

DESCRIPTION

The mEZDPD3603 series are ultra-low EMI, programmable DC/DC power supplies up to 3A and 0.6V to 12V output voltage. There are two packages available. The mEZDPD3603AS is a surface mount: LGA package, and the mEZDPD3603A is in the DIP (Dual Inline Package). The mEZDPD3603 series products have a multiple-time programmable memory and simple GUI (Graphic User Interface).

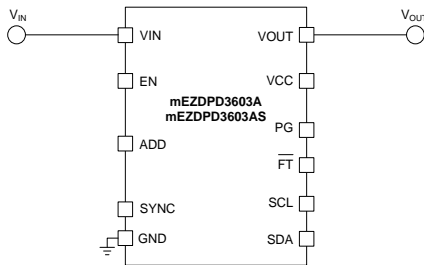
The GUI includes modeling software for verification of performance. During bench evaluations, different configurations can be obtained easily through the I2C interface. This allows users to optimize each output for their requirements. All non-programmed parts (mEZDPD3603A-XXXX, mEZDPD3603AS-XXXX) parts require only current and output voltage values to begin the evaluation. The other parameters, as defined in the GUI, have default settings that can be modified by the user, if necessary.

mEZ Product Options:

1. Surface Mount and SIP Package
2. Ready-to-Use Modules
3. Do-It-Yourself. Manufacturing assistance is provided
4. Components can be purchased separately

FEATURES

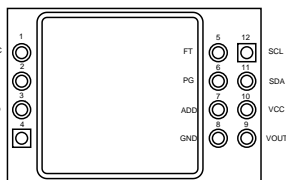
- 4.5V to 36V Operating Input
- 0.6V to 12V Output Voltage
- Up to 3A Continuous Current
- Meet EN55022 Class B Emissions
- Operation Temperature: -40°C to 85°C
- Standard DIP Package (16x23x6.5mm)
- Standard LGA Package (15x15x6mm)
- Programmable Parameters
- Output Voltage
- Output Current Limit
- Switching Frequency
- Multiple Selection Modes
- Compensation
- Design Files Available



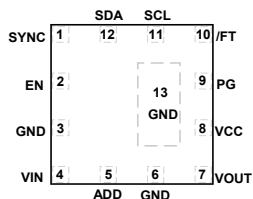
Typical Application Circuit

WEB PROGRAMMABLE MODULE

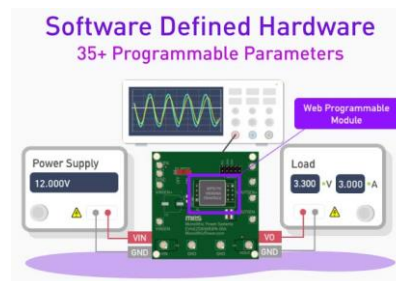
- Build a custom module using our online service.
- Customize your voltage, current limit, and more.
- Simulate > Program > Receive > Test



mEZDPD3603A Pin Assignment
TOP VIEW



mEZDPD3603AS Pin Assignment
TOP VIEW



Order directly from Monolithicpower.com or our distributors.

For more information, please contact mEZsupport@monolithicpower.com

PROGRAMMABLE mEZD FAMILY

Part Number	Input Voltage	Programmable Current up to
mEZDPD3603A	4.5-36V	3A
mEZDPD3603AS	4.5-36V	3A



mEZDPD3603A, mEZDPD3603AS

Zero EMI, Programmable 36V DC/DC Power Supply up to 3A

ORDERING INFORMATION

Part Number	Input Voltage (V)(V)	Output Current (A)	Output Voltage (V)
mEZDPD3603A-XXXX mEZDPD3603AS-XXXX	4.5-36	NP	NP
mEZDPD3603A-0001 mEZDPD3603AS-0001 (default programmed)	6.5-36	3A	5V
mEZDPD3603A-0002 mEZDPD3603AS-0002	4.5-36	3A	3.3V
mEZDPD3603A-0003 mEZDPD3603AS-0003	15-36	3A	12V
PKT-mEZDPD3603A*	4.5-36	NP*	NP*

