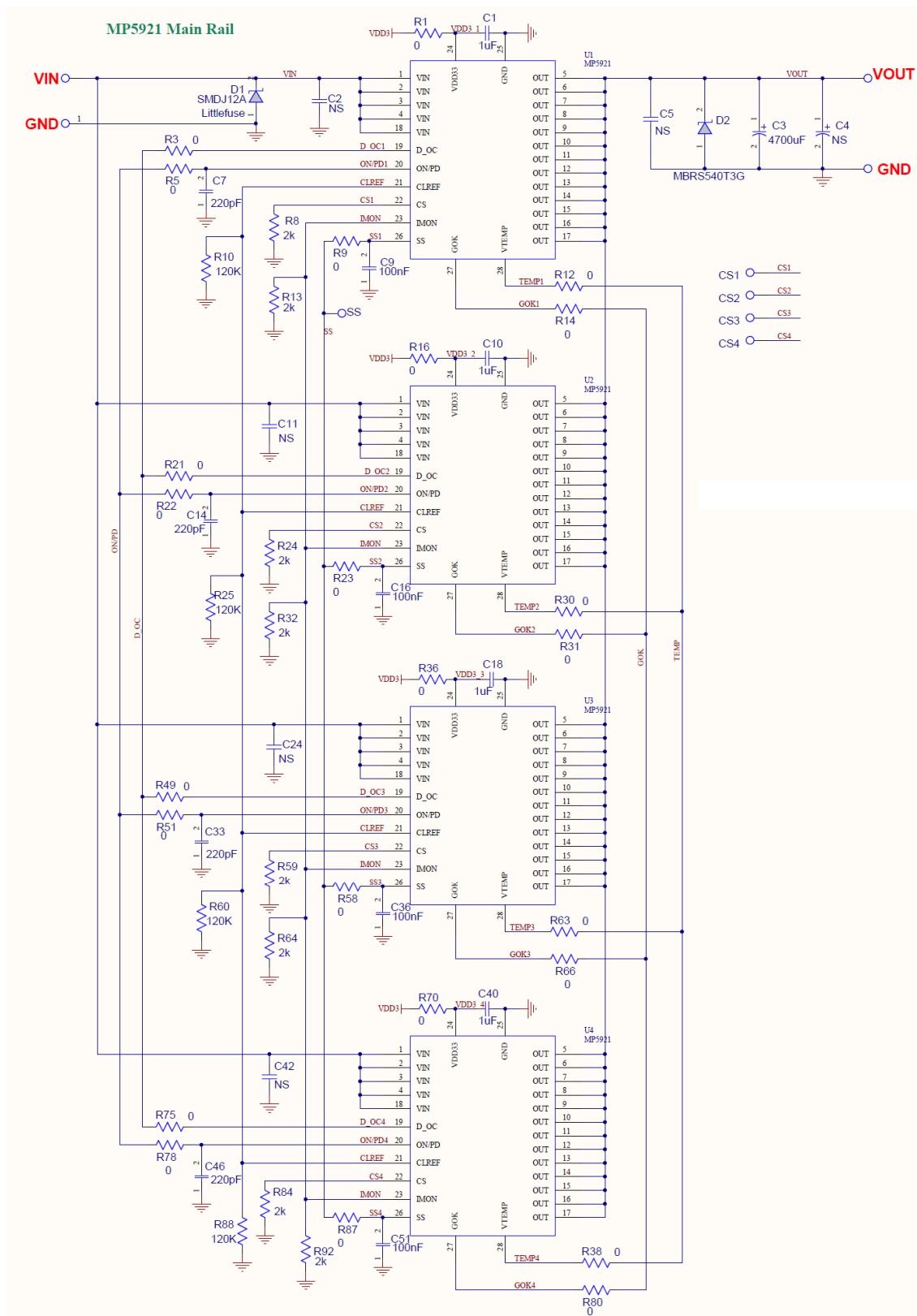
## EV5921-V-01A EVALUATION BOARD



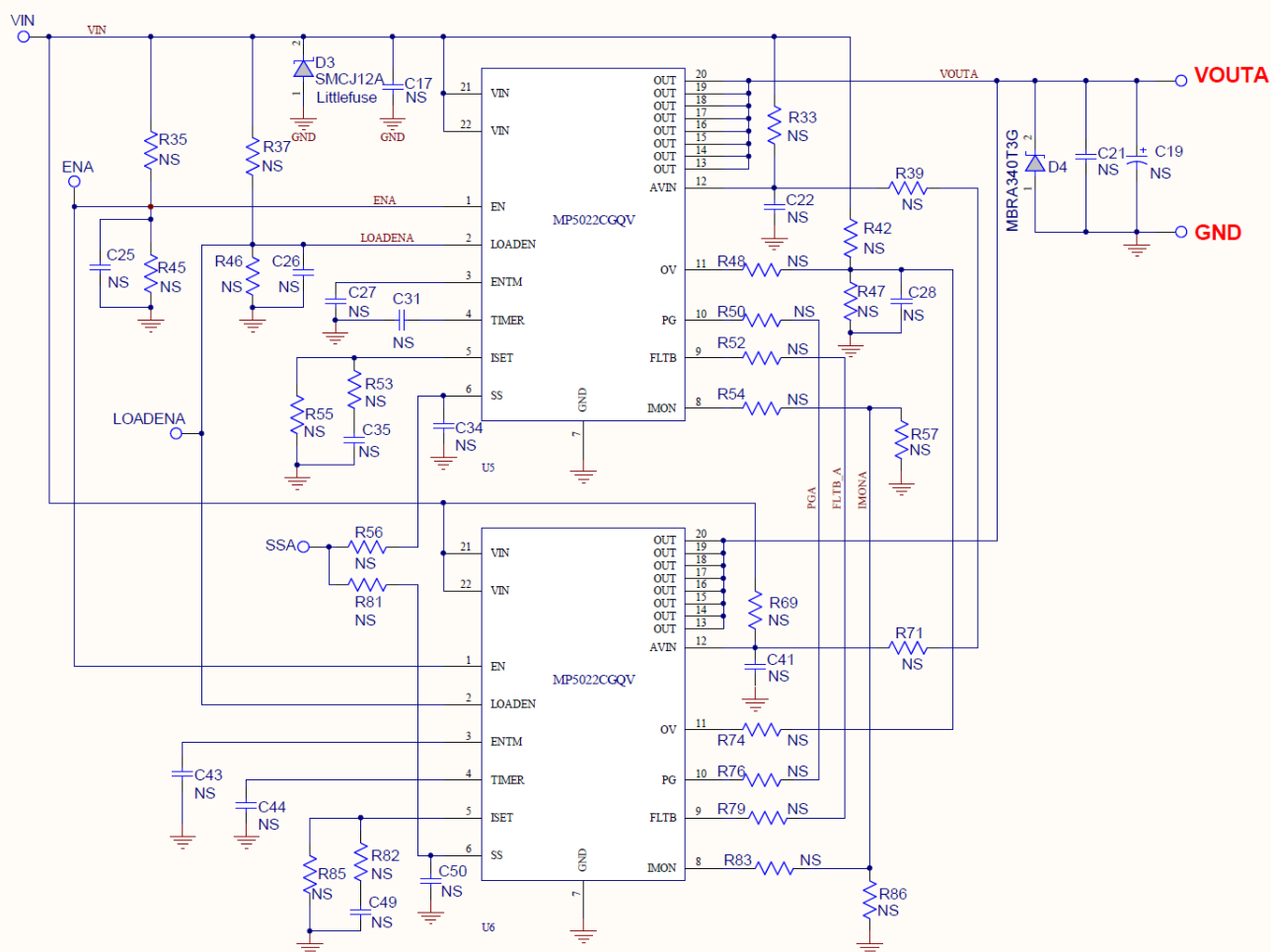
(L x W x H) 13.44cm × 9.44cm × 1.6mm

Board Number	MPS IC Number
EV5921-V-01A	MP5921GV

