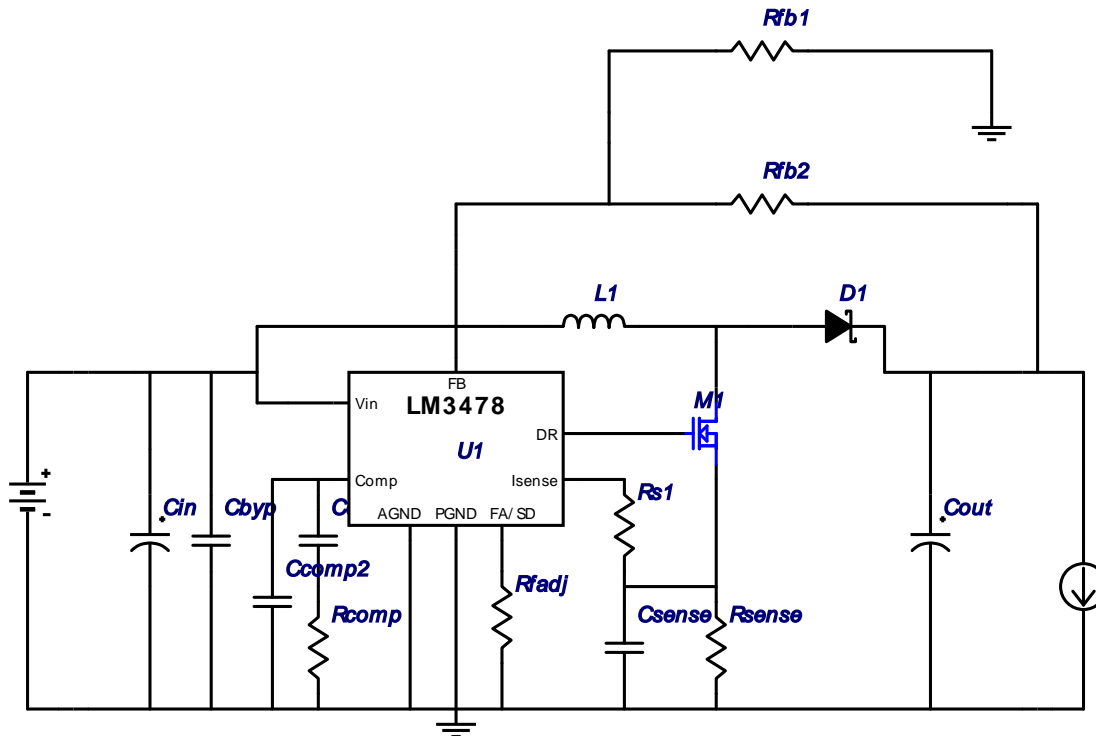



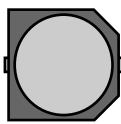




WEBENCH[®] Design Report

 Design : 938544/17 LM3478MM
 LM3478MM 3.0V-4.2V to 5.0V @ 3.0A

Electrical BOM

#	Name	Manufacturer	Part Number	Quantity	Price	Properties	Footprint
1.	Cbyp	AVX	08053C104KAT2A Series= X7R	1	\$0.01	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	 0805 13mm2
2.	Ccomp	MuRata	GRM21BR71E104KA01L Series= X7R	1	\$0.01	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	 0805 13mm2
3.	Ccomp2	Yageo America	CC0805KRX7R9BB562 Series= X7R	1	\$0.01	Cap= 5.6 nF VDC= 50.0 V IRMS= 0.0 A	 0805 13mm2
4.	Cin	Nippon Chemi-Con	EMZA350ADA331MJA0G Series= MZA	1	\$0.28	Cap= 330.0 µF ESR= 80.0 mOhm VDC= 35.0 V IRMS= 850.0 mA	 CAPSMT_62_JA0 151mm ²
5.	Cout	Nippon Chemi-Con	APXC100ARA820MF60G Series= PXC	3	\$0.43	Cap= 82.0 µF ESR= 23.0 mOhm VDC= 10.0 V IRMS= 2.4 A	 CAPSMT_62_F60 77mm ²
6.	Csense	MuRata	GRM216R71H103KA01D Series= X7R	1	\$0.01	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	 0805 13mm2

