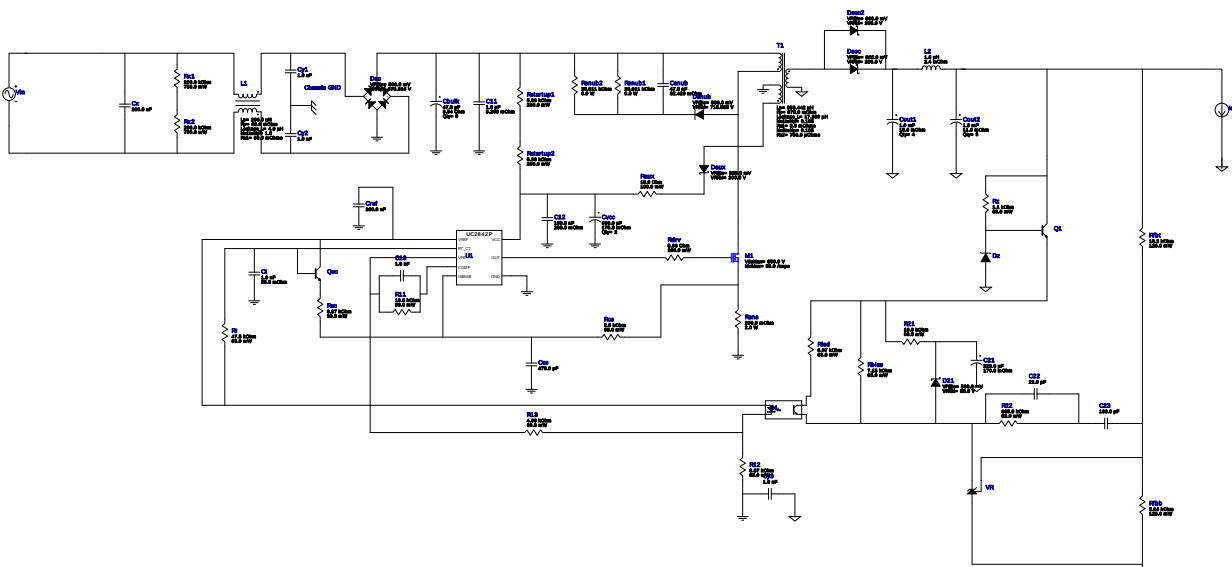


WEBENCH® Design Report

Design : 4658265/14 UC2842N
UC2842N 100.0V-240.0V to 15.00V @ 6.7A

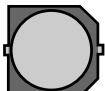


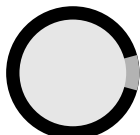
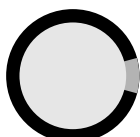
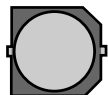
1. The EMI filter selected here contains the estimated values. The real numbers will depend on the attenuation needed at a particular frequency.

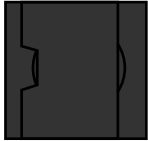
My Comments

No comments

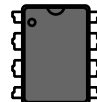
Electrical BOM

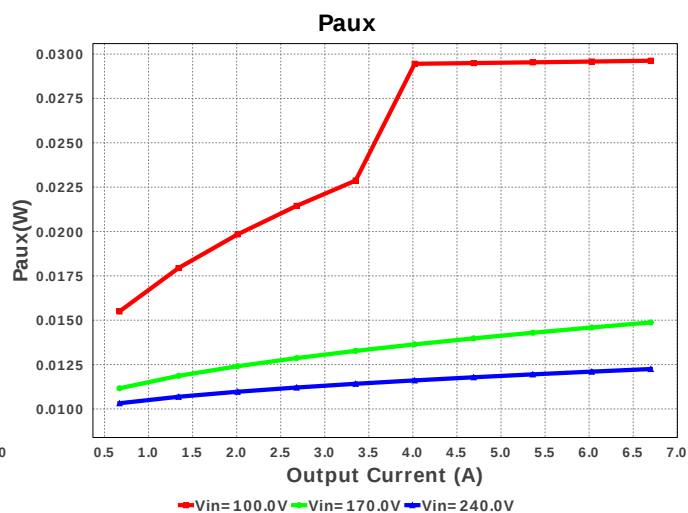
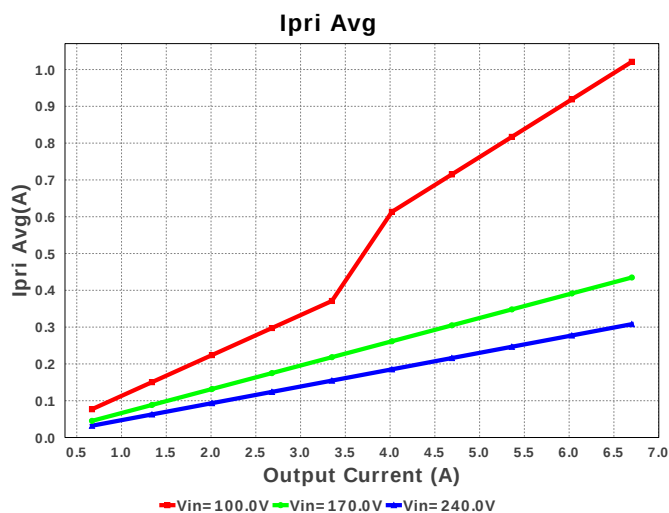
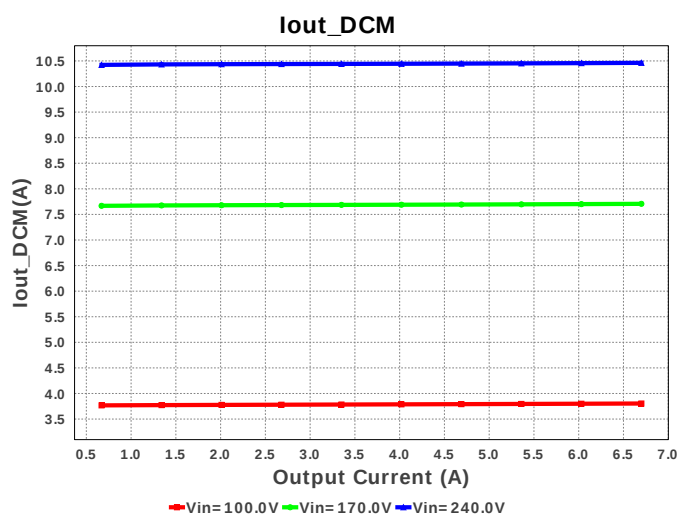
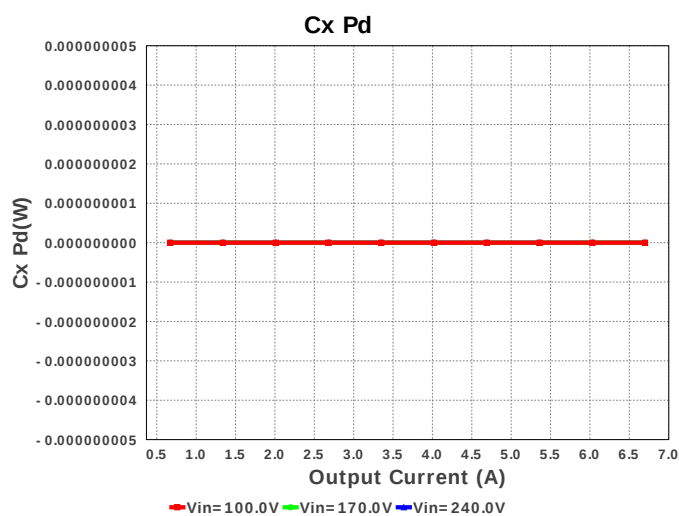
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C11	TDK	C5750X6S2W105K Series= X6S	Cap= 1.0 uF ESR= 5.263 mOhm VDC= 400.0 V IRMS= 0.0 A	1	\$1.19	 2220 54 mm ²
2.	C12	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
3.	C13	MuRata	GRM033R71C102KA01D Series= X7R	Cap= 1.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²
4.	C21	Nichicon	UUD1E221MNL1GS Series= uD	Cap= 220.0 uF ESR= 170.0 mOhm VDC= 25.0 V IRMS= 450.0 mA	1	\$0.16	 SM_RADIAL_8MM 113 mm ²
5.	C22	MuRata	GRM0225C1C220JD05L Series= C0G/NP0	Cap= 22.0 pF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 01005 2 mm ²
6.	C23	Samsung Electro-Mechanics	CL21C161JBANNNC Series= C0G/NP0	Cap= 160.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
7.	Cbulk	Vishay-Bccomponents	MAL215759479E3 Series= 2239	Cap= 47.0 uF ESR= 3.54 Ohm VDC= 500.0 V IRMS= 680.0 mA	5	\$2.68	157PUM-SI_2200x2500 576 mm ²
8.	Ccs	MuRata	GRM033R71C471KA01D Series= X7R	Cap= 470.0 pF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm ²

