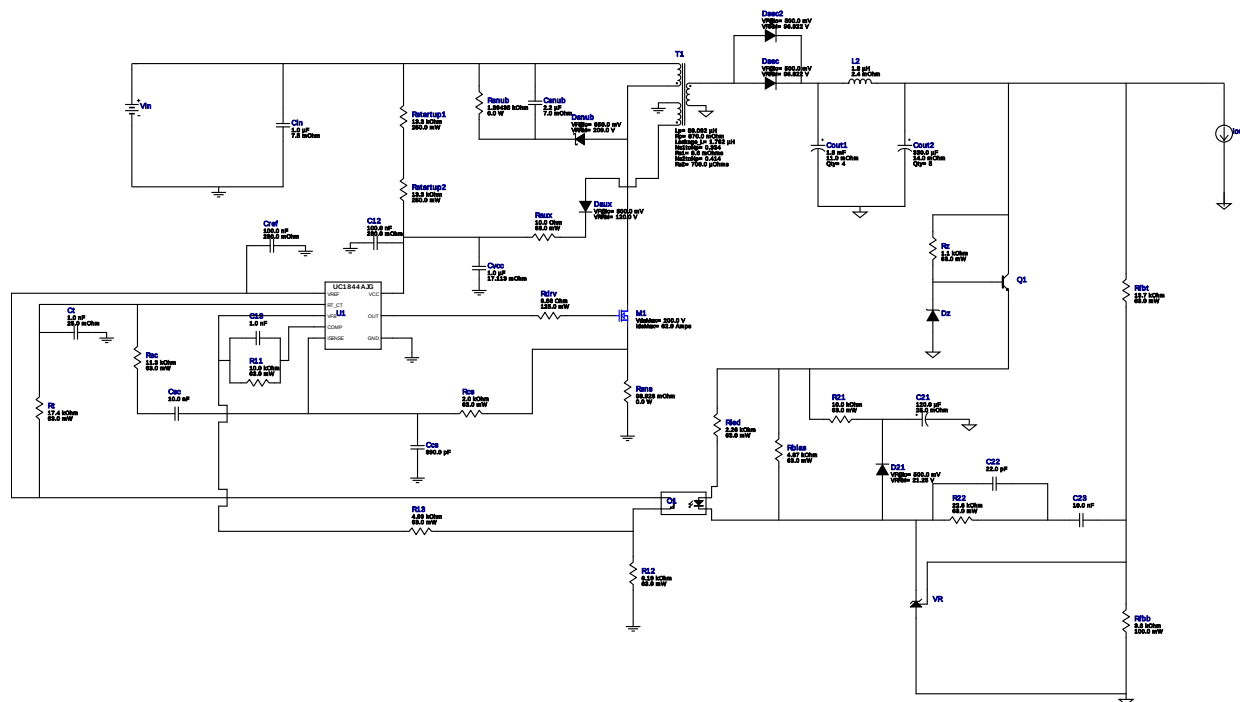
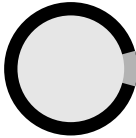
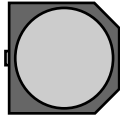


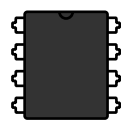
WEBENCH® Design Report

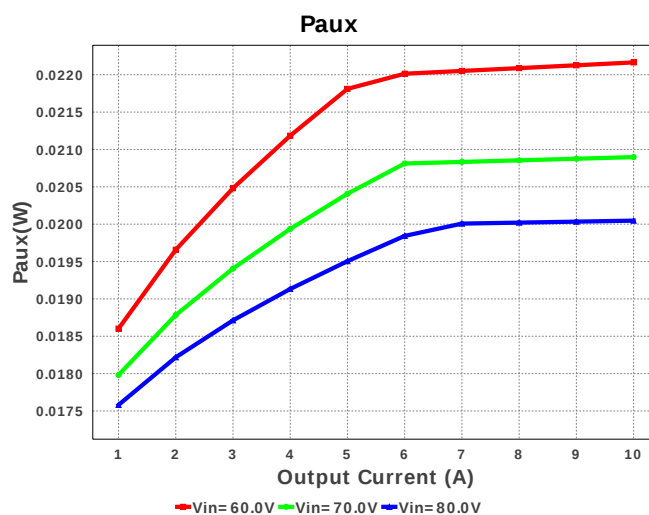
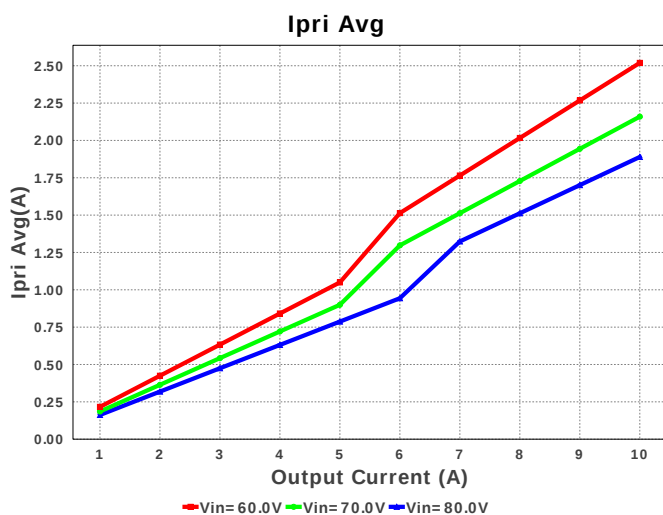
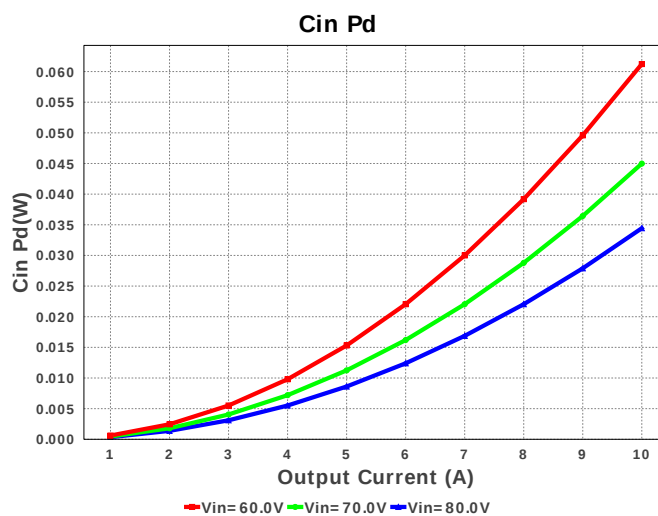
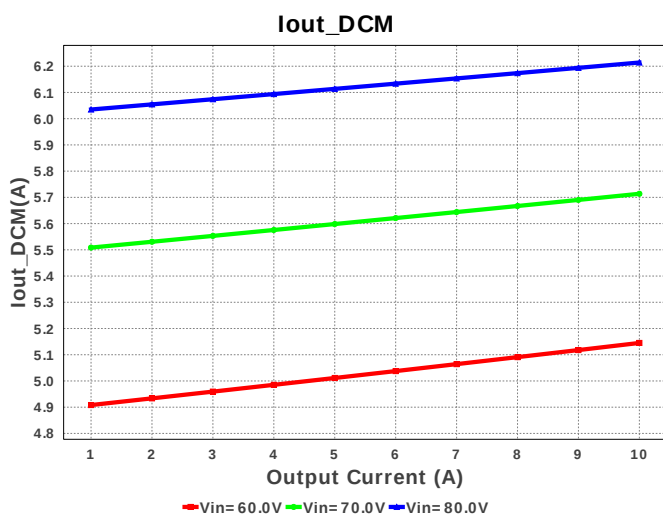
Design : 4161985/29 UC1844AJ
UC1844AJ 60.0V-80.0V to 12.00V @ 10.0A

