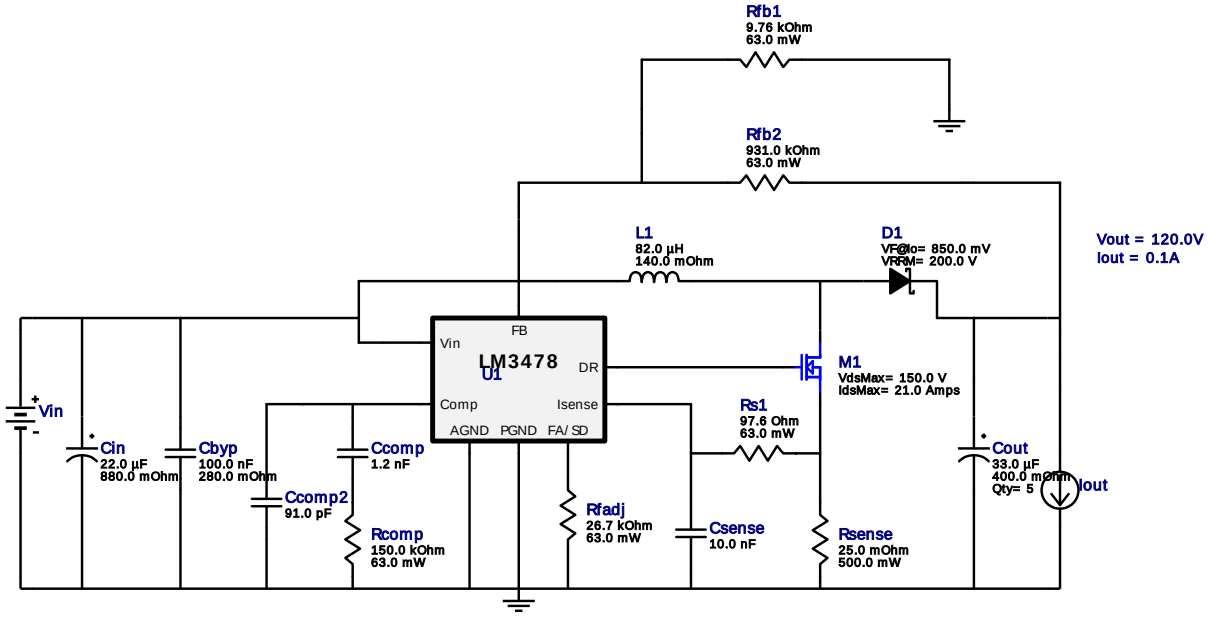
VinMin = 10.0V
VinMax = 16.0V
Vout = 120.0V
Iout = 0.1A

Device = LM3478MMX/NOPB
Topology = Boost
Created = 2018-03-11 12:06:07.841
BOM Cost = $8.77
BOM Count = 20
Total Pd = 1.67W

WEBENCH® Design Report

Design : 663314/58 LM3478MMX/NOPB
LM3478MMX/NOPB 10.0V-16.0V to 120.00V @ 0.1A

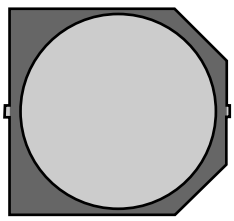


1. With the low turn of voltage of the LM34x8 your power supply may current limit before you reach your working input voltage. If this happens, or to preempt this from happening, you can include a low pass RC filter from input voltage to Vin on the IC. Make sure the rise time on the RC network is slower than your supply's rise time.