*NP: Current and Voltage Not Programmed *PKT: Programming Kit

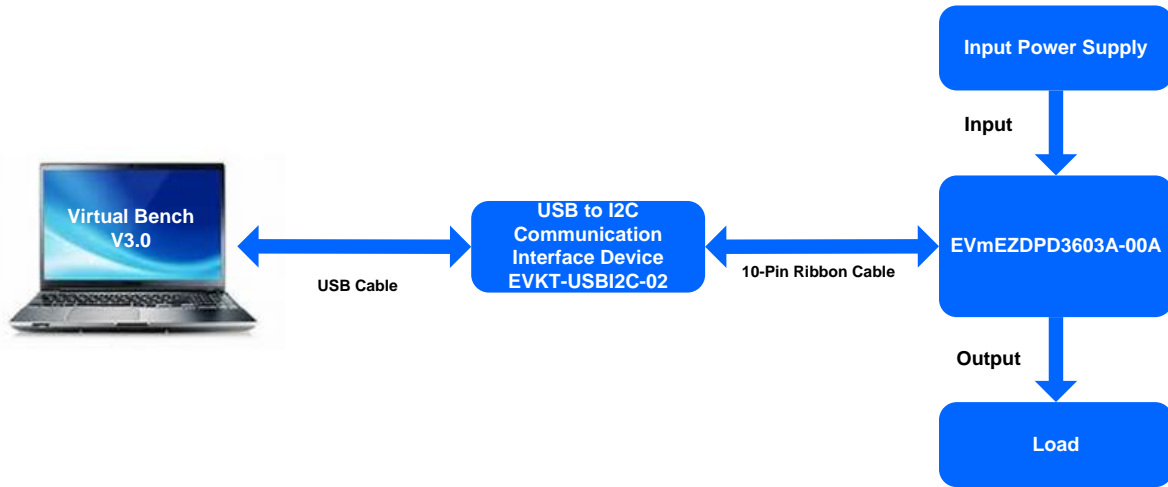
ELECTRICAL CHARACTERISTICS

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

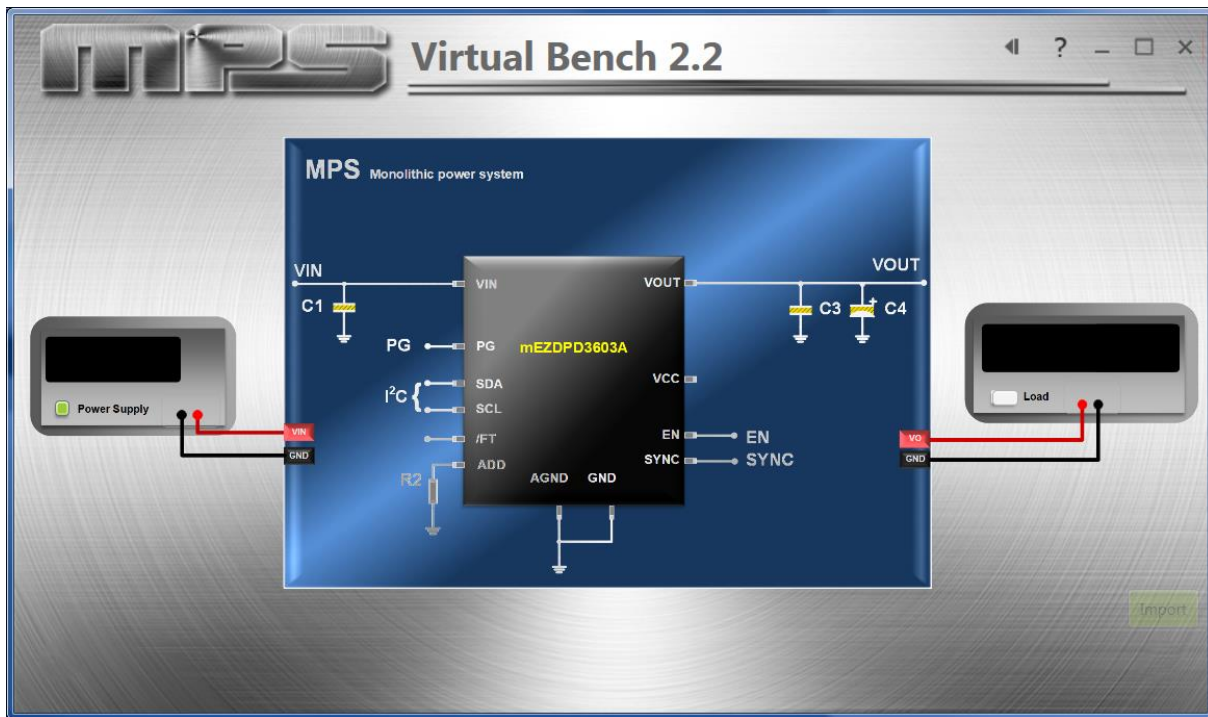
Parameters	Condition	Typ Value
Input Voltage Range	V_{IN} continuous	4.5 to 36V
Output Voltage Set Accuracy		$\pm 1\%$ (typ)
Output Voltage Ripple	$V_{IN} = 24V$, $V_{OUT} = 5V$, full load	30mV*
Line Regulation	$V_{IN} = 24V$, $V_{OUT} = 5V$	$\pm 1\%$ (typ)
Load Regulation	$V_{IN} = 24V$, $V_{OUT} = 5V$	$\pm 1\%$ (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 $85^\circ C$ *
Over-Temperature Protection (OTP)	Default value	$175^\circ C$ *
Rise Time	From 10% V_{OUT} to 90% V_{OUT}	1ms (typ)
Calculated MTBF	MIL-HDBK-217F	4185×10^3 hrs

* Guaranteed by sample characterization. Not tested in production.

