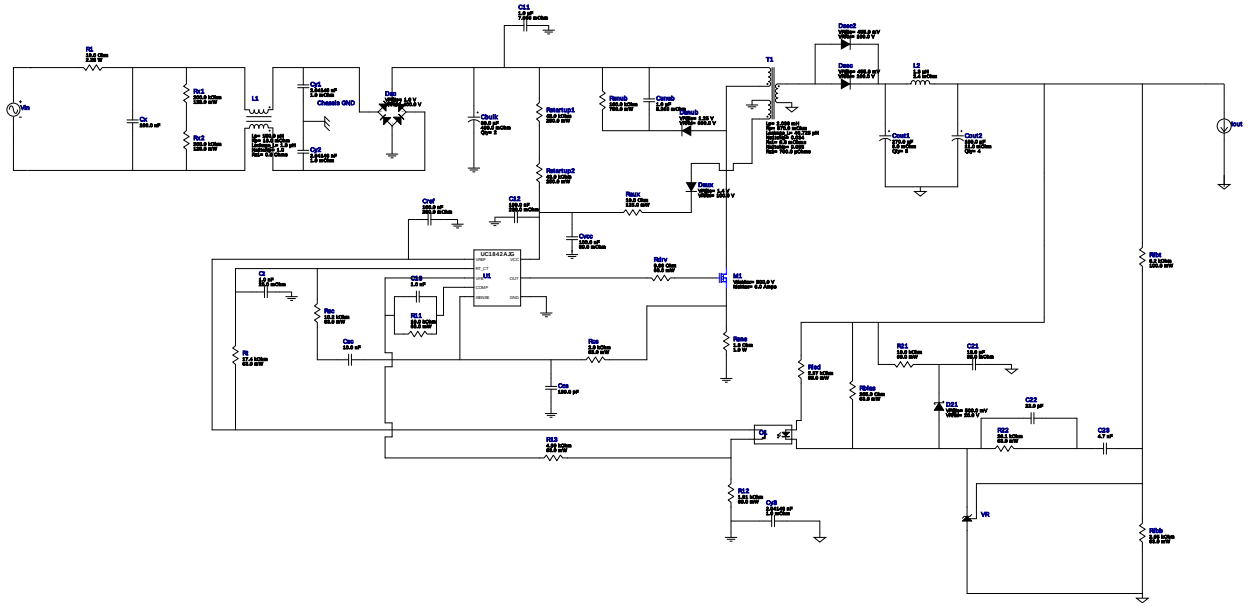
VinMin = 110.0V
VinMax = 130.0V
Vout = 5.0V
Iout = 5.0A

Device = UC1842AJ
Topology = Flyback
Created = 7/13/16 1:29:40 AM
BOM Cost = $0.00
BOM Count = 59
Total Pd = 4.37W

WEBENCH® Design Report

Design : 4354344/46 UC1842AJ
UC1842AJ 110.0V-130.0V to 5.00V @ 5.0A



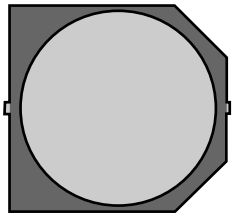
1. The EMI filter selected here contains the estimated values. The real numbers will depend on the attenuation needed at a particular frequency.

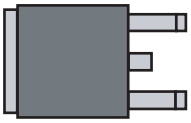
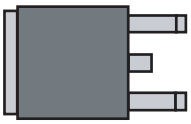
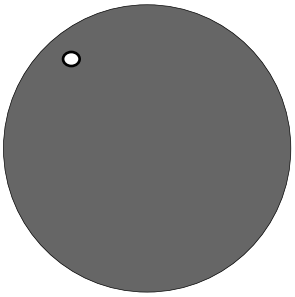
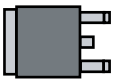
My Comments

No comments

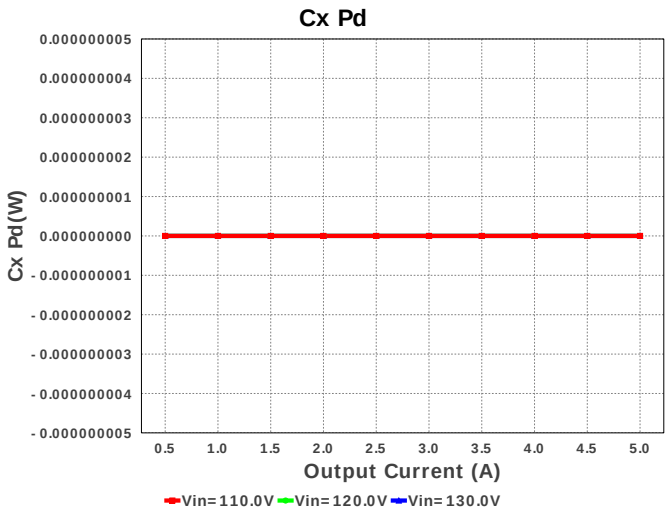
Electrical BOM

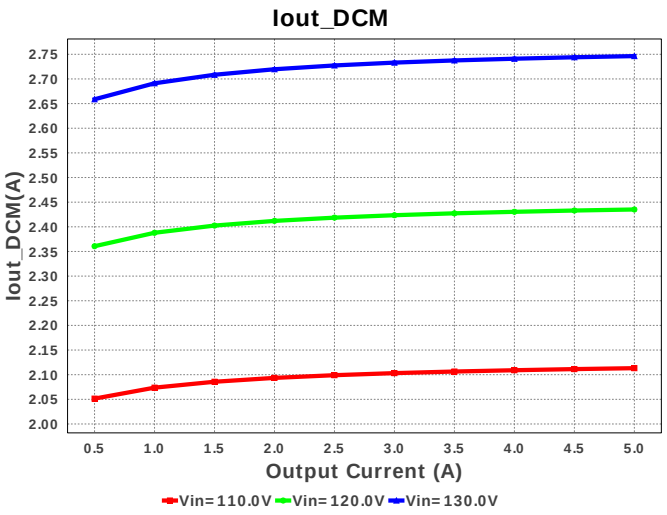
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C11	MuRata	GRM55DR72E105KW01L Series= X7R	Cap= 1.0 uF ESR= 7.086 mOhm VDC= 250.0 V IRMS= 2.0605 A	1	$0.26	2220_200 54 mm²
2.	C12	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
3.	C13	Samsung Electro-Mechanics	CL21C102JBCNFNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	C21	Panasonic	50SVPF18M Series= ?	Cap= 18.0 uF ESR= 35.0 mOhm VDC= 50.0 V IRMS= 2.7 A	1	$0.53	CAPSMT_62_E7 106 mm²
5.	C22	Kemet	C0805C220K3GACTU Series= C0G/NP0	Cap= 22.0 pF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
6.	C23	Yageo America	CC0805KRX7R9BB472 Series= X7R	Cap= 4.7 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²

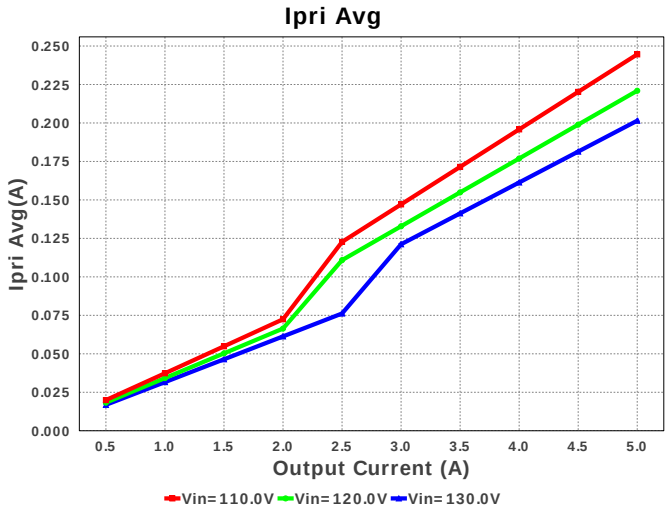
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	Cbulk	Panasonic	EEV-EB2E330SM Series= ?	Cap= 33.0 uF ESR= 400.0 mOhm VDC= 250.0 V IRMS= 560.0 mA	2	$1.25	 EB_K16 483 mm²
8.	Ccs	Kemet	C0805C181K5GACTU Series= C0G/NP0	Cap= 180.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	 0805 7 mm²
9.	Cout1	Panasonic	16SVPG270M Series= ?	Cap= 270.0 uF ESR= 8.0 mOhm VDC= 16.0 V IRMS= 5.8 A	3	$0.70	 CAPSMT_62_C10 74 mm²
10.	Cout2	Panasonic	16SVPE180M Series= SVPE	Cap= 180.0 uF ESR= 11.0 mOhm VDC= 16.0 V IRMS= 4.46 A	4	$0.49	 CAPSMT_62_C10 74 mm²
11.	Cref	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 mm²
12.	Csc	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	 0805 7 mm²
13.	Csnub	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 mm²
14.	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 mm²
15.	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 mm²
16.	Cx	TDK	B32913A5104M000 Series= 2231	Cap= 100.0 nF VDC= 1000.0 V IRMS= 0.0 A	1	$0.46	 B32913_2650x600x1500 228 mm²
17.	Cy1	CUSTOM	CUSTOM Series= ?	Cap= 2.04148 nF ESR= 1.0 mOhm VDC= 220.62 V IRMS= 500.0 uA	1	NA	CUSTOM 0 mm²
18.	Cy2	CUSTOM	CUSTOM Series= ?	Cap= 2.04148 nF ESR= 1.0 mOhm VDC= 220.62 V IRMS= 500.0 uA	1	NA	CUSTOM 0 mm²
19.	Cy3	CUSTOM	CUSTOM Series= ?	Cap= 2.04148 nF ESR= 1.0 mOhm VDC= 220.62 V IRMS= 500.0 uA	1	NA	CUSTOM 0 mm²
20.	D21	Diodes Inc.	B220-13-F	VF@Io= 500.0 mV VRRM= 20.0 V	1	$0.08	 SMB 44 mm²
21.	Dac	Diodes Inc.	HD04-T	VF@Io= 1.0 V VRRM= 400.0 V	1	$0.12	 MiniDIP 62 mm²

