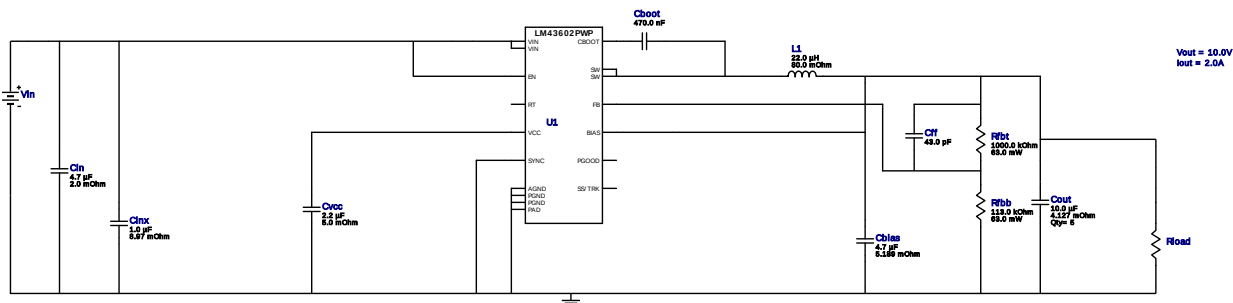


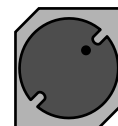
WEBENCH® Design Report

Design : 4352199/52 LM43602PWPR
LM43602PWPR 22.0V-30.0V to 10.00V @ 2.0A


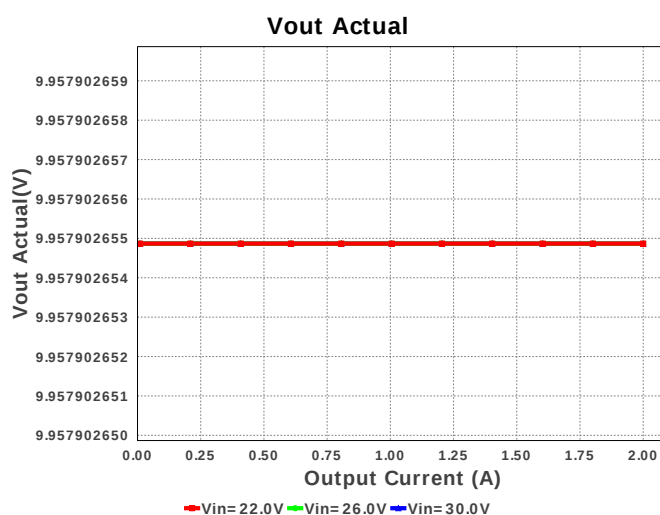
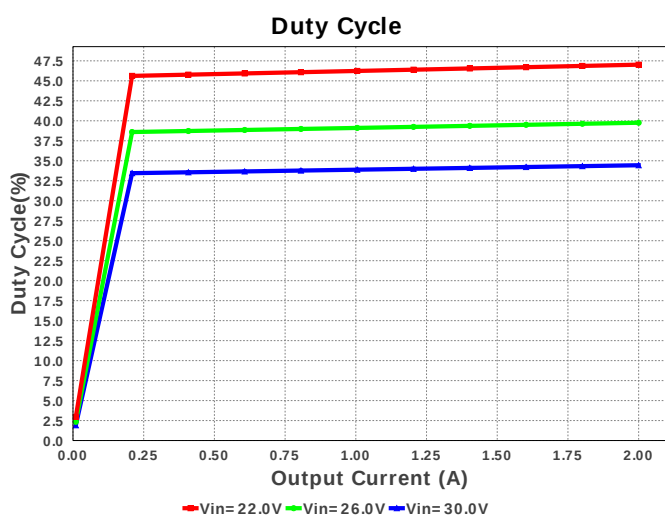
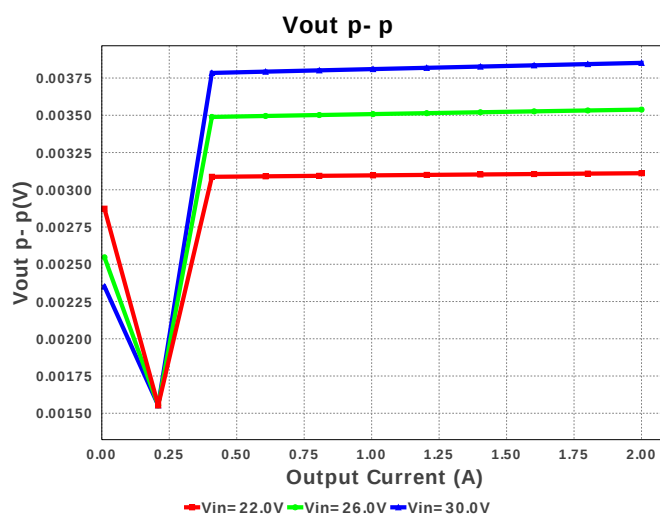
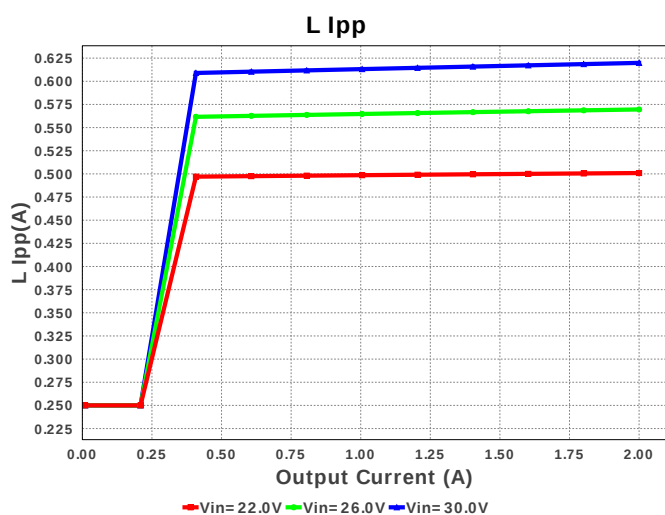
1. The input capacitor included in the BOM only contains a small filter capacitor that should be placed near the IC. Depending on where the power supply is laid out in the system additional bulk capacitance may need to be added to filter the line ripple.
2. If there is no VinTyp specified, WEBENCH will use the VinMax value. To change the VinTyp value, click on the "Change Design Inputs" button under the Optimization Tuning knob. In some applications, while the design requires the input voltage to be a wide range, for a majority of the time, it is operating at a much lower voltage than the maximum input voltage. Sizing the inductor based on the maximum input voltage may yield an inductance much larger than typically needed, causing a larger footprint for the overall design. At the same time, components such as the input capacitor must be rated based on the maximum input voltage. WEBENCH now supports the use of this additional input voltage specification.

