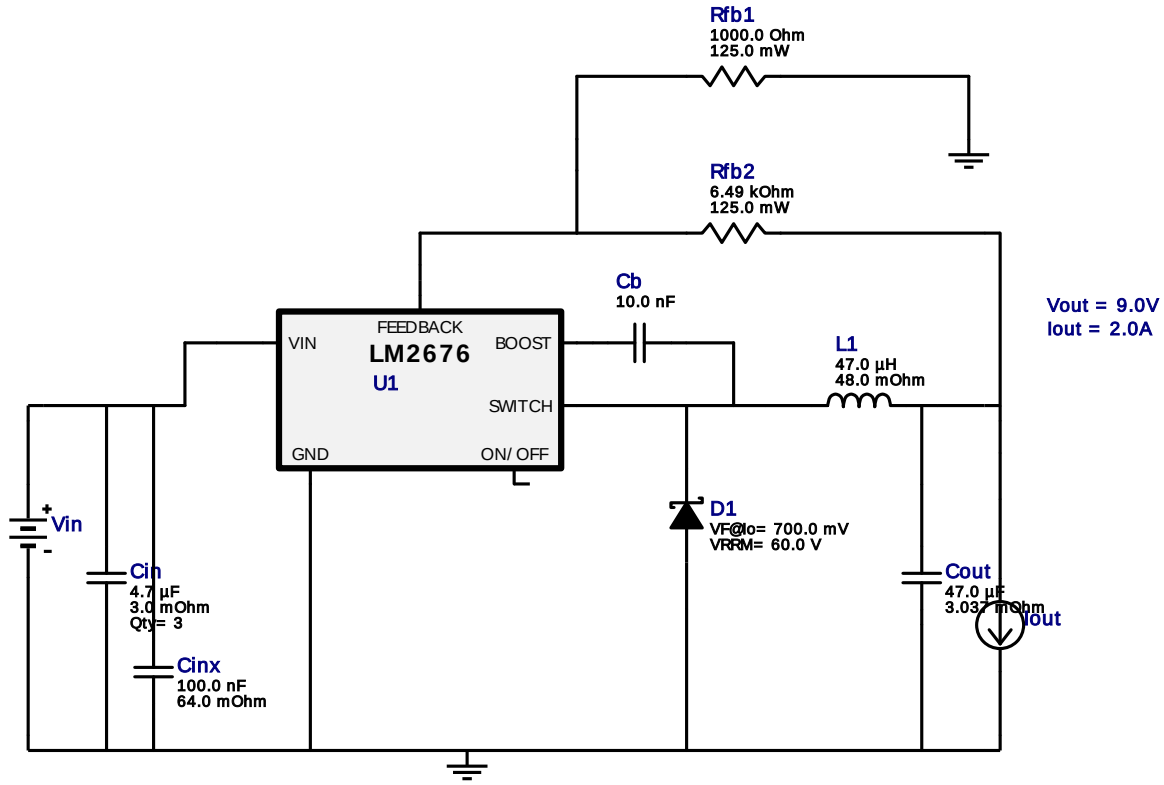
WEBENCH® Design Report

VinMin = 12.0V
VinMax = 36.0V
Vout = 9.0V
Iout = 2.0A

Device = LM2676SX-ADJ/NOPB
Topology = Buck
Created = 7/20/16 8:18:06 AM
BOM Cost = $3.19
BOM Count = 11
Total Pd = 1.62W

Design : 4077713/51 LM2676SX-ADJ/NOPB
LM2676SX-ADJ/NOPB 12.0V-36.0V to 9.00V @ 2.0A

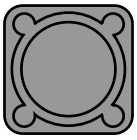
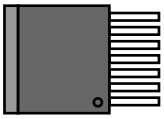


