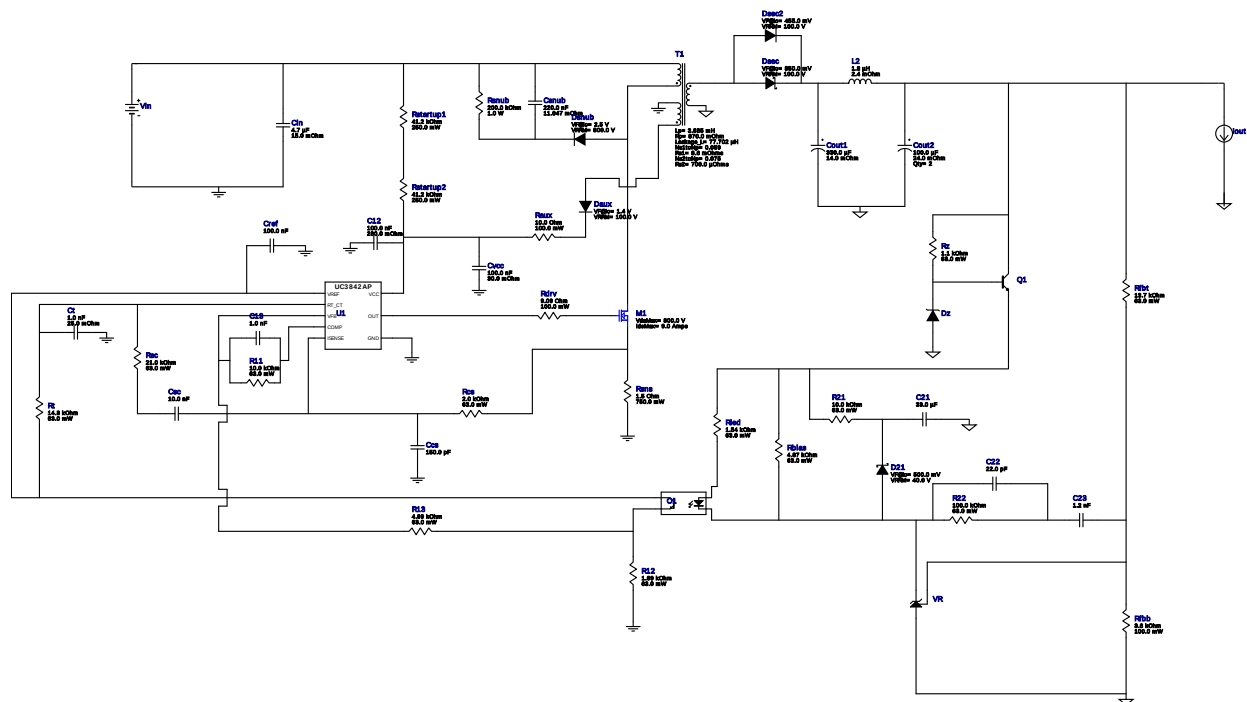


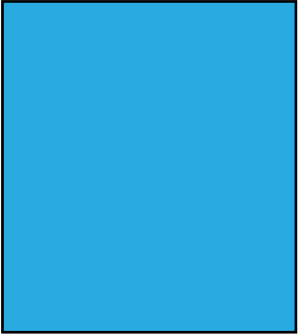
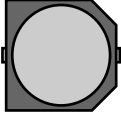
WEBENCH® Design Report

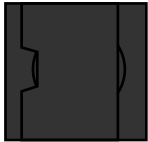
Design : 4354914/6 UC3842AN
UC3842AN 150.0V-280.0V to 12.00V @ 2.0A

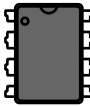


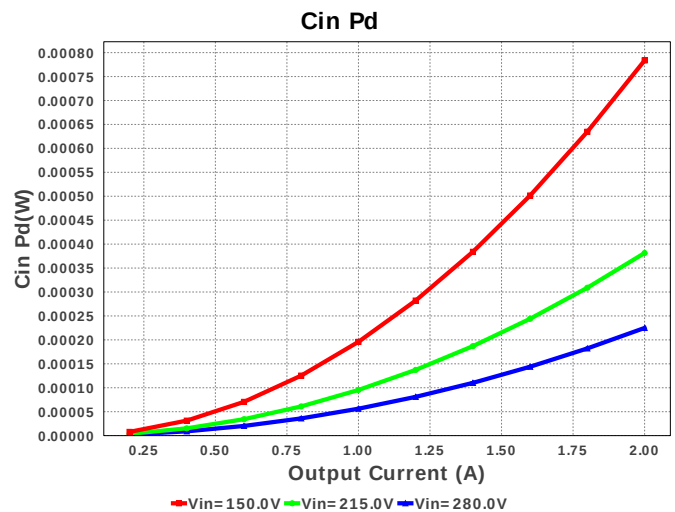
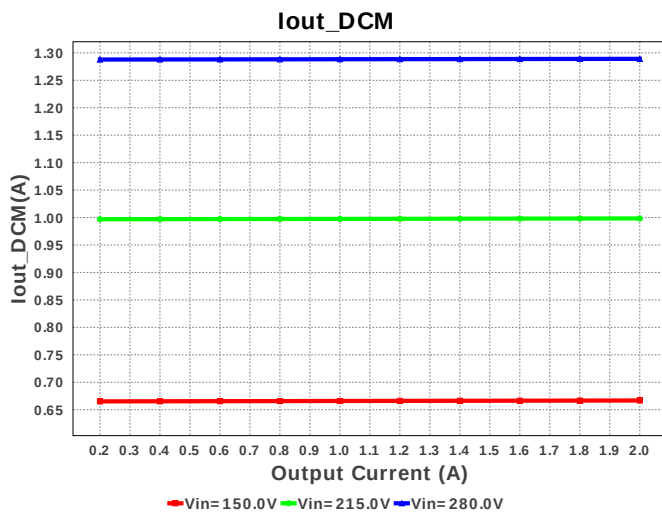
Electrical BOM

