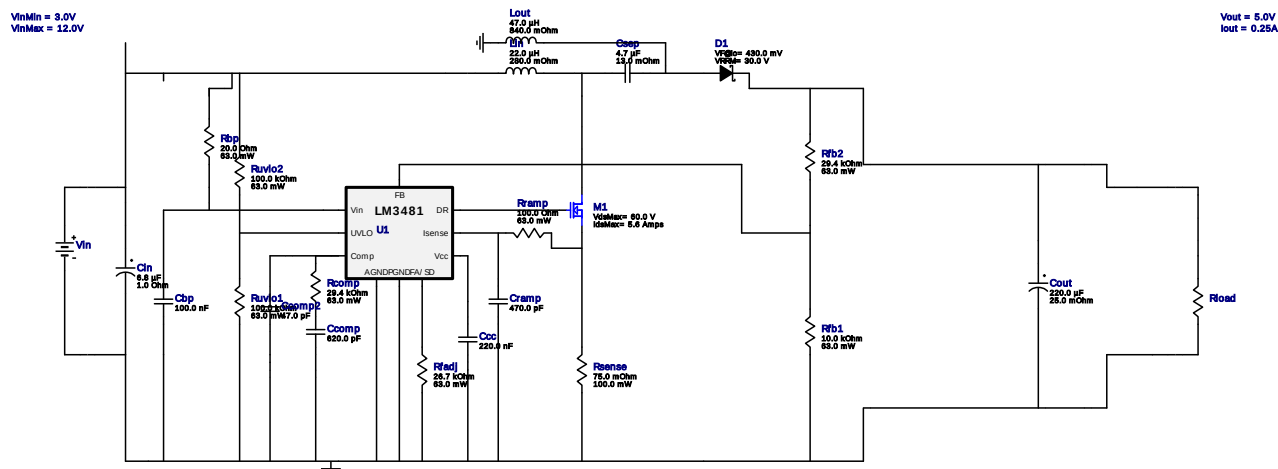


WEBENCH® Design Report

Design : 3474743/367 LM3481MM/NOPB
LM3481MM/NOPB 3.0V-12.0V to 5.0V @ 0.25A

VinMin = 3.0V
VinMax = 12.0V
Vout = 5.0V
Iout = 0.25A

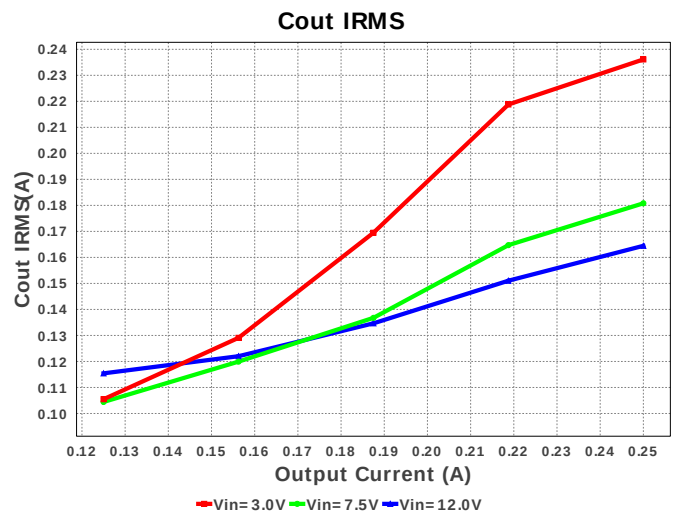
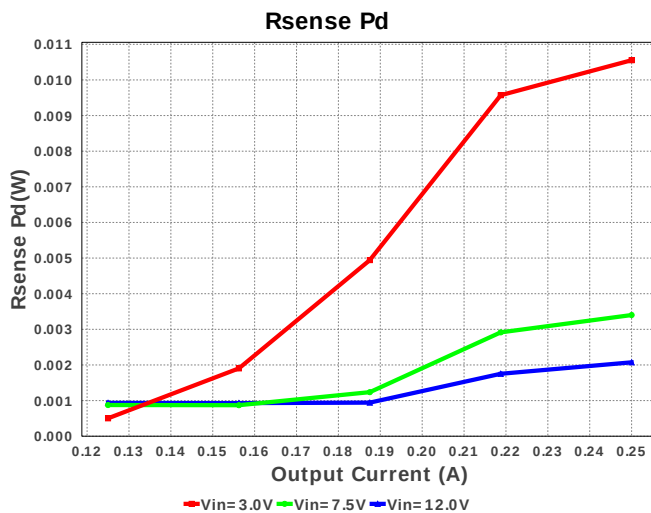
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Topology = SEPIC
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BOM Cost = \$3.01
Footprint = 208.0mm2
BOM Count = 22
Total Pd = 0.47W

