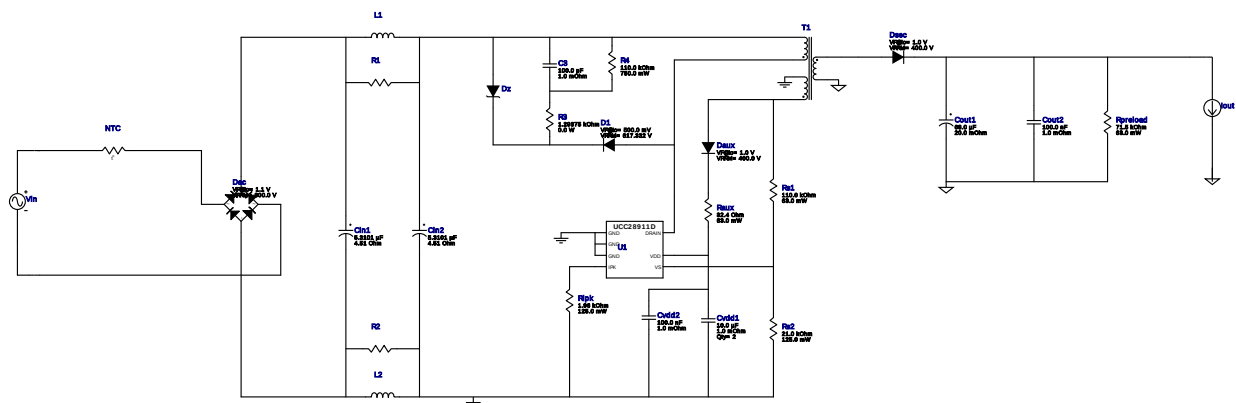


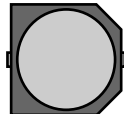
WEBENCH® Design Report

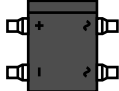
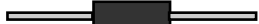
Design : UCC28911D
UCC28911D 90V-265V to 24.00V @ 0.2A