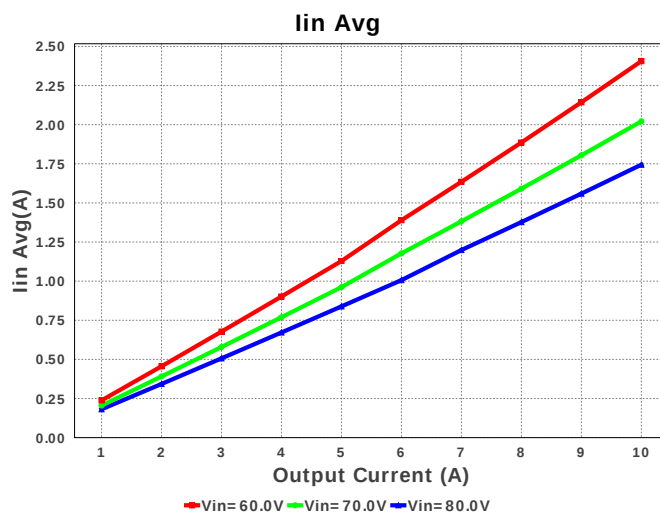
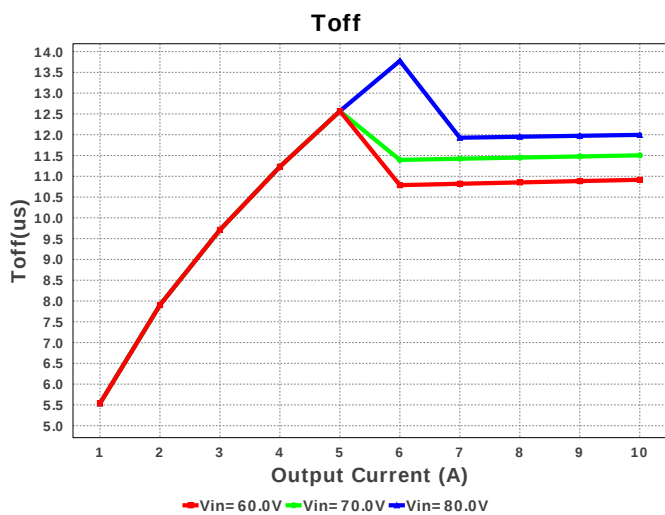
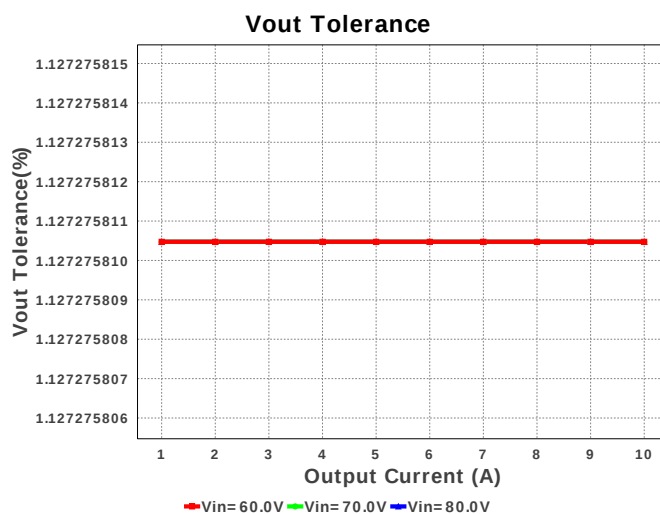
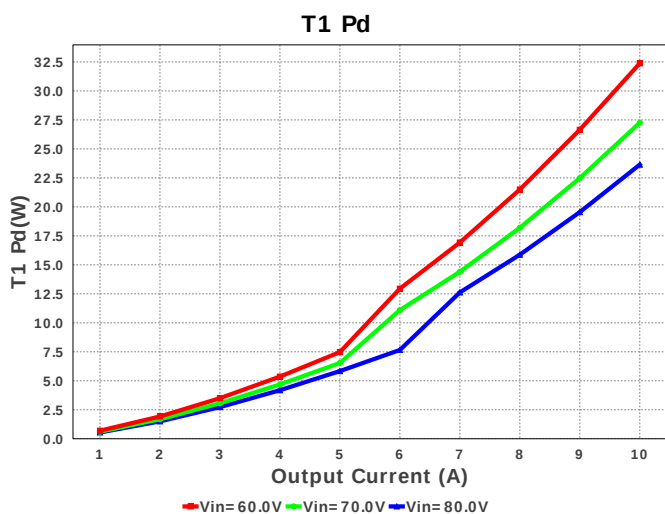
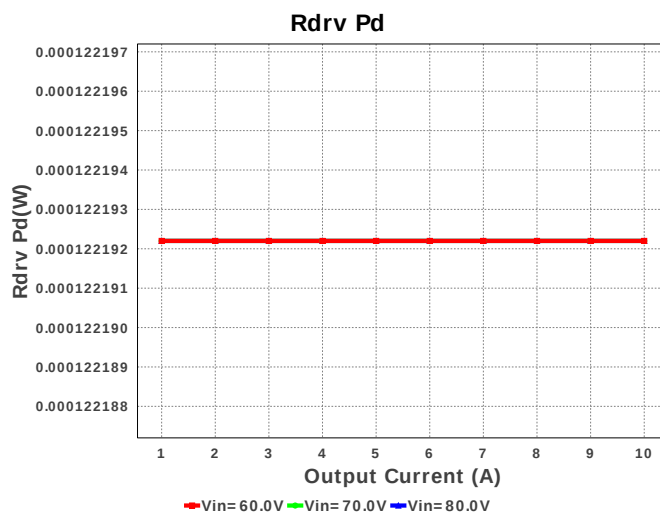
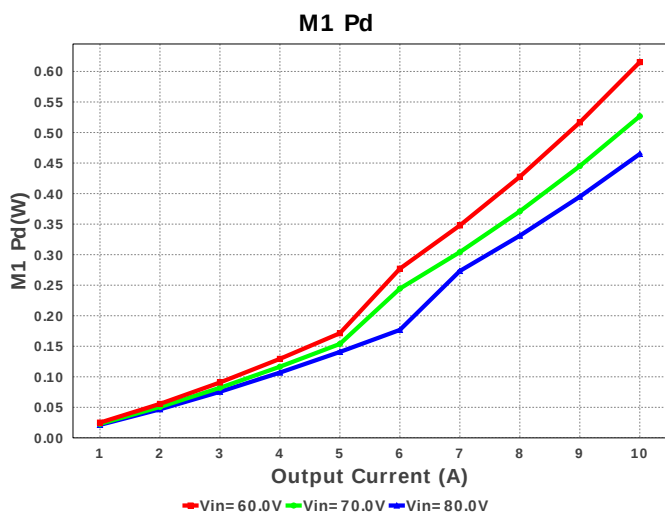


