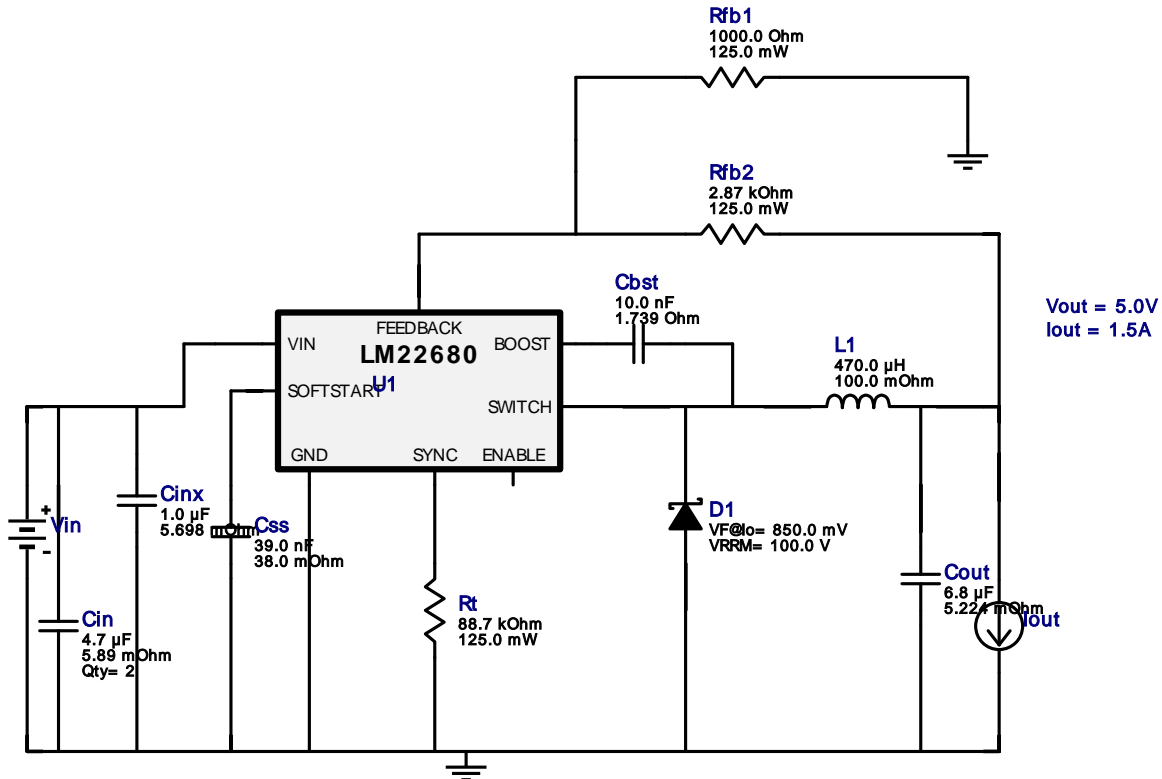



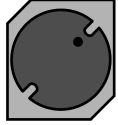




**WEBENCH® Design Report**

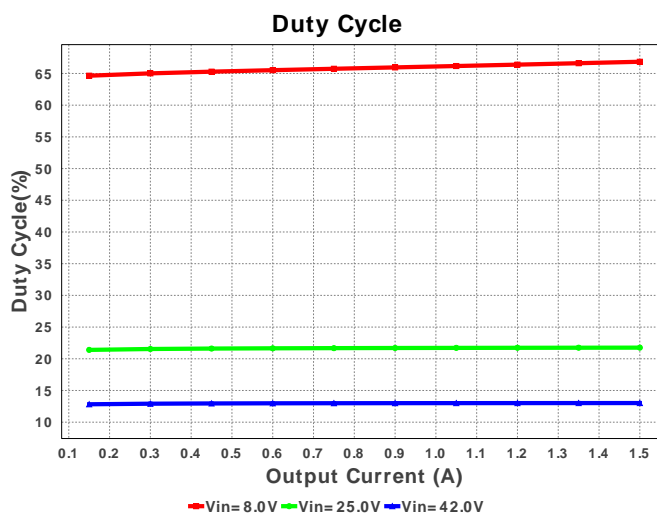
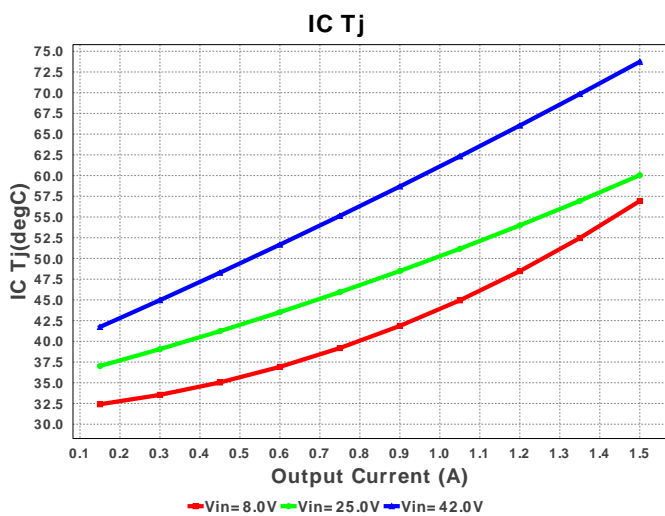
 Design : 1175773/1132 LM22680MRE-ADJ/NOPB  
 LM22680MRE-ADJ/NOPB 8.0V-42.0V to 5.00V @ 1.5A

