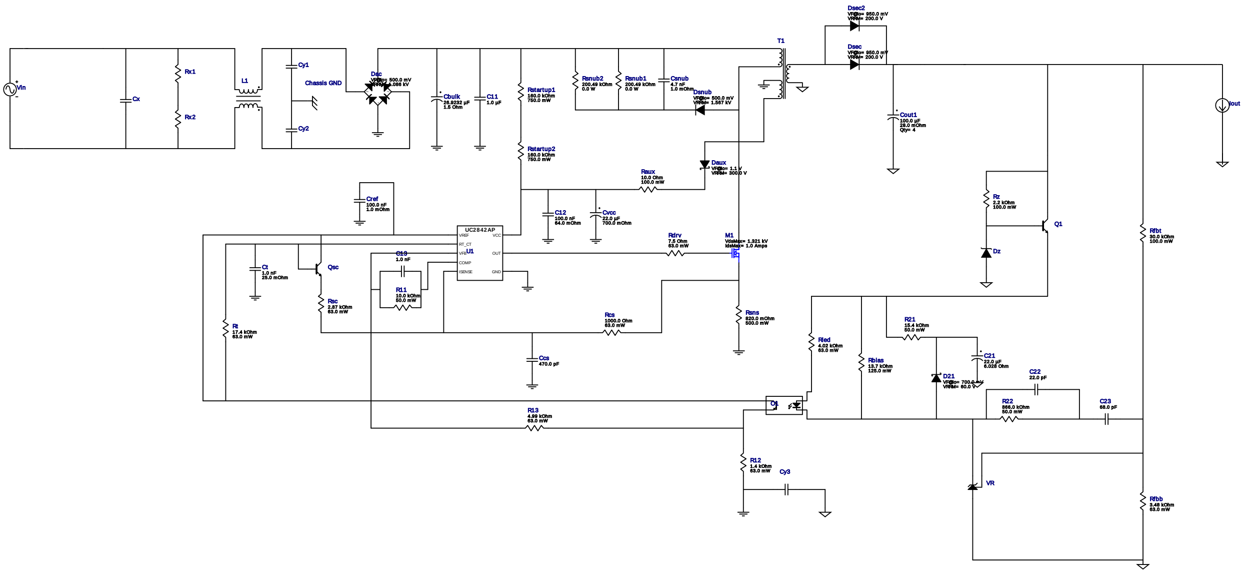
TEXAS INSTRUMENTS

WEBENCH ® Design Report

VinMin = 240.0V
VinMax = 480.0V
Vout = 24.0V
Iout = 3.0A

Device = UC2842AQD8R
Topology = Flyback
Created = 2019-12-15 23:24:38.098
BOM Cost = NA
BOM Count = 50
Total Pd =

Design : 14 UC2842AQD8R
UC2842AQD8R 240V-480V to 24.00V @ 3A



1. The EMI filter shown in the schematic is a placeholder. It has not yet been designed for the application.This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application.View WEBENCH(R) Disclaimer.

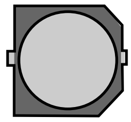
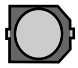
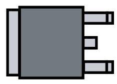
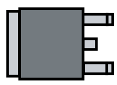
Design Alerts

Component Selection Information

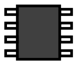
The UC2842AQ is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application. Click on the transformer symbol in the schematic and select "Explore Transformer Core/Bobbin Selection" to design using specific transformer cores and bobbin. With the current design condition, suitable FET could not be found in the current database. Hence, this design is created using an ideal FET. Please note that the resulting FET parameters are ideal, so the efficiency/loss values have been disabled. Also, the schematic/PCB export and Thermal simulations will not work with the ideal FET.

Electrical BOM

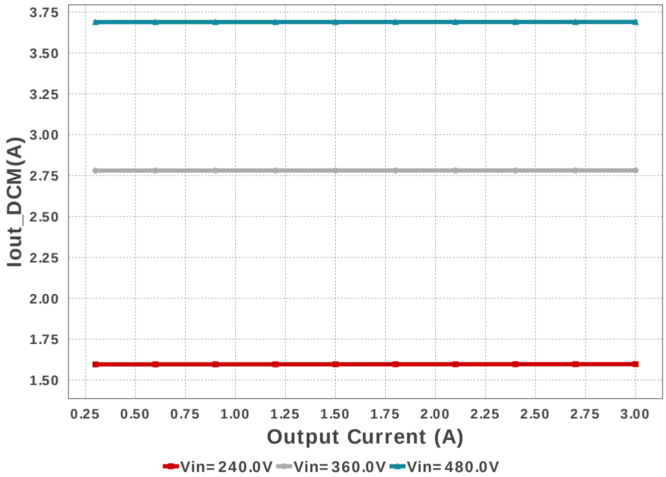
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
C11	CUSTOM	CUSTOM Series= ?	Cap= 1.0 uF VDC= 1.01822 kV IRMS= 0.0 A	1	NA	CUSTOM 0 mm^2
C12	Kemet	C0805C104M5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm^2
C13	MuRata	GRM1555C1H102JA01J Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
C21	Panasonic	EEUFC1H220 Series= FC	Cap= 22.0 uF ESR= 6.028 Ohm VDC= 50.0 V IRMS= 155.0 mA	1	$0.06	Panasonic_500x1100 49 mm^2
C22	Samsung Electro-Mechanics	CL21C220JBANNNC Series= C0G/NP0	Cap= 22.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2

Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
C23	Samsung Electro-Mechanics	CL21C680JBANNNC Series= C0G/NP0	Cap= 68.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm^2
Cbulk	CUSTOM	CUSTOM Series= ?	Cap= 26.9232 uF ESR= 1.5005 Ohm VDC= 712.76 V IRMS= 727.97 mA	1	NA	CUSTOM 0 mm^2
Ccs	AVX	04025A471JAT2A Series= C0G/NP0	Cap= 470.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Cout1	Panasonic	EEHZA1H101P Series= ZA	Cap= 100.0 uF ESR= 28.0 mOhm VDC= 50.0 V IRMS= 2.0 A	4	$1.00	 SM_RADIAL_10BMM 160 mm^2
Cref	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Csnub	MuRata	GRM31BR73A472KW01L Series= X7R	Cap= 4.7 nF ESR= 1.0 mOhm VDC= 1000.0 V IRMS= 0.0 A	1	$0.12	 1206 11 mm^2
Ct	Kemet	C0805C102J1GACTU Series= C0G/NP0	Cap= 1.0 nF ESR= 25.0 mOhm VDC= 100.0 V IRMS= 1.71 A	1	$0.09	0805 7 mm^2
Cvcc	Panasonic	EEE-FK1V220R Series= FK	Cap= 22.0 uF ESR= 700.0 mOhm VDC= 35.0 V IRMS= 160.0 mA	1	$0.09	 SM_RADIAL_C 62 mm^2
D21	Diodes Inc.	B260A-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	$0.09	 SMA 37 mm^2
Dac	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 1.086 kV	1	NA	CUSTOM 0 mm^2
Daux	SMC Diode Solutions	ST1300ATR	VF@Io= 1.1 V VRRM= 300.0 V	1	$0.07	 SMA 37 mm^2
Dsec	SMC Diode Solutions	SBRD10200TR	VF@Io= 950.0 mV VRRM= 200.0 V	1	$0.12	 DPAK 102 mm^2
Dsec2	SMC Diode Solutions	SBRD10200TR	VF@Io= 950.0 mV VRRM= 200.0 V	1	$0.12	 DPAK 102 mm^2
Dsnub	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 1.567 kV	1	NA	CUSTOM 0 mm^2
Dz	Diodes Inc.	MMSZ5250B-7-F	Zener	1	$0.03	SOD-123 13 mm^2
M1	NA	IdealFET	VdsMax= 1.321 kV IdsMax= 1.0 Amps	1	NA	NA 0 mm^2
O1	Fairchild Semiconductor	FOD817A	Optocoupler	1	$0.11	 DIP-4 71 mm^2
Q1	Diodes Inc.	MMBT4401-7-F	Bipolar Transistor	1	$0.02	 SOT-23 14 mm^2

