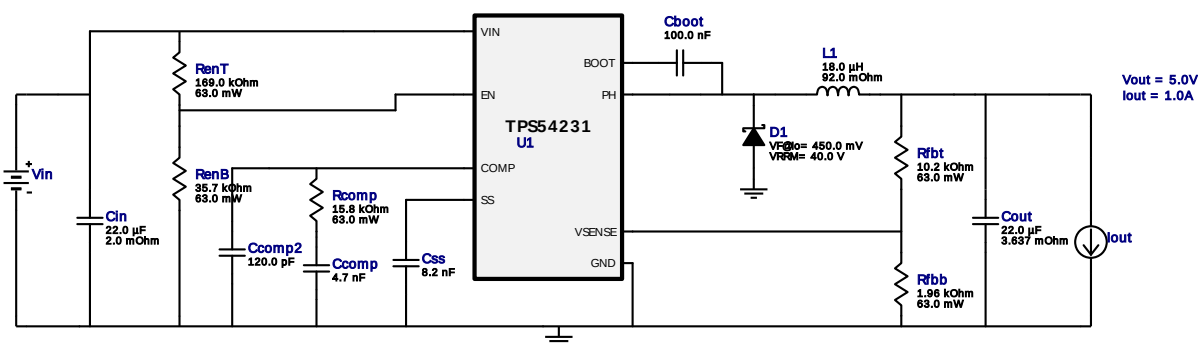


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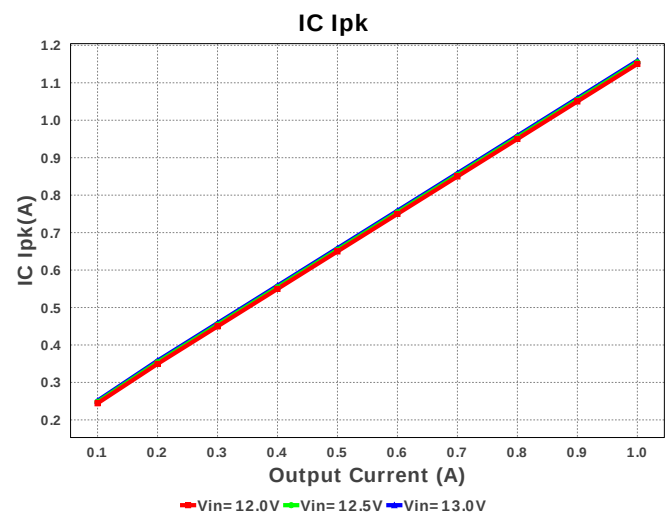
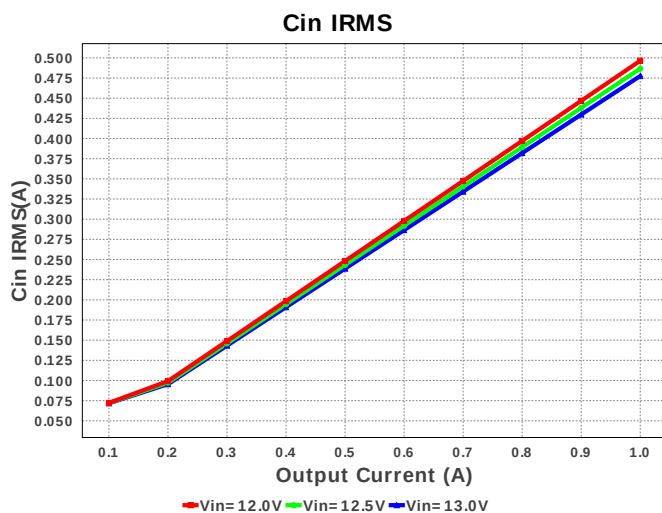
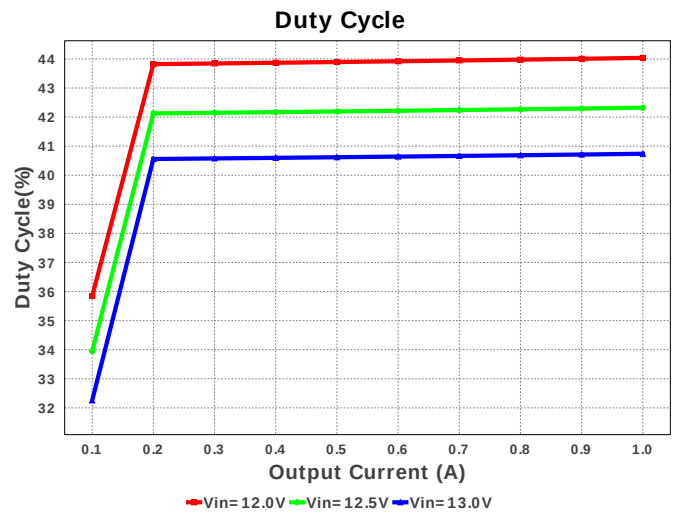
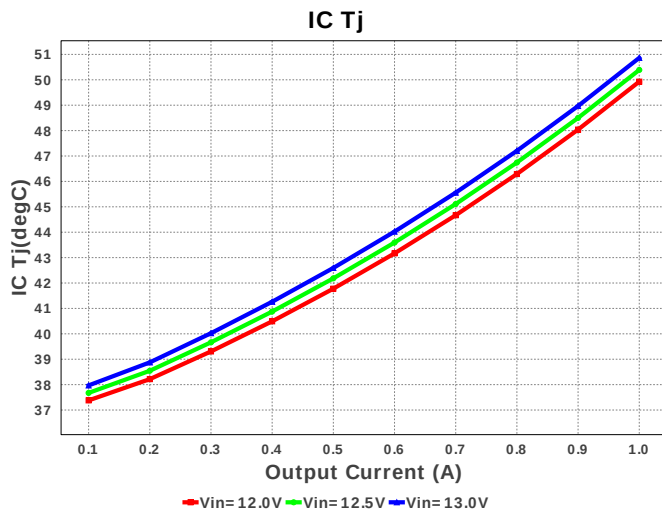
Design : 4742013/56 TPS54231DR
TPS54231DR 12.0V-13.0V to 5.00V @ 1.0A

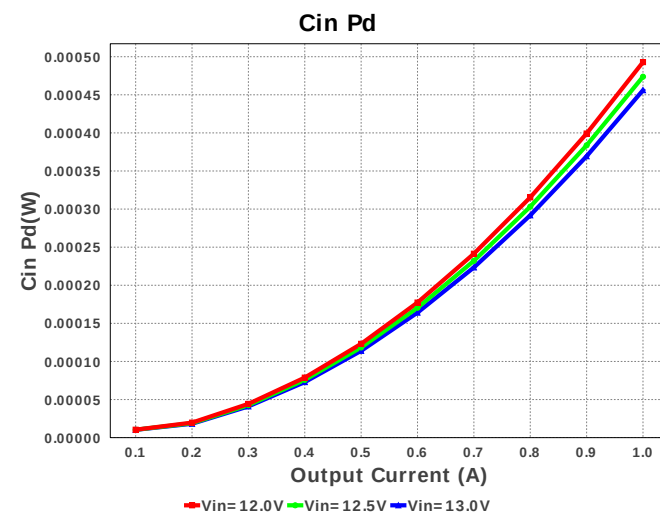
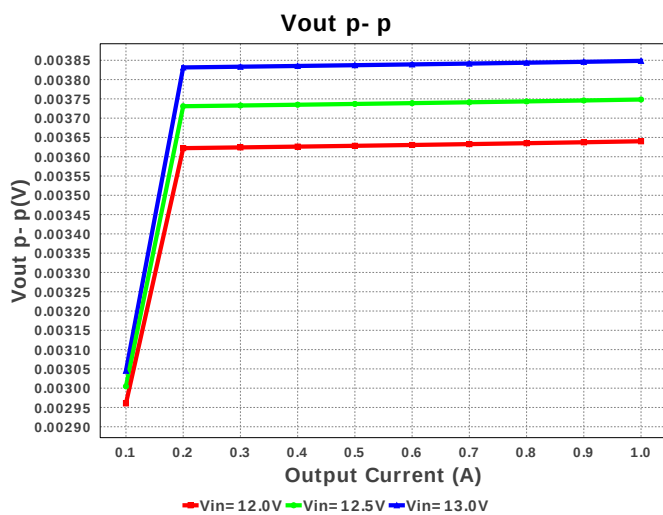
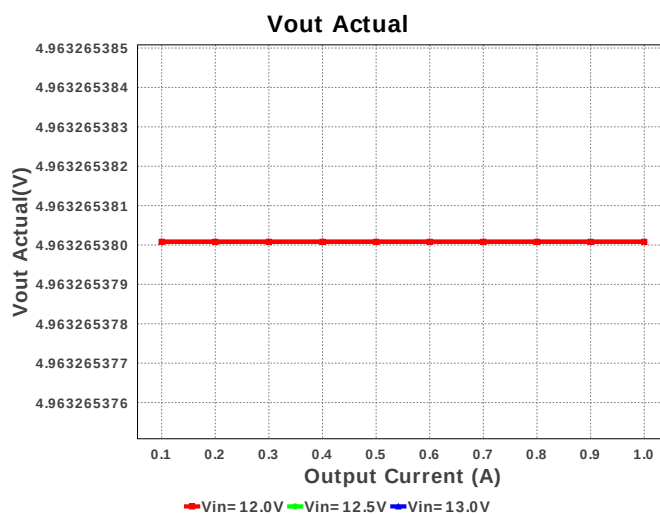
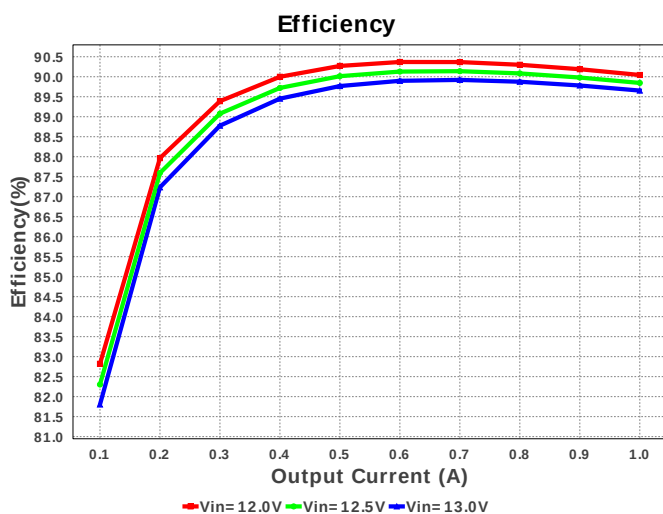
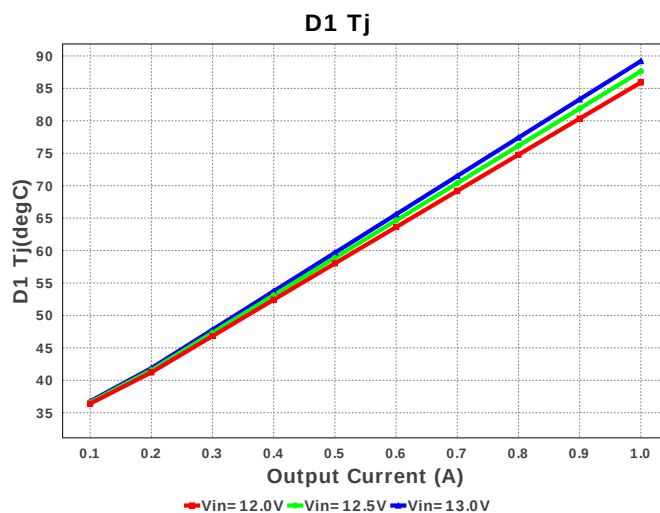
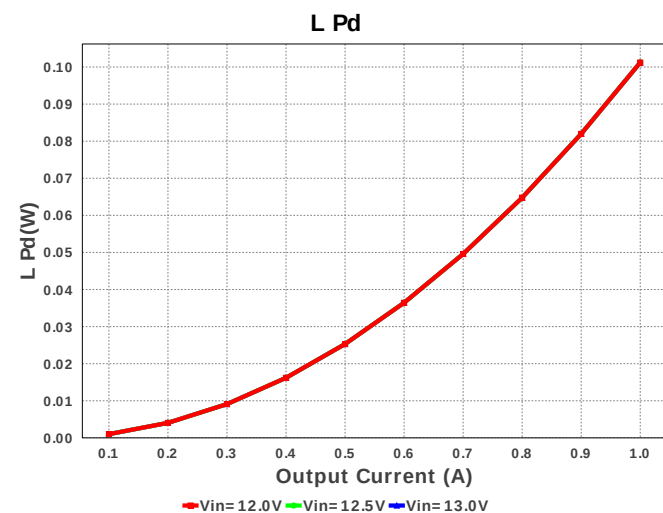


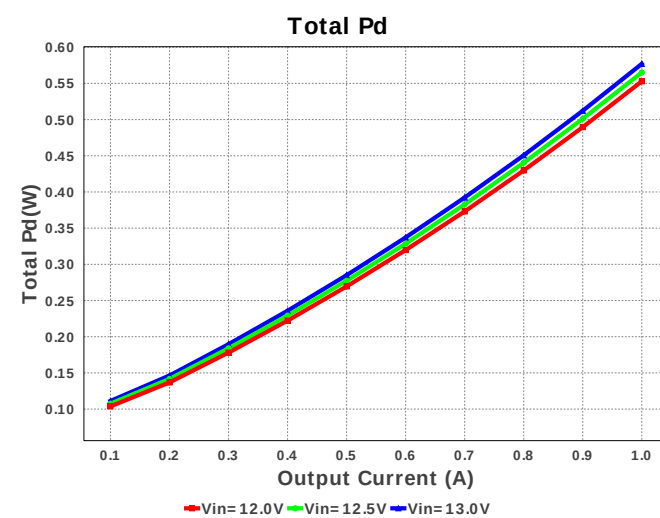
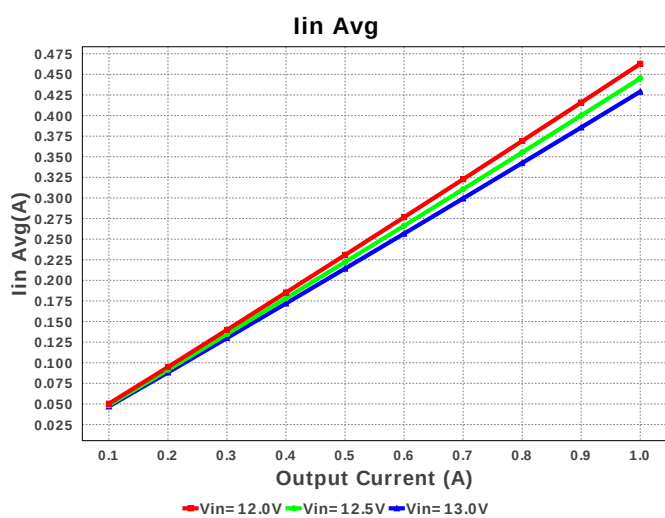
