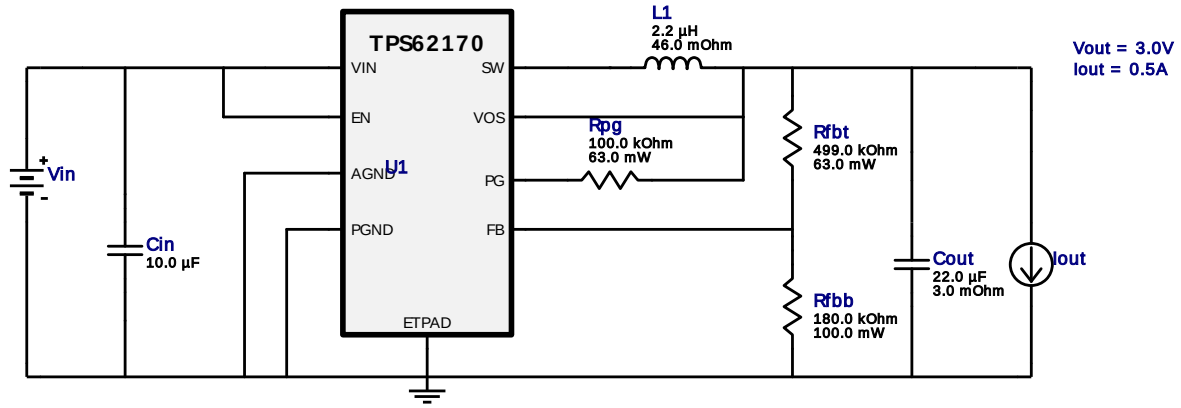
WEBENCH® Design Report

VinMin = 4.5V
VinMax = 5.5V
Vout = 3.0V
Iout = 0.5A

Device = TPS62170DSGR
Topology = Buck
Created = 7/19/16 5:45:44 AM
BOM Cost = $1.43
BOM Count = 7
Total Pd = 0.16W

Design : 4742013/149 TPS62170DSGR
TPS62170DSGR 4.5V-5.5V to 3.00V @ 0.5A



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	Taiyo Yuden	LMK212BJ106KG-T Series= X5R	Cap= 10.0 uF VDC= 10.0 V IRMS= 0.0 A	1	$0.03	0805 7 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	CRCW0402499KFKED Series= CRCW..e3	Res= 499.0 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

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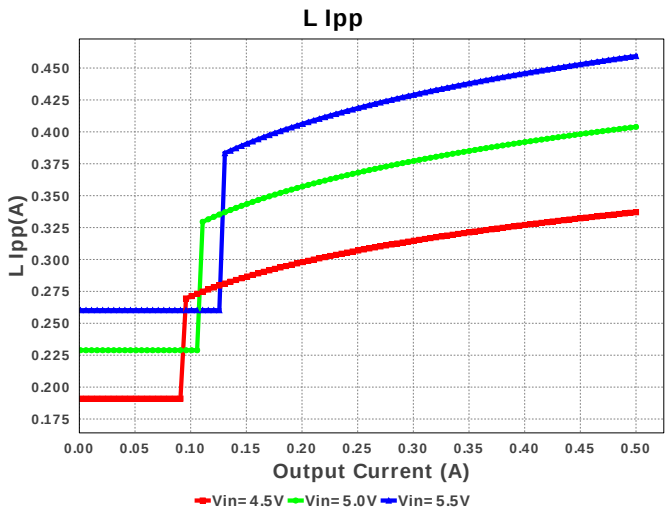

