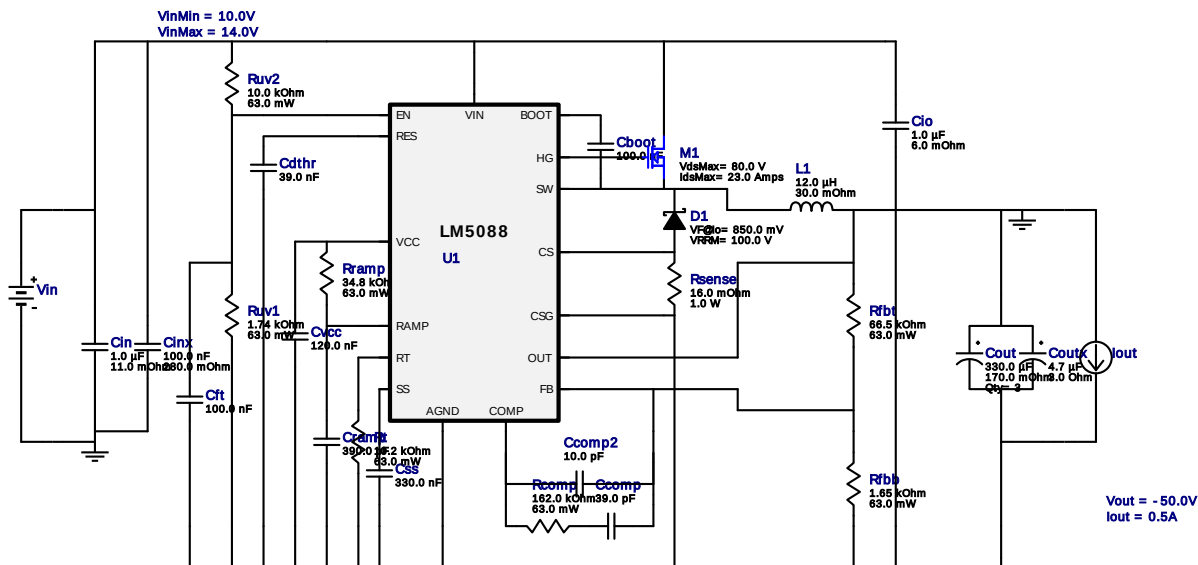


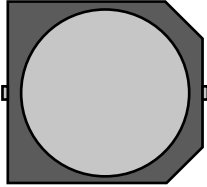
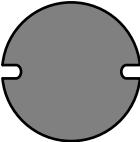
WEBENCH® Design Report