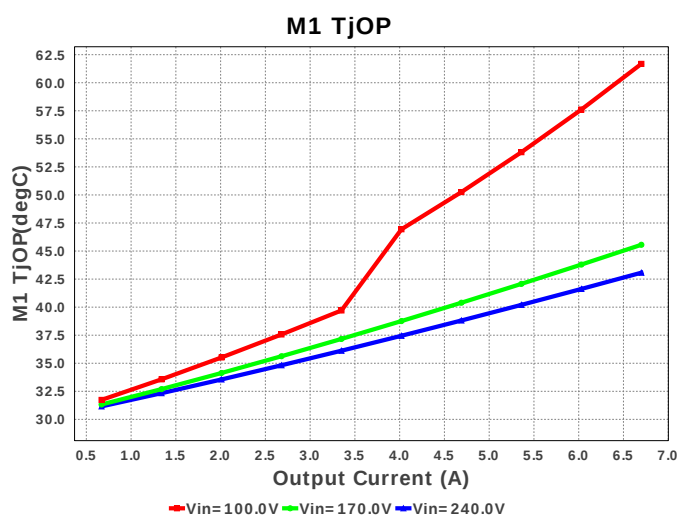
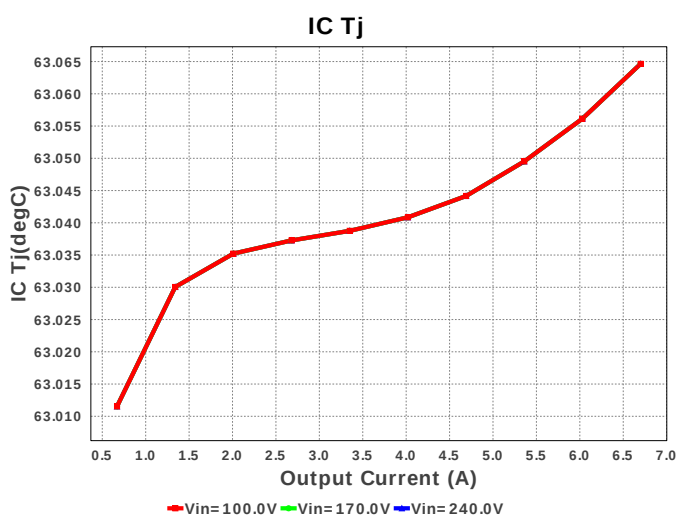
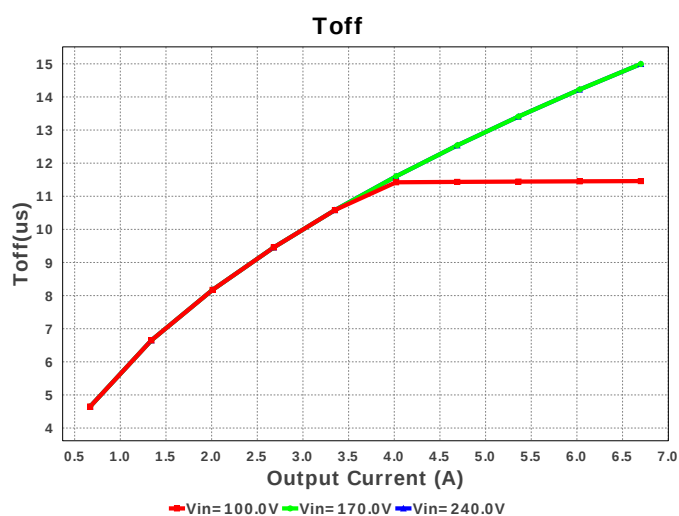
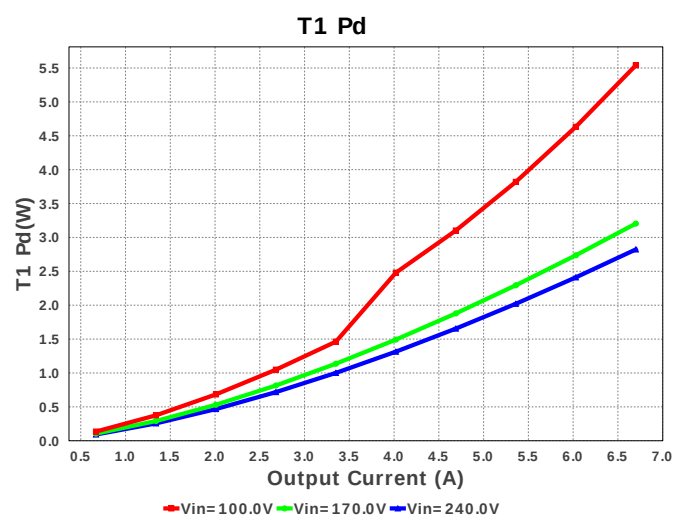
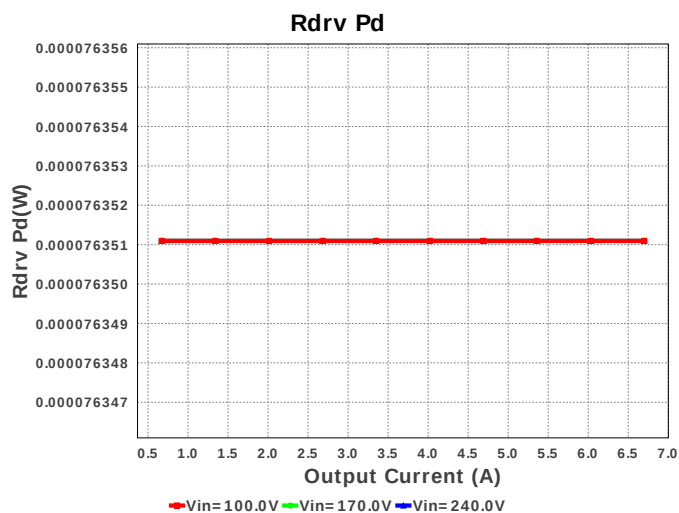
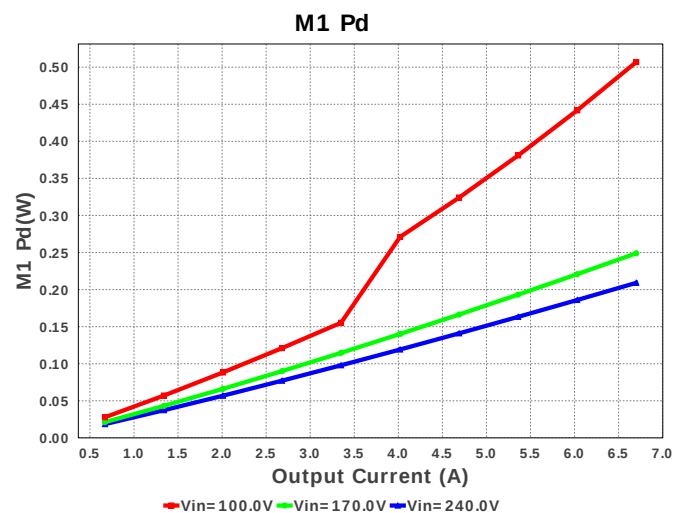
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Cout1	Nichicon	UHV1V102MHD Series= HV	Cap= 1.0 mF ESR= 16.0 mOhm VDC= 35.0 V IRMS= 2.92 A	4	NA	 CAPPR5-12.5X25 210 mm ²
10.	Cout2	Nichicon	UHV1V182MHD Series= HV	Cap= 1.8 mF ESR= 11.0 mOhm VDC= 35.0 V IRMS= 3.925 A	3	NA	 CAPPR5-12.5X25 210 mm ²
11.	Cref	MuRata	GRM155R61C104KA88D Series= X5R	Cap= 100.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
12.	Csnub	TDK	C3225X5R2J473K Series= X5R	Cap= 47.0 nF ESR= 32.429 mOhm VDC= 630.0 V IRMS= 0.0 A	1	\$0.14	 1210 15 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	Nichicon	UUD1E331MNL1GS Series= uD	Cap= 330.0 uF ESR= 170.0 mOhm VDC= 25.0 V IRMS= 450.0 mA	2	\$0.20	 SM_RADIAL_8MM 113 mm ²
15.	Cx	TDK	B32913A5104M000 Series= 2231	Cap= 100.0 nF VDC= 1000.0 V IRMS= 0.0 A	1	\$0.46	 B32913_2650x600x1500 228 mm ²
16.	Cy1	TDK	B81123C1102M Series= B81123	Cap= 1.0 nF VDC= 3.0 kV IRMS= 0.0 A	1	\$0.22	 B81123_1800x500x1050 140 mm ²
17.	Cy2	TDK	B81123C1102M Series= B81123	Cap= 1.0 nF VDC= 3.0 kV IRMS= 0.0 A	1	\$0.22	 B81123_1800x500x1050 140 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
18.	Cy3	TDK	B81123C1102M Series= B81123	Cap= 1.0 nF VDC= 3.0 kV IRMS= 0.0 A	1	\$0.22	 B81123_1800x500x1050 140 mm ²
19.	D21	Diodes Inc.	B230A-13-F	VF@Io= 500.0 mV VRRM= 30.0 V	1	\$0.09	 SMA 37 mm ²
20.	Dac	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 678.816 V	1	NA	CUSTOM 0 mm ²
21.	Daux	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	\$0.21	 PowerDI123 13 mm ²
22.	Dsec	ON Semiconductor	MBRB40250TG	VF@Io= 860.0 mV VRRM= 250.0 V	1	\$0.94	 DDPAK 210 mm ²
23.	Dsec2	ON Semiconductor	MBRB40250TG	VF@Io= 860.0 mV VRRM= 250.0 V	1	\$0.94	 DDPAK 210 mm ²
24.	Dsnub	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 715.593 V	1	NA	CUSTOM 0 mm ²
25.	Dz	Diodes Inc.	MMSZ5242B-7-F	Zener	1	\$0.04	 SOD-123 13 mm ²
26.	L1	CUSTOM	CUSTOM	Lp= 200.0 µH Rp= 60.0 mOhm Leakage_L= 4.0 µH Ns1toNp= 1.0 Rs1= 60.0 mOhms	1	NA	CUSTOM 0 mm ²
27.	L2	Coilcraft	SER1360-182KLB	L= 1.8 µH DCR= 2.4 mOhm	1	\$0.72	 SER1360 225 mm ²
28.	M1	STMicroelectronics	STP45N65M5	VdsMax= 650.0 V IdsMax= 35.0 Amps	1	\$3.85	 TO-220AB 397 mm ²
29.	O1	Vishay-Semiconductor	TCMT1107	Optocoupler	1	\$0.21	 SOP-4 44 mm ²
30.	Q1	ON Semiconductor	BC846BLT1G	Bipolar Transistor	1	\$0.02	 SOT-23 14 mm ²
31.	Qsc	STMicroelectronics	2N2222A	Bipolar Transistor	1	\$0.97	 TO-18 57 mm ²

