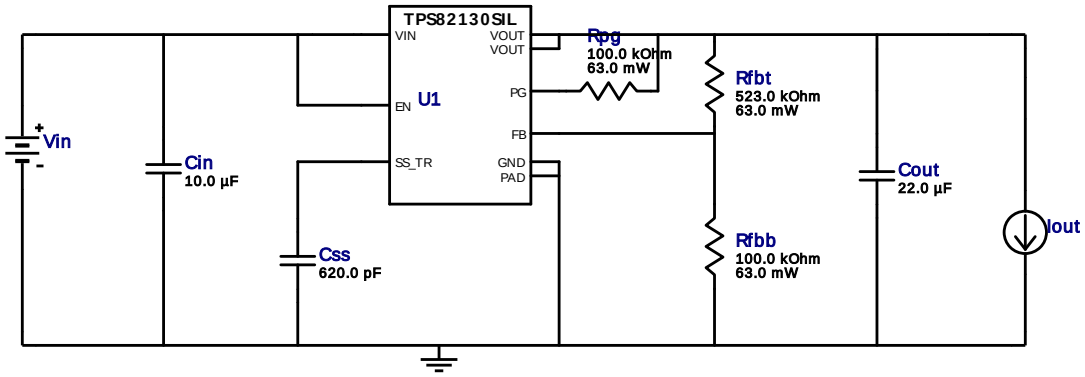
WEBENCH® Design Report

VinMin = 6.0V
VinMax = 14.0V
Vout = 5.0V
Iout = 2.5A

Device = TPS82130SILR
Topology = Buck
Created = 3/27/17 5:54:51 AM
BOM Cost = $2.12
BOM Count = 7
Total Pd = 1.34W

Design : 957852/92 TPS82130SILR
TPS82130SILR 6.0V-14.0V to 5.00V @ 2.5A

Vout = 5.0V
Iout = 2.5A



My Comments

No comments

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	Taiyo Yuden	LMK212BJ226MG-T Series= X5R	Cap= 22.0 uF VDC= 10.0 V IRMS= 0.0 A	1	$0.13	0805 7 mm²
3.	Css	Samsung Electro-Mechanics	CL21C621JBCNNNC Series= C0G/NP0	Cap= 620.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	Rfbb	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
5.	Rfbt	Vishay-Dale	CRCW0402523KFKED Series= CRCW..e3	Res= 523.0 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	TPS82130SILR	Switcher	1	$1.90	SIL0008D_SMD 15 mm²

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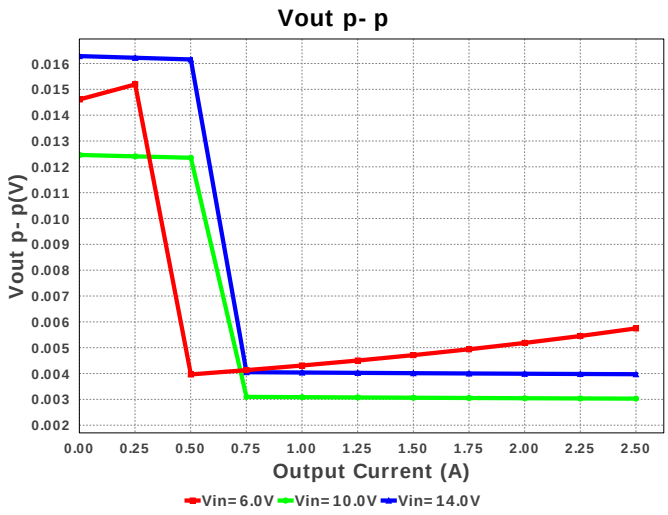

