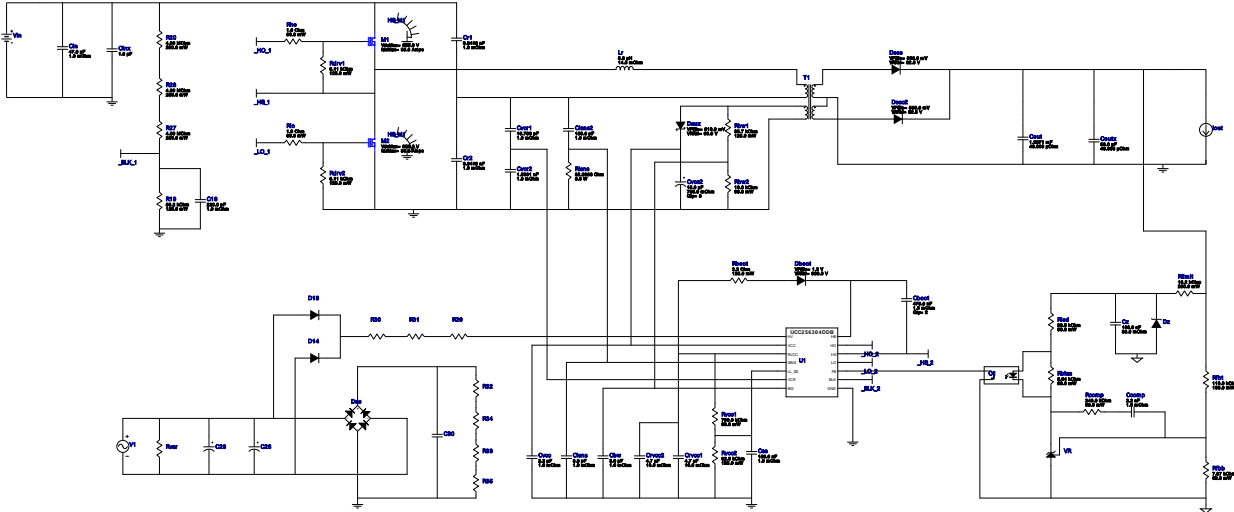


## WEBENCH<sup>®</sup> Design Report

 Design : UCC25630-4DDBR  
 UCC25630-4DDBR 290.0V-390.0V to 19.00V @ 25.0A


1. Select the AC input bridge rectifier, associated diodes and resistor values (connected to HV pin) accordingly when it is used with PFC input stage. Both M1 and M2 mosfets selected should be the same.


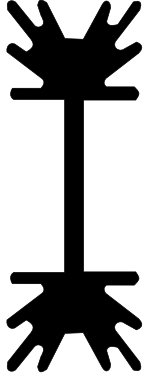
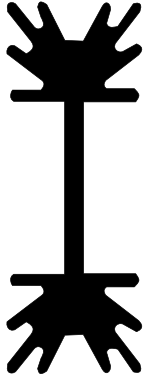
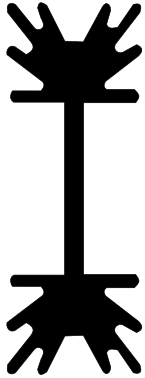



