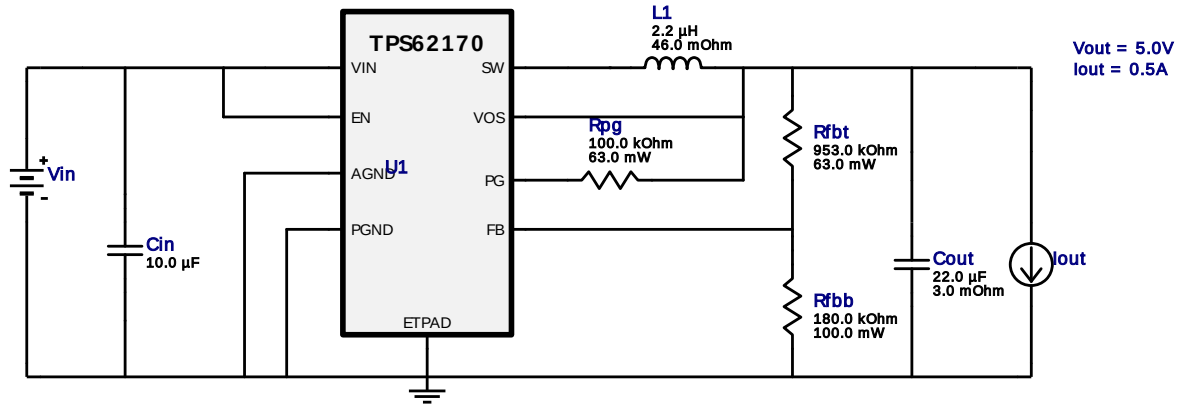
WEBENCH® Design Report

VinMin = 10.0V
VinMax = 12.0V
Vout = 5.0V
Iout = 0.5A

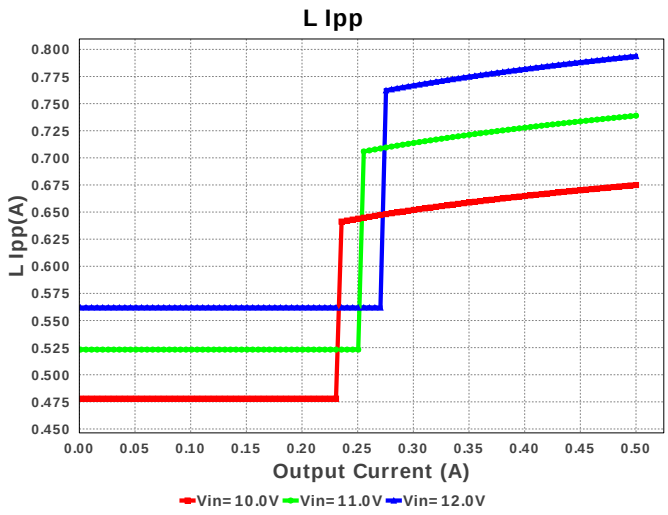
Device = TPS62170DSGR
Topology = Buck
Created = 7/21/16 2:08:57 AM
BOM Cost = $1.45
BOM Count = 7
Total Pd = 0.24W

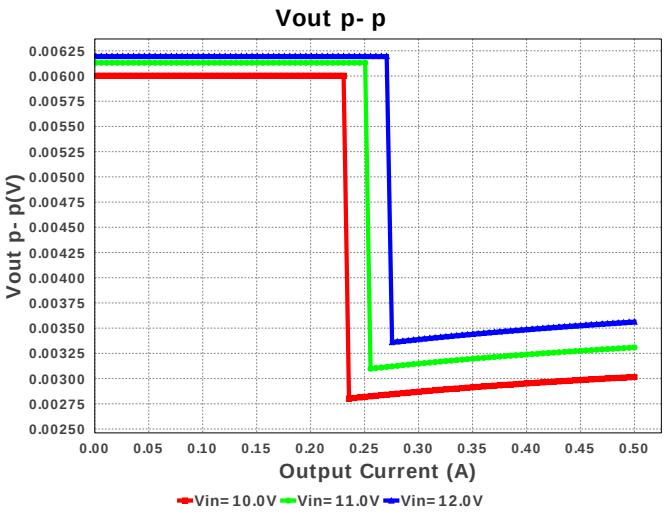
Design : 4742013/220 TPS62170DSGR
TPS62170DSGR 10.0V-12.0V to 5.00V @ 0.5A

