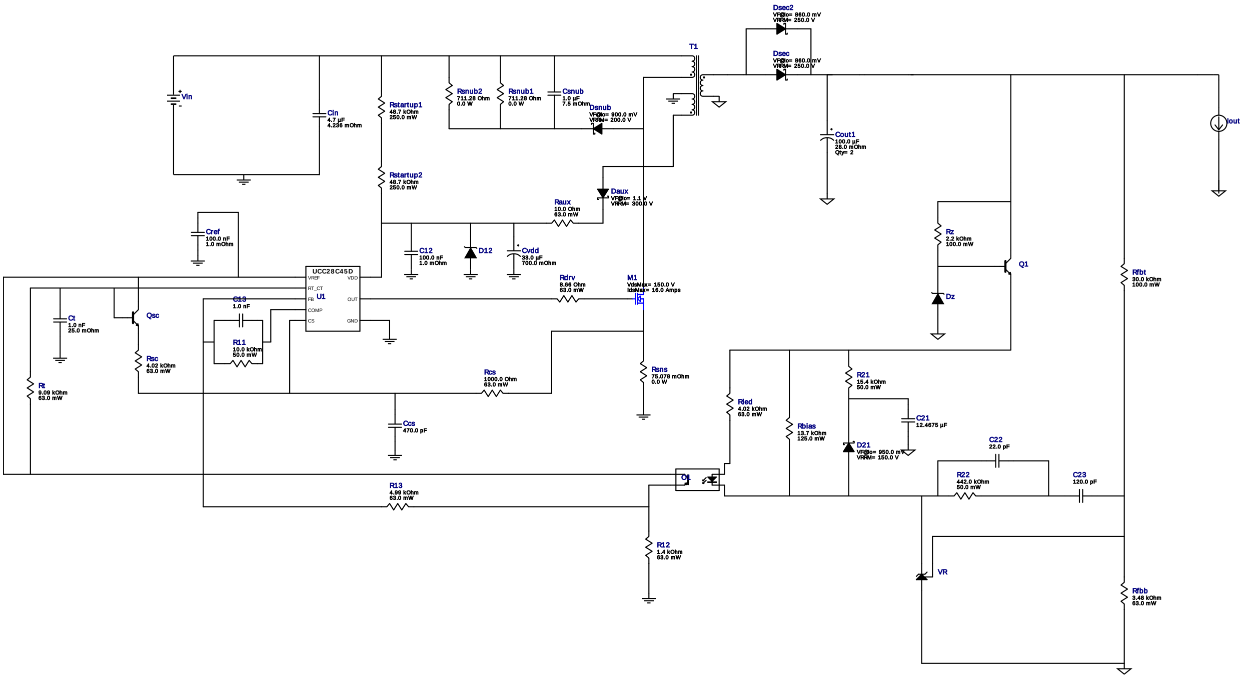
TEXAS INSTRUMENTS	VinMin = 37.0V VinMax = 57.0V Vout = 24.0V Iout = 2.5A	Device = UCC28C45DR Topology = Flyback Created = 2019-09-27 05:06:30.655 BOM Cost = NA BOM Count = 47 Total Pd = 4.14W

WEBENCH ® Design Report

Design : 17119 UCC28C45DR
UCC28C45DR 37V-57V to 24.00V @ 2.5A



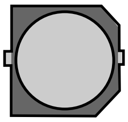
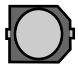
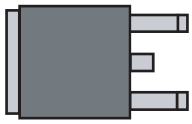
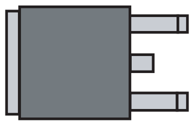
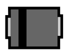
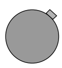
Design Alerts

Component Selection Information

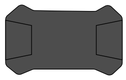
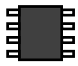
Click on the transformer symbol in the schematic and select "Explore Transformer Core/Bobbin Selection" to design using specific transformer cores and bobbin.

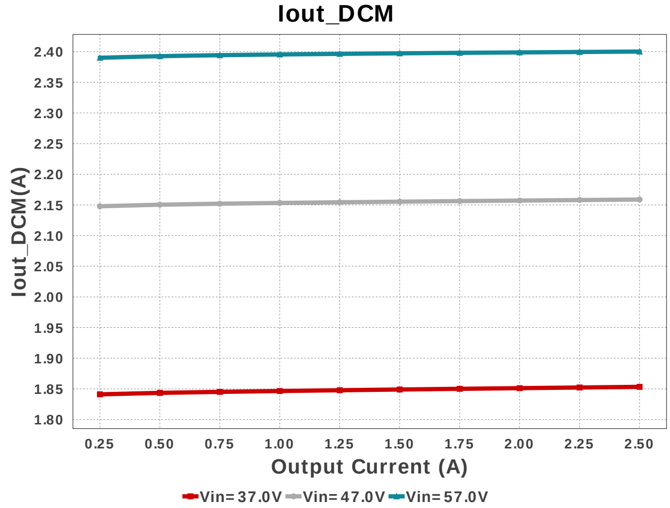
Electrical BOM

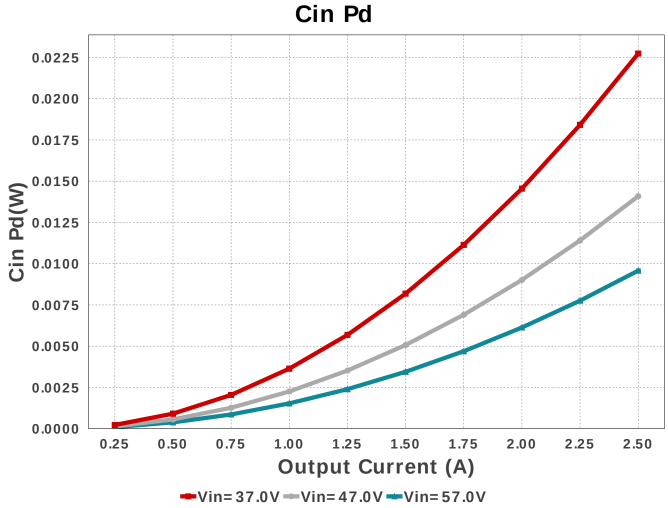
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
C12	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
C13	MuRata	GRM1555C1H102JA01J Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
C21	CUSTOM	CUSTOM Series= ?	Cap= 12.4675 uF VDC= 40.0 V IRMS= 0.0 A	1	NA	CUSTOM 0 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
C23	Samsung Electro-Mechanics	CL21C121JBANNNC Series= C0G/NP0	Cap= 120.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 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
Cin	TDK	CGA6M3X7S2A475K200AB Series= X7S	Cap= 4.7 uF ESR= 4.236 mOhm VDC= 100.0 V IRMS= 3.57337 A	1	$0.47	1210_220 15 mm^2

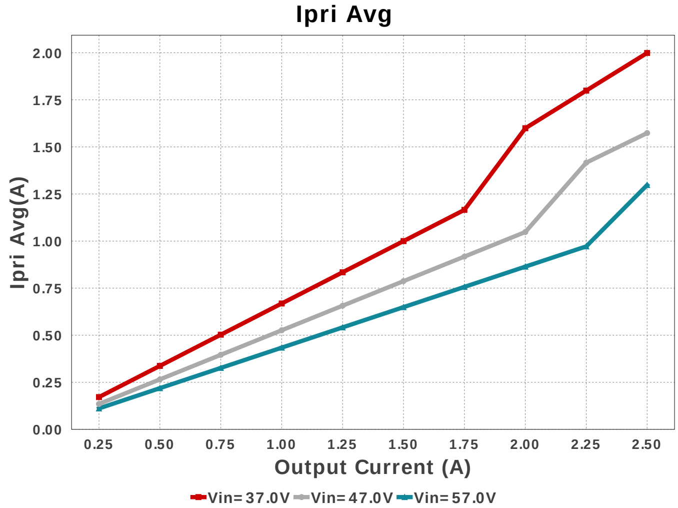
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cout1	Panasonic	EEHZA1H101P Series= ZA	Cap= 100.0 uF ESR= 28.0 mOhm VDC= 50.0 V IRMS= 2.0 A	2	$1.00	 SM_RADIAL_10BMM 160 mm^2
Cref	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm^2
Csnub	TDK	C3216X7R2A105M160AA Series= X7R	Cap= 1.0 uF ESR= 7.5 mOhm VDC= 100.0 V IRMS= 5.9235 A	1	$0.12	 1206 11 mm^2
Ct	Kemet	C0805C102J5GACTU Series= C0G/NP0	Cap= 1.0 nF ESR= 25.0 mOhm VDC= 50.0 V IRMS= 1.71 A	1	$0.02	0805 7 mm^2
Cvdd	Panasonic	EEE-FK1E330UR Series= FK	Cap= 33.0 uF ESR= 700.0 mOhm VDC= 25.0 V IRMS= 160.0 mA	1	$0.09	 SM_RADIAL_C 62 mm^2
D12	ON Semiconductor	MMSZ4705T1G	Zener	1	$0.04	SOD-123 13 mm^2
D21	SMC Diode Solutions	SK215ATR	VF@Io= 950.0 mV VRRM= 150.0 V	1	$0.04	 SMA 37 mm^2
Daux	SMC Diode Solutions	ST1300ATR	VF@Io= 1.1 V VRRM= 300.0 V	1	$0.07	 SMA 37 mm^2
Dsec	ON Semiconductor	MBRB40250TG	VF@Io= 860.0 mV VRRM= 250.0 V	1	$0.50	 DDPAK 210 mm^2
Dsec2	ON Semiconductor	MBRB40250TG	VF@Io= 860.0 mV VRRM= 250.0 V	1	$0.50	 DDPAK 210 mm^2
Dsnub	Fairchild Semiconductor	S320	VF@Io= 900.0 mV VRRM= 200.0 V	1	$0.13	 SMB 44 mm^2
Dz	Diodes Inc.	MMSZ5250B-7-F	Zener	1	$0.03	SOD-123 13 mm^2
M1	Fairchild Semiconductor	FDMC86240	VdsMax= 150.0 V IdsMax= 16.0 Amps	1	$0.93	 TRANS_Fairchild_MLP08S 18 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
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