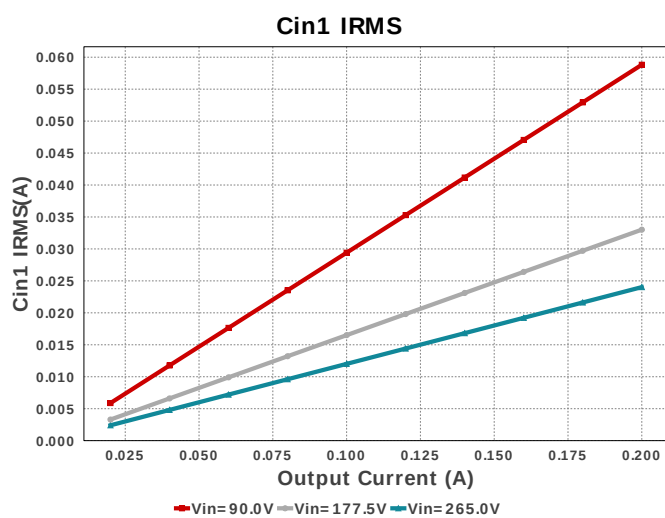
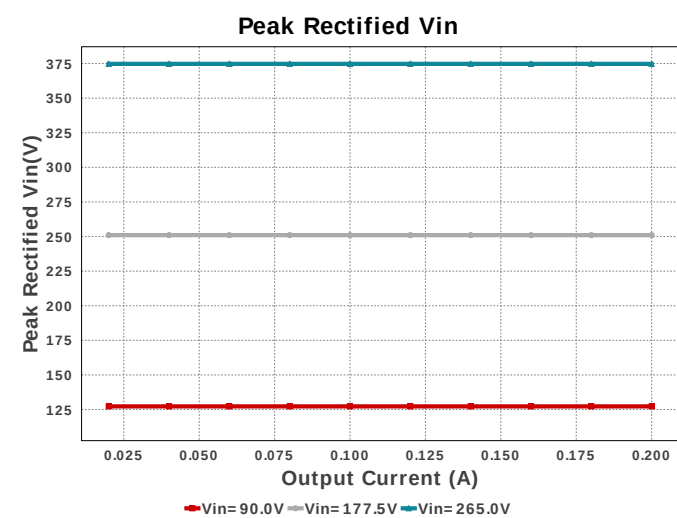
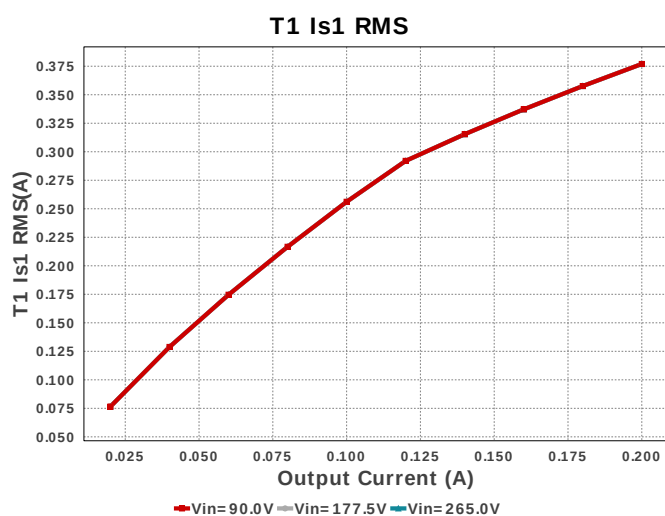
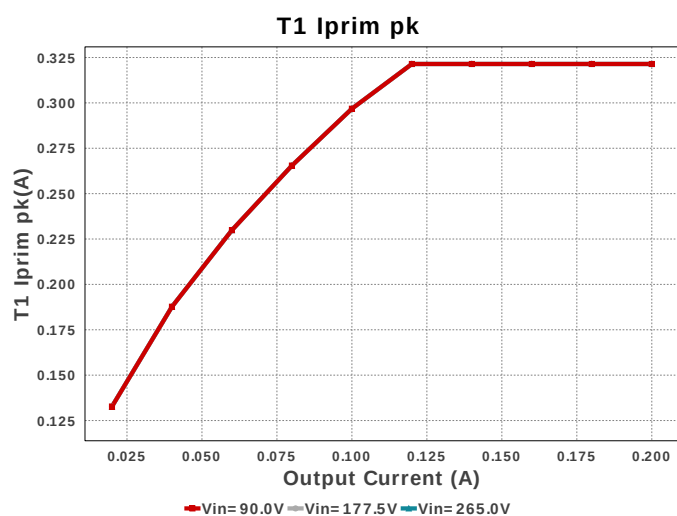
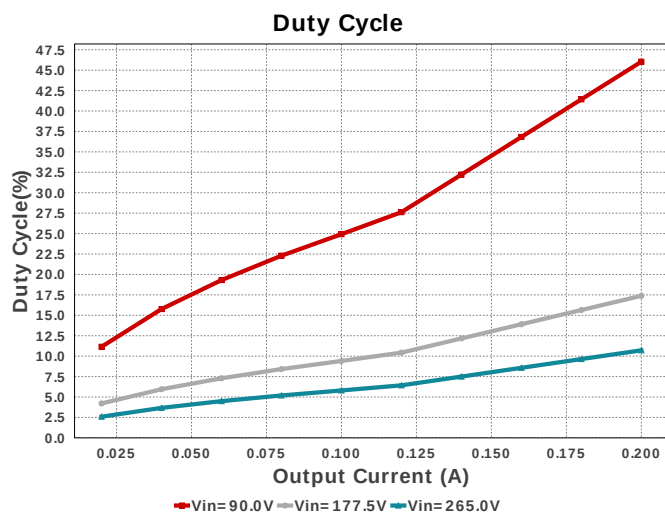
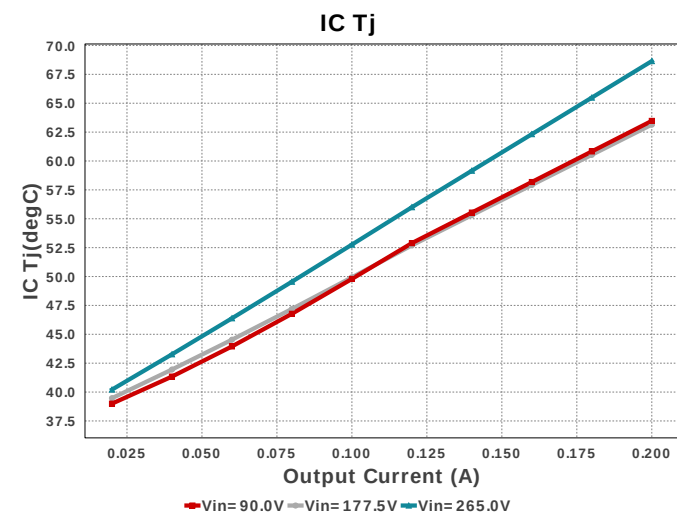


