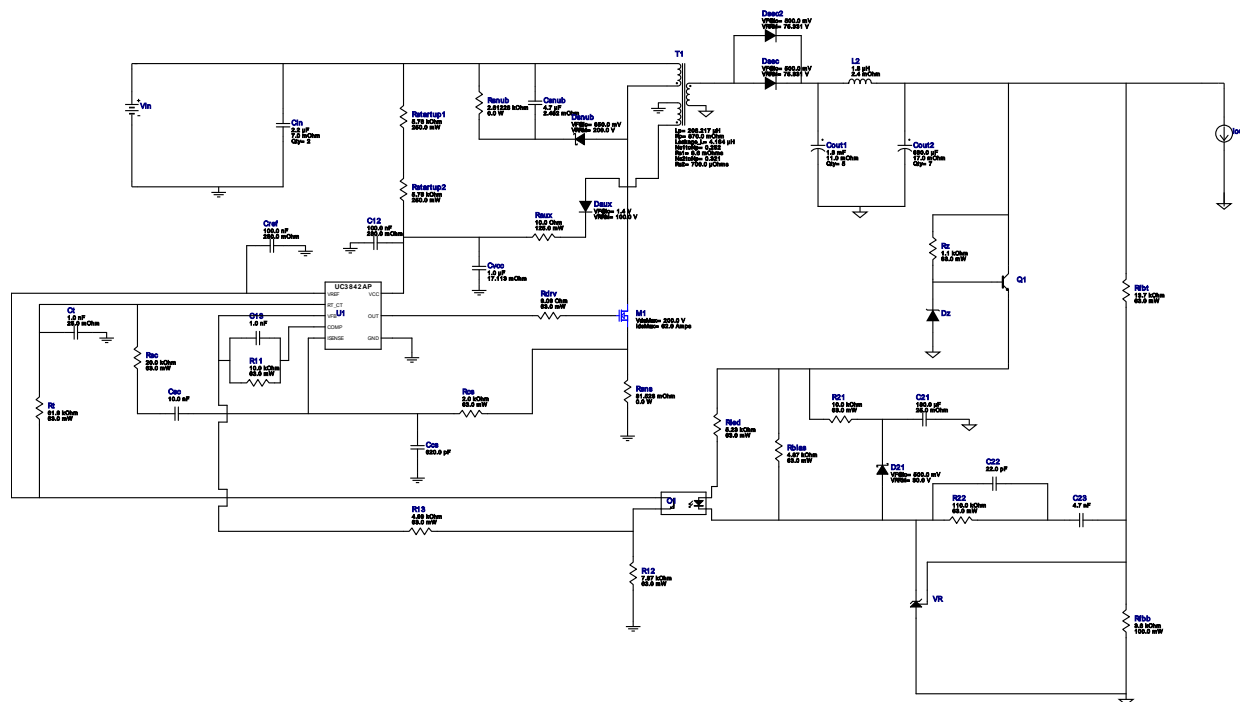
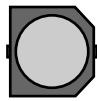


WEBENCH® Design Report


















Design : 4058737/180 UC3842AN
UC3842AN 36.0V-72.0V to 12.00V @ 10.0A

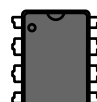



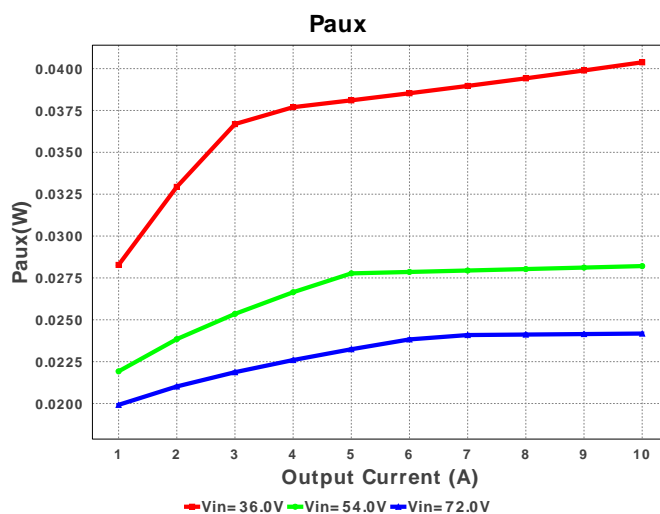
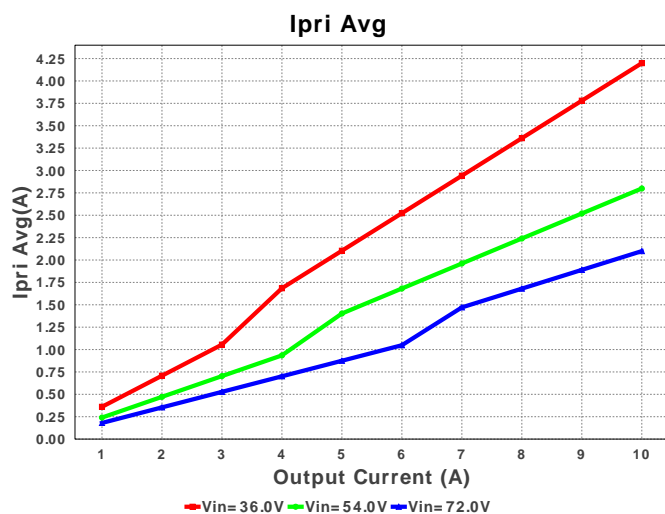
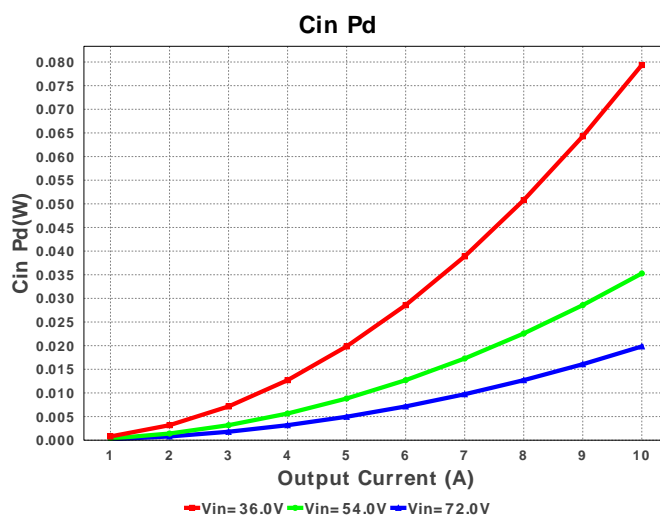
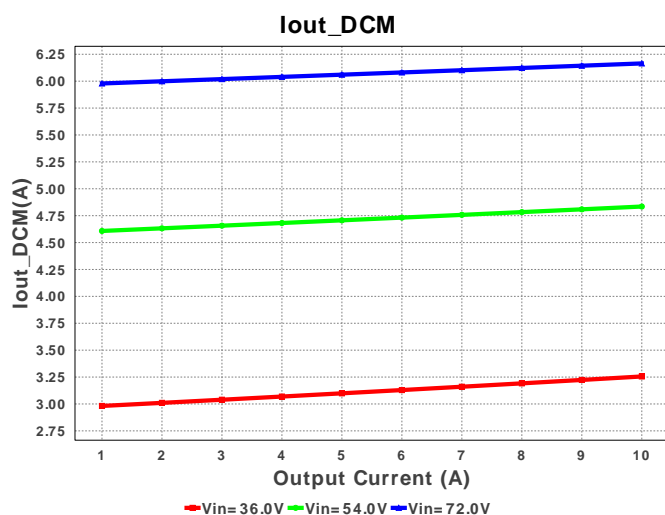
Electrical BOM