### My Comments




















No comments

### Electrical BOM

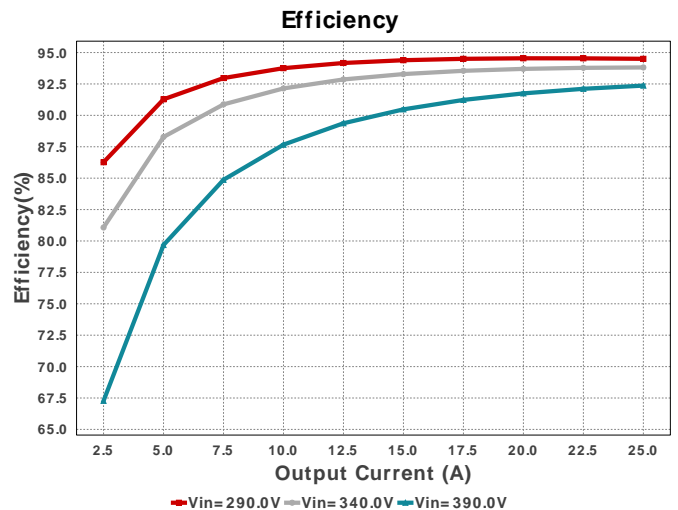
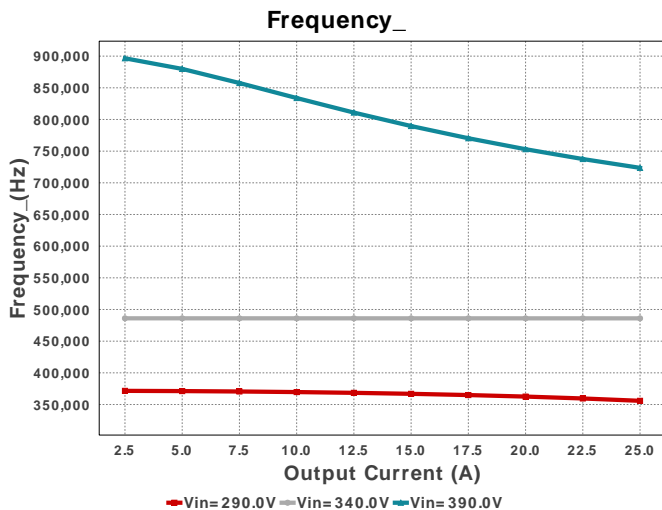
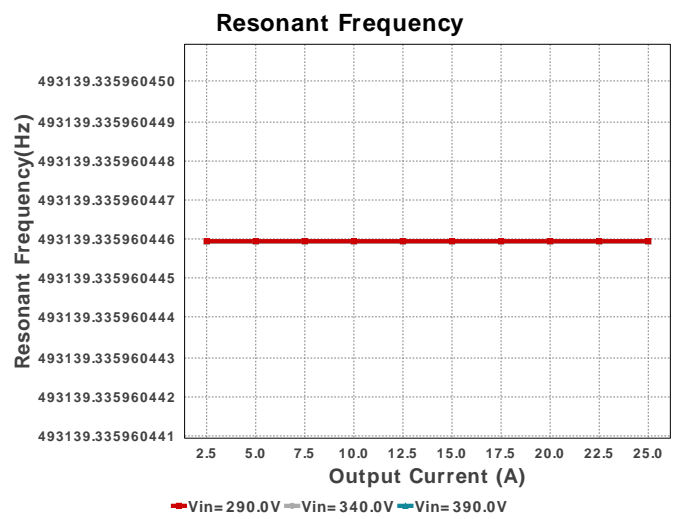
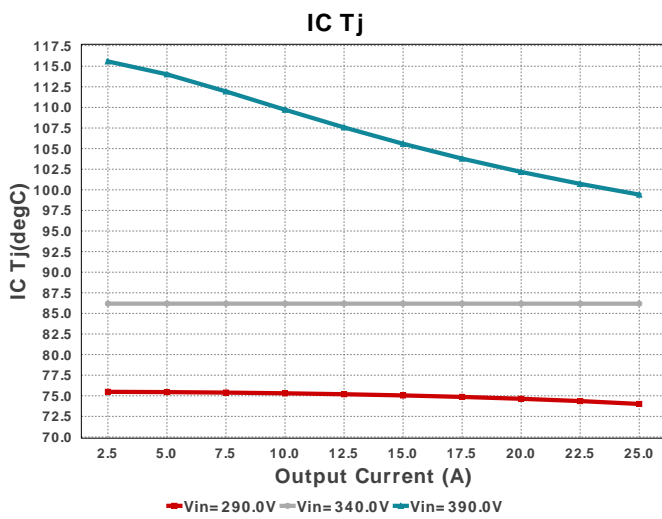
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C16	MuRata	GRM155R72A221KA01D Series= X7R	Cap= 220.0 pF ESR= 1.0 mOhm VDC= 100.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
2.	Cboot	Taiyo Yuden	TMK212BJ474KD-T Series= X5R	Cap= 470.0 nF ESR= 1.0 mOhm VDC= 20.0 V IRMS= 0.0 A	2	\$0.02	0805 7 mm <sup>2</sup>
3.	Cbw	MuRata	GRM1555C1H3R9CA01D Series= C0G/NP0	Cap= 3.9 pF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>
4.	Ccomp	Yageo	CC0805KRX7R9BB222 Series= X7R	Cap= 2.2 nF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm <sup>2</sup>
5.	Cin	CUSTOM	CUSTOM Series= ?	Cap= 47.0 uF ESR= 1.0 mOhm VDC= 468.0 V IRMS= 510.0 mA	1	NA	CUSTOM 0 mm <sup>2</sup>
6.	Cinx	CUSTOM	CUSTOM Series= ?	Cap= 1.5 uF VDC= 429.0 V IRMS= 0.0 A	1	NA	CUSTOM 0 mm <sup>2</sup>
7.	Cisns	MuRata	GRM1555C1H3R3CA01D Series= C0G/NP0	Cap= 3.3 pF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm <sup>2</sup>

