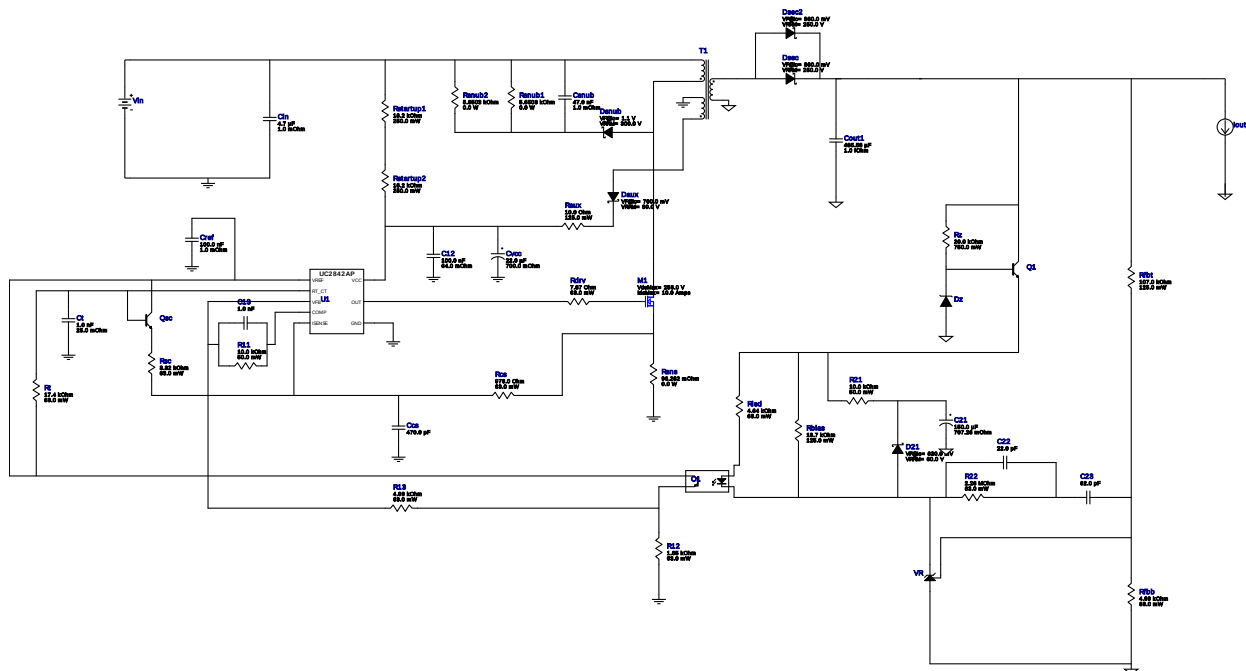


WEBENCH® Design Report

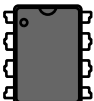
Design : UC2842AN
UC2842AN 53V-58.8V to 56.00V @ 2A



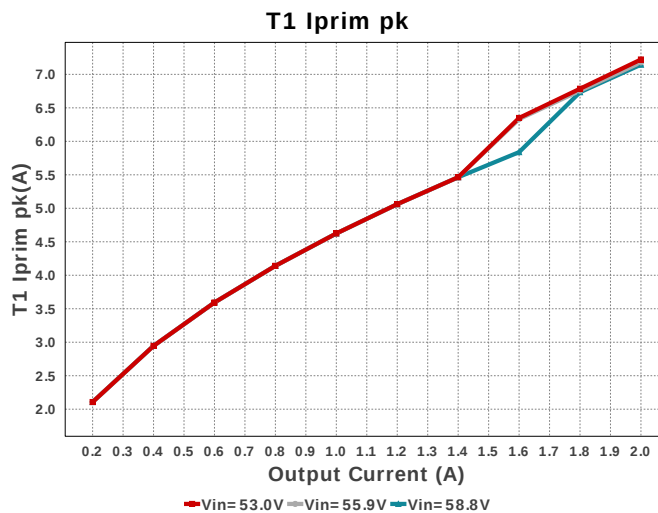
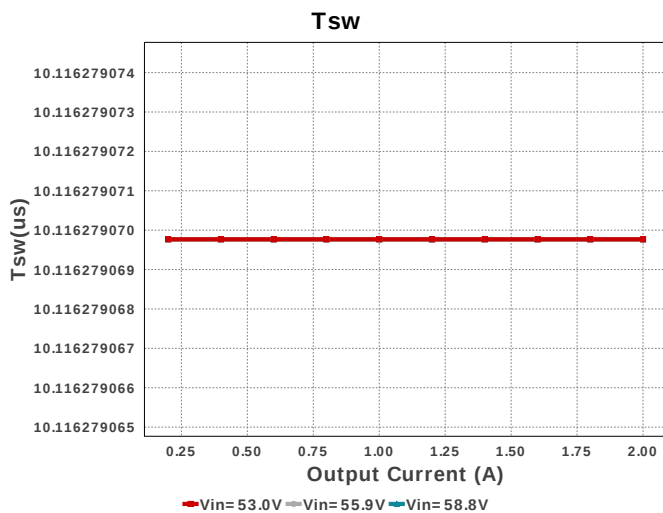
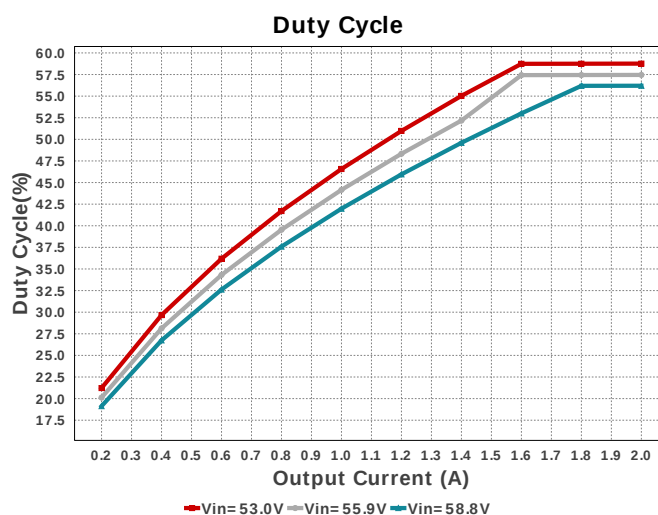
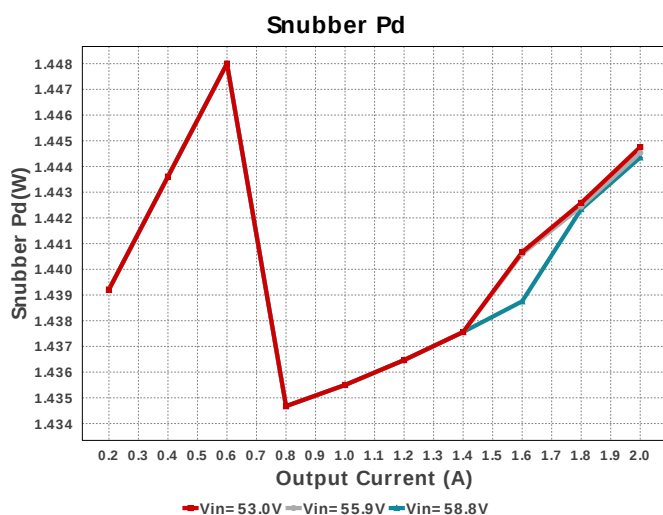
Electrical BOM

