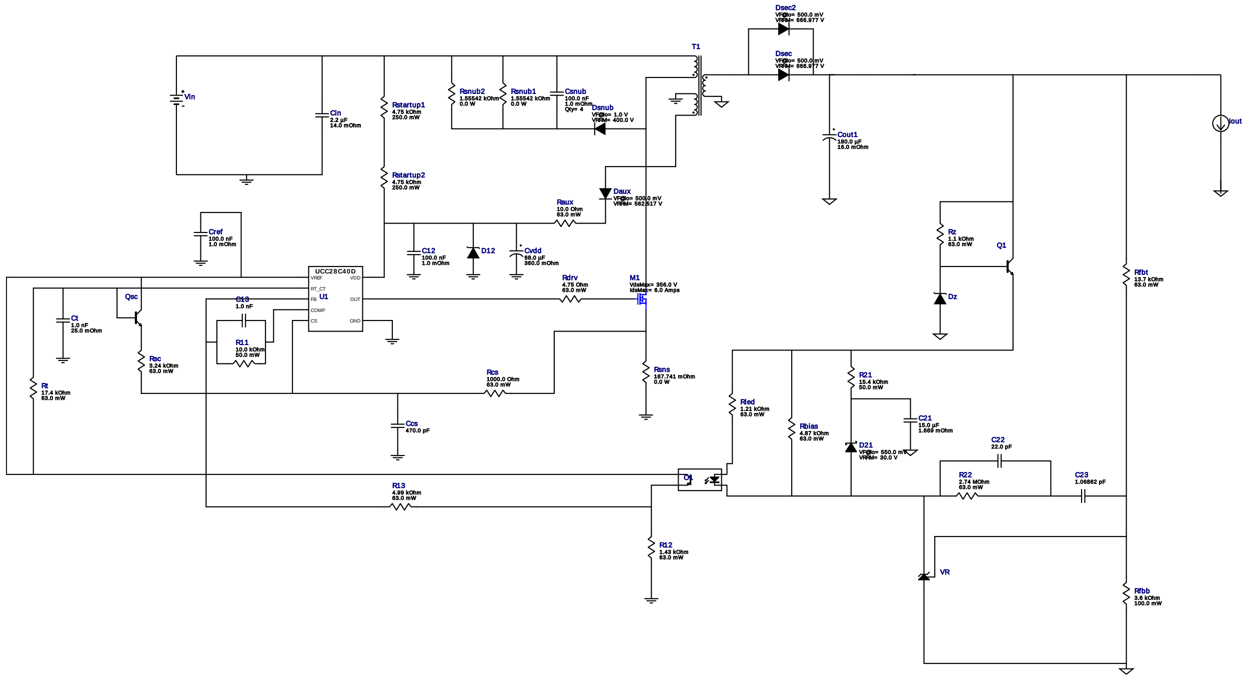
TEXAS INSTRUMENTS

WEBENCH ® Design Report

VinMin = 10.0V
VinMax = 264.0V
Vout = 12.0V
Iout = 1.0A

Device = UCC28C40DR
Topology = Flyback
Created = 2021-01-27 03:13:56.312
BOM Cost = NA
BOM Count = 49
Total Pd =

Design : 103 UCC28C40DR
UCC28C40DR 10V-264V to 12.00V @ 1A



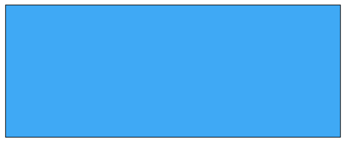
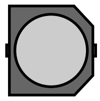
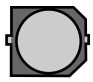
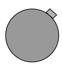
Design Alerts

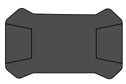
Component Selection Information

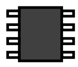
Click on the transformer symbol in the schematic and select "Explore Transformer Core/Bobbin Selection" to design using specific transformer cores and bobbin. With the current design condition, suitable FET could not be found in the current database. Hence, this design is created using an ideal FET. 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.

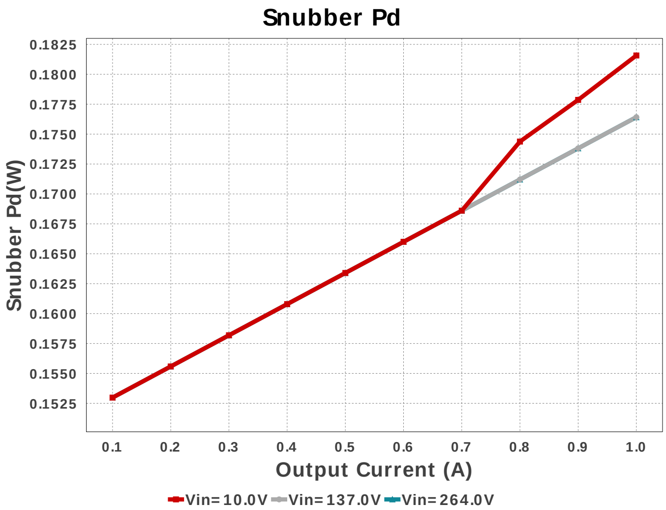
Electrical BOM

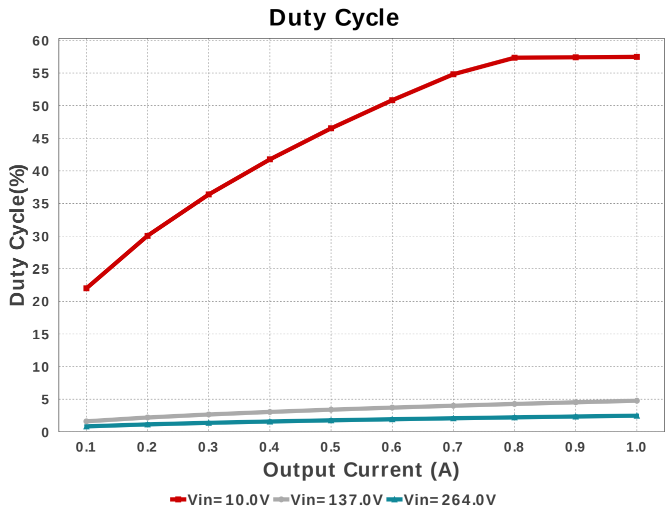
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
C12	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
C13	MuRata	GRM1555C1H102JA01J Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
C21	TDK	C2012X5R1V156M125AC Series= X5R	Cap= 15.0 uF ESR= 1.669 mOhm VDC= 35.0 V IRMS= 5.0498 A	1	$0.21	0805 7 mm²
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 mm²
C23	CUSTOM	CUSTOM Series= ?	Cap= 1.06862 pF VDC= 0.0 V IRMS= 0.0 A	1	NA	CUSTOM 0 mm²
Ccs	AVX	04025A471JAT2A Series= C0G/NP0	Cap= 470.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²