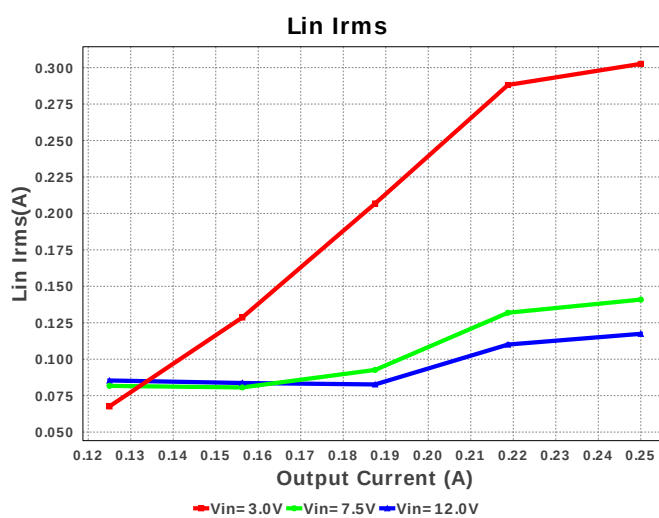
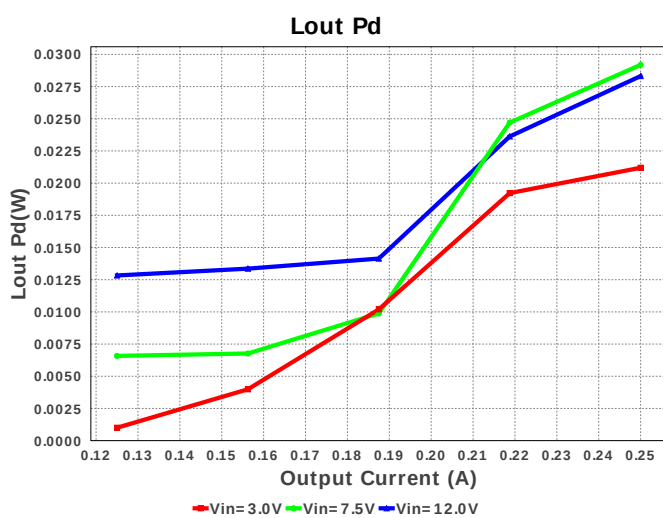
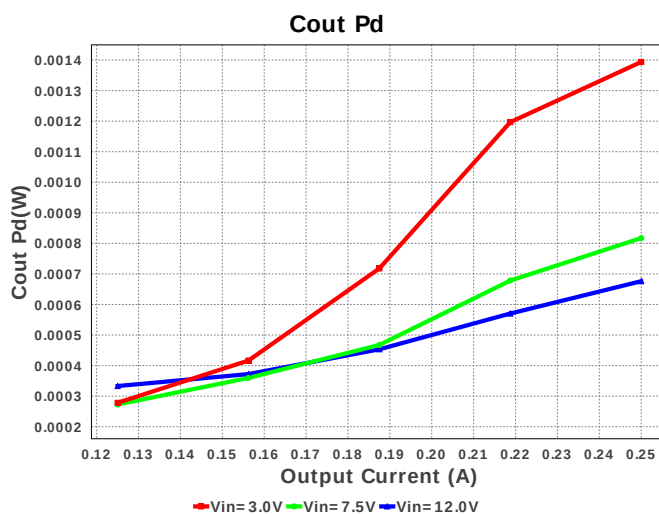
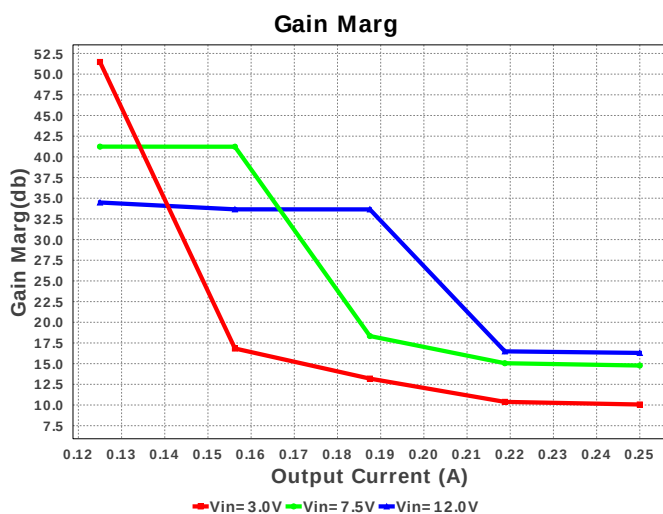
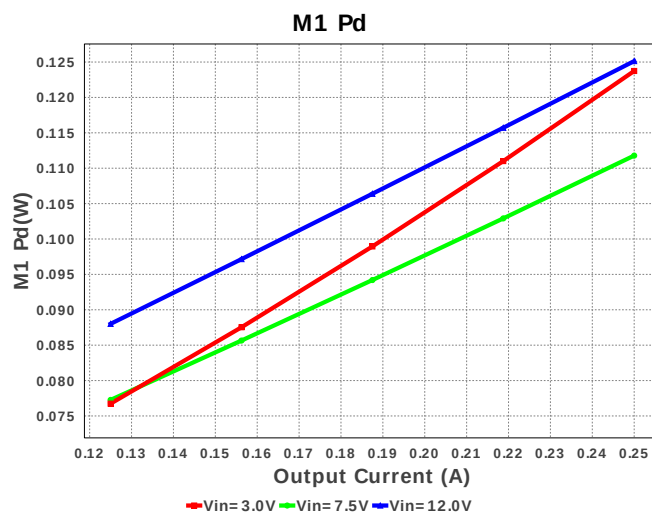
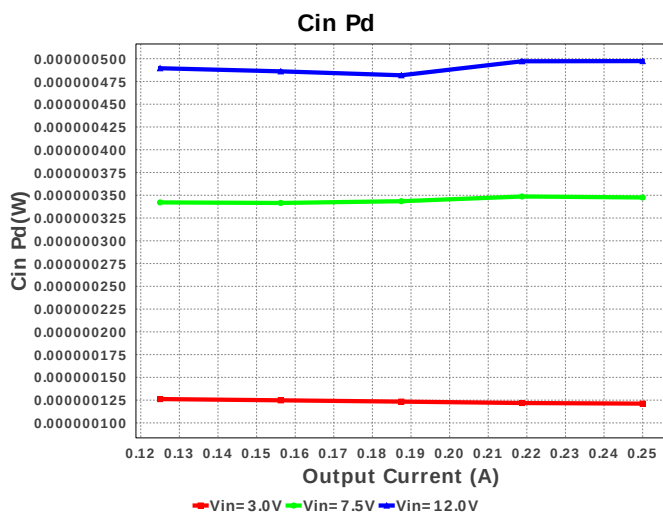