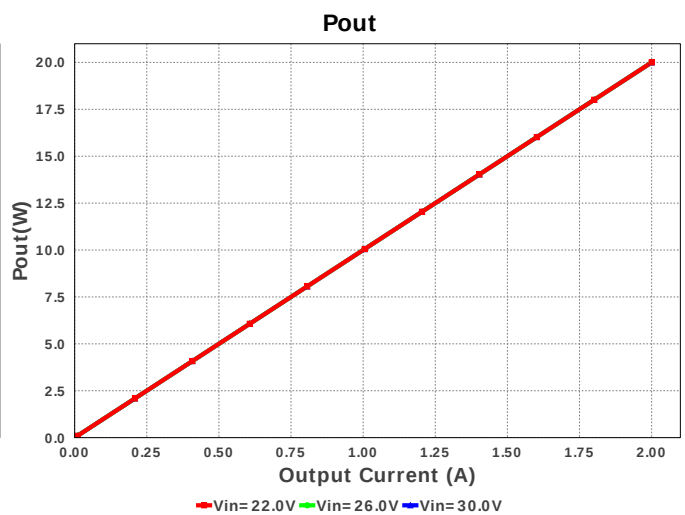
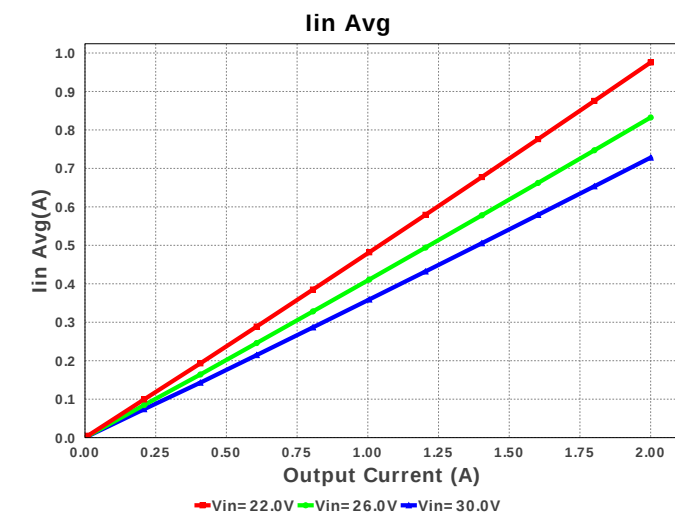
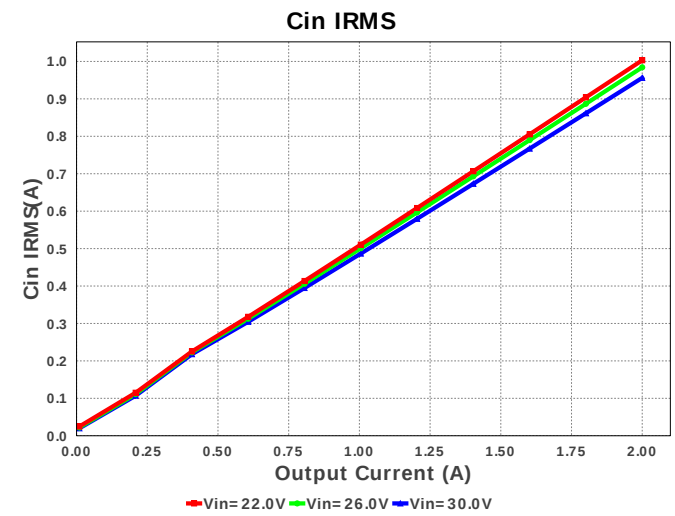
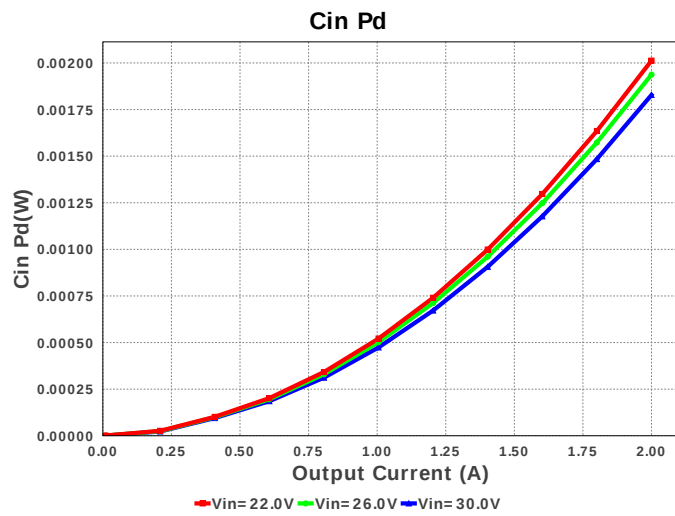
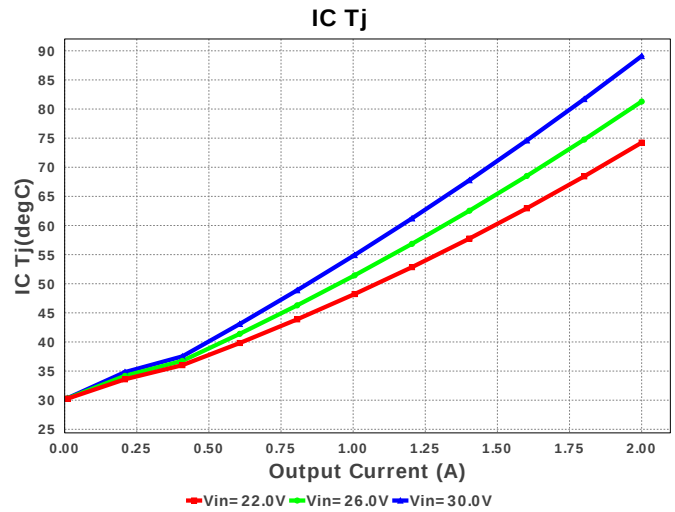
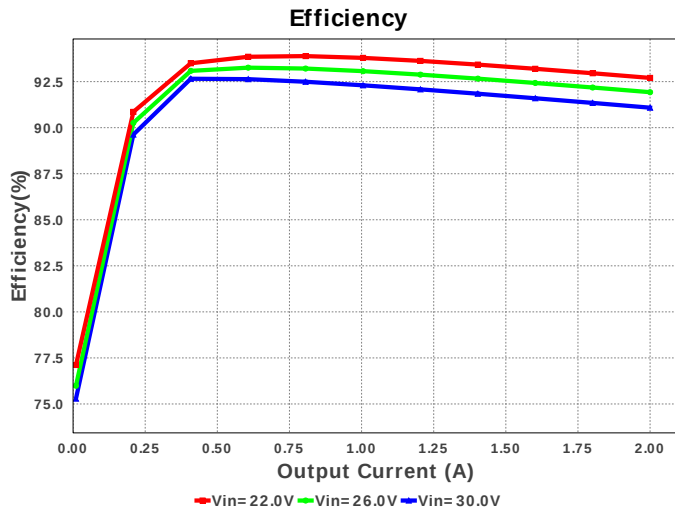
Electrical BOM

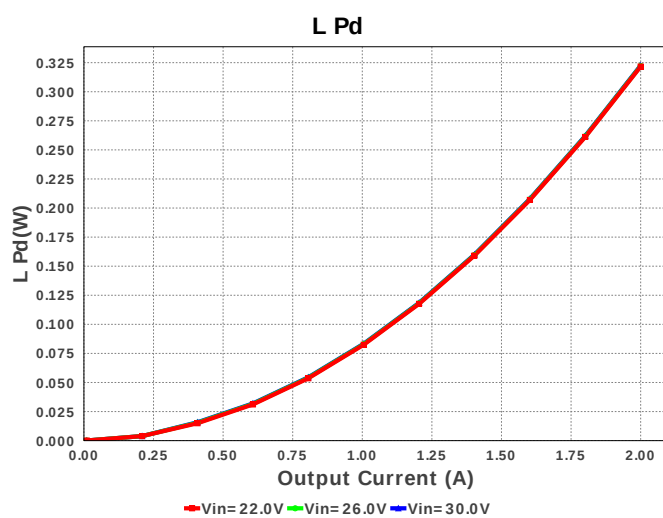
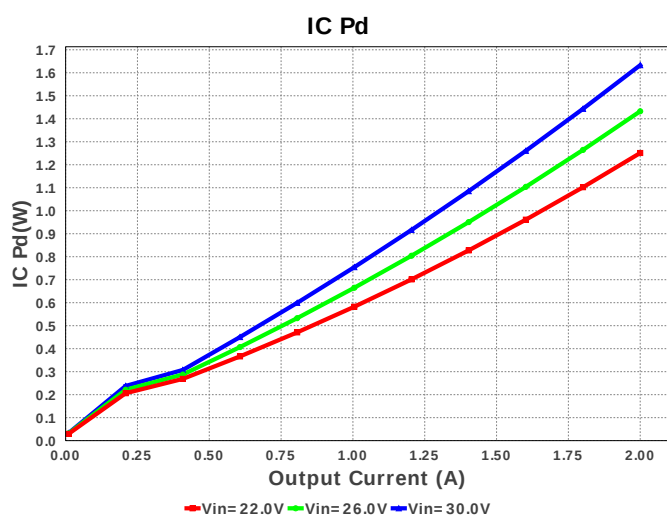
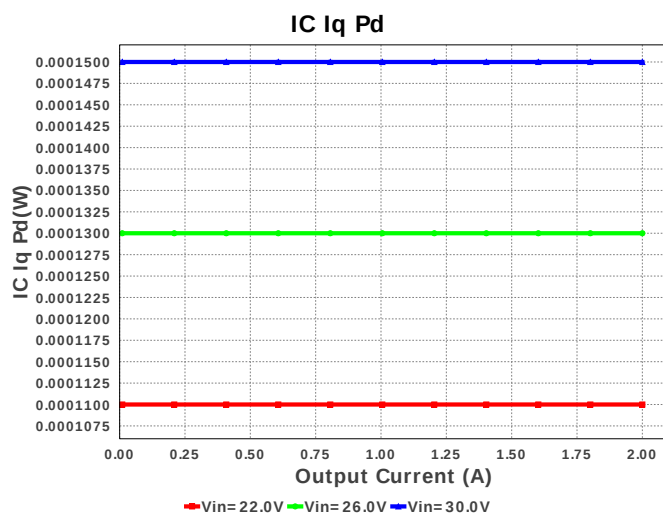
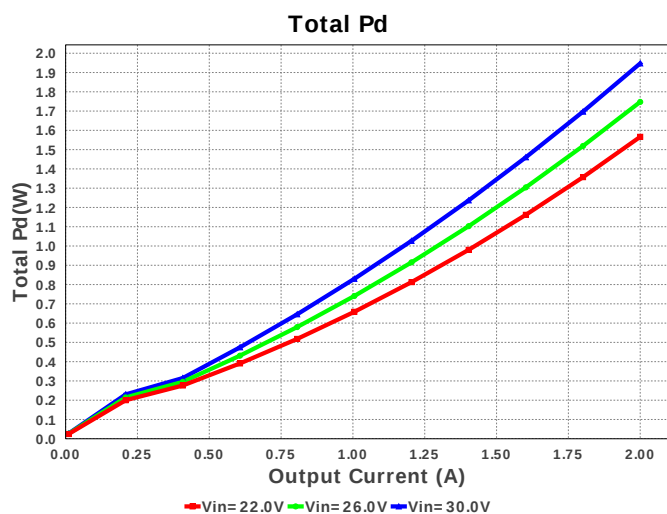
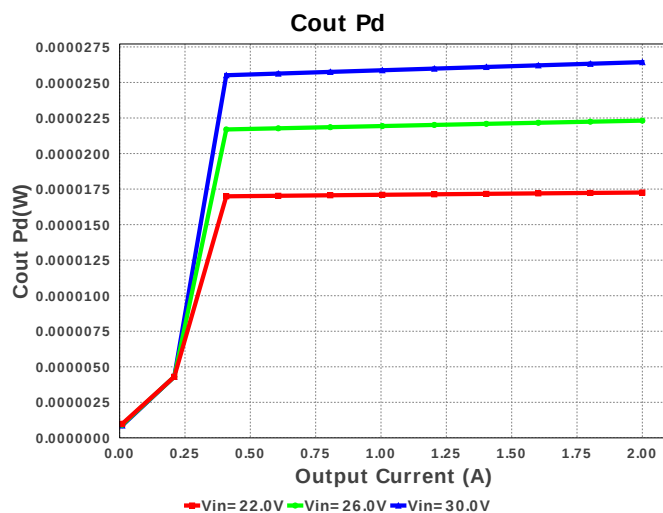
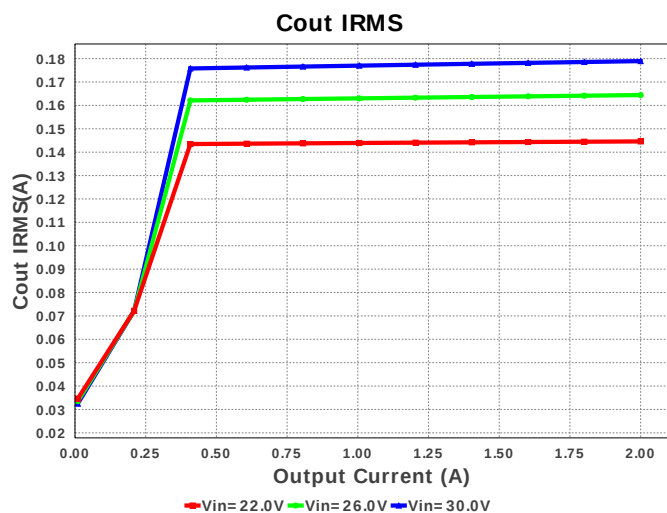
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbias	MuRata	GRM21BR61E475KA12L Series= X5R	Cap= 4.7 uF ESR= 5.189 mOhm VDC= 25.0 V IRMS= 2.03531 A	1	\$0.02	0805 7 mm ²
2.	Cboot	MuRata	GRM155C80J474KE19D Series= X6S	Cap= 470.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
