EV3430-Q-00A
90V Step-Up Converter with APD Current Monitor Evaluation Board

The Future of Analog IC Technology

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
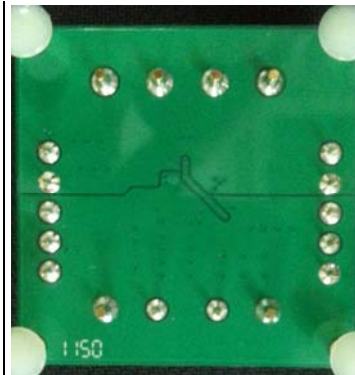- 3×3mm QFN16 Package

APPLICATIONS

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

EV3430-Q-00A EVALUATION BOARD

FRONT

BACK

APD Monitor Current Response Speed 10µA to 1mA Step
V_{IN} = 3.3V, V_{OUT} = 50V

Board Number	MPS IC Number
EV3430-Q-00A	MP3430GQ
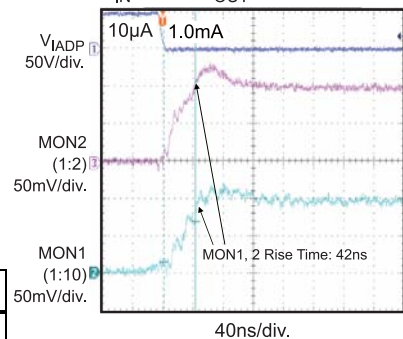
EVALUATION BOARD SCHEMATIC
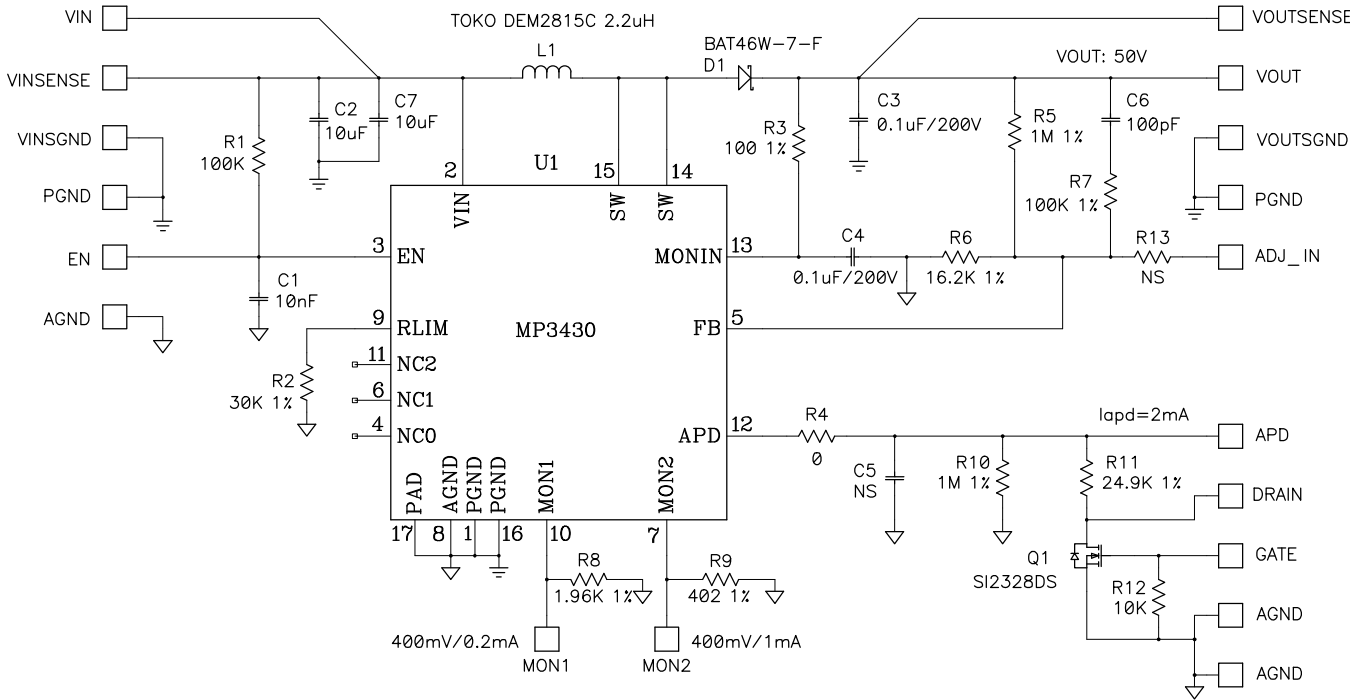
EV3430-Q-00A BILL OF MATERIALS