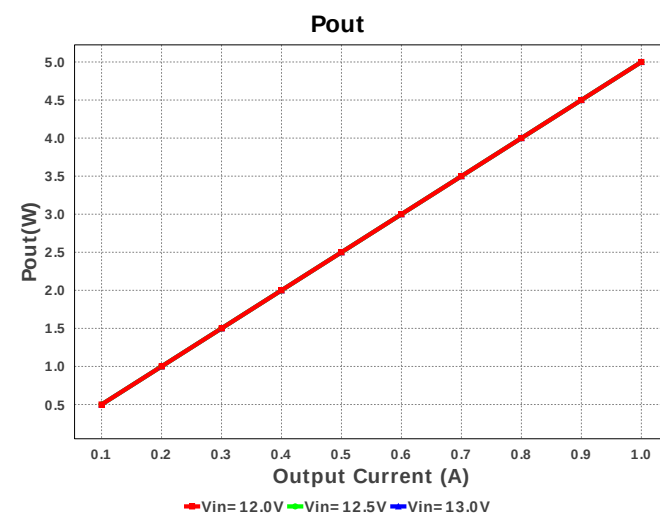
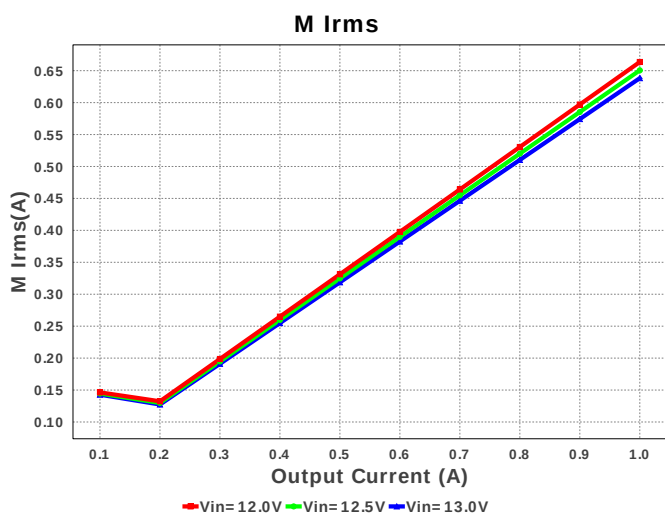
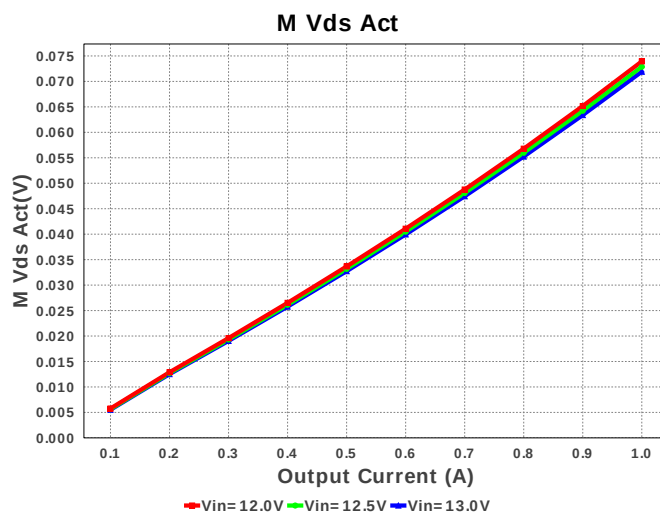
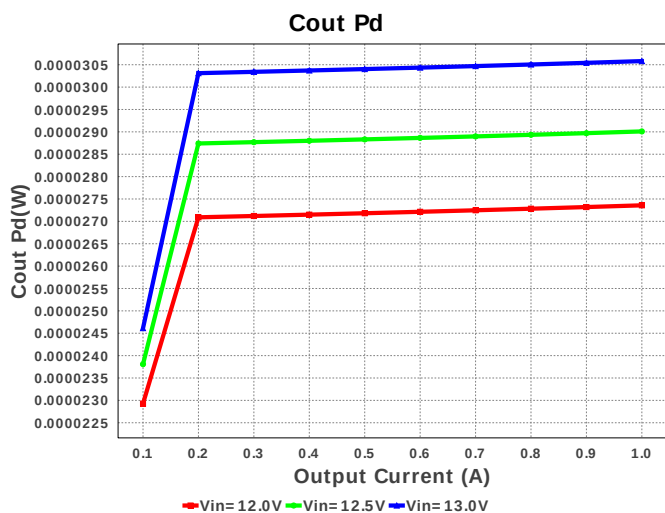
Electrical BOM

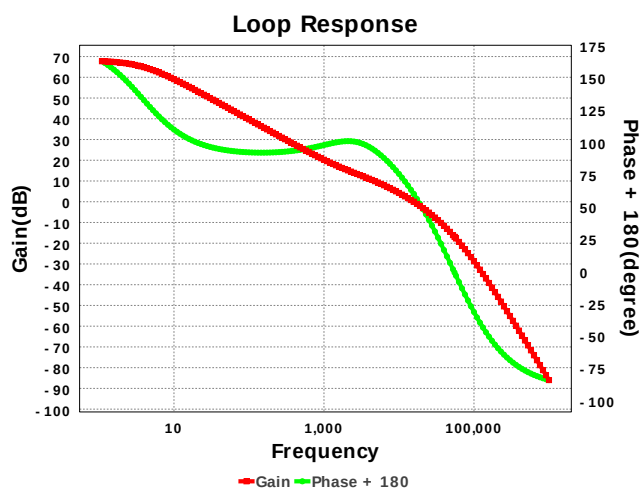
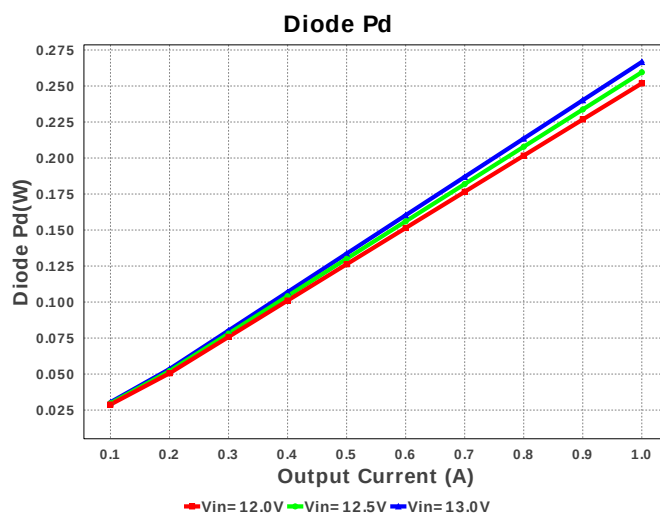
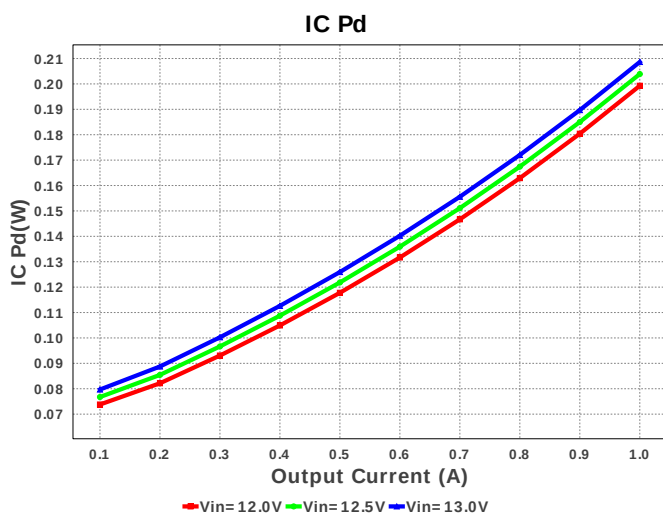
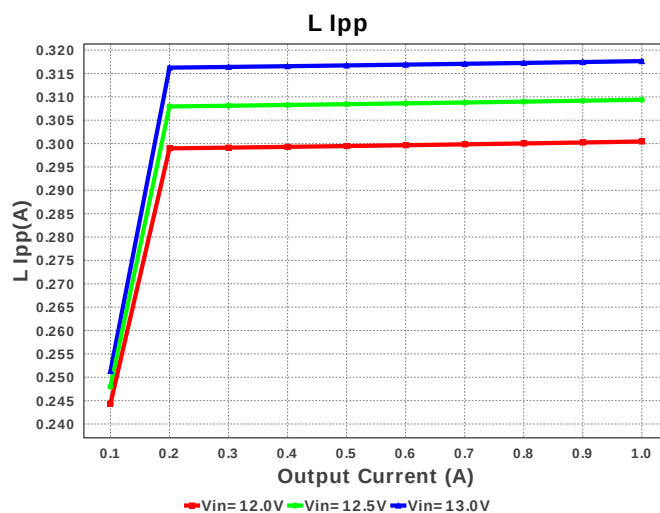
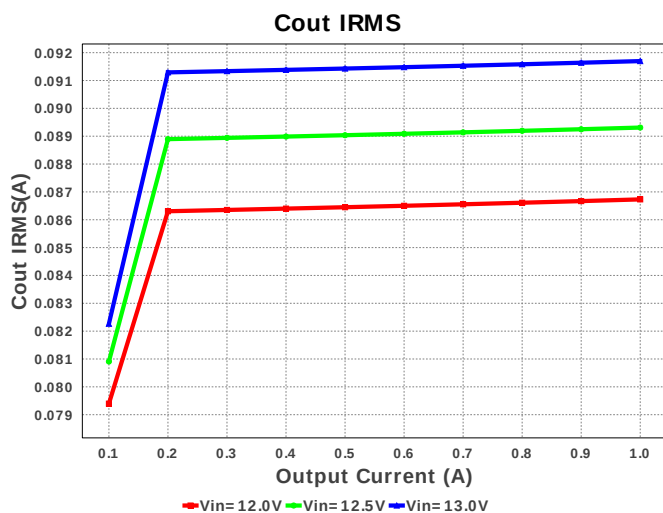
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
2.	Ccomp	Yageo America	CC0805KRX7R9BB472 Series= X7R	Cap= 4.7 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	Ccomp2	Samsung Electro-Mechanics	CL21C121JB61PNC Series= C0G/NP0	Cap= 120.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
