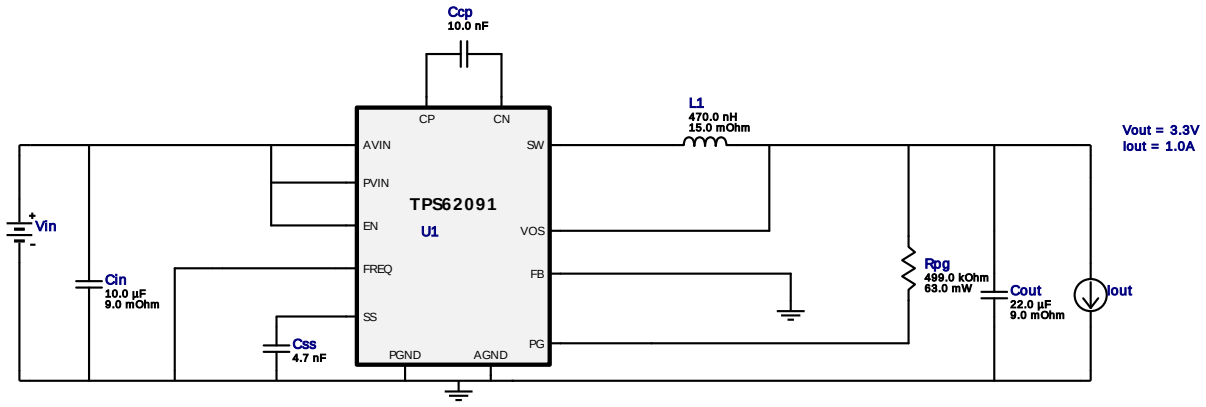
WEBENCH® Design Report

VinMin = 3.5V
VinMax = 4.2V
Vout = 3.3V
Iout = 1.0A

Device = TPS62091RGTR
Topology = Buck
Created = 3/5/17 10:37:50 AM
BOM Cost = $1.47
BOM Count = 7
Total Pd = 0.21W

