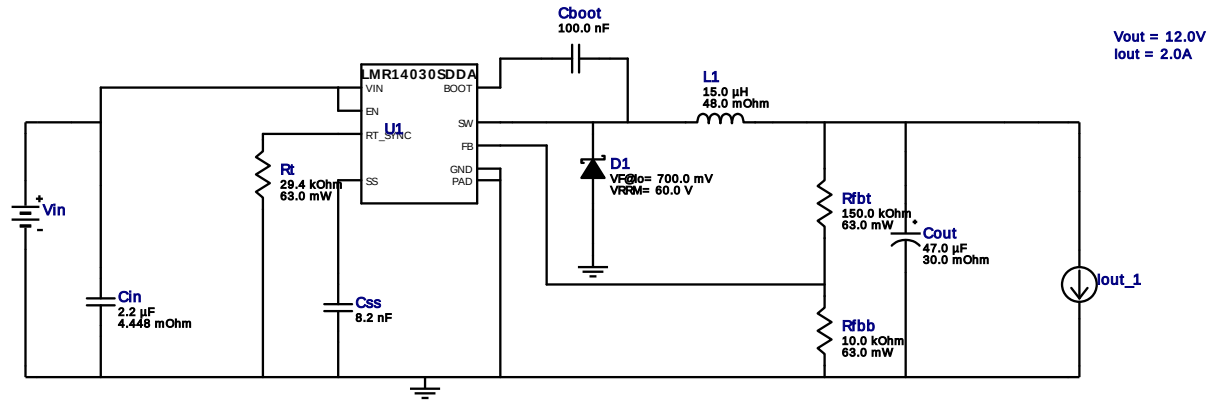
WEBENCH® Design Report

VinMin = 33.0V
VinMax = 36.0V
Vout = 12.0V
Iout = 2.0A

Device = LMR14030SDDAR
Topology = Buck
Created = 8/4/16 2:30:36 AM
BOM Cost = $2.78
BOM Count = 10
Total Pd = 1.9W

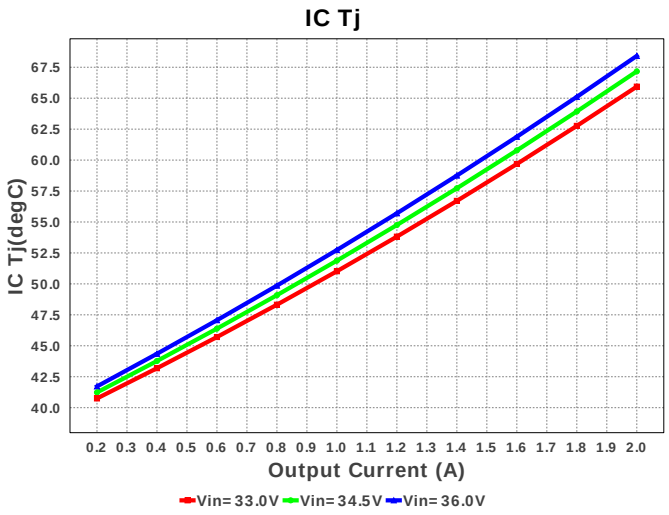
Design : 4742119/4 LMR14030SDDAR
LMR14030SDDAR 33.0V-36.0V to 12.00V @ 2.0002249999999995A

