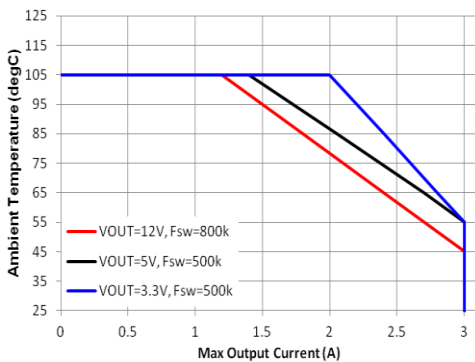
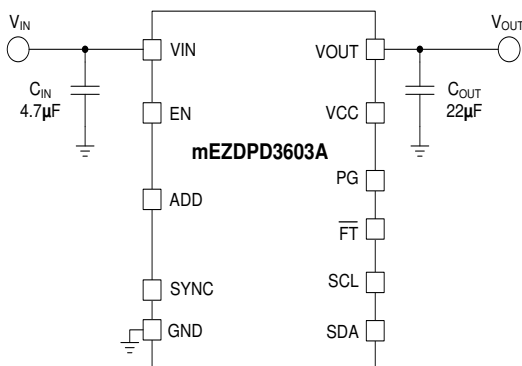




#### mEZ Product Options:

1. Ready-to-Use products
  2. Do-It-Yourself.
- Manufacture assistance is provided

#### Typical Application Circuit



#### Safe Operation Area

**NOTES:** All electrical characteristics are tested under 25°C ambient temperature,  $V_{IN}=24V$ . Unless otherwise noted.

#### DESCRIPTION

The mEZDPD3603A is a programmable DC/DC power supply up to 3A and 0.6 - 12V output voltage. This part has a multiple-time programmable memory and a simple programmable GUI.

The GUI includes a modeling software for verification of the part performance. During bench evaluations, different configurations can be obtained easily through the I2C interface. This allows users to optimize each output for their requirements. All non-programmed parts (mEZDPD3603A-XXXX) parts require only current and output voltage values to begin the evaluation. The other parameters, as defined in the GUI, have default settings that could be modified by the user, if needed.

#### FEATURES

- 4.5V to 36V Operating Input
- 0.6V to 12V Output Voltage
- Up to 3A Continuous Current
- High Efficiency Up to 97%
- Meet EN55022 Class B Emissions
- Operation Temperature: -40°C to 85°C
- Standard DIP Package (16x23x6.5mm)
- Programmable Parameters
- Output Voltage
- Output Current Limit
- Switching Frequency
- Multiple Selection Modes
- Compensation

#### ORDERING INFORMATION

Part Number	Input Voltage (V)	Output Current (A)	Output Voltage (A)
mEZDPD3603A-XXXX	4.5-36	NP	NP
mEZDPD3603A-0001 (default programmed)	4.5-36	3A	5V
PKT-mEZDPD3603A	4.5-36	NP	NP

NP: Current and Voltage Not Programmed

Note: User can program the OTP (ROM) once. Writing to registers (RAM) is unlimited.

PKT-mEZDPD3603A Kit Contents (Items below can be ordered separately)

#	Part Number	Item	Qty
1	EVmEZDPD3603A-00A	mEZDPD3603A evaluation board	1
2	mEZDPD3603A-0001	mEZDPD3603A modules with default configuration	1
3	EVKT-USBI2C-02	USB to I2C communication interface device kit, includes one USB to I2C communication interface device, USB cable, and ribbon cable	1
4	Tdrive-mEZPD3603A	USB thumb drive that stores the GUI installation file and supplemental documents	1

Order directly from [Monolithicpower.com](http://Monolithicpower.com) or our distributors.

For more information, please contact [mEZsupport@monolithicpower.com](mailto:mEZsupport@monolithicpower.com).

**PROGRAMMABLE mEZD FAMILY**

Part Number	Input Voltage	Programmable Current up to
mEZDPD3603A	4.5-36V	3A
mEZD81260A	5-16V	60A / Dual 30A