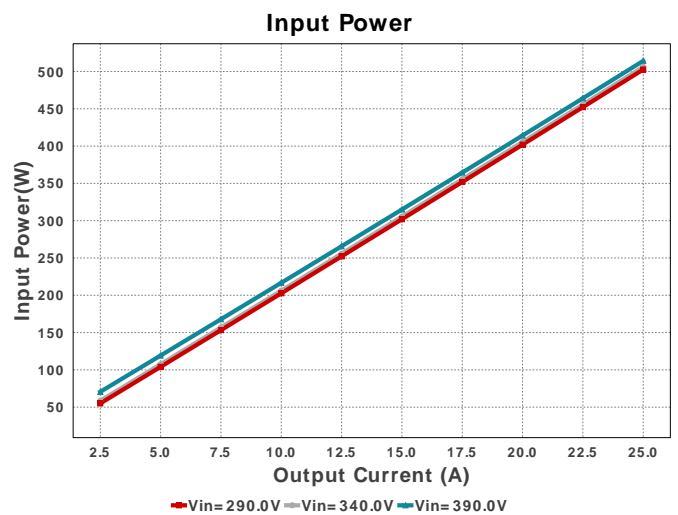
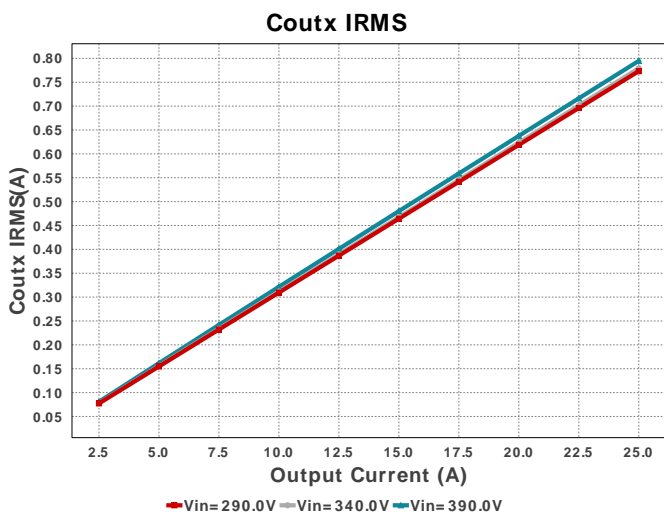
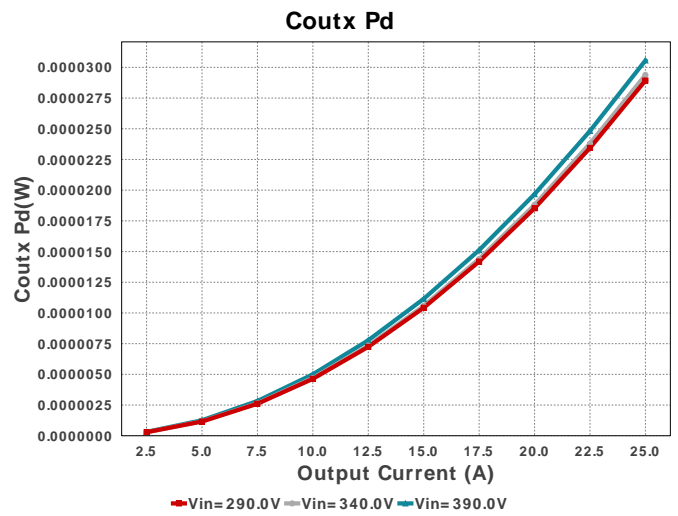
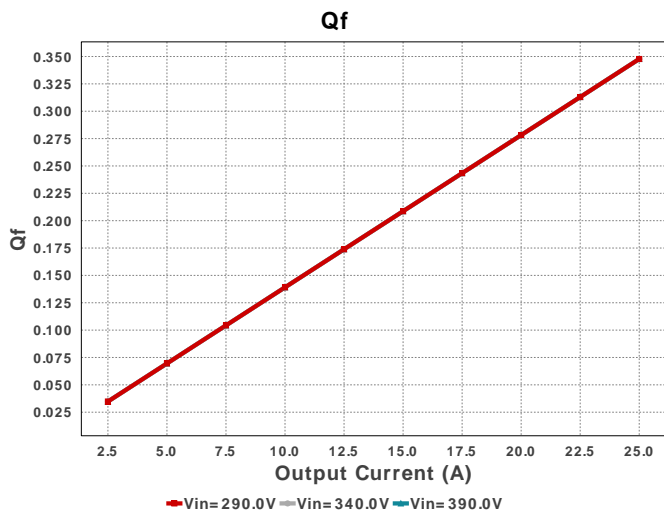
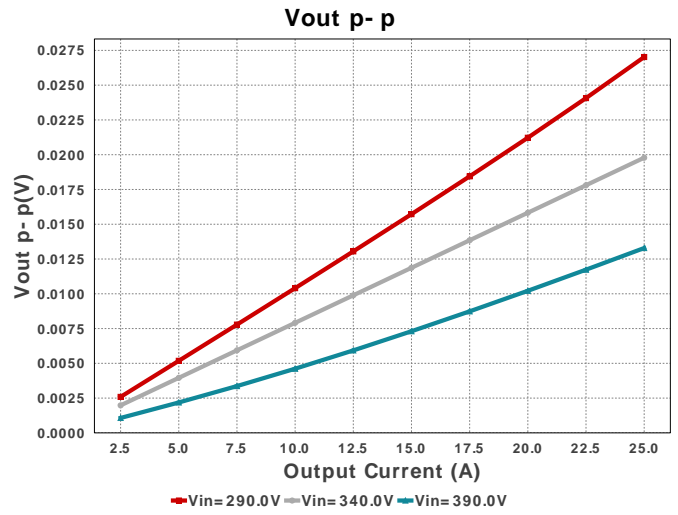
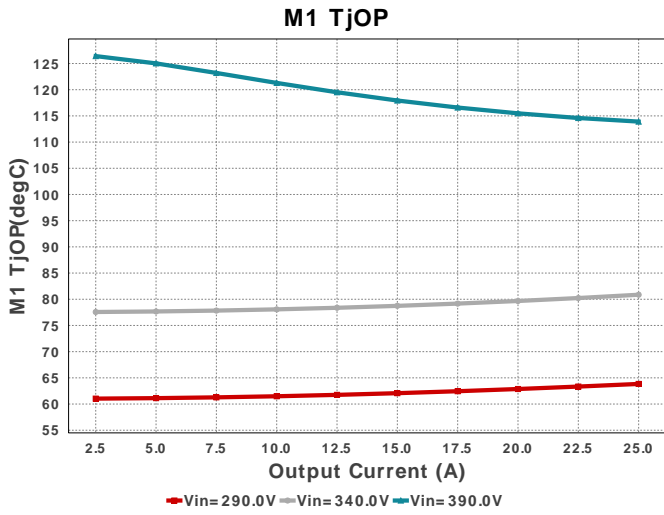
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
8.	Cisns2	CUSTOM	CUSTOM Series= ?	Cap= 150.0 pF ESR= 1.0 mOhm VDC= 535.51 V IRMS= 28.04 mA	1	NA	CUSTOM 0 mm <sup>2</sup>
9.	Cout	CUSTOM	CUSTOM Series= ?	Cap= 1.3371 mF ESR= 48.383 uOhm VDC= 28.5 V IRMS= 18.128 A	1	NA	CUSTOM 0 mm <sup>2</sup>
10.	Coutx	CUSTOM	CUSTOM Series= ?	Cap= 88.0 uF ESR= 48.383 uOhm VDC= 28.5 V IRMS= 14.5028 A	1	NA	CUSTOM 0 mm <sup>2</sup>
11.	Cr1	CUSTOM	CUSTOM Series= ?	Cap= 9.3419 nF ESR= 1.0 mOhm VDC= 376.99 V IRMS= 5.8231 A	1	NA	CUSTOM 0 mm <sup>2</sup>
12.	Cr2	CUSTOM	CUSTOM Series= ?	Cap= 9.3419 nF ESR= 1.0 mOhm VDC= 376.99 V IRMS= 5.8231 A	1	NA	CUSTOM 0 mm <sup>2</sup>
13.	Crvcc1	AVX	12063D475MAT2A Series= X5R	Cap= 4.7 uF ESR= 10.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.14	 1206 11 mm <sup>2</sup>
14.	Crvcc2	AVX	12063D475MAT2A Series= X5R	Cap= 4.7 uF ESR= 10.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.14	 1206 11 mm <sup>2</sup>