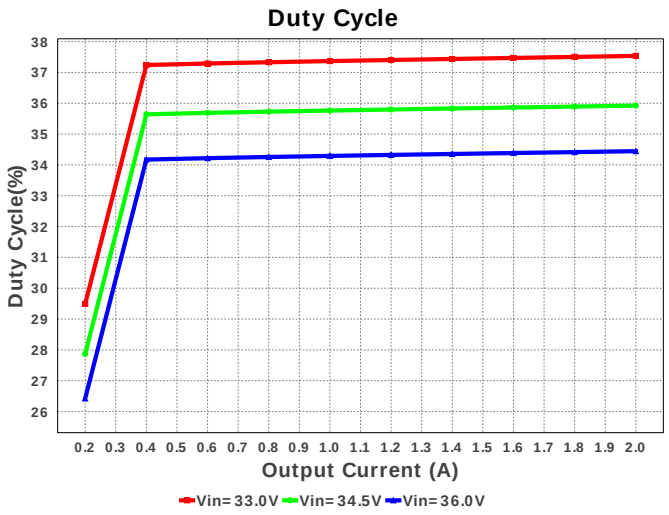


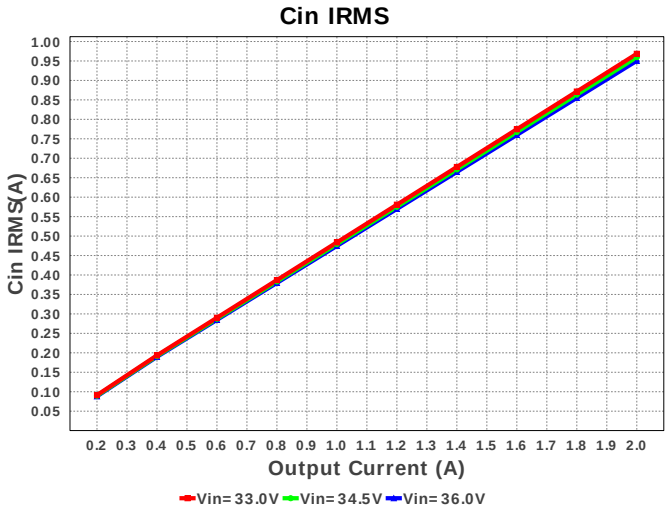
Electrical BOM

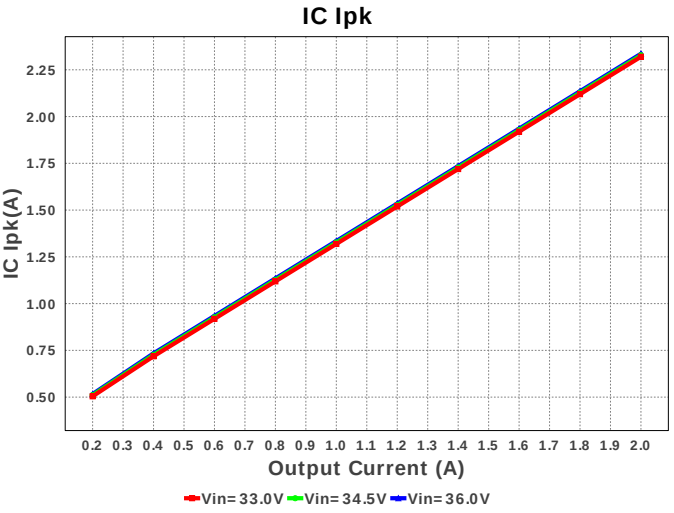
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Taiyo Yuden	HMK212B7104KG-T Series= X7R	Cap= 100.0 nF VDC= 100.0 V IRMS= 0.0 A	1	$0.03	0805 7 mm²
2.	Cin	MuRata	GRM31CR71H225KA88L Series= X7R	Cap= 2.2 uF ESR= 4.448 mOhm VDC= 50.0 V IRMS= 2.2252 A	1	$0.05	1206_190 11 mm²
3.	Cout	Panasonic	25SVPF47M Series= ?	Cap= 47.0 uF ESR= 30.0 mOhm VDC= 25.0 V IRMS= 2.8 A	1	$0.43	CAPSMT_62_F61 74 mm²
4.	Css	MuRata	GRM155R71C822KA01D Series= X7R	Cap= 8.2 nF VDC= 16.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
5.	D1	Diodes Inc.	B260A-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	$0.09	SMA 37 mm²
6.	L1	TDK	CLF10040T-150M	L= 15.0 µH DCR= 48.0 mOhm	1	$0.46	CLF10040 148 mm²
7.	Rfbb	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	Rfbt	Vishay-Dale	CRCW0402150KFKED Series= CRCW..e3	Res= 150.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rt	Vishay-Dale	CRCW040229K4FKED Series= CRCW..e3	Res= 29.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

