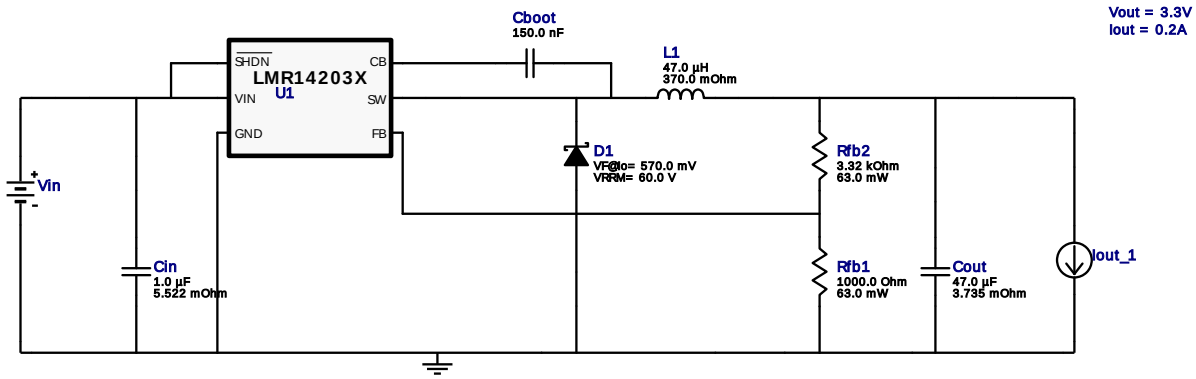
WEBENCH® Design Report

VinMin = 5.0V
VinMax = 25.0V
Vout = 3.3V
Iout = 0.2A

Device = LMR14203XMKE/NOPB
Topology = Buck
Created = 6/22/16 7:46:24 PM
BOM Cost = $1.44
BOM Count = 8
Total Pd = 0.27W

Design : 3747628/27 LMR14203XMKE/NOPB
LMR14203XMKE/NOPB 5.0V-25.0V to 3.30V @ 0.2A