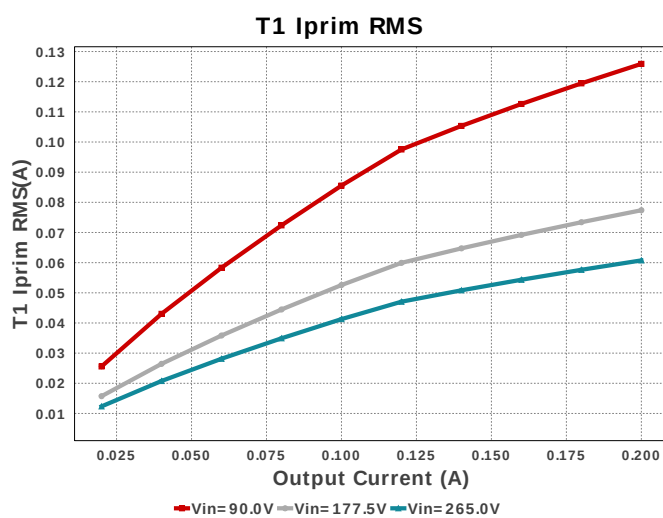
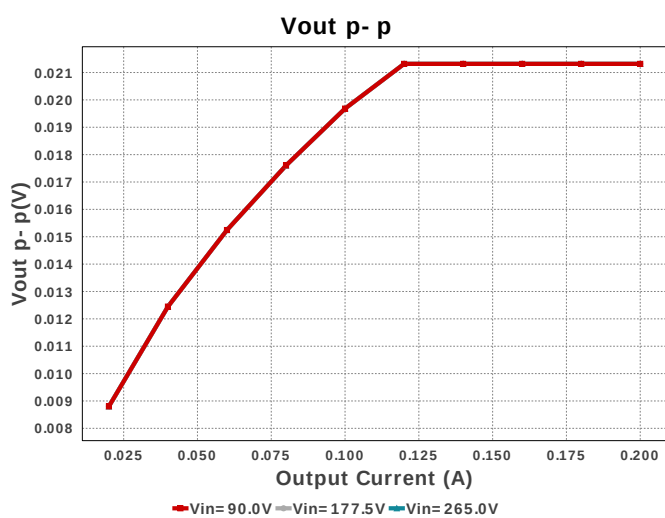
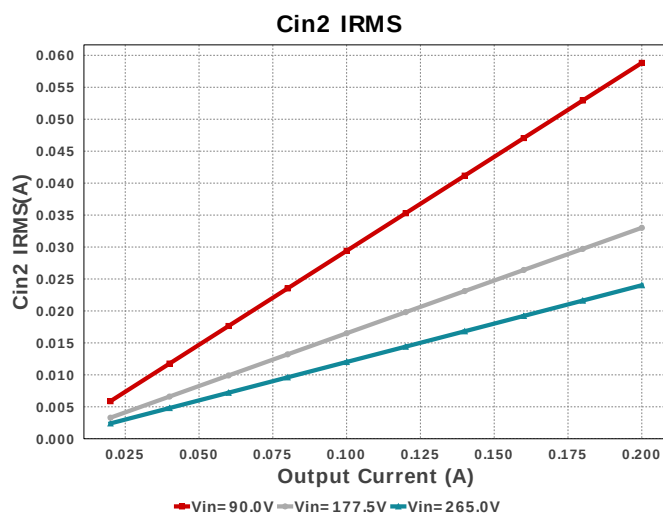
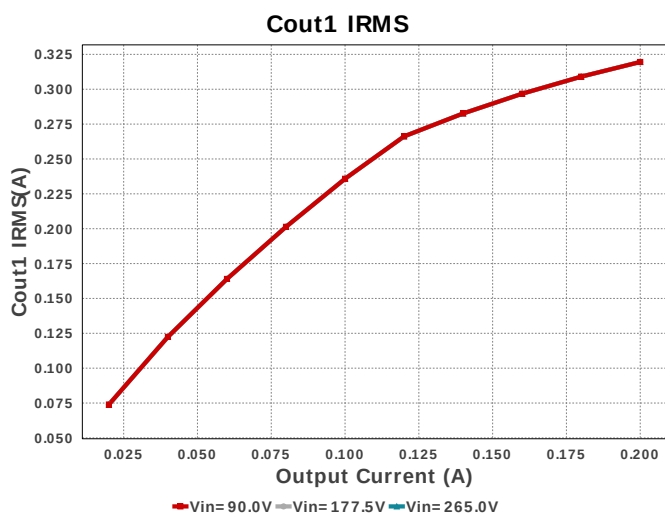
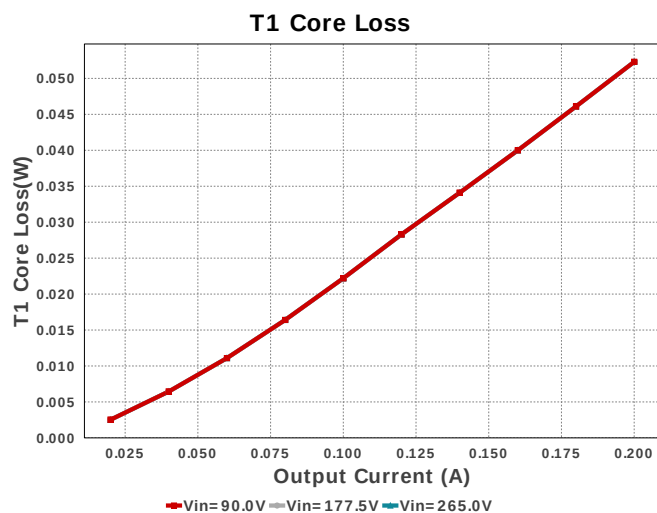
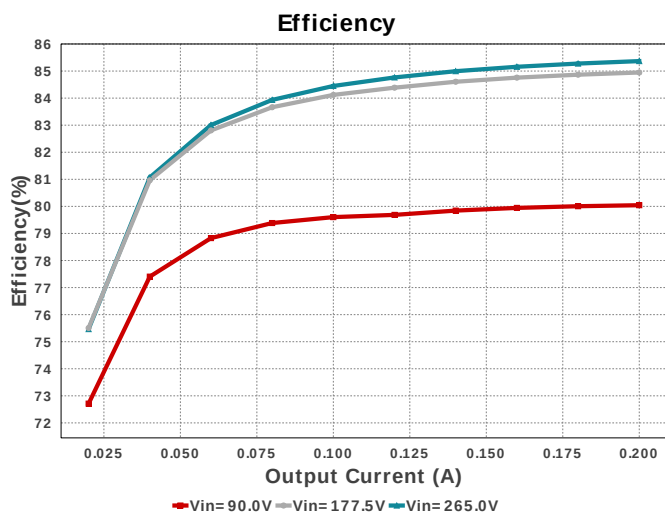
1. The EMI filter shown in the schematic is a placeholder. It has not yet been designed for the application.

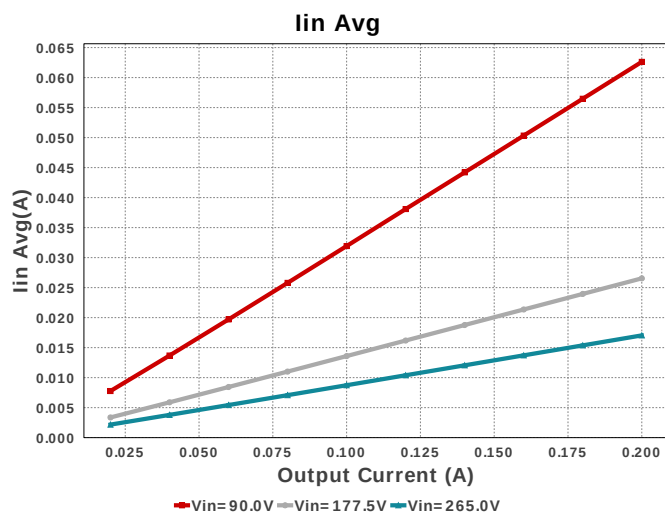
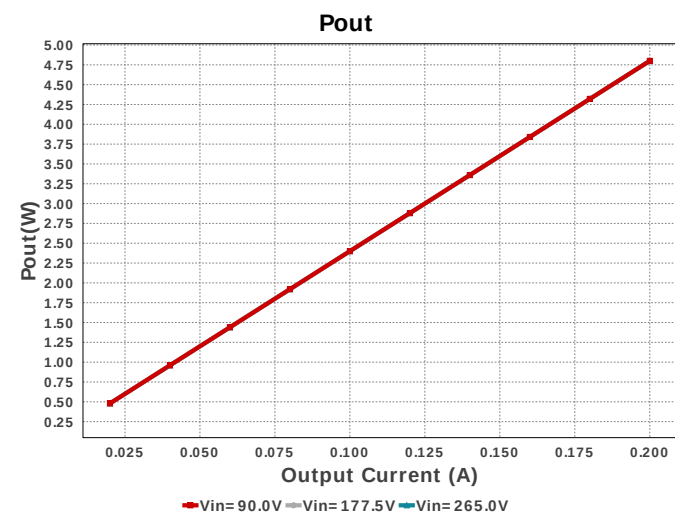
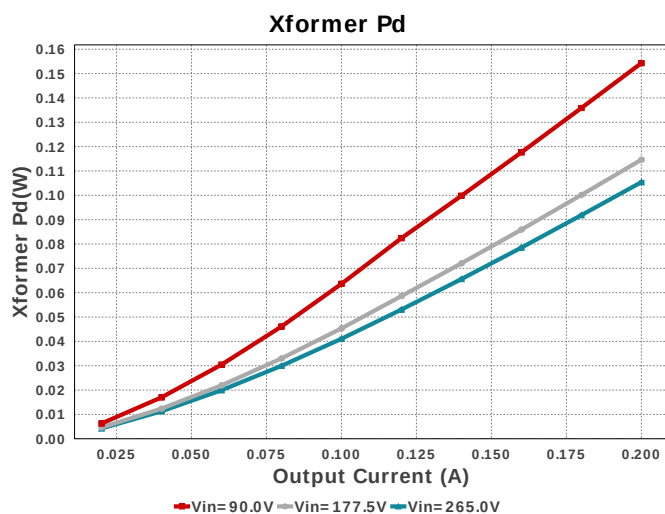
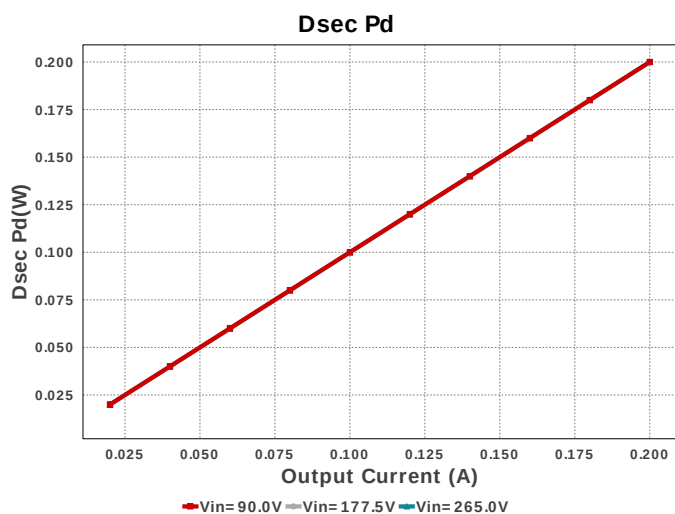
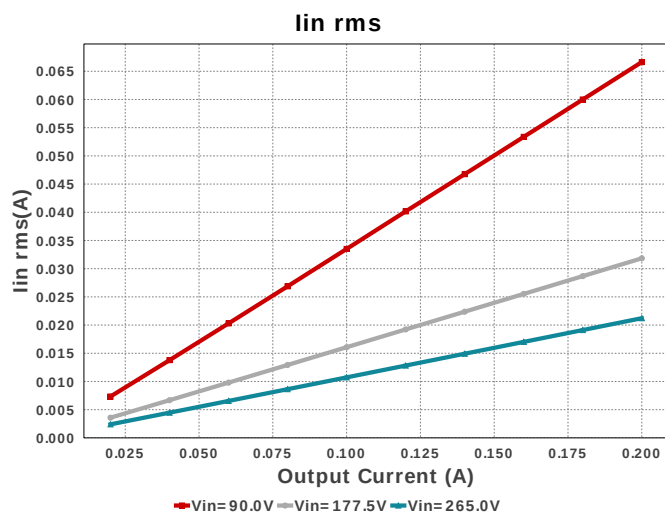
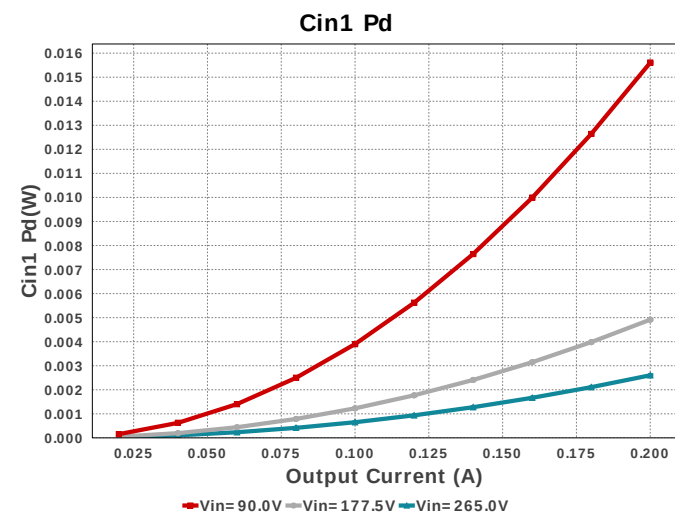
Electrical BOM

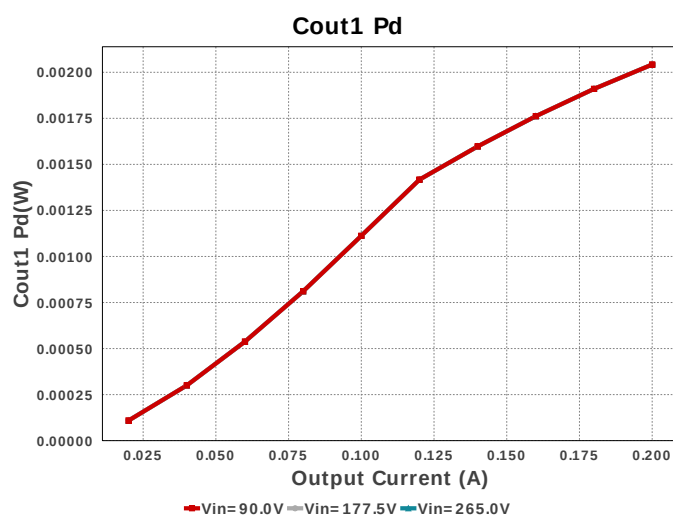
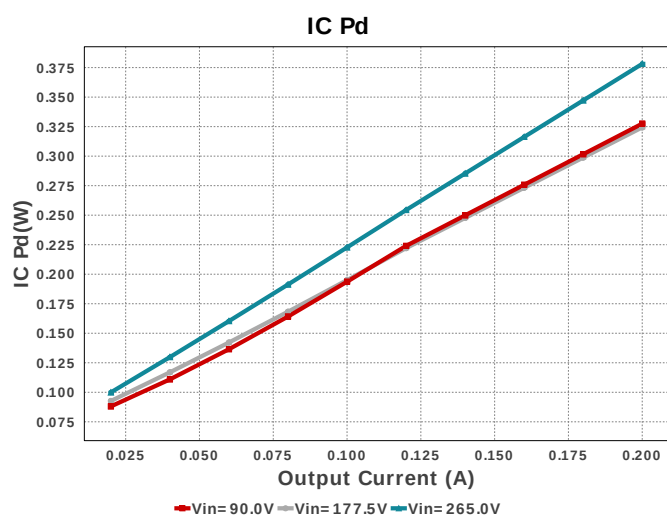
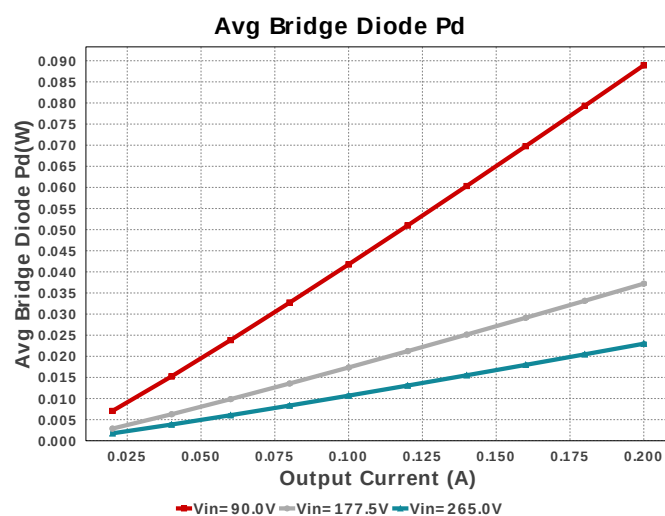
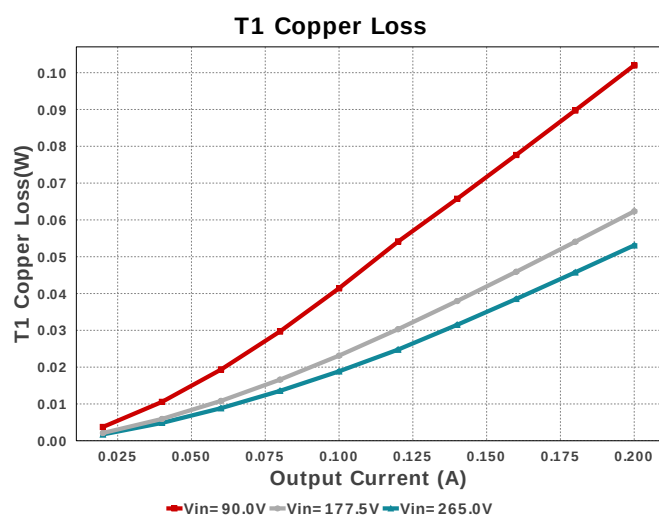
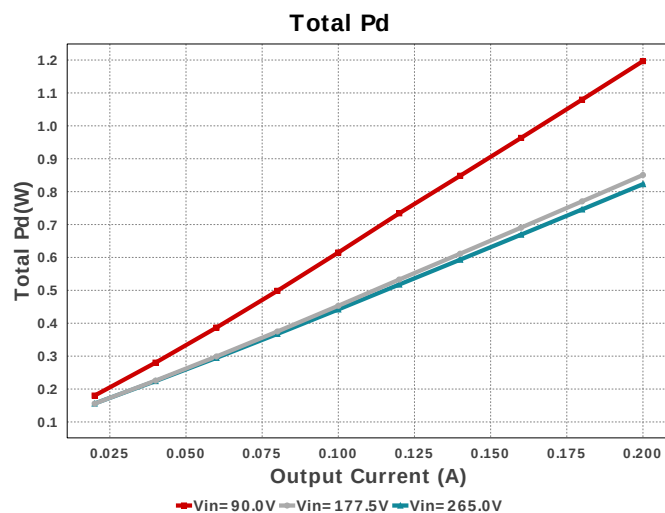
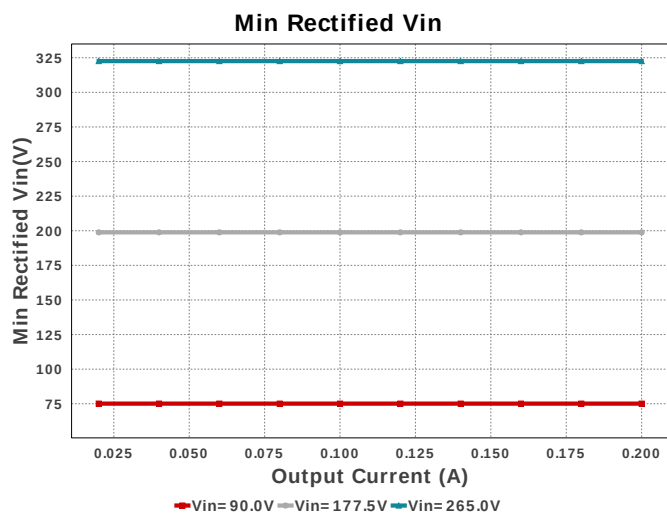
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C3	Vishay-Vitramon	VJ0805A101JXGAT5Z Series= COG/NPO	Cap= 100.0 pF ESR= 1.0 mOhm VDC= 1000.0 V IRMS= 0.0 A	1	\$0.26	0805 7 mm ²
2.	Cin1	CUSTOM	CUSTOM Series= ?	Cap= 5.3101 uF ESR= 4.51046 Ohm VDC= 393.5 V IRMS= 70.58 mA	1	NA	CUSTOM 0 mm ²