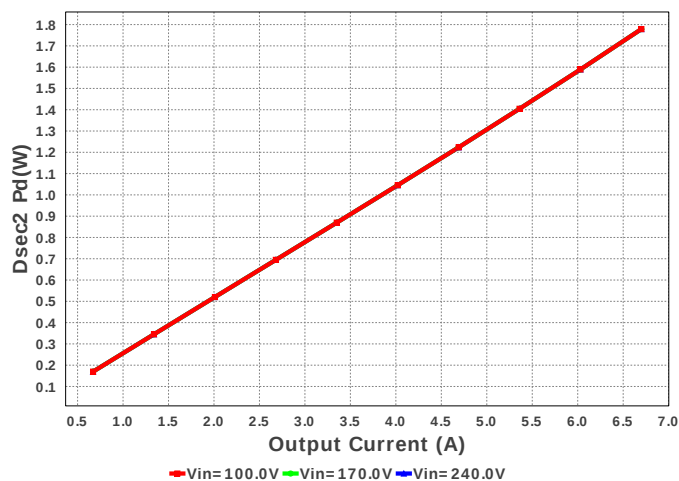
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
32.	R11	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
33.	R12	Vishay-Dale	CRCW04028K87FKED Series= CRCW..e3	Res= 8.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
34.	R13	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
35.	R21	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
36.	R22	Vishay-Dale	CRCW0402665KFKED Series= CRCW..e3	Res= 665.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
37.	Raux	Vishay-Dale	CRCW060310R0FKEA Series= CRCW..e3	Res= 10.0 Ohm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm²
38.	Rbias	Vishay-Dale	CRCW04027K15FKED Series= CRCW..e3	Res= 7.15 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
39.	Rcs	Vishay-Dale	CRCW04022K00FKED Series= CRCW..e3	Res= 2.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
40.	Rdrv	Vishay-Dale	CRCW06038R66FKEA Series= CRCW..e3	Res= 8.66 Ohm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm²
41.	Rfbb	Yageo America	RT0805BRD072K64L Series= ?	Res= 2.64 kOhm Power= 125.0 mW Tolerance= 0.1%	1	\$0.04	 0805 7 mm²
42.	Rfbt	Yageo America	RT0805BRD0713K2L Series= RT0805	Res= 13.2 kOhm Power= 125.0 mW Tolerance= 0.1%	1	\$0.05	 0805 7 mm²
43.	Rled	Vishay-Dale	CRCW04028K87FKED Series= CRCW..e3	Res= 8.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
44.	Rsc	Vishay-Dale	CRCW04028K87FKED Series= CRCW..e3	Res= 8.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
45.	Rsns	Stackpole Electronics Inc	CSRN2512FKR250 Series= ?	Res= 250.0 mOhm Power= 2.0 W Tolerance= 1.0%	1	\$0.13	 2512 43 mm²
46.	Rsnub1	CUSTOM	CUSTOM Series= ?	Res= 20.011 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm²
47.	Rsnub2	CUSTOM	CUSTOM Series= ?	Res= 20.011 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm²
48.	Rstartup1	Panasonic	ERJ-8ENF5361V Series= ERJ-8E	Res= 5.36 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm²
49.	Rstartup2	Panasonic	ERJ-8ENF5361V Series= ERJ-8E	Res= 5.36 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm²
50.	Rt	Vishay-Dale	CRCW040247K5FKED Series= CRCW..e3	Res= 47.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
51.	Rx1	Vishay-Semiconductor	CRCW2010200KFKEF Series= ?	Res= 200.0 kOhm Power= 750.0 mW Tolerance= 1.0%	1	\$0.03	 2010 32 mm²
52.	Rx2	Vishay-Semiconductor	CRCW2010200KFKEF Series= ?	Res= 200.0 kOhm Power= 750.0 mW Tolerance= 1.0%	1	\$0.03	 2010 32 mm²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
53.	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
54.	T1	CUSTOM	CUSTOM	Lp= 858.442 μH Rp= 870.0 mOhm Leakage_L= 17.169 μH Ns1toNp= 0.105 Rs1= 8.6 mOhms Ns2toNp= 0.105 Rs2= 700.0 μOhms	1	NA	CUSTOM 0 mm ²
55.	U1	Texas Instruments	UC2842N	Switcher	1	\$0.64	 P0008A 116 mm ²
56.	VR	Texas Instruments	TL431AIDBZR	Voltage References	1	\$0.08	 DBZ0003A 14 mm ²

