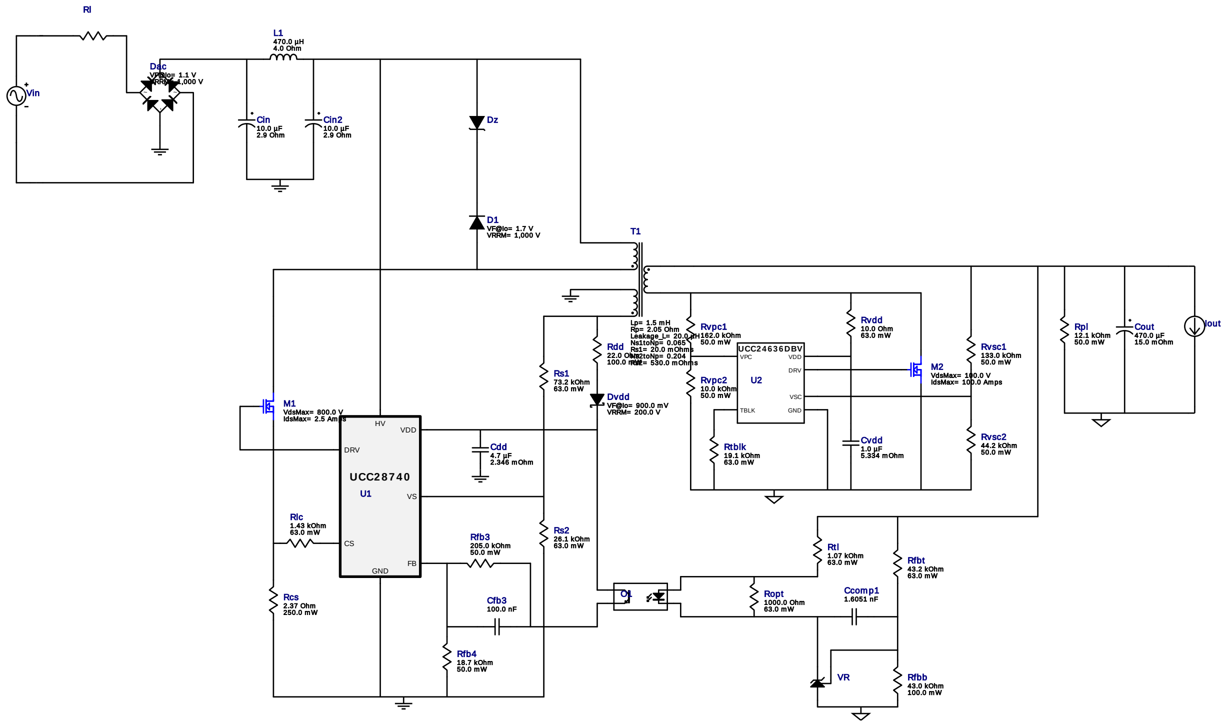
VinMin = 57.0V VinMax = 270.0V Vout = 5.0V Iout = 1.0A	Device = UCC28740DR Topology = Flyback Created = 2025-07-01 08:12:39.971 BOM Cost = NA BOM Count = 37 Total Pd = 1.2W

WEBENCH ® Design Report

Design : 37 UCC28740DR
UCC28740DR 57V-270V to 5.00V @ 1A



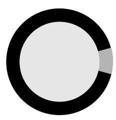
1. Rlc, Rtl and the feedback resistors for this design are a starting point, but may need adjustment based on the actual transformer used. For more information please click the design assistance button.
2. Click on the transformer symbol and select 'Design Transformer' to design using specific transformer cores and bobbin

Design Alerts

Component Selection Information

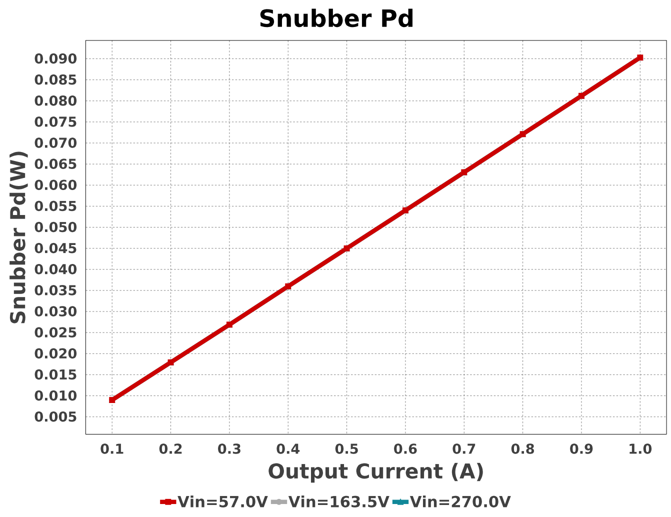
Click on the transformer symbol in the schematic and select "Explore Transformer Core/Bobbin Selection" to design using specific transformer cores and bobbin.

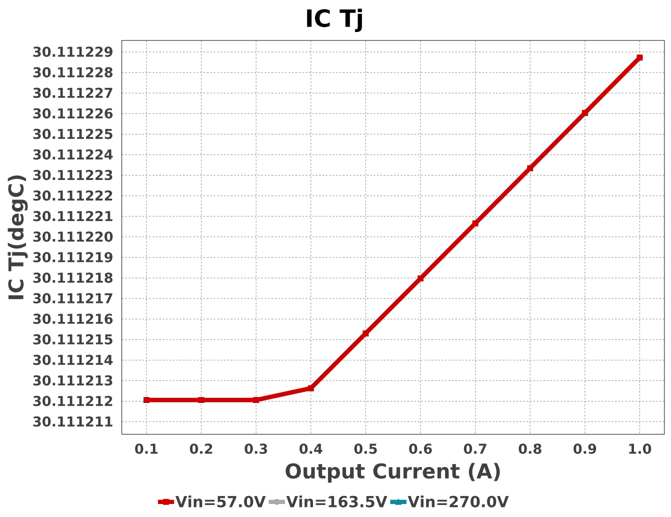
Electrical BOM

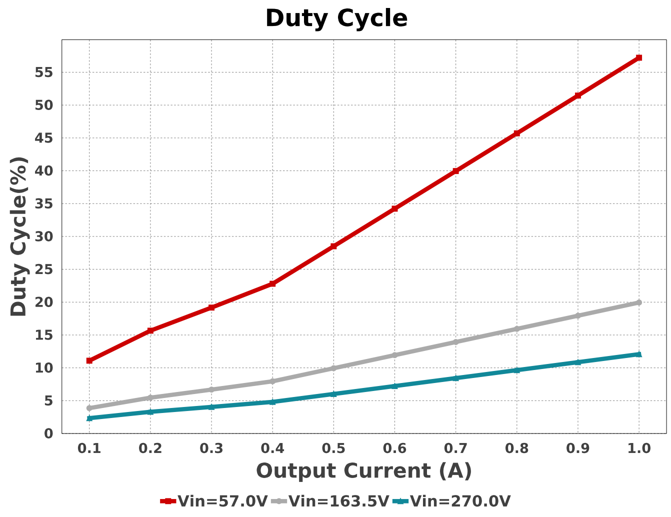
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Ccomp1	CUSTOM	CUSTOM Series= ?	Cap= 1.6051 nF VDC= 0.0 V IRMS= 0.0 A	1	NA	CUSTOM 0 mm²
Cdd	TDK	CGA4J1X7R1V475K125AC Series= X7R	Cap= 4.7 uF ESR= 2.346 mOhm VDC= 35.0 V IRMS= 4.2602 A	1	$0.13	0805 7 mm²
Cfb3	AVX	08053C104JAZ2A Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.07	0805 7 mm²
Cin	Kemet	ESG106M400AH4AA Series= 2334	Cap= 10.0 uF ESR= 2.9 Ohm VDC= 400.0 V IRMS= 100.0 mA	1	$0.29	 ESG106 144 mm²