15.	Css	Kemet	C0603C154Z3VACTU Series= Y5V	Cap= 150.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.06	 0603 5 mm <sup>2</sup>
16.	Cvcc	TDK	C1005X5R1V225K050BC Series= X5R	Cap= 2.2 uF ESR= 1.0 mOhm VDC= 35.0 V IRMS= 0.0 A	1	\$0.08	 0402_065 3 mm <sup>2</sup>
17.	Cvcc2	Nichicon	UUD1V150MCL1GS Series= uD	Cap= 15.0 uF ESR= 760.0 mOhm VDC= 35.0 V IRMS= 150.0 mA	8	\$0.11	 SM_RADIAL_5MM 58 mm <sup>2</sup>
18.	Cvcr1	CUSTOM	CUSTOM Series= ?	Cap= 16.708 pF ESR= 1.0 mOhm VDC= 535.51 V IRMS= 8.9552 mA	1	NA	CUSTOM 0 mm <sup>2</sup>
19.	Cvcr2	CUSTOM	CUSTOM Series= ?	Cap= 1.5301 nF ESR= 1.0 mOhm VDC= 7.125 V IRMS= 8.9552 mA	1	NA	CUSTOM 0 mm <sup>2</sup>
20.	Cz	MuRata	GRM188R71E104KA01D Series= X7R	Cap= 100.0 nF ESR= 30.0 mOhm VDC= 25.0 V IRMS= 1.51 A	1	\$0.02	 0603 5 mm <sup>2</sup>
21.	Daux	ON Semiconductor	MBRA160T3G	VF@Io= 510.0 mV VRRM= 60.0 V	1	\$0.13	 SMA 37 mm <sup>2</sup>
22.	Dboot	Microsemi	UFS180JE3/TR13	VF@Io= 1.2 V VRRM= 800.0 V	1	\$0.71	 DO-214BA 42 mm <sup>2</sup>
23.	Dsec	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 32.5 V	1	NA	CUSTOM 0 mm <sup>2</sup>
24.	Dsec2	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 32.5 V	1	NA	CUSTOM 0 mm <sup>2</sup>