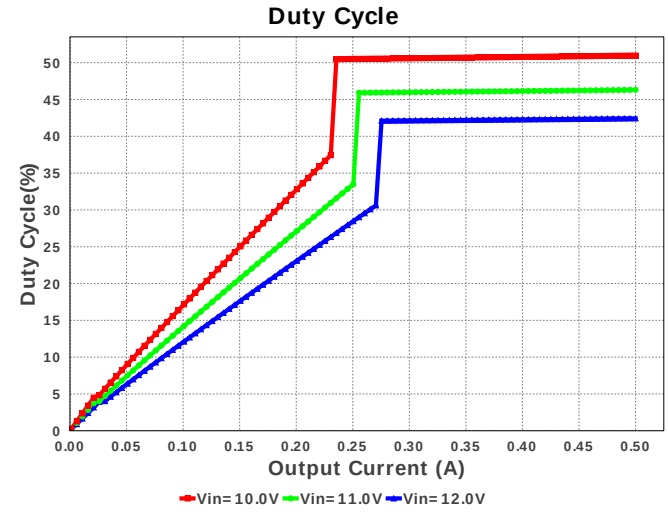


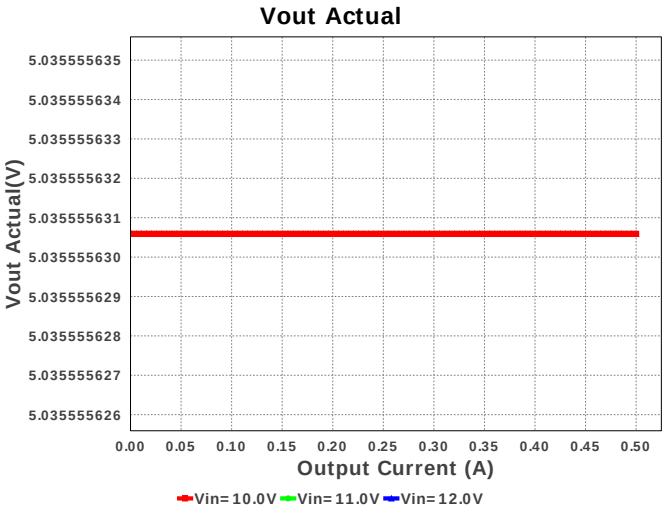
Electrical BOM

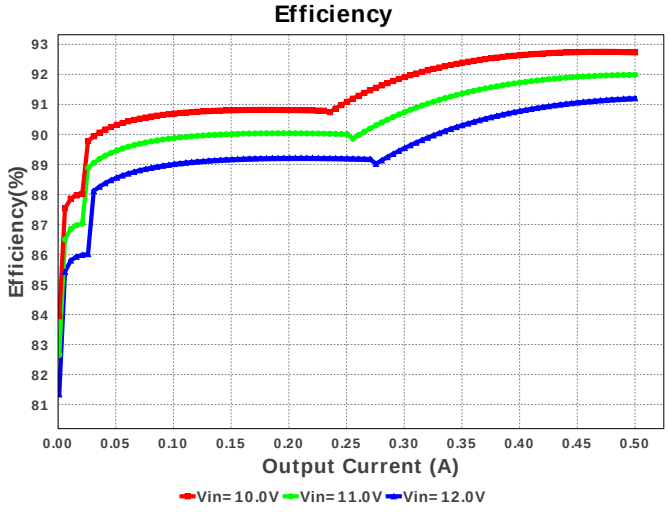
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	Taiyo Yuden	TMK316BJ106KL-T Series= X5R	Cap= 10.0 uF VDC= 25.0 V IRMS= 0.0 A	1	$0.05	1206 11 mm²
2.	Cout	MuRata	GRM32ER71C226KE18L Series= X7R	Cap= 22.0 uF ESR= 3.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	$0.28	1210 15 mm²
3.	L1	Vishay-Dale	IHLP1212BZER2R2M11	L= 2.2 µH DCR= 46.0 mOhm	1	$0.56	IHLP-1212BZ 19 mm²
4.	Rfbb	Yageo America	RC0603FR-07180KL Series= ?	Res= 180.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	0603 5 mm²
5.	Rfbt	Vishay-Dale	CRCW0402953KFKED Series= CRCW..e3	Res= 953.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
6.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	U1	Texas Instruments	TPS62170DSGR	Switcher	1	$0.53	S-PWSON-N8 10 mm²