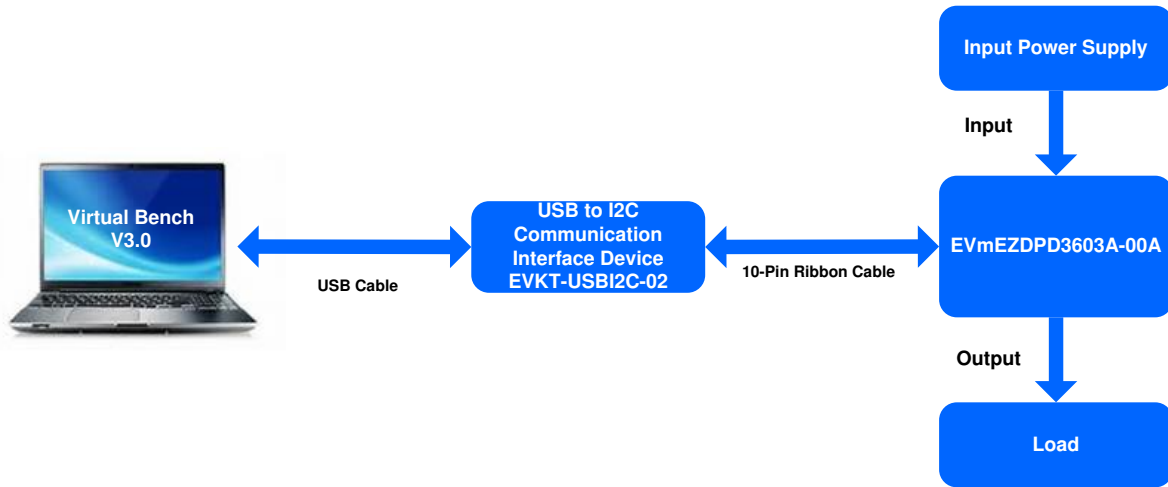
**ELECTRICAL CHARACTERISTICS**

$V_{IN} = 24V$ ,  $V_{OUT} = 5V$ ,  $F_{sw}=500\text{ kHz}$ , typical value is tested at  $T_A = 25^\circ C$ , unless otherwise noted.

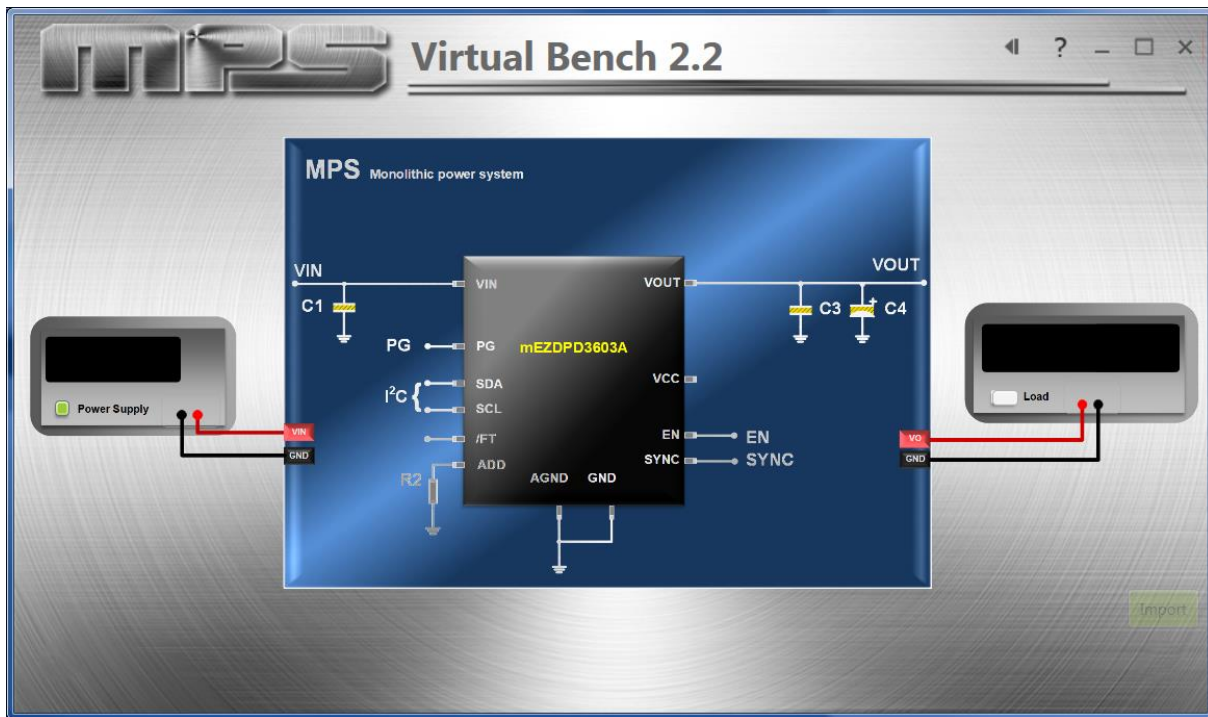
Parameters	Condition	Typ Value
Input Voltage Range	$V_{IN}$ continuous	4.5 to 36V
Output Voltage Set Accuracy		$\pm 1\%$ (typ)
Output Voltage Ripple	$V_{IN}=24V$ , $V_{OUT}=5V$ , full load	30mV*
Line Regulation	$V_{IN}=24V$ , $V_{OUT}=5V$	$\pm 1\%$ (typ)
Load Regulation	$V_{IN}=24V$ , $V_{OUT}=5V$	$\pm 1\%$ (typ)
Efficiency	$V_{IN}=24V$ , $V_{OUT}=12V$ , full load, $F_{sw}=800kHz$	93.2%*
	$V_{IN}=24V$ , $V_{OUT}=5V$ , full load	89%
	$V_{IN}=24V$ , $V_{OUT}=3.3V$ , full load	85.5%*
	$V_{IN}=12V$ , $V_{OUT}=5V$ , full load	90%*
	$V_{IN}=12V$ , $V_{OUT}=3.3V$ , full load	87%*
Switching Frequency	Typical switching frequency	500kHz*
Short Circuit Protection	Short output to ground	Hiccup mode*
Operating Temperature Range		-40 to 85°C*
Over-Temperature Protection (OTP)	Default value	175°C*
Rise Time	From 10% $V_{OUT}$ to 90% $V_{OUT}$	1ms (typ)
Calculated MTBF	MIL-HDBK-217F	4185x10 <sup>3</sup> hrs