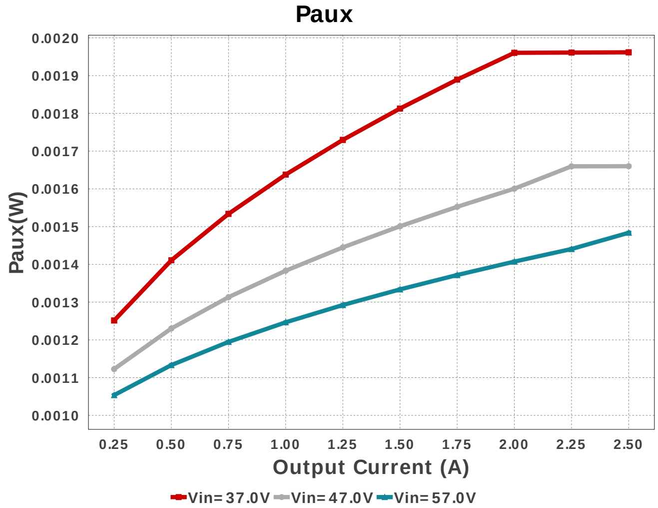
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
R12	Vishay-Dale	CRCW04021K40FKED Series= CRCW..e3	Res= 1.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
R13	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
R21	Yageo	RC0201FR-0715K4L Series= ?	Res= 15.4 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
R22	Yageo	RC0201FR-07442KL Series= ?	Res= 442.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
Raux	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 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	CRCW04028R66FKED Series= CRCW..e3	Res= 8.66 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	CRCW04024K02FKED Series= CRCW..e3	Res= 4.02 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rsns	CUSTOM	CUSTOM Series= ?	Res= 75.078 mOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rsnub1	CUSTOM	CUSTOM Series= ?	Res= 711.28 Ohm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rsnub2	CUSTOM	CUSTOM Series= ?	Res= 711.28 Ohm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rstartup1	Panasonic	ERJ-8ENF4872V Series= ERJ-8E	Res= 48.7 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm^2
Rstartup2	Panasonic	ERJ-8ENF4872V Series= ERJ-8E	Res= 48.7 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm^2
Rt	Vishay-Dale	CRCW04029K09FKED Series= CRCW..e3	Res= 9.09 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rz	Yageo	RC0603FR-072K2L Series= ?	Res= 2.2 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm^2

Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
T1	Core=Wurth Elektronik , CoilFormer=Wurth Elektronik	Core=150-2624 , CoilFormer=070-5680	Lp= 18.0 µH Turns Ratio(Nas)= 7:13 Turns Ratio(Nps)= 10:13 Npri= 10.0 Naux= 7.0 Nsec= 13.0	1	NA	 TDK_B65803 793 mm²
U1	Texas Instruments	UCC28C45DR	Switcher	1	$0.58	 D0008A 57 mm²
VR	Texas Instruments	TL431IDBVR	Voltage References	1	$0.07	 R-PDSO-G3 16 mm²