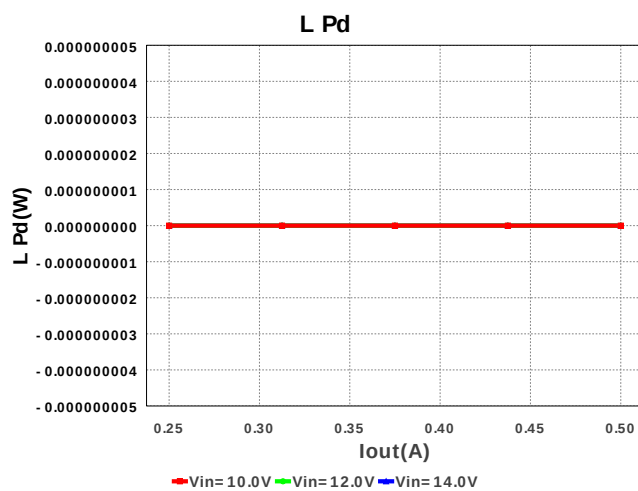
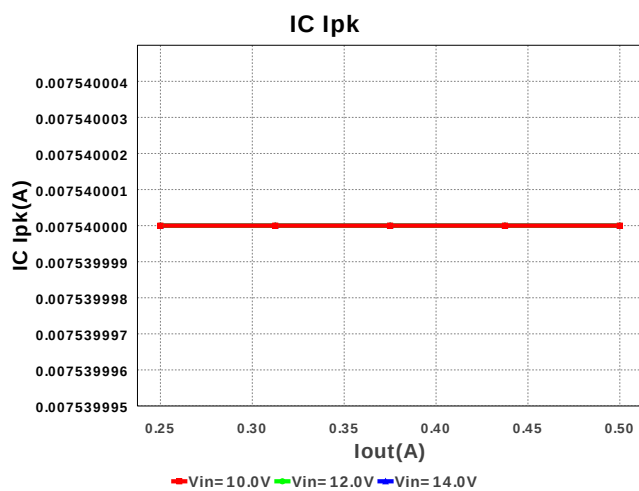
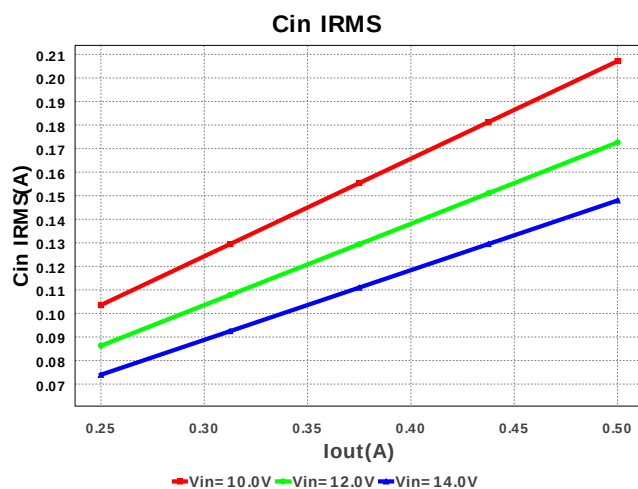
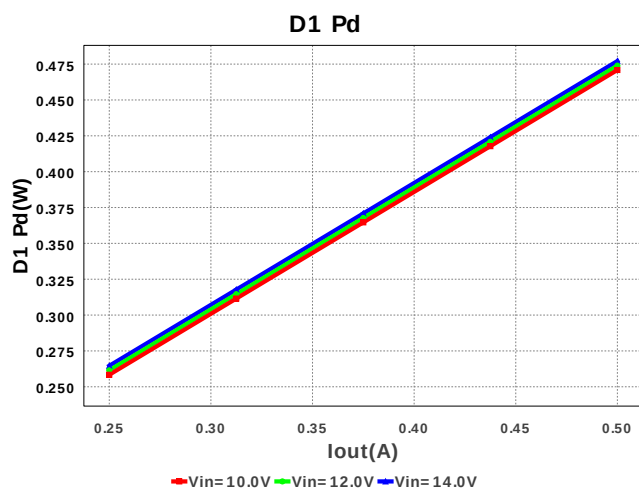
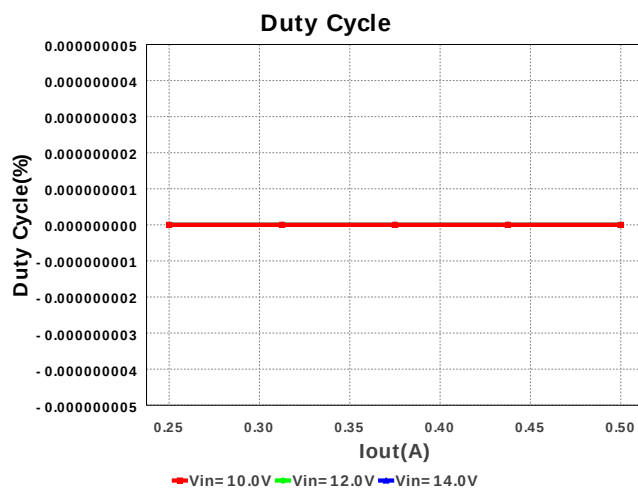
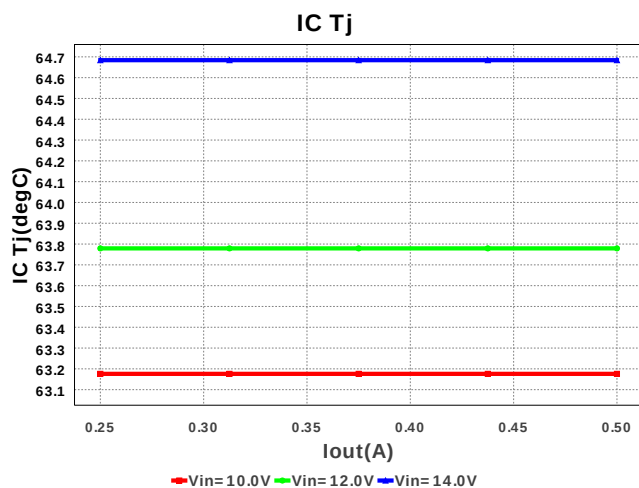
Design : 606210/182 LM5088MH-1/NOPB
LM5088MH-1/NOPB 10.0V-14.0V to -50.0V @ 0.5A

