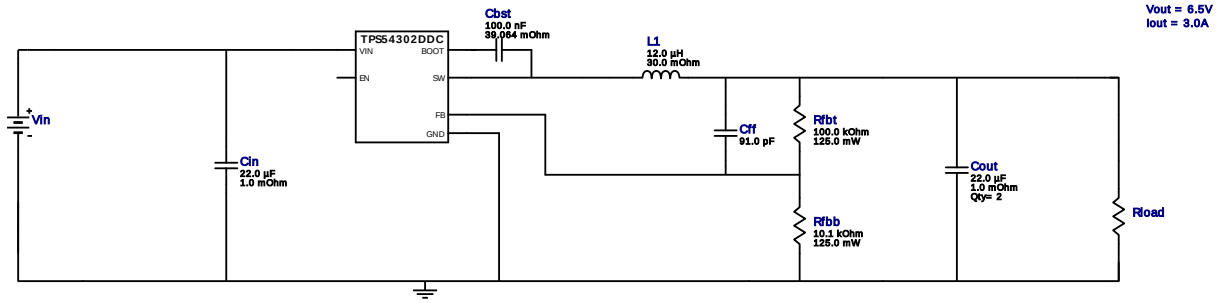
WEBENCH® Design Report

VinMin = 8.0V
VinMax = 28.0V
Vout = 6.5V
Iout = 3.0A

Device = TPS54302DDCR
Topology = Buck
Created = 2018-06-25 02:13:15.200
BOM Cost = $8.13
BOM Count = 9
Total Pd = 2.06W

Design : TPS54302DDCR
TPS54302DDCR 8.0V-28.0V to 6.50V @ 3.0A



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	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 mm²
2.	Cin	MuRata	KCM55WR71J226MH01K Series= X7R	Cap= 22.0 uF ESR= 1.0 mOhm VDC= 63.0 V IRMS= 0.0 A	1	$2.31	KCM55W 59 mm²
3.	Cout	MuRata	KCM55WR71J226MH01K Series= X7R	Cap= 22.0 uF ESR= 1.0 mOhm VDC= 63.0 V IRMS= 0.0 A	2	$2.31	KCM55W 59 mm²
4.	L1	Bourns	SDR1307-120ML	L= 12.0 µH DCR= 30.0 mOhm	1	$0.37	SDR1307 227 mm²
5.	Rfbb	Yageo	RT0805BRD0710K1L Series= ?	Res= 10.1 kOhm Power= 125.0 mW Tolerance= 0.1%	1	$0.04	0805 7 mm²
6.	Rfbt	Panasonic	ERJ-6ENF1003V Series= ERJ-6E	Res= 100.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm²
7.	U1	Texas Instruments	TPS54302DDCR	Switcher	1	$0.75	DDC0006A_N 10 mm²

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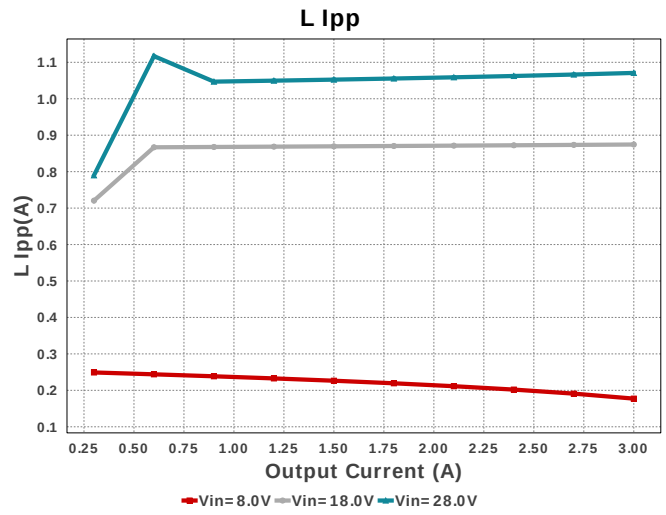