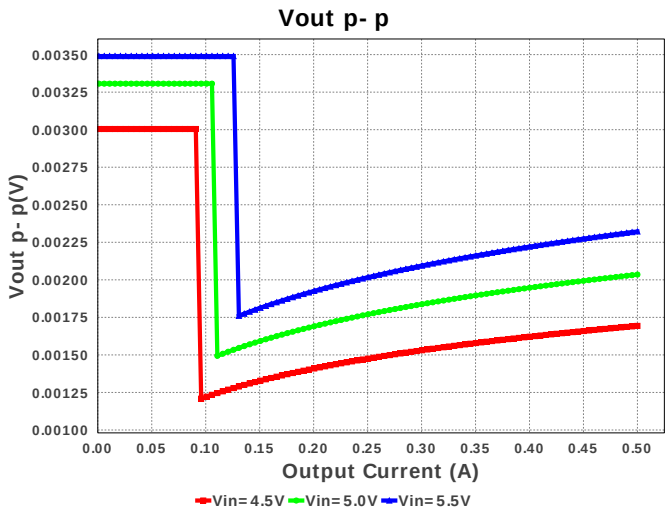

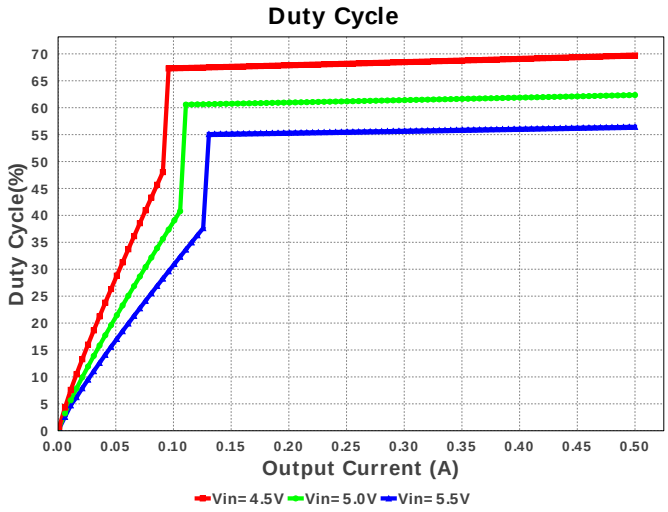

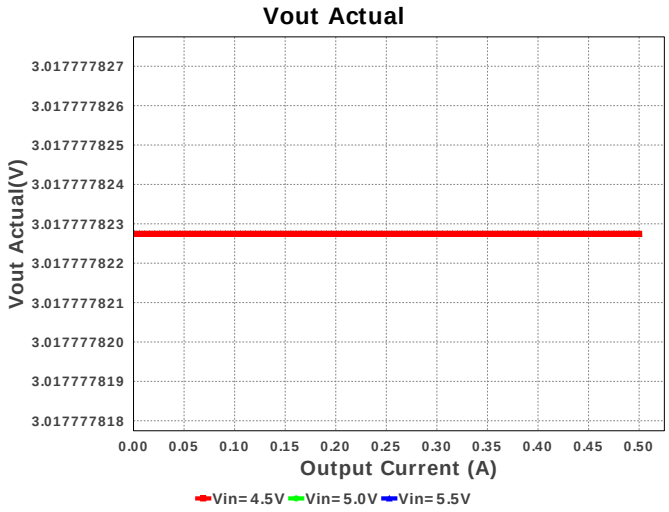

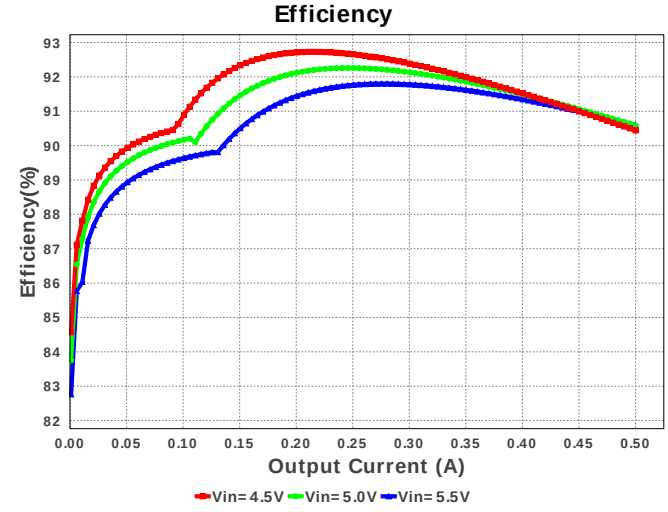

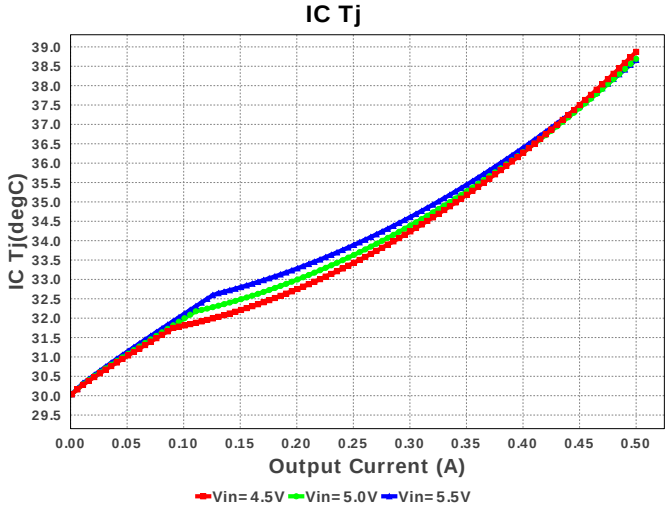