## EVALUATION BOARD SCHEMATIC

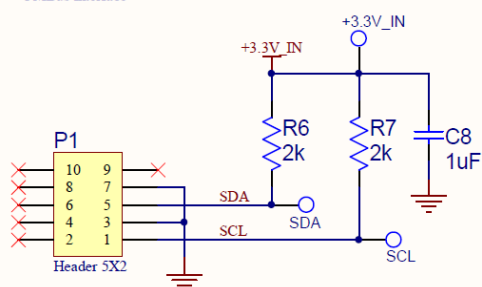


### MP5022C Auxiliary Rail

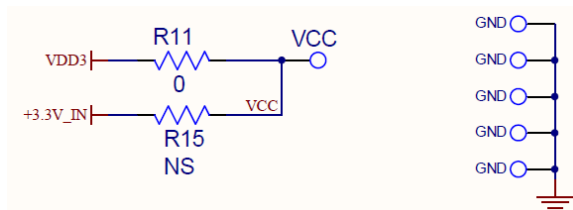
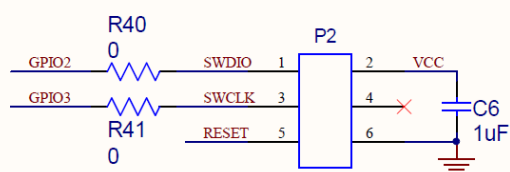