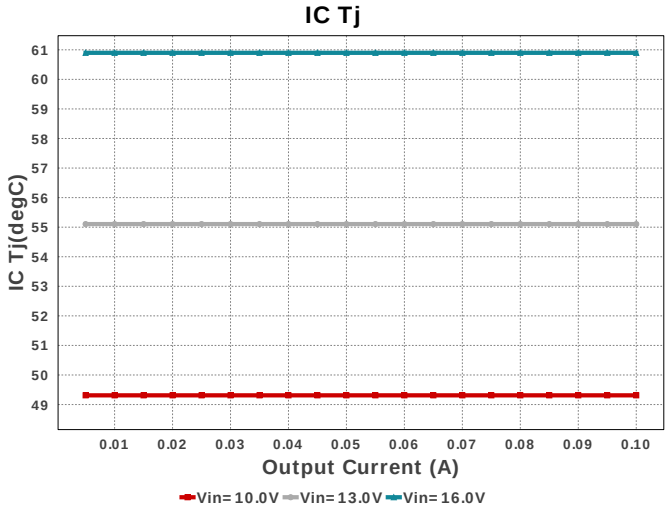
My Comments

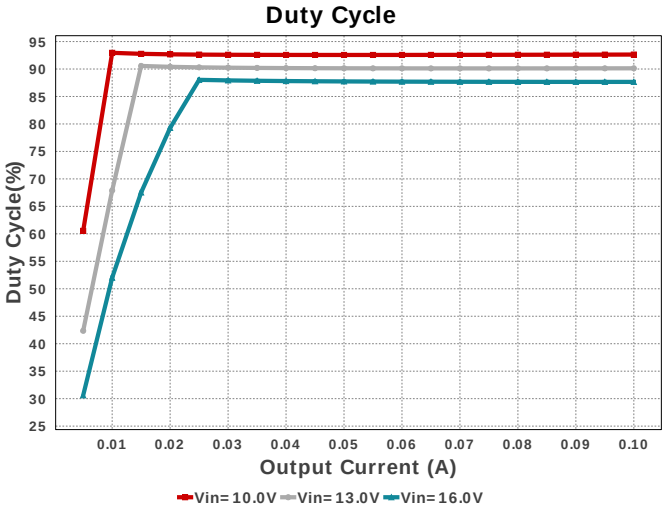
No comments

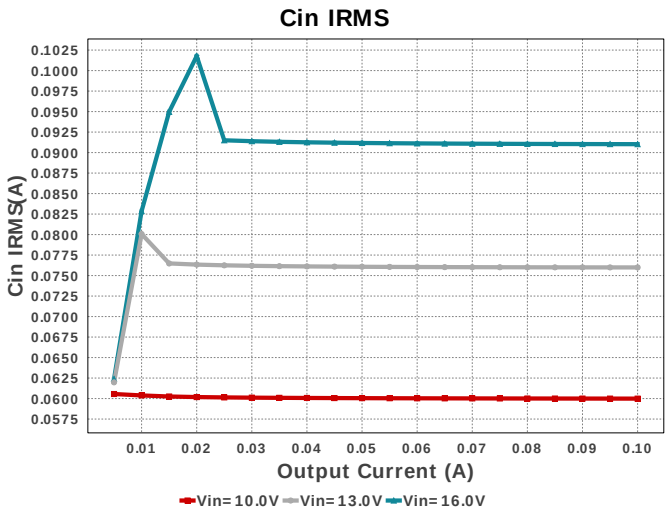
Electrical BOM

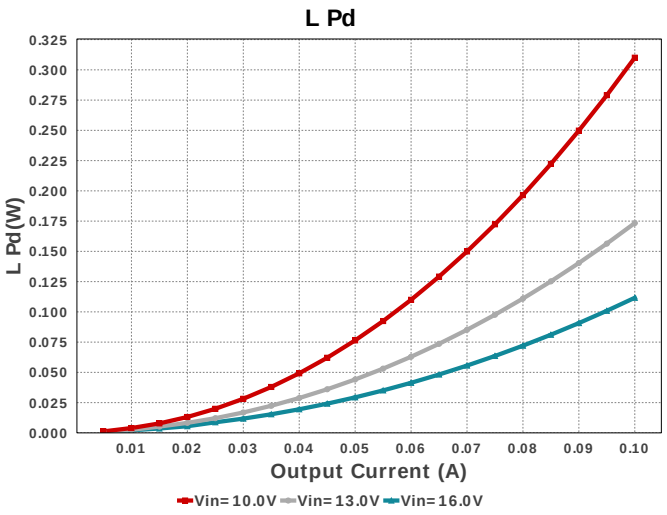
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbyp	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Ccomp	Samsung Electro-Mechanics	CL21C122JBFNNWE Series= C0G/NP0	Cap= 1.2 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	Ccomp2	Samsung Electro-Mechanics	CL21C910JBANNNC Series= C0G/NP0	Cap= 91.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	Cin	Nichicon	UUD1H220MCL1GS Series= uD	Cap= 22.0 uF ESR= 880.0 mOhm VDC= 50.0 V IRMS= 165.0 mA	1	$0.09	 SM_RADIAL_6.3AMM 80 mm²
5.	Cout	Panasonic	EEV-EB2E330SM Series= ?	Cap= 33.0 uF ESR= 400.0 mOhm VDC= 250.0 V IRMS= 560.0 mA	5	$1.31	 EB_K16 483 mm²

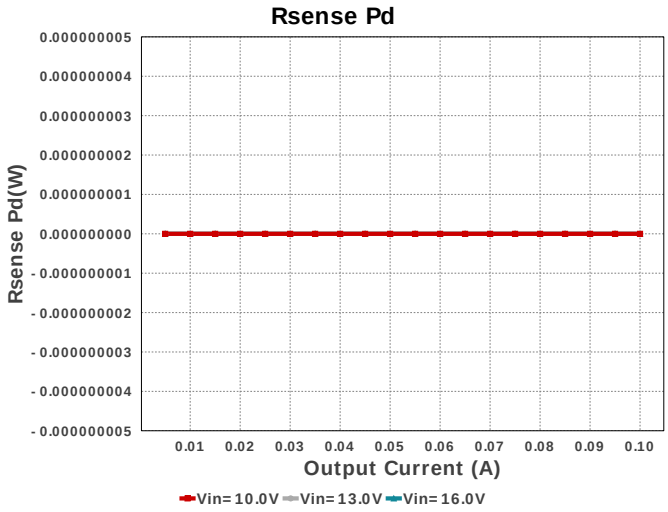
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
6.	Csense	MuRata	GCM2195C1H103JA16D Series= C0G/NP0	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.05	0805 7 mm²
7.	D1	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	$0.23	PowerDI123 13 mm²
8.	L1	Bourns	SDR1307-820KL	L= 82.0 µH DCR= 140.0 mOhm	1	$0.37	SDR1307 227 mm²
9.	M1	Infineon Technologies	BSZ520N15NS3 G	VdsMax= 150.0 V IdsMax= 21.0 Amps	1	$0.55	PG-TSDSON-8 19 mm²
10.	Rcomp	Vishay-Dale	CRCW0402150KFKED Series= CRCW..e3	Res= 150.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
11.	Rfadj	Vishay-Dale	CRCW040226K7FKED Series= CRCW..e3	Res= 26.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
12.	Rfb1	Vishay-Dale	CRCW04029K76FKED Series= CRCW..e3	Res= 9.76 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
13.	Rfb2	Vishay-Dale	CRCW0402931KFKED Series= CRCW..e3	Res= 931.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
14.	Rs1	Vishay-Dale	CRCW040297R6FKED Series= CRCW..e3	Res= 97.6 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
15.	Rsense	Stackpole Electronics Inc	CSR1206FK25L0 Series= ?	Res= 25.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	$0.10	1206 11 mm²
16.	U1	Texas Instruments	LM3478MMX/NOPB	Switcher	1	$0.75	MUA08A 24 mm²