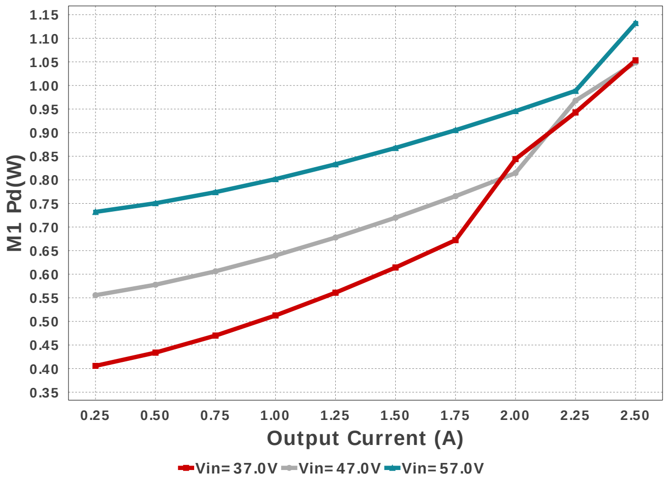




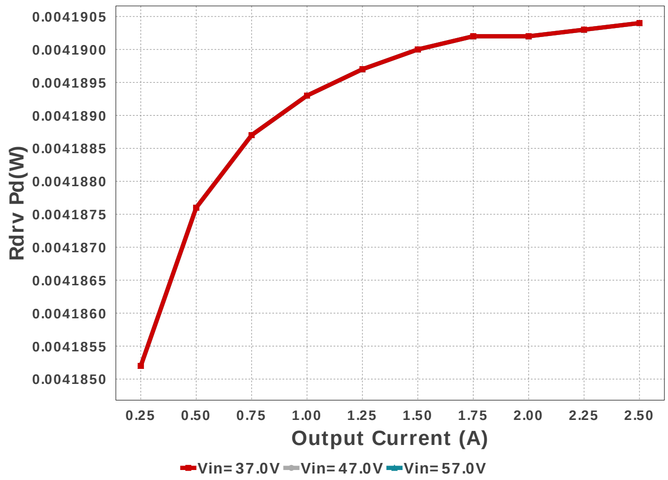




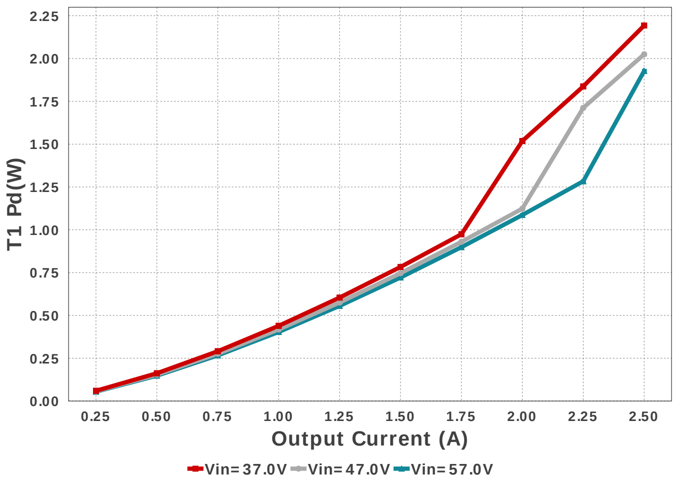
M1 Pd



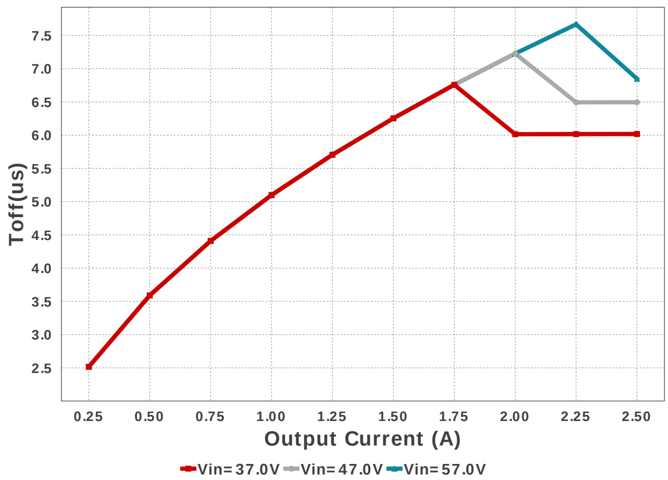
Rdrv Pd



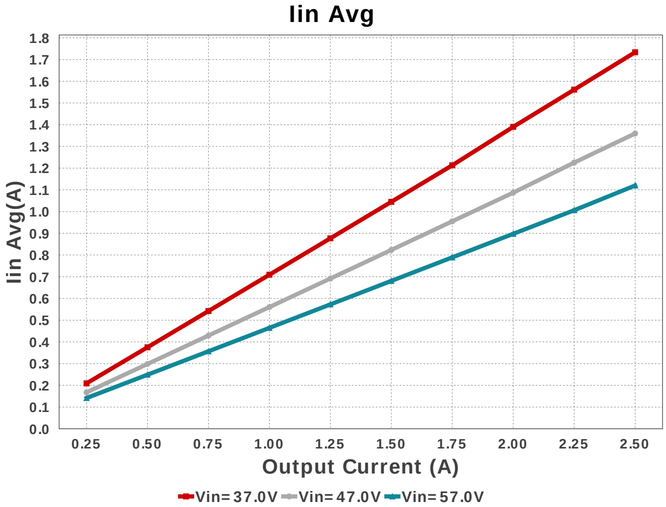
T1 Pd



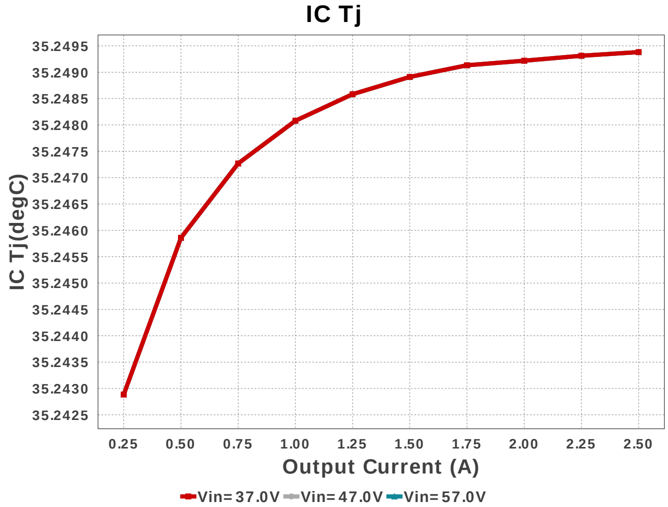
Toff

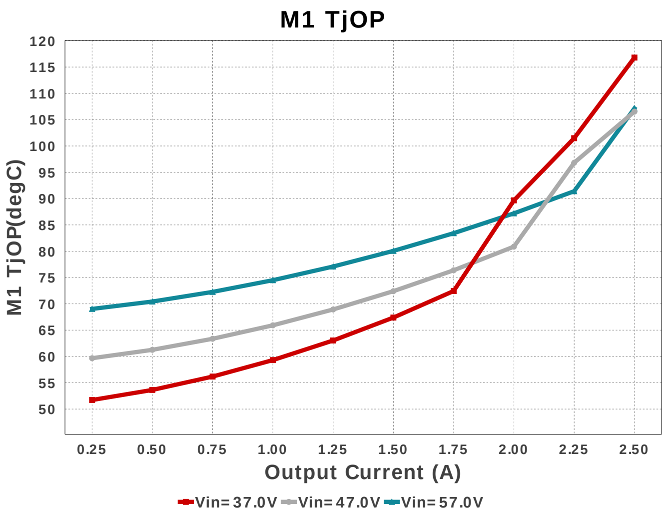


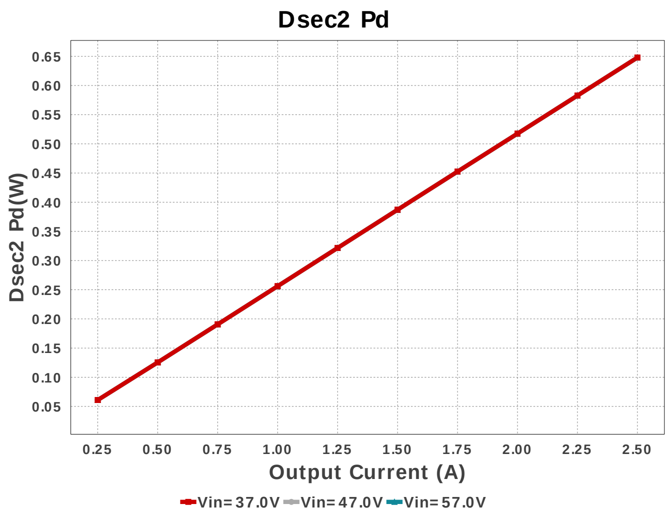
Iin Avg

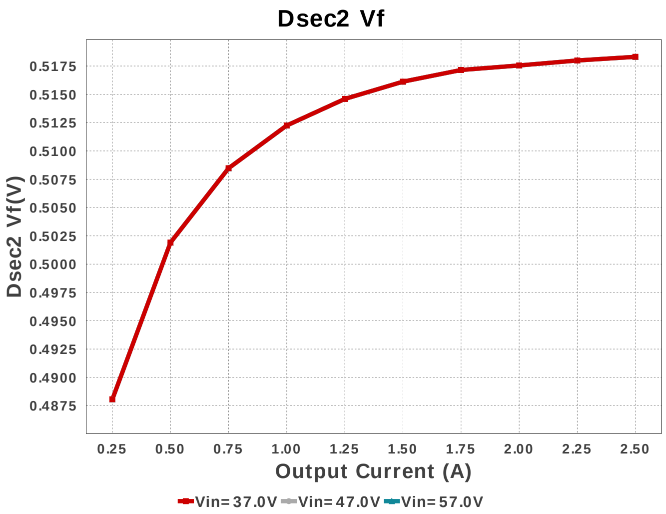


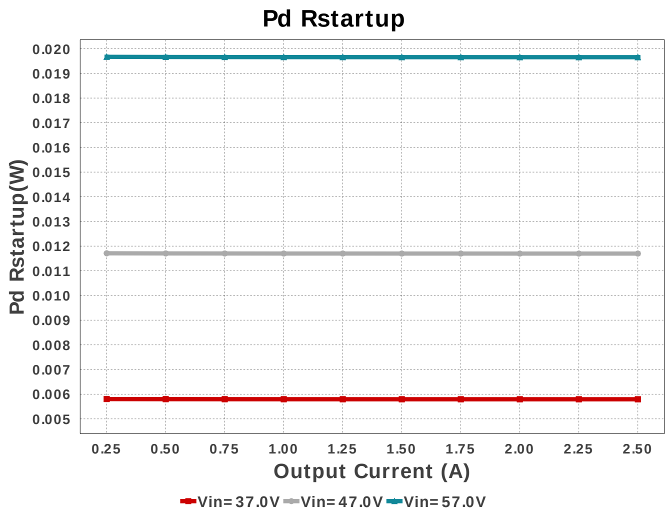
IC Tj

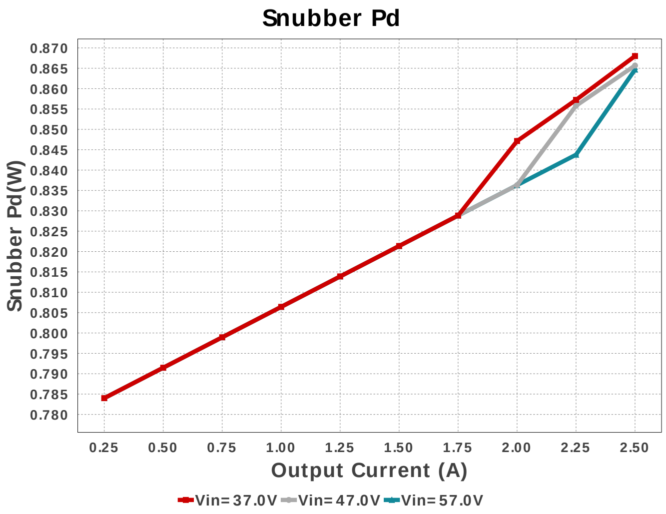


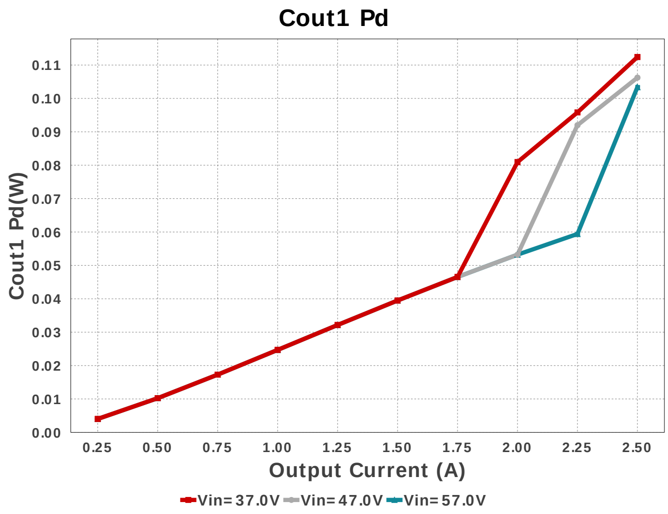

M1 TjOP
M1 TjOP(degC)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

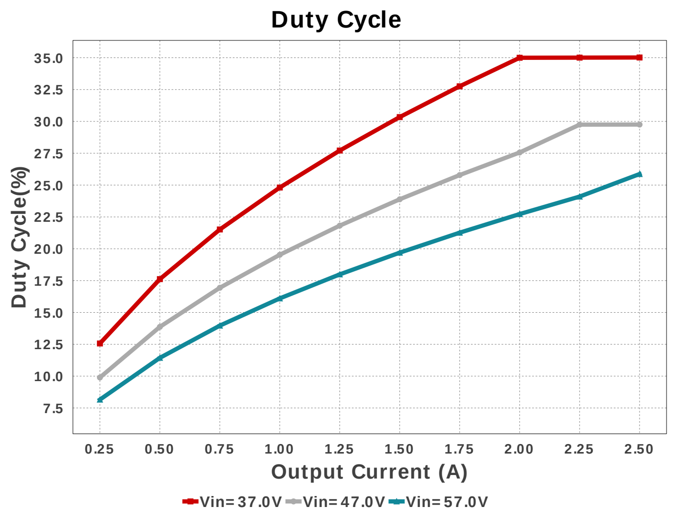

Dsec2 Pd
Dsec2 Pd(W)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