3.	Cin2	CUSTOM	CUSTOM Series= ?	Cap= 5.3101 uF ESR= 4.51046 Ohm VDC= 393.5 V IRMS= 70.58 mA	1	NA	CUSTOM 0 mm ²
4.	Cout1	Panasonic	50SVPF68M Series= SVPF	Cap= 68.0 uF ESR= 20.0 mOhm VDC= 50.0 V IRMS= 4.3 A	1	\$1.00	 CAPSMT_62_F12 151 mm ²
5.	Cout2	Taiyo Yuden	UMK212B7104KG-T Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.02	0805 7 mm ²
6.	Cvdd1	MuRata	GRM219R61E106KA12 Series= X5R	Cap= 10.0 uF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	2	\$0.06	0805 7 mm ²
7.	Cvdd2	Taiyo Yuden	UMK212B7104KG-T Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.02	0805 7 mm ²
8.	D1	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 617.332 V	1	NA	CUSTOM 0 mm ²

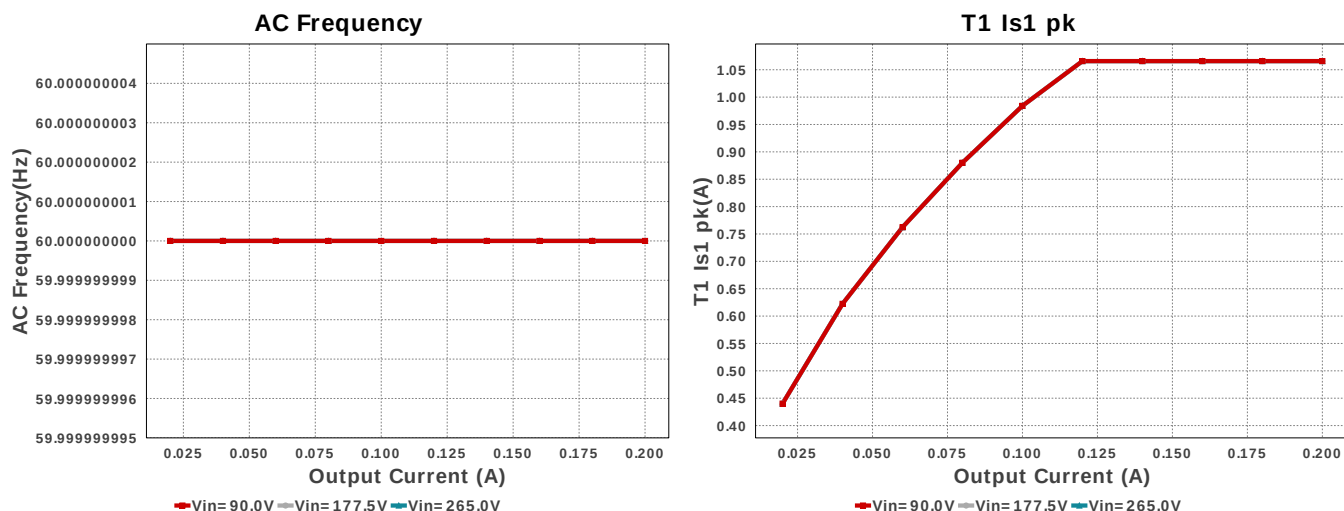
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Dac	Vishay-Semiconductor	DF08SA	VF@Io= 1.1 V VRRM= 800.0 V	1	\$0.25	 DF-S 99 mm ²
10.	Daux	SMC Diode Solutions	UF4004TA	VF@Io= 1.0 V VRRM= 400.0 V	1	\$0.05	 DO-41 43 mm ²
11.	Dsec	SMC Diode Solutions	UF4004TA	VF@Io= 1.0 V VRRM= 400.0 V	1	\$0.05	 DO-41 43 mm ²
12.	Dz	ON Semiconductor	1SMB5954BT3G	Zener	1	\$0.11	 SMB 44 mm ²
13.	NTC	Ametherm	SL0310001 Series= miniAMP	Thermistor	1	\$0.23	 SL03 16 mm ²