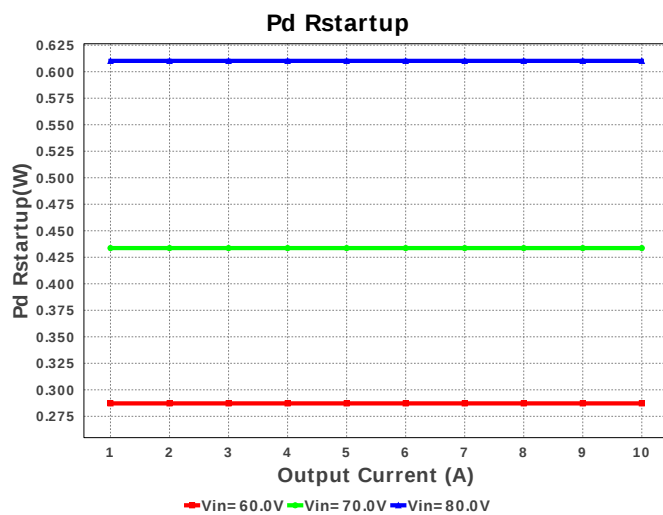
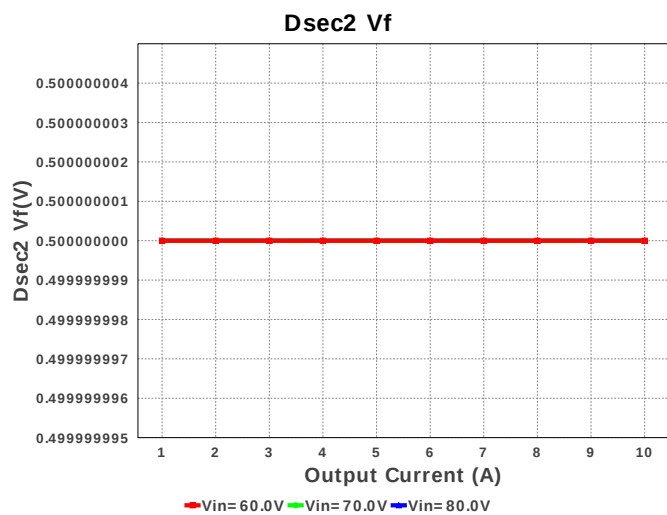
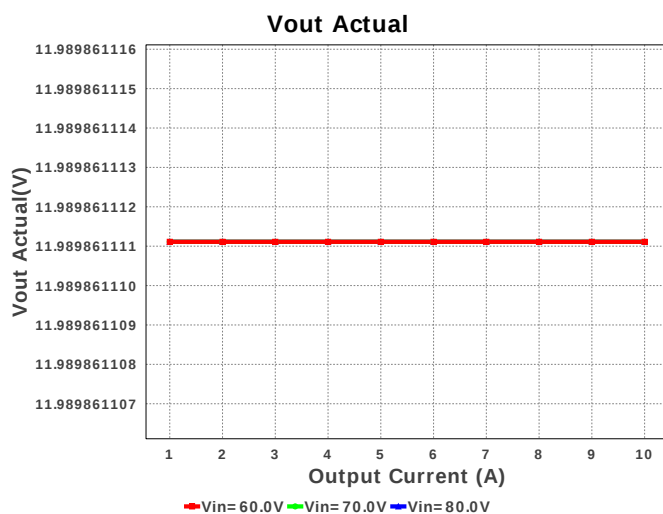
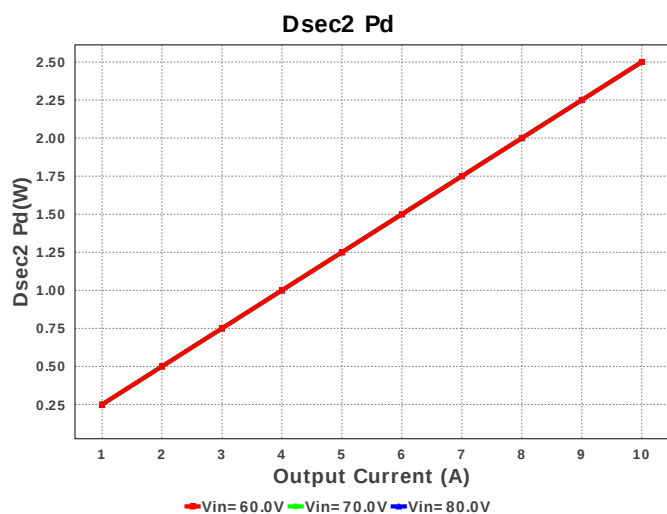
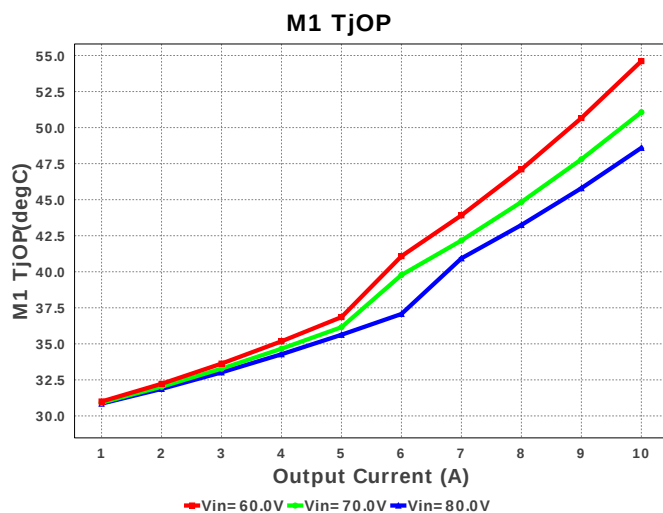
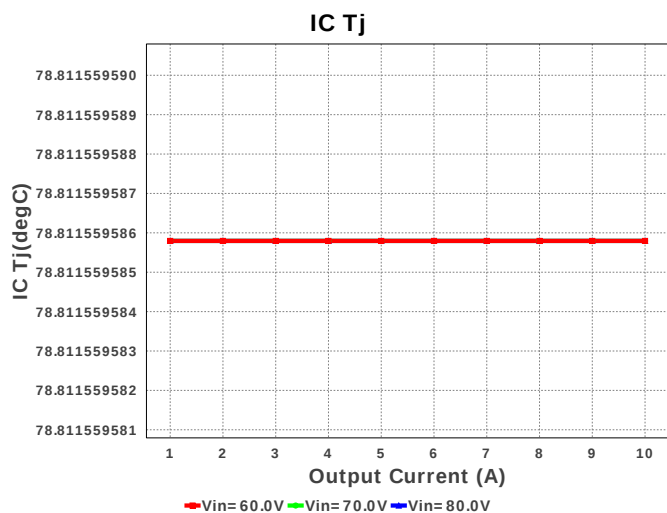
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8.	Cout1	Nichicon	UHV1V182MHD Series= HV	Cap= 1.8 mF ESR= 11.0 mOhm VDC= 35.0 V IRMS= 3.925 A	4	NA	 CAPPR5-12.5X25 210 mm ²
9.	Cout2	Panasonic	25SVPF330M Series= SVPF	Cap= 330.0 uF ESR= 14.0 mOhm VDC= 25.0 V IRMS= 5.0 A	5	\$0.70	 CAPSMT_62_F12 151 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	MuRata	GRM32ER72A225KA35L Series= X7R	Cap= 2.2 uF ESR= 7.0 mOhm VDC= 100.0 V IRMS= 4.4 A	1	\$0.19	 1210 15 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	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 21.25 V	1	NA	CUSTOM 0 mm ²
16.	Daux	Vishay-Semiconductor	V12P12-M3/86A	VF@Io= 800.0 mV VRRM= 120.0 V	1	\$0.40	 TO-277A 56 mm ²
17.	Dsec	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 96.822 V	1	NA	CUSTOM 0 mm ²
18.	Dsec2	CUSTOM	CUSTOM	VF@Io= 500.0 mV VRRM= 96.822 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