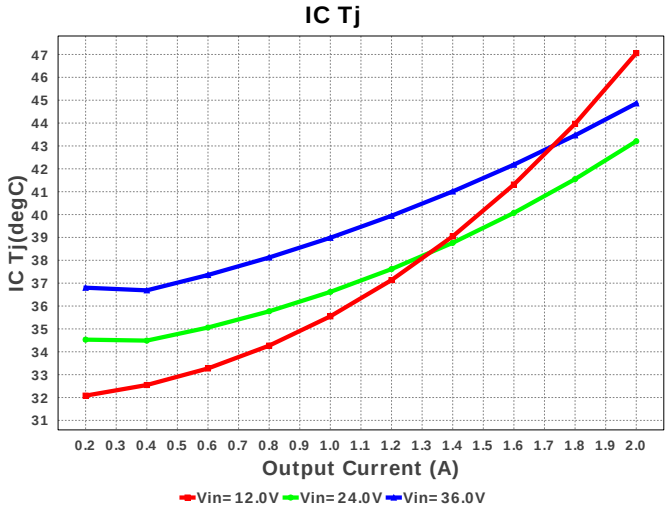
My Comments

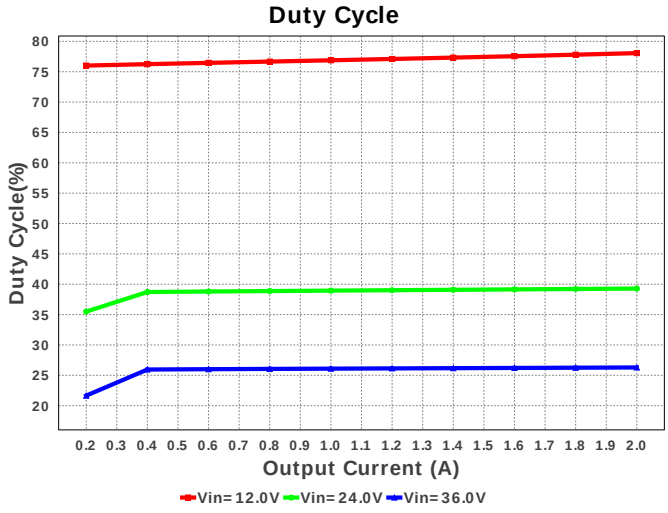
No comments

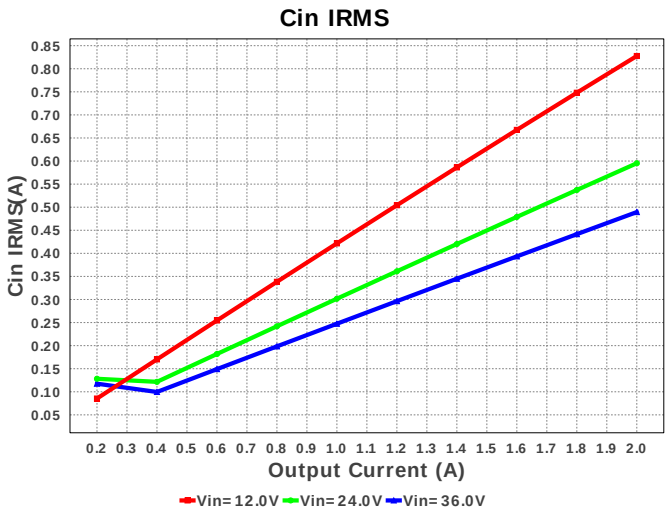
Electrical BOM

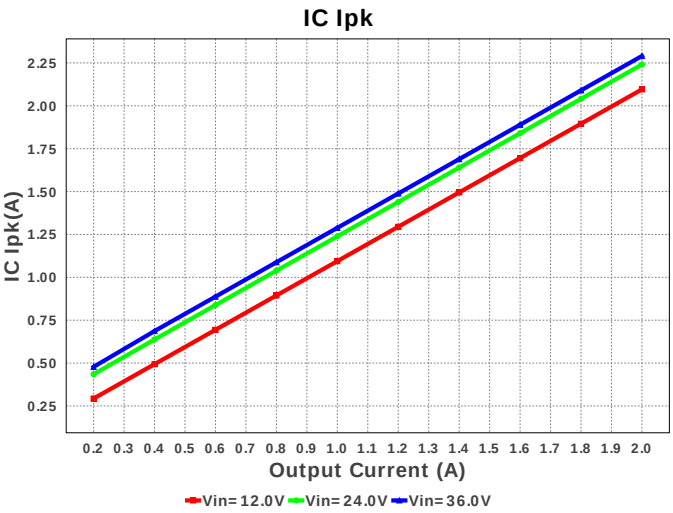
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cb	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 uF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	3	$0.07	1206 11 mm²
3.	Cinx	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
4.	Cout	MuRata	GRM32ER61C476ME15L Series= X5R	Cap= 47.0 uF ESR= 3.037 mOhm VDC= 16.0 V IRMS= 4.59346 A	1	$0.24	1210_280 15 mm²
5.	D1	Diodes Inc.	B260A-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	$0.09	SMA 37 mm²

