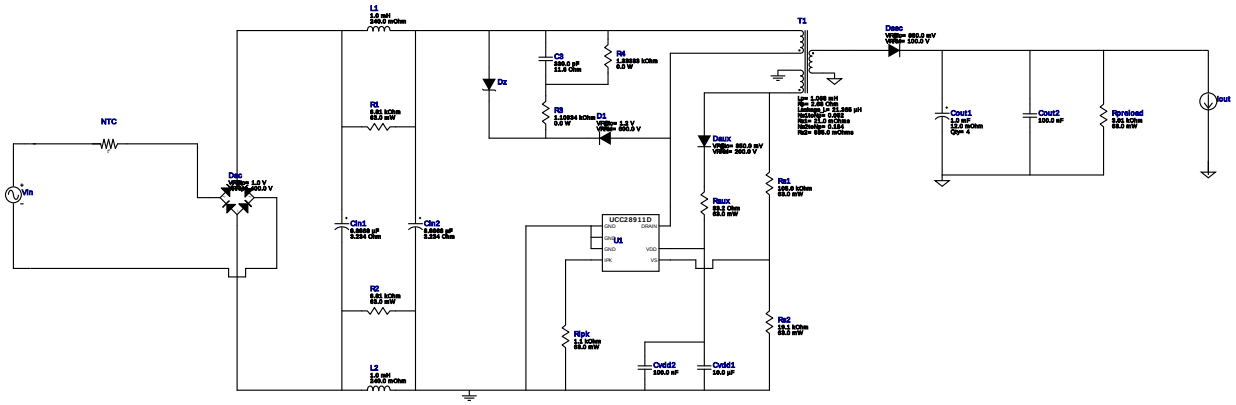
WEBENCH® Design Report

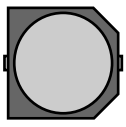
VinMin = 110.0V
VinMax = 130.0V
Vout = 5.0V
Iout = 2.0A

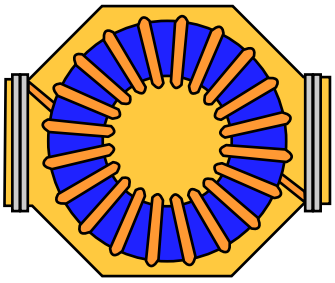
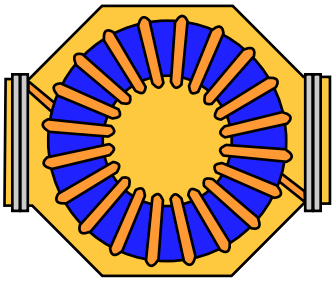
Device = UCC28911D
Topology = Flyback
Created = 8/10/16 8:29:44 PM
BOM Cost = $0.00
BOM Count = 29
Total Pd = 4.47W