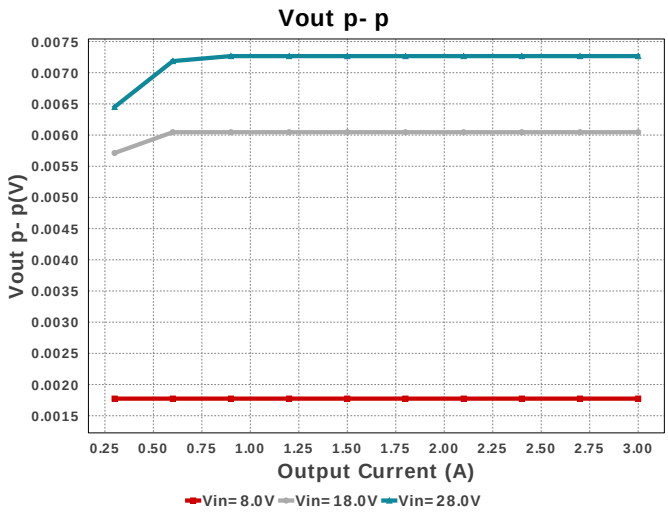

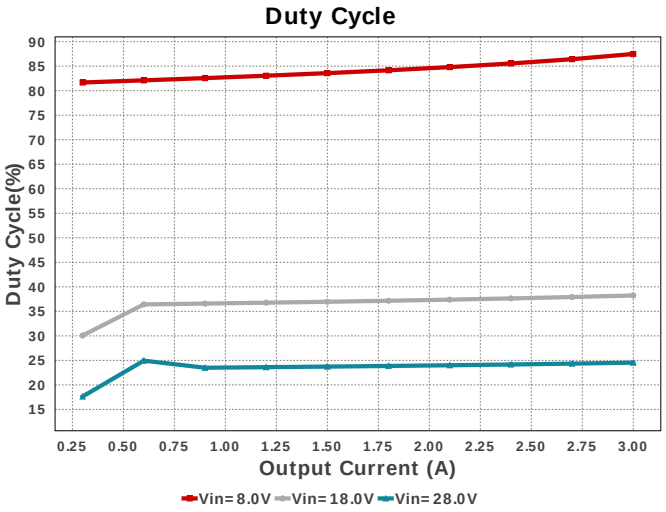

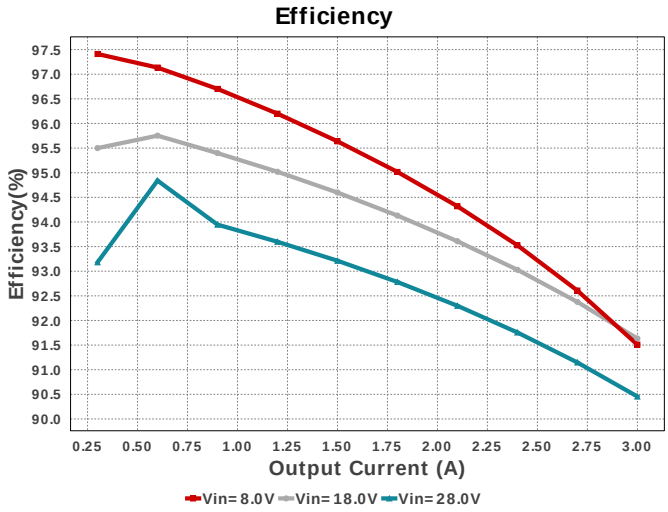

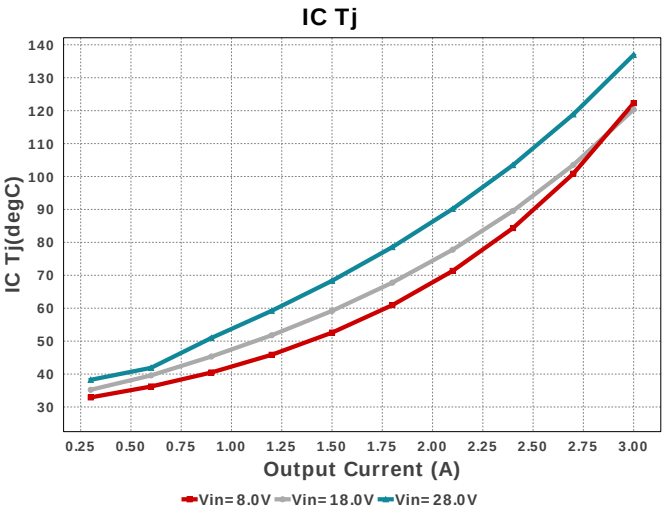