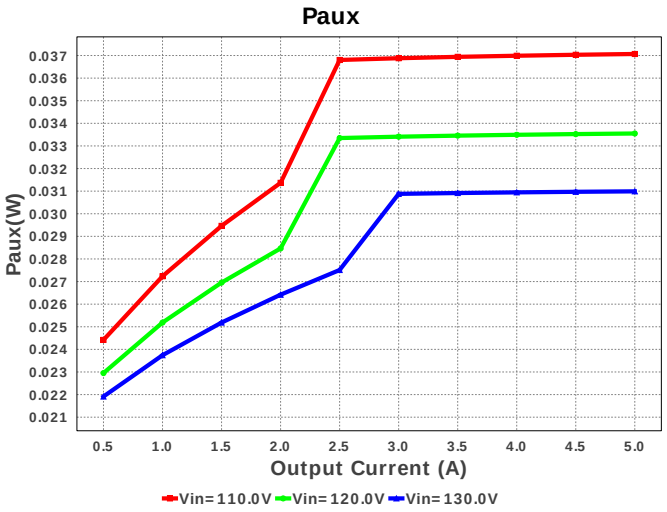
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
22.	Daux	NXP Semiconductor	BAS316,115	VF@Io= 1.4 V VRRM= 100.0 V	1	$0.02	 SOD-323 9 mm²
23.	Dsec	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	$1.33	 DDPAK 210 mm²
24.	Dsec2	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	$1.33	 DDPAK 210 mm²
25.	Dsnub	Diodes Inc.	MURS160-13-F	VF@Io= 1.25 V VRRM= 600.0 V	1	$0.11	 SMB 44 mm²
26.	L1	API Delevan	CM6296R-154	Lp= 150.0 µH Rp= 16.0 mOhm Leakage_L= 1.8 µH Ns1toNp= 1.0 Rs1= 0.0 Ohms	1	$5.95	 CM6296 833 mm²
27.	L2	Coilcraft	MLC1250-132MLB	L= 1.3 µH DCR= 2.4 mOhm	1	$0.79	 MLC1250 165 mm²
28.	M1	Fairchild Semiconductor	FDD6N50TM	VdsMax= 500.0 V IdsMax= 6.0 Amps	1	$0.47	 DPAK 102 mm²
29.	O1	Vishay-Semiconductor	TCMT1109	Optocoupler	1	$0.21	 SOP-4 44 mm²
30.	R1	Vishay-Dale	AC03000001009JACCS Series= F_RES	Res= 10.0 Ohm Power= 2.25 W Tolerance= 5.0%	1	$0.30	 AC03 158 mm²
31.	R11	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
32.	R12	Vishay-Dale	CRCW04021K91FKED Series= CRCW..e3	Res= 1.91 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
33.	R13	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
34.	R21	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
35.	R22	Vishay-Dale	CRCW040226K1FKED Series= CRCW..e3	Res= 26.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
36.	Raux	Vishay-Dale	CRCW080510R0FKEA Series= CRCW..e3	Res= 10.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm²

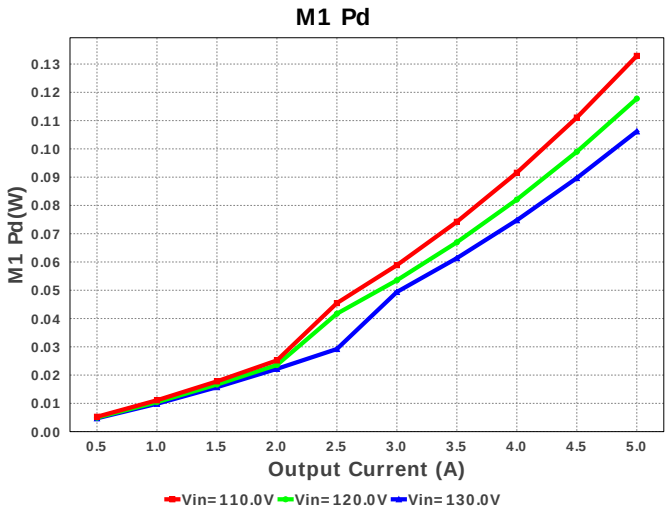
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
37.	Rbias	Vishay-Dale	CRCW0402205RFKED Series= CRCW..e3	Res= 205.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
38.	Rcs	Vishay-Dale	CRCW04022K00FKED Series= CRCW..e3	Res= 2.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
39.	Rdrv	Vishay-Dale	CRCW04028R66FKED Series= CRCW..e3	Res= 8.66 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
40.	Rfbb	Vishay-Dale	CRCW04022K05FKED Series= CRCW..e3	Res= 2.05 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
41.	Rfbt	Yageo America	RC0603FR-076K2L Series= ?	Res= 6.2 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm²
42.	Rled	Vishay-Dale	CRCW04022K37FKED Series= CRCW..e3	Res= 2.37 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
43.	Rsc	Vishay-Dale	CRCW040210K2FKED Series= CRCW..e3	Res= 10.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
44.	Rsns	Panasonic	ERJ-1TRQF1R3U Series= ?	Res= 1.3 Ohm Power= 1.0 W Tolerance= 1.0%	1	$0.19	2512 43 mm²
45.	Rsnub	Vishay-Dale	CRCW2010160KFKEF Series= ?	Res= 160.0 kOhm Power= 750.0 mW Tolerance= 1.0%	1	$0.03	2010 32 mm²
46.	Rstartup1	Yageo America	RC1206FR-0743KL Series= ?	Res= 43.0 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm²
47.	Rstartup2	Yageo America	RC1206FR-0743KL Series= ?	Res= 43.0 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm²
48.	Rt	Vishay-Dale	CRCW040217K4FKED Series= CRCW..e3	Res= 17.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
49.	Rx1	Panasonic	ERJ-6ENF2003V Series= ERJ-6E	Res= 200.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm²
50.	Rx2	Panasonic	ERJ-6ENF2003V Series= ERJ-6E	Res= 200.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm²
51.	T1	CUSTOM	CUSTOM	Lp= 2.036 mH Rp= 870.0 mOhm Leakage_L= 40.725 µH Ns1toNp= 0.034 Rs1= 8.6 mOhms Ns2toNp= 0.095 Rs2= 700.0 µOhms	1	NA	CUSTOM 0 mm²
52.	U1	Texas Instruments	UC1842AJ	Switcher	1	$13.89	JG0008A 111 mm²
53.	VR	Texas Instruments	LMV431CM5/NOPB	Voltage References	1	$0.16	R-PDSO-G3 16 mm²

