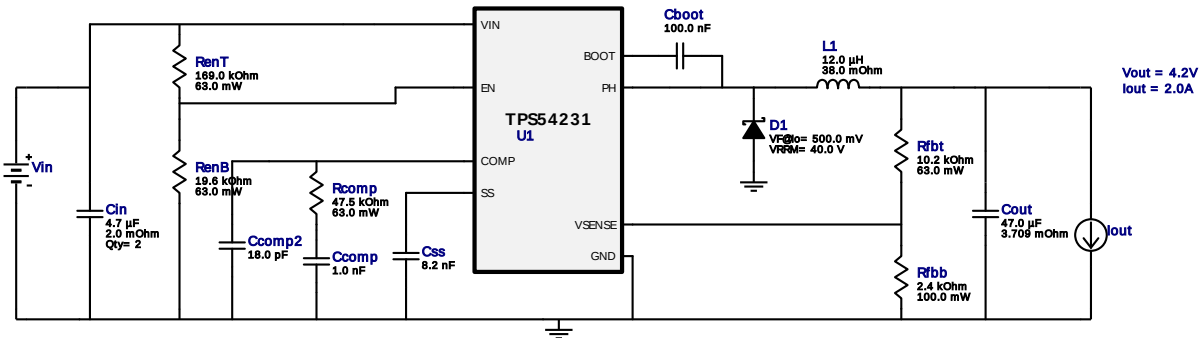


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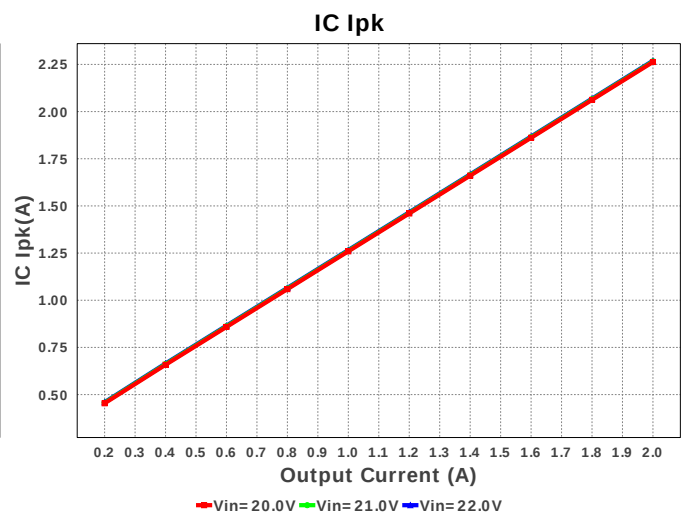
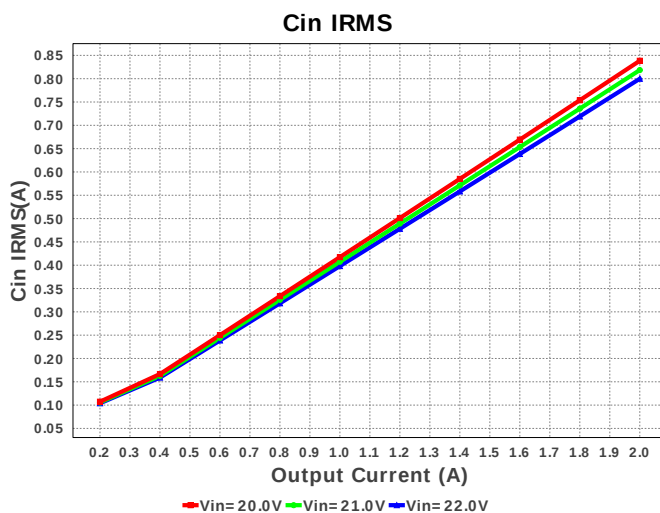
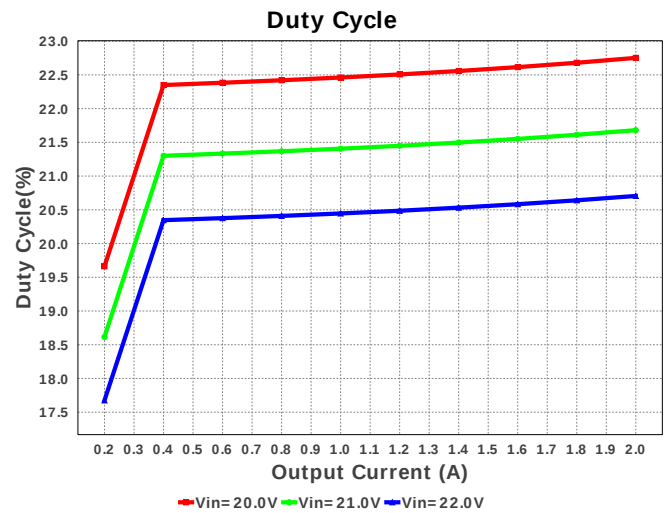
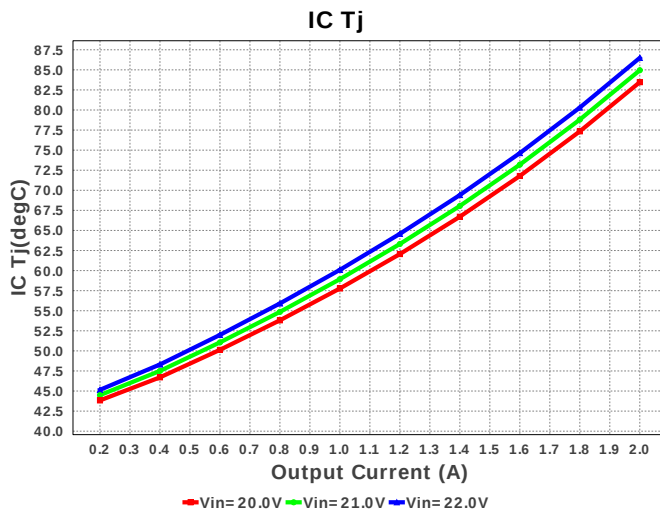
Design : 4743517/3 TPS54231DR
TPS54231DR 20.0V-22.0V to 4.20V @ 2.0A

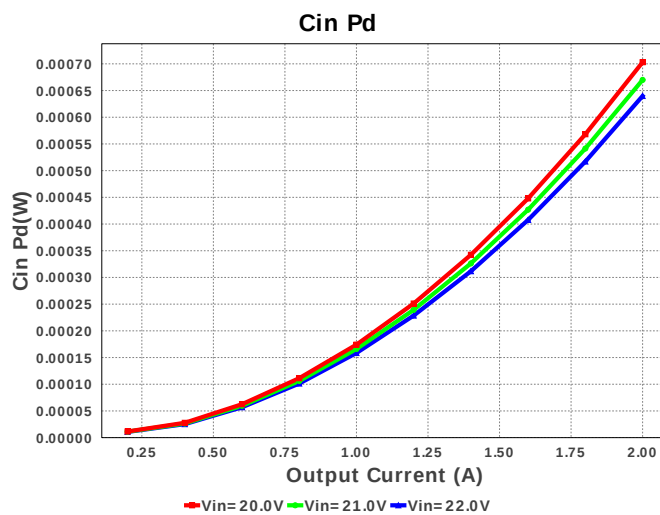
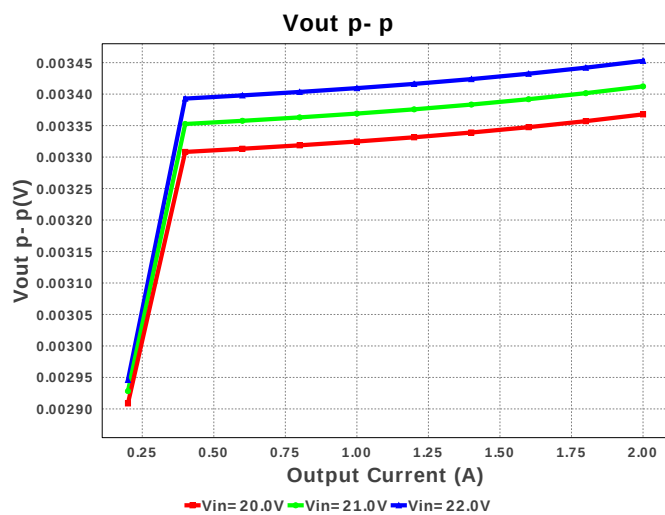
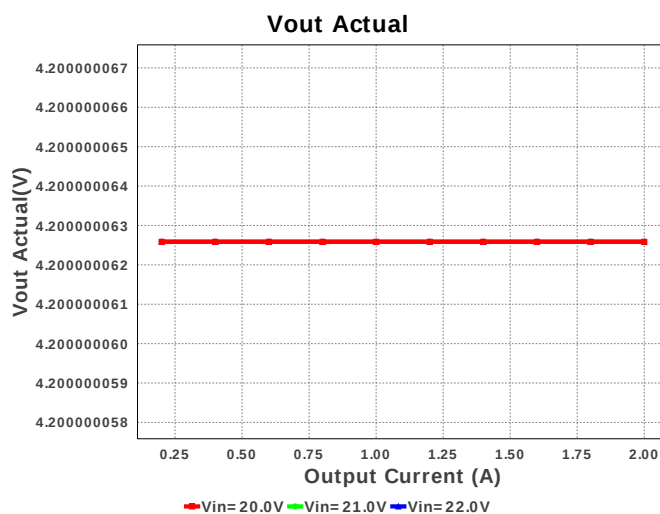
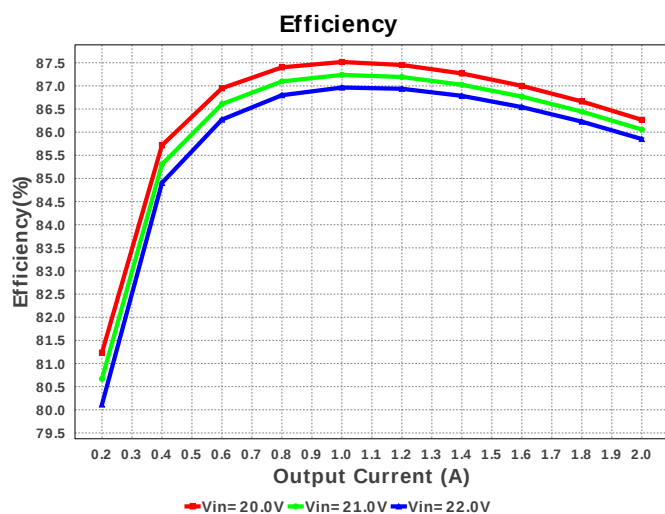
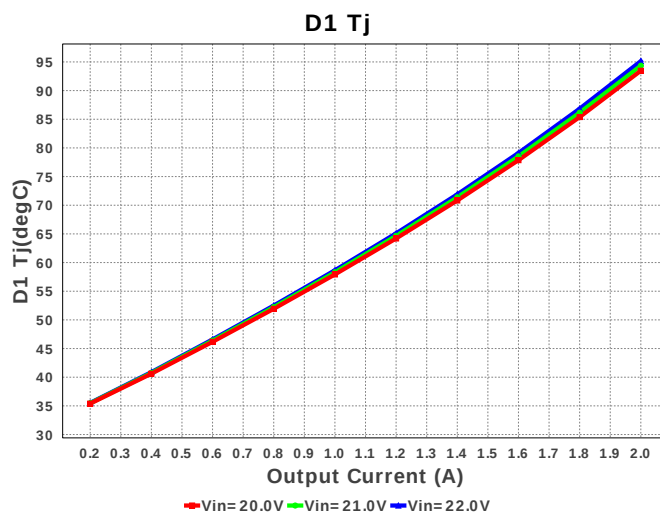
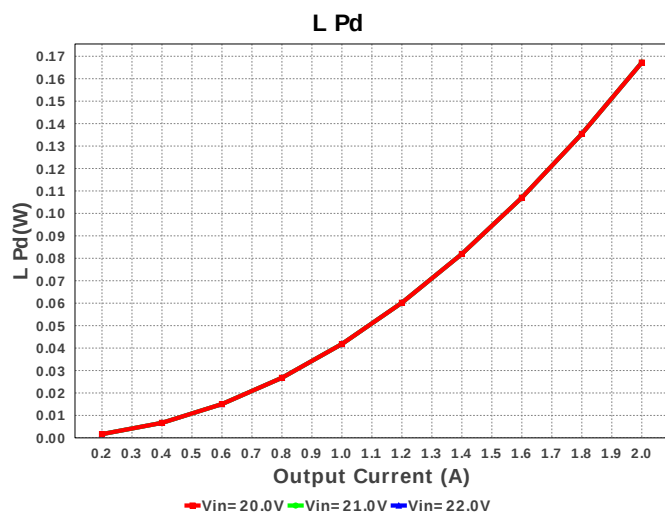