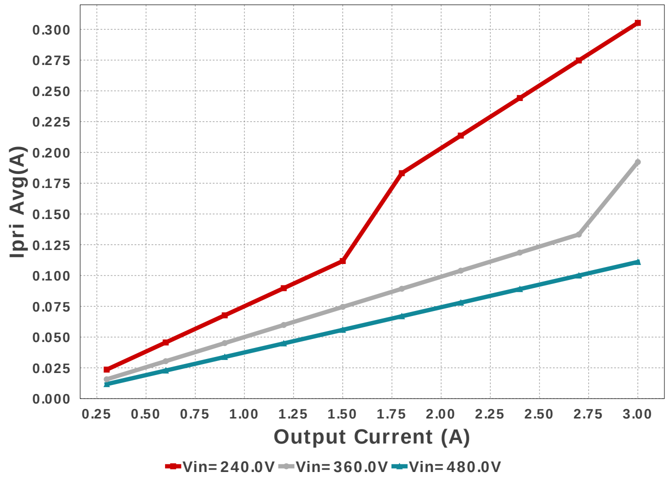
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Qsc	STMicroelectronics	2N2222A	Bipolar Transistor	1	$1.11	TO-18 57 mm^2
R11	Yageo	RC0201FR-0710KL Series= ?	Res= 10.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
R12	Vishay-Dale	CRCW04021K40FKED Series= CRCW..e3	Res= 1.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
R13	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
R21	Yageo	RC0201FR-0715K4L Series= ?	Res= 15.4 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
R22	Yageo	RC0201FR-07866KL Series= ?	Res= 866.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
Raux	Vishay-Dale	CRCW060310R0FKEA Series= CRCW..e3	Res= 10.0 Ohm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm^2
Rbias	Vishay-Dale	CRCW080513K7FKEA Series= CRCW..e3	Res= 13.7 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm^2
Rcs	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rdrv	Vishay-Dale	CRCW04027R50FKED Series= CRCW..e3	Res= 7.5 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rfbb	Vishay-Dale	CRCW04023K48FKED Series= CRCW..e3	Res= 3.48 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rfbt	Yageo	RC0603FR-0730KL Series= ?	Res= 30.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm^2
Rled	Vishay-Dale	CRCW04024K02FKED Series= CRCW..e3	Res= 4.02 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rsc	Vishay-Dale	CRCW04022K87FKED Series= CRCW..e3	Res= 2.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rsns	Rohm	MCR25JZHFLR820 Series= MCR25	Res= 820.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	$0.03	1210 15 mm^2
Rsnub1	CUSTOM	CUSTOM Series= ?	Res= 200.49 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rsnub2	CUSTOM	CUSTOM Series= ?	Res= 200.49 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rstartup1	Vishay-Dale	CRCW2010160KFKEF Series= ?	Res= 160.0 kOhm Power= 750.0 mW Tolerance= 1.0%	1	$0.03	2010 32 mm^2
Rstartup2	Vishay-Dale	CRCW2010160KFKEF Series= ?	Res= 160.0 kOhm Power= 750.0 mW Tolerance= 1.0%	1	$0.03	2010 32 mm^2
Rt	Vishay-Dale	CRCW040217K4FKED Series= CRCW..e3	Res= 17.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2

Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Rz	Yageo	RC0603FR-072K2L Series= ?	Res= 2.2 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm^2
T1	Core=TDK , CoilFormer=TDK	Core=B66421G0000X197 , CoilFormer=B66422W1010D001	Lp= 2.524 mH Turns Ratio(Nas)= 8:12 Turns Ratio(Nps)= 159:12 Npri= 159.0 Naux= 8.0 Nsec= 12.0	1	$0.35	 TDK_B66305 756 mm^2
U1	Texas Instruments	UC2842AQD8R	Switcher	1	$0.37	 D0008A 57 mm^2
VR	Texas Instruments	TL431IDBVR	Voltage References	1	$0.07	 R-PDSO-G3 16 mm^2