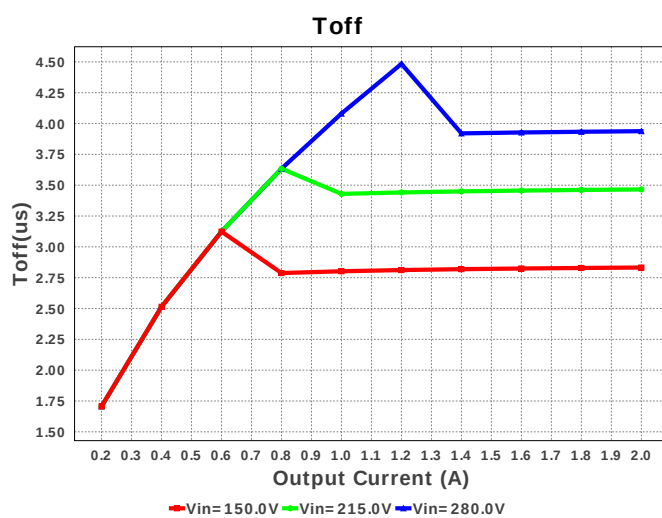
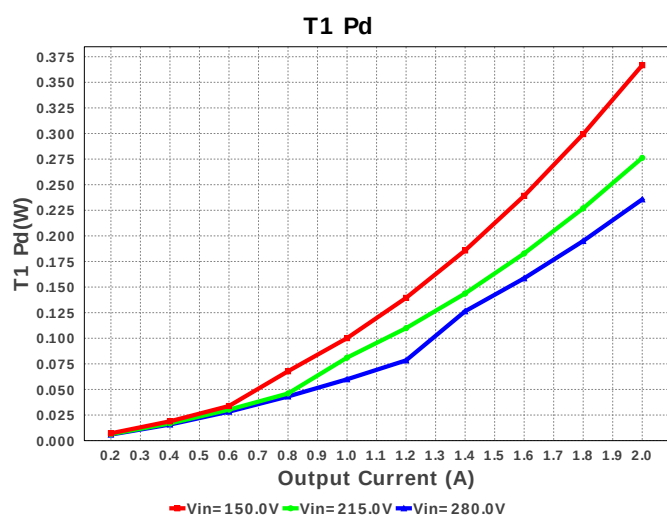
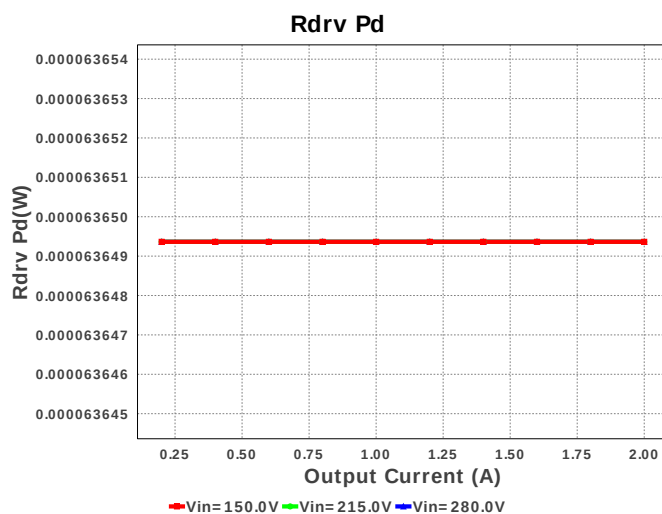
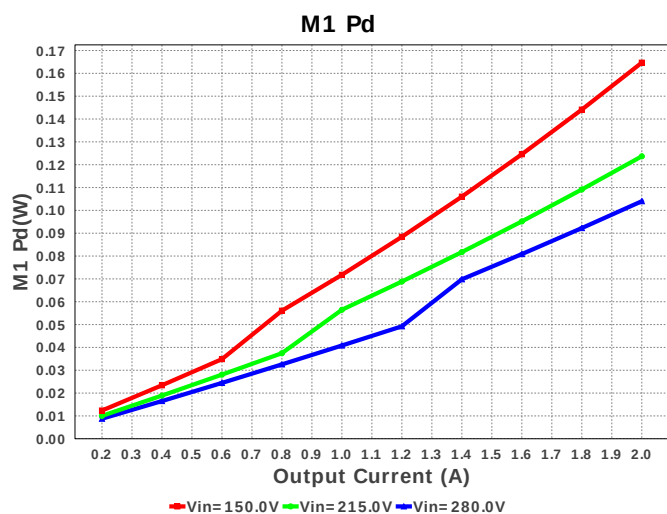
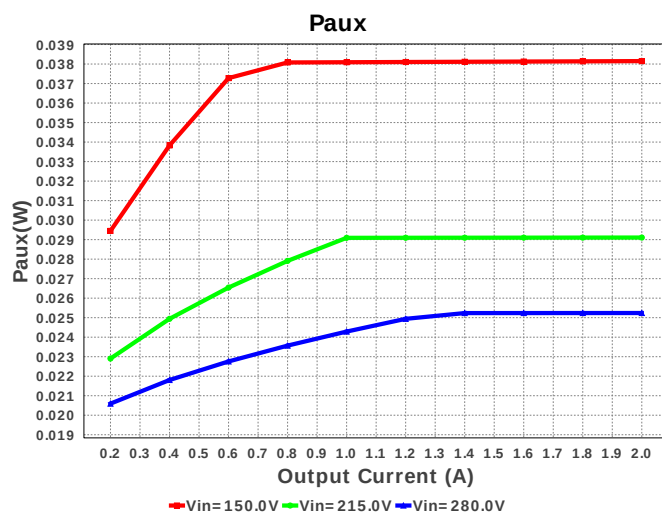
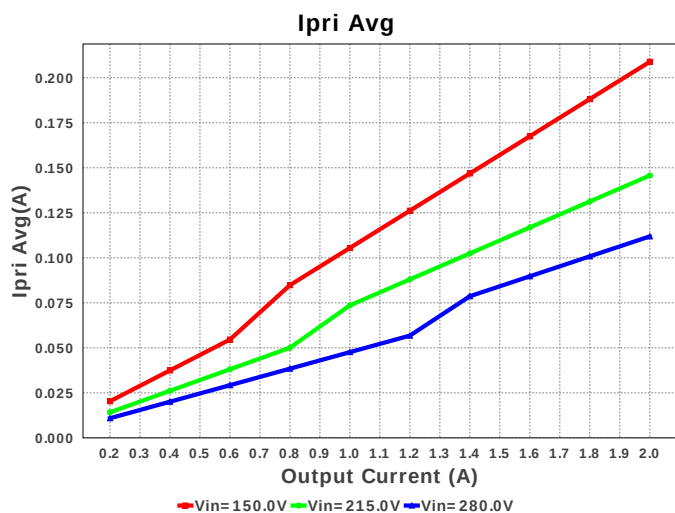
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C12	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
2.	C13	MuRata	GRM033R71C102KA01D Series= X7R	Cap= 1.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²
3.	C21	MuRata	KCM55WR7YA336MH01K Series= X7R	Cap= 33.0 uF VDC= 35.0 V IRMS= 0.0 A	1	\$1.51	 KCM55W 59 mm ²
4.	C22	Kemet	C0805C220K3GACTU Series= C0G/NP0	Cap= 22.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
5.	C23	MuRata	GRM033R71C122KA01D Series= X7R	Cap= 1.2 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²
6.	Ccs	MuRata	GRM033R71C151KA01D Series= X7R	Cap= 150.0 pF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²