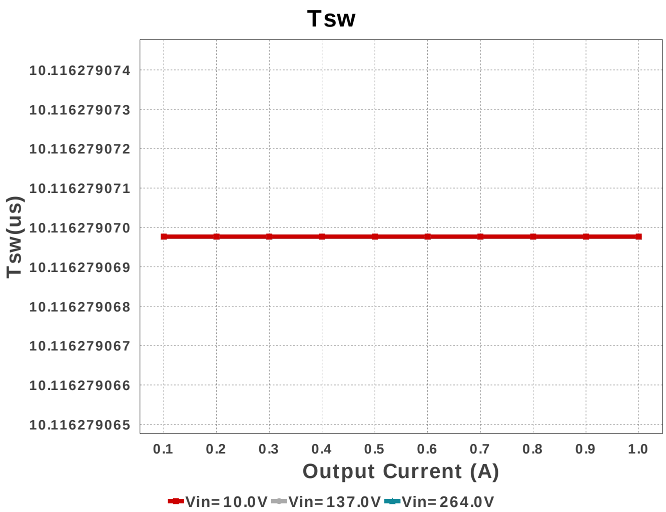
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cin	TDK	B32674D4225K Series= B32674	Cap= 2.2 uF ESR= 14.0 mOhm VDC= 450.0 V IRMS= 6.0 A	1	$0.94	 CAPRR2750W80L3150T1250H2150 486 mm²
Cout1	Panasonic	25SVPF180M Series= SVPF	Cap= 180.0 uF ESR= 16.0 mOhm VDC= 25.0 V IRMS= 4.65 A	1	$0.63	 CAPSMT_62_E12 106 mm²
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 mm²
Csnub	TDK	C3216X7T2W104K160AE Series= X7T	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 450.0 V IRMS= 0.0 A	4	$0.13	 1206_180 11 mm²
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 mm²
Cvdd	Panasonic	EEE-FK1E680P Series= FK	Cap= 68.0 uF ESR= 360.0 mOhm VDC= 25.0 V IRMS= 240.0 mA	1	$0.11	 SM_RADIAL_D 84 mm²
D12	ON Semiconductor	MMSZ4705T1G	Zener	1	$0.04	SOD-123 13 mm²
D21	Panasonic	DB2S31600L	VF@Io= 550.0 mV VRRM= 30.0 V	1	$0.03	SOD-523 5 mm²
Daux	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 562.517 V	1	NA	CUSTOM 0 mm²
Dsec	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 666.977 V	1	NA	CUSTOM 0 mm²
Dsec2	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 666.977 V	1	NA	CUSTOM 0 mm²
Dsnub	SMC Diode Solutions	UF4004TA	VF@Io= 1.0 V VRRM= 400.0 V	1	$0.22	 DO-41 43 mm²
Dz	ON Semiconductor	MMBZ5239BLT1G	Zener	1	$0.02	 SOT-23 14 mm²
M1	NA	IdealFET	VdsMax= 356.0 V IdsMax= 6.0 Amps	1	NA	NA 0 mm²
O1	Fairchild Semiconductor	FOD817A	Optocoupler	1	$0.11	 DIP-4 71 mm²
Q1	Diodes Inc.	MMBT4401-7-F	Bipolar Transistor	1	$0.02	 SOT-23 14 mm²
Qsc	STMicroelectronics	2N2222A	Bipolar Transistor	1	$1.11	 TO-18 57 mm²
R11	Yageo	RC0201FR-0710KL Series= ?	Res= 10.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm²
R12	Vishay-Dale	CRCW04021K43FKED Series= CRCW..e3	Res= 1.43 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

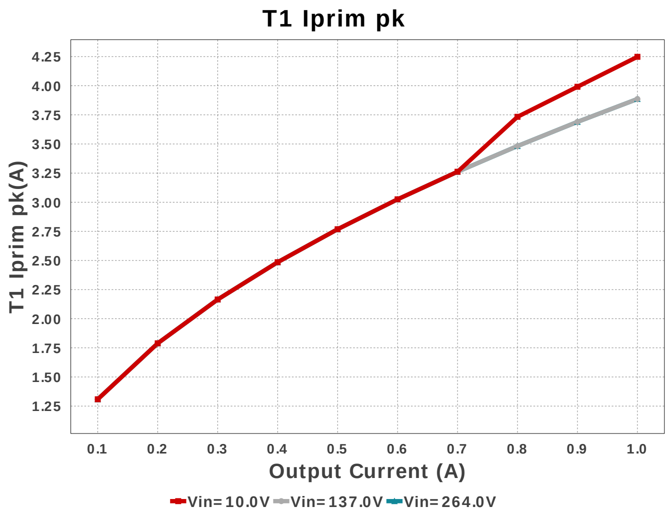
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
R13	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
R21	Yageo	RC0201FR-0715K4L Series= ?	Res= 15.4 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
R22	Vishay-Dale	CRCW04022M74FKED Series= CRCW..e3	Res= 2.74 MOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 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	CRCW04024K87FKED Series= CRCW..e3	Res= 4.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 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	CRCW04024R75FKED Series= CRCW..e3	Res= 4.75 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rfbb	Yageo	RC0603FR-073K6L Series= ?	Res= 3.6 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm^2
Rfbt	Vishay-Dale	CRCW040213K7FKED Series= CRCW..e3	Res= 13.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rled	Vishay-Dale	CRCW04021K21FKED Series= CRCW..e3	Res= 1.21 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rsc	Vishay-Dale	CRCW04023K24FKED Series= CRCW..e3	Res= 3.24 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rsns	CUSTOM	CUSTOM Series= ?	Res= 167.741 mOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rsnub1	CUSTOM	CUSTOM Series= ?	Res= 1.55542 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rsnub2	CUSTOM	CUSTOM Series= ?	Res= 1.55542 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm^2
Rstartup1	Panasonic	ERJ-8ENF4751V Series= ERJ-8E	Res= 4.75 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm^2
Rstartup2	Panasonic	ERJ-8ENF4751V Series= ERJ-8E	Res= 4.75 kOhm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 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
Rz	Vishay-Dale	CRCW04021K10FKED Series= CRCW..e3	Res= 1.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
T1	Core=TDK , CoilFormer=TDK	Core=B65807J0000R041 , CoilFormer=B65808E1508T001	Lp= 17.0 µH Turns Ratio(Nas)= 8:9 Turns Ratio(Nps)= 9:9 Npri= 9.0 Naux= 8.0 Nsec= 9.0	1	$1.38	 TDK_B65803 341 mm^2

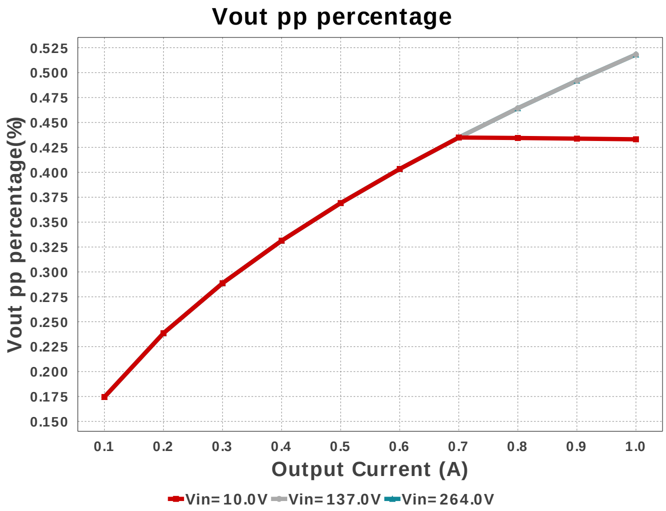
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
U1	Texas Instruments	UCC28C40DR	Switcher	1	$0.51	 D0008A 57 mm²
VR	Texas Instruments	TL431IDBVR	Voltage References	1	$0.06	 R-PDSO-G3 16 mm²