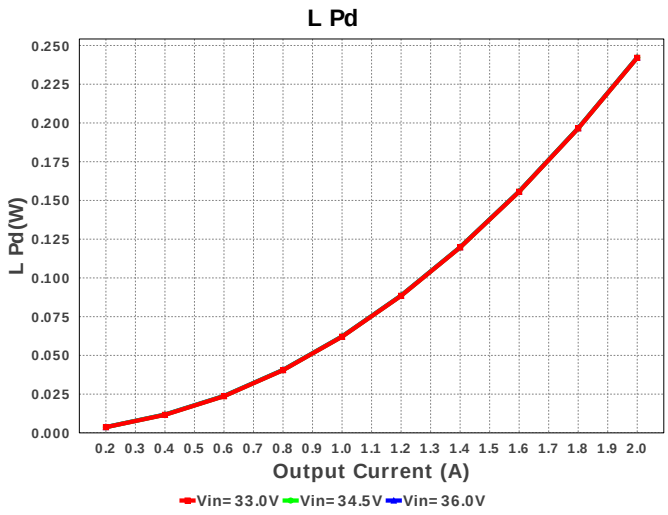
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	U1	Texas Instruments	LMR14030SDDAR	Switcher	1	$1.68	DDA0008E_N 57 mm²

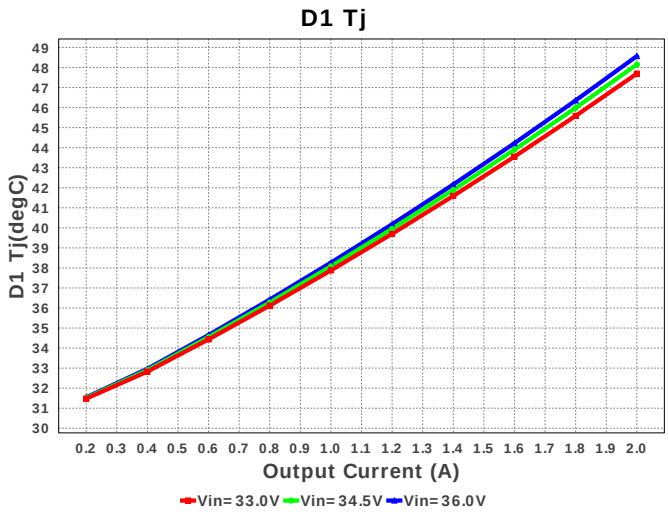


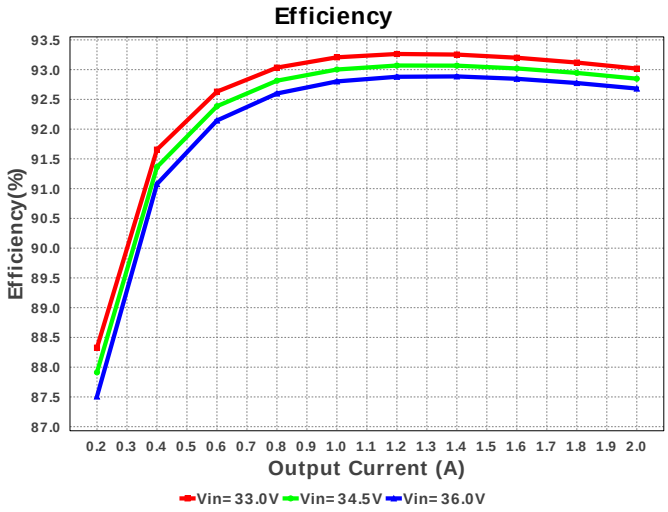


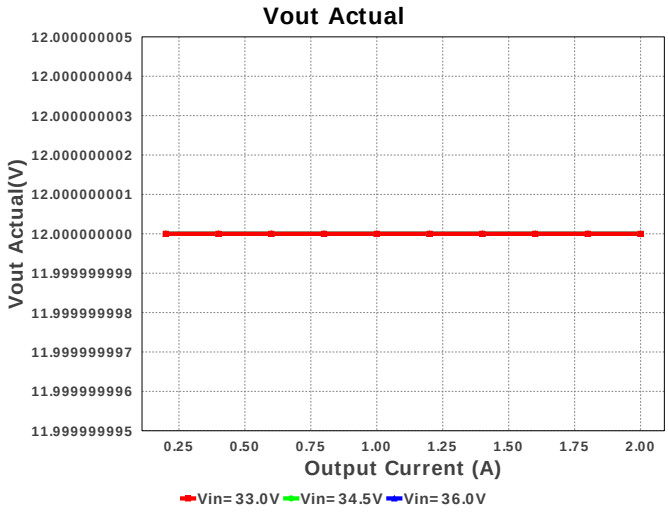


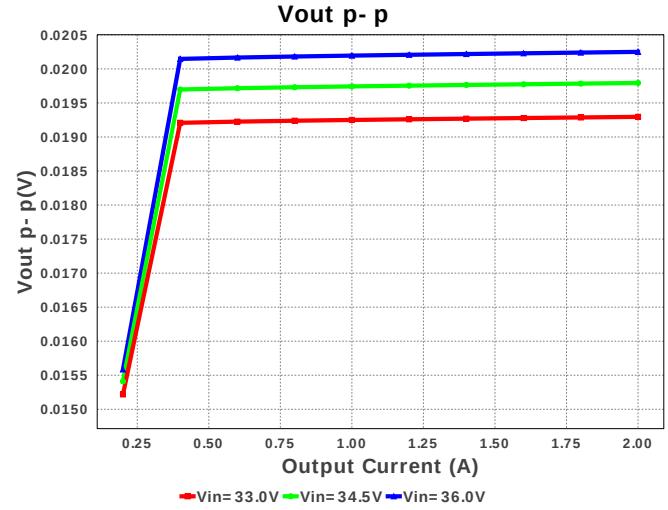


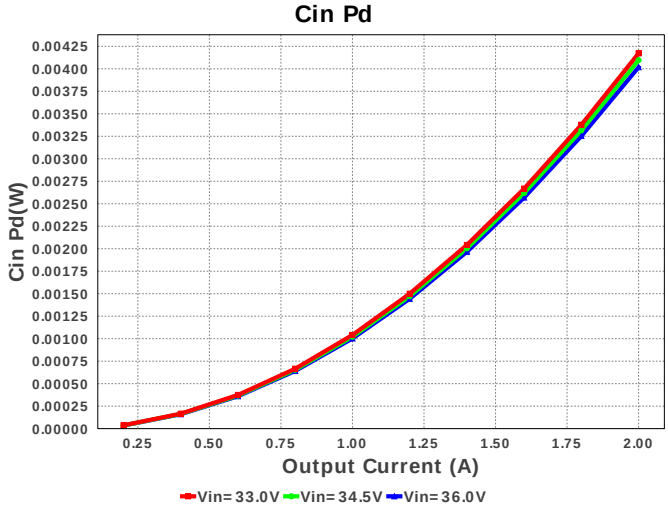


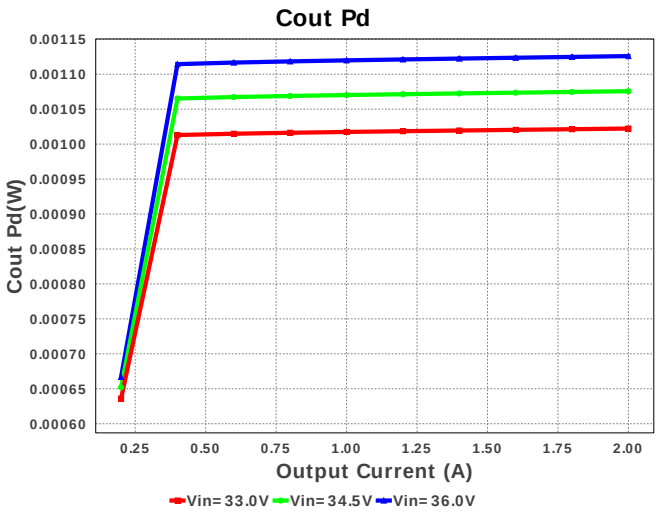


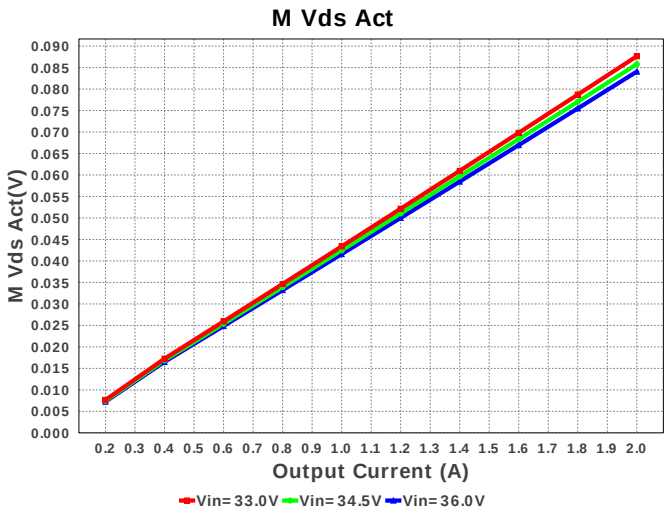


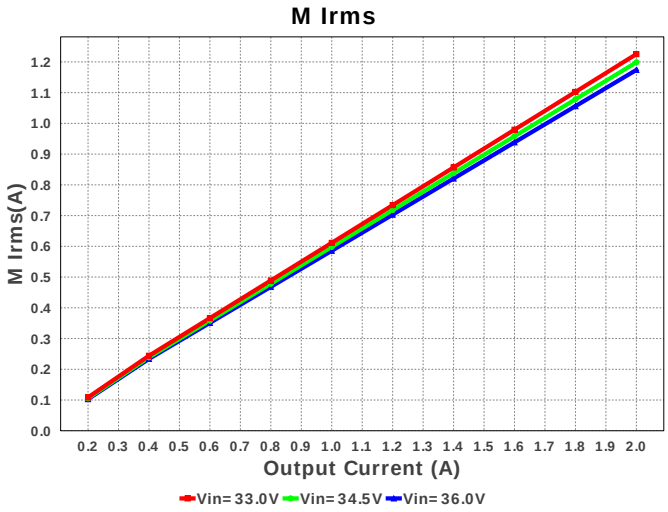


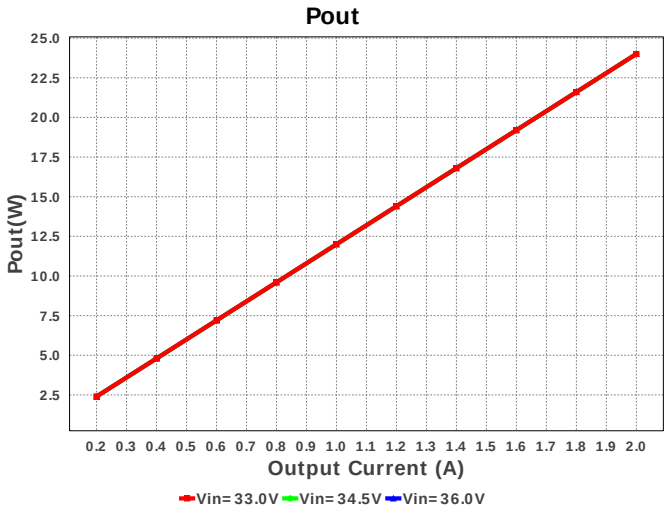


