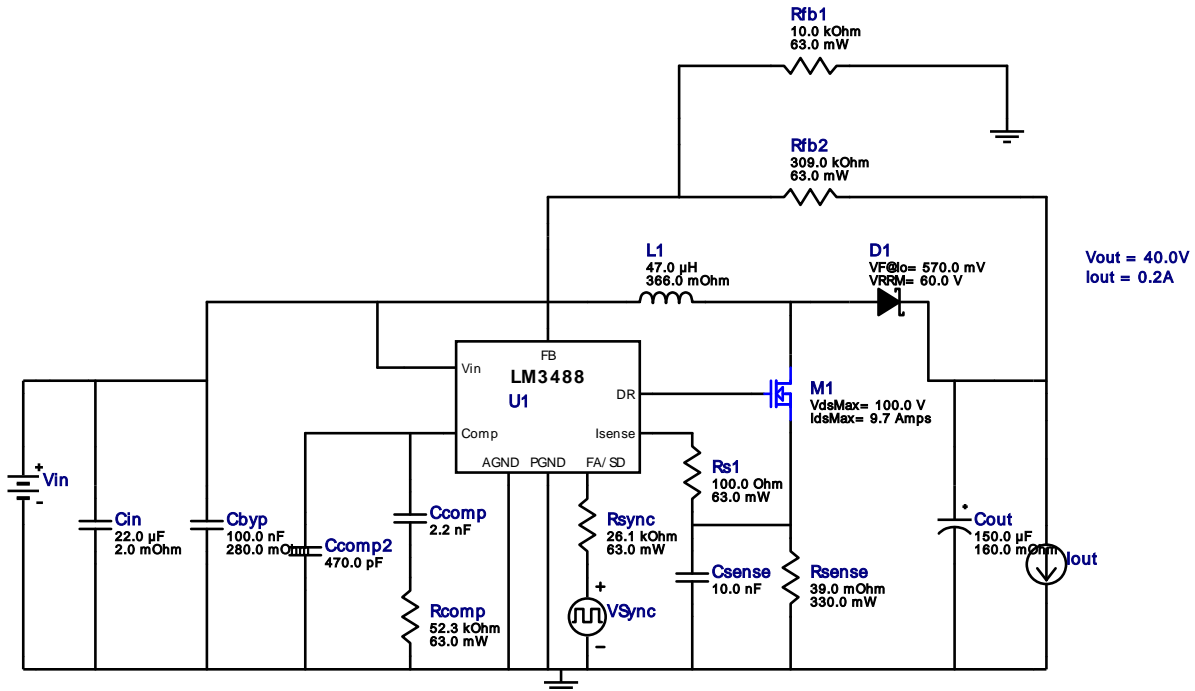
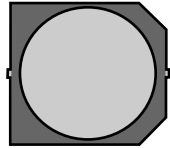











WEBENCH® Design Report

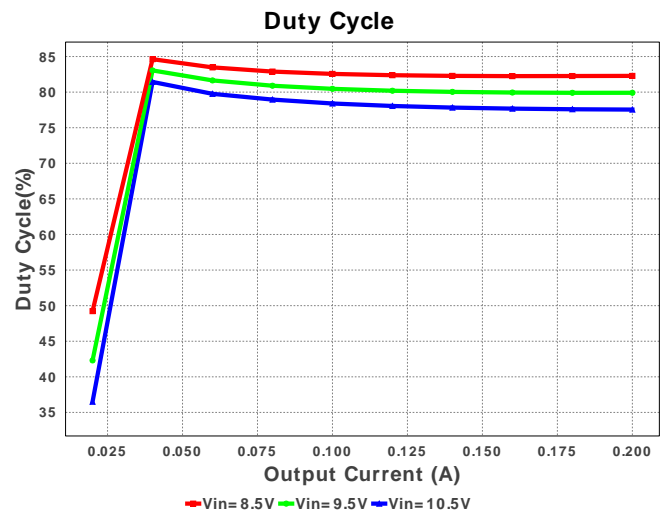
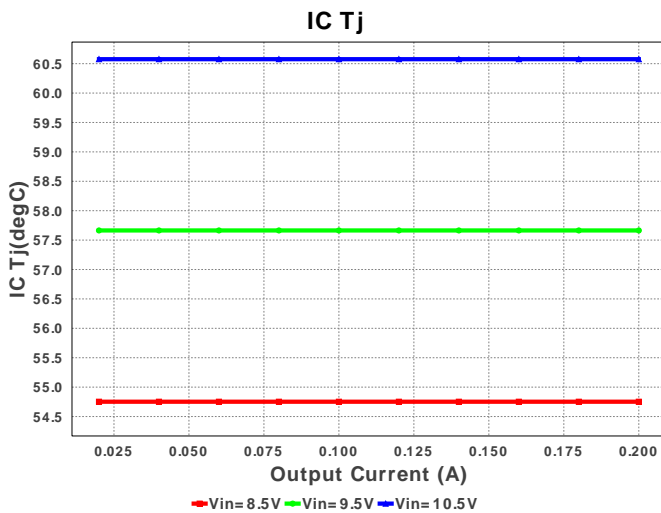
 Design : 836379/774 LM3488MMX/NOPB
 LM3488MMX/NOPB 8.5V-10.5V to 40.00V @ 0.2A


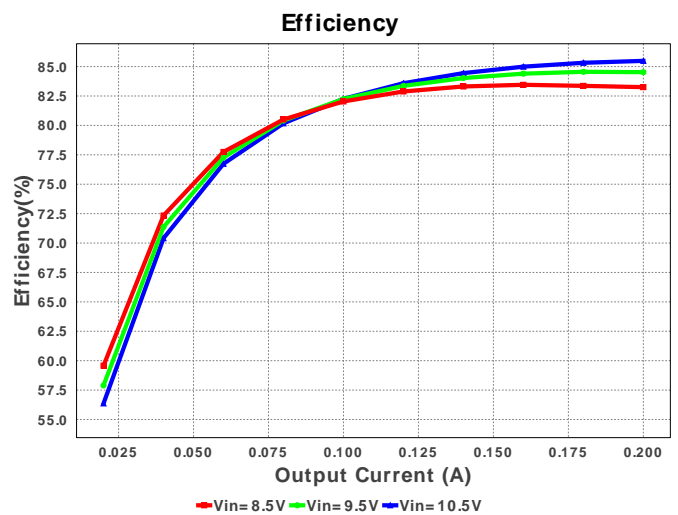
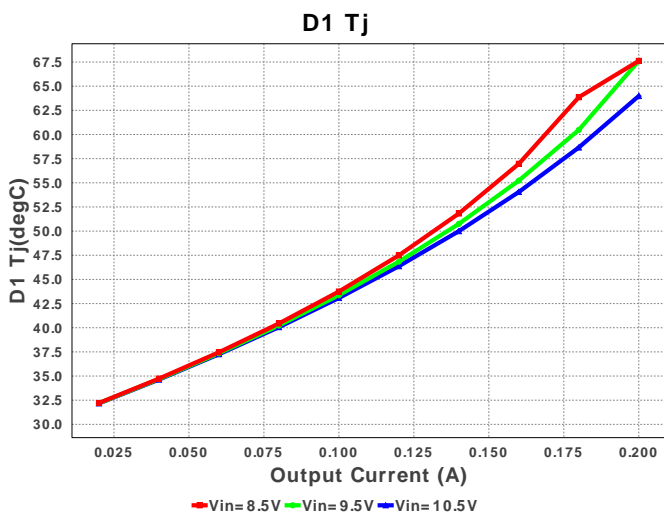
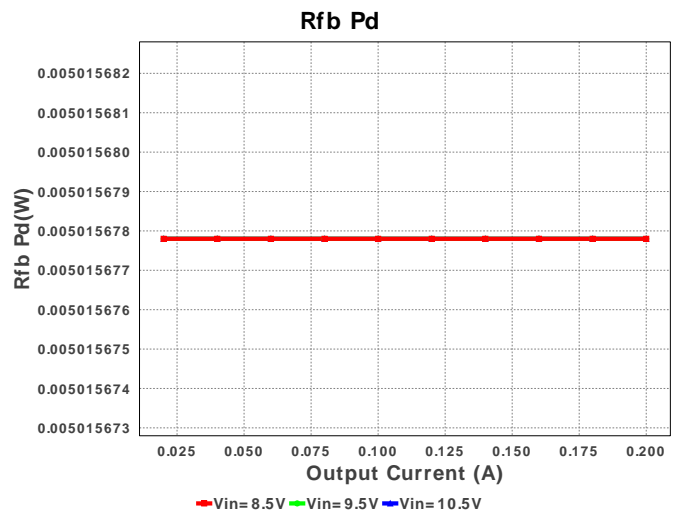
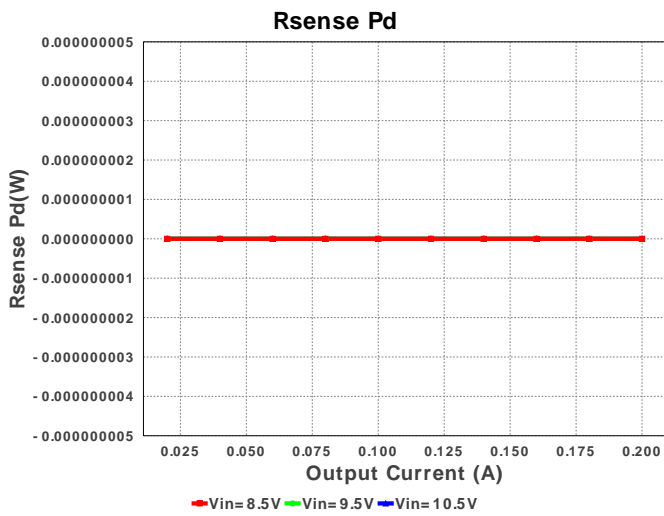
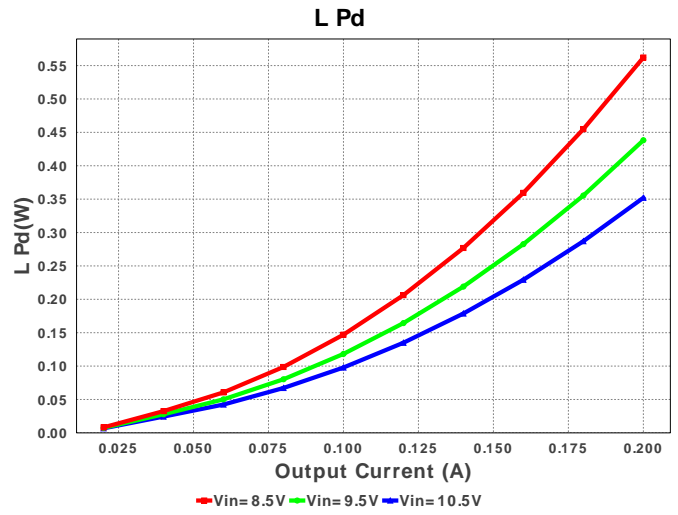
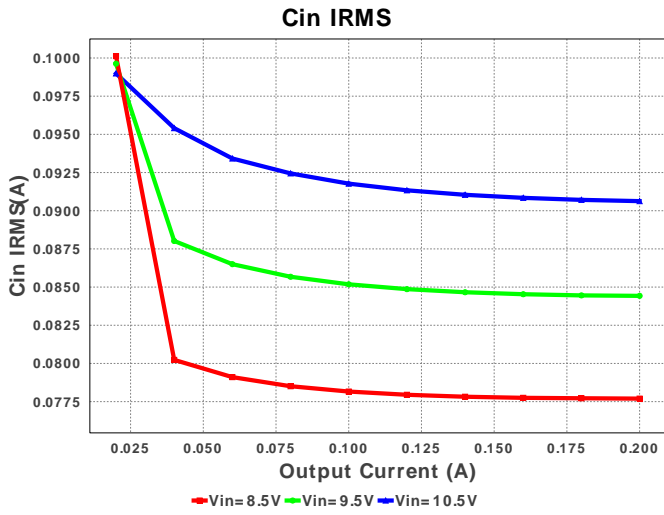
1. With the low turn of voltage of the LM34x8 your power supply may current limit before you reach your working input voltage. If this happens, or to preempt this from happening, you can include a low pass RC filter from input voltage to Vin on the IC. Make sure the rise time on the RC