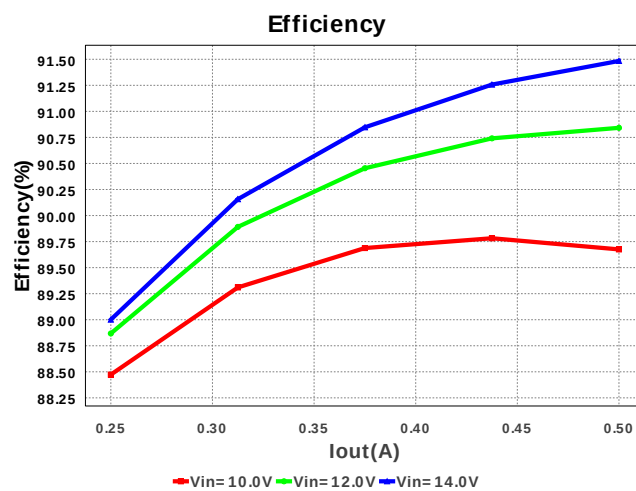
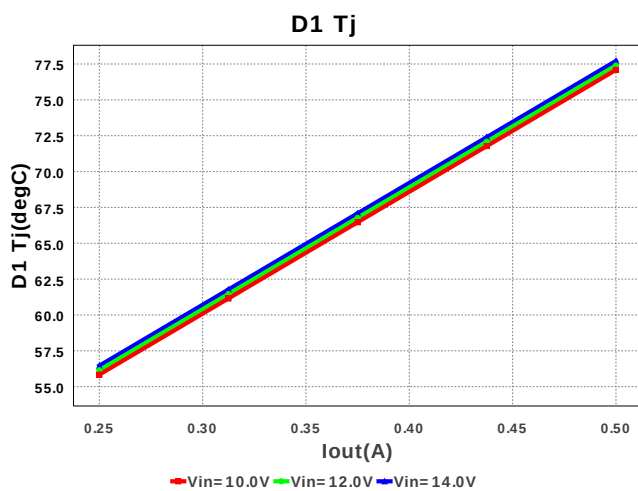
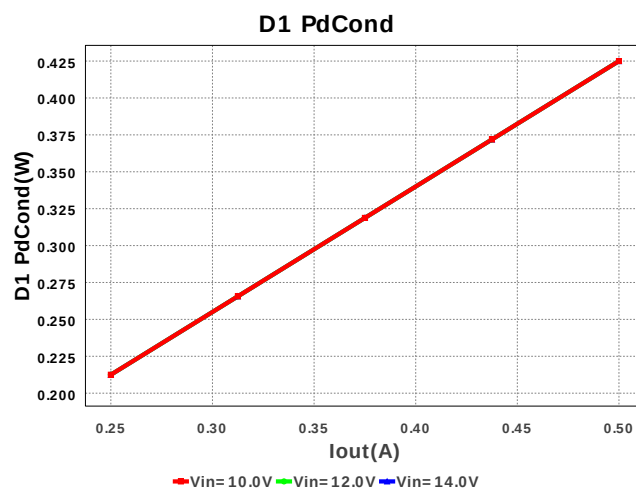
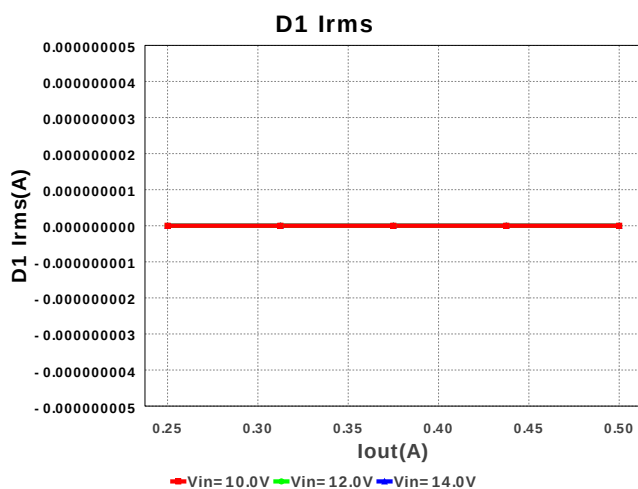
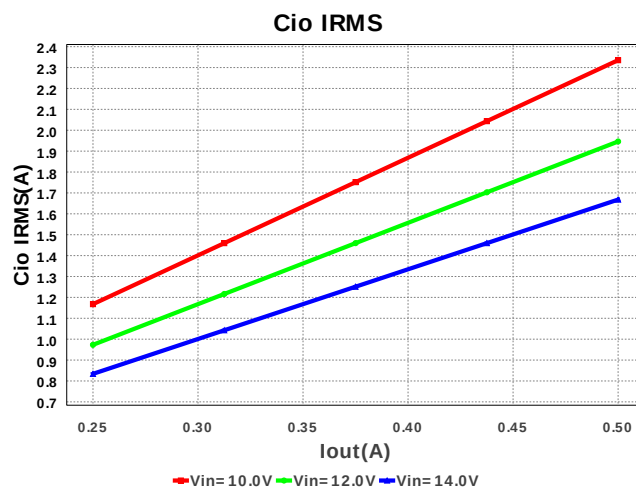
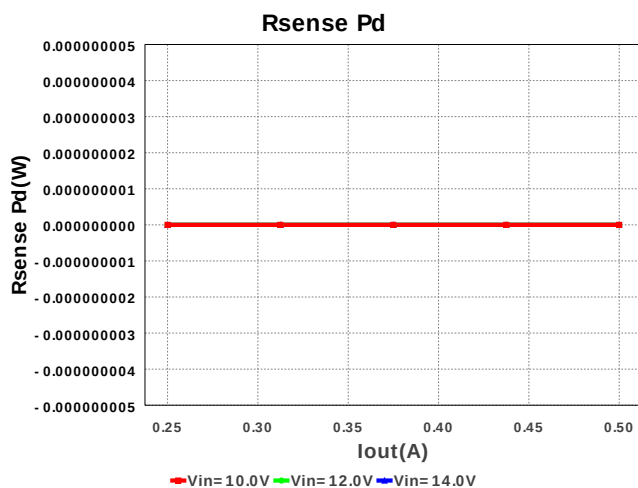


Electrical BOM

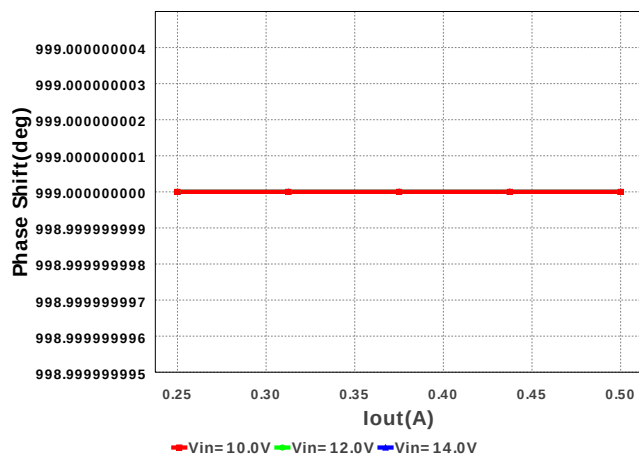
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0603C104K3RACTU Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0603 10mm2
2.	Ccomp	Yageo America	CC0805JRNP09BN390 Series= C0G/NP0	Cap= 39.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 13mm2
3.	Ccomp2	Yageo America	CC0805JRNP09BN100 Series= C0G/NP0	Cap= 10.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 13mm2
4.	Cdthr	MuRata	GRM155R71A393KA01D Series= X7R	Cap= 39.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 8mm2
5.	Cft	Kemet	C0603C104K3RACTU Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0603 10mm2
6.	Cin	Kemet	C1206C105K3RACTU Series= X7R	Cap= 1.0 µF ESR= 11.0 mOhm VDC= 25.0 V IRMS= 3.55 A	1	\$0.04	1206 19mm2
7.	Cinx	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 13mm2
8.	Cio	TDK	C3216X7R2A105M Series= 285	Cap= 1.0 µF ESR= 6.0 mOhm VDC= 100.0 V IRMS= 4.5 A	1	\$0.11	1206 19mm2

