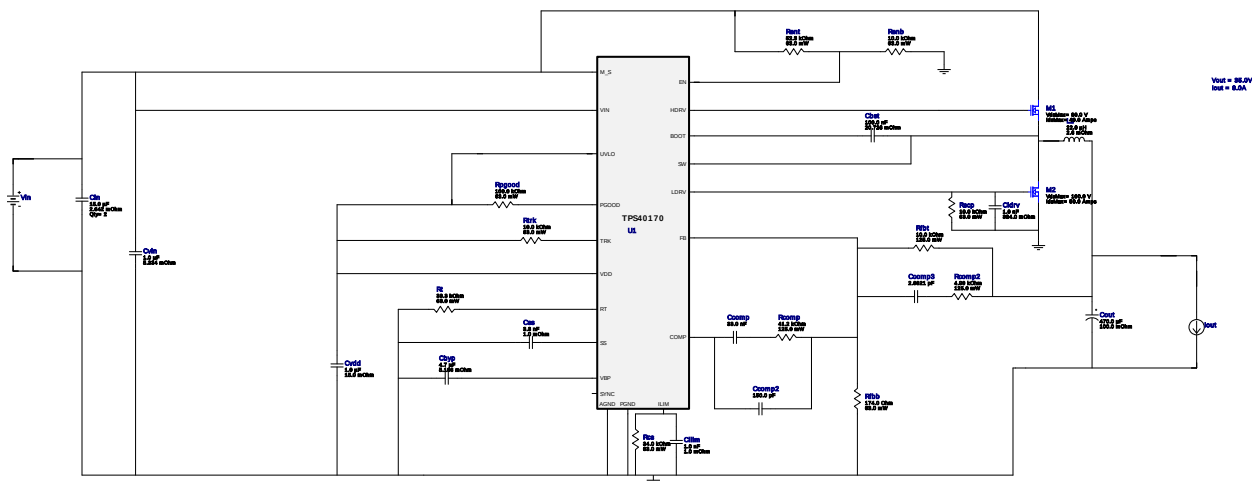


WEBENCH® Design Report

Design : 1225793/857 TPS40170RGYR
TPS40170RGYR 45.0V-50.0V to 35.00V @ 8.0A

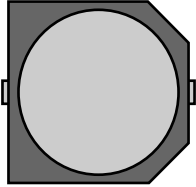
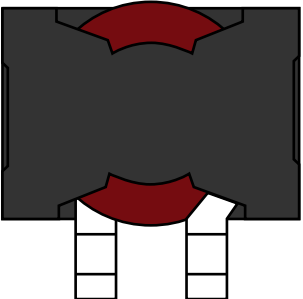


My Comments

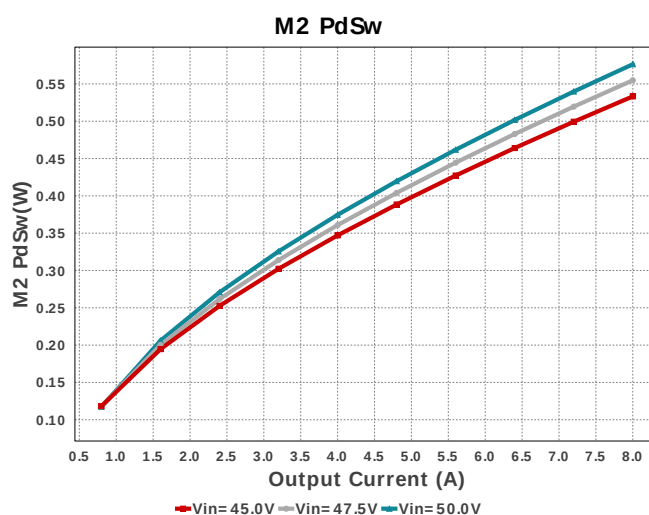
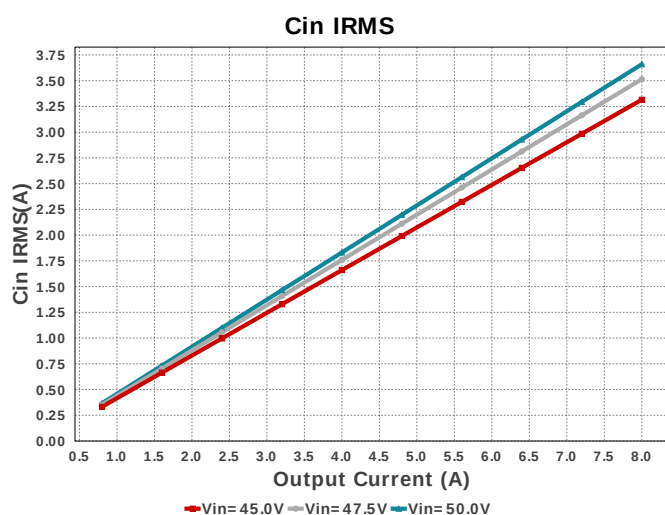
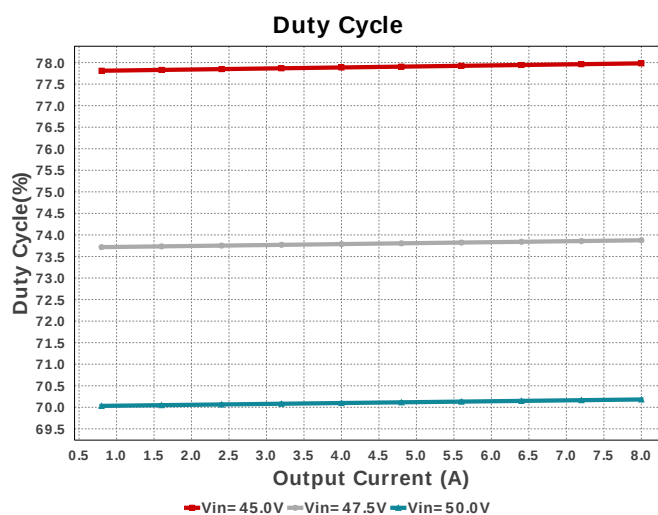
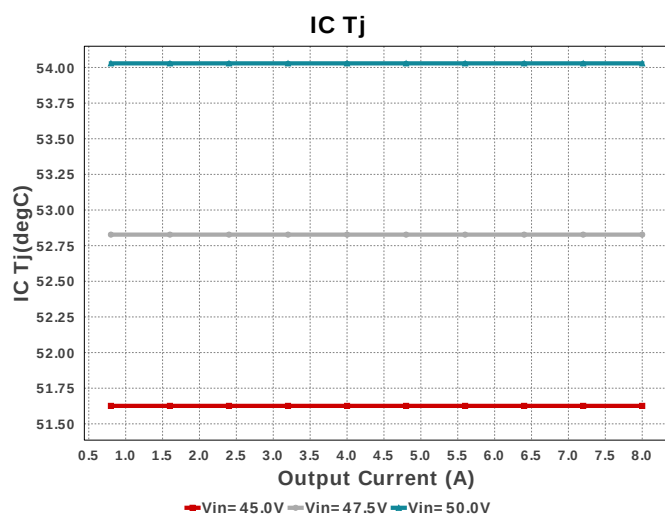
No comments

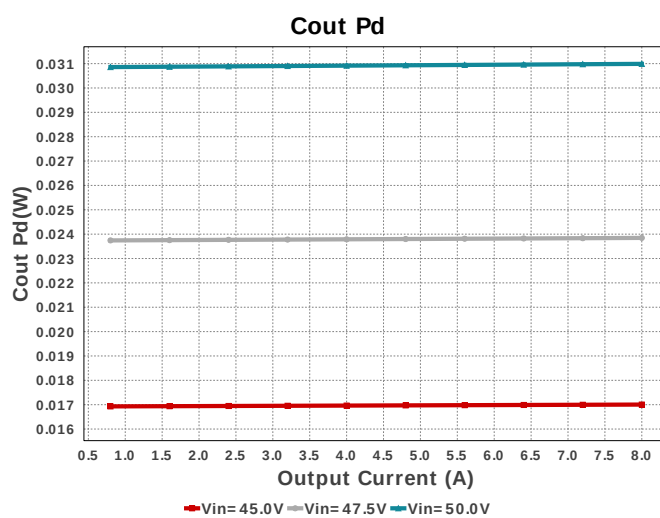
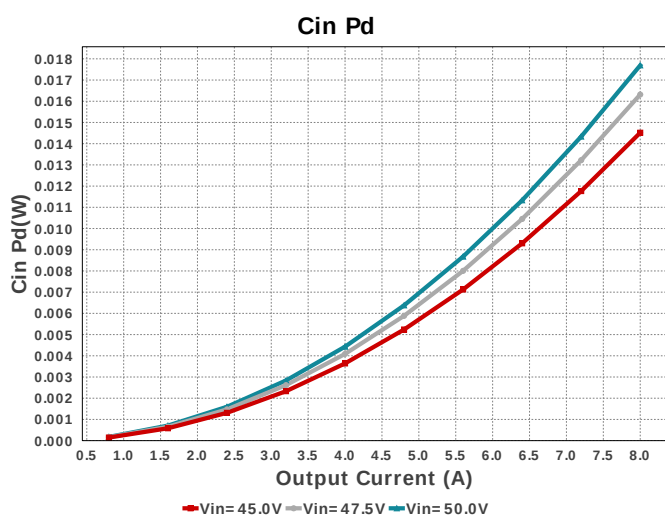
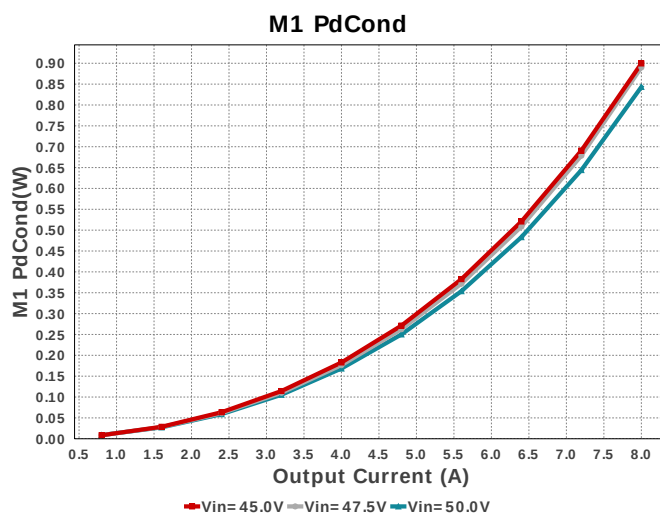
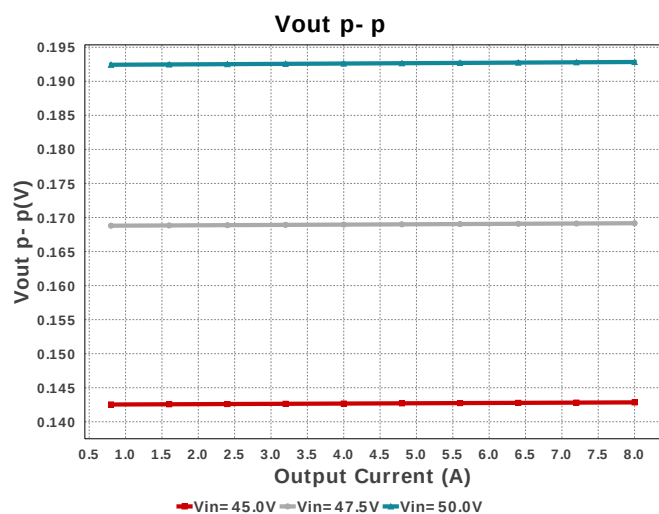
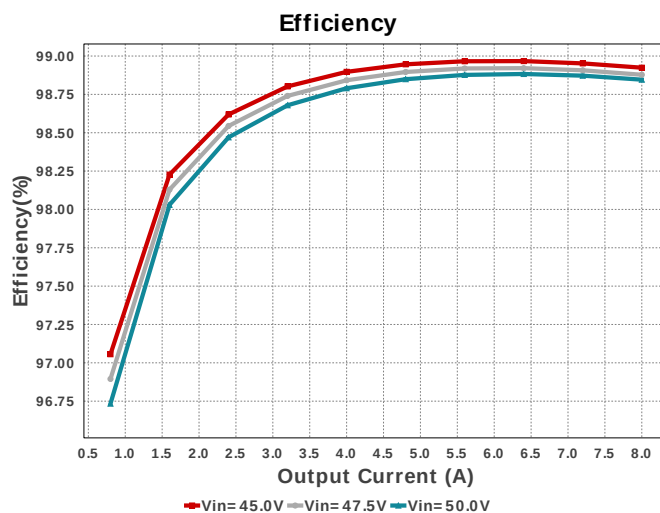
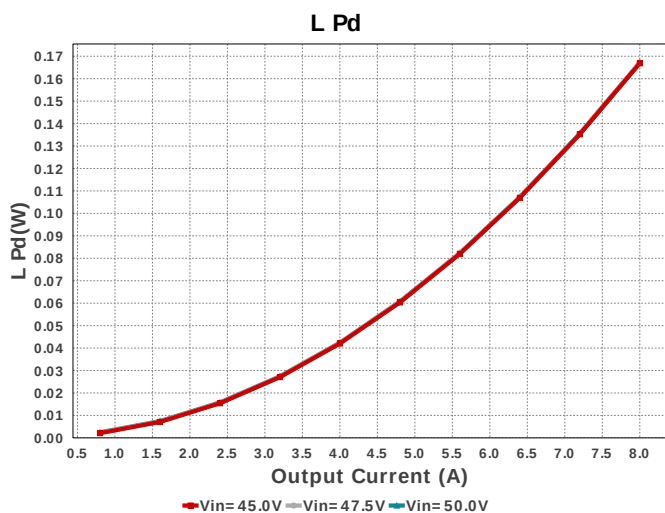
Electrical BOM

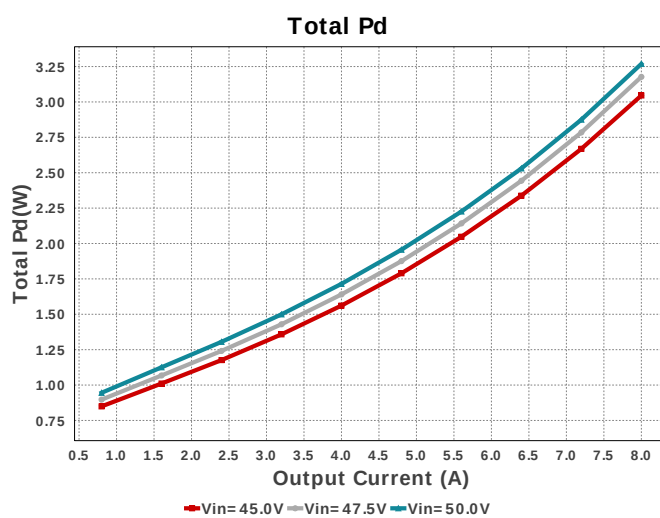
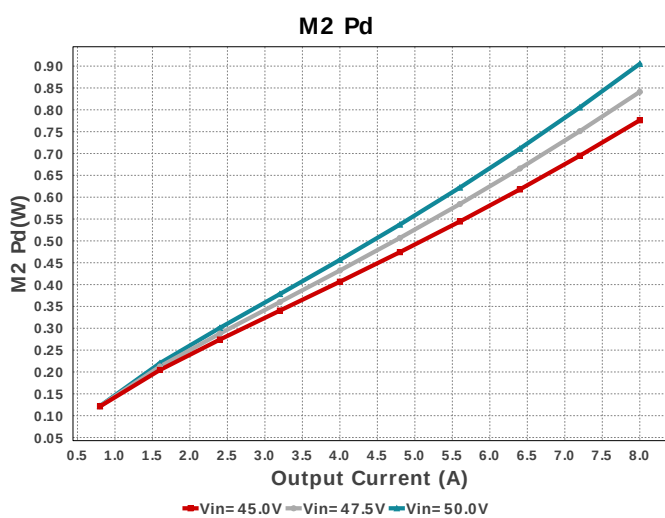
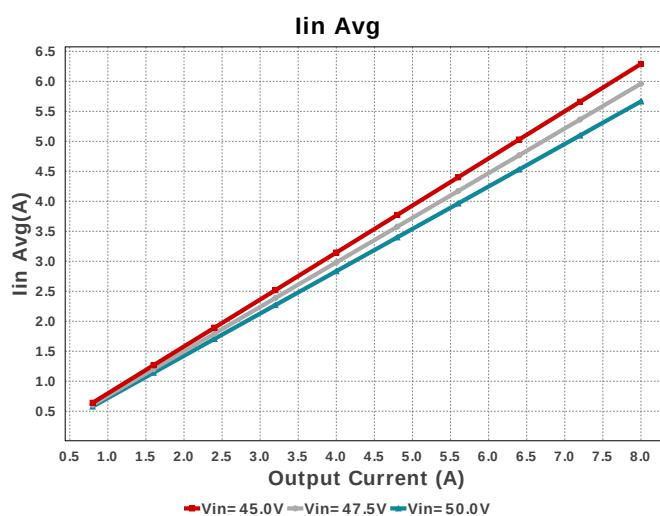
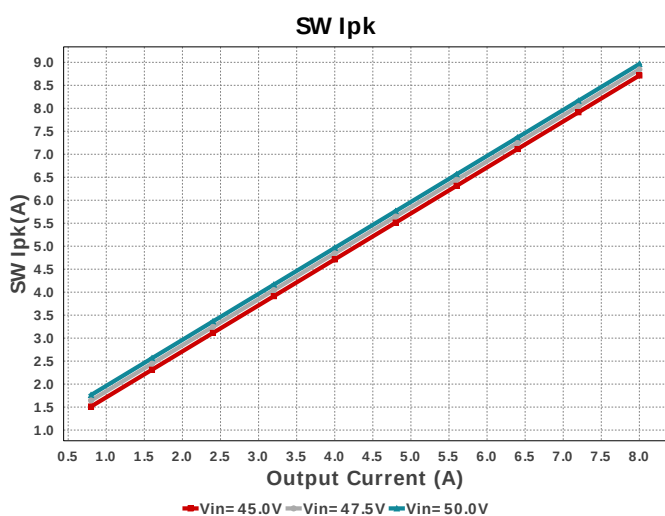
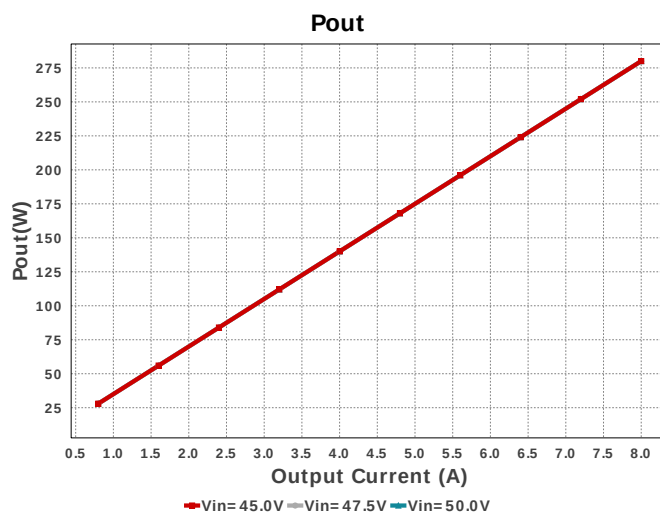