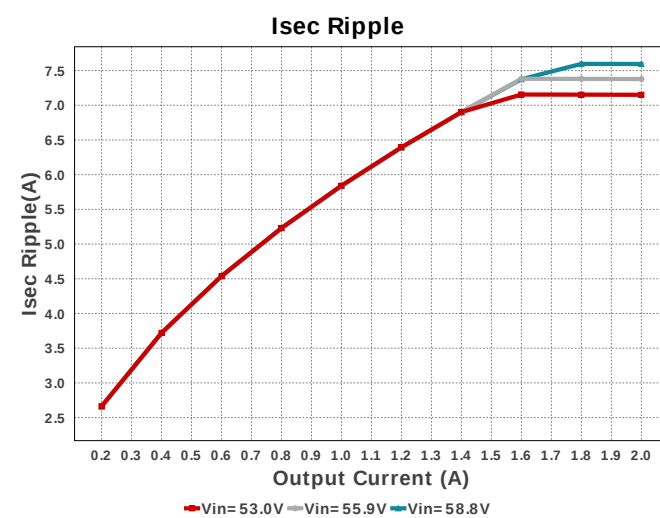
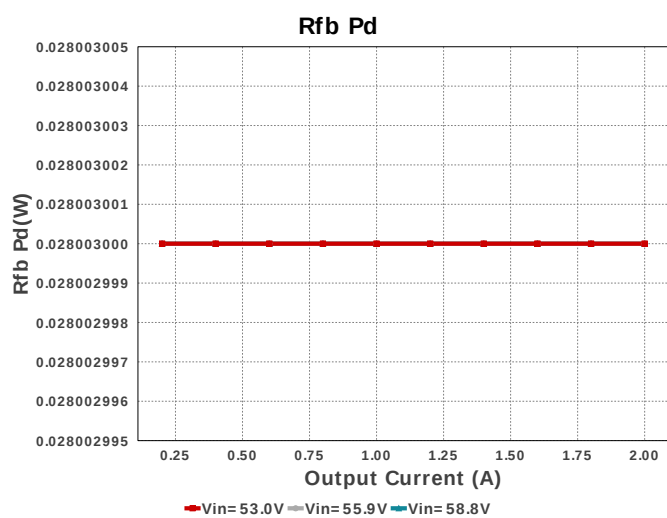
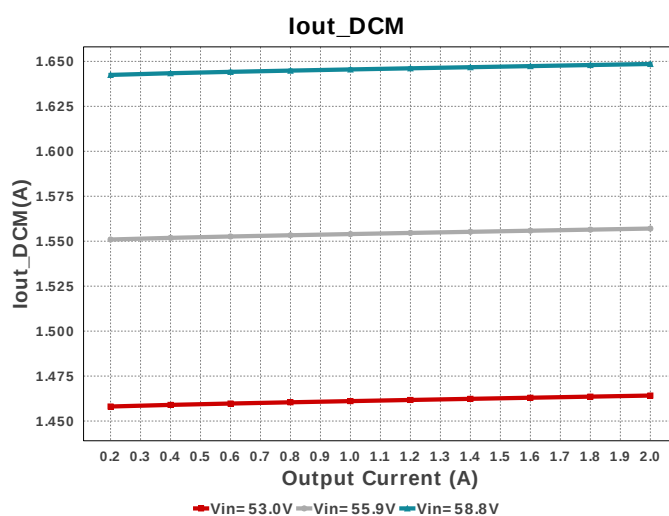
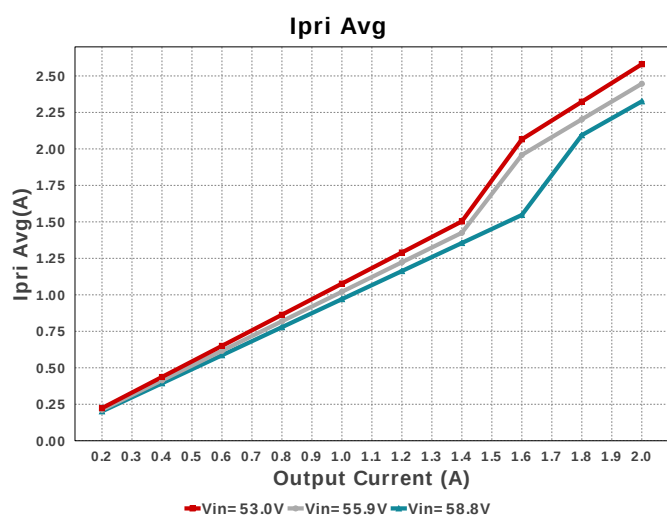
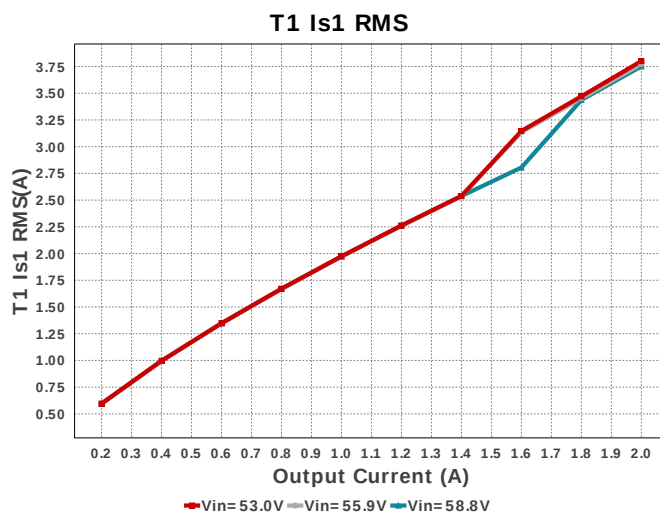
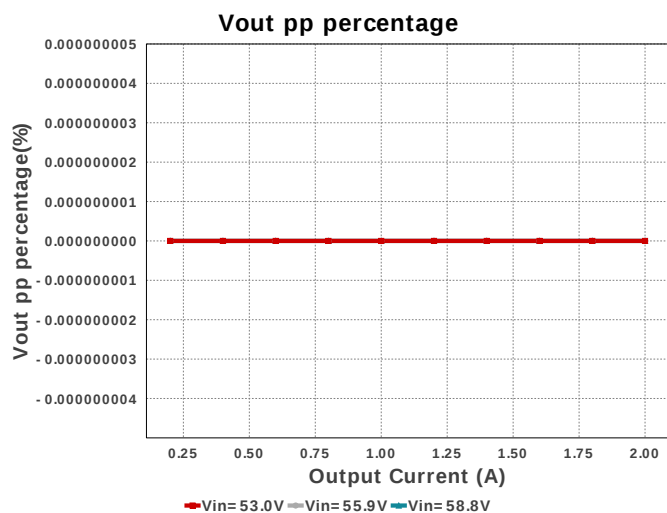
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C12	Kemet	C0805C104M5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	0805 7 mm ²
2.	C13	MuRata	GRM1555C1H102JA01J Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
3.	C21	Chemi-Con	ELXZ630ELL151MH20D Series= LXZ	Cap= 150.0 uF ESR= 707.26 mOhm VDC= 63.0 V IRMS= 690.0 mA	1	\$0.12	Chemi-Con_800x2000 100 mm ²
4.	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
5.	C23	Samsung Electro-Mechanics	CL21C620JBANNNC Series= C0G/NP0	Cap= 62.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
6.	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
7.	Cin	MuRata	GCM32DC72A475KE02L Series= X7S	Cap= 4.7 uF ESR= 1.0 mOhm VDC= 100.0 V IRMS= 6.0 A	1	\$0.60	1210_220 15 mm ²
8.	Cout1	CUSTOM	CUSTOM Series= ?	Cap= 485.58 uF ESR= 1.0 fOhm VDC= 140.0 V IRMS= 3.8899 A	1	NA	CUSTOM 0 mm ²

