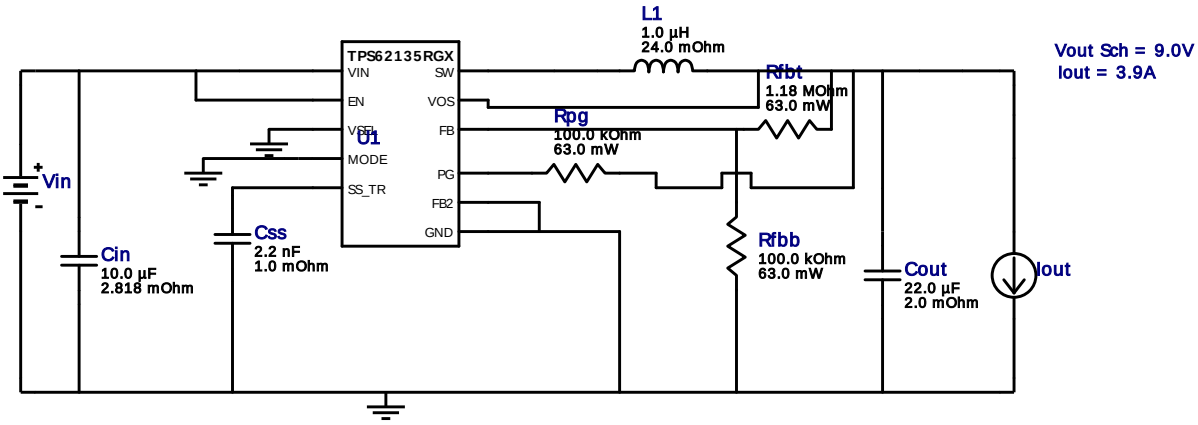
WEBENCH® Design Report

VinMin = 11.1V
VinMax = 17.0V
Vout = 9.0V
Vout Sch = 9.0V
Iout = 3.9A

Device = TPS62135RGXR
Topology = Buck
Created = 2018-01-04 19:08:01.821
BOM Cost = $1.83
BOM Count = 8
Total Pd = 2.83W

Design : 284889/9 TPS62135RGXR
TPS62135RGXR 11.1V-17.0V to 9.00V @ 3.9A



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	TDK	C2012X5R1V106K085AC Series= X5R	Cap= 10.0 uF ESR= 2.818 mOhm VDC= 35.0 V IRMS= 3.8868 A	1	$0.17	0805 7 mm²
2.	Cout	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 uF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	$0.18	1210 15 mm²
3.	Css	MuRata	GRM033R61A222KA01D Series= X5R	Cap= 2.2 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
4.	L1	Vishay-Dale	IHLP1212BZER1R0M11	L= 1.0 µH DCR= 24.0 mOhm	1	$0.56	IHLP-1212BZ 19 mm²
5.	Rfbb	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
6.	Rfbt	Vishay-Dale	CRCW04021M18FKED Series= CRCW..e3	Res= 1.18 MOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	U1	Texas Instruments	TPS62135RGXR	Switcher	1	$0.88	RGX0011A 12 mm²

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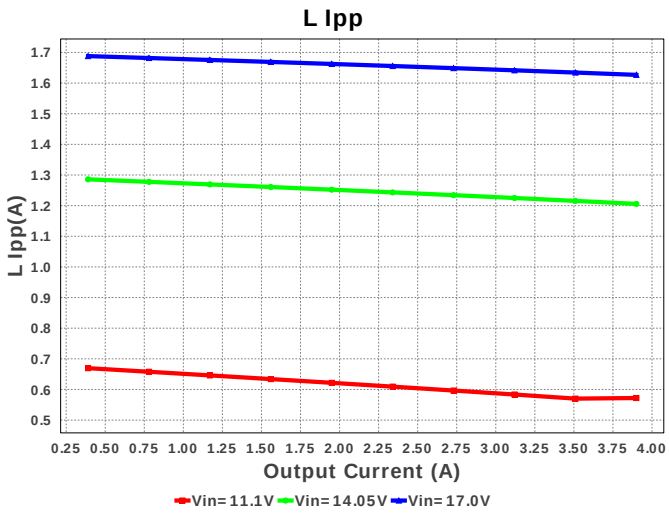