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Cout	Panasonic	EEV-FK1K331M Series= FK	Cap= 330.0 μ F ESR= 170.0 mOhm VDC= 80.0 V IRMS= 793.0 mA	3	\$0.78	 SM_RADIAL_J16 399mm2
10.	Coutx	Panasonic	EEE-FK1K4R7P Series= FK	Cap= 4.7 μ F ESR= 3.0 Ohm VDC= 80.0 V IRMS= 40.0 mA	1	\$0.13	 SM_RADIAL_D 84mm2
11.	Cramp	Yageo America	CC0805KRX7R9BB391 Series= X7R	Cap= 390.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 13mm2
12.	Css	MuRata	GRM155C80J334KE01D Series= 379	Cap= 330.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	 0402 8mm2
13.	Cvcc	MuRata	GRM155R61A124KE19D Series= X5R	Cap= 120.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 8mm2
14.	D1	Micro Commercial Components	SK310A-TP	VF@Io= 850.0 mV VRRM= 100.0 V	1	\$0.10	 SMA 37mm2
15.	L1	Bourns	SDR1307-120ML	L= 12.0 μ H DCR= 30.0 mOhm	1	\$0.34	 SDR1307 227mm2
16.	M1	Infineon Technologies	BSC340N08NS3 G	VdsMax= 80.0 V IdsMax= 23.0 Amps	1	\$0.30	 PG-TDSON-8 55mm2
17.	Rcomp	Vishay-Dale	CRCW0402162KFKED Series= CRCW..e3	Res= 162.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 8mm2
18.	Rfbb	Vishay-Dale	CRCW04021K65FKED Series= CRCW..e3	Res= 1.65 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 8mm2
19.	Rfbt	Vishay-Dale	CRCW040266K5FKED Series= CRCW..e3	Res= 66.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 8mm2
20.	Rramp	Vishay-Dale	CRCW040234K8FKED Series= CRCW..e3	Res= 34.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 8mm2
21.	Rsense	Panasonic	ERJ-M1WSF16MU Series= 1119	Res= 16.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	\$0.15	 2512 43mm2
22.	Rt	Vishay-Dale	CRCW040210K2FKED Series= CRCW..e3	Res= 10.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 8mm2
23.	Ruv1	Vishay-Dale	CRCW04021K74FKED Series= CRCW..e3	Res= 1.74 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 8mm2
24.	Ruv2	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 8mm2
25.	U1	Texas Instruments	LM5088MH-1/NOPB	Switcher	1	\$1.47	 MXA16A 59mm2