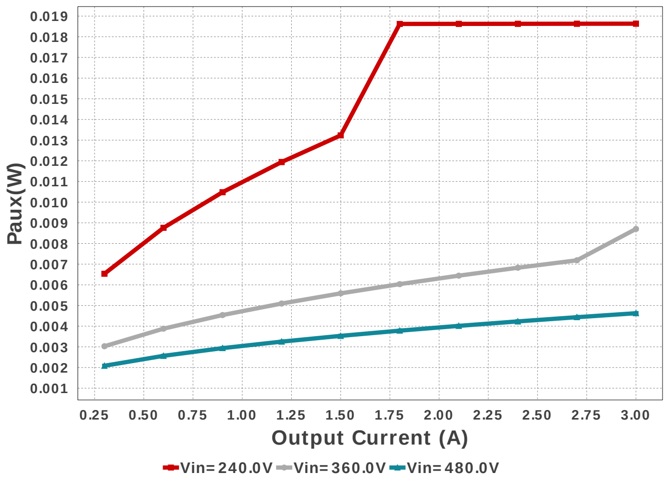
Iout_DCM



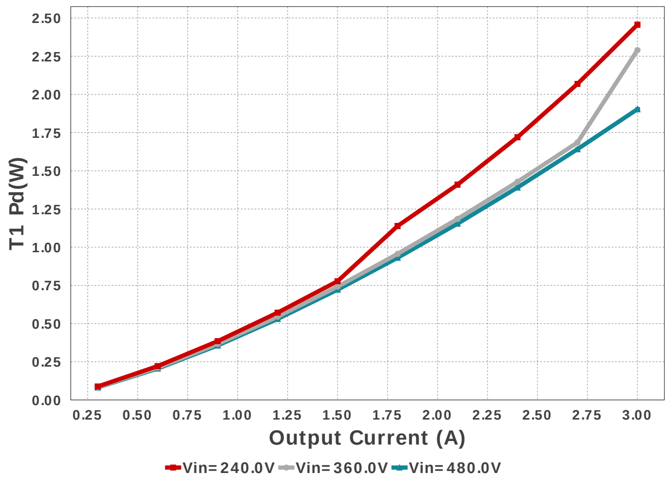
Ipri Avg

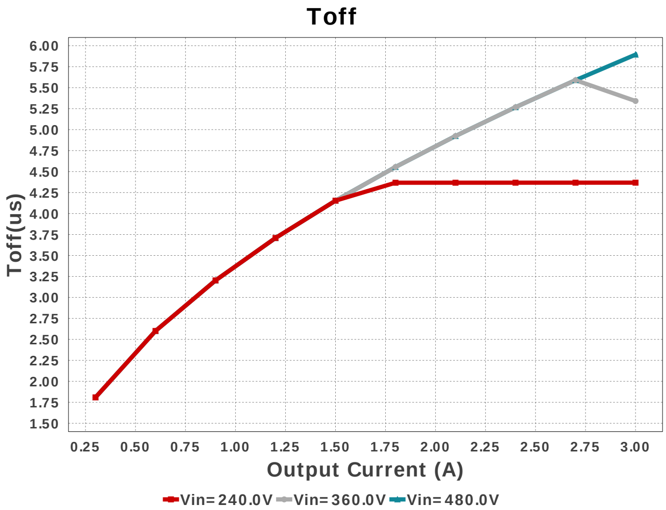


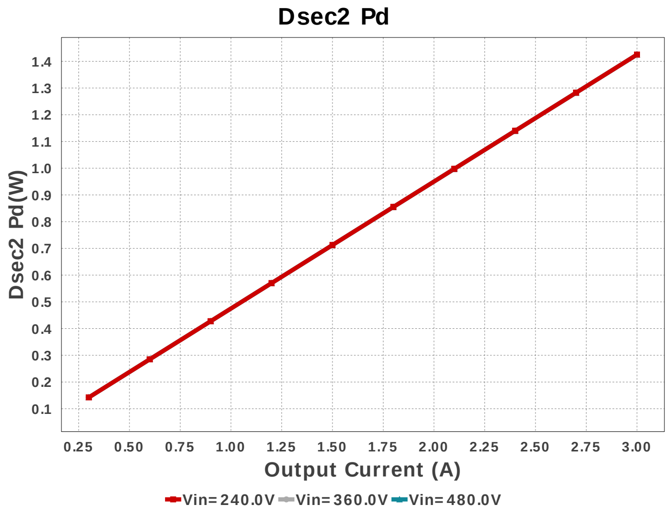
Paux

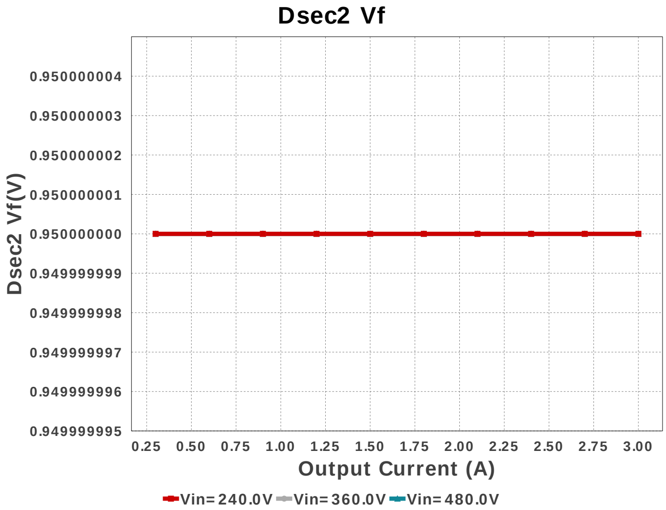


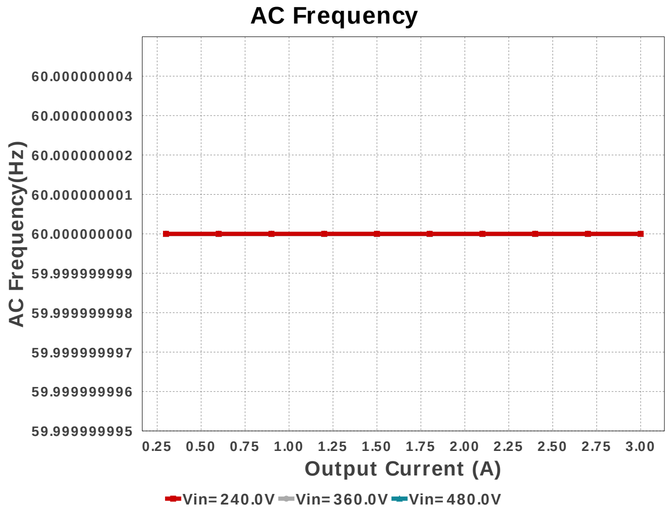
T1 Pd

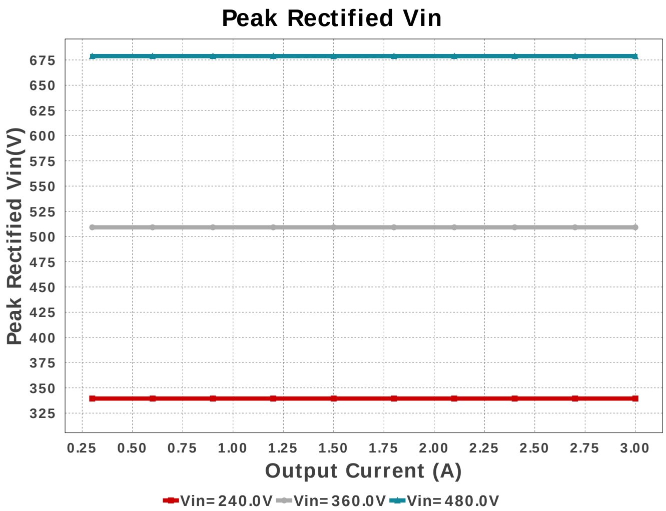


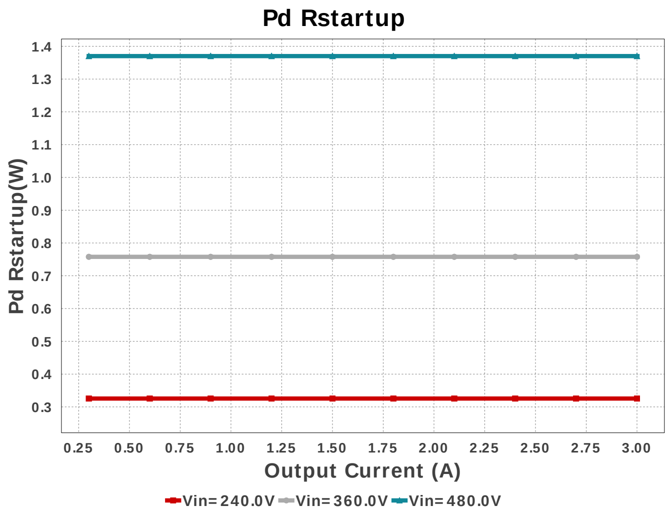

Toff
Toff(us)
6.00
5.75
5.50
5.25
5.00
4.75
4.50
4.25
4.00
3.75
3.50
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00
Output Current (A)
Vin=240.0V Vin=360.0V Vin=480.0V

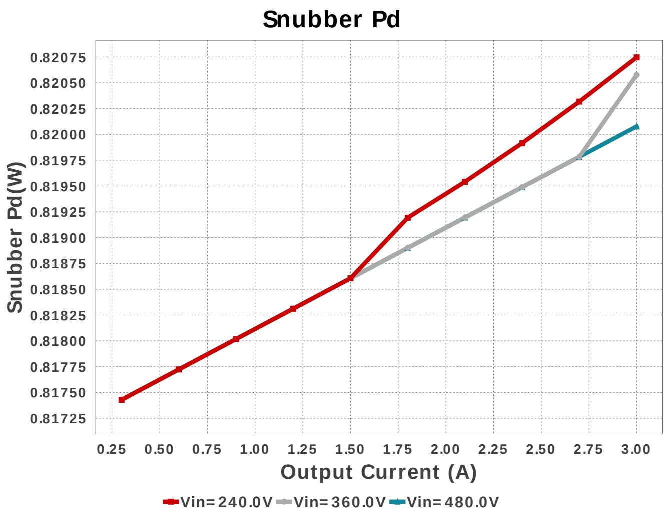

Dsec2 Pd
Dsec2 Pd(W)
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00
Output Current (A)
Vin=240.0V Vin=360.0V Vin=480.0V

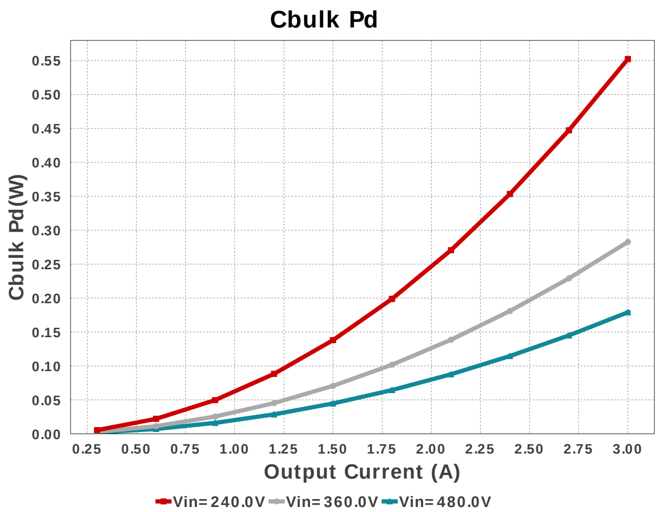

Dsec2 Vf
Dsec2 Vf(V)
0.950000004
0.950000003
0.950000002
0.950000001
0.950000000
0.949999999
0.949999998
0.949999997
0.949999996
0.949999995
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00
Output Current (A)
Vin=240.0V Vin=360.0V Vin=480.0V

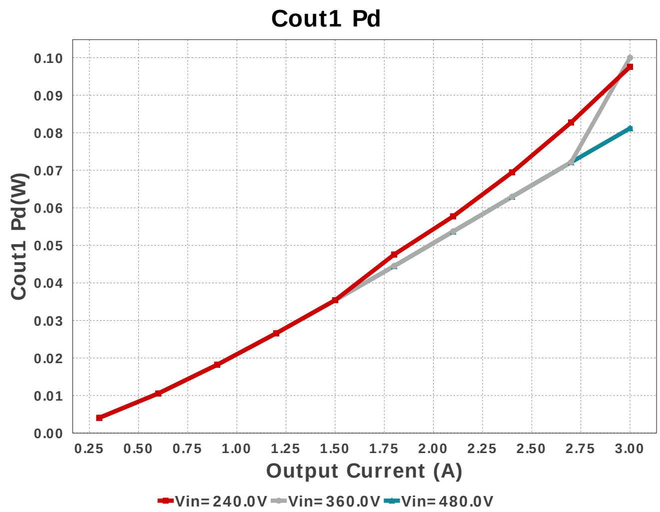

AC Frequency
AC Frequency(Hz)
60.000000004
60.000000003
60.000000002
60.000000001
60.000000000
59.999999999
59.999999998
59.999999997
59.999999996
59.999999995
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00
Output Current (A)
Vin=240.0V Vin=360.0V Vin=480.0V

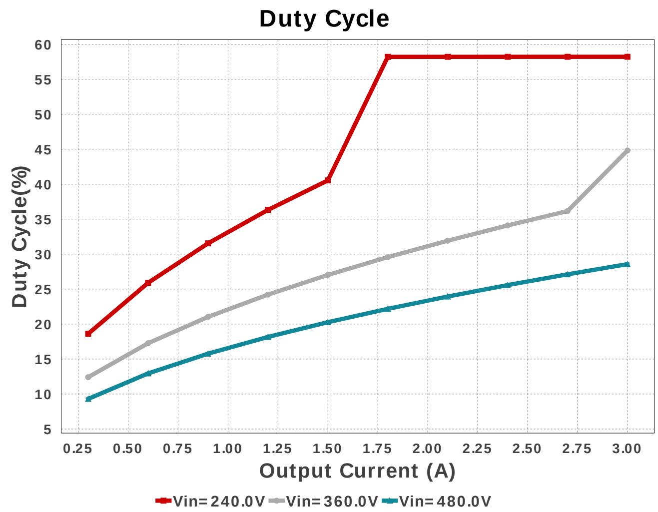

Peak Rectified Vin
Peak Rectified Vin(V)
675
650
625
600
575
550
525
500
475
450
425
400
375
350
325
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00
Output Current (A)
Vin=240.0V Vin=360.0V Vin=480.0V