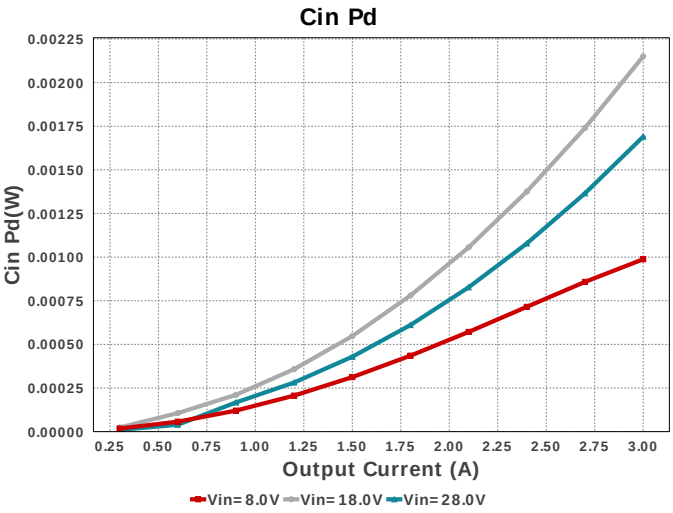

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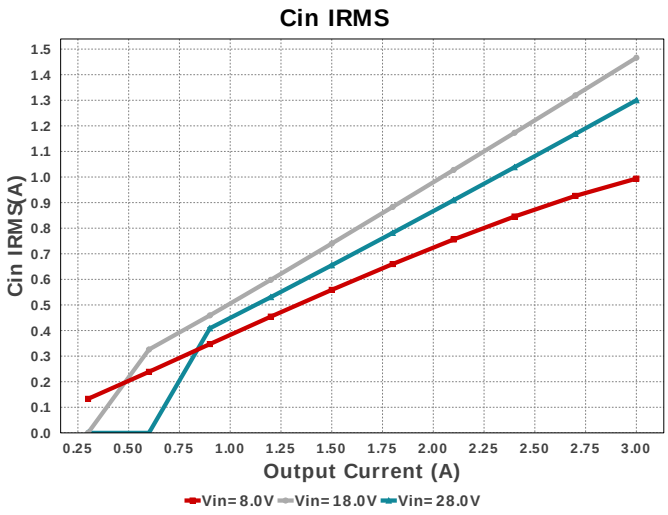

