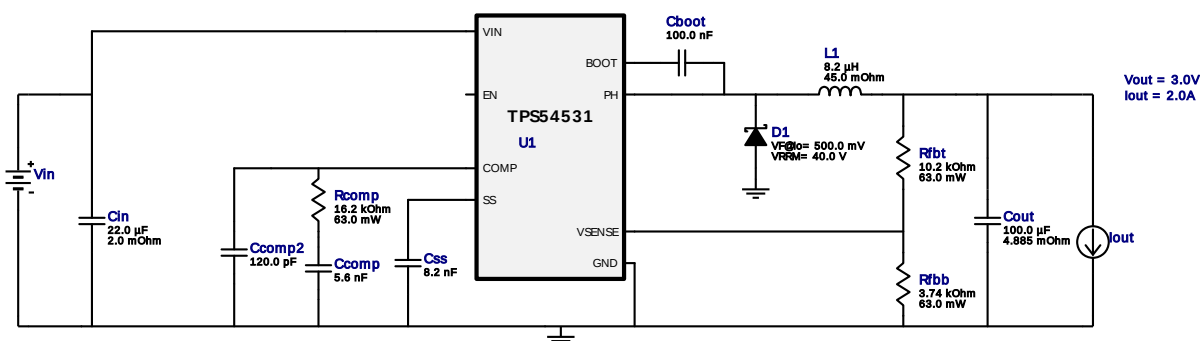


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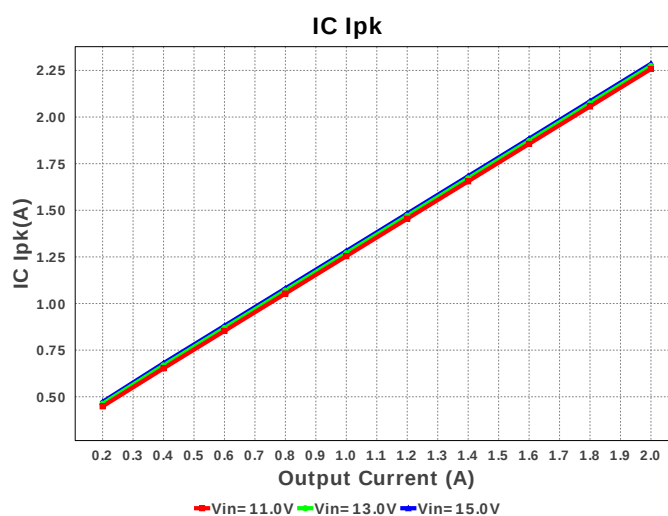
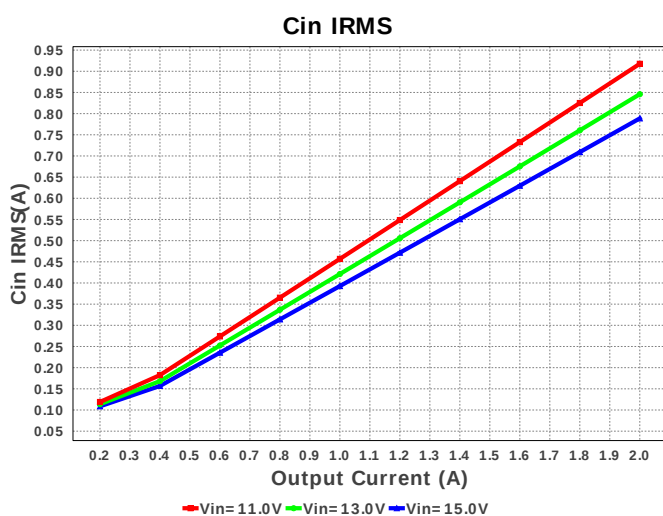
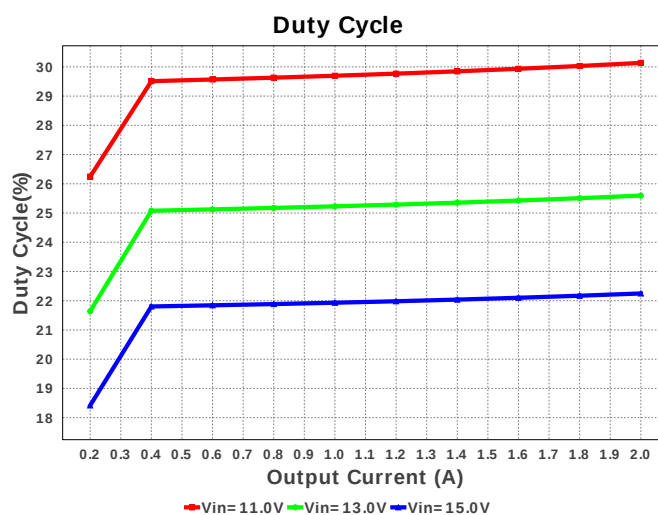
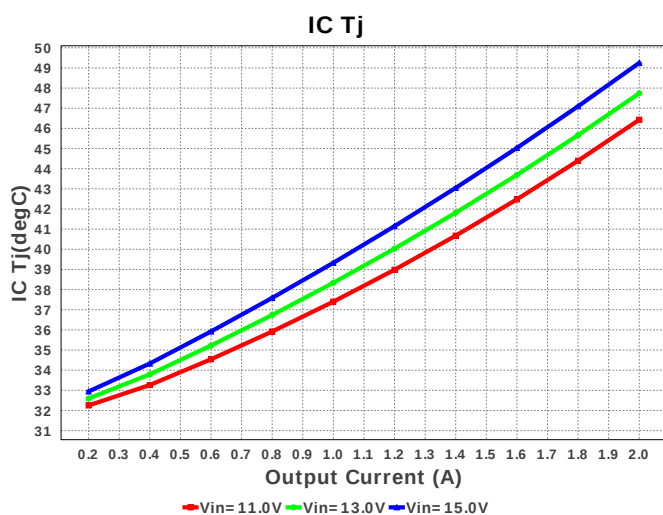
Design : 4743458/7 TPS54531DDAR
TPS54531DDAR 11.0V-15.0V to 3.00V @ 2.0A

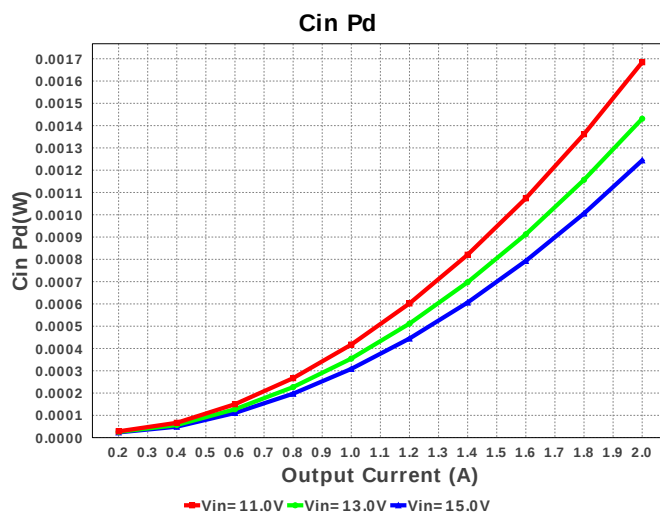
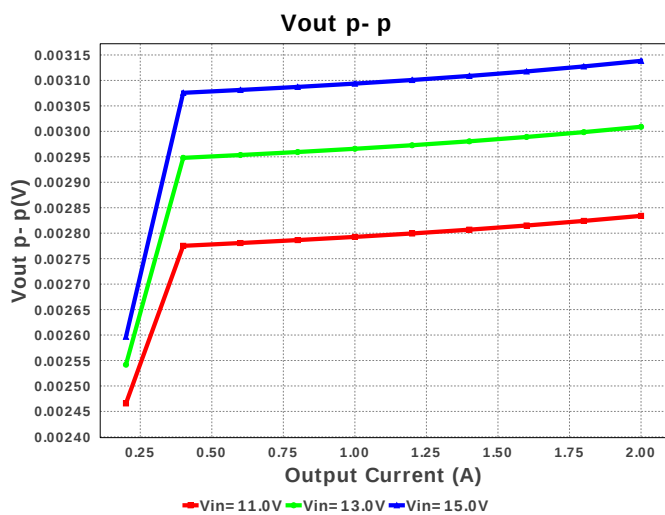
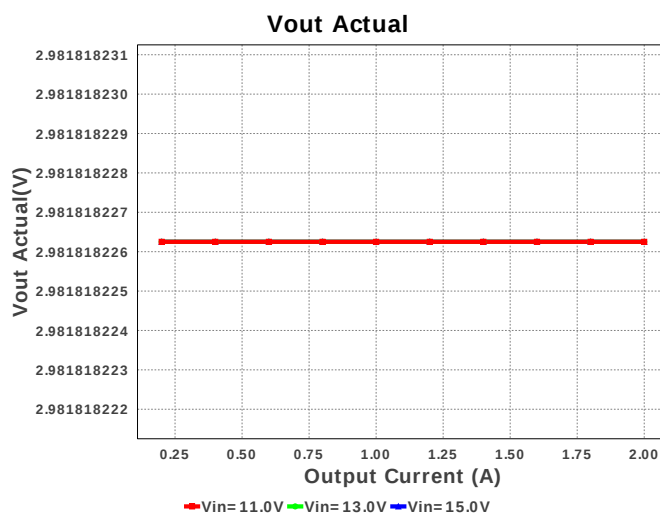
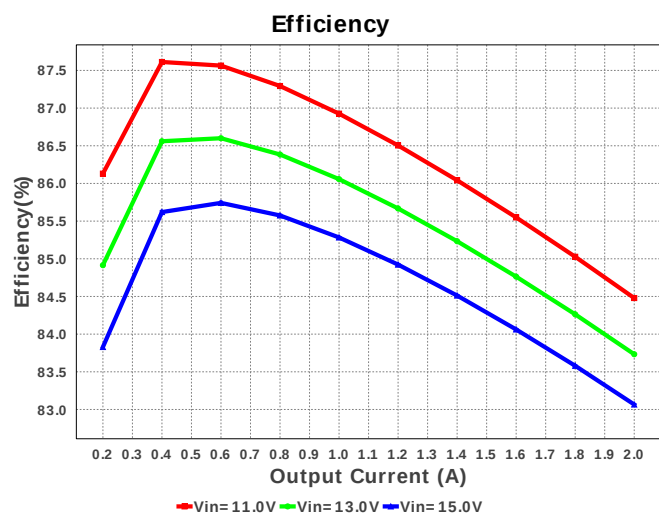
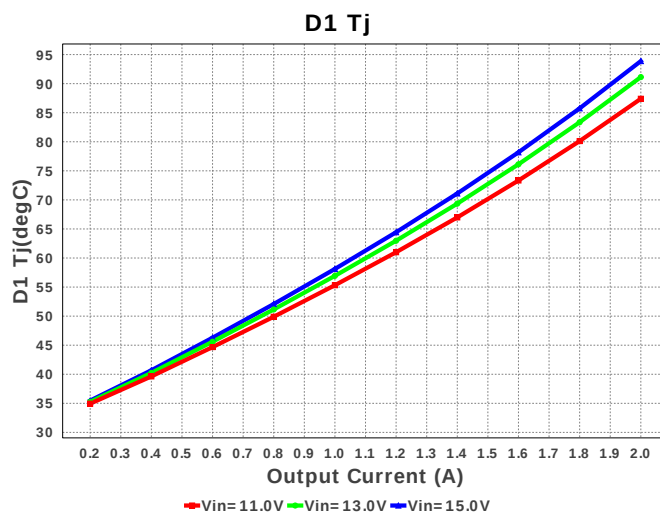
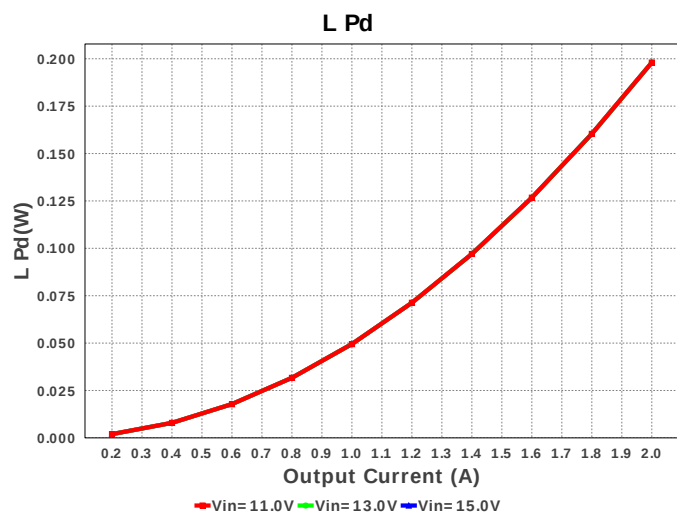


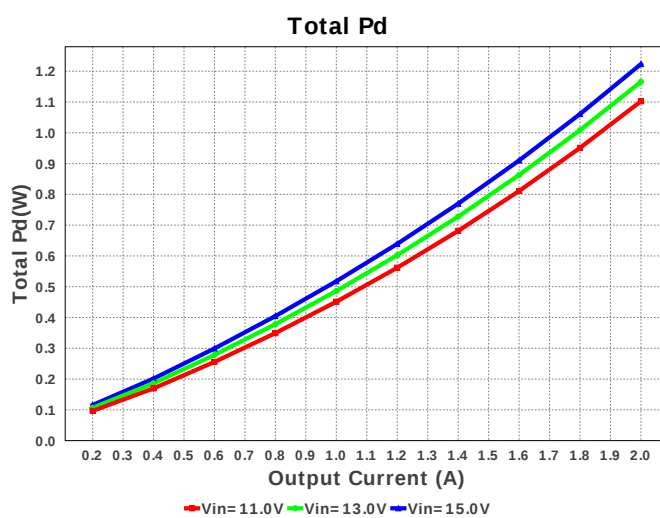