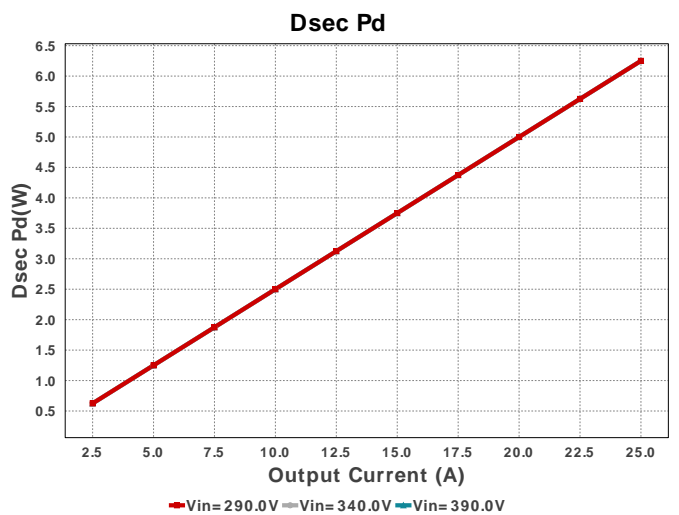
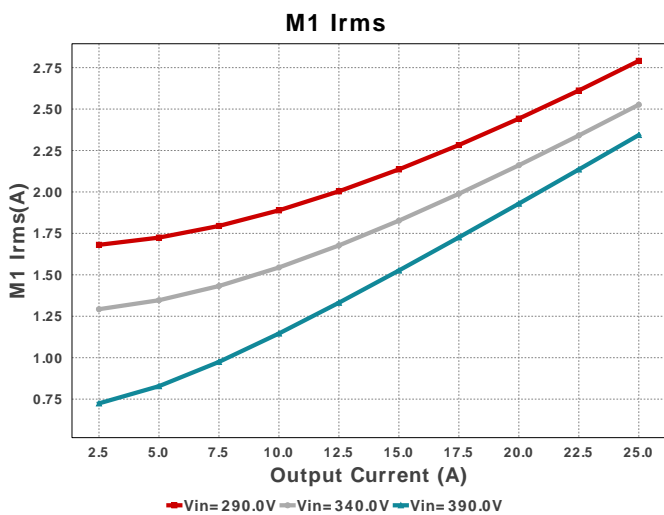
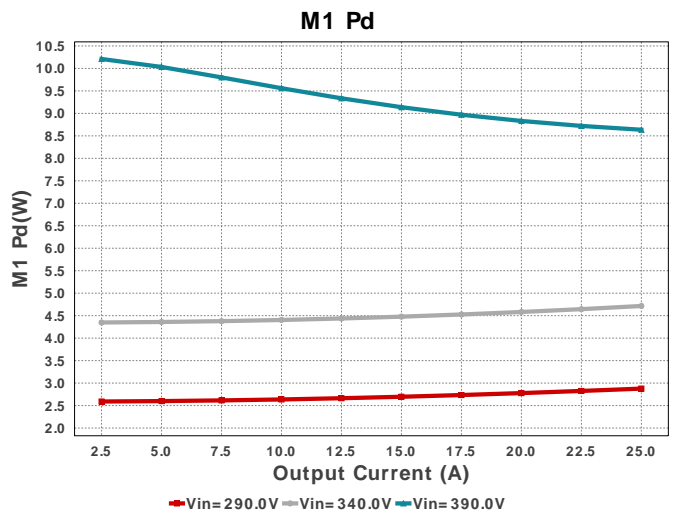
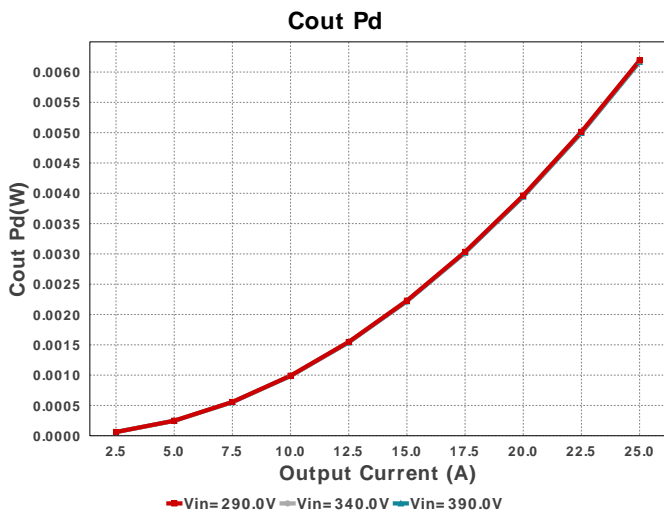
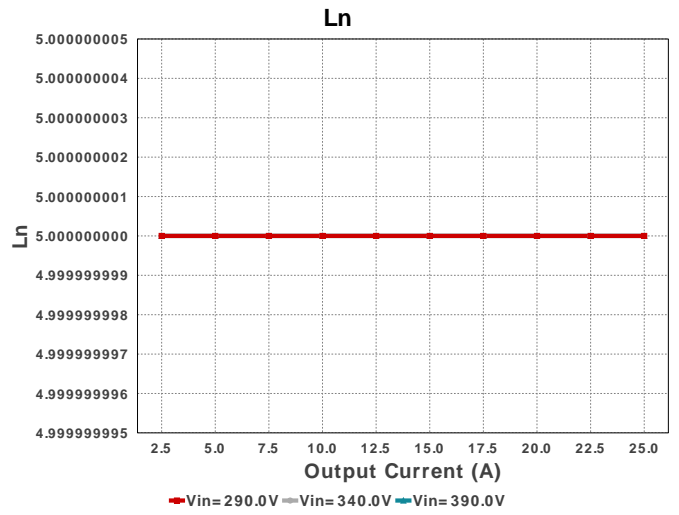
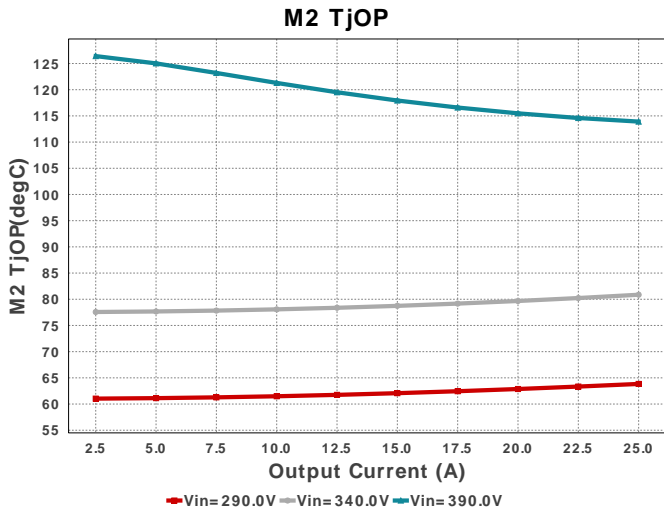
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
25.	Dz	ON Semiconductor	BZX84C11LT1G	Zener	1	\$0.03	 SOT-23 14 mm <sup>2</sup>
26.	HS_M1	Aavid	531202B02500G	Heatsink	1	\$0.87	 531202 545 mm <sup>2</sup>
27.	HS_M1	Aavid	531202B02500G	Heatsink	1	\$0.87	 531202 545 mm <sup>2</sup>
28.	HS_M2	Aavid	531202B02500G	Heatsink	1	\$0.87	 531202 545 mm <sup>2</sup>
29.	Lr	Coilcraft	XAL6060-562MEB	L= 5.6 µH DCR= 14.5 mOhm	1	\$0.82	 XAL6060 72 mm <sup>2</sup>
30.	M1	STMicroelectronics	STP45N65M5	VdsMax= 650.0 V IdsMax= 35.0 Amps	1	\$4.42	 TO-220AB 79 mm <sup>2</sup>
31.	M2	STMicroelectronics	STP45N65M5	VdsMax= 650.0 V IdsMax= 35.0 Amps	1	\$4.42	 TO-220AB 79 mm <sup>2</sup>