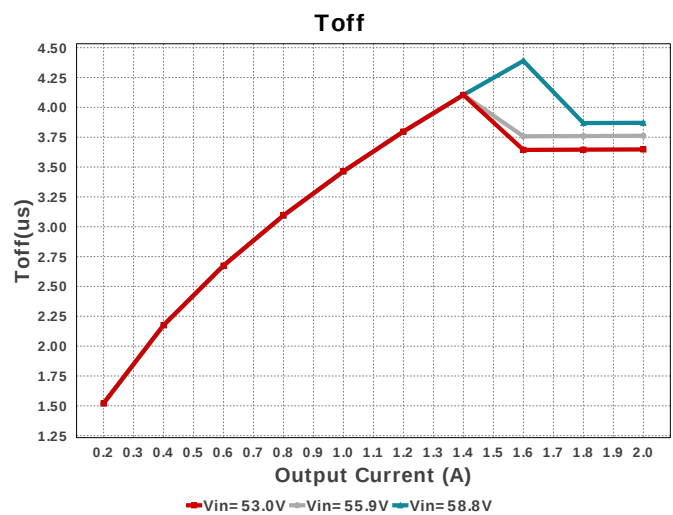
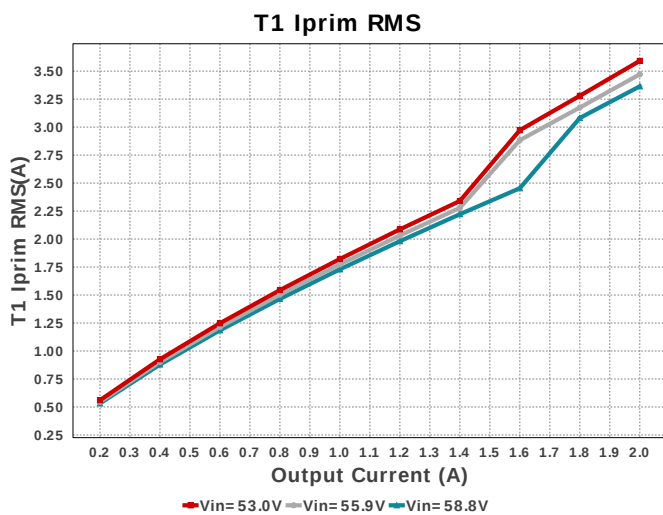
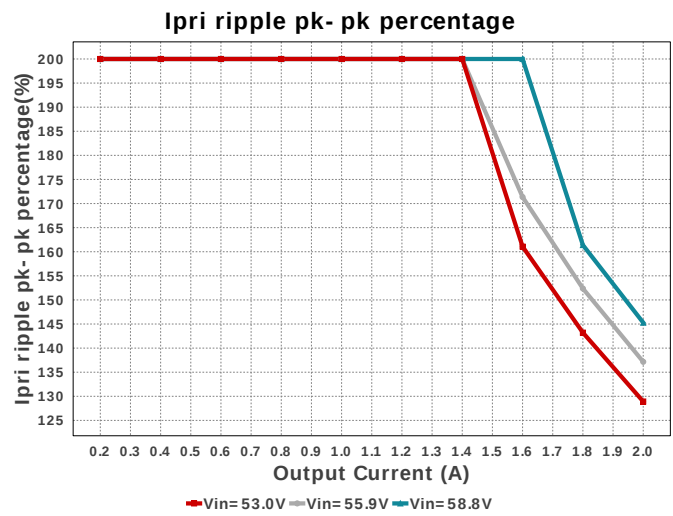
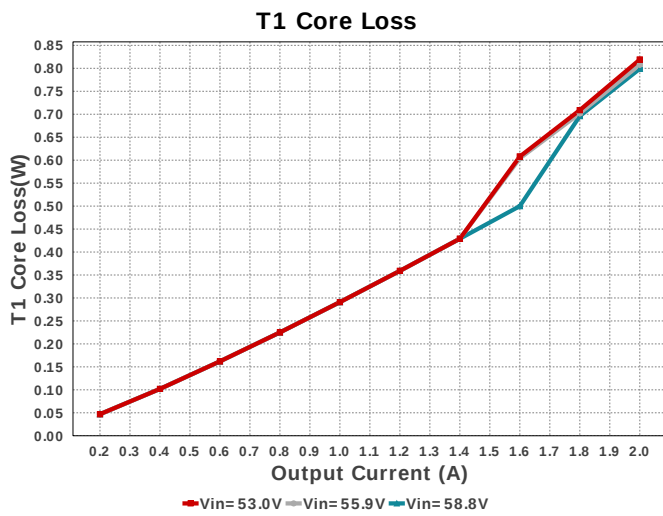
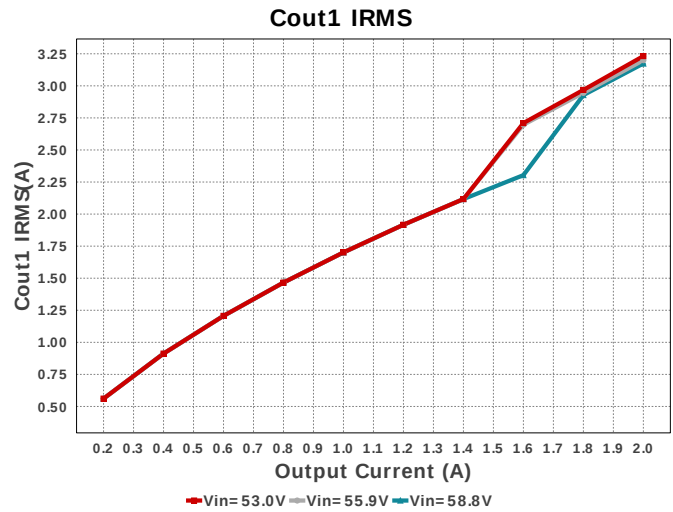
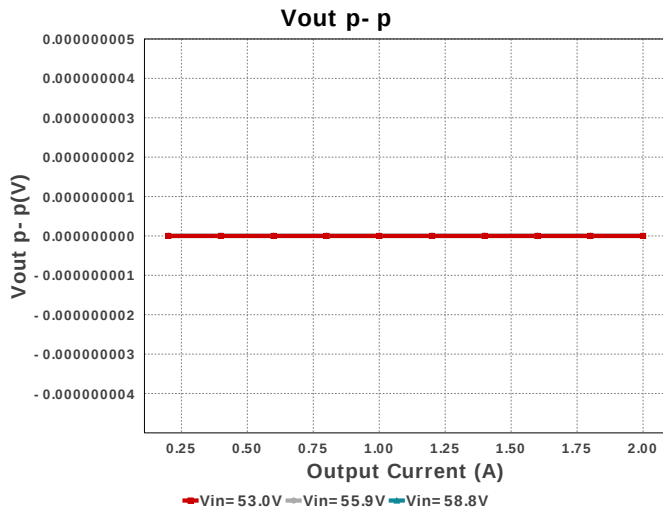
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9.	Cref	MuRata	GRM155R71C104KA88D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm²
10.	Csnub	MuRata	GRM31CR72E473KW03L Series= X7R	Cap= 47.0 nF ESR= 1.0 mOhm VDC= 250.0 V IRMS= 0.0 A	1	\$0.20	 1206 11 mm²
11.	Ct	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
12.	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 mm²
13.	D21	ON Semiconductor	SS26T3G	VF@Io= 630.0 mV VRRM= 60.0 V	1	\$0.09	 SMB 44 mm²
14.	Daux	Fairchild Semiconductor	SS26FL	VF@Io= 700.0 mV VRRM= 60.0 V	1	\$0.10	 SOD-123F 12 mm²
15.	Dsec	ON Semiconductor	MBRB40250TG	VF@Io= 860.0 mV VRRM= 250.0 V	1	\$0.94	 DDPAK 210 mm²
16.	Dsec2	ON Semiconductor	MBRB40250TG	VF@Io= 860.0 mV VRRM= 250.0 V	1	\$0.94	 DDPAK 210 mm²
17.	Dsnub	SMC Diode Solutions	ST1300ATR	VF@Io= 1.1 V VRRM= 300.0 V	1	\$0.07	 SMA 37 mm²
18.	Dz	Diodes Inc.	MMSZ5250B-7-F	Zener	1	\$0.04	 SOD-123 13 mm²
19.	M1	NA	IdealFET	VdsMax= 256.0 V IdsMax= 10.0 Amps	1	NA	NA 0 mm²
20.	O1	Fairchild Semiconductor	FOD817A	Optocoupler	1	\$0.13	 DIP-4 71 mm²
21.	Q1	Nexperia	MMBTA42	Bipolar Transistor	1	\$0.05	 SOT-23 14 mm²
22.	Qsc	STMicroelectronics	2N2222A	Bipolar Transistor	1	\$1.12	 TO-18 57 mm²
23.	R11	Yageo	RC0201FR-0710KL Series= ?	Res= 10000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm²
24.	R12	Vishay-Dale	CRCW04021K65FKED Series= CRCW..e3	Res= 1650.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
25.	R13	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4990.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
26.	R21	Yageo	RC0201FR-0710KL Series= ?	Res= 10000.0Ohm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm²