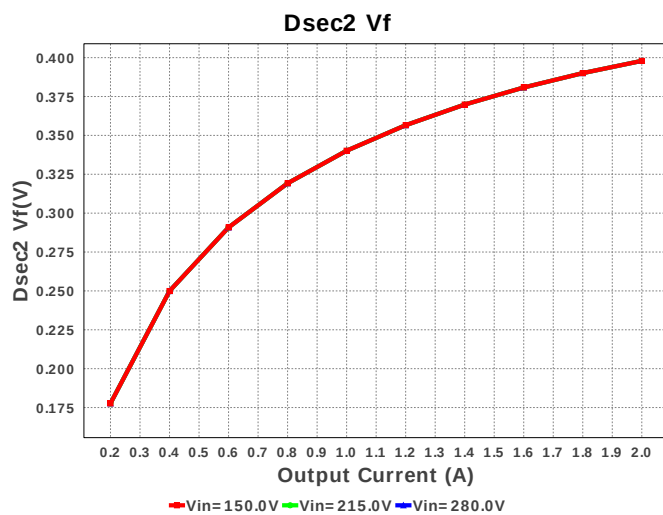
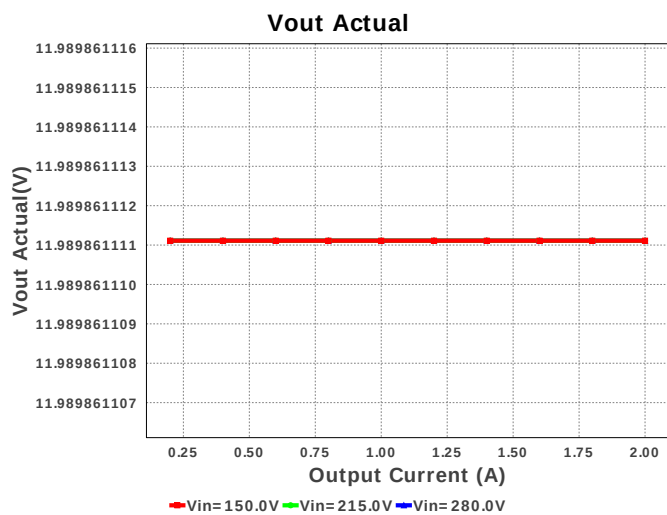
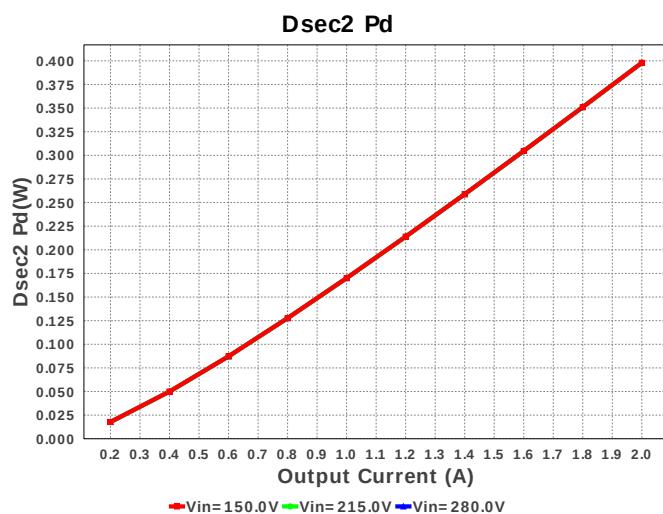
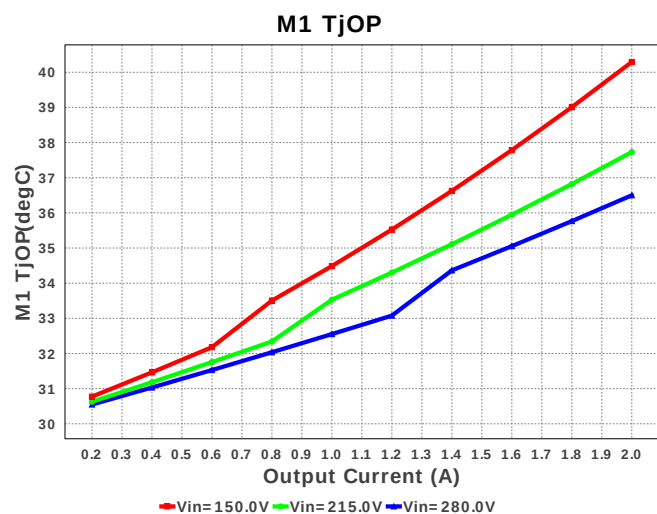
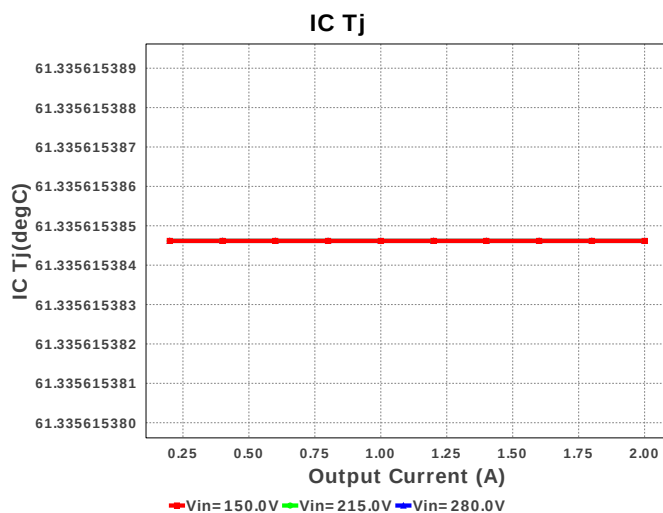
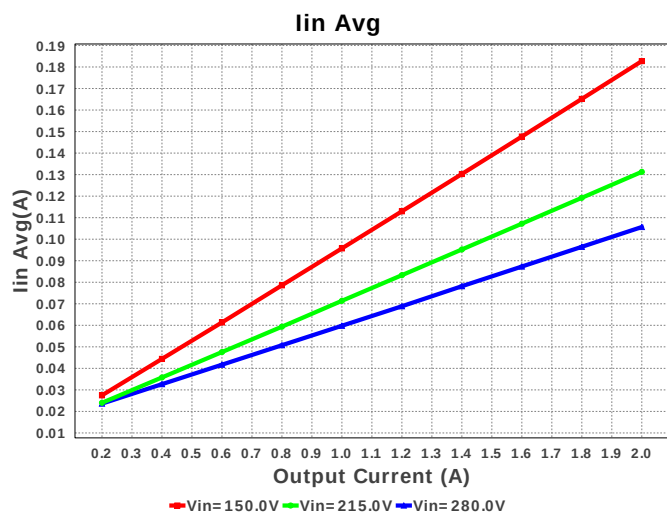
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7.	Cin	TDK	B32924D3475K Series= B32924	Cap= 4.7 uF ESR= 15.0 mOhm VDC= 630.0 V IRMS= 457.0 mA	1	\$1.68	 B32924_31mm 770 mm ²
8.	Cout1	Panasonic	25SVPF330M Series= ?	Cap= 330.0 uF ESR= 14.0 mOhm VDC= 25.0 V IRMS= 5.0 A	1	\$0.70	 CAPSMT_62_F12 151 mm ²
9.	Cout2	Panasonic	25SVPF100M Series= ?	Cap= 100.0 uF ESR= 24.0 mOhm VDC= 25.0 V IRMS= 3.2 A	2	\$0.50	 CAPSMT_62_E7 106 mm ²
10.	Cref	MuRata	GRM155R61C104KA88D Series= X5R	Cap= 100.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
11.	Csc	MuRata	GRM033R60J103KA01D Series= X5R	Cap= 10.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²
12.	Csnub	TDK	C5750JB2J224K Series= JB	Cap= 220.0 nF ESR= 11.047 mOhm VDC= 630.0 V IRMS= 0.0 A	1	\$0.20	 2220 54 mm ²
13.	Ct	Kemet	C0805C102J5GACTU Series= C0G/NP0	Cap= 1.0 nF ESR= 25.0 mOhm VDC= 50.0 V IRMS= 1.71 A	1	\$0.01	 0805 7 mm ²
14.	Cvcc	MuRata	GRM188R71E104KA01D Series= X7R	Cap= 100.0 nF ESR= 30.0 mOhm VDC= 25.0 V IRMS= 1.51 A	1	\$0.01	 0603 5 mm ²
15.	D21	Vishay-Semiconductor	SS14-E3/61T	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.08	 SMA 37 mm ²
16.	Daux	NXP Semiconductor	BAS316,115	VF@Io= 1.4 V VRRM= 100.0 V	1	\$0.02	 SOD-323 9 mm ²
17.	Dsec	Comchip Technology	CDBC5100-G	VF@Io= 850.0 mV VRRM= 100.0 V	1	\$0.26	 SMC 83 mm ²
18.	Dsec2	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	\$1.33	 DDPAK 210 mm ²
19.	Dsnub	Bourns	CD1408-FU1800	VF@Io= 2.5 V VRRM= 800.0 V	1	\$0.13	 Diode_1408 13 mm ²
20.	Dz	ON Semiconductor	BZX84C9V1LT1G	Zener	1	\$0.02	 SOT-23 14 mm ²

