

# AN-1204 LM3478/LM3488 Evaluation Board

## User's Guide



Literature Number: SNVA656A  
June 2012—Revised October 2013

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## ***AN-1204 LM3478/LM3488 Evaluation Board***

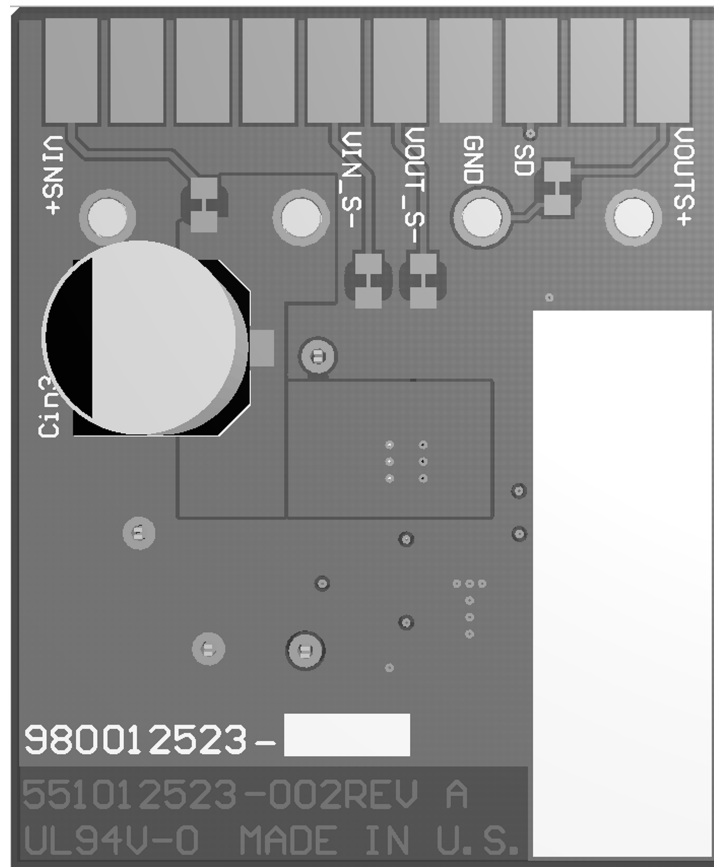
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The LM3478 and LM3488 are current mode, low side N-channel FET controllers. They can be utilized in numerous configurations including a Boost, Flyback or SEPIC. This evaluation board demonstrates the flexibility of the LM3478 in a boost topology.