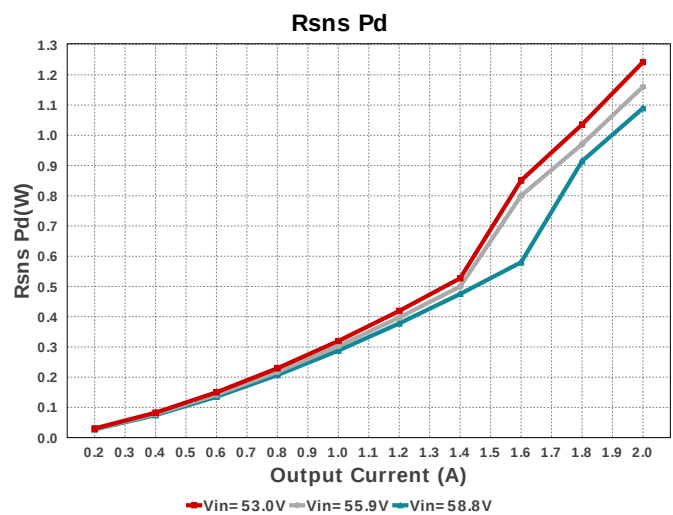
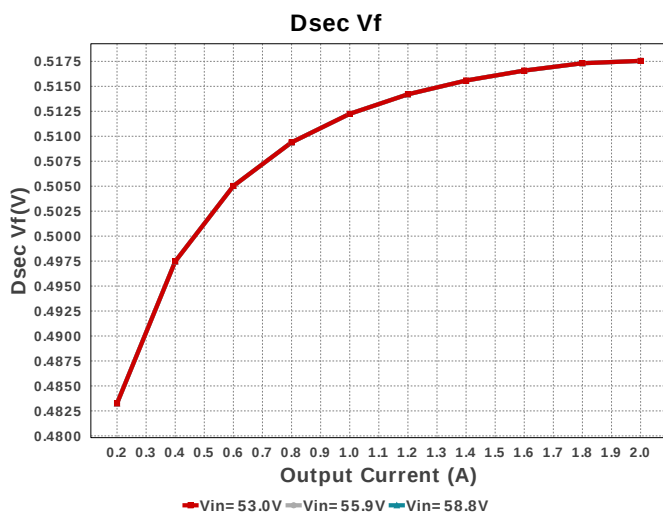
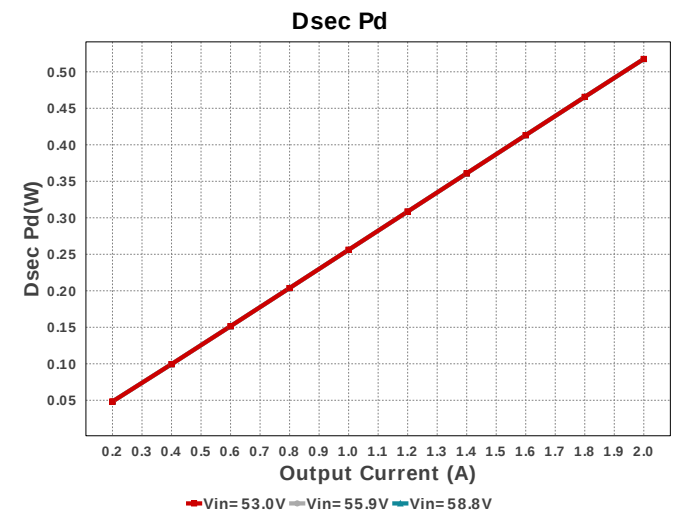
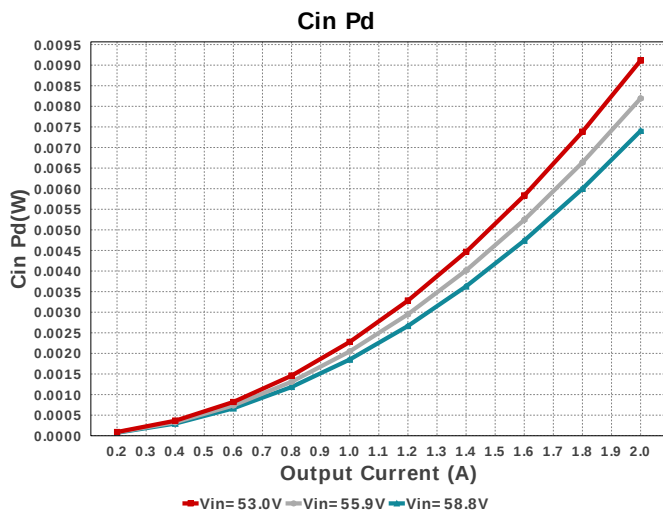
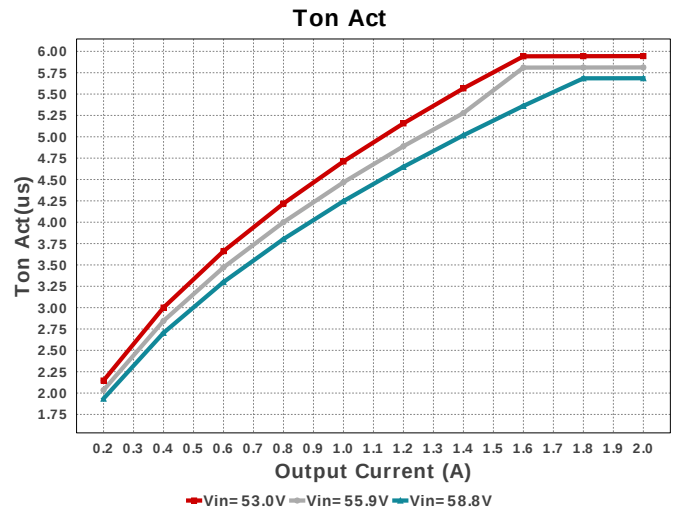
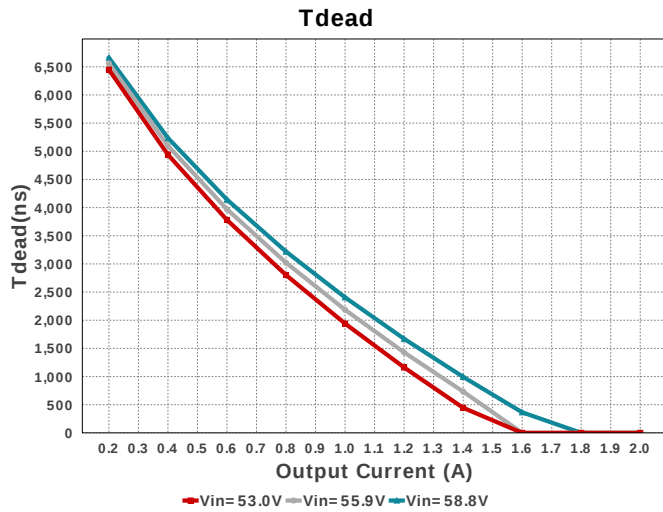
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27.	R22	Vishay-Dale	CRCW04022M26FKED Series= CRCW..e3	Res= 2260000.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
28.	Raux	Vishay-Dale	CRCW080510R0FKEA Series= CRCW..e3	Res= 10.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
29.	Rbias	Vishay-Dale	CRCW080513K7FKEA Series= CRCW..e3	Res= 13700.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
30.	Rcs	Vishay-Dale	CRCW0402976RFKED Series= CRCW..e3	Res= 976.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
31.	Rdrv	Vishay-Dale	CRCW04027R87FKED Series= CRCW..e3	Res= 7.87Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
32.	Rfbb	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4990.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
33.	Rfbt	Vishay-Dale	CRCW0805107KFKEA Series= CRCW..e3	Res= 107000.0Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
34.	Rled	Vishay-Dale	CRCW04024K64FKED Series= CRCW..e3	Res= 4640.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