3.	Cff	Samsung Electro-Mechanics	CL21C430JBANNNC Series= C0G/NP0	Cap= 43.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
4.	Cin	MuRata	GRM32ER71H475KA88L Series= X7R	Cap= 4.7 uF ESR= 2.0 mOhm VDC= 50.0 V IRMS= 5.35 A	1	\$0.19	1210 15 mm ²
5.	Cinx	TDK	C3216X5R1H105K Series= X5R	Cap= 1.0 uF ESR= 8.97 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.02	1206 11 mm ²
6.	Cout	MuRata	GRM21BR61C106KE15L Series= X5R	Cap= 10.0 uF ESR= 4.127 mOhm VDC= 16.0 V IRMS= 2.46634 A	5	\$0.03	0805 7 mm ²
7.	Cvcc	MuRata	GRM155R60J225ME15D Series= X5R	Cap= 2.2 uF ESR= 5.0 mOhm VDC= 6.3 V IRMS= 3.67 A	1	\$0.02	0402 3 mm ²
8.	L1	Bourns	SDR1105-220ML	L= 22.0 uH DCR= 80.0 mOhm	1	\$0.29	SDR1105 157 mm ²

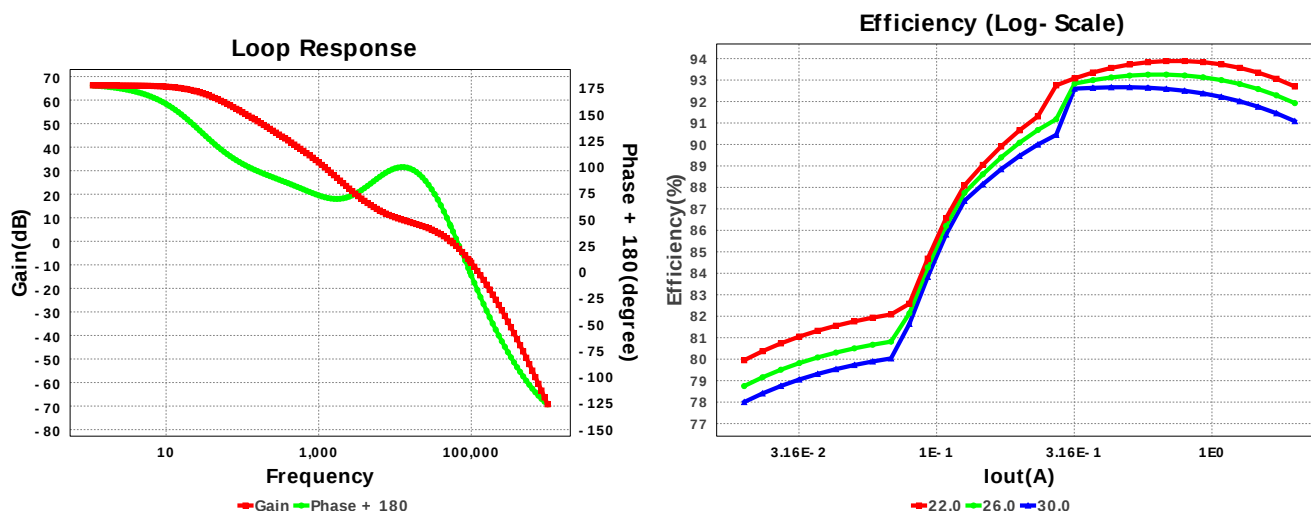