\* Guaranteed by sample characterization. Not tested in production.

### GUI Interface to Program mEZDPD3603A



Evaluation Kit Connection for Programming



Virtual Bench Pro Main GUI Interface to

### One-Time Programming (OTP) Program Guidance

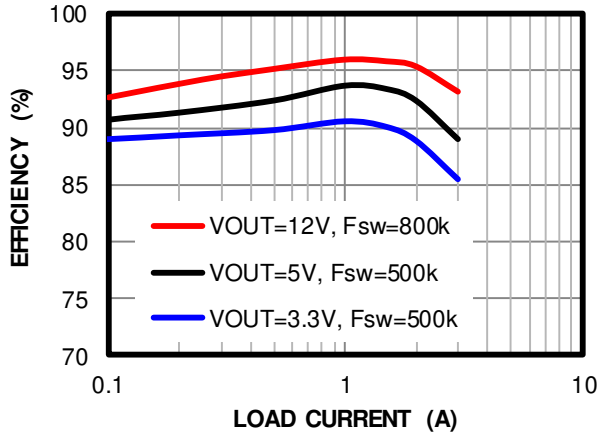
1. The VIN range for writing to the OTP is 8 - 36V. When writing to OTP (ROM), the module will shut down and restart.
2. Power off the part and power on again. The part will work normally with a new configuration.
3. Users can program the OTP once.
4. In RAM mode, the users can write to registers an unlimited number of times.

## Typical Performance Curve

$V_{IN} = 24V$ ,  $V_{OUT} = 5V$ ,  $T_J = -40^{\circ}C$  to  $125^{\circ}C$ , typical value is tested at  $T_A = 25^{\circ}C$ , unless otherwise noted.