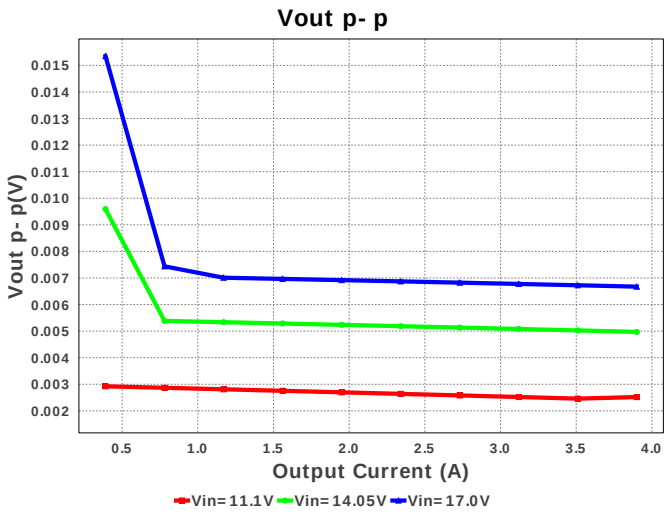

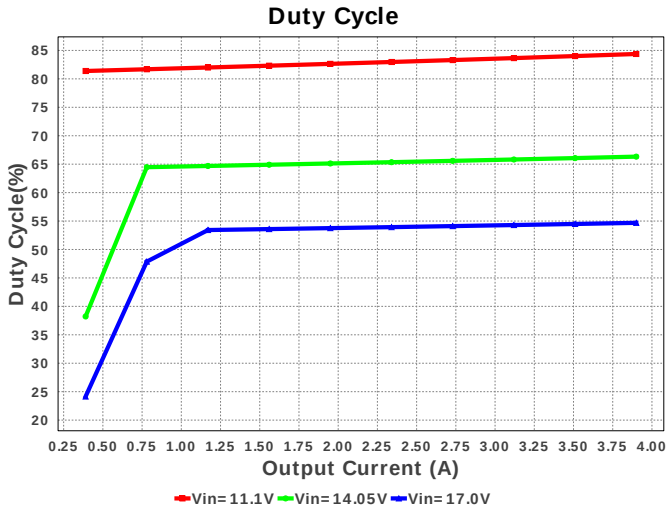

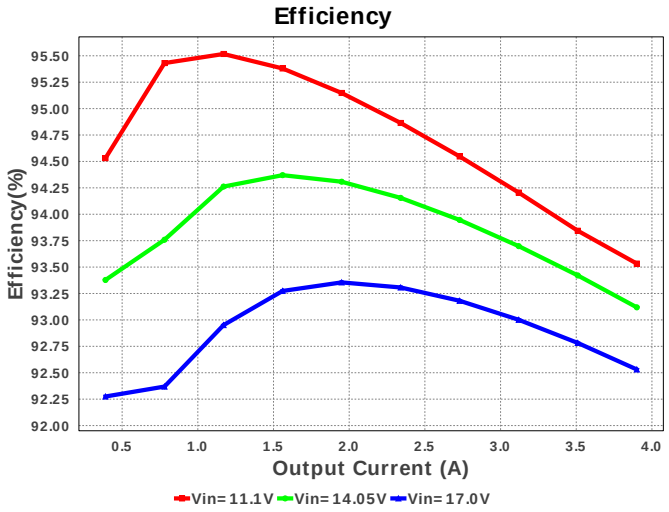

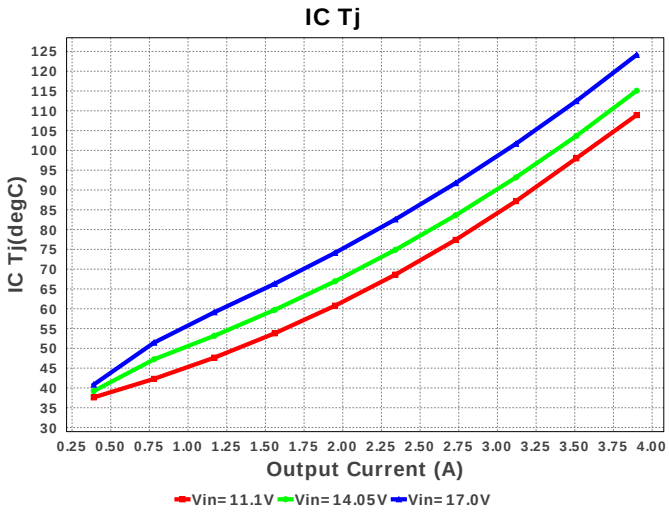