4.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	\$0.16	1210 15 mm ²
5.	Cout	MuRata	GRM31CR61A226KE19L Series= X5R	Cap= 22.0 uF ESR= 3.637 mOhm VDC= 10.0 V IRMS= 3.56456 A	1	\$0.07	1206_190 11 mm ²
6.	Css	MuRata	GRM033R61A822KA01D Series= X5R	Cap= 8.2 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0201 2 mm ²
7.	D1	Diodes Inc.	1N5819HW-7-F	VF@Io= 450.0 mV VRRM= 40.0 V	1	\$0.08	SOD-123 13 mm ²
8.	L1	Bourns	SRR6038-180Y	L= 18.0 uH DCR= 92.0 mOhm	1	\$0.26	SRR6038 77 mm ²
9.	Rcomp	Vishay-Dale	CRCW040215K8FKED Series= CRCW..e3	Res= 15.8 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
10.	RenB	Vishay-Dale	CRCW040235K7FKED Series= CRCW..e3	Res= 35.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
11.	RenT	Vishay-Dale	CRCW0402169KFKED Series= CRCW..e3	Res= 169.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	Rfbb	Vishay-Dale	CRCW04021K96FKED Series= CRCW..e3	Res= 1.96 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
13.	Rfbt	Vishay-Dale	CRCW040210K2FKED Series= CRCW..e3	Res= 10.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
14.	U1	Texas Instruments	TPS54231DR	Switcher	1	\$0.55	

D0008A 57 mm²







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	477.509 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	91.697 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.159 A	Current	Peak switch current in IC