A Bottom View

Figure 2. LM3478 Evaluation Board

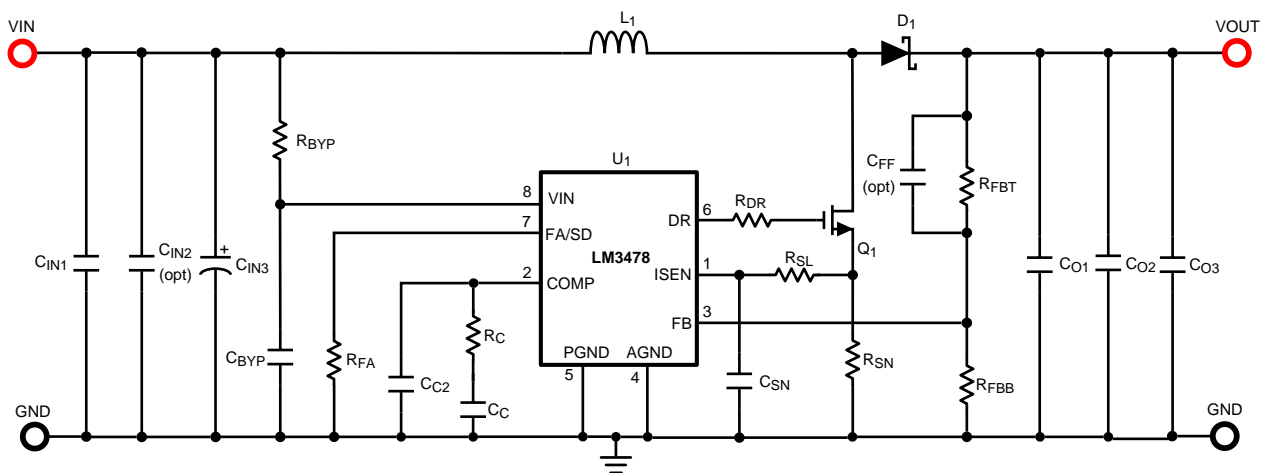


Figure 3. LM3478 Evaluation Board Schematic

Table 1. Bill of Materials (BOM) LM3478

Designation	Description	Size	Manufacturer Part #	Vendor
C <sub>IN1</sub>	CAP, 47µF, 20%, 25V, X5R	1206	C3216X5R1E476M	TDK
C <sub>IN2</sub>	optional			

**Table 1. Bill of Materials (BOM) LM3478 (continued)**

Designation	Description	Size	Manufacturer Part #	Vendor
C <sub>IN3</sub>	CAP, 150μF, 20%, 8V 15mΩ, Aluminum	7.3mm L x 4.3mm W x 4.2mm H	EEF-UE0K151R	Panasonic
C <sub>O1</sub> , C <sub>O2</sub> , C <sub>O3</sub>	CAP, 47μF, 20%, 25V, X5R	1206	C3216X5R1E476M	TDK
C <sub>C</sub>	CAP, 0.1μF, 10%, 16V, X7R	0603	GRM188R71C104KA01D	Murata
C <sub>C2</sub>	CAP, 100pF, 5%, 50V, NP0	0603	GRM1885C1H101JA01D	Murata
C <sub>BYP</sub>	CAP, 0.1μF, 10%, 16V, X7R	0603	GRM188R71C104KA01D	Murata
C <sub>FF</sub>	optional			
C <sub>SN</sub>	CAP, 0.01μF, 10%, 50V, X7R	0603	C0603C103K5RACTU	Kemet
R <sub>C</sub>	RES, 1kΩ, 1%, 0.1W	0603	CRCW06031K00FKEA	Vishay
R <sub>BYP</sub>	RES, 10.0 ohm, 1%, 0.1W	0603	CRCW060310R0FKEA	Vishay
R <sub>FBT</sub>	RES, 86.6kΩ, 1%, 0.1W	0603	CRCW060386K6FKEA	Vishay
R <sub>FBB</sub>	RES, 10.2kΩ, 1%, 0.1W	0603	CRCW060310K2FKEA	Vishay
R <sub>DR</sub>	RES, 0Ω, 1%, 0.1W	0603	CRCW06030000Z0EA	Vishay
R <sub>SL</sub>	RES, 0Ω, 1%, 0.1W	0603	CRCW06030000Z0EA	Vishay
R <sub>SN</sub>	RES, 0.015Ω, 1%, 1W	1206	CSR1206FK15L0	Stackpole Electronics
Q <sub>1</sub>	NexFET™ N-CH, 25V, 60A, R <sub>DS(on)</sub> = 4.4mΩ	8-SON	CSD16323Q3	TI
D <sub>1</sub>	Diode Schottky, 30V, 3A	SOD128	PMEG3030EP	Vishay
L <sub>1</sub>	Shielded Inductor, 1.8μH, 10A	6.36mm L x 6.56mm W x 3.1mm H	XAL6030-182ME	Coilcraft
U <sub>1</sub>	LM3478MM			TI
	EDGE CONNECTOR		307-020-500-202	EDAC