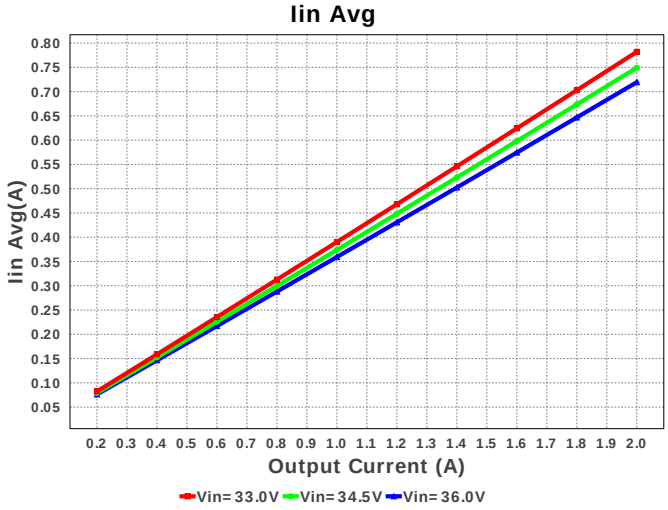


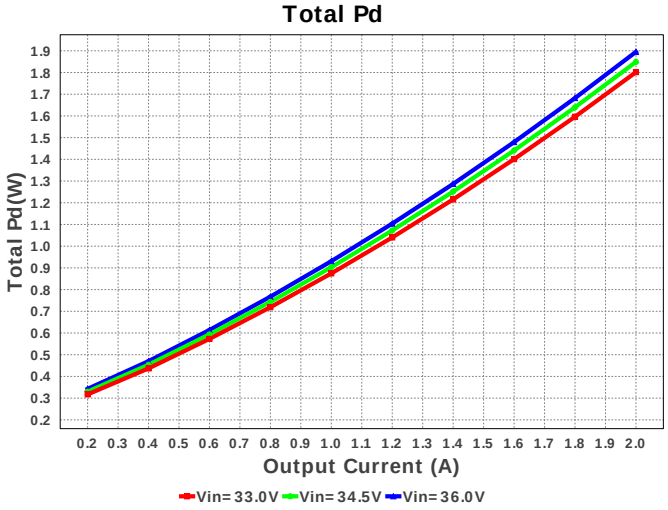


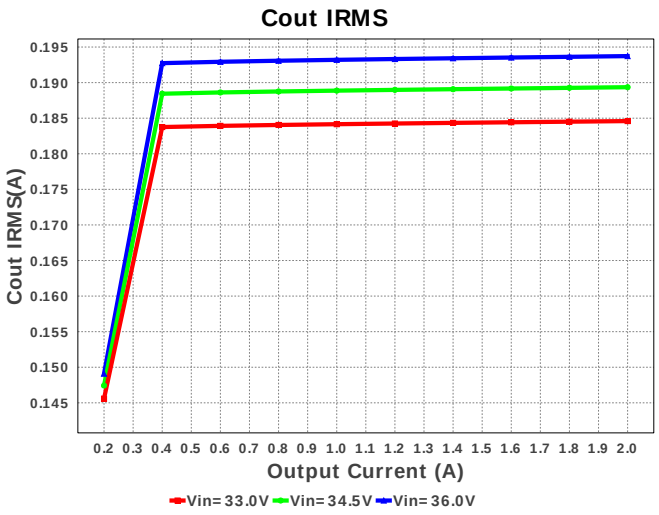


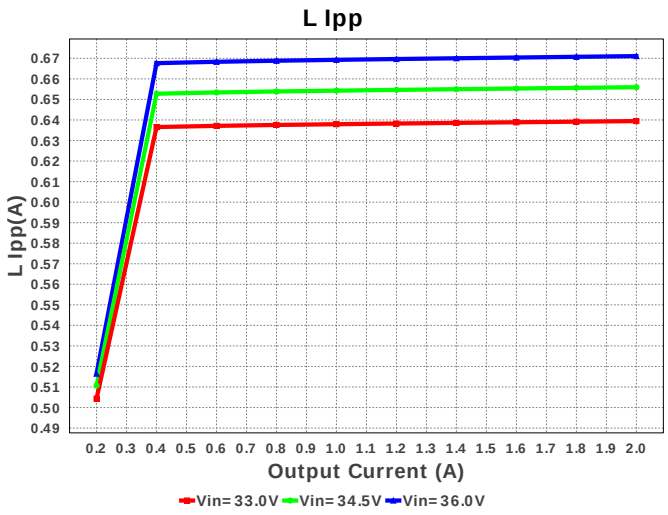


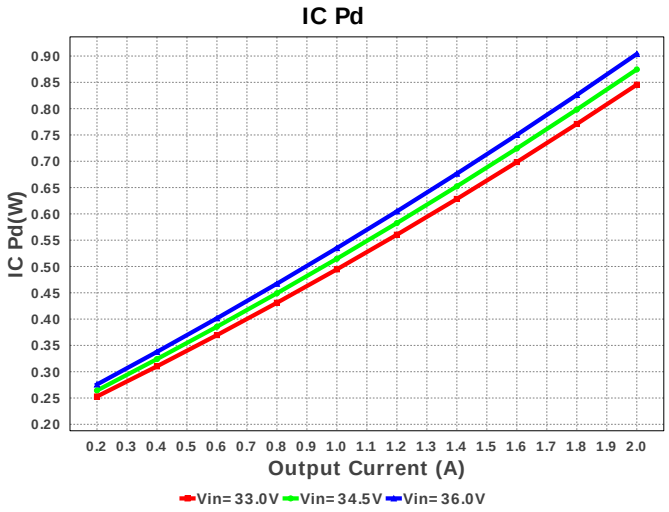


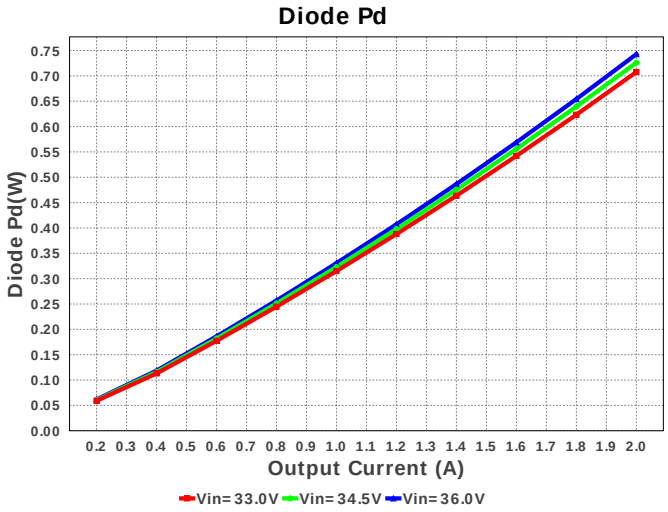


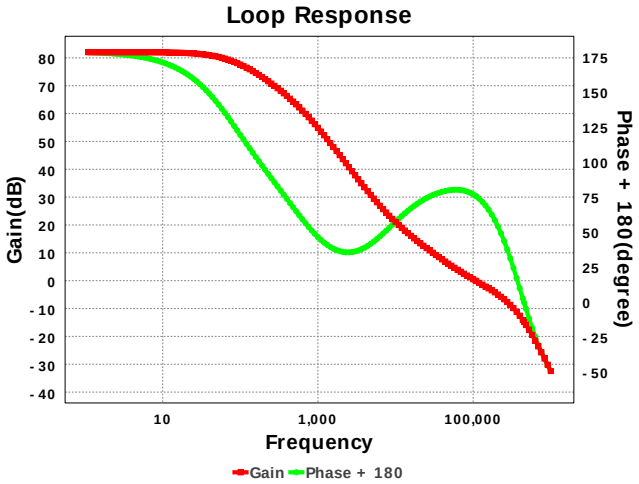












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	950.415 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	193.726 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.336 A	Current	Peak switch current in IC
4.	Iin Avg	719.33 mA	Current	Average input current
