



Microsemi Power Management Solution for M1AFS_EMBEDDED_KIT

DVP-102-000252-001 Rev C

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Scope

This document presents data covering proposed AMMSG power management ICs targeted to replace competitor's parts used in Microsemi SOC's LC_M1AFS Embedded Kit. Power requirements are addressed via a comparison list between targeted power management ICs for retrofitting, as compared to Microsemi power management ICs determined to fit the requirements. Note that these are not all of the power management ICs on the M1AFS Embedded Kit circuit card; only PM chips which can be retrofitted are addressed here.

Test images and data of the competitor's solution vs. the AMMSG solution follow the comparison for each selected part. Lastly, schematic diagrams and suggested PCB layouts of the proposed AMMSG devices are at the end of this document.

Power Requirements

Parts targeted for retrofit are referenced to their respective schematic page. Please reference the LC_M1AFS_DEV Kit SCH_02_25_09.DSN, (Rev C), for details.

Schematic Page 2

- 1) U2 –LT1963A-3.3
 - a. No Replacement
- 2) U18 – LT3080
 - a. No Replacement
- 3) U16 – LT1615ES5
 - a. 5V to 10V Boost
 - b. 350mA Current Limit
 - c. $V_{CE_{SAT}} = 250\text{mV}$ at 300mA
 - d. ICC (no load) = 20uA
 - e. ICC (shutdown) = 500nA
 - f. 400ns Constant Off Time Control – Operates in Burst Mode
 - g. Shutdown Pin – Chip is enabled high
 - h. SOT23 – 5pin

Suggested AMMSG replacement: LX1742

- a. 5V to 10V Boost capable

- b. Peak Current Limit is Adjustable to 500mA.
- c. $V_{CE_{SAT}}$ not specified – $R_{DS_{ON}}$ of FET specified at 1.1Ω at 10mA
- d. I_{CC} (no load) = 80uA
- e. I_{CC} (shutdown) = 1uA
- f. 300ns Constant Off Time Control – Operates in Burst Mode
- g. Shutdown Pin – Chip is enabled high
- h. MSOP – 8pin

Test Data

U16 – 5V to 10V Boost

Old Device Steady State:

Output Voltage: 10.01V

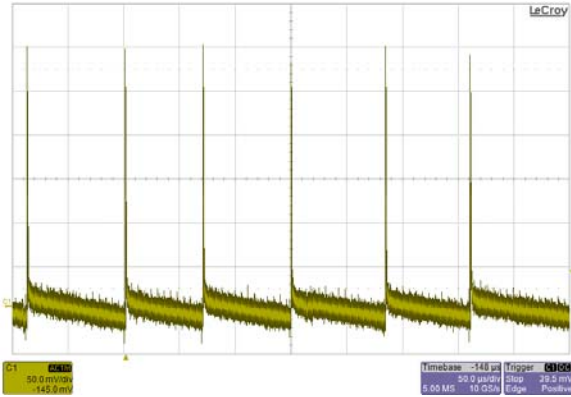
Enable: 3.276V

New Device Steady State:

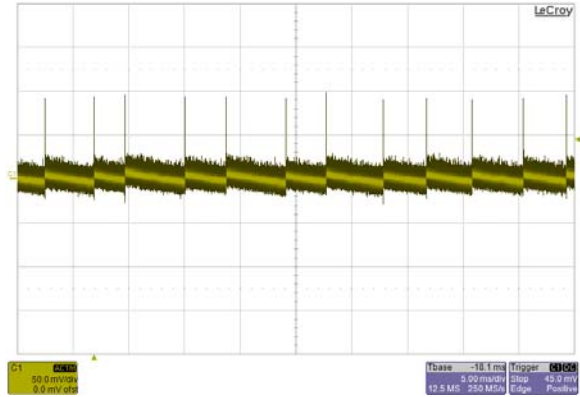
Output: 10.16V

Enable: 3.276V

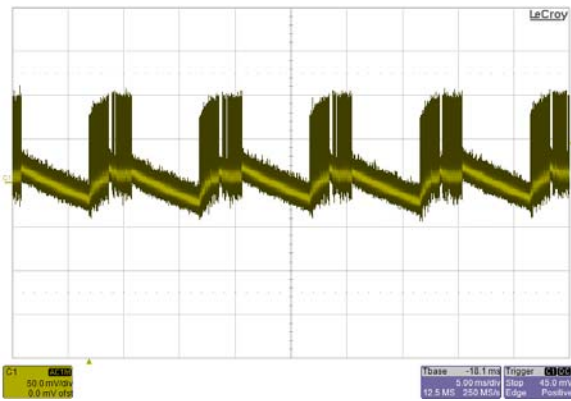
Images:



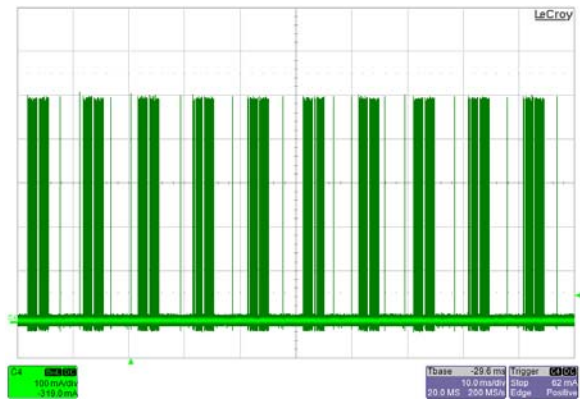
LT Part – Static Display
Output Ripple



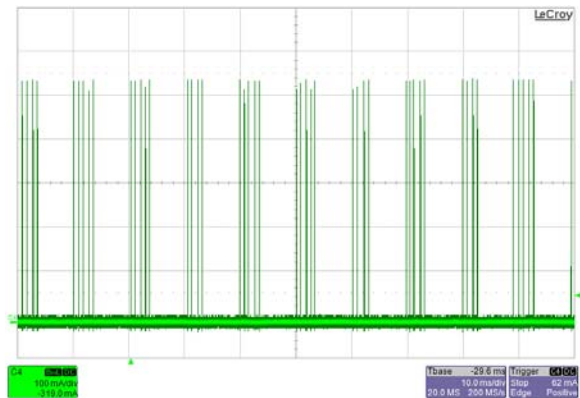
Microsemi Part – Static Display
Output Ripple



Microsemi Part Display Scrolling
Output Ripple



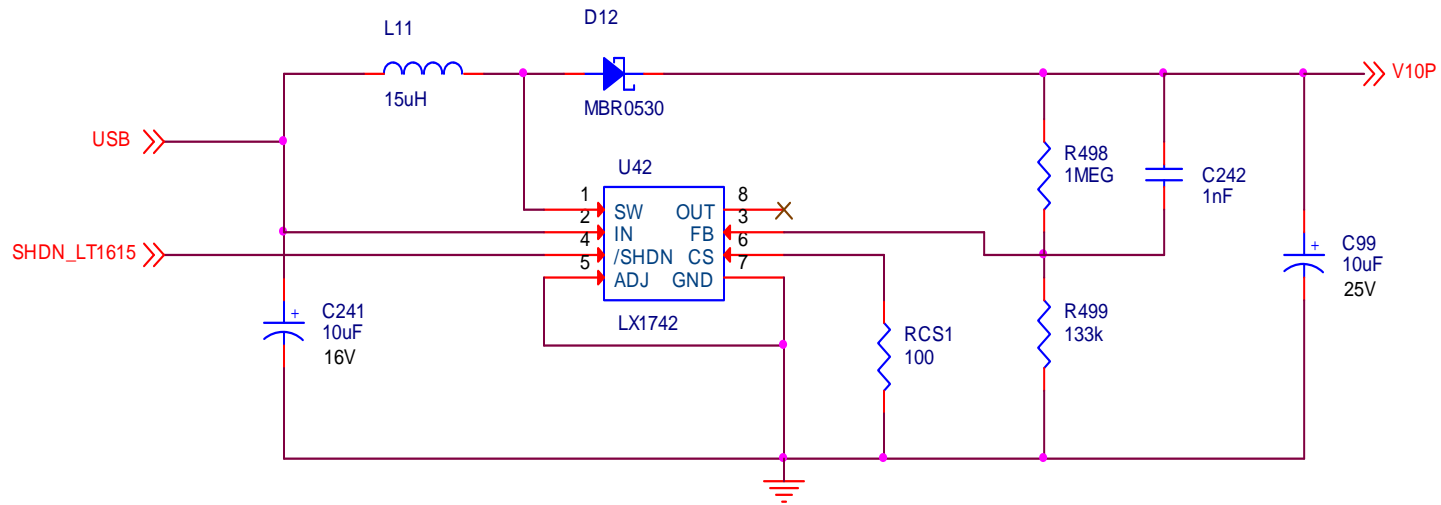
LT Part – Peak Ripple Current



Microsemi Part Peak Ripple Current

Summary of Observations: U16 is used to power the OLED circuit. The OLED was exercised with the Microsemi part installed by running all Demo Programs. No functionality issues were observed; the OLED display functions correctly with no indication of brightness degrading or flickering.