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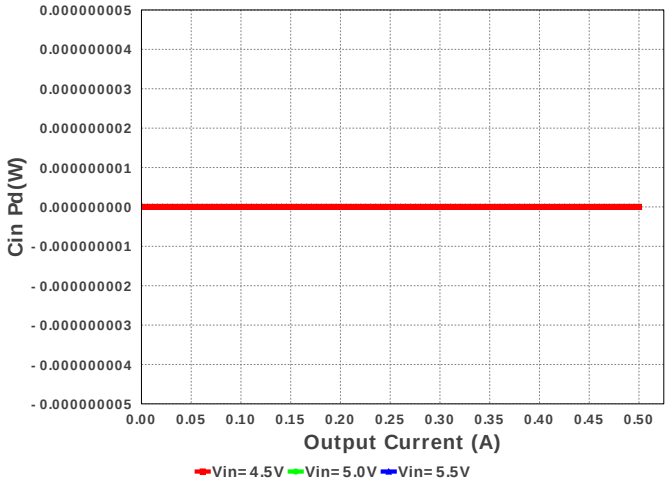
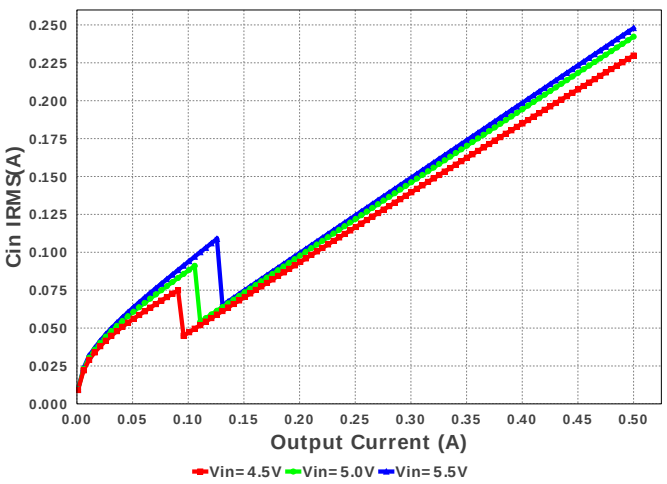
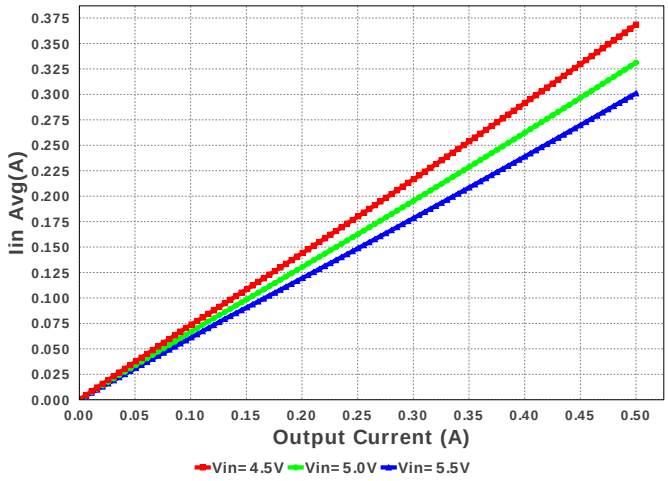
Cin Pd