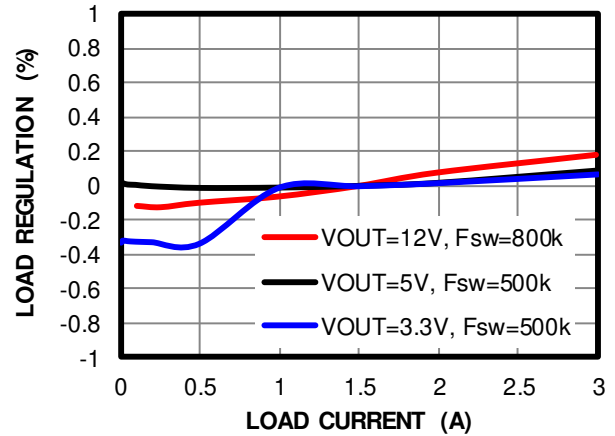
### Efficiency

$V_{IN} = 24V$



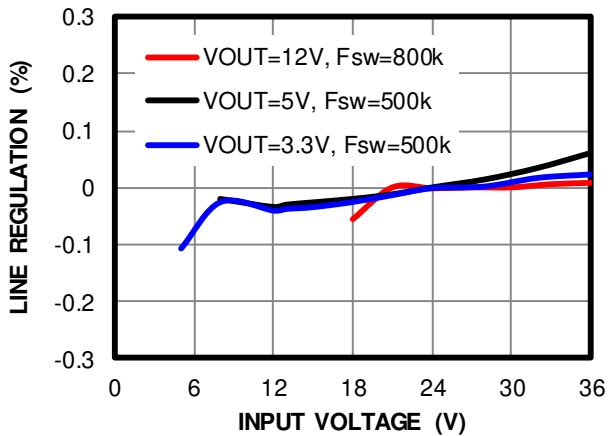
### Load Regulation

$V_{IN} = 24V$



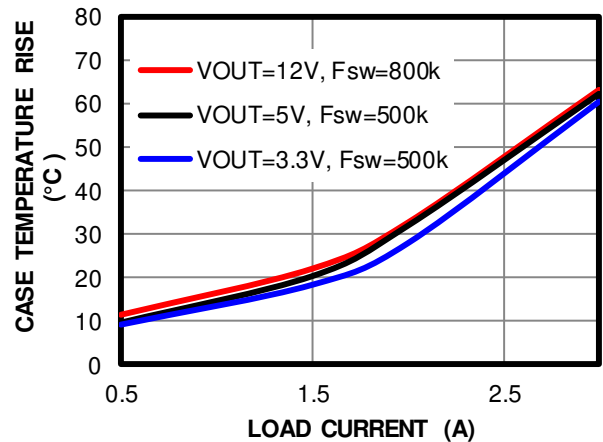
### Line Regulation

Full Load

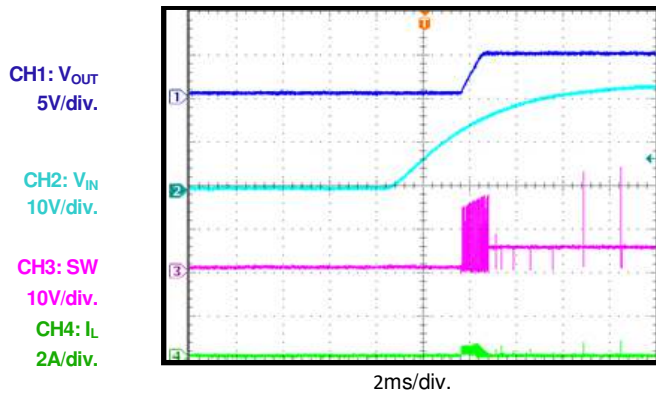


### Case Temperature Rise

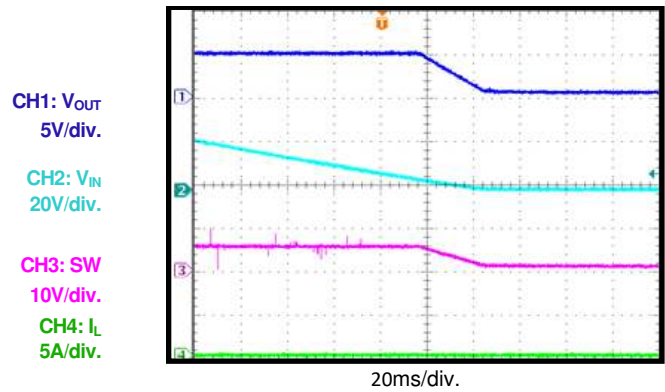
$V_{IN} = 24V$



### VIN Start-Up



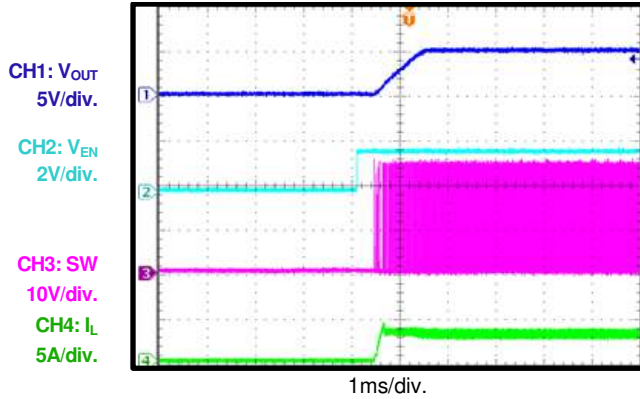
### VIN Shut Down



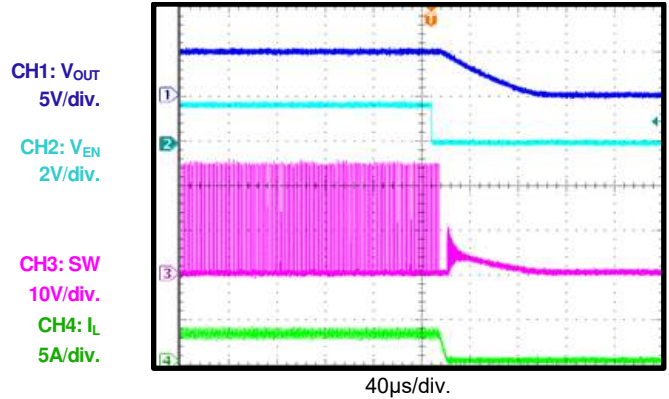
### Typical Performance Curve (continued)

$V_{IN} = 24V$ ,  $V_{OUT} = 5V$ ,  $T_J = -40^{\circ}C$  to  $125^{\circ}C$ , typical value is tested at  $T_A = 25^{\circ}C$ , unless otherwise noted.