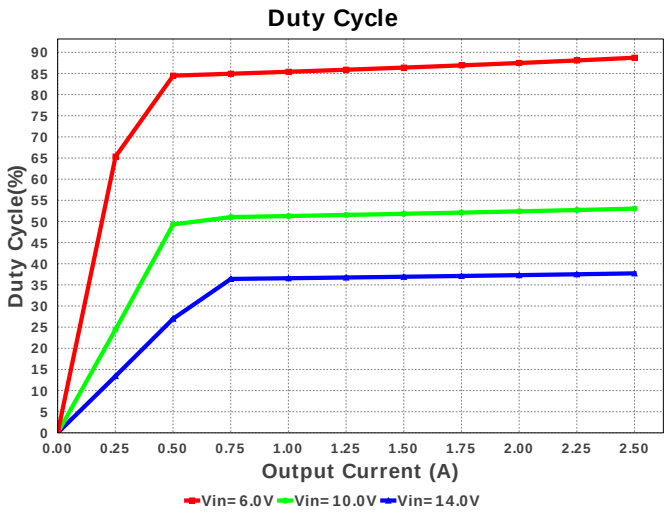

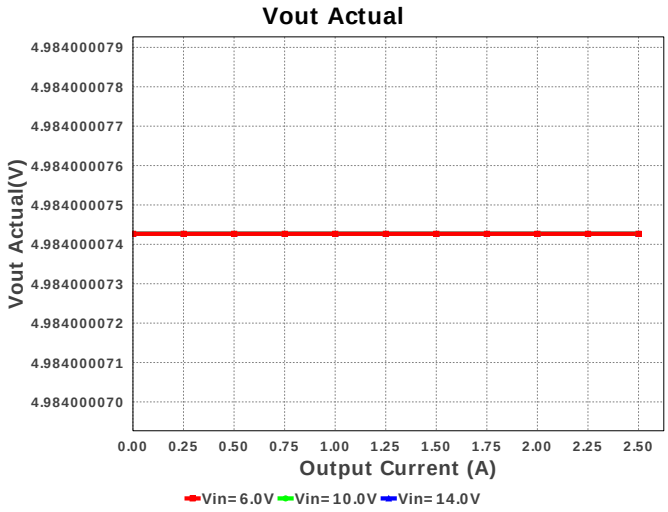

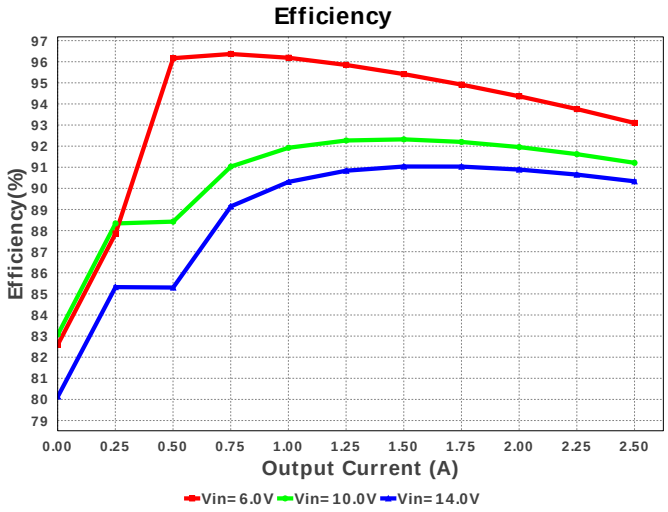

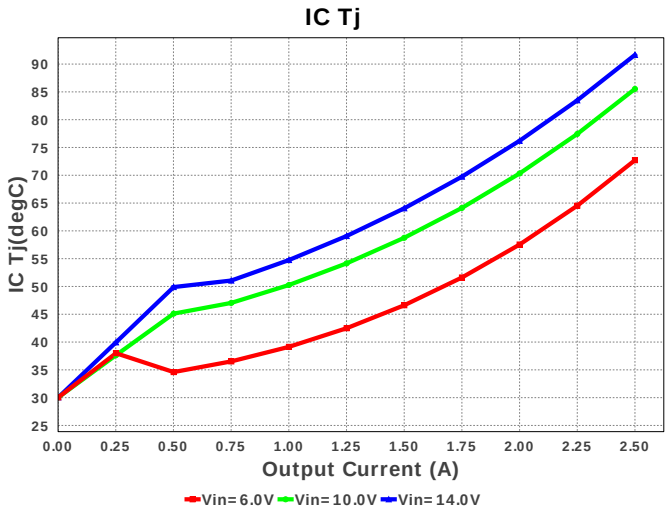