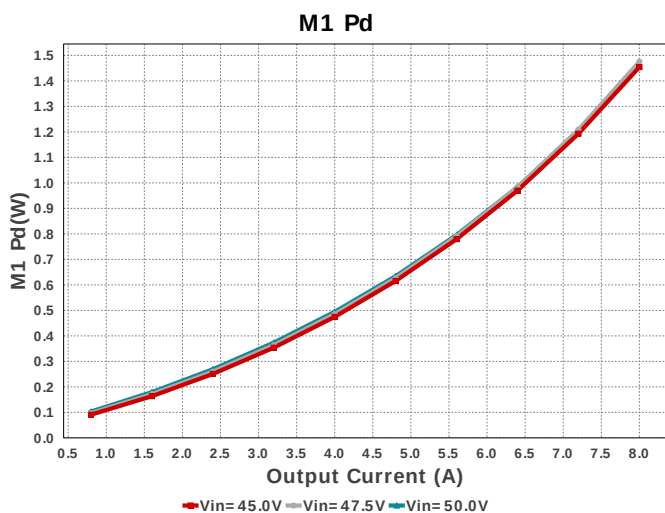
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	TDK	C2012X5R2A104K125AA Series= X5R	Cap= 100.0 nF ESR= 20.726 mOhm VDC= 100.0 V IRMS= 1.456 A	1	\$0.04	0805 7 mm ²
2.	Cbyp	MuRata	GRM21BR61C475KA88L Series= X5R	Cap= 4.7 uF ESR= 5.166 mOhm VDC= 16.0 V IRMS= 1.8541 A	1	\$0.03	0805 7 mm ²
3.	Ccomp	TDK	CGA4J2C0G1H333J125AA Series= C0G/NP0	Cap= 33.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.09	0805 7 mm ²
4.	Ccomp2	Samsung Electro-Mechanics	CL21C151JBANNNC Series= C0G/NP0	Cap= 150.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
5.	Ccomp3	CUSTOM	CUSTOM Series= ?	Cap= 2.6821 pF VDC= 0.0 V IRMS= 0.0 A	1	NA	CUSTOM 0 mm ²
6.	Cilim	MuRata	GRM216R71E102KA01D Series= X7R	Cap= 1.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