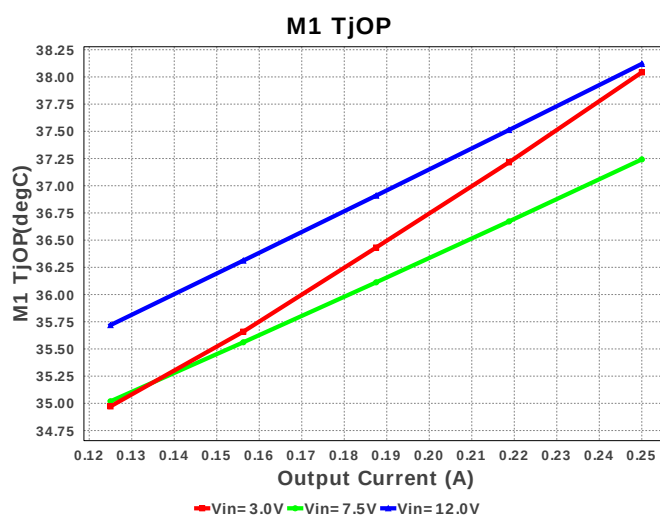
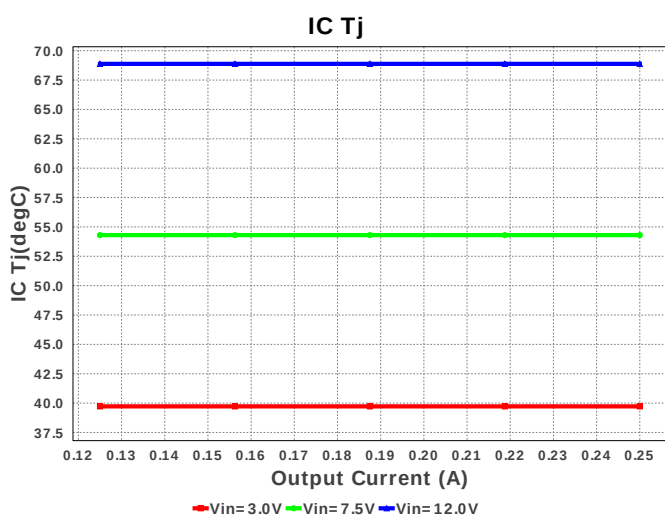
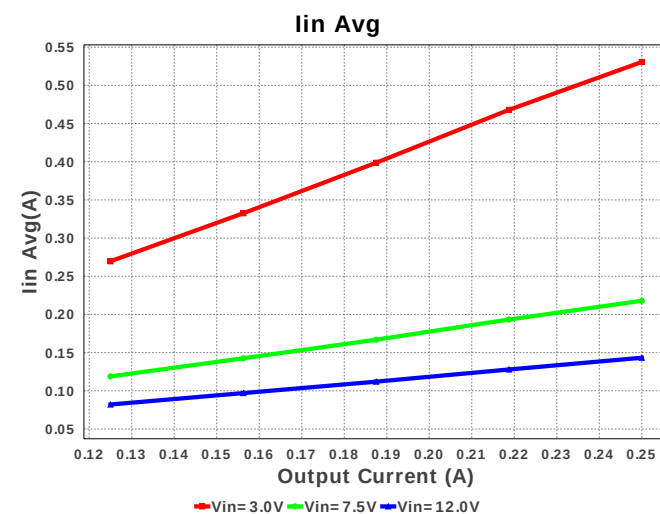
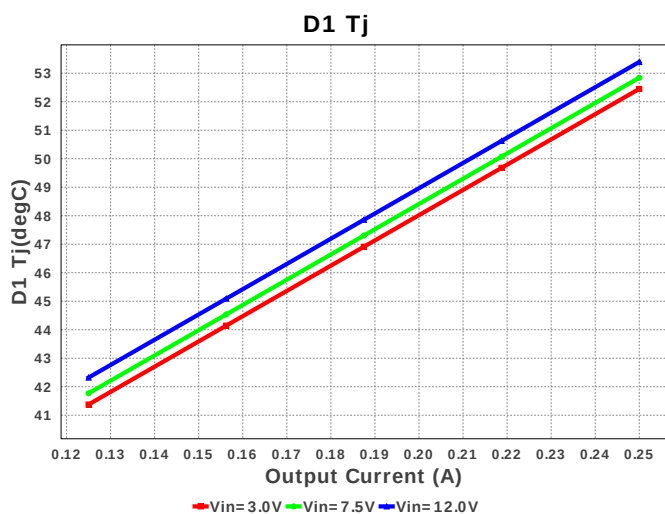
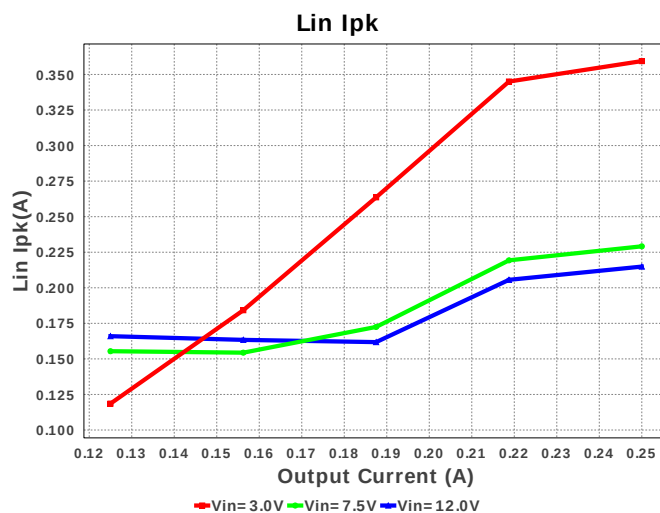
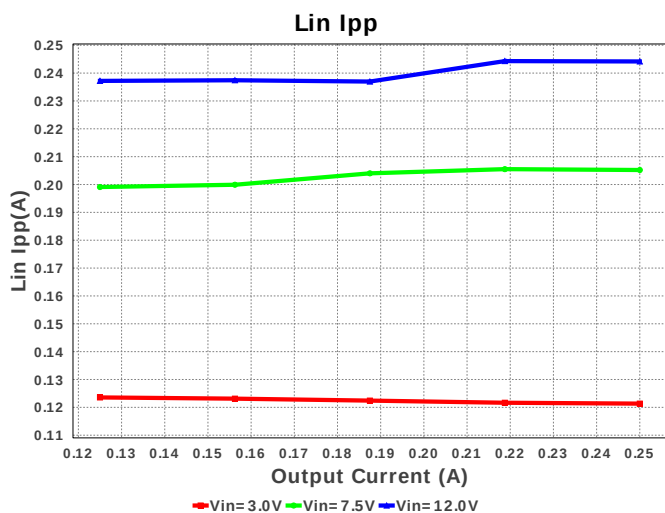
Electrical BOM