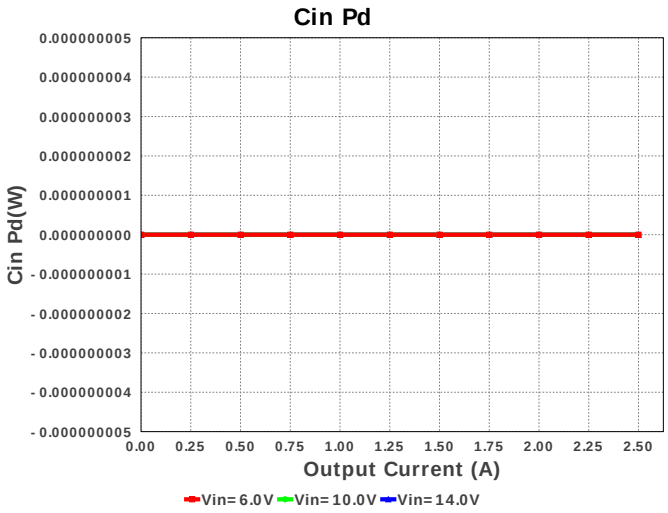

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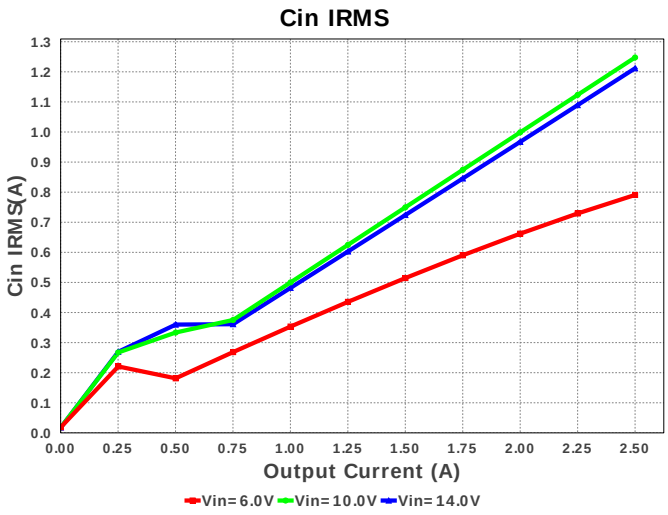

