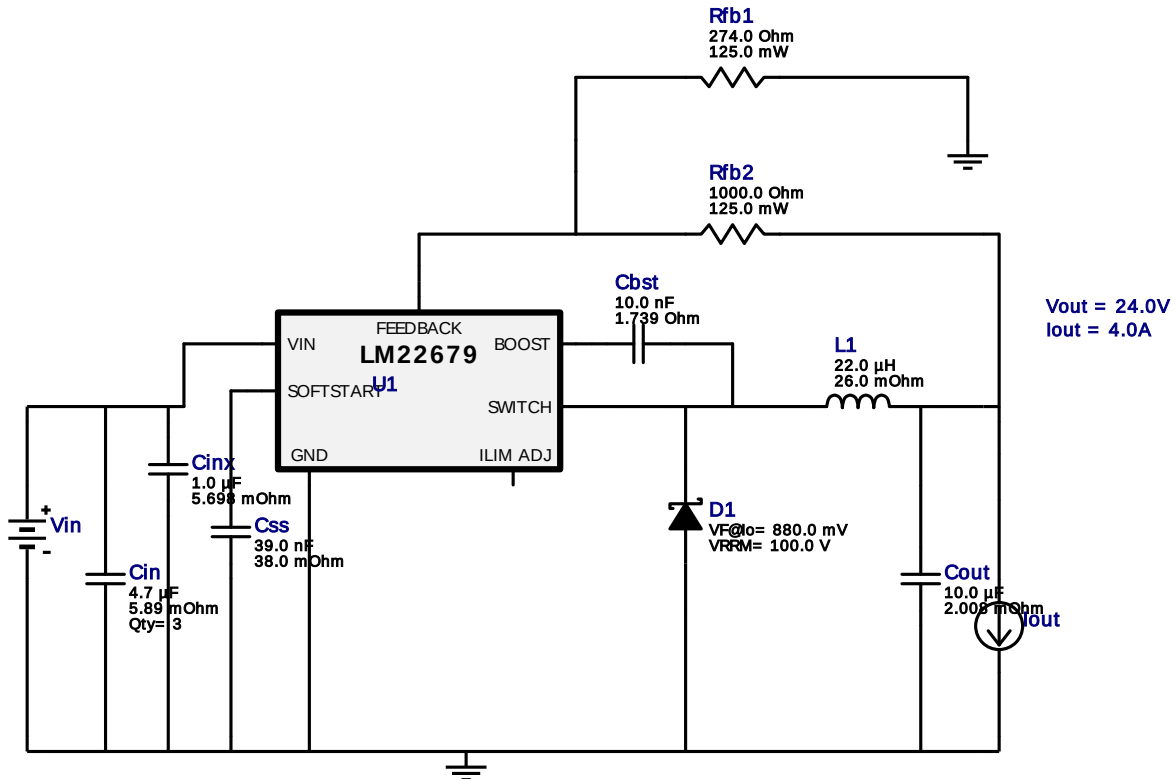


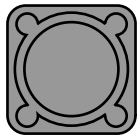
WEBENCH® Design Report

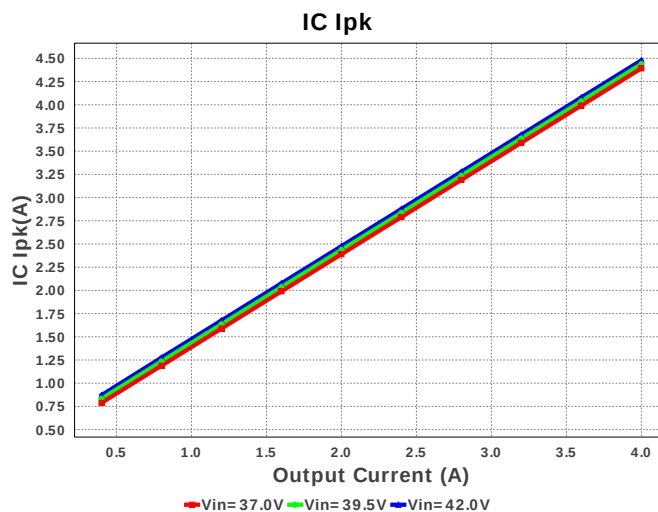
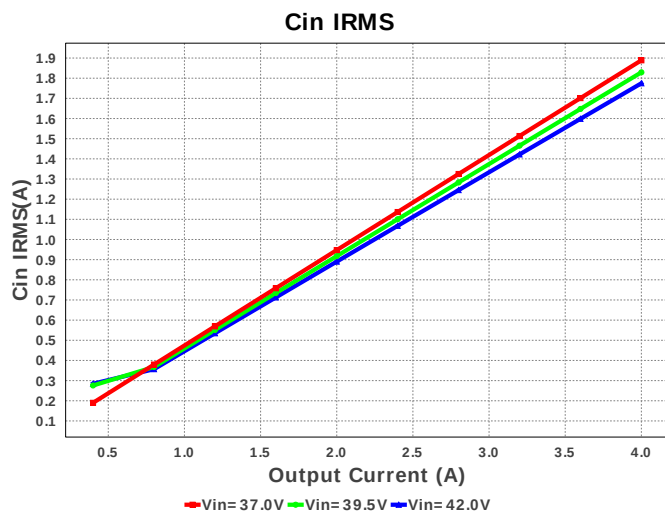
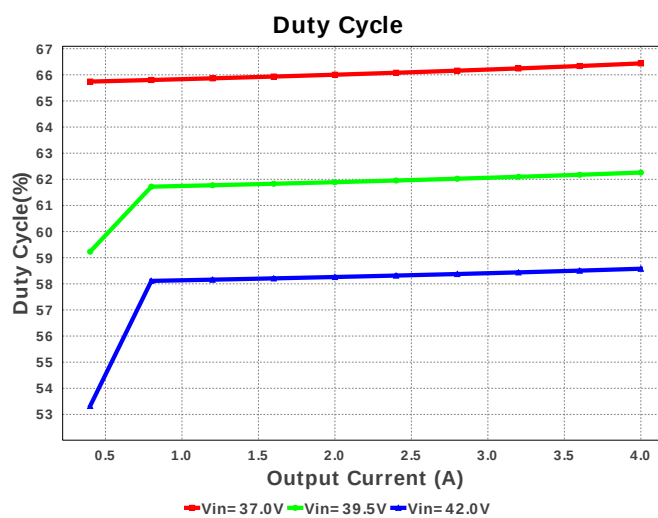
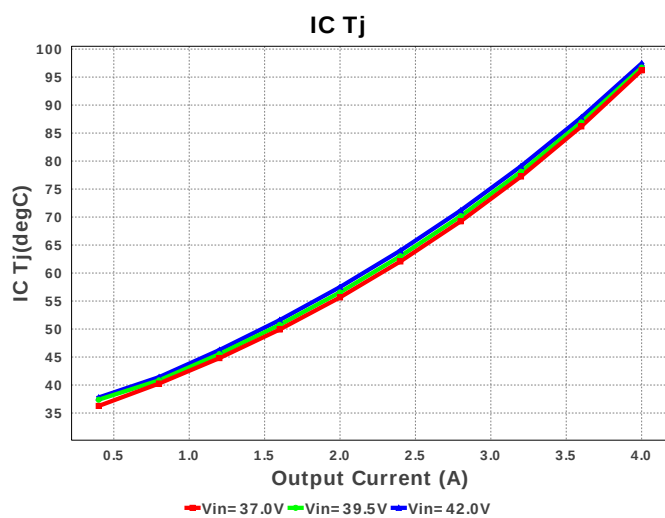
Design : 4738396/6 LM22679TJ-5.0/NOPB
LM22679TJ-5.0/NOPB 37.0V-42.0V to 24.00V @ 4.0A

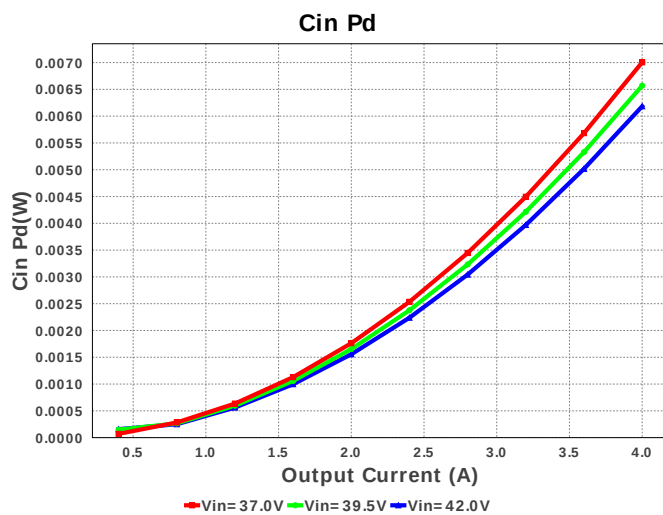
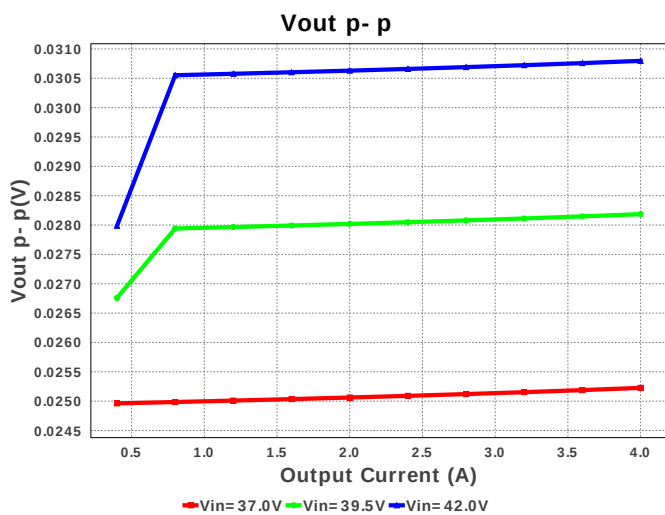
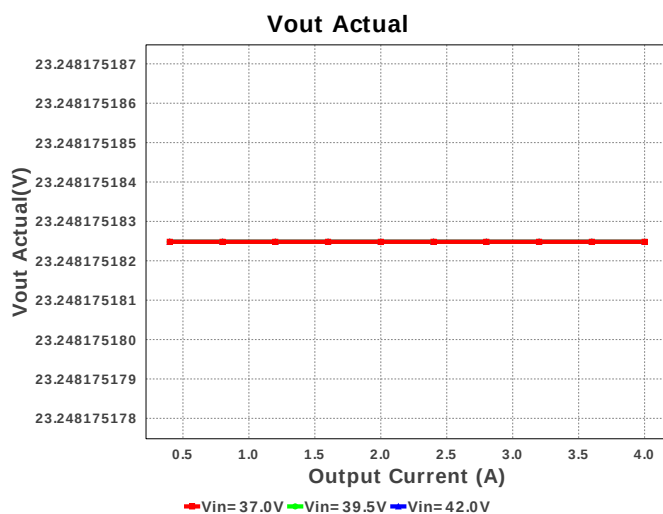
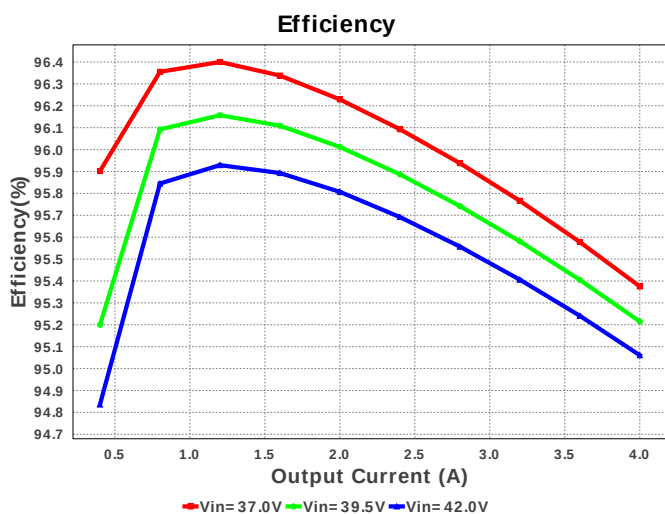
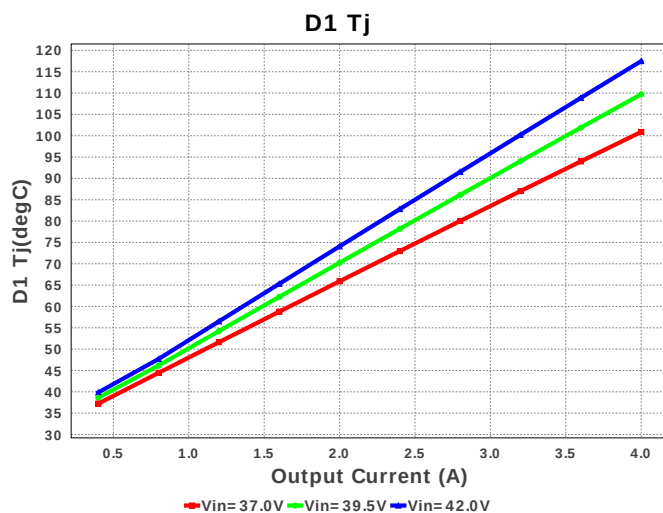
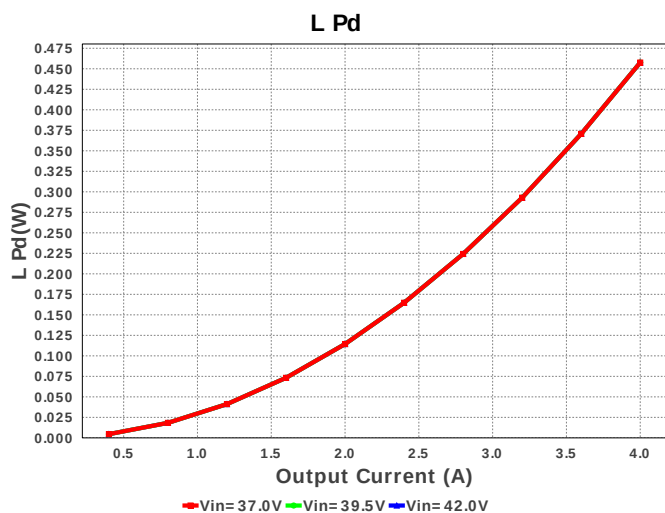


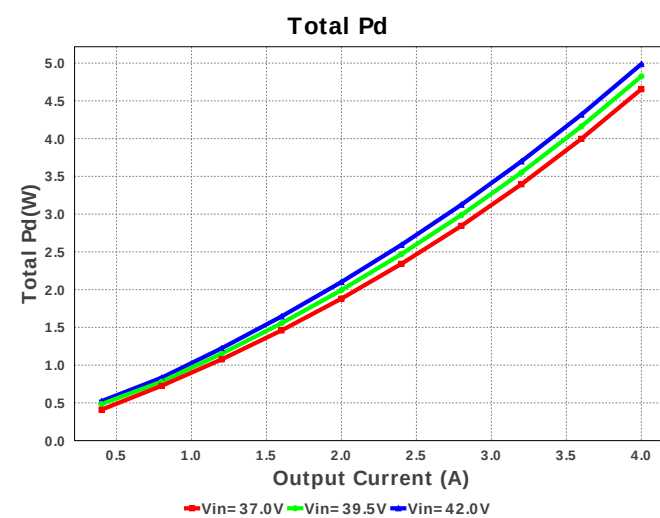
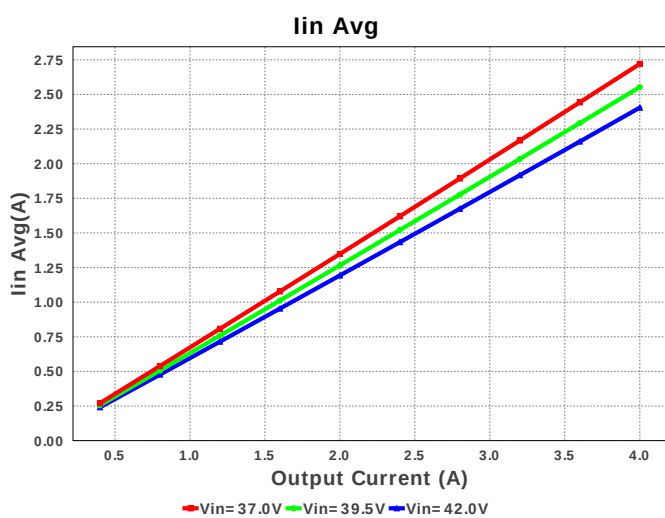
