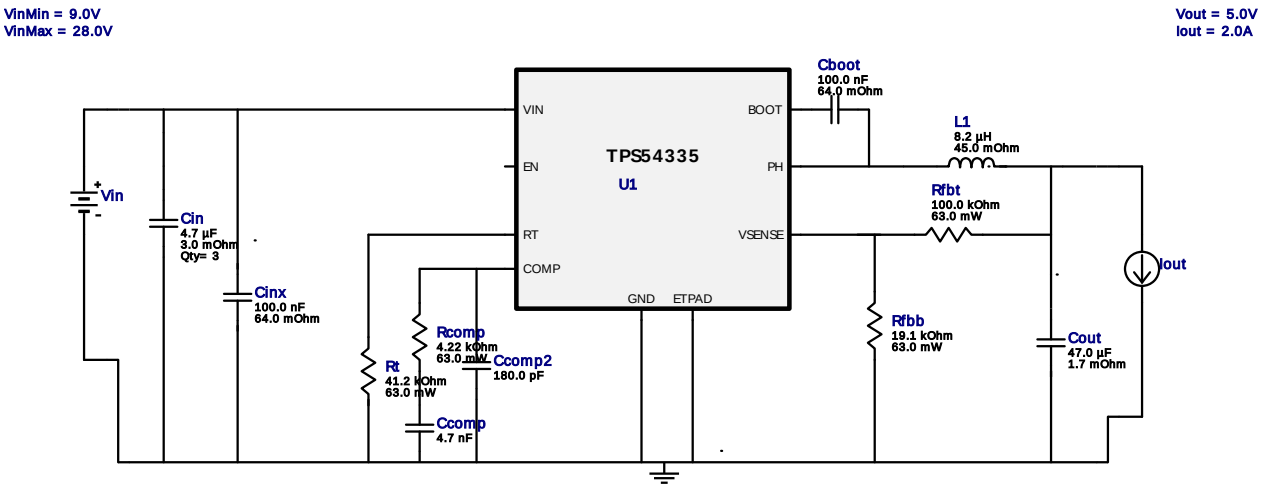
WEBENCH® Design Report

VinMin = 9.0V
VinMax = 28.0V
Vout = 5.0V
Iout = 2.0A

Device = TPS54335DDAR
Topology = Buck
Created = 4/14/14 11:26:19 PM
BOM Cost = $2.12
Footprint = 247.0mm2
BOM Count = 14
Total Pd = 2.61W