Design : 4764958/4 UCC28911D
UCC28911D 110.0V-130.0V to 5.00V @ 2.0A



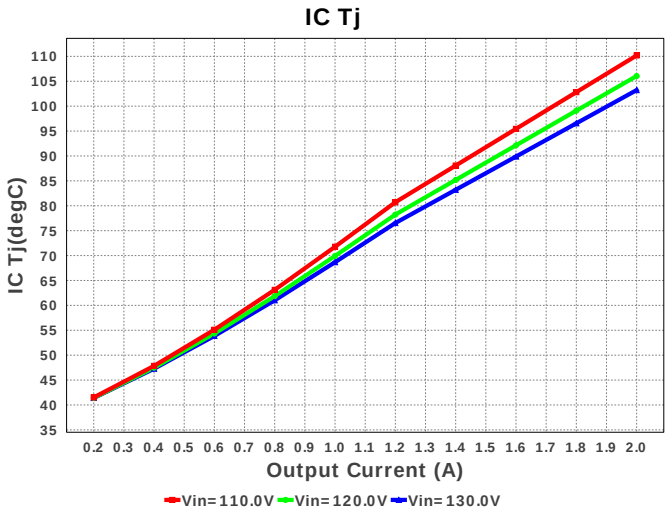
Electrical BOM

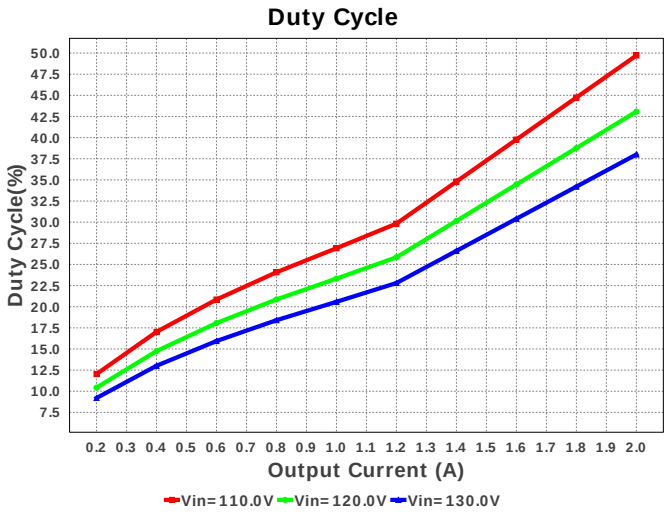
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C3	MuRata	GRM188R72E331KW07D Series= X7R	Cap= 330.0 pF ESR= 11.6 Ohm VDC= 250.0 V IRMS= 50.0 mA	1	$0.01	0603 5 mm^2
2.	C3	MuRata	GRM188R72E331KW07D Series= X7R	Cap= 330.0 pF ESR= 11.6 Ohm VDC= 250.0 V IRMS= 50.0 mA	1	$0.01	0603 5 mm^2
3.	Cin1	CUSTOM	CUSTOM Series= ?	Cap= 8.8868 uF ESR= 3.23445 Ohm VDC= 220.62 V IRMS= 120.31 mA	1	NA	CUSTOM 0 mm^2
4.	Cin1	CUSTOM	CUSTOM Series= ?	Cap= 8.8868 uF ESR= 3.23445 Ohm VDC= 220.62 V IRMS= 120.31 mA	1	NA	CUSTOM 0 mm^2
5.	Cin2	CUSTOM	CUSTOM Series= ?	Cap= 8.8868 uF ESR= 3.23445 Ohm VDC= 220.62 V IRMS= 120.31 mA	1	NA	CUSTOM 0 mm^2
6.	Cout1	Panasonic	16SVPF1000M Series= ?	Cap= 1.0 mF ESR= 12.0 mOhm VDC= 16.0 V IRMS= 5.4 A	4	$0.74	 CAPSMT_62_F12 151 mm^2
7.	Cout1	Panasonic	16SVPF1000M Series= ?	Cap= 1.0 mF ESR= 12.0 mOhm VDC= 16.0 V IRMS= 5.4 A	4	$0.74	 CAPSMT_62_F12 151 mm^2
8.	Cout2	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2

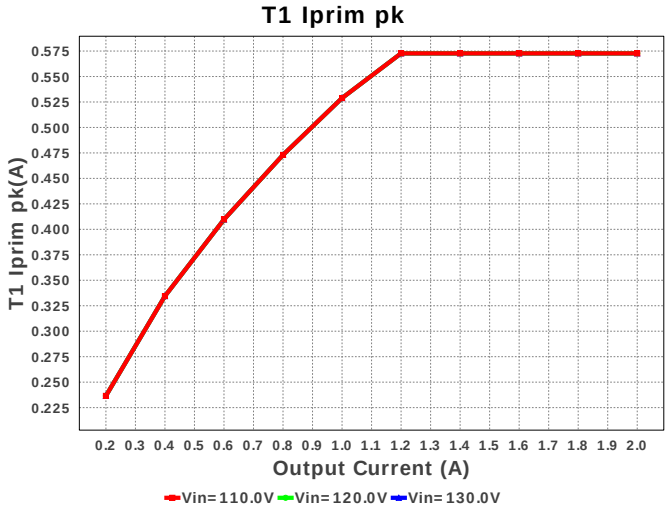
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Cvdd1	MuRata	GRM32ER71J106KA12L Series= X7R	Cap= 10.0 uF VDC= 63.0 V IRMS= 0.0 A	1	$0.27	 1210_280 15 mm^2
10.	Cvdd1	MuRata	GRM32ER71J106KA12L Series= X7R	Cap= 10.0 uF VDC= 63.0 V IRMS= 0.0 A	1	$0.27	 1210_280 15 mm^2
11.	Cvdd2	Kemet	C0603C104K5RACTU Series= X7R	Cap= 100.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	 0603 5 mm^2
12.	Cvdd2	Kemet	C0603C104K5RACTU Series= X7R	Cap= 100.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	 0603 5 mm^2
13.	D1	ON Semiconductor	1N4937G	VF@Io= 1.2 V VRRM= 600.0 V	1	$0.04	 DO-41 43 mm^2
14.	Dac	Diodes Inc.	HD04-T	VF@Io= 1.0 V VRRM= 400.0 V	1	$0.12	 MiniDIP 62 mm^2
15.	Daux	Rohm	RF071M2S	VF@Io= 850.0 mV VRRM= 200.0 V	1	$0.09	 SOD-123 13 mm^2
16.	Daux	Rohm	RF071M2S	VF@Io= 850.0 mV VRRM= 200.0 V	1	$0.09	 SOD-123 13 mm^2
17.	Dsec	Vishay-Semiconductor	SS10PH10-M3/86A	VF@Io= 880.0 mV VRRM= 100.0 V	1	$0.29	 TO-277A 56 mm^2
18.	Dsec	Vishay-Semiconductor	SS10PH10-M3/86A	VF@Io= 880.0 mV VRRM= 100.0 V	1	$0.29	 TO-277A 56 mm^2
19.	Dz	ON Semiconductor	1SMB5955BT3G	Zener	1	$0.10	 SMB 44 mm^2
20.	L1	Bourns	PM2110-102K-RC	L= 1.0 mH DCR= 240.0 mOhm	1	$1.21	 PM2110 890 mm^2
21.	L2	Bourns	PM2110-102K-RC	L= 1.0 mH DCR= 240.0 mOhm	1	$1.21	 PM2110 890 mm^2
22.	NTC	Ametherm	SL0310001 Series= miniAMP	Thermistor	1	$0.23	 SL03 16 mm^2
23.	R1	Vishay-Dale	CRCW04026K81FKED Series= CRCW..e3	Res= 6.81 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm^2