35.	Rsc	Vishay-Dale	CRCW04023K32FKED Series= CRCW..e3	Res= 3320.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
36.	Rsns	CUSTOM	CUSTOM Series= ?	Res= 0.09628189164045477Ohm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm ²
37.	Rsub1	CUSTOM	CUSTOM Series= ?	Res= 5650.328725184523Ohm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm ²
38.	Rsub2	CUSTOM	CUSTOM Series= ?	Res= 5650.328725184523Ohm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm ²
39.	Rstartup1	Vishay-Dale	CRCW120616K2FKEA Series= CRCW..e3	Res= 16200.0Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
40.	Rstartup2	Vishay-Dale	CRCW120616K2FKEA Series= CRCW..e3	Res= 16200.0Ohm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
41.	Rt	Vishay-Dale	CRCW040217K4FKED Series= CRCW..e3	Res= 17400.0Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
42.	Rz	Vishay-Dale	CRCW201020K0FKEF Series= CRCW..e3	Res= 20000.0Ohm Power= 750.0 mW Tolerance= 1.0%	1	\$0.04	 2010 32 mm ²
43.	T1	Core=TDK , CoilFormer=TDK	Core=B66423G0000X197 , CoilFormer=B66424W1012D001	Lp= 54.0 µH Turns Ratio(Nas)= 6:19 Turns Ratio(Nps)= 24:19 Npri= 24.0 Naux= 6.0 Naux= 19.0	1	\$1.25	 TDK_B66305 930 mm ²
44.	U1	Texas Instruments	UC2842AN	Switcher	1	\$0.62	 P0008A 116 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
45.	VR	Texas Instruments	TL431AIDBZR	Voltage References	1	\$0.08	 DBZ0003A 14 mm ²