#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Rfbb	Vishay-Dale	CRCW0402113KFKED Series= CRCW..e3	Res= 113.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
10.	Rfbt	Vishay-Dale	CRCW04021M00FKED Series= CRCW..e3	Res= 1000.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
11.	U1	Texas Instruments	LM43602PWPR	Switcher	1	\$1.75	 PWP0016F 59 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	956.123 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	178.94 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	728.12 mA	Current	Average input current
4.	L Ipp	619.87 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	15	General	Total Design BOM count
6.	FootPrint	301.0 mm ²	General	Total Foot Print Area of BOM components
7.	Frequency	500.0 kHz	General	Switching frequency
8.	Pout	20.0 W	General	Total output power
9.	Total BOM	\$2.48	General	Total BOM Cost
10.	Low Freq Gain	66.223 dB	Op_Point	Gain at 10Hz
11.	Vout Actual	9.958 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
12.	Vout OP	10.0 V	Op_Point	Operational Output Voltage
13.	Cross Freq	53.751 kHz	Op_point	Bode plot crossover frequency
14.	Duty Cycle	34.439 %	Op_point	Duty cycle
15.	Efficiency	91.085 %	Op_point	Steady state efficiency
16.	Gain Marg	-8.377 dB	Op_point	Bode Plot Gain Margin
17.	IC Tj	89.091 degC	Op_point	IC junction temperature
18.	ICThetaJA	38.9 degC/W	Op_point	IC junction-to-ambient thermal resistance
19.	IOUT_OP	2.0 A	Op_point	Iout operating point
20.	Phase Marg	43.633 deg	Op_point	Bode Plot Phase Margin
21.	VIN_OP	30.0 V	Op_point	Vin operating point
22.	Vout p-p	3.852 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	1.828 mW	Power	Input capacitor power dissipation
24.	Cout Pd	26.429 μW	Power	Output capacitor power dissipation
25.	IC Iq Pd	150.0 μW	Power	IC Iq Pd
26.	IC Pd	1.633 W	Power	IC power dissipation
27.	L Pd	322.562 mW	Power	Inductor power dissipation
28.	Total Pd	1.947 W	Power	Total Power Dissipation
29.	Vout Tolerance	2.822 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	30.0	Maximum input voltage
3.	VinMin	22.0	Minimum input voltage
4.	Vout	10.0	Output Voltage
5.	base_pn	LM43602	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM43602** Product Folder : <http://www.ti.com/product/LM43602> : contains the data sheet and other resources.

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

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