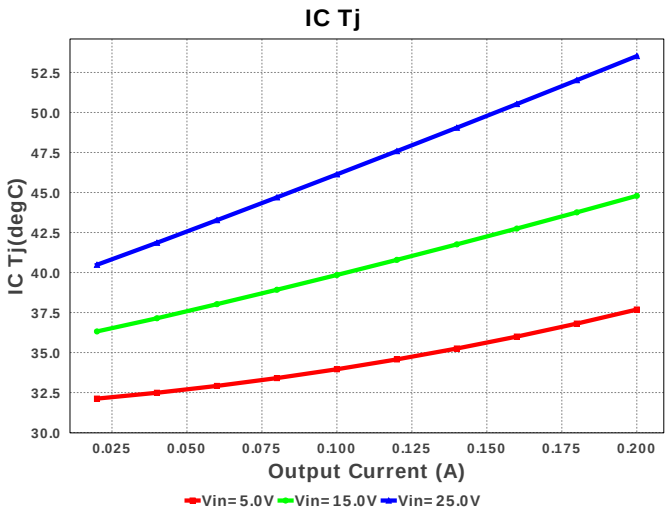


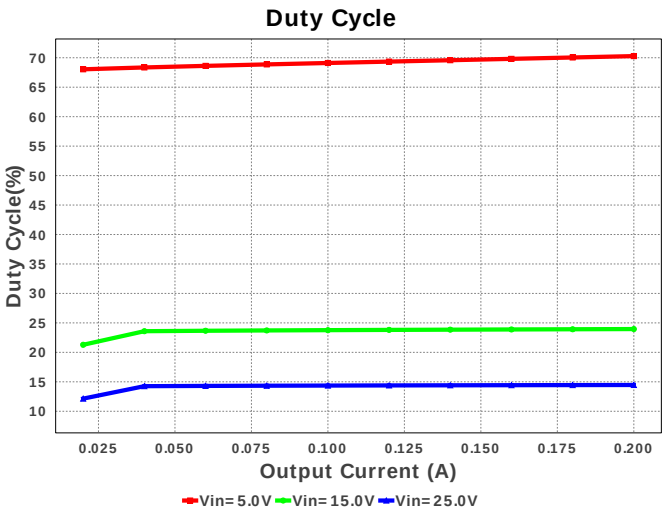
My Comments

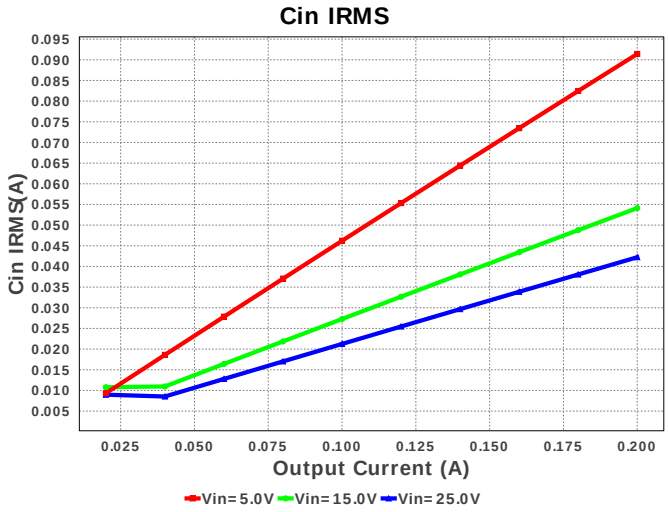
No comments

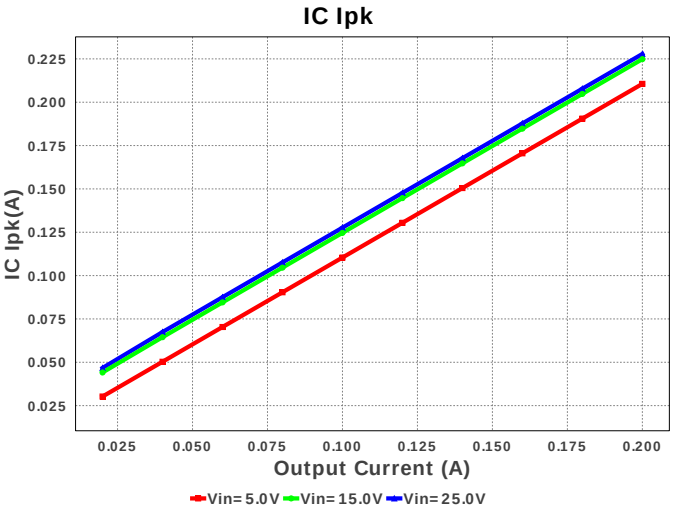
Electrical BOM

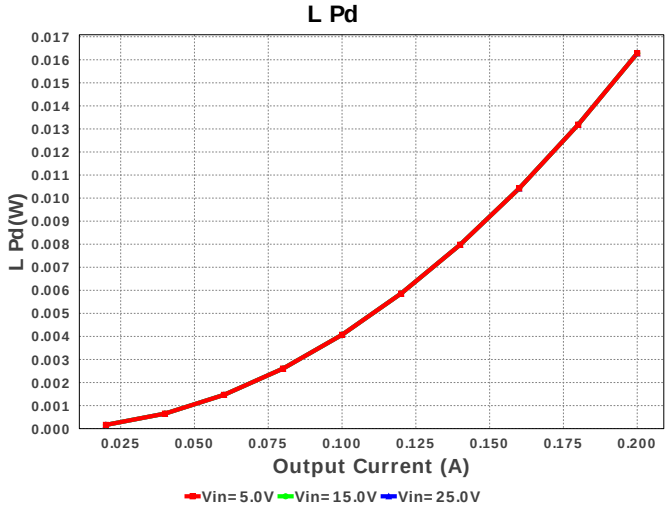
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R60J154KE01D Series= X5R	Cap= 150.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cin	TDK	C1608X7R1V105K080AC Series= X7R	Cap= 1.0 uF ESR= 5.522 mOhm VDC= 35.0 V IRMS= 2.2162 A	1	$0.05	0603 5 mm²
3.	Cout	MuRata	GRM31CR60J476KE19L Series= X5R	Cap= 47.0 uF ESR= 3.735 mOhm VDC= 6.3 V IRMS= 4.091 A	1	$0.10	1206_190 11 mm²
4.	D1	NXP Semiconductor	PMEG6010CEH,115	VF@Io= 570.0 mV VRRM= 60.0 V	1	$0.04	SOD-123F 12 mm²
5.	L1	Bourns	SDR0604-470KL	L= 47.0 µH DCR= 370.0 mOhm	1	$0.18	SDR0604 61 mm²
6.	Rfb1	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	Rfb2	Vishay-Dale	CRCW04023K32FKED Series= CRCW..e3	Res= 3.32 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	U1	Texas Instruments	LMR14203XMKE/NOPB	Switcher	1	$1.04	MK06A 11 mm²