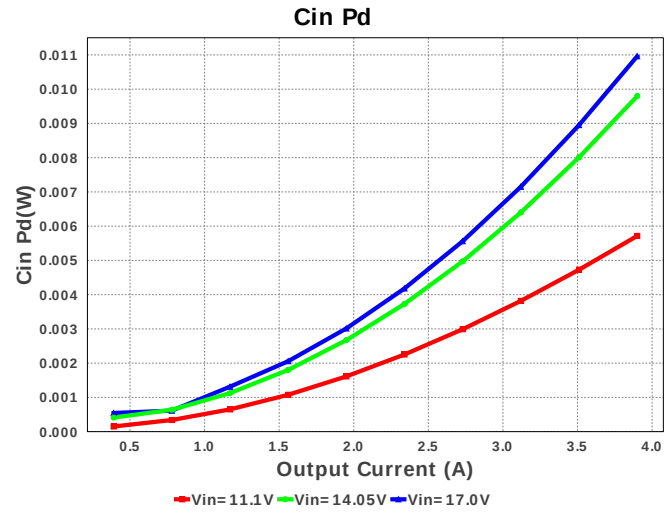

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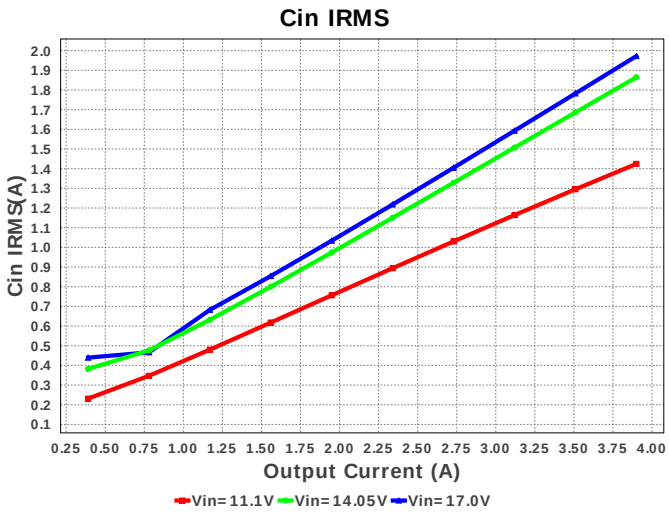