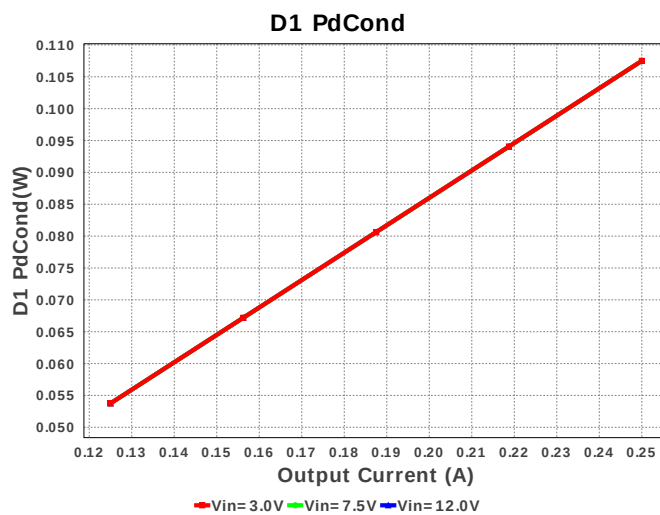
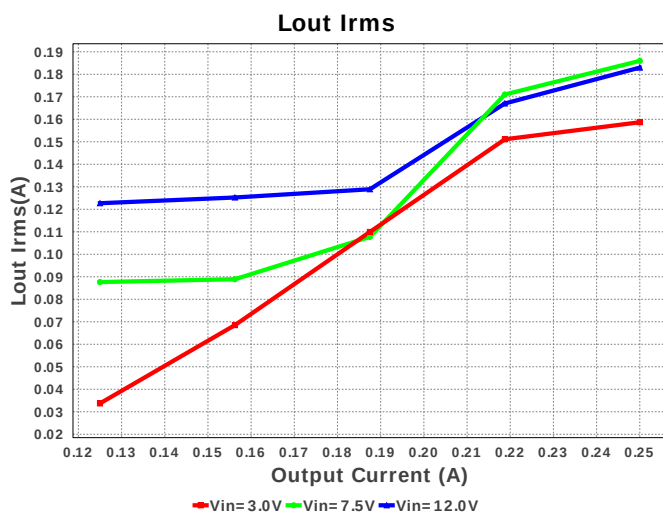
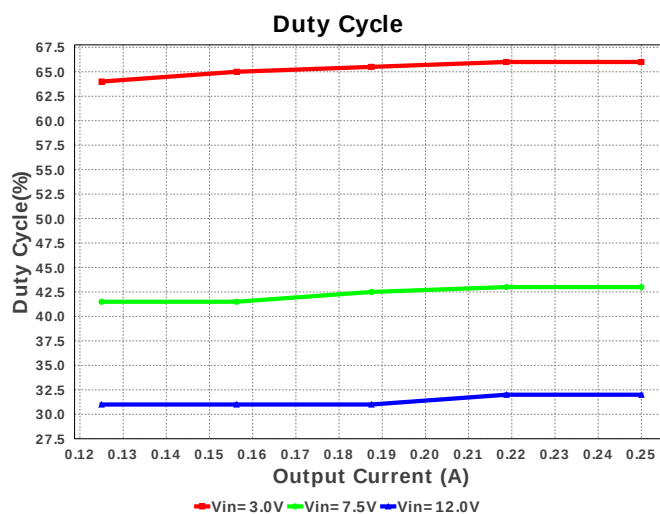
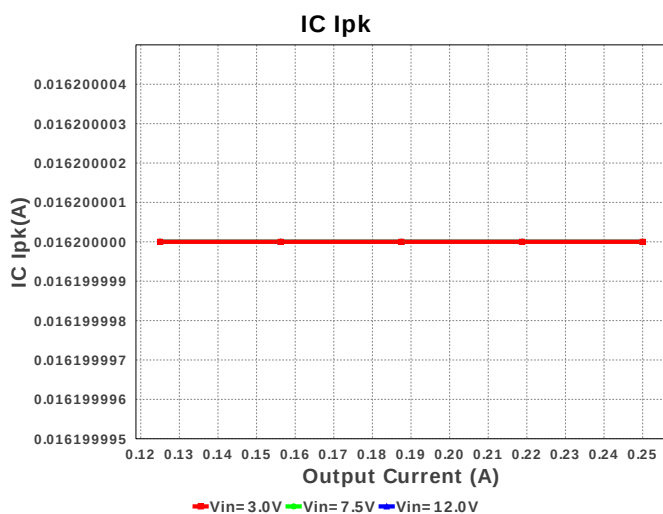
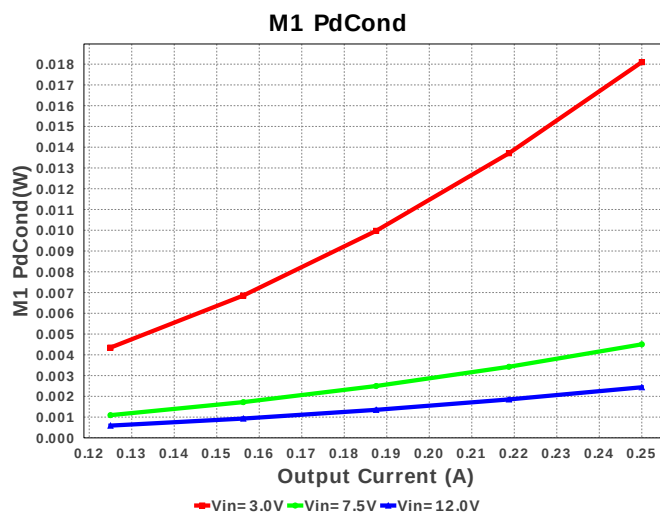
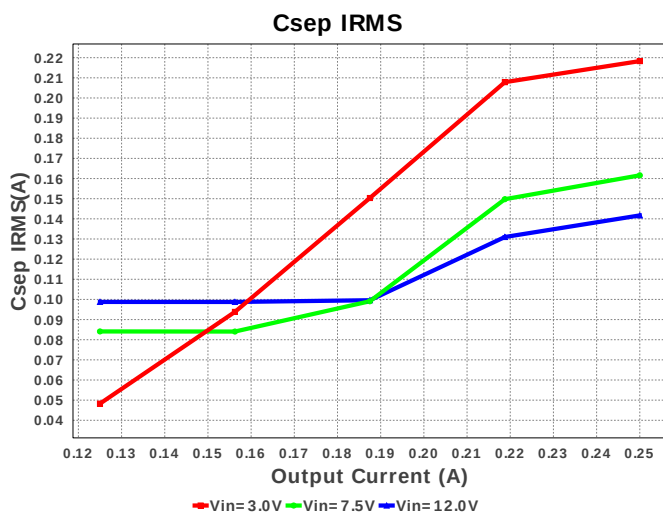
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbp	Kemet	C0603C104K3RACTU Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0603 5mm2
2.	Ccc	MuRata	GRM155R61A224KE19D Series= X5R	Cap= 220.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
3.	Ccomp	MuRata	GRM1555C1E621JA01D Series= C0G/NP0	Cap= 620.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
4.	Ccomp2	Yageo America	CC0805JRNP09BN470 Series= C0G/NP0	Cap= 47.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7mm2
5.	Cin	AVX	TPSA685K020R1000 Series= TPS	Cap= 6.8 µF ESR= 1.0 Ohm VDC= 20.0 V IRMS= 246.0 mA	1	\$0.26	3216-18 11mm2
6.	Cout	Panasonic	10TPE220ML Series= 1281	Cap= 220.0 µF ESR= 25.0 mOhm VDC= 10.0 V IRMS= 2.4 A	1	\$0.73	CAPSMT_6_D3L 3mm2
7.	Cramp	Yageo America	CC0805KRX7R9BB471 Series= X7R	Cap= 470.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7mm2
8.	Csep	Kemet	C1206C475K4PACTU Series= X5R	Cap= 4.7 µF ESR= 13.0 mOhm VDC= 16.0 V IRMS= 4.9 A	1	\$0.04	1206 11mm2
9.	D1	ON Semiconductor	MBR0530T1G	VF@Io= 430.0 mV VRRM= 30.0 V	1	\$0.06	SOD-123 13mm2
10.	Lin	Bourns	SDR0503-220ML	L= 22.0 µH DCR= 280.0 mOhm	1	\$0.20	SDR0503 48mm2
11.	Lout	Bourns	SDR0403-470KL	L= 47.0 µH DCR= 840.0 mOhm	1	\$0.18	SDR0403 28mm2