Design : 122542/9 TPS54335DDAR
TPS54335DDAR 9.0V-28.0V to 5.0V @ 2.0A

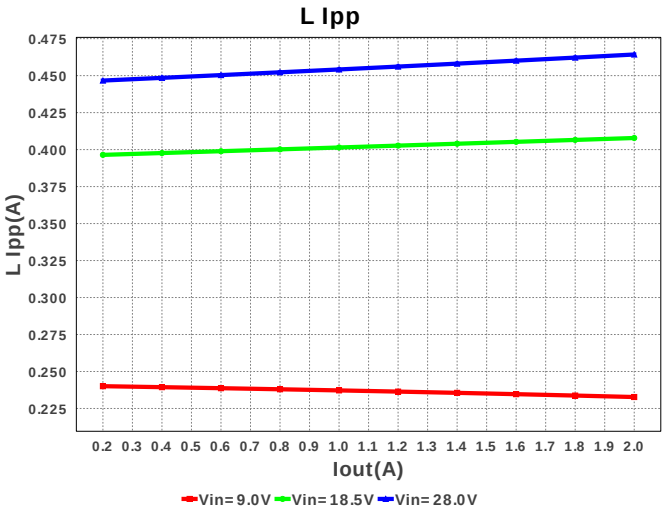


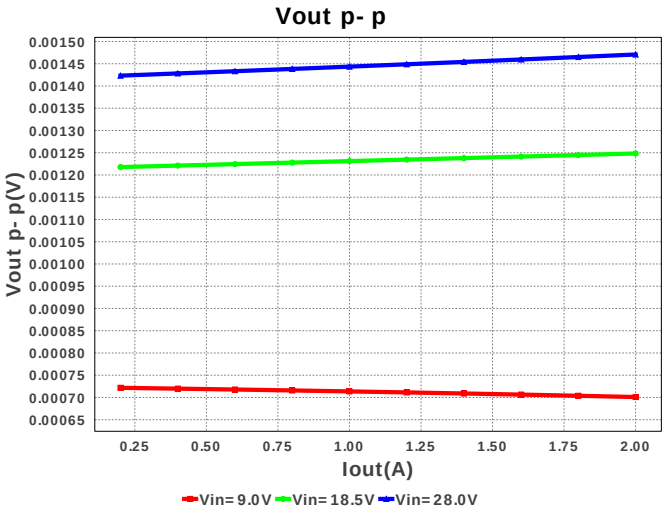
Electrical BOM

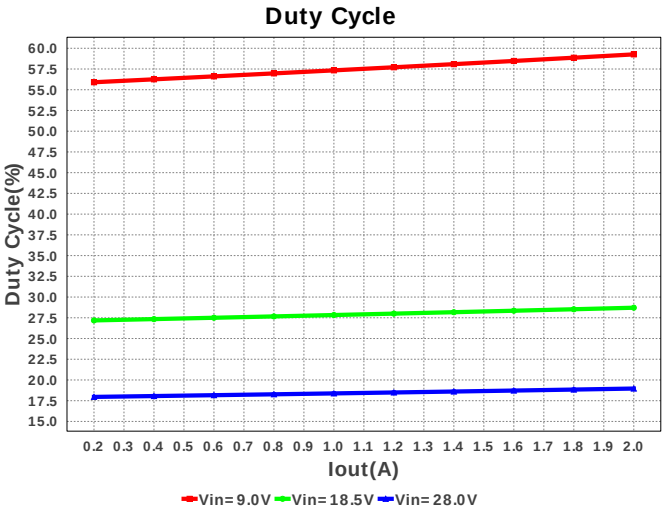
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7mm2
2.	Ccomp	MuRata	GRM033R61A472KA01D Series= X5R	Cap= 4.7 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0201 2mm2
3.	Ccomp2	MuRata	GRM033R71E181KA01D Series= X7R	Cap= 180.0 pF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0201 2mm2
4.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 µF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	3	$0.10	1206 11mm2
5.	Cinx	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7mm2
6.	Cout	TDK	C4532X5R1A476M Series= X5R	Cap= 47.0 µF ESR= 1.7 mOhm VDC= 10.0 V IRMS= 3.8 A	1	$0.63	1812 27mm2
7.	L1	Bourns	SRN8040-8R2Y	L= 8.2 µH DCR= 45.0 mOhm	1	$0.21	SRN8040 100mm2
8.	Rcomp	Vishay-Dale	CRCW04024K22FKED Series= CRCW..e3	Res= 4.22 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3mm2
9.	Rfbb	Vishay-Dale	CRCW040219K1FKED Series= CRCW..e3	Res= 19.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3mm2
10.	Rfbt	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3mm2

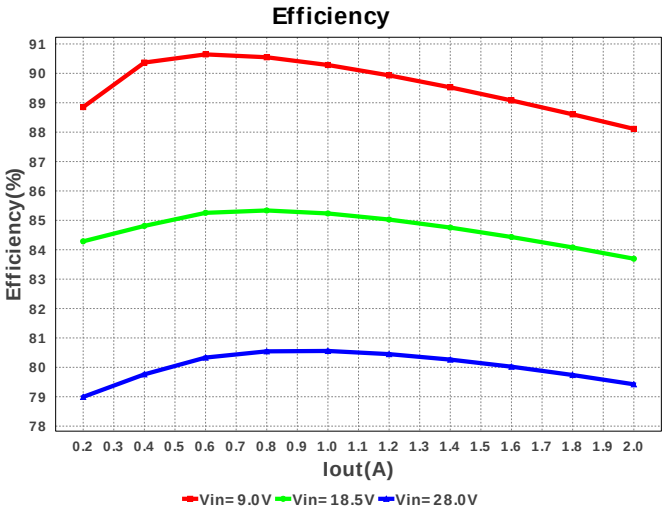
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rt	Vishay-Dale	CRCW040241K2FKED Series= CRCW..e3	Res= 41.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3mm2
12.	U1	Texas Instruments	TPS54335DDAR	Switcher	1	$0.90	