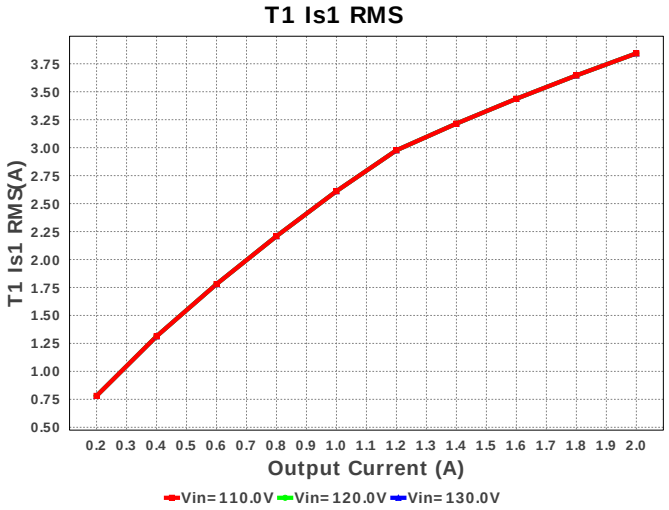
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
24.	R1	Vishay-Dale	CRCW04026K81FKED Series= CRCW..e3	Res= 6.81 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
25.	R2	Vishay-Dale	CRCW04026K81FKED Series= CRCW..e3	Res= 6.81 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
26.	R2	Vishay-Dale	CRCW04026K81FKED Series= CRCW..e3	Res= 6.81 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
27.	R3	CUSTOM	CUSTOM Series= ?	Res= 1.10934 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
28.	R3	CUSTOM	CUSTOM Series= ?	Res= 1.10934 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
29.	R4	CUSTOM	CUSTOM Series= ?	Res= 1.33333 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
30.	R4	CUSTOM	CUSTOM Series= ?	Res= 1.33333 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
31.	Raux	Vishay-Dale	CRCW040233R2FKED Series= CRCW..e3	Res= 33.2 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
32.	Raux	Vishay-Dale	CRCW040233R2FKED Series= CRCW..e3	Res= 33.2 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
33.	Ripk	Vishay-Dale	CRCW04021K10FKED Series= CRCW..e3	Res= 1.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
34.	Ripk	Vishay-Dale	CRCW04021K10FKED Series= CRCW..e3	Res= 1.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
35.	Rpreload	Vishay-Dale	CRCW04023K01FKED Series= CRCW..e3	Res= 3.01 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
36.	Rpreload	Vishay-Dale	CRCW04023K01FKED Series= CRCW..e3	Res= 3.01 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
37.	Rs1	Vishay-Dale	CRCW0402105KFKED Series= CRCW..e3	Res= 105.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
38.	Rs1	Vishay-Dale	CRCW0402105KFKED Series= CRCW..e3	Res= 105.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
39.	Rs2	Vishay-Dale	CRCW040219K1FKED Series= CRCW..e3	Res= 19.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
40.	T1	CUSTOM	CUSTOM	Lp= 1.068 mH Rp= 2.68 Ohm Leakage_L= 21.365 µH Ns1toNp= 0.052 Rs1= 21.0 mOhms Ns2toNp= 0.194 Rs2= 685.0 mOhms	1	NA	CUSTOM 0 mm^2

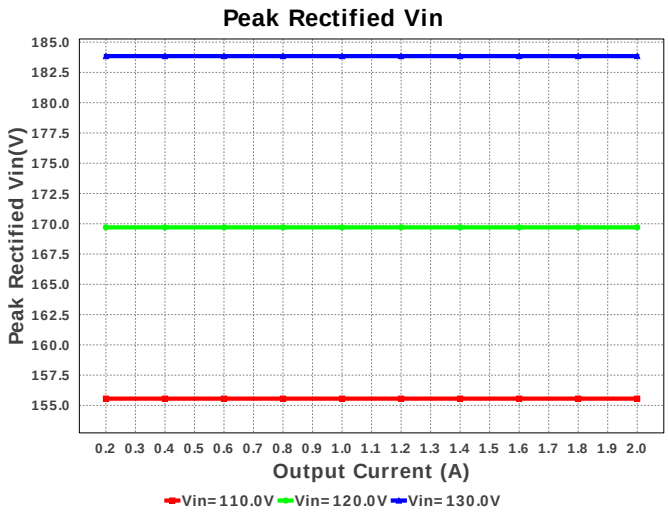
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
41.	U1	Texas Instruments	UCC28911D	Switcher	1	$0.72	 D0007A 55 mm^2