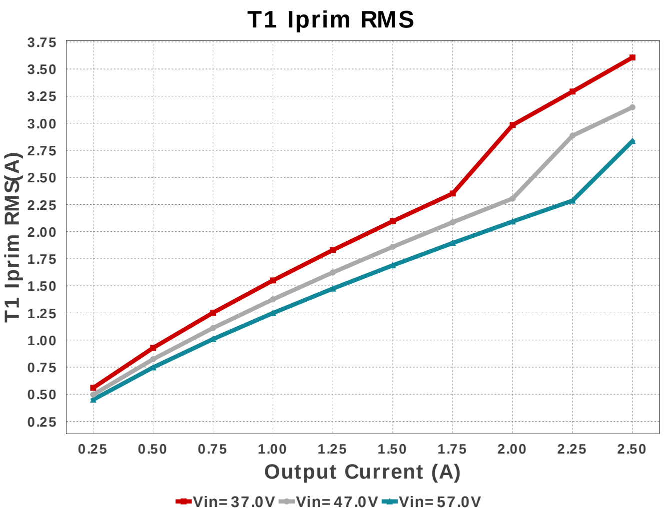

Dsec2 Vf
Dsec2 Vf(V)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

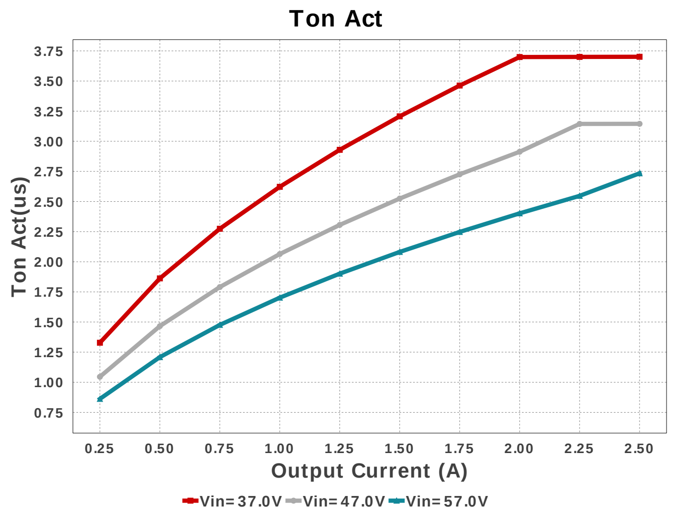

Pd Rstartup
Pd Rstartup(W)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

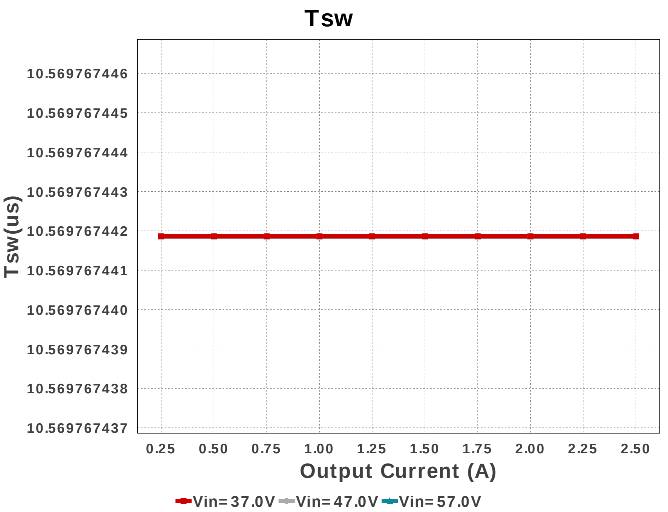

Snubber Pd
Snubber Pd(W)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

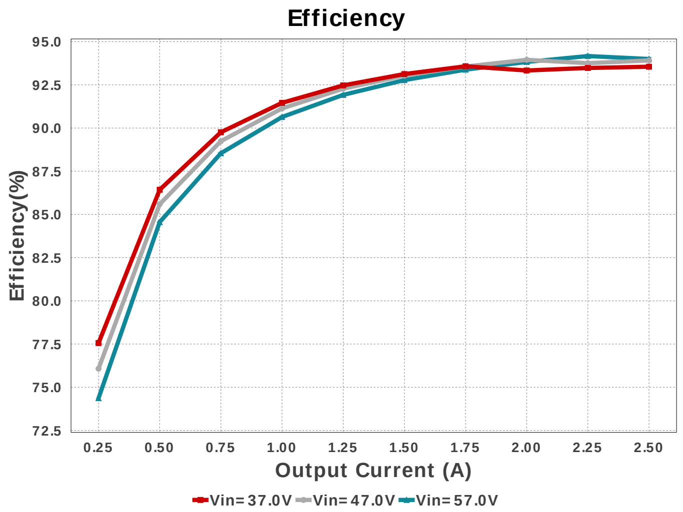

Cout1 Pd
Cout1 Pd(W)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

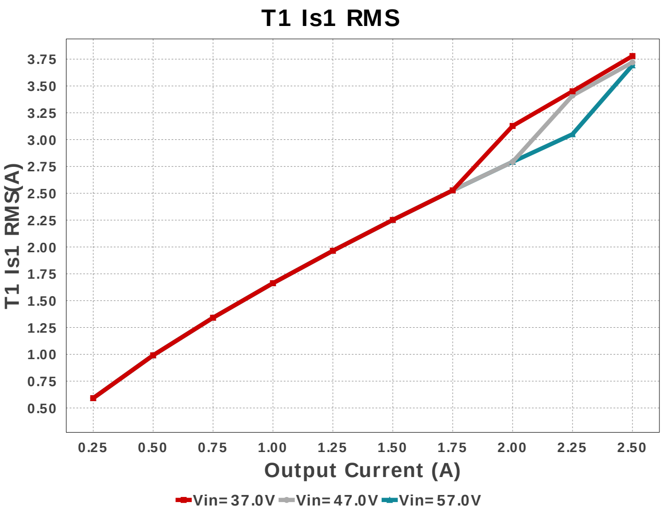

Duty Cycle
Duty Cycle(%)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

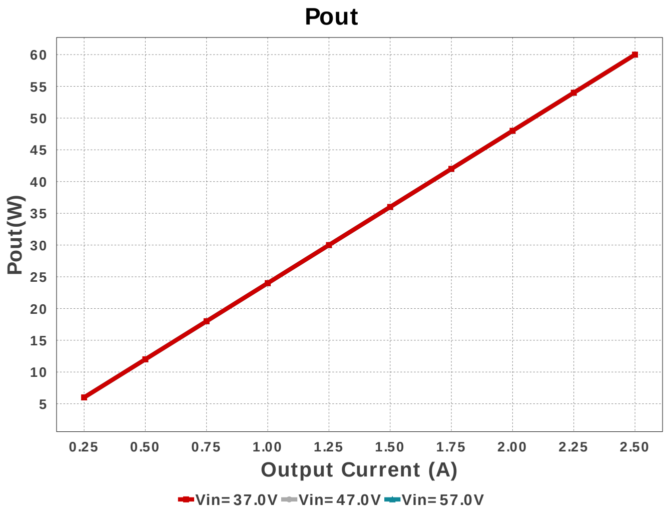

T1 Iprim RMS
T1 Iprim RMS(A)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