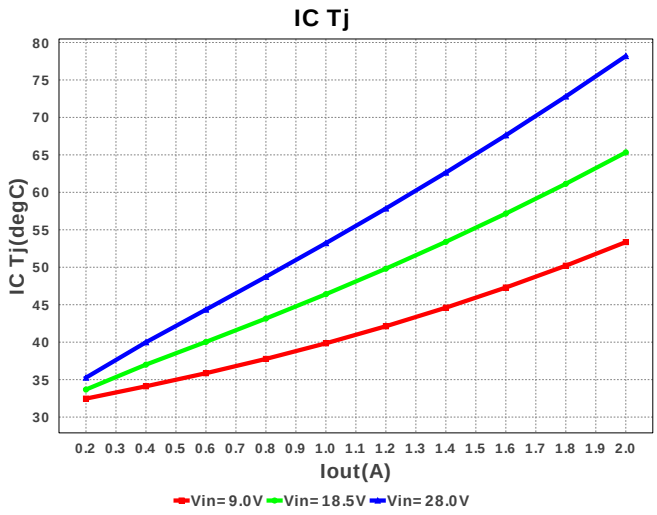
R-PDSO-G8 57mm2

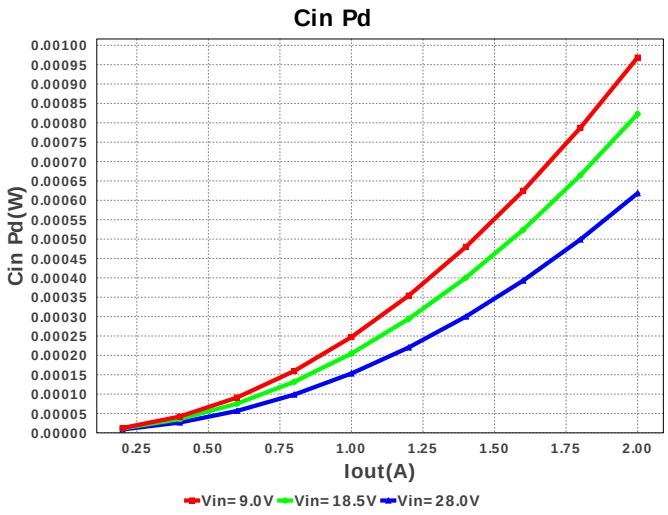


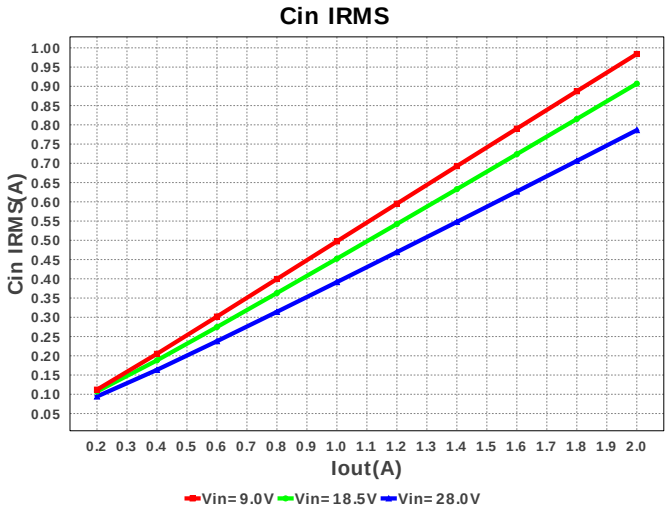


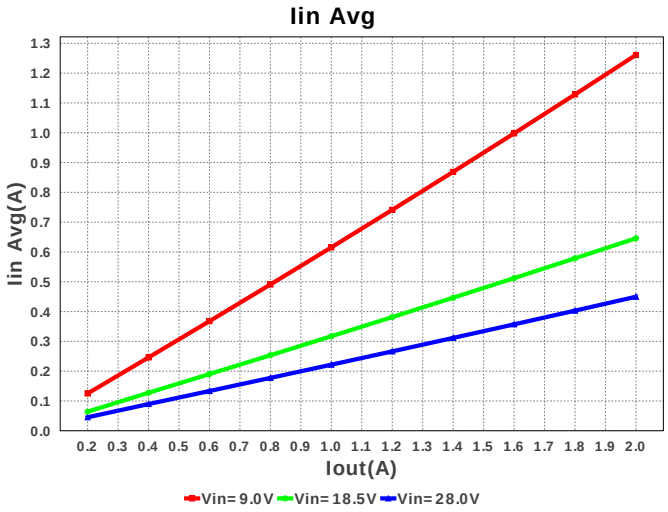


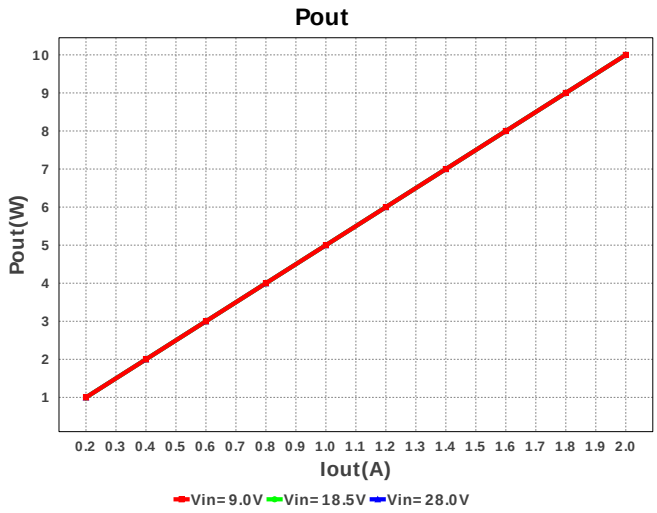


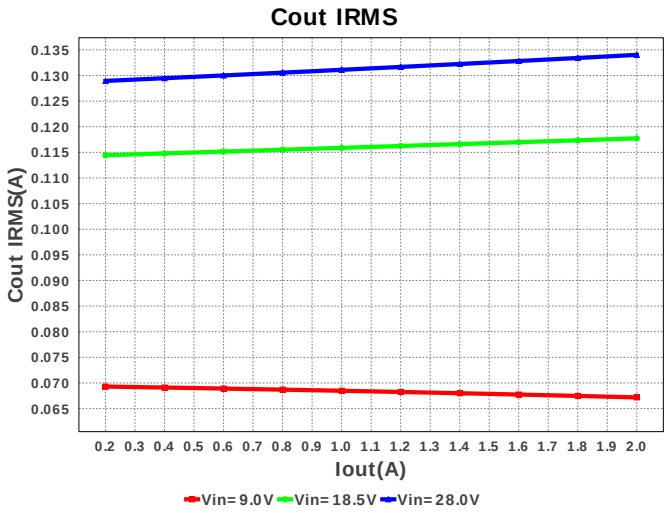


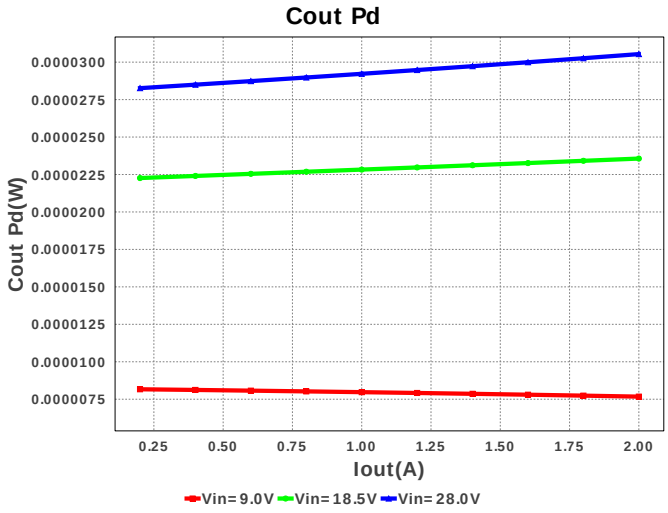


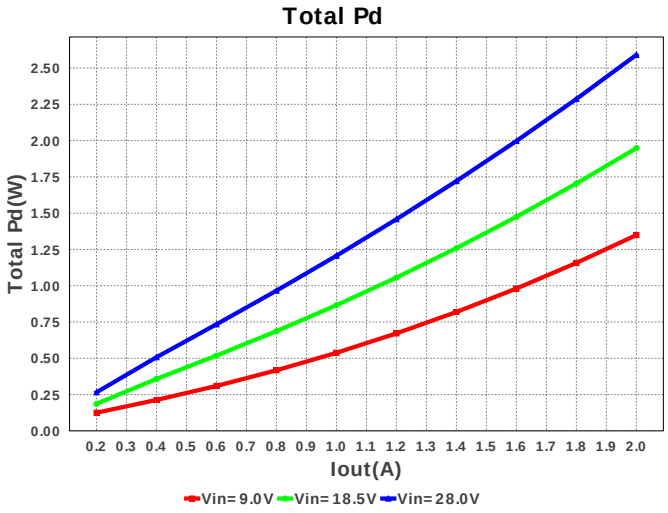


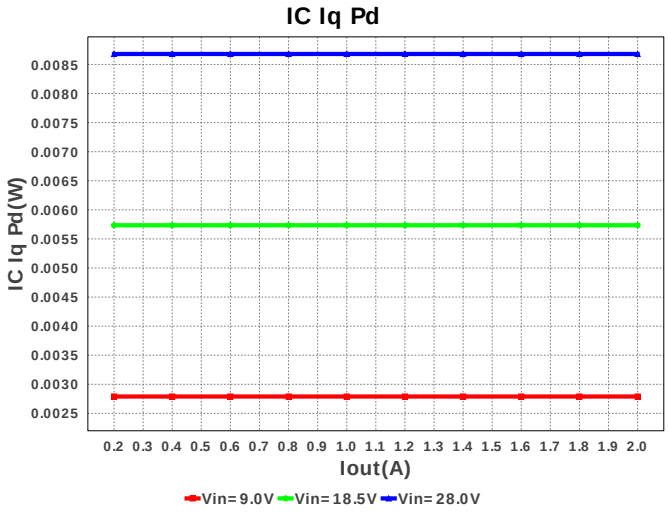


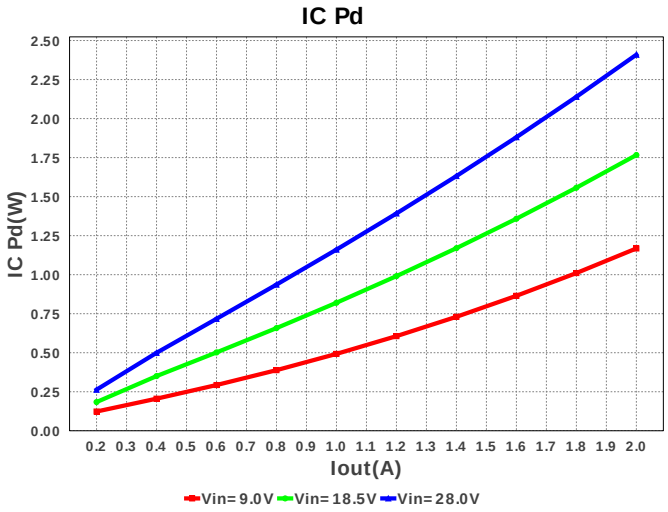


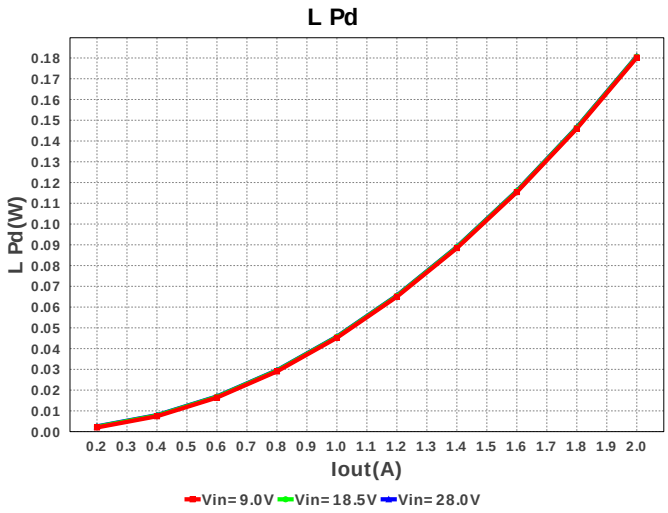


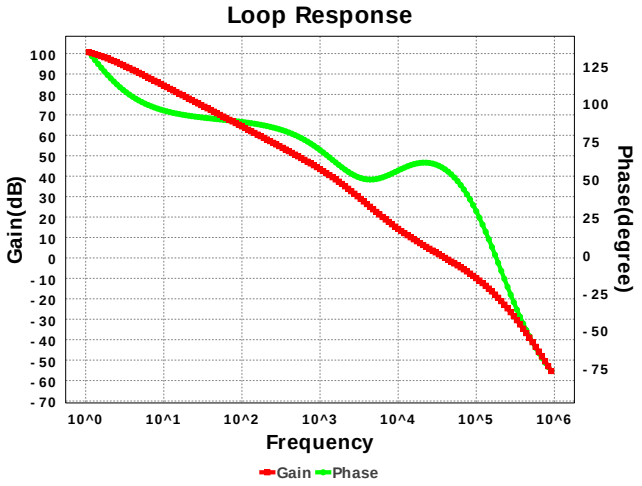