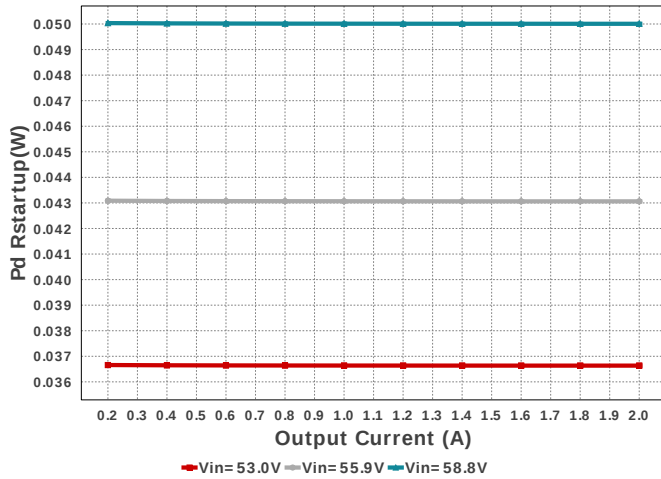




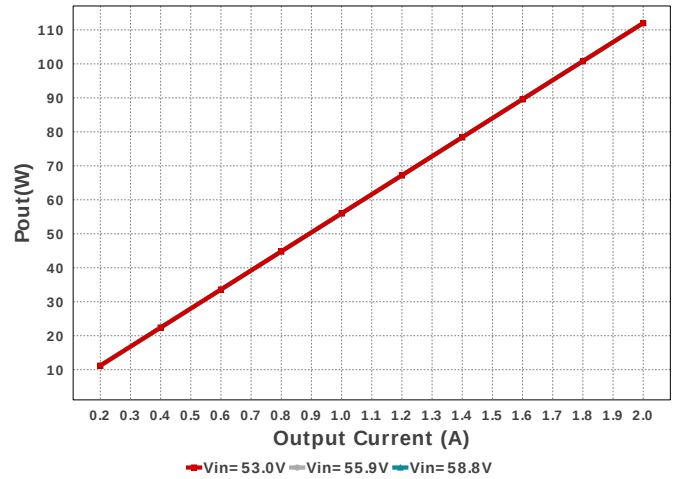




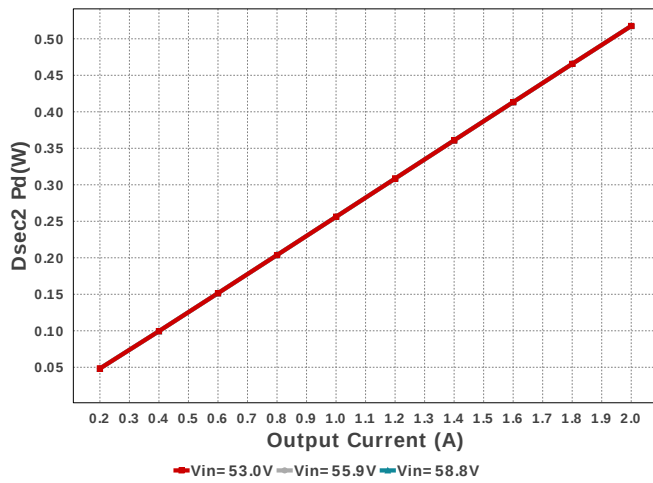
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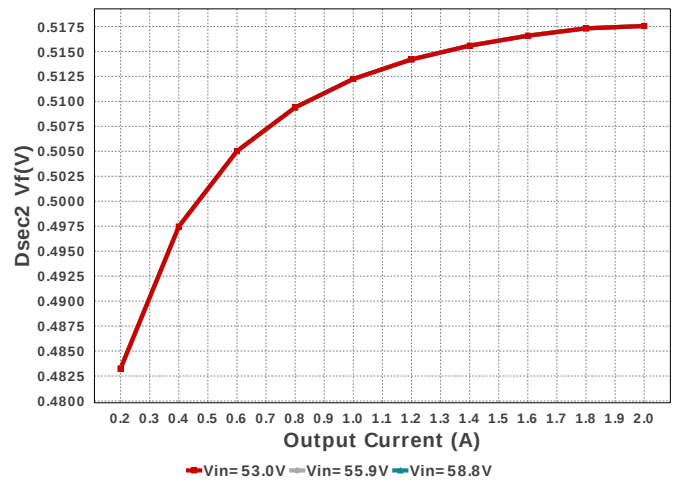
Pout