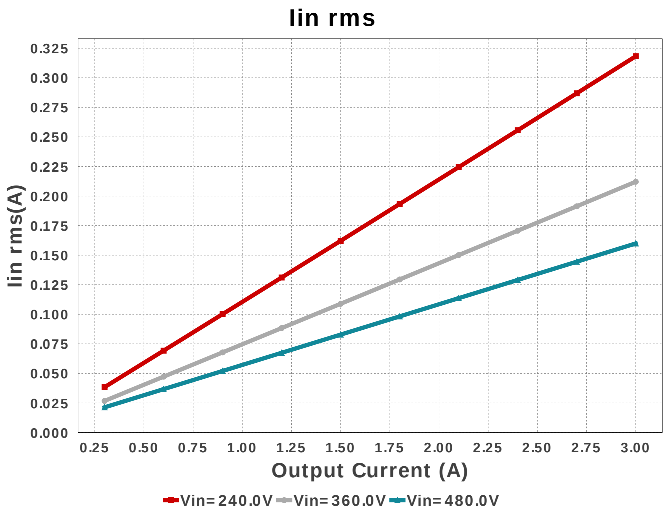

Pd Rstartup
Pd Rstartup(W)
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00
Output Current (A)
Vin=240.0V Vin=360.0V Vin=480.0V

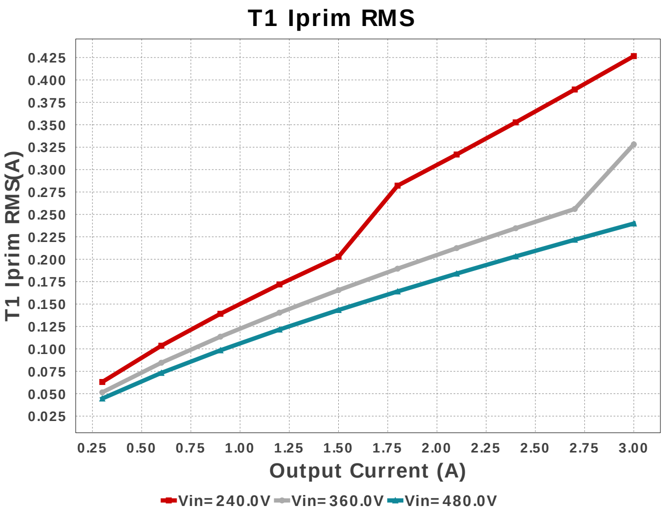

Snubber Pd
Snubber Pd(W)
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

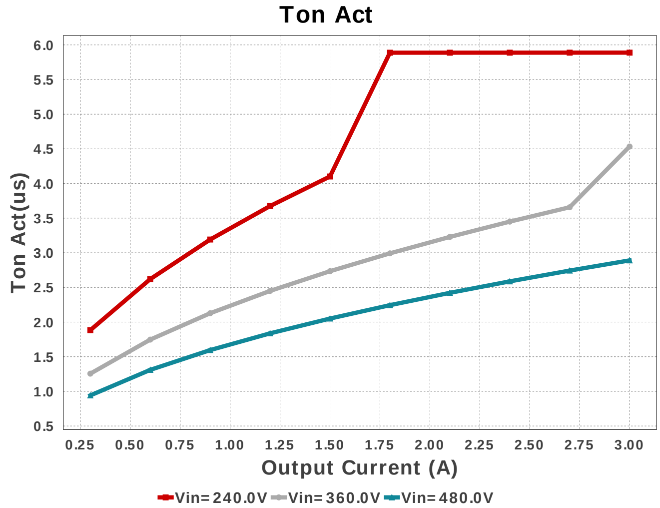

Cbulk Pd
Cbulk Pd(W)
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

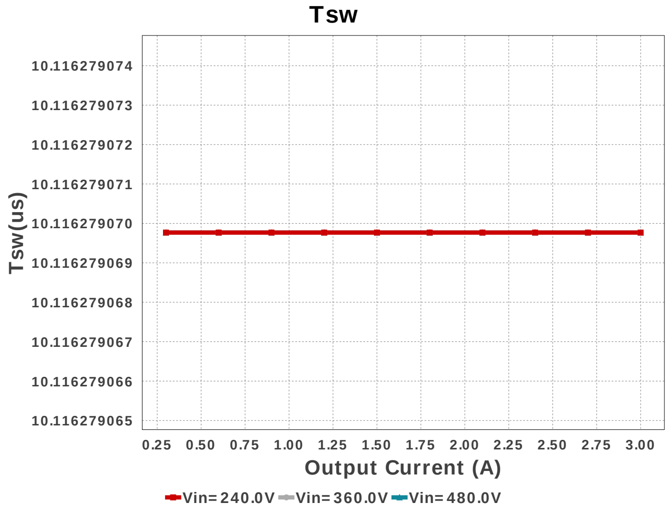

Cout1 Pd
Cout1 Pd(W)
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

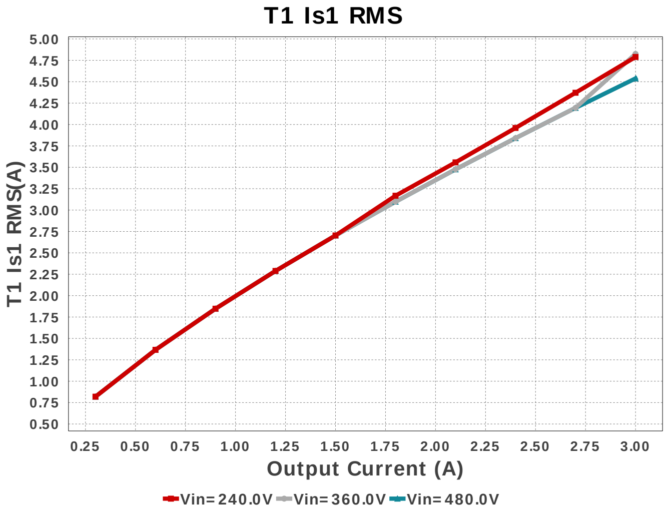

Duty Cycle
Duty Cycle(%)
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

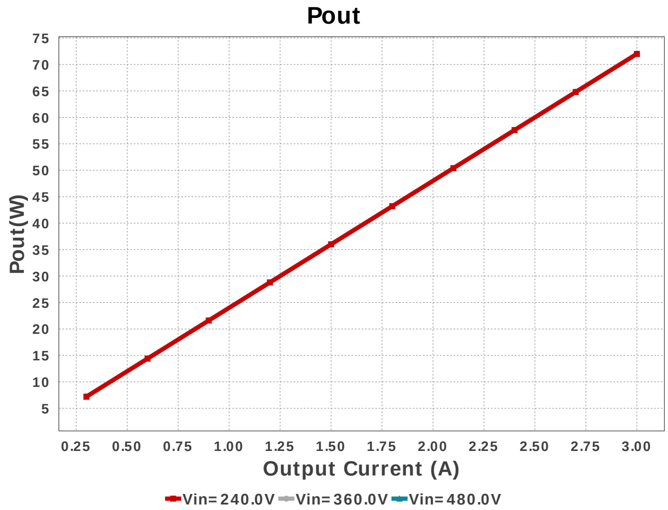

Iin rms
Iin rms(A)
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

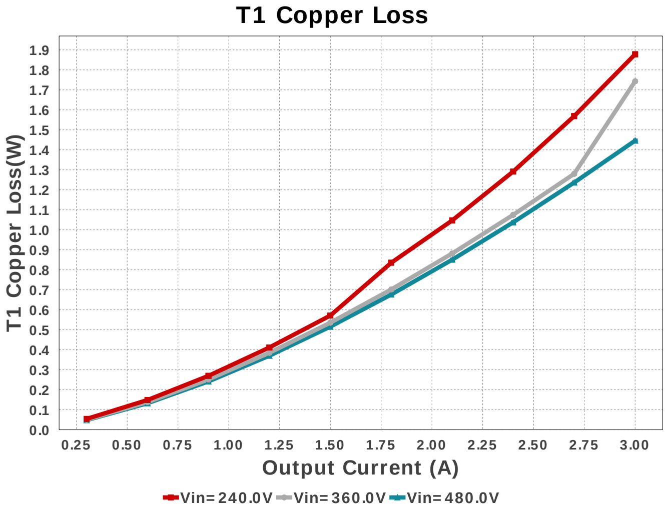

T1 Iprim RMS
T1 Iprim RMS(A)
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