**My Comments**

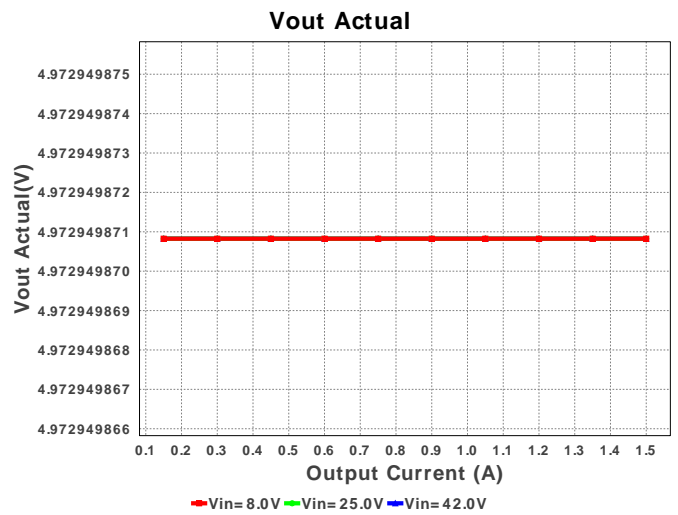
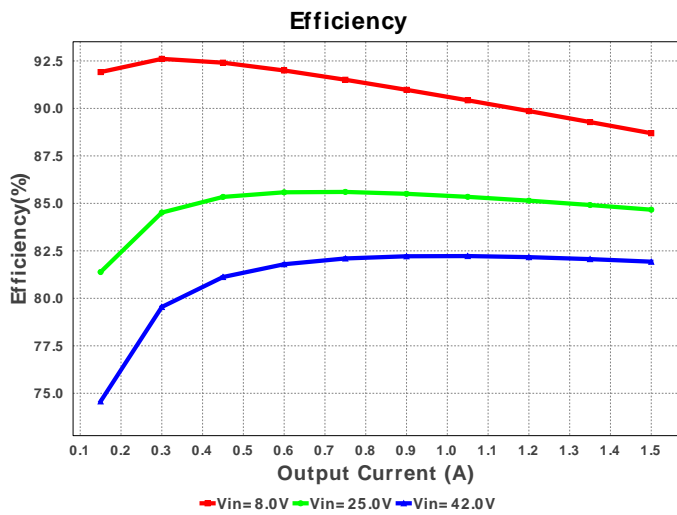
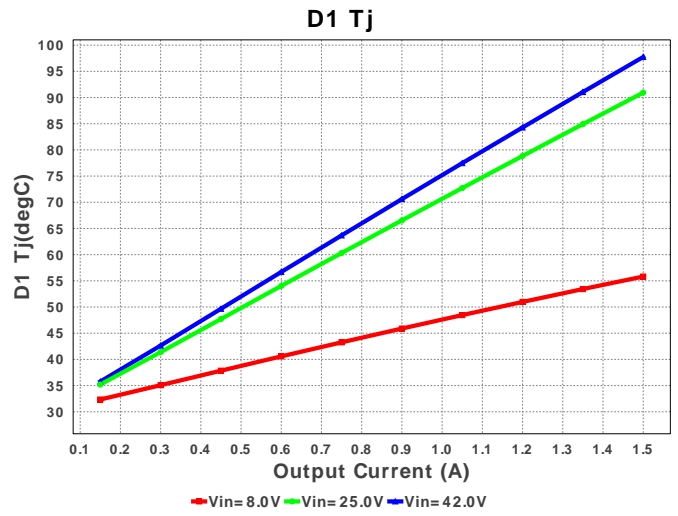