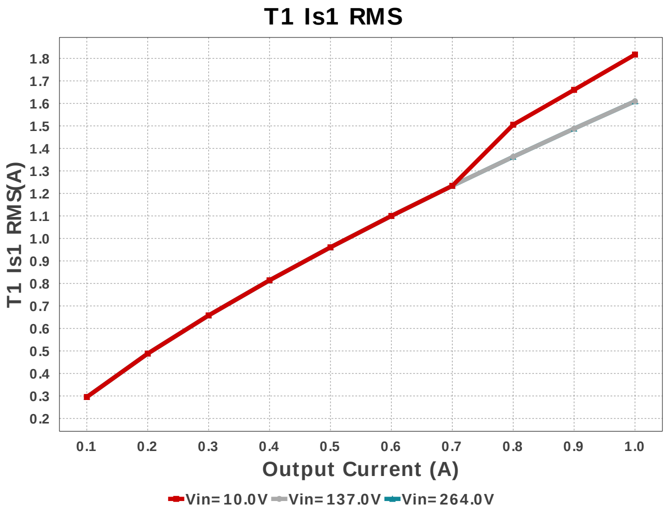


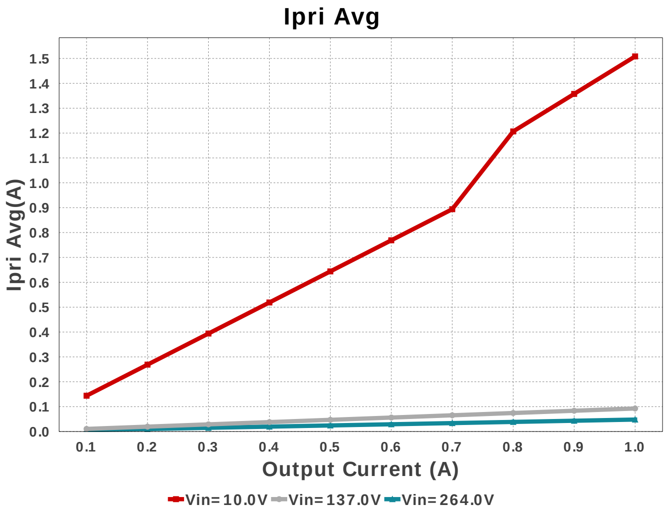


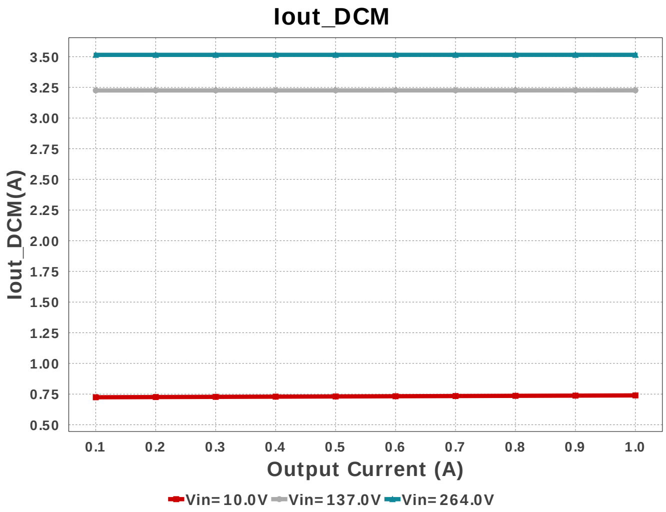


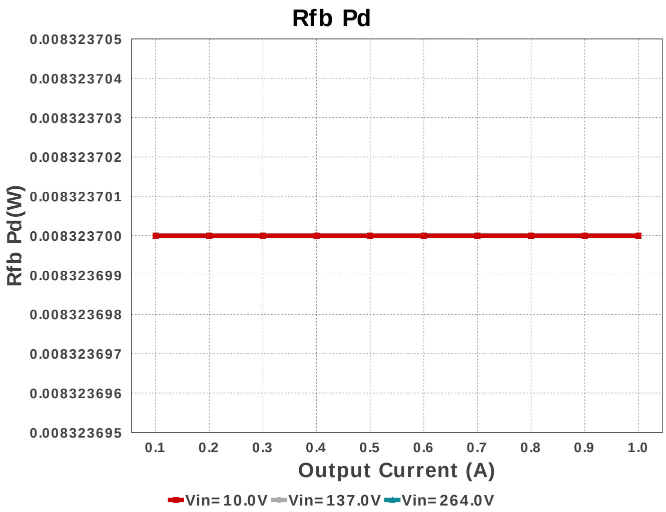


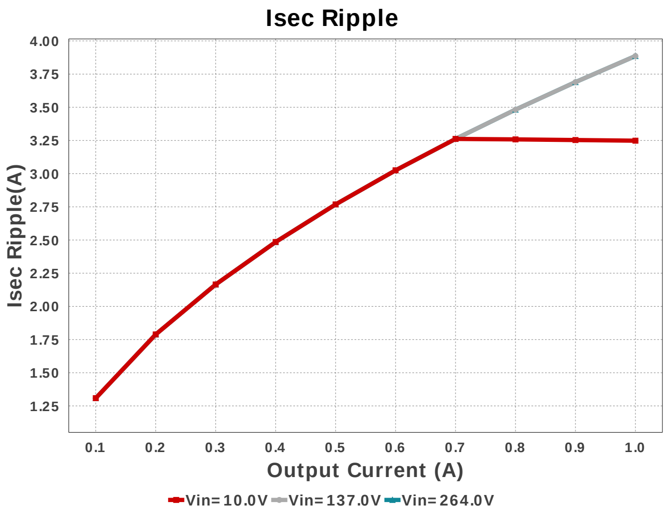

Vout pp percentage
Vout pp percentage(%)
0.525 0.500 0.475 0.450 0.425 0.400 0.375 0.350 0.325 0.300 0.275 0.250 0.225 0.200 0.175 0.150
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 10.0V Vin= 137.0V Vin= 264.0V


T1 Is1 RMS
T1 Is1 RMS(A)
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 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 10.0V Vin= 137.0V Vin= 264.0V

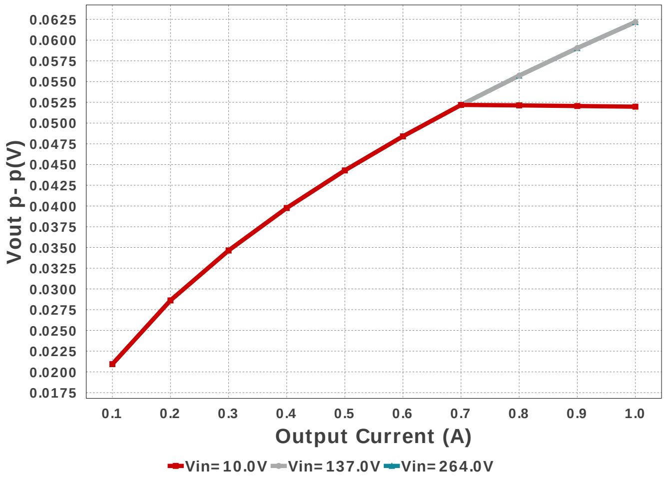

Ipri Avg
Ipri Avg(A)
1.5 1.4 1.3 1.2 1.1 1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 10.0V Vin= 137.0V Vin= 264.0V


Iout_DCM
Iout_DCM(A)
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
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 10.0V Vin= 137.0V Vin= 264.0V

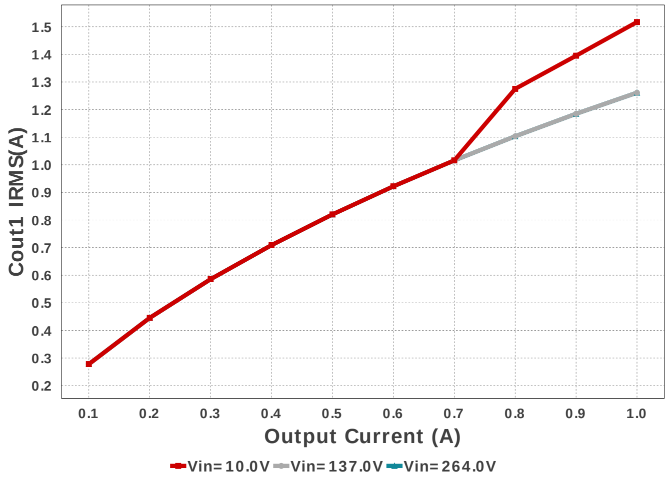

Rfb Pd
Rfb Pd(W)
0.008323705 0.008323704 0.008323703 0.008323702 0.008323701 0.008323700 0.008323699 0.008323698 0.008323697 0.008323696 0.008323695
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 10.0V Vin= 137.0V Vin= 264.0V


Isec Ripple
Isec Ripple(A)
4.00 3.75 3.50 3.25 3.00 2.75 2.50 2.25 2.00 1.75 1.50 1.25
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin= 10.0V Vin= 137.0V Vin= 264.0V