GUI Interface to Program mEZDPD3603A, mEZDPD3603AS



Evaluation Kit Connection for Programming



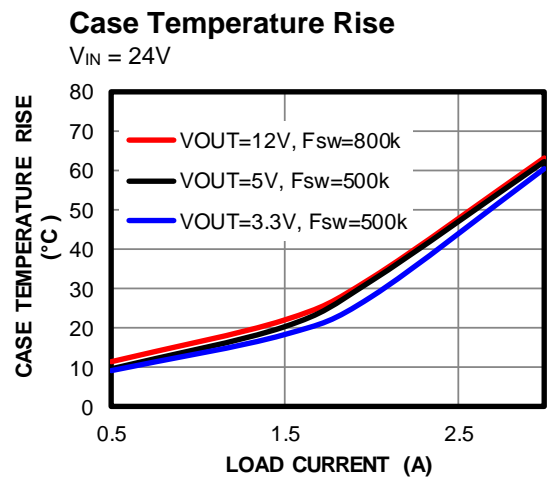
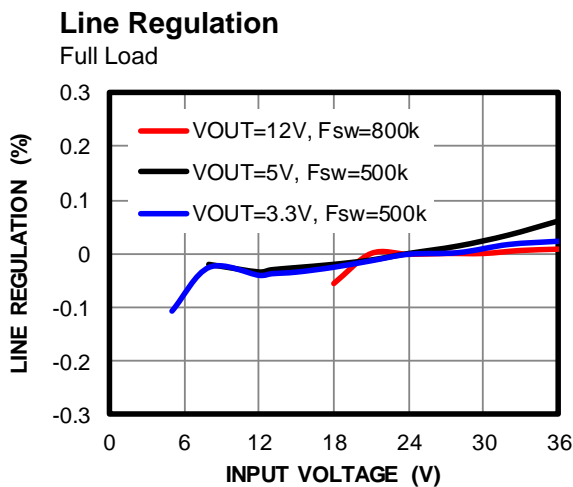
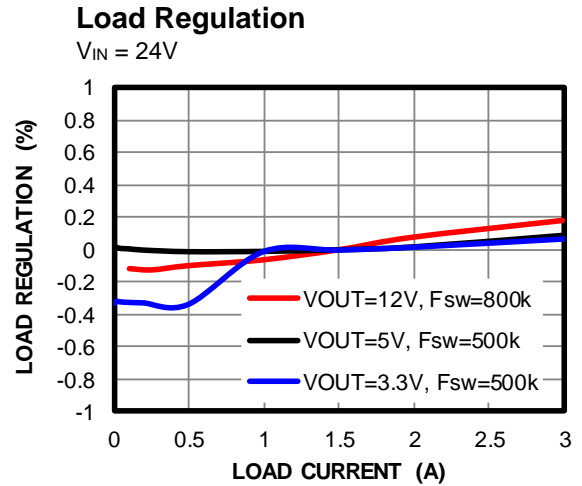
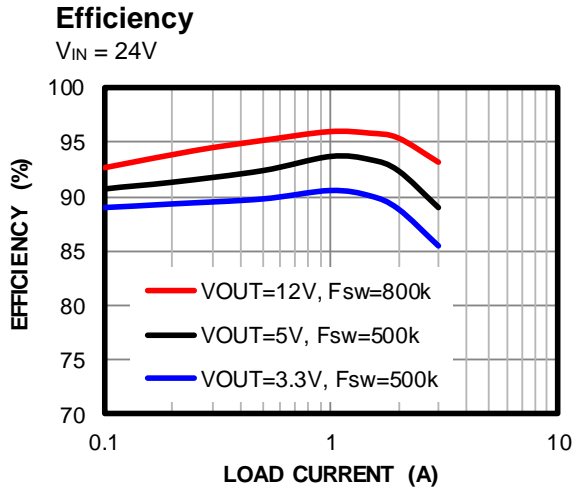
Virtual Bench Pro Main GUI Interface to