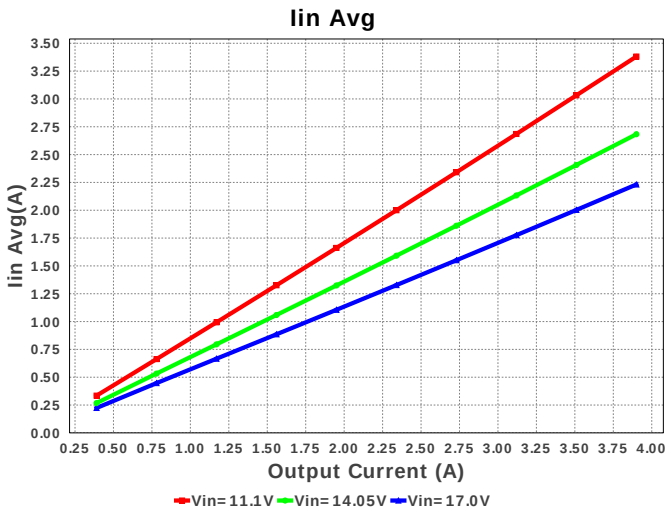

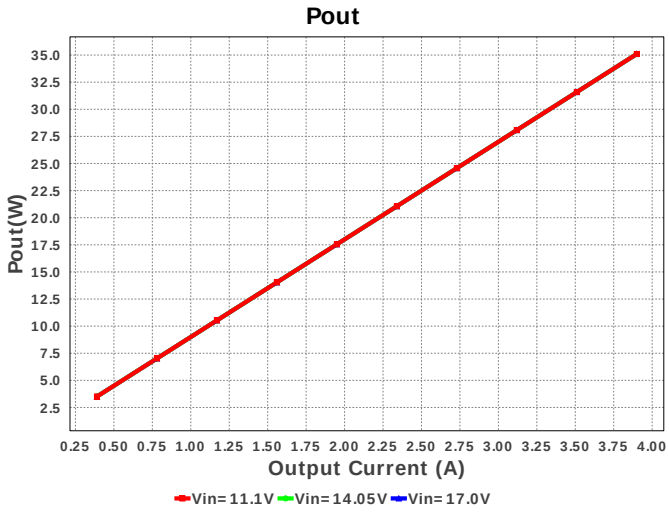

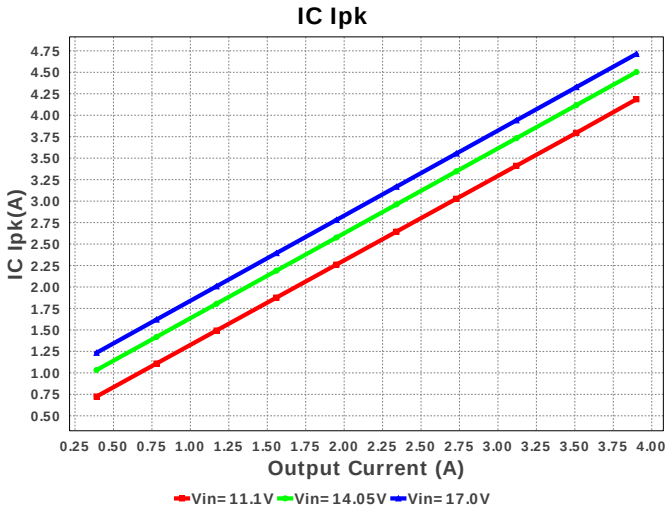

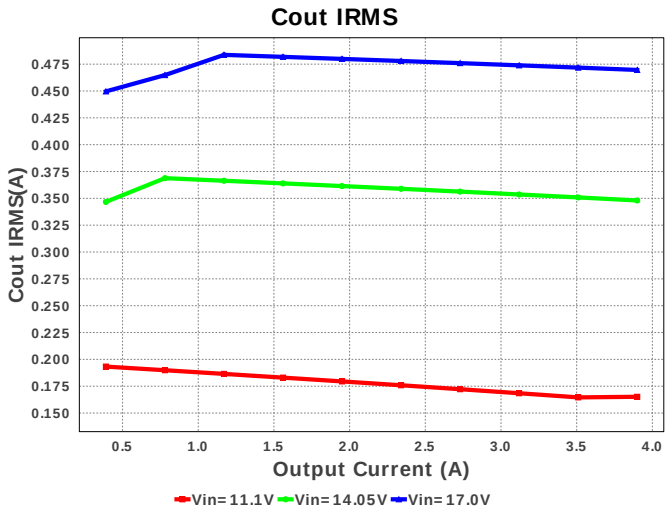