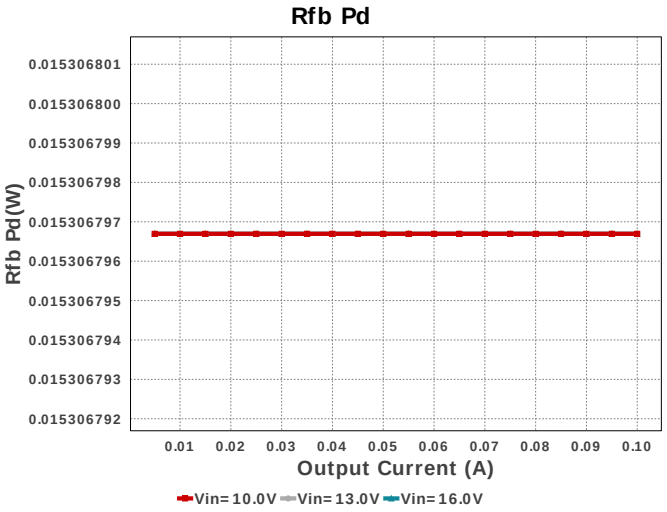


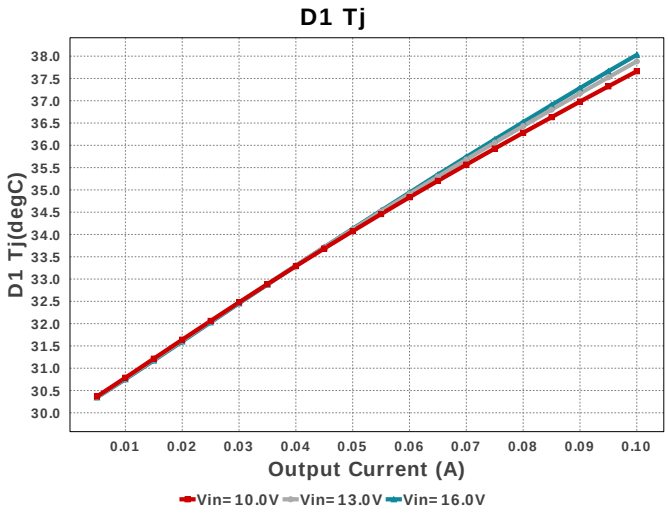


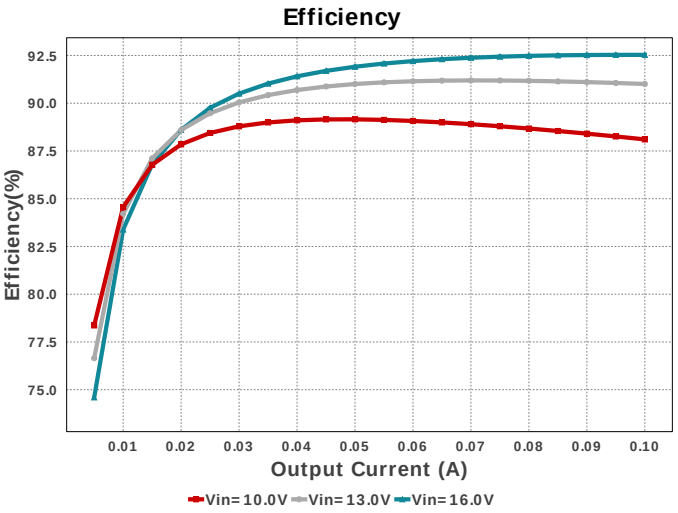


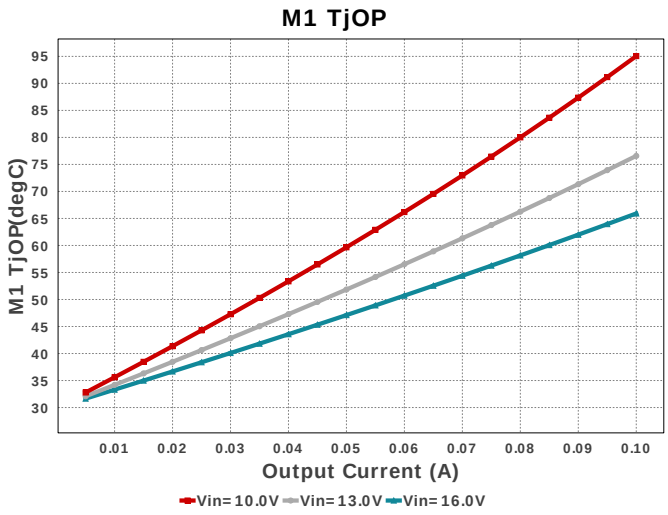


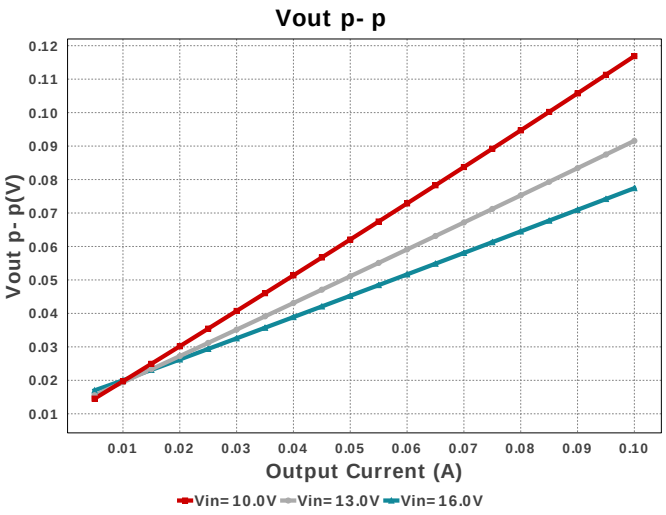


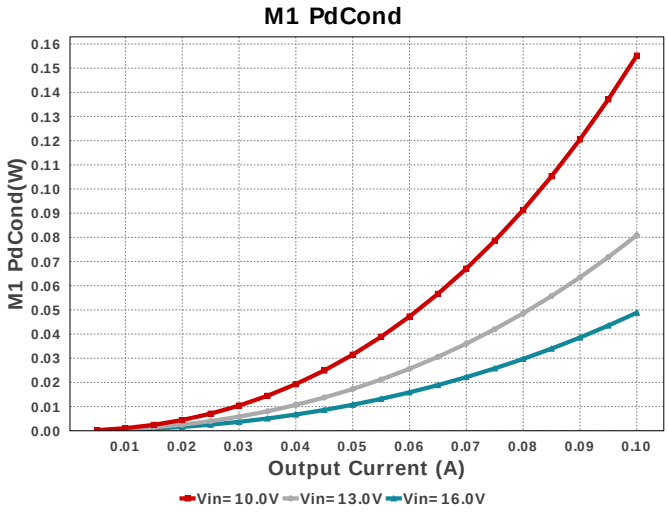


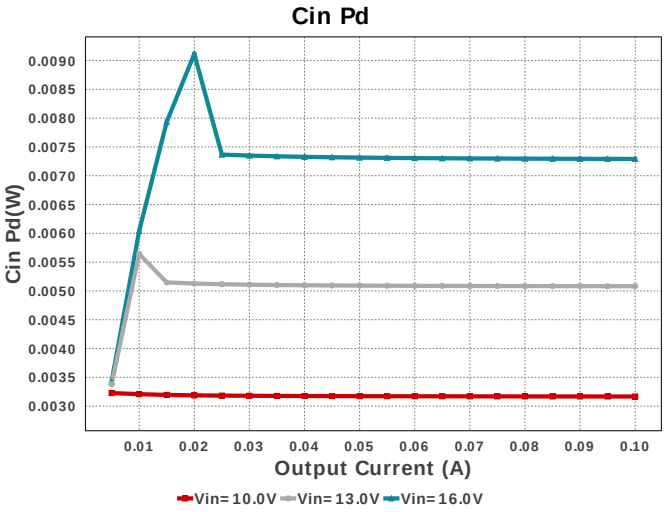


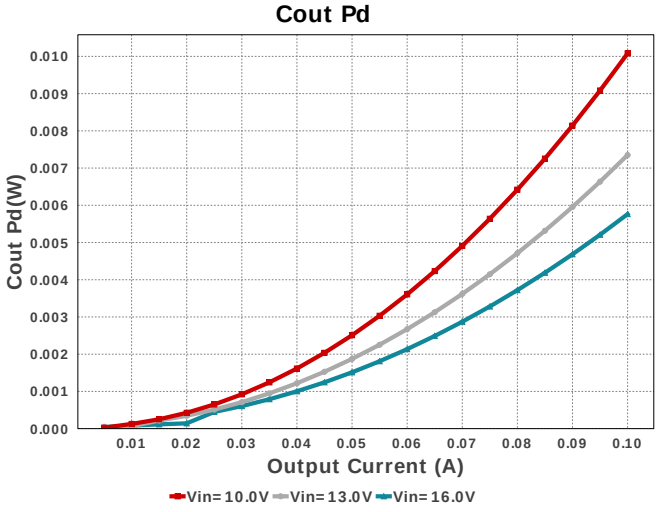


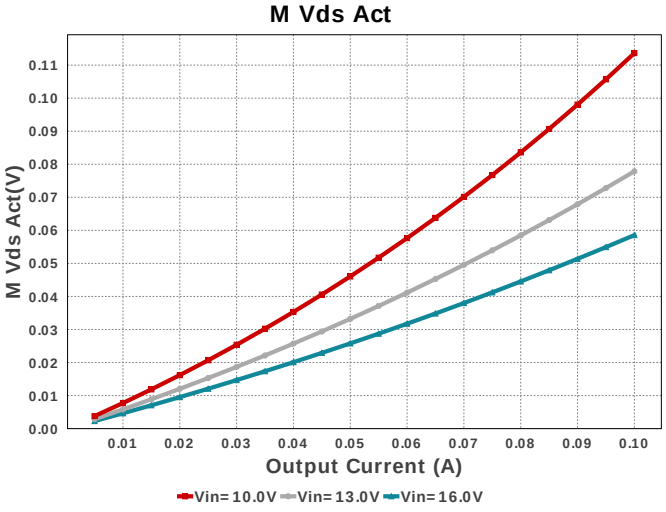


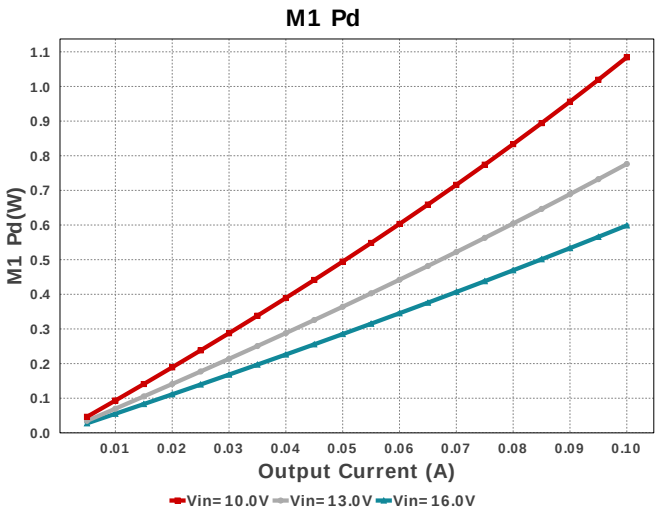


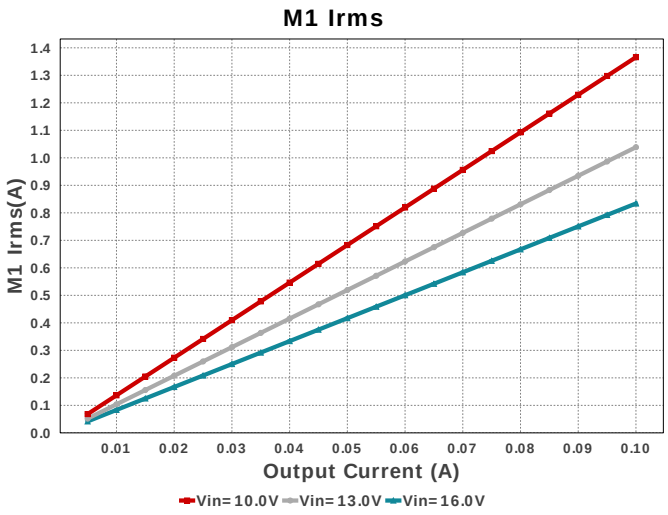


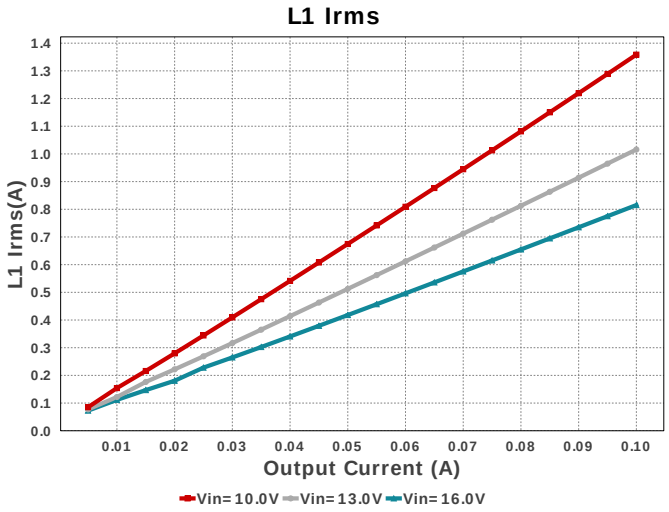


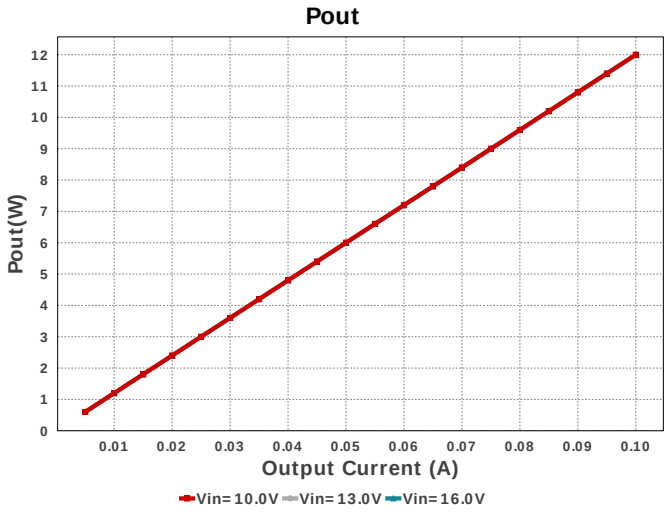


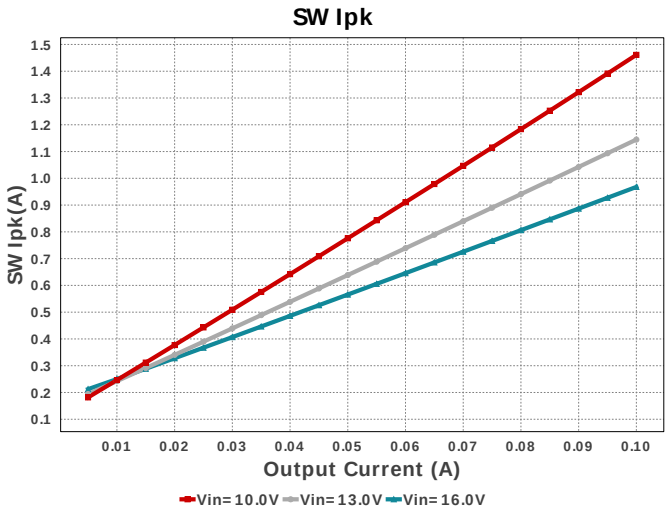


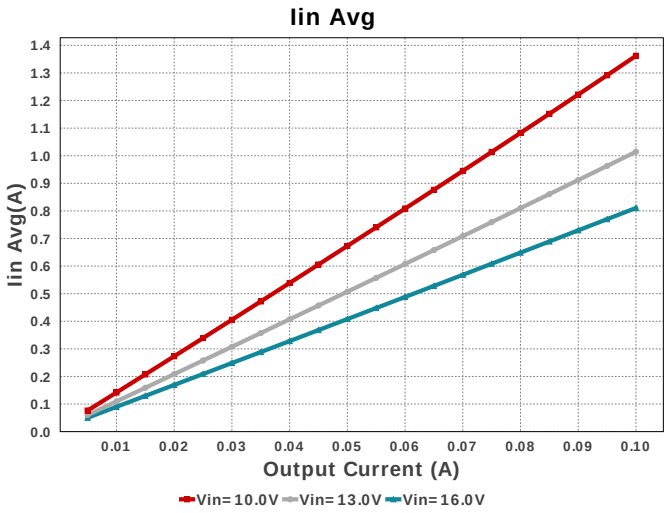