7.	Cin	TDK	CGA9P3X7S2A156M250KB Series= X7S	Cap= 15.0 uF ESR= 2.642 mOhm VDC= 100.0 V IRMS= 5.6162 A	2	\$1.36	2220_280 54 mm ²
8.	Cldrv	Kemet	C0805C102M5RACTU Series= X7R	Cap= 1.0 nF ESR= 384.0 mOhm VDC= 50.0 V IRMS= 214.0 mA	1	\$0.01	0805 7 mm ²

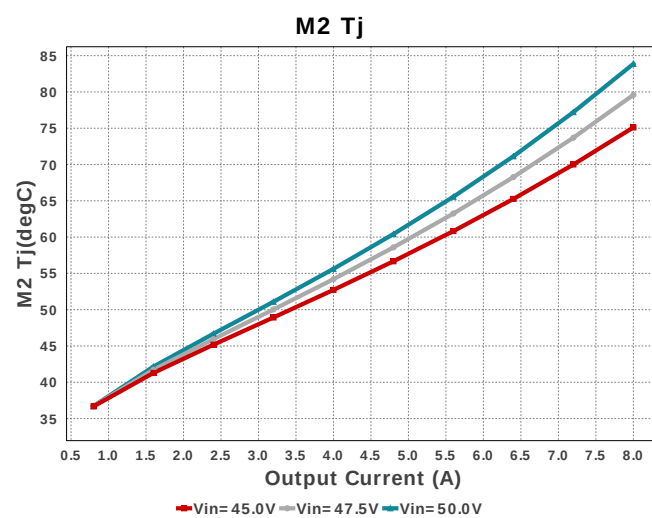
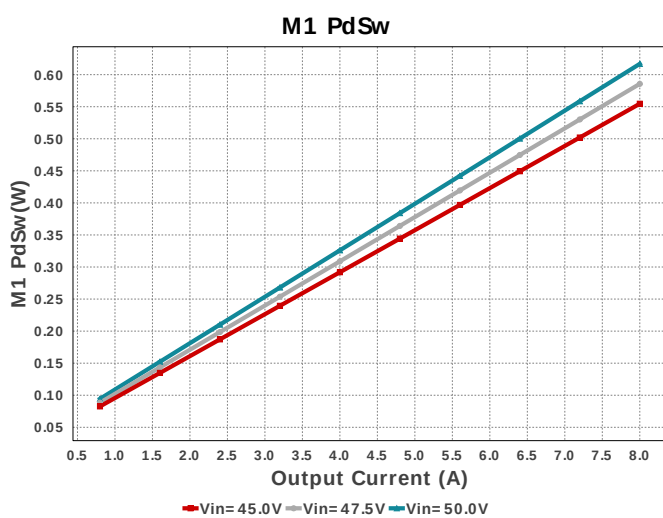
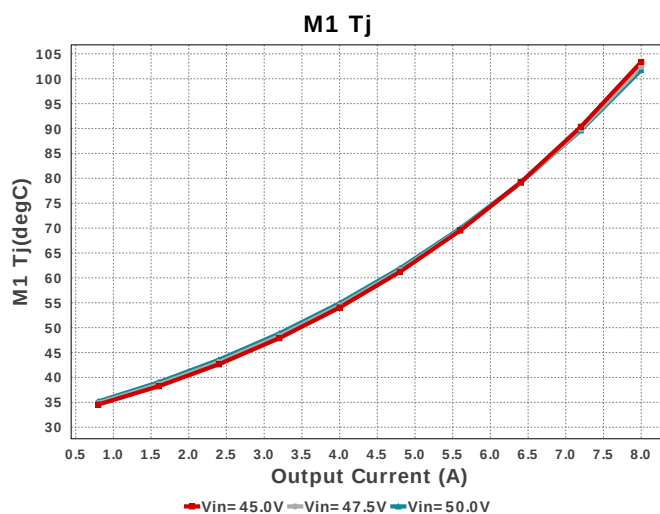
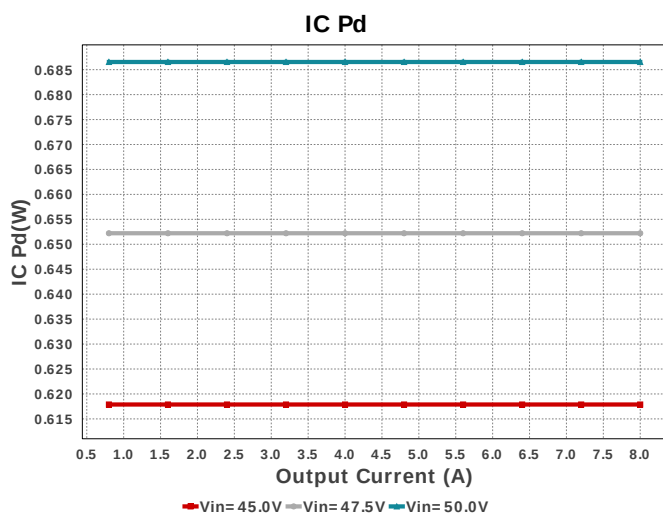
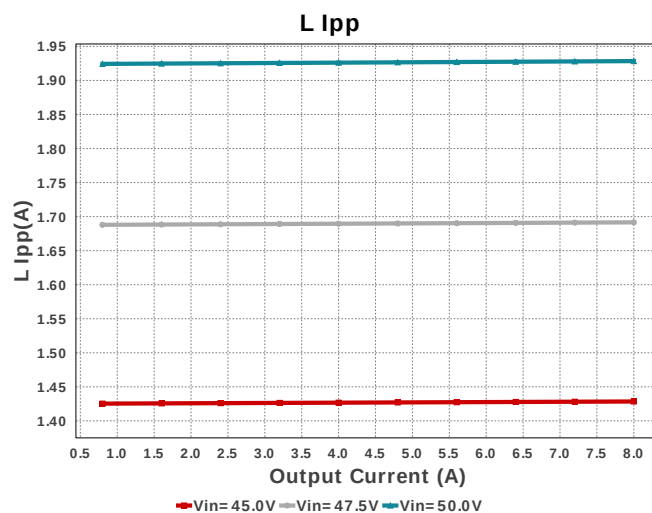
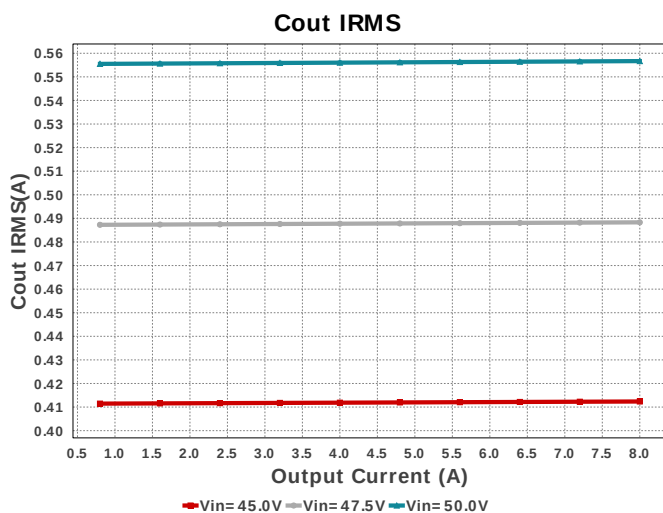
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Cout	Chemi-Con	EMVH350GDA471MLH0S Series= MVH	Cap= 470.0 uF ESR= 100.0 mOhm VDC= 35.0 V IRMS= 1.0 A	1	\$1.69	 CAPSMT_62_LH0 361 mm²
10.	Css	MuRata	GRM033R70J332KA01D Series= X7R	Cap= 3.3 nF ESR= 1.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	 0201 2 mm²
11.	Cvdd	Kemet	C0805C105K4RACTU Series= X7R	Cap= 1.0 uF ESR= 15.0 mOhm VDC= 16.0 V IRMS= 8.19 A	1	\$0.02	 0805 7 mm²
