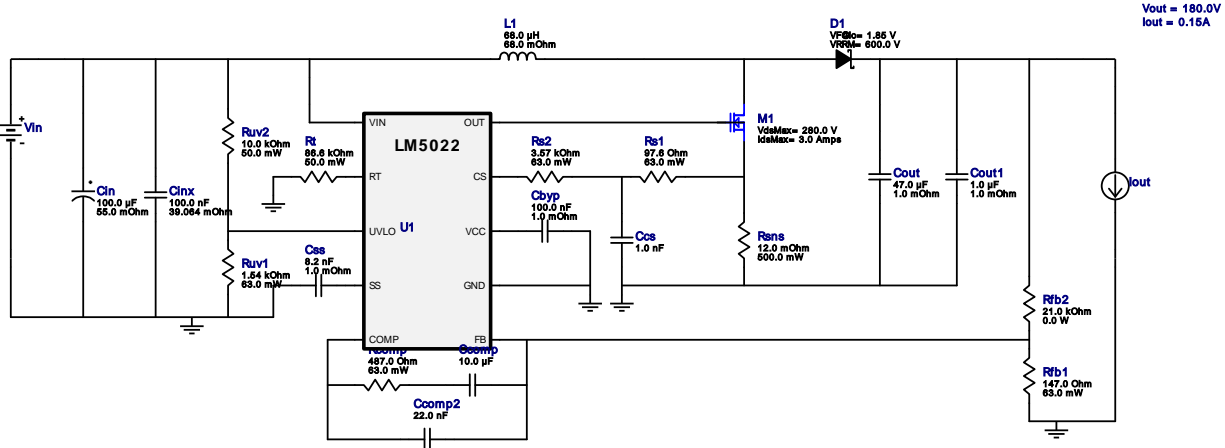


WEBENCH® Design Report

 Design : LM5022MM/NOPB
 LM5022MM/NOPB 12.0V-13.6V to 180.00V @ 0.15A


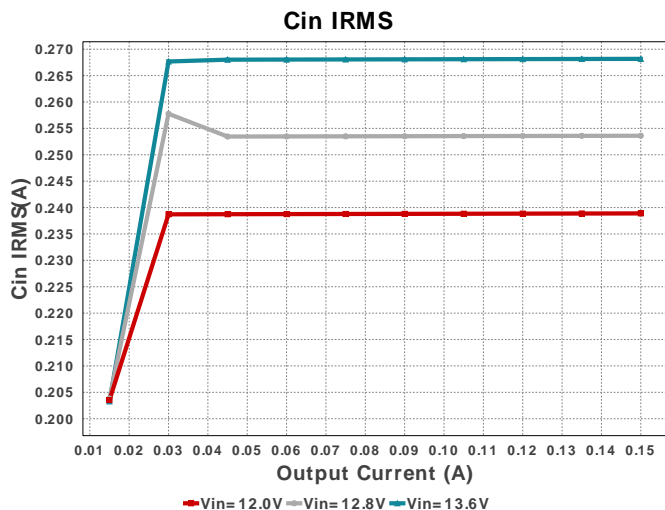
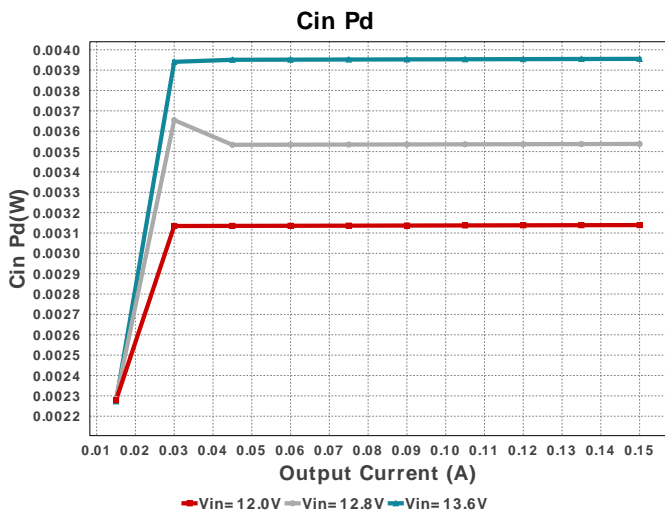
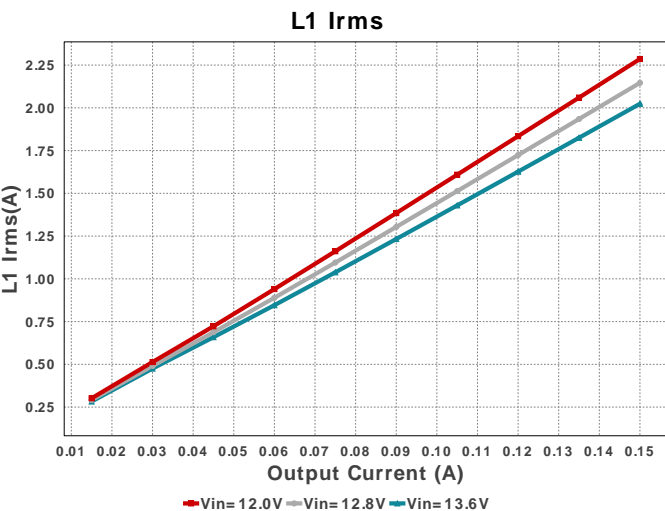
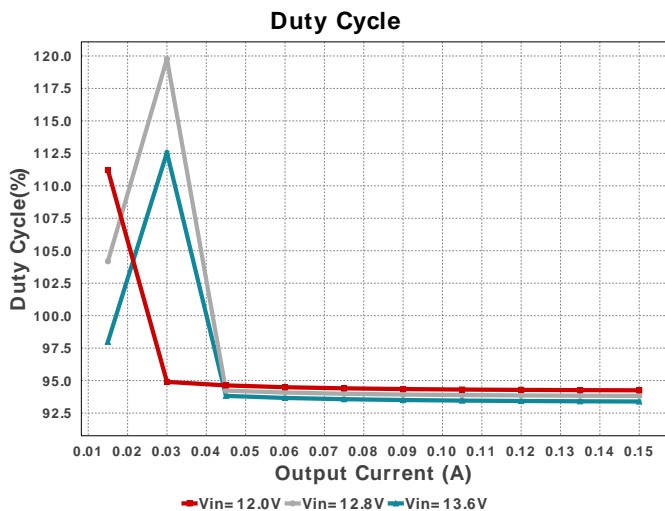
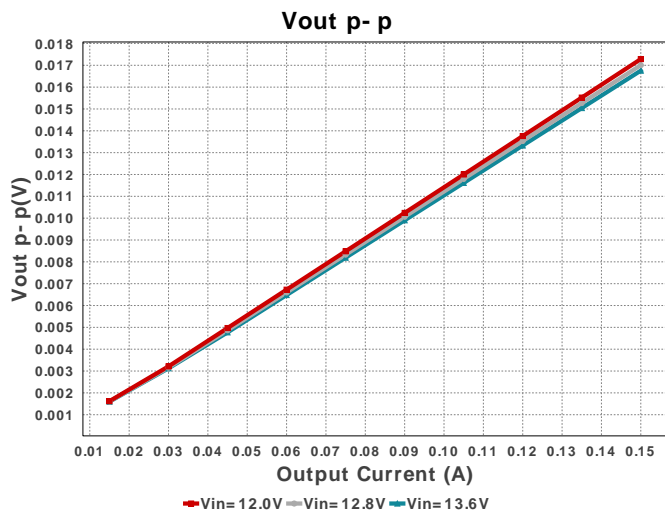
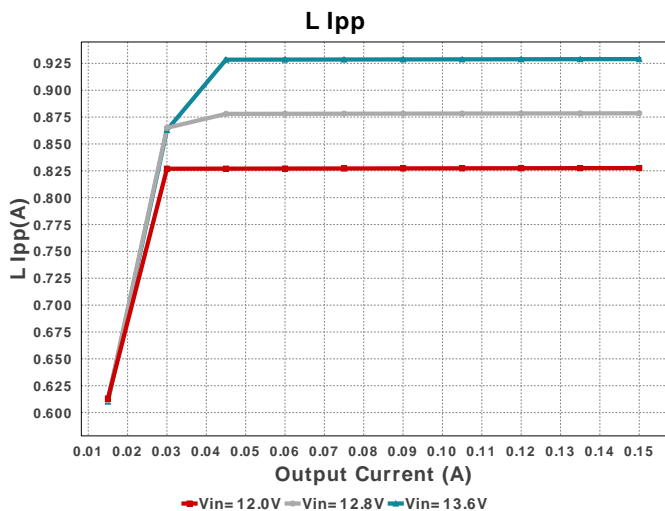
My Comments

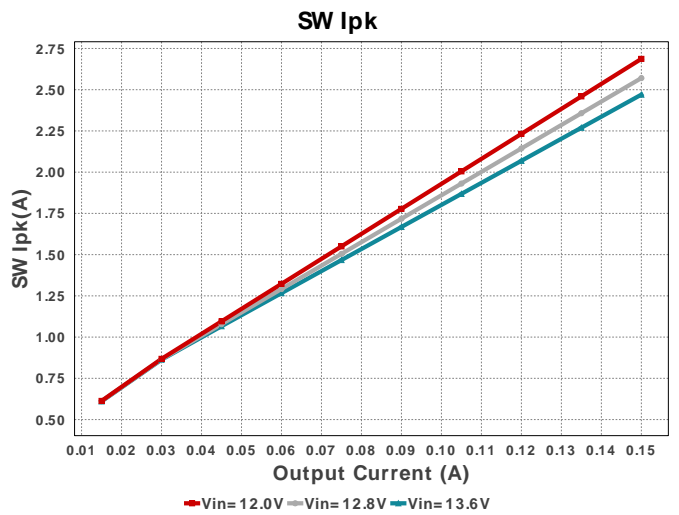
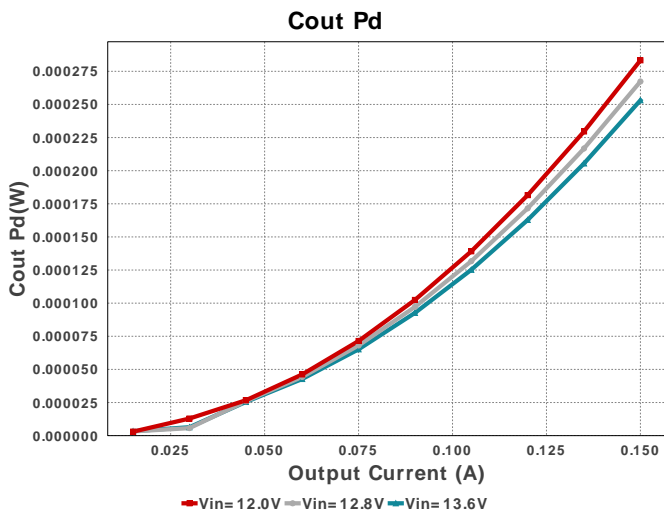
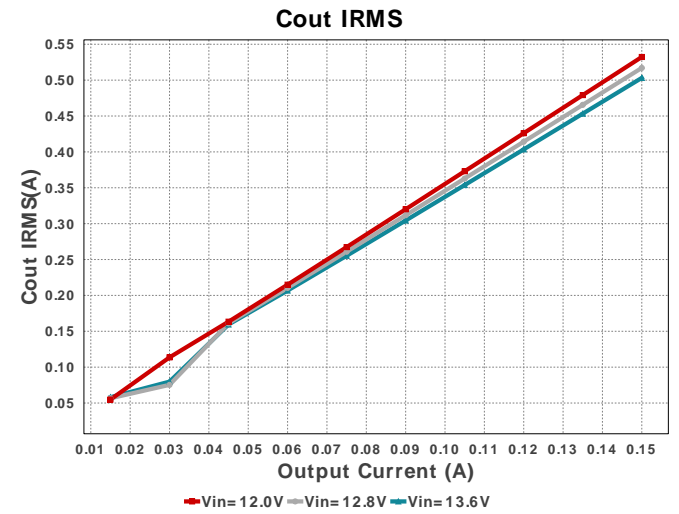
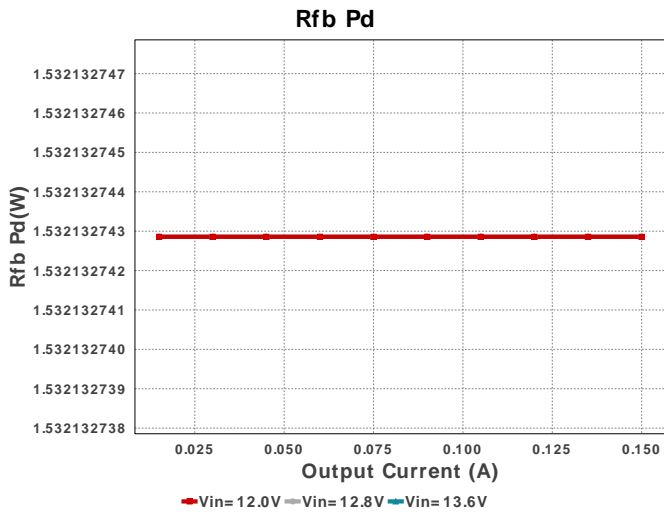
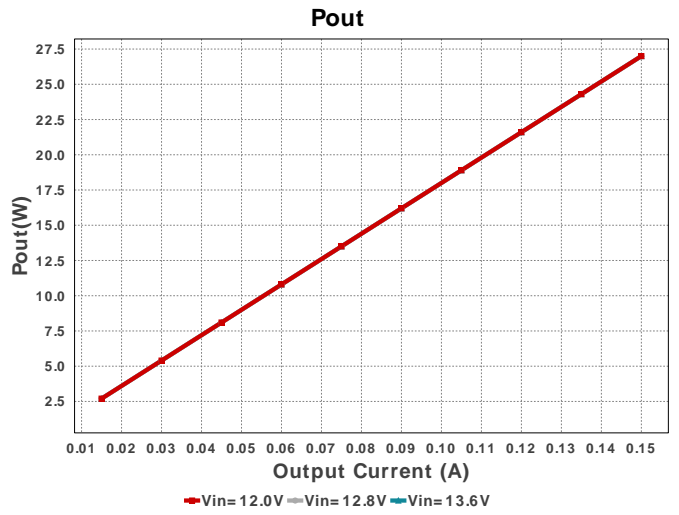
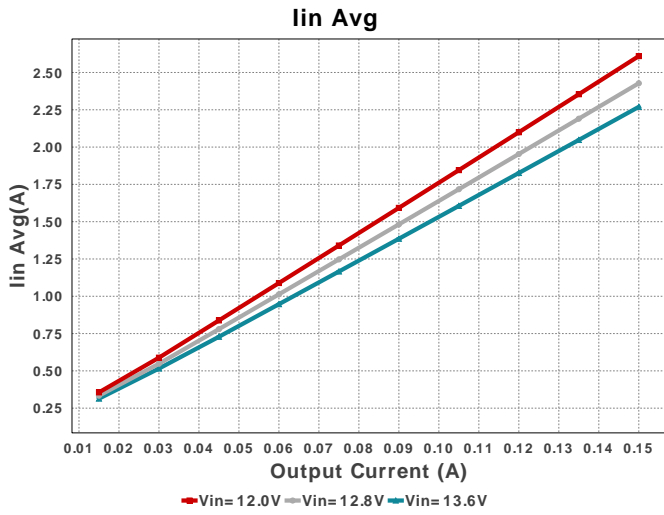
No comments

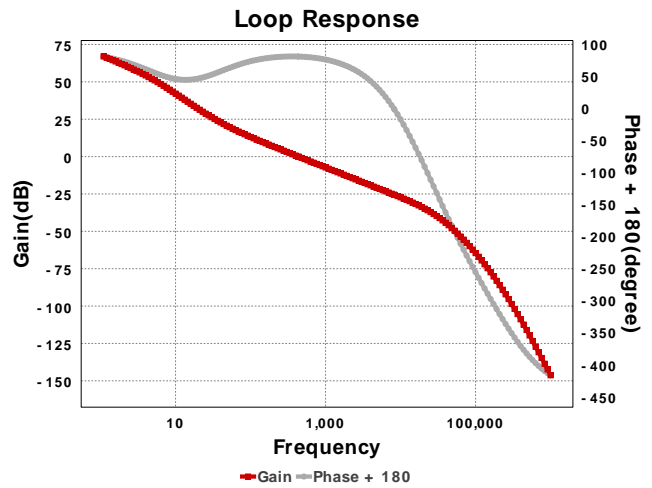
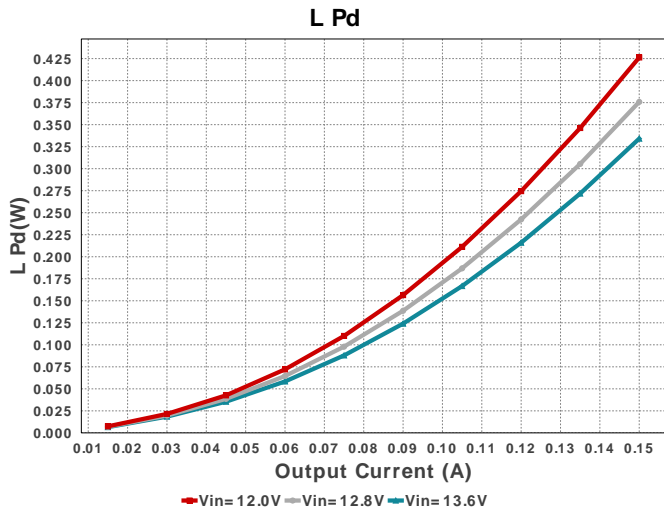
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cby	MuRata	GRM155R61C104KA88D Series= X5R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