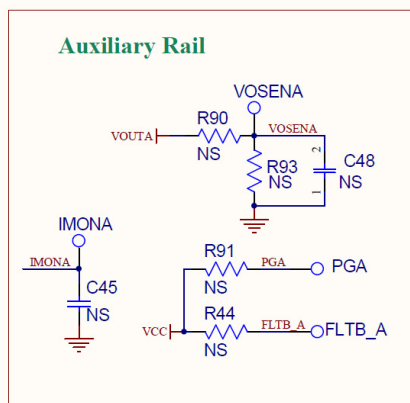
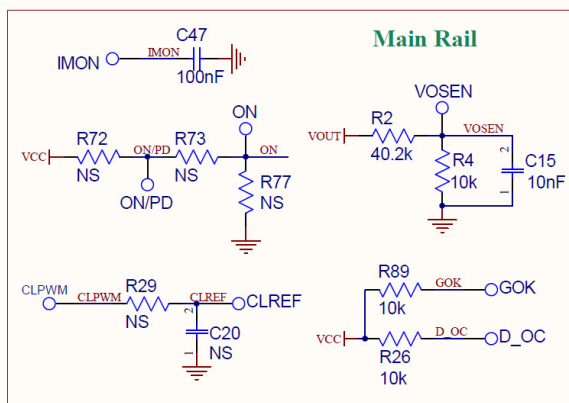
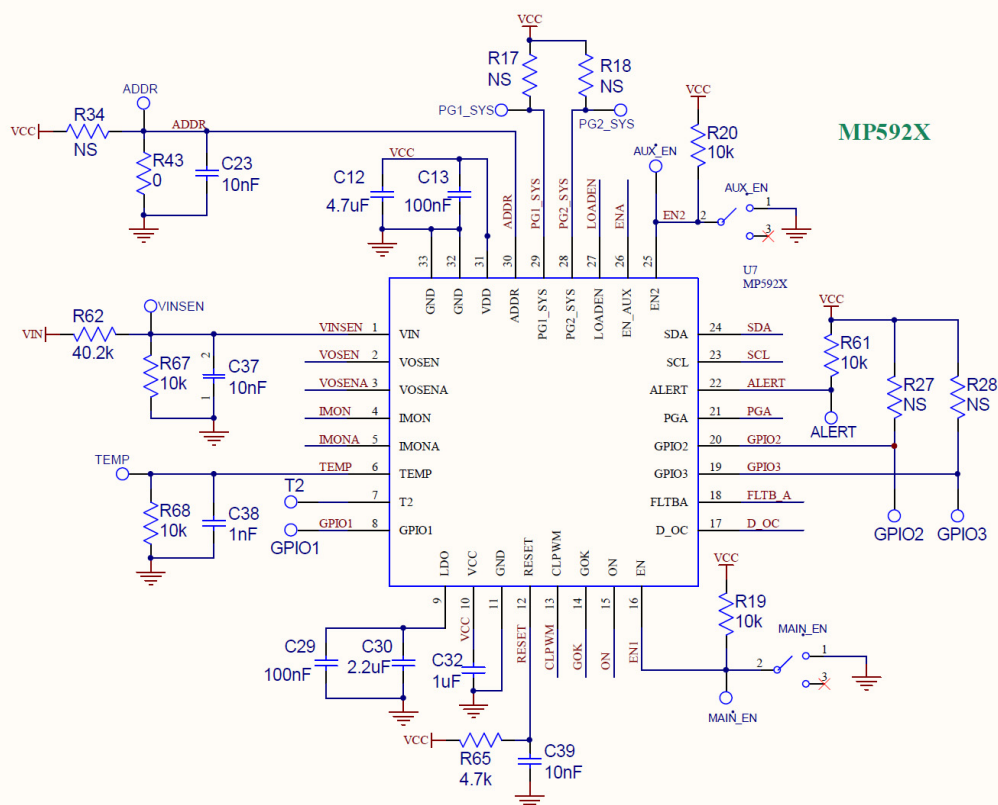
### PMBus Connector