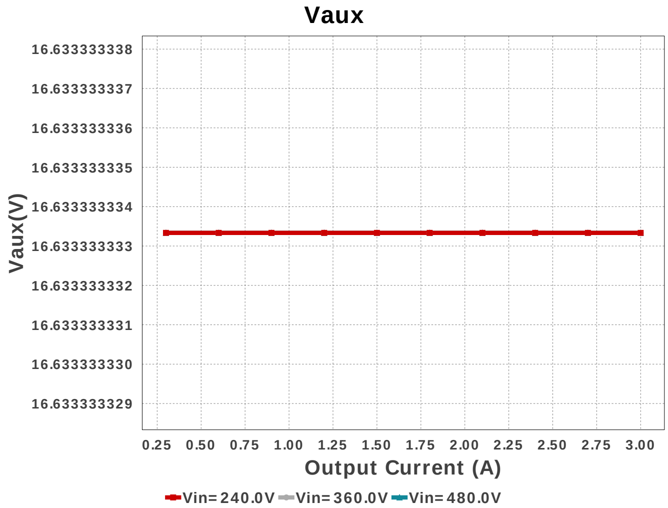

Ton Act
Ton Act(us)
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

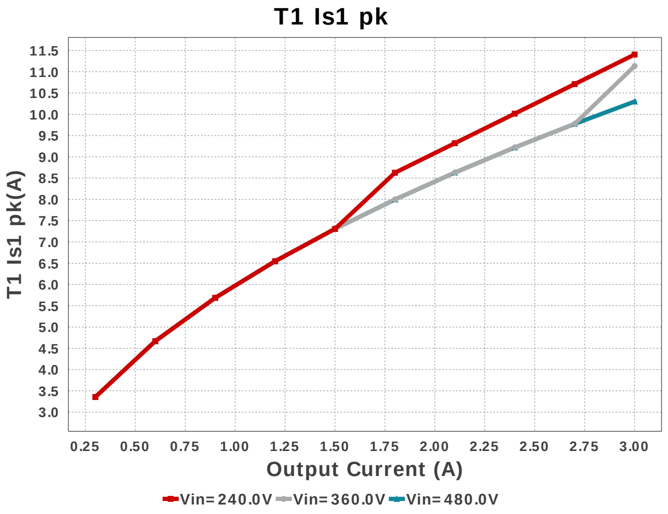

Tsw
Tsw(us)
10.116279074
10.116279073
10.116279072
10.116279071
10.116279070
10.116279069
10.116279068
10.116279067
10.116279066
10.116279065
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

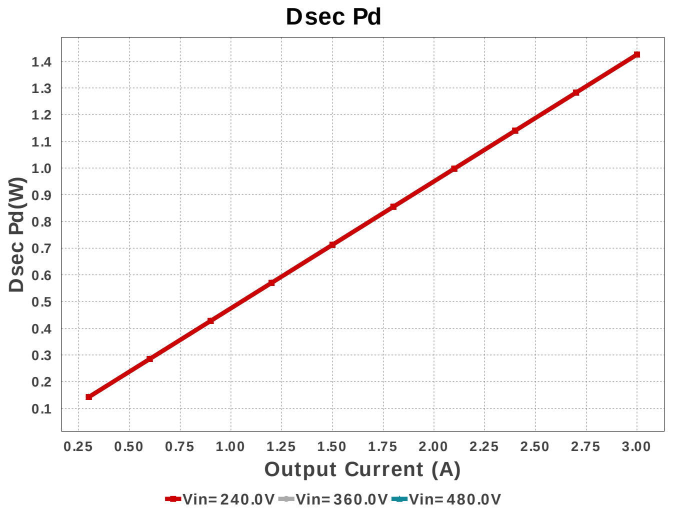

T1 Is1 RMS
T1 Is1 RMS(A)
5.00
4.75
4.50
4.25
4.00
3.75
3.50
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

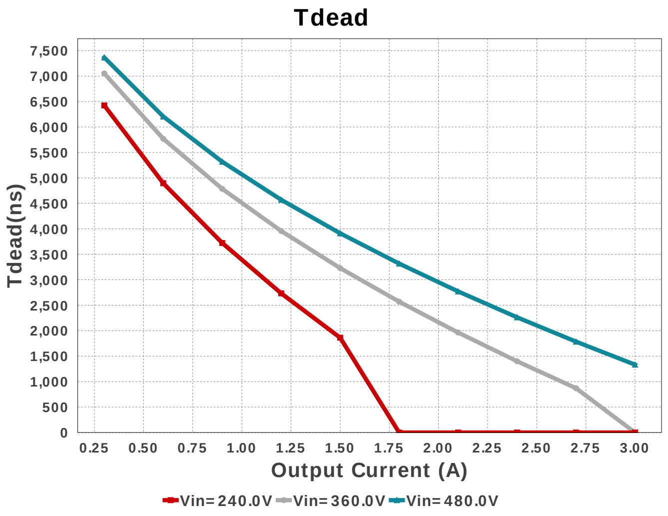

Pout
Pout(W)
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

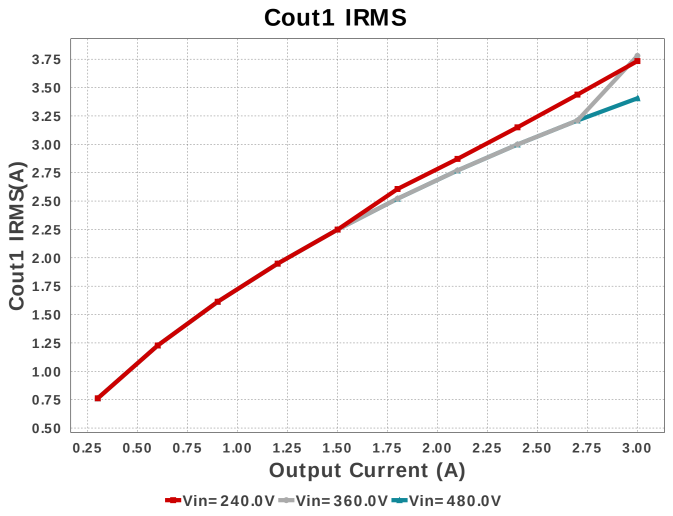

T1 Copper Loss
T1 Copper Loss(W)
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

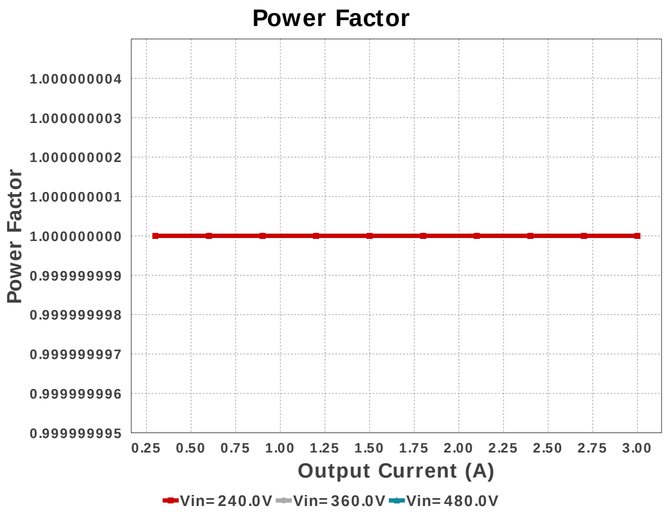

Vaux
Vaux(V)
16.633333338
16.633333337
16.633333336
16.633333335
16.633333334
16.633333333
16.633333332
16.633333331
16.633333330
16.633333329
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