#### 4 Optional components

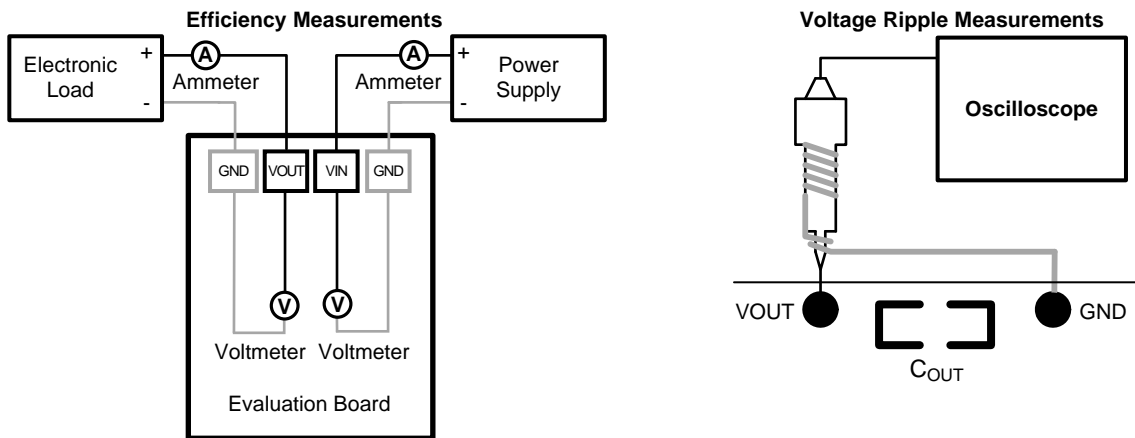
C<sub>IN2</sub> is an additional input capacitor.

C<sub>FF</sub> increases the gain of the dynamic loop during load transients.

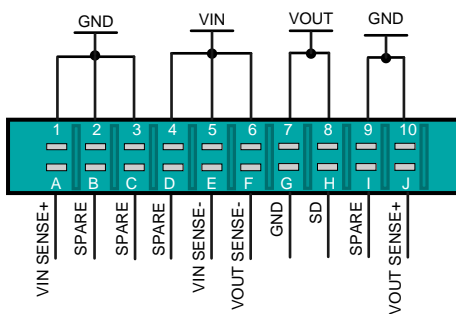
#### 5 Test Setup

**Table 2. Demonstration Board Quick Setup Procedures**

Step	Description	Notes
1	Connect a power supply to V <sub>IN</sub> and GND terminals	V <sub>IN</sub> range: 4.5V to 5.5V
2	Turn on V <sub>IN</sub> with 0A load applied, check V <sub>OUT</sub>	V <sub>OUT</sub> = 12V
3	Slowly increase the load from 0A to 1.5A, check V <sub>OUT</sub>	V <sub>OUT</sub> = 12V

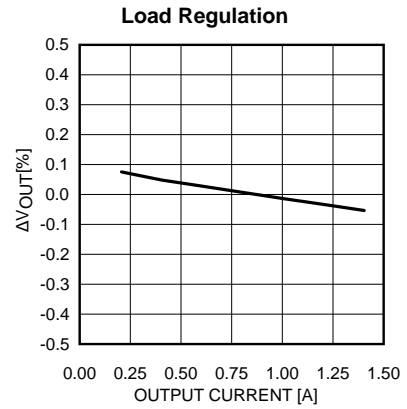
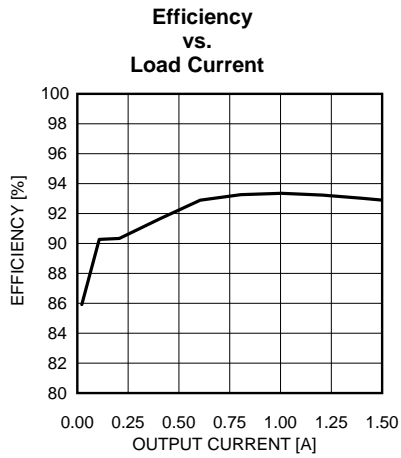


