EV5505E-L-00A

7V, 4A Energy Storage and Management Unit Application Evaluation Board

The Future of Analog IC Technology

DESCRIPTION

EV5505E-L-00A Evaluation Board is designed to demonstrate the capabilities of MP5505E. MP5505E is designed to provide back-up power in the event of a power loss. The internal input-current-limit block with dv/dt control prevents inrush current during system start-up; the bus voltage start-up slew rate is programmable. MPS' patented power back-up control circuit minimizes the storage capacitor requirement. It pumps the input voltage to a higher storage voltage and releases the energy over a hold-up time to the system in the case of an input outage. The storage voltage and the release voltage are both programmable for different system requirements.

The MP5505E is available in a QFN20 (3mmX4mm) package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	3.3-5	V
Charge Voltage	V_{STRG}	12	V
Bus Release Voltage	$V_{RELEASE}$	2.9	V
Buck Max Output Current	$I_{RELEASE}$	4	A

FEATURES

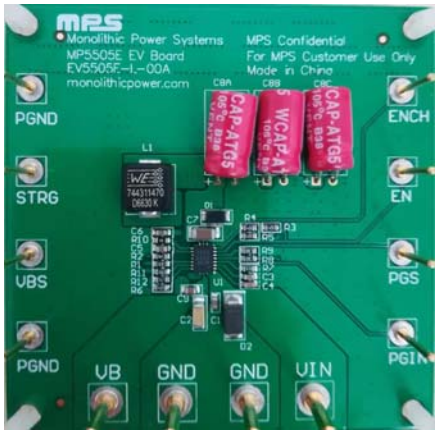
- Wide 2.7 to 7V Operating Input Range for MP5505E
- 60mΩ Back to Back SW for in Input current Limit Circuit and Reverse Current Blocking
- Reverse Current Protection
- 6V Bus Clamping Voltage
- Power on Reset
- Adjustable dv/dt Slew Rate for Bus Voltage Start up
- EN and Power Good indicator
- Thermal protection
- Available in an QFN20(3mmx4m) Package

APPLICATIONS

- Hard Dish Drives
- Solid State Drives
- Power Back-Up/Battery Hold-Up Supplies

All MPS parts are lead-free, halogen-free, and adhere to the RoHS directive. For MPS green status, please visit the MPS website under Quality Assurance. "MPS" and "The Future of Analog IC Technology" are registered trademarks of Monolithic Power Systems, Inc.