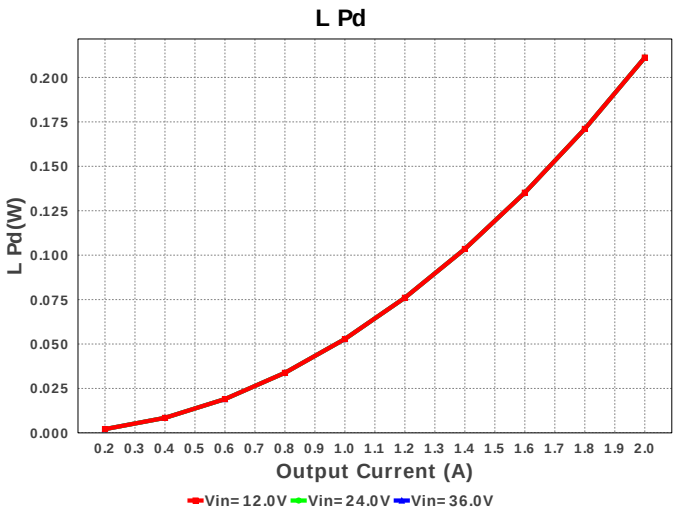
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
6.	L1	Coilcraft	MSS1210-473MEB	L= 47.0 µH DCR= 48.0 mOhm	1	$0.81	 MSS1210 204 mm^2
7.	Rfb1	Panasonic	ERJ-6ENF1001V Series= ERJ-6E	Res= 1000.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm^2
8.	Rfb2	Panasonic	ERJ-6ENF6491V Series= ERJ-6E	Res= 6.49 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm^2
9.	U1	Texas Instruments	LM2676SX-ADJ/NOPB	Switcher	1	$1.80	 TS7B 199 mm^2