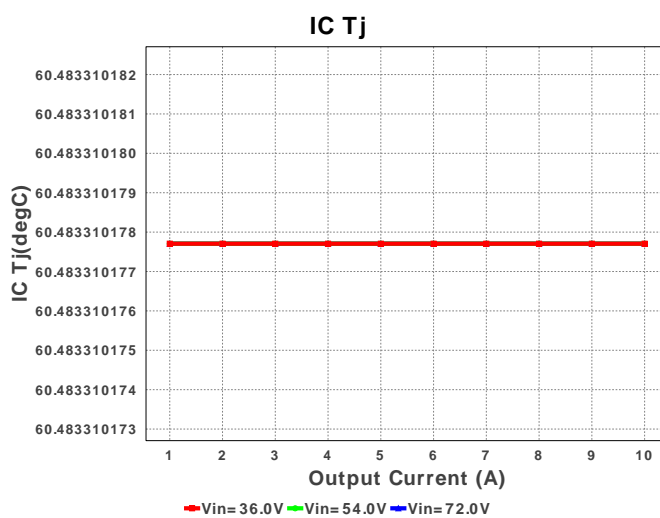
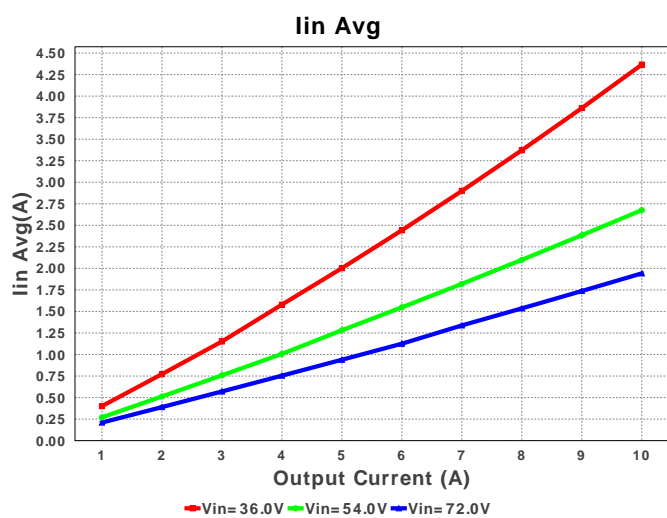
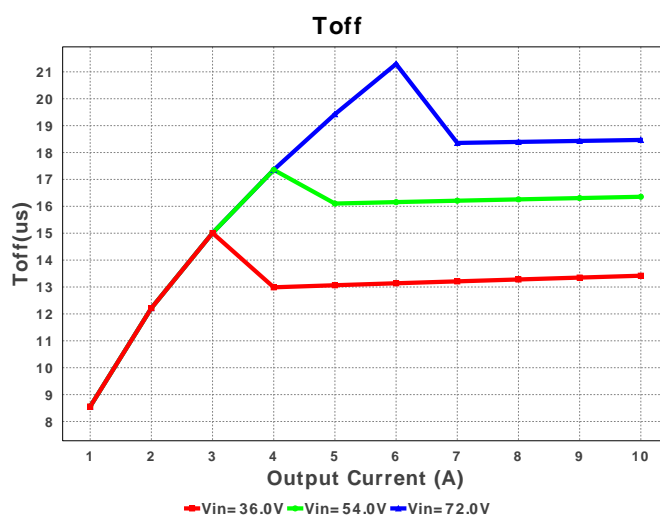
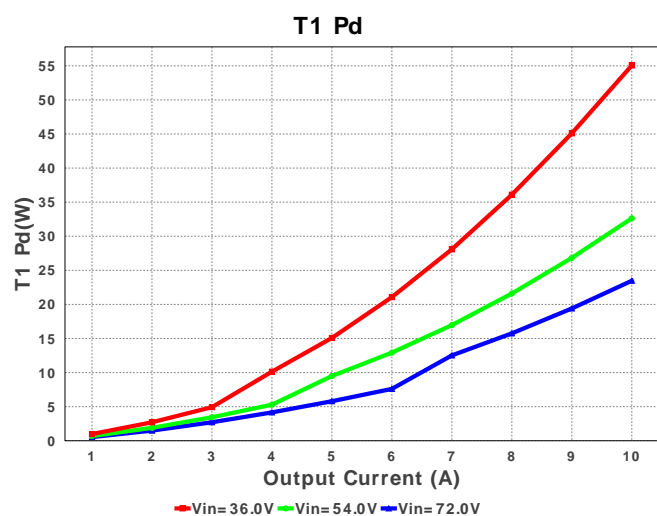
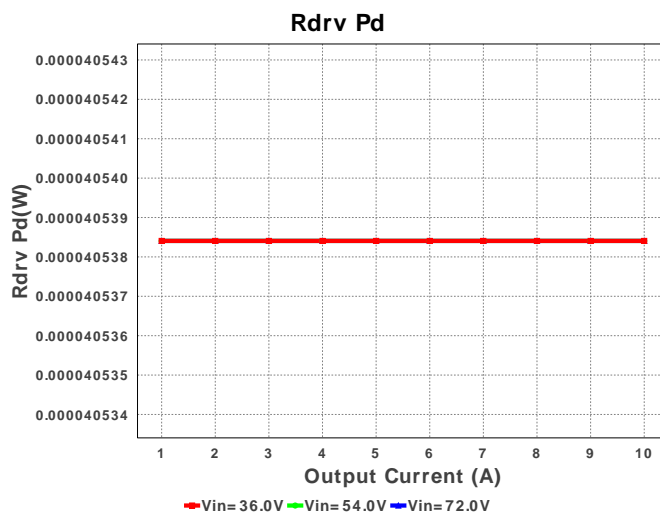
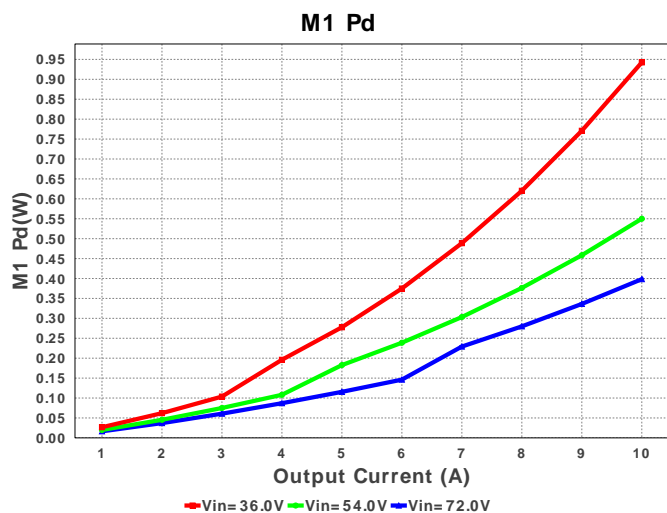
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	C12	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
2.	C13	Samsung Electro-Mechanics	CL21C102JBCNFNC Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
3.	C21	Panasonic	20SVPF180M Series= ?	Cap= 180.0 uF ESR= 25.0 mOhm VDC= 20.0 V IRMS= 3.2 A	1	\$0.50	 CAPSMT_62_E7 106 mm ²
4.	C22	Kemet	C0805C220K3GACTU Series= C0G/NP0	Cap= 22.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
5.	C23	Yageo America	CC0805KRX7R9BB472 Series= X7R	Cap= 4.7 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
6.	Ccs	Samsung Electro-Mechanics	CL21C621JBCNNNC Series= C0G/NP0	Cap= 620.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
7.	Cin	MuRata	GRM32ER72A225KA35L Series= X7R	Cap= 2.2 uF ESR= 7.0 mOhm VDC= 100.0 V IRMS= 4.4 A	2	\$0.17	1210 15 mm ²