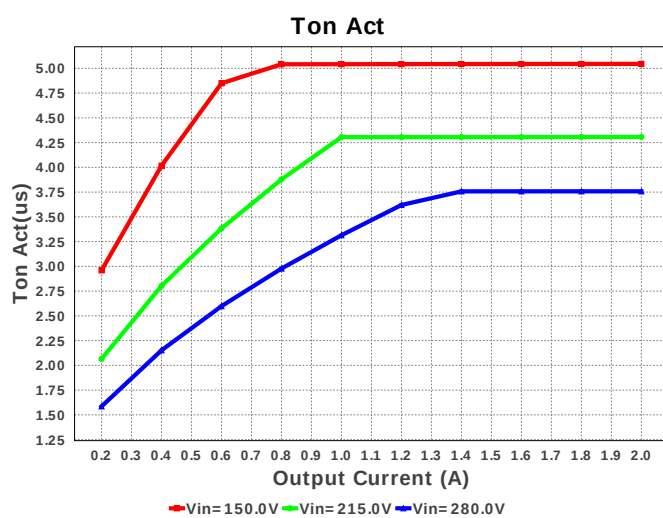
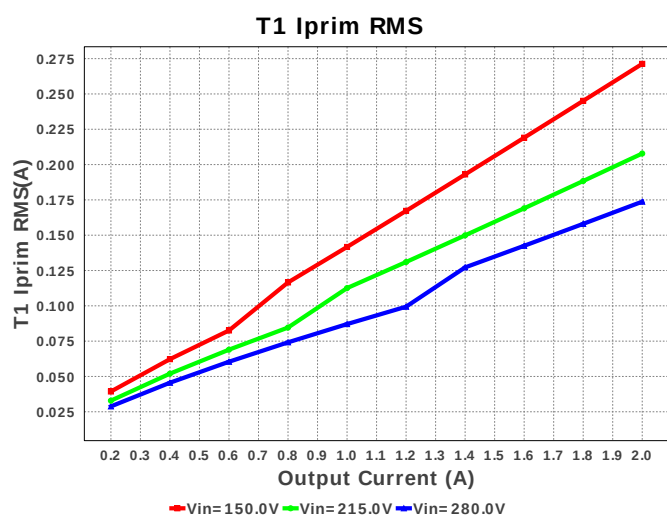
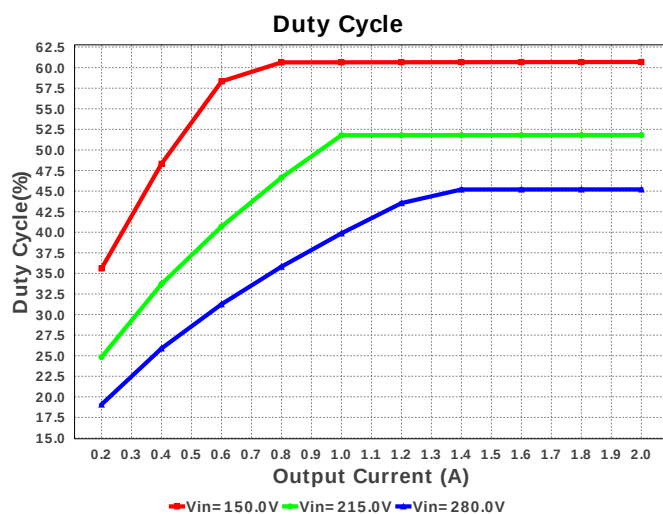
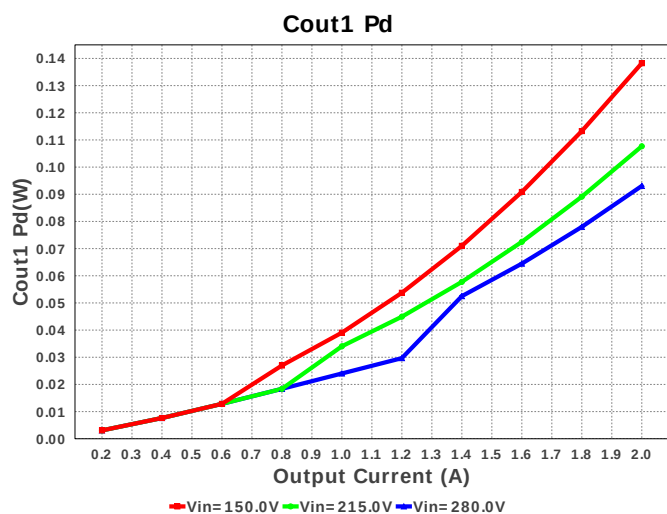
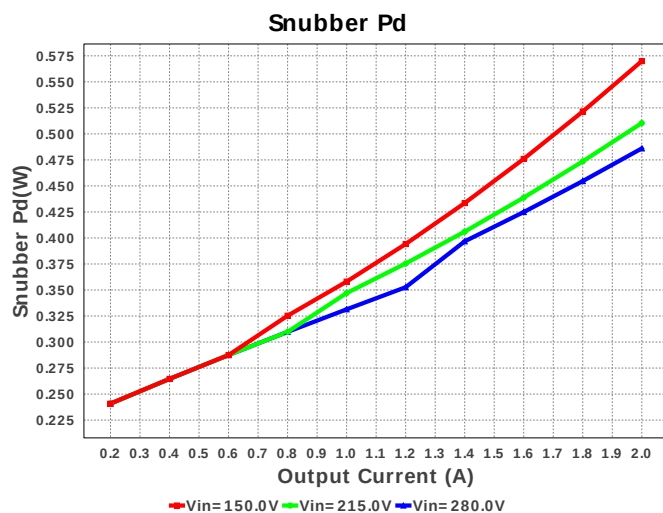
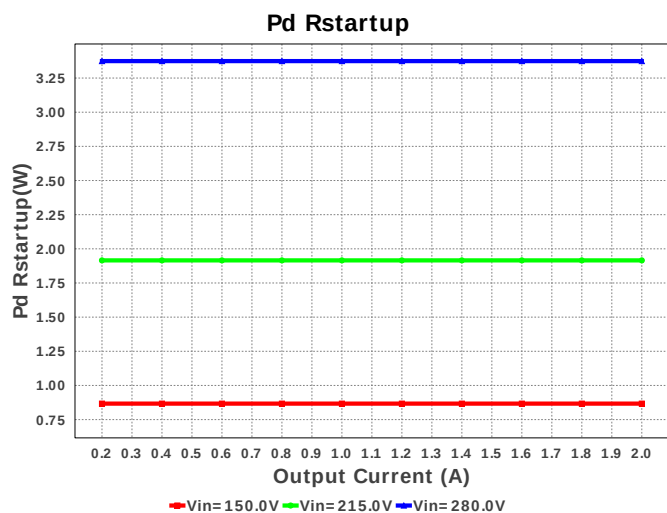
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
21. L2	Coilcraft		SER1360-182KLB	L= 1.8 μ H DCR= 2.4 mOhm	1	\$0.72	 SER1360 225 mm ²
22. M1	STMicroelectronics		STF10N80K5	VdsMax= 800.0 V IdsMax= 9.0 Amps	1	\$2.52	 TO-220FP 79 mm ²
23. O1	Vishay-Semiconductor		TCMT1107	Optocoupler	1	\$0.21	 SOP-4 44 mm ²
24. Q1	ON Semiconductor		BC846BLT1G	Bipolar Transistor	1	\$0.02	 SOT-23 14 mm ²
25. R11	Vishay-Dale		CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
26. R12	Vishay-Dale		CRCW04021K69FKED Series= CRCW..e3	Res= 1.69 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
27. R13	Vishay-Dale		CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
28. R21	Vishay-Dale		CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
29. R22	Vishay-Dale		CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
30. Raux	Vishay-Dale		CRCW060310R0FKEA Series= CRCW..e3	Res= 10.0 Ohm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
31. Rbias	Vishay-Dale		CRCW04024K87FKED Series= CRCW..e3	Res= 4.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
32. Rcs	Vishay-Dale		CRCW04022K00FKED Series= CRCW..e3	Res= 2.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
33. Rdrv	Vishay-Dale		CRCW06039R09FKEA Series= CRCW..e3	Res= 9.09 Ohm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
34. Rfbb	Yageo America		RC0603FR-073K6L Series= ?	Res= 3.6 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
35. Rfbt	Vishay-Dale		CRCW040213K7FKED Series= CRCW..e3	Res= 13.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
36. Rled	Vishay-Dale		CRCW04021K54FKED Series= CRCW..e3	Res= 1.54 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
37. Rsc	Vishay-Dale		CRCW040221K0FKED Series= CRCW..e3	Res= 21.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
38. Rsns	Stackpole Electronics Inc		RMCF2010FT1R50 Series= ?	Res= 1.5 Ohm Power= 750.0 mW Tolerance= 1.0%	1	\$0.03	 2010 32 mm ²
39. Rsnub	Vishay-Semiconductor		CRCW2512200KFKEF Series= ?	Res= 200.0 kOhm Power= 1.0 W Tolerance= 1.0%	1	NA	 2512 43 mm ²