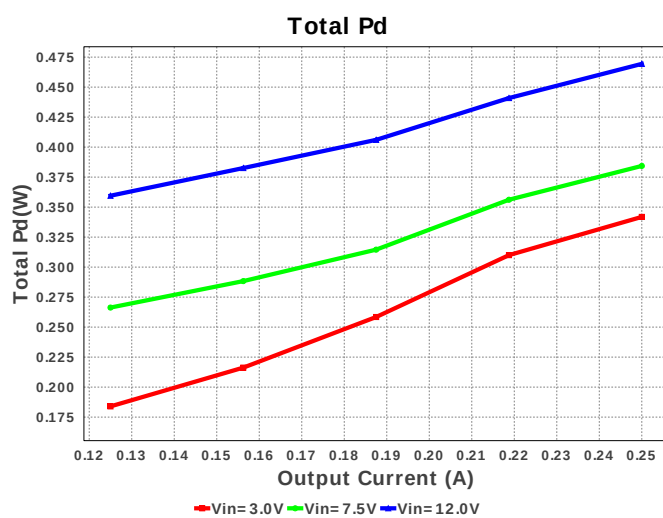
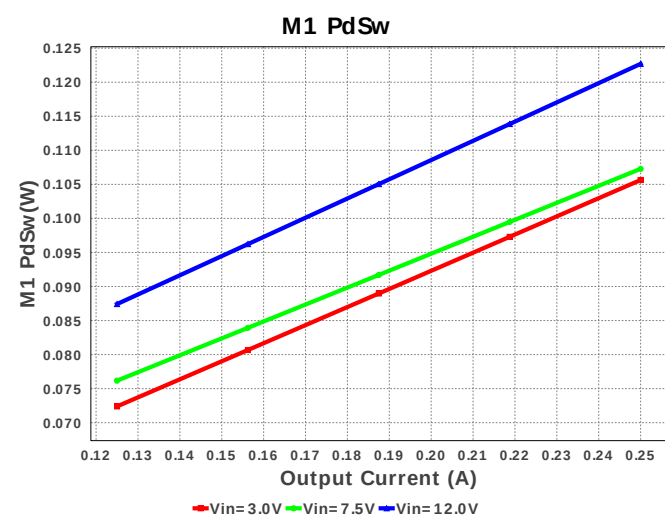
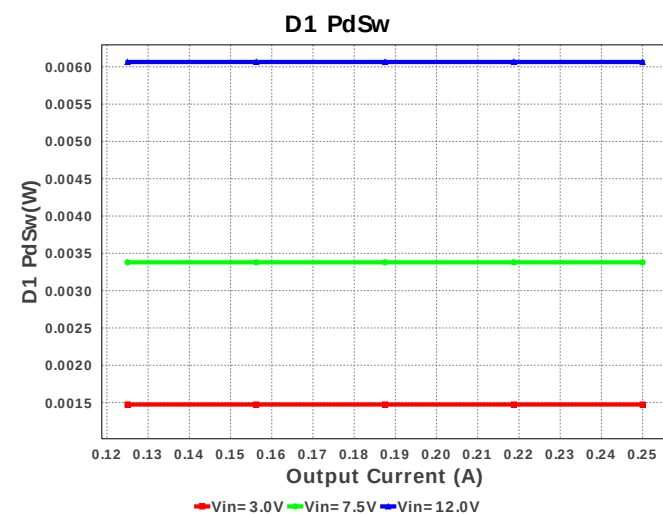
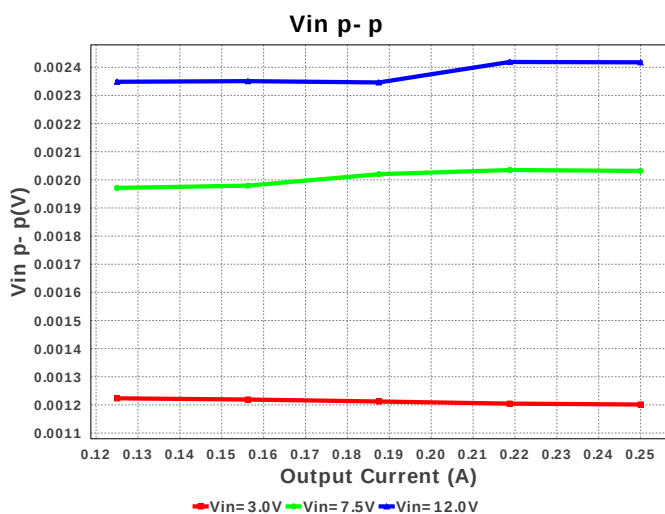
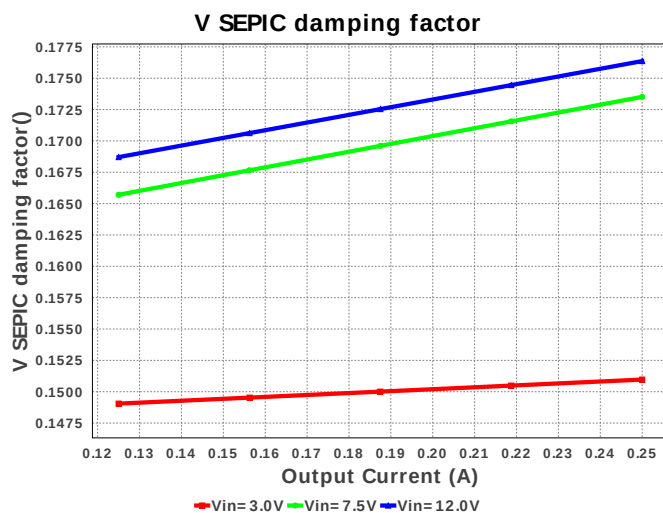
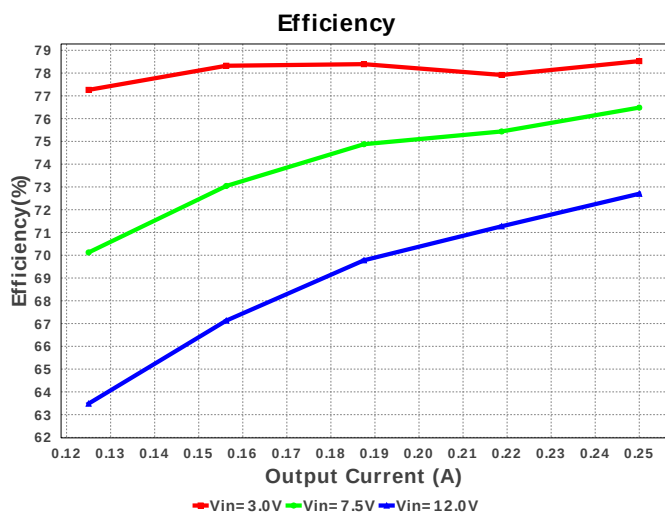
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	M1	Vishay-Siliconix	SI7414DN-T1-E3	VdsMax= 60.0 V IdsMax= 5.6 Amps	1	\$0.52	 PowerPAK_1212-8 18mm2
13.	Rbp	Vishay-Dale	CRCW040220R0FKED Series= CRCW..e3	Res= 20.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
14.	Rcomp	Vishay-Dale	CRCW040229K4FKED Series= CRCW..e3	Res= 29.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
15.	Rfadj	Vishay-Dale	CRCW040226K7FKED Series= CRCW..e3	Res= 26.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
16.	Rfb1	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
17.	Rfb2	Vishay-Dale	CRCW040229K4FKED Series= CRCW..e3	Res= 29.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
18.	Rramp	Vishay-Dale	CRCW0402100R0FKED Series= CRCW..e3	Res= 100.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
19.	Rsense	Panasonic	ERJ-L03UF75MV Series= 231	Res= 75.0 mOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.09	 0603 5mm2
20.	Ruvlo1	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
21.	Ruvlo2	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
22.	U1	Texas Instruments	LM3481MM/NOPB	Switcher	1	\$0.80	 MUB10A 24mm2