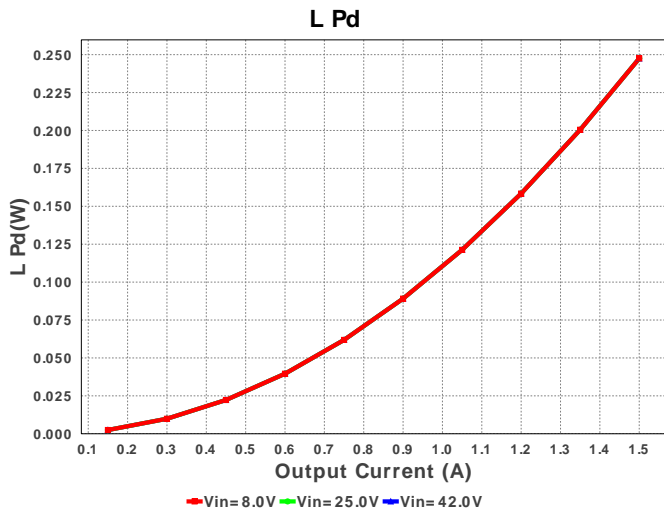
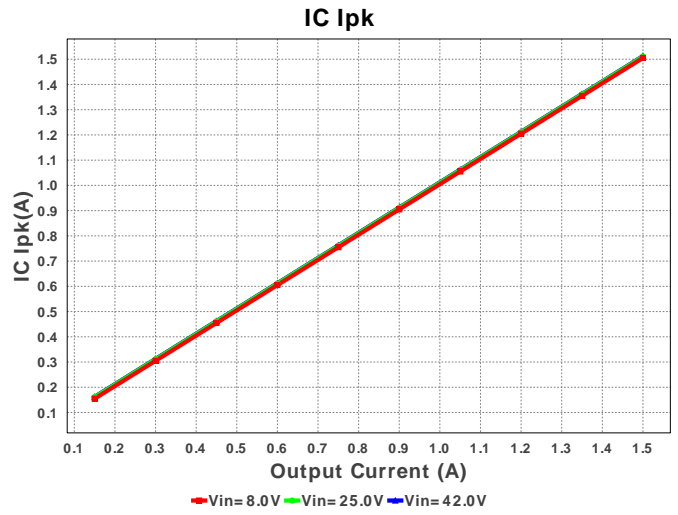
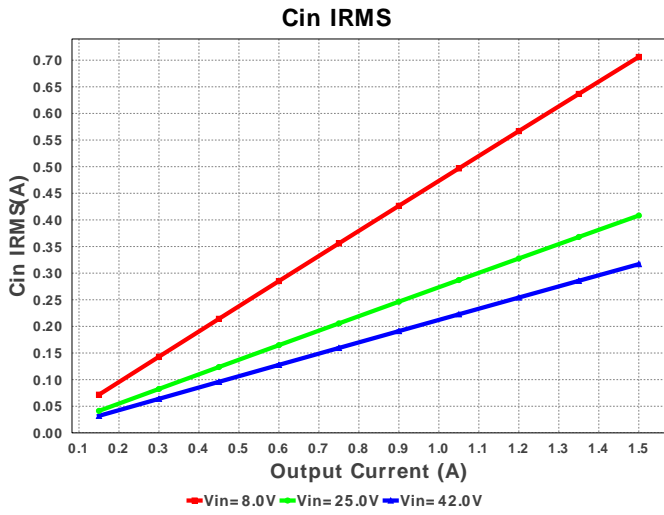
No comments