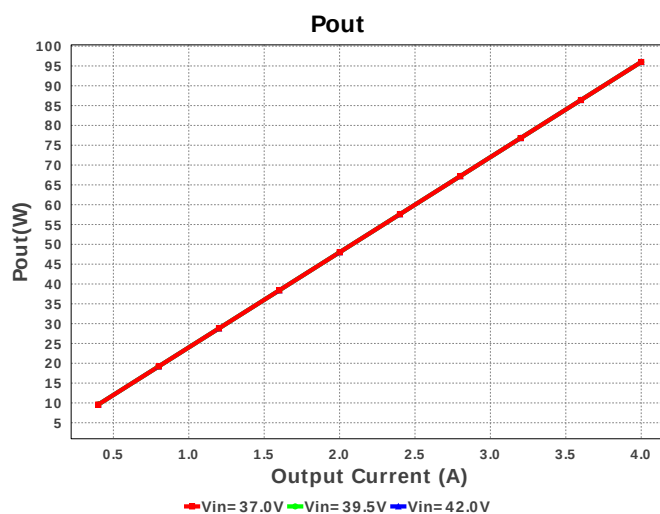
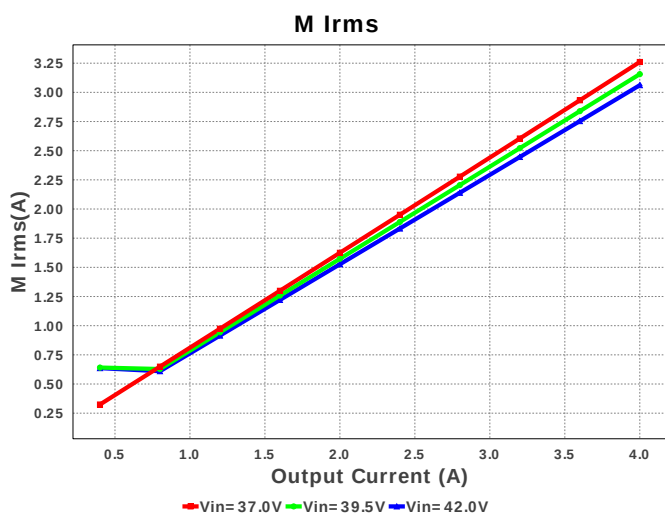
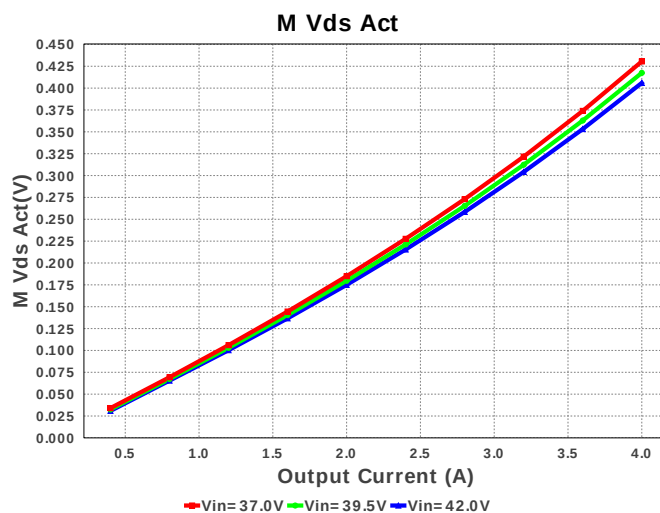
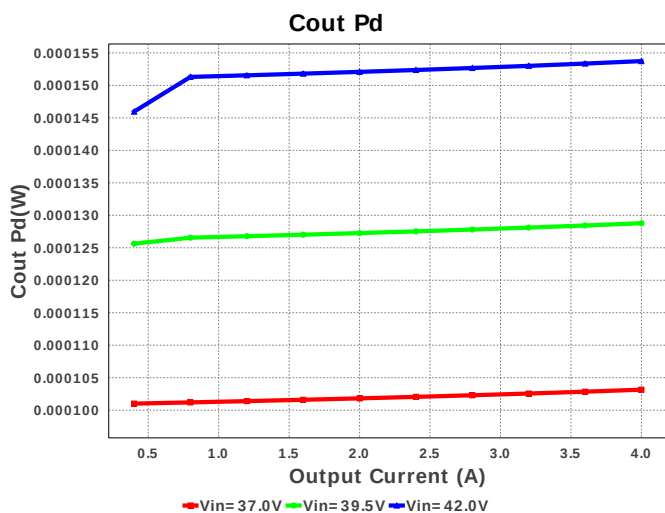
Electrical BOM

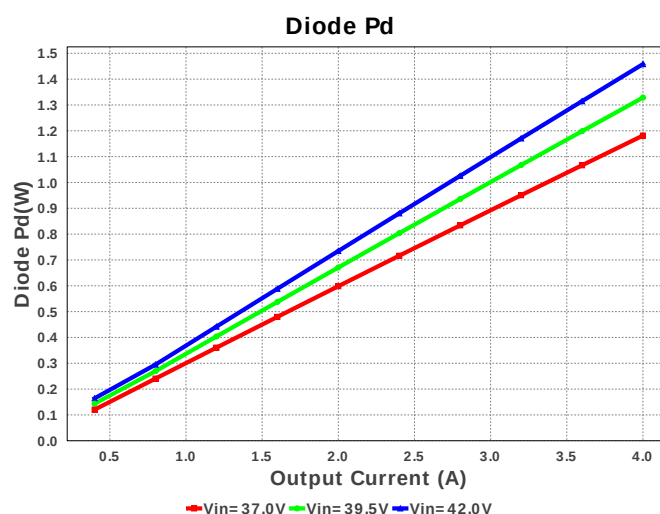
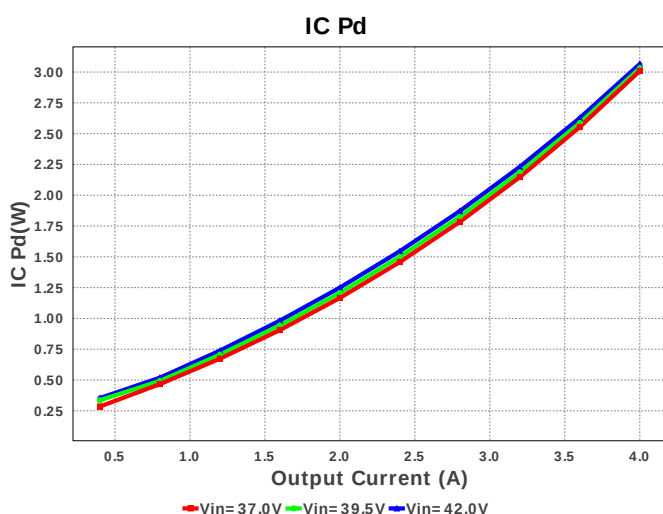
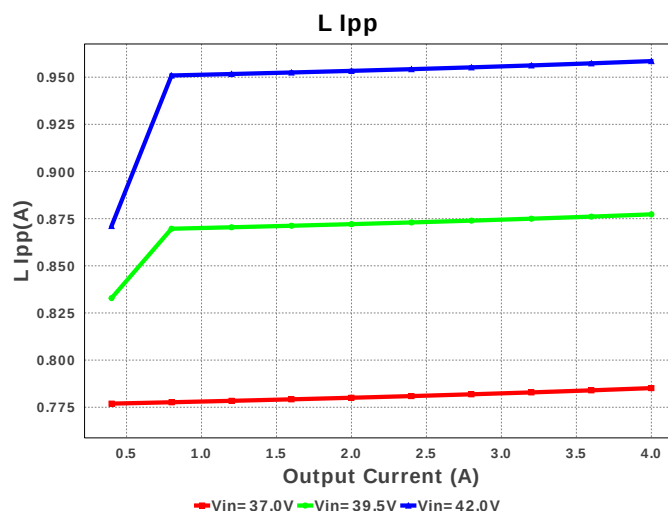
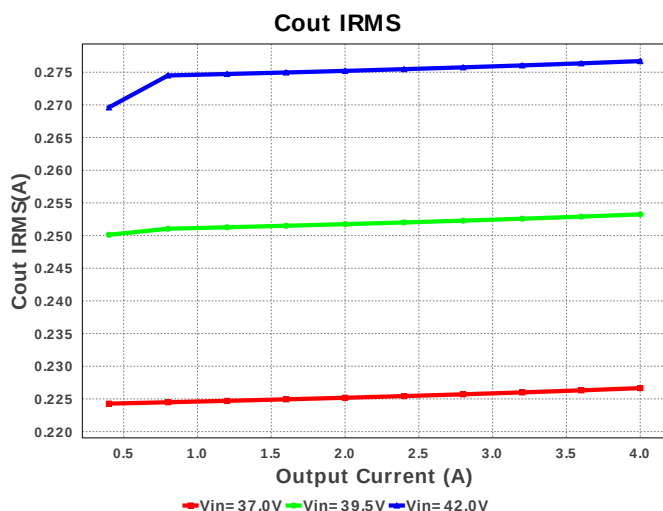
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C103K5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	\$0.01	0805 7 mm ²
2.	Cin	TDK	C3225X7S2A475M200AB Series= X7S	Cap= 4.7 uF ESR= 5.89 mOhm VDC= 100.0 V IRMS= 6.7739 A	3	\$0.42	1210 15 mm ²
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 ²