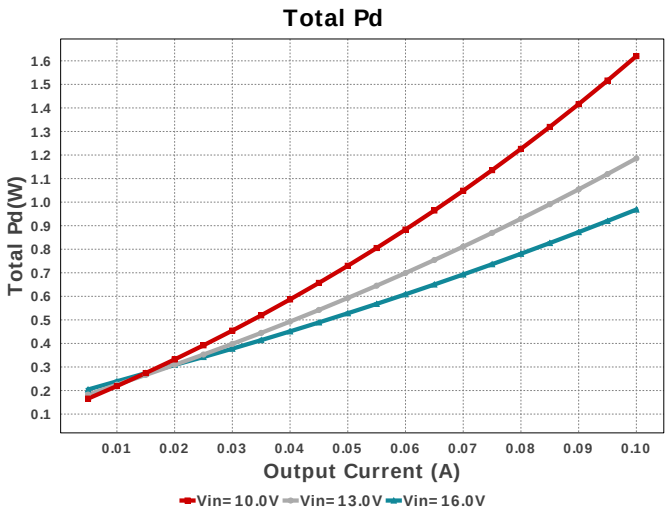


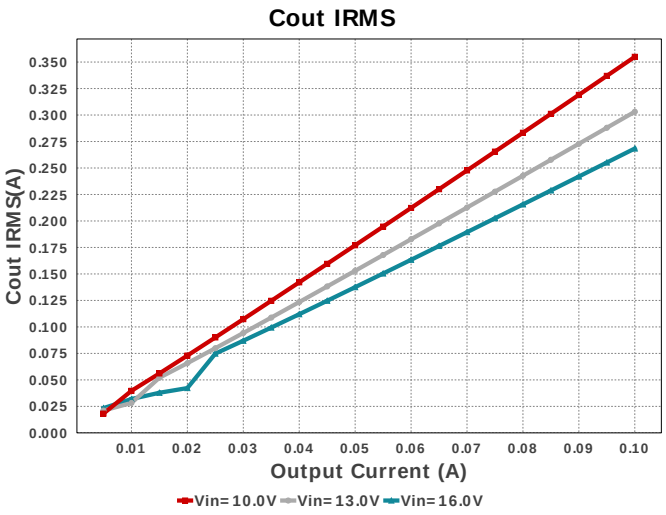


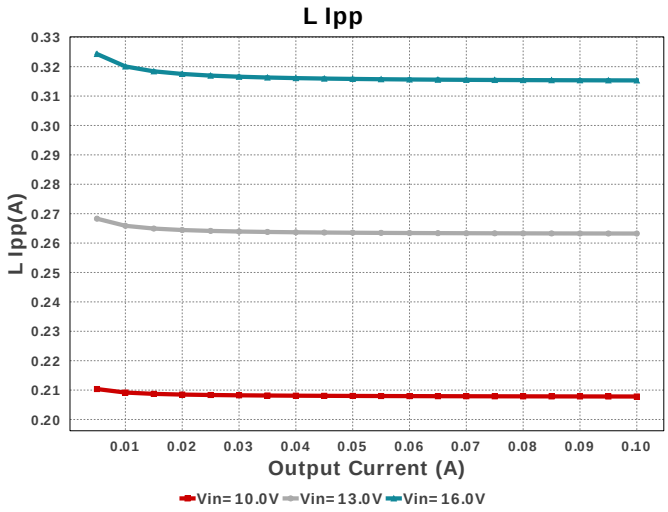


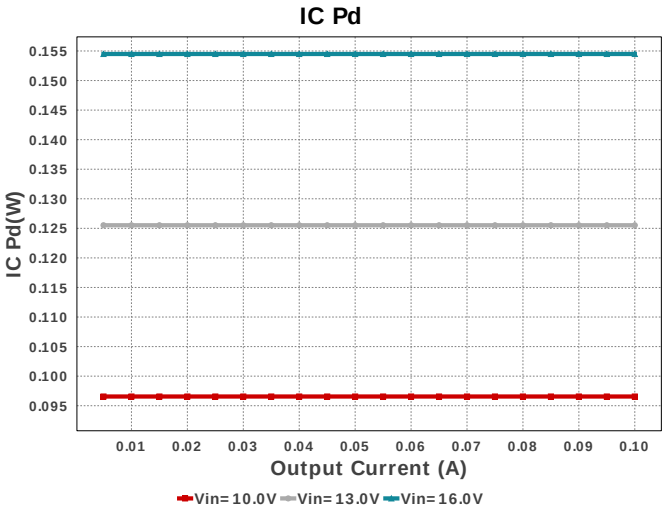


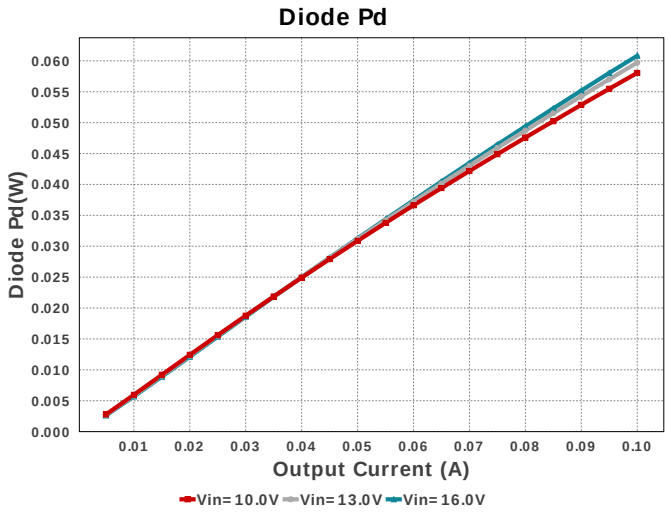


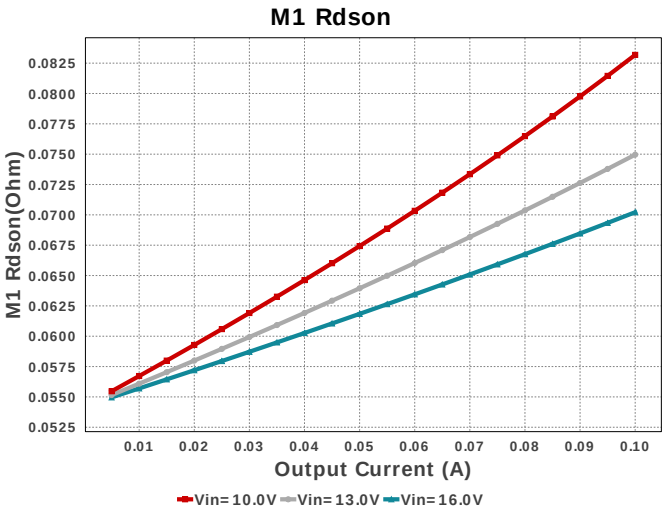


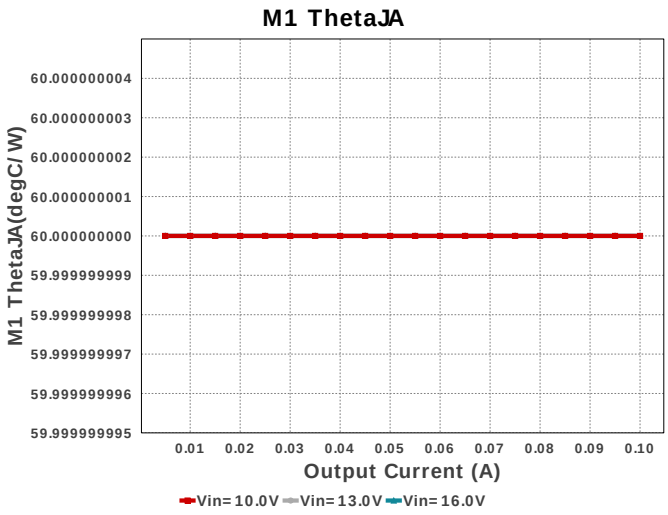


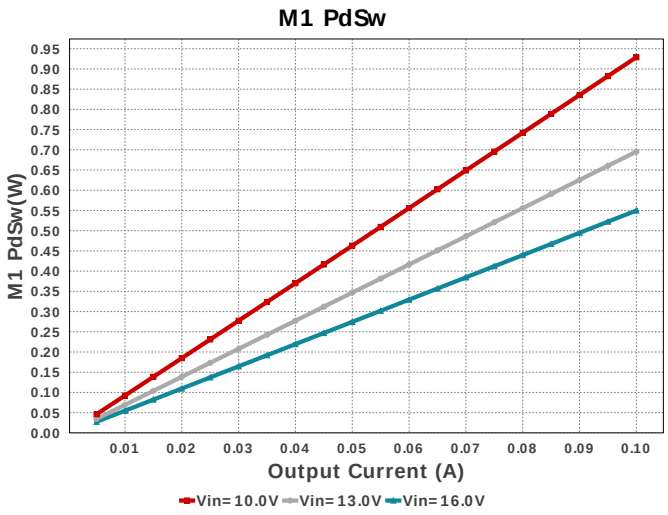


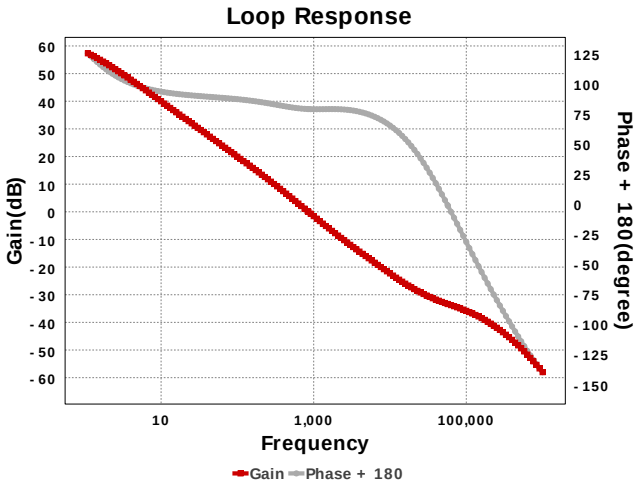












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	60.009 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	355.633 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	1.367 A	Current	Average input current