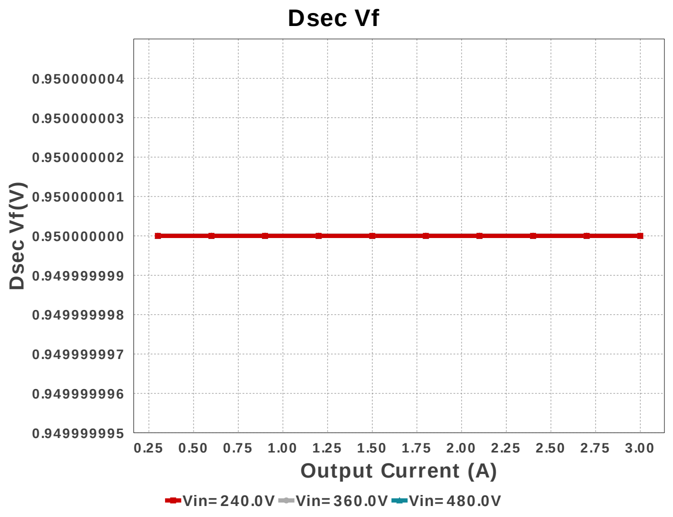

T1 Is1 pk
T1 Is1 pk(A)
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V


Dsec Pd
Dsec Pd(W)
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

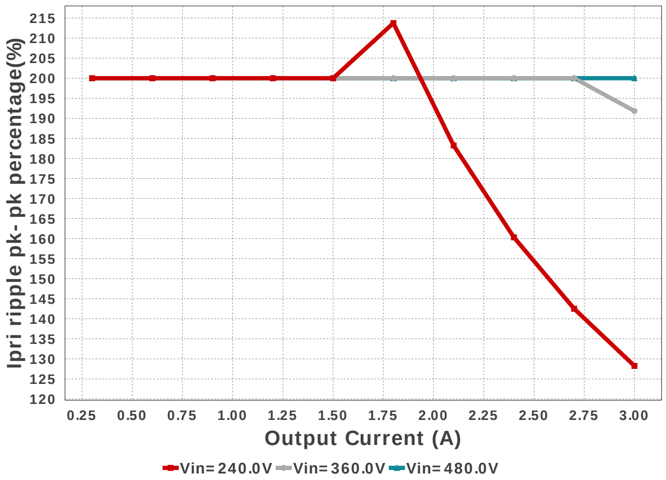

Tdead
Tdead(ns)
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V


Cout1 IRMS
Cout1 IRMS(A)
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

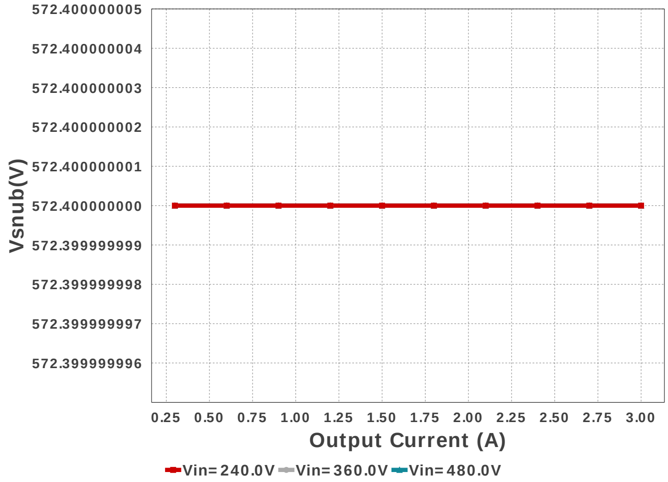

Power Factor
Power Factor
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V


Dsec Vf
Dsec Vf(V)
Output Current (A)
Vin= 240.0V Vin= 360.0V Vin= 480.0V

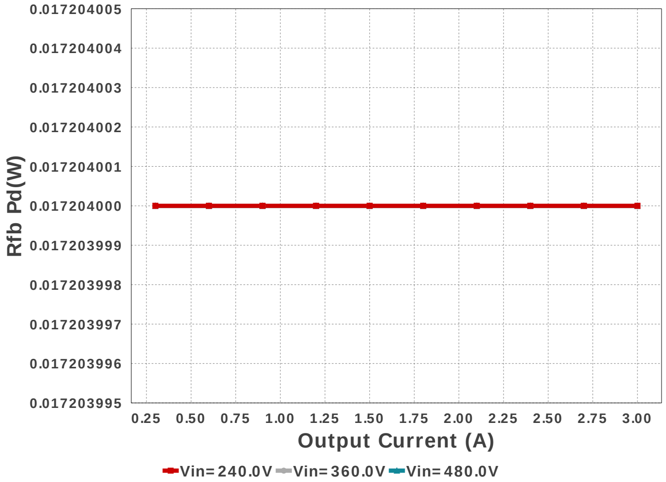
Ipri ripple pk- pk percentage



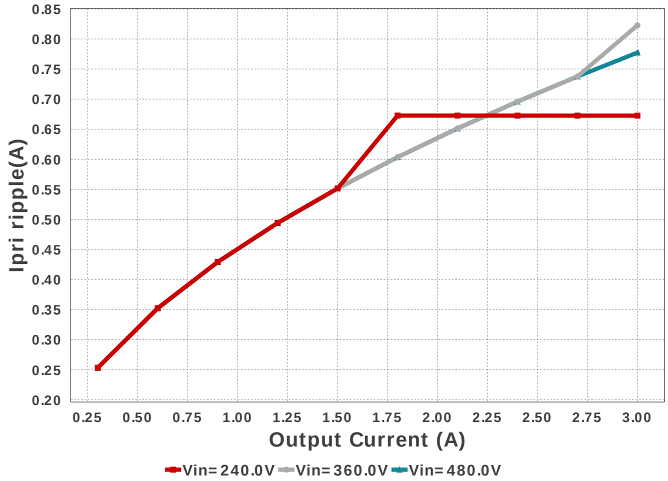
Vsnub



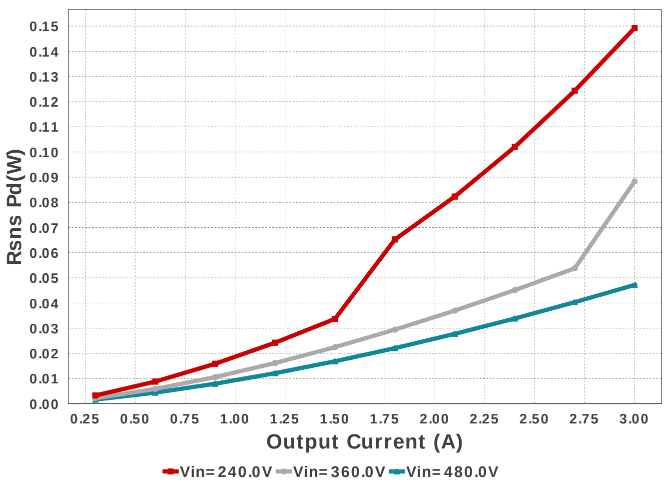
Rfb Pd



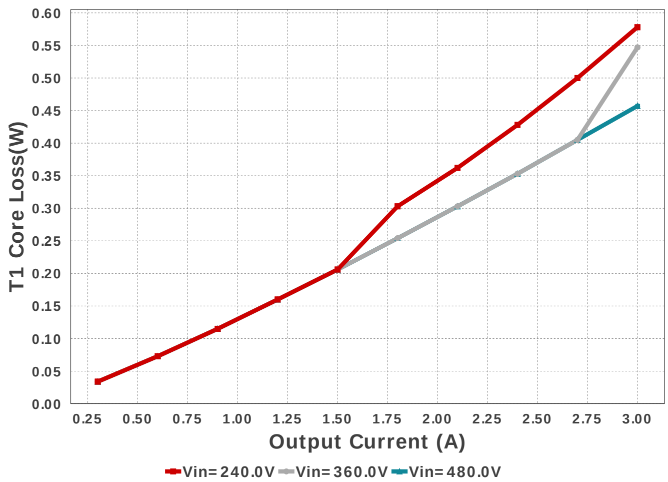
Ipri ripple

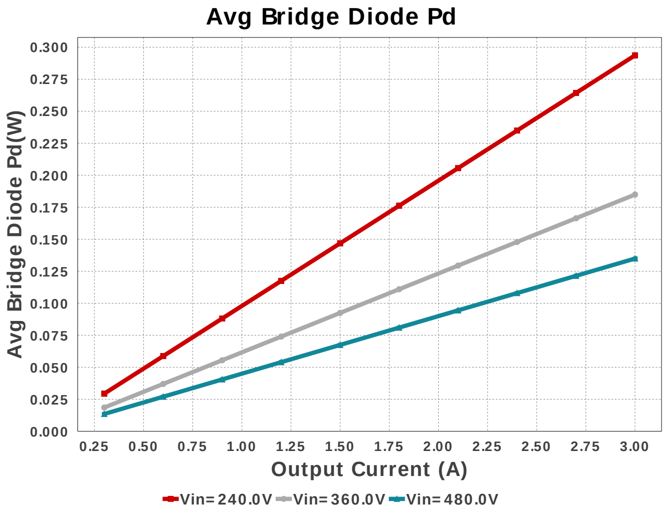


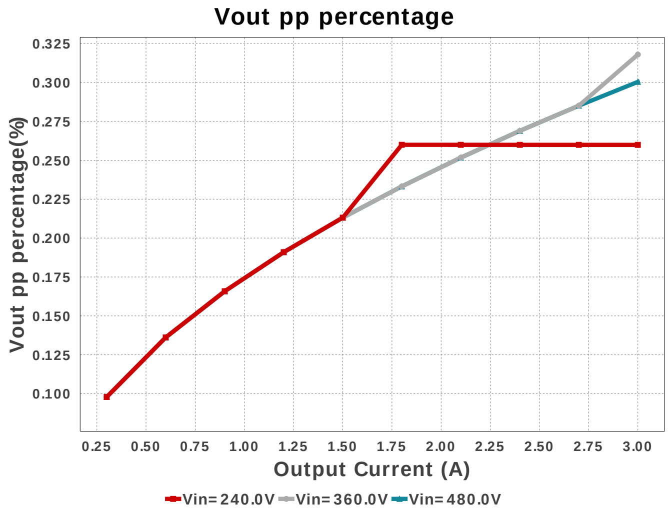
Rsns Pd

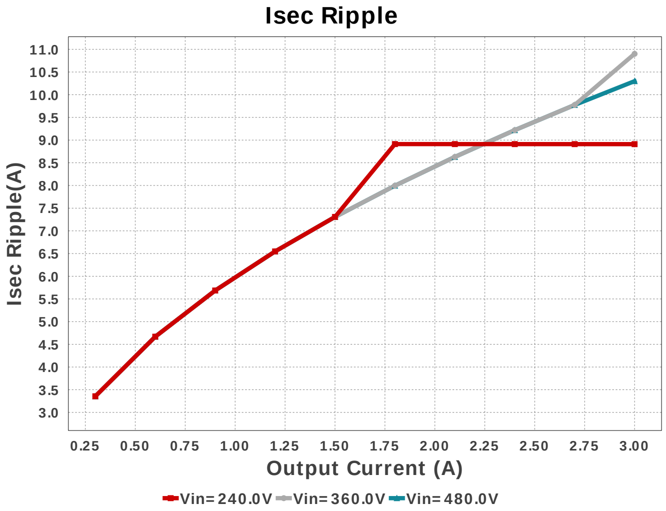


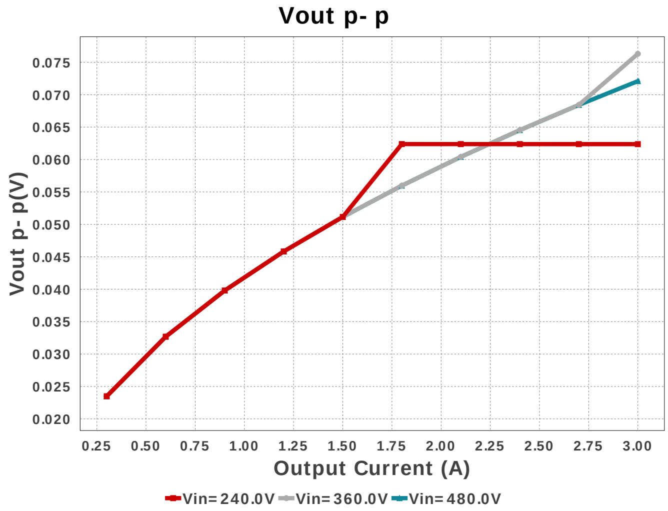
T1 Core Loss

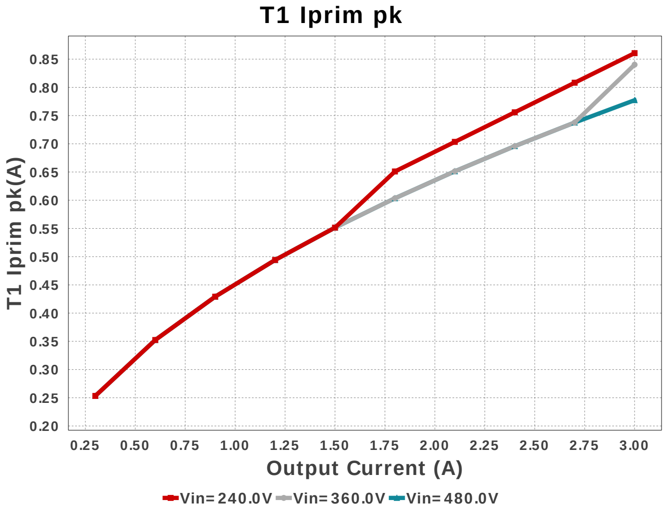












Operating Values

#	Name	Value	Category	Description
1.	Cbulk Pd	552.2 mW	Capacitor	Bulk capacitor power dissipation
2.	Cout1 IRMS	3.733 A	Capacitor	Output capacitor1 RMS ripple current
3.	Cout1 Pd	97.568 mW	Capacitor	Output capacitor1 power dissipation
4.	Avg Bridge Diode Pd	293.61 mW	Diode	Average Power Dissipation in the Bridge Diode over the AC Line Period
5.	Daux trr	35.0 ns	Diode	Auxiliary Diode Reverse Recovery Time
6.	Dsec Pd	1.425 W	Diode	Secondary Diode Power Dissipation
7.	Dsec Vf	950.0 mV	Diode	Effective Forward Voltage Drop at the Operating Current
8.	Dsec trr	0.0 ns	Diode	Output Diode Reverse Recovery Time
9.	Dsec2 Pd	1.425 W	Diode	Secondary Diode Power Dissipation
10.	Dsec2 Vf	950.0 mV	Diode	Effective Forward Voltage Drop at the Operating Current
11.	Dsnub trr	0.0 ns	Diode	Snubber Diode Reverse Recovery Time

#	Name	Value	Category	Description
12.	ICThetaJA	97.0 degC/W	IC	IC junction-to-ambient thermal resistance
13.	Avg Bridge Diode Pd	293.61 mW	Power	Average Power Dissipation in the Bridge Diode over the AC Line Period
14.	Cbulk Pd	552.2 mW	Power	Bulk capacitor power dissipation
15.	Cout1 Pd	97.568 mW	Power	Output capacitor1 power dissipation
16.	Dsec Pd	1.425 W	Power	Secondary Diode Power Dissipation
17.	Dsec2 Pd	1.425 W	Power	Secondary Diode Power Dissipation
18.	Paux	18.633 mW	Power	Power Dissipation in Raux and Daux
19.	Pd Rstartup	325.49 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
20.	Rfb Pd	17.204 mW	Power	Rfb Power Dissipation
21.	Rsns Pd	149.23 mW	Power	Current Limit Sense Resistor Power Dissipation
22.	Snubber Pd	820.747 mW	Power	Snubber Power Dissipation
23.	T1 Copper Loss	1.609 W	Power	Transformer Copper Loss Power Dissipation
24.	T1 Core Loss	541.0 mW	Power	Transformer Core Loss Power Dissipation
25.	T1 Pd	2.15 W	Power	Estimated Losses in Transformer
26.	Pd Rstartup	325.49 mW	Resistor	Power Dissipation in Rstartup1 and Rstartup2
27.	Rfb Pd	17.204 mW	Resistor	Rfb Power Dissipation
28.	Rsns Pd	149.23 mW	Resistor	Current Limit Sense Resistor Power Dissipation
29.	AC Frequency	60.0 Hz	System Information	Input AC frequency
30.	BOM Count	50	System Information	Total Design BOM count
31.	Duty Cycle	58.21 %	System Information	Duty cycle
32.	FootPrint	2.319 k mm^2	System Information	Total Foot Print Area of BOM components
33.	Frequency	98.851 kHz	System Information	Switching frequency