One-Time Programming (OTP) Program Guidance

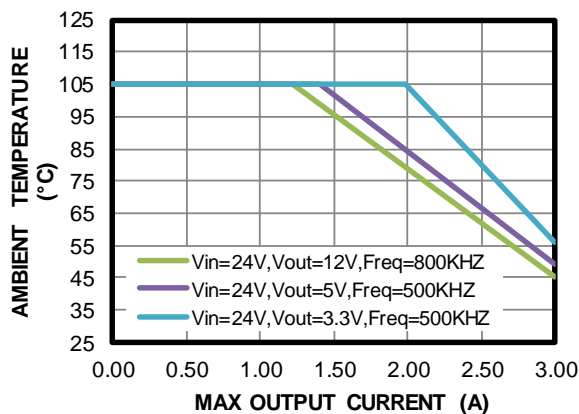
1. The VIN range for writing to the OTP is 8 - 36V. When writing to OTP (ROM), the module will shut down and restart.
2. Power off the part and power on again. The part will work normally with a new configuration.
3. Users can program the OTP once.
4. In RAM mode, the users can write to registers an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

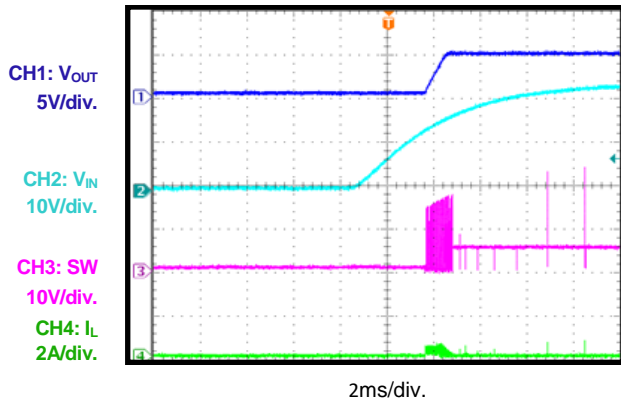


Ambient Temperature vs. Max Output Current

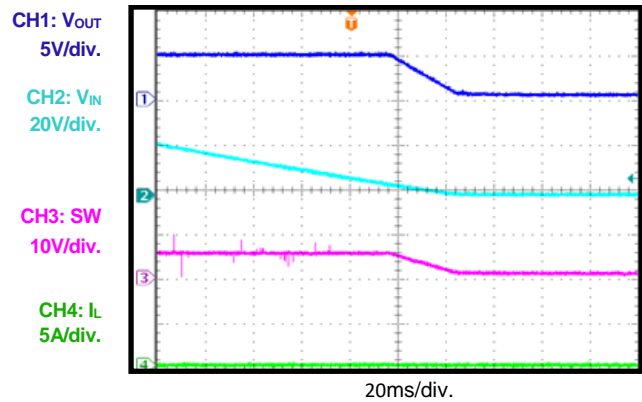


TYPICAL PERFORMANCE CURVE (continued)

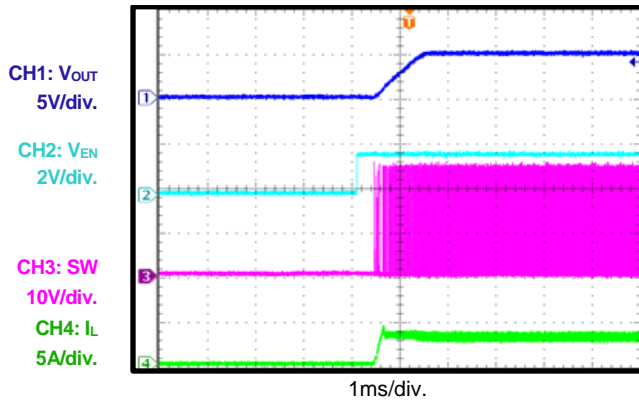
$V_{IN} = 24V$, $V_{OUT} = 5V$, $T_J = -40^{\circ}C$ to $125^{\circ}C$, typical value is tested at $T_A = 25^{\circ}C$, unless otherwise noted.