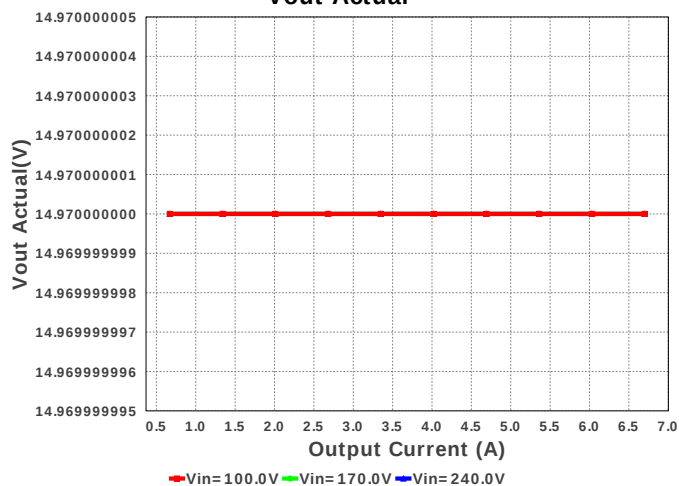




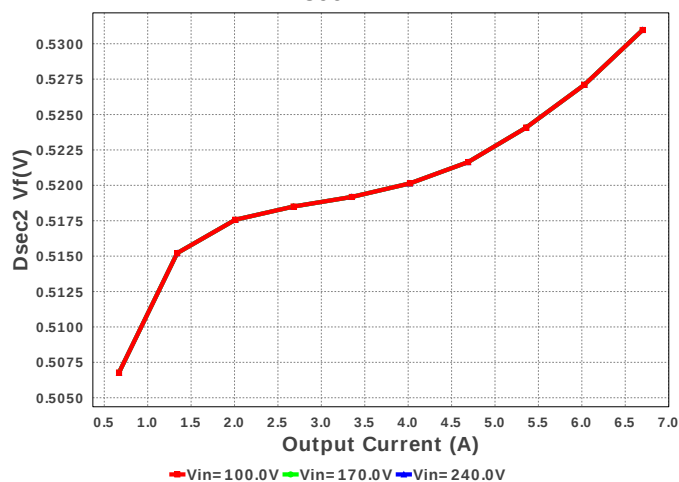
Dsec2 Pd



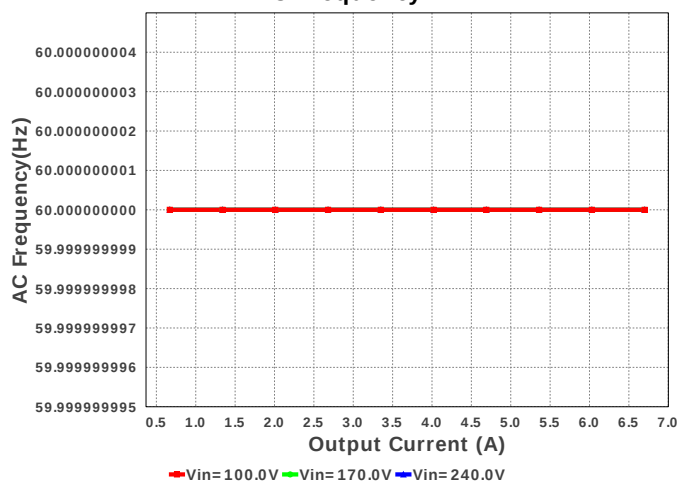
Vout Actual



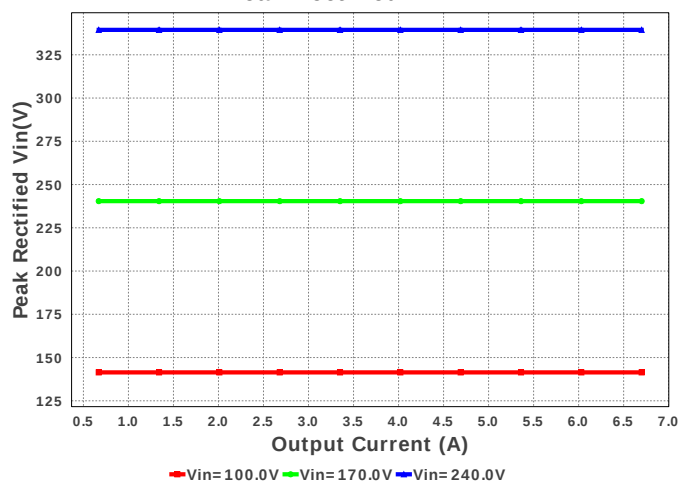
Dsec2 Vf



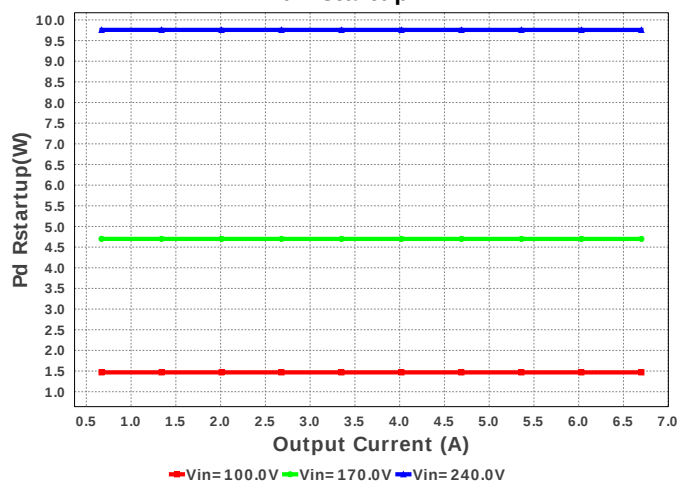
AC Frequency

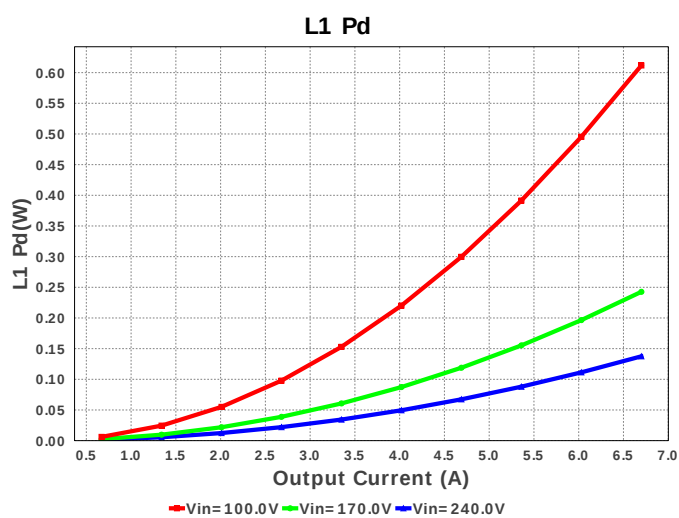
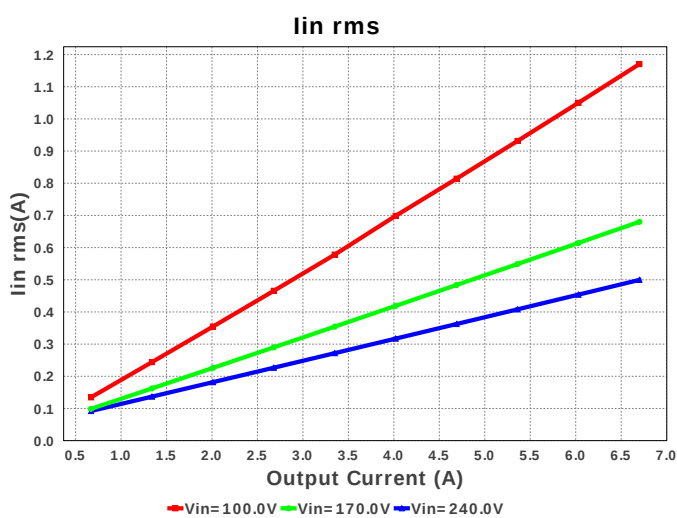
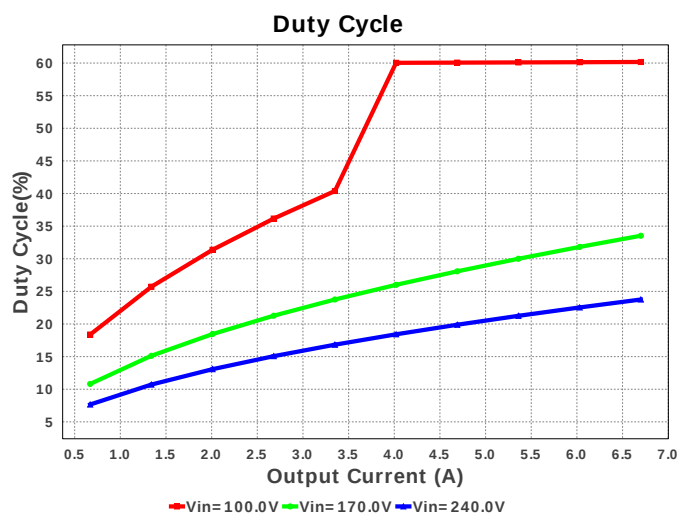
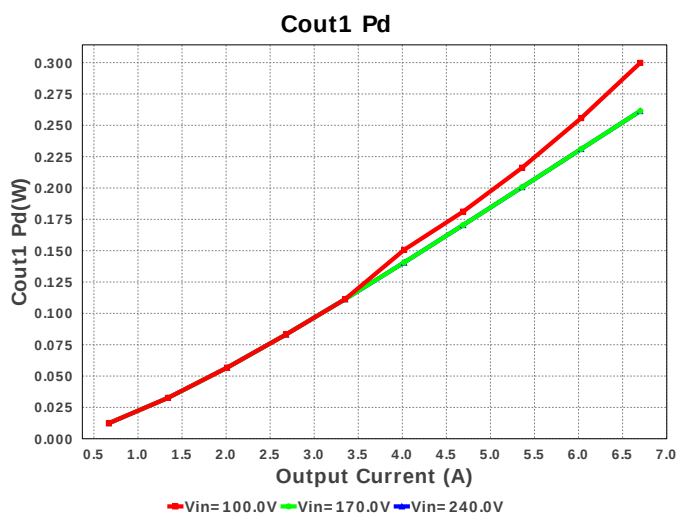
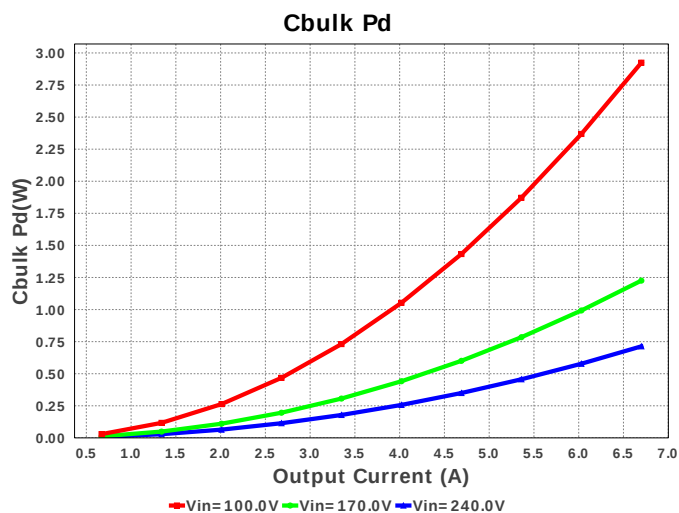
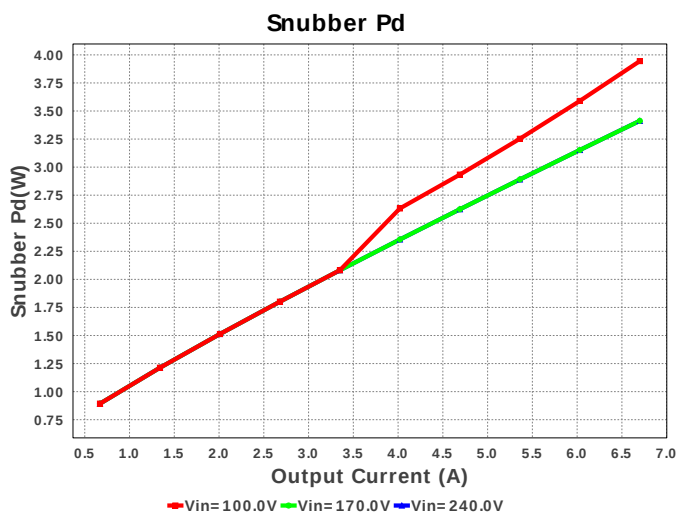