EV5505E-L-00A EVALUATION BOARD

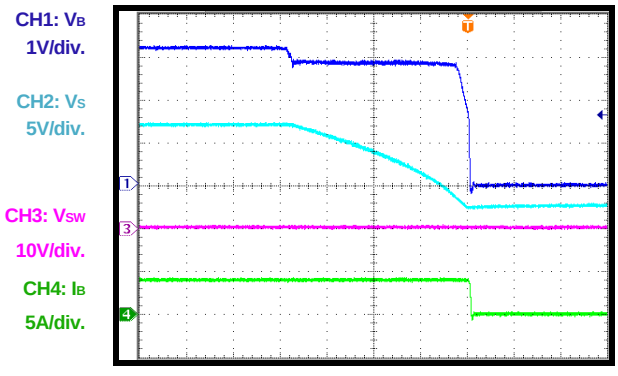


(L x W x H) 6.35cm x 6.35cm x 0.8cm

Board Number	MPS IC Number
EV5505E-L-00A	MP5505EGL

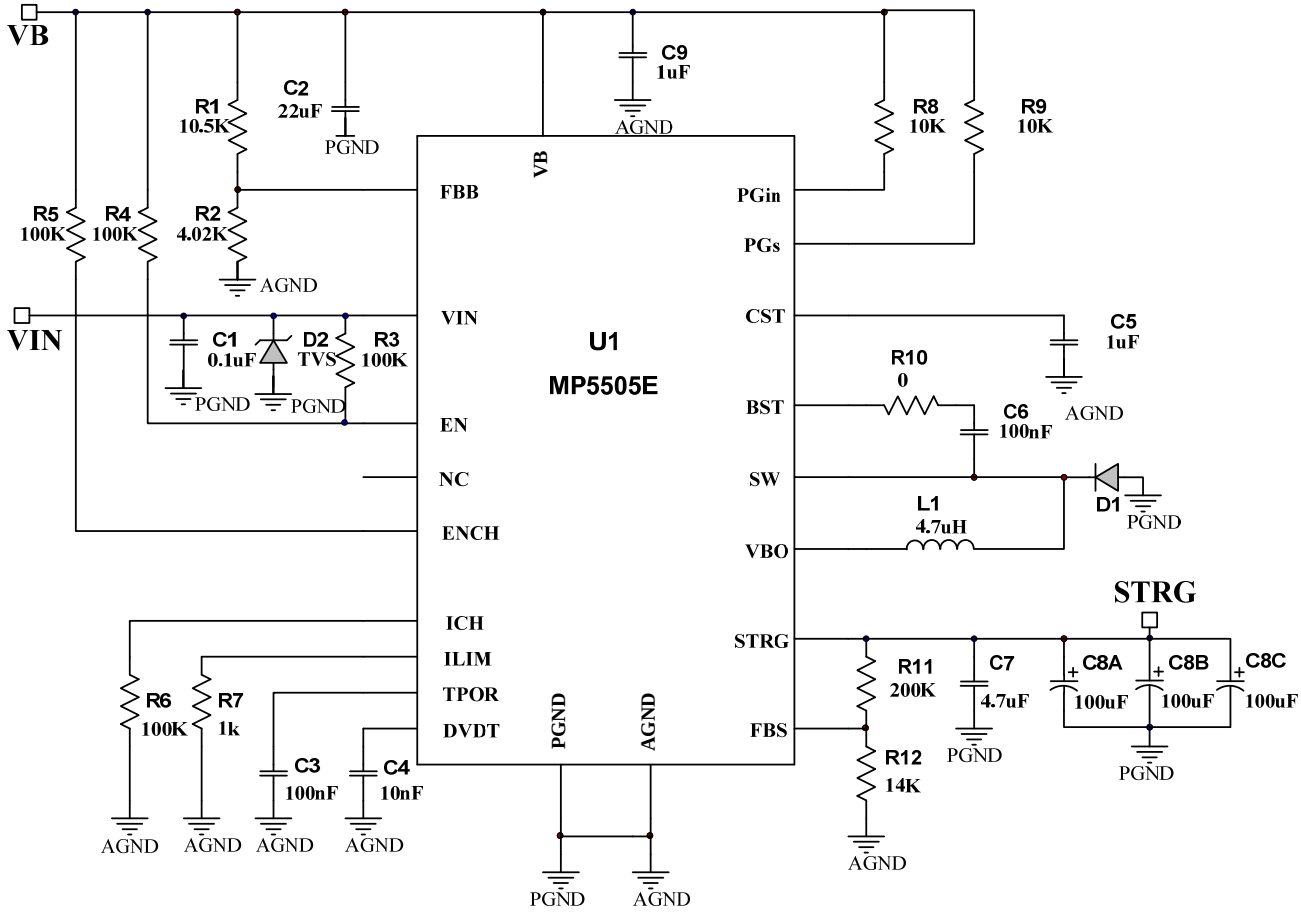
RELEASE

IB=4A



MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2018 MPS. All Rights Reserved.

EVALUATION BOARD SCHEMATIC



MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2018 MPS. All Rights Reserved.