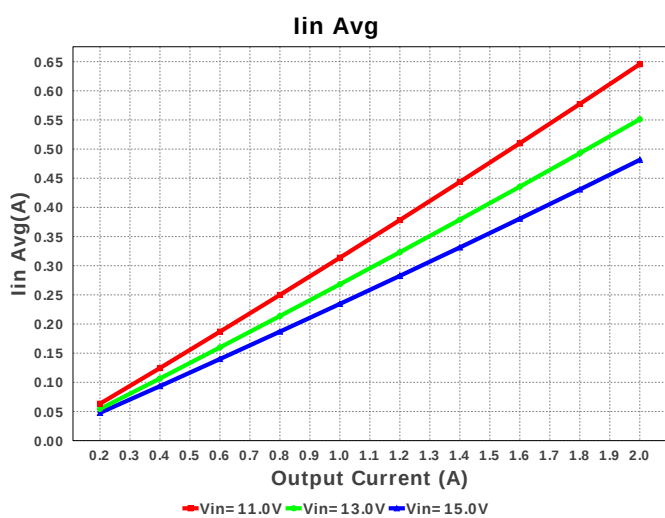
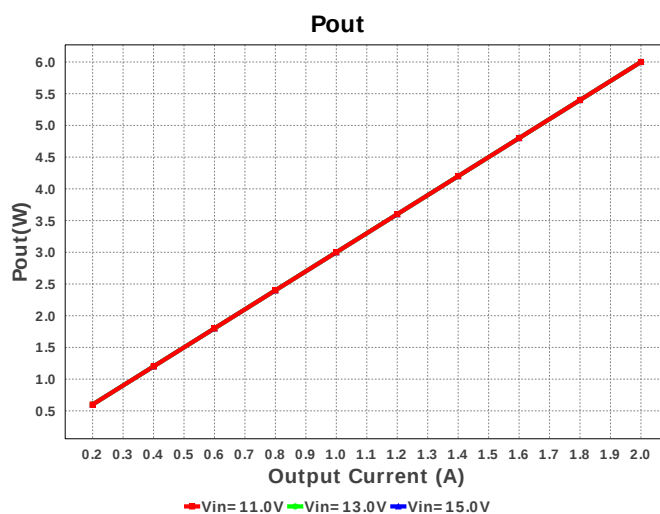
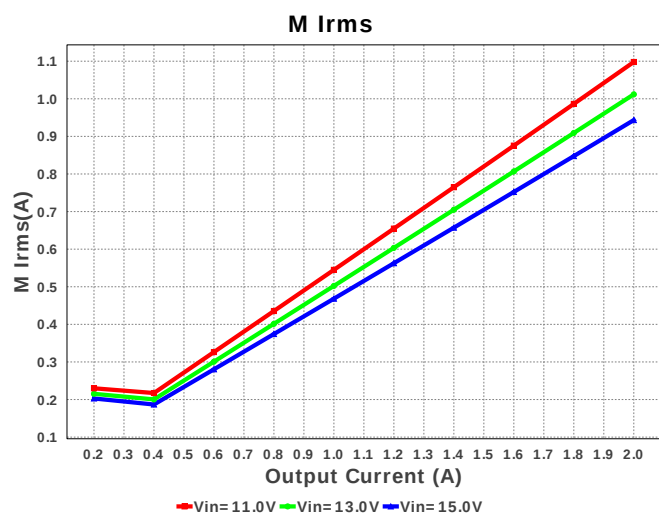
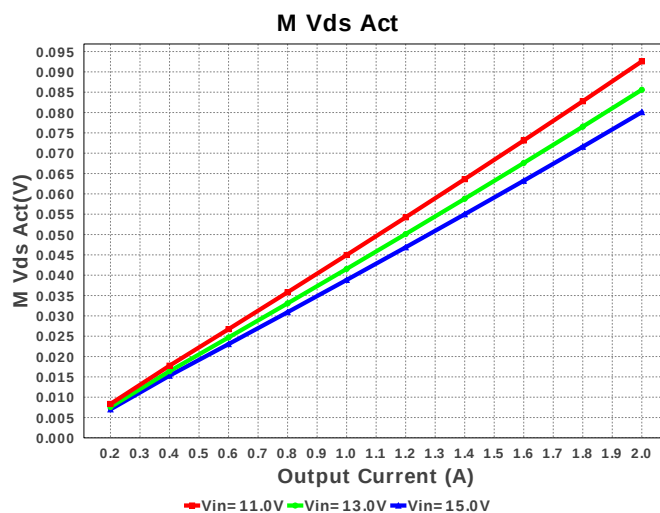
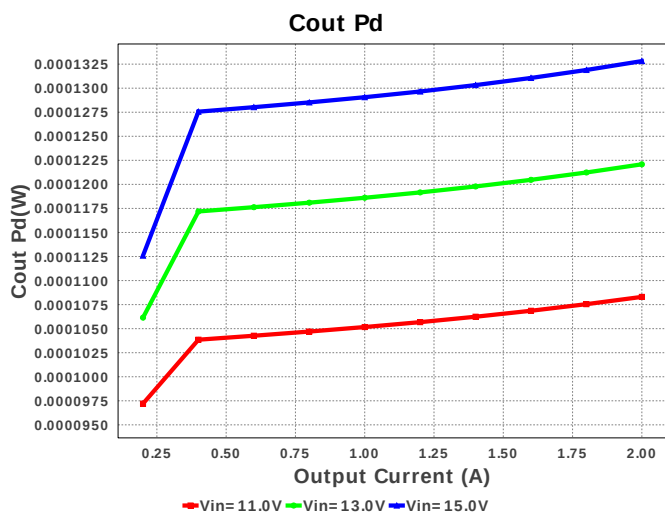
Electrical BOM

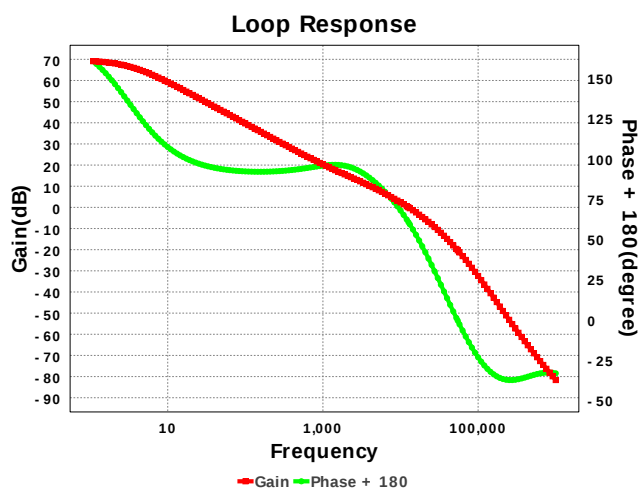
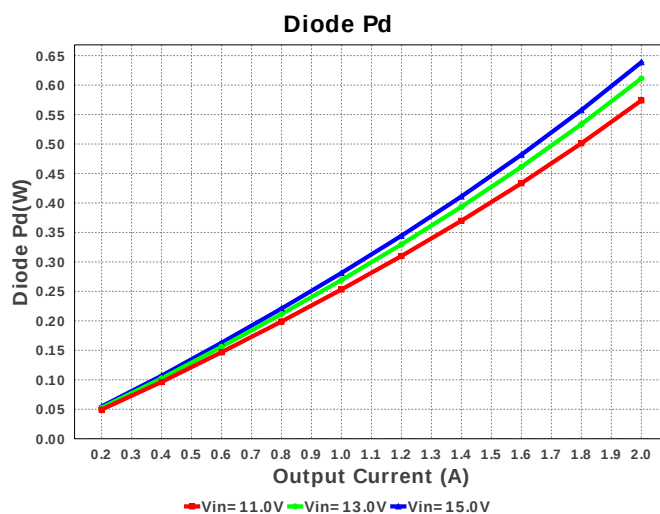
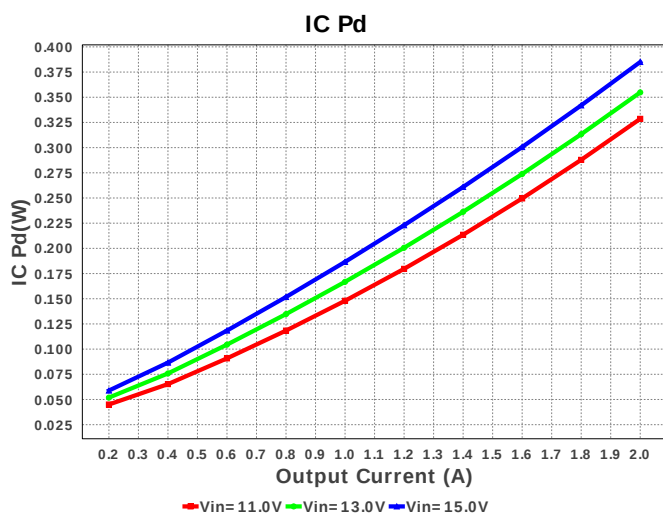
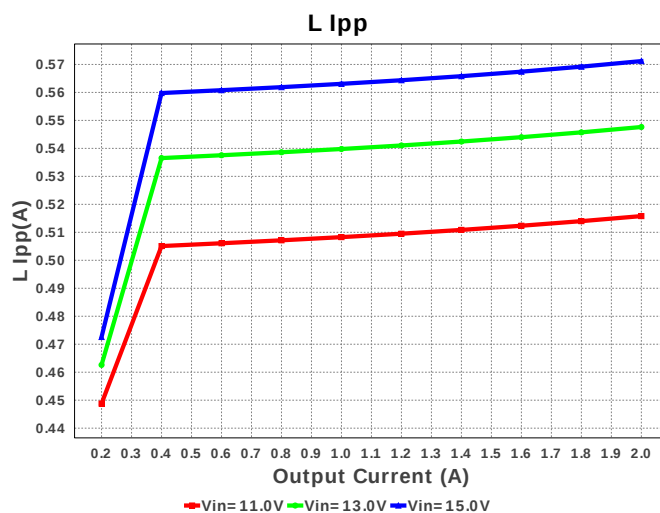
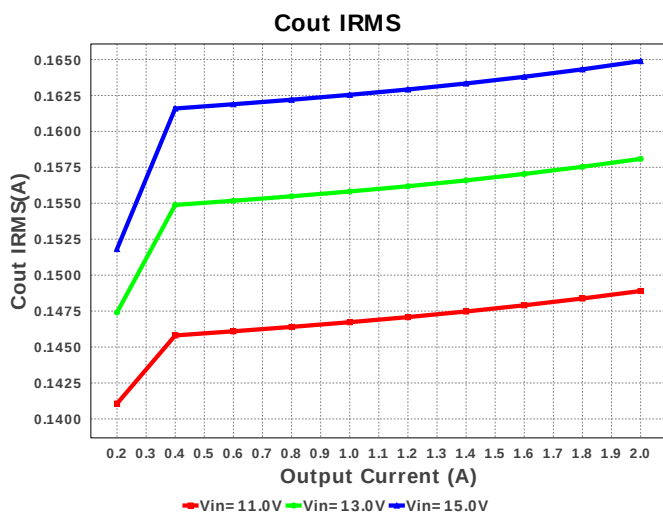
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
2.	Ccomp	Yageo America	CC0805KRX7R9BB562 Series= X7R	Cap= 5.6 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	