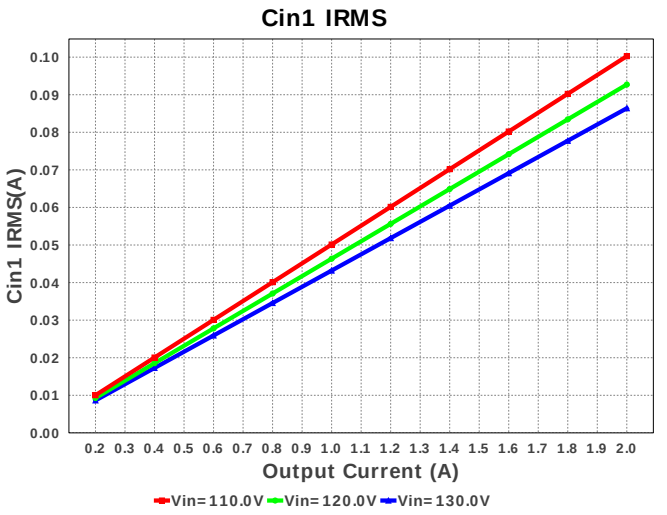


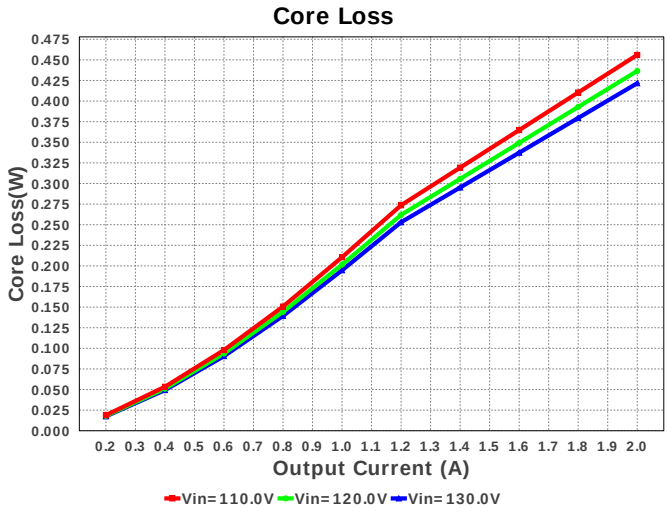


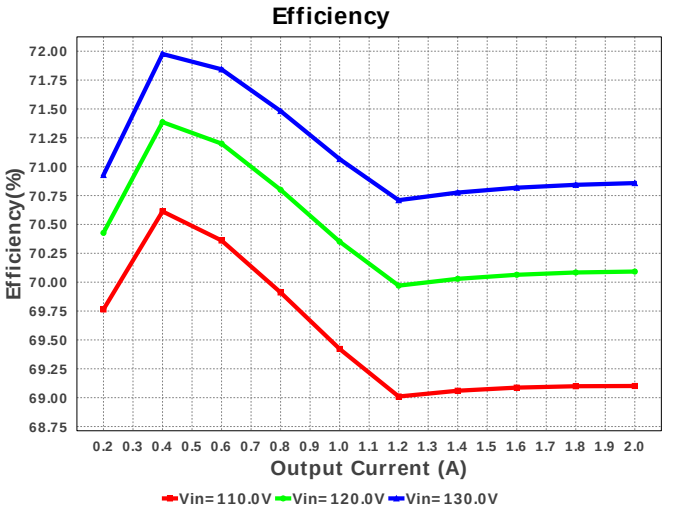


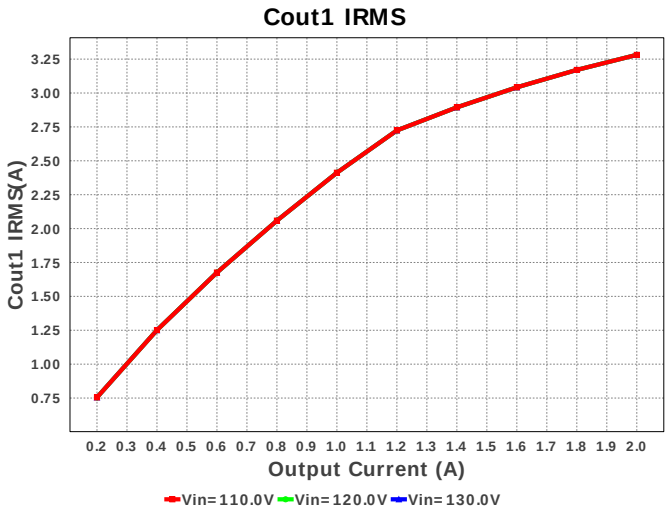


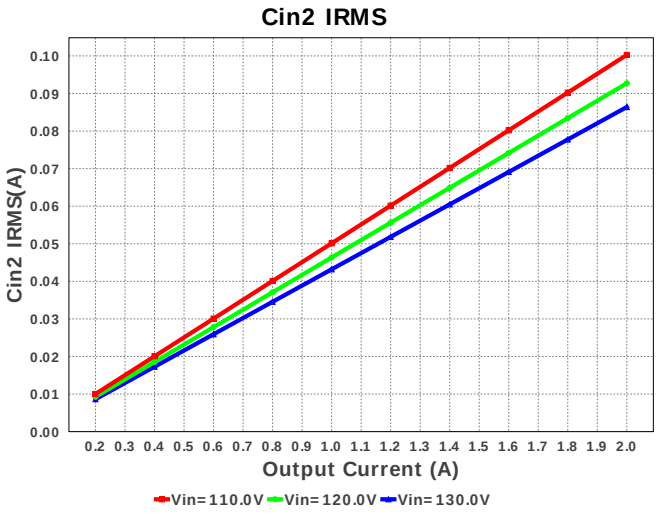


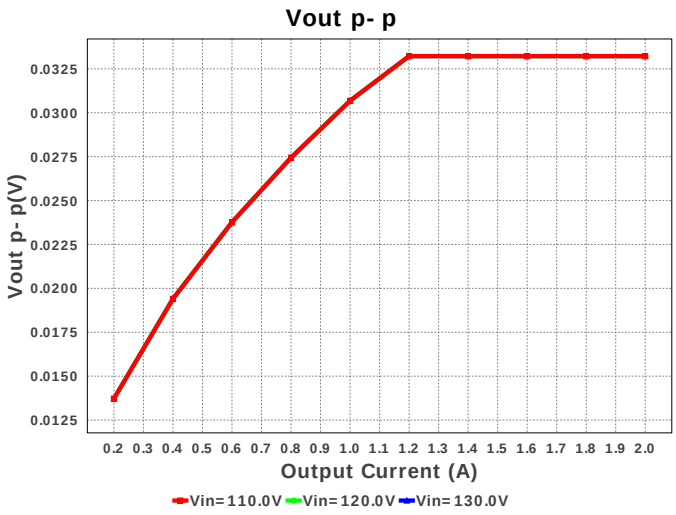


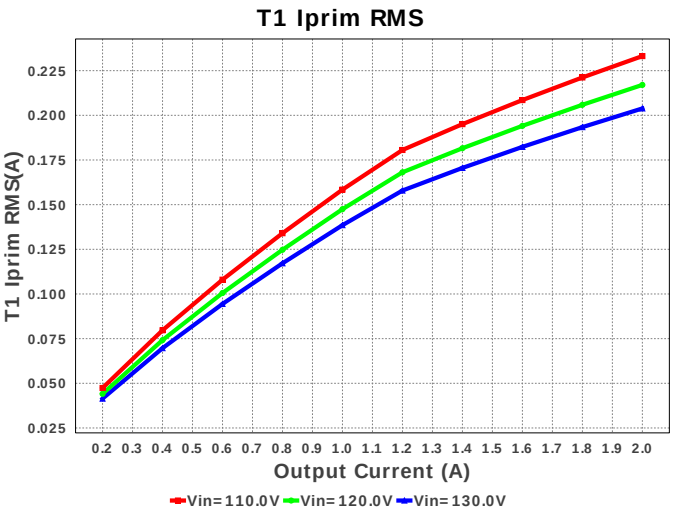


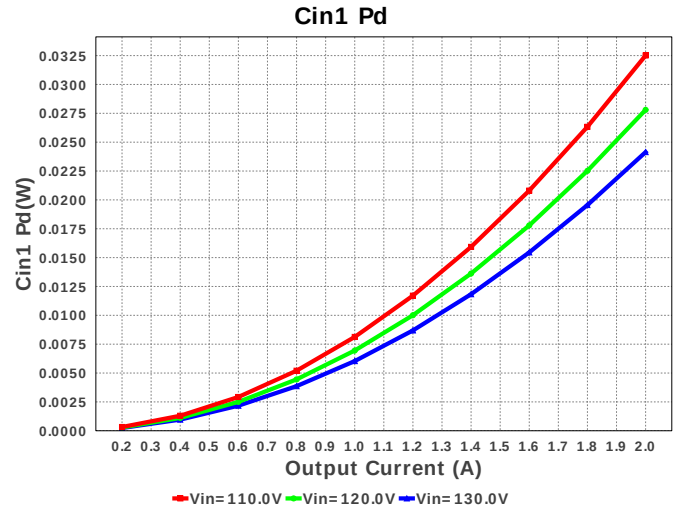


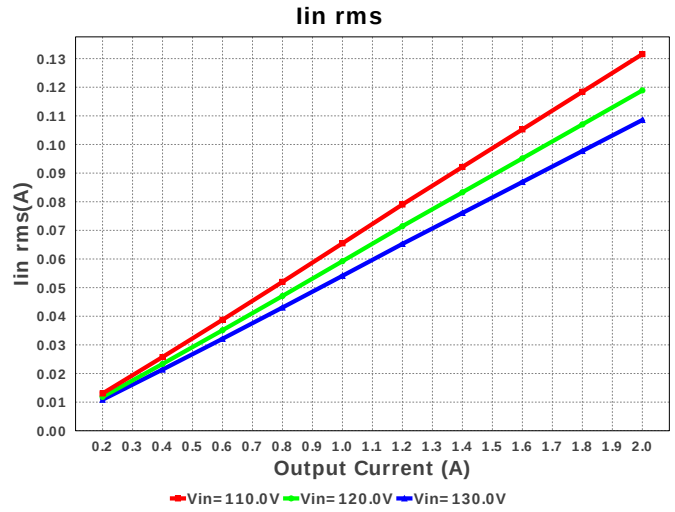


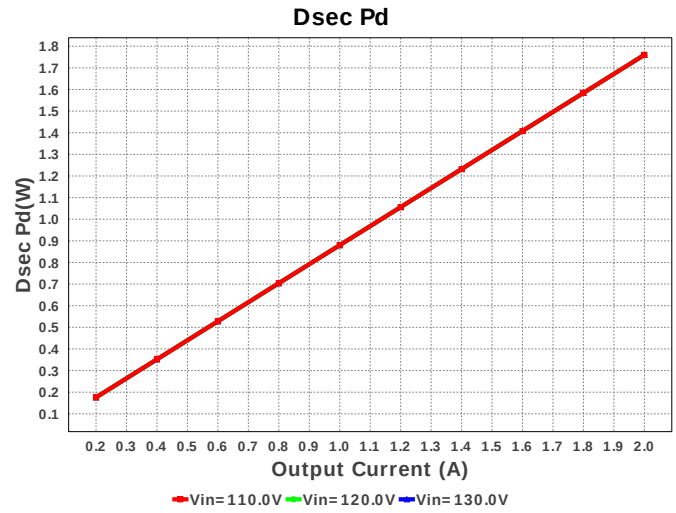


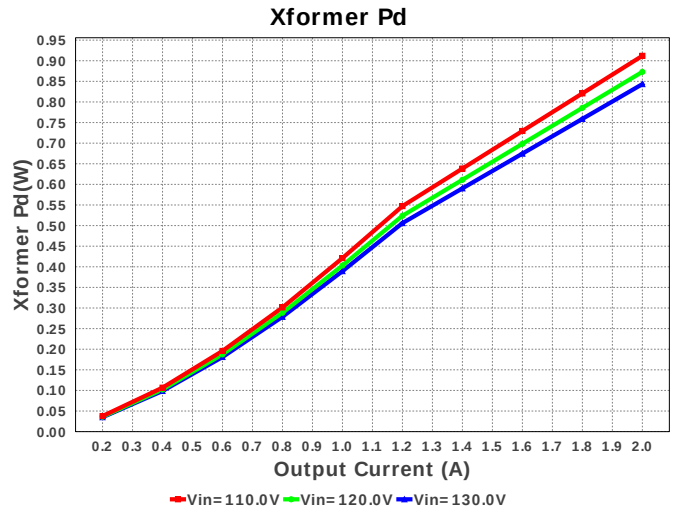


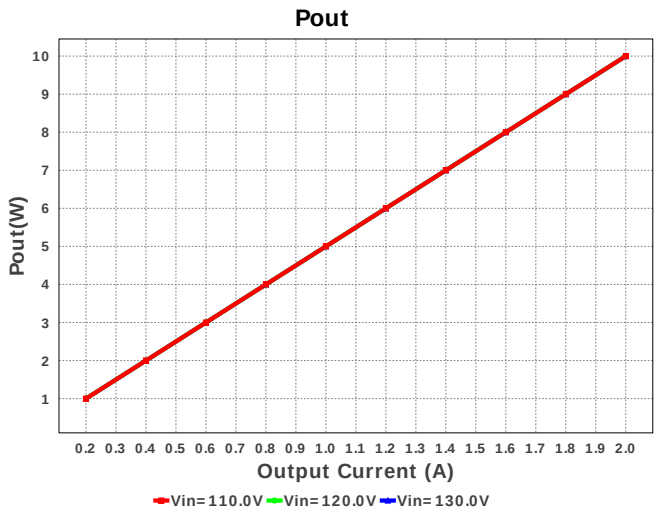


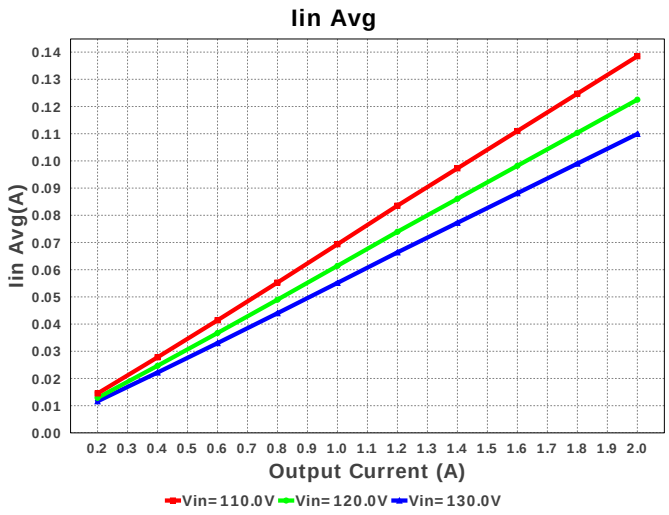


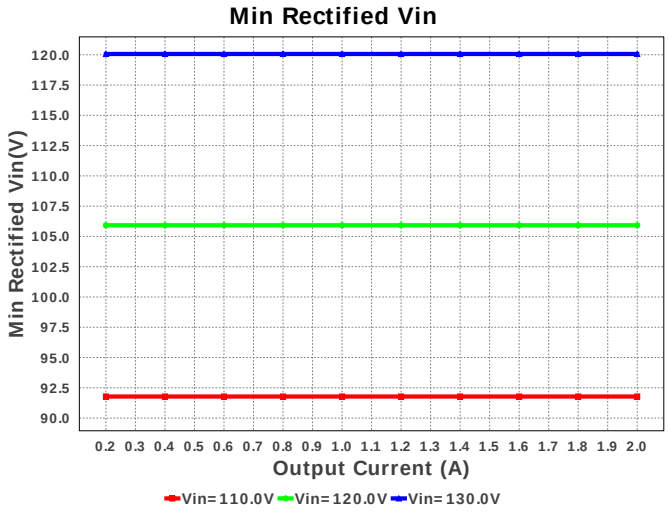


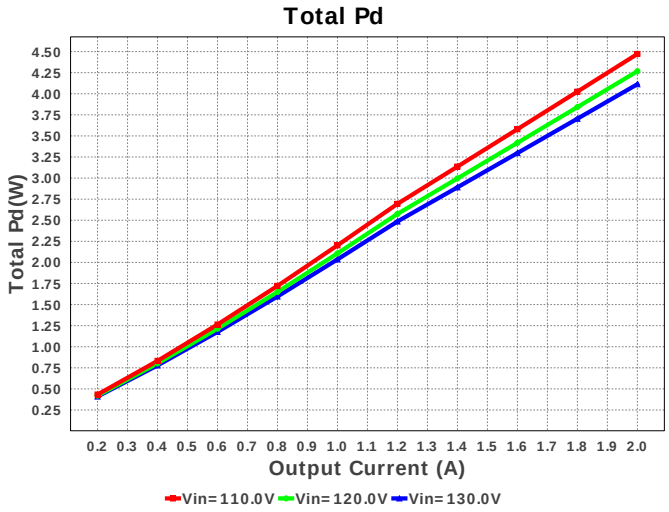


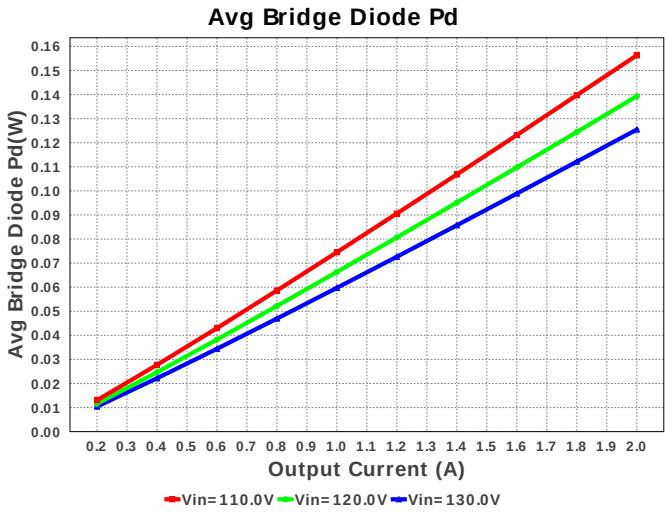


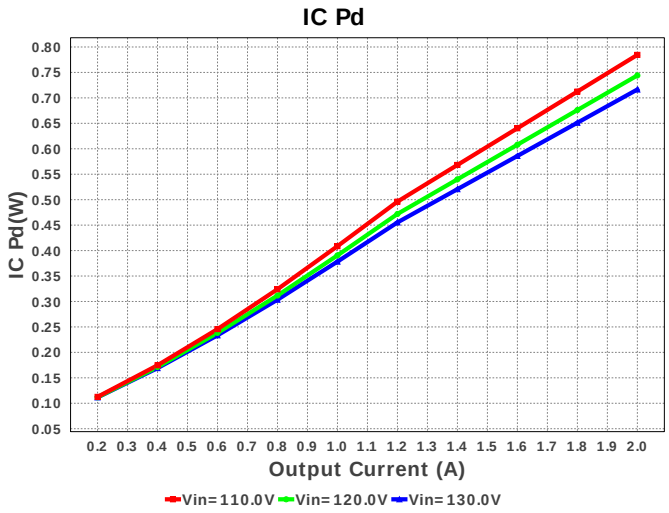


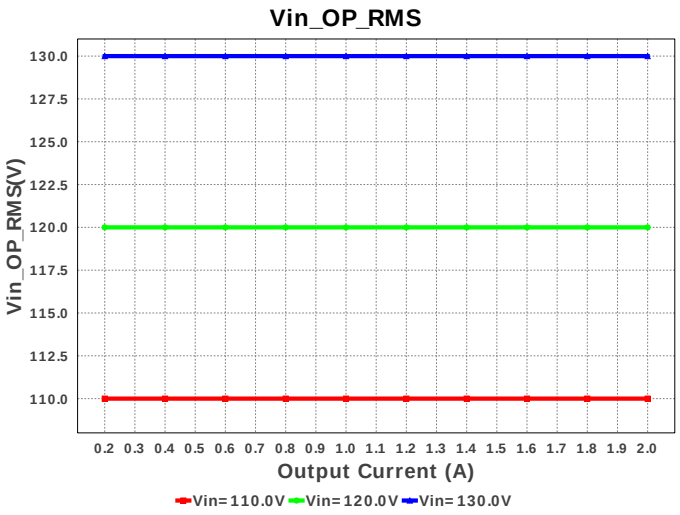