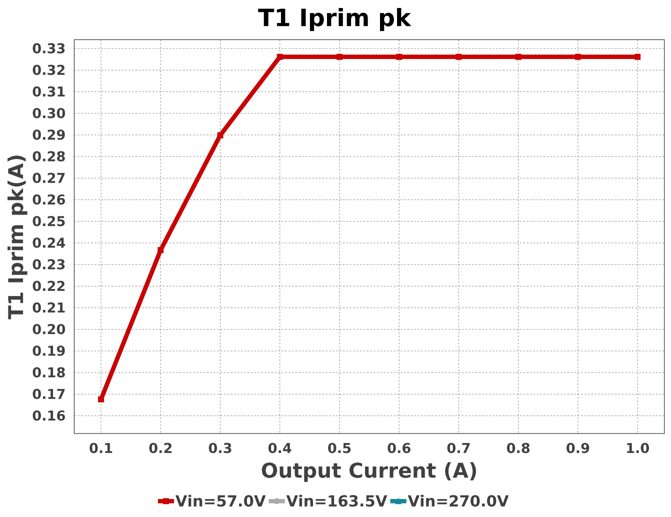
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cin2	Kemet	ESG106M400AH4AA Series= 2334	Cap= 10.0 uF ESR= 2.9 Ohm VDC= 400.0 V IRMS= 100.0 mA	1	$0.29	ESG106 144 mm^2
Cout	Kemet	A750MS477M1EAAE015 Series= 3273	Cap= 470.0 uF ESR= 15.0 mOhm VDC= 25.0 V IRMS= 4.9 A	1	$0.36	A750_MS 144 mm^2
Cvdd	MuRata	GRM31CR72A105KA01L Series= X7R	Cap= 1.0 uF ESR= 5.334 mOhm VDC= 100.0 V IRMS= 1.55432 A	1	$0.11	1206_190 11 mm^2
D1	SMC Diode Solutions	UF4007TA	VF@Io= 1.7 V VRRM= 1,000.0 V	1	$0.07	DO-41 43 mm^2
Dac	Vishay-Semiconductor	DF10SA	VF@Io= 1.1 V VRRM= 1,000.0 V	1	$0.28	DF-S 99 mm^2
Dvdd	SMC Diode Solutions	SK220ATR	VF@Io= 900.0 mV VRRM= 200.0 V	1	$0.06	SMA 37 mm^2
Dz	Diodes Inc.	SMBJ110A-13-F	Zener	1	$0.10	SMB 44 mm^2
L1	NIC Components	NPI54C471KTRF	L= 470.0 µH 4.0 Ohm	1	$0.16	IND_NPI54C 61 mm^2
M1	STMicroelectronics	STD3NK80Z-1	VdsMax= 800.0 V IdsMax= 2.5 Amps	1	$1.11	IPAK 37 mm^2
M2	Texas Instruments	CSD19531Q5A	VdsMax= 100.0 V IdsMax= 100.0 Amps	1	$0.52	TRANS_NexFET_Q5A 55 mm^2
O1	California Eastern Laboratories	PS2811-1	Optocoupler	1	$1.17	SSOP-4 111 mm^2
Rcs	Vishay-Dale	CRCW12062R37FKEA Series= CRCW..e3	Res= 2.37 Ohm Power= 250.0 mW Tolerance= 1.0%	1	$0.01	1206 11 mm^2
Rdd	Yageo	RC0603FR-0722RL Series= ?	Res= 22.0 Ohm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm^2
Rfb3	Yageo	RC0201FR-07205KL Series= ?	Res= 205.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
Rfb4	Yageo	RC0201FR-0718K7L Series= ?	Res= 18.7 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
Rfbb	Yageo	RC0603FR-0743KL Series= ?	Res= 43.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm^2
Rfbt	Vishay-Dale	CRCW040243K2FKED Series= CRCW..e3	Res= 43.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rlc	Vishay-Dale	CRCW04021K43FKED Series= CRCW..e3	Res= 1.43 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2

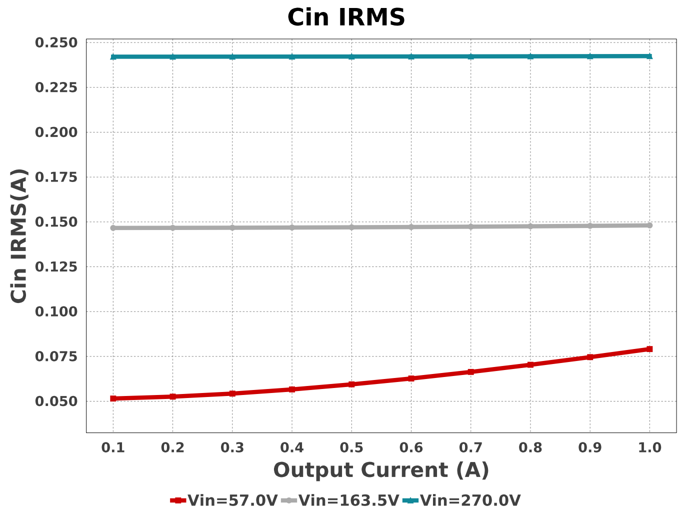
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Ropt	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rpl	Yageo	RC0201FR-0712K1L Series= ?	Res= 12.1 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
Rs1	Vishay-Dale	CRCW040273K2FKED Series= CRCW..e3	Res= 73.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rs2	Vishay-Dale	CRCW040226K1FKED Series= CRCW..e3	Res= 26.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rtblk	Vishay-Dale	CRCW040219K1FKED Series= CRCW..e3	Res= 19.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rtl	Vishay-Dale	CRCW04021K07FKED Series= CRCW..e3	Res= 1.07 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rvdd	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
Rvpc1	Yageo	RC0201FR-07162KL Series= ?	Res= 162.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
Rvpc2	Yageo	RC0201FR-0710KL Series= ?	Res= 10.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
Rvsc1	Yageo	RC0201FR-07133KL Series= ?	Res= 133.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
Rvsc2	Vishay-Dale	CRCW020144K2FNED Series= ?	Res= 44.2 kOhm Power= 50.0 mW Tolerance= 1.0%	1	$0.01	0201 2 mm^2
T1	Wurth Elektronik	7508110151	Lp= 1.5 mH Rp= 2.05 Ohm Leakage_L= 20.0 µH Ns1toNp= 64.8 m Rs1= 20.0 mOhms Ns2toNp= 0.204 Rs2= 530.0 mOhms	1	$3.10	EP13_4821 256 mm^2
U1	Texas Instruments	UCC28740DR	Switcher	1	$0.38	R-PDSO-G7 55 mm^2
U2	Texas Instruments	UCC24636DBVR	Switcher	1	$0.39	DBV0005A 10 mm^2
VR	Texas Instruments	TL431IDBVR	Voltage References	1	$0.05	R-PDSO-G3 16 mm^2