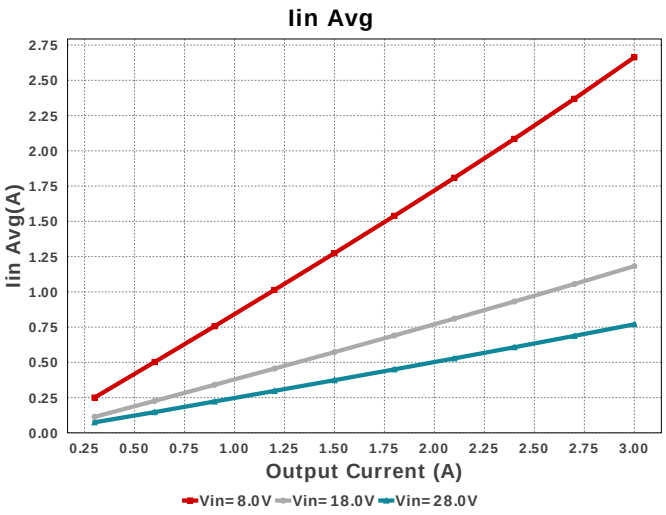

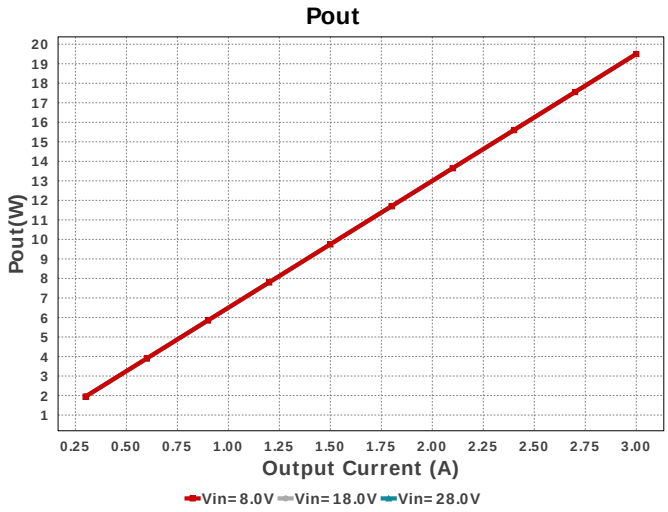

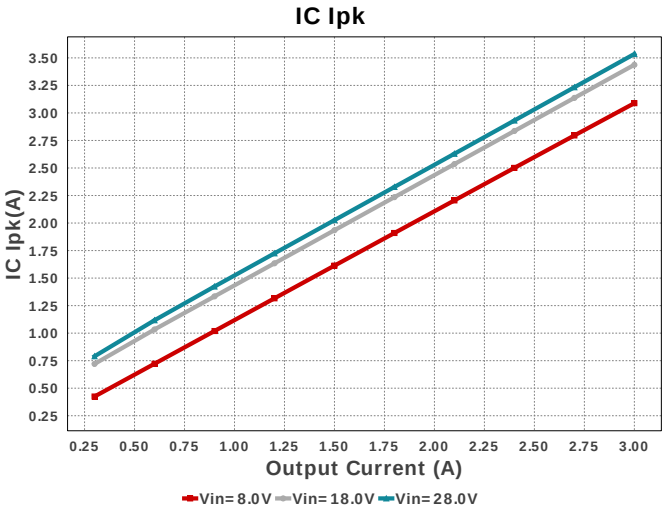

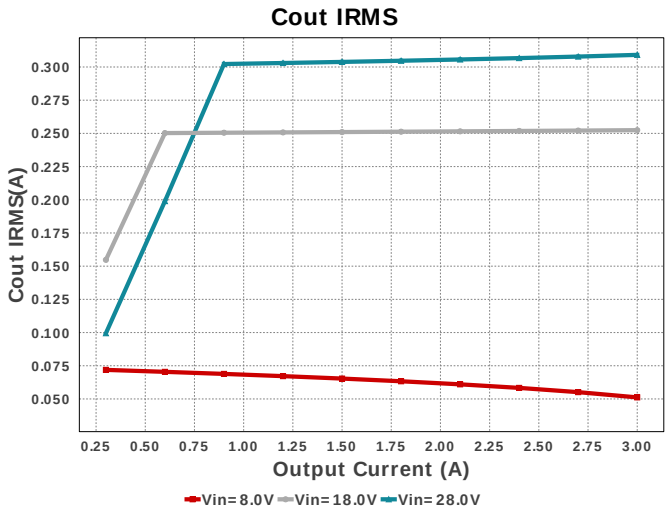