34.	Iin rms	320.492 mA	System Information	RMS Input Current
35.	Iout	3.0 A	System Information	Iout operating point
36.	Iout_DCM	1.597 A	System Information	Approximate Current below which DCM mode of operation will begin
37.	Mode	CCM	System Information	Conduction Mode
38.	Peak Rectified Vin	339.408 V	System Information	Peak voltage seen at rectified input
39.	Pout	72.0 W	System Information	Total output power
40.	Power Factor	1.0	System Information	Assumed Power Factor for the Application
41.	Tdead	0.0 ns	System Information	Approximate Dead Time of the Regulator
42.	Toff	4.368 us	System Information	Approximate Converter Off Time
43.	Ton Act	5.889 us	System Information	Approximate Converter On Time
44.	Total BOM	NA	System Information	Total BOM Cost
45.	Tsw	10.116 us	System Information	Switching Time Period
46.	Vin_RMS	240.0 V	System Information	Vin operating point
47.	Vout	24.0 V	System Information	Operational Output Voltage
48.	Vout Actual	24.004 V	System Information	Vout Actual calculated based on selected voltage divider resistors
49.	Vout Tolerance	2.137 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
50.	Vout p-p	62.374 mV	System Information	Peak-to-peak output ripple voltage
51.	Vout pp percentage	259.893 m%	System Information	Output Voltage ripple percentage
52.	Vsnub	572.4 V	System Information	Voltage Across the Snubber
53.	Ipri Avg	305.233 mA	Transformer	Average Current in Primary Winding over the complete Switching Period
54.	Ipri ripple	672.501 mA	Transformer	Ripple Current in the Primary Winding
55.	Ipri ripple pk-pk percentage	128.25 %	Transformer	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
56.	Isec Ripple	8.911 A	Transformer	Ripple Current in the Secondary Winding
57.	Paux	18.633 mW	Transformer	Power Dissipation in Raux and Daux
58.	T1 Copper Loss	1.609 W	Transformer	Transformer Copper Loss Power Dissipation
59.	T1 Core Loss	541.0 mW	Transformer	Transformer Core Loss Power Dissipation
60.	T1 Iprim RMS	426.605 mA	Transformer	Transformer Primary RMS Current
61.	T1 Iprim pk	860.617 mA	Transformer	Transformer Primary Peak Current

#	Name	Value	Category	Description
62.	T1 Is1 RMS	4.789 A	Transformer	Transformer Secondary1 RMS Current
63.	T1 Is1 pk	11.403 A	Transformer	Transformer Secondary1 Peak Current
64.	T1 Pd	2.15 W	Transformer	Estimated Losses in Transformer
65.	Vaux	16.633 V	Transformer	Auxiliary Voltage

Design Inputs

Name	Value	Description
Iout	3.0	Maximum Output Current
VinMax	480.0	Maximum input voltage
VinMin	240.0	Minimum input voltage
Vout	24.0	Output Voltage
acFrequency	60.0	AC Frequency
base_pn	UC2842AQ	Base Product Number
source	AC	Input Source Type
Ta	30.0	Ambient temperature

WEBENCH® Assembly

Component Testing

Some published data on components in datasheets such as Capacitor ESR and Inductor DC resistance is based on conservative values that will guarantee that the components always exceed the specification. For design purposes it is usually better to work with typical values. Since this data is not always available it is a good practice to measure the Capacitance and ESR values of Cin and Cout, and the inductance and DC resistance of L1 before assembly of the board. Any large discrepancies in values should be electrically simulated in WEBENCH to check for instabilities and thermally simulated in WebTHERM to make sure critical temperatures are not exceeded.