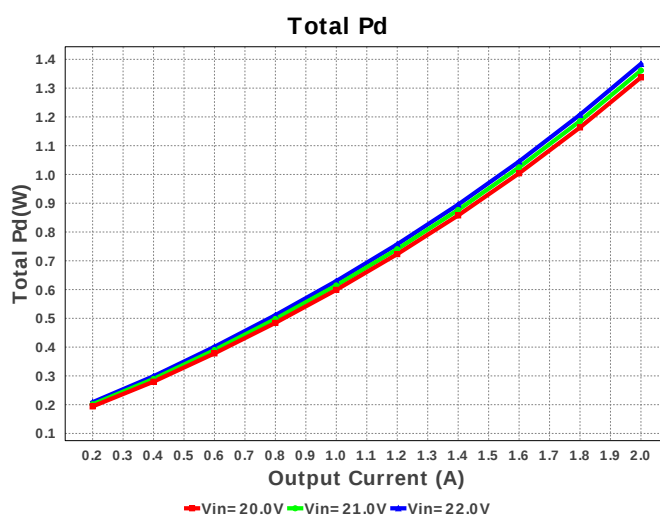
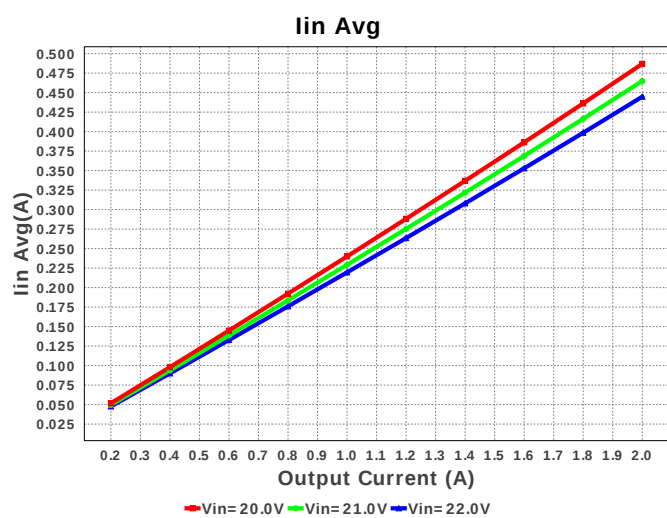
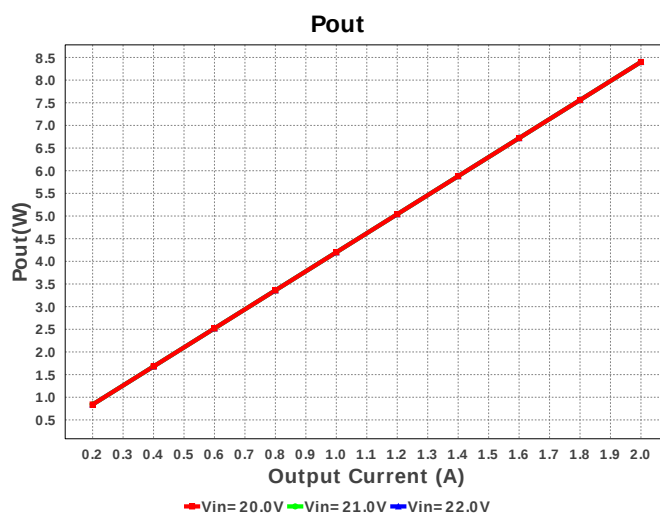
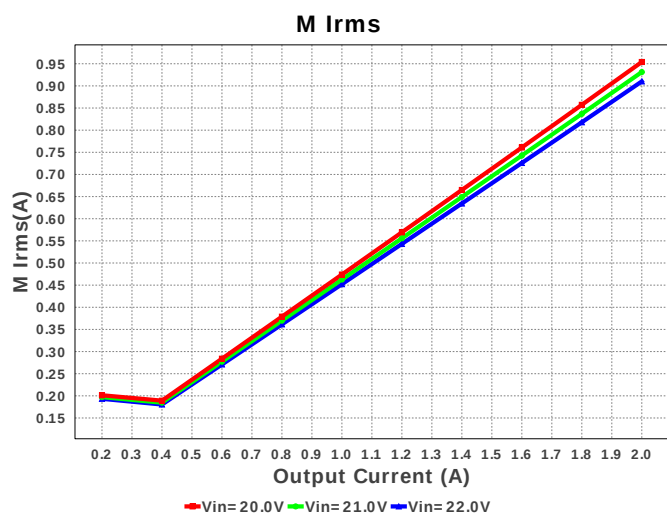
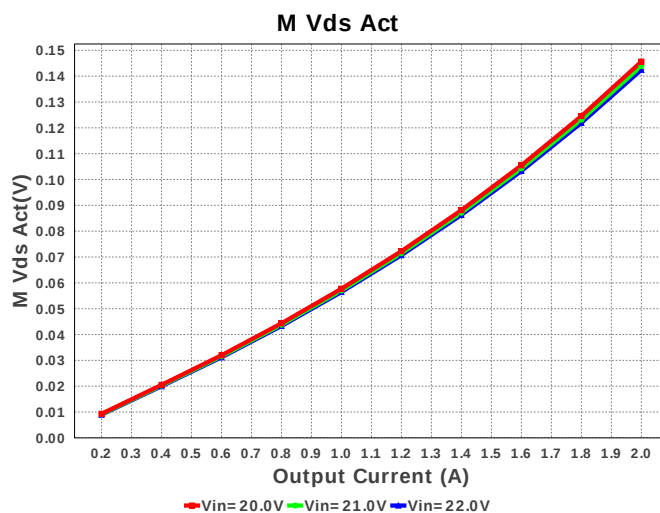
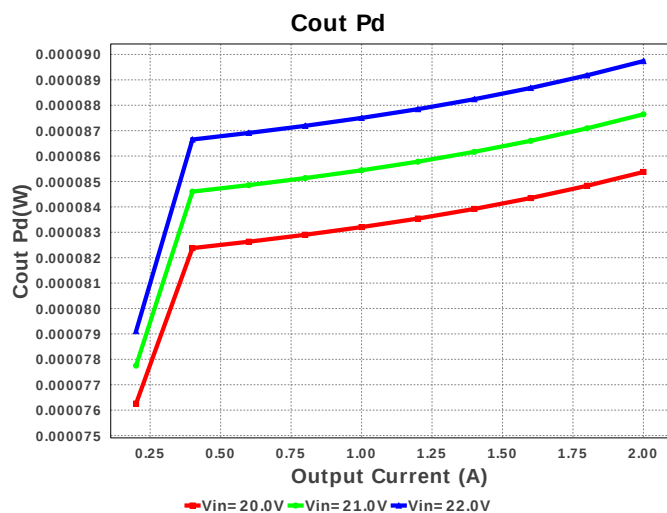
Electrical BOM

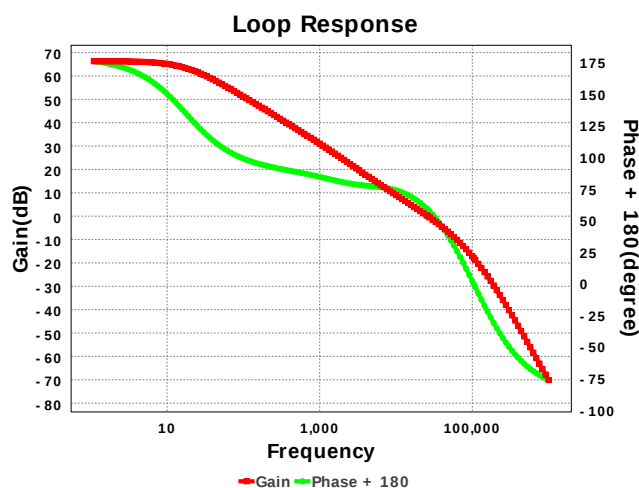
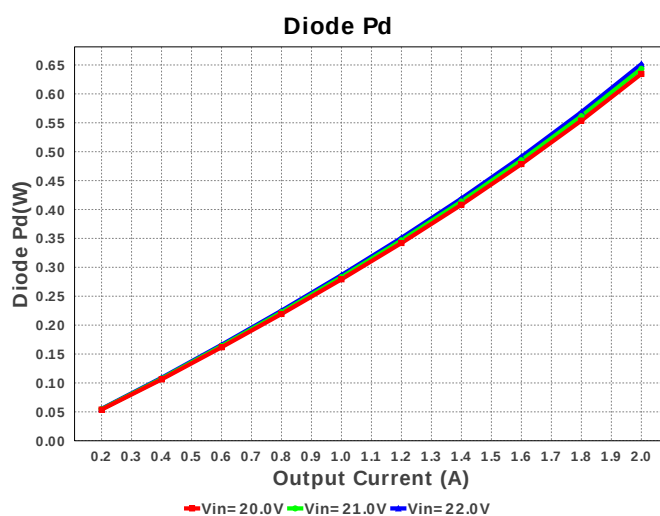
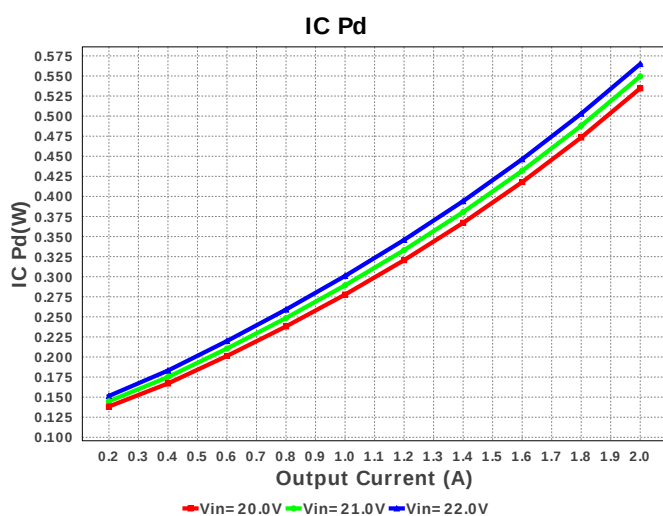
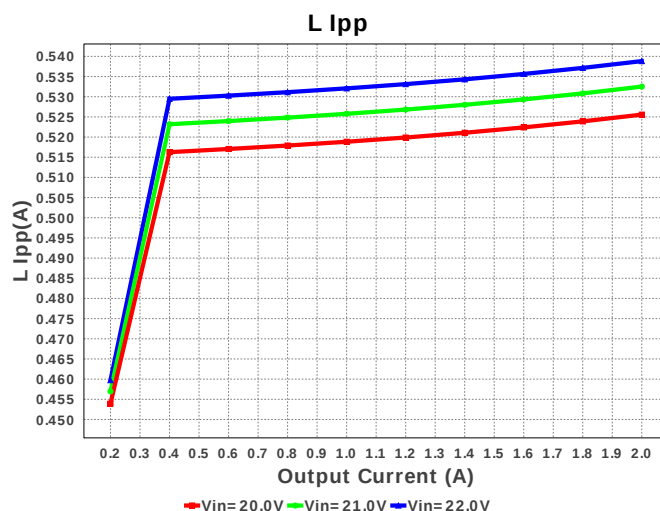
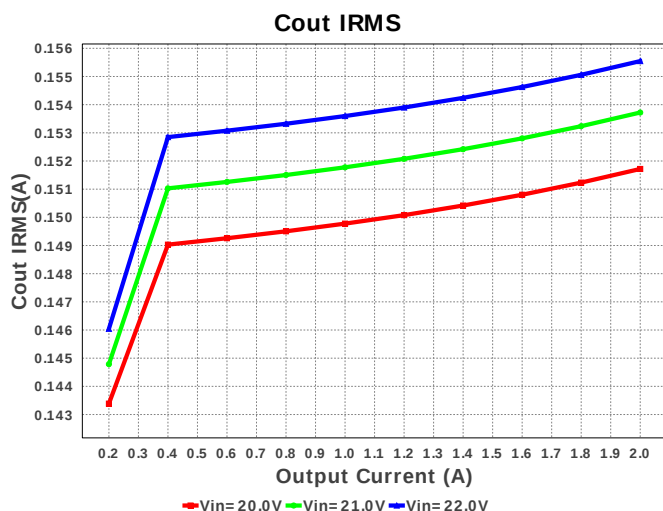
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