2.	Ccomp	Taiyo Yuden	LMK107BBJ106MAHT Series= X5R	Cap= 10.0 uF VDC= 10.0 V IRMS= 0.0 A	1	\$0.10	0603 5 mm ²
3.	Ccomp2	TDK	C2012C0G1H223K125AA Series= C0G/NP0	Cap= 22.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.09	0805 7 mm ²
4.	Ccs	Samsung Electro-Mechanics	CL05C102JO5NNNC Series= C0G/NP0	Cap= 1.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.02	0402 3 mm ²
5.	Cin	Panasonic	20TQC100MYF Series= TQC	Cap= 100.0 uF ESR= 55.0 mOhm VDC= 20.0 V IRMS= 1.7 A	1	\$1.53	7343-31 59 mm ²
6.	Cinx	TDK	C1005X5R1H104K050BB Series= X5R	Cap= 100.0 nF ESR= 39.064 mOhm VDC= 50.0 V IRMS= 814.67 mA	1	\$0.02	0402 3 mm ²
7.	Cout	AVX	FFWE6N0356K7X Series= 2237	Cap= 47.0 uF ESR= 1.0 mOhm VDC= 900.0 V IRMS= 67.0 A	1	\$52.13	FFWE_8450X6400 0 mm ²
8.	Cout1	TDK	C5750JB2E105K230KA Series= JB	Cap= 1.0 uF ESR= 1.0 mOhm VDC= 250.0 V IRMS= 0.0 A	1	\$0.59	2220_250 54 mm ²