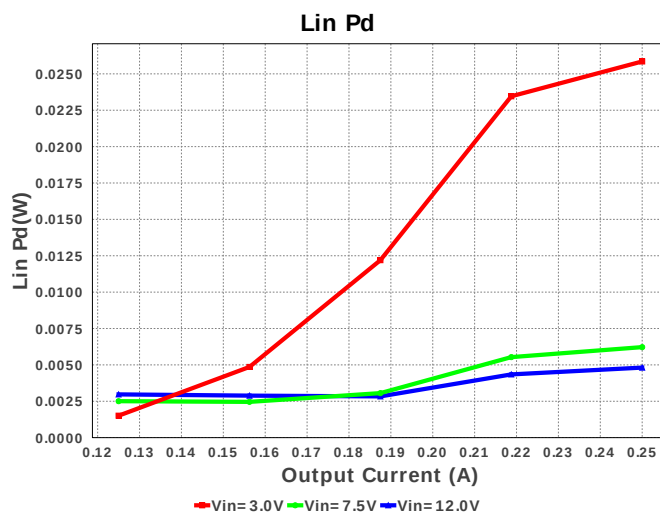
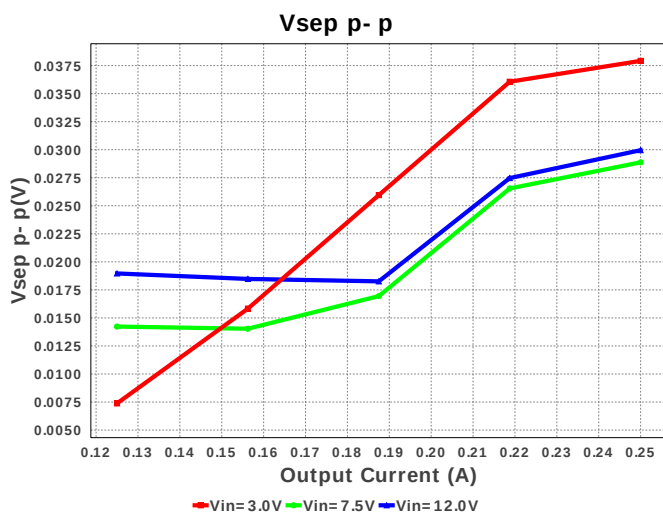
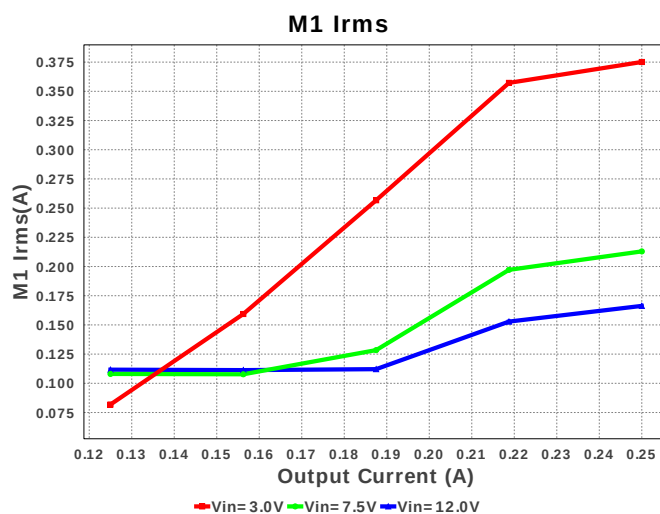
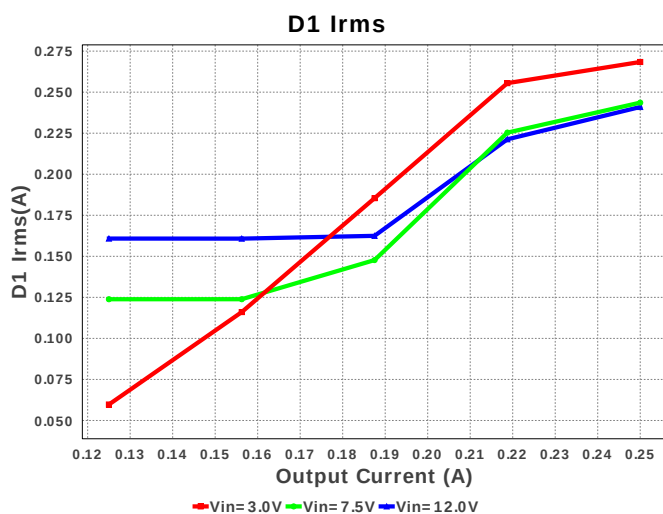
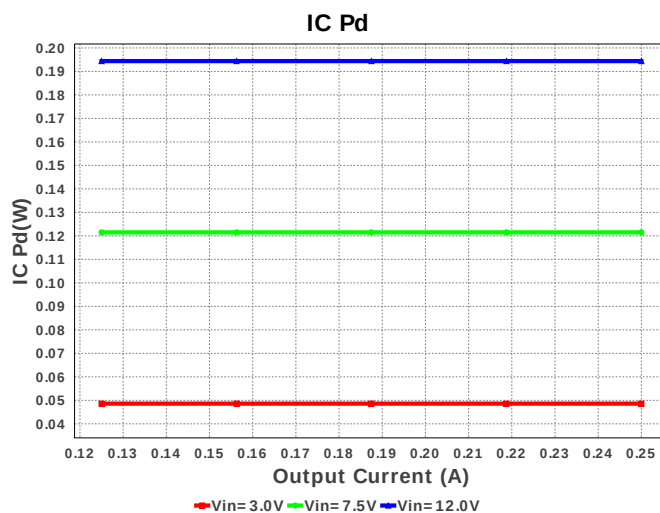
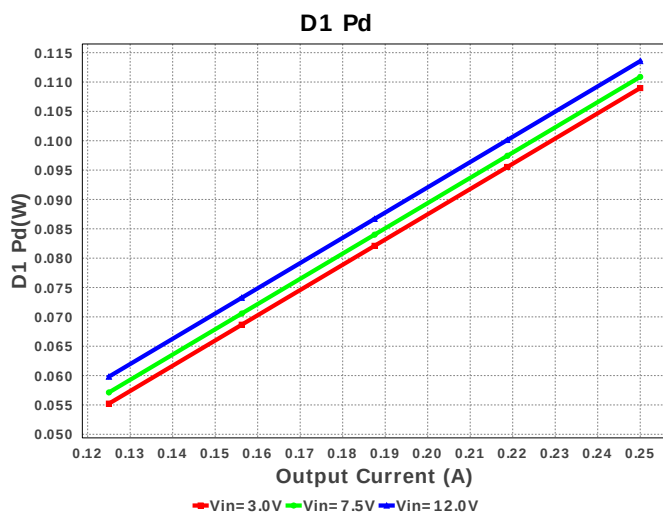