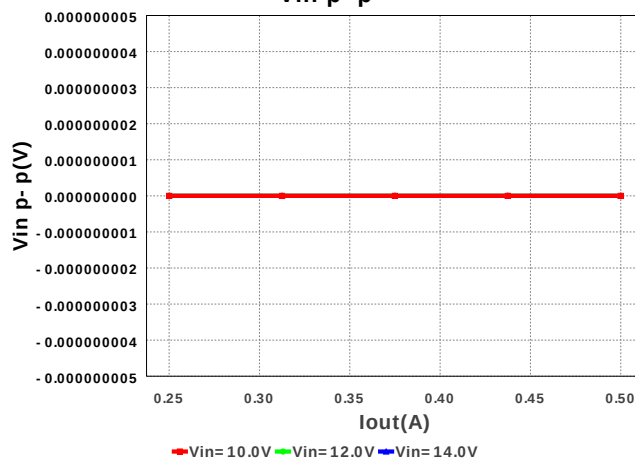




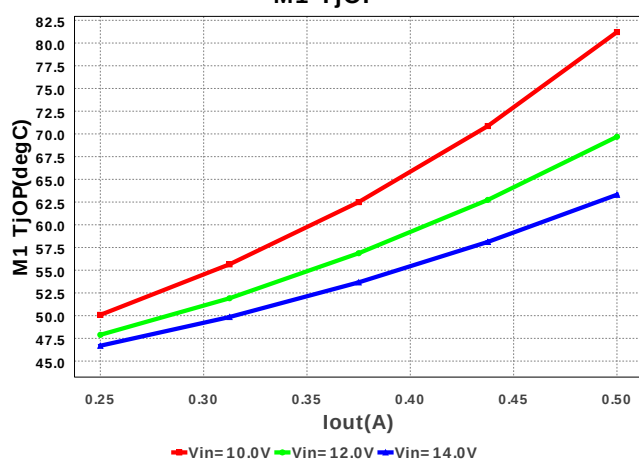
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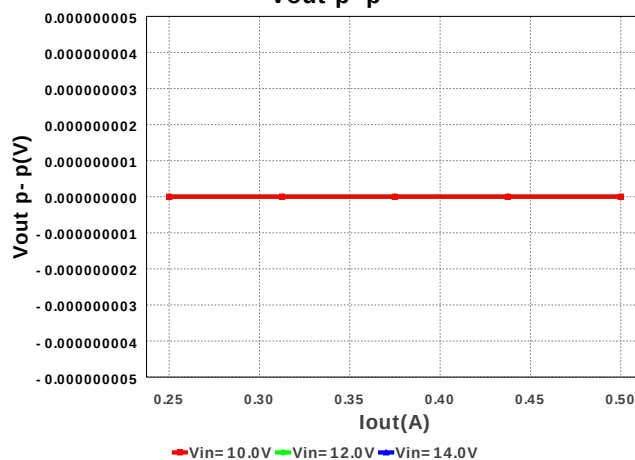
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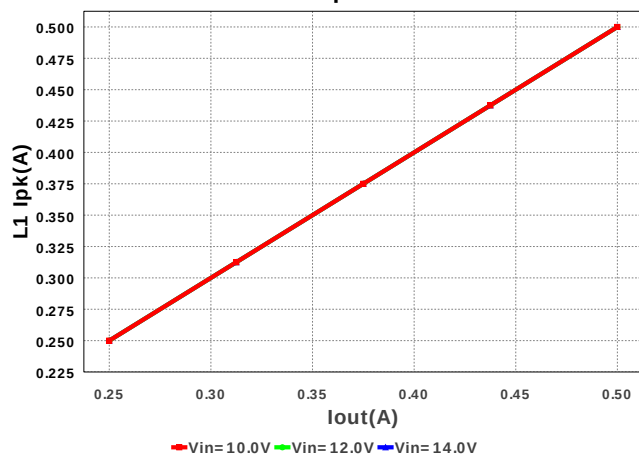
M1 TjOP



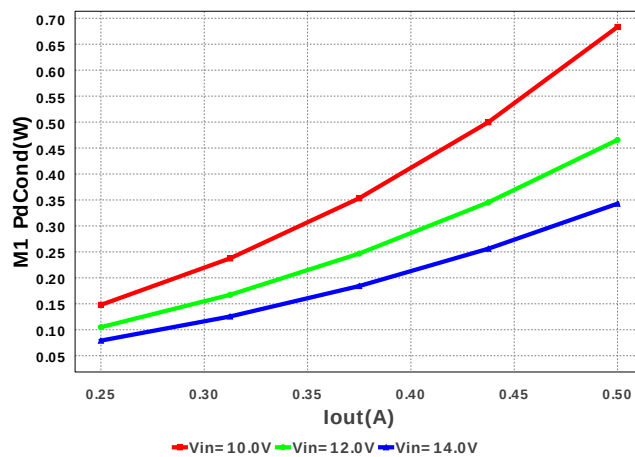
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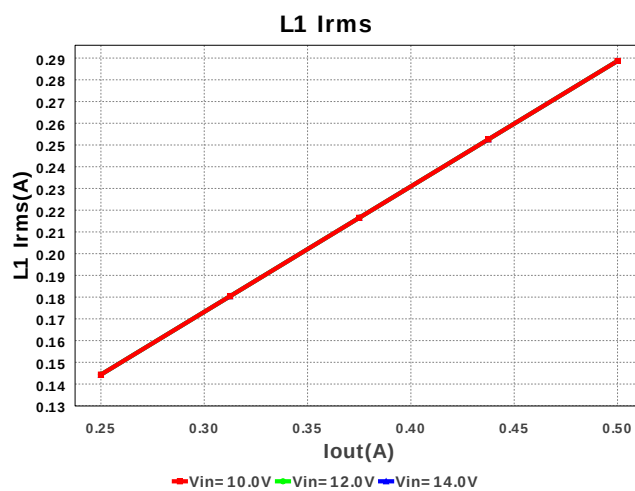
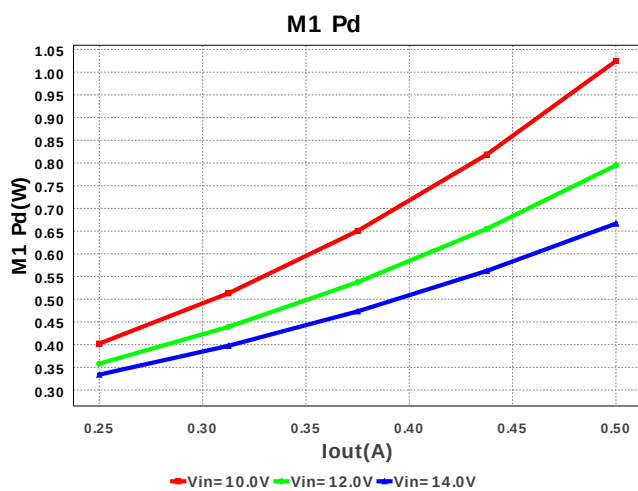
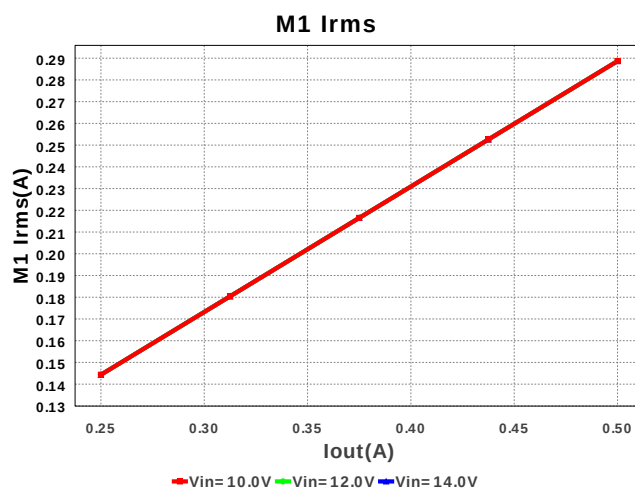
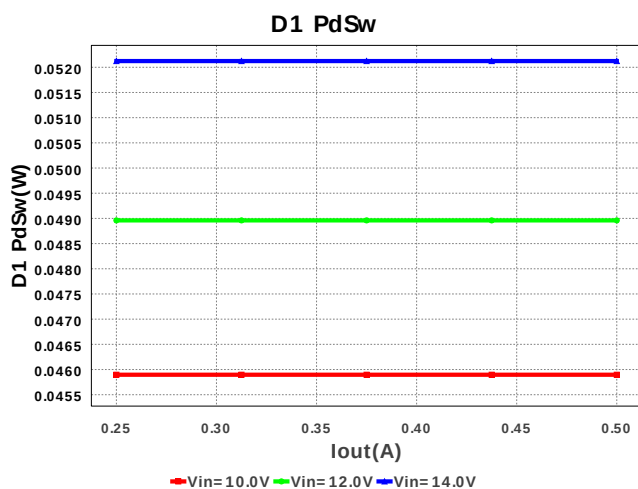
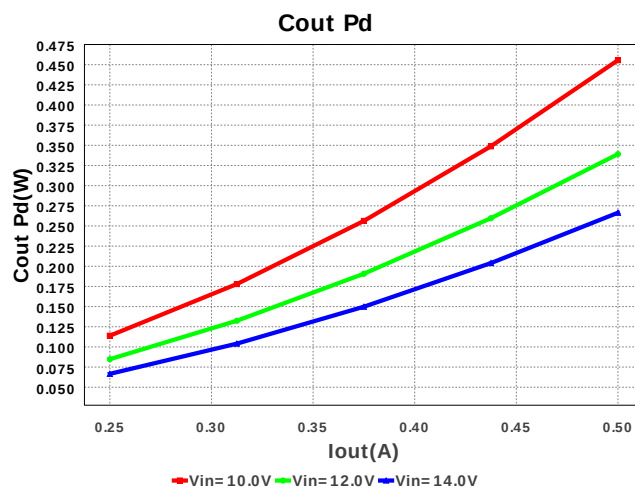
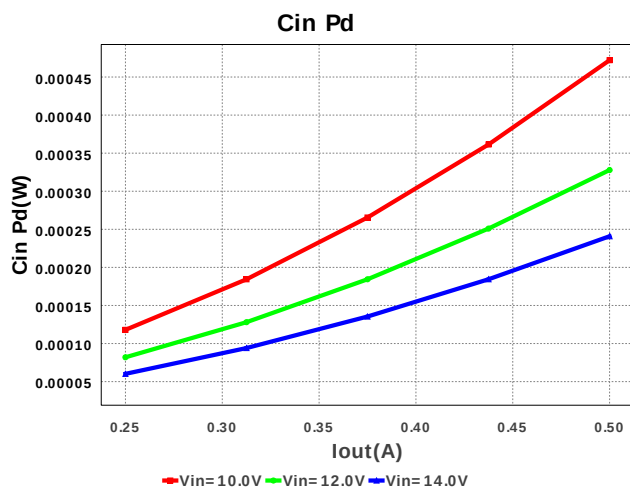