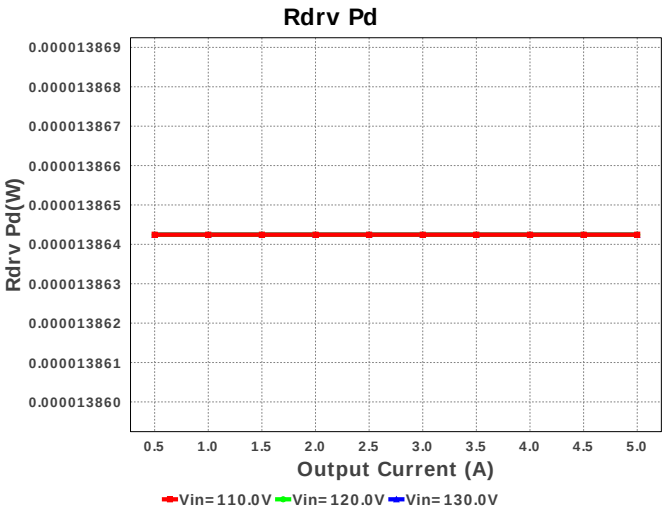


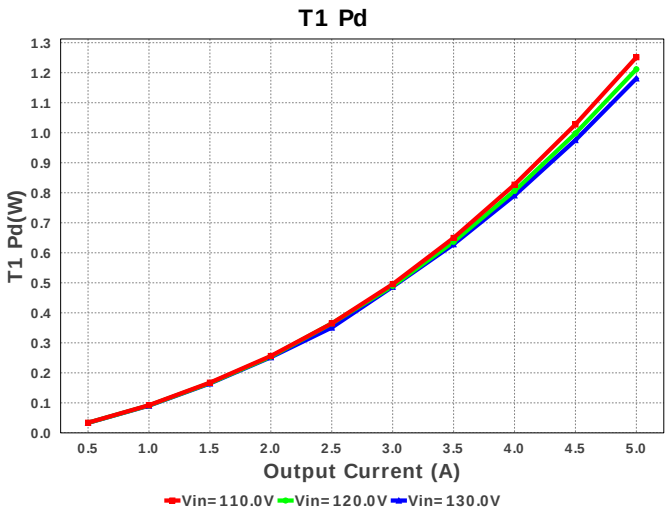


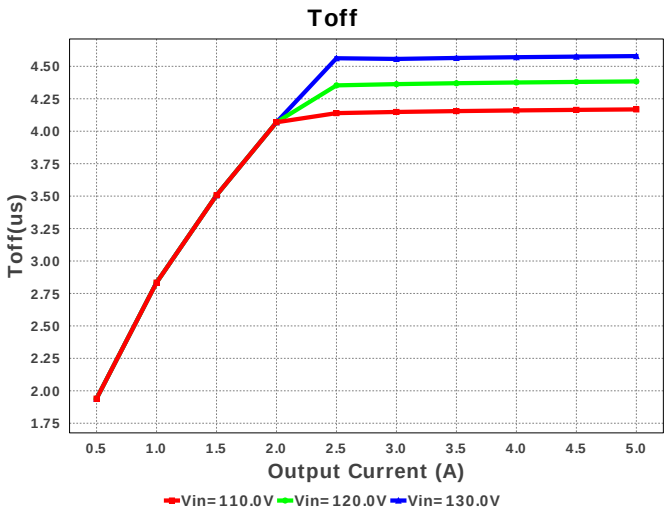


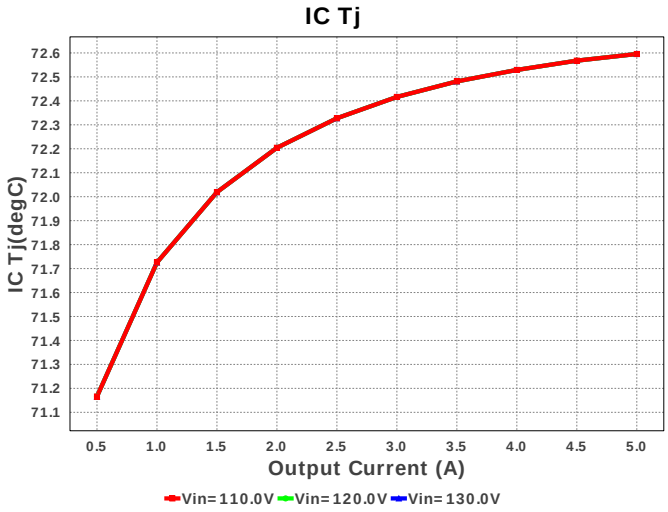


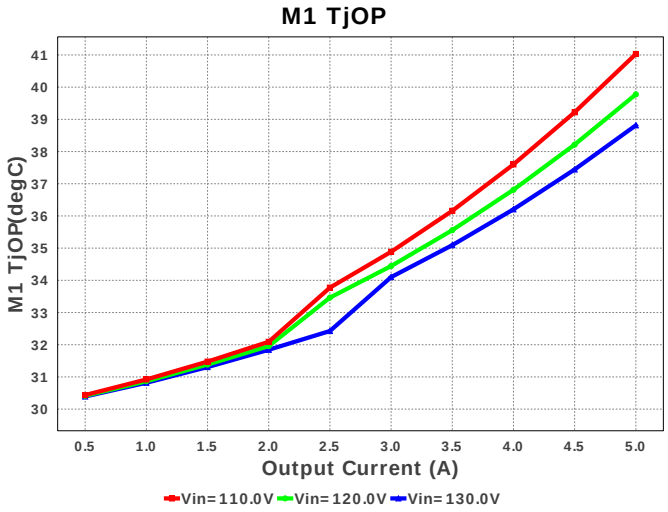


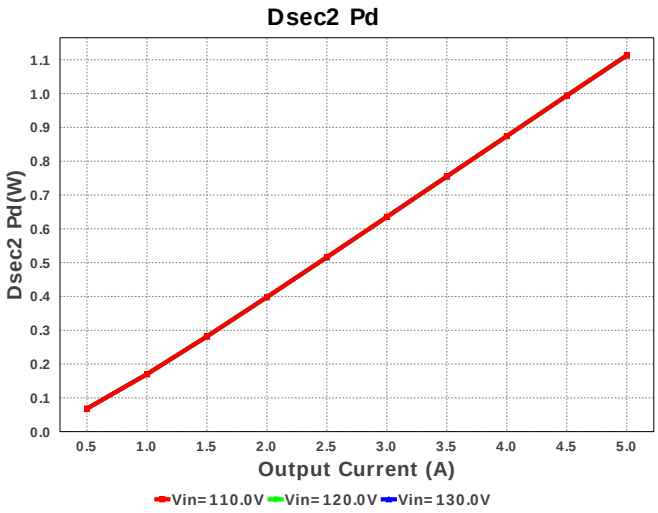


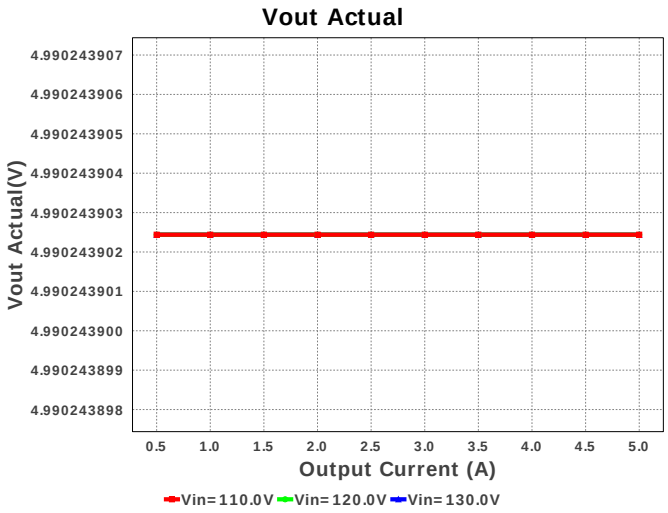




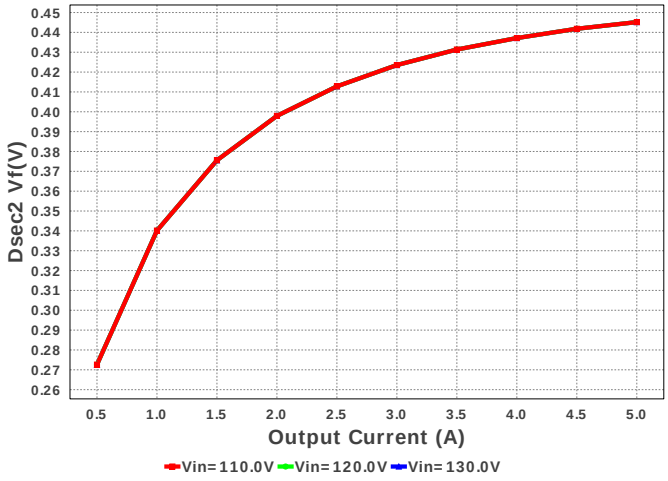




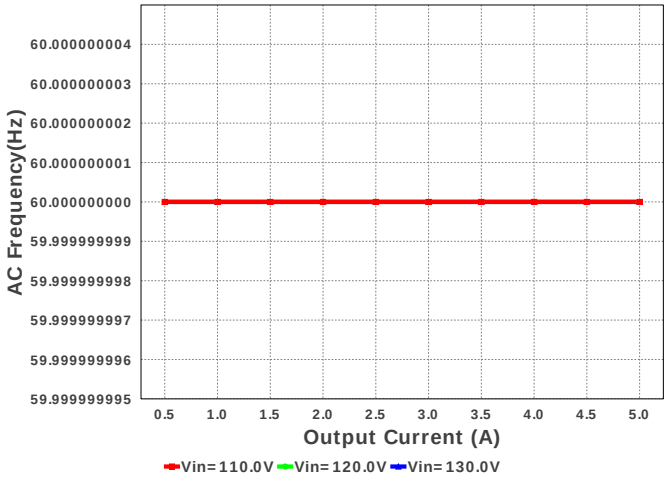




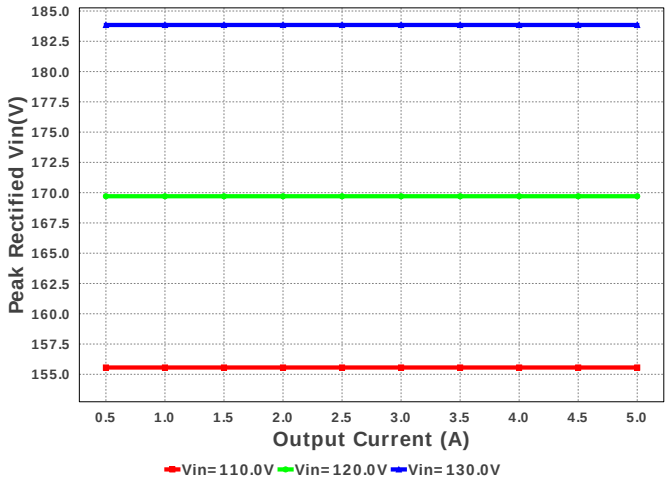
Dsec2 Vf



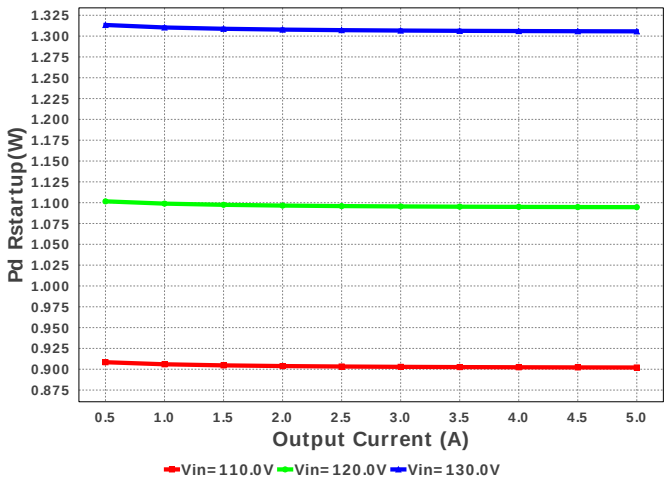
AC Frequency



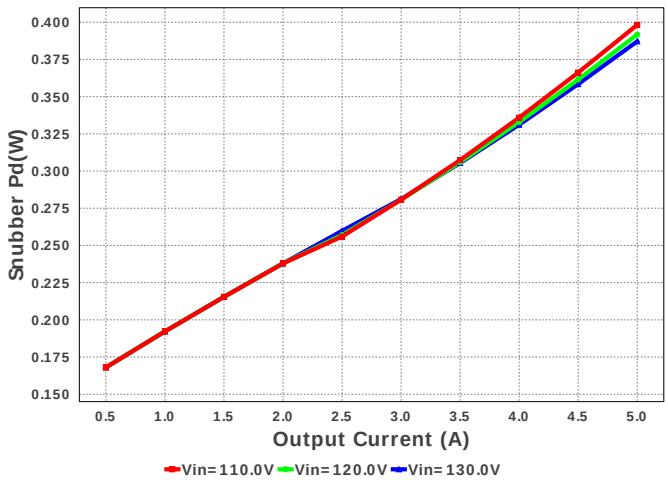
Peak Rectified Vin



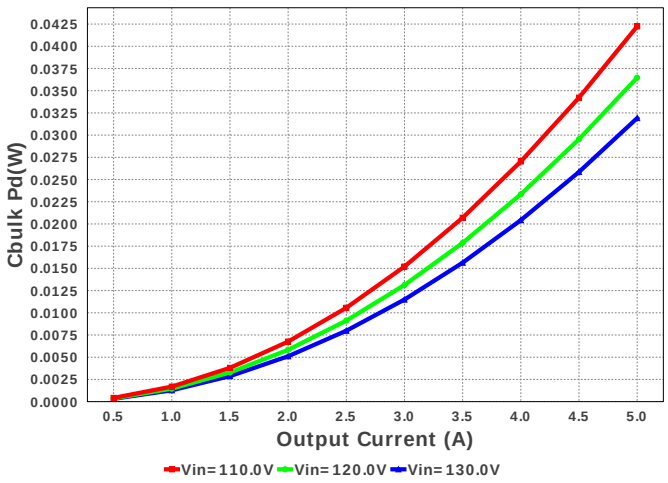
Pd Rstartup

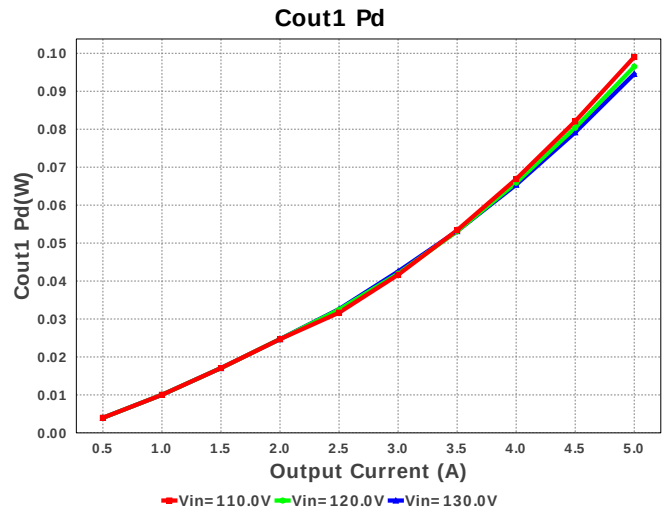


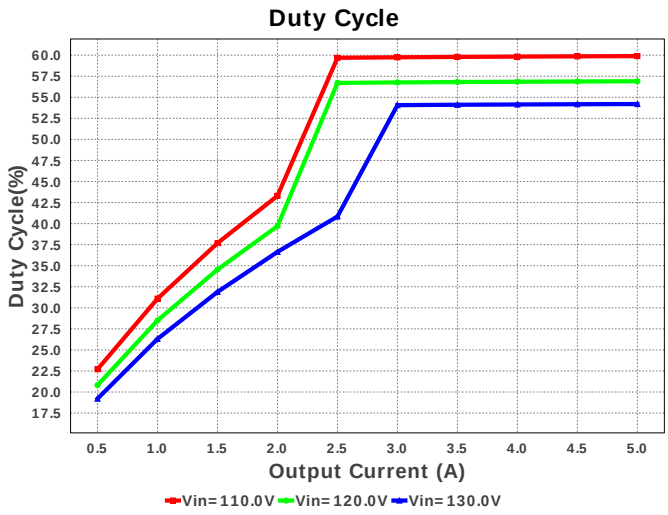
Snubber Pd

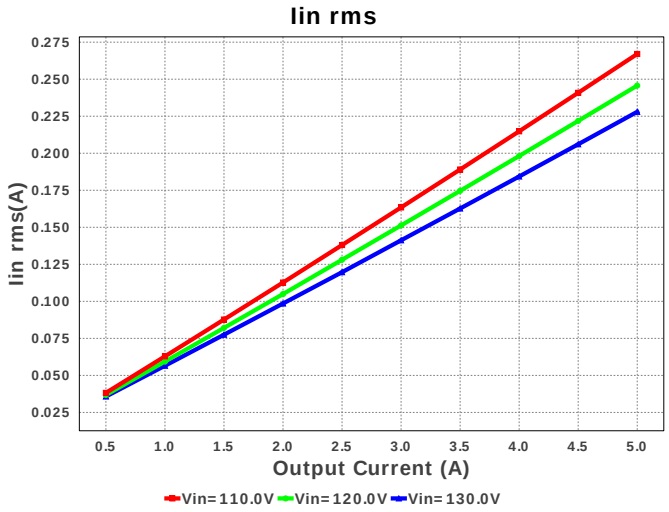


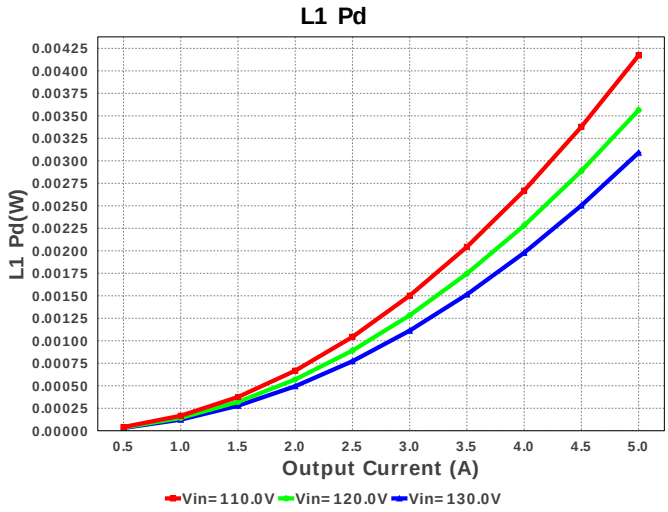
Cbulk Pd

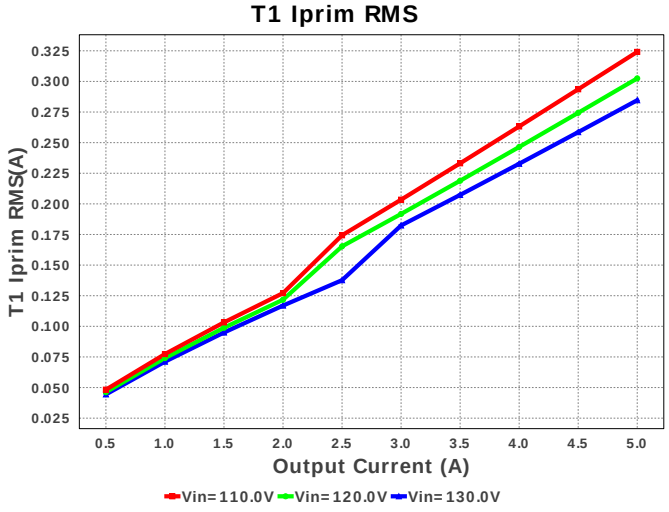


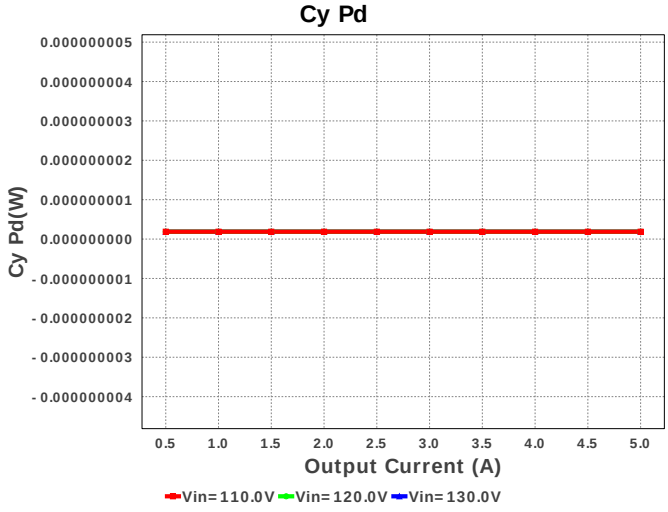


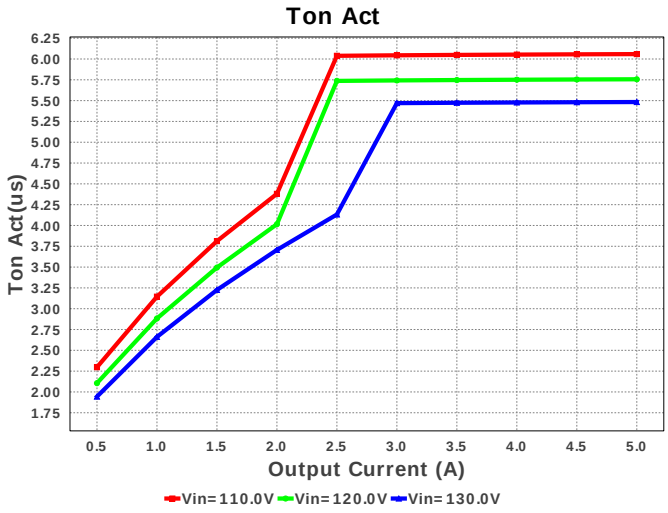


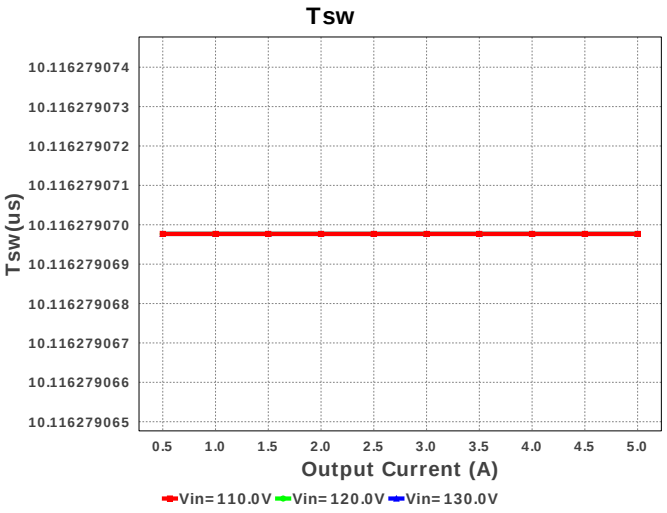


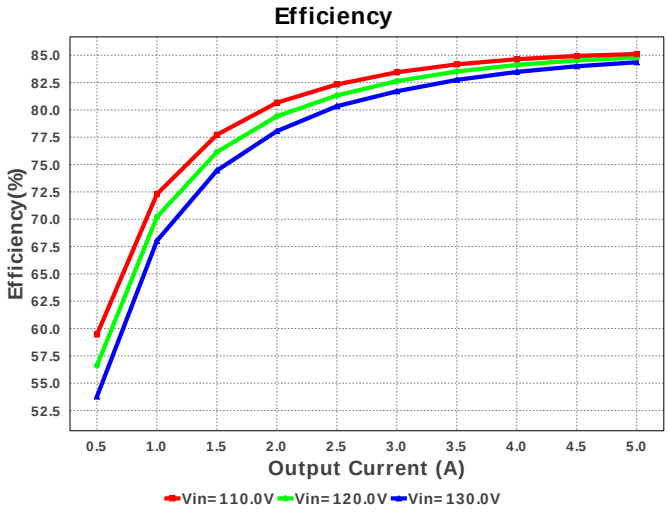


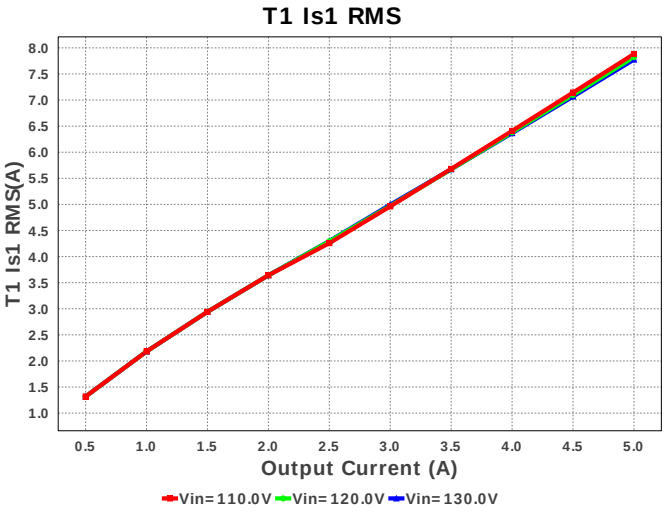