Design : 4927137/1 TPS62091RGTR
TPS62091RGTR 3.5V-4.2V to 3.30V @ 1.0A

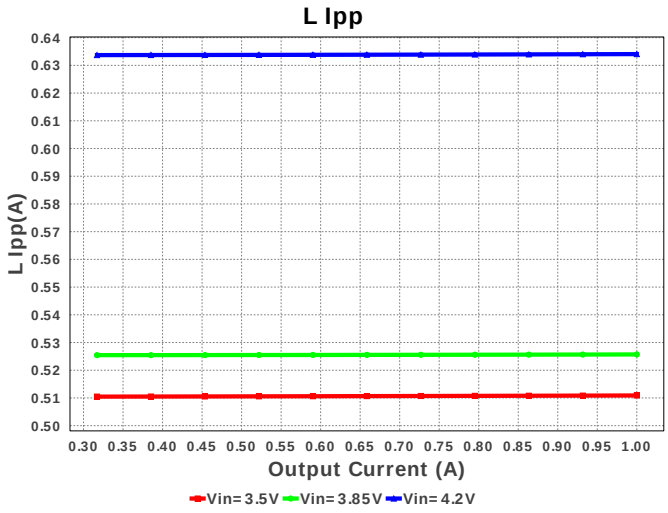


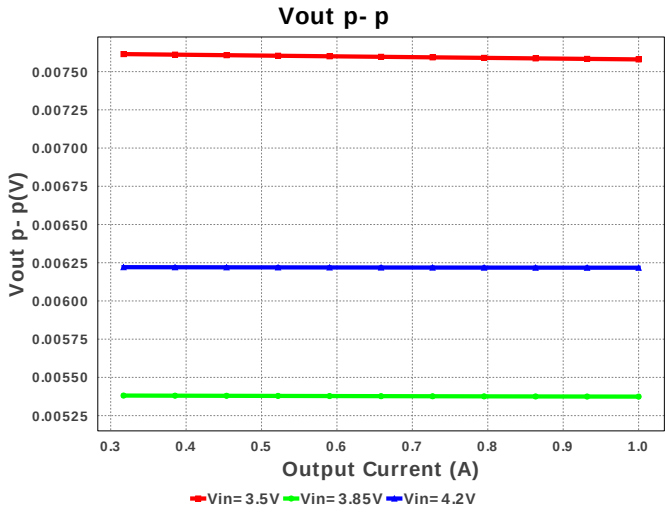
My Comments

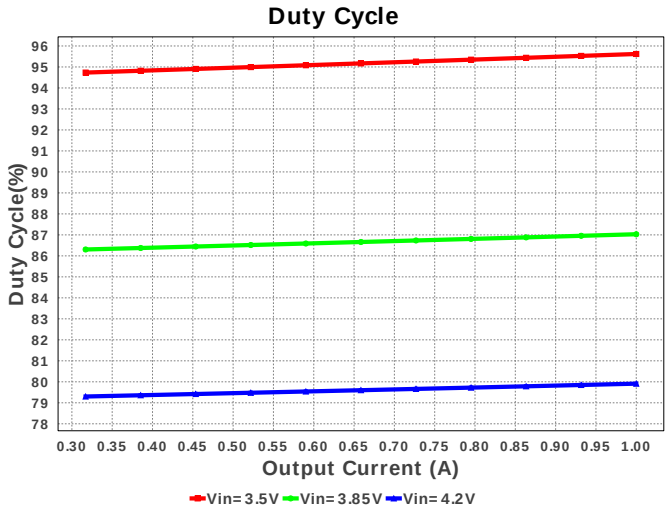
No comments

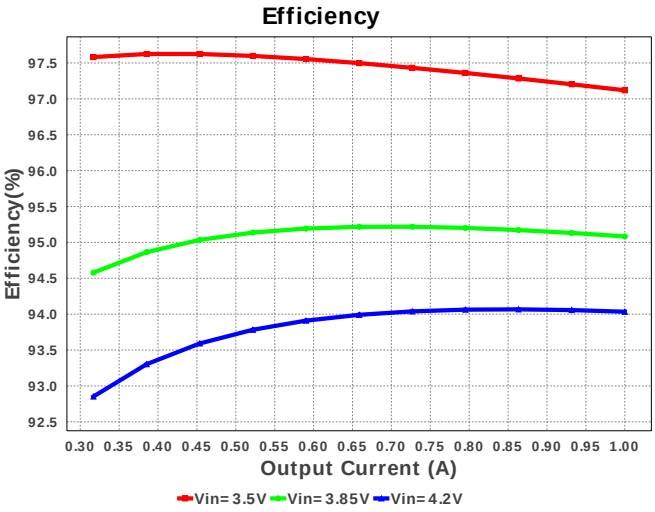
Electrical BOM

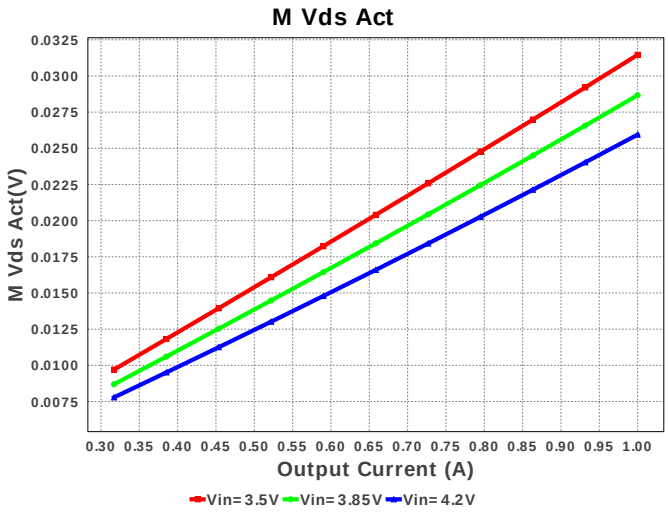
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccp	MuRata	GRM155R71E103KA01D Series= X7R	Cap= 10.0 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cin	MuRata	GRM188R60J106ME47D Series= X5R	Cap= 10.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 2.74 A	1	$0.02	0603 5 mm²
3.	Cout	MuRata	GRM21BR60J226ME39L Series= X5R	Cap= 22.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 3.5 A	1	$0.04	0805 7 mm²
4.	Css	MuRata	GRM033R61A472KA01D Series= X5R	Cap= 4.7 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0201 2 mm²
5.	L1	Vishay-Dale	IHLP1212AEERR47M11	L= 470.0 nH DCR= 15.0 mOhm	1	$0.54	IHLP-1212AE 19 mm²
6.	Rpg	Vishay-Dale	CRCW0402499KFKED Series= CRCW..e3	Res= 499.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	U1	Texas Instruments	TPS62091RGTR	Switcher	1	$0.84	S-PVQFN-N16 17 mm²

