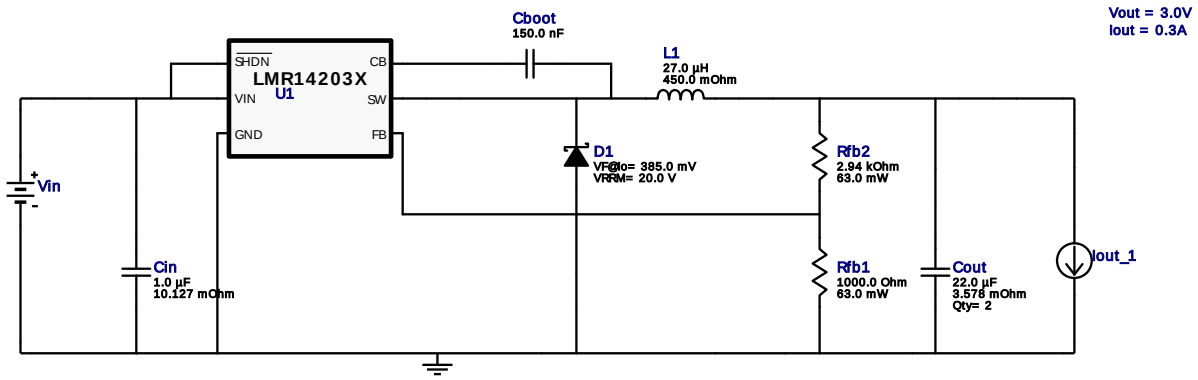
WEBENCH® Design Report

VinMin = 8.0V
VinMax = 12.0V
Vout = 3.0V
Iout = 0.3A

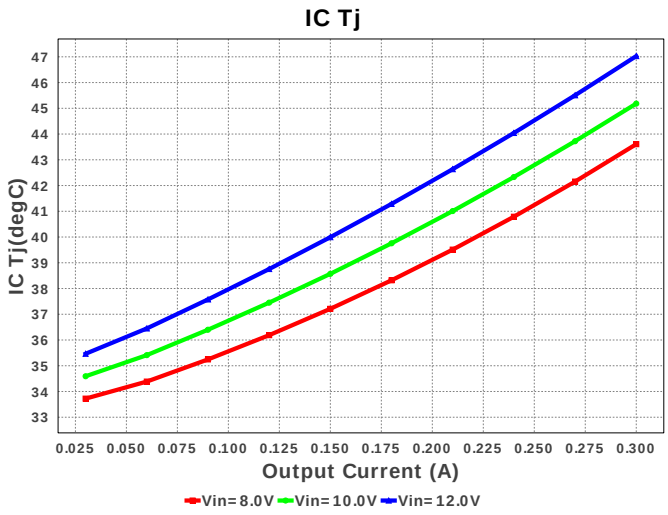
Device = LMR14203XMKE/NOPB
Topology = Buck
Created = 8/4/16 2:21:44 AM
BOM Cost = $1.29
BOM Count = 9
Total Pd = 0.25W

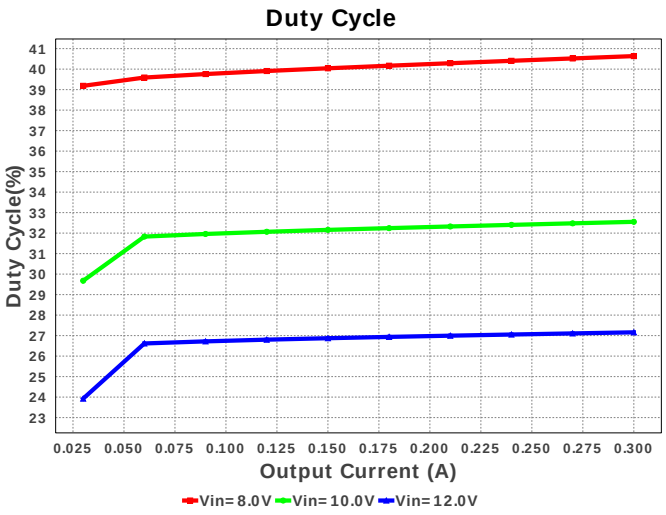
Design : 4743623/2 LMR14203XMKE/NOPB
LMR14203XMKE/NOPB 8.0V-12.0V to 3.00V @ 0.3A