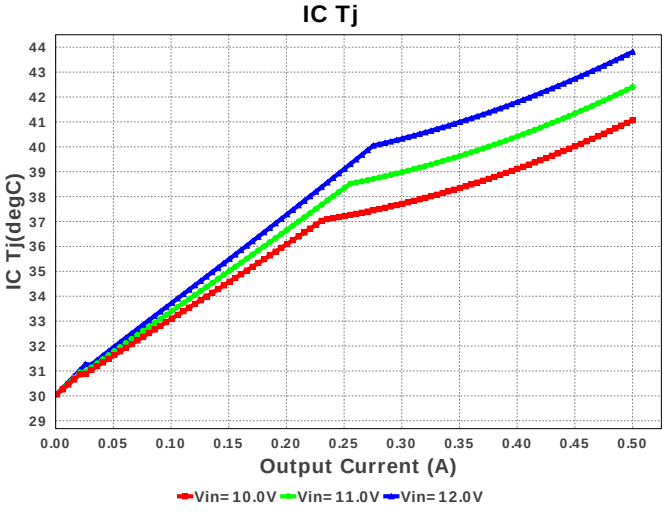


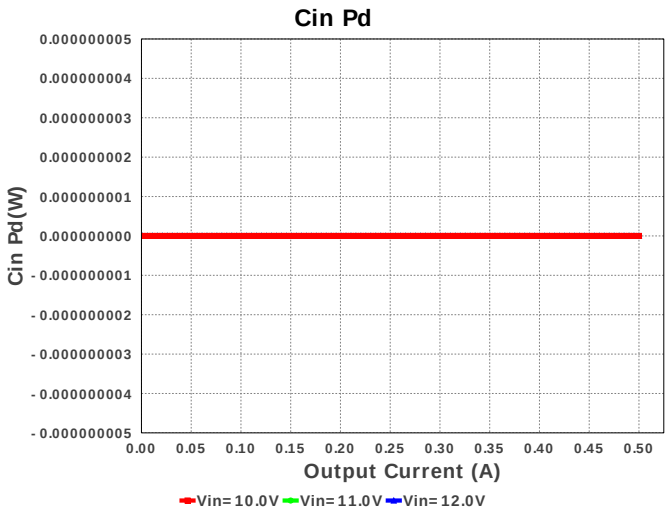


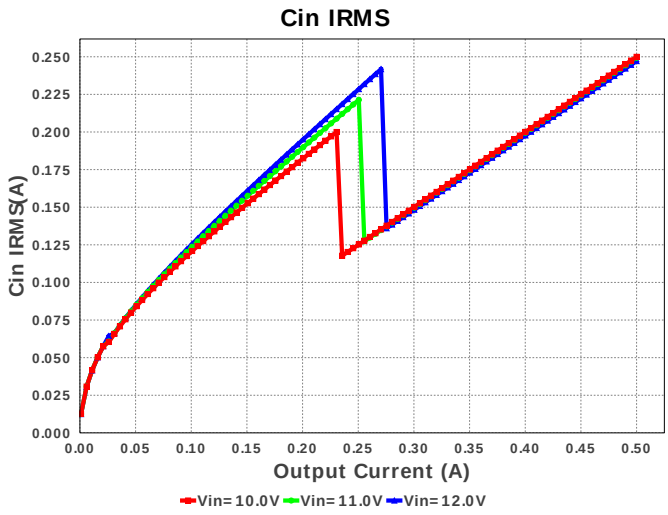


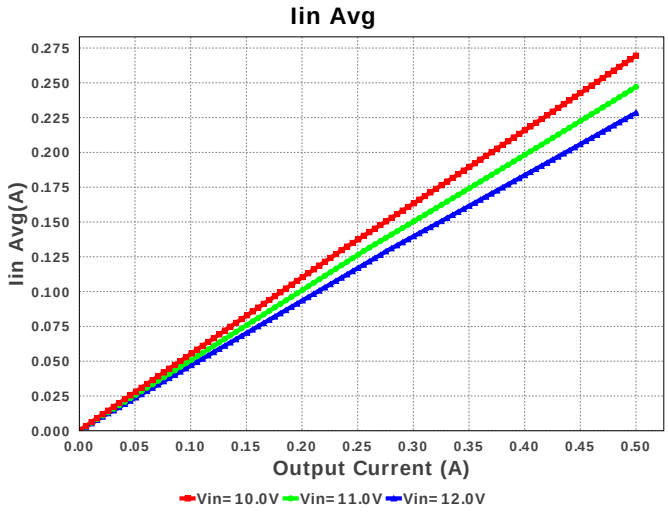


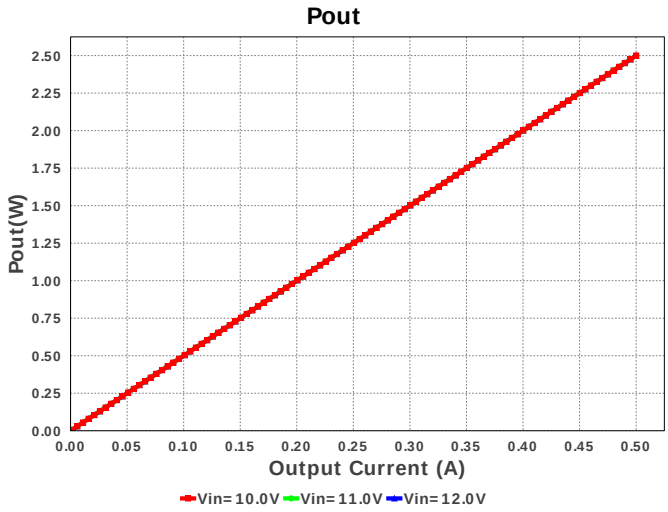


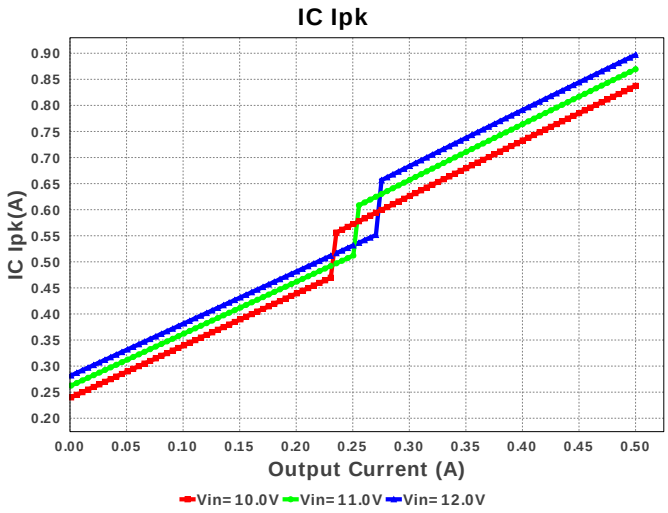


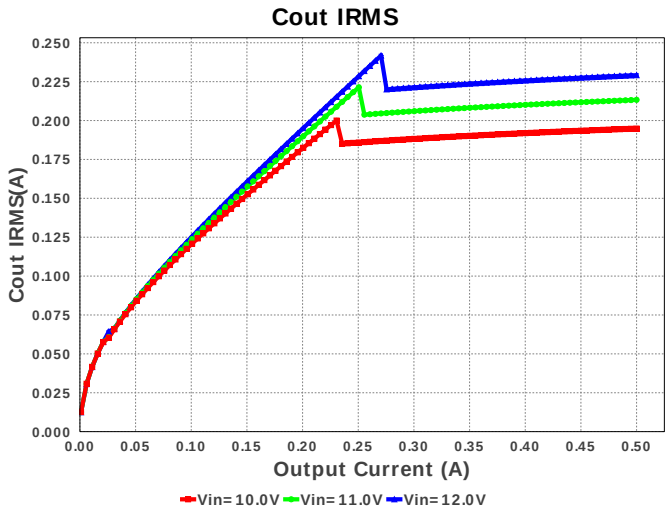


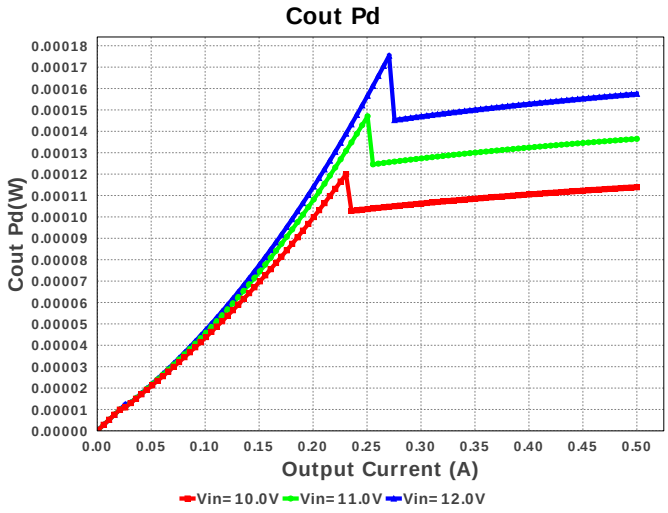


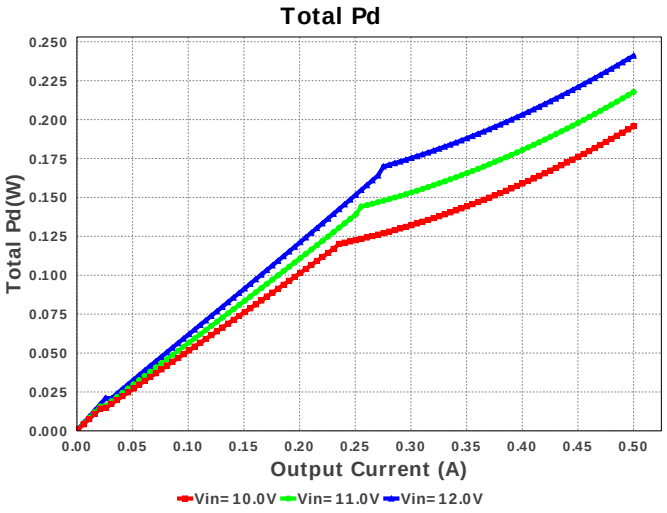


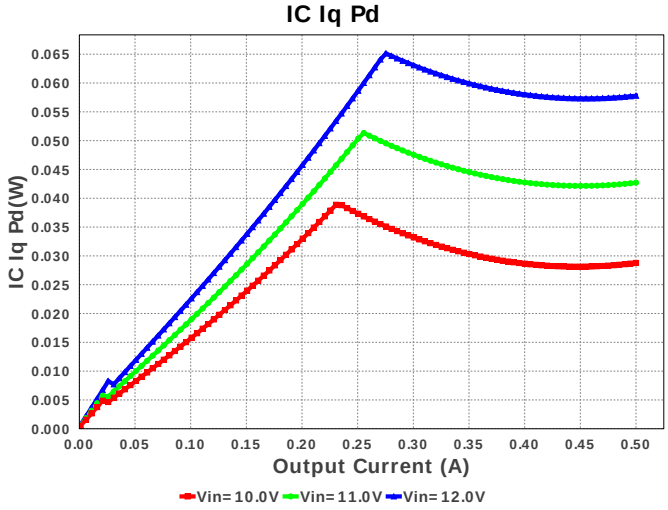


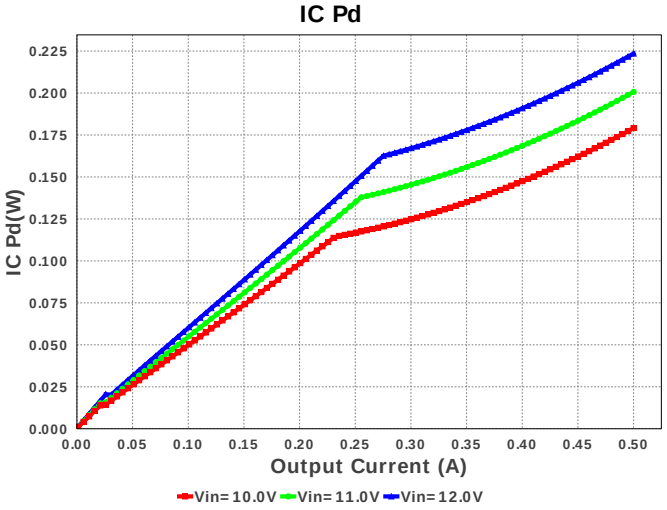


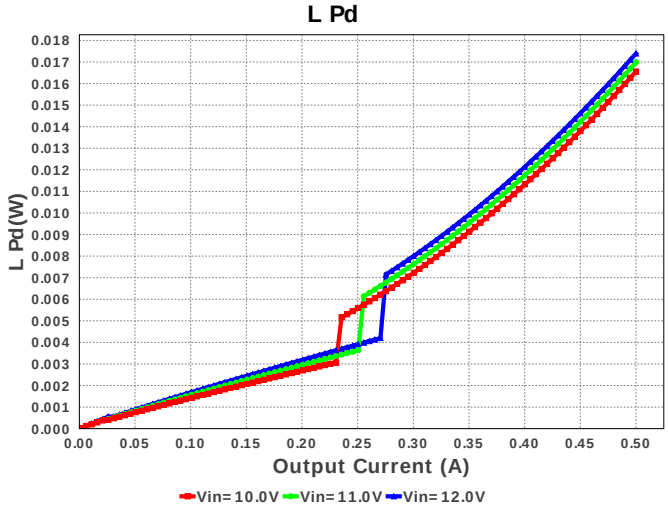


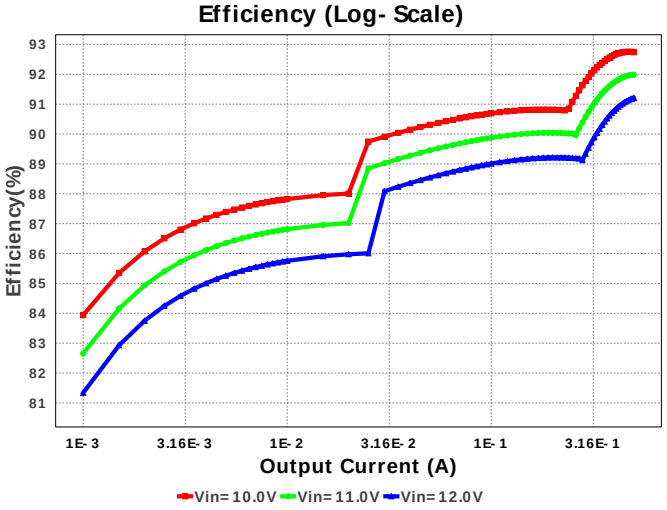