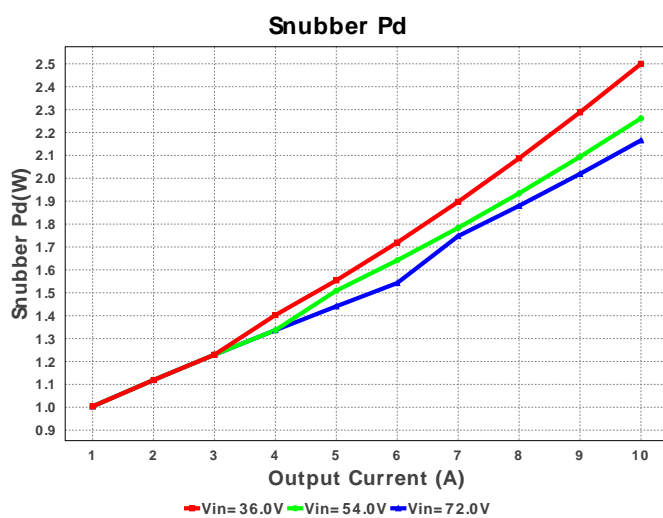
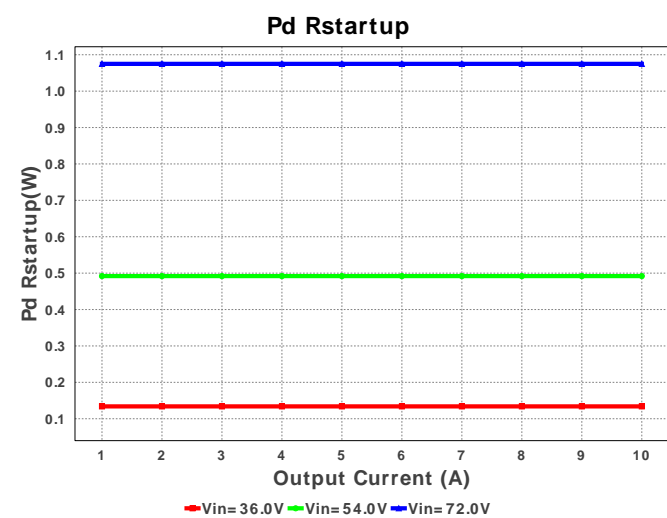
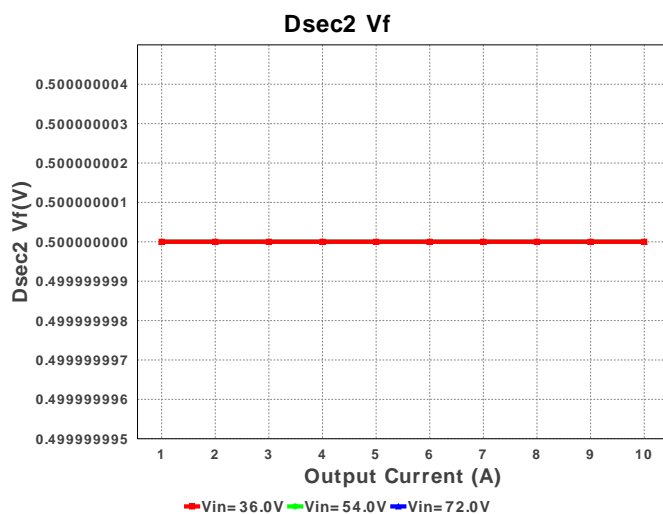
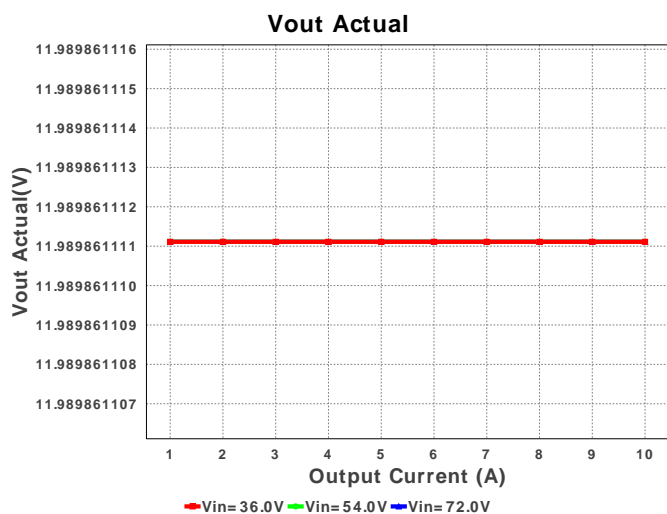
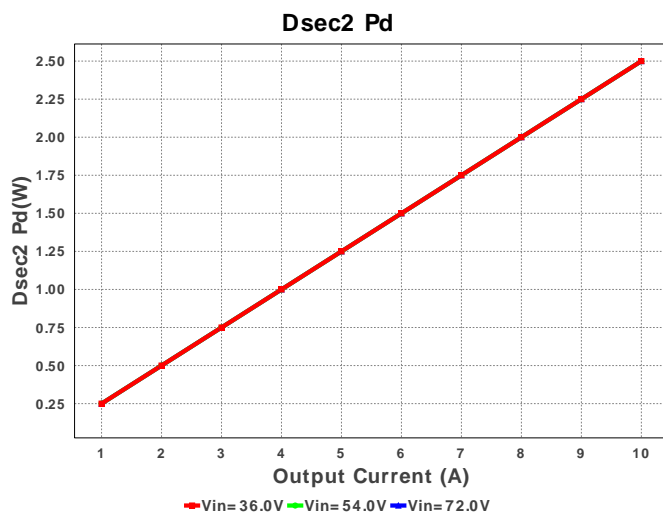
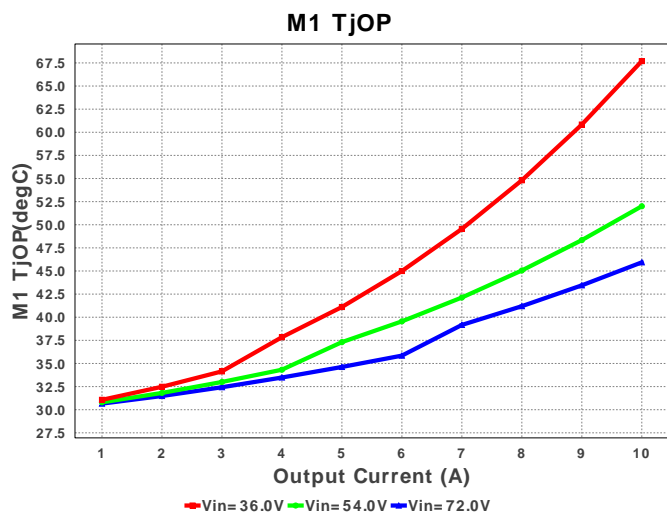
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8.	Cout1	Nichicon	UHV1V182MHD Series= HV	Cap= 1.8 mF ESR= 11.0 mOhm VDC= 35.0 V IRMS= 3.925 A	5	NA	 CAPPR5-12.5X25 210 mm ²
9.	Cout2	Nichicon	UHV1V681MPD Series= HV	Cap= 680.0 uF ESR= 17.0 mOhm VDC= 35.0 V IRMS= 2.475 A	7	NA	CAPPR7 144 mm ²
10.	Cref	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
11.	Csc	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
12.	Csnub	TDK	C5750X5R2A475K Series= X5R	Cap= 4.7 uF ESR= 2.482 mOhm VDC= 100.0 V IRMS= 0.0 A	1	\$0.37	 2220 54 mm ²
13.	Ct	Kemet	C0805C102J5GACTU Series= C0G/NP0	Cap= 1.0 nF ESR= 25.0 mOhm VDC= 50.0 V IRMS= 1.71 A	1	\$0.01	 0805 7 mm ²
14.	Cvcc	MuRata	GRM188R61E105KA12D Series= X5R	Cap= 1.0 uF ESR= 17.113 mOhm VDC= 25.0 V IRMS= 979.39 mA	1	\$0.01	 0603 5 mm ²
15.	D21	Diodes Inc.	B230A-13-F	VF@Io= 500.0 mV VRRM= 30.0 V	1	\$0.09	 SMA 37 mm ²
16.	Daux	NXP Semiconductor	BAS316,115	VF@Io= 1.4 V VRRM= 100.0 V	1	\$0.02	 SOD-323 9 mm ²
17.	Dsec	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 75.331 V	1	NA	CUSTOM 0 mm ²
18.	Dsec2	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 75.331 V	1	NA	CUSTOM 0 mm ²
19.	Dsnub	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	\$0.21	 PowerDI123 13 mm ²
20.	Dz	ON Semiconductor	BZX84C9V1LT1G	Zener	1	\$0.02	 SOT-23 14 mm ²
21.	L2	Coilcraft	SER1360-182KLB	L= 1.8 uH DCR= 2.4 mOhm	1	\$0.72	 SER1360 225 mm ²
22.	M1	Fairchild Semiconductor	FDB2614	VdsMax= 200.0 V IdsMax= 62.0 Amps	1	\$2.01	 DDPAK 210 mm ²
23.	O1	Vishay-Semiconductor	TCMT1107	Optocoupler	1	\$0.21	 SOP-4 44 mm ²
24.	Q1	ON Semiconductor	BC846BLT1G	Bipolar Transistor	1	\$0.02	 SOT-23 14 mm ²