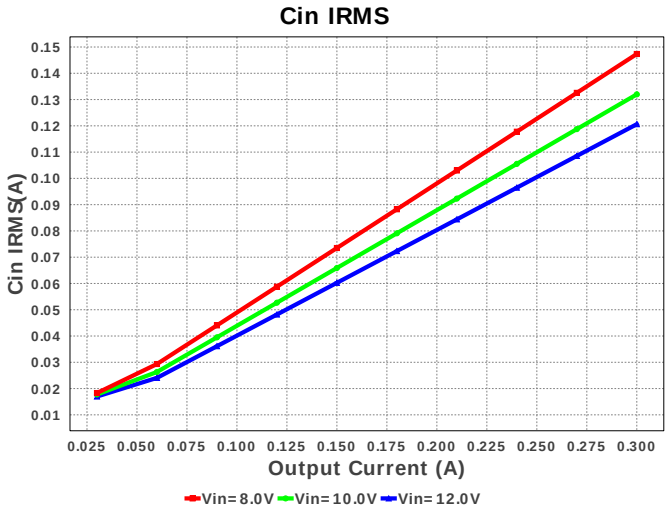


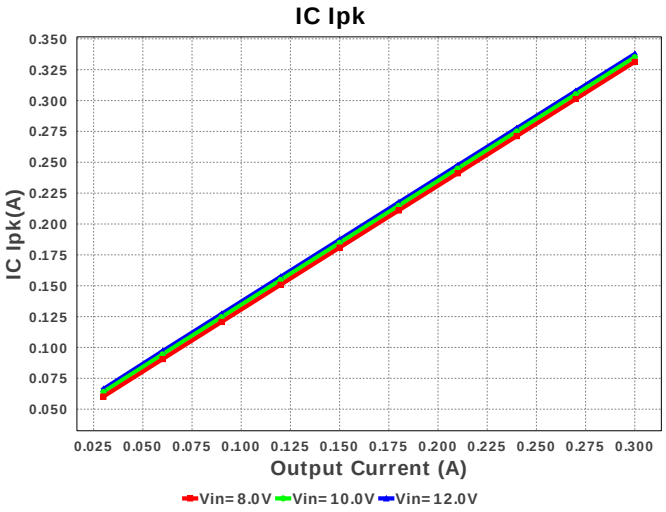
Electrical BOM

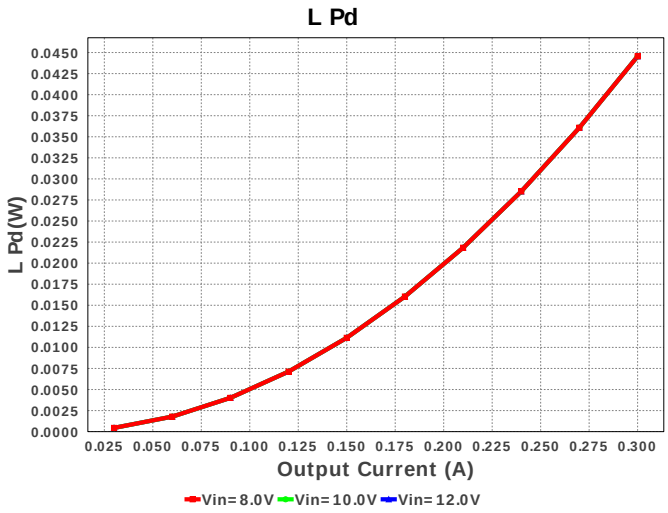
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R60J154KE01D Series= X5R	Cap= 150.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cin	MuRata	GRM188R61C105KA93D Series= X5R	Cap= 1.0 uF ESR= 10.127 mOhm VDC= 16.0 V IRMS= 994.63 mA	1	$0.01	0603 5 mm²
3.	Cout	MuRata	GRM21BC80G226ME39L Series= X6S	Cap= 22.0 uF ESR= 3.578 mOhm VDC= 4.0 V IRMS= 3.29633 A	2	$0.04	0805 7 mm²
4.	D1	ON Semiconductor	MBR0520LT1G	VF@Io= 385.0 mV VRRM= 20.0 V	1	$0.06	SOD-123 13 mm²
5.	L1	NIC Components	NPI43C270MTRF	L= 27.0 µH DCR= 450.0 mOhm	1	$0.07	IND_NPI43C 31 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	CRCW04022K94FKED Series= CRCW..e3	Res= 2.94 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