4.	L Ipp	207.88 mA	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	1.363 A	Current	Inductor ripple current
6.	M1 Irms	1.363 A	Current	M1 MOSFET Irms
7.	SW Ipk	1.466 A	Current	Peak switch current
8.	BOM Count	20	General	Total Design BOM count
9.	FootPrint	2.83 k mm^2	General	Total Foot Print Area of BOM components
10.	Frequency	541.734 kHz	General	Switching frequency
11.	IC Tolerance	24.3 mV	General	IC Feedback Tolerance
12.	M Vds Act	115.141 mV	General	M Vds
13.	M1 Rdson	84.469 mOhm	General	Drain-Source On-resistance
14.	M1 ThetaJA	60.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
15.	Mode	CCM	General	Conduction Mode
16.	Pout	12.0 W	General	Total output power
17.	Total BOM	$8.77	General	Total BOM Cost
18.	Cross Freq	541.31 Hz	Op Point	Bode plot crossover frequency
19.	D1 Tj	37.662 degC	Op Point	D1 junction temperature
20.	Duty Cycle	92.658 %	Op Point	Duty cycle
21.	Efficiency	87.772 %	Op Point	Steady state efficiency
22.	Gain Marg	-29.045 dB	Op Point	Bode Plot Gain Margin
23.	IC Tj	49.484 degC	Op Point	IC junction temperature
24.	ICThetaJA	200.0 degC/W	Op Point	IC junction-to-ambient thermal resistance
25.	IOUT_OP	100.0 mA	Op Point	Iout operating point
26.	Low Freq Gain	52.82 dB	Op Point	Gain at 1Hz
27.	M1 TjOP	97.944 degC	Op Point	M1 MOSFET junction temperature