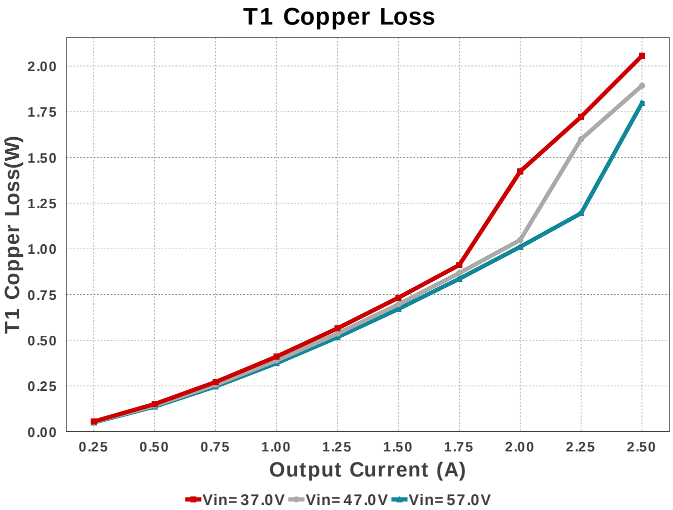

Ton Act
Ton Act(us)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

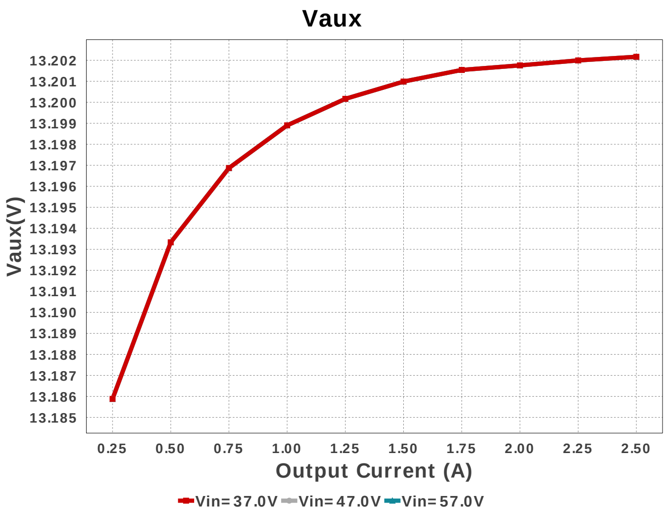

Tsw
Tsw(us)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

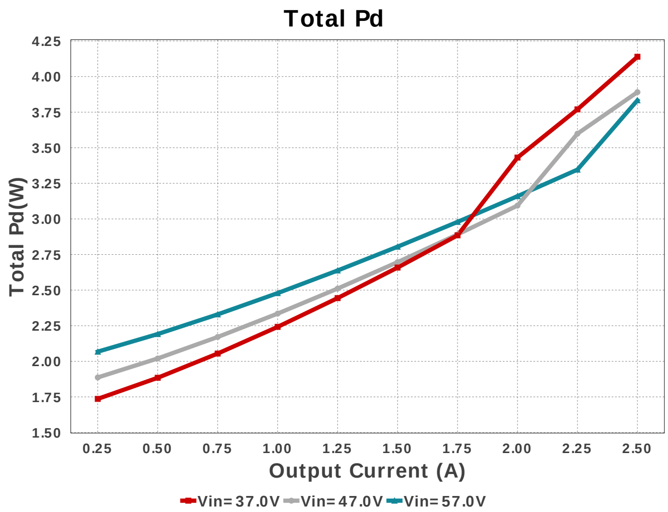

Efficiency
Efficiency(%)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

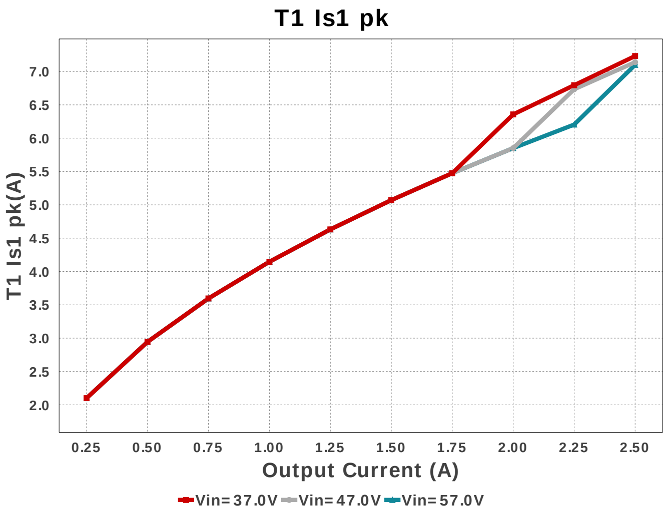

T1 Is1 RMS
T1 Is1 RMS(A)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

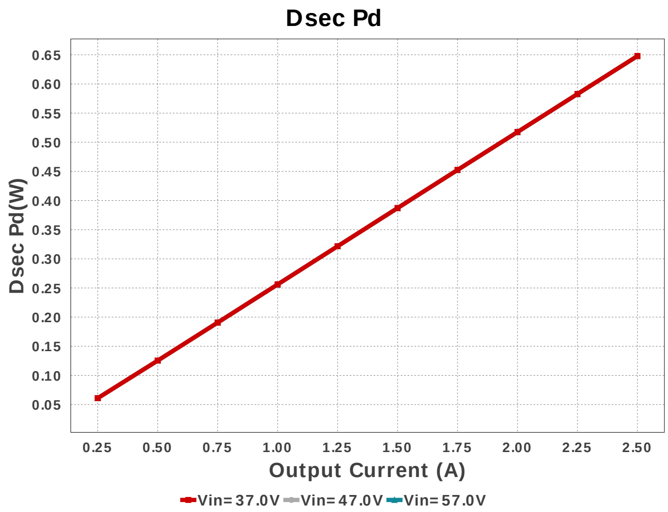

Pout
Pout(W)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V


T1 Copper Loss
T1 Copper Loss(W)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