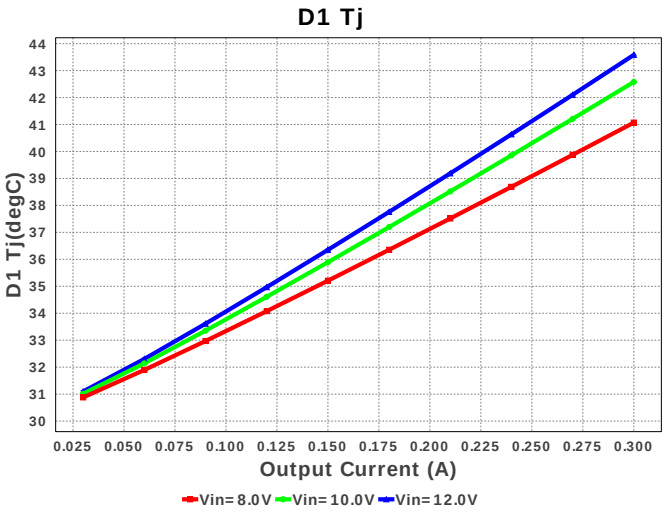


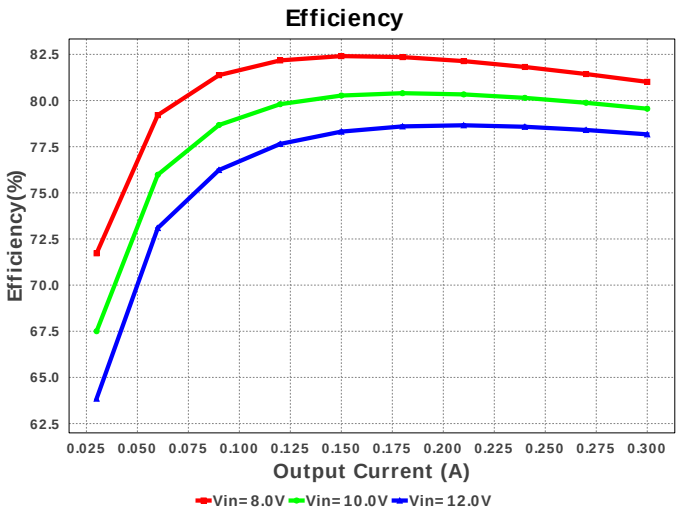


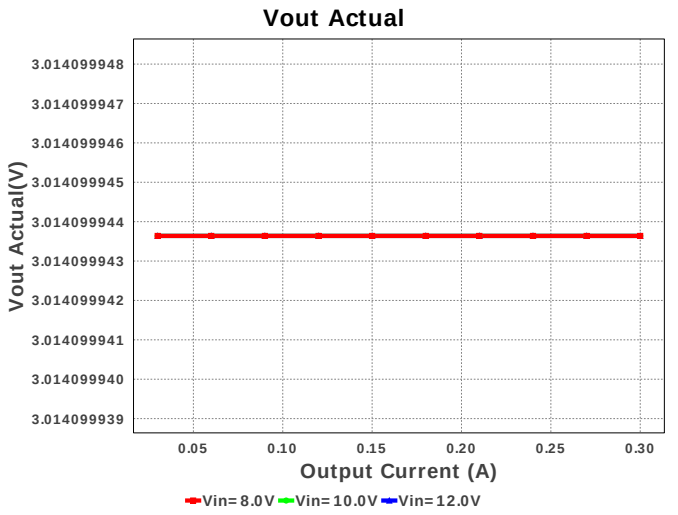


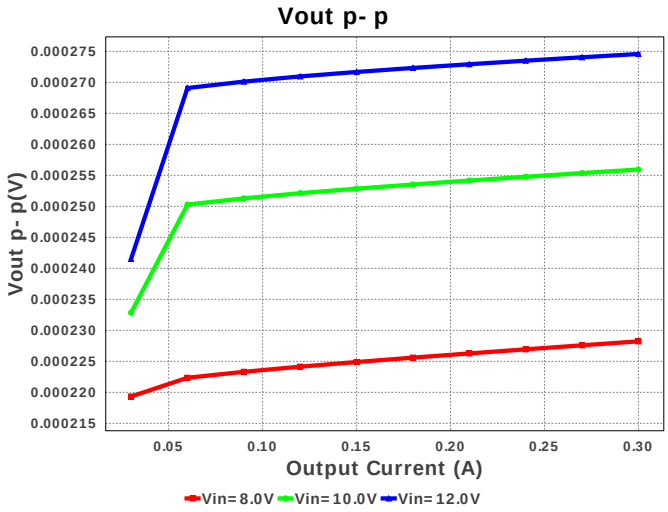


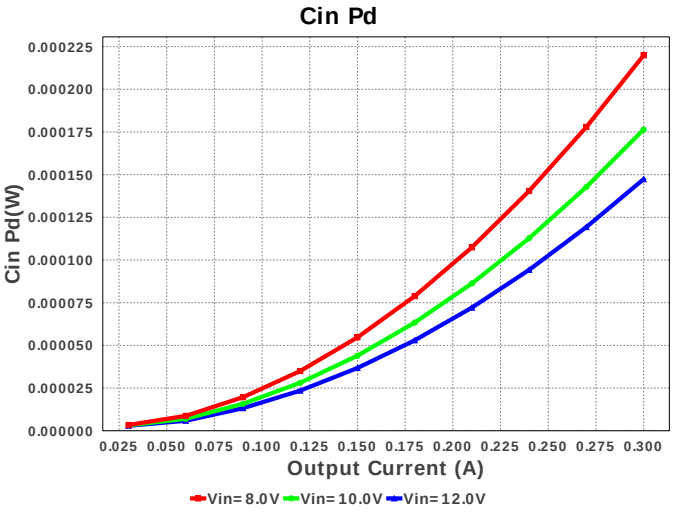


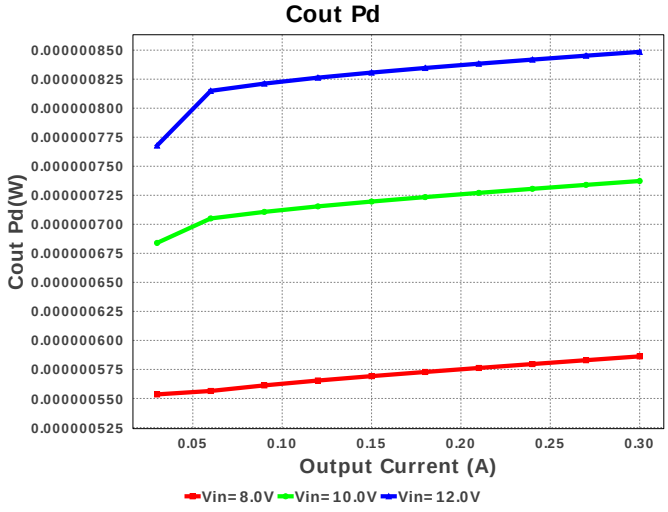


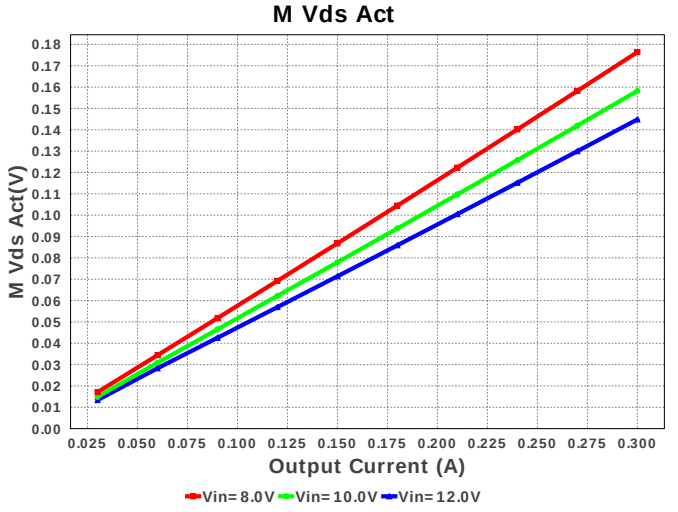


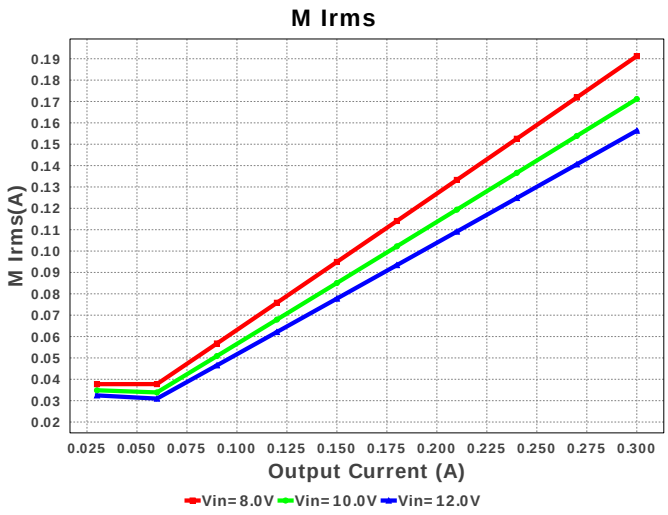


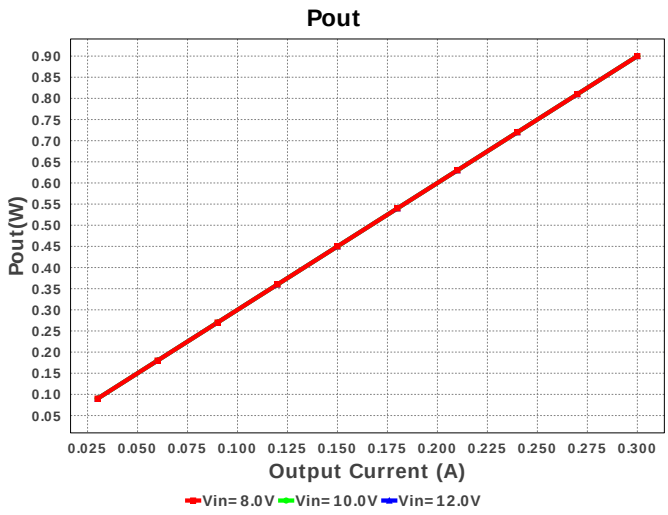


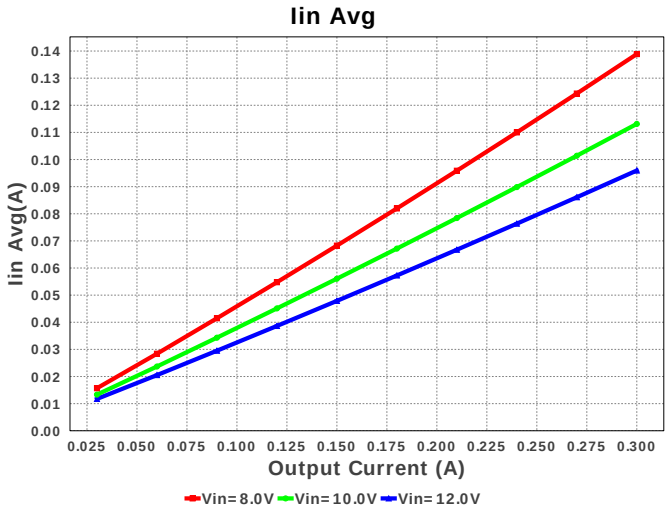


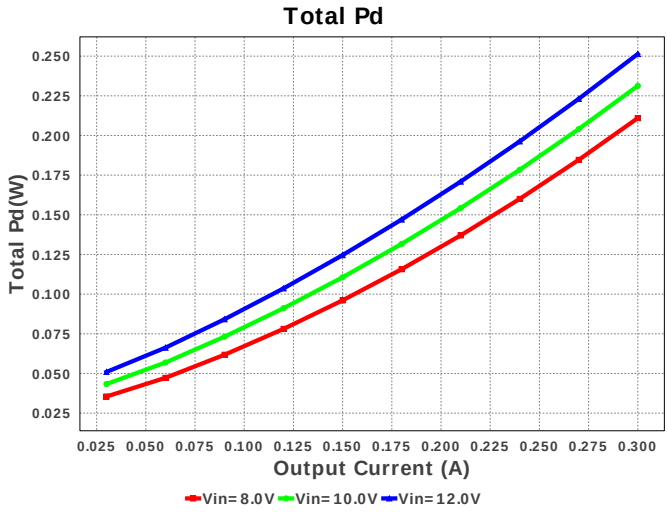


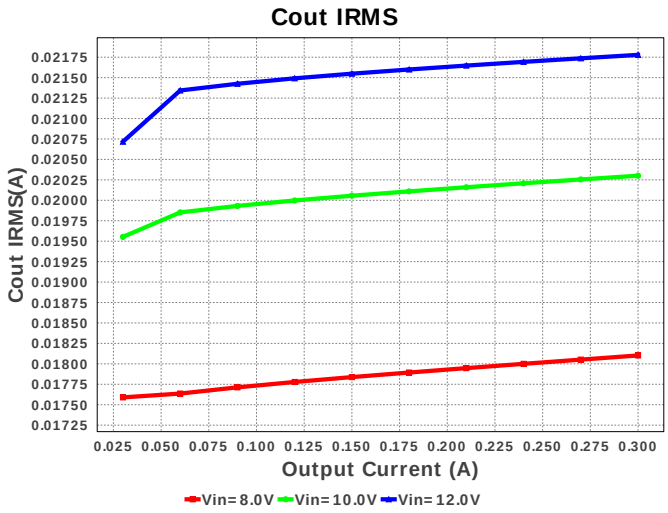