28.	Phase Marg	79.502 deg	Op Point	Bode Plot Phase Margin
29.	VIN_OP	10.0 V	Op Point	Vin operating point
30.	Vout Actual	121.451 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
31.	Vout OP	120.0 V	Op Point	Operational Output Voltage

#	Name	Value	Category	Description
32.	Vout Tolerance	3.966 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
33.	Vout p-p	117.283 mV	Op Point	Peak-to-peak output ripple voltage
34.	Cin Pd	3.169 mW	Power	Input capacitor power dissipation
35.	Cout Pd	10.118 mW	Power	Output capacitor power dissipation
36.	Diode Pd	58.042 mW	Power	Diode power dissipation
37.	IC Pd	97.42 mW	Power	IC power dissipation
38.	L Pd	312.299 mW	Power	Inductor power dissipation
39.	M1 Pd	1.132 W	Power	M1 MOSFET total power dissipation
40.	M1 PdCond	156.95 mW	Power	M1 MOSFET conduction losses
41.	M1 PdSw	975.451 mW	Power	M1 MOSFET switching losses
42.	Rfb Pd	15.307 mW	Power	Rfb Power Dissipation
43.	Rsense Pd	36.827 mW	Power	LED Current Rsns Power Dissipation
44.	Total Pd	1.672 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	100.0 m	Maximum Output Current
2.	VinMax	16.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	120.0	Output Voltage
5.	base_pn	LM3478	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

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