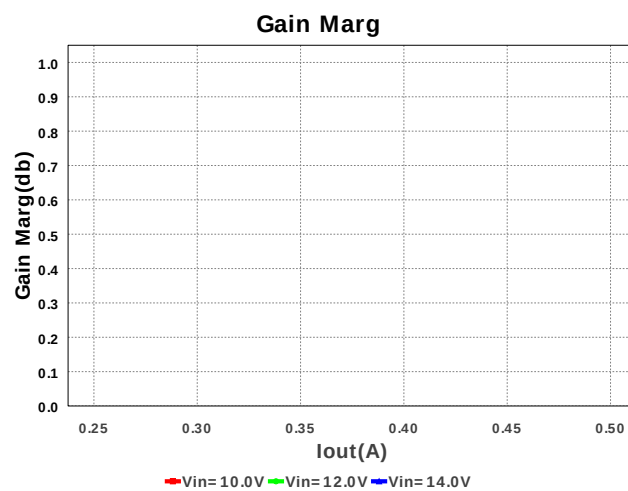
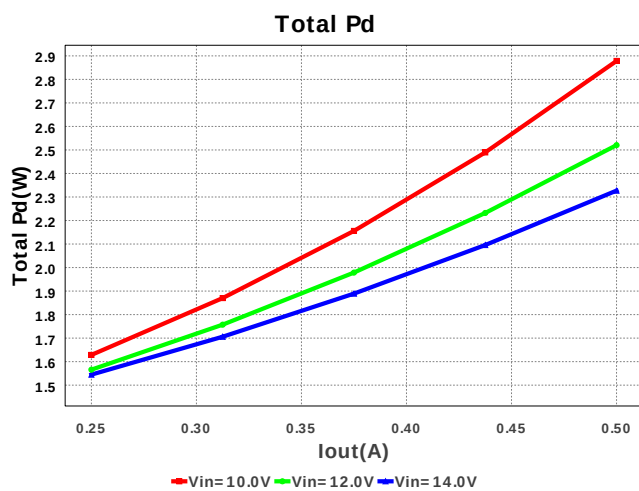
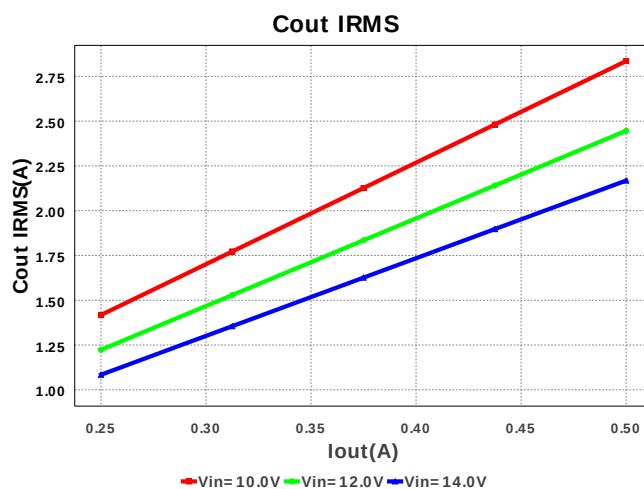
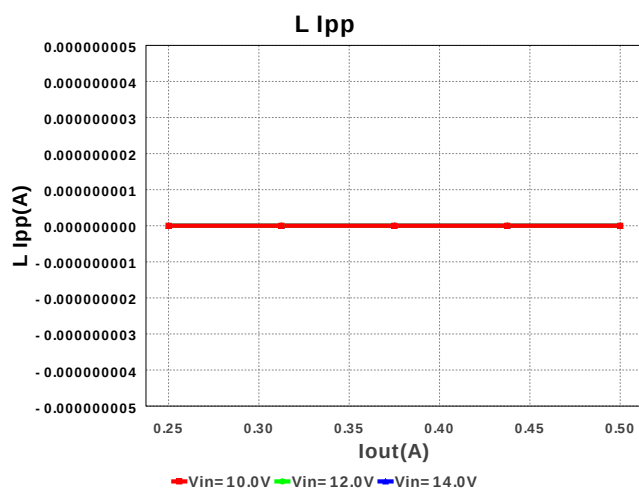
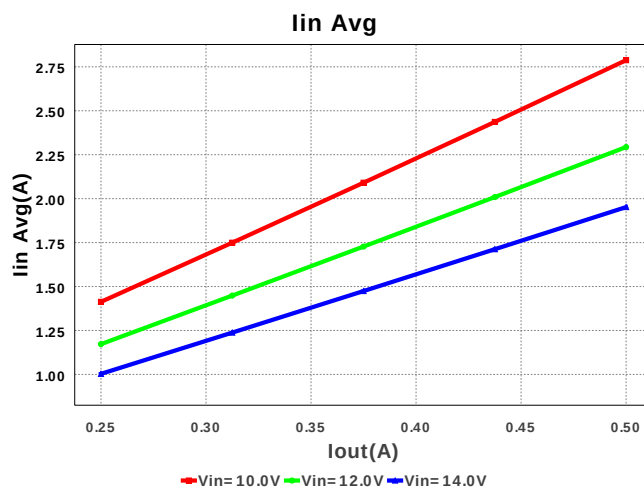
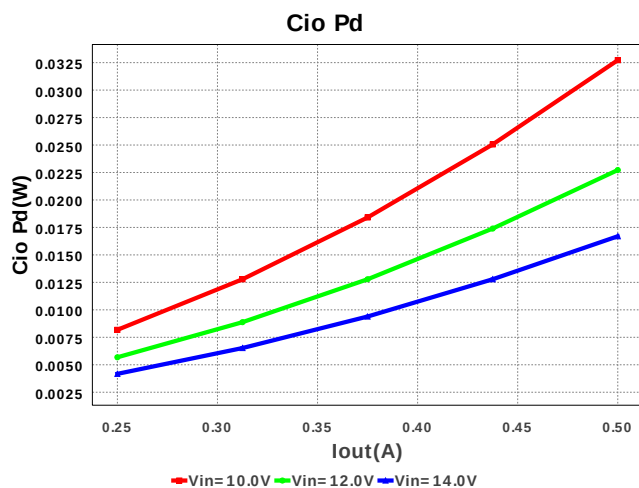
L1 Ipk