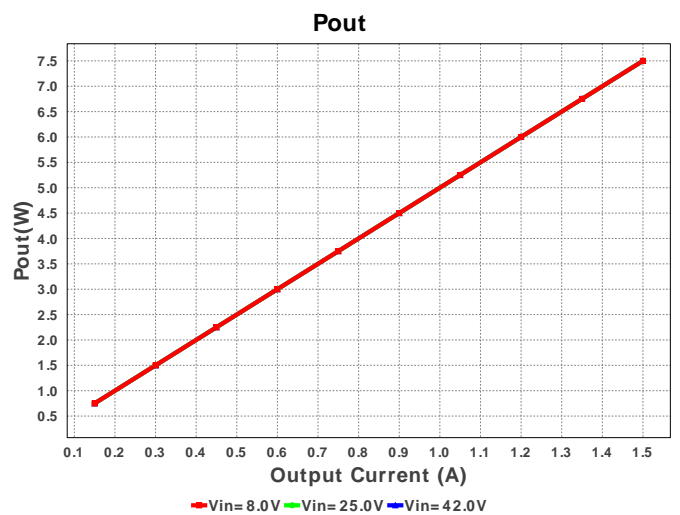
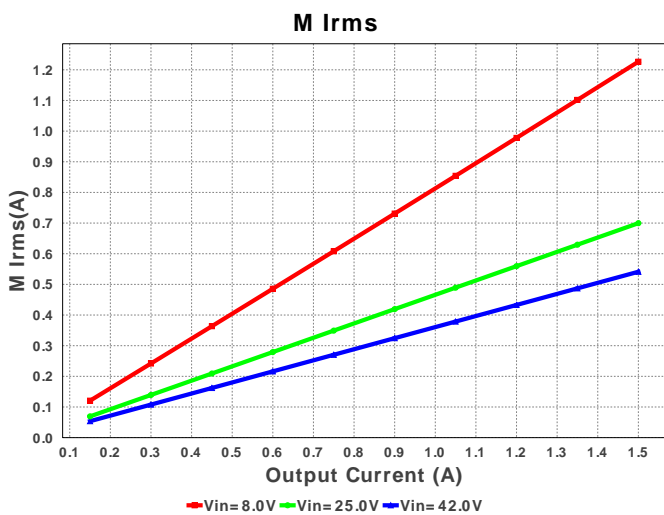
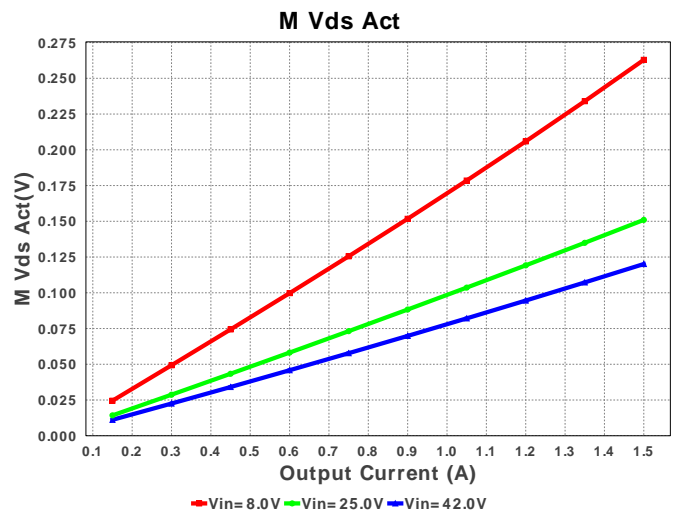
