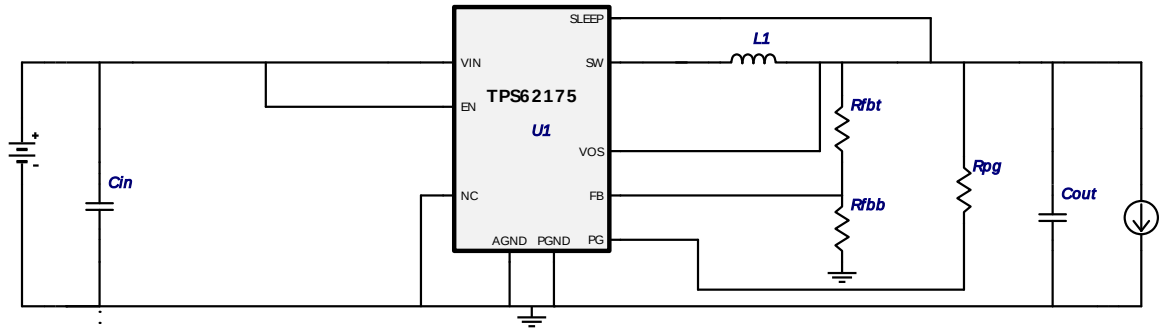
WEBENCH® Design Report

VinMin = 10.0V
VinMax = 16.0V
Vout = 5.0V
Iout = 0.25A

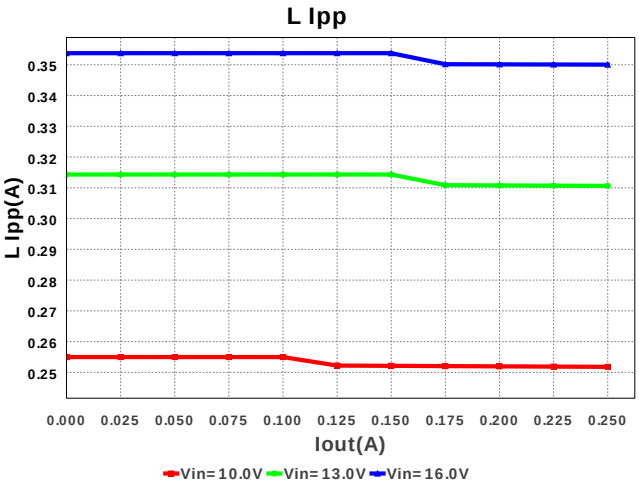
Device = TPS62175DQCR
Topology = Buck
Created = 2/24/13 6:12:21 AM
BOM Cost = $1.41
Total Pd = 0.15W
Footprint = 152.0mm2
BOM Count = 7

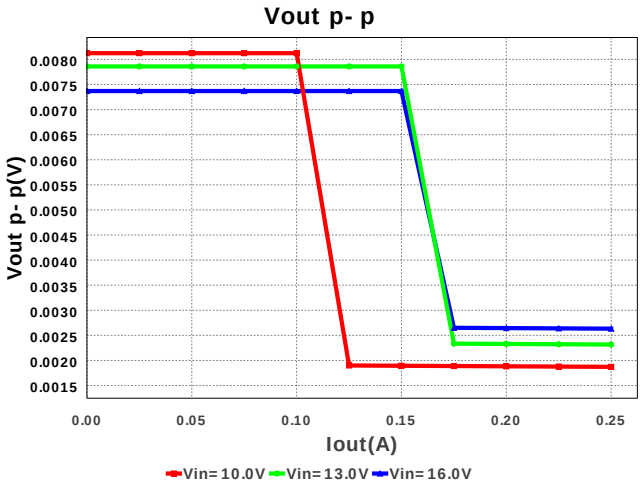
Design : 3670388/1 TPS62175DQCR
TPS62175DQCR 10.0V-16.0V to 5.0V @ 0.25A