4.	Cout	MuRata	GRM32ER7YA106KA12L Series= X7R	Cap= 10.0 uF ESR= 2.008 mOhm VDC= 35.0 V IRMS= 4.6772 A	1	\$0.22	1210_280 15 mm ²
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 ²
6.	D1	Vishay-Semiconductor	SS10PH10-M3/86A	VF@Io= 880.0 mV VRRM= 100.0 V	1	\$0.29	TO-277A 56 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	L1	Coilcraft	MSS1210-223MEB	L= 22.0 μ H DCR= 26.0 mOhm	1	\$0.81	 MSS1210 204 mm ²
8.	Rfb1	Vishay-Dale	CRCW0805274RFKEA Series= CRCW..e3	Res= 274.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
9.	Rfb2	Panasonic	ERJ-6ENF1001V Series= ERJ-6E	Res= 1000.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
10.	U1	Texas Instruments	LM22679TJ-5.0/NOPB	Switcher	1	\$2.40	 TJ7A 199 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.775 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	276.704 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	4.479 A	Current	Peak switch current in IC
4.	Iin Avg	2.404 A	Current	Average input current
5.	L Ipp	958.53 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	3.061 A	Current	Q lavg
7.	BOM Count	12	General	Total Design BOM count
8.	FootPrint	556.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	500.0 kHz	General	Switching frequency
10.	IC Tolerance	75.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	405.941 mV	General	Voltage drop across the MosFET
12.	Pout	96.0 W	General	Total output power