PMBus Interface



### MP592X FW Download Connector







## EV5921-V-01A BILL OF MATERIALS

Qty	Designator	Value	Description	Footprint	Manufacturer	Manufacturer P/N
7	C1, C6, C8, C10, C18, C32, C40	1uF	Ceramic Capacitor;10V;X7R	0603	Murata	GRM188R71A105KA61D
25	C2, C4, C5, C11, C17, C19, C20, C21, C22, C24, C25, C26, C27, C28, C31, C34, C35, C41, C42, C43, C44, C45, C48, C49, C50,	NS				
1	C3	4700uF	Electrolytic Cap, 35V	DIP	Wurth	860020581026(4.7mF/35V)
4	C7, C14, C33, C46	220pF	Ceramic Capacitor;50V;COG	0603	Murata	GRM1885C1H221JA01D
7	C9, C13, C16, C29, C36, C47, C51	100nF	Ceramic Capacitor;50V;X7R	0603	Murata	GRM188R71H104KA93D
1	C12	4.7uF	Ceramic Capacitor;10V;X5R	0603	Murata	GRM188R61A475KE15D
4	C15, C23, C37, C39	10nF	Ceramic Capacitor;50V;X7R	0603	Murata	GRM188R71H103KA01D
1	C30	2.2uF	Ceramic Capacitor;16V;X5R	0603	Murata	GRM188R61C225KE15D
1	C38	1nF	Ceramic Capacitor;25V;COG	0603	Murata	GRM1885C1E102JA01D
1	D1	SMDJ12A	TVS Diode; 12V	DO-214AB	Littlefuse	SMDJ12A
1	D2	MBRS540T3G	SCHOTTKY	SMC	ON	MBRS540T3G
2	D3, D4	NS				
17	TEMP, GOK, SS, IMON, CLREF, D_OC, ON/PD, GND1, GND6, GND7, ALERT, SCL, SDA, GND8, VCC, +3.3V_IN, GND9	TP	Test point	CONN/T P		1*40 180 度, 2.54mm 排针
28	CS1, CS2, CS3, CS4, GPIO3, GPIO2, GPIO1, MAIN_EN1, AUX_EN2, GND2, ON, GND3,T2, CLPWM, PG1_SYS, PG2_SYS, SSA, LOADENA, GND4, ENA, FLTB_A, PGA, IMONA, VOSENA, VOSEN, VINSEN, ADDR, GND5	NS				
2	AUX_EN, MAIN_EN	NS				
2	P1, P2	NS				
27	R1, R3, R5, R9, R12, R14, R16, R21, R22, R23, R30, R31, R36, R38, R40, R41, R43, R49, R51, R58, R63, R66, R70, R75, R78, R80, R87	0	Film Res., 1%	0603	Yageo	RC0603FR-070RL
2	R2, R62	40.2k	Film Res., 1%	0603	Yageo	RC0603FR-0740K2L

**EV5921-V-01A BILL OF MATERIALS (continued)**

Qty	Designator	Value	Description	Footprint	Manufacturer	Manufacturer P/N
8	R4, R19, R20, R26, R61, R67, R68, R89	10k	Film Res., 1%	0603	Yageo	RC0603FR-0710KL
10	R6, R7, R8, R13, R24, R32, R59, R64, R84, R92	2k	Film Res., 1%	0603	Yageo	RC0603FR-072KL
4	R10, R25, R60, R88	120k	Film Res., 1%	0603	Yageo	RC0603FR-07120KL
1	R11	0	Film Res., 1%	0805	Yageo	RC0805JR-070RL
40	R15, R17, R18, R27, R28, R29, R33, R34, R35, R37, R39, R42, R44, R45, R46, R47, R48, R50, R52, R53, R54, R55, R56, R57, R69, R71, R72, R73, R74, R76, R77, R79, R81, R82, R83, R85, R86, R90, R91, R93	NS				
1	R65	4.7k	Film Res., 1%	0603	Yageo	RC0603FR-074K7L
4	U1, U2, U3, U4	MP5921	Hot Swap Protection device	FCQFN28(4*5mm)	MPS	MP5921GV
3	U5, U6, U7	NS				
10	VIN, VOUT, GND	KEYSTONE 7701	Connector, 30A	KEYSTONE7701	Keystone	KEYSTONE7701