Schematics and BOM



NOTE: Reference designators match existing A2F schematic designators where applicable.

Figure 1. U16 Boost Circuit

U16 Boost Circuit BOM:

<u>Item Number</u>	<u>Quantity</u>	<u>Part Reference</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Manufacturer Part Number</u>
1	1	C99	CAP TANT 10UF 25V 10% SMD	Vishay/Sprague	TR3B106K025C1100
2	1	C241	CAP TANT 10UF 16V 10% SMD	Vishay/Sprague	293D106X9016A2TE3
3	1	C242	Capacitor, Ceramic, 1nF, 25v, 0603 SMD	Any	Any
4	1	D12	DIODE SCHOTTKY 30V 0.5A SOD123	On Semiconductor	MBR0530T1G
5	1	L11	Inductor, 15uH, 1812 SMD	Murata	LQH43CN150K03
6	1	RCS1	Resistor, 100, 5%, 0603 SMD	Any	Any
7	1	R498	Resistor, 1.00M, 1%, 0603 SMD	Any	Any
8	1	R499	Resistor, 133k, 1%, 0603 SMD	Any	Any
9	1	U42	IC, High Voltage Boost Controller, MSOP 8	Microsemi	LX1742CDU

Note: Highlighted items are items already in the existing design.

PCB Layouts

The circuit schematic (reference Figure 1) were respectively assembled on a small two-sided PCB for testing. The following PCB Layout can be used as a reference to retrofit the Microsemi parts onto the existing PCB:

U16 Boost Circuit

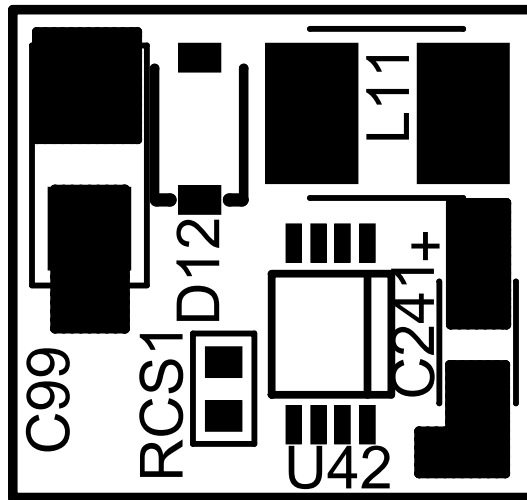


Figure 3. Boost Circuit Top Assembly

Finished Board Size = 0.542 (W) X 0.508 (H)

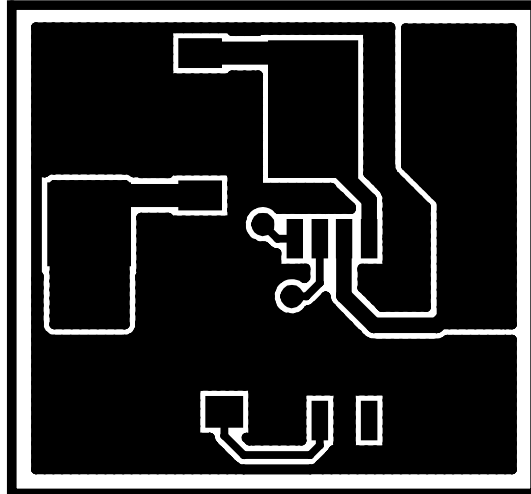


Figure 5. Boost Circuit Top Layer

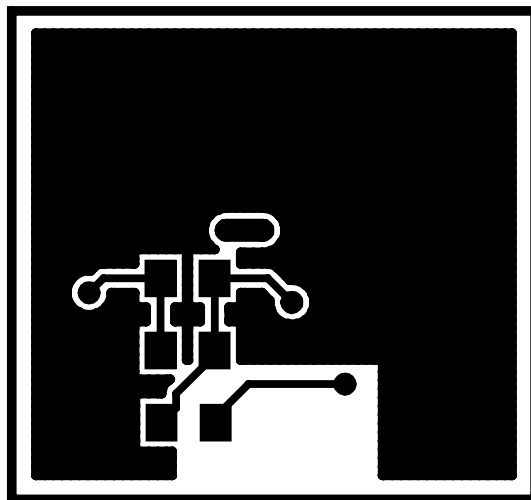


Figure 6. Boost Circuit Bottom Layer

Finished Board Size = 0.570 (W) X 0.238 (H)