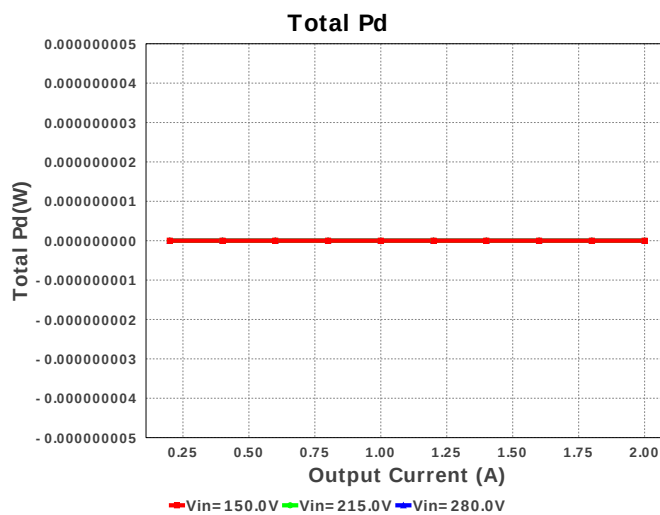
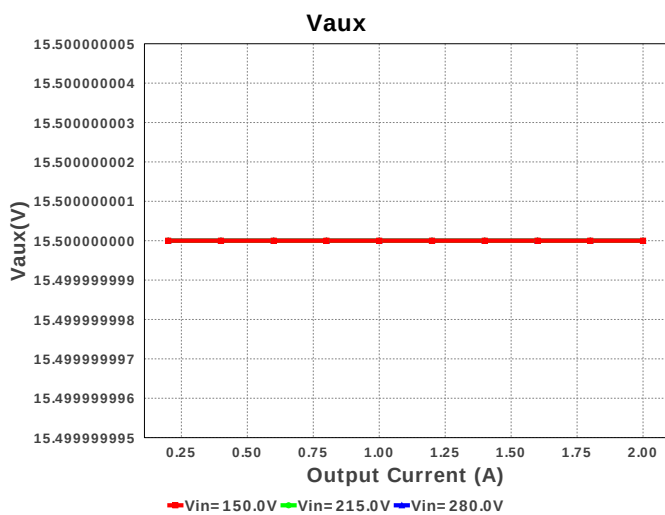
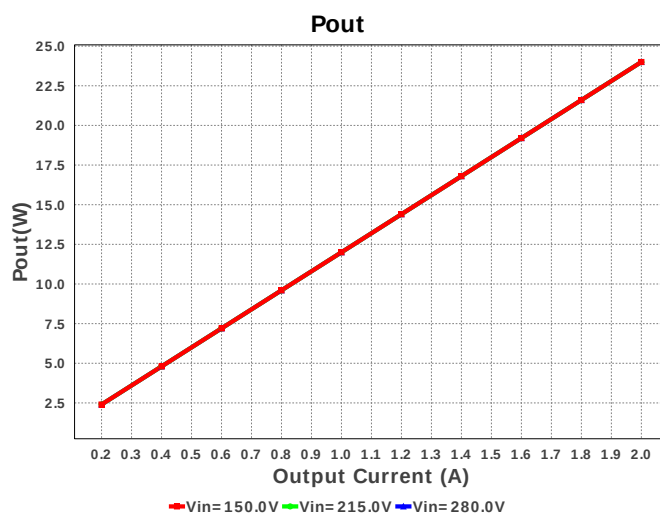
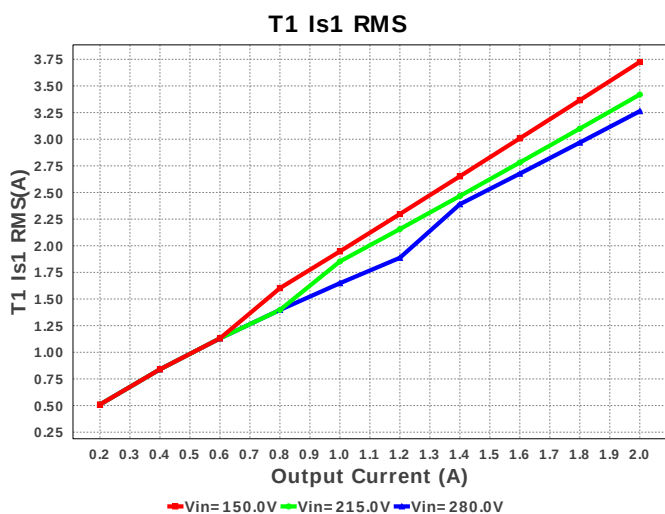
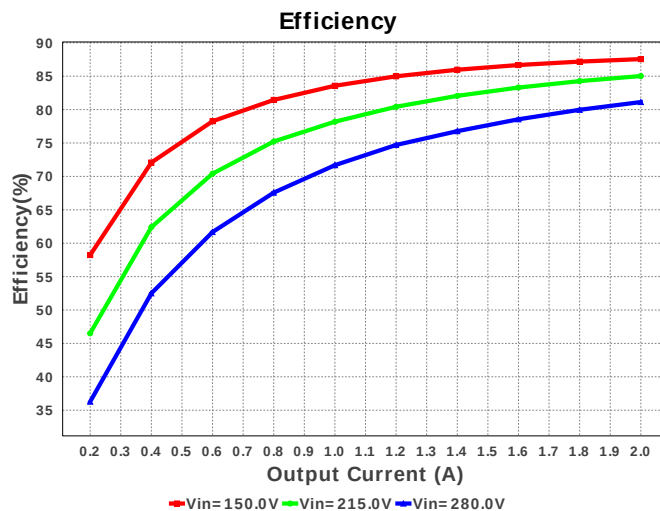
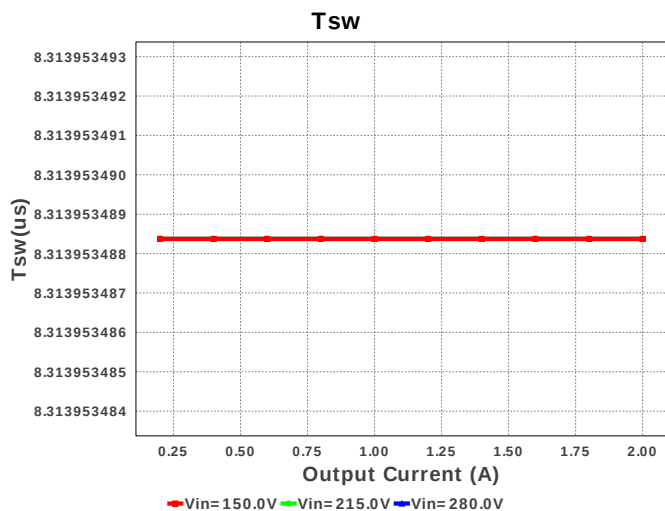
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
40.	Rstartup1	Panasonic	ERJ-8ENF4122V Series= ERJ-8E	Res= 41.2 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
41.	Rstartup2	Panasonic	ERJ-8ENF4122V Series= ERJ-8E	Res= 41.2 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
42.	Rt	Vishay-Dale	CRCW040214K3FKED Series= CRCW..e3	Res= 14.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
43.	Rz	Vishay-Dale	CRCW04021K10FKED Series= CRCW..e3	Res= 1.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
44.	T1	CUSTOM	CUSTOM	Lp= 3.885 mH Rp= 870.0 mOhm Leakage_L= 77.702 μ H Ns1toNp= 0.059 Rs1= 8.6 mOhms Ns2toNp= 0.075 Rs2= 700.0 μ Ohms	1	NA	CUSTOM 0 mm ²
45.	U1	Texas Instruments	UC3842AN	Switcher	1	\$0.56	 P0008A 116 mm ²
46.	VR	Texas Instruments	TL431AIDBVR	Voltage References	1	\$0.07	 R-PDSO-G3 16 mm ²