network is slower than your supply's rise time. If you are not using the synchronization feature of the part use the LM3478.

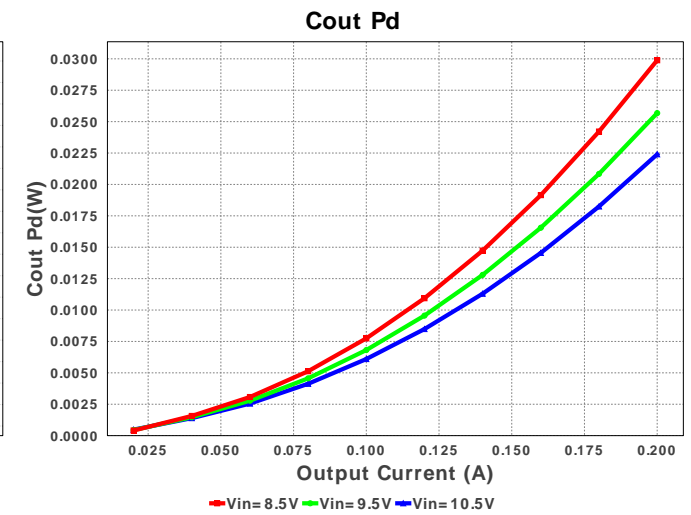
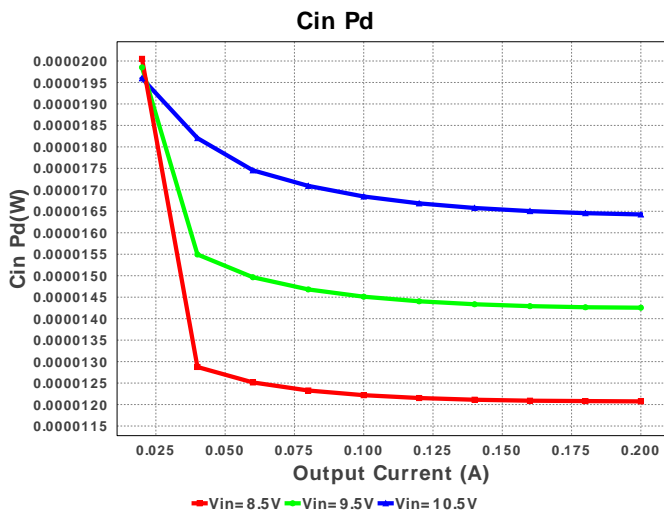
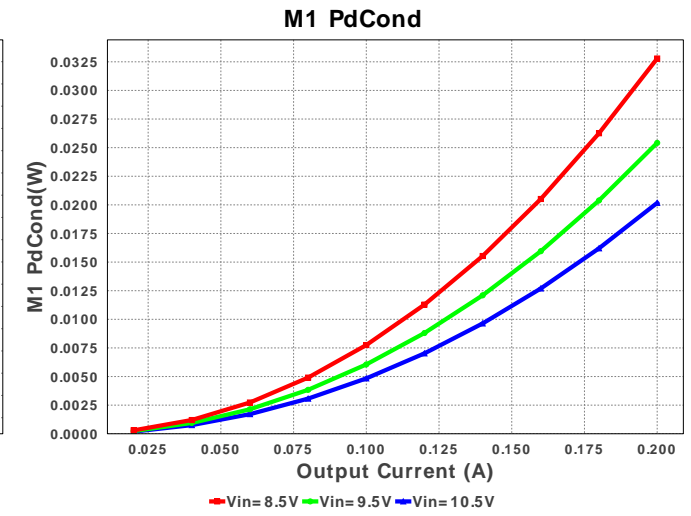
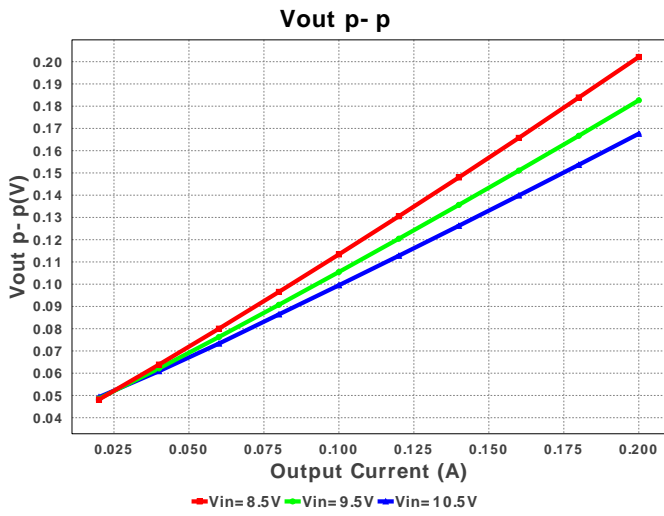
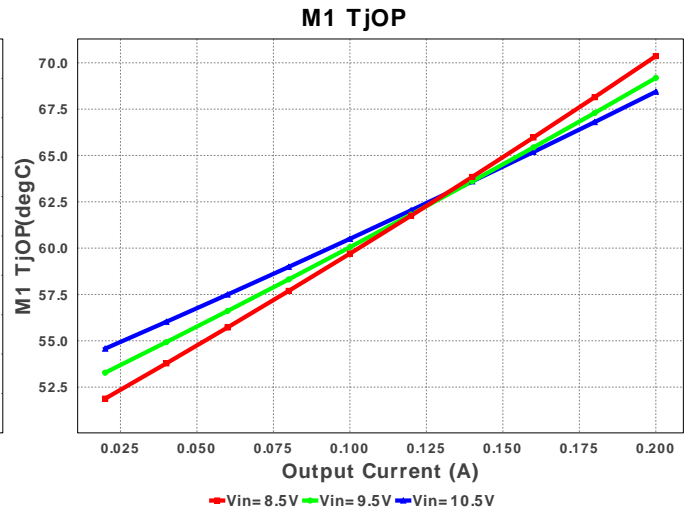
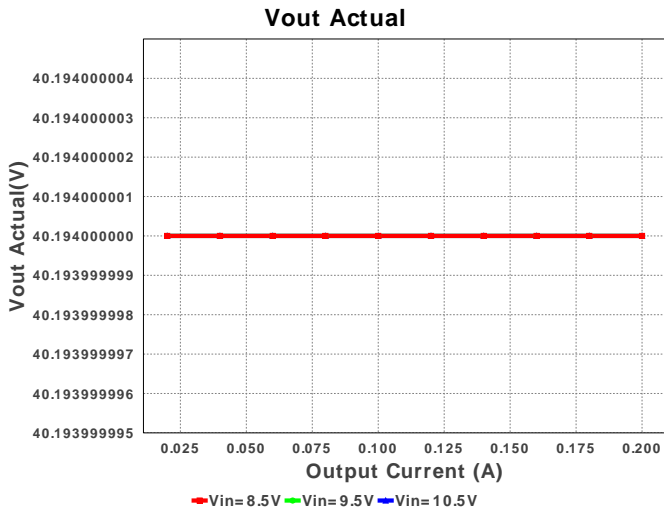
Electrical BOM

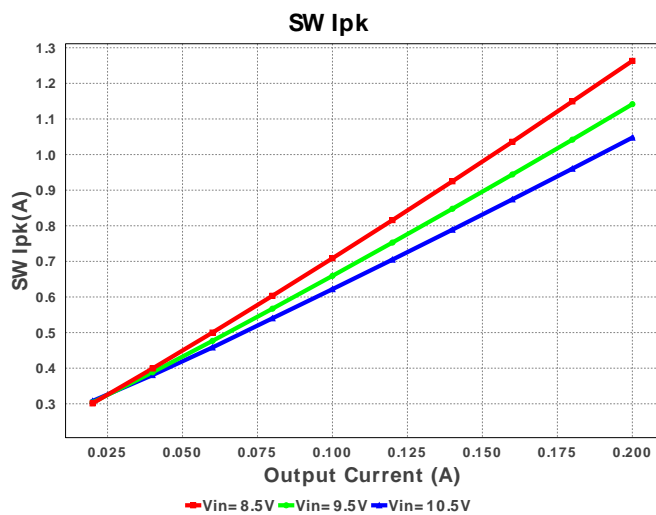
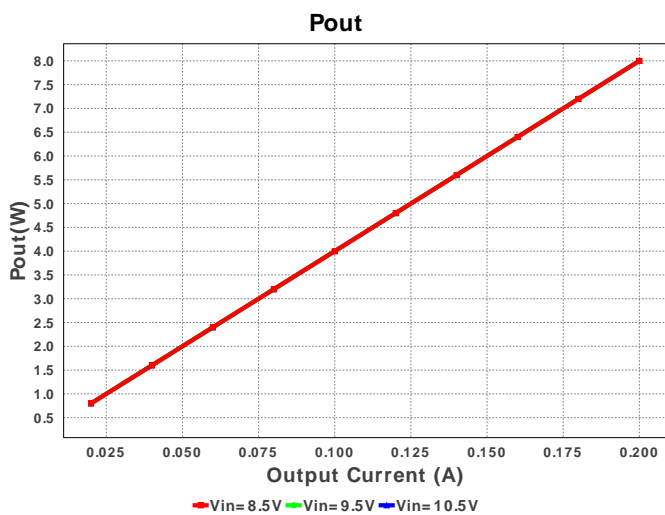
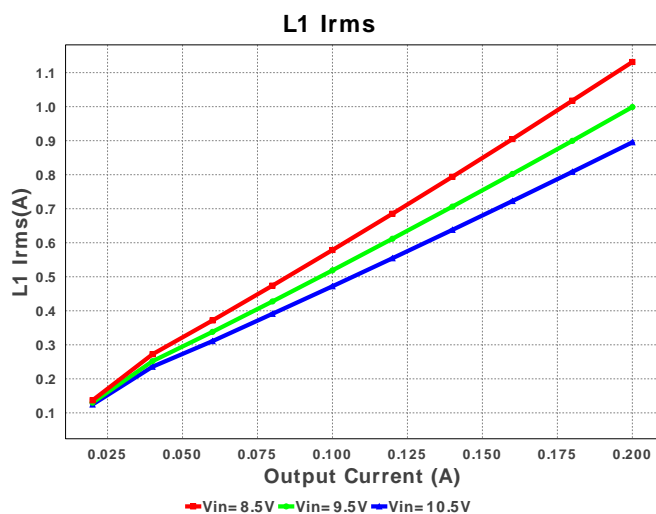
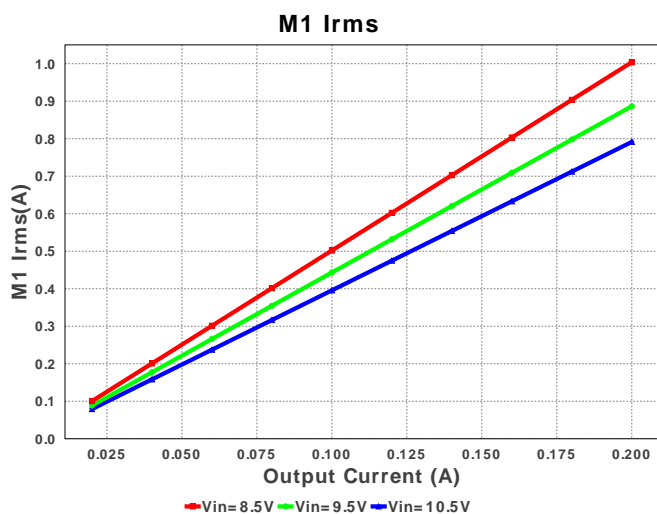
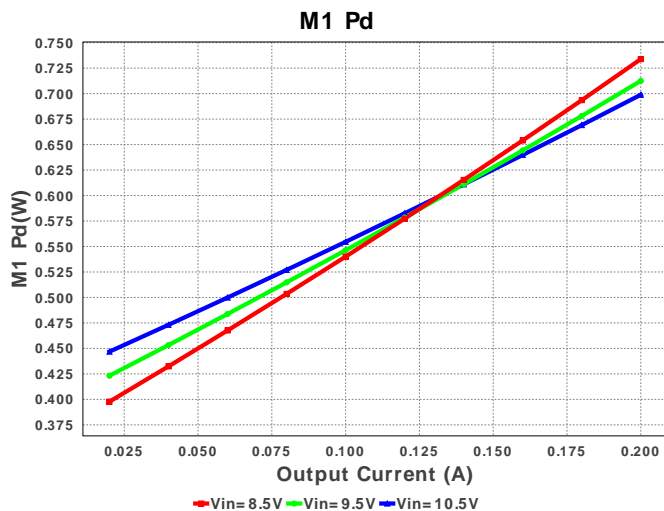
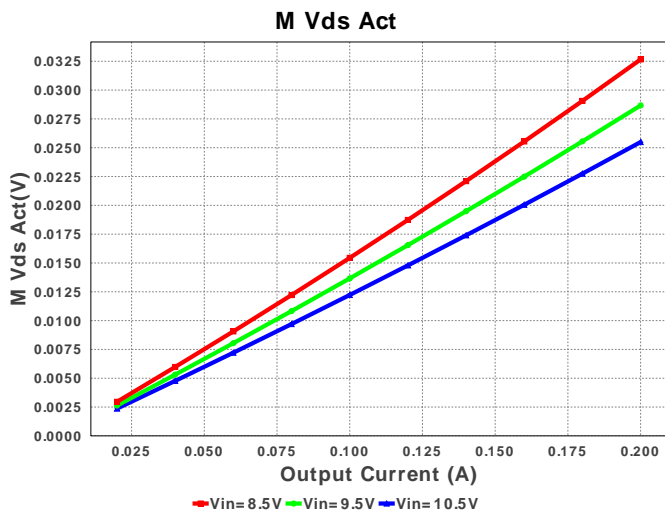
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbyp	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