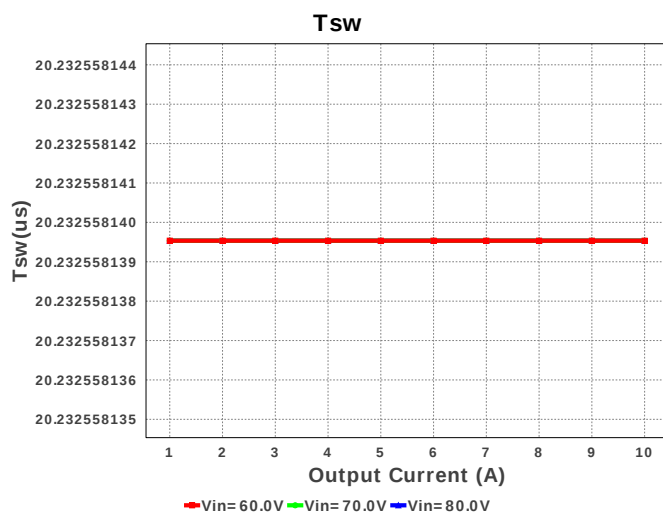
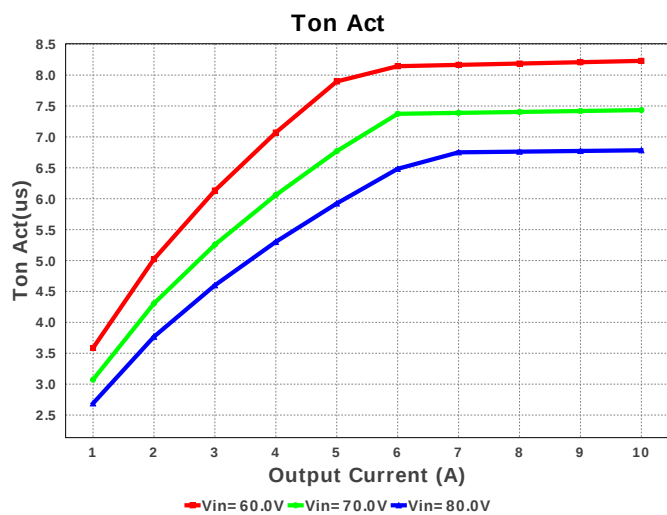
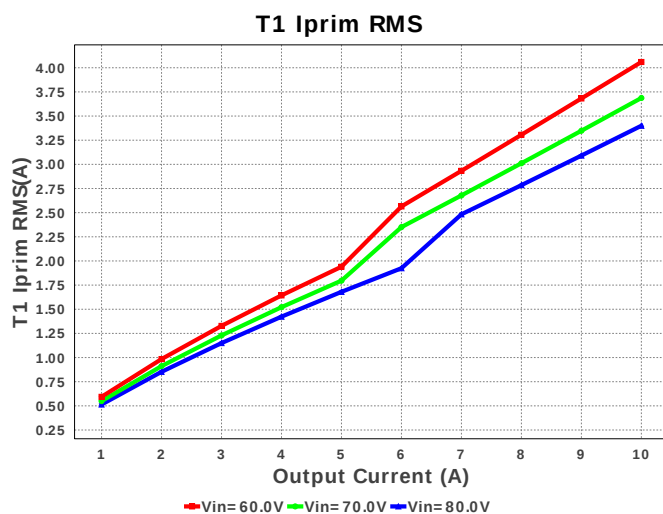
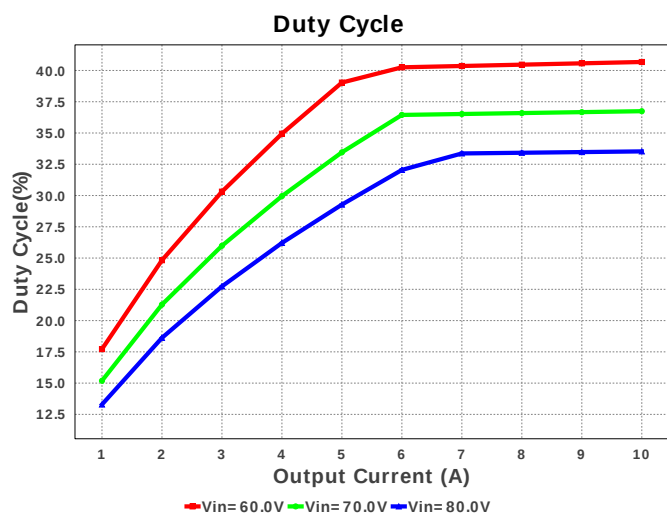
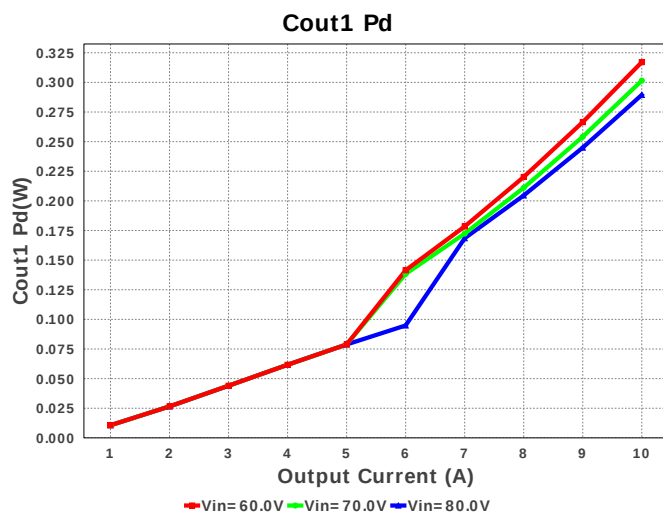
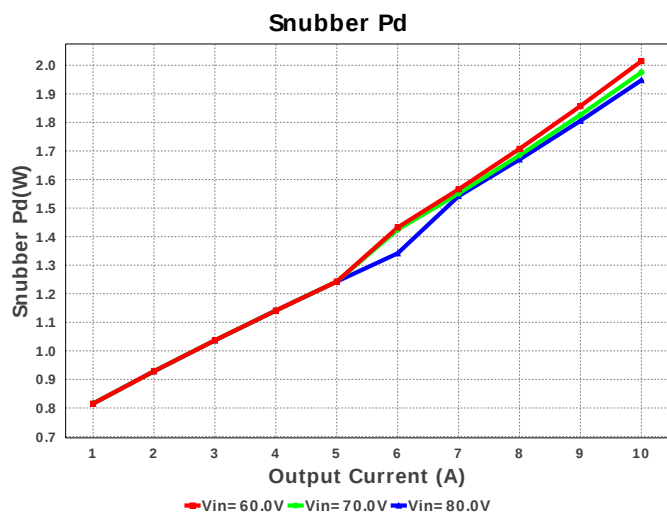
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
24.	Q1	ON Semiconductor	BC848CLT1G	Bipolar Transistor	1	\$0.02	 SOT-23 14 mm ²
25.	R11	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
26.	R12	Vishay-Dale	CRCW04026K19FKED Series= CRCW..e3	Res= 6.19 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	CRCW040222K6FKED Series= CRCW..e3	Res= 22.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
30.	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
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	CRCW08058R66FKEA Series= CRCW..e3	Res= 8.66 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 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	CRCW04022K26FKED Series= CRCW..e3	Res= 2.26 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
37.	Rsc	Vishay-Dale	CRCW040211K3FKED Series= CRCW..e3	Res= 11.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
38.	Rsns	CUSTOM	CUSTOM Series= ?	Res= 98.928 mOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm ²
39.	Rsnub	CUSTOM	CUSTOM Series= ?	Res= 1.89438 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm ²
40.	Rstartup1	Panasonic	ERJ-8ENF1332V Series= ERJ-8E	Res= 13.3 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
41.	Rstartup2	Panasonic	ERJ-8ENF1332V Series= ERJ-8E	Res= 13.3 kOhm Power= 250.0 mW Tolerance= 1.0%	1	\$0.01	 1206 11 mm ²
42.	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
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