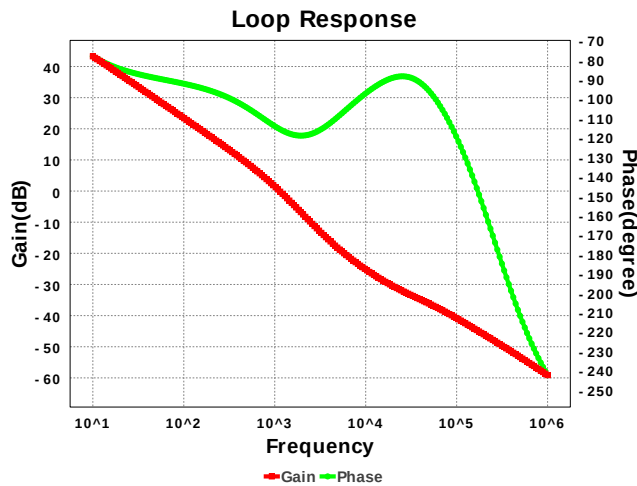
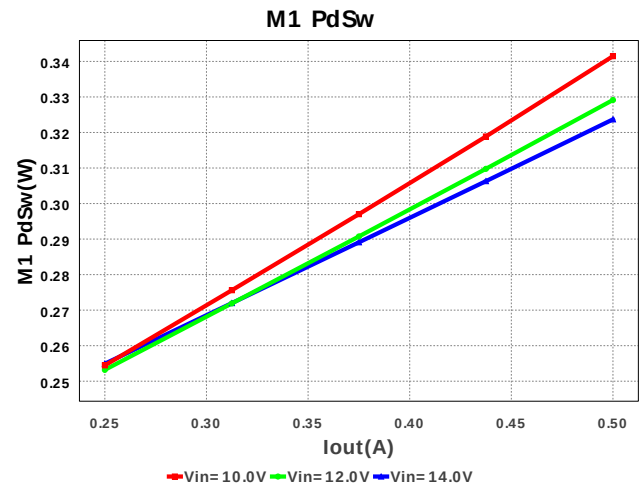
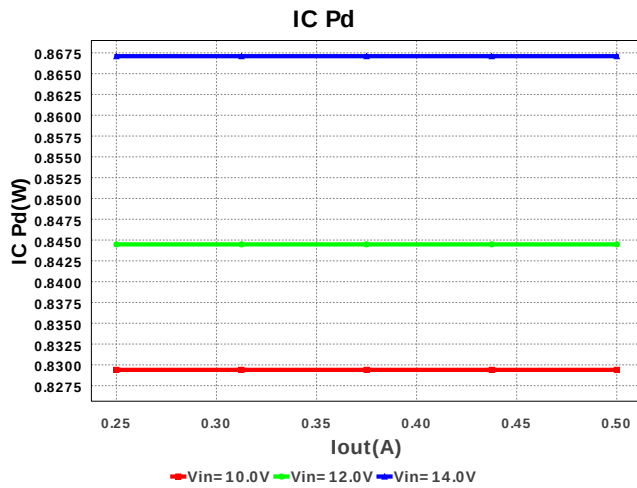