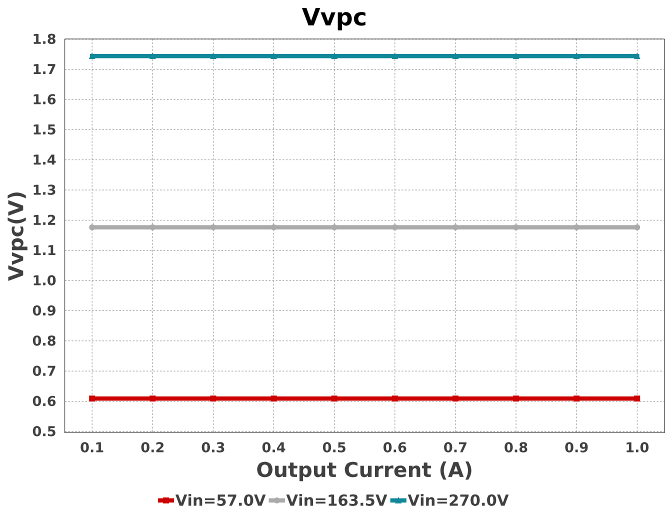

Snubber Pd
Snubber Pd(W)
0.090 0.085 0.080 0.075 0.070 0.065 0.060 0.055 0.050 0.045 0.040 0.035 0.030 0.025 0.020 0.015 0.010 0.005
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

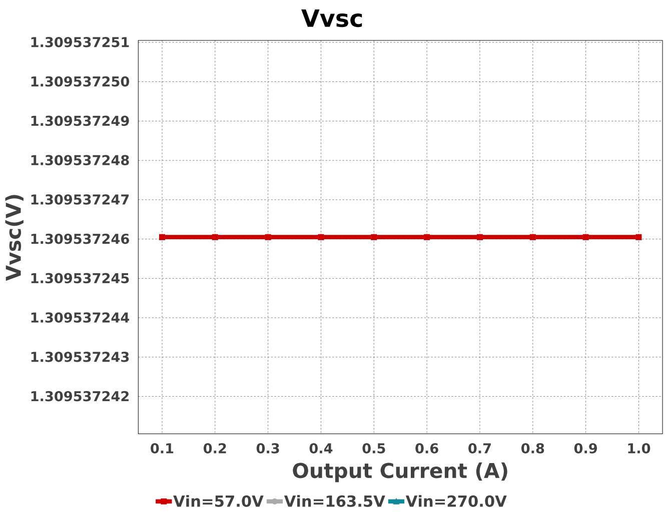

IC Tj
IC Tj(degC)
30.111229 30.111228 30.111227 30.111226 30.111225 30.111224 30.111223 30.111222 30.111221 30.111220 30.111219 30.111218 30.111217 30.111216 30.111215 30.111214 30.111213 30.111212 30.111211
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

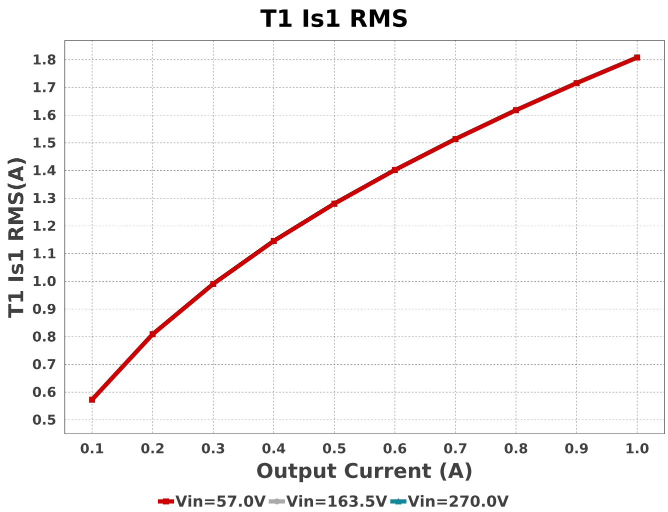

Duty Cycle
Duty Cycle(%)
55 50 45 40 35 30 25 20 15 10 5 0
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

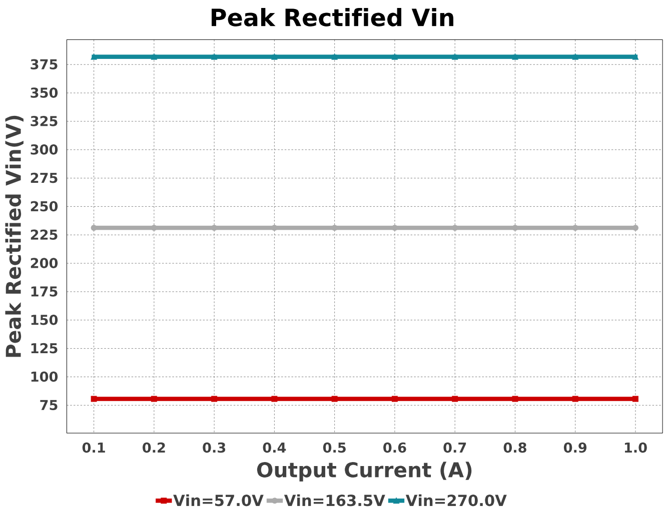

T1 Iprim pk
T1 Iprim pk(A)
0.33 0.32 0.31 0.30 0.29 0.28 0.27 0.26 0.25 0.24 0.23 0.22 0.21 0.20 0.19 0.18 0.17 0.16
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

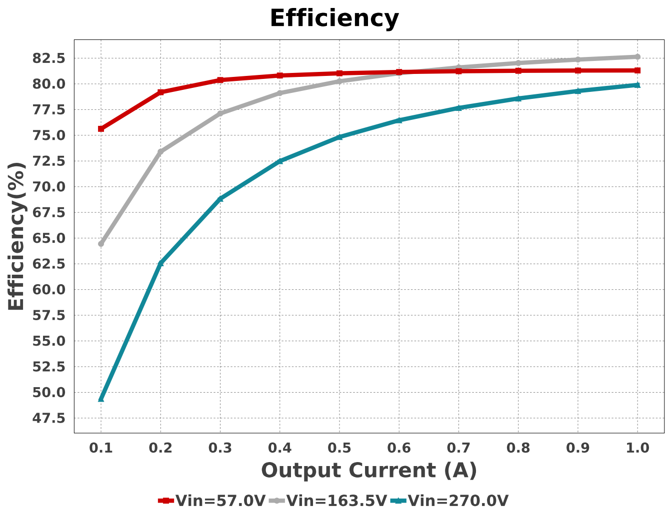

Cin IRMS
Cin IRMS(A)
0.250 0.225 0.200 0.175 0.150 0.125 0.100 0.075 0.050
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