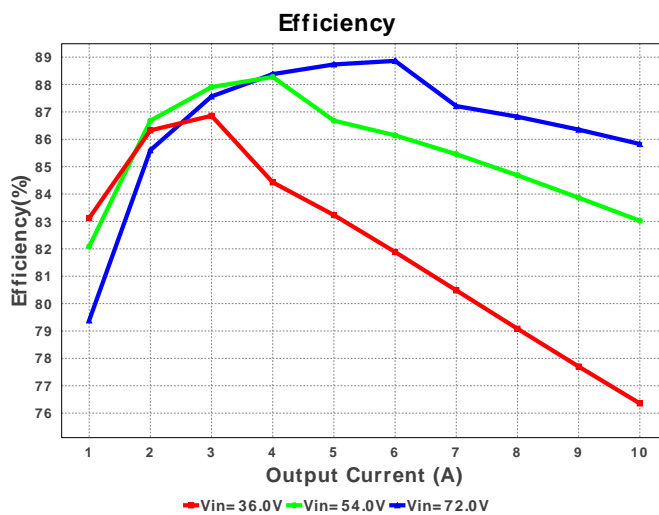
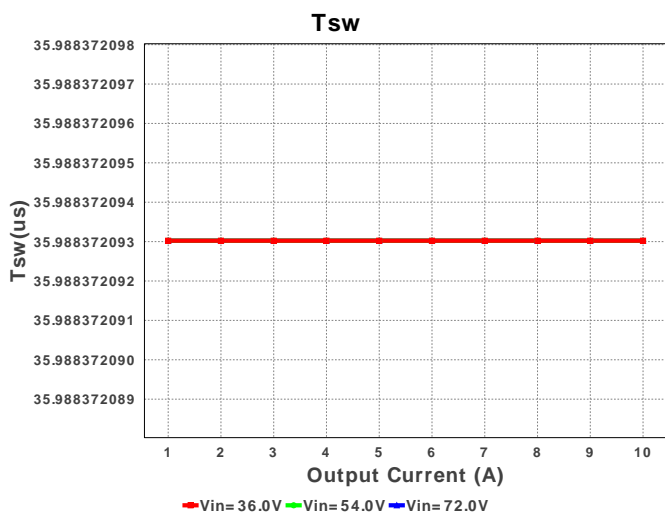
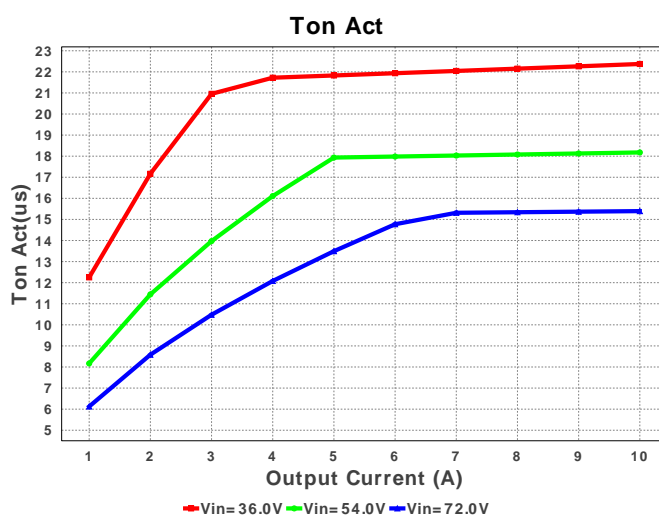
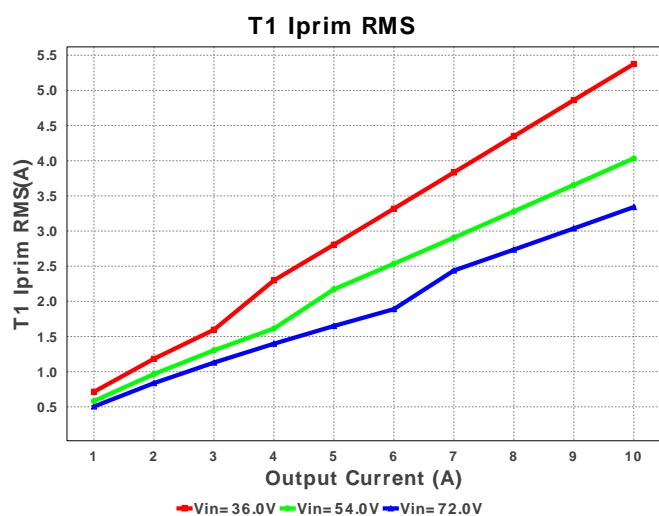
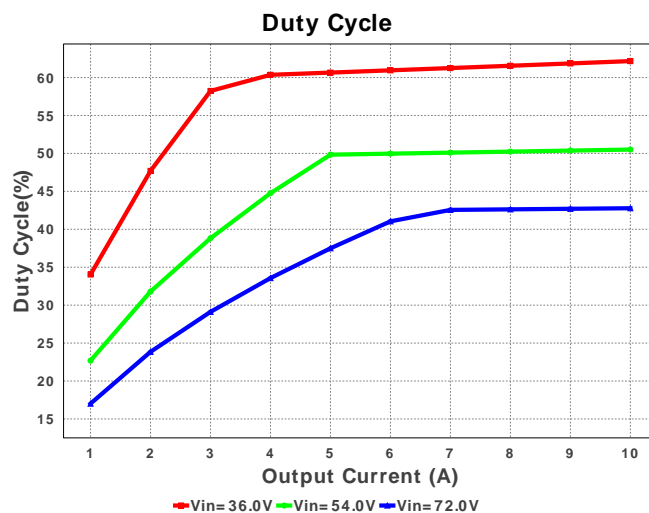
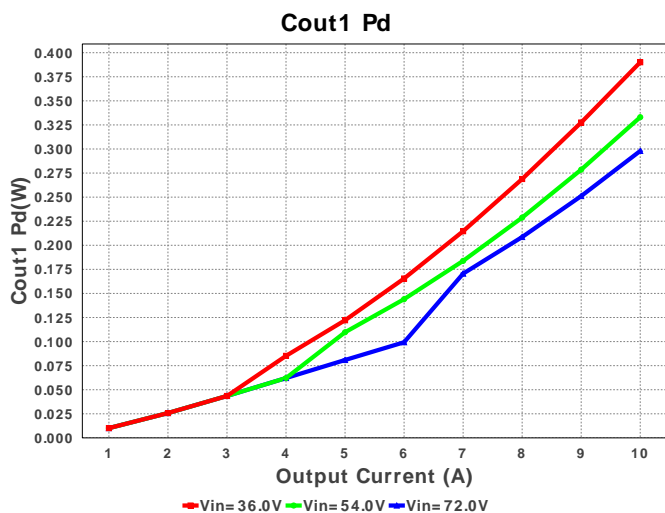
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
25.	R11	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
26.	R12	Vishay-Dale	CRCW04027K87FKED Series= CRCW..e3	Res= 7.87 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
27.	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
28.	R21	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
29.	R22	Vishay-Dale	CRCW0402110KFKED Series= CRCW..e3	Res= 110.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
30.	Raux	Vishay-Dale	CRCW080510R0FKEA Series= CRCW..e3	Res= 10.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
31.	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
32.	Rcs	Vishay-Dale	CRCW04022K00FKED Series= CRCW..e3	Res= 2.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
33.	Rdrv	Vishay-Dale	CRCW04029R09FKED Series= CRCW..e3	Res= 9.09 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
34.	Rfbb	Yageo America	RC0603FR-073K6L Series= ?	Res= 3.6 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
35.	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
36.	Rled	Vishay-Dale	CRCW04025K23FKED Series= CRCW..e3	Res= 5.23 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
37.	Rsc	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
38.	Rsns	CUSTOM	CUSTOM Series= ?	Res= 81.528 mOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm ²
39.	Rsnub	CUSTOM	CUSTOM Series= ?	Res= 2.61228 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm ²
40.	Rstartup1	Panasonic	ERJ-8ENF5761V Series= ERJ-8E	Res= 5.76 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
41.	Rstartup2	Panasonic	ERJ-8ENF5761V Series= ERJ-8E	Res= 5.76 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
42.	Rt	Vishay-Dale	CRCW040261K9FKED Series= CRCW..e3	Res= 61.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
43.	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