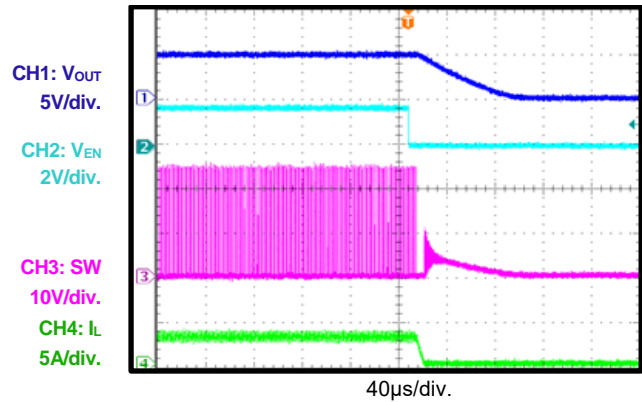
EN Start-Up



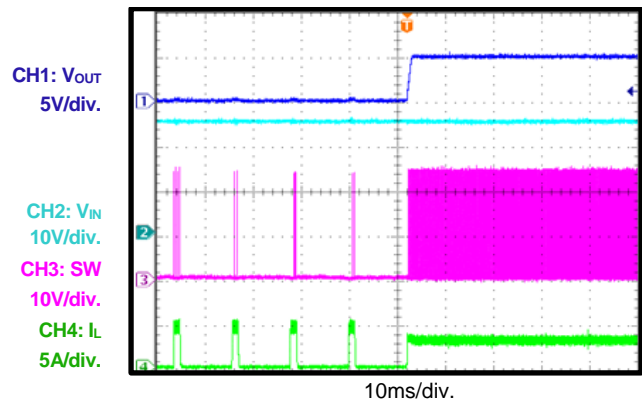
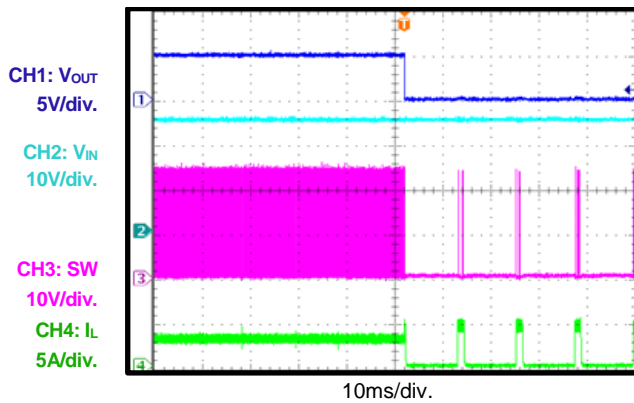
EN Shutdown