12.	Cvin	MuRata	GRM31CR72A105KA01L Series= X7R	Cap= 1.0 uF ESR= 5.334 mOhm VDC= 100.0 V IRMS= 1.55432 A	1	\$0.14	 1206_190 11 mm²
13.	L1	Coilcraft	SER2918H-223KL	L= 22.0 uH DCR= 2.6 mOhm	1	\$2.65	 SER2918H 652 mm²
14.	M1	Infineon Technologies	BSC117N08NS5ATMA1	VdsMax= 80.0 V IdsMax= 49.0 Amps	1	\$0.55	 PG-TDSON-8 55 mm²
15.	M2	Texas Instruments	CSD19537Q3	VdsMax= 100.0 V IdsMax= 50.0 Amps	1	\$0.41	 DQG0008A 18 mm²
16.	Rcomp	Panasonic	ERJ-6ENF4122V Series= ERJ-6E	Res= 41.2 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
17.	Rcomp2	Panasonic	ERJ-6ENF4991V Series= ERJ-6E	Res= 4.99 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
18.	Rcs	Vishay-Dale	CRCW040234K0FKED Series= CRCW..e3	Res= 34.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
19.	Renb	Stackpole Electronics Inc	RMCF0402FT10K0 Series= ?	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
20.	Rent	Vishay-Dale	CRCW040252K3FKED Series= CRCW..e3	Res= 52.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
21.	Rfbb	Vishay-Dale	CRCW0402174RFKED Series= CRCW..e3	Res= 174.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
22.	Rfbb	Yageo America	RT0805DRE0710KL Series= ?	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 0.5%	1	\$0.01	 0805 7 mm²
23.	Rpgood	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²

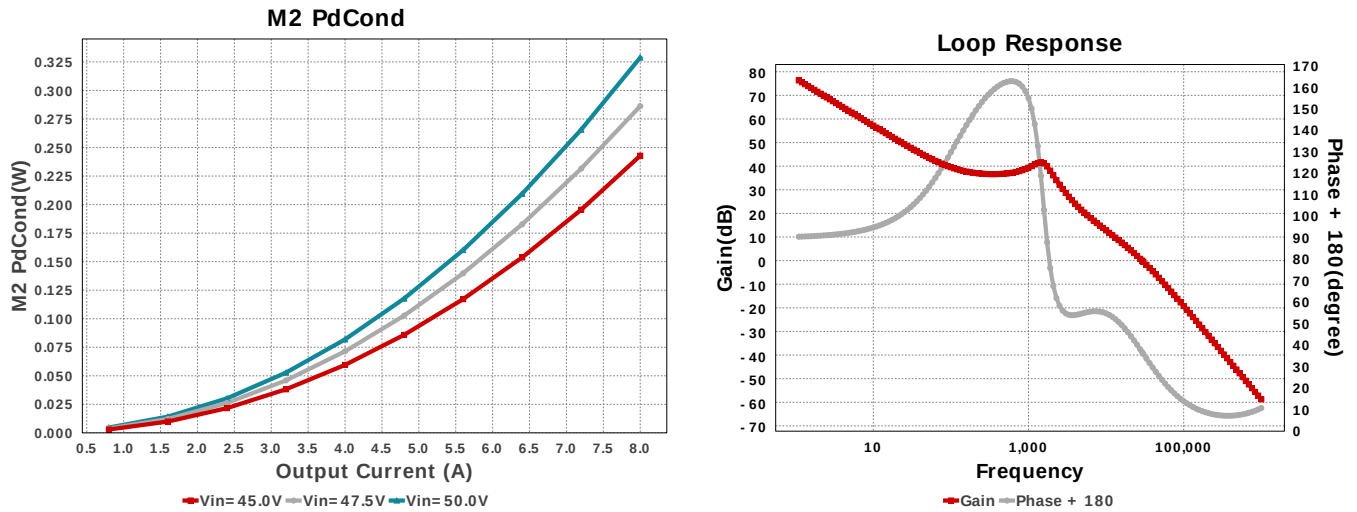
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
24.	Rscp	Stackpole Electronics Inc	RMCF0402FT10K0 Series= ?	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
25.	Rt	Vishay-Dale	CRCW040238K3FKED Series= CRCW..e3	Res= 38.3 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
26.	Rtrk	Stackpole Electronics Inc	RMCF0402FT10K0 Series= ?	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm²