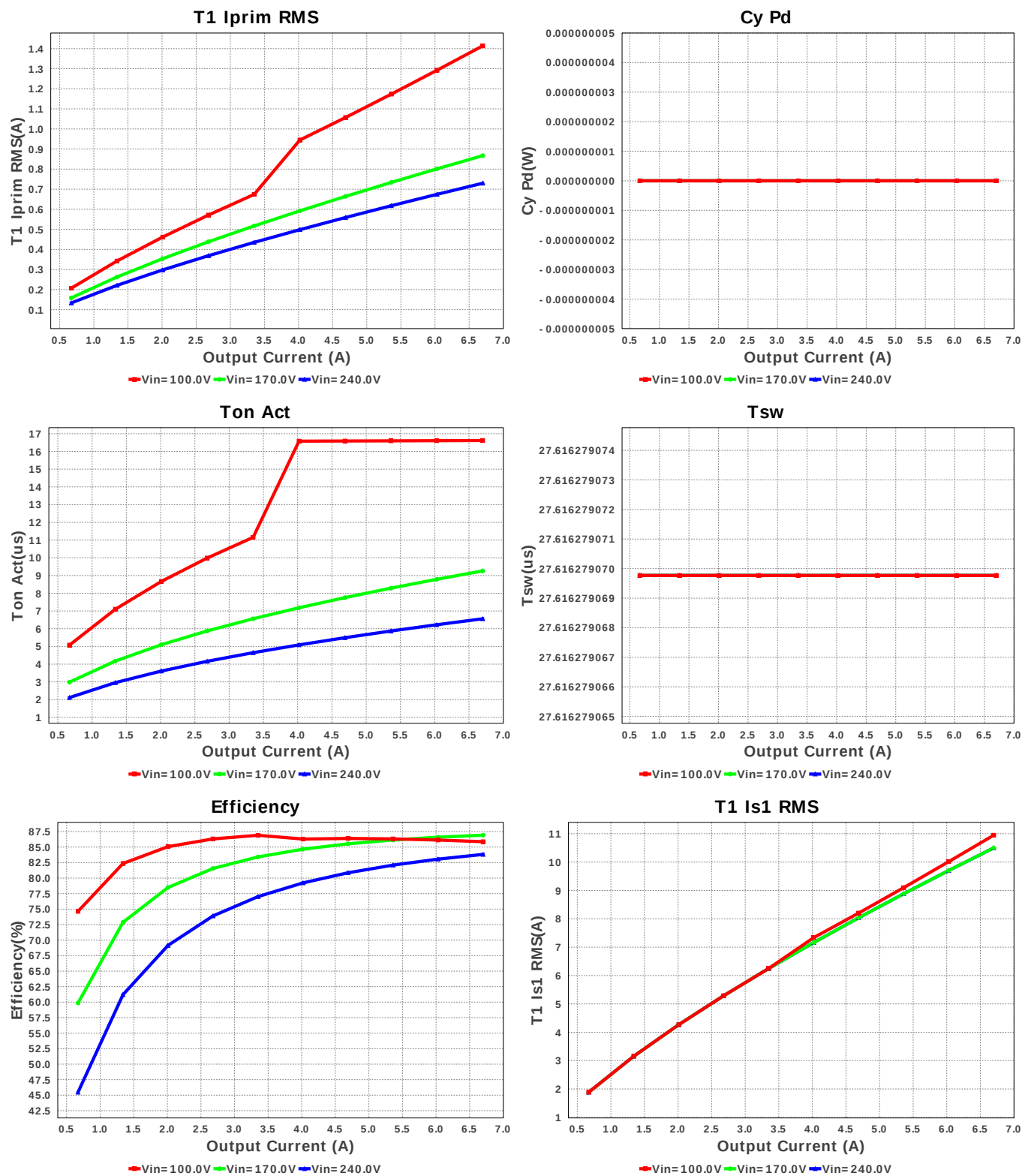
Peak Rectified Vin

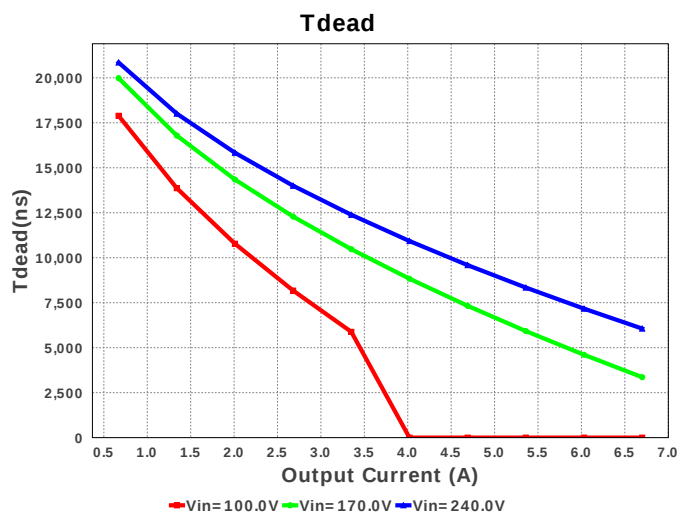
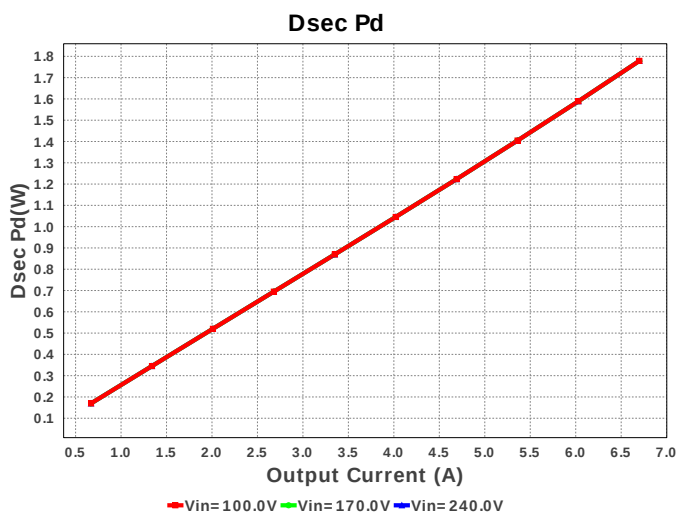
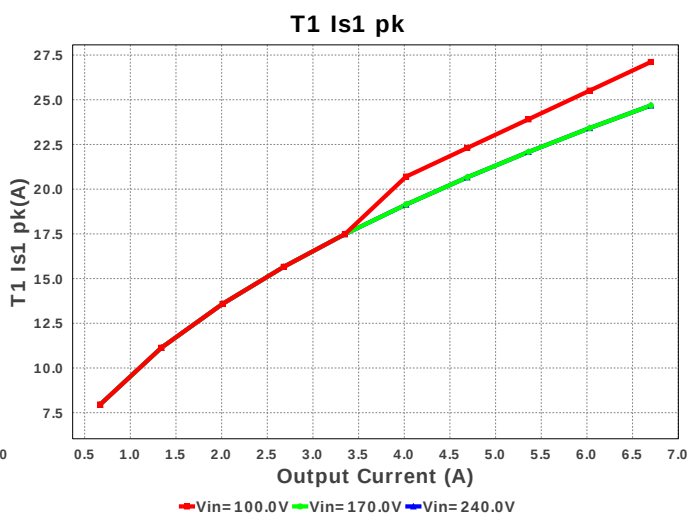
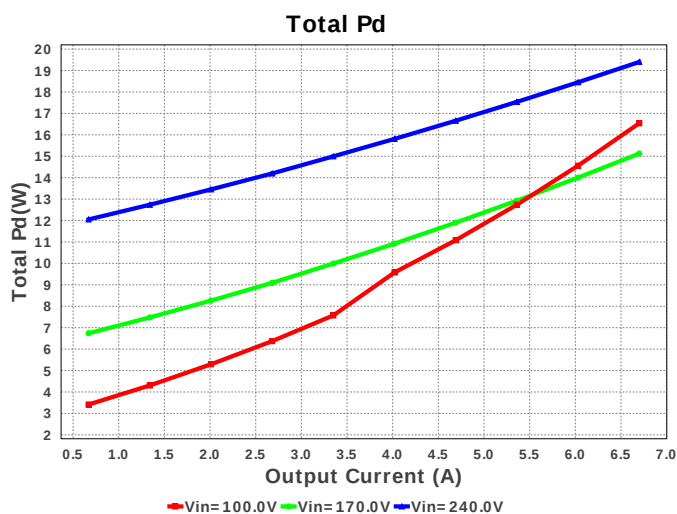
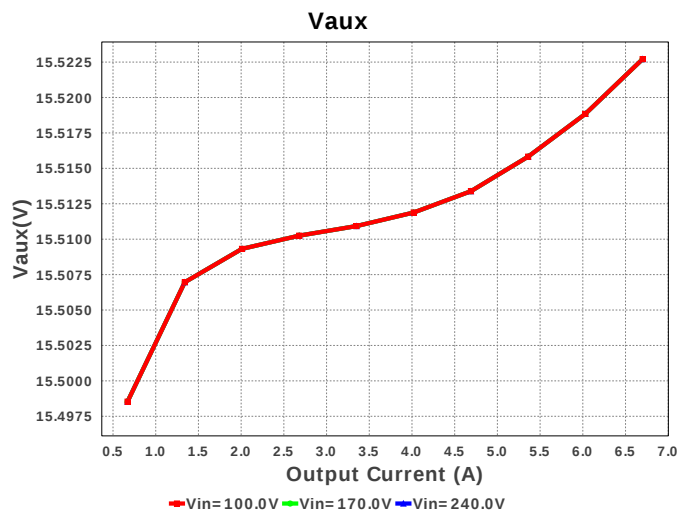
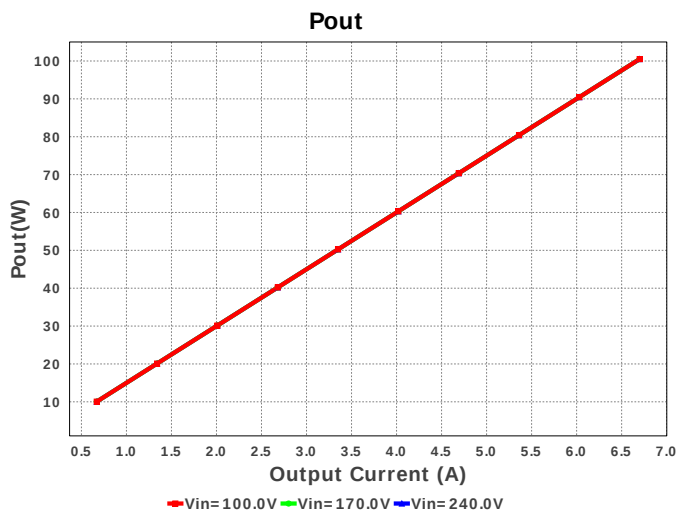