Soldering Component to Board

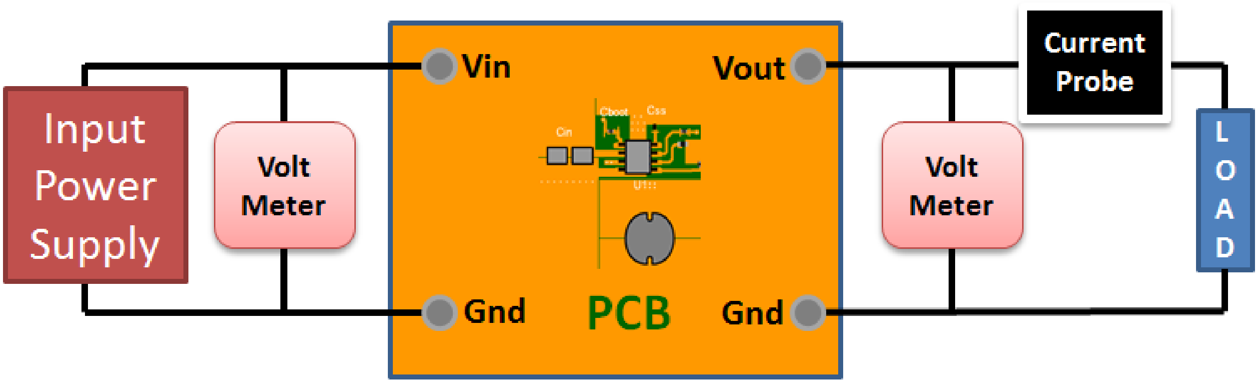
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. To solder the tab town to the board place the iron down on the board while resting against the tab, heating both surfaces simultaneously. Apply light pressure to the top of the plastic case until the solder flows around the part and the part is flush with the PCB. If the solder is not flowing around the board you may need a higher wattage iron (generally 25W to 30W is enough).

Initial Startup of Circuit

It is best to initially power up the board by setting the input supply voltage to the lowest operating input voltage 240.0V and set the input supply's current limit to zero. With the input supply off connect up the input supply to Vin and GND. Connect a digital volt meter and a load if needed to set the minimum Iout of the design from Vout and GND. Turn on the input supply and slowly turn up the current limit on the input supply. If the voltage starts to rise on the input supply continue increasing the input supply current limit while watching the output voltage. If the current increases on the input supply, but the voltage remains near zero, then there may be a short or a component misplaced on the board. Power down the board and visually inspect for solder bridges and recheck the diode and capacitor polarities. Once the power supply circuit is operational then more extensive testing may include full load testing, transient load and line tests to compare with simulation results.

Load Testing

The setup is the same as the initial startup, except that an additional digital voltmeter is connected between Vin and GND, a load is connected between Vout and GND and a current meter is connected in series between Vout and the load. The load must be able to handle at least rated output power + 50% (7.5 watts for this design). Ideally the load is supplied in the form of a variable load test unit. It can also be done in the form of suitably large power resistors. When using an oscilloscope to measure waveforms on the prototype board, the ground leads of the oscilloscope probes should be as short as possible and the area of the loop formed by the ground lead should be kept to a minimum. This will help reduce ground lead inductance and eliminate EMI noise that is not actually present in the circuit.



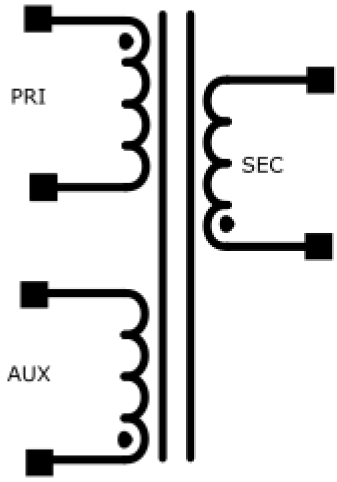
WEBENCH® Transformer Report

#	Name	Value
1.	Core Part Number	B66421G0000X197
2.	Core Manufacturer	TDK
3.	Coil Former Part Number	B66422W1010D001
4.	Coil Former Manufacturer	TDK

Transformer Electrical Diagram

Primary

Turns	159.0
AWG	28.0
Layers	4.0
Strands	1.0
Insulation Type	Heavy Insulated Magnet Wire



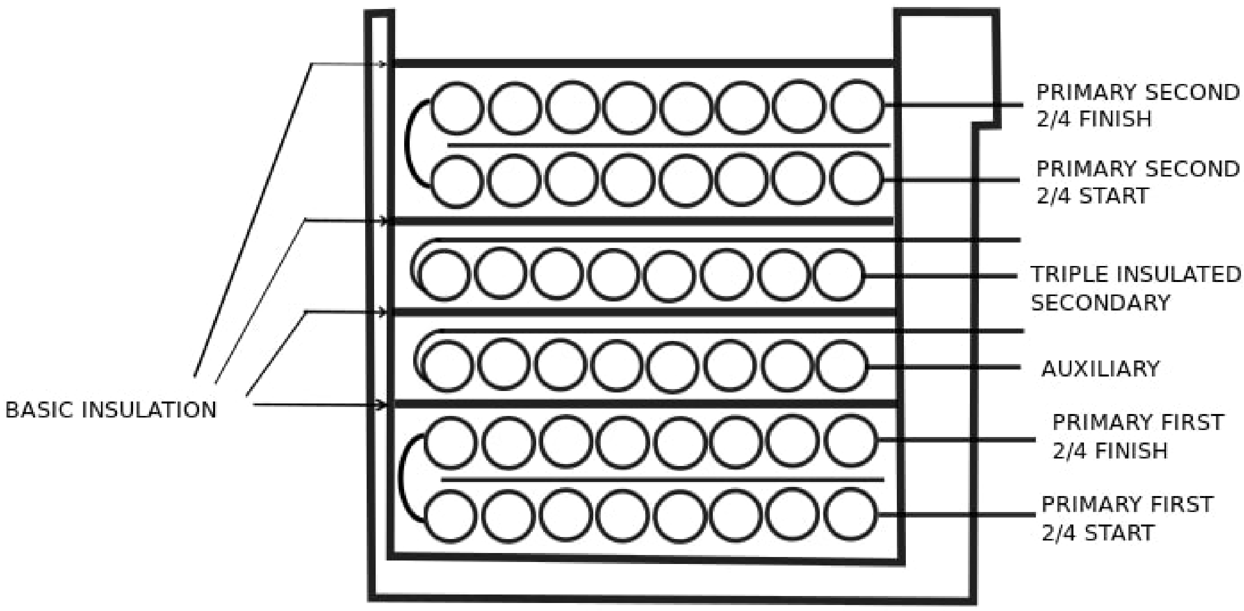
Secondary

Turns	12.0
AWG	28.0
Layers	1.0
Strands	2.0
Insulation Type	Triple Insulated

Auxiliary

Turns	8.0
AWG	28.0
Layers	1.0
Strands	4.0
Insulation Type	Heavy Insulated Magnet Wire

Transformer Construction Diagram



Winding Instruction

Winding	AWG	Turns	Winding Orientation
Primary First 2/4.0	28.0	80	Clockwise
Auxiliary	28.0	8.0	Counter Clockwise
Triple Insulated Secondary	28.0	12.0	Counter Clockwise
Primary Second 2/4.0	28.0	79	Clockwise

Transformer Parameters

#	Name	Value
1.	Lpri	0.00252H
2.	Inductance Factor(Al)	100.0nH
3.	Npri	159.0
4.	Nsec	12.0
5.	Naux	8.0
6.	Core Type	EFD25/13/9
7.	Core Material	N97
8.	Bmax	0.23T
9.	Switching Frequency	98.85kHz
10.	DMax	0.6
11.	Ipk(Primary)	0.84A
12.	Irms(Primary)	0.41A
13.	Ipk(Secondary)	11.1A
14.	Irms(Secondary)	4.43A

Design Assistance

1. Feature Highlights: This device provides the features that are necessary to implement off-line or dc-to-dc fixed-frequency current-mode control schemes, with a minimum number of external components.

2. The UC2842AQ is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application

3. Master key : 39702A89778F138D[v1]

4. **UC2842AQ** Product Folder : http://www.ti.com/product/UC2842AQ : contains the data sheet and other resources.