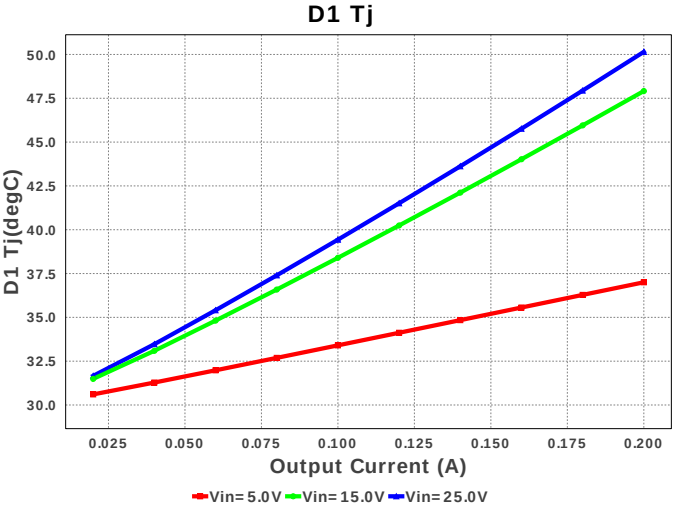


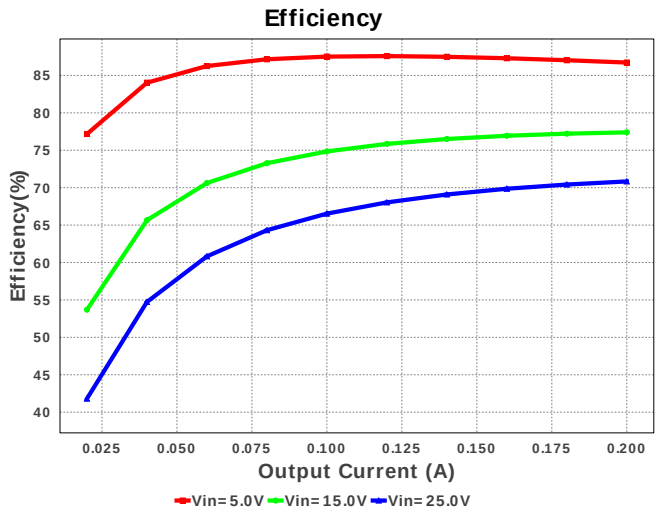


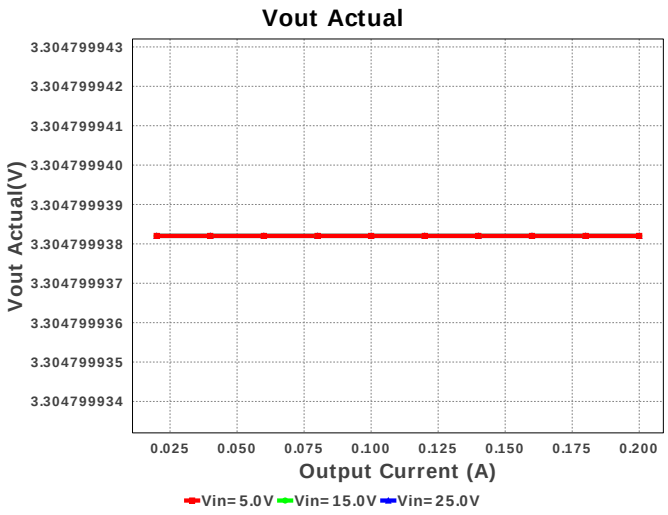


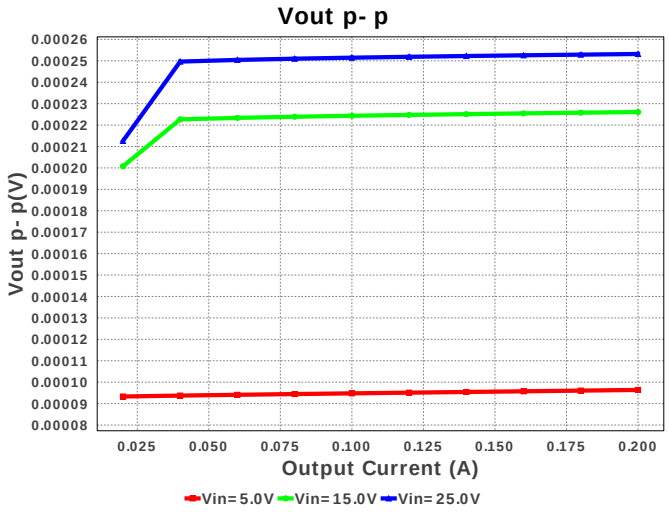


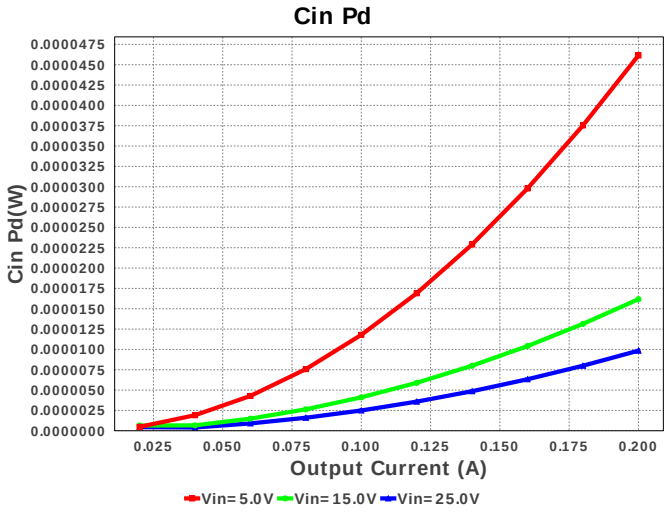


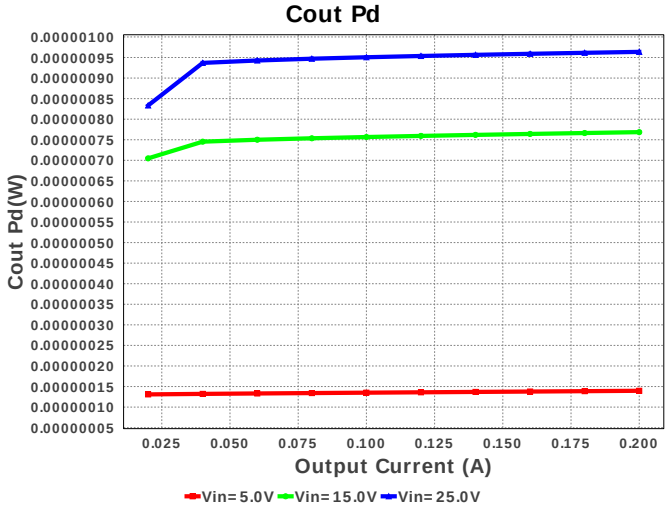


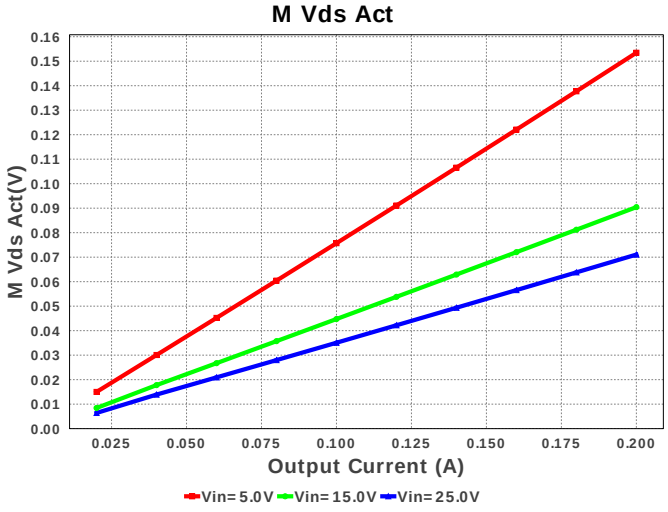


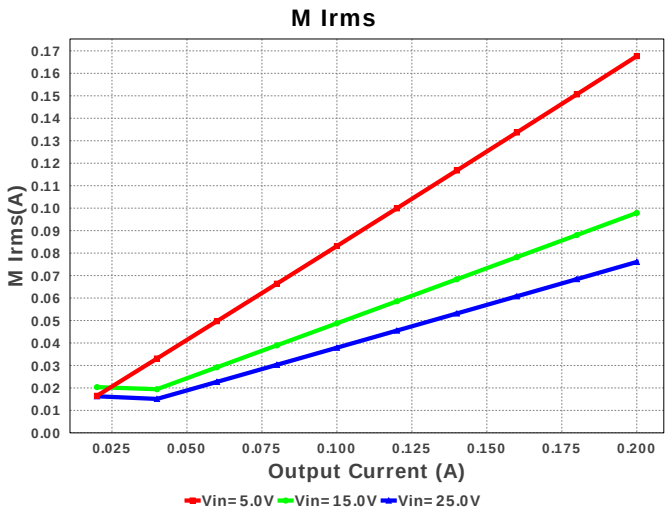


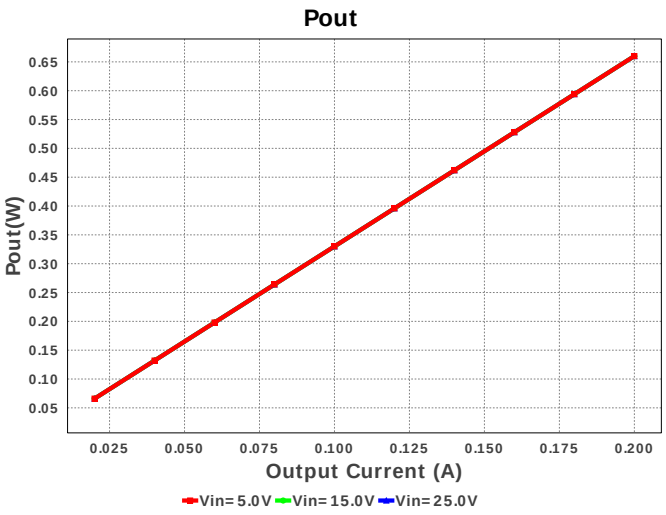


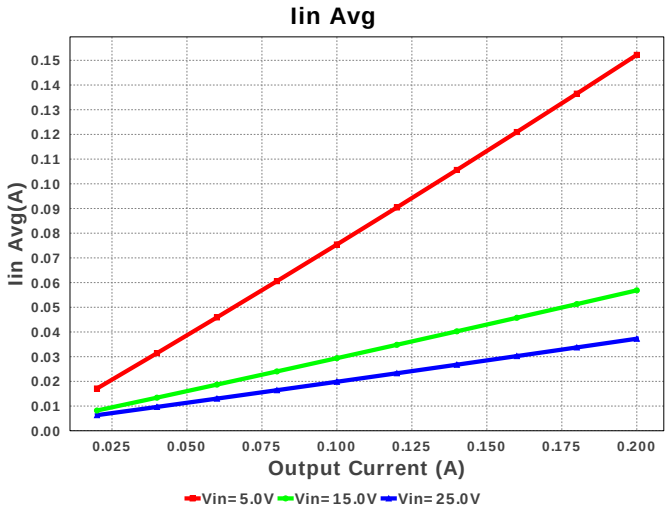


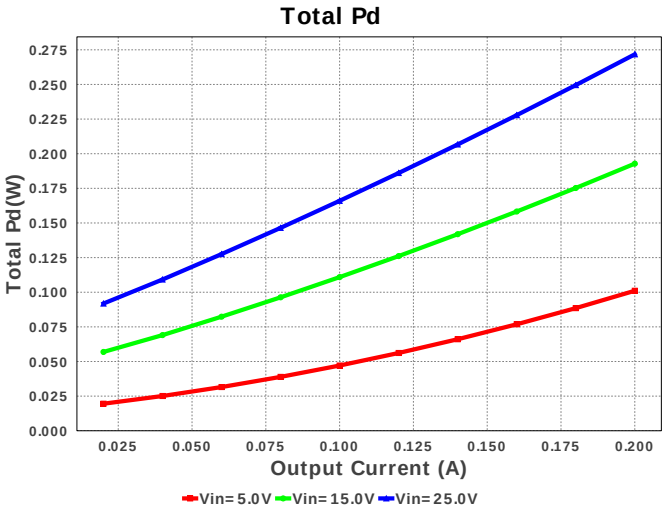


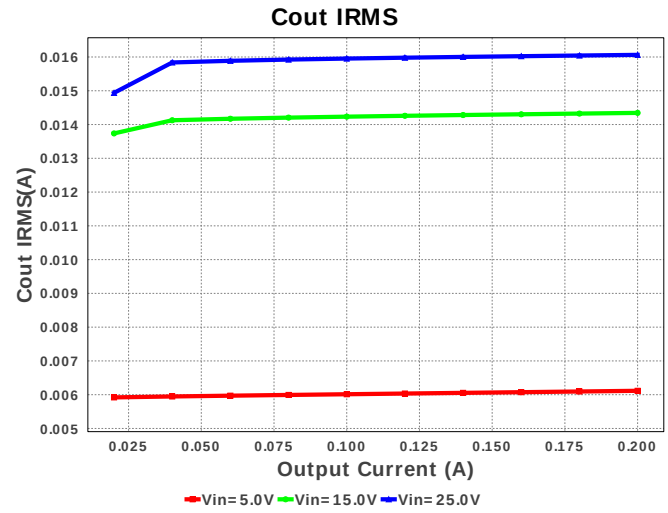


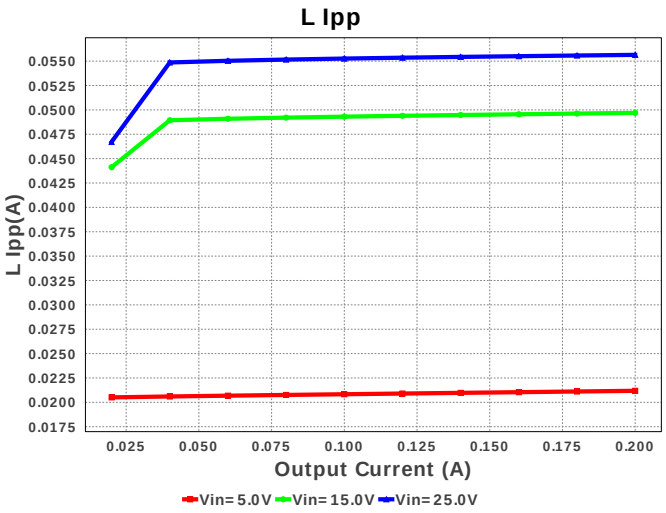


