

### DESCRIPTION

The MP3430 is a monolithic step-up converter with an integrated power switch and a biased avalanche-photodiode (APD) current monitor. The output voltage can be doubled by design through the APD's optical receivers. The MP3430 can provide up to 90V output.

The MP3430 uses a current-mode, fixed-frequency architecture to regulate the output voltage and provide a fast transient response and cycle-by-cycle current limit. The MP3430 features two accurate APD current-monitoring outputs with 1:10 and 1:2 ratios, respectively. Resistor-adjustable current limiting protects the APD from optical power transients.

### ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	$V_{IN}$	2.7 to 5.5	V
Output Voltage	$V_{OUT}$	50	V
Output Current	$I_{OUT}$	2	mA

### FEATURES

- 2.7V-to-5.5V Input Voltage
- 100V, 0.8Ω NFET with 280mA Limit
- Up to 90V Output Voltage
- 50ns APD Current Monitoring Response Speed
- 1.3MHz Fixed Switching Frequency
- Internal Compensation and Soft Start
- High Side APD Current Monitor with Less Than ±5% Tolerance.
- 1:10 and 1:2 Output Ratios for APD Current Monitoring
- Thermal-Shutdown Protection
- Programmable APD Over-Current Limit and Protection
- 3×3mm QFN16 Package

### APPLICATIONS

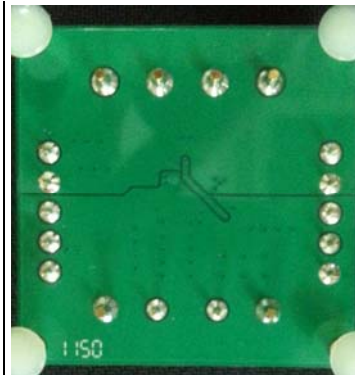
- APD Bias
- PIN Diode Bias
- Optical Receivers and Modules
- Fiber Optic Network Equipment

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## EV3430-Q-00A EVALUATION BOARD