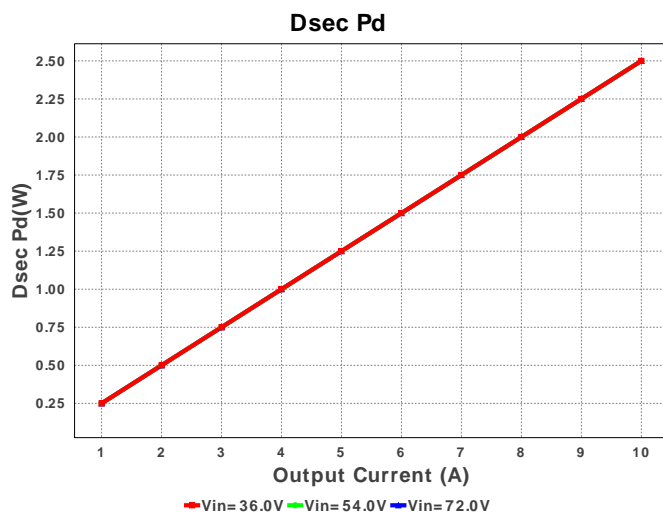
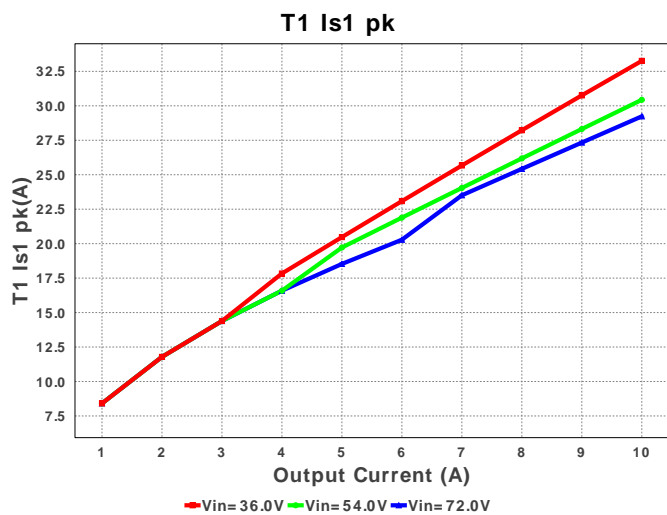
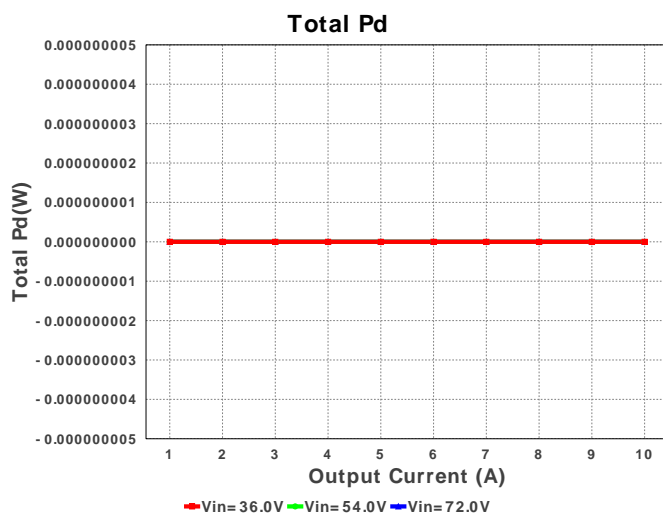
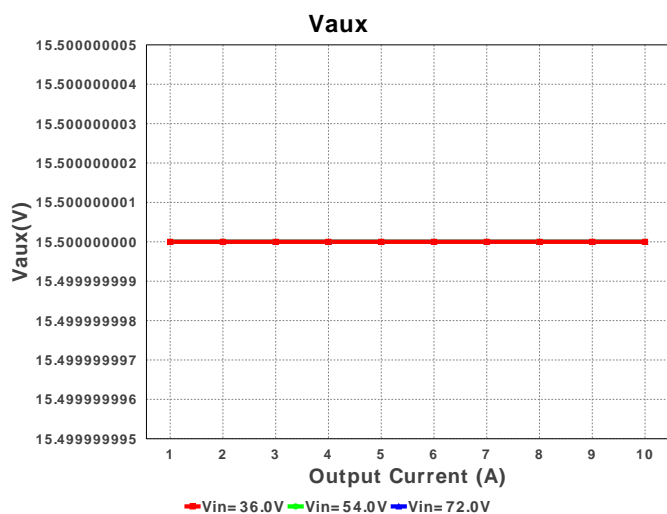
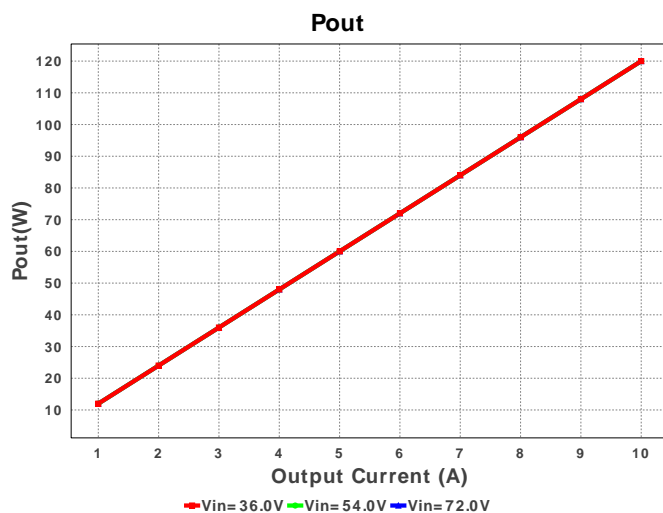
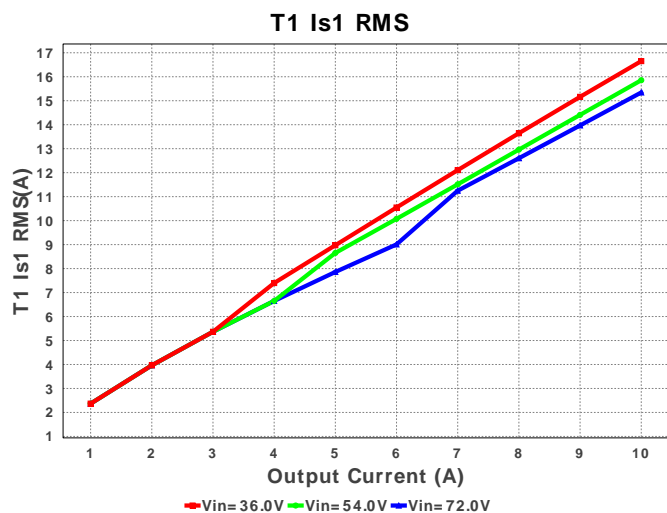
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
44.	T1	CUSTOM	CUSTOM	Lp= 208.217 μ H Rp= 870.0 mOhm Leakage_L= 4.164 μ H Ns1toNp= 0.252 Rs1= 8.6 mOhms Ns2toNp= 0.321 Rs2= 700.0 μ Ohms	1	NA	CUSTOM 0 mm ²
45.	U1	Texas Instruments	UC3842AN	Switcher	1	\$0.56	 P0008A 116 mm ²
46.	VR	Texas Instruments	TL431AIDBVR	Voltage References	1	\$0.07	 R-PDSO-G3 16 mm ²