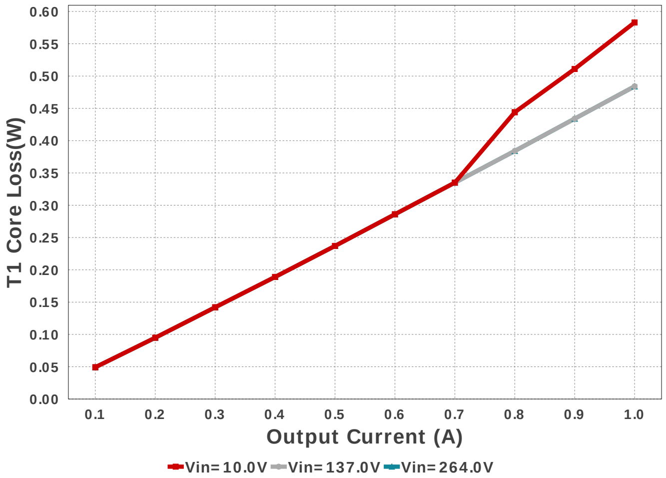
Vout p- p



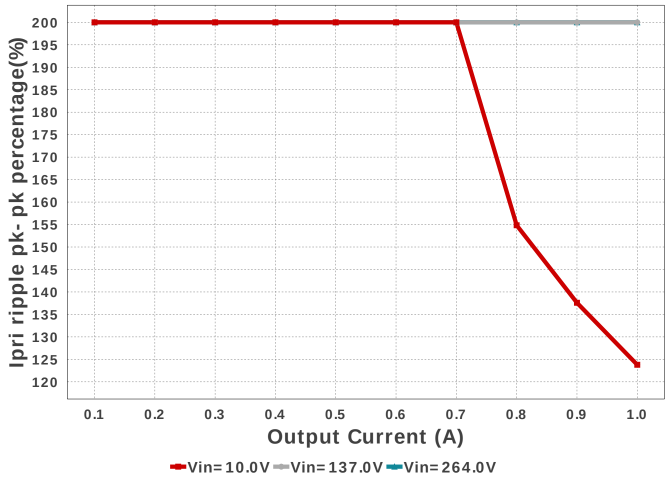
Cout1 IRMS



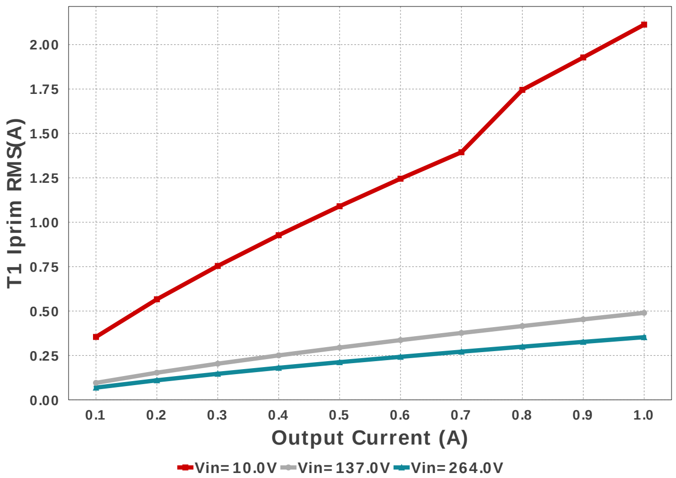
T1 Core Loss



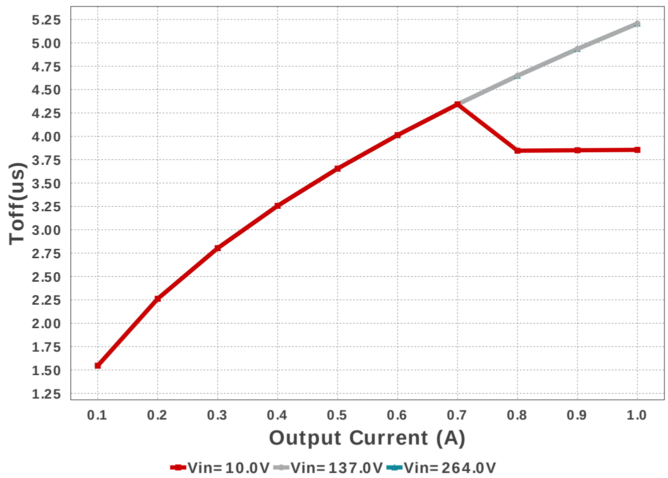
Ipri ripple pk- pk percentage

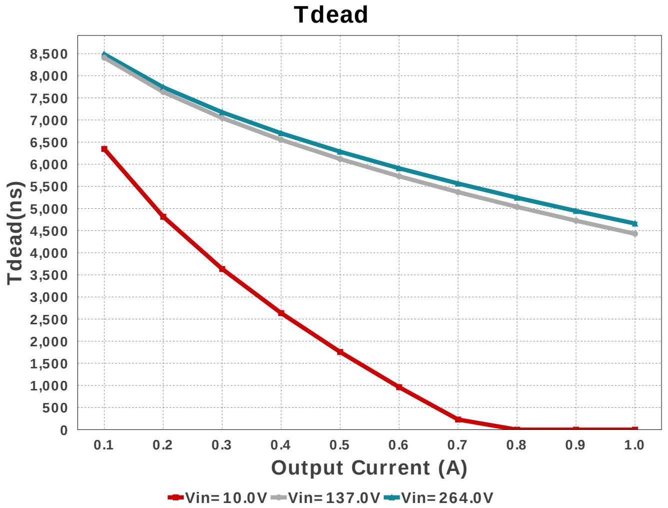


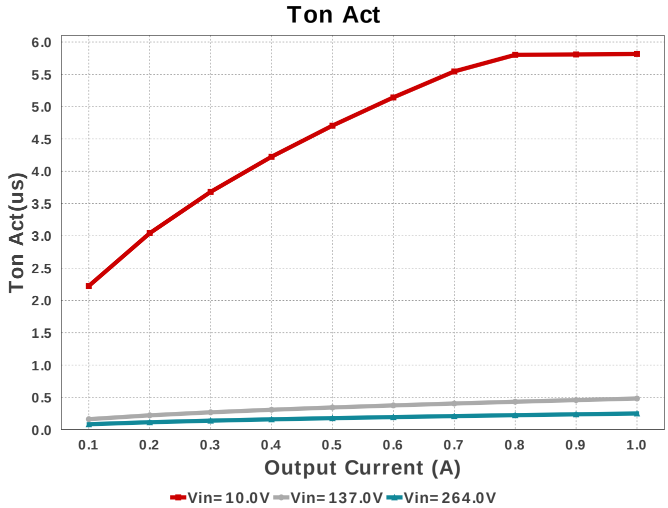
T1 Iprim RMS

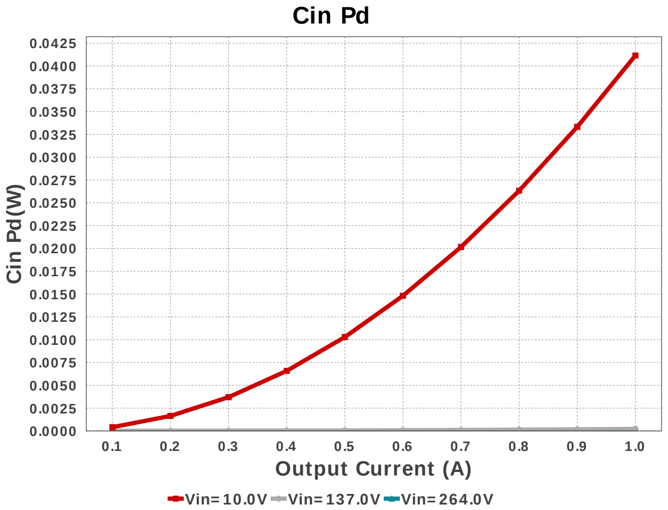


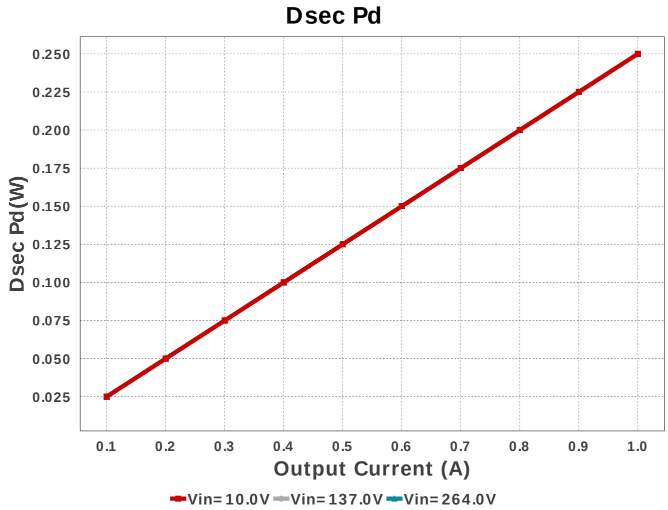
Toff

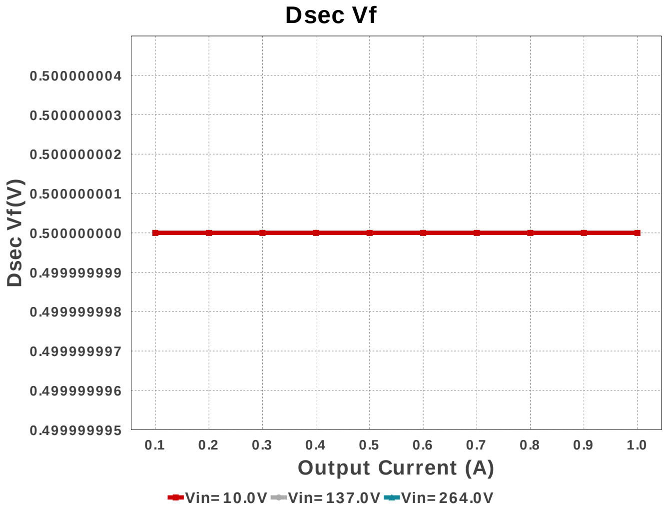


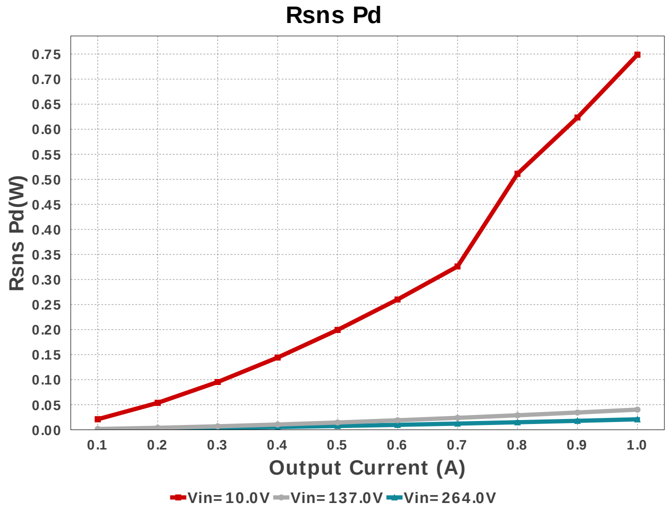

Tdead
Tdead(ns)
Output Current (A)
Vin=10.0V Vin=137.0V Vin=264.0V


Ton Act
Ton Act(us)
Output Current (A)
Vin=10.0V Vin=137.0V Vin=264.0V

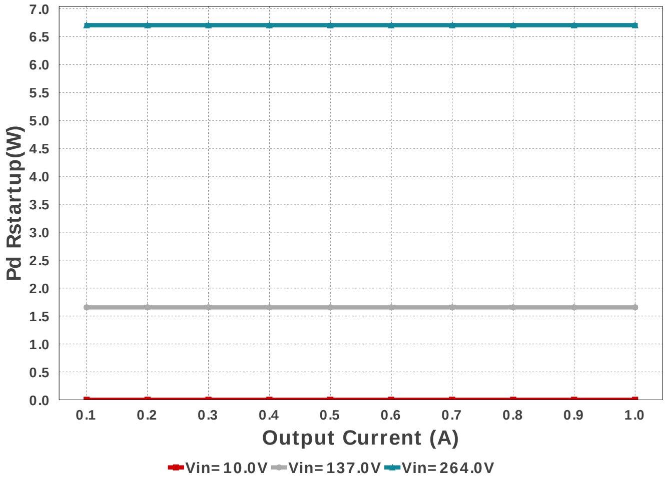

Cin Pd
Cin Pd(W)
Output Current (A)
Vin=10.0V Vin=137.0V Vin=264.0V


Dsec Pd
Dsec Pd(W)
Output Current (A)
Vin=10.0V Vin=137.0V Vin=264.0V

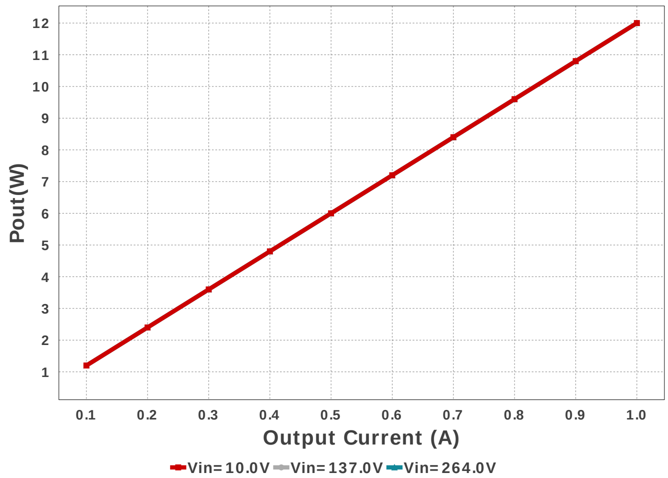

Dsec Vf
Dsec Vf(V)
Output Current (A)
Vin=10.0V Vin=137.0V Vin=264.0V


Rsns Pd
Rsns Pd(W)
Output Current (A)
Vin=10.0V Vin=137.0V Vin=264.0V

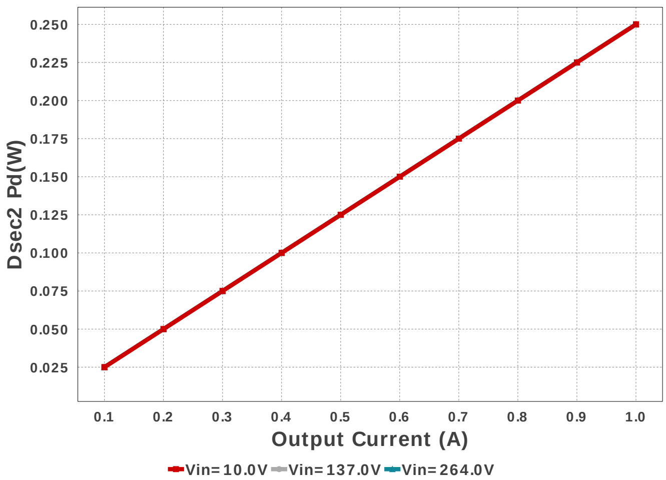
Pd Rstartup



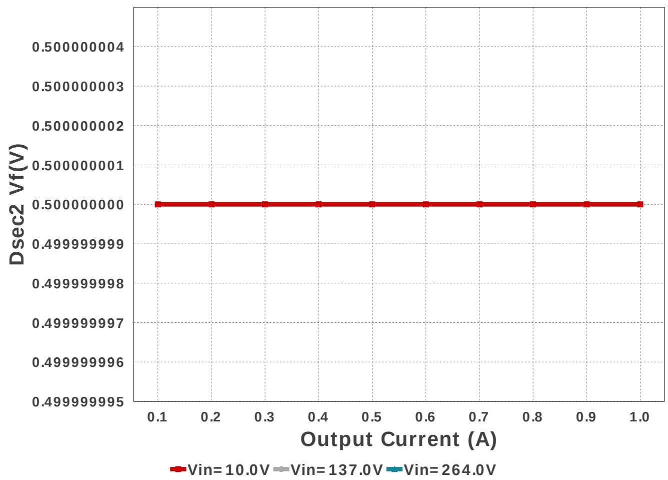
Pout



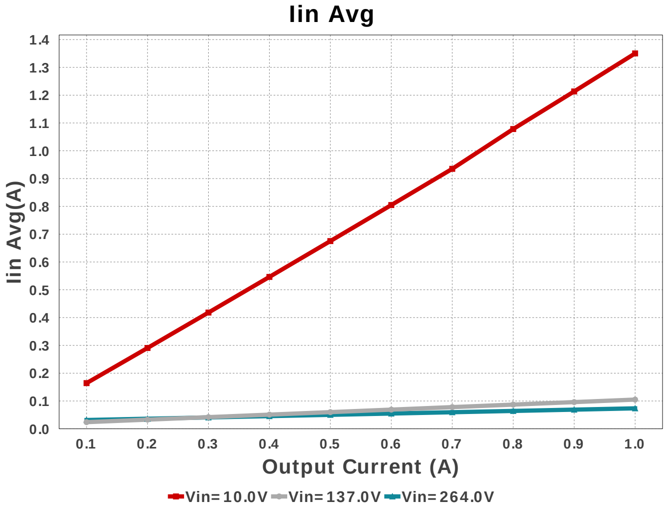
Dsec2 Pd



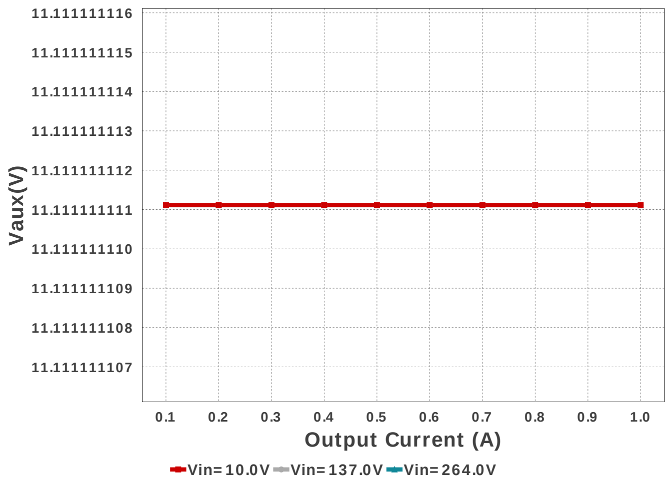
Dsec2 Vf

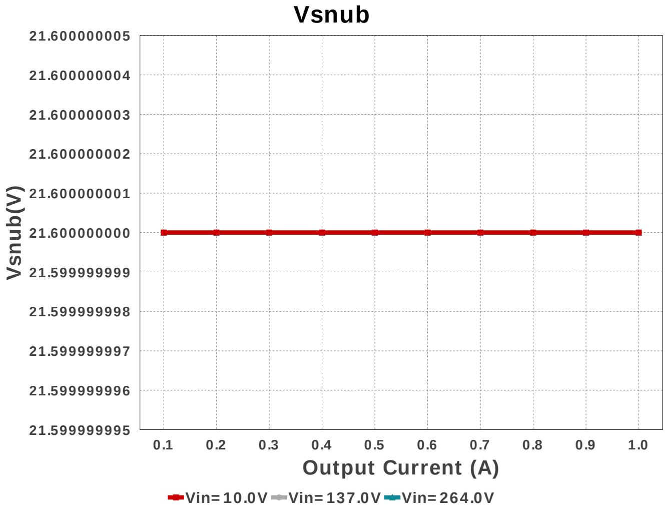


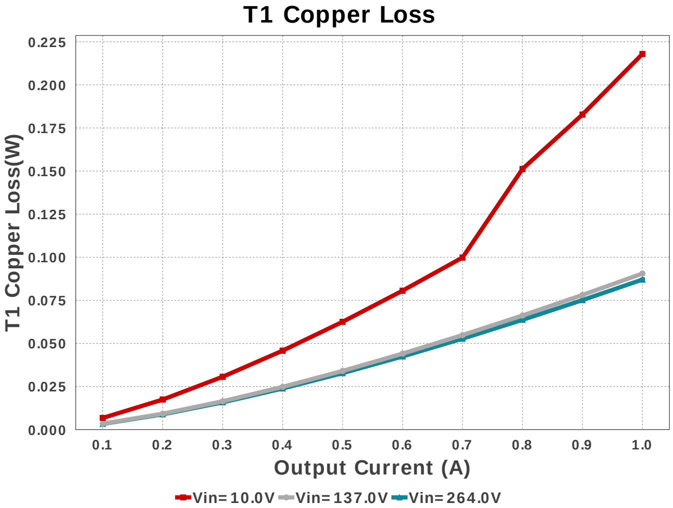