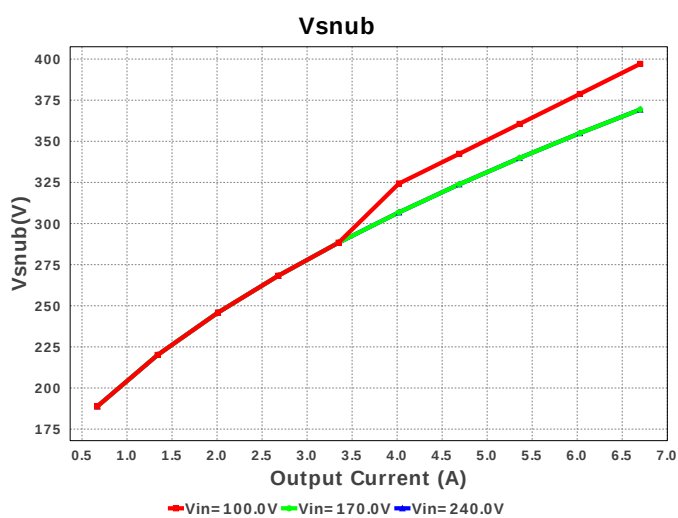
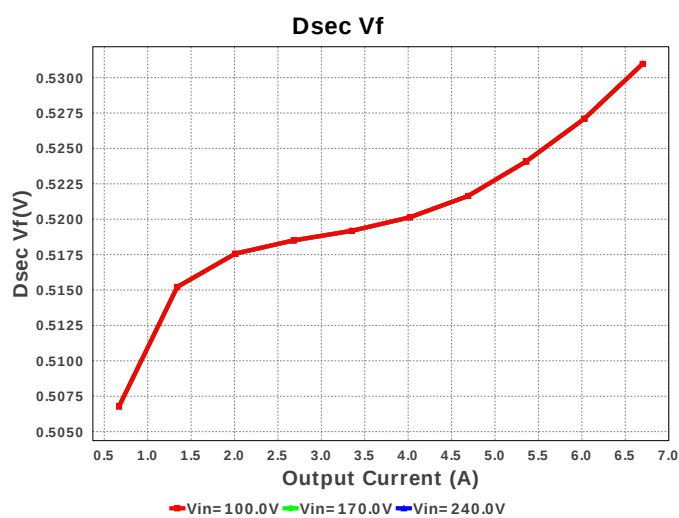
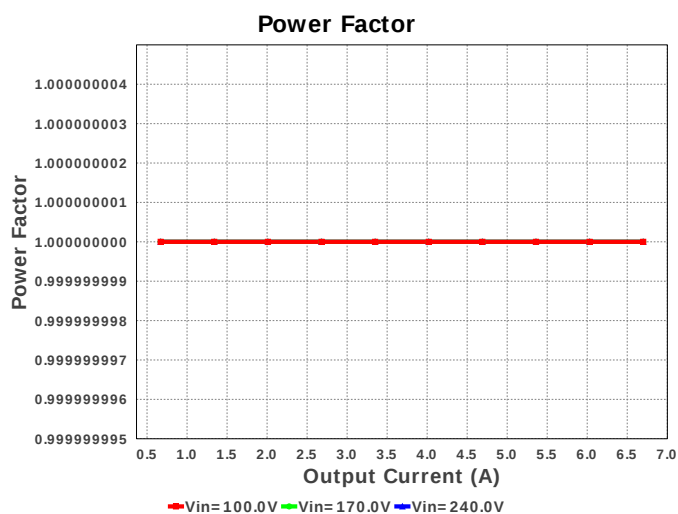
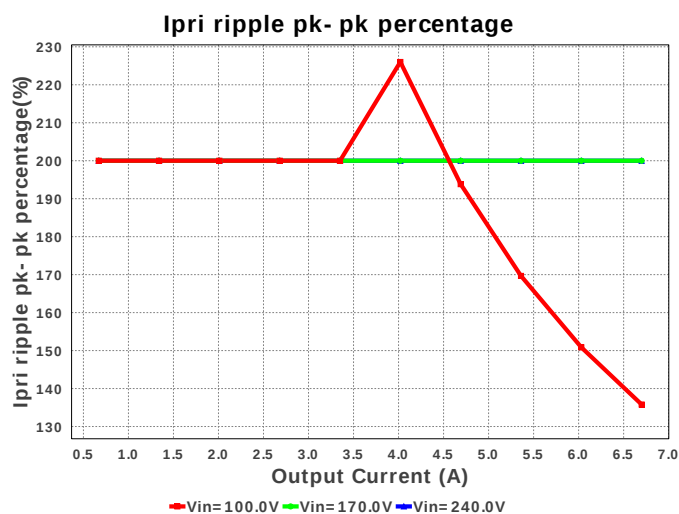
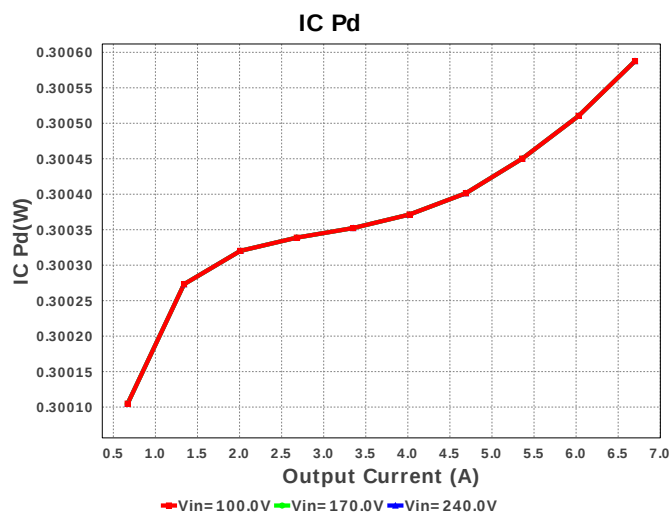
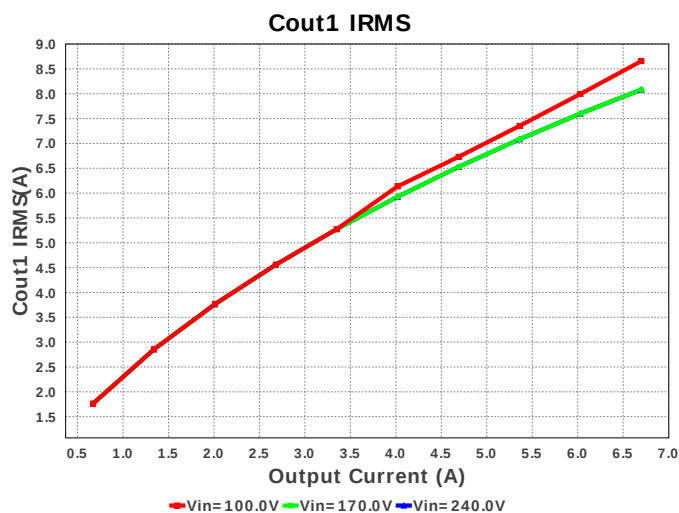
Pd Rstartup