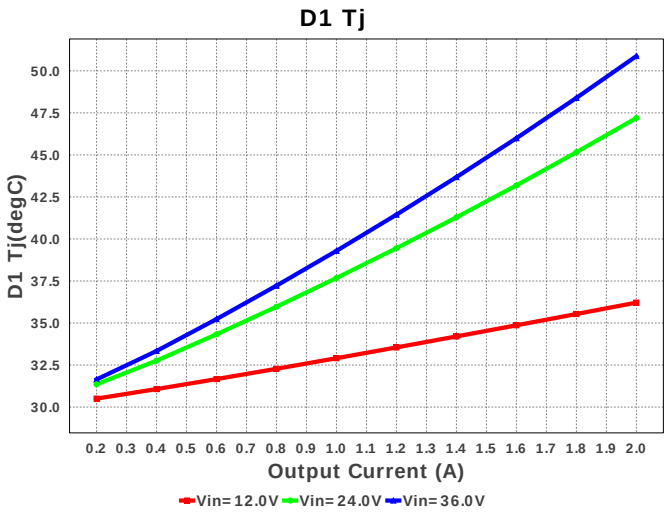


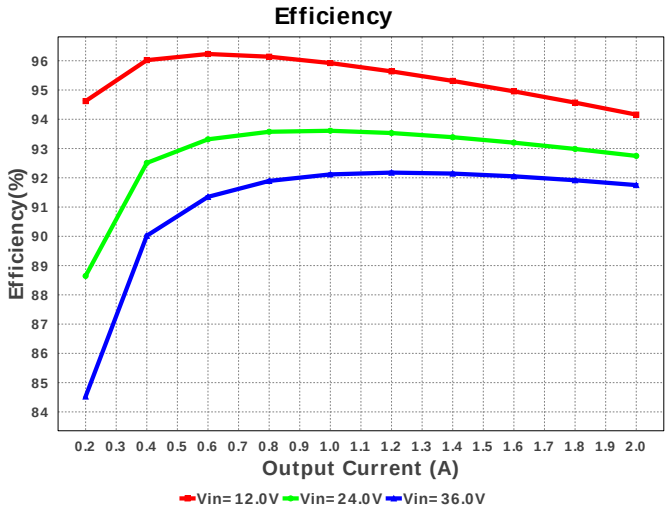


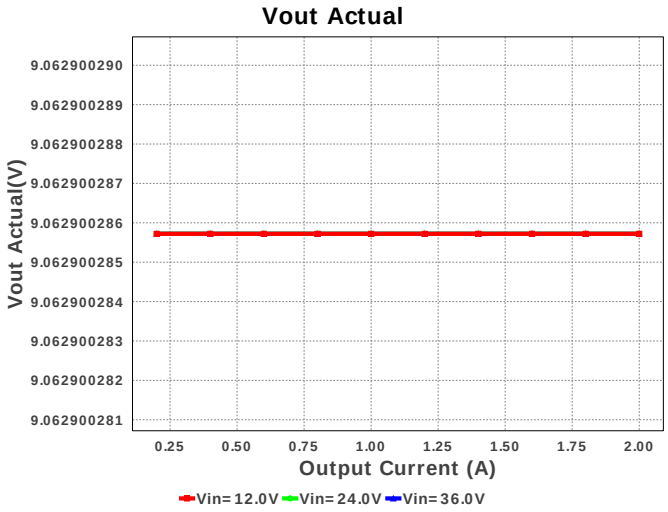


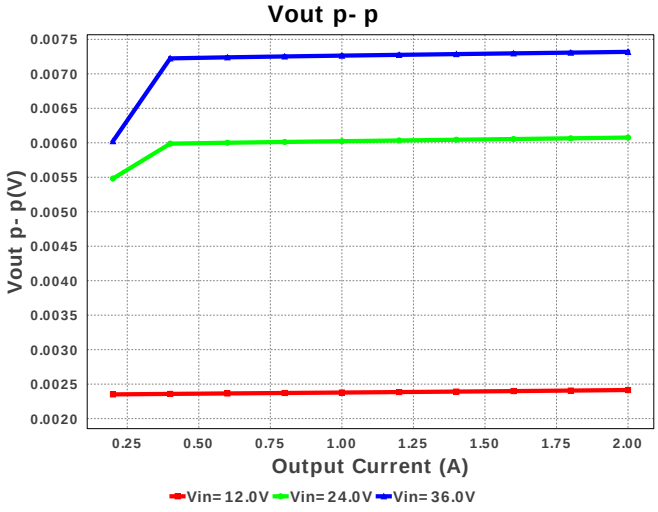


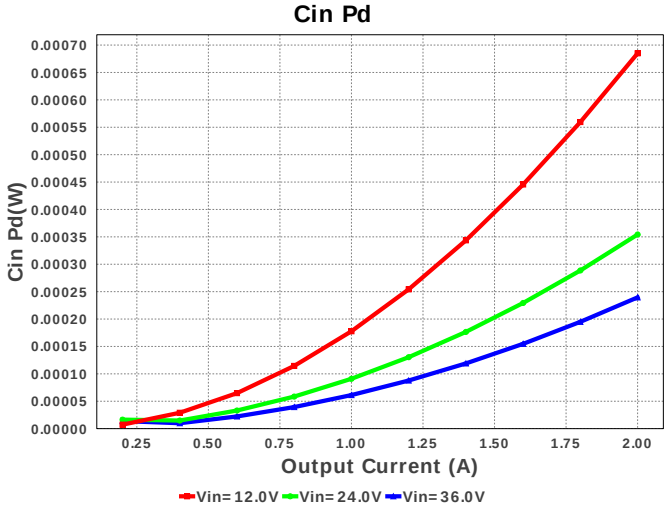