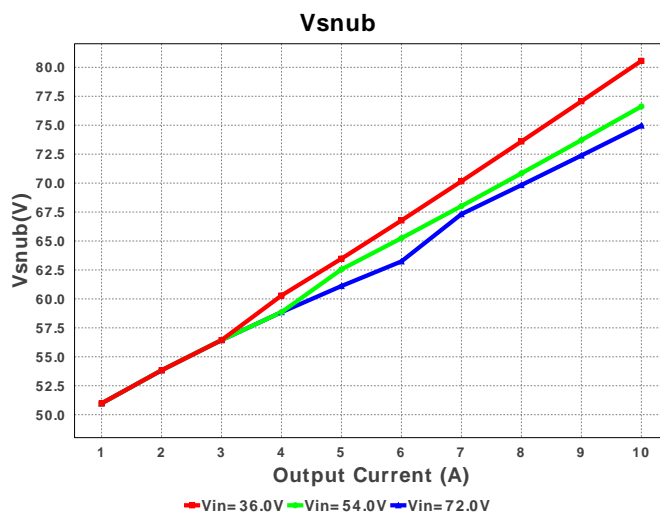
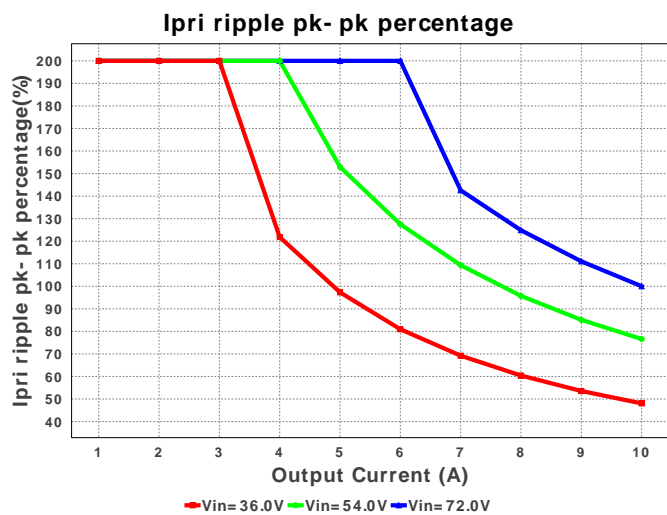
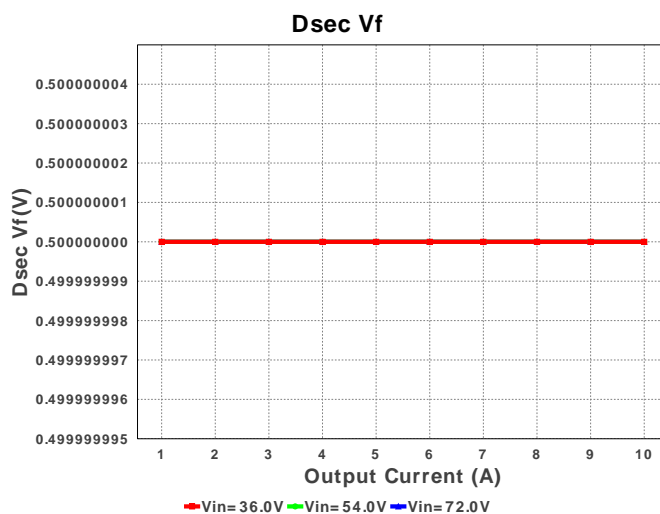
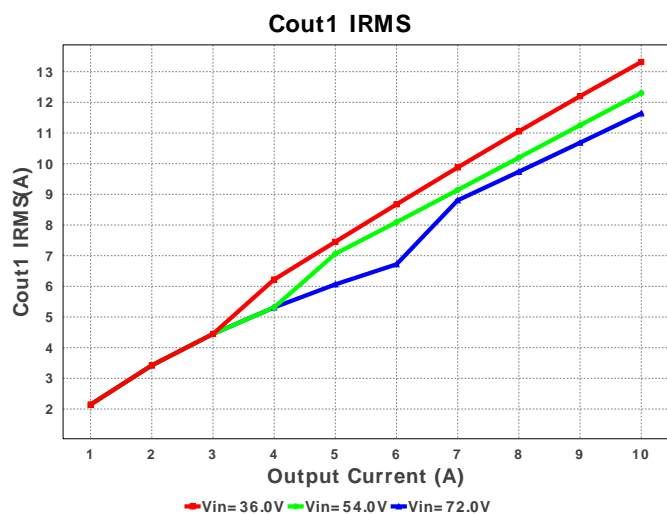
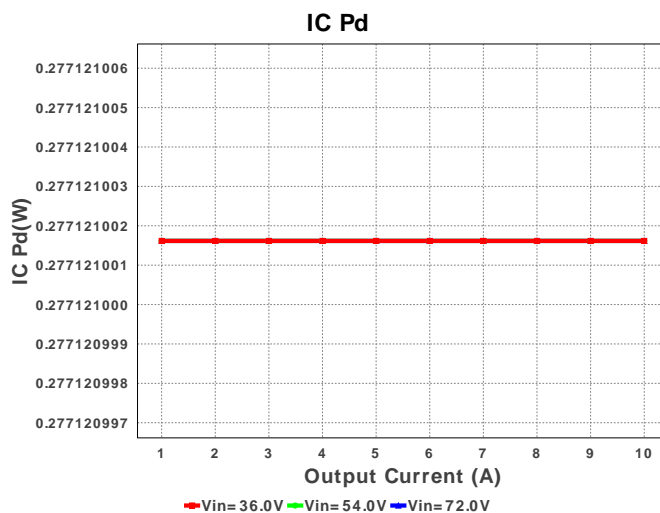
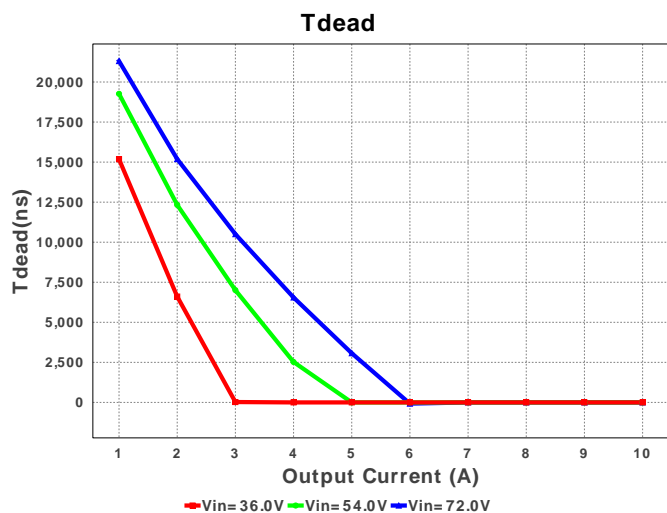