#	Name	Manufacturer	Part Number	Quantity	Price	Properties	Footprint
7.	D1	ON Semiconductor	MBRB2515LT4G	1	\$1.00	VF@Io= 450.0 mV VRRM= 15.0 V	 DDPAK 210mm2
8.	L1	Coilcraft	XAL6030-332MEB	1	\$0.60	L= 3.3 µH DCR= 20.0 mOhm	 XAL6030 72mm2
9.	M1	Texas Instruments	CSD17308Q3	1	\$0.34	VdsMax= 30.0 V IdsMax= 47.0 Amps	 TRANS_NexFET_Q3 29mm2
10.	Rcomp	Vishay-Dale	CRCW0402931RFKED Series= CRCW..e3	1	\$0.01	Res= 931.0 Ohm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
11.	Rfadj	Vishay-Dale	CRCW040263K4FKED Series= CRCW..e3	1	\$0.01	Res= 63.4 kOhm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
12.	Rfb1	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	1	\$0.01	Res= 1,000 Ohm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
13.	Rfb2	Vishay-Dale	CRCW04022K94FKED Series= CRCW..e3	1	\$0.01	Res= 2.94 kOhm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
14.	Rs1	Vishay-Dale	CRCW0402100RFKED Series= CRCW..e3	1	\$0.01	Res= 100.0 Ohm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2
15.	Rsense	Stackpole Electronics Inc	CSR1206FK10L0 Series= ?	1	\$0.11	Res= 10.0 mOhm Power= 500.0 mW Tolerance= 1.0%	 1206 19mm2
16.	U1	Texas Instruments	LM3478MM	1	\$0.80	Switcher	 MUA08A 34mm2

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	446.057 m A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	2.771 A	Current	Output capacitor RMS ripple current
3.	Iin Avg	5.969 A	Current	Average input current
4.	L Ipp	1.545 A	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	5.524 A	Current	Inductor ripple current
6.	M Irms	5.449 A	Current	MOSFET RMS ripple current
7.	SW Ipk	6.278 A	Current	Peak switch current
8.	BOM Count	18.0	General	Total Design BOM count
9.	FootPrint	837.0 mm2	General	Total Foot Print Area of BOM components
10.	Frequency	273.577 k Hz	General	Switching frequency
11.	IC Tolerance	24.3 m V	General	IC Feedback Tolerance
12.	M Rdson	12.22 m Ohm	General	Drain-Source On-resistance
13.	M Vds Act	66.586 m V	General	M Vds
14.	Mode	CCM	General	Conduction Mode
15.	Pout	15.0 W	General	Total output power
16.	Total BOM	\$4.51	General	Total BOM Cost
17.	D1 Tj	97.5 degC	Op_Point	D1 junction temperature
18.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
19.	Cross Freq	3.362 k Hz	Op_point	Bode plot crossover frequency
20.	Duty Cycle	49.577 %	Op_point	Duty cycle
21.	Efficiency	83.768 %	Op_point	Steady state efficiency
22.	IC Tj	33.168 degC	Op_point	IC junction temperature
23.	ICThetaJA	200.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
24.	IOUT_OP	3.0 A	Op_point	Iout operating point
25.	M ThetaJA	58.0 degC/W	Op_point	MOSFET junction-to-ambient thermal resistance
26.	M TjOp	62.003 degC	Op_point	MOSFET junction temperature
27.	Phase Marg	50.647 deg	Op_point	Bode Plot Phase Margin
28.	VIN_OP	3.0 V	Op_point	Vin operating point
29.	Vout p-p	11.846 m V	Op_point	Peak-to-peak output ripple voltage
30.	Cin Pd	15.917 m W	Power	Input capacitor power dissipation
31.	Cout Pd	58.863 m W	Power	Output capacitor power dissipation

#	Name	Value	Category	Description
32.	Diode Pd	1.35 W	Power	Diode power dissipation
33.	IC Pd	15.841 m W	Power	IC power dissipation
34.	L Pd	732.258 m W	Power	Inductor power dissipation
35.	M Pd	551.782 m W	Power	MOSFET power dissipation
36.	M1 PdCond	406.853 m W	Power	M1 MOSFET conduction losses
37.	M1 PdSw	144.929 m W	Power	M1 MOSFET switching losses
38.	Rfb Pd	6.345 m W	Power	Rfb Power Dissipation
39.	Total Pd	2.907 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	3.0 A	Maximum Output Current
2.	Iout1	3.0 Amps	Output Current #1
3.	VinMax	4.2 V	Maximum input voltage
4.	VinMin	3.0 V	Minimum input voltage
5.	Vout	5.0 V	Output Voltage
6.	Vout1	5.0 Volt	Output Voltage #1
7.	base_pn	LM3478	National Based Product Number
8.	Ta	30.0 degC	Ambient temperature
9.	UserFsw	273.577 kHz	Customer Selected Frequency

Design Assistance

1. **LM3478** Product Folder : <http://www.ti.com/product/lm3478> : contains the data sheet and other resources.

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