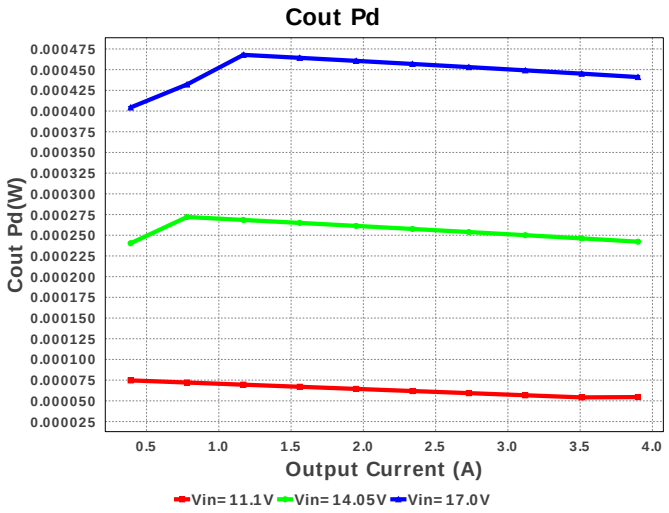

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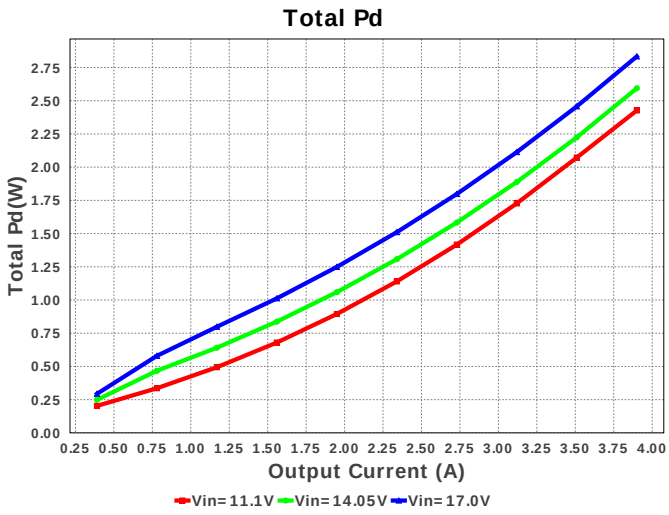