## PRINTED CIRCUIT BOARD LAYOUT

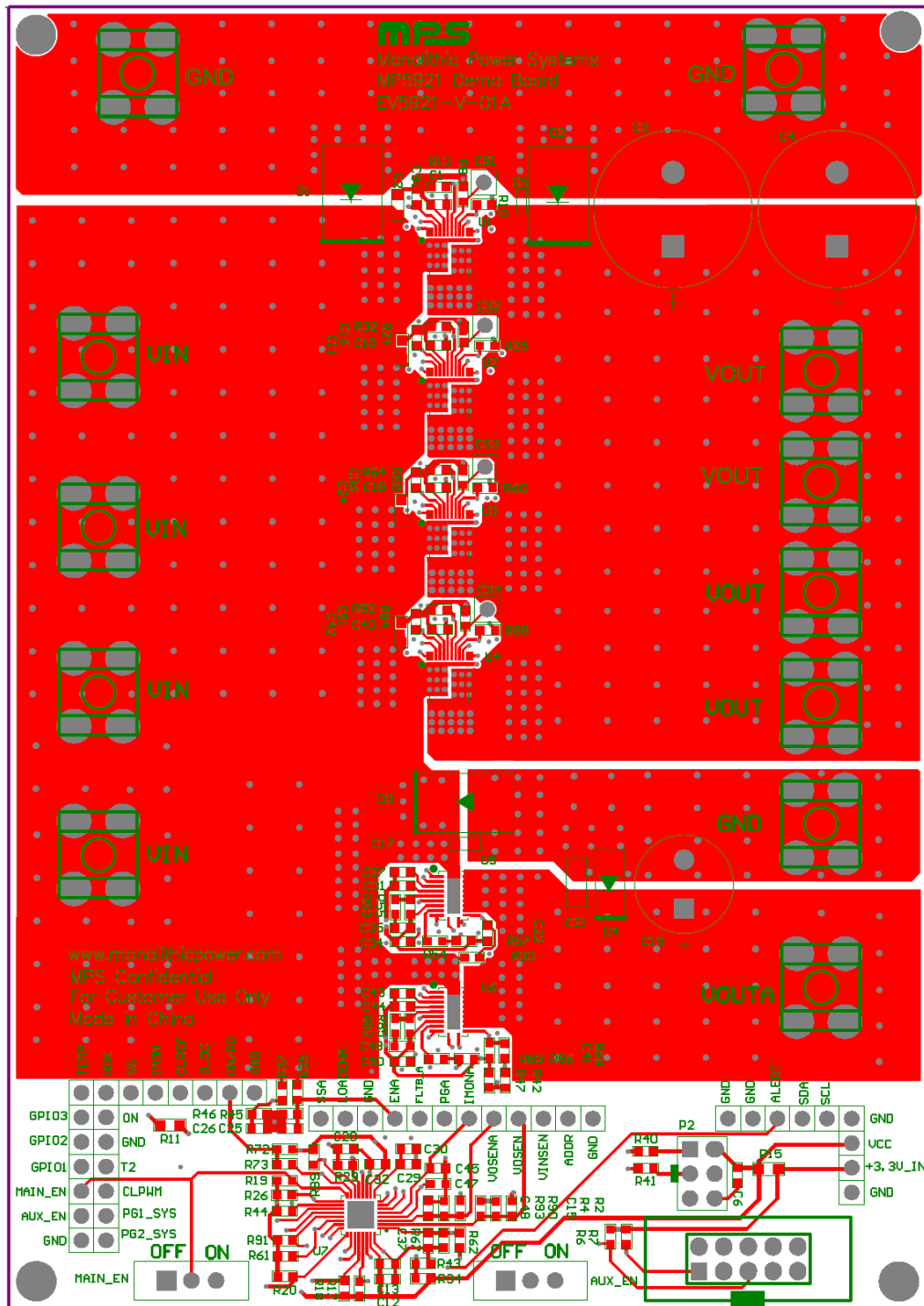
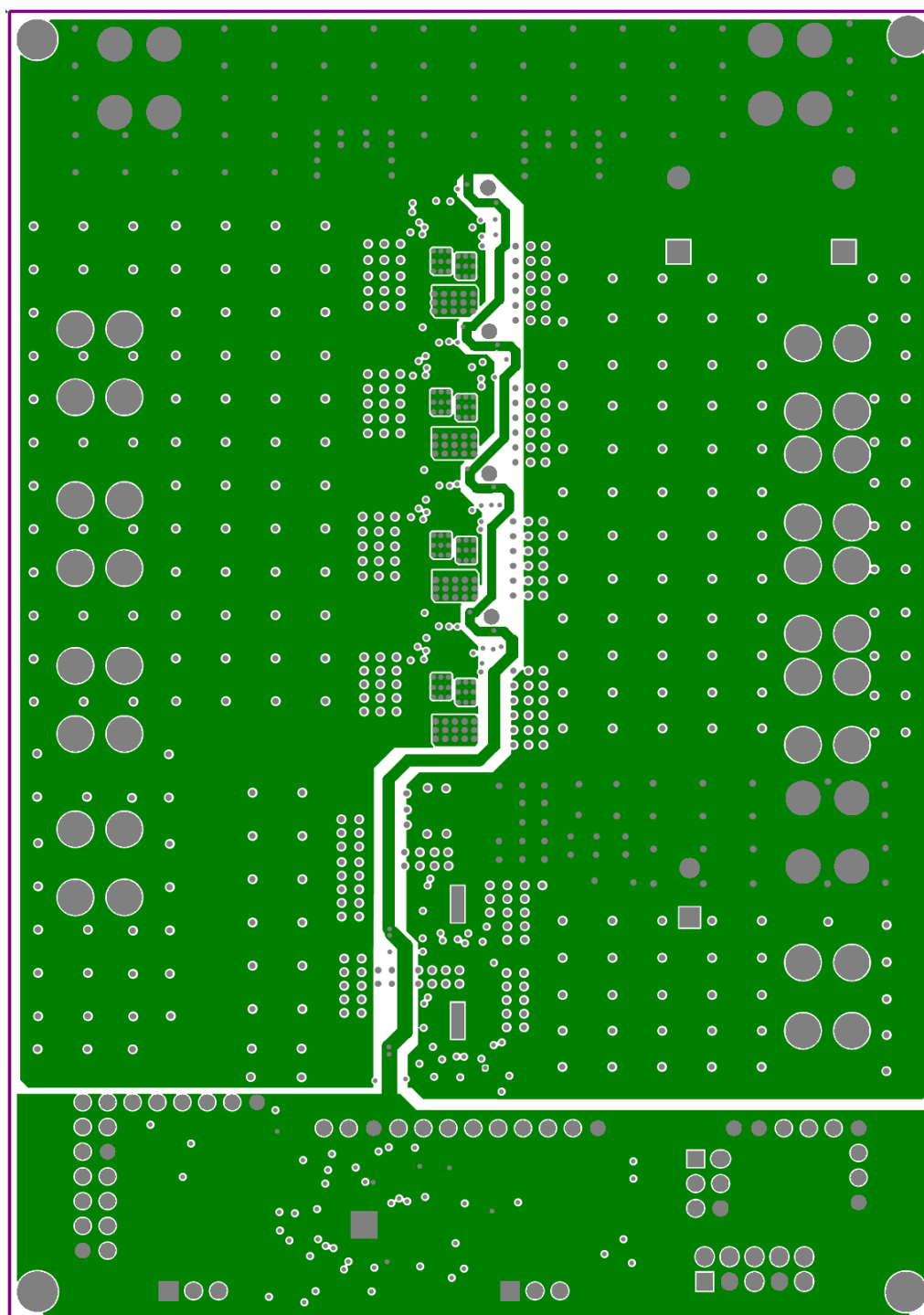