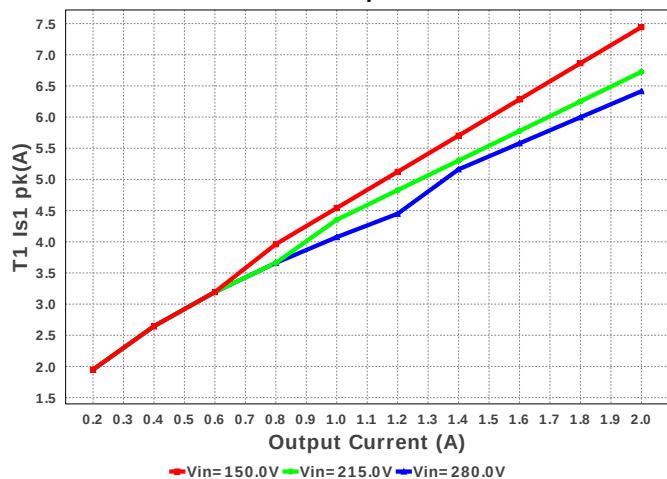




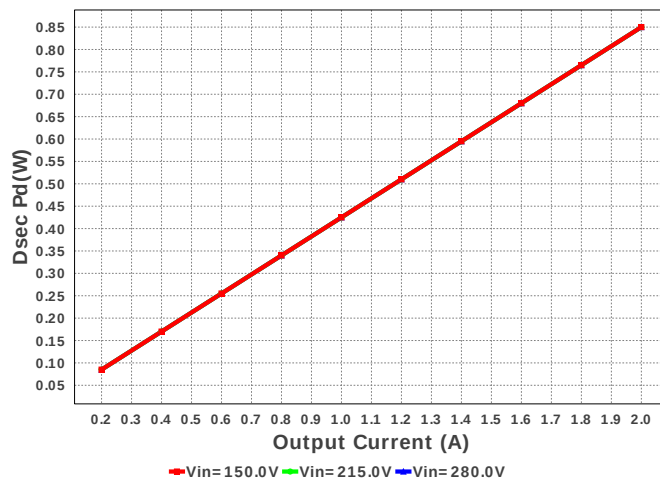




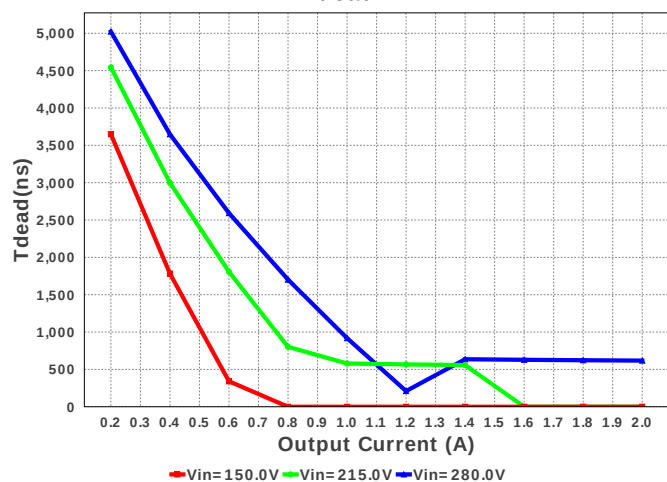
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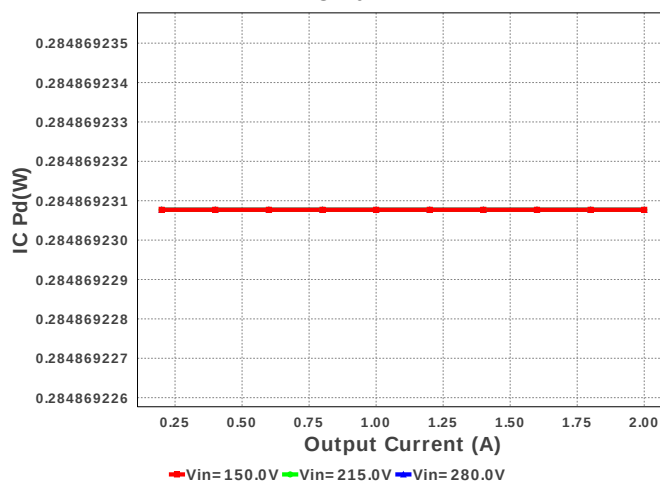
Dsec Pd