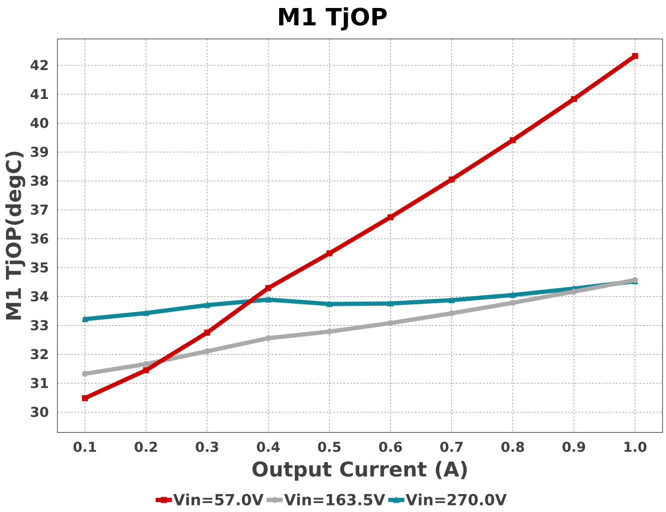

Vvpc
Vvpc(V)
1.8 1.7 1.6 1.5 1.4 1.3 1.2 1.1 1.0 0.9 0.8 0.7 0.6 0.5
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

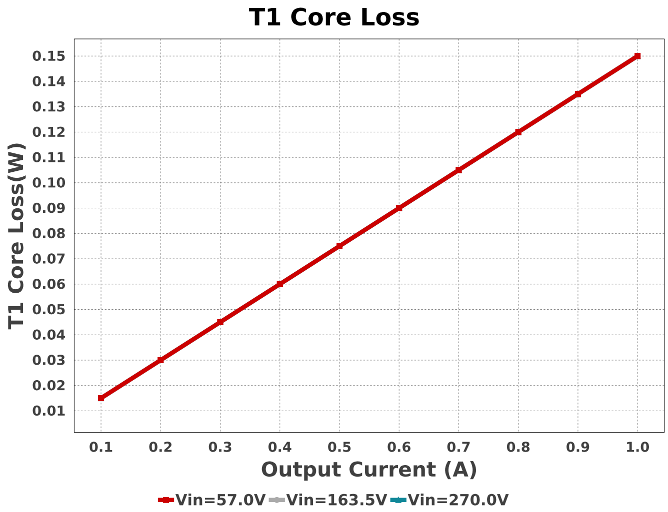

Vvsc
Vvsc(V)
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

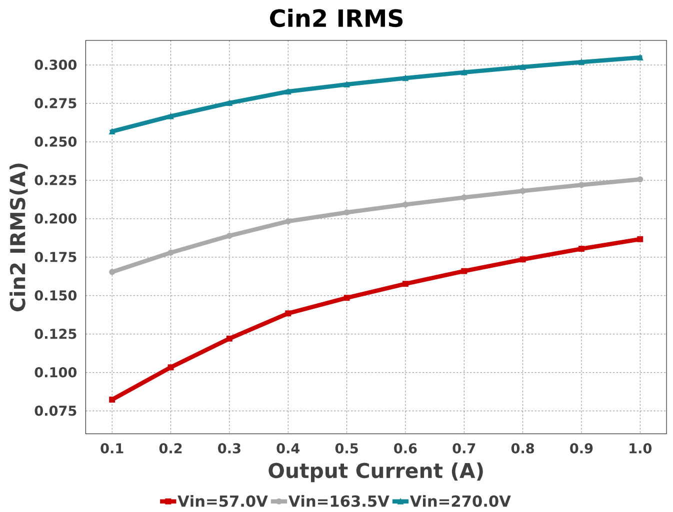

T1 Is1 RMS
T1 Is1 RMS(A)
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

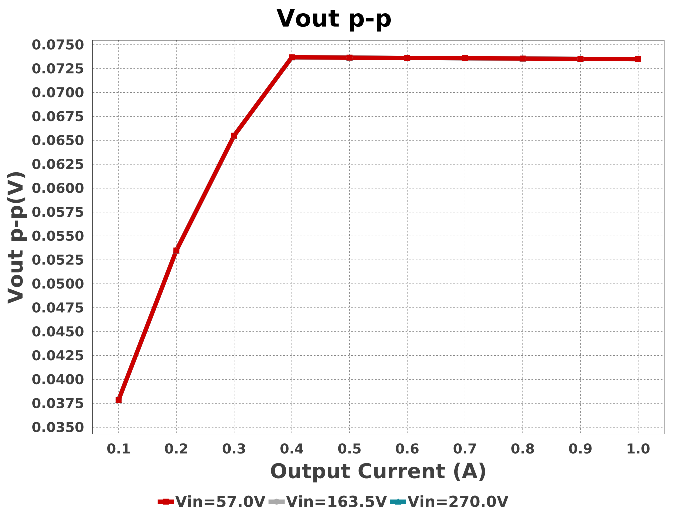

Peak Rectified Vin
Peak Rectified Vin(V)
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