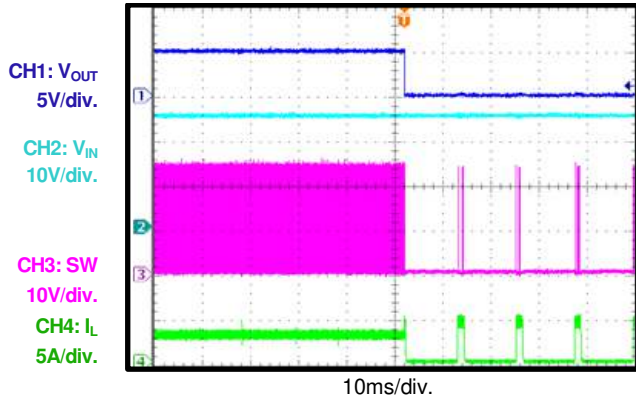
#### EN Start-Up



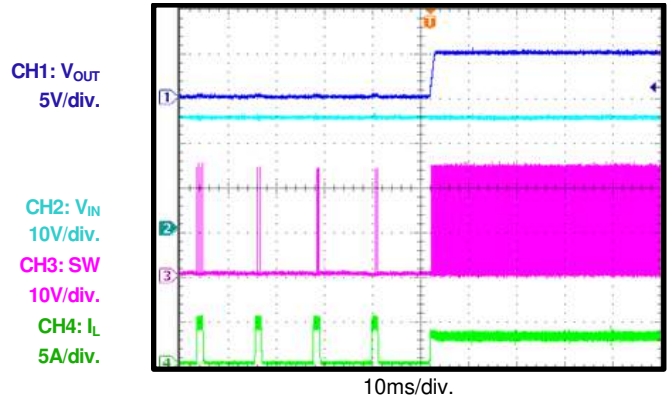
#### EN Shutdown



#### SCP Entry

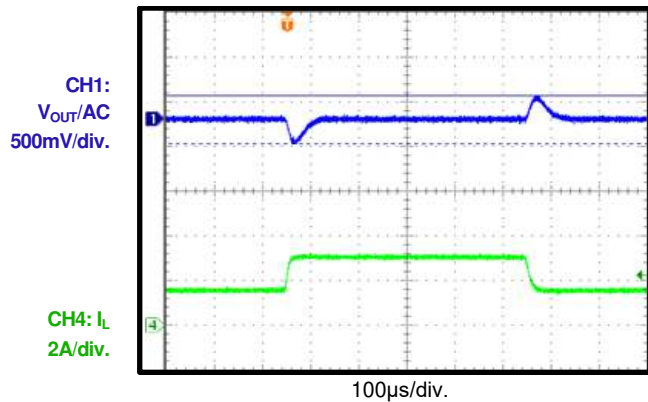


#### SCP Recovery



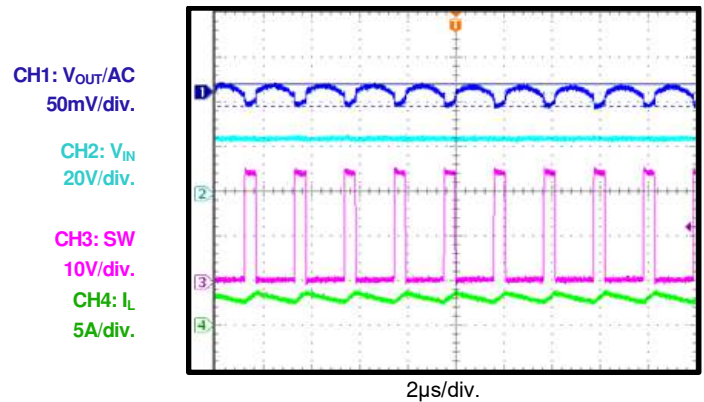
#### Load Transient

1.5A to 3A, without external  $C_{OUT}$

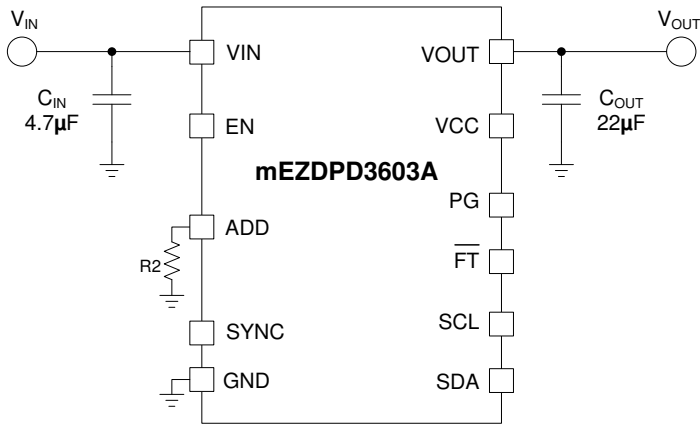


#### $V_{OUT}$ Ripple

Full load, without external  $C_{OUT}$