Ccomp2	Samsung Electro-Mechanics	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	GRM31CR60J107ME39L Series= X5R	Cap= 100.0 uF ESR= 4.885 mOhm VDC= 6.3 V IRMS= 4.4118 A	1	\$0.14	 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.	B340A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.11	 SMA 37 mm ²
8.	L1	Bourns	SRN8040-8R2Y	L= 8.2 uH DCR= 45.0 mOhm	1	\$0.22	 SRN8040 100 mm ²
9.	Rcomp	Vishay-Dale	CRCW040216K2FKED Series= CRCW..e3	Res= 16.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
10.	Rfbb	Vishay-Dale	CRCW04023K74FKED Series= CRCW..e3	Res= 3.74 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
11.	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

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	U1	Texas Instruments	TPS54531DDAR	Switcher	1	\$0.75	 DDA0008E 57 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	788.693 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	164.89 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.286 A	Current	Peak switch current in IC
4.	Iin Avg	481.54 mA	Current	Average input current
5.	L Ipp	571.19 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	943.356 mA	Current	Q lavg
7.	BOM Count	12	General	Total Design BOM count
8.	FootPrint	248.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	570.0 kHz	General	Switching frequency
10.	M Vds Act	80.092 mV	General	Voltage drop across the MosFET
11.	Pout	6.0 W	General	Total output power

#	Name	Value	Category	Description
12.	Total BOM	\$1.45	General	Total BOM Cost
13.	D1 Tj	93.877 degC	Op_Point	D1 junction temperature
14.	Low Freq Gain	69.114 dB	Op_Point	Gain at 10Hz
15.	Vout Actual	2.982 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	3.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	12.672 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	22.248 %	Op_point	Duty cycle
19.	Efficiency	83.066 %	Op_point	Steady state efficiency
20.	Gain Marg	-20.332 dB	Op_point	Bode Plot Gain Margin
21.	IC Tj	49.25 degC	Op_point	IC junction temperature
22.	ICThetaJA	50.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	2.0 A	Op_point	Iout operating point
24.	Phase Marg	61.042 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	15.0 V	Op_point	Vin operating point
26.	Vout p-p	3.138 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	1.244 mW	Power	Input capacitor power dissipation
28.	Cout Pd	132.816 µW	Power	Output capacitor power dissipation
29.	Diode Pd	638.773 mW	Power	Diode power dissipation
30.	IC Pd	385.006 mW	Power	IC power dissipation
31.	L Pd	198.0 mW	Power	Inductor power dissipation
32.	Total Pd	1.223 W	Power	Total Power Dissipation
33.	Vout Tolerance	5.03 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	15.0	Maximum input voltage
3.	VinMin	11.0	Minimum input voltage
4.	Vout	3.0	Output Voltage
5.	base_pn	TPS54531	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54531** Product Folder : <http://www.ti.com/product/TPS54531> : contains the data sheet and other resources.

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