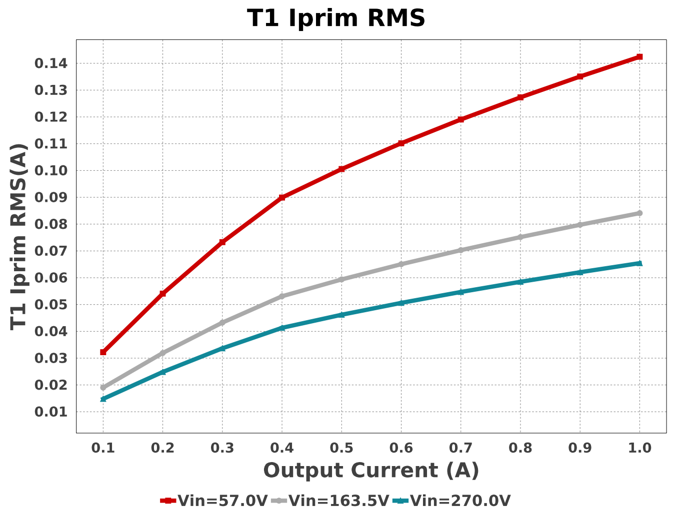

Efficiency
Efficiency(%)
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

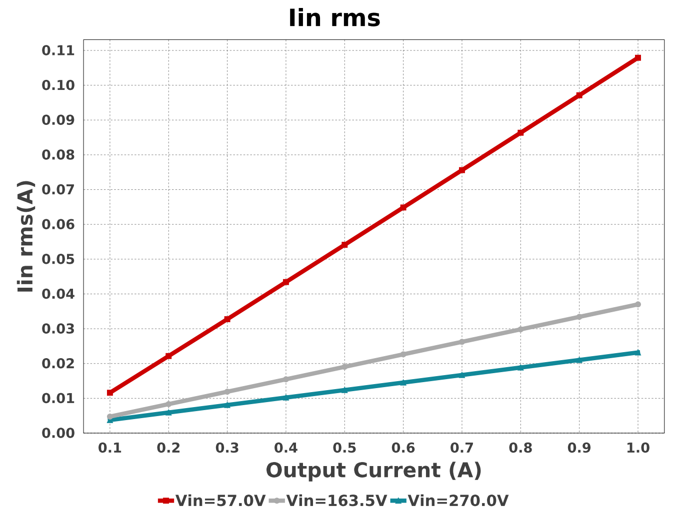

M1 TjOP
M1 TjOP(degC)
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

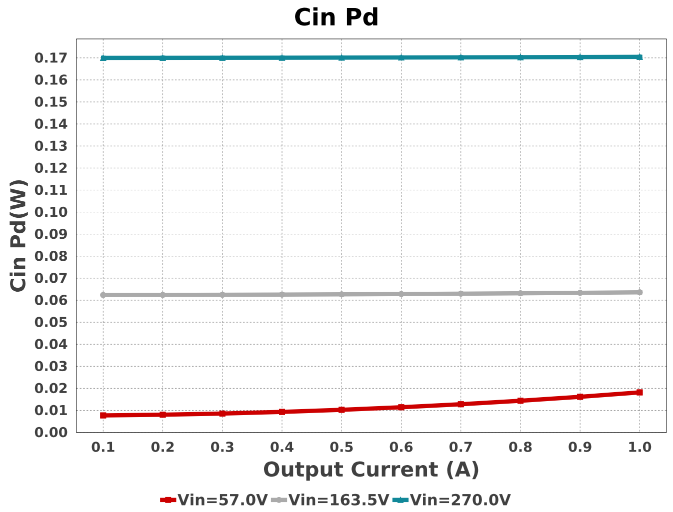

T1 Core Loss
T1 Core Loss(W)
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

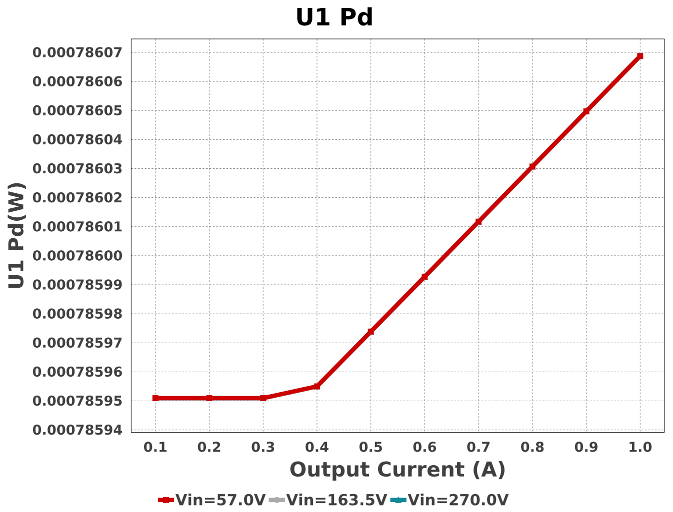

Cin2 IRMS
Cin2 IRMS(A)
0.300
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

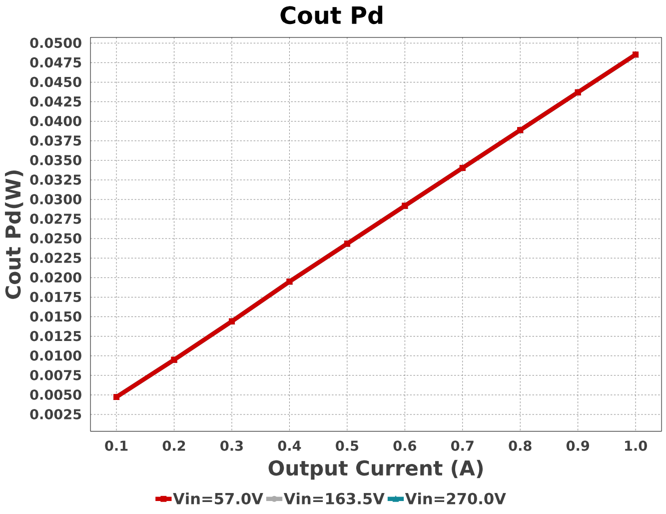

Vout p-p
Vout p-p(V)
0.0750
0.0725
0.0700
0.0675
0.0650
0.0625
0.0600
0.0575
0.0550
0.0525
0.0500
0.0475
0.0450
0.0425
0.0400
0.0375
0.0350
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

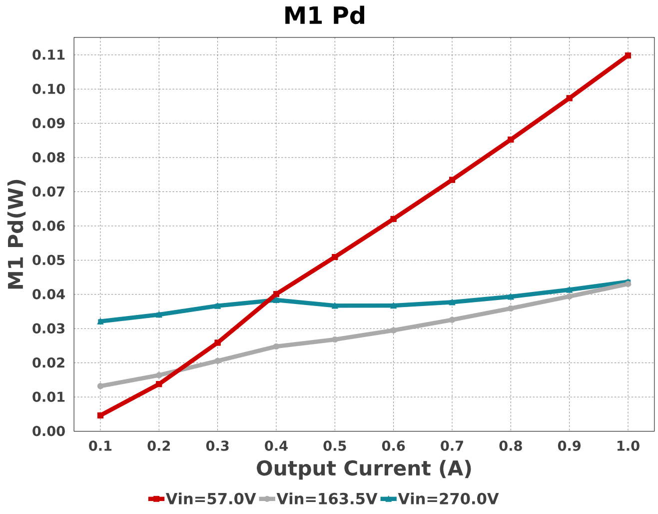

T1 Iprim RMS
T1 Iprim RMS(A)
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