FRONT



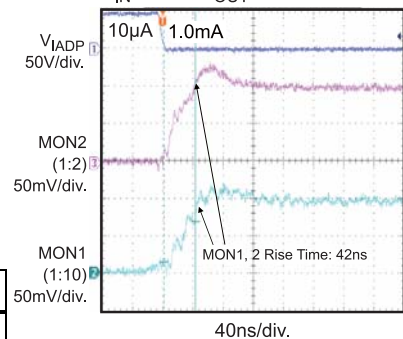
BACK

<b>Board Number</b>	<b>MPS IC Number</b>
EV3430-Q-00A	MP3430GQ

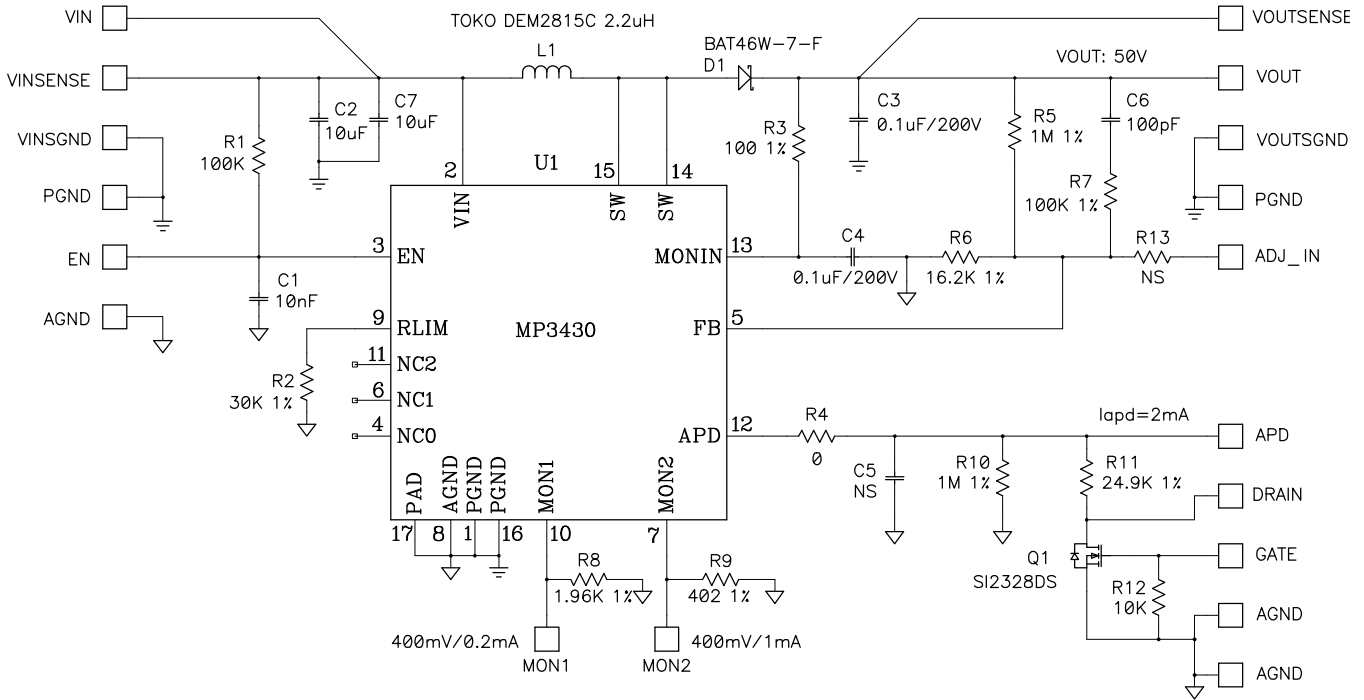
### APD Monitor Current Response Speed

10μA to 1mA Step

$V_{IN} = 3.3V, V_{OUT} = 50V$



## EVALUATION BOARD SCHEMATIC



## EV3430-Q-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
1	L1	2.2µH	L, Inductor 2.2uH, 1.8A	Type DEM2815C	Toko	1226AS-H-2R2M
1	Q1	XTR	MOSFET N-CH 100V 1.15A SOT23-3	SOT-23-3	Vishay/Siliconix	SI2328DS-T1-E3
1	D1	Diode	DIODE SCHOTTKY 200MW 100V SOD-12	SOD-123	Diodes Inc	BAT46W-7-F
1	C1	10nF	CAP CER 10000PF 16V 10% X7R 0603	0603	muRata	GRM188R71C103 KA01D
2	C2, C7	10µF	CAP CER 10UF 10V 10% X7R 0805	0805	muRata	GRM21BR71A106 KE51L
2	C3, C4	0.1µF	0.1uF/250V/X7R/10%/1210	1210	muRata	GRM32DR72E104 KW01L
1	C5	NS		1210		
1	C6	100pF	CAP CER 100pF/250V/NPO/5%/0805	0805	muRata	GRM21A5C2E101J W01D
1	R1	100kΩ	Film Res., 5%	0603	Yageo	RC0603JR-07100KL
1	R2	30kΩ	Film Res., 1%	0603	Yageo	RC0603FR-0730KL
1	R3	100Ω	Film Res., 1%	0603	Yageo	RC0603FR-07100RL

**EV3430-Q-00A BILL OF MATERIALS (Continued)**

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
1	R4	0Ω	Film Res., Jumper	0603	Yageo	RC0603JR-070RL
2	R5, R10	1MΩ	R <sub>FB</sub> , Top RES 1.00M OHM 1/10W 1% 0603 SMD	0603	Yageo	RC0603FR-071ML
1	R6	16.2kΩ	Film Res., 1%	0603	Yageo	RC0603FR-0716K2L
1	R7	100kΩ	Film Res., 1%	0603	Yageo	RC0603FR-07100KL
1	R8	1.96kΩ	Film Res., 1%	0603	Yageo	RC0603FR-071K96L
1	R9	402Ω	Film Res., 1%	0603	Yageo	RC0603FR-07402RL
1	R11	24.9kΩ	Film Res., 1%	0805	Yageo	RC0805FR-0724K9L
1	R12	10kΩ	Film Res., 5%	0603	Yageo	RC0603JR-0710KL
1	R13		NS	0603		
1	U1		MP3430 APD Boost IC with Internal Switch		MPS	MP3430GQ