5.	L Ipp	671.09 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.174 A	Current	Q Iavg
7.	BOM Count	10	General	Total Design BOM count
8.	FootPrint	346.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	818.366 kHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	84.035 mV	General	Voltage drop across the MosFET

#	Name	Value	Category	Description
12.	Pout	24.0 W	General	Total output power
13.	Total BOM	$2.78	General	Total BOM Cost
14.	D1 Tj	48.568 degC	Op_Point	D1 junction temperature
15.	Vout Actual	12.0 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	107.787 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	34.445 %	Op_point	Duty cycle
19.	Efficiency	92.682 %	Op_point	Steady state efficiency
20.	IC Tj	67.963 degC	Op_point	IC junction temperature
21.	ICThetaJA	42.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	2.0 A	Op_point	Iout operating point
23.	Phase Marg	76.377 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	36.0 V	Op_point	Vin operating point
25.	Vout p-p	20.25 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	4.018 mW	Power	Input capacitor power dissipation
27.	Cout Pd	1.126 mW	Power	Output capacitor power dissipation
28.	Diode Pd	742.74 mW	Power	Diode power dissipation
29.	IC Pd	903.89 mW	Power	IC power dissipation
30.	L Pd	242.27 mW	Power	Inductor power dissipation
31.	Total Pd	1.895 W	Power	Total Power Dissipation
32.	Vout Tolerance	4.339 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	36.0	Maximum input voltage
3.	VinMin	33.0	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	LMR14030S	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LMR14030S** Product Folder : http://www.ti.com/product/LMR14030 : contains the data sheet and other resources.