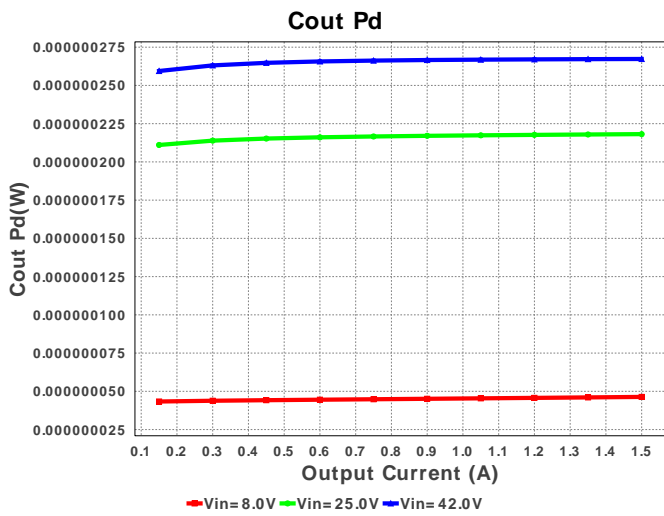
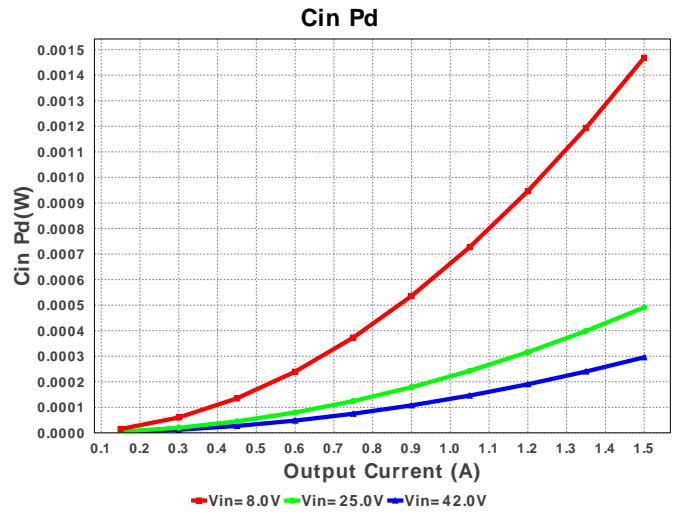
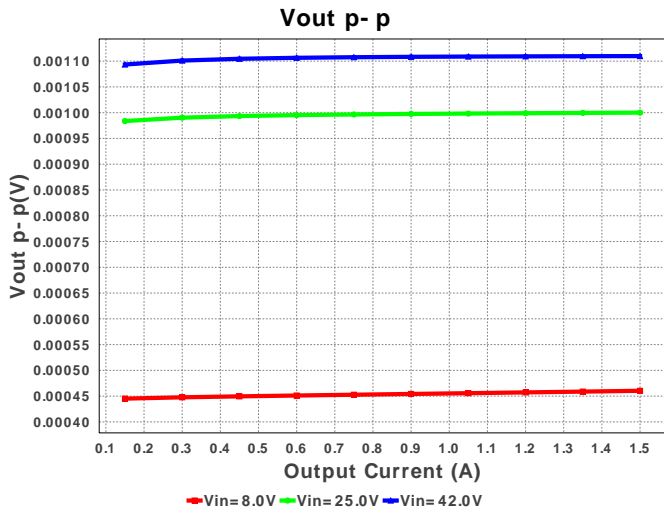
**Electrical BOM**