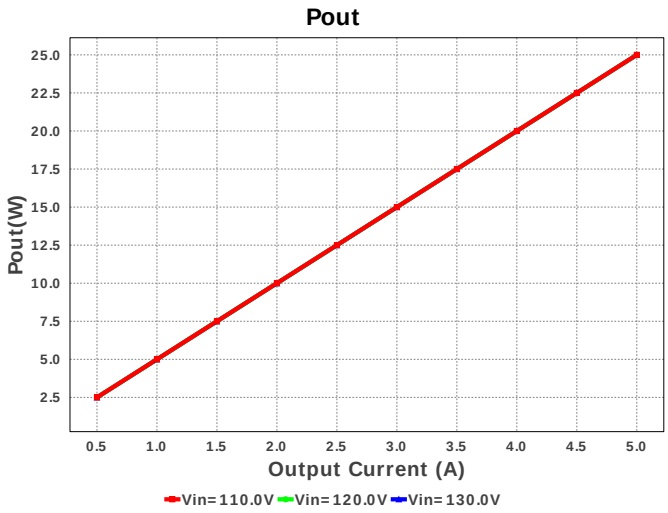


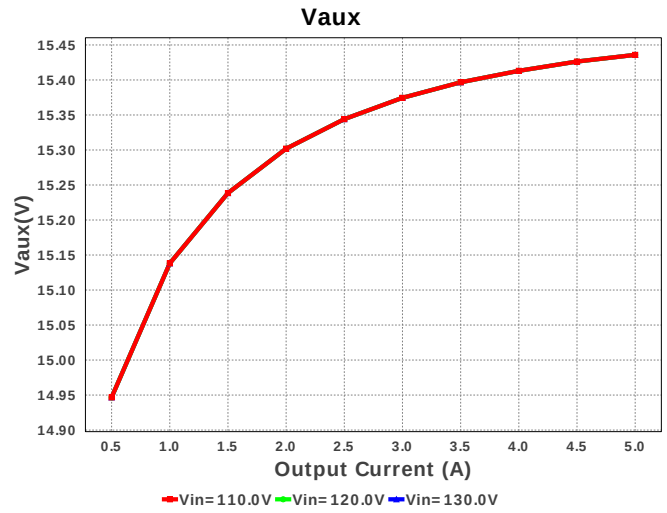


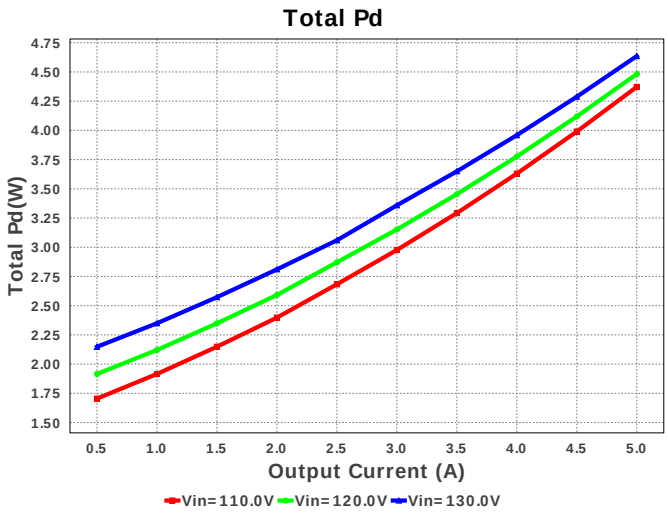


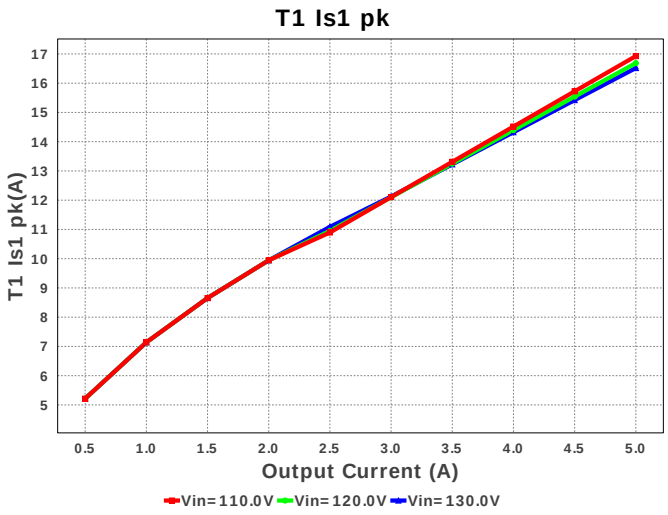


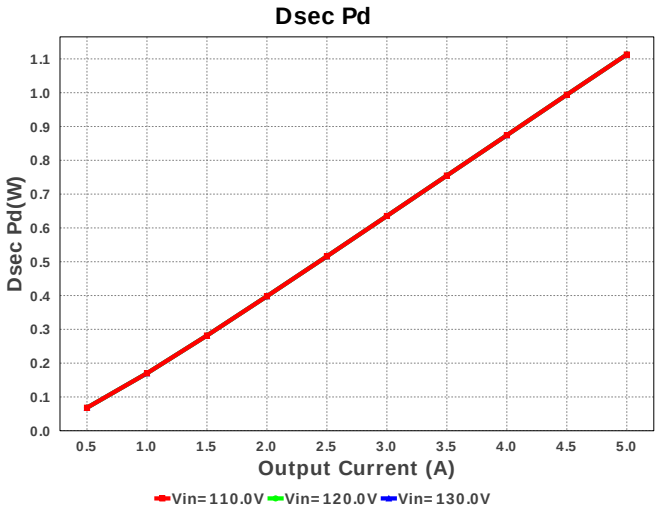


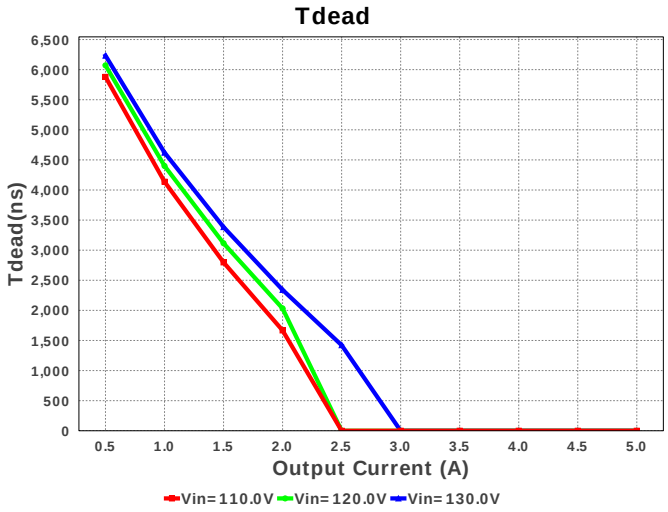


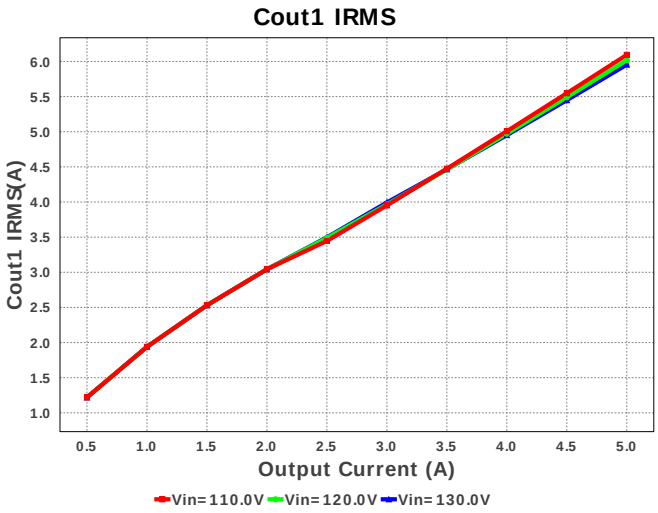


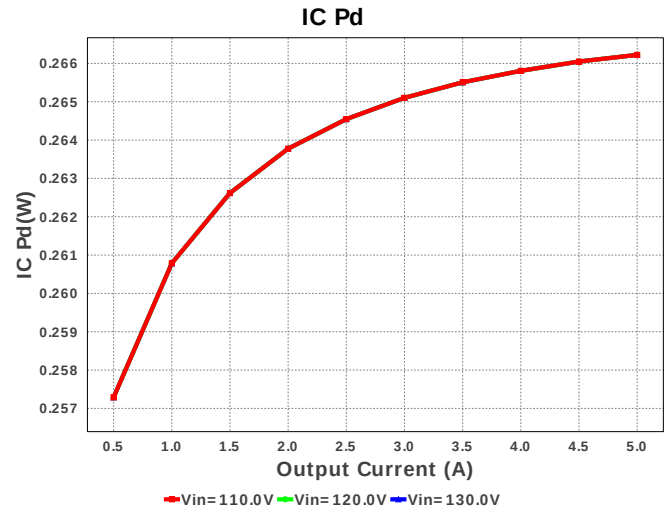


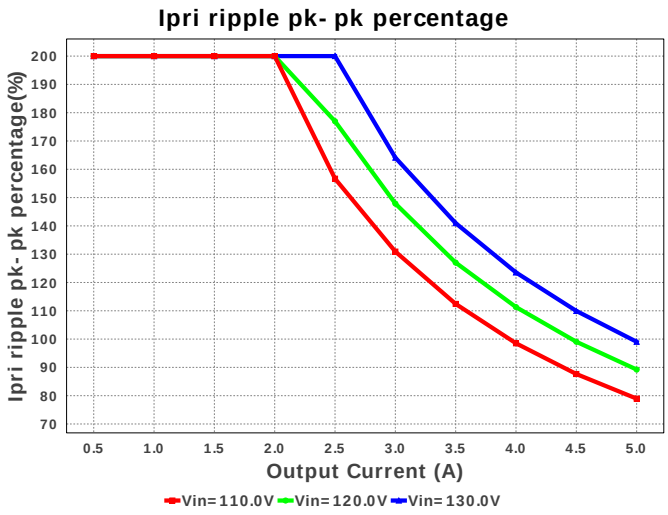


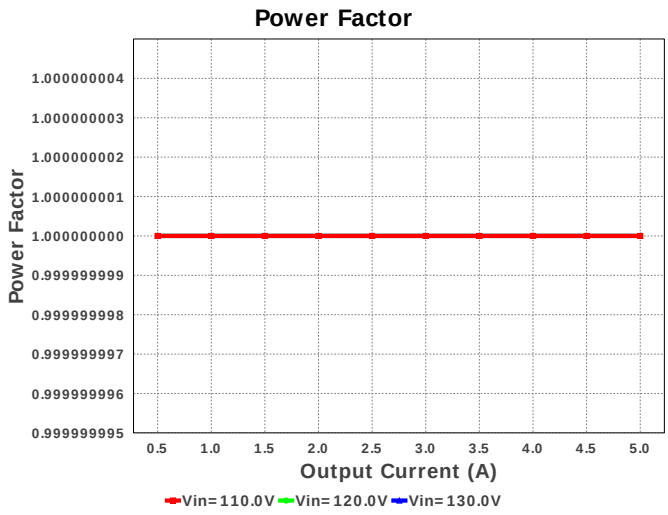


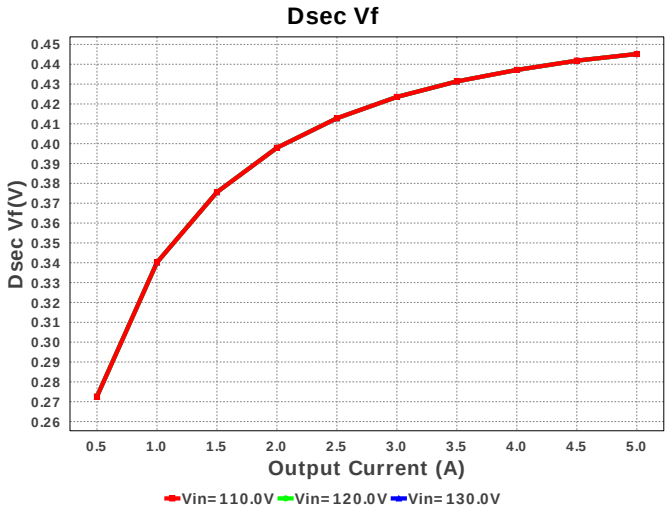


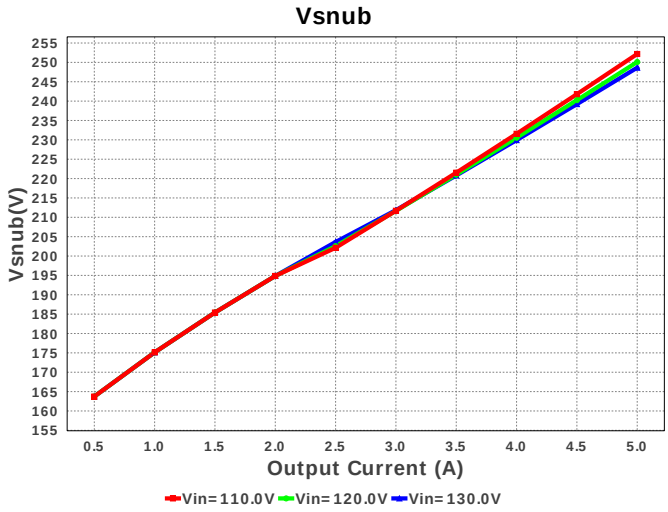


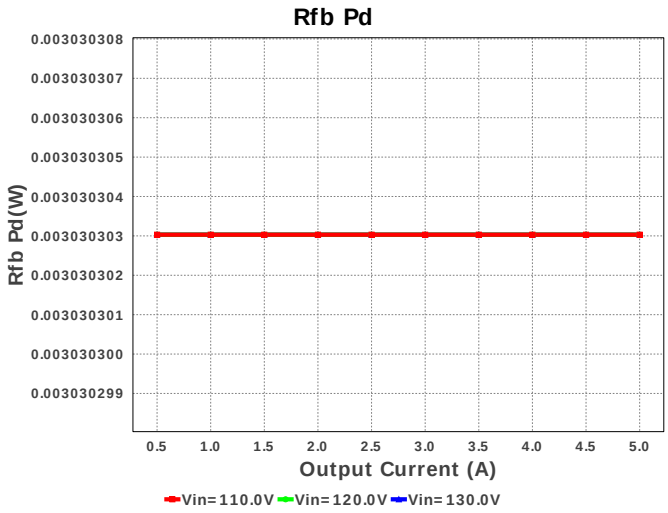


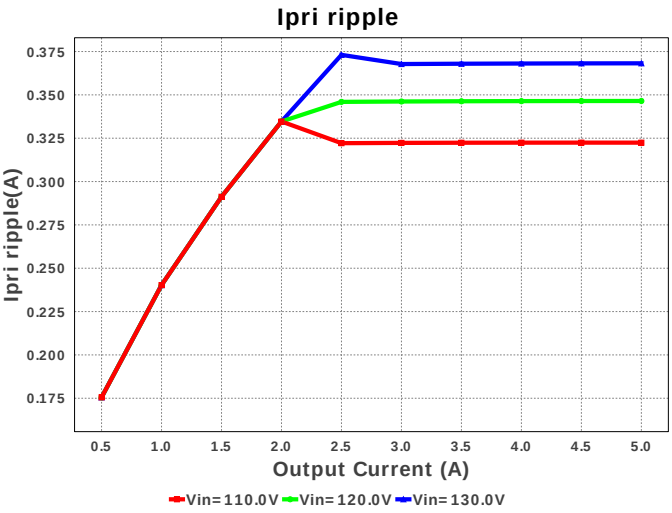


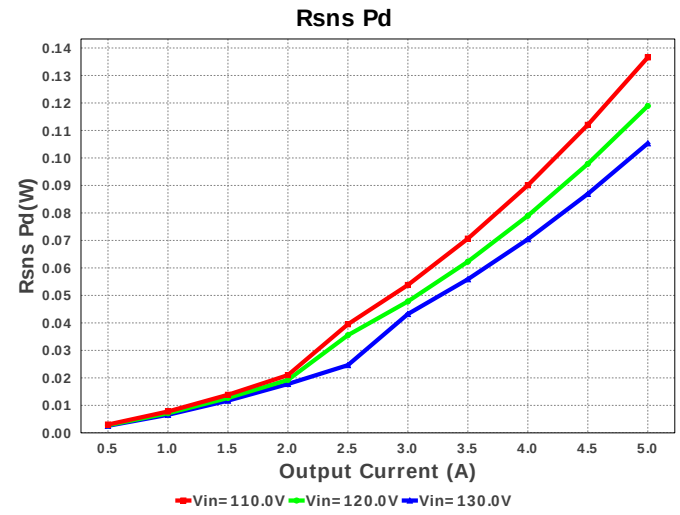


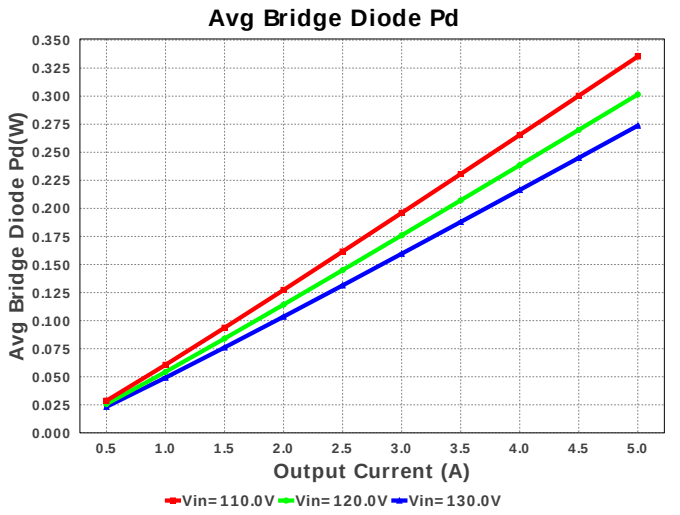


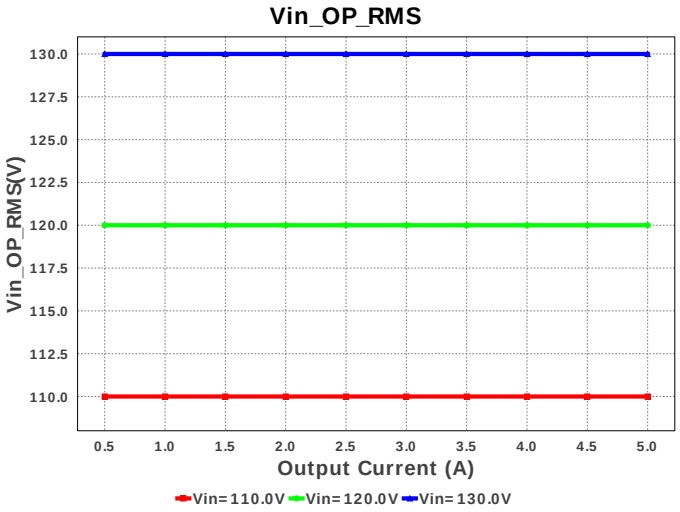


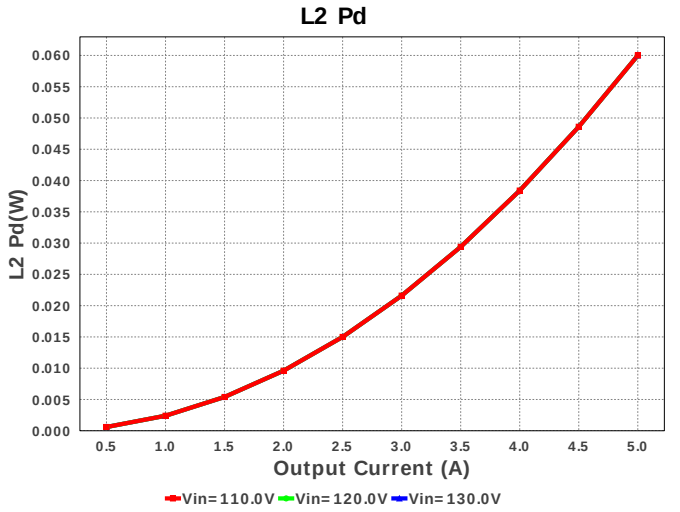


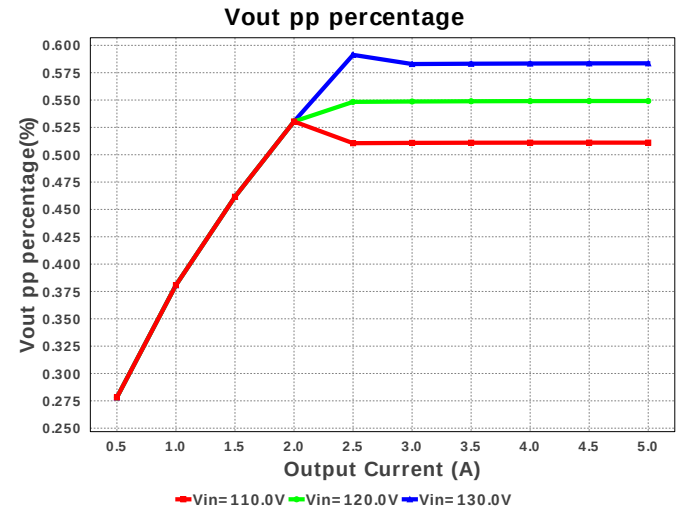


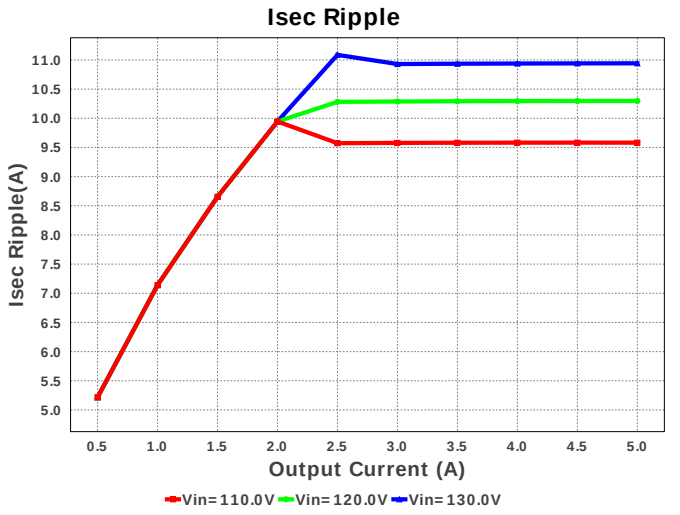


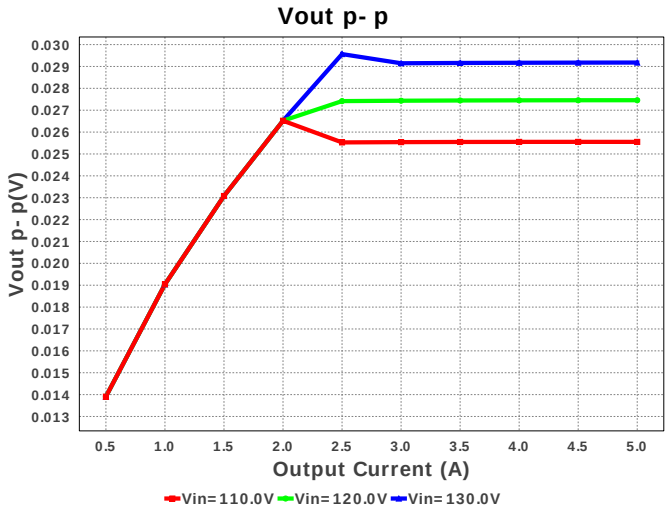


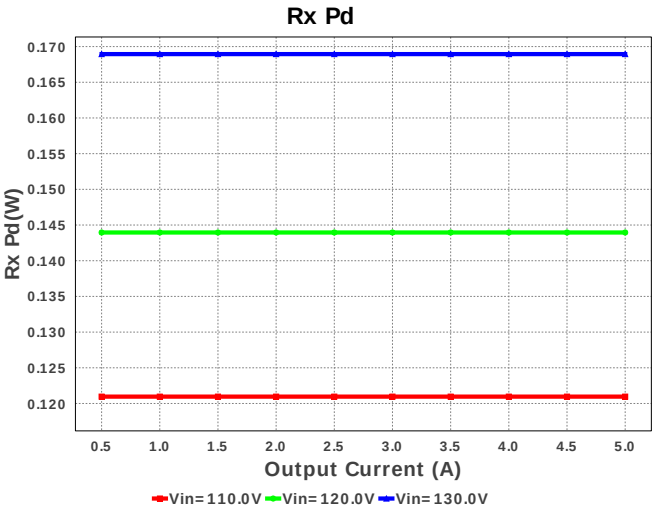


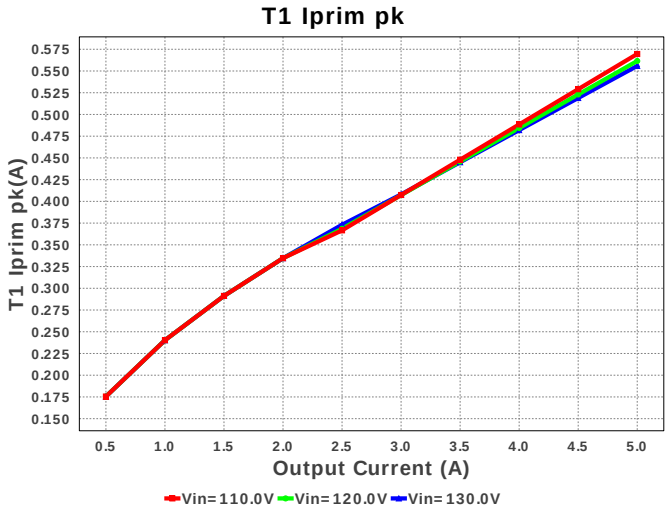












Operating Values

#	Name	Value	Category	Description
1.	Cout1 IRMS	6.094 A	Current	Output capacitor1 RMS ripple current