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	GRM188R71C103KA01D
2	C2, C7	10µF	CAP CER 10UF 10V 10% X7R 0805	0805	muRata	GRM21BR71A106KE51L
2	C3, C4	0.1µF	0.1uF/250V/X7R/10%/1210	1210	muRata	GRM32DR72E104KW01L
1	C5		NS	1210		
1	C6	100pF	CAP CER 100pF/250V/NPO/5%/0805	0805	muRata	GRM21A5C2E101JW01D
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_{FB}, 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

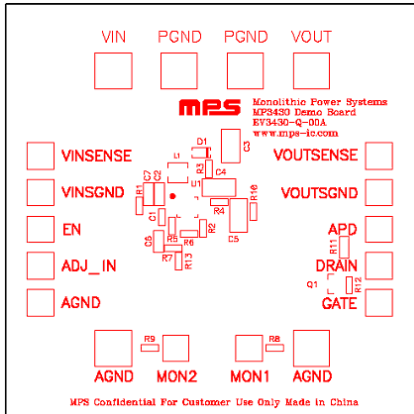# PRINTED CIRCUIT BOARD LAYOUT
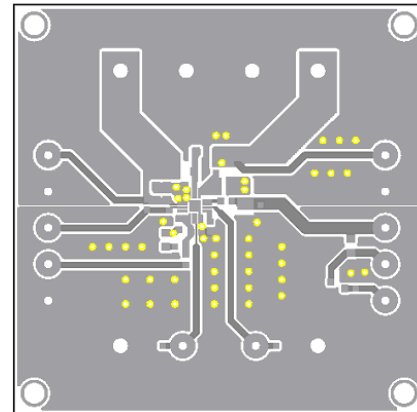

Figure 1—Top Silk Layer
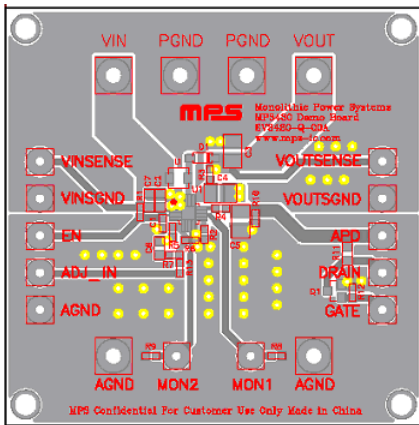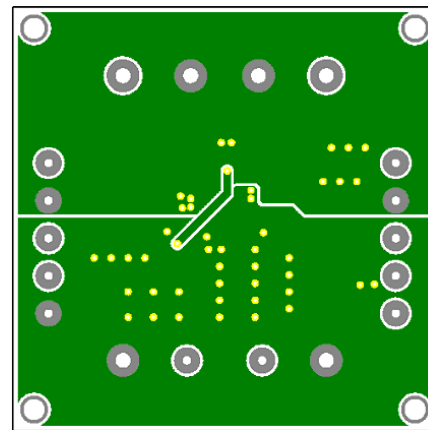

Figure 2—Top Layer

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 ≤ VIN ≤ 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 ≤ 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 = kΩ

I$_{RLIM}$ units = mA

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