27.	U1	Texas Instruments	TPS40170RGYR	Switcher	1	\$2.40	 RGY0020A 25 mm²











Operating Values

#	Name	Value	Category	Description
1.	BOM Count	28		Total Design BOM count
2.	Total BOM	\$0.0		Total BOM Cost
3.	Cin IRMS	3.66 A	Current	Input capacitor RMS ripple current
4.	Cout IRMS	556.683 mA	Current	Output capacitor RMS ripple current
5.	Iin Avg	5.665 A	Current	Average input current
6.	L Ipp	1.928 A	Current	Peak-to-peak inductor ripple current
7.	SW Ipk	8.964 A	Current	Peak switch current
8.	FootPrint	1.328 k mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	248.139 kHz	General	Switching frequency
10.	IC Tolerance	6.0 μ V	General	IC Feedback Tolerance
11.	Mode	CCM	General	Conduction Mode
12.	Pout	280.0 W	General	Total output power
13.	Cross Freq	29.168 kHz	Op Point	Bode plot crossover frequency
14.	Duty Cycle	70.182 %	Op Point	Duty cycle
15.	Efficiency	98.846 %	Op Point	Steady state efficiency
16.	Gain Marg	-44.644 dB	Op Point	Bode Plot Gain Margin
17.	IC Tj	54.029 degC	Op Point	IC junction temperature
18.	IOUT_OP	8.0 A	Op Point	Iout operating point
19.	Low Freq Gain	76.318 dB	Op Point	Gain at 1Hz
20.	M1 Tj	101.762 degC	Op Point	M1 MOSFET junction temperature
21.	M2 Tj	83.868 degC	Op Point	M2 MOSFET junction temperature
22.	Phase Marg	36.768 deg	Op Point	Bode Plot Phase Margin
23.	VIN_OP	50.0 V	Op Point	Vin operating point
24.	Vout Actual	35.083 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
25.	Vout Tolerance	1.49 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
26.	Vout p-p	192.841 mV	Op Point	Peak-to-peak output ripple voltage
27.	Cin Pd	17.692 mW	Power	Input capacitor power dissipation
28.	Cout Pd	30.99 mW	Power	Output capacitor power dissipation
29.	IC Pd	686.538 mW	Power	IC power dissipation
30.	L Pd	167.206 mW	Power	Inductor power dissipation
31.	M1 Pd	1.46 W	Power	M1 MOSFET total power dissipation
32.	M1 PdCond	843.241 mW	Power	M1 MOSFET conduction losses
33.	M1 PdSw	616.812 mW	Power	M1 MOSFET switching losses
34.	M2 Pd	905.146 mW	Power	M2 MOSFET total power dissipation
35.	M2 PdCond	328.807 mW	Power	M2 MOSFET conduction losses
36.	M2 PdSw	576.339 mW	Power	M2 MOSFET switching losses
37.	Total Pd	3.269 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	8.0	Maximum Output Current
2.	VinMax	50.0	Maximum input voltage
3.	VinMin	45.0	Minimum input voltage
4.	Vout	35.0	Output Voltage
5.	base_pn	TPS40170	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS40170** Product Folder : <http://www.ti.com/product/TPS40170> : contains the data sheet and other resources.

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