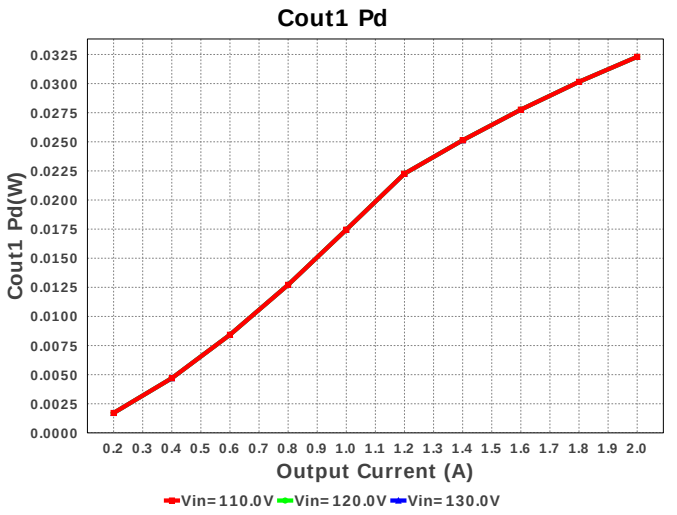


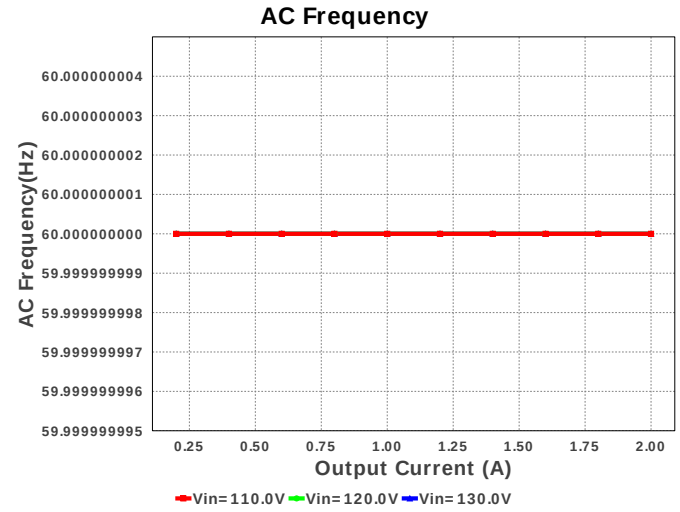


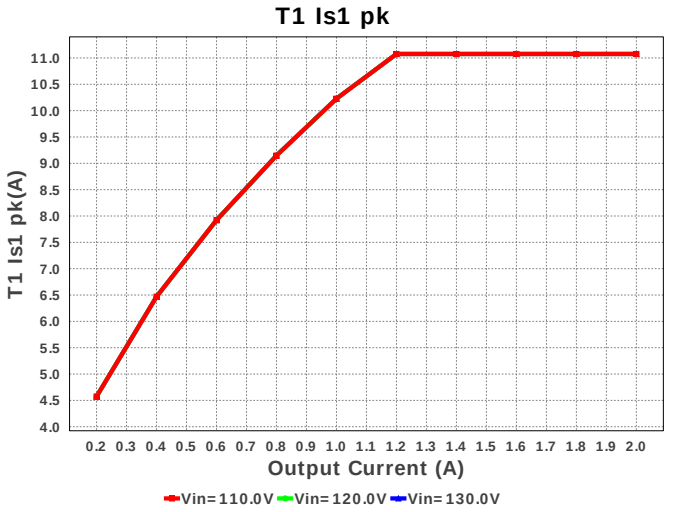












Operating Values

#	Name	Value	Category	Description
1.	Cin1 IRMS	100.256 mA	Current	Input Capacitor Cin1 RMS Ripple Current
2.	Cin2 IRMS	100.256 mA	Current	Input Capacitor Cin2 RMS Ripple Current
3.	Cout1 IRMS	3.281 A	Current	Output capacitor1 RMS ripple current
4.	Iin Avg	138.486 mA	Current	Average input current
5.	Iin rms	131.56 mA	Current	RMS Input Current
6.	T1 Iprim RMS	233.149 mA	Current	Transformer Primary RMS Current
7.	T1 Iprim pk	572.727 mA	Current	Transformer Primary Peak Current
8.	T1 Is1 RMS	3.843 A	Current	Transformer Secondary1 RMS Current
9.	T1 Is1 pk	11.075 A	Current	Transformer Secondary1 Peak Current