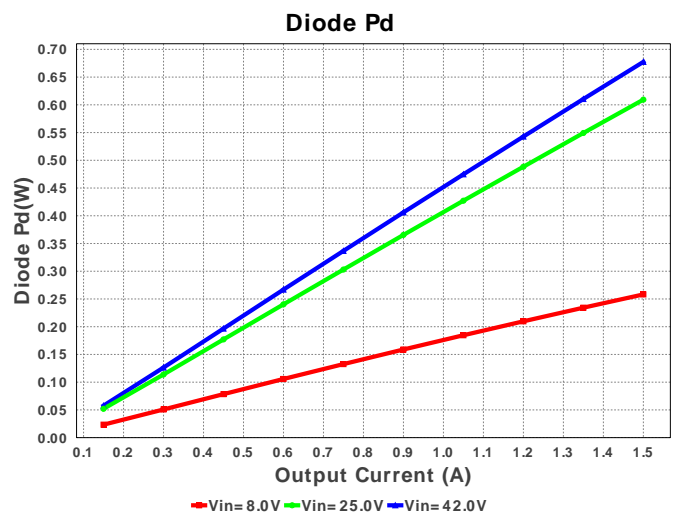
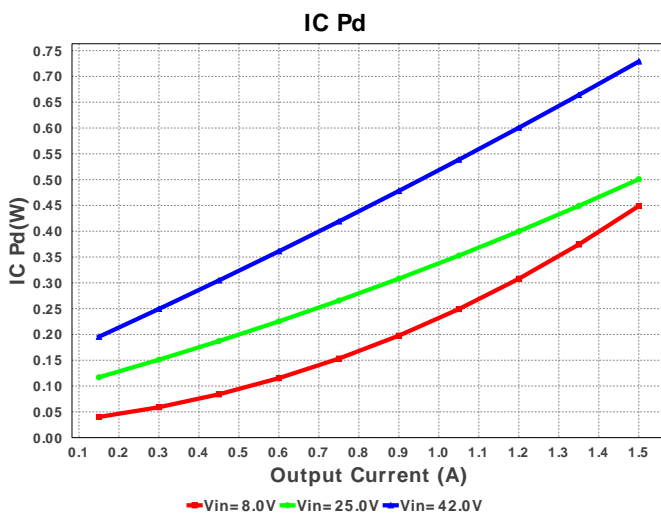
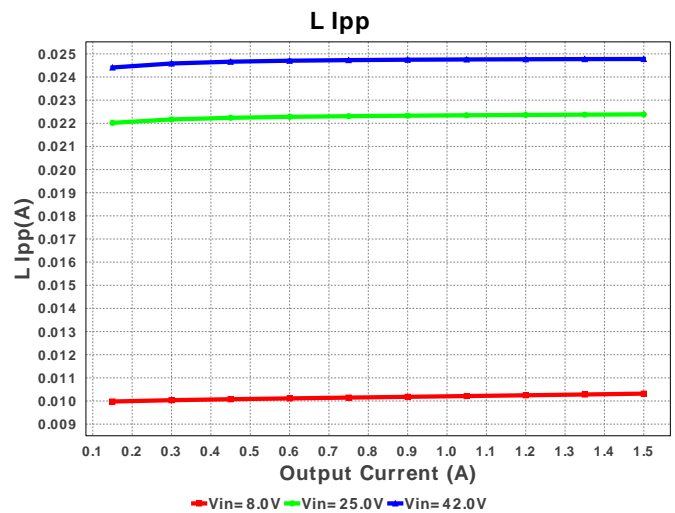
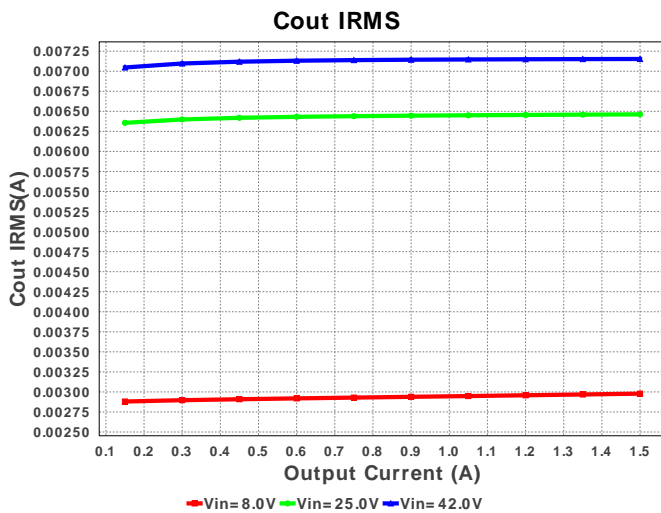
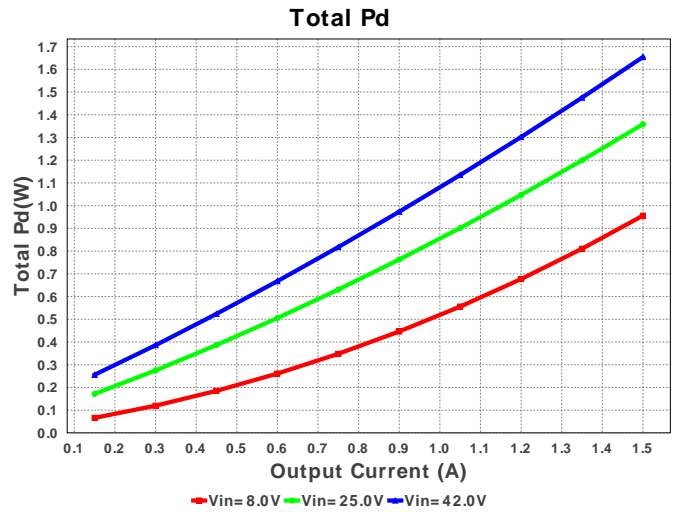
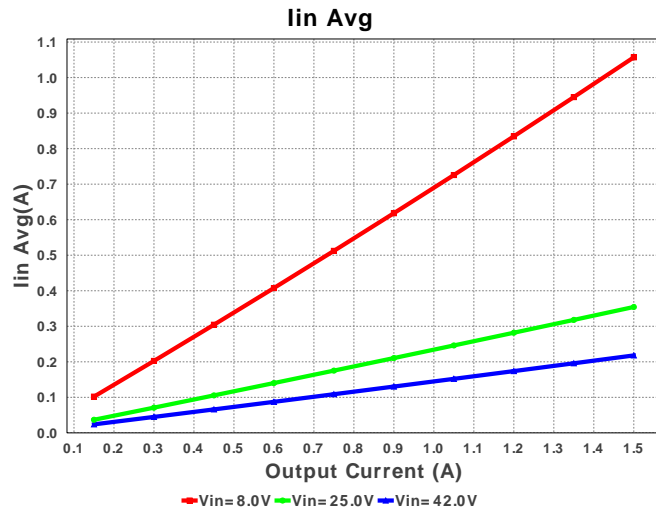
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C103K5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	\$0.01	0805 7 mm <sup>2</sup>
2.	Cin	TDK	C3225X7S2A475M200AB Series= X7S	Cap= 4.7 uF ESR= 5.89 mOhm VDC= 100.0 V IRMS= 6.7739 A	2	\$0.42	1210 15 mm <sup>2</sup>
3.	Cinx	TDK	C3216X5R2A105K Series= X5R	Cap= 1.0 uF ESR= 5.698 mOhm VDC= 100.0 V IRMS= 0.0 A	1	\$0.07	1206 11 mm <sup>2</sup>
4.	Cout	CUSTOM	CUSTOM_CAP_MD Series= CUSTOM	Cap= 6.8 uF ESR= 5.224 mOhm VDC= 16.0 V IRMS= 2.158 A	1	\$0.10	1210 5 mm <sup>2</sup>
5.	Css	AVX	08055C393KAT2A Series= X7R	Cap= 39.0 nF ESR= 38.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.02	0805 7 mm <sup>2</sup>