Iin Avg

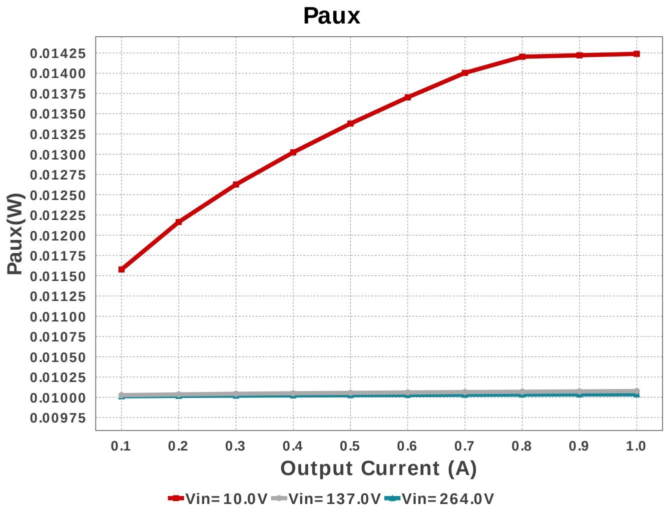


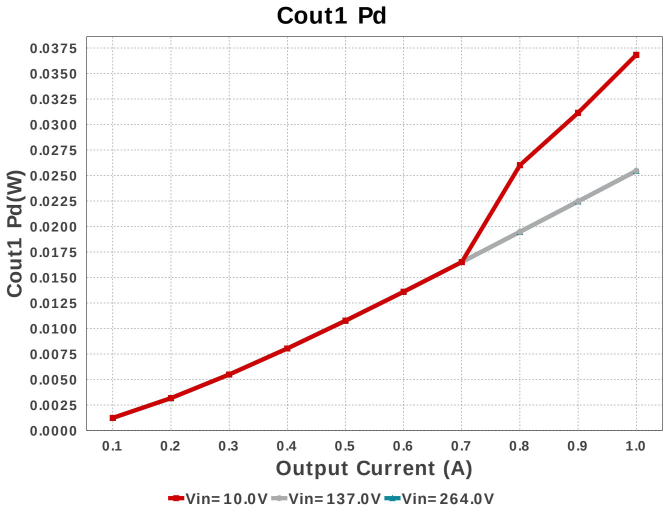
Vaux

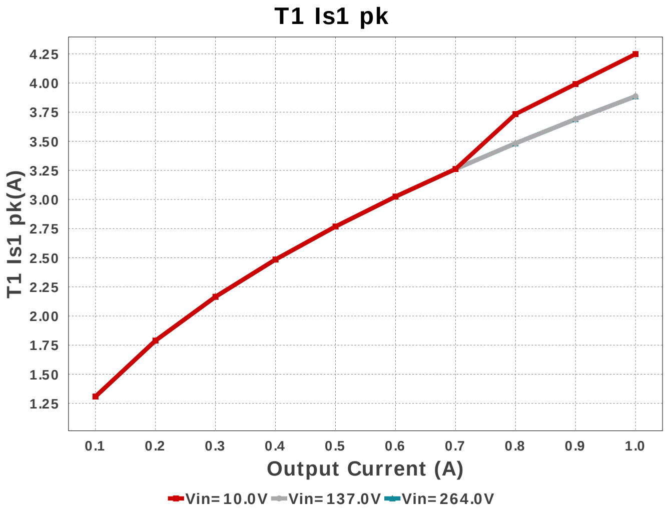


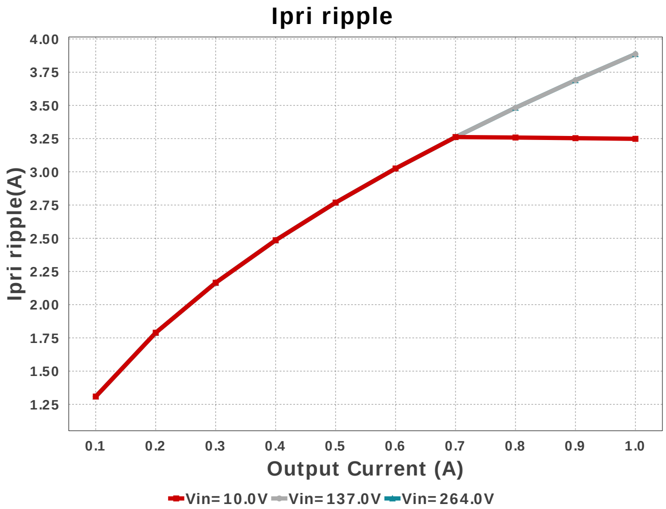

Vsnub
Vsnub(V)
21.600000005
21.600000004
21.600000003
21.600000002
21.600000001
21.600000000
21.599999999
21.599999998
21.599999997
21.599999996
21.599999995
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=10.0V Vin=137.0V Vin=264.0V

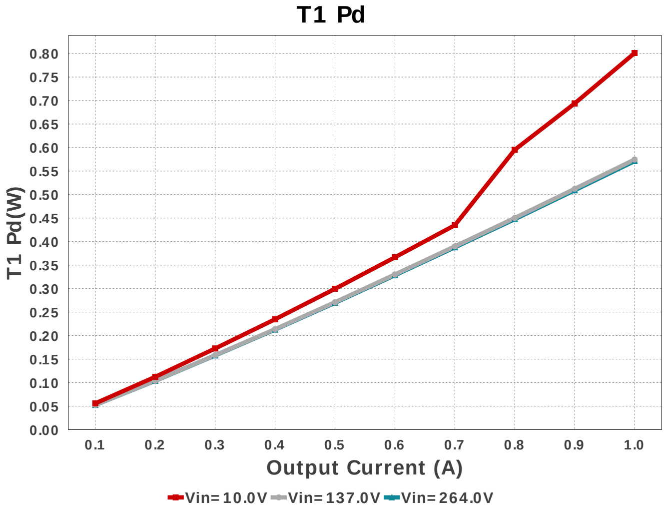

T1 Copper Loss
T1 Copper Loss(W)
0.225
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=10.0V Vin=137.0V Vin=264.0V


Paux
Paux(W)
0.01425
0.01400
0.01375
0.01350
0.01325
0.01300
0.01275
0.01250
0.01225
0.01200
0.01175
0.01150
0.01125
0.01100
0.01075
0.01050
0.01025
0.01000
0.00975
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=10.0V Vin=137.0V Vin=264.0V


Cout1 Pd
Cout1 Pd(W)
0.0375
0.0350
0.0325
0.0300
0.0275
0.0250
0.0225
0.0200
0.0175
0.0150
0.0125
0.0100
0.0075
0.0050
0.0025
0.0000
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=10.0V Vin=137.0V Vin=264.0V


T1 Is1 pk
T1 Is1 pk(A)
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
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=10.0V Vin=137.0V Vin=264.0V


Ipri ripple
Ipri ripple(A)
4.00
3.75
3.50