14.	R3	CUSTOM	CUSTOM Series= ?	Res= 1.29375 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm ²
15.	R4	Vishay-Dale	CRCW2010110KFKEF Series= CRCW..e3	Res= 110.0 kOhm Power= 750.0 mW Tolerance= 1.0%	1	\$0.04	 2010 32 mm ²
16.	Raux	Vishay-Dale	CRCW040232R4FKED Series= CRCW..e3	Res= 32.4 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
17.	Ripk	Panasonic	ERJ-6ENF1961V Series= ERJ-6E	Res= 1.96 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
18.	Rpreload	Vishay-Dale	CRCW040271K5FKED Series= CRCW..e3	Res= 71.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
19.	Rs1	Vishay-Dale	CRCW0402110KFKEF Series= CRCW..e3	Res= 110.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
20.	Rs2	Vishay-Dale	CRCW080521K0FKEA Series= CRCW..e3	Res= 21.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
21.	T1	Core=TDK , CoilFormer=TDK	Core=B65807P0000R049 , CoilFormer=B65821C1008T001	Lp= 1.453 mH Turns Ratio(Nas)= 16:19 Turns Ratio(Nps)= 63:19 Npri= 63.0 Naux= 16.0 Naux= 19.0	1	\$1.39	 TDK_B65803 290 mm ²
22.	U1	Texas Instruments	UCC28911D	Switcher	1	\$0.72	 D0007A 55 mm ²











Operating Values