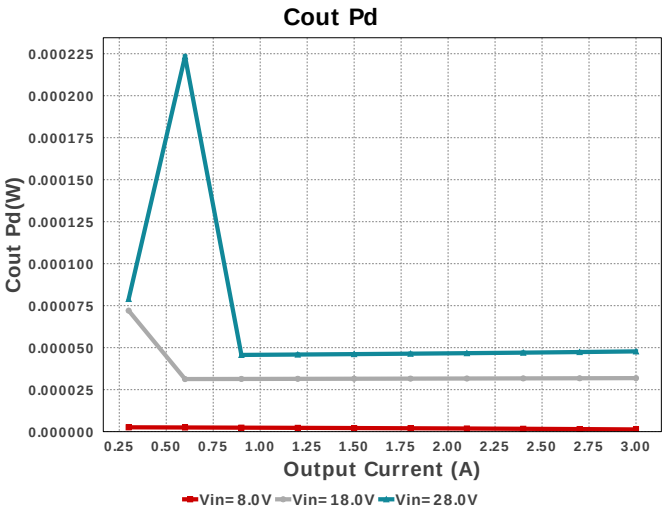

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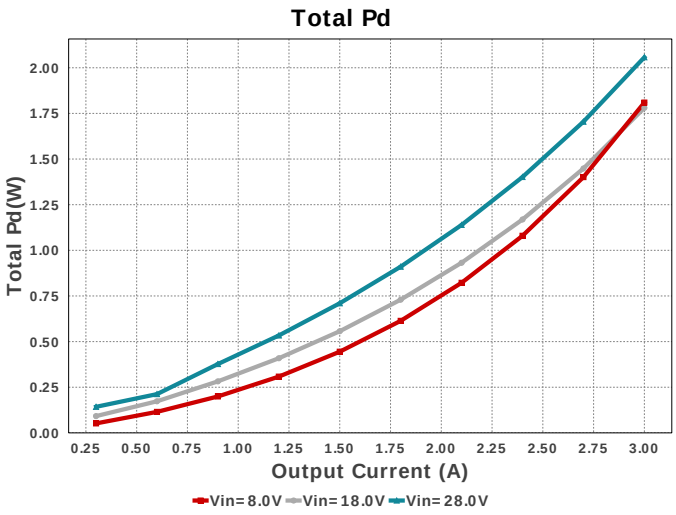