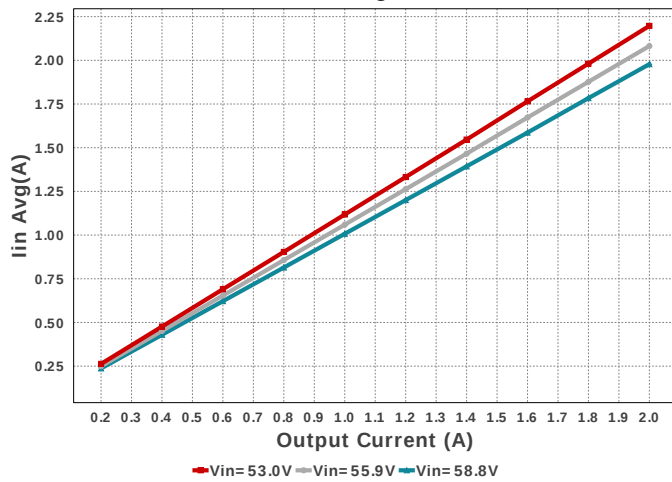
Dsec2 Pd



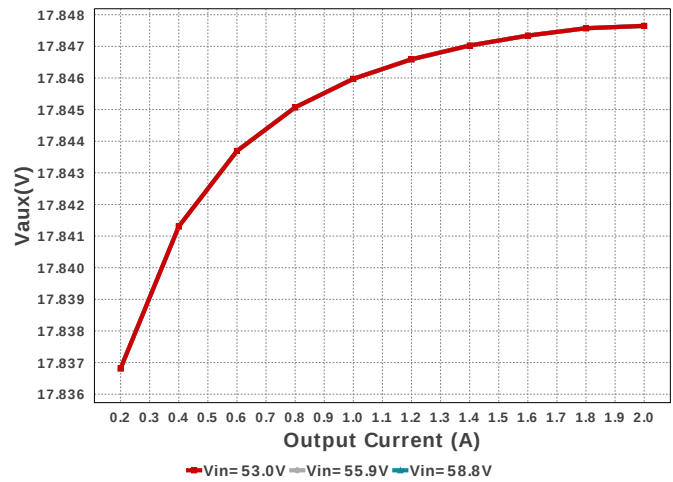
Dsec2 Vf

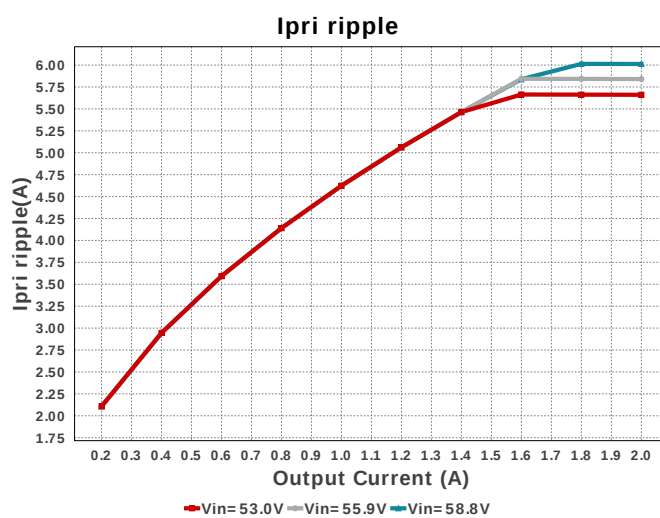
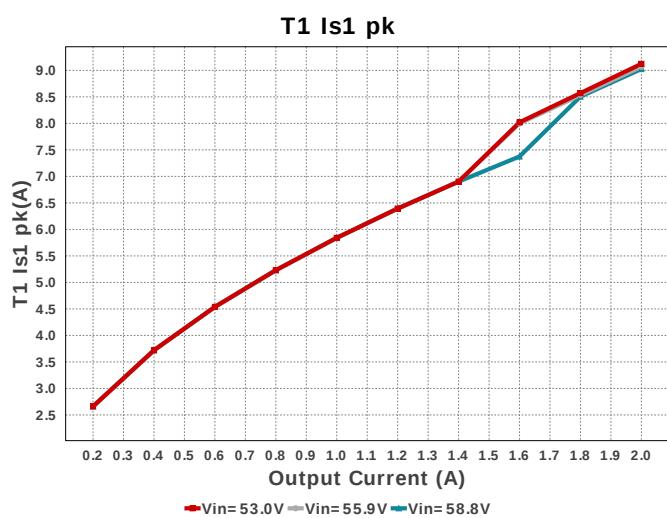
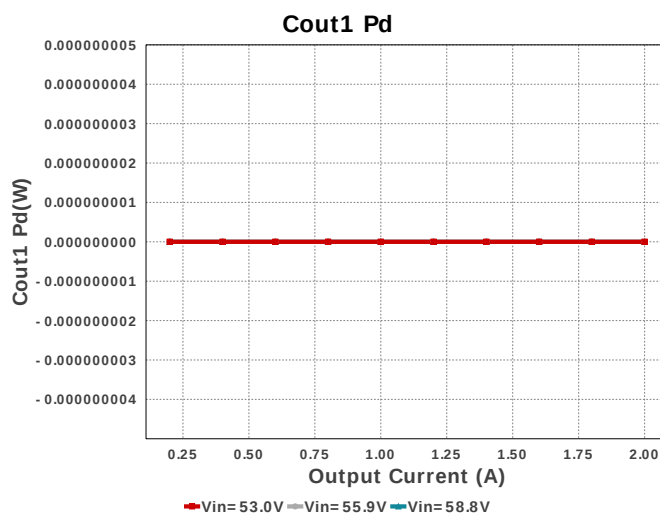
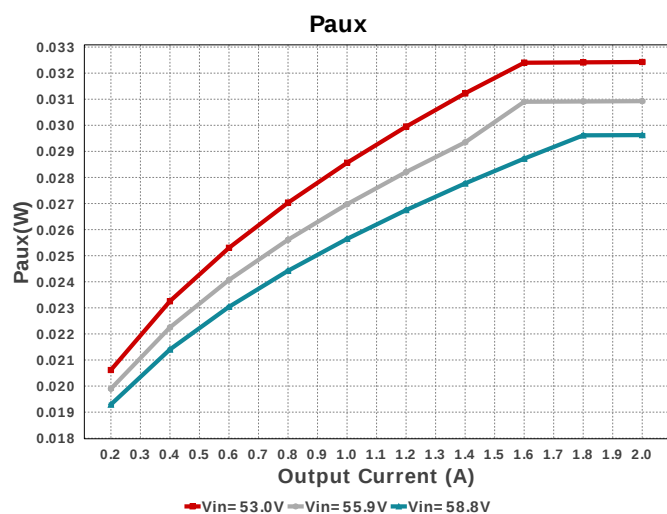
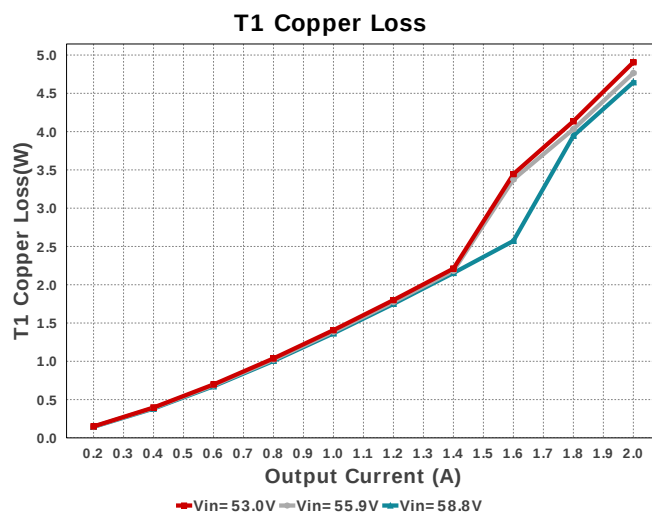
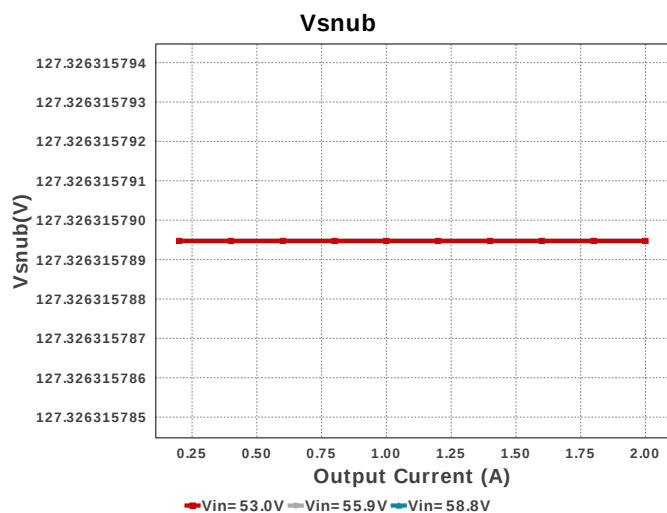