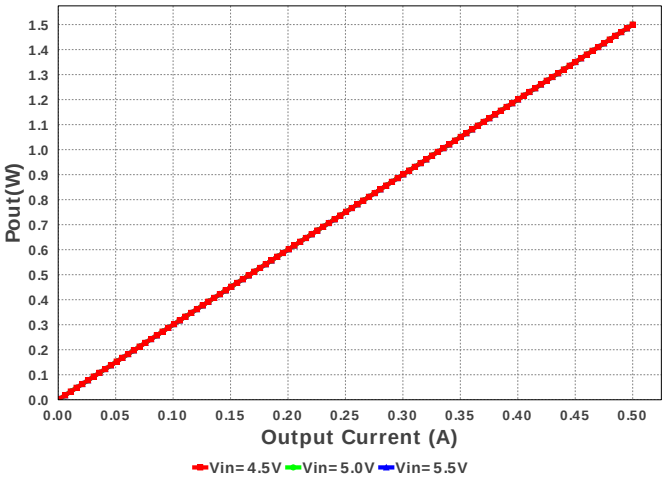
Cin IRMS



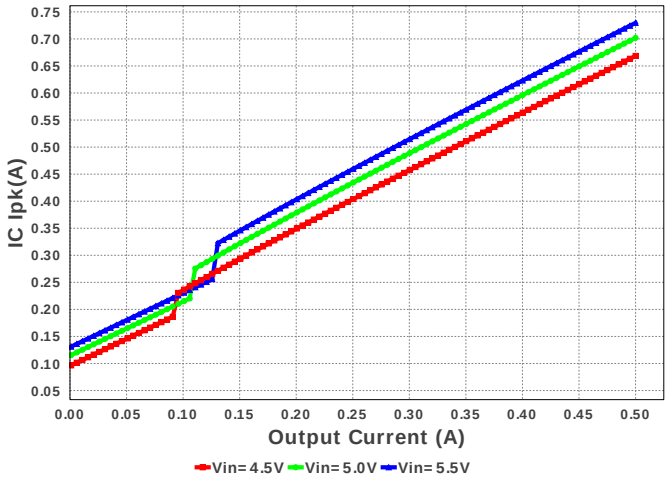
Iin Avg



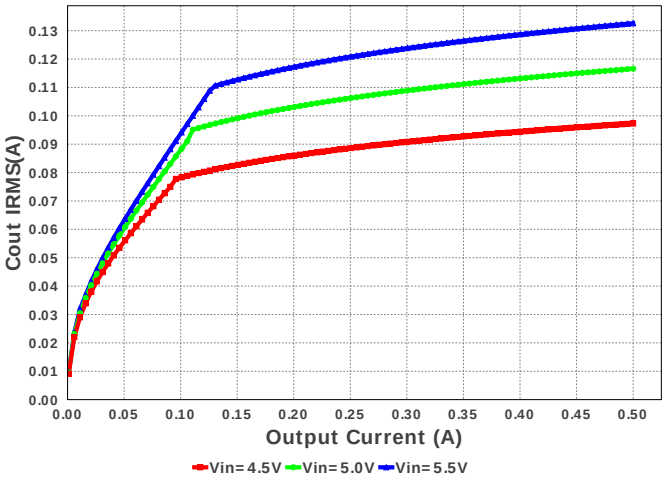
Pout



IC Ipk



Cout IRMS



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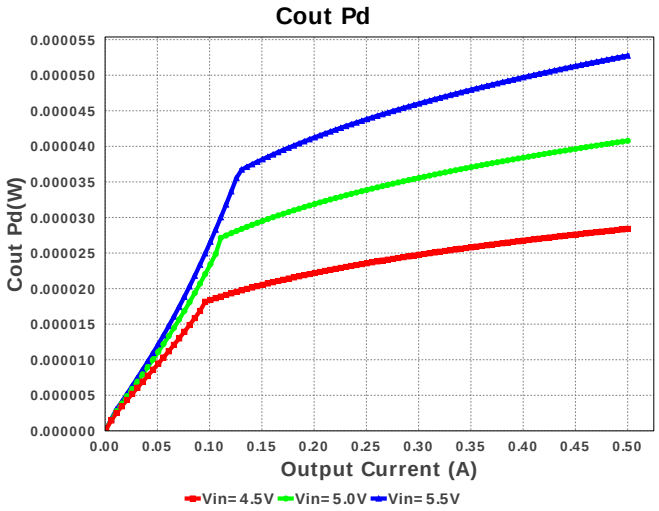