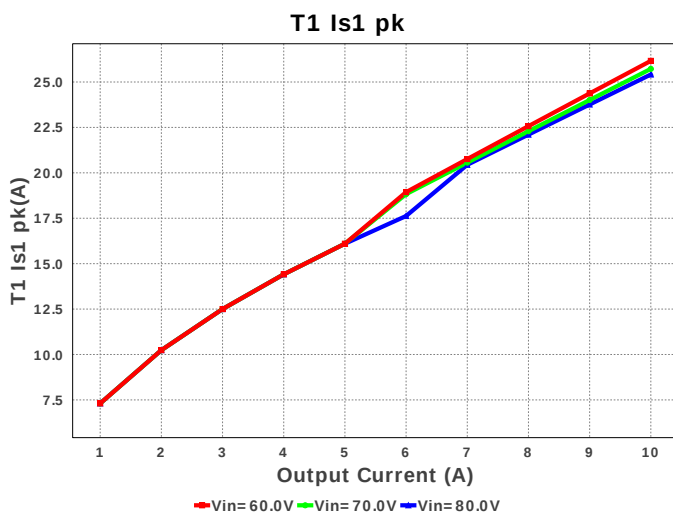
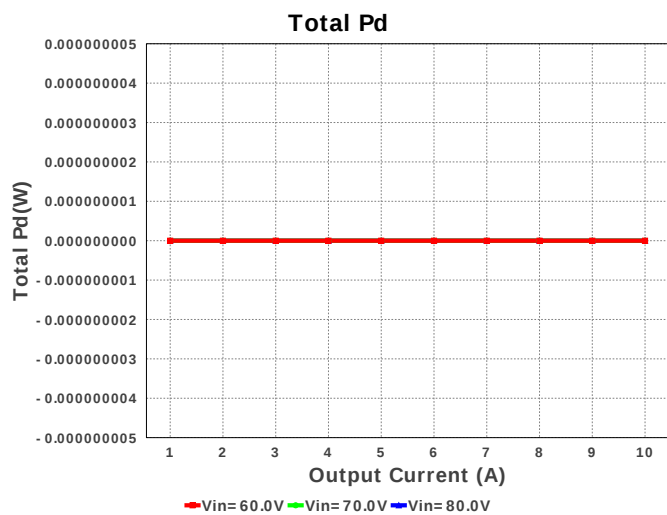
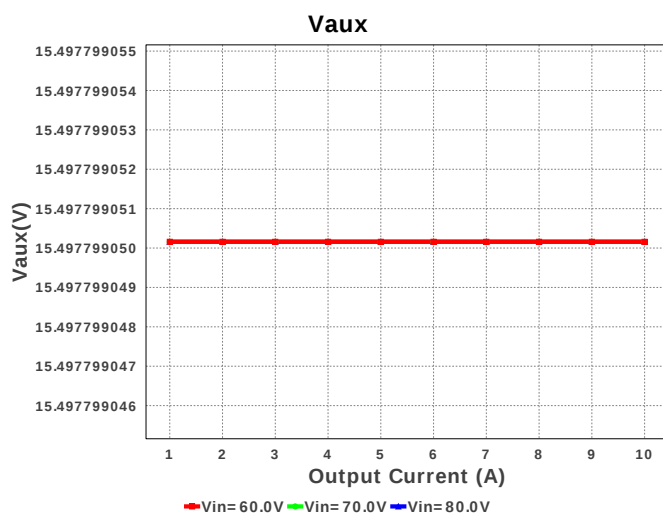
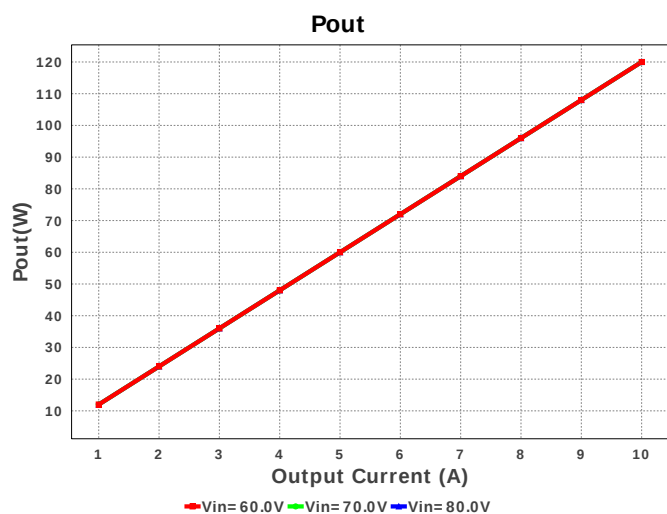
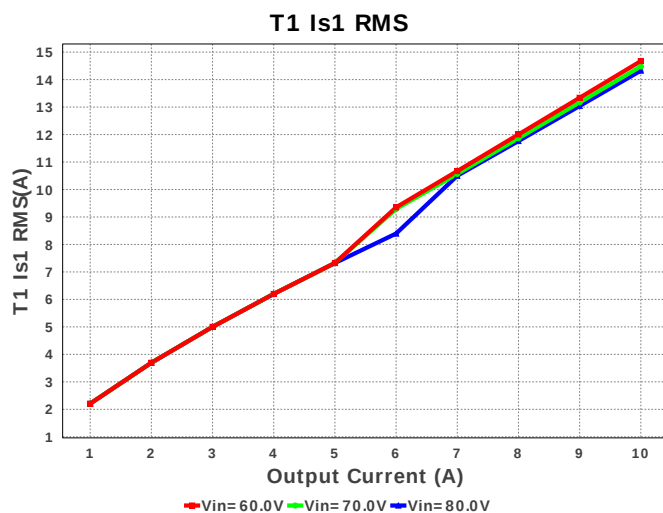
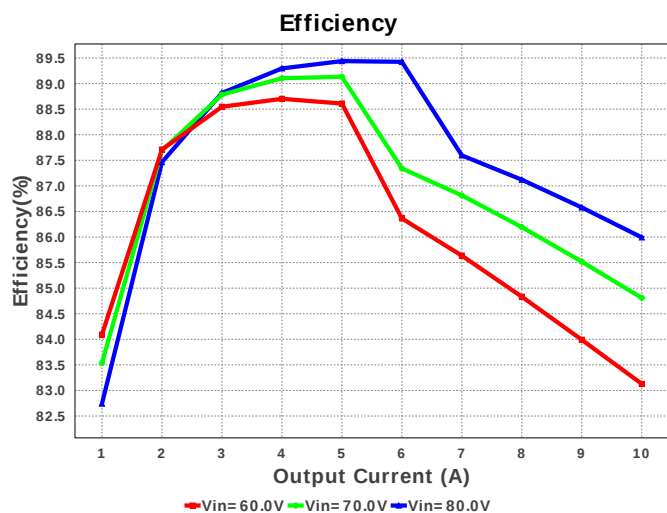
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
44. T1	CUSTOM	CUSTOM	CUSTOM	Lp= 88.092 μ H Rp= 870.0 mOhm Leakage_L= 1.762 μ H Ns1toNp= 0.334 Rs1= 8.6 mOhms Ns2toNp= 0.414 Rs2= 700.0 μ Ohms	1	NA	CUSTOM 0 mm ²
45. U1	Texas Instruments	UC1844AJ	Switcher		1	NA	 JG0008A 111 mm ²
46. VR	Texas Instruments	TL431AIDBZR	Voltage References		1	\$0.08	 DBZ0003A 14 mm ²