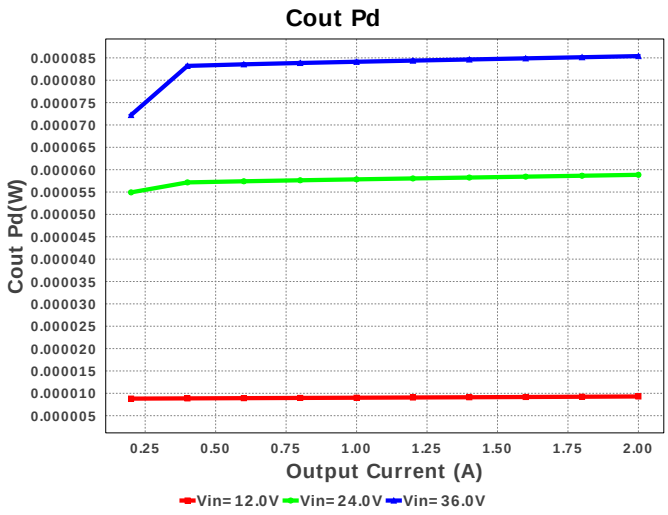


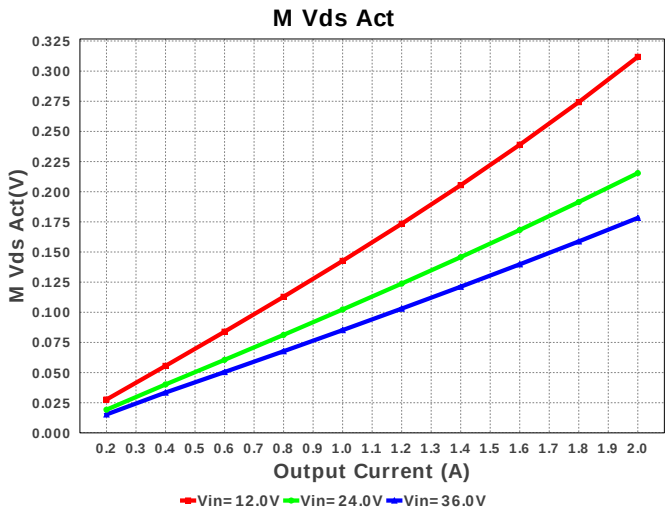


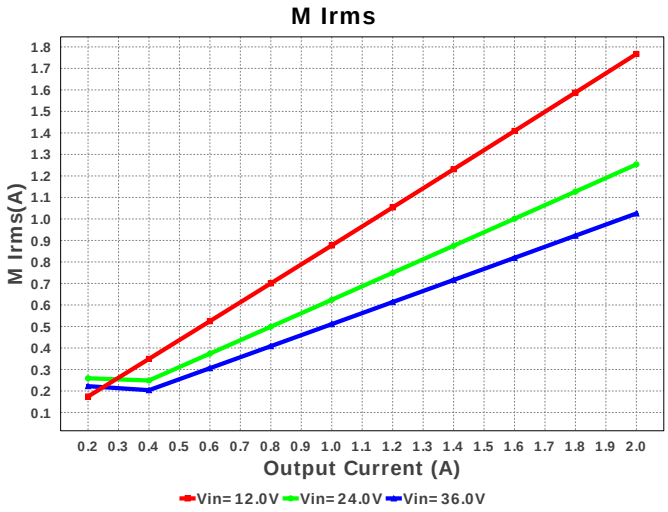


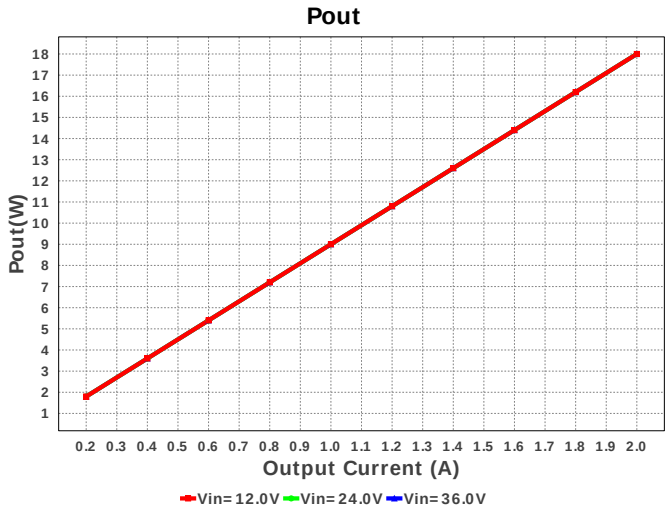


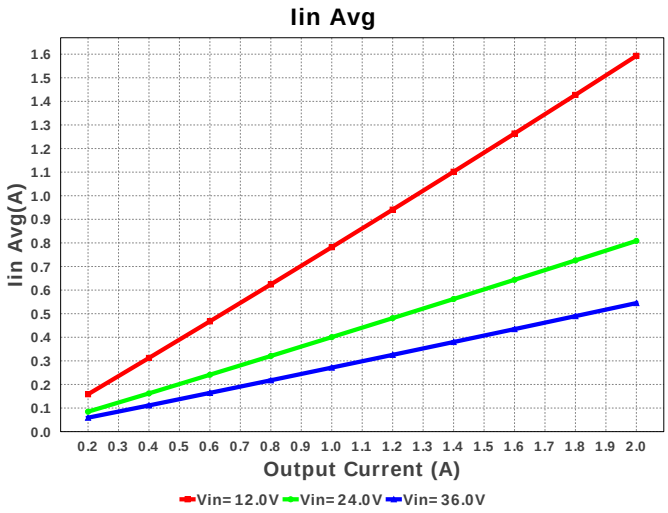