SCP Entry



SCP Recovery

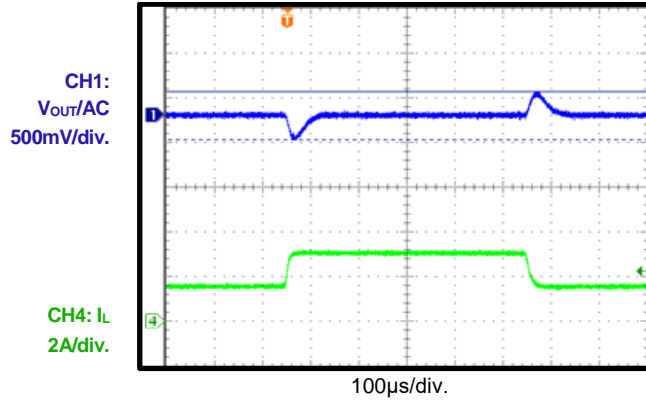


TYPICAL PERFORMANCE CURVE *(continued)*

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

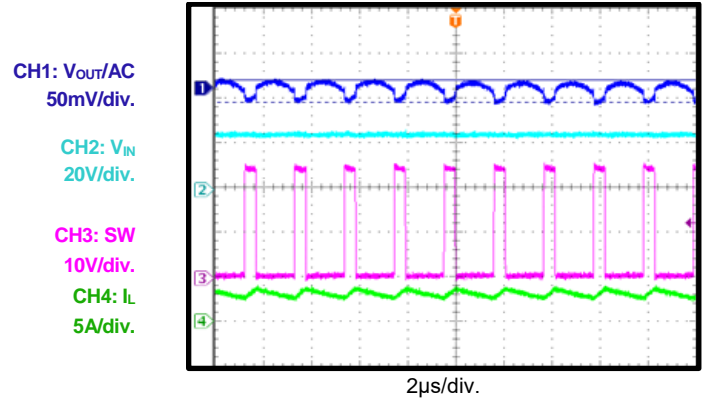
Load Transient

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

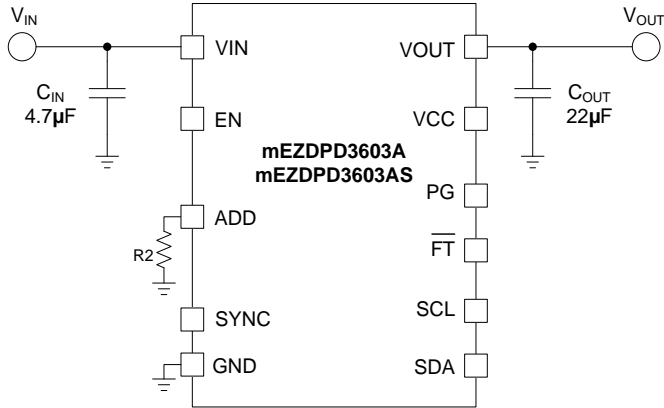


V_{OUT} Ripple

Full load, without external C_{OUT}



TYPICAL APPLICATION CIRCUIT



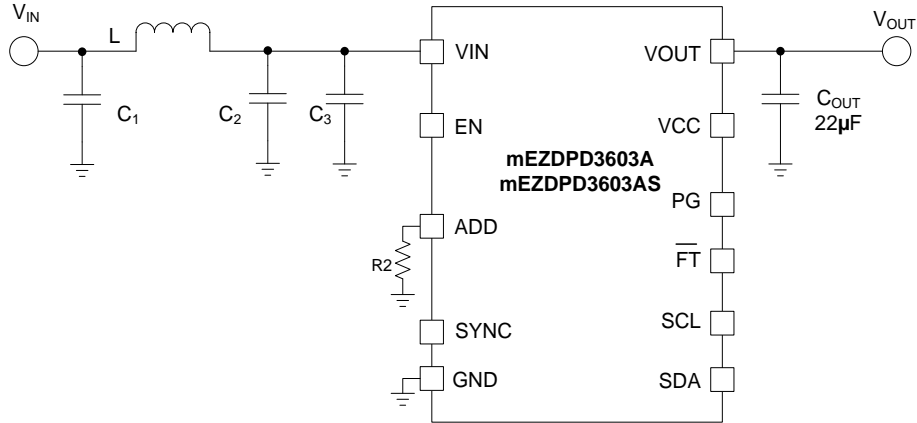
Recommend Input, Output Capacitors

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 EN5022 CLASS B STANDARD

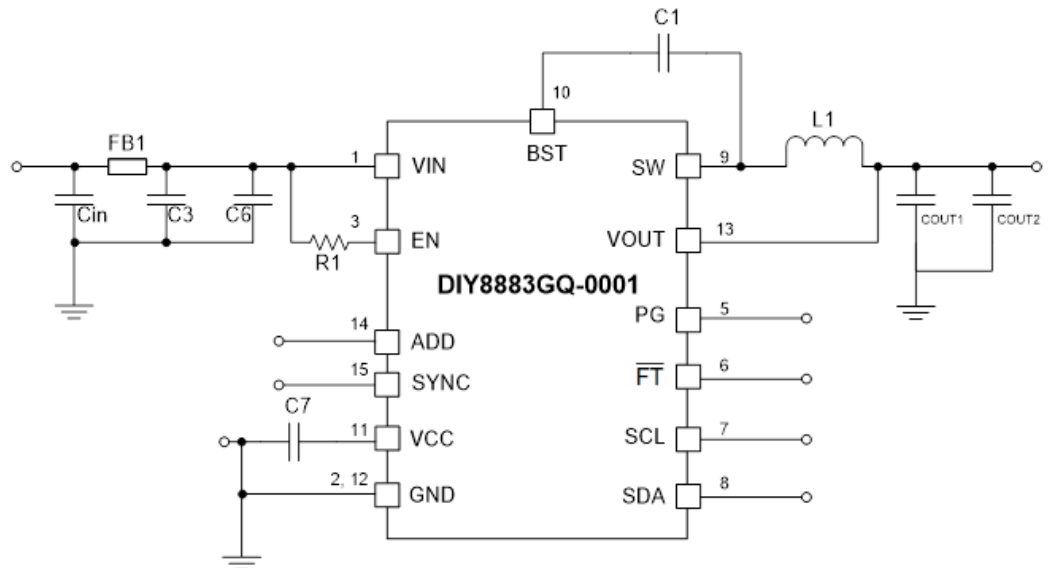


VOUT (V)	L	C1	C2	C3	Cout
<3.3	4.7µH	10µF	10µF	N/A	22µF
5	4.7µH	10µF	10µF	N/A	22µF x 2
12	4.7µH	10µF	10µF	100µF E-cap	22µF x 2

INTERNAL MODULE SCHEMATIC

Do It Yourself!