#	Name	Value	Category	Description
1.	Cin1 IRMS	58.817 mA	Capacitor	Input Capacitor Cin1 RMS Ripple Current
2.	Cin1 Pd	15.603 mW	Capacitor	Average Power Dissipation in the Input Capacitor Cin1
3.	Cin2 IRMS	58.817 mA	Capacitor	Input Capacitor Cin2 RMS Ripple Current
4.	Cout1 IRMS	319.539 mA	Capacitor	Output capacitor1 RMS ripple current
5.	Cout1 Pd	2.042 mW	Capacitor	Output capacitor1 power dissipation
6.	Avg Bridge Diode Pd	88.93 mW	Diode	Average Power Dissipation in the Bridge Diode over the AC Line Period
7.	D1 trr	500.0 ns	Diode	D1 Reverse Recovery Time
8.	Daux trr	50.0 ns	Diode	Auxiliary Diode Reverse Recovery Time
9.	Dsec Pd	200.0 mW	Diode	Secondary Diode Power Dissipation
10.	Dsec trr	50.0 ns	Diode	Output Diode Reverse Recovery Time
11.	IC Pd	327.51 mW	IC	IC power dissipation
12.	IC Tj	63.472 degC	IC	IC junction temperature
13.	ICThetaJA	102.2 degC/W	IC	IC junction-to-ambient thermal resistance
14.	Iin Avg	62.954 mA	IC	Average input current
15.	Avg Bridge Diode Pd	88.93 mW	Power	Average Power Dissipation in the Bridge Diode over the AC Line Period
16.	Cin1 Pd	15.603 mW	Power	Average Power Dissipation in the Input Capacitor Cin1