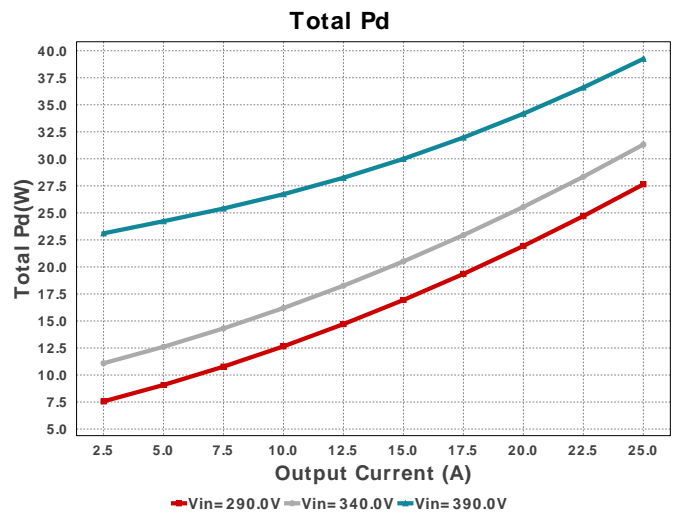
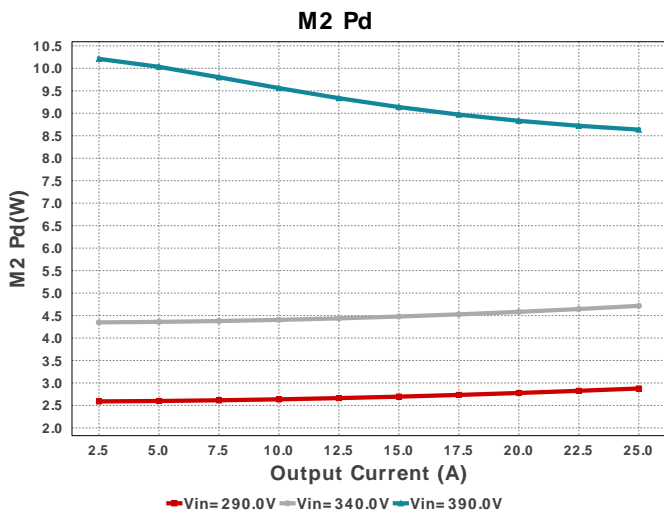
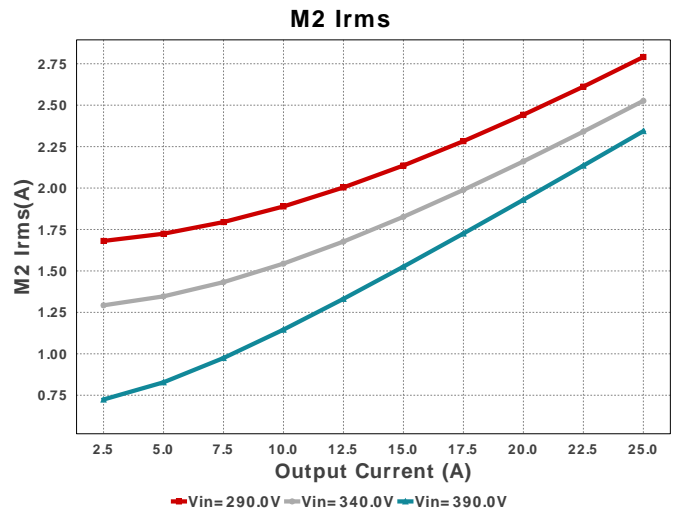
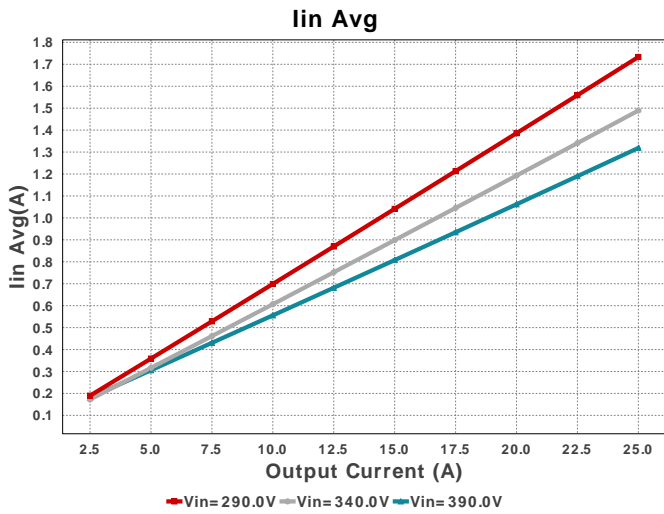
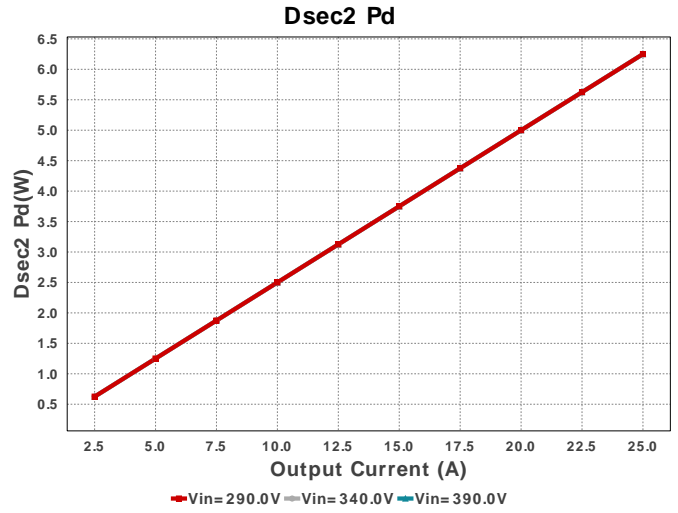
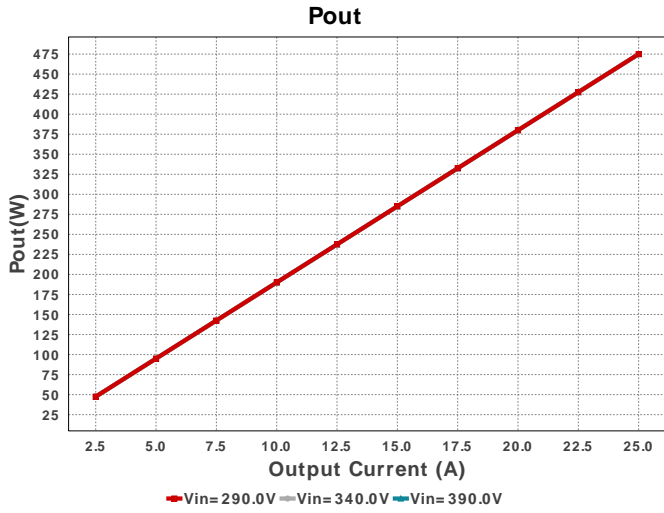
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
32.	O1	California Eastern Laboratories	PS2501L-1-A	Optocoupler	1	\$0.23	 PS2501L 77 mm <sup>2</sup>
33.	R19	Panasonic	ERJ-6ENF5622V Series= ERJ-6E	Res= 56.2 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
34.	R20	Vishay-Dale	CRCW12064M99FKEA Series= CRCW..e3	Res= 4.99 MOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm <sup>2</sup>
35.	R27	Vishay-Dale	CRCW12064M99FKEA Series= CRCW..e3	Res= 4.99 MOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm <sup>2</sup>
36.	R28	Vishay-Dale	CRCW12064M99FKEA Series= CRCW..e3	Res= 4.99 MOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm <sup>2</sup>
37.	Rbias	Vishay-Dale	CRCW04026K04FKED Series= CRCW..e3	Res= 6.04 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
38.	Rboot	Yageo	RC0805FR-072R2L Series= ?	Res= 2.2 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
39.	Rbw1	Vishay-Dale	CRCW080535K7FKEA Series= CRCW..e3	Res= 35.7 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
40.	Rbw2	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
41.	Rcomp	Yageo	RC0201FR-07249KL Series= ?	Res= 249.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
42.	Rdrv1	Panasonic	ERJ-6ENF5111V Series= ERJ-6E	Res= 5.11 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
43.	Rdrv2	Panasonic	ERJ-6ENF5111V Series= ERJ-6E	Res= 5.11 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
44.	Rfbb	Vishay-Dale	CRCW04027K87FKED Series= CRCW..e3	Res= 7.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
45.	Rfbt	Vishay-Dale	CRCW0603110KFKEA Series= CRCW..e3	Res= 110.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm <sup>2</sup>
46.	Rho	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
47.	Risns	CUSTOM	CUSTOM Series= ?	Res= 32.0968 Ohm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm <sup>2</sup>
48.	Rled	Yageo	RC0201FR-0736K5L Series= ?	Res= 36.5 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm <sup>2</sup>
49.	Rlimit	Vishay-Dale	CRCW120618K2FKEA Series= CRCW..e3	Res= 18.2 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm <sup>2</sup>
50.	Rlo	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>
51.	Rvcc1	Vishay-Dale	CRCW0402750KFKEA Series= CRCW..e3	Res= 750.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
52.	Rvcc2	Vishay-Dale	CRCW080582K5FKEA Series= CRCW..e3	Res= 82.5 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	0805 7 mm <sup>2</sup>
53.	T1	Core=TDK , CoilFormer=TDK	Core=B65845J0000R087 , CoilFormer=B65846W1008D001	Lp= 28.0 μH Turns Ratio(Nas)= 2:2 Turns Ratio(Nps)= 18:2 Npri= 18.0 Naux= 2.0 Nsec= 2.0	1	\$1.16	TDK_B65839 428 mm <sup>2</sup>
54.	U1	Texas Instruments	UCC25630-4DDBR	Switcher	1	\$0.95	DDB0014A 95 mm <sup>2</sup>
55.	VR	Texas Instruments	TLV431AIDBVT	Voltage References	1	\$0.38	DBV0005A 15 mm <sup>2</sup>