4.	Iin Avg	429.0 mA	Current	Average input current
5.	L Ipp	317.65 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	638.265 mA	Current	Q lavg
7.	BOM Count	14	General	Total Design BOM count
8.	FootPrint	206.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	570.0 kHz	General	Switching frequency
10.	M Vds Act	71.904 mV	General	Voltage drop across the MosFET
11.	Pout	5.0 W	General	Total output power

#	Name	Value	Category	Description
12.	Total BOM	\$1.21	General	Total BOM Cost
13.	D1 Tj	89.203 degC	Op_Point	D1 junction temperature
14.	Low Freq Gain	67.752 dB	Op_Point	Gain at 10Hz
15.	Vout Actual	4.963 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	15.698 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	40.738 %	Op_point	Duty cycle
19.	Efficiency	89.654 %	Op_point	Steady state efficiency
20.	Gain Marg	-16.917 dB	Op_point	Bode Plot Gain Margin
21.	IC Tj	50.863 degC	Op_point	IC junction temperature
22.	ICThetaJA	100.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	1.0 A	Op_point	Iout operating point
24.	Phase Marg	61.01 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	13.0 V	Op_point	Vin operating point
26.	Vout p-p	3.849 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	456.029 μ W	Power	Input capacitor power dissipation
28.	Cout Pd	30.581 μ W	Power	Output capacitor power dissipation
29.	Diode Pd	266.678 mW	Power	Diode power dissipation
30.	IC Pd	208.633 mW	Power	IC power dissipation
31.	L Pd	101.2 mW	Power	Inductor power dissipation
32.	Total Pd	576.996 mW	Power	Total Power Dissipation
33.	Vout Tolerance	5.254 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	VinMax	13.0	Maximum input voltage
3.	VinMin	12.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS54231	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54231** Product Folder : <http://www.ti.com/product/TPS54231> : contains the data sheet and other resources.

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