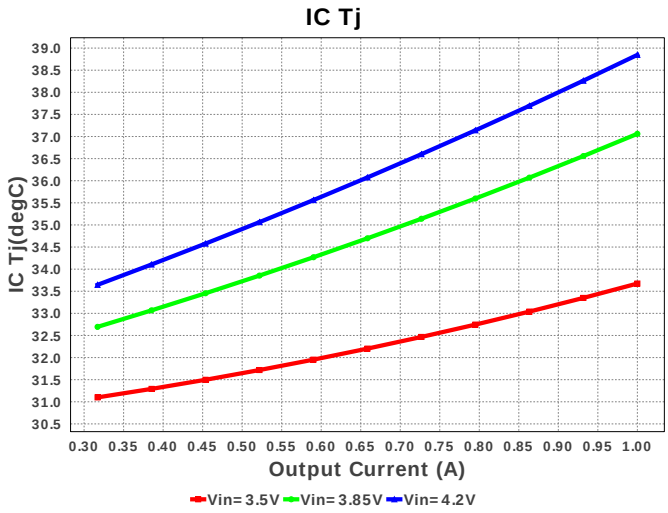


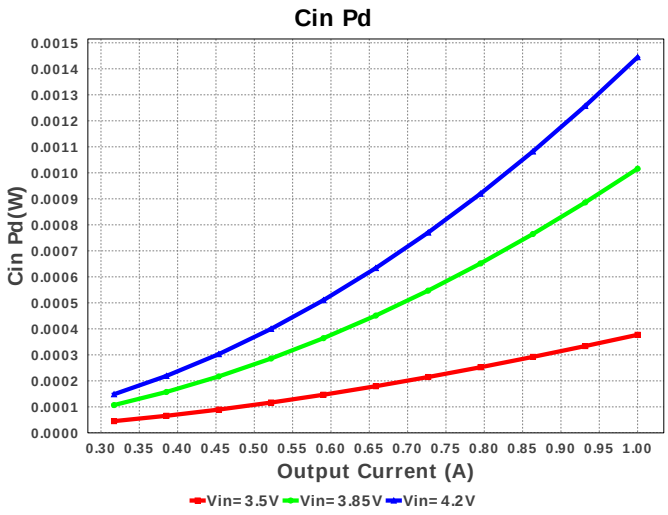


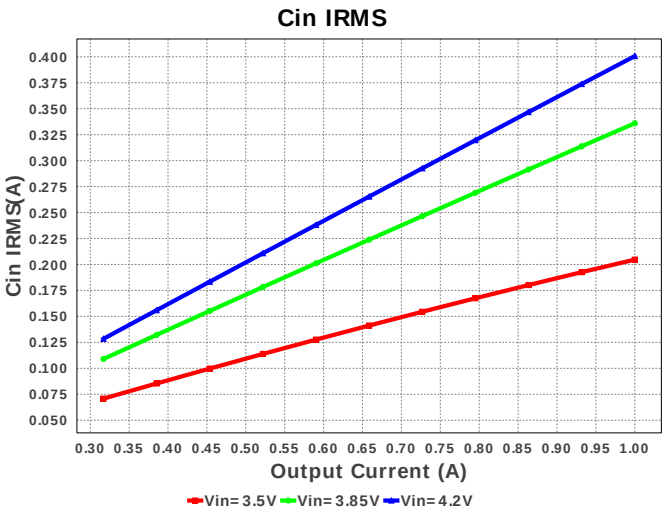


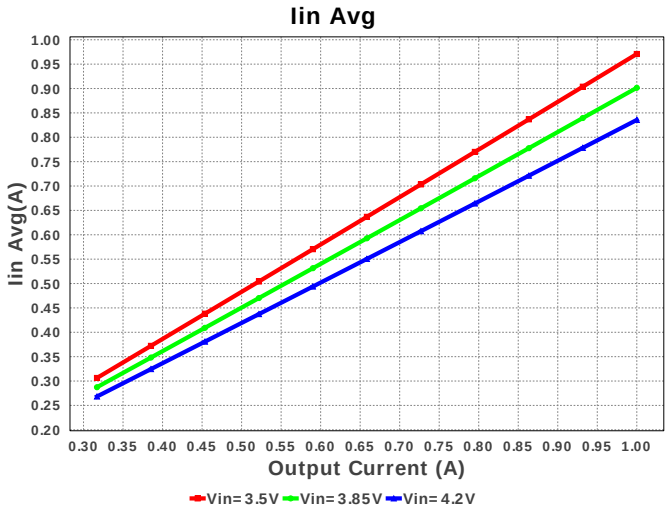


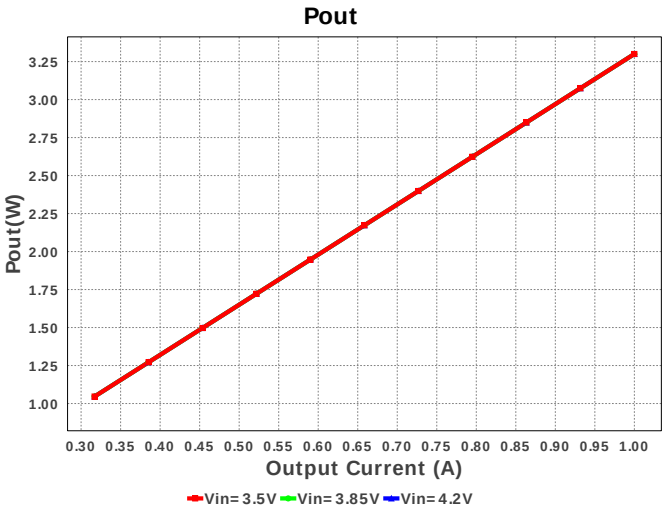


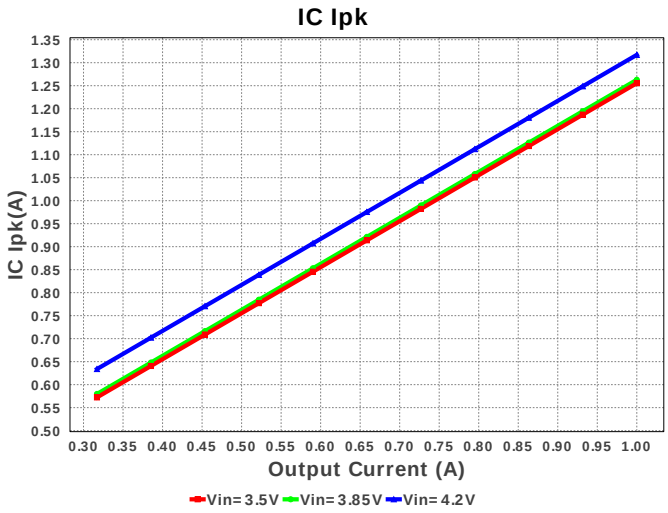


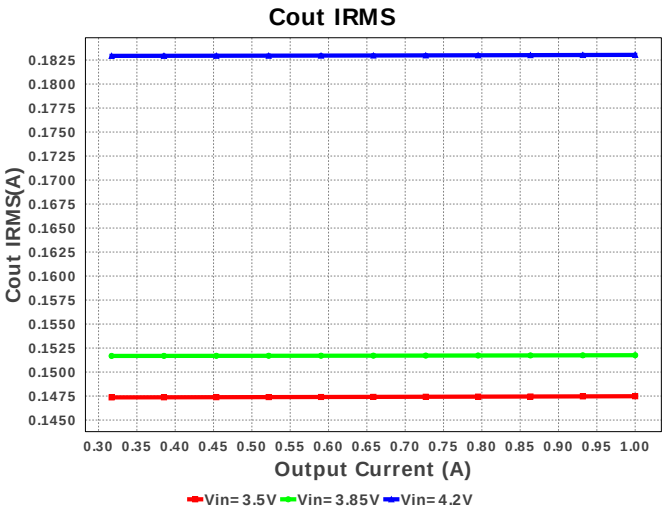


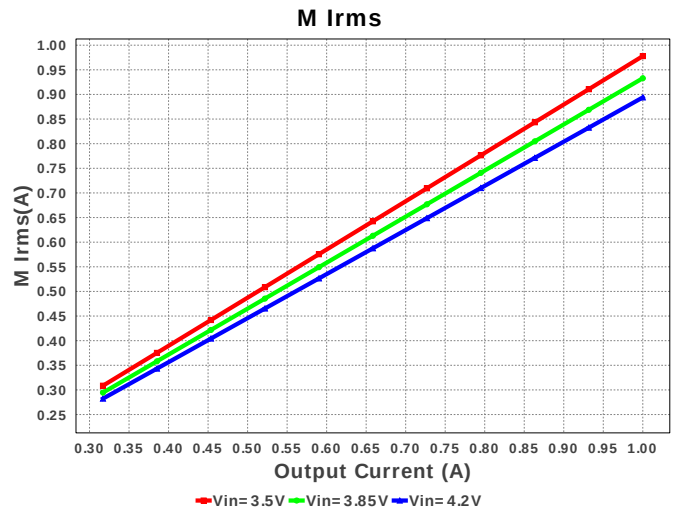


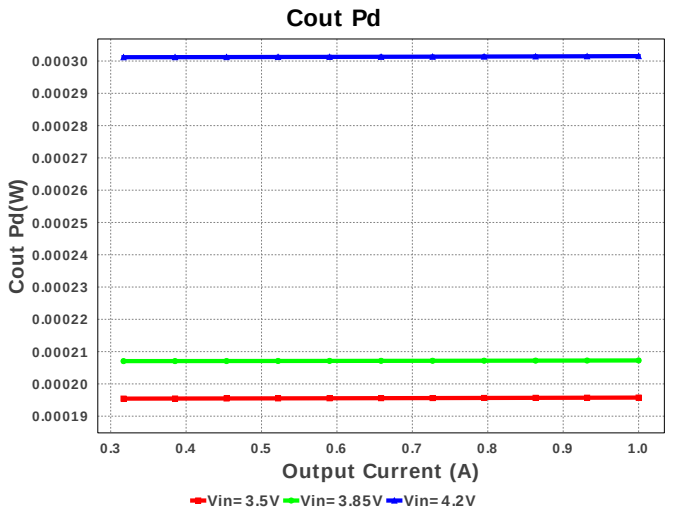


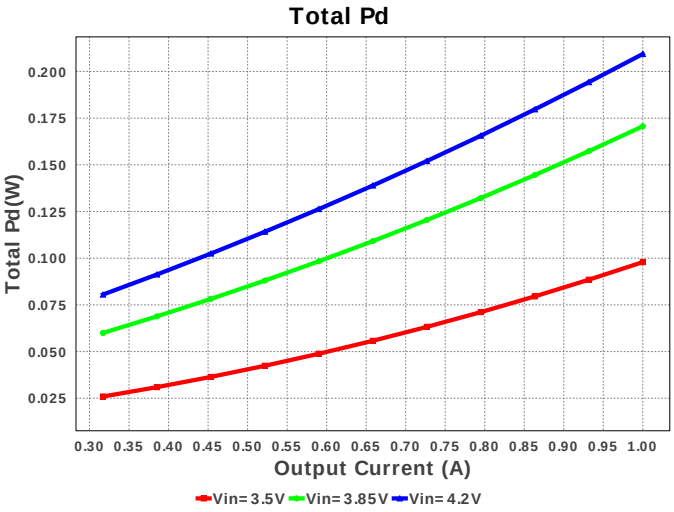


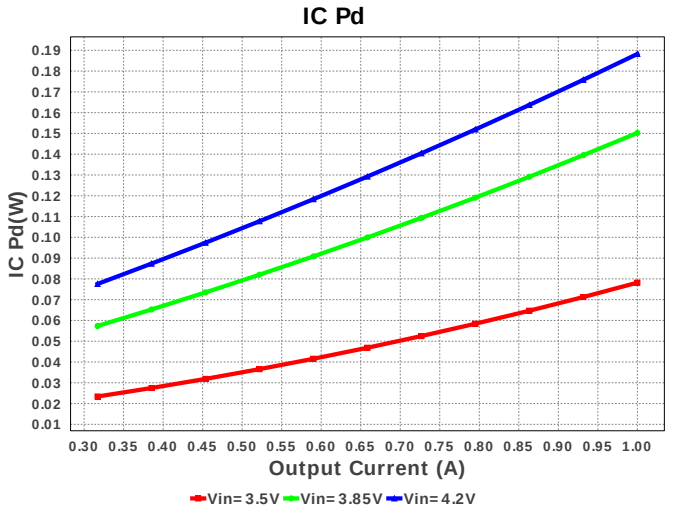


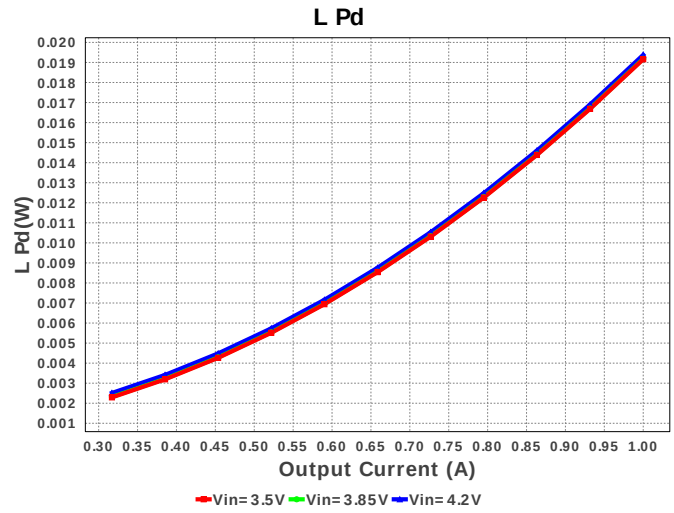