### TYPICAL APPLICATION CIRCUIT



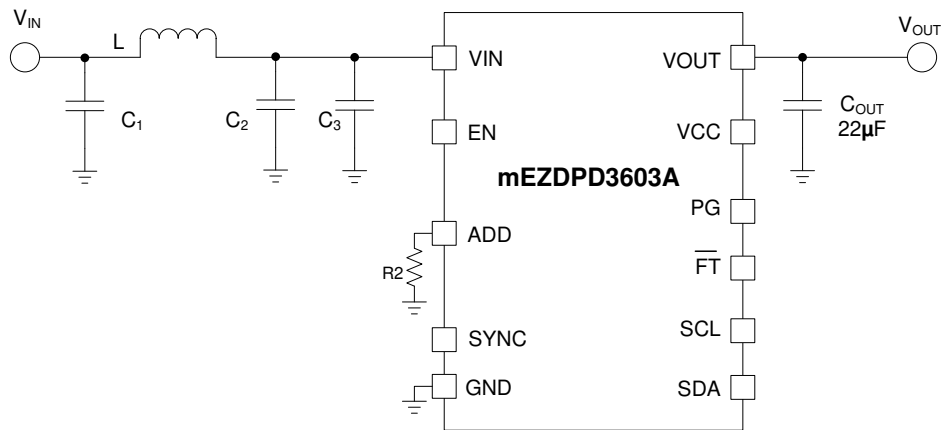
#### Recommend Input, Output Capacitors

VOUT (V)	CIN	COUT
<3.3	4.7µF	22µF
5	4.7µF	22µF x 2
12	10µF	22µF x 2

#### Resistors to Set I2C Address (To Identify Multiple Modules in One System)

R2 Value (kΩ)	I2C Address
0	21h
37.5	22h
62.5	23h
87.5	24h
112.5	25h
137.5	26h

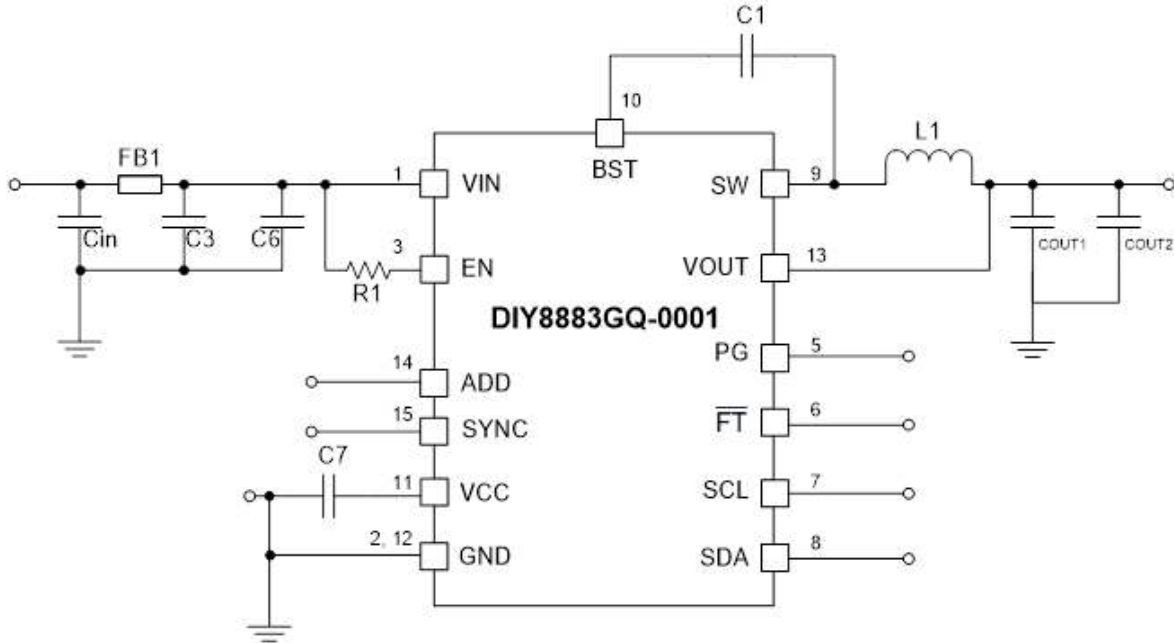
### RECOMMENDED FILTER for EN55022 CLASS B STANDARD