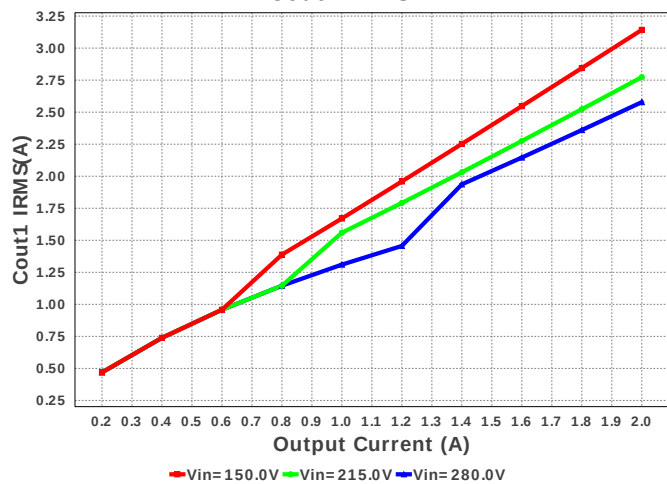
Tdead



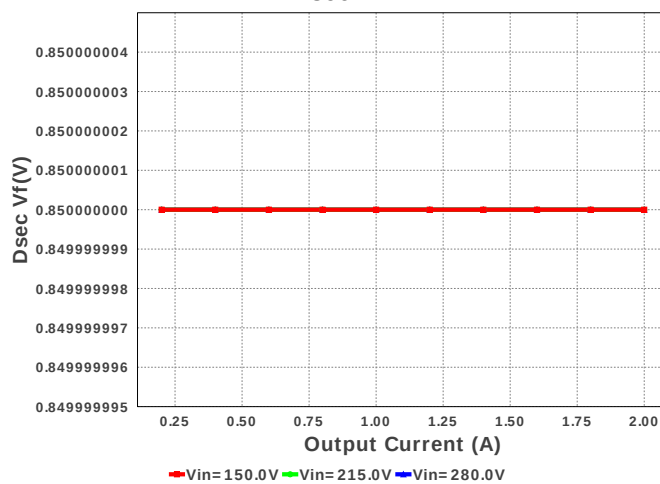
IC Pd

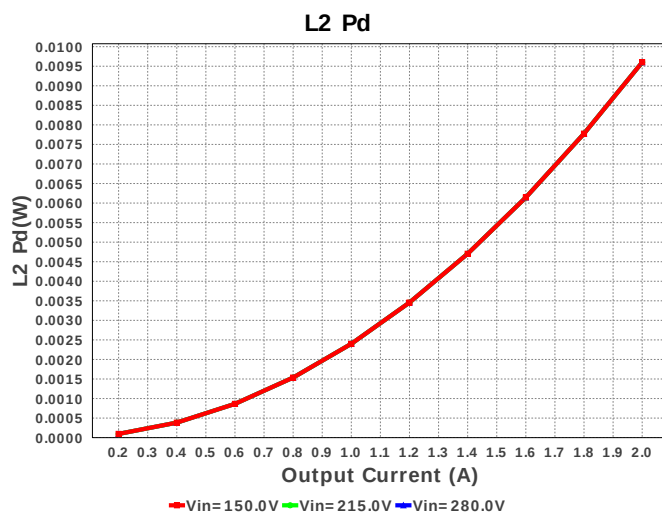
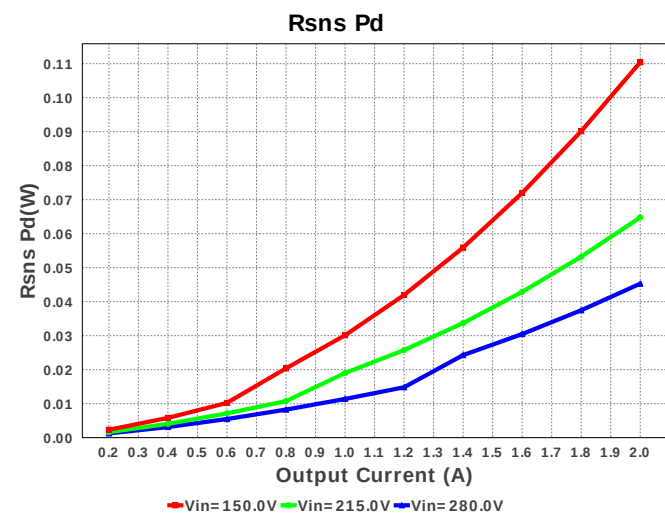
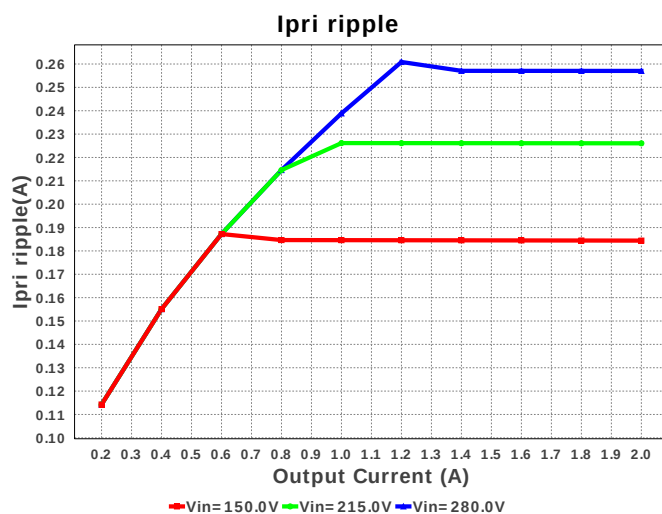
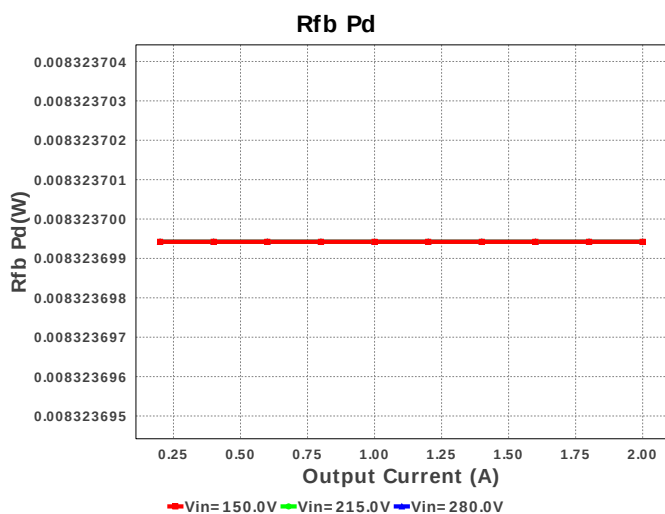
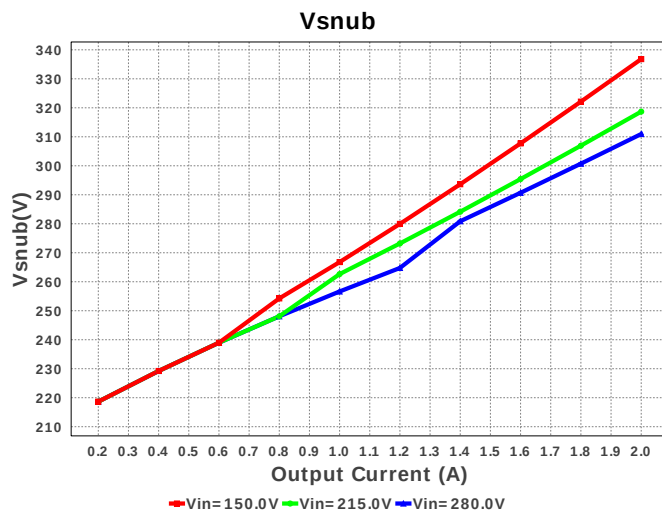
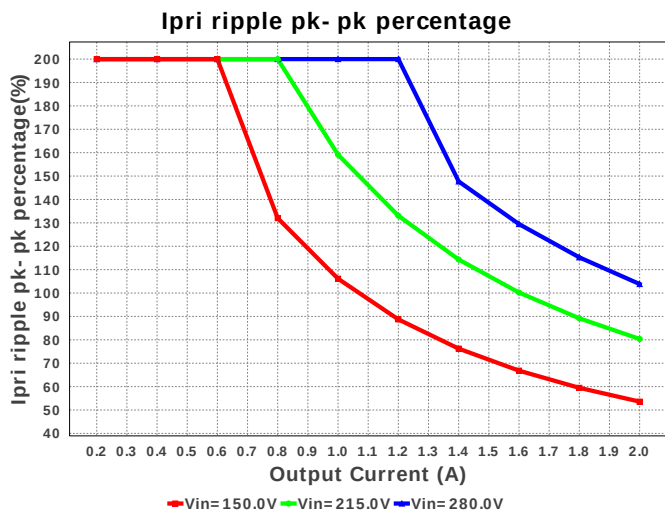