EV5505E-L-00A BILL OF MATERIALS

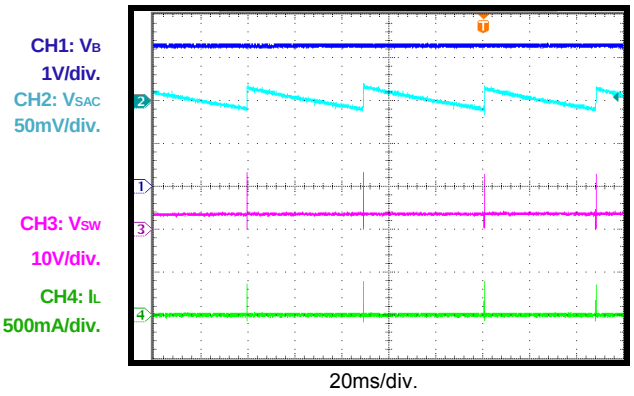
Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
3	C1,C3,C6	100nF	Ceramic Cap.,25V,X7R	0603	WE	885012206071
1	C2	22μF	Ceramic Cap.,16V,X5R	1206	WE	885012108018
1	C4	10nF	Ceramic Cap.,16V,X7R	0603	WE	885012206040
2	C5,C9	1uF	Ceramic Cap.,16V,X7R	0603	WE	885012206052
1	C7	4.7μF	Ceramic Cap.,25V,X7R	1206	WE	885012208068
3	C8A,C8B, C8C	100μF	100μF/25V CD284	DIP	WE	860010473008
1	R1	10K5	Film Res,1%,0603,10K5	0603	YAGEO	RC0603FR-0710K5L
1	R2	4K02	Film Res,1%,0603,4K02	0603	YAGEO	RC0603FR-074K02L
4	R3,R4, R5, R6	100K	Film Res,1%,0603,100K	0603	YAGEO	RC0603FR-07100KL
1	R7	1K	Film Res,1%,0603,1K	0603	YAGEO	RC0603FR-071KL
2	R8,R9	10K	Film Res,1%,0603,10K	0603	YAGEO	RC0603FR-0710KL
1	R10	0R	Film Res,1%,0603,0R	0603	YAGEO	RC0603FR-070RL
1	R11	200K	Film Res,1%,0603,200K	0603	YAGEO	RC0603FR-07200KL
1	R12	14K	Film Res,1%,0603,14K	0603	YAGEO	RC0603FR-0714KL
1	L1	4.7μH	Inductor, DCR=19.5mΩ, Isat=7A	SMD	WE	744311470
1	D1	40V,2A	Schottky Diodes,Vf=40V,If=2A	SOD-123	DIODES	DFLS240L-7
1	D2	SMA6J5.0A-TR	TVS DIODE	SMA	VISHAT	SMA6J5.0A-TR

MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2018 MPS. All Rights Reserved.

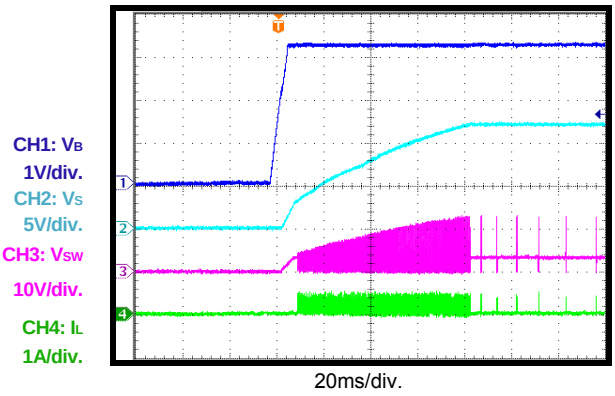
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.
V_{IN} = 3.3V, $V_{STORAGE}$ =12V, $V_{RELEASE}$=2.9V, L=4.7μH, T_A = +25ºC, unless otherwise noted.