2.	Ccomp	Samsung Electro-Mechanics	CL21C102JBCNFNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	Ccomp2	Kemet	C0805C180K5GACTU Series= C0G/NP0	Cap= 18.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
4.	Cin	MuRata	GRM32ER71H475KA88L Series= X7R	Cap= 4.7 uF ESR= 2.0 mOhm VDC= 50.0 V IRMS= 5.35 A	2	\$0.19	 1210 15 mm ²
5.	Cout	MuRata	GRM31CR61A476KE15L Series= X5R	Cap= 47.0 uF ESR= 3.709 mOhm VDC= 10.0 V IRMS= 4.2862 A	1	\$0.15	 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	SRR1206-120ML	L= 12.0 uH DCR= 38.0 mOhm	1	\$0.37	 SRR1206 216 mm ²
9.	Rcomp	Vishay-Dale	CRCW040247K5FKED Series= CRCW..e3	Res= 47.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
10.	RenB	Vishay-Dale	CRCW040219K6FKED Series= CRCW..e3	Res= 19.6 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	Yageo America	RC0603FR-072K4L Series= ?	Res= 2.4 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	0603 5 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	799.883 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	155.546 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.269 A	Current	Peak switch current in IC
4.	Iin Avg	444.74 mA	Current	Average input current
5.	L Ipp	538.83 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	910.067 mA	Current	Q lavg