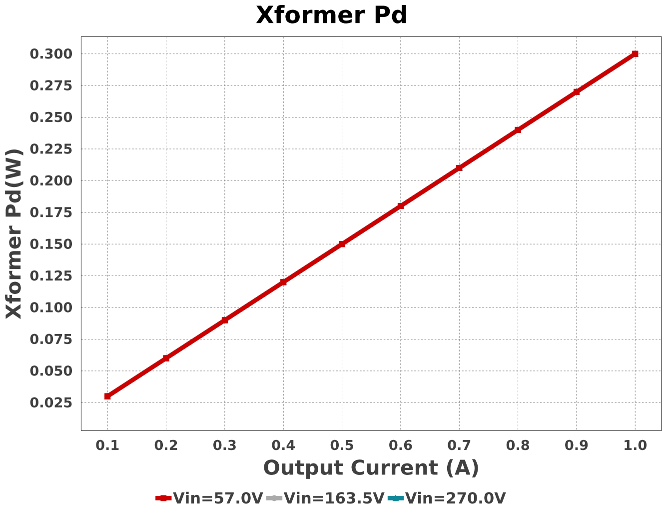

Iin rms
Iin rms(A)
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

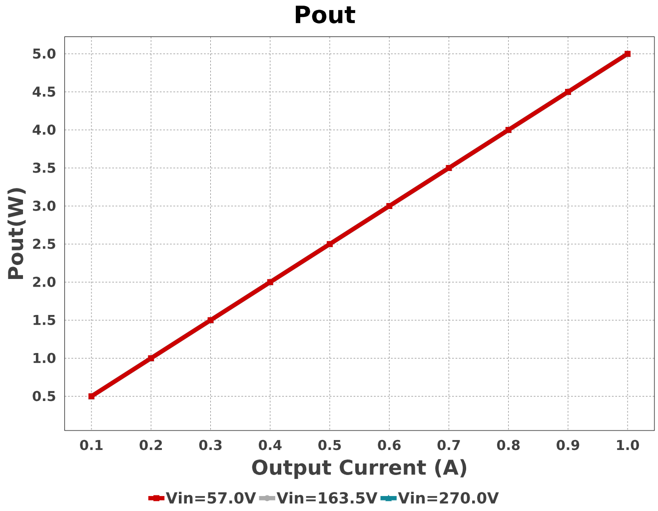

Cin Pd
Cin Pd(W)
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

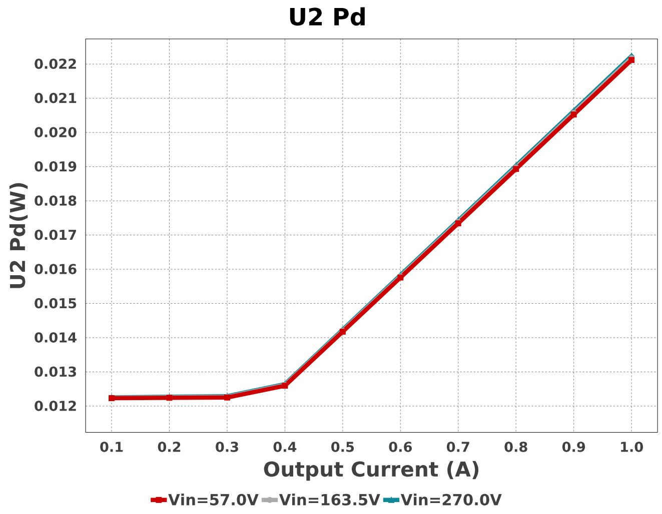

U1 Pd
U1 Pd(W)
0.00078607
0.00078606
0.00078605
0.00078604
0.00078603
0.00078602
0.00078601
0.00078600
0.00078599
0.00078598
0.00078597
0.00078596
0.00078595
0.00078594
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

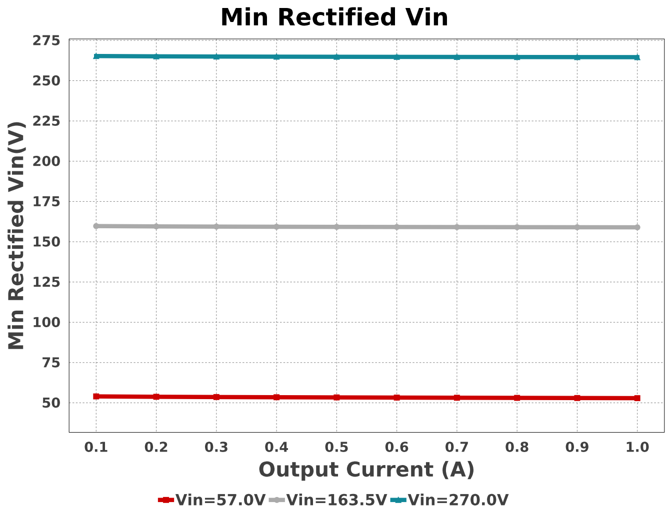

Cout Pd
Cout Pd(W)
0.0500
0.0475
0.0450
0.0425
0.0400
0.0375
0.0350
0.0325
0.0300
0.0275
0.0250
0.0225
0.0200
0.0175
0.0150
0.0125
0.0100
0.0075
0.0050
0.0025
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

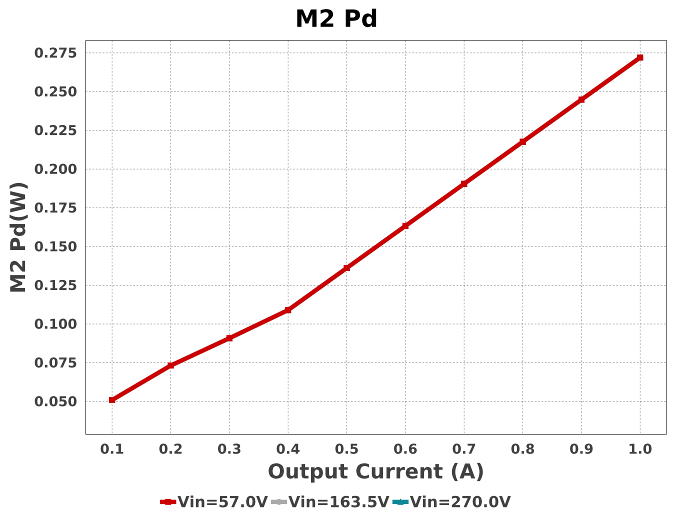

M1 Pd
M1 Pd(W)
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

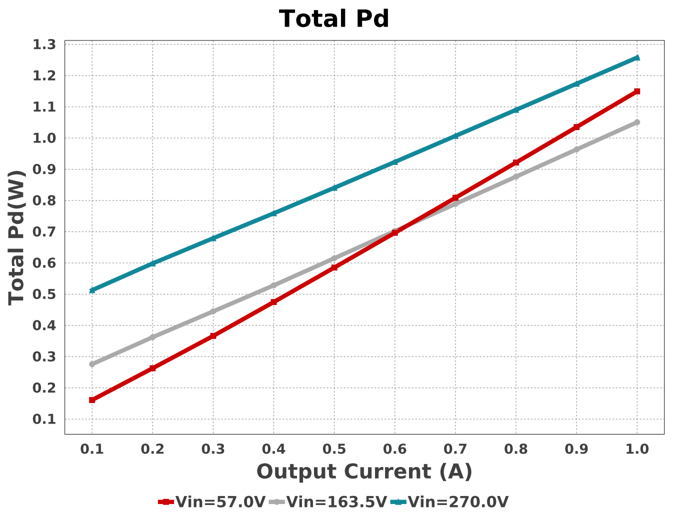

Xformer Pd
Xformer Pd(W)
0.300
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