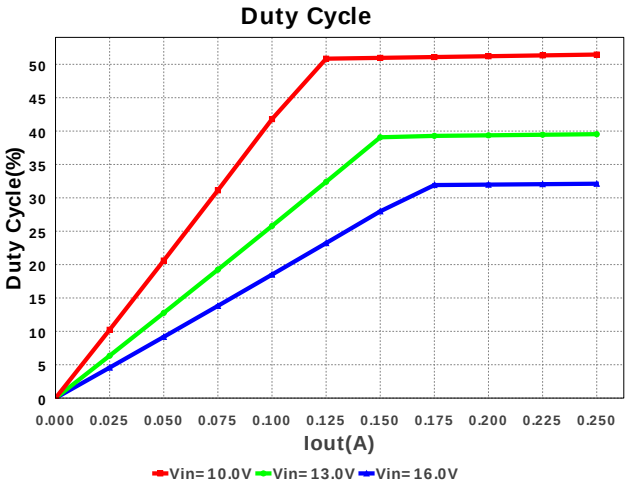


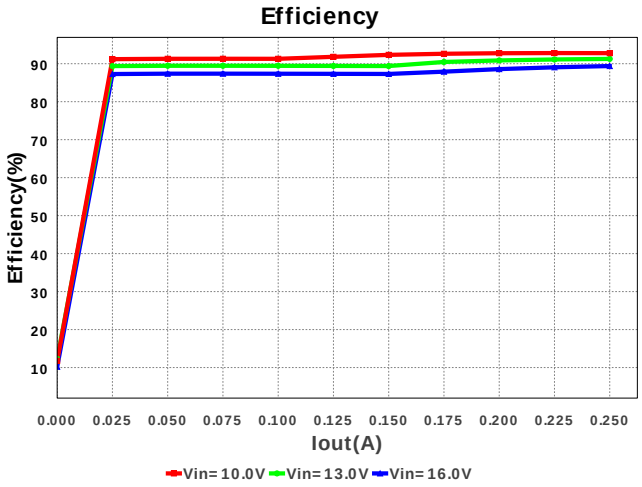
Electrical BOM

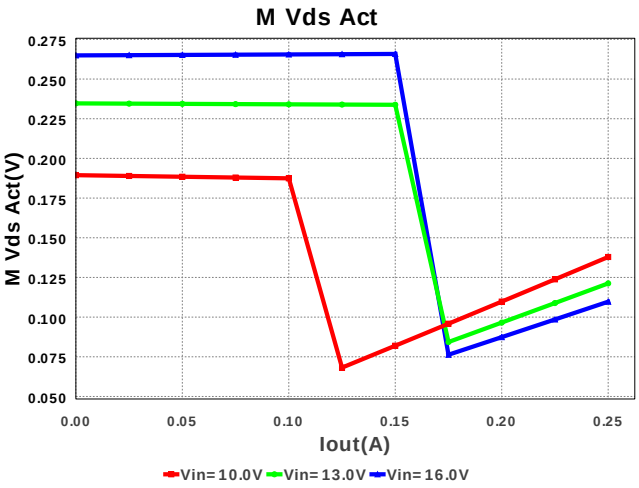
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	Kemet	C1206C225K4RACTU Series= X7R	Cap= 2.2 µF ESR= 9.0 mOhm VDC= 16.0 V IRMS= 4.46 A	1	$0.07	1206 19mm2
2.	Cout	TDK	C3225X5R1A226M Series= X5R	Cap= 22.0 µF ESR= 2.0 mOhm VDC= 10.0 V IRMS= 3.2 A	1	$0.19	1210 23mm2
3.	L1	Bourns	SDR0604-100ML	L= 10.0 µH DCR= 100.0 mOhm	1	$0.17	SDR0604 61mm2
4.	Rfbb	Vishay-Dale	CRCW0402374KFKED Series= CRCW..e3	Res= 374.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
5.	Rfbt	Vishay-Dale	CRCW08052M05FKEA Series= CRCW..e3	Res= 2.05 MOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 13mm2
6.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
7.	U1	Texas Instruments	TPS62175DQCR	Switcher	1	$0.95	R-PWSON-N10 21mm2