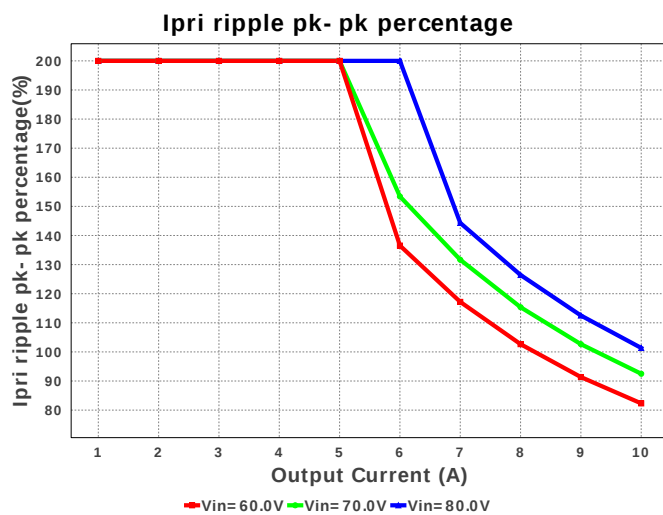
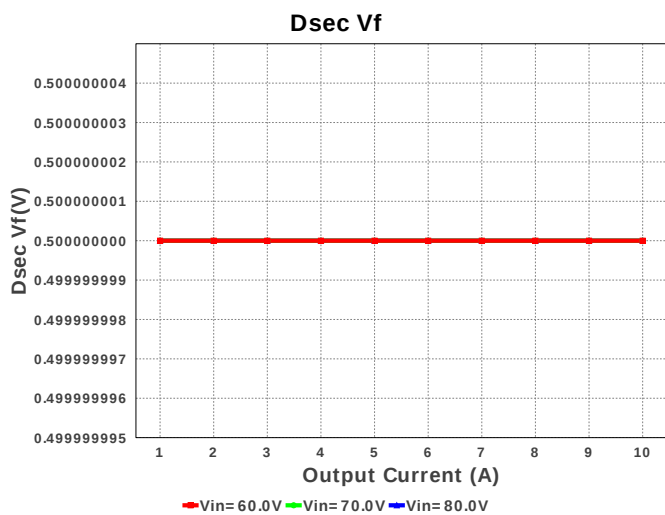
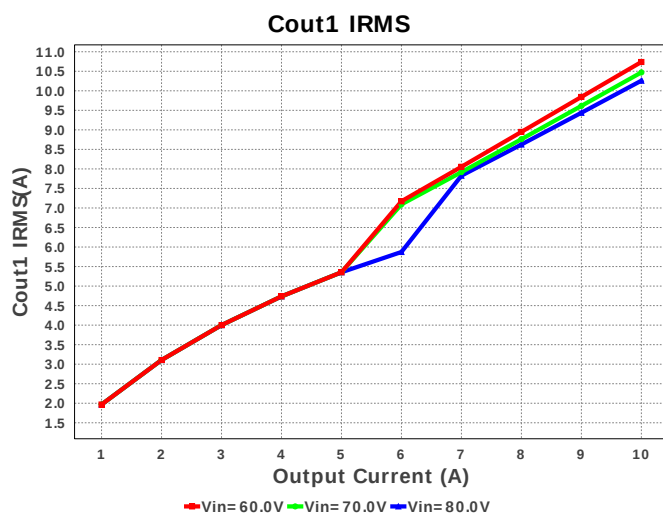
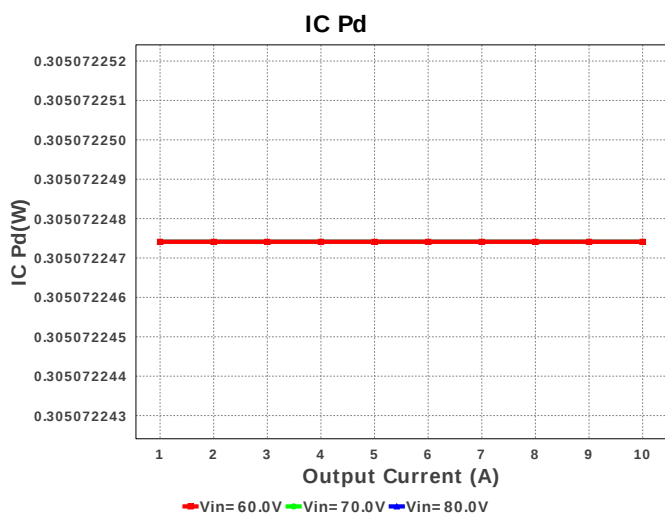
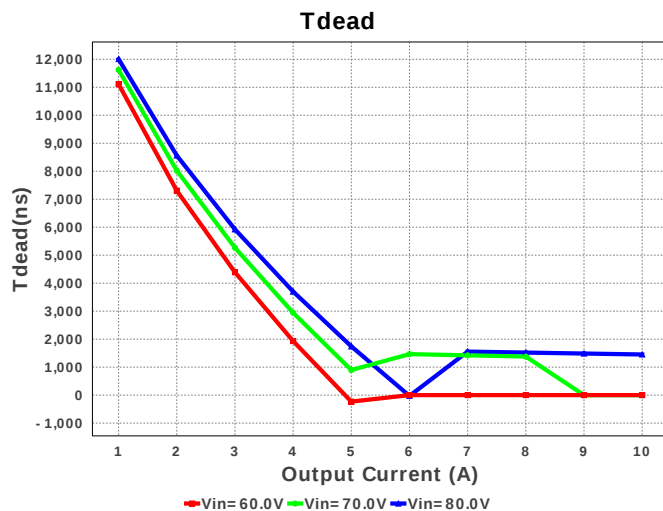
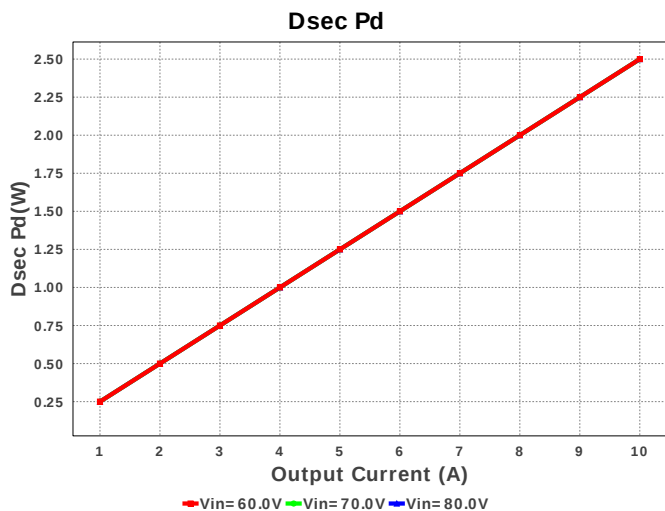