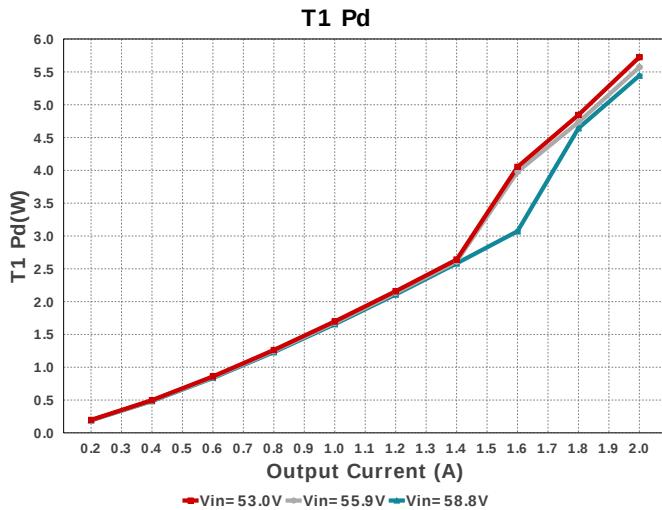
Iin Avg



Vaux







Operating Values

#	Name	Value	Category	Description
1.	Cin Pd	9.114 mW	Capacitor	Input capacitor power dissipation
2.	Cout1 IRMS	3.232 A	Capacitor	Output capacitor1 RMS ripple current
3.	Cout1 Pd	10.445 fW	Capacitor	Output capacitor1 power dissipation
4.	Daux trr	8.26 ns	Diode	Auxiliary Diode Reverse Recovery Time
5.	Dsec Pd	517.55 mW	Diode	Secondary Diode Power Dissipation
6.	Dsec Vf	517.55 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	517.55 mW	Diode	Secondary Diode Power Dissipation
9.	Dsec2 Vf	517.55 mV	Diode	Effective Forward Voltage Drop at the Operating Current
10.	Dsnub trr	35.0 ns	Diode	Snubber Diode Reverse Recovery Time
11.	ICThetaJA	110.0 degC/W	IC	IC junction-to-ambient thermal resistance
12.	Iin Avg	2.2 A	IC	Average input current
13.	Cin Pd	9.114 mW	Power	Input capacitor power dissipation
14.	Cout1 Pd	10.445 fW	Power	Output capacitor1 power dissipation
15.	Dsec Pd	517.55 mW	Power	Secondary Diode Power Dissipation
16.	Dsec2 Pd	517.55 mW	Power	Secondary Diode Power Dissipation
17.	Paux	32.428 mW	Power	Power Dissipation in Raux and Daux
18.	Pd Rstartup	36.635 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
19.	Rfb Pd	28.003 mW	Power	Rfb Power Dissipation
20.	Rsns Pd	1.242 W	Power	Current Limit Sense Resistor Power Dissipation
21.	Snubber Pd	1.445 W	Power	Snubber Power Dissipation
22.	T1 Copper Loss	4.778 W	Power	Transformer Copper Loss Power Dissipation
23.	T1 Core Loss	794.0 mW	Power	Transformer Core Loss Power Dissipation
24.	T1 Pd	5.572 W	Power	Estimated Losses in Transformer
25.	Pd Rstartup	36.635 mW	Resistor	Power Dissipation in Rstartup1 and Rstartup2
26.	Rfb Pd	28.003 mW	Resistor	Rfb Power Dissipation
27.	Rsns Pd	1.242 W	Resistor	Current Limit Sense Resistor Power Dissipation
28.	BOM Count	45	System Information	Total Design BOM count
29.	Duty Cycle	58.761 %	System Information	Duty cycle
30.	FootPrint	2.211 k mm ²	System Information	Total Foot Print Area of BOM components
31.	Frequency	98.851 kHz	System Information	Switching frequency
32.	Iout	2.0 A	System Information	Iout operating point
33.	Iout_DCM	1.464 A	System Information	Approximate Current below which DCM mode of operation will begin
34.	Mode	CCM	System Information	Conduction Mode
35.	Pout	112.0 W	System Information	Total output power
36.	Tdead	0.0 ns	System Information	Approximate Dead Time of the Regulator
37.	Toff	3.648 us	System Information	Approximate Converter Off Time
38.	Ton Act	5.944 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	53.0 V	System Information	Vin operating point
42.	Vout	56.0 V	System Information	Operational Output Voltage
43.	Vout Actual	55.995 V	System Information	Vout Actual calculated based on selected voltage divider resistors
44.	Vout Tolerance	2.257 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
45.	Vout p-p	7.151 fV	System Information	Peak-to-peak output ripple voltage
46.	Vout pp percentage	12.77 f%	System Information	Output Voltage ripple percentage
47.	Vsnub	127.326 V	System Information	Voltage Across the Snubber
48.	Ipri Avg	2.58 A	Transformer	Average Current in Primary Winding over the complete Switching Period
49.	Ipri ripple	5.661 A	Transformer	Ripple Current in the Primary Winding
50.	Ipri ripple pk-pk percentage	128.92 %	Transformer	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
51.	Isec Ripple	7.151 A	Transformer	Ripple Current in the Secondary Winding
52.	Paux	32.428 mW	Transformer	Power Dissipation in Raux and Daux
53.	T1 Copper Loss	4.778 W	Transformer	Transformer Copper Loss Power Dissipation
54.	T1 Core Loss	794.0 mW	Transformer	Transformer Core Loss Power Dissipation
55.	T1 Iprim RMS	3.592 A	Transformer	Transformer Primary RMS Current
56.	T1 Iprim pk	7.222 A	Transformer	Transformer Primary Peak Current
57.	T1 Is1 RMS	3.801 A	Transformer	Transformer Secondary1 RMS Current
58.	T1 Is1 pk	9.122 A	Transformer	Transformer Secondary1 Peak Current
59.	T1 Pd	5.572 W	Transformer	Estimated Losses in Transformer
60.	Vaux	17.848 V	Transformer	Auxiliary Voltage

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	58.8	Maximum input voltage
3.	VinMin	53.0	Minimum input voltage
4.	Vout	56.0	Output Voltage
5.	base_pn	UC2842A	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **UC2842A** Product Folder : <http://www.ti.com/product/UC2842A> : contains the data sheet and other resources.

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