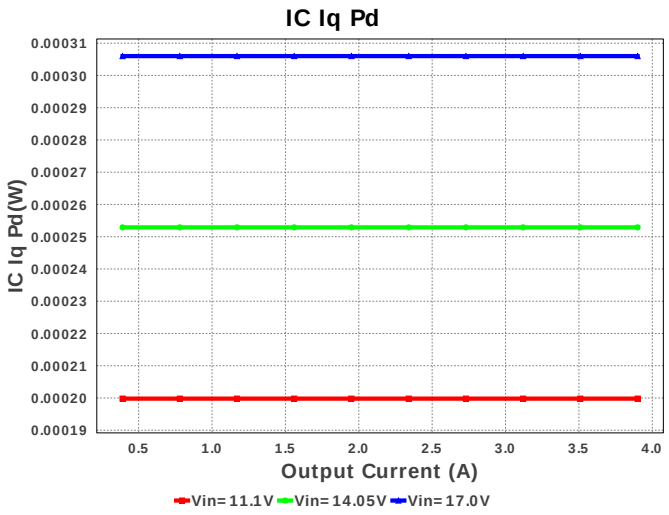

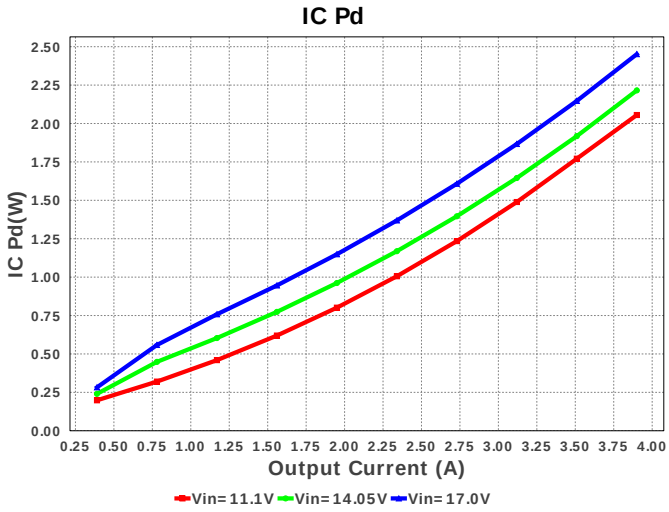

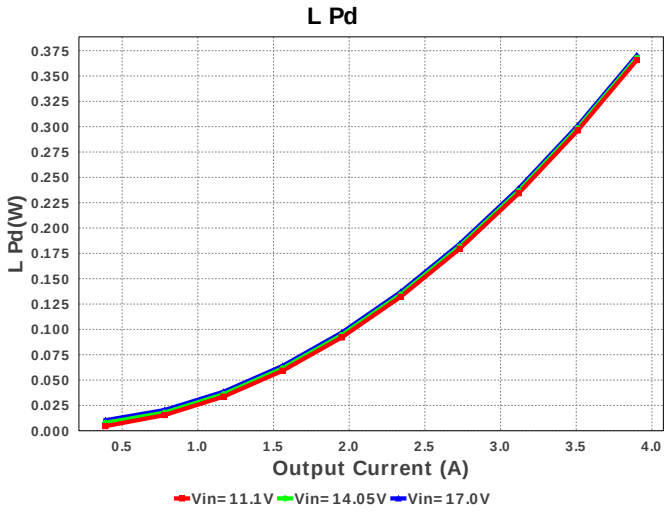

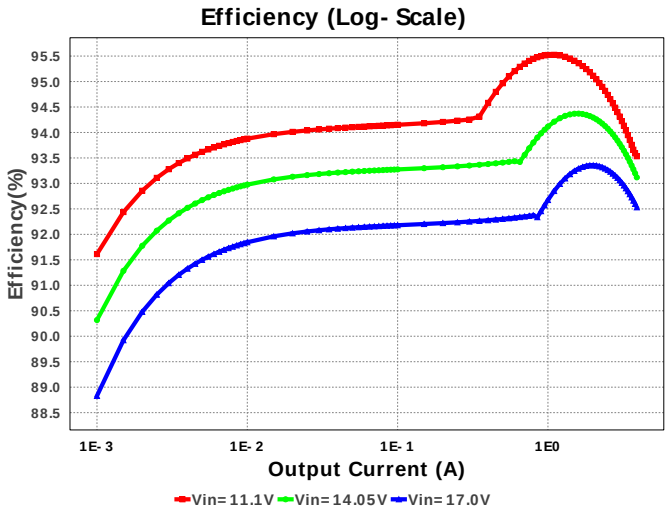

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.972 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	469.601 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	4.713 A	Current	Peak switch current in IC
4.	Iin Avg	2.231 A	Current	Average input current
5.	L Ipp	1.627 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	8	General	Total Design BOM count
7.	FootPrint	64.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	2.505 MHz	General	Switching frequency
9.	Mode	CCM	General	Conduction Mode
10.	Pout	35.1 W	General	Total output power
11.	Total BOM	$1.83	General	Total BOM Cost

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#	Name	Value	Category	Description
12.	Vout Actual	8.96 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
13.	Vout OP	9.0 V	Op_Point	Operational Output Voltage
14.	Vout Sch	9.0 V	Op_Point	Output voltage selected
15.	Duty Cycle	54.686 %	Op_point	Duty cycle
16.	Efficiency	92.531 %	Op_point	Steady state efficiency
17.	IC Tj	124.131 degC	Op_point	IC junction temperature
18.	ICThetaJA	38.4 degC/W	Op_point	IC junction-to-ambient thermal resistance
19.	IOUT_OP	3.9 A	Op_point	Iout operating point
20.	VIN_OP	17.0 V	Op_point	Vin operating point
21.	Vout p-p	6.673 mV	Op_point	Peak-to-peak output ripple voltage
22.	Cin Pd	10.961 mW	Power	Input capacitor power dissipation
23.	Cout Pd	441.049 µW	Power	Output capacitor power dissipation
24.	IC Iq Pd	306.0 µW	Power	IC Iq Pd
25.	IC Pd	2.451 W	Power	IC power dissipation
26.	L Pd	370.333 mW	Power	Inductor power dissipation
27.	Total Pd	2.833 W	Power	Total Power Dissipation
28.	Vout Tolerance	3.026 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	3.9	Maximum Output Current
2.	VinMax	17.0	Maximum input voltage
3.	VinMin	11.1	Minimum input voltage
4.	Vout	9.0	Output Voltage
5.	base_pn	TPS62135	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature
1.	Vout Sch	9.0	Output voltage selected

Design Assistance

1. **TPS62135** Product Folder : http://www.ti.com/product/tps62135 : contains the data sheet and other resources.

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