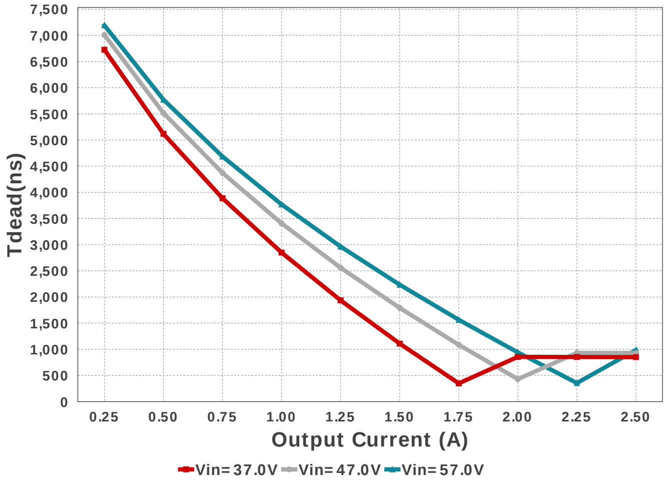

Vaux
Vaux(V)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V


Total Pd
Total Pd(W)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

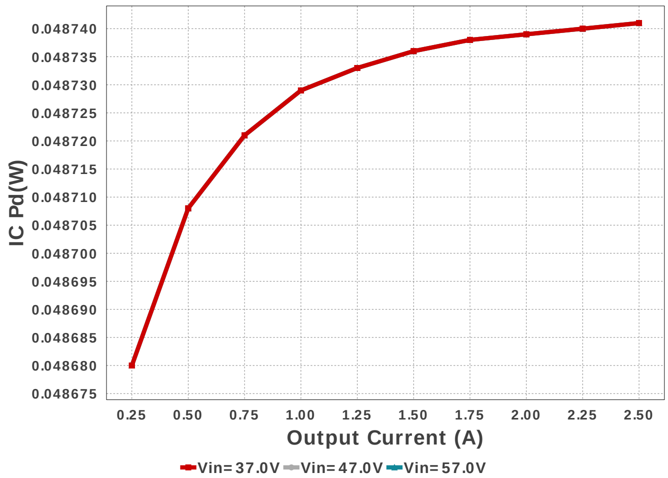

T1 Is1 pk
T1 Is1 pk(A)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V


Dsec Pd
Dsec Pd(W)
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

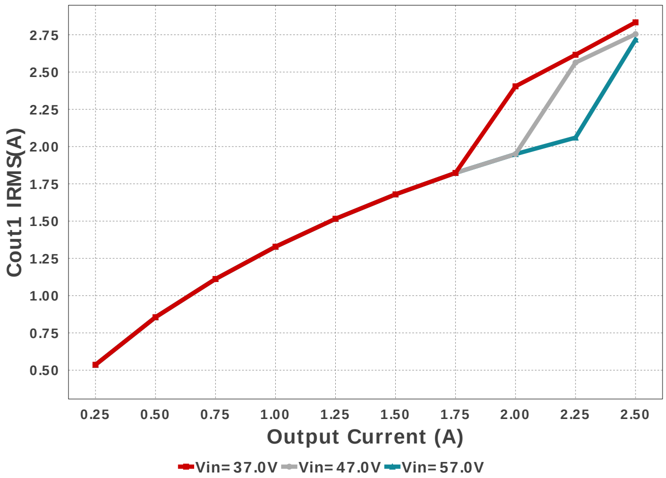
Tdead



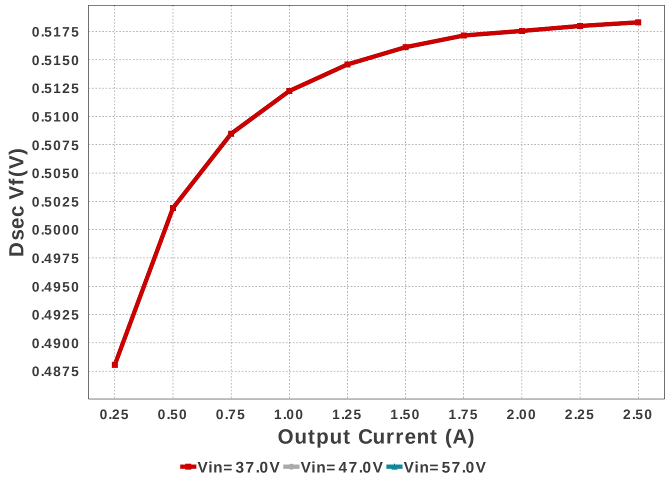
IC Pd



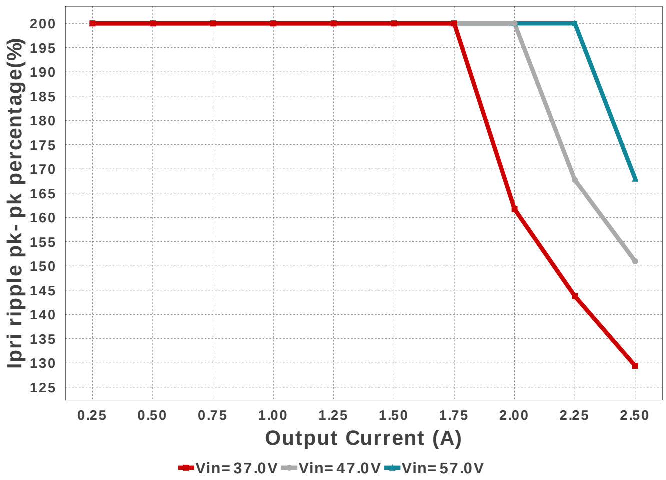
Cout1 IRMS



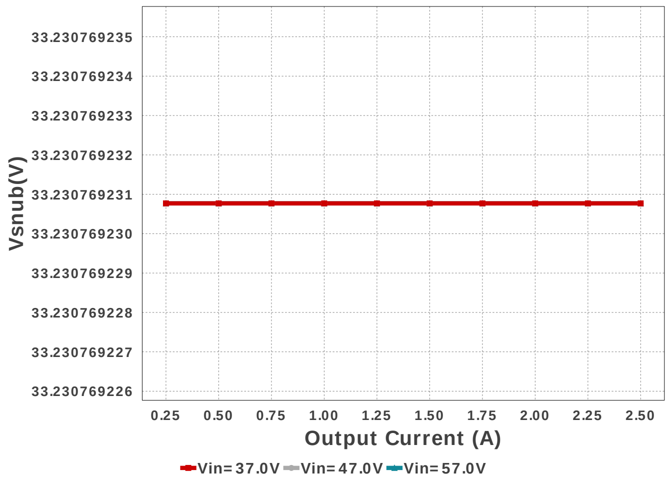
Dsec Vf

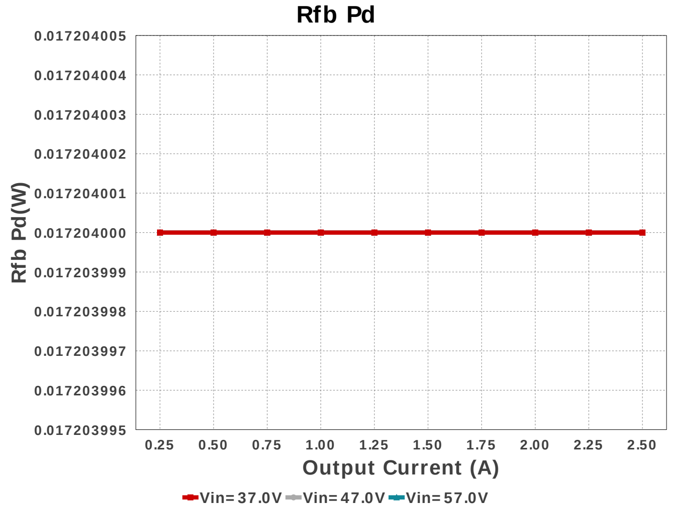


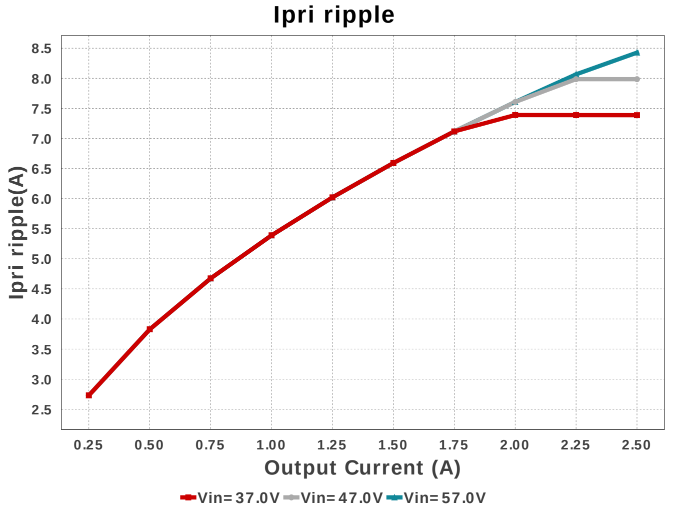
Ipri ripple pk- pk percentage

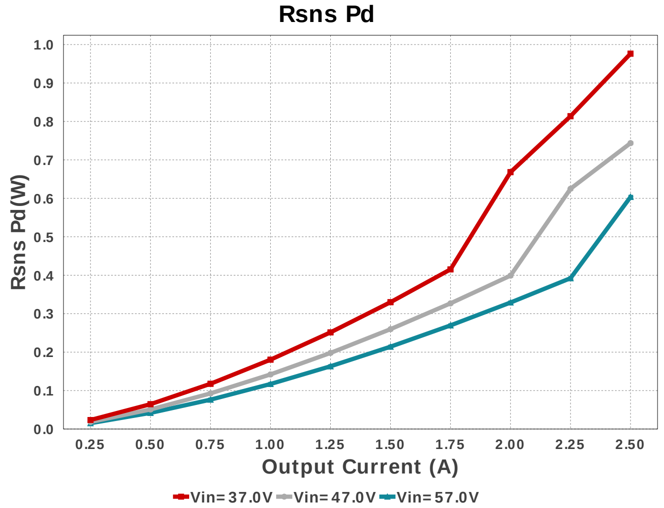


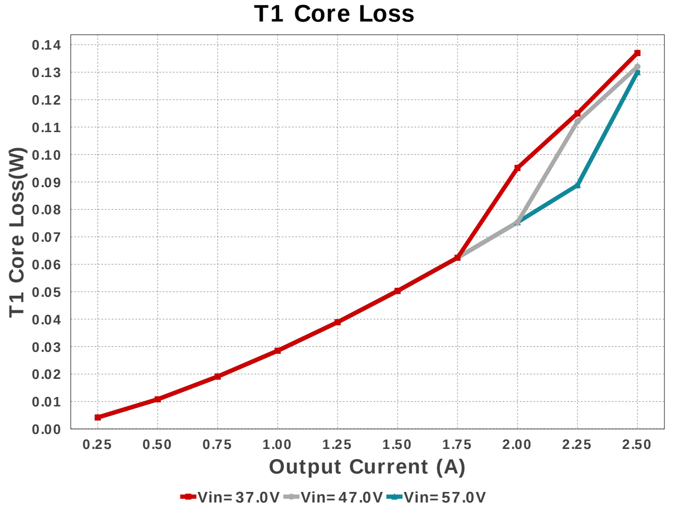
Vsnub

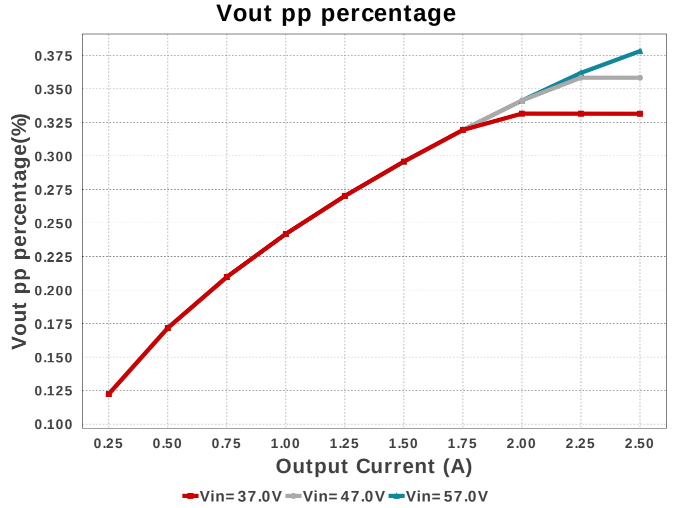


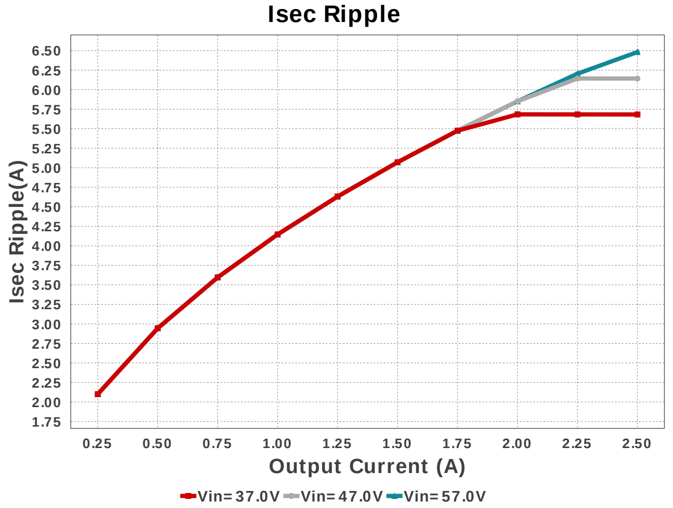

Rfb Pd
Rfb Pd(W)
0.017204005
0.017204004
0.017204003
0.017204002
0.017204001
0.017204000
0.017203999
0.017203998
0.017203997
0.017203996
0.017203995
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

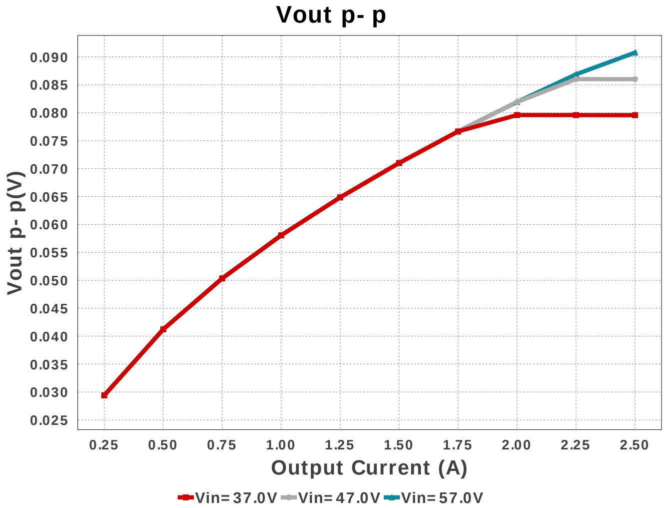

Ipri ripple
Ipri ripple(A)
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V

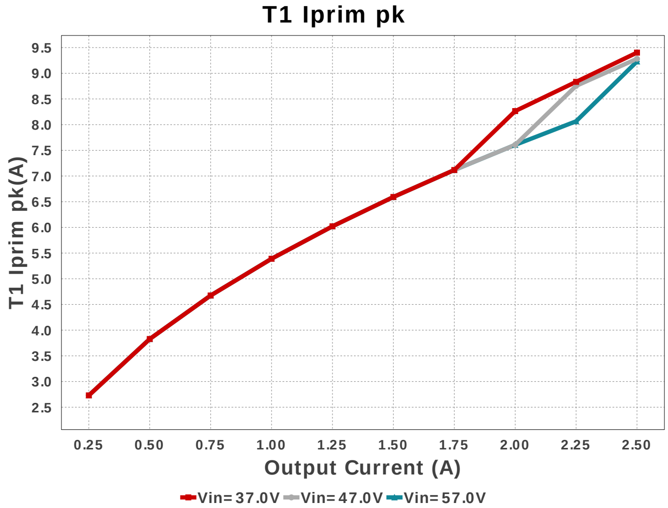

Rsns Pd
Rsns Pd(W)
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V


T1 Core Loss
T1 Core Loss(W)
0.14 0.13 0.12 0.11 0.10 0.09 0.08 0.07 0.06 0.05 0.04 0.03 0.02 0.01 0.00
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V


Vout pp percentage
Vout pp percentage(%)
0.375 0.350 0.325 0.300 0.275 0.250 0.225 0.200 0.175 0.150 0.125 0.100
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V


Isec Ripple
Isec Ripple(A)
6.50 6.25 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
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
Output Current (A)
Vin=37.0V Vin=47.0V Vin=57.0V





Operating Values

#	Name	Value	Category	Description
1.	Cin Pd	22.733 mW	Capacitor	Input capacitor power dissipation
2.	Cout1 IRMS	2.834 A	Capacitor	Output capacitor1 RMS ripple current
3.	Cout1 Pd	112.4 mW	Capacitor	Output capacitor1 power dissipation
4.	Daux trr	35.0 ns	Diode	Auxiliary Diode Reverse Recovery Time
5.	Dsec Pd	647.89 mW	Diode	Secondary Diode Power Dissipation
6.	Dsec Vf	518.311 mV	Diode	Effective Forward Voltage Drop at the Operating Current
7.	Dsec trr	0.0 ns	Diode	Output Diode Reverse Recovery Time