2.	Ccomp	Yageo America	CC0805KRX7R9BB222 Series= X7R	Cap= 2.2 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	Ccomp2	Yageo America	CC0805KRX7R9BB471 Series= X7R	Cap= 470.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
4.	Cin	MuRata	GRM32ER61C226ME20L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 16.0 V IRMS= 3.68 A	1	\$0.12	1210 15 mm ²
5.	Cout	Panasonic	EEV-FK1J151Q Series= FK	Cap= 150.0 uF ESR= 160.0 mOhm VDC= 63.0 V IRMS= 800.0 mA	1	\$0.51	 SM_RADIAL_H13 264 mm ²
6.	Csense	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²

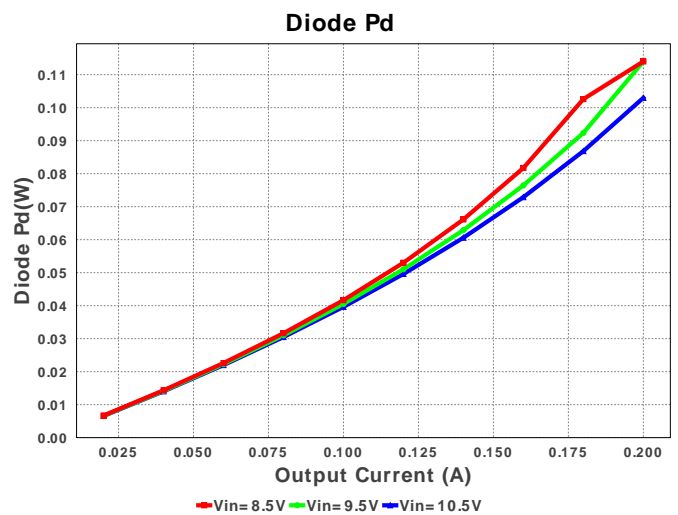
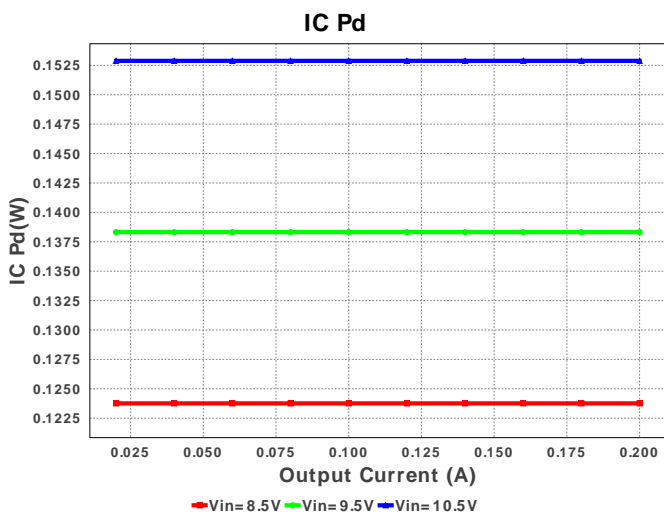
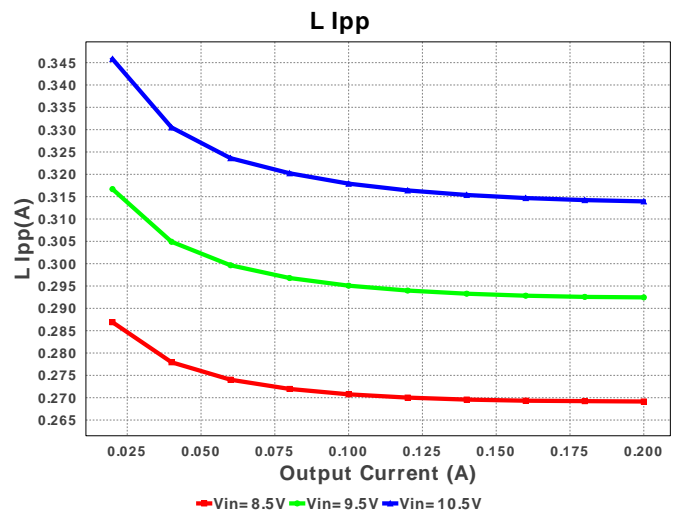
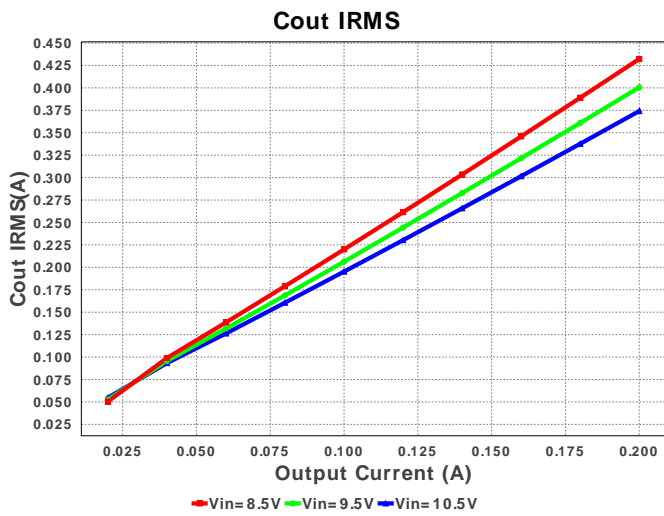
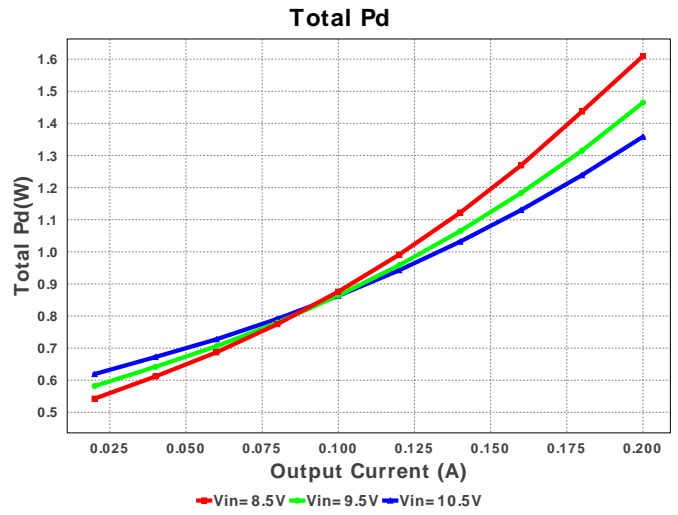
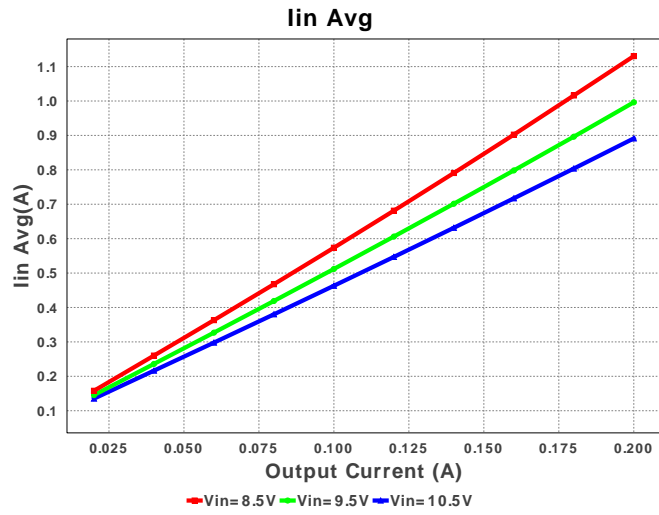
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	D1	NXP Semiconductor	PMEG6010CEH,115	VF@Io= 570.0 mV VRRM= 60.0 V	1	\$0.04	 SOD-123F 12 mm ²