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	247.119 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	229.153 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	896.905 mA	Current	Peak switch current in IC
4.	Iin Avg	228.42 mA	Current	Average input current
5.	L Ipp	793.81 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	7	General	Total Design BOM count
7.	FootPrint	65.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	2.407 MHz	General	Switching frequency
9.	Pout	2.5 W	General	Total output power
10.	Total BOM	$1.45	General	Total BOM Cost
11.	Vout Actual	5.036 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors

#	Name	Value	Category	Description
12.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
13.	Duty Cycle	42.43 %	Op_point	Duty cycle
14.	Efficiency	91.205 %	Op_point	Steady state efficiency
15.	IC Tj	43.813 degC	Op_point	IC junction temperature
16.	ICThetaJA	61.8 degC/W	Op_point	IC junction-to-ambient thermal resistance
17.	IOUT_OP	500.0 mA	Op_point	Iout operating point
18.	VIN_OP	12.0 V	Op_point	Vin operating point
19.	Vout p-p	3.564 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
21.	Cout Pd	157.534 µW	Power	Output capacitor power dissipation
22.	IC Iq Pd	57.79 mW	Power	IC Iq Pd
23.	IC Pd	223.519 mW	Power	IC power dissipation
24.	L Pd	17.394 mW	Power	Inductor power dissipation
25.	Total Pd	241.074 mW	Power	Total Power Dissipation
26.	Vout Tolerance	1.699 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 m	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS62170	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. Feature Highlights: DCS-Control(TM) Architecture with upto 0.5A output current, 3V to 17V Input Voltage Range, Adjustable output voltage from 0.9V to 6V, Seamless Power Save Mode for Light Load Efficiency, Power Good Output, 100% Duty Cycle mode, Short Circuit Protection, Thermal Shutdown

2. **TPS62170** Product Folder : http://www.ti.com/product/TPS62170 : contains the data sheet and other resources.