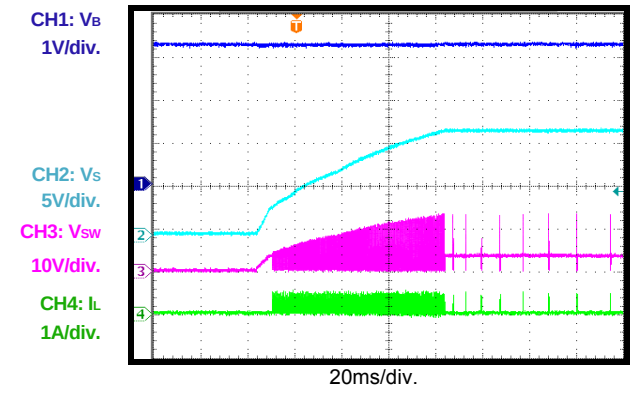
BOOST STEADY STATE
IB=0A



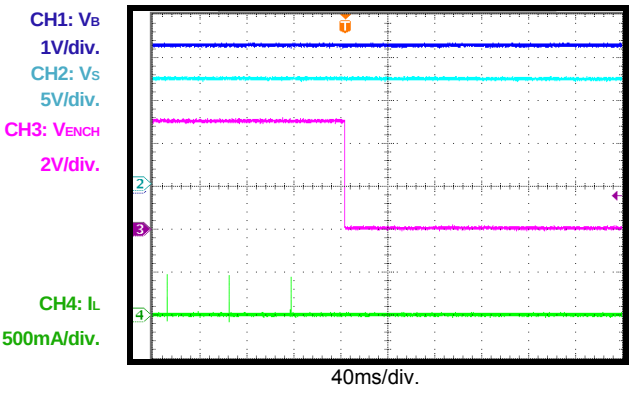
VIN POWER ON
IB=0A



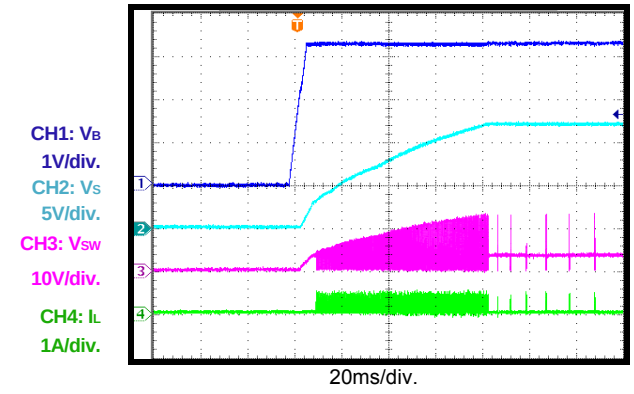
ENCH POWER ON
IB=0A



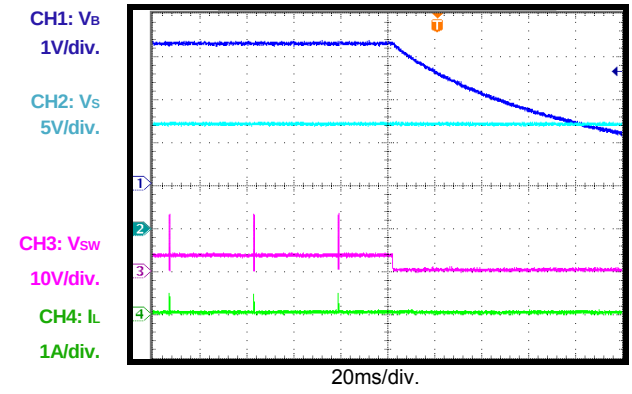
ENCH POWER OFF
IB=0A



EN POWER ON
IB=0A



EN POWER OFF
IB=0A

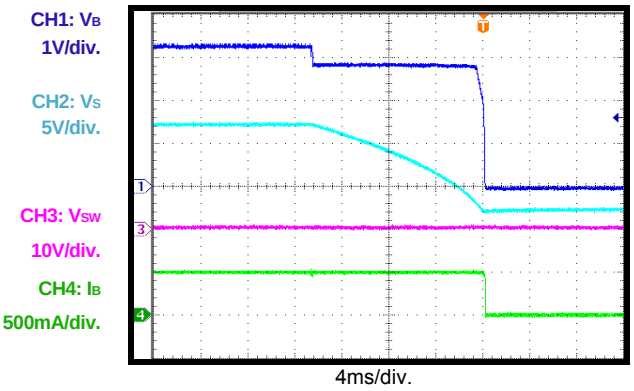


MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2018 MPS. All Rights Reserved.

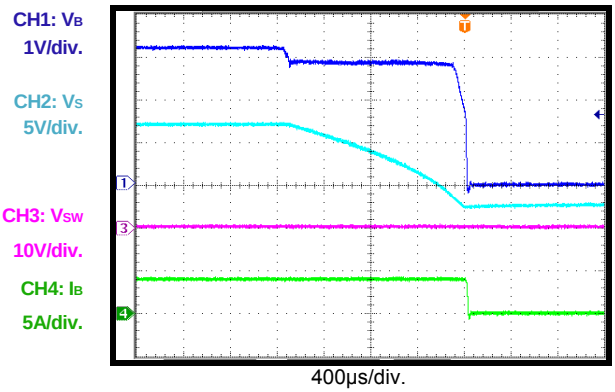
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.
V_{IN} = 3.3V, $V_{STORAGE}$ =12V, $V_{RELEASE}$=2.9V, L=4.7μH, T_A = +25ºC, unless otherwise noted.

RELEASE
IB=0.5A



RELEASE
IB=4A



MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2018 MPS. All Rights Reserved.