13.	Total BOM	\$5.1	General	Total BOM Cost
14.	D1 Tj	117.486 degC	Op_Point	D1 junction temperature
15.	Vout Actual	23.248 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	24.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	52.559 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	58.577 %	Op_point	Duty cycle
19.	Efficiency	95.061 %	Op_point	Steady state efficiency
20.	IC Tj	97.442 degC	Op_point	IC junction temperature
21.	ICThetaJA	22.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	4.0 A	Op_point	Iout operating point
23.	Phase Marg	46.351 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	42.0 V	Op_point	Vin operating point
25.	Vout p-p	30.797 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	6.184 mW	Power	Input capacitor power dissipation
27.	Cout Pd	153.743 μ W	Power	Output capacitor power dissipation
28.	Diode Pd	1.458 W	Power	Diode power dissipation
29.	IC Pd	3.066 W	Power	IC power dissipation
30.	L Pd	457.6 mW	Power	Inductor power dissipation
31.	Total Pd	4.988 W	Power	Total Power Dissipation

#	Name	Value	Category	Description
32.	Vout Tolerance	3.11 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	4.0	Maximum Output Current
2.	VinMax	42.0	Maximum input voltage
3.	VinMin	37.0	Minimum input voltage
4.	Vout	24.0	Output Voltage
5.	base_pn	LM22679	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. Why WEBENCH recommends the 5.0 option for your 24.0V output: The internal compensation for the ADJ version of the LM22679 is optimized for output voltages below 5V. Therefore it is recommended that for outputs greater than 5V, the 5.0 option be used with an additional external resistive feedback divider. Part Description The LM22679 is a monolithic integrated circuit that provides all of the active functions for a step-down (buck) switching regulator capable of driving up to 5.0A 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. **LM22679** Product Folder : <http://www.ti.com/product/LM22679> : 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](#).