9.	Css	MuRata	GRM155R71E822KA01D Series= X7R	Cap= 8.2 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	D1	STMicroelectronics	STTH506B-TR	VF@Io= 1.85 V VRRM= 600.0 V	1	\$0.66	 DPAK 102 mm ²
11.	L1	Coilcraft	MSS1210-683MEB	L= 68.0 µH DCR= 68.0 mOhm	1	\$0.81	 MSS1210 204 mm ²
12.	M1	NA	IdealFET	VdsMax= 280.0 V IdsMax= 3.0 Amps	1	NA	NA 0 mm ²
13.	Rcomp	Vishay-Dale	CRCW0402487RFKED Series= CRCW..e3	Res= 487.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
14.	Rfb1	Vishay-Dale	CRCW0402147RFKED Series= CRCW..e3	Res= 147.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
15.	Rfb2	CUSTOM	CUSTOM Series= ?	Res= 21.0 kOhm Power= 0.0 W Tolerance= 0.0%	1	NA	CUSTOM 0 mm ²
16.	Rs1	Vishay-Dale	CRCW040297R6FKED Series= CRCW..e3	Res= 97.6 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
17.	Rs2	Vishay-Dale	CRCW04023K57FKED Series= CRCW..e3	Res= 3.57 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
18.	Rsns	Stackpole Electronics Inc	CSR1206FK12L0 Series= ?	Res= 12.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	\$0.12	 1206 11 mm ²
19.	Rt	Yageo	RC0201FR-0786K6L Series= ?	Res= 86.6 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm ²
20.	Ruv1	Vishay-Dale	CRCW04021K54FKED Series= CRCW..e3	Res= 1.54 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
21.	Ruv2	Yageo	RC0201FR-0710KL Series= ?	Res= 10.0 kOhm Power= 50.0 mW Tolerance= 1.0%	1	\$0.01	 0201 2 mm ²
22.	U1	Texas Instruments	LM5022MM/NOPB	Switcher	1	\$0.99	 MUB10A 24 mm ²







Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	238.122 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	532.184 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	2.61 A	Current	Average input current
4.	L Ipp	824.88 mA	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	2.286 A	Current	Inductor ripple current