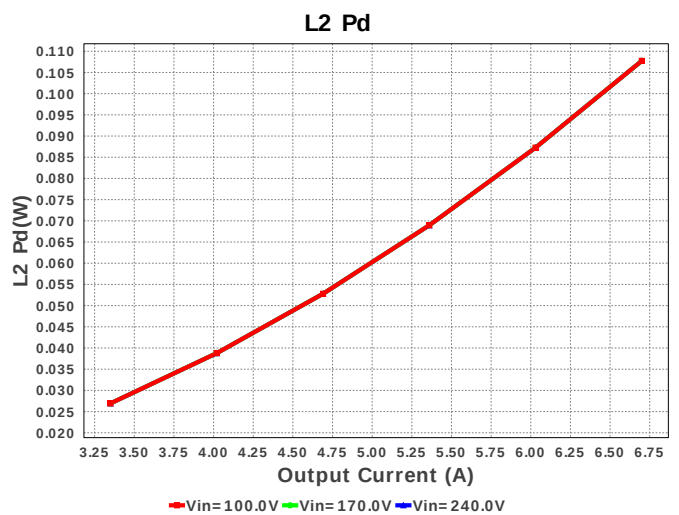
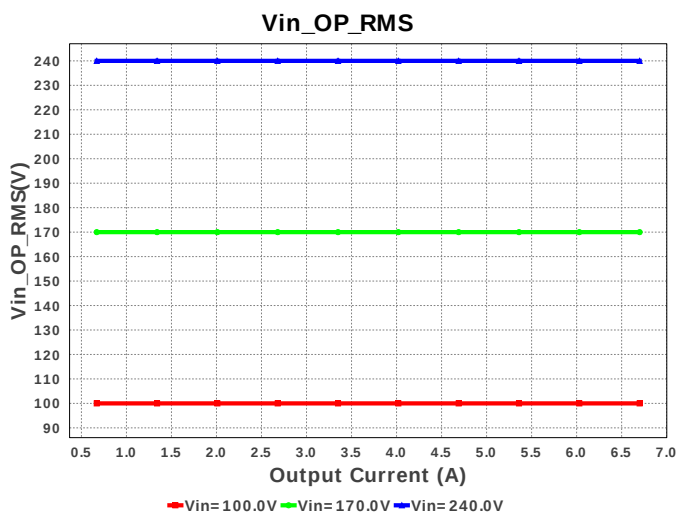
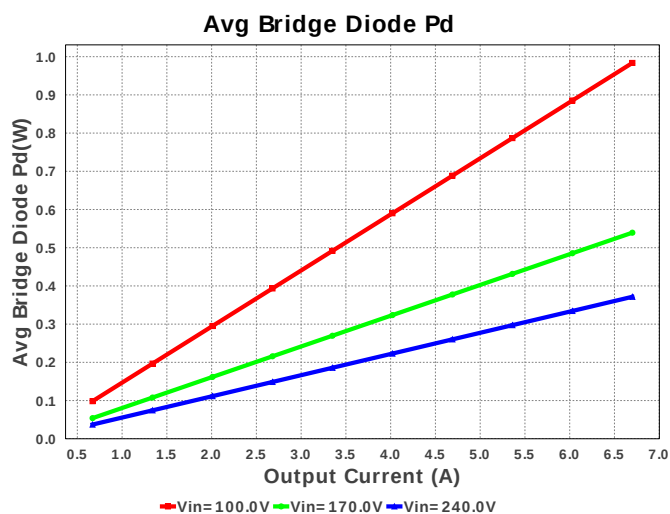
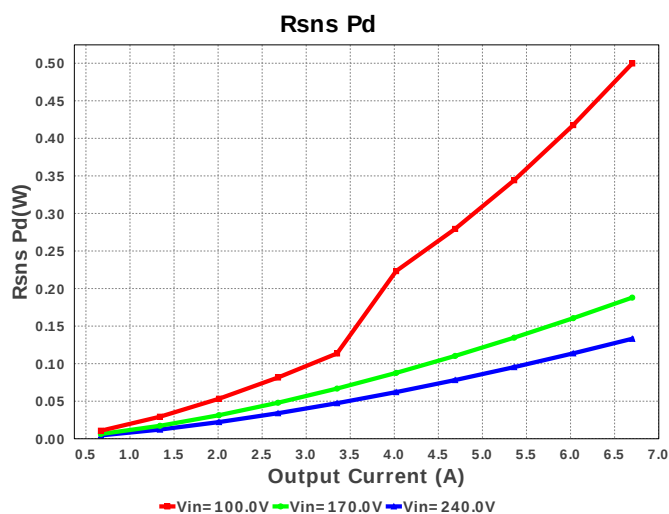
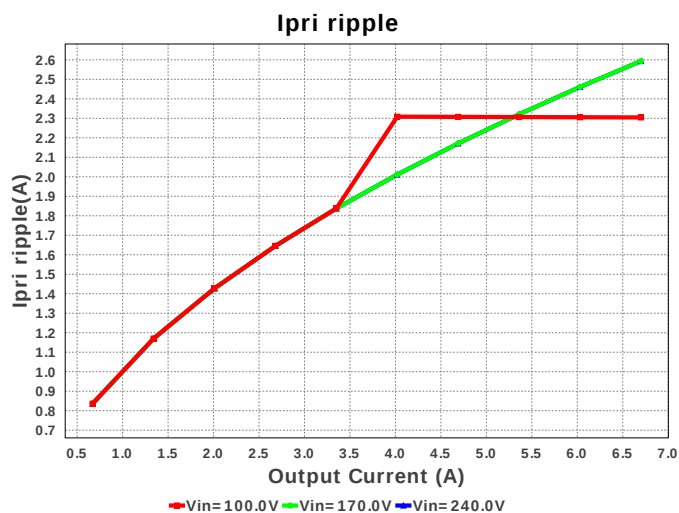
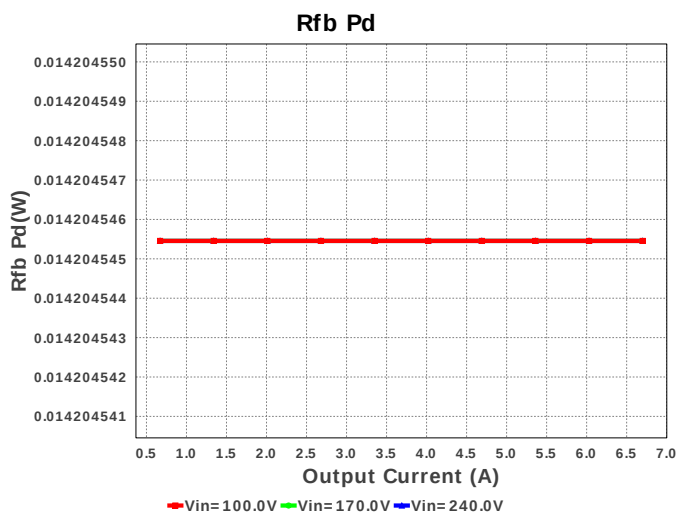