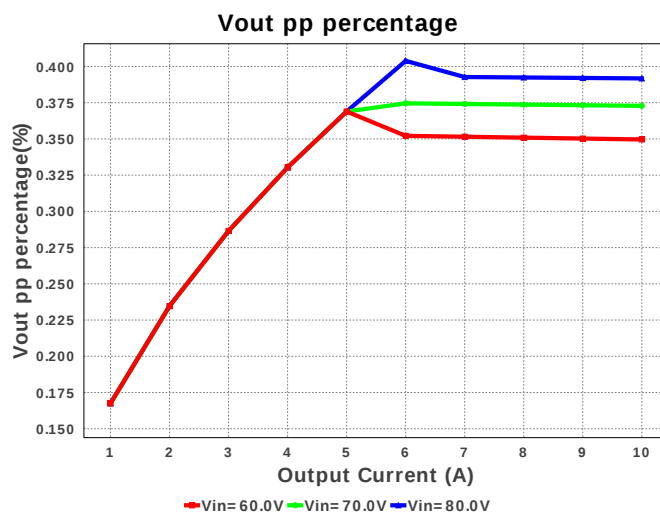
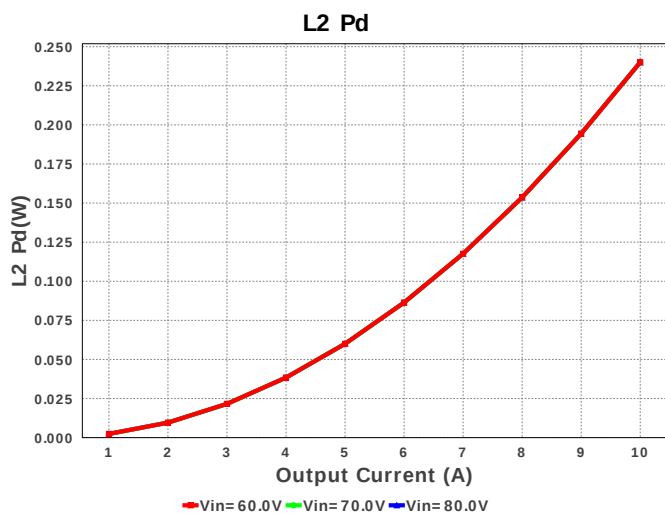
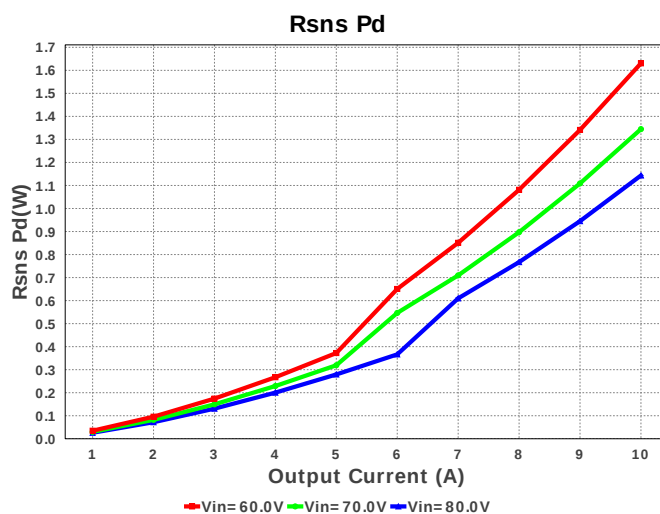
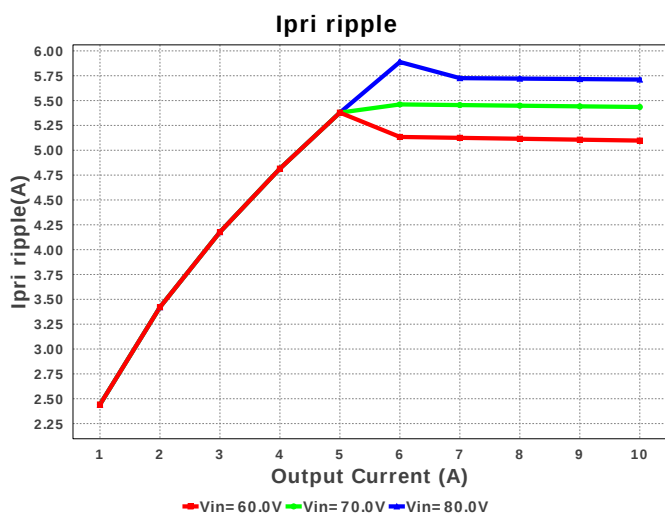
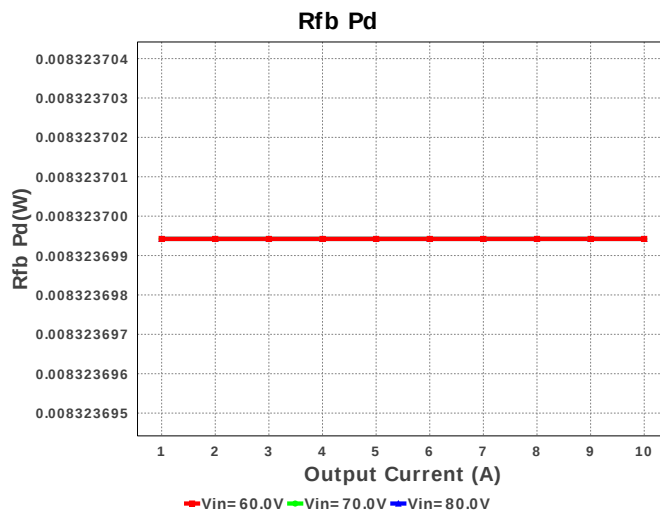
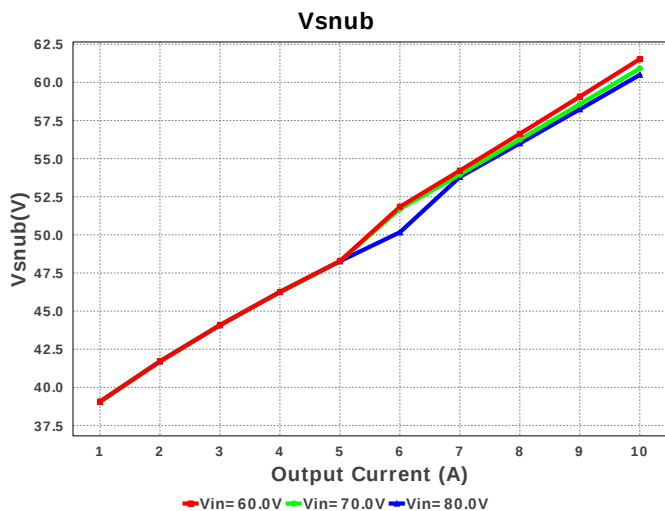