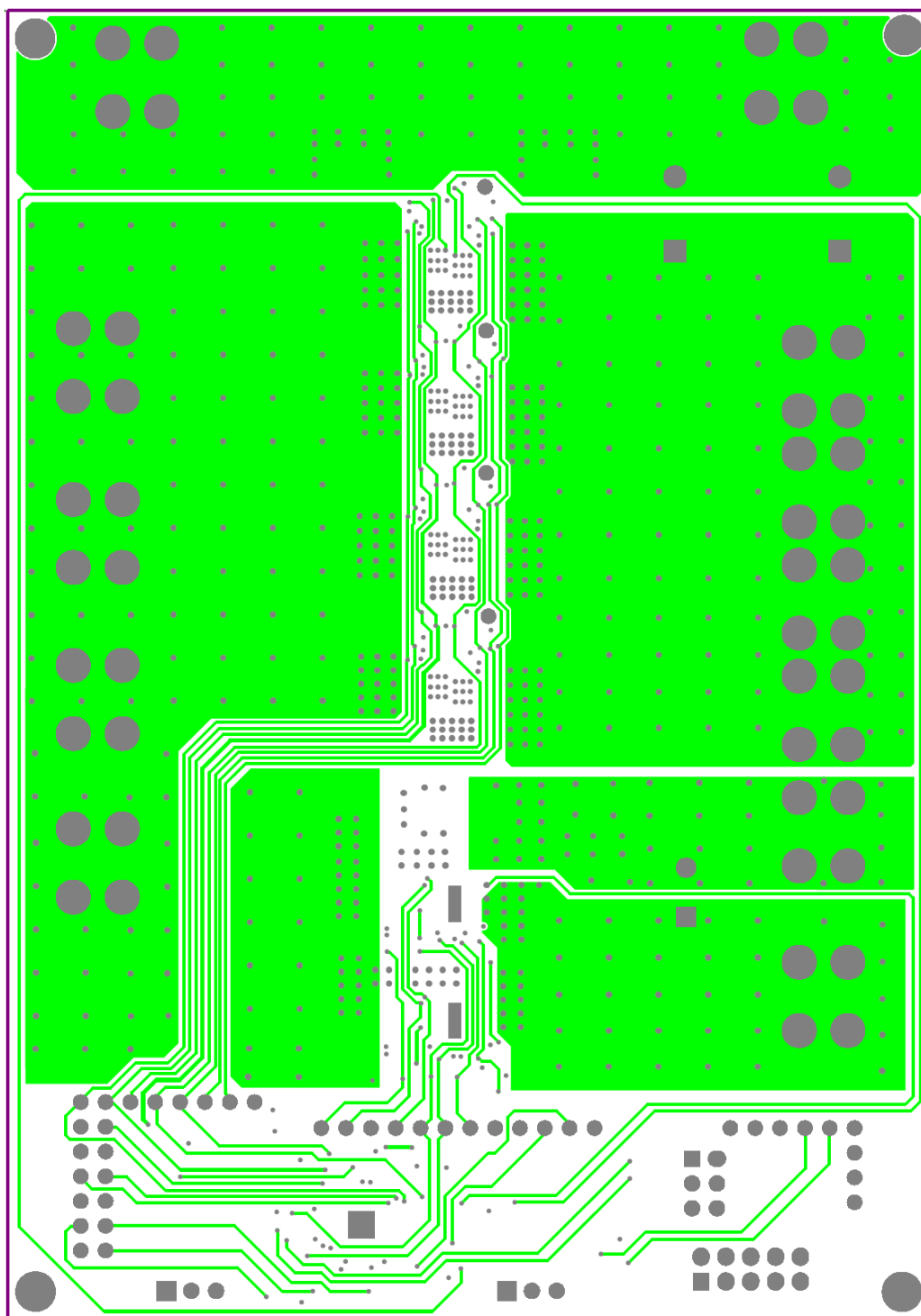