6.	SW Ipk	2.686 A	Current	Peak switch current
7.	BOM Count	22	General	Total Design BOM count
8.	FootPrint	631.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	200.0 kHz	General	Switching frequency
10.	IC Tolerance	25.0 mV	General	IC Feedback Tolerance
11.	Mode	CCM	General	Conduction Mode
12.	Pout	27.0 W	General	Total output power
13.	Total BOM	\$0.0	General	Total BOM Cost
14.	Cross Freq	377.283 Hz	Op Point	Bode plot crossover frequency
15.	Duty Cycle	94.251 %	Op Point	Duty cycle
16.	Gain Marg	-25.038 dB	Op Point	Bode Plot Gain Margin
17.	ICThetaJA	200.0 degC/W	Op Point	IC junction-to-ambient thermal resistance
18.	IOUT_OP	150.0 mA	Op Point	Iout operating point
19.	Low Freq Gain	65.788 dB	Op Point	Gain at 1Hz
20.	Phase Marg	80.85 deg	Op Point	Bode Plot Phase Margin
21.	VIN_OP	12.0 V	Op Point	Vin operating point
22.	Vout Actual	181.26 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
23.	Vout OP	180.0 V	Op Point	Operational Output Voltage
24.	Vout Tolerance	3.007 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
25.	Vout p-p	17.237 mV	Op Point	Peak-to-peak output ripple voltage
26.	Cin Pd	3.119 mW	Power	Input capacitor power dissipation
27.	Cout Pd	283.22 μW	Power	Output capacitor power dissipation
28.	L Pd	426.262 mW	Power	Inductor power dissipation
29.	Rfb Pd	1.532 W	Power	Rfb Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	150.0 m	Maximum Output Current
2.	VinMax	13.6	Maximum input voltage
3.	VinMin	12.0	Minimum input voltage
4.	Vout	180.0	Output Voltage
5.	base_pn	LM5022	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM5022** Product Folder : <http://www.ti.com/product/LM5022> : contains the data sheet and other resources.

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