2.	Iin rms	267.02 mA	Current	RMS Input Current
3.	Iout_DCM	2.113 A	Current	Approximate Current below which DCM mode of operation will begin
4.	Ipri Avg	244.572 mA	Current	Average Current in Primary Winding over the complete Switching Period
5.	Ipri ripple	322.438 mA	Current	Ripple Current in the Primary Winding
6.	Ipri ripple pk-pk percentage	78.961 %	Current	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
7.	Isec Ripple	9.582 A	Current	Ripple Current in the Secondary Winding
8.	T1 Iprim RMS	324.13 mA	Current	Transformer Primary RMS Current
9.	T1 Iprim pk	569.57 mA	Current	Transformer Primary Peak Current
10.	T1 Is1 RMS	7.882 A	Current	Transformer Secondary1 RMS Current
11.	T1 Is1 pk	16.926 A	Current	Transformer Secondary1 Peak Current
12.	AC Frequency	50.0 Hz	General	Input AC frequency
13.	BOM Count	59	General	Total Design BOM count
14.	Daux trr	4.0 ns	General	Auxiliary Diode Reverse Recovery Time
15.	Dsec Vf	445.177 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	445.177 mV	General	Effective Forward Voltage Drop at the Operating Current
18.	Dsnub trr	50.0 ns	General	Snubber Diode Reverse Recovery Time
19.	FootPrint	4.169 k mm^2	General	Total Foot Print Area of BOM components
20.	Frequency	98.851 kHz	General	Switching frequency
21.	Pout	25.0 W	General	Total output power
22.	Power Factor	1.0	General	Assumed Power Factor for the Application
23.	Tdead	0.0 ns	General	Approximate Dead Time of the Regulator
24.	Toff	4.168 us	General	Approximate Converter Off Time
25.	Ton Act	6.059 us	General	Approximate Converter On Time
26.	Total BOM	$0.0	General	Total BOM Cost
27.	Tsw	10.116 us	General	Switching Time Period
28.	Vaux	15.436 V	General	Auxiliary Voltage
29.	Vsnub	252.168 V	General	Voltage Across the Snubber

#	Name	Value	Category	Description
30.	Vout Actual	4.99 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
31.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
32.	Duty Cycle	59.893 %	Op_point	Duty cycle
33.	Efficiency	85.115 %	Op_point	Steady state efficiency
34.	IC Tj	72.596 degC	Op_point	IC junction temperature
35.	ICThetaJA	160.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