M1 PdCond









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	150.335 mA	Current	Input capacitor RMS ripple current
2.	Cio IRMS	153.562 mA	Current	Input to output capacitor RMS ripple current
3.	Cout IRMS	514.499 mA	Current	Output capacitor RMS ripple current
4.	D1 Irms	1.933 A	Current	D1 Irms
5.	IC Ipk	7.54 mA	Current	Peak switch current in IC
6.	Iin Avg	2.737 A	Current	Average input current
7.	L Ipp	1.266 A	Current	Peak-to-peak output inductor ripple current
8.	L1 Ipk	3.663 A	Current	Inductor peak current
9.	L1 Irms	2.115 A	Current	Inductor ripple current
10.	M1 Irms	859.165 mA	Current	M1 MOSFET Irms
11.	BOM Count	27	General	Total Design BOM count
12.	FootPrint	1.887 kmm2	General	Total Foot Print Area of BOM components
13.	Frequency	550.0 kHz	General	Switching frequency
14.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
15.	Mode	CCM	General	Conduction Mode
16.	Total BOM	\$5.14	General	Total BOM Cost
17.	D1 Tj	77.09 degC	Op_Point	D1 junction temperature
18.	Vin p-p	86.695 mV	Op_Point	Peak-to-peak input voltage
19.	Cross Freq	1.084 kHz	Op_point	Bode plot crossover frequency
20.	Duty Cycle	83.5 %	Op_point	Duty cycle
21.	Efficiency	91.327 %	Op_point	Steady state efficiency
22.	Gain Marg	49.153 db	Op_point	Bode Plot Gain Margin
23.	IC Tj	64.684 degC	Op_point	IC junction temperature
24.	IOUT_OP	500.0 mA	Op_point	Iout operating point
25.	M1 TJOP	81.208 degC	Op_point	M1 MOSFET junction temperature
26.	Phase Marg	65.238 deg	Op_point	Bode Plot Phase Margin
27.	Phase Shift	65.946 deg	Op_point	Bode Plot Phase Shift
28.	VIN_OP	10.0 V	Op_point	Vin operating point
29.	Vout p-p	61.177 mV	Op_point	Peak-to-peak output ripple voltage
30.	Cin Pd	248.605 μW	Power	Input capacitor power dissipation
31.	Cio Pd	141.489 μW	Power	Input to output capacitor power dissipation
32.	Cout Pd	15.0 mW	Power	Output capacitor power dissipation

#	Name	Value	Category	Description
33.	D1 Pd	470.897 mW	Power	Diode power dissipation
34.	D1 PdCond	425.0 mW	Power	Diode conduction losses
35.	D1 PdSw	45.897 mW	Power	Diode switching losses
36.	IC Pd	867.1 mW	Power	IC power dissipation
37.	L Pd	30.58 mW	Power	Inductor power dissipation
38.	M1 Pd	1.025 W	Power	M1 MOSFET total power dissipation
39.	M1 PdCond	683.24 mW	Power	M1 MOSFET conduction losses
40.	M1 PdSw	341.474 mW	Power	M1 MOSFET switching losses
41.	Rsense Pd	9.432 μ W	Power	LED Current Rsns Power Dissipation
42.	Total Pd	2.374 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 mA	Maximum Output Current
2.	Iout1	500.0 mAmps	Output Current #1
3.	VinMax	14.0 V	Maximum input voltage
4.	VinMin	10.0 V	Minimum input voltage
5.	Vout	-50.0 V	Output Voltage
6.	Vout1	-50.0 Volt	Output Voltage #1
7.	base_pn	LM5088	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **LM5088** Product Folder : <http://www.ti.com/product/lm5088> : contains the data sheet and other resources.

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