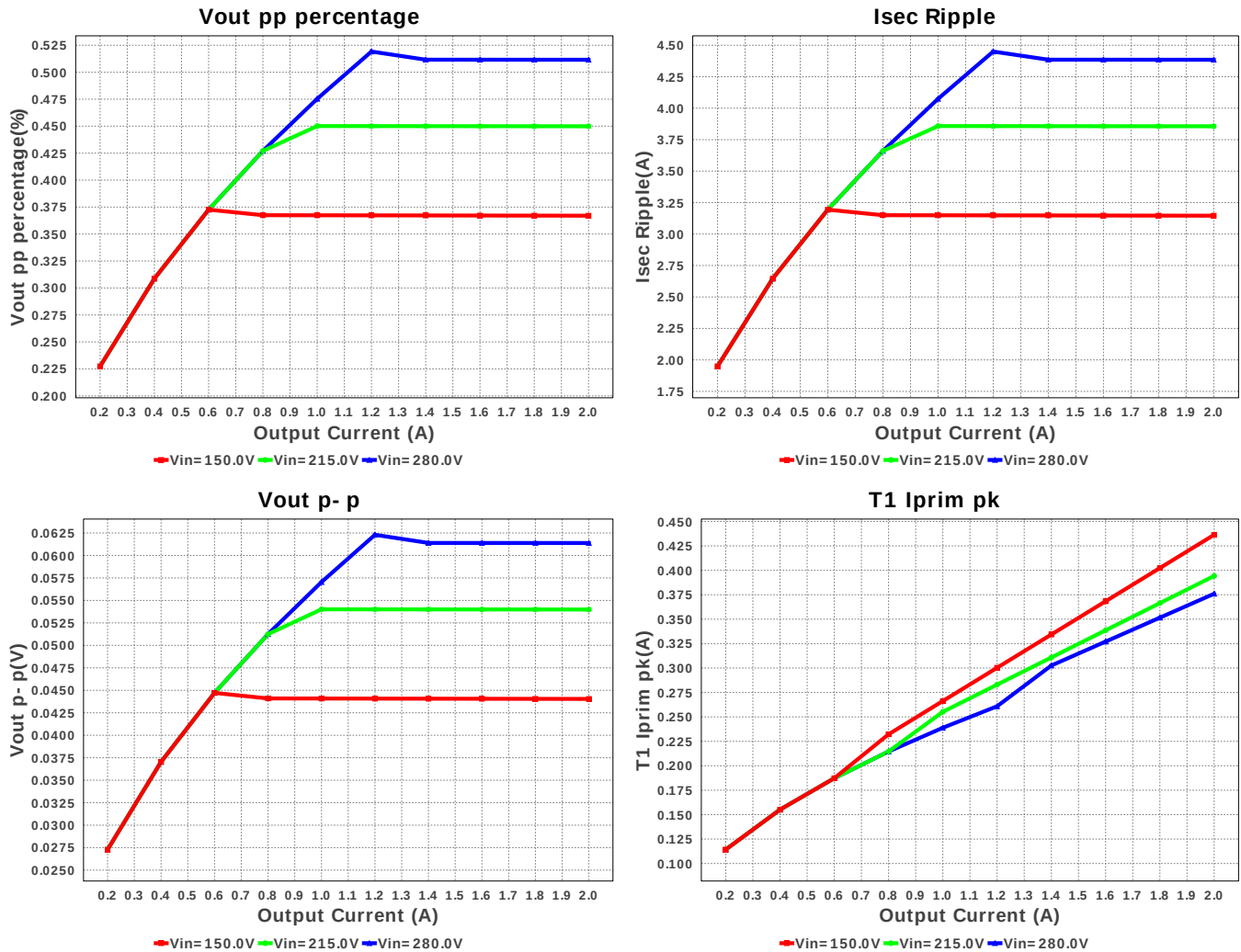
Cout1 IRMS



Dsec Vf







Operating Values

#	Name	Value	Category	Description
1.	Cout1 IRMS	3.145 A	Current	Output capacitor1 RMS ripple current
2.	Iin Avg	182.718 mA	Current	Average input current
3.	Iout_DCM	666.798 mA	Current	Approximate Current below which DCM mode of operation will begin
4.	Ipri Avg	208.988 mA	Current	Average Current in Primary Winding over the complete Switching Period
5.	Ipri ripple	184.413 mA	Current	Ripple Current in the Primary Winding
6.	Ipri ripple pk-pk percentage	53.55 %	Current	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
7.	Isec Ripple	3.146 A	Current	Ripple Current in the Secondary Winding
8.	T1 Iprim RMS	271.461 mA	Current	Transformer Primary RMS Current
9.	T1 Iprim pk	436.585 mA	Current	Transformer Primary Peak Current
10.	T1 Is1 RMS	3.727 A	Current	Transformer Secondary1 RMS Current
11.	T1 Is1 pk	7.447 A	Current	Transformer Secondary1 Peak Current
12.	BOM Count	47	General	Total Design BOM count
13.	Daux trr	4.0 ns	General	Auxiliary Diode Reverse Recovery Time
14.	Dsec Vf	850.0 mV	General	Effective Forward Voltage Drop at the Operating Current
15.	Dsec trr	0.0 ns	General	Output Diode Reverse Recovery Time
16.	Dsec2 Vf	397.923 mV	General	Effective Forward Voltage Drop at the Operating Current
17.	Dsnub trr	35.0 ns	General	Snubber Diode Reverse Recovery Time
18.	FootPrint	2.294 k mm ²	General	Total Foot Print Area of BOM components
19.	Frequency	120.28 kHz	General	Switching frequency
20.	Pout	24.0 W	General	Total output power
21.	Tdead	0.0 ns	General	Approximate Dead Time of the Regulator
22.	Toff	2.831 us	General	Approximate Converter Off Time
23.	Ton Act	5.045 us	General	Approximate Converter On Time
24.	Total BOM	\$0.0	General	Total BOM Cost
25.	Tsw	8.314 us	General	Switching Time Period
26.	Vaux	16.462 V	General	Auxiliary Voltage
27.	Vsnub	336.893 V	General	Voltage Across the Snubber
28.	Vout Actual	11.99 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
29.	Vout OP	12.0 V	Op_Point	Operational Output Voltage

#	Name	Value	Category	Description
30.	Duty Cycle	60.686 %	Op_point	Duty cycle
31.	Efficiency	87.567 %	Op_point	Steady state efficiency
32.	IC Tj	63.715 degC	Op_point	IC junction temperature
33.	ICThetaJA	110.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
34.	IOUT_OP	2.0 A	Op_point	Iout operating point
35.	M1 TjOP	39.529 degC	Op_point	M1 MOSFET junction temperature
36.	Vout p-p	44.041 mV	Op_point	Peak-to-peak output ripple voltage
37.	Cin Pd	783.673 μ W	Power	Input capacitor power dissipation
38.	Cout1 Pd	138.48 mW	Power	Output capacitor1 power dissipation
39.	Dsec Pd	850.0 mW	Power	Secondary Diode Power Dissipation
40.	Dsec2 Pd	397.923 mW	Power	Secondary Diode Power Dissipation
41.	IC Pd	306.5 mW	Power	IC power dissipation
42.	L2 Pd	9.6 mW	Power	Average Power Dissipation in the Inductor Over the AC Line Period
43.	M1 Pd	152.469 mW	Power	M1 MOSFET total power dissipation
44.	Paux	38.151 mW	Power	Power Dissipation in Raux and Daux
45.	Pd Rstartup	854.536 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
46.	Rdrv Pd	63.649 μ W	Power	Power Dissipation in Gate Drive Resistor
47.	Rfb Pd	8.324 mW	Power	Rfb Power Dissipation
48.	Rsns Pd	110.536 mW	Power	Current Limit Sense Resistor Power Dissipation
49.	Snubber Pd	570.245 mW	Power	Snubber Power Dissipation
50.	T1 Pd	367.158 mW	Power	Estimated Losses in Transformer
51.	Total Pd	0.0 W	Power	Total Power Dissipation
52.	Vout Tolerance	1.926 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
53.	Vout pp percentage	367.006 m%		Output Voltage ripple percentage

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	280.0	Maximum input voltage
3.	VinMin	150.0	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	UC3842A	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. UC3842A Product Folder : <http://www.ti.com/product/UC3842A> : contains the data sheet and other resources.

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