8.	Dsec2 Pd	647.89 mW	Diode	Secondary Diode Power Dissipation
9.	Dsec2 Vf	518.311 mV	Diode	Effective Forward Voltage Drop at the Operating Current
10.	Dsnub trr	30.0 ns	Diode	Snubber Diode Reverse Recovery Time
11.	IC Pd	48.741 mW	IC	IC power dissipation
12.	IC Tj	35.249 degC	IC	IC junction temperature
13.	ICThetaJA	107.7 degC/W	IC	IC junction-to-ambient thermal resistance
14.	Iin Avg	1.734 A	IC	Average input current
15.	M1 Pd	1.053 W	Mosfet	M1 MOSFET total power dissipation
16.	M1 TjOP	116.8 degC	Mosfet	M1 MOSFET junction temperature
17.	Cin Pd	22.733 mW	Power	Input capacitor power dissipation
18.	Cout1 Pd	112.4 mW	Power	Output capacitor1 power dissipation
19.	Dsec Pd	647.89 mW	Power	Secondary Diode Power Dissipation
20.	Dsec2 Pd	647.89 mW	Power	Secondary Diode Power Dissipation
21.	IC Pd	48.741 mW	Power	IC power dissipation
22.	M1 Pd	1.053 W	Power	M1 MOSFET total power dissipation
23.	Paux	1.962 mW	Power	Power Dissipation in Raux and Daux
24.	Pd Rstartup	5.794 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
25.	Rdrv Pd	4.19 mW	Power	Power Dissipation in Gate Drive Resistor
26.	Rfb Pd	17.204 mW	Power	Rfb Power Dissipation
27.	Rsns Pd	976.27 mW	Power	Current Limit Sense Resistor Power Dissipation
28.	Snubber Pd	868.002 mW	Power	Snubber Power Dissipation
29.	T1 Copper Loss	1.878 W	Power	Transformer Copper Loss Power Dissipation
30.	T1 Core Loss	132.0 mW	Power	Transformer Core Loss Power Dissipation
31.	T1 Pd	2.01 W	Power	Estimated Losses in Transformer
32.	Total Pd	4.139 W	Power	Total Power Dissipation
33.	Pd Rstartup	5.794 mW	Resistor	Power Dissipation in Rstartup1 and Rstartup2
34.	Rdrv Pd	4.19 mW	Resistor	Power Dissipation in Gate Drive Resistor
35.	Rfb Pd	17.204 mW	Resistor	Rfb Power Dissipation
36.	Rsns Pd	976.27 mW	Resistor	Current Limit Sense Resistor Power Dissipation
37.	BOM Count	47	System Information	Total Design BOM count
38.	Duty Cycle	35.017 %	System Information	Duty cycle
39.	Efficiency	93.547 %	System Information	Steady state efficiency
40.	FootPrint	2.122 k mm^2	System Information	Total Foot Print Area of BOM components
41.	Frequency	94.609 kHz	System Information	Switching frequency
42.	Iout	2.5 A	System Information	Iout operating point
43.	Iout_DCM	1.853 A	System Information	Approximate Current below which DCM mode of operation will begin
44.	Mode	CCM	System Information	Conduction Mode