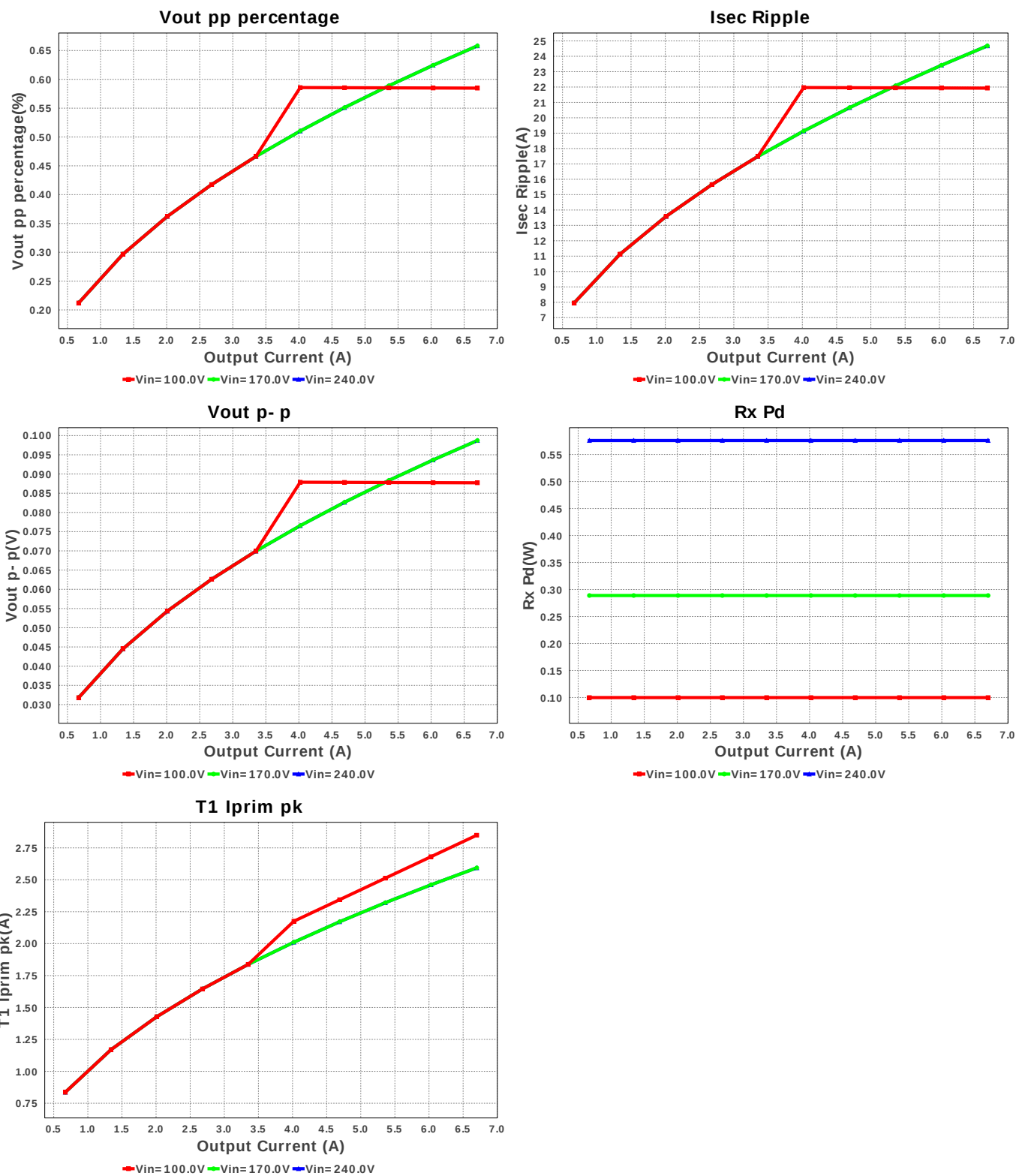












Operating Values

#	Name	Value	Category	Description
1.	Cout1 IRMS	8.657 A	Current	Output capacitor1 RMS ripple current
2.	Iin rms	1.17 A	Current	RMS Input Current
3.	Iout_DCM	3.804 A	Current	Approximate Current below which DCM mode of operation will begin
4.	Ipri Avg	1.021 A	Current	Average Current in Primary Winding over the complete Switching Period
5.	Ipri ripple	2.304 A	Current	Ripple Current in the Primary Winding
6.	Ipri ripple pk-pk percentage	135.796 %	Current	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
7.	Isec Ripple	21.928 A	Current	Ripple Current in the Secondary Winding
8.	T1 Iprim RMS	1.414 A	Current	Transformer Primary RMS Current
9.	T1 Iprim pk	2.849 A	Current	Transformer Primary Peak Current

#	Name	Value	Category	Description
10.	T1 Is1 RMS	10.947 A	Current	Transformer Secondary1 RMS Current
11.	T1 Is1 pk	27.112 A	Current	Transformer Secondary1 Peak Current
12.	AC Frequency	60.0 Hz	General	Input AC frequency
13.	BOM Count	66	General	Total Design BOM count
14.	Daux trr	0.0 ns	General	Auxiliary Diode Reverse Recovery Time
15.	Dsec Vf	530.971 mV	General	Effective Forward Voltage Drop at the Operating Current
16.	Dsec trr	0.0 ns	General	Output Diode Reverse Recovery Time
17.	Dsec2 Vf	530.971 mV	General	Effective Forward Voltage Drop at the Operating Current
18.	Dsnub trr	0.0 ns	General	Snubber Diode Reverse Recovery Time
19.	FootPrint	7.196 k mm ²	General	Total Foot Print Area of BOM components
20.	Frequency	36.211 kHz	General	Switching frequency
21.	Mode	CCM	General	Conduction Mode
22.	Pout	100.5 W	General	Total output power
23.	Power Factor	1.0	General	Assumed Power Factor for the Application
24.	Tdead	0.0 ns	General	Approximate Dead Time of the Regulator
25.	Toff	11.458 us	General	Approximate Converter Off Time
26.	Ton Act	16.615 us	General	Approximate Converter On Time
27.	Total BOM	\$0.0	General	Total BOM Cost
28.	Tsw	27.616 us	General	Switching Time Period
29.	Vaux	15.523 V	General	Auxiliary Voltage
30.	Vsnub	397.084 V	General	Voltage Across the Snubber
31.	Vout Actual	14.97 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
32.	Vout OP	15.0 V	Op_Point	Operational Output Voltage
33.	Duty Cycle	60.164 %	Op_point	Duty cycle
34.	Efficiency	85.868 %	Op_point	Steady state efficiency
35.	IC Tj	63.065 degC	Op_point	IC junction temperature
36.	ICThetaJA	110.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
37.	IOUT_OP	6.7 A	Op_point	Iout operating point
38.	M1 TJOP	61.681 degC	Op_point	M1 MOSFET junction temperature
39.	Peak Rectified Vin	141.42 V	Op_point	Peak voltage seen at rectified input
40.	Vin_OP_RMS	100.0 V	Op_point	AC Input RMS Voltage
41.	Vout p-p	87.714 mV	Op_point	Peak-to-peak output ripple voltage
42.	Avg Bridge Diode Pd	983.597 mW	Power	Average Power Dissipation in the Bridge Diode over the AC Line Period
43.	Cbulk Pd	2.924 W	Power	Bulk capacitor power dissipation
44.	Cout1 Pd	299.787 mW	Power	Output capacitor1 power dissipation
45.	Cx Pd	0.0 W	Power	X-cap Power Dissipation
46.	Cy Pd	0.0 W	Power	Y-caps Power Dissipation
47.	Dsec Pd	1.779 W	Power	Secondary Diode Power Dissipation
48.	Dsec2 Pd	1.779 W	Power	Secondary Diode Power Dissipation
49.	IC Pd	300.588 mW	Power	IC power dissipation
50.	L1 Pd	611.694 mW	Power	Power Dissipation in the Inductor
51.	L2 Pd	107.736 mW	Power	Average Power Dissipation in the Inductor Over the AC Line Period
52.	M1 Pd	506.897 mW	Power	M1 MOSFET total power dissipation
53.	Paux	29.625 mW	Power	Power Dissipation in Raux and Daux
54.	Pd Rstartup	1.468 W	Power	Power Dissipation in Rstartup1 and Rstartup2
55.	Rdrv Pd	76.351 μW	Power	Power Dissipation in Gate Drive Resistor
56.	Rfb Pd	14.205 mW	Power	Rfb Power Dissipation
57.	Rsns Pd	499.726 mW	Power	Current Limit Sense Resistor Power Dissipation
58.	Rx Pd	99.968 mW	Power	Total Power Dissipation in Rx1 and Rx2
59.	Snubber Pd	3.945 W	Power	Snubber Power Dissipation
60.	T1 Pd	5.539 W	Power	Estimated Losses in Transformer
61.	Total Pd	16.54 W	Power	Total Power Dissipation
62.	Vout Tolerance	488.01 m%		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
63.	Vout pp percentage	584.757 m%		Output Voltage ripple percentage

Design Inputs

#	Name	Value	Description
1.	Iout	6.7	Maximum Output Current
2.	VinMax	240.0	Maximum input voltage
3.	VinMin	100.0	Minimum input voltage
4.	Vout	15.0	Output Voltage
5.	line_fsw	0.0	Light Output in Lumen
6.	base_pn	UC2842	Base Product Number
7.	source	AC	Input Source Type
8.	Ta	30.0	Ambient temperature
9.	UserFsw	32.887 k	Customer Selected Frequency

Design Assistance

1. **UC2842** Product Folder : <http://www.ti.com/product/UC2842> : contains the data sheet and other resources.

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

Use of Texas Instruments' WEBENCH simulation tools is subject to [Texas Instruments' Site Terms and Conditions of Use](#). Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the [Evaluation License Agreement](#).