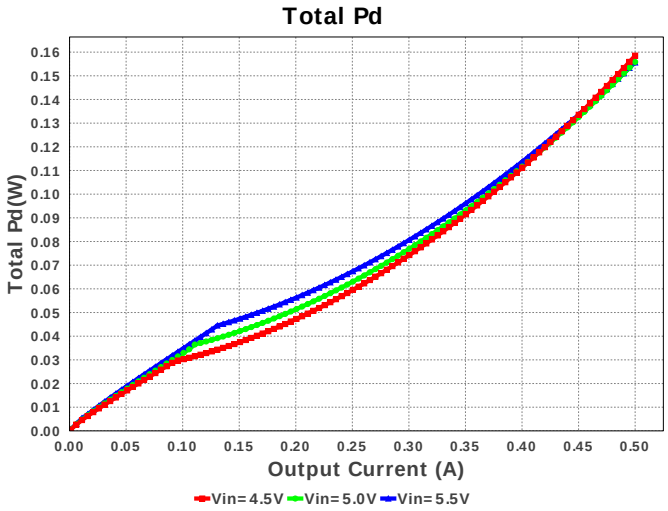

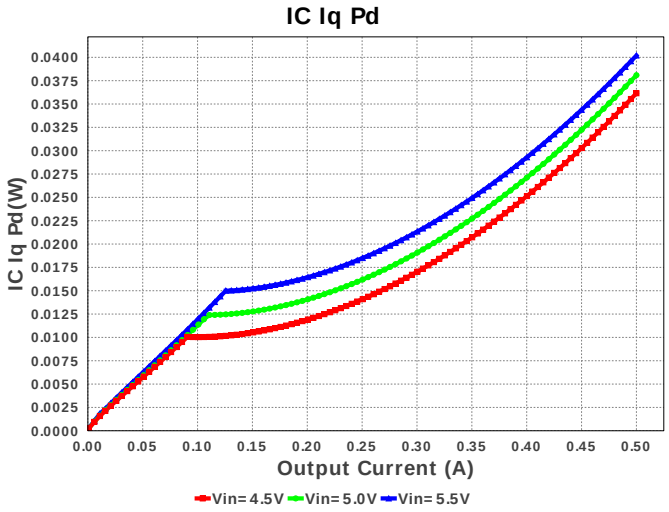

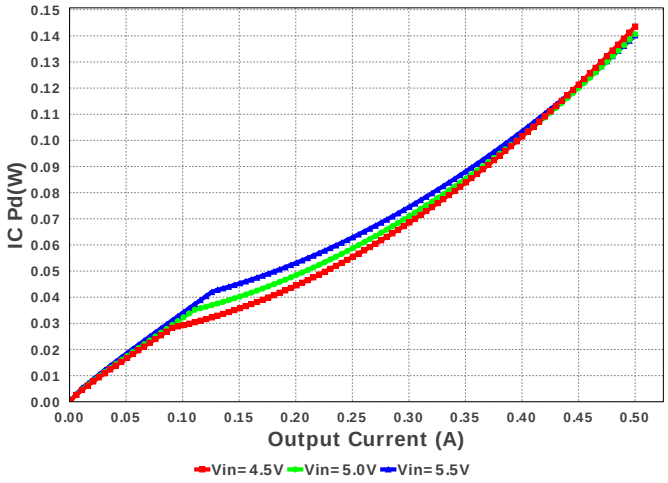

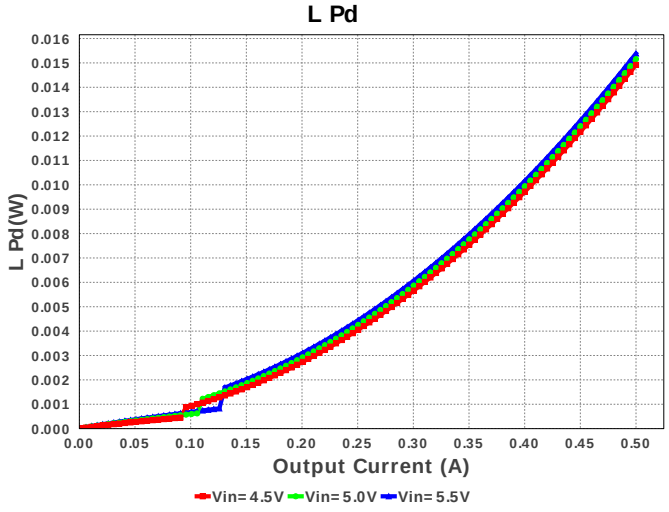

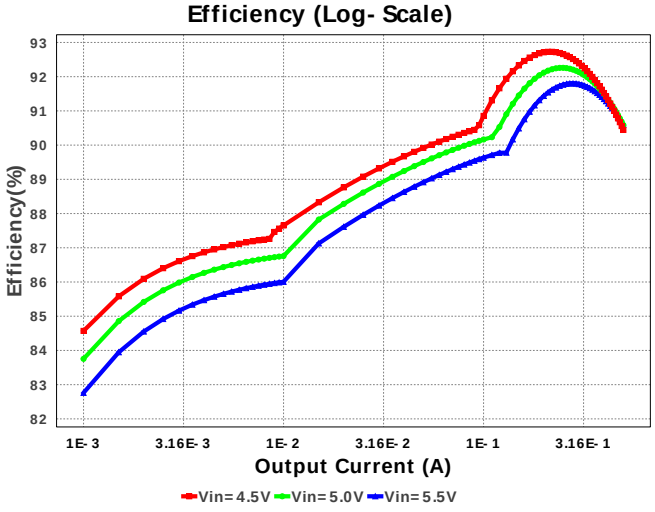

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	247.913 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	132.603 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	729.675 mA	Current	Peak switch current in IC
4.	Iin Avg	301.02 mA	Current	Average input current
5.	L Ipp	459.35 mA	Current	Peak-to-peak inductor ripple current
6.	BOM Count	7	General	Total Design BOM count
7.	FootPrint	61.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	2.477 MHz	General	Switching frequency
9.	Pout	1.5 W	General	Total output power
10.	Total BOM	$1.43	General	Total BOM Cost
11.	Vout Actual	3.018 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors

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#	Name	Value	Category	Description
12.	Vout OP	3.0 V	Op_Point	Operational Output Voltage
13.	Duty Cycle	56.447 %	Op_point	Duty cycle
14.	Efficiency	90.6 %	Op_point	Steady state efficiency
15.	IC Tj	38.664 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	5.5 V	Op_point	Vin operating point
19.	Vout p-p	2.322 mV	Op_point	Peak-to-peak output ripple voltage
20.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
21.	Cout Pd	52.751 µW	Power	Output capacitor power dissipation
22.	IC Iq Pd	40.197 mW	Power	IC Iq Pd
23.	IC Pd	140.192 mW	Power	IC power dissipation
24.	L Pd	15.386 mW	Power	Inductor power dissipation
25.	Total Pd	155.627 mW	Power	Total Power Dissipation
26.	Vout Tolerance	1.485 %		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	5.5	Maximum input voltage
3.	VinMin	4.5	Minimum input voltage
4.	Vout	3.0	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.

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