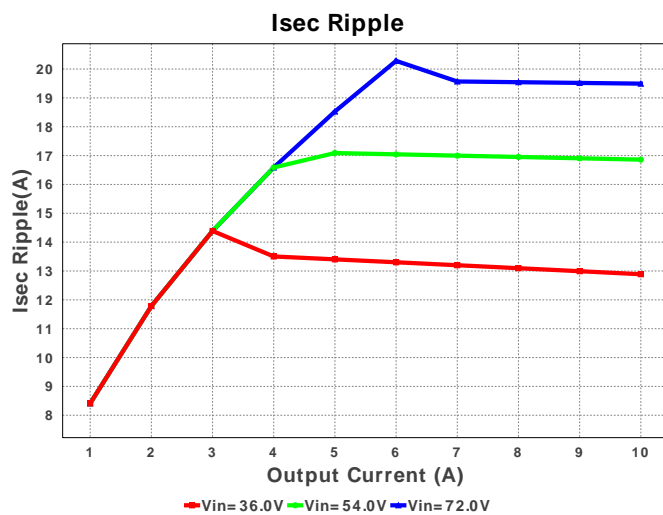
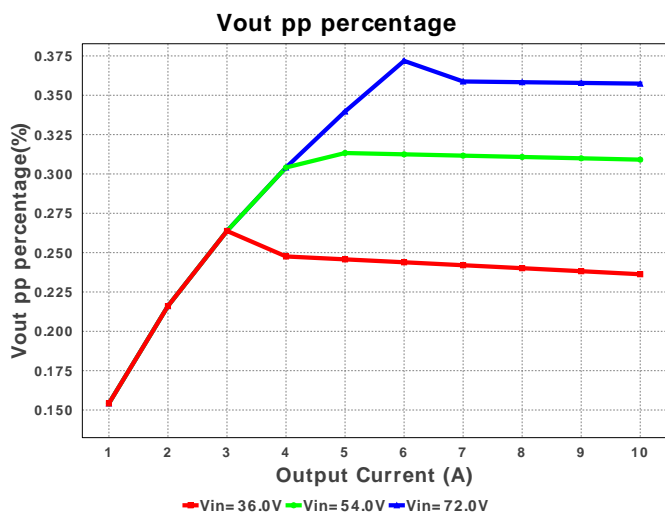
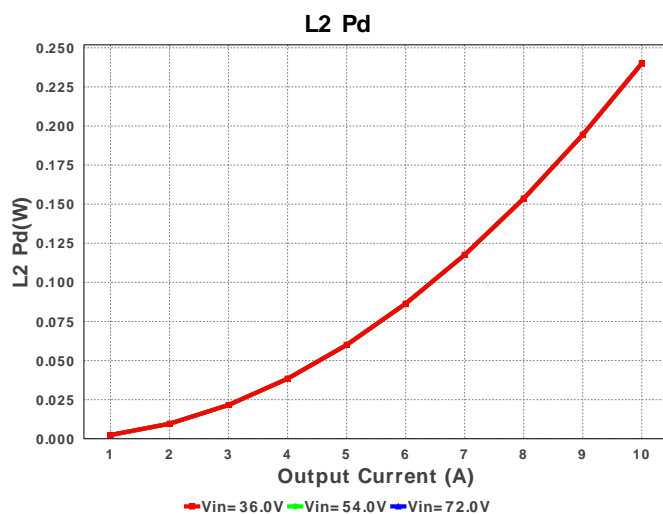
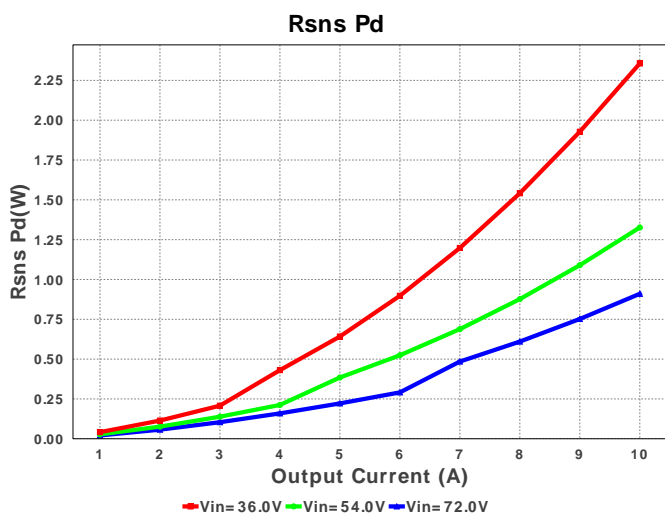
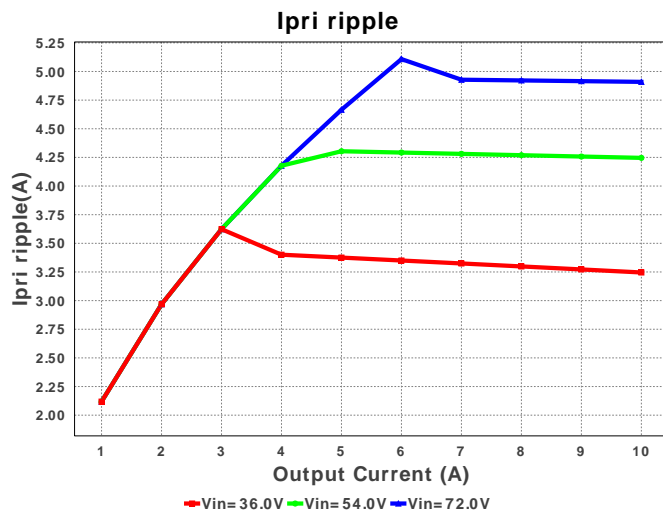
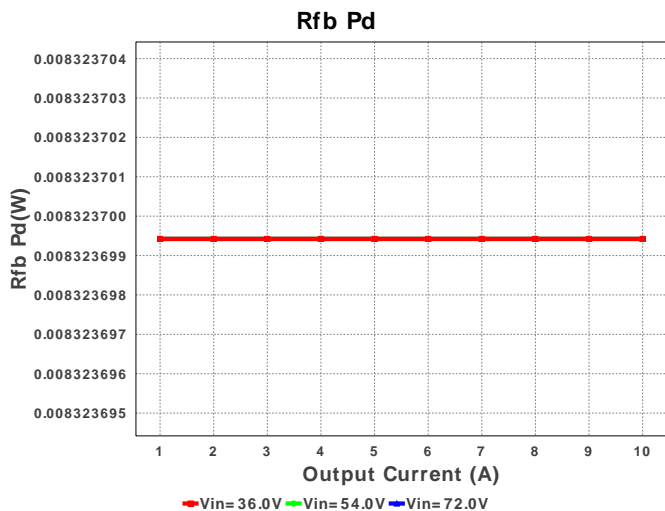