7.	BOM Count	15	General	Total Design BOM count
8.	FootPrint	386.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	570.0 kHz	General	Switching frequency
10.	M Vds Act	142.455 mV	General	Voltage drop across the MosFET
11.	Pout	8.4 W	General	Total output power

#	Name	Value	Category	Description
12.	Total BOM	\$1.65	General	Total BOM Cost
13.	D1 Tj	95.145 degC	Op_Point	D1 junction temperature
14.	Low Freq Gain	66.309 dB	Op_Point	Gain at 10Hz
15.	Vout Actual	4.2 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	4.2 V	Op_Point	Operational Output Voltage
17.	Cross Freq	26.077 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	20.706 %	Op_point	Duty cycle
19.	Efficiency	85.852 %	Op_point	Steady state efficiency
20.	Gain Marg	-17.988 dB	Op_point	Bode Plot Gain Margin
21.	IC Tj	86.493 degC	Op_point	IC junction temperature
22.	ICThetaJA	100.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	2.0 A	Op_point	Iout operating point
24.	Phase Marg	59.127 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	22.0 V	Op_point	Vin operating point
26.	Vout p-p	3.453 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	639.812 μ W	Power	Input capacitor power dissipation
28.	Cout Pd	89.738 μ W	Power	Output capacitor power dissipation
29.	Diode Pd	651.445 mW	Power	Diode power dissipation
30.	IC Pd	564.933 mW	Power	IC power dissipation
31.	L Pd	167.2 mW	Power	Inductor power dissipation
32.	Total Pd	1.384 W	Power	Total Power Dissipation
33.	Vout Tolerance	5.193 %		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	22.0	Maximum input voltage
3.	VinMin	20.0	Minimum input voltage
4.	Vout	4.2	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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