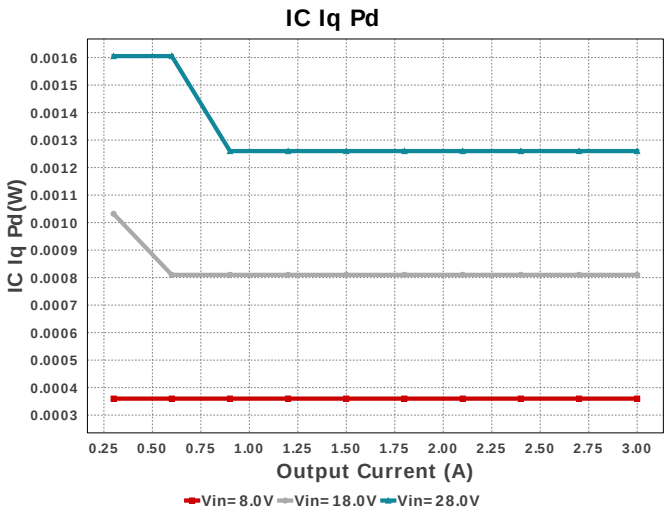

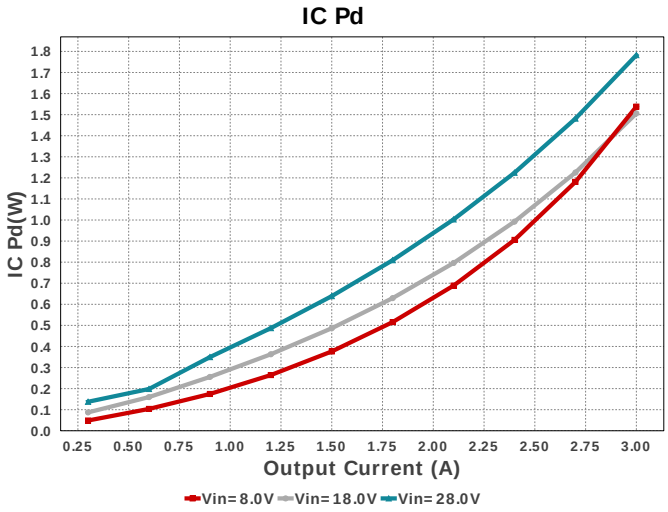

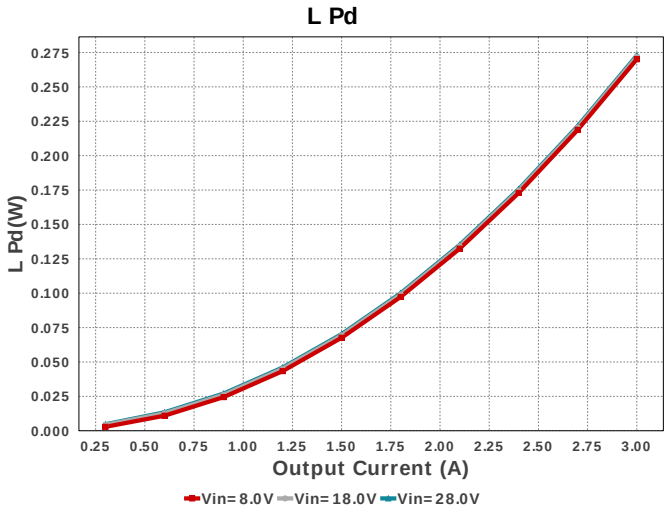

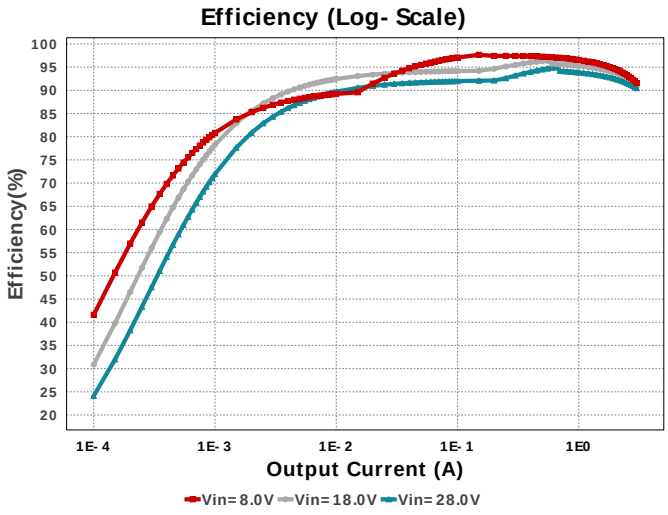

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.3 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	309.134 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	3.535 A	Current	Peak switch current in IC
4.	Iin Avg	769.91 mA	Current	Average input current
5.	L Ipp	1.071 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	9	General	Total Design BOM count
7.	FootPrint	433.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	400.0 kHz	General	Switching frequency
9.	Mode	CCM	General	PWM/PFM Mode
10.	Pout	19.5 W	General	Total output power
11.	Total BOM	$8.126	General	Total BOM Cost

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#	Name	Value	Category	Description
12.	Duty Cycle	24.54 %	Op Point	Duty cycle
13.	Efficiency	90.456 %	Op Point	Steady state efficiency
14.	IC Tj	136.945 degC	Op Point	IC junction temperature
15.	ICThetaJA Effective	60.0 degC/W	Op Point	Effective IC Junction-to-Ambient Thermal Resistance
16.	IOUT_OP	3.0 A	Op Point	Iout operating point
17.	VIN_OP	28.0 V	Op Point	Vin operating point
18.	Vout Actual	6.497 V	Op Point	Vout Actual calculated based on selected voltage divider resistors
19.	Vout Tolerance	1.0 %	Op Point	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
20.	Vout p-p	7.266 mV	Op Point	Peak-to-peak output ripple voltage
21.	Cin Pd	1.69 mW	Power	Input capacitor power dissipation
22.	Cout Pd	47.782 µW	Power	Output capacitor power dissipation
23.	IC Iq Pd	1.26 mW	Power	IC Iq Pd
24.	IC Pd	1.782 W	Power	IC power dissipation
25.	L Pd	272.867 mW	Power	Inductor power dissipation
26.	Total Pd	2.057 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	3.0	Maximum Output Current
2.	VinMax	28.0	Maximum input voltage
3.	VinMin	8.0	Minimum input voltage
4.	Vout	6.5	Output Voltage
5.	acFrequency	0.0	AC Frequency
6.	base_pn	TPS54302	Base Product Number
7.	source	DC	Input Source Type
8.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54302** Product Folder : http://www.ti.com/product/TPS54302 : contains the data sheet and other resources.

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