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	400.657 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	183.039 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.317 A	Current	Peak switch current in IC
4.	Iin Avg	835.56 mA	Current	Average input current
5.	L Ipp	634.07 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	893.936 mA	Current	Q Iavg
7.	BOM Count	7	General	Total Design BOM count
8.	FootPrint	56.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	2.413 MHz	General	Switching frequency
10.	IC Tolerance	16.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	25.944 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Mode	CCM	General	Conduction Mode
13.	Pout	3.3 W	General	Total output power
14.	Total BOM	$1.47	General	Total BOM Cost
15.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
16.	Duty Cycle	79.912 %	Op_point	Duty cycle
17.	Efficiency	94.034 %	Op_point	Steady state efficiency
18.	IC Tj	38.847 degC	Op_point	IC junction temperature
19.	ICThetaJA	47.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	1.0 A	Op_point	Iout operating point
21.	VIN_OP	4.2 V	Op_point	Vin operating point
22.	Vout p-p	6.217 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	1.445 mW	Power	Input capacitor power dissipation
24.	Cout Pd	301.531 µW	Power	Output capacitor power dissipation
25.	IC Pd	188.227 mW	Power	IC power dissipation
26.	L Pd	19.378 mW	Power	Inductor power dissipation
27.	Total Pd	209.368 mW	Power	Total Power Dissipation
28.	Vout Tolerance	484.85 m%		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	SoftStart	0.7 ms	Soft Start Time (ms)
3.	VinMax	4.2	Maximum input voltage
4.	VinMin	3.5	Minimum input voltage
5.	Vout	3.3	Output Voltage
6.	base_pn	TPS62091	Base Product Number
7.	source	DC	Input Source Type
8.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS62091** Product Folder : http://www.ti.com/product/TPS62091 : contains the data sheet and other resources.