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
6.	D1	Micro Commercial Components	SK310A-TP	VF@Io= 850.0 mV VRRM= 100.0 V	1	\$0.10	 SMA 37 mm <sup>2</sup>
7.	L1	CUSTOM	CUSTOM_INDUCTOR_MD	L= 470.0 µH DCR= 100.0 mOhm	1	\$0.10	 SDR1105 111 mm <sup>2</sup>
8.	Rfb1	Panasonic	ERJ-6ENF1001V Series= ERJ-6E	Res= 1000.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
9.	Rfb2	Panasonic	ERJ-6ENF2871V Series= ERJ-6E	Res= 2.87 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
10.	Rt	Panasonic	ERJ-6ENF8872V Series= ERJ-6E	Res= 88.7 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm <sup>2</sup>
11.	U1	Texas Instruments	LM22680MRE-ADJ/NOPB	Switcher	1	\$1.96	 MRA08B 56 mm <sup>2</sup>









### Operating Values

#	Name	Value	Category	Description
1.	BOM Count	12		Total Design BOM count
2.	Total BOM	\$3.229		Total BOM Cost
3.	Cin IRMS	316.901 mA	Current	Input capacitor RMS ripple current
4.	Cout IRMS	7.153 mA	Current	Output capacitor RMS ripple current
5.	IC Ipk	1.512 A	Current	Peak switch current in IC
6.	Iin Avg	217.96 mA	Current	Average input current
7.	L Ipp	24.779 mA	Current	Peak-to-peak inductor ripple current
8.	M1 Irms	541.192 mA	Current	Q lavg
9.	FootPrint	335.0 mm <sup>2</sup>	General	Total Foot Print Area of BOM components
10.	Frequency	413.568 kHz	General	Switching frequency
11.	IC Tolerance	19.0 mV	General	IC Feedback Tolerance

#	Name	Value	Category	Description
12.	M Vds Act	120.107 mV	General	Voltage drop across the MosFET
13.	Mode	CCM	General	Conduction Mode
14.	Pout	7.5 W	General	Total output power
15.	D1 Tj	97.742 degC	Op_Point	D1 junction temperature
16.	Vout Actual	4.973 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
17.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
18.	Cross Freq	10.148 kHz	Op_point	Bode plot crossover frequency
19.	Duty Cycle	13.017 %	Op_point	Duty cycle
20.	Efficiency	81.93 %	Op_point	Steady state efficiency
21.	IC Tj	73.734 degC	Op_point	IC junction temperature
22.	ICThetaJA	60.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	1.5 A	Op_point	Iout operating point
24.	Phase Marg	57.271 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	42.0 V	Op_point	Vin operating point
26.	Vout p-p	1.11 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	295.755 µW	Power	Input capacitor power dissipation
28.	Cout Pd	267.285 nW	Power	Output capacitor power dissipation
29.	Diode Pd	677.425 mW	Power	Diode power dissipation
30.	IC Pd	728.897 mW	Power	IC power dissipation
31.	L Pd	247.5 mW	Power	Inductor power dissipation
32.	Total Pd	1.654 W	Power	Total Power Dissipation
33.	Vout Tolerance	2.999 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

## Design Inputs

#	Name	Value	Description
1.	Iout	1.5	Maximum Output Current
2.	SoftStart	1.0 ms	Soft Start Time (ms)
3.	VinMax	42.0	Maximum input voltage
4.	VinMin	8.0	Minimum input voltage
5.	Vout	5.0	Output Voltage
6.	base_pn	LM22680	Base Product Number
7.	source	DC	Input Source Type
8.	Ta	30.0	Ambient temperature
9.	UserFsw	420.0 k	Customer Selected Frequency

## Design Assistance

1. Part Description The LM22680 is a monolithic integrated circuit that provides all of the active functions for a step-down (buck) switching regulator capable of driving up to 2.0A loads with excellent line and load regulation characteristics. High efficiency (>90%) is obtained through the use of a low ON-resistance N-channel MOSFET.

2. **LM22680** Product Folder : <http://www.ti.com/product/LM22680> : contains the data sheet and other resources.

Texas Instruments' WEBENCH simulation tools attempt to recreate the performance of a substantially equivalent physical implementation of the design. Simulations are created using Texas Instruments' published specifications as well as the published specifications of other device manufacturers. While Texas Instruments does update this information periodically, this information may not be current at the time the simulation is built. Texas Instruments does not warrant the accuracy or completeness of the specifications or any information contained therein. Texas Instruments does not warrant that any designs or recommended parts will meet the specifications you entered, will be suitable for your application or fit for any particular purpose, or will operate as shown in the simulation in a physical implementation. Texas Instruments does not warrant that the designs are production worthy.

**You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.**

Use of Texas Instruments' WEBENCH simulation tools is subject to [Texas Instruments' Site Terms and Conditions of Use](#). Prototype boards based on WEBENCH created designs are provided AS IS without warranty of any kind for evaluation and testing purposes and are subject to the terms of the [Evaluation License Agreement](#).