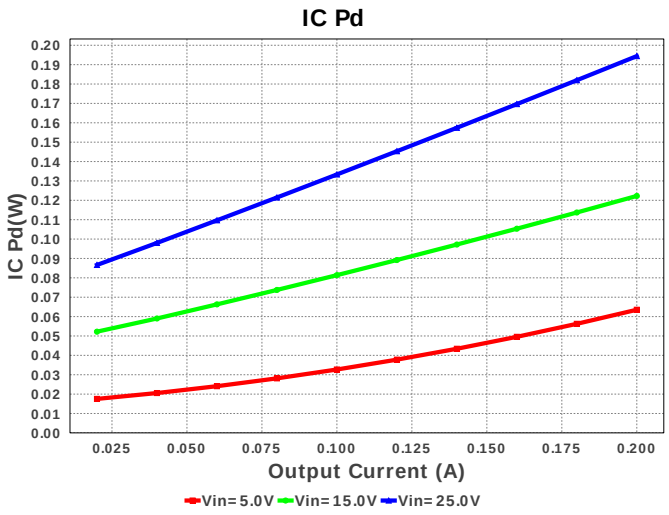


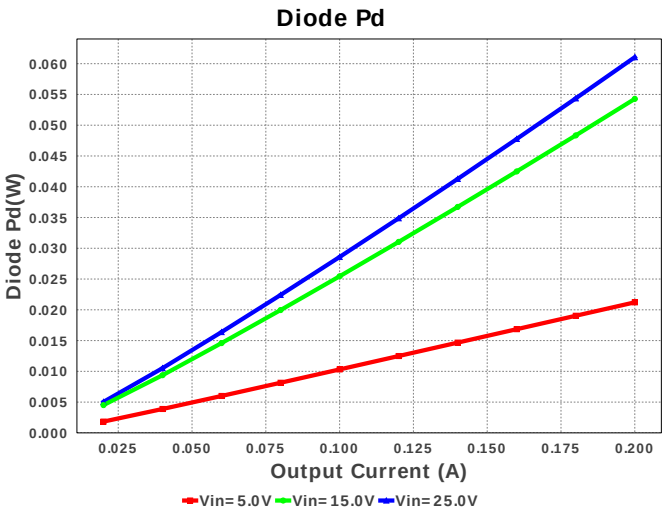












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	42.222 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	16.063 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	227.822 mA	Current	Peak switch current in IC
4.	Iin Avg	37.27 mA	Current	Average input current
5.	L Ipp	55.643 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	76.058 mA	Current	MOSFET RMS current
7.	BOM Count	8	General	Total Design BOM count