- BOM provided below
- Design Files can be downloaded
- Purchase DIY8883GQ-001 IC separately

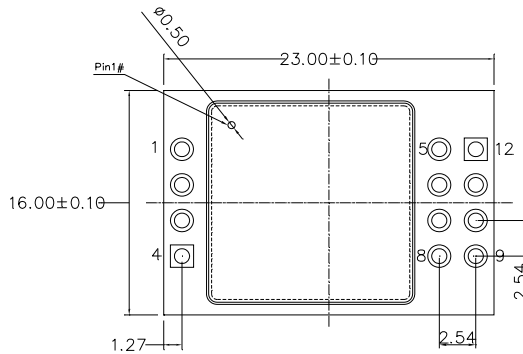


mEZDPD3603A and mEZDPD3603AS Internal Block Diagram

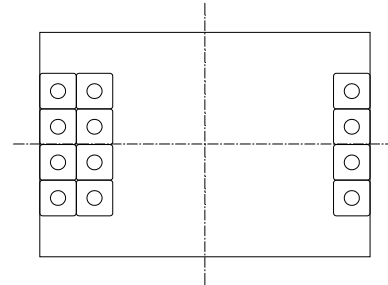
BILL OF MATERIALS

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
1	0603-1UF-X7R-16V	C7	CAP0603-S	885012206052	Wurth
1	0603-1UF-X7R-16V	Option1	CAP0603-S	CGA3E1X7R1C105KT0Y0N	TDK
1	0603-1UF-X5R-16V	Option2	CAP0603-S	GRM188R61C105KA12J	Marata
2	1206-22UF-X7R-25V	Cout1, Cout2	CAP1206S	GRM31CC71E226ME11L	Marata
2	1206-22UF-X5R-25V	Option1	CAP1206S	GRM31CR61E226KE15L	Marata
2	SMD/SMT 22uF 25V X5R ±20% 1206	Option2	CAP1206S	TMK316BBJ226ML-T	Taiyo Yuden
1	Bead,5A,30Ω@100MHz	FB1	RES0603	MPZ1608S300ATAH0	TDK
1	Bead,5A,30Ω@100MHz	Option	RES0603	BLM18KG300TN1D	Marata
1	10uH, 4A, 7mm x 7mm inductor	L1	7mm x 7mm	MPL-AY6030-100	MPS
1	Film Res,1%,0603,1M	R1	RES0603	RC0603FR-071ML	Yageo
1	Chinafastpcb / For mEZDPD3603A	-	-	VH-23*16-MPS-01-A/DIP VERSION	ChinaFastPCB
1	Chinafastpcb / For mEZDPD3603AS	-	-	mEZDPD3603AS/SMD VERSION	ChinaFastPCB
1	Lid-14.5x14.5-01	-	-	Lid-14.5x14.5-01	Yuyuan
1	MPS DCDC IC	U1	FCQFN_16P_3X3MM	DIY8883GQ-0001	MPS

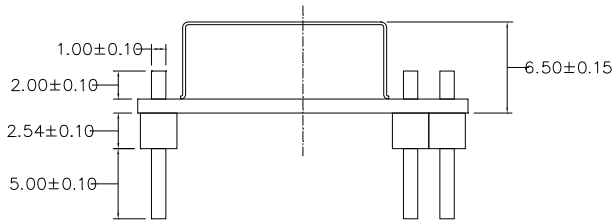
PRODUCT PACKAGE DIMENSIONS - mEZDPD3603A DIP Package