Edge Connector Schematic

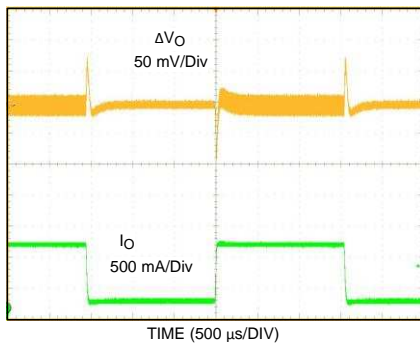




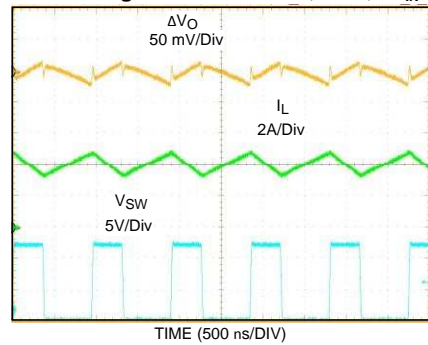
## 6 Typical Performance Characteristics for LM3478 Evaluation Board



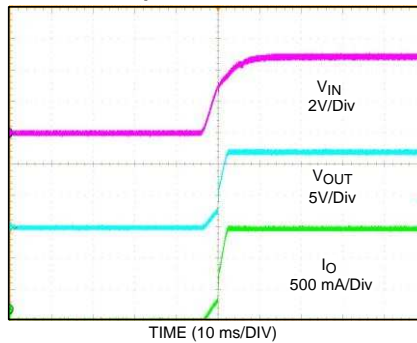
**Load Transient Waveforms 500mA to 1500mA, 5V<sub>IN</sub>**