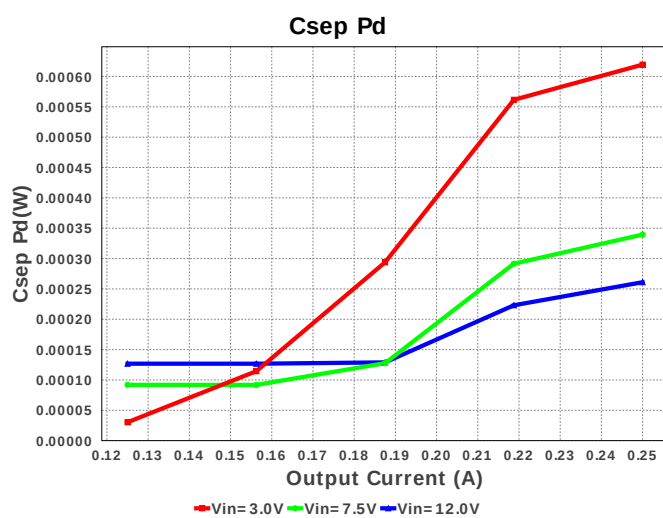
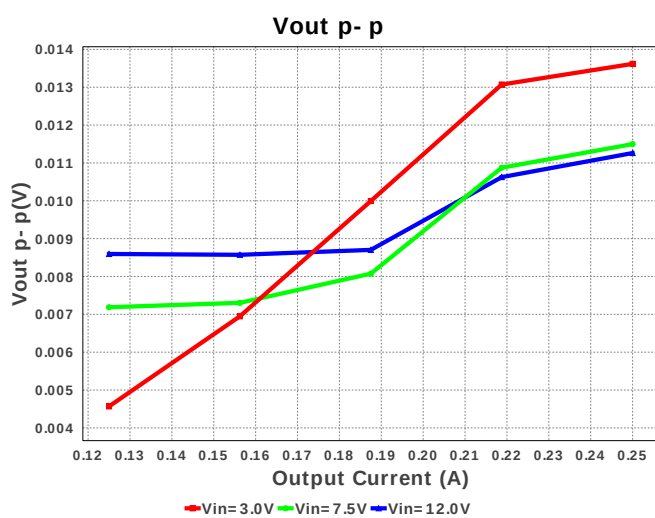
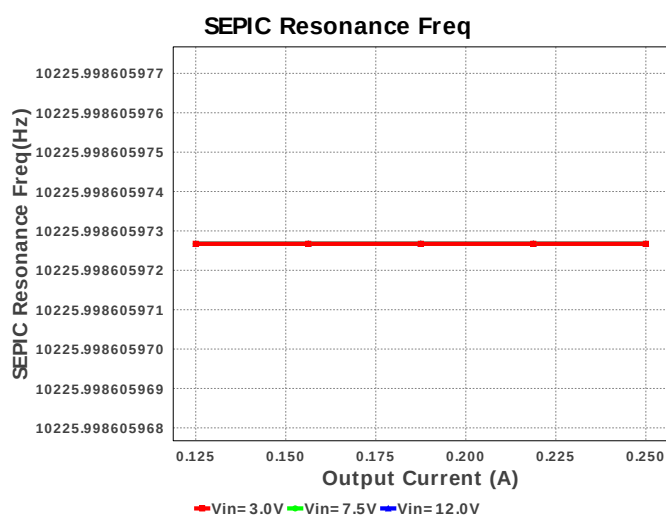
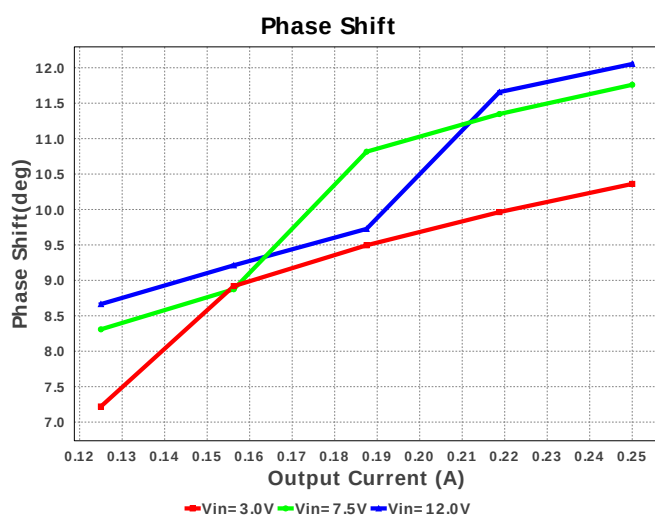
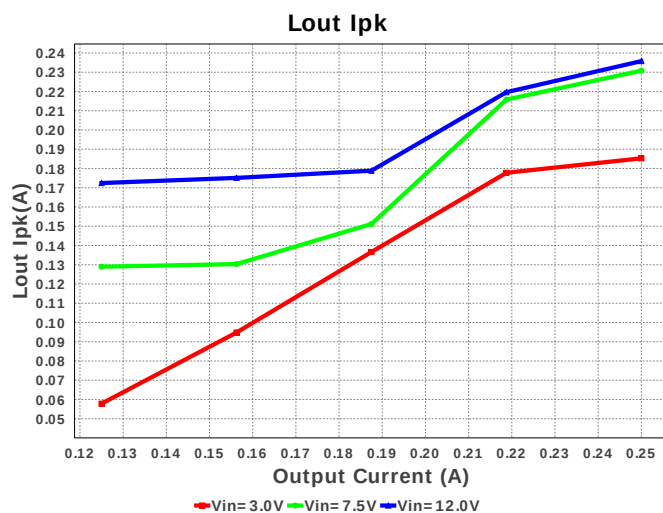
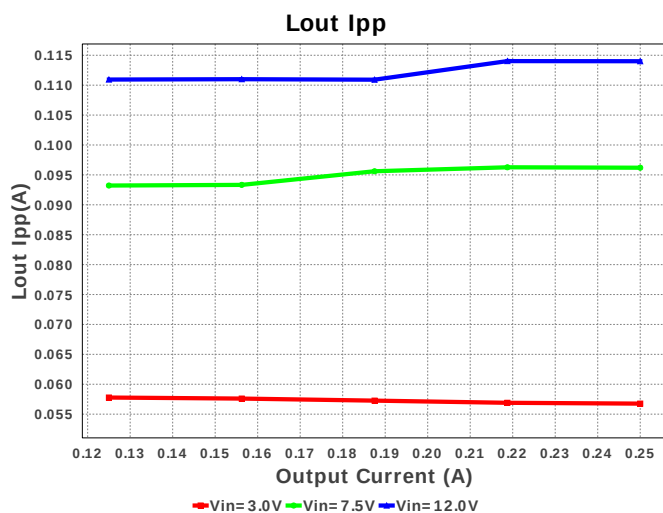