8.	L1	Bourns	SRP6540-470M	L= 47.0 µH DCR= 366.0 mOhm	1	\$0.60	 SRP6540 83 mm ²
9.	M1	Texas Instruments	CSD19537Q3	VdsMax= 100.0 V IdsMax= 9.7 Amps	1	\$0.75	 TRANS_NexFET_Q3 18 mm ²
10.	Rcomp	Vishay-Dale	CRCW040252K3FKED Series= CRCW..e3	Res= 52.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
11.	Rfb1	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
12.	Rfb2	Vishay-Dale	CRCW0402309KFKED Series= CRCW..e3	Res= 309.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
13.	Rs1	Vishay-Dale	CRCW0402100RFKED Series= CRCW..e3	Res= 100.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
14.	Rsense	Panasonic	ERJ-L14KF39MU Series= ERJ-L14	Res= 39.0 mOhm Power= 330.0 mW Tolerance= 1.0%	1	\$0.11	 1210 15 mm ²
15.	Rsync	Vishay-Dale	CRCW040226K1FKED Series= CRCW..e3	Res= 26.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
16.	U1	Texas Instruments	LM3488MMX/NOPB	Switcher	1	\$0.80	 MUA08A 24 mm ²

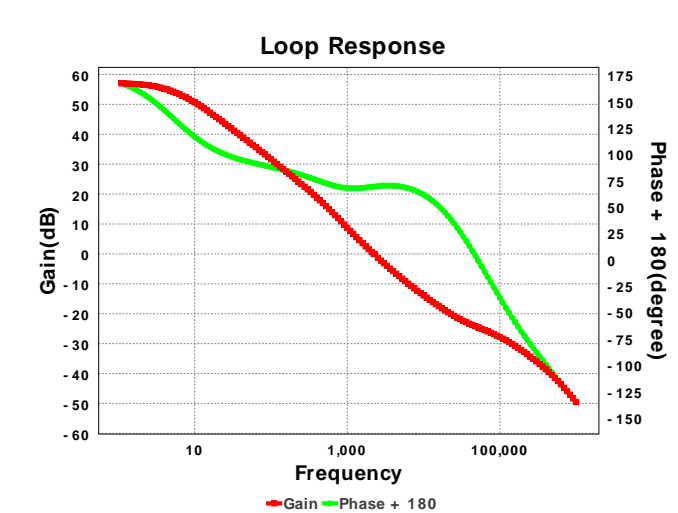
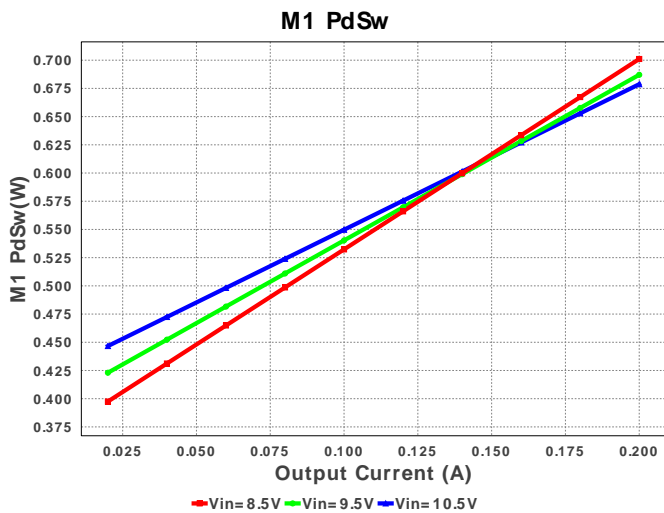
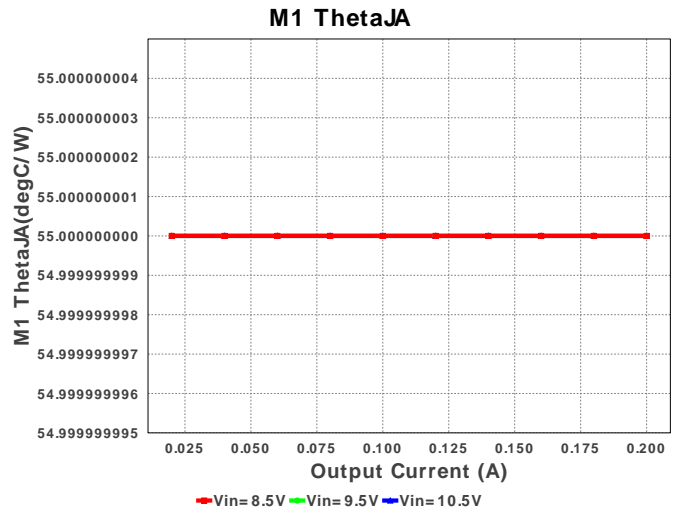
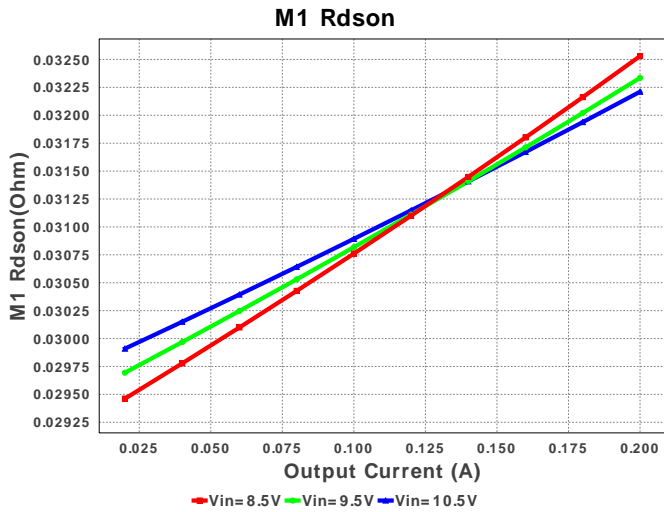












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	77.697 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	432.192 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	1.13 A	Current	Average input current
4.	L Ipp	269.15 mA	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	1.131 A	Current	Inductor ripple current
6.	M1 Irms	1.004 A	Current	M1 MOSFET Irms
7.	SW Ipk	1.263 A	Current	Peak switch current
8.	BOM Count	16	General	Total Design BOM count