17.	Cout1 Pd	2.042 mW	Power	Output capacitor1 power dissipation
18.	Dsec Pd	200.0 mW	Power	Secondary Diode Power Dissipation
19.	IC Pd	327.51 mW	Power	IC power dissipation
20.	T1 Copper Loss	120.43 mW	Power	Transformer Copper Loss Power Dissipation
21.	T1 Core Loss	66.1 mW	Power	Transformer Core Loss Power Dissipation
22.	Total Pd	1.229 W	Power	Total Power Dissipation
23.	Xformer Pd	186.53 mW	Power	Transformer power dissipation
24.	AC Frequency	60.0 Hz	System	Input AC frequency
25.	BOM Count	23	Information	Total Design BOM count
26.	Duty Cycle	46.033 %	System	Duty cycle at the Minimum voltage seen at the rectified input
27.	Efficiency	79.616 %	System	Steady state efficiency
28.	FootPrint	1.003 k mm ²	System	Total Foot Print Area of BOM components
29.	Frequency	74.016 kHz	System	Approximate switching frequency
30.	Iin rms	66.989 mA	System	RMS Input Current
31.	Iout	200.0 mA	System	Iout operating point
32.	Min Rectified Vin	75.094 V	System	Minimum voltage seen at rectified input
33.	Mode	DCM	System	Conduction Mode
34.	Peak Rectified Vin	127.278 V	System	Peak voltage seen at rectified input
35.	Pout	4.8 W	System	Total output power
36.	Total BOM	NA	System	Total BOM Cost

#	Name	Value	Category	Description
37.	Vin_RMS	90.0 V	System Information	Vin operating point
38.	Vout	24.0 V	System Information	Operational Output Voltage
39.	Vout Tolerance	33.333 m%	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
40.	Vout p-p	21.316 mV	System Information	Peak-to-peak output ripple voltage
41.	T1 Copper Loss	120.43 mW	Transformer	Transformer Copper Loss Power Dissipation
42.	T1 Core Loss	66.1 mW	Transformer	Transformer Core Loss Power Dissipation
43.	T1 Iprim RMS	125.909 mA	Transformer	Transformer Primary RMS Current
44.	T1 Iprim pk	321.429 mA	Transformer	Transformer Primary Peak Current
45.	T1 Is1 RMS	376.969 mA	Transformer	Transformer Secondary1 RMS Current
46.	T1 Is1 pk	1.066 A	Transformer	Transformer Secondary1 Peak Current
47.	Xformer Pd	186.53 mW	Transformer	Transformer power dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	200.0 m	Maximum Output Current
2.	VinMax	265.0	Maximum input voltage
3.	VinMin	90.0	Minimum input voltage
4.	Vout	24.0	Output Voltage
5.	acFrequency	60.0	AC Frequency
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.

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