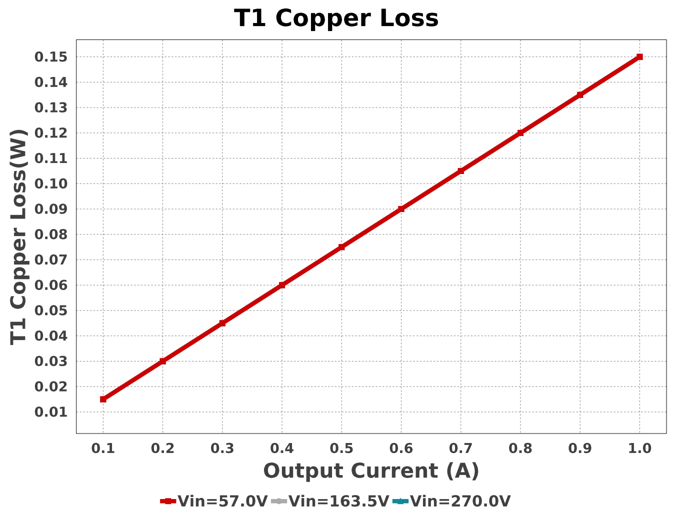

Pout
Pout(W)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

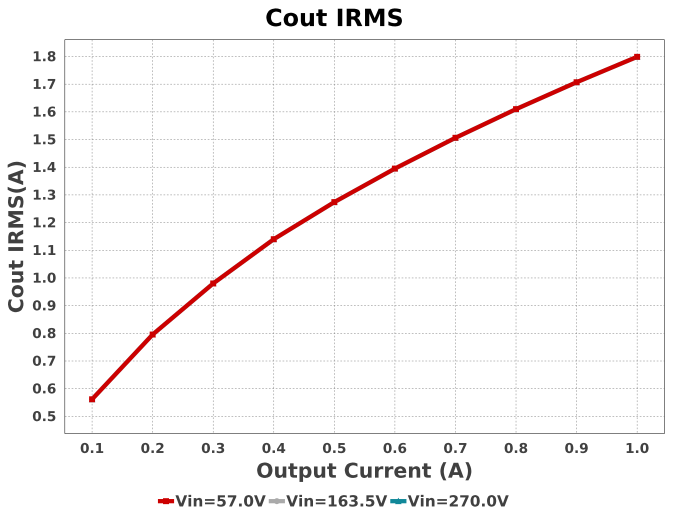

U2 Pd
U2 Pd(W)
0.022
0.021
0.020
0.019
0.018
0.017
0.016
0.015
0.014
0.013
0.012
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

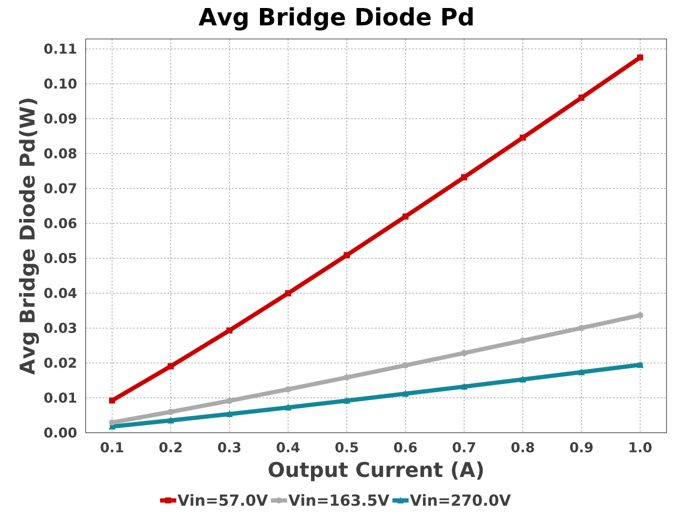

Min Rectified Vin
Min Rectified Vin(V)
275
250
225
200
175
150
125
100
75
50
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

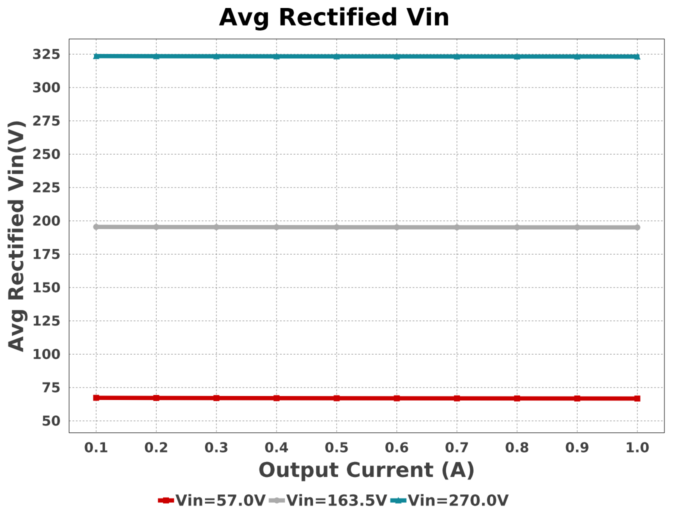

M2 Pd
M2 Pd(W)
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V

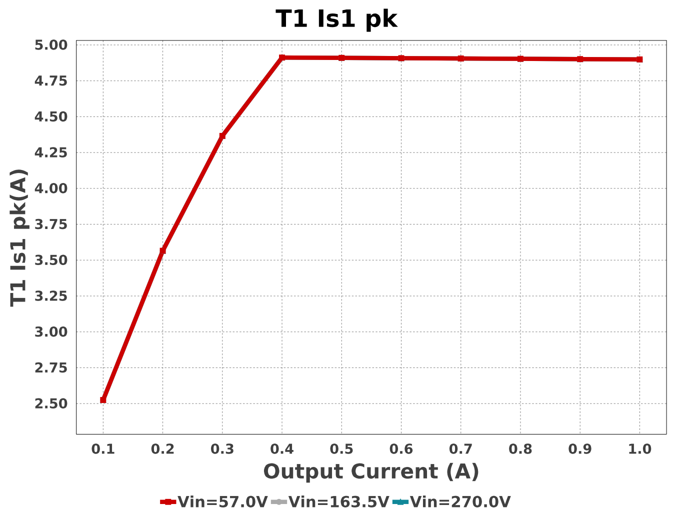

Total Pd
Total Pd(W)
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V


T1 Copper Loss
T1 Copper Loss(W)
0.15
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
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V


Cout IRMS
Cout IRMS(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
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V


Avg Bridge Diode Pd
Avg Bridge Diode Pd(W)
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Output Current (A)
Vin=57.0V Vin=163.5V Vin=270.0V


Avg Rectified Vin
Avg Rectified Vin(V)
325
300
275
250
225
200
175
150
125
100
75
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=57.0V Vin=163.5V Vin=270.0V



Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	79.474 mA	Capacitor	Input capacitor RMS ripple current
2.	Cin Pd	18.317 mW	Capacitor	Input capacitor power dissipation
3.	Cin2 IRMS	187.194 mA	Capacitor	Input Capacitor Cin2 RMS Ripple Current
4.	Cout IRMS	1.795 A	Capacitor	Output capacitor RMS ripple current
5.	Cout Pd	48.35 mW	Capacitor	Output capacitor power dissipation
6.	Avg Bridge Diode Pd	108.48 mW	Diode	Average Power Dissipation in the Bridge Diode over the AC Line Period
7.	IC Tj	30.111 degC	IC	IC junction temperature
8.	ICThetaJA	141.5 degC/W	IC	IC junction-to-ambient thermal resistance
9.	M1 Pd	110.8 mW	Mosfet	M1 MOSFET total power dissipation
10.	M1 TjOP	42.437 degC	Mosfet	M1 MOSFET junction temperature
11.	M2 Pd	271.91 mW	Mosfet	M2 MOSFET total power dissipation
12.	Avg Bridge Diode Pd	108.48 mW	Power	Average Power Dissipation in the Bridge Diode over the AC Line Period
13.	Cin Pd	18.317 mW	Power	Input capacitor power dissipation
14.	Cout Pd	48.35 mW	Power	Output capacitor power dissipation
15.	M1 Pd	110.8 mW	Power	M1 MOSFET total power dissipation
16.	M2 Pd	271.91 mW	Power	M2 MOSFET total power dissipation
17.	Snubber Pd	136.448 mW	Power	Snubber Power Dissipation
18.	T1 Copper Loss	150.0 mW	Power	Transformer Copper Loss Power Dissipation
19.	T1 Core Loss	150.0 mW	Power	Transformer Core Loss Power Dissipation
20.	Total Pd	1.199 W	Power	Total Power Dissipation
21.	U1 Pd	786.07 µW	Power	U1 Power Dissipation
22.	U2 Pd	22.239 mW	Power	Synchronous Rectifier Circuit Power Dissipation
23.	Xformer Pd	300.0 mW	Power	Transformer power dissipation
24.	Avg Rectified Vin	66.754 V	System Information	Average Rectified Voltage for the AC Line Period
25.	BOM Count	37	System Information	Total Design BOM count
26.	Duty Cycle	57.644 %	System Information	Duty cycle
27.	Efficiency	80.66 %	System Information	Steady state efficiency
28.	FootPrint	1.345 k mm^2	System Information	Total Foot Print Area of BOM components
29.	Frequency	85.51 kHz	System Information	Switching frequency
30.	Frequency	85.51 kHz	System Information	Switching frequency
31.	Iin rms	108.75 mA	System Information	RMS Input Current
32.	Iout	1.0 A	System Information	Iout operating point
33.	Min Rectified Vin	52.898 V	System Information	Minimum voltage seen at rectified input
34.	Mode	DCM	System Information	Conduction Mode
35.	Peak Rectified Vin	80.609 V	System Information	Peak voltage seen at rectified input
36.	Pout	5.0 W	System Information	Total output power
37.	Total BOM	NA	System Information	Total BOM Cost

#	Name	Value	Category	Description
38.	Vin_RMS	57.0 V	System Information	Vin operating point
39.	Vout	5.0 V	System Information	Operational Output Voltage
40.	Vout Actual	5.0 V	System Information	Vout Actual calculated based on selected voltage divider resistors
41.	Vout Tolerance	1.339 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
42.	Vout p-p	73.207 mV	System Information	Peak-to-peak output ripple voltage
43.	T1 Copper Loss	150.0 mW	Transformer	Transformer Copper Loss Power Dissipation
44.	T1 Core Loss	150.0 mW	Transformer	Transformer Core Loss Power Dissipation
45.	T1 Iprim RMS	142.971 mA	Transformer	Transformer Primary RMS Current
46.	T1 Iprim pk	326.16 mA	Transformer	Transformer Primary Peak Current
47.	T1 Is1 RMS	1.805 A	Transformer	Transformer Secondary1 RMS Current
48.	T1 Is1 pk	4.88 A	Transformer	Transformer Secondary1 Peak Current
49.	Vvpc	608.924 mV	Transformer	Voltage during Primary Conduction for SR circuit
50.	Vvsc	1.31 V	Transformer	Voltage during Secondary Conduction for SR circuit
51.	Xformer Pd	300.0 mW	Transformer	Transformer power dissipation

Design Inputs

Name	Value	Description
Iout	1.0	Maximum Output Current
VinMax	270.0	Maximum input voltage
VinMin	57.0	Minimum input voltage
Vout	5.0	Output Voltage
base_pn	UCC28740	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

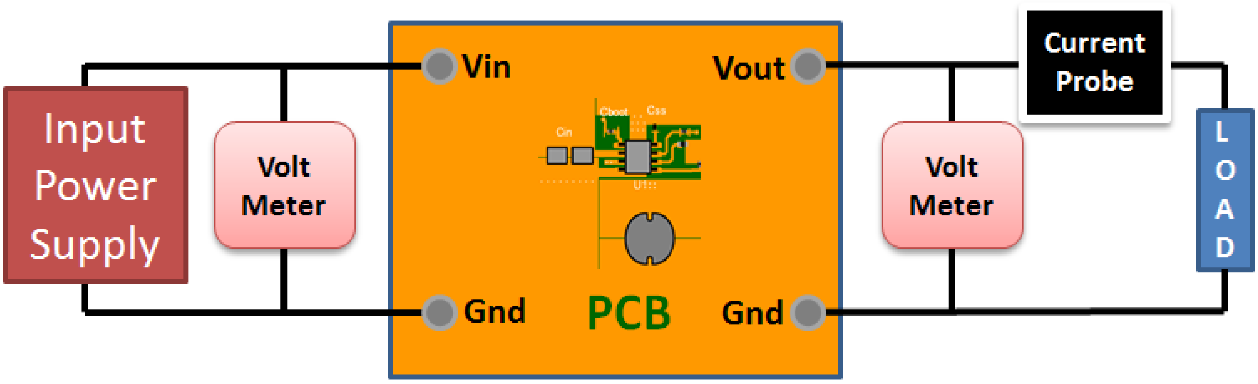
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. 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 57.0V 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.



Design Assistance

1. Application Hints Rlc Rlc provides the function of feed-forward line compensation to eliminate change in IPP due to change in di/dt and the propagation delay of the internal comparator and MOSFET turn-off time. For best results the chosen value may need to be adjusted based on board, FET and transformer parasitics. Rpl: Rpl is used to to set a minimum load for the circuit, so that in standby the output voltage does not float up. The value chosen by WEBENCH should be a good starting point but may need to be adjusted to achieve minimum power dissipation at standby as well. Rtl Rtl is added to prevent excessive diode current and limit Iopt to the maximum value necessary for regulationThe Rtl value may be adjusted for optimal limiting later during the porotype evaluation process. Rfbt & Rfbb The feedback resistors will set the output voltage of the circuit. The values chosen may need to be fined tuned based on the final Transformer turns ratios and the voltage across the output diode at close to zero current. Rfb3 & Cfb3 Rfb3 is necessary to limit the current into FB and to avoid excess draining of Cvdd during this type of transient situation.The value of Rfb3 is chosen to limit the excess Ifb and Rfb4 current to an acceptable level when the optocoupler is saturatedCfb3 helps improve the transient response and is estimated initially by equating the time constant to 1ms. This can later beadjusted for optimal performance during prototype evaluation Rfb4 Rfb4 speeds up the turnoff time of the optocoupler in the case of a heavy load-step transient condition. This value tends to fallwithin the range of 10k and 100k. A tradeoff must be made between a lower value for faster transient response and a higher value forlower standby power. Rfb4 also serves to set a minimum bias current for the optocoupler and to drain dark current Part Description The UCC28740 isolated-flyback controller provides Constant-Voltage (CV) using an optical coupler toimprove transient

response. Constant-Current (CC) regulation is accomplished through Primary Side Regulation (PSR) techniques. The UCC24636 Sychronous Rectifier is a compact, secondary-side MOSFET controller for high efficiency Flyback controllers operating in DCM and Trasition mode. It enables maximum SR conduction time and provides high rectifier efficiency for a given MOSFET. Please see the datasheet for further design guidance. http://www.ti.com/lit/ds/symlink/ucc28740.pdf http://www.ti.com/lit/ds/symlink/ucc24636.pdf

2. Master key : F8339E48A52168C0[v1]

3. **UCC28740** Product Folder : http://www.ti.com/product/UCC28740 : contains the data sheet and other resources.