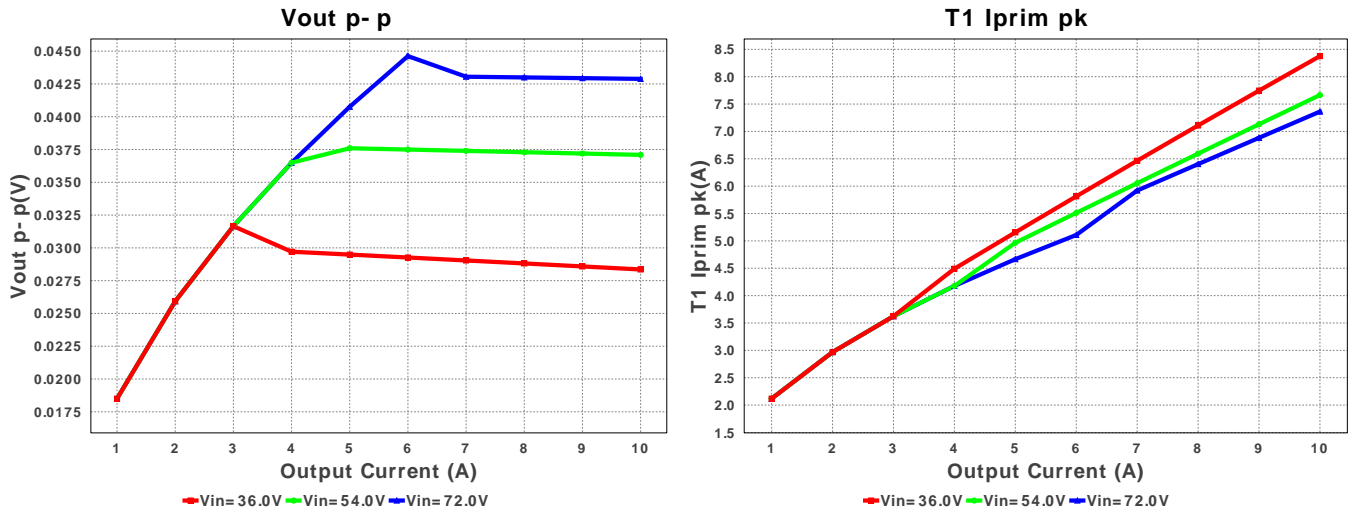












Operating Values

#	Name	Value	Category	Description
1.	Cout1 IRMS	13.317 A	Current	Output capacitor1 RMS ripple current
2.	Iin Avg	4.365 A	Current	Average input current
3.	Iout_DCM	3.256 A	Current	Approximate Current below which DCM mode of operation will begin
4.	Ipri Avg	4.199 A	Current	Average Current in Primary Winding over the complete Switching Period
5.	Ipri ripple	3.246 A	Current	Ripple Current in the Primary Winding
6.	Ipri ripple pk-pk percentage	48.054 %	Current	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
7.	Isec Ripple	12.887 A	Current	Ripple Current in the Secondary Winding
8.	T1 lprim RMS	5.376 A	Current	Transformer Primary RMS Current
9.	T1 lprim pk	8.377 A	Current	Transformer Primary Peak Current
10.	T1 Is1 RMS	16.653 A	Current	Transformer Secondary1 RMS Current
11.	T1 Is1 pk	33.262 A	Current	Transformer Secondary1 Peak Current
12.	BOM Count	57	General	Total Design BOM count
13.	Daux trr	4.0 ns	General	Auxiliary Diode Reverse Recovery Time
14.	Dsec Vf	500.0 mV	General	Effective Forward Voltage Drop at the Operating Current
15.	Dsec trr	60.0 ns	General	Output Diode Reverse Recovery Time
16.	Dsec2 Vf	500.0 mV	General	Effective Forward Voltage Drop at the Operating Current
17.	Dsnub trr	0.0 ns	General	Snubber Diode Reverse Recovery Time
18.	FootPrint	3.102 k mm ²	General	Total Foot Print Area of BOM components
19.	Frequency	27.787 kHz	General	Switching frequency
20.	Pout	120.0 W	General	Total output power
21.	Tdead	0.0 ns	General	Approximate Dead Time of the Regulator
22.	Toff	13.419 us	General	Approximate Converter Off Time
23.	Ton Act	22.373 us	General	Approximate Converter On Time
24.	Total BOM	\$0.0	General	Total BOM Cost
25.	Tsw	35.988 us	General	Switching Time Period
26.	Vaux	15.931 V	General	Auxiliary Voltage
27.	Vsnub	80.56 V	General	Voltage Across the Snubber
28.	Vout Actual	11.99 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
29.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
30.	Duty Cycle	62.168 %	Op_point	Duty cycle
31.	Efficiency	76.357 %	Op_point	Steady state efficiency
32.	IC Tj	61.683 degC	Op_point	IC junction temperature
33.	ICThetaJA	110.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
34.	IOUT_OP	10.0 A	Op_point	Iout operating point
35.	M1 TjOP	67.266 degC	Op_point	M1 MOSFET junction temperature
36.	Vout p-p	28.352 mV	Op_point	Peak-to-peak output ripple voltage
37.	Cin Pd	79.365 mW	Power	Input capacitor power dissipation
38.	Cout1 Pd	390.127 mW	Power	Output capacitor1 power dissipation
39.	Dsec Pd	2.5 W	Power	Secondary Diode Power Dissipation
40.	Dsec2 Pd	2.5 W	Power	Secondary Diode Power Dissipation
41.	IC Pd	288.029 mW	Power	IC power dissipation
42.	L2 Pd	240.0 mW	Power	Average Power Dissipation in the Inductor Over the AC Line Period
43.	M1 Pd	931.656 mW	Power	M1 MOSFET total power dissipation
44.	Paux	40.376 mW	Power	Power Dissipation in Raux and Daux
45.	Pd Rstartup	128.11 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
46.	Rdrv Pd	40.538 μW	Power	Power Dissipation in Gate Drive Resistor
47.	Rfb Pd	8.324 mW	Power	Rfb Power Dissipation
48.	Rsns Pd	2.357 W	Power	Current Limit Sense Resistor Power Dissipation
49.	Snubber Pd	2.5 W	Power	Snubber Power Dissipation
50.	T1 Pd	55.063 W	Power	Estimated Losses in Transformer

#	Name	Value	Category	Description
51.	Total Pd	0.0 W	Power	Total Power Dissipation
52.	Vout Tolerance	1.926 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
53.	Vout pp percentage	236.268 m%		Output Voltage ripple percentage

Design Inputs

#	Name	Value	Description
1.	Iout	10.0	Maximum Output Current
2.	VinMax	72.0	Maximum input voltage
3.	VinMin	36.0	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	UC3842A	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. UC3842A Product Folder : <http://www.ti.com/product/UC3842A> : contains the data sheet and other resources.

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