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=10.0V Vin=137.0V Vin=264.0V



Operating Values

#	Name	Value	Category	Description
1.	Cin Pd	41.143 mW	Capacitor	Input capacitor power dissipation
2.	Cout1 IRMS	1.517 A	Capacitor	Output capacitor1 RMS ripple current
3.	Cout1 Pd	36.828 mW	Capacitor	Output capacitor1 power dissipation
4.	Daux trr	0.0 ns	Diode	Auxiliary Diode Reverse Recovery Time
5.	Dsec Pd	250.0 mW	Diode	Secondary Diode Power Dissipation
6.	Dsec Vf	500.0 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	250.0 mW	Diode	Secondary Diode Power Dissipation
9.	Dsec2 Vf	500.0 mV	Diode	Effective Forward Voltage Drop at the Operating Current
10.	Dsnub trr	50.0 ns	Diode	Snubber Diode Reverse Recovery Time
11.	ICThetaJA	107.7 degC/W	IC	IC junction-to-ambient thermal resistance
12.	Iin Avg	1.401 A	IC	Average input current
13.	Cin Pd	41.143 mW	Power	Input capacitor power dissipation
14.	Cout1 Pd	36.828 mW	Power	Output capacitor1 power dissipation
15.	Dsec Pd	250.0 mW	Power	Secondary Diode Power Dissipation
16.	Dsec2 Pd	250.0 mW	Power	Secondary Diode Power Dissipation
17.	Paux	14.239 mW	Power	Power Dissipation in Raux and Daux
18.	Pd Rstartup	273.23 µW	Power	Power Dissipation in Rstartup1 and Rstartup2
19.	Rfb Pd	8.324 mW	Power	Rfb Power Dissipation
20.	Rsns Pd	748.68 mW	Power	Current Limit Sense Resistor Power Dissipation