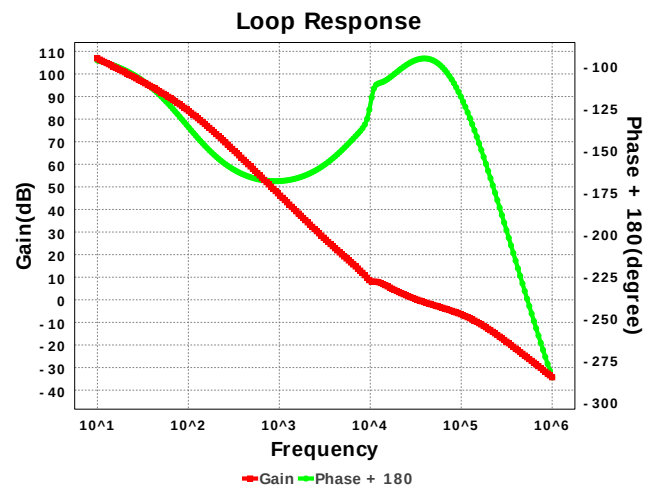
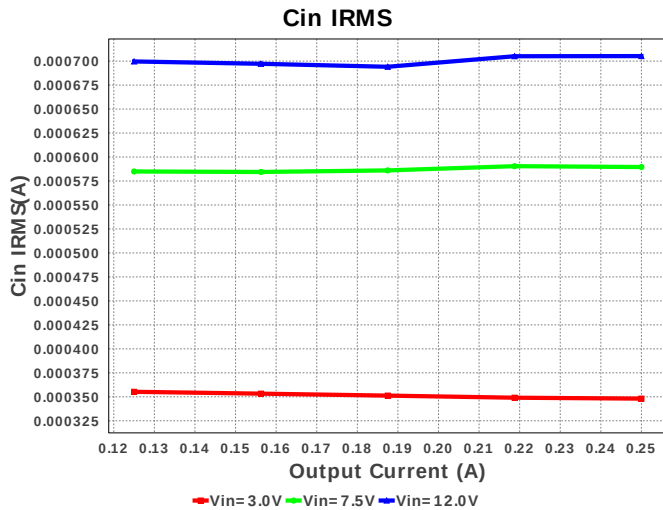












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	705.232 μ A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	164.459 mA	Current	Output capacitor RMS ripple current
3.	Csep IRMS	141.705 mA	Current	SEPIC capacitor RMS ripple current
4.	D1 Irms	240.957 mA	Current	D1 Irms
5.	IC Ipk	16.2 mA	Current	Peak switch current in IC
6.	Iin Avg	143.28 mA	Current	Average input current
7.	Lin Ipk	214.9 mA	Current	Lin peak current
8.	Lin Ipp	244.179 mA	Current	Peak-to-peak input inductor ripple current
9.	Lin Irms	117.401 mA	Current	Lin ripple current
10.	Lout Ipk	235.779 mA	Current	Lout peak current
11.	Lout Ipp	114.002 mA	Current	Peak-to-peak output inductor ripple current
12.	Lout Irms	182.97 mA	Current	Lout ripple current
13.	M1 Irms	166.283 mA	Current	M1 MOSFET Irms
14.	BOM Count	22	General	Total Design BOM count
15.	FootPrint	208.0 mm ²	General	Total Foot Print Area of BOM components
16.	Frequency	700.0 kHz	General	Switching frequency
17.	IC Tolerance	19.0 mV	General	IC Feedback Tolerance
18.	Total BOM	\$3.01	General	Total BOM Cost
19.	D1 Tj	53.394 degC	Op_Point	D1 junction temperature
20.	SEPIC Resonance Freq	10.226 kHz	Op_Point	SEPIC Resonance Frequency
21.	V SEPIC damping factor	176.364 m	Op_Point	V SEPIC damping factor
22.	Vin p-p	2.418 mV	Op_Point	Peak-to-peak input voltage
23.	Vsep p-p	29.956 mV	Op_Point	Peak-to-peak sepic voltage
24.	Cross Freq	32.93 kHz	Op_point	Bode plot crossover frequency
25.	Duty Cycle	32.0 %	Op_point	Duty cycle
26.	Efficiency	72.701 %	Op_point	Steady state efficiency
27.	Gain Marg	16.297 db	Op_point	Bode Plot Gain Margin
28.	IC Tj	68.88 degC	Op_point	IC junction temperature
29.	IOUT_OP	250.0 mA	Op_point	Iout operating point
30.	M1 TJOP	38.12 degC	Op_point	M1 MOSFET junction temperature
31.	Phase Marg	84.629 deg	Op_point	Bode Plot Phase Margin
32.	Phase Shift	12.053 deg	Op_point	Bode Plot Phase Shift
33.	VIN_OP	12.0 V	Op_point	Vin operating point
34.	Vout p-p	11.261 mV	Op_point	Peak-to-peak output ripple voltage
35.	Cin Pd	497.352 nW	Power	Input capacitor power dissipation
36.	Cout Pd	676.169 μ W	Power	Output capacitor power dissipation
37.	Csep Pd	261.043 μ W	Power	SEPIC capacitor power dissipation
38.	D1 Pd	113.565 mW	Power	Diode power dissipation
39.	D1 PdCond	107.5 mW	Power	Diode conduction losses
40.	D1 PdSw	6.065 mW	Power	Diode switching losses
41.	IC Pd	194.4 mW	Power	IC power dissipation
42.	Lin Pd	4.813 mW	Power	Lin power dissipation
43.	Lout Pd	28.314 mW	Power	Lout power dissipation
44.	M1 Pd	125.133 mW	Power	M1 MOSFET total power dissipation
45.	M1 PdCond	2.437 mW	Power	M1 MOSFET conduction losses
46.	M1 PdSw	122.696 mW	Power	M1 MOSFET switching losses
47.	Rsense Pd	2.074 mW	Power	LED Current Rsns Power Dissipation
48.	Total Pd	469.373 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	250.0 mA	Maximum Output Current
2.	Iout1	250.0 mAmps	Output Current #1
3.	VinMax	12.0 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	LM3481	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature
10.	UserFsw	700.0 kHz	Customer Selected Frequency

Design Assistance

1. **LM3481** Product Folder : <http://www.ti.com/product/lm3481> : contains the data sheet and other resources.

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