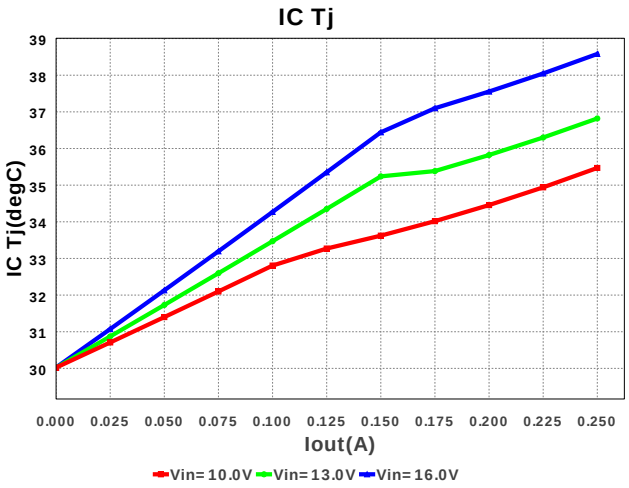


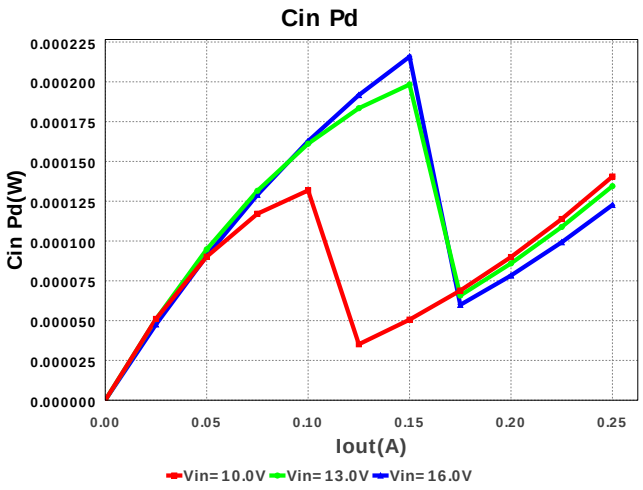


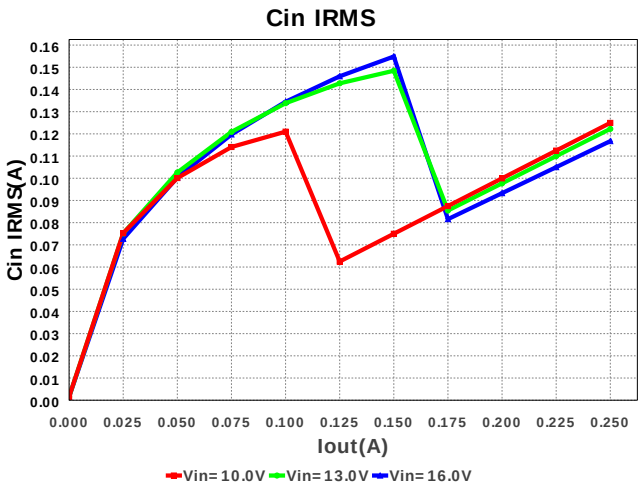


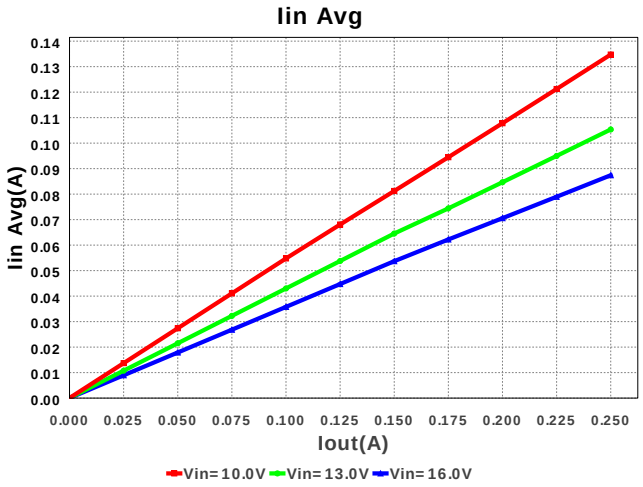


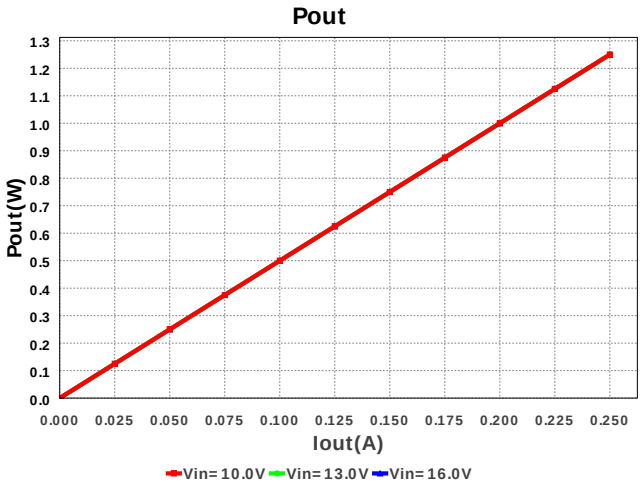


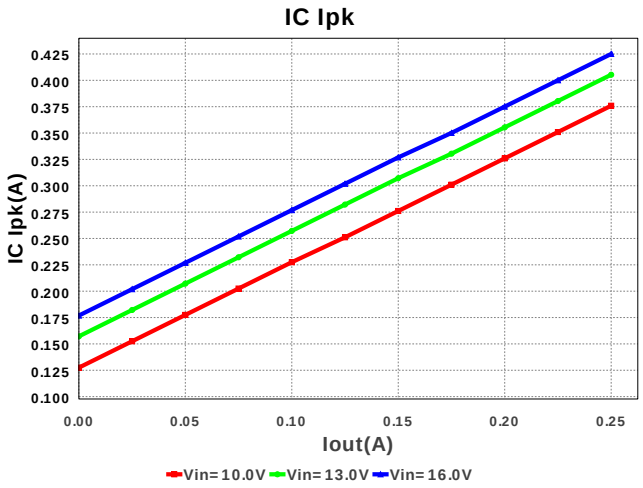


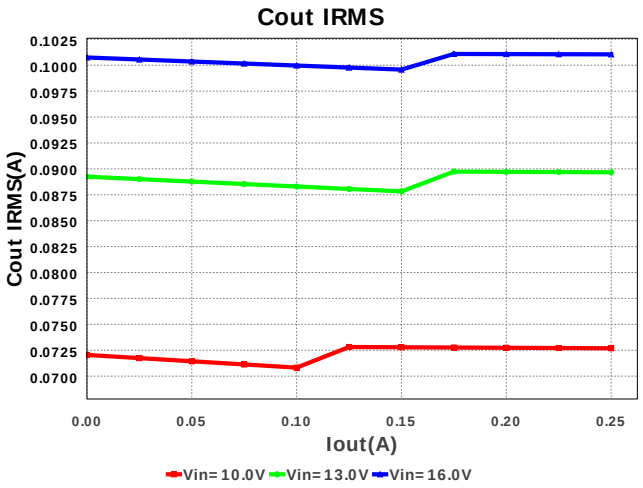


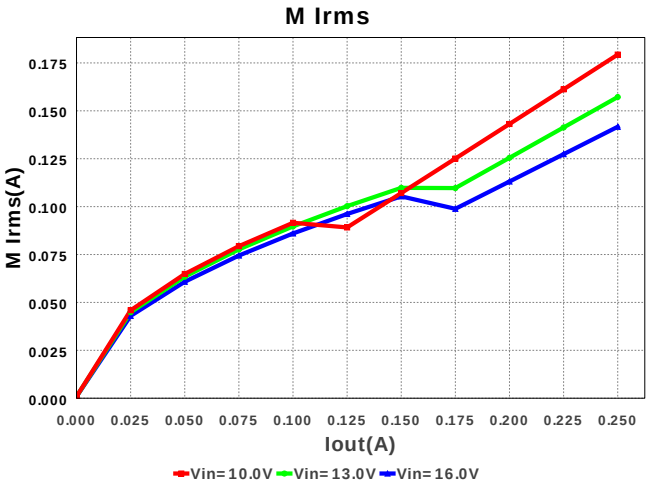


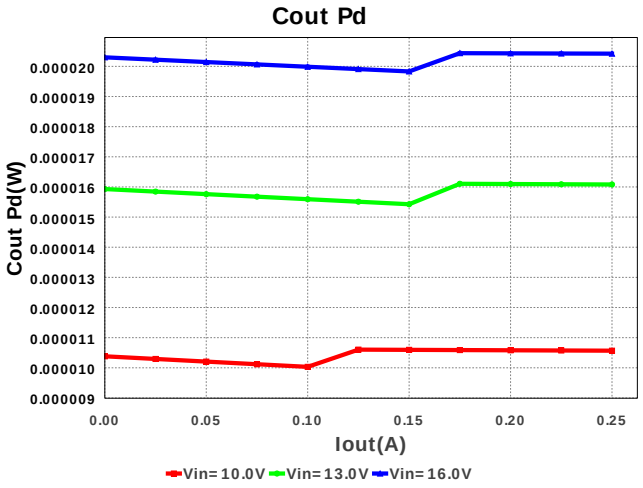


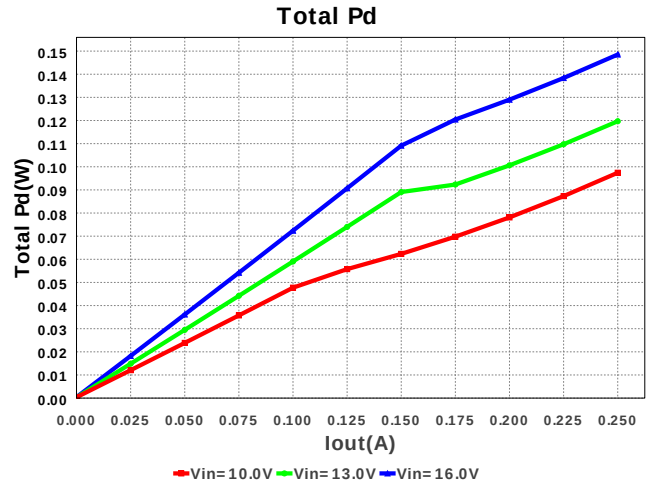


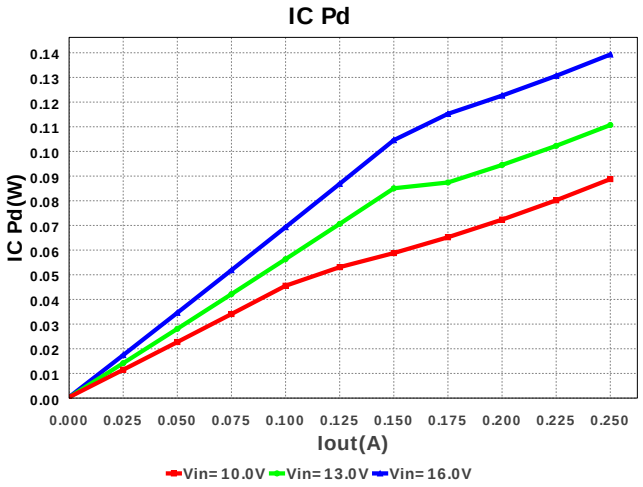


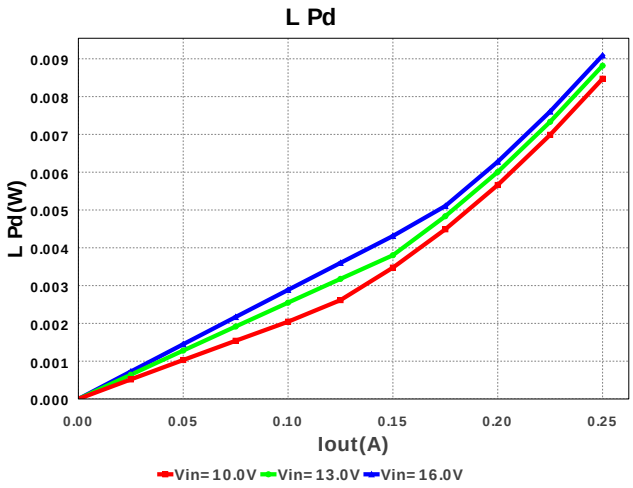


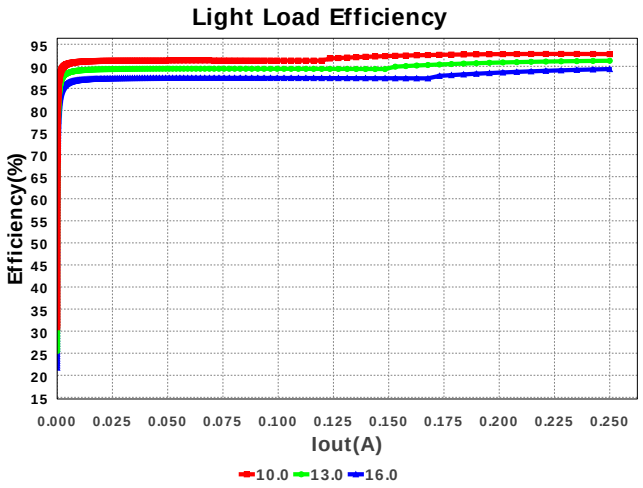