VOUT (V)	L	C1	C2	C3	COUT
<3.3	4.7µH	10µF	10µF	N/A	22µF
5	4.7µH	10µF	10µF	N/A	22µF x 2
12	4.7µH	10µF	10µF	100µF E-cap	22µF x 2



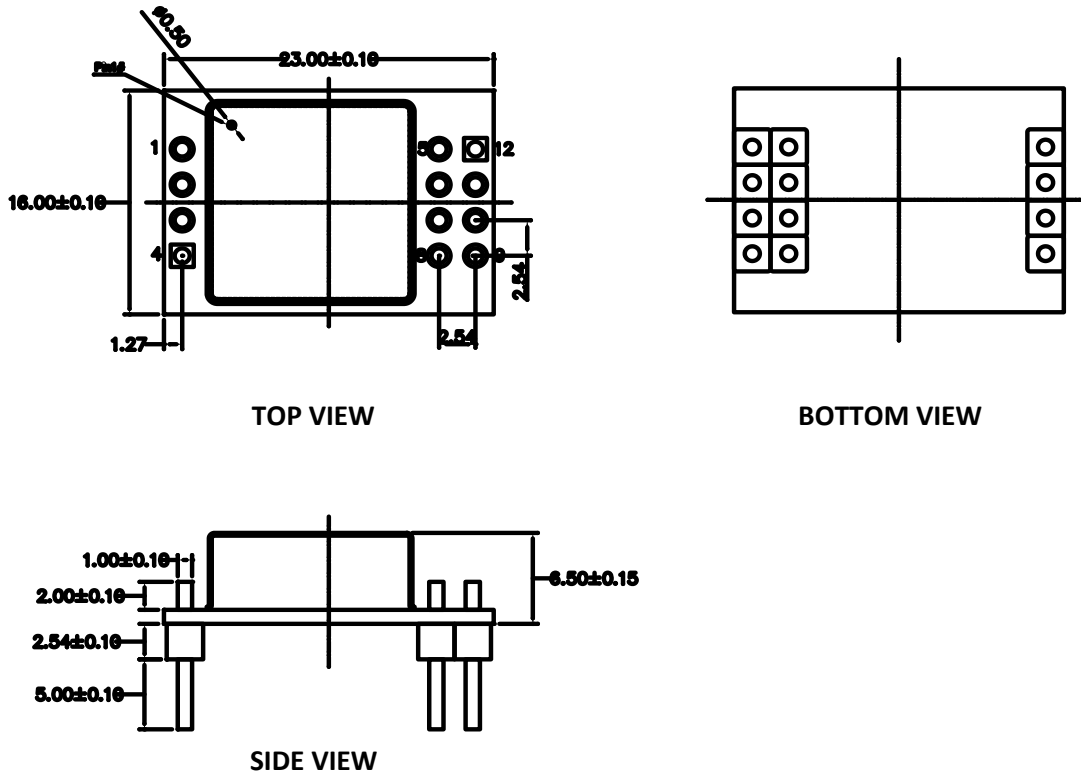
## INTERNAL MODULE SCHEMATIC



## BILL OF MATERIALS

Qty	Description	Designator	Footprint	PN	Manufacturer
1	0603-220NF-X7R-25V	C1	CAP0603-S	885012206073	Wurth
2	1206-4.7UF-X7R-50V	C3, Cin	CAP1206S	GRM31CR71H475KA12L	Marata
1	0603-100NF-X7R-50V	C6	CAP0603-S	885012206095	Wurth
	0603-1UF-X7R-16V	C7	CAP0603-S	885012206052	Wurth
1	0603-1UF-X7R-16V	Option1	CAP0603-S	CGA3E1X7R1C105KT0Y0N	TDK
	0603-1UF-X5R-16V	Option2	CAP0603-S	GRM188R61C105KA12J	Marata
	1206-22UF-X7R-25V	Cout1, Cout2	CAP1206S	GRM31CC71E226ME11L	Marata
2	1206-22UF-X5R-25V	Option1	CAP1206S	GRM31CR61E226KE15L	Marata
	SMD/SMT 22uF 25V X5R ±20% 1206	Option2	CAP1206S	TMK316BBJ226ML-T	Taiyo Yuden
1	Bead,5A,30Ω@100MHz	FB1	RES0603	MPZ1608S300ATAH0	TDK
	Bead,5A,30Ω@100MHz	Option	RES0603	BLM18KG300TN1D	Marata
1	10uH, 4A, 7mm x 7mm inductor	L1	7mm x 7mm	MMD-06CZN100M-M1-CY	Maglayer
1	Film Res,1%,0603,1M	R1	RES0603	RC0603FR-071ML	Yageo
1	Chinafastpcb / For mEZDPD3603A	-	-	VH-23*16-MPS-01-A	ChinaFastPCB
1	Lid-14.5x14.5-01	-	-	Lid-14.5x14.5-01	Yuyuan
1	MPS DCDC IC	U1	FCQFN_16P_3X3MM	DIY8883GQ-0001	MPS