## PRINTED CIRCUIT BOARD LAYOUT

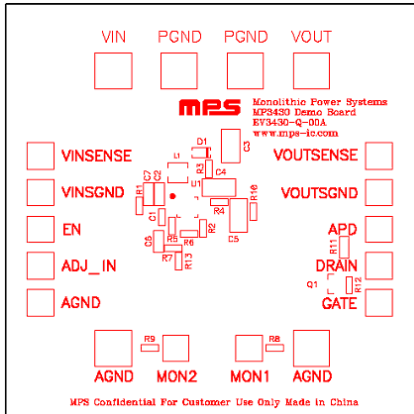


Figure 1—Top Silk Layer

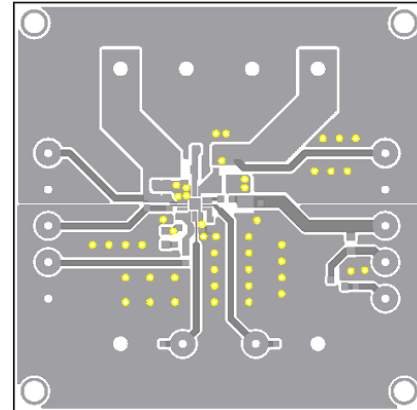


Figure 2—Top Layer

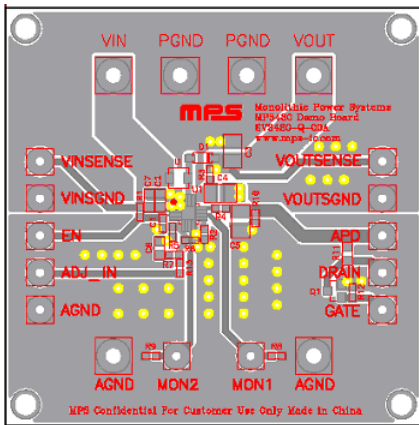


Figure 3—Top Layer with Silk

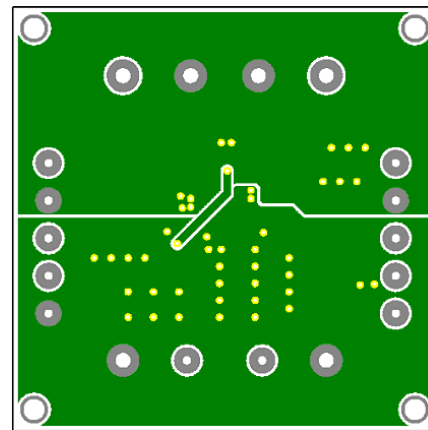


Figure 4—Bottom Layer

## QUICK START GUIDE

- 1) The output voltage of this board is set to 50V
- 2) Preset the power supply to  $2.7V \leq V_{IN} \leq 5.5V$ .
- 3) Turn the power supply off.
- 4) Connect the power supply terminals to:
  - Positive (+): VIN
  - Negative (-): GND
- 5) Connect the load to:
  - Positive (+): APD
  - Negative (-): GND
- 6) Make sure the load is  $\leq 2mA$
- 7) Turn the power supply on after making the connections.
- 8) The MP3430 is enabled on the evaluation board once VIN is applied.
- 9) The output voltage VOUT can be changed by varying R6. Calculate the new value using the formula:

$$V_{OUT} = 0.8 \times \left( 1 + \frac{R5}{R6} \right)$$

- 10) The output voltage can be dynamically adjusted through a voltage applied to the ADJ pin. Use the following formula to adjust VOUT:

$$V_{OUT} = 0.8 \times \left( 1 + \frac{R5}{R6} \right) + \left( \frac{R5}{R13} \times (0.8V - ADJ) \right)$$

- 11) The APD current limit can be changed by adjusting R2. The formula is:

$$R_{RLIM} = \frac{68}{I_{APD,MAX}}$$

Where:

$R_{RLIM}$  units = k $\Omega$

$I_{RLIM}$  units = mA

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