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	786.201 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	132.664 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	450.41 mA	Current	Average input current
4.	L Ipp	459.563 mA	Current	Peak-to-peak inductor ripple current
5.	BOM Count	14	General	Total Design BOM count
6.	FootPrint	247.0 mm2	General	Total Foot Print Area of BOM components
7.	Frequency	1.138 MHz	General	Switching frequency
8.	IC Tolerance	10.0 mV	General	IC Feedback Tolerance
9.	Pout	10.0 W	General	Total output power
10.	Total BOM	$2.12	General	Total BOM Cost
11.	Vout OP	5.0 V	Op_Point	Operational Output Voltage

#	Name	Value	Category	Description
12.	Cross Freq	39.975 kHz	Op_point	Bode plot crossover frequency
13.	Duty Cycle	18.967 %	Op_point	Duty cycle
14.	Efficiency	79.293 %	Op_point	Steady state efficiency
15.	IC Tj	78.598 degC	Op_point	IC junction temperature
16.	ICThetaJA	20.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
17.	IOUT_OP	2.0 A	Op_point	Iout operating point
18.	Phase Marg	57.04 deg	Op_point	Bode Plot Phase Margin
19.	VIN_OP	28.0 V	Op_point	Vin operating point
20.	Vout p-p	1.445 mV	Op_point	Peak-to-peak output ripple voltage
21.	Cin Pd	618.112 µW	Power	Input capacitor power dissipation
22.	Cout Pd	29.92 µW	Power	Output capacitor power dissipation
23.	IC Iq Pd	8.68 mW	Power	IC Iq Pd
24.	IC Pd	2.43 W	Power	IC power dissipation
25.	L Pd	180.792 mW	Power	Inductor power dissipation
26.	Total Pd	2.611 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	2.0 A	Maximum Output Current
2.	Iout1	2.0 Amps	Output Current #1
3.	VinMax	28.0 V	Maximum input voltage
4.	VinMin	9.0 V	Minimum input voltage
5.	Vout	5.0 V	Output Voltage
6.	Vout1	5.0 Volt	Output Voltage #1
7.	base_pn	TPS54335	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **TPS54335** Product Folder : http://www.ti.com/product/tps54335 : contains the data sheet and other resources.