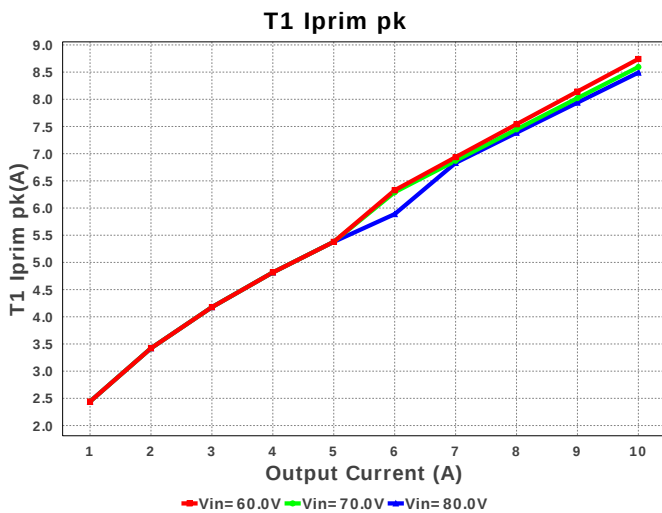
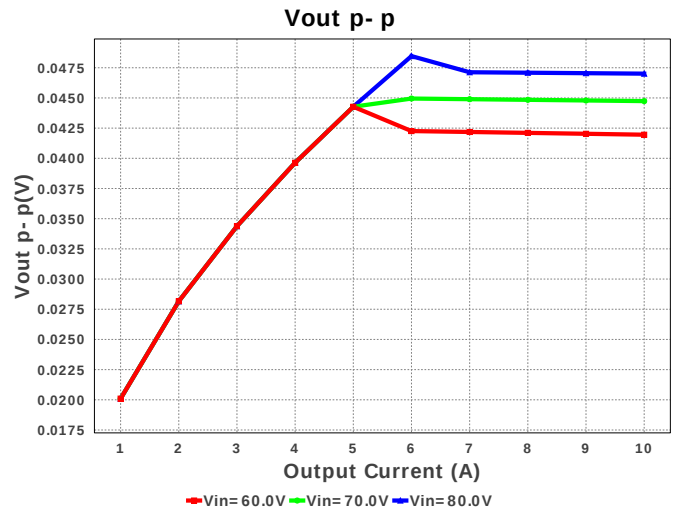
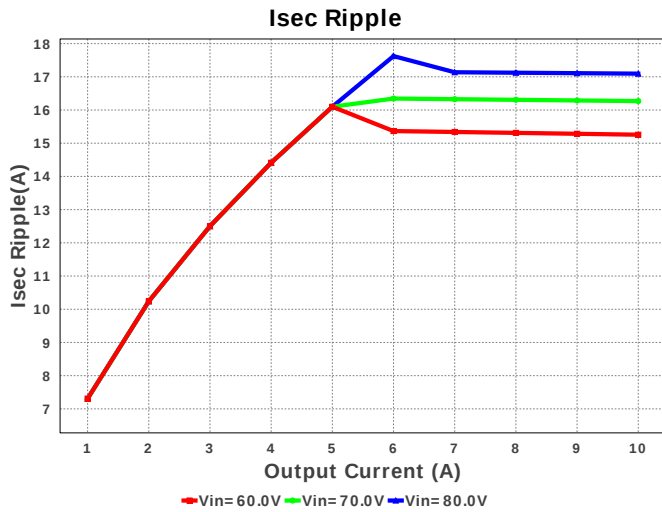












Operating Values

#	Name	Value	Category	Description
1.	Cout1 IRMS	10.738 A	Current	Output capacitor1 RMS ripple current
2.	Iin Avg	2.406 A	Current	Average input current
3.	Iout_DCM	5.145 A	Current	Approximate Current below which DCM mode of operation will begin
4.	Ipri Avg	2.519 A	Current	Average Current in Primary Winding over the complete Switching Period
5.	Ipri ripple	5.097 A	Current	Ripple Current in the Primary Winding
6.	Ipri ripple pk-pk percentage	82.311 %	Current	Primary Current pk-pk ripple percentage(of Ipri avg during ton only)
7.	Isec Ripple	15.256 A	Current	Ripple Current in the Secondary Winding
8.	T1 Iprim RMS	4.06 A	Current	Transformer Primary RMS Current
9.	T1 Iprim pk	8.741 A	Current	Transformer Primary Peak Current
10.	T1 Is1 RMS	14.673 A	Current	Transformer Secondary1 RMS Current
11.	T1 Is1 pk	26.163 A	Current	Transformer Secondary1 Peak Current
12.	BOM Count	53	General	Total Design BOM count
13.	Daux trr	0.0 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	2.654 k mm ²	General	Total Foot Print Area of BOM components
19.	Frequency	49.425 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	10.916 us	General	Approximate Converter Off Time
23.	Ton Act	8.23 us	General	Approximate Converter On Time
24.	Total BOM	\$0.0	General	Total BOM Cost
25.	Tsw	20.233 us	General	Switching Time Period
26.	Vaux	15.498 V	General	Auxiliary Voltage
27.	Vsnub	61.526 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

#	Name	Value	Category	Description
30.	Duty Cycle	40.678 %	Op_point	Duty cycle
31.	Efficiency	83.128 %	Op_point	Steady state efficiency
32.	IC Tj	78.812 degC	Op_point	IC junction temperature
33.	ICThetaJA	160.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
34.	IOUT_OP	10.0 A	Op_point	Iout operating point
35.	M1 TjOP	54.612 degC	Op_point	M1 MOSFET junction temperature
36.	Vout p-p	41.955 mV	Op_point	Peak-to-peak output ripple voltage
37.	Cin Pd	61.224 mW	Power	Input capacitor power dissipation
38.	Cout1 Pd	317.089 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	305.072 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	615.289 mW	Power	M1 MOSFET total power dissipation
44.	Paux	22.165 mW	Power	Power Dissipation in Raux and Daux
45.	Pd Rstartup	287.2 mW	Power	Power Dissipation in Rstartup1 and Rstartup2
46.	Rdrv Pd	122.192 μ W	Power	Power Dissipation in Gate Drive Resistor
47.	Rfb Pd	8.324 mW	Power	Rfb Power Dissipation
48.	Rsns Pd	1.63 W	Power	Current Limit Sense Resistor Power Dissipation
49.	Snubber Pd	2.015 W	Power	Snubber Power Dissipation
50.	T1 Pd	32.381 W	Power	Estimated Losses in Transformer
51.	Total Pd	0.0 W	Power	Total Power Dissipation
52.	Vout Tolerance	1.127 %		Vout Tolerance based on IC Tolerance and voltage divider resistors if applicable
53.	Vout pp percentage	349.627 m%		Output Voltage ripple percentage

Design Inputs

#	Name	Value	Description
1.	Iout	10.0	Maximum Output Current
2.	VinMax	80.0	Maximum input voltage
3.	VinMin	60.0	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	UC1844A	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. UC1844A Product Folder : <http://www.ti.com/lit/ds/symlink/uc1842a.pdf> : contains the data sheet and other resources.

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