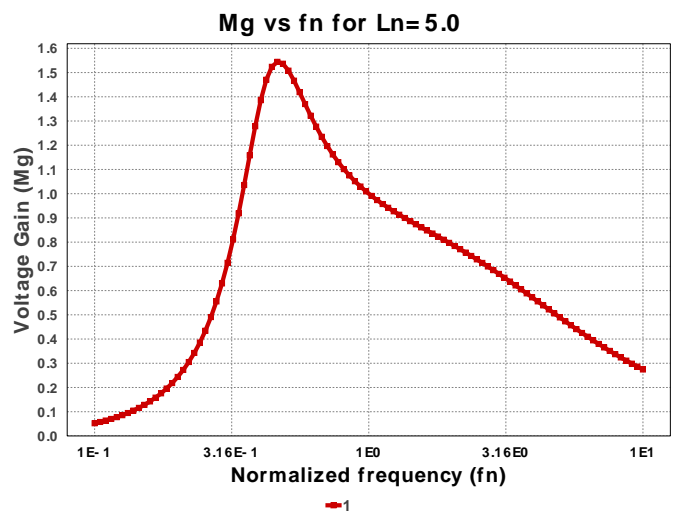
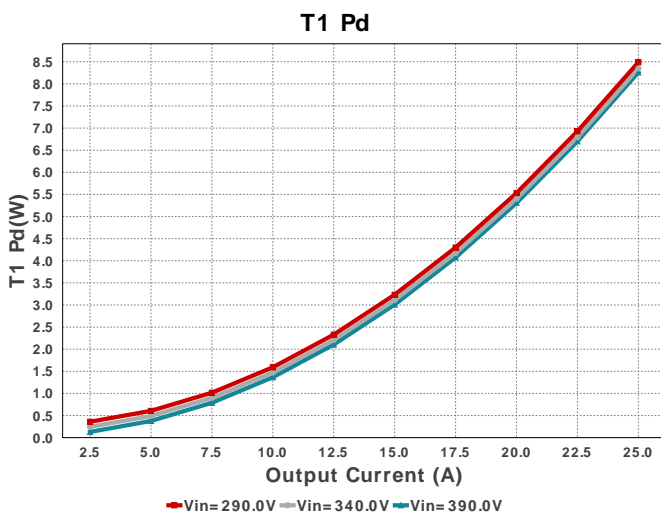
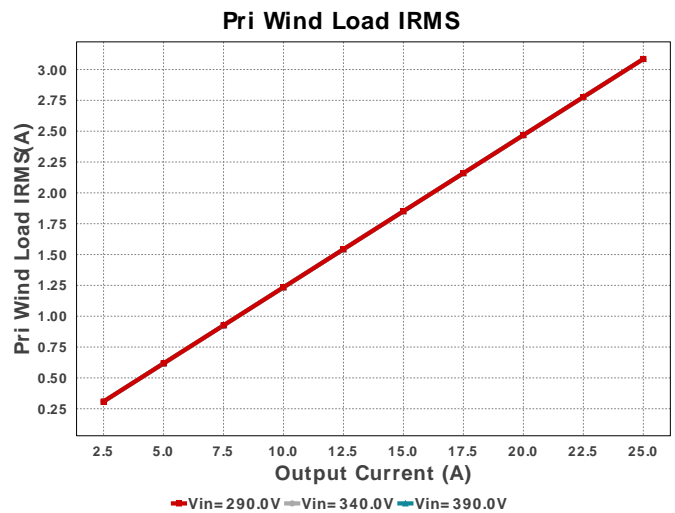
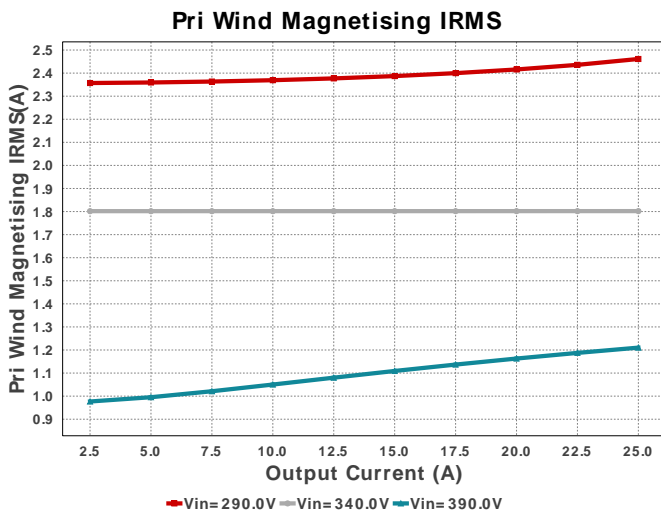
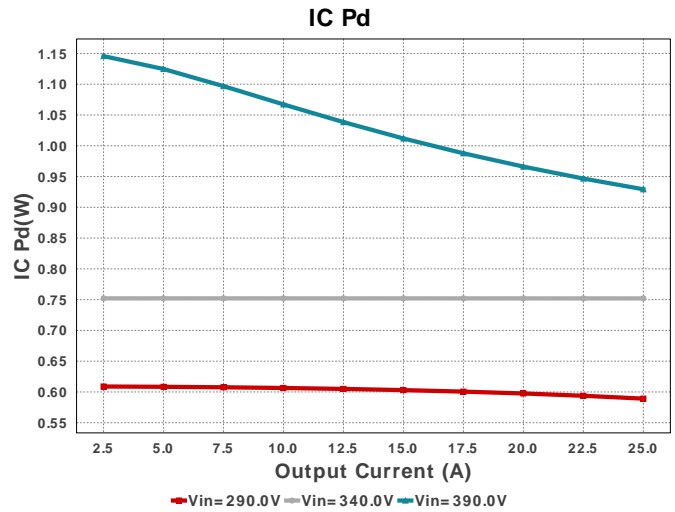
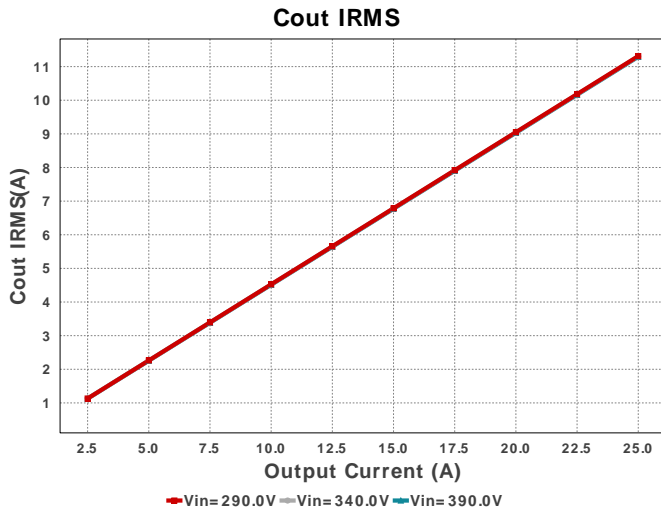