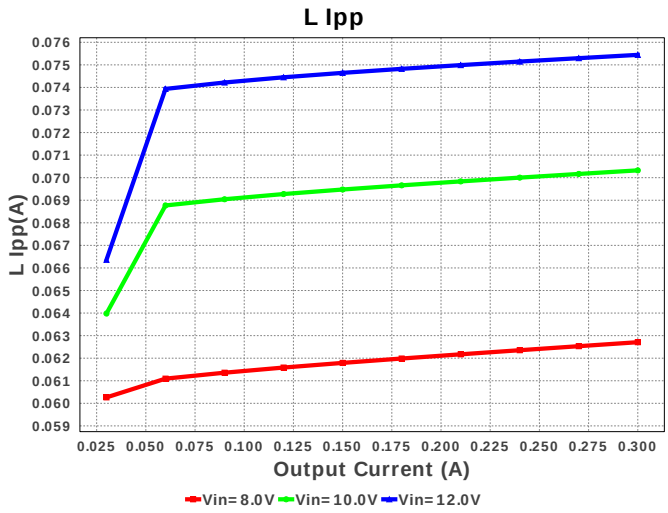


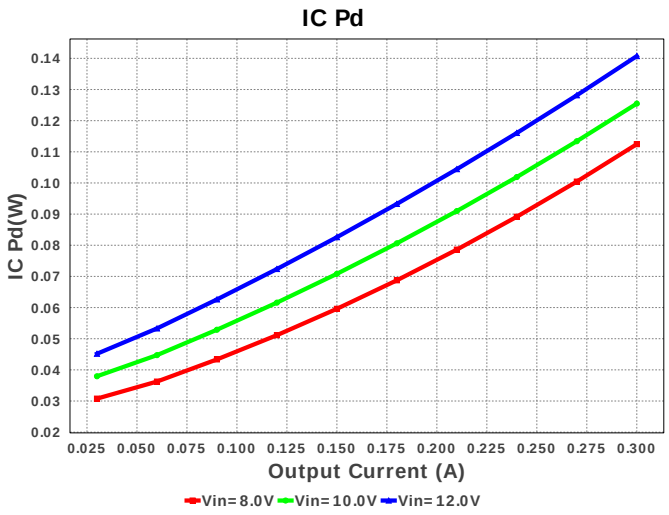


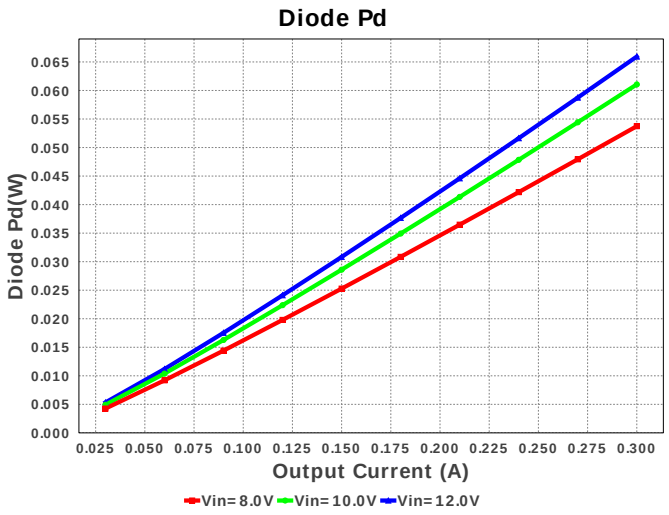












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	120.62 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	21.779 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	337.722 mA	Current	Peak switch current in IC
4.	Iin Avg	95.947 mA	Current	Average input current
5.	L Ipp	75.443 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	156.344 mA	Current	Q Iavg