36.	IOUT_OP	5.0 A	Op_point	Iout operating point
37.	M1 TjOP	41.03 degC	Op_point	M1 MOSFET junction temperature
38.	Peak Rectified Vin	155.562 V	Op_point	Peak voltage seen at rectified input
39.	Vin_OP_RMS	110.0 V	Op_point	AC Input RMS Voltage
40.	Vout p-p	25.552 mV	Op_point	Peak-to-peak output ripple voltage
41.	Avg Bridge Diode Pd	335.343 mW	Power	Average Power Dissipation in the Bridge Diode over the AC Line Period
42.	Cbulk Pd	42.242 mW	Power	Bulk capacitor power dissipation
43.	Cout1 Pd	99.021 mW	Power	Output capacitor1 power dissipation
44.	Cx Pd	0.0 W	Power	X-cap Power Dissipation
45.	Cy Pd	187.5 pW	Power	Y-caps Power Dissipation
46.	Dsec Pd	1.113 W	Power	Secondary Diode Power Dissipation
47.	Dsec2 Pd	1.113 W	Power	Secondary Diode Power Dissipation
48.	IC Pd	266.223 mW	Power	IC power dissipation
49.	L1 Pd	4.171 mW	Power	Power Dissipation in the Inductor
50.	L2 Pd	60.0 mW	Power	Average Power Dissipation in the Inductor Over the AC Line Period
51.	M1 Pd	132.894 mW	Power	M1 MOSFET total power dissipation
52.	Paux	37.068 mW	Power	Power Dissipation in Raux and Daux