21.	Snubber Pd	181.571 mW	Power	Snubber Power Dissipation
22.	T1 Copper Loss	183.68 mW	Power	Transformer Copper Loss Power Dissipation
23.	T1 Core Loss	183.68 mW	Power	Transformer Core Loss Power Dissipation
24.	T1 Pd	367.36 mW	Power	Estimated Losses in Transformer
25.	Pd Rstartup	273.23 µW	Resistor	Power Dissipation in Rstartup1 and Rstartup2
26.	Rfb Pd	8.324 mW	Resistor	Rfb Power Dissipation
27.	Rsns Pd	748.68 mW	Resistor	Current Limit Sense Resistor Power Dissipation
28.	BOM Count	49	System Information	Total Design BOM count
29.	Duty Cycle	57.479 %	System Information	Duty cycle
30.	FootPrint	1.586 k mm^2	System Information	Total Foot Print Area of BOM components
31.	Frequency	98.851 kHz	System Information	Switching frequency
32.	Iout	1.0 A	System Information	Iout operating point
33.	Iout_DCM	739.315 mA	System Information	Approximate Current below which DCM mode of operation will begin
34.	Mode	CCM	System Information	Conduction Mode
35.	Pout	12.0 W	System Information	Total output power
36.	Tdead	0.0 ns	System Information	Approximate Dead Time of the Regulator
37.	Toff	3.855 us	System Information	Approximate Converter Off Time
38.	Ton Act	5.815 us	System Information	Approximate Converter On Time
39.	Total BOM	NA	System Information	Total BOM Cost