10.	AC Frequency	50.0 Hz	General	Input AC frequency
11.	BOM Count	29	General	Total Design BOM count
12.	D1 trr	300.0 ns	General	D1 Reverse Recovery Time
13.	Daux trr	25.0 ns	General	Auxiliary Diode Reverse Recovery Time
14.	Dsec trr	0.0 ns	General	Output Diode Reverse Recovery Time
15.	FootPrint	2.795 k mm^2	General	Total Foot Print Area of BOM components
16.	Frequency	74.58 kHz	General	Approximate switching frequency
17.	Mode	DCM	General	Conduction Mode
18.	Pout	10.0 W	General	Total output power
19.	Total BOM	$0.0	General	Total BOM Cost
20.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
21.	Duty Cycle	49.715 %	Op_point	Duty cycle at the Minimum voltage seen at the rectified input
22.	Efficiency	69.101 %	Op_point	Steady state efficiency
23.	IC Tj	110.176 degC	Op_point	IC junction temperature
24.	ICThetaJA	102.2 degC/W	Op_point	IC junction-to-ambient thermal resistance
25.	IOUT_OP	2.0 A	Op_point	Iout operating point
26.	Min Rectified Vin	91.782 V	Op_point	Minimum voltage seen at rectified input
27.	Peak Rectified Vin	155.562 V	Op_point	Peak voltage seen at rectified input
28.	Vin_OP_RMS	110.0 V	Op_point	AC Input RMS Voltage
29.	Vout p-p	33.227 mV	Op_point	Peak-to-peak output ripple voltage
30.	Avg Bridge Diode Pd	156.312 mW	Power	Average Power Dissipation in the Bridge Diode over the AC Line Period
31.	Cin1 Pd	32.51 mW	Power	Average Power Dissipation in the Input Capacitor Cin1

#	Name	Value	Category	Description
32.	Core Loss	455.975 mW	Power	CoreLoss
33.	Cout1 Pd	32.302 mW	Power	Output capacitor1 power dissipation
34.	Dsec Pd	1.76 W	Power	Secondary Diode Power Dissipation
35.	IC Pd	784.505 mW	Power	IC power dissipation
36.	Total Pd	4.472 W	Power	Total Power Dissipation
37.	Xformer Pd	911.951 mW	Power	Transformer power dissipation
38.	Vout Tolerance	160.0 m%		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	130.0	Maximum input voltage
3.	VinMin	110.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	acFrequency	50.0	Light Output in Lumen
6.	base_pn	UCC28911	Texas Instruments Base Part Number
7.	source	AC	Input Source Type
8.	ta	30.0	Ambient temperature

Design Assistance

1. UCC28911 Product Folder : http://www.ti.com/product/UCC28911 : contains the data sheet and other resources.