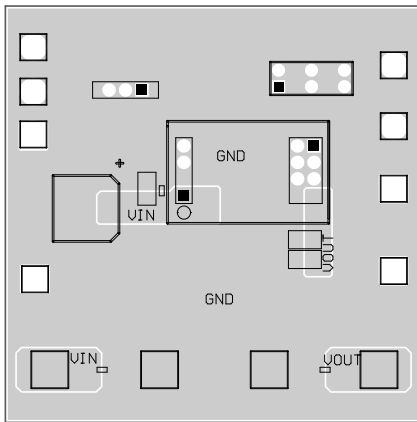
## PRODUCT PACKAGE DIMENSIONS



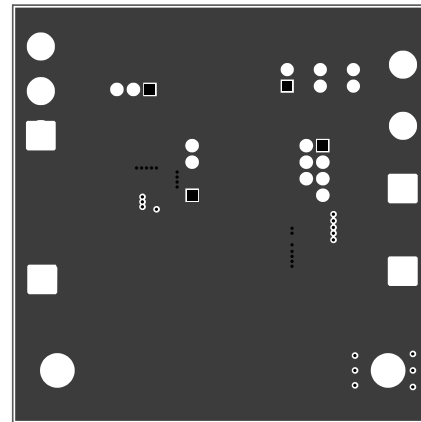
Pin	Designation	Function	PIN Description
1	SYNC	Synchronize	Input, clock synchronization
2	EN	Enable	Input, Drive EN high to turn on the device
3	GND	Power Ground	Power ground
4	VIN	Input Voltage	Input, supply voltage
5	$\overline{FT}$	Fault Indicator	Output, fault indicator
6	PG	Power Good	Output, power good indicator
7	ADD	Address Setting	Address setting for I <sup>2</sup> C
8	GND	Power Ground	Power ground
9	VOUT	Output Voltage	Output voltage
10	VCC	Internal LDO Output	Output, internal 5V LDO regulator output
11	SDA	I <sup>2</sup> C Serial Data	Communication bus, I <sup>2</sup> C serial data
12	SCL	I <sup>2</sup> C Serial Clock	Communication bus, I <sup>2</sup> C serial clock



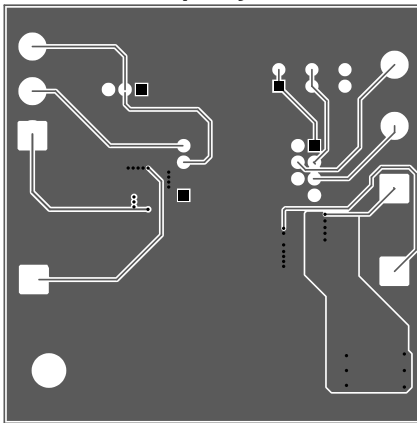
### LAYOUT GUIDELINES



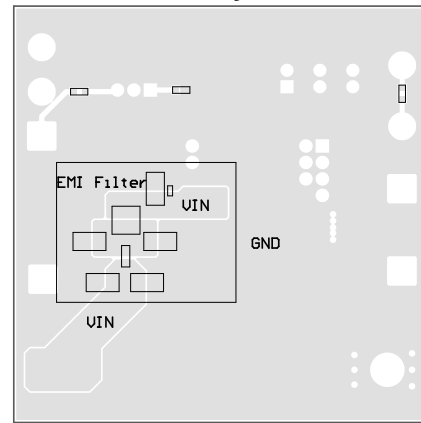
**Top Layer**



**Mid Layer 1**



**Mid Layer 2**



**Bottom Layer**

1. Use a large ground plane to connect to GND directly.
2. Add vias near GND if the bottom layer is a ground plane.
3. Ensure that the high-current paths at GND and VIN have short, direct, and wide traces.
4. Place the VCC capacitor as close to VCC and GND as possible.
5. Ensure an integrate GND is at the internal layer or bottom layer.
6. Use a four-layer layout to achieve better thermal performance.
7. Use multiple vias to connect the power planes to the internal layers.