9.	FootPrint	471.0 mm ²	General	Total Foot Print Area of BOM components
10.	Frequency	550.0 kHz	General	Switching frequency
11.	IC Tolerance	15.3 mV	General	IC Feedback Tolerance
12.	M Vds Act	32.659 mV	General	M Vds
13.	M1 Rdson	32.53 mOhm	General	Drain-Source On-resistance
14.	M1 ThetaJA	55.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
15.	Pout	8.0 W	General	Total output power
16.	Total BOM	\$3.02	General	Total BOM Cost
17.	D1 Tj	67.62 degC	Op_Point	D1 junction temperature
18.	Low Freq Gain	54.974 dB	Op_Point	Gain at 10Hz
19.	Vout Actual	40.194 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
20.	Vout OP	40.0 V	Op_Point	Operational Output Voltage
21.	Cross Freq	1.823 kHz	Op_point	Bode plot crossover frequency
22.	Duty Cycle	82.279 %	Op_point	Duty cycle
23.	Efficiency	83.251 %	Op_point	Steady state efficiency
24.	Gain Marg	-22.64 dB	Op_point	Bode Plot Gain Margin
25.	IC Tj	54.752 degC	Op_point	IC junction temperature
26.	ICThetaJA	200.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
27.	IOUT_OP	200.0 mA	Op_point	Iout operating point
28.	M1 TjOP	70.362 degC	Op_point	M1 MOSFET junction temperature
29.	Phase Marg	67.794 deg	Op_point	Bode Plot Phase Margin
30.	VIN_OP	8.5 V	Op_point	Vin operating point
31.	Vout p-p	202.108 mV	Op_point	Peak-to-peak output ripple voltage

#	Name	Value	Category	Description
32.	Cin Pd	12.074 μ W	Power	Input capacitor power dissipation
33.	Cout Pd	29.886 mW	Power	Output capacitor power dissipation
34.	Diode Pd	114.0 mW	Power	Diode power dissipation
35.	IC Pd	123.76 mW	Power	IC power dissipation
36.	L Pd	562.078 mW	Power	Inductor power dissipation
37.	M1 Pd	733.86 mW	Power	M1 MOSFET total power dissipation
38.	M1 PdCond	32.788 mW	Power	M1 MOSFET conduction losses
39.	M1 PdSw	701.072 mW	Power	M1 MOSFET switching losses
40.	Rfb Pd	5.016 mW	Power	Rfb Power Dissipation
41.	Rsense Pd	35.705 mW	Power	LED Current Rsns Power Dissipation
42.	Total Pd	1.609 W	Power	Total Power Dissipation
43.	Vout Tolerance	3.195 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	200.0 m	Maximum Output Current
2.	VinMax	10.5	Maximum input voltage
3.	VinMin	8.5	Minimum input voltage
4.	Vout	40.0	Output Voltage
5.	base_pn	LM3488	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature
8.	UserFsw	550.0 k	Customer Selected Frequency

Design Assistance

1. **LM3488** Product Folder : <http://www.ti.com/product/LM3488> : contains the data sheet and other resources.

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