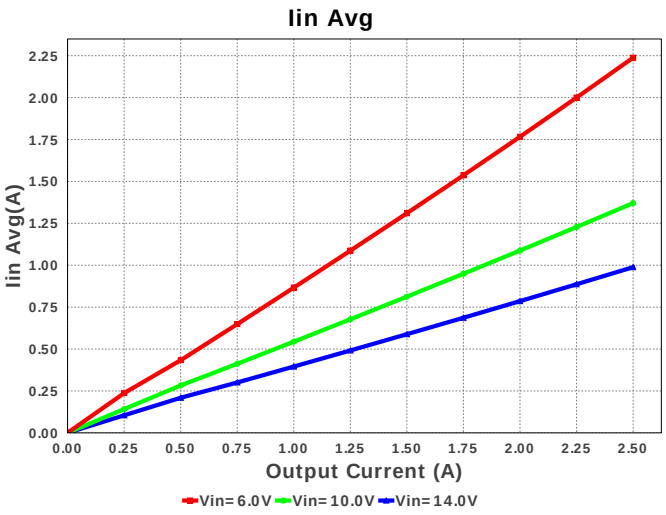

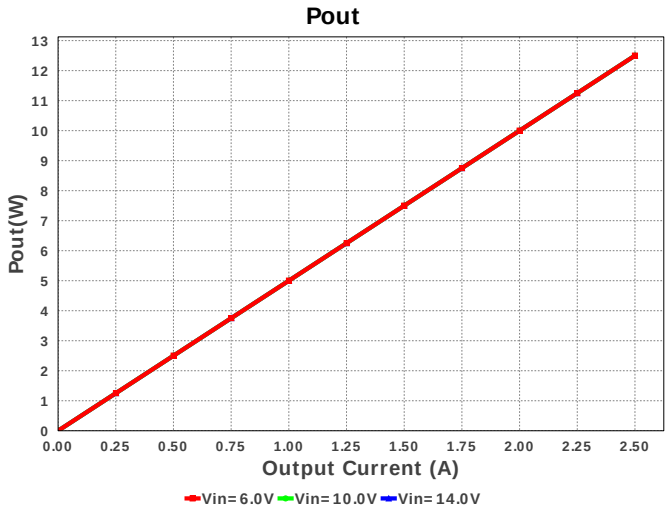

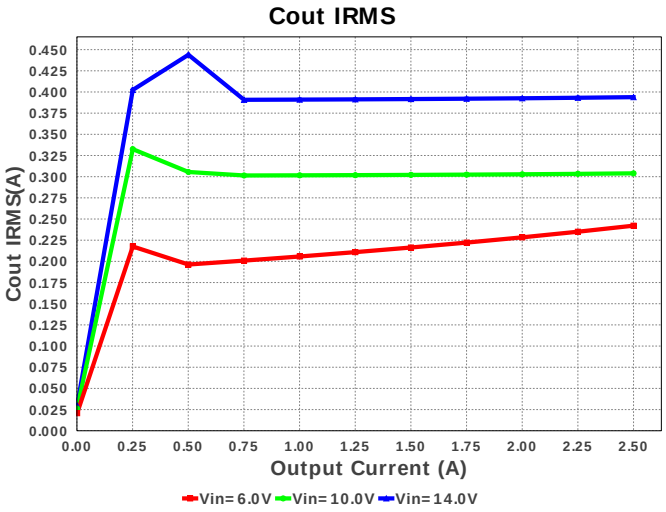

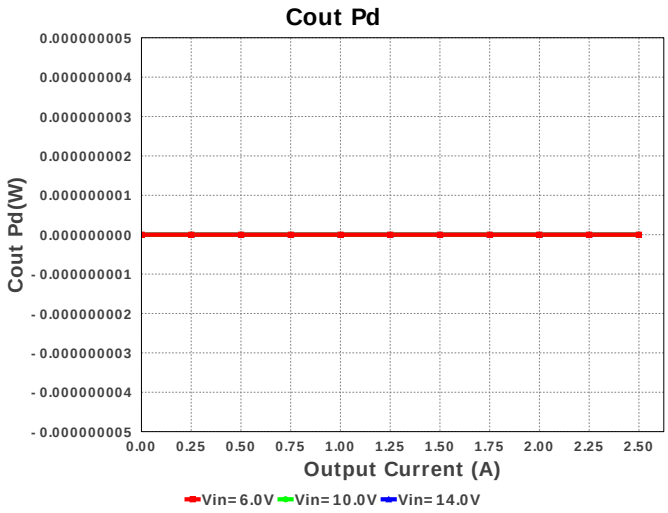

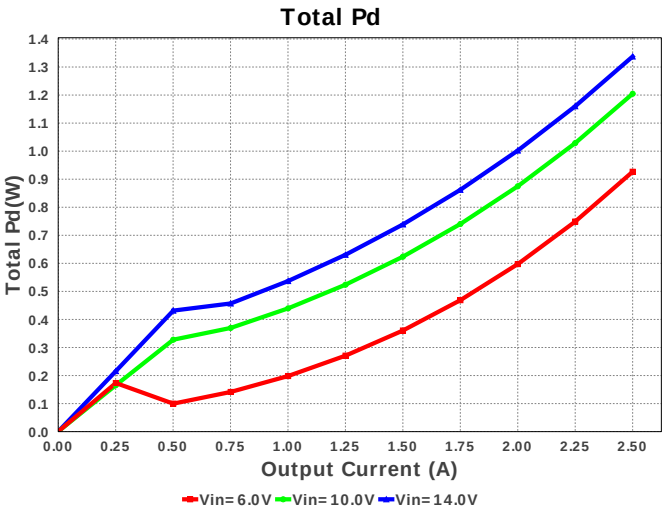

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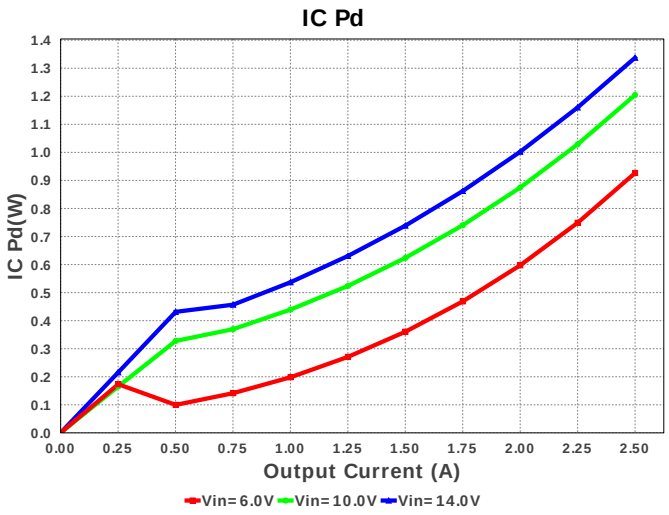

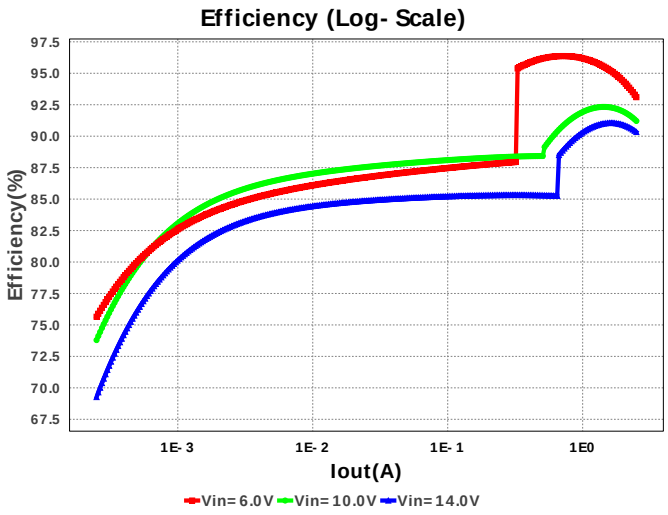

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.212 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	393.892 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	988.39 mA	Current	Average input current
4.	BOM Count	7	General	Total Design BOM count
5.	FootPrint	49.0 mm^2	General	Total Foot Print Area of BOM components
6.	Frequency	2.262 MHz	General	Switching frequency
7.	Mode	CCM	General	Conduction Mode
8.	Pout	12.5 W	General	Total output power
9.	Total BOM	$2.12	General	Total BOM Cost
10.	ICThetaJA Effective	46.1 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
11.	Vout Actual	4.984 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
12.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
13.	Duty Cycle	37.723 %	Op_point	Duty cycle
14.	Efficiency	90.334 %	Op_point	Steady state efficiency
15.	IC Tj	91.657 degC	Op_point	IC junction temperature
16.	IOUT_OP	2.5 A	Op_point	Iout operating point
17.	VIN_OP	14.0 V	Op_point	Vin operating point
18.	Vout p-p	3.974 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
20.	Cout Pd	0.0 W	Power	Output capacitor power dissipation
21.	IC Pd	1.337 W	Power	IC power dissipation
22.	Total Pd	1.338 W	Power	Total Power Dissipation
23.	Vout Tolerance	4.62 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.5	Maximum Output Current
2.	VinMax	14.0	Maximum input voltage
3.	VinMin	6.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS82130	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 up to 3A output current, Power module with integrated inductor, 3V to 17V Input Voltage Range, Adjustable output voltage from 0.9V to 5V, Optional softstart capacitor for slow startup, Power Save Mode for light load efficiency, 100% duty cycle for lowest dropout, PG=Low when device is in shutdown through EN or Thermal Shutdown

2. **TPS82130** Product Folder : http://www.ti.com/product/TPS82130 : contains the data sheet and other resources.

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