Operating Values

#	Name	Value	Category	Description
1.	Cout IRMS	11.312 A	Current	Output capacitor RMS ripple current
2.	Coutx IRMS	773.26 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	1.733 A	Current	Average input current
4.	M1 Irms	2.791 A	Current	Q lavg
5.	M2 Irms	2.791 A	Current	Q lavg
6.	Pri Wind Load IRMS	3.085 A	Current	Primary winding Load RMS current
7.	Pri Wind Magnetising IRMS	2.461 A	Current	Primary winding Magnetising RMS current
8.	BOM Count	62	General	Total Design BOM count
9.	FootPrint	3.195 k mm <sup>2</sup>	General	Total Foot Print Area of BOM components
10.	Frequency	355.82 kHz	General	Switching frequency

#	Name	Value	Category	Description
11.	Input Power	502.643 W	General	Total input power
12.	Ln	5.0	General	Inductor ratio (Lm/Lr)
13.	Pout	475.0 W	General	Total output power
14.	Qf	347.735 m	General	Quality factor
15.	Resonant Frequency	493.139 kHz	General	Resonant Frequency
16.	Total BOM	\$0.0	General	Total BOM Cost
17.	Efficiency	94.501 %	Op Point	Steady state efficiency
18.	Frequency	355.82 kHz	Op Point	Switching frequency
19.	IC Tj	74.01 degC	Op Point	IC junction temperature
20.	ICThetaJA	74.7 degC/W	Op Point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	25.0 A	Op Point	Iout operating point
22.	M1 TjOP	63.838 degC	Op Point	M1 MOSFET junction temperature
23.	M2 TjOP	63.838 degC	Op Point	M1 MOSFET junction temperature
24.	VIN_OP	290.0 V	Op Point	Vin operating point
25.	Vout Actual	18.572 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
26.	Vout OP	19.0 V	Op Point	Operational Output Voltage
27.	Vout Tolerance	1.885 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
28.	Vout p-p	27.023 mV	Op Point	Peak-to-peak output ripple voltage
29.	Cout Pd	6.192 mW	Power	Output capacitor power dissipation
30.	Coutx Pd	28.93 µW	Power	Output capacitor_x power loss
31.	Dsec Pd	6.25 W	Power	Secondary Diode Power Dissipation
32.	Dsec2 Pd	6.25 W	Power	Secondary Diode Power Dissipation
33.	IC Pd	589.161 mW	Power	IC power dissipation
34.	M1 Pd	2.877 W	Power	MOSFET power dissipation
35.	M2 Pd	2.877 W	Power	MOSFET power dissipation
36.	T1 Pd	8.489 W	Power	Estimated Losses in Transformer
37.	Total Pd	27.641 W	Power	Total Power Dissipation

## Design Inputs

#	Name	Value	Description
1.	Iout	25.0	Maximum Output Current
2.	SoftStart	40.0 ms	Soft Start Time (ms)
3.	VinMax	390.0	Maximum input voltage
4.	VinMin	290.0	Minimum input voltage
5.	Vout	19.0	Output Voltage
6.	acFrequency	0.0	AC Frequency
7.	base_pn	UCC256304	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0	Ambient temperature

## Design Assistance

1. **UCC256304** Product Folder : <http://www.ti.com/product/UCC256304> : contains the data sheet and other resources.

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

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