**Switching Waveforms CCM, 1.5A, 5V<sub>IN</sub>**



**Startup Waveforms V<sub>IN</sub> = 5V**



7 Layout

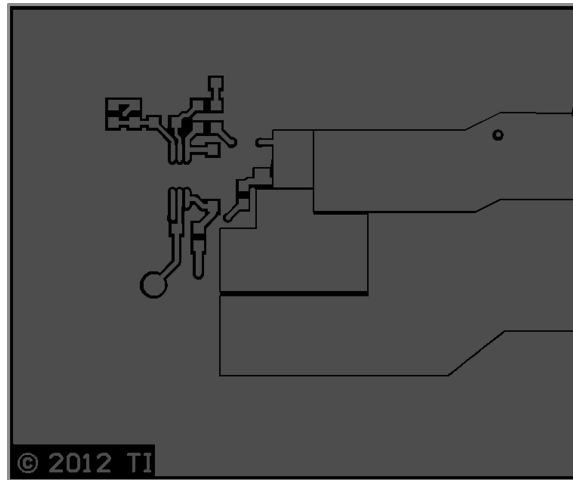


Figure 4. Top Layer

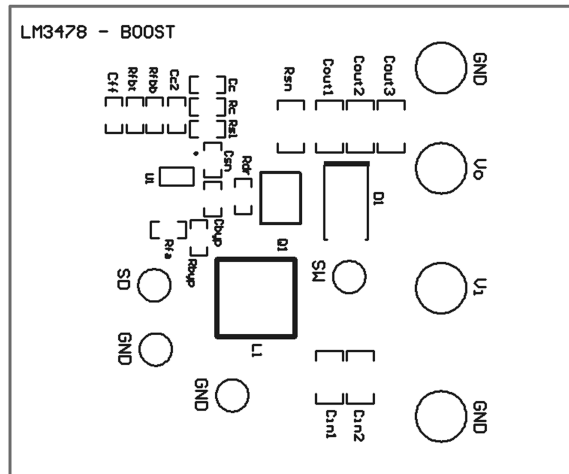


Figure 5. Top Silkscreen

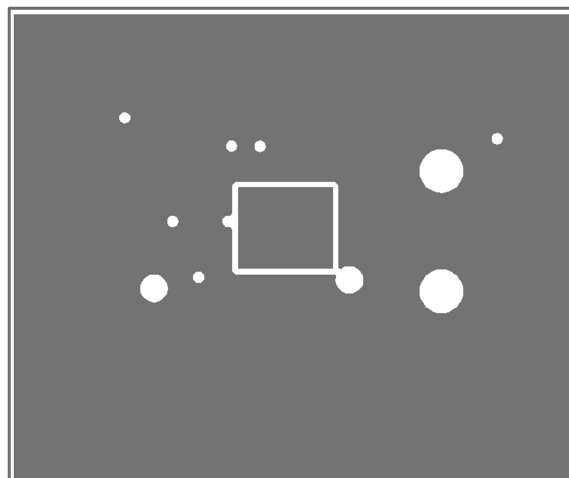


Figure 6. Mid Layer 1

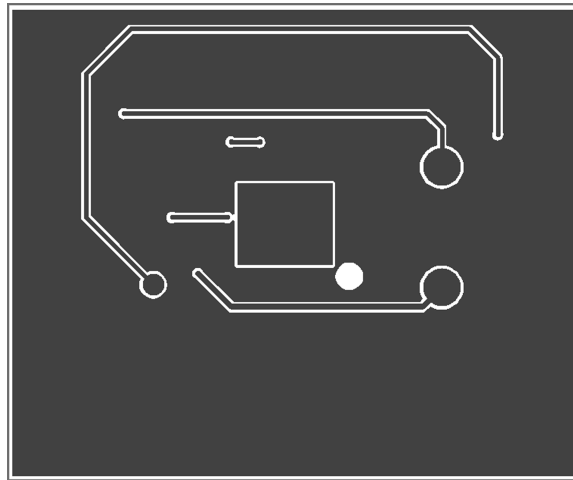


Figure 7. Mid Layer 2

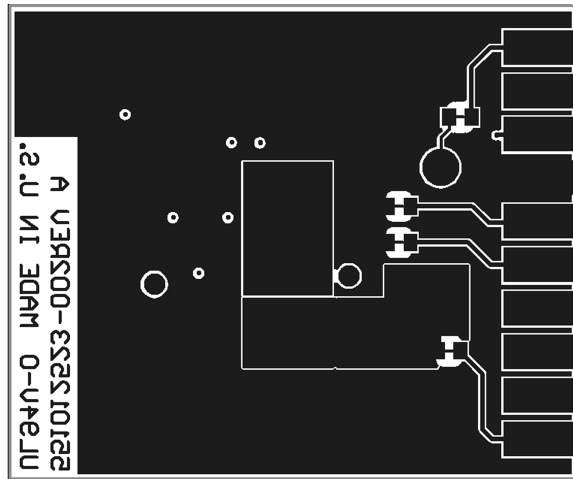


Figure 8. Bottom Layer

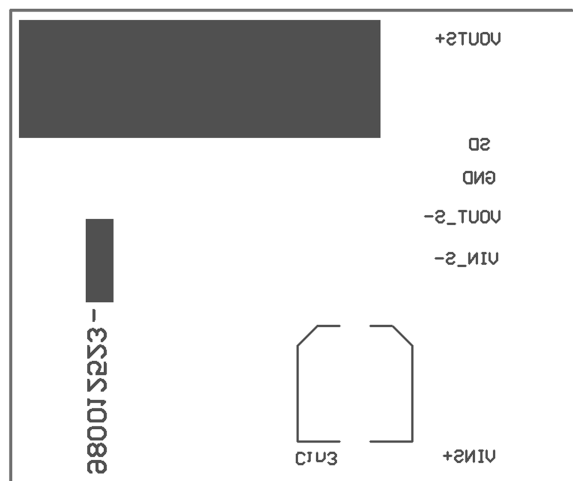


Figure 9. Bottom Silkscreen

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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#### Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

#### Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

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2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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