Figure 1—Top Layer

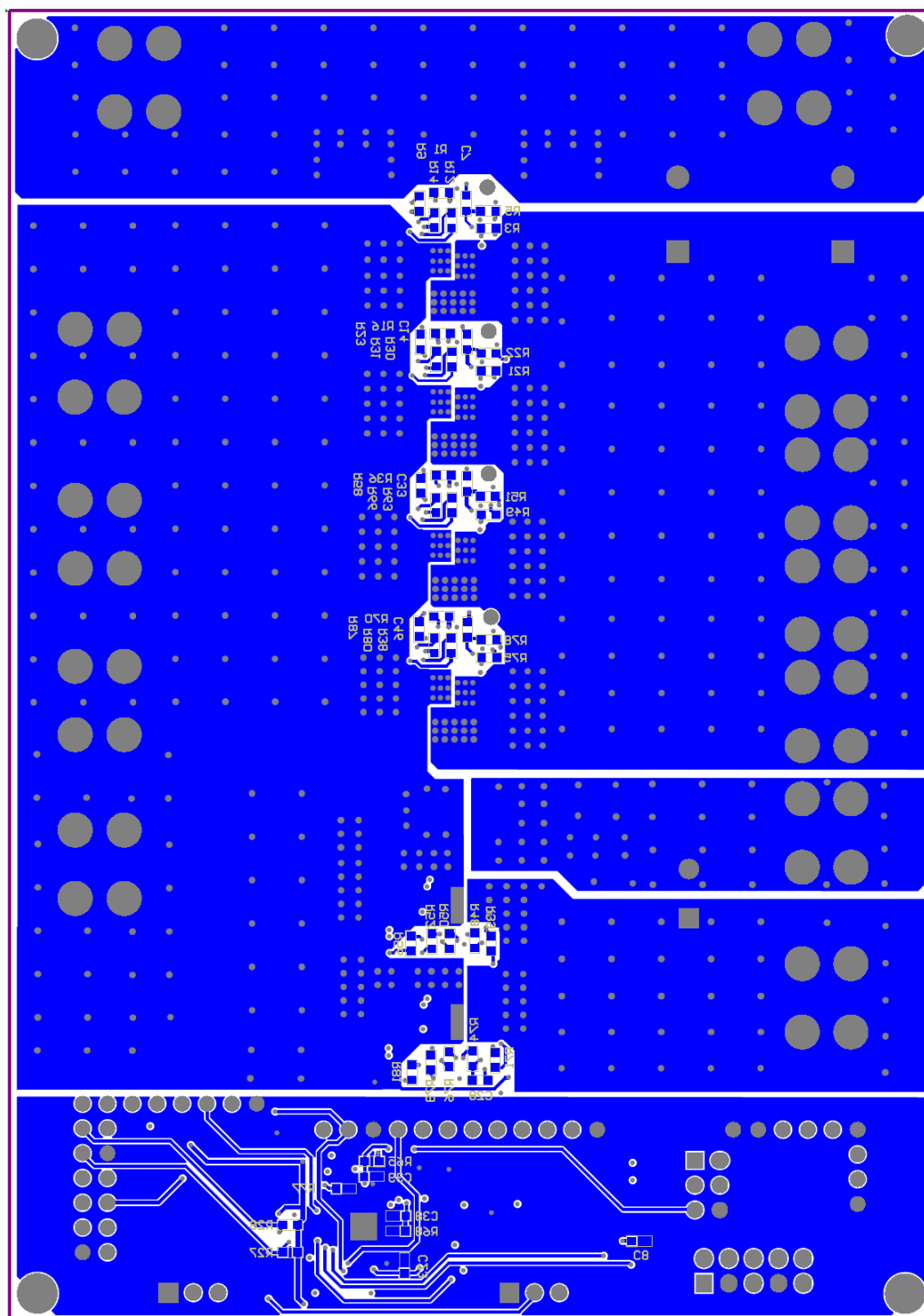




**Figure 2—Inner layer**



**Figure 3— Inner layer 2**



**Figure 4—Bottom layer**

## QUICK START GUIDE

1. Attach the positive and negative terminals of the load to the VOUT and GND terminals on demo board, respectively.
2. Preset the power supply output to be 12V, and then turn off the power supply.
3. Attach the positive and negative terminals of the power supply to the VIN and GND terminals on demo board, respectively.
4. Turn on the VIN power supply.

## USER GUIDE

The EV5921-V-01A can be configured as 1~4 phase operation application by adjusting some parameters on EV board as shown in below Table.

	Active Part	Remove Resistors				Change Cap to Resistor(0ohm)
1Phase	U1		U2	U3	U4	C14 C33 C46
		ON/PD	R22	R51	R78	
		CLREF	R25	R60	R88	
		SS	R23	R58	R92	
		IMON	R32	R64	R87	
		VDD3	R16	R36	R70	
2Phase	U1+ U2		U2	U3	U4	C33 C46
		ON/PD	/	R51	R78	
		CLREF	/	R60	R88	
		SS	/	R58	R92	
		IMON	/	R64	R87	
		VDD3	/	R36	R70	
3Phase	U1+ U2+ U3		U2	U3	U4	C46
		ON/PD	/	/	R78	
		CLREF	/	/	R88	
		SS	/	/	R92	
		IMON	/	/	R87	
		VDD3	/	/	R70	
4Phase	U1+ U2+ U3+U4	The default configuration is 4 phase.				

Note: Changing the capacitor to 0ohm resistor is used to connect the ON/PD to ground.

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