7.	BOM Count	9	General	Total Design BOM count
8.	FootPrint	82.0 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	144.843 mV	General	Voltage drop across the MosFET
12.	Pout	900.0 mW	General	Total output power
13.	Total BOM	$1.29	General	Total BOM Cost
14.	D1 Tj	43.584 degC	Op_Point	D1 junction temperature
15.	Vout Actual	3.014 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	3.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	13.962 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	27.159 %	Op_point	Duty cycle
19.	Efficiency	78.168 %	Op_point	Steady state efficiency
20.	IC Tj	47.028 degC	Op_point	IC junction temperature
21.	ICThetaJA	121.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	300.0 mA	Op_point	Iout operating point
23.	Phase Marg	54.691 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	12.0 V	Op_point	Vin operating point
25.	Vout p-p	274.58 µV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	147.341 µW	Power	Input capacitor power dissipation
27.	Cout Pd	848.53 nW	Power	Output capacitor power dissipation
28.	Diode Pd	65.94 mW	Power	Diode power dissipation
29.	IC Pd	140.725 mW	Power	IC power dissipation
30.	L Pd	44.55 mW	Power	Inductor power dissipation
31.	Total Pd	251.366 mW	Power	Total Power Dissipation
32.	Vout Tolerance	3.896 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	300.0 m	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	8.0	Minimum input voltage
4.	Vout	3.0	Output Voltage
5.	base_pn	LMR14203X	Base Product 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.