#	Name	Value	Category	Description
45.	Pout	60.0 W	System Information	Total output power
46.	Tdead	850.951 ns	System Information	Approximate Dead Time of the Regulator
47.	Toff	6.018 us	System Information	Approximate Converter Off Time
48.	Ton Act	3.701 us	System Information	Approximate Converter On Time
49.	Total BOM	NA	System Information	Total BOM Cost
50.	Tsw	10.57 us	System Information	Switching Time Period
51.	Vin	37.0 V	System Information	Vin operating point
52.	Vout	24.0 V	System Information	Operational Output Voltage
53.	Vout Actual	24.004 V	System Information	Vout Actual calculated based on selected voltage divider resistors
54.	Vout Tolerance	2.137 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
55.	Vout p-p	79.552 mV	System Information	Peak-to-peak output ripple voltage
56.	Vout pp percentage	331.468 m%	System Information	Output Voltage ripple percentage
57.	Vsnub	33.231 V	System Information	Voltage Across the Snubber
58.	Ipri Avg	1.999 A	Transformer	Average Current in Primary Winding over the complete Switching Period
59.	Ipri ripple	7.387 A	Transformer	Ripple Current in the Primary Winding
60.	Ipri ripple pk-pk percentage	129.402 %	Transformer	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
61.	Isec Ripple	5.682 A	Transformer	Ripple Current in the Secondary Winding
62.	Paux	1.962 mW	Transformer	Power Dissipation in Raux and Daux
63.	T1 Copper Loss	1.878 W	Transformer	Transformer Copper Loss Power Dissipation
64.	T1 Core Loss	132.0 mW	Transformer	Transformer Core Loss Power Dissipation
65.	T1 Iprim RMS	3.606 A	Transformer	Transformer Primary RMS Current
66.	T1 Iprim pk	9.402 A	Transformer	Transformer Primary Peak Current
67.	T1 Is1 RMS	3.779 A	Transformer	Transformer Secondary1 RMS Current
68.	T1 Is1 pk	7.232 A	Transformer	Transformer Secondary1 Peak Current
69.	T1 Pd	2.01 W	Transformer	Estimated Losses in Transformer
70.	Vaux	13.202 V	Transformer	Auxiliary Voltage

Design Inputs

Name	Value	Description
Iout	2.5	Maximum Output Current
VinMax	57.0	Maximum input voltage
VinMin	37.0	Minimum input voltage
Vout	24.0	Output Voltage
base_pn	UCC28C45	Base Product Number
source	DC	Input Source Type
Ta	30.0	Ambient temperature
UserFsw	95.0 k	Customer Selected Frequency

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

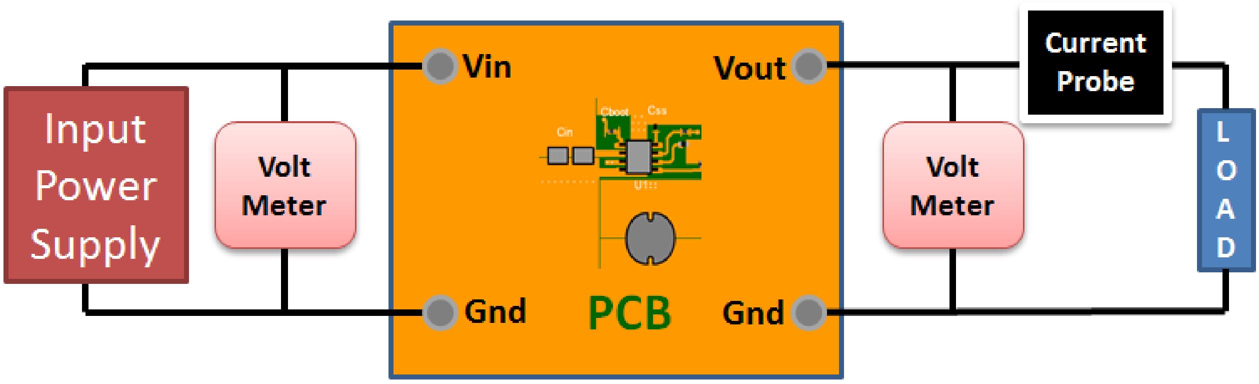
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. 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 37.0V 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.



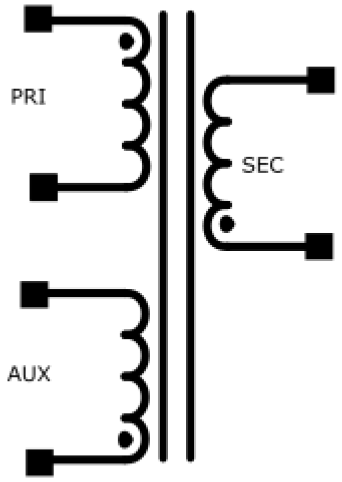
WEBENCH® Transformer Report

#	Name	Value
1.	Core Part Number	150-2624
2.	Core Manufacturer	Wurth Elektronik
3.	Coil Former Part Number	070-5680
4.	Coil Former Manufacturer	Wurth Elektronik

Transformer Electrical Diagram

Primary

Turns	10.0
AWG	26.0
Layers	2.0
Strands	4.0
Insulation Type	Heavy Insulated Magnet Wire



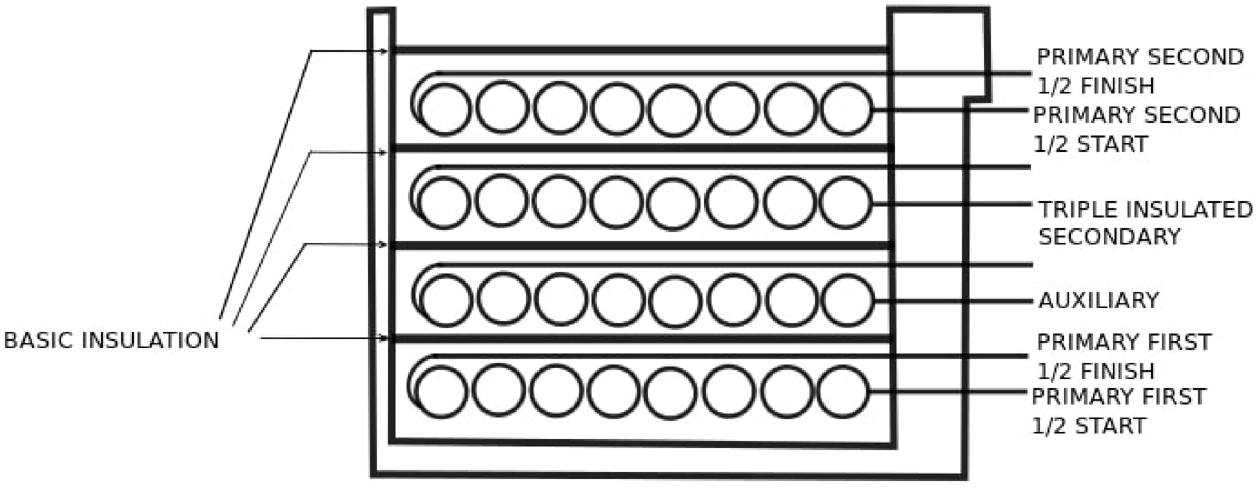
Secondary

Turns	13.0
AWG	26.0
Layers	1.0
Strands	1.0
Insulation Type	Triple Insulated

Auxiliary

Turns	7.0
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 1/2.0	26.0	5	Clockwise

Winding	AWG	Turns	Winding Orientation
Auxiliary	28.0	7.0	Counter Clockwise
Triple Insulated Secondary	26.0	13.0	Counter Clockwise
Primary Second 1/2.0	26.0	5	Clockwise

Transformer Parameters

#	Name	Value
1.	Lpri	1.8E-5H
2.	Inductance Factor(Al)	182.0nH
3.	Npri	10.0
4.	Nsec	13.0
5.	Naux	7.0
6.	Core Type	RM10
7.	Core Material	TP4A
8.	Bmax	0.19T
9.	Switching Frequency	94.61kHz
10.	DMax	0.36
11.	Ipk(Primary)	9.22A
12.	Irms(Primary)	3.52A
13.	Ipk(Secondary)	7.09A
14.	Irms(Secondary)	3.61A

Design Assistance

1. Master key : EA1A2FC478260EC3[v1]
2. **UCC28C45** Product Folder : http://www.ti.com/product/UCC28C45 : contains the data sheet and other resources.