#	Name	Value	Category	Description
40.	Tsw	10.116 us	System Information	Switching Time Period
41.	Vin	10.0 V	System Information	Vin operating point
42.	Vout	12.0 V	System Information	Operational Output Voltage
43.	Vout Actual	11.99 V	System Information	Vout Actual calculated based on selected voltage divider resistors
44.	Vout Tolerance	1.926 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
45.	Vout p-p	51.974 mV	System Information	Peak-to-peak output ripple voltage
46.	Vout pp percentage	433.119 m%	System Information	Output Voltage ripple percentage
47.	Vsnub	21.6 V	System Information	Voltage Across the Snubber
48.	Ipri Avg	1.508 A	Transformer	Average Current in Primary Winding over the complete Switching Period
49.	Ipri ripple	3.248 A	Transformer	Ripple Current in the Primary Winding
50.	Ipri ripple pk-pk percentage	123.792 %	Transformer	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
51.	Isec Ripple	3.248 A	Transformer	Ripple Current in the Secondary Winding
52.	Paux	14.239 mW	Transformer	Power Dissipation in Raux and Daux
53.	T1 Copper Loss	183.68 mW	Transformer	Transformer Copper Loss Power Dissipation
54.	T1 Core Loss	183.68 mW	Transformer	Transformer Core Loss Power Dissipation
55.	T1 Iprim RMS	2.113 A	Transformer	Transformer Primary RMS Current
56.	T1 Iprim pk	4.248 A	Transformer	Transformer Primary Peak Current
57.	T1 Is1 RMS	1.817 A	Transformer	Transformer Secondary1 RMS Current
58.	T1 Is1 pk	4.248 A	Transformer	Transformer Secondary1 Peak Current
59.	T1 Pd	367.36 mW	Transformer	Estimated Losses in Transformer
60.	Vaux	11.111 V	Transformer	Auxiliary Voltage

Design Inputs

Name	Value	Description
Iout	1.0	Maximum Output Current
VinMax	264.0	Maximum input voltage
VinMin	10.0	Minimum input voltage
Vout	12.0	Output Voltage
base_pn	UCC28C40	Base Product Number
source	DC	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

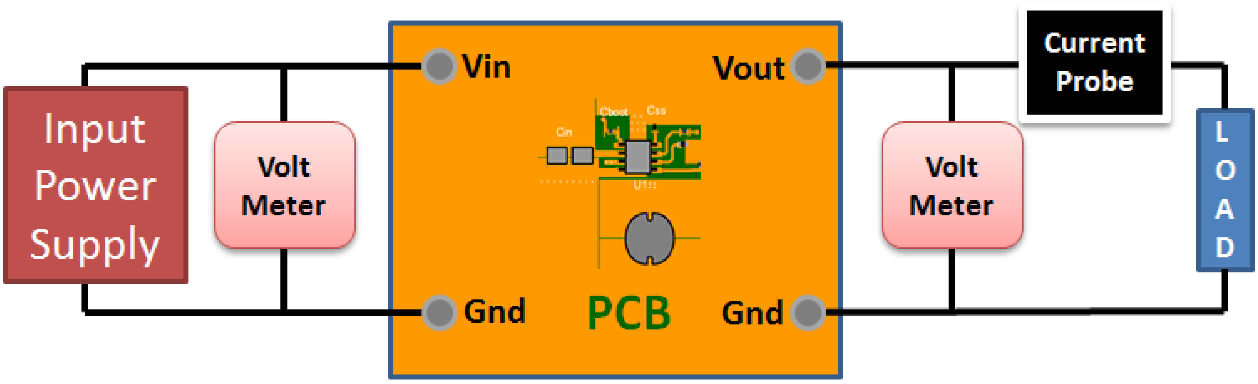
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. 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 10.0V 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.



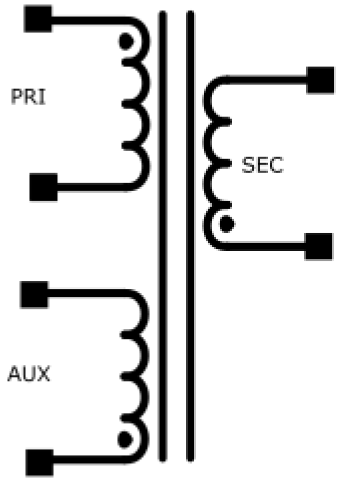
WEBENCH® Transformer Report

#	Name	Value
1.	Core Part Number	B65807J0000R041
2.	Core Manufacturer	TDK
3.	Coil Former Part Number	B65808E1508T001
4.	Coil Former Manufacturer	TDK

Transformer Electrical Diagram

Primary

Turns	9.0
AWG	29.0
Layers	2.0
Strands	4.0
Insulation Type	Heavy Insulated Magnet Wire



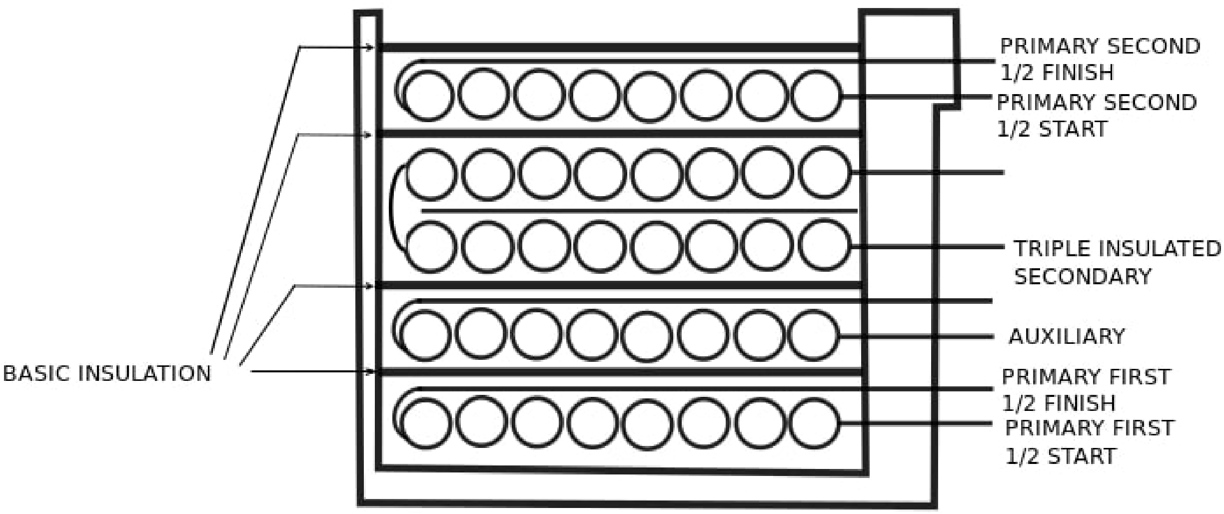
Secondary

Turns	9.0
AWG	27.0
Layers	2.0
Strands	2.0
Insulation Type	Triple Insulated

Auxiliary

Turns	8.0
AWG	28.0
Layers	1.0
Strands	2.0
Insulation Type	Heavy Insulated Magnet Wire

Transformer Construction Diagram



Winding Instruction

Winding	AWG	Turns	Winding Orientation
Primary First 1/2.0	29.0	5	Clockwise
Auxiliary	28.0	8.0	Counter Clockwise
Triple Insulated Secondary	27.0	9.0	Counter Clockwise
Primary Second 1/2.0	29.0	4	Clockwise

Transformer Parameters

#	Name	Value
1.	Lpri	1.7E-5H
2.	Inductance Factor(Al)	214.0nH
3.	Npri	9.0
4.	Nsec	9.0
5.	Naux	8.0
6.	Core Type	RM6
7.	Core Material	N41
8.	Bmax	0.22T
9.	Switching Frequency	98.85kHz
10.	DMax	0.6
11.	Ipk(Primary)	4.13A
12.	Irms(Primary)	2.02A
13.	Ipk(Secondary)	4.13A
14.	Irms(Secondary)	1.65A

Design Assistance

1. Master key : D51FA5CEBDB6905D[v1]
2. **UCC28C40** Product Folder : http://www.ti.com/product/UCC28C40 : contains the data sheet and other resources.