PRINTED CIRCUIT BOARD LAYOUT

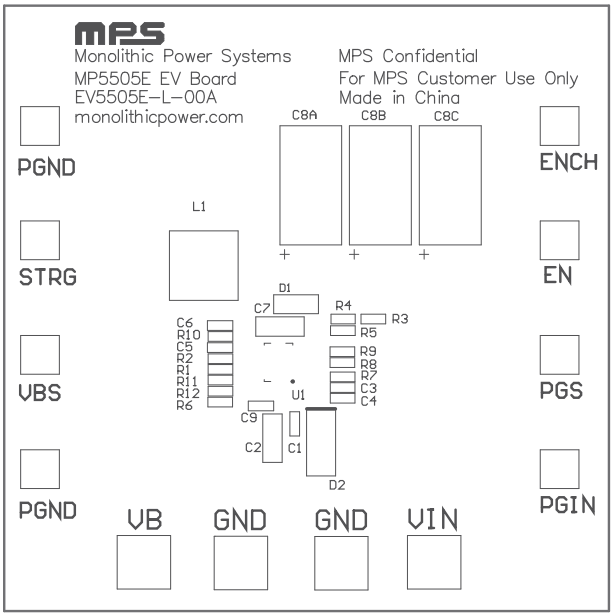


Figure 1—Top Silk Layer

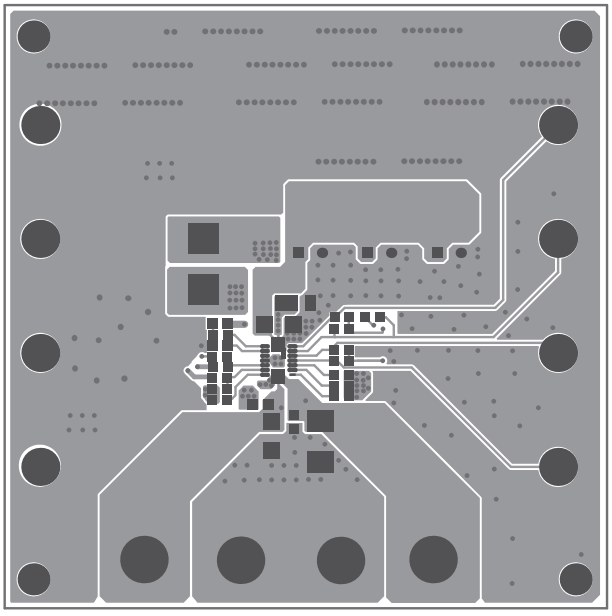


Figure 2—Top Layer

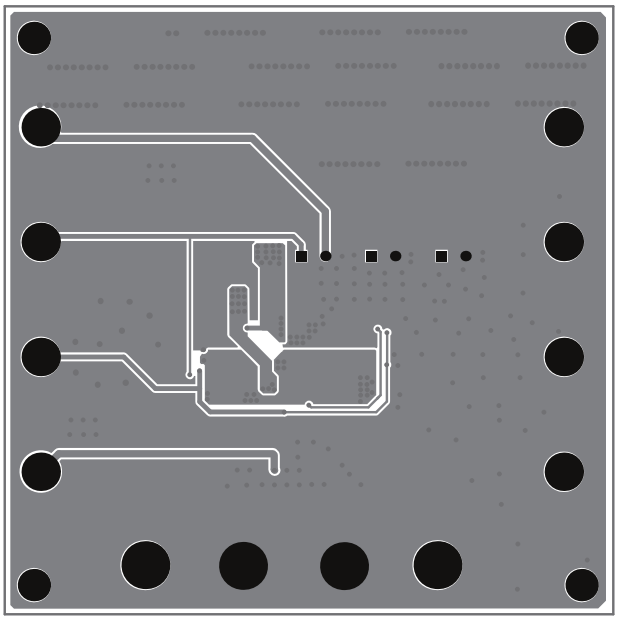


Figure 3—Bottom Layer

MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2018 MPS. All Rights Reserved.

QUICK START GUIDE

The board layout accommodates most commonly used components.

1. Connect the positive and negative terminals of the load to VB and GND pins, respectively.
2. Preset Power Supply to 3.3V.Turn off Power Supply.
3. Connect Power Supply terminals to:

   Positive (+): VIN

   Negative (–): GND
4. Turn on Power Supply after making connections, MP5505E will charge the storage capacitor to 12V after DCDC converter completes start-up.
5. In order to observe the power release performance, following two methods can be applied:

   Turning off the power supply.

   Short VIN to GND directly. Note: make sure bench power supply have output current limiting when doing this test.
6. Use R1 and R2 to set release voltage:

$$V_{RELEASE} = 0.801V \times \frac{R1 + R2}{R2}$$

Similarly, R11 and R12 can be chosen for storage voltage setting:

$$V_{STRG} = 0.795V \times \frac{R11 + R12}{R12}$$

NOTICE: The information in this document is subject to change without notice. Please contact MPS for current specifications. Users should warrant and guarantee that third party Intellectual Property rights are not infringed upon when integrating MPS products into any application. MPS will not assume any legal responsibility for any said applications.

MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2018 MPS. All Rights Reserved.