TOP VIEW



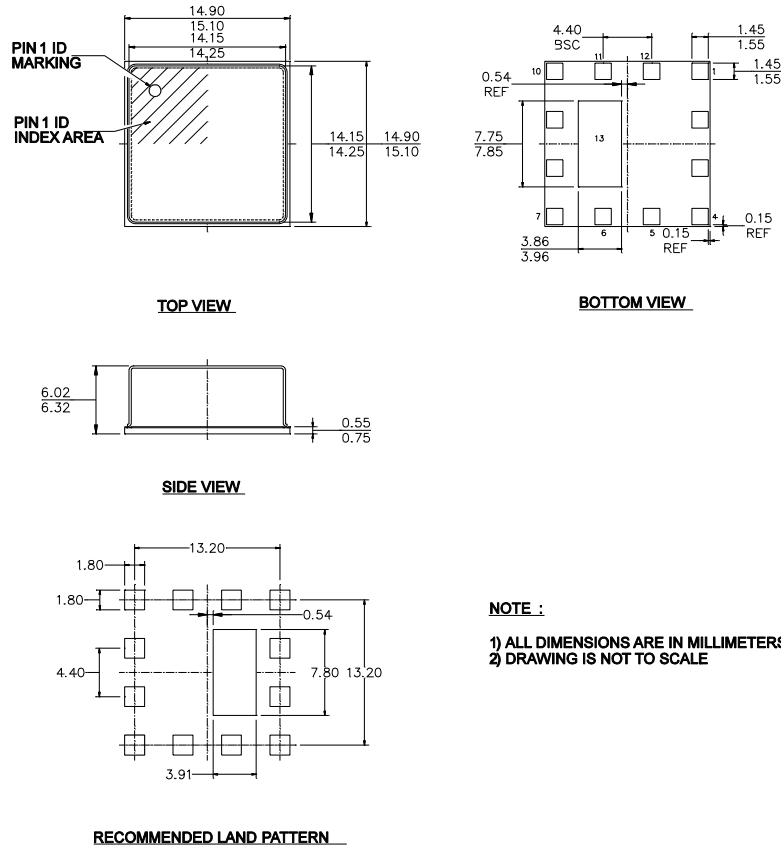
BOTTOM VIEW



SIDE VIEW

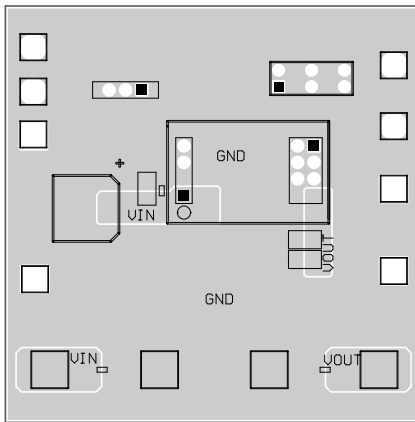
Pin	Designation	Function	PIN Description
1	SYNC	Synchronize	Input, clock synchronization
2	EN	Enable	Input, Drive EN high to turn on the device
3	GND	Power Ground	Power ground
4	VIN	Input Voltage	Input, supply voltage
5	\overline{FT}	Fault Indicator	Output, fault indicator
6	PG	Power Good	Output, power good indicator
7	ADD	Address Setting	Address setting for I ² 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 ² C Serial Data	Communication bus, I ² C serial data
12	SCL	I ² C Serial Clock	Communication bus, I ² C serial clock

PRODUCT PACKAGE DIMENSIONS - mEZDPD3603AS Surface Mount LGA Package

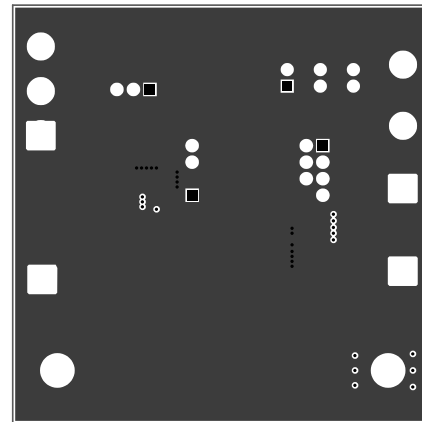


Pin	Designation	Function	PIN Description
1	SYNC	Synchronize	Input, clock synchronization
2	EN	Enable	Input, Drive EN high to turn on the device
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4	VIN	Input Voltage	Input, supply voltage
5	ADD	Address Setting	Address setting for I ² C
6	GND	Power Ground	Power ground
7	VOUT	Output Voltage	Output voltage
8	VCC	Internal LDO Output	Output, internal 5V LDO regulator output
9	PG	Power Good	Output, power good indicator
10	\overline{FT}	Fault Indicator	Output, fault indicator
11	SCL	I2C Serial Clock	Communication bus, I ² C serial clock
12	SDA	I2C Serial Data	Communication bus, I ² C serial data
13	GND	Power Ground	Power ground

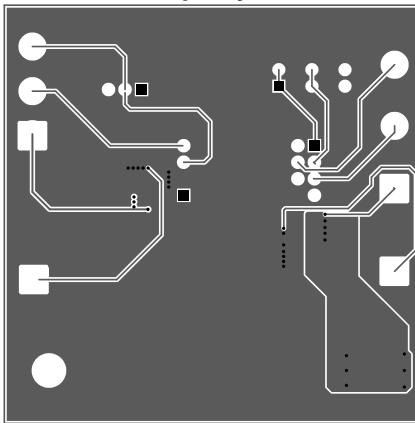
LAYOUT GUIDELINES



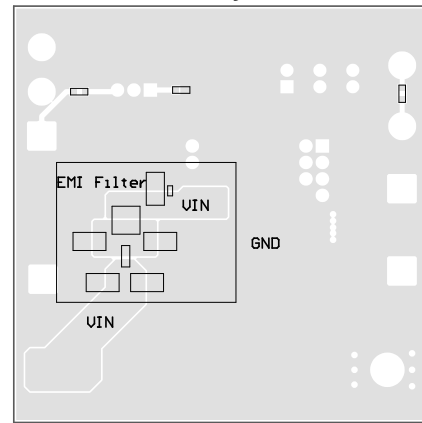
Top Layer



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.