53.	Pd Rstartup	902.089 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
54.	Rdrv Pd	13.864 µW	Power	Power Dissipation in Gate Drive Resistor
55.	Rfb Pd	3.03 mW	Power	Rfb Power Dissipation
56.	Rsns Pd	136.578 mW	Power	Current Limit Sense Resistor Power Dissipation
57.	Rx Pd	120.961 mW	Power	Total Power Dissipation in Rx1 and Rx2
58.	Snubber Pd	398.213 mW	Power	Snubber Power Dissipation
59.	T1 Pd	1.251 W	Power	Estimated Losses in Transformer
60.	Total Pd	4.372 W	Power	Total Power Dissipation
61.	Vout Tolerance	2.173 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
62.	Vout pp percentage	511.045 m%		Output Voltage ripple percentage

Design Inputs

#	Name	Value	Description
1.	Iout	5.0	Maximum Output Current
2.	VinMax	130.0	Maximum input voltage
3.	VinMin	110.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	line_fsw	50.0	Light Output in Lumen
6.	base_pn	UC1842A	Base Product Number
7.	source	AC	Input Source Type
8.	Ta	30.0	Ambient temperature

Design Assistance

1. **UC1842A** Product Folder : http://www.ti.com/product/UC1842A : contains the data sheet and other resources.