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	116.729 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	101.049 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	425.022 mA	Current	Peak switch current in IC
4.	Iin Avg	87.408 mA	Current	Average input current
5.	L Ipp	350.044 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	141.674 mA	Current	Q Iavg
7.	BOM Count	7	General	Total Design BOM count
8.	FootPrint	152.0 mm2	General	Total Foot Print Area of BOM components
9.	Frequency	1.009 MHz	General	Switching frequency
10.	IC Tolerance	24.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	109.719 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Mode	CCM	General	Conduction Mode
13.	Pout	1.25 W	General	Total output power
14.	Total BOM	$1.41	General	Total BOM Cost
15.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
16.	Duty Cycle	32.115 %	Op_point	Duty cycle
17.	Efficiency	89.38 %	Op_point	Steady state efficiency
18.	IC Tj	38.58 degC	Op_point	IC junction temperature
19.	ICThetaJA	61.6 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	250.0 mA	Op_point	Iout operating point
21.	VIN_OP	16.0 V	Op_point	Vin operating point
22.	Vout p-p	2.634 mV	Op_point	Peak-to-peak output ripple voltage
23.	Cin Pd	122.631 µW	Power	Input capacitor power dissipation
24.	Cout Pd	20.422 µW	Power	Output capacitor power dissipation
25.	IC Pd	139.29 mW	Power	IC power dissipation
26.	L Pd	9.089 mW	Power	Inductor power dissipation
27.	Total Pd	148.524 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	250.0 mA	Maximum Output Current
2.	Iout1	250.0 mAmps	Output Current #1
3.	VinMax	16.0 V	Maximum input voltage
4.	VinMin	10.0 V	Minimum input voltage
5.	Vout	5.0 V	Output Voltage
6.	Vout1	5.0 Volt	Output Voltage #1
7.	base_pn	TPS62175	National Based Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **TPS62175** Product Folder : http://www.ti.com/product/tps62175 : contains the data sheet and other resources.