8.	FootPrint	108.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	1.2 MHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	71.056 mV	General	Voltage drop across the MosFET
12.	Pout	660.0 mW	General	Total output power
13.	Total BOM	$1.44	General	Total BOM Cost
14.	D1 Tj	50.148 degC	Op_Point	D1 junction temperature
15.	Vout Actual	3.305 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
17.	Cross Freq	11.439 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	14.462 %	Op_point	Duty cycle
19.	Efficiency	70.835 %	Op_point	Steady state efficiency
20.	IC Tj	53.523 degC	Op_point	IC junction temperature
21.	ICThetaJA	121.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	200.0 mA	Op_point	Iout operating point
23.	Phase Marg	51.382 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	25.0 V	Op_point	Vin operating point
25.	Vout p-p	253.183 µV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	9.844 µW	Power	Input capacitor power dissipation
27.	Cout Pd	963.691 nW	Power	Output capacitor power dissipation
28.	Diode Pd	61.053 mW	Power	Diode power dissipation
29.	IC Pd	194.404 mW	Power	IC power dissipation
30.	L Pd	16.28 mW	Power	Inductor power dissipation
31.	Total Pd	271.745 mW	Power	Total Power Dissipation
32.	Vout Tolerance	3.942 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	200.0 m	Maximum Output Current
2.	VinMax	25.0	Maximum input voltage
3.	VinMin	5.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	LMR14203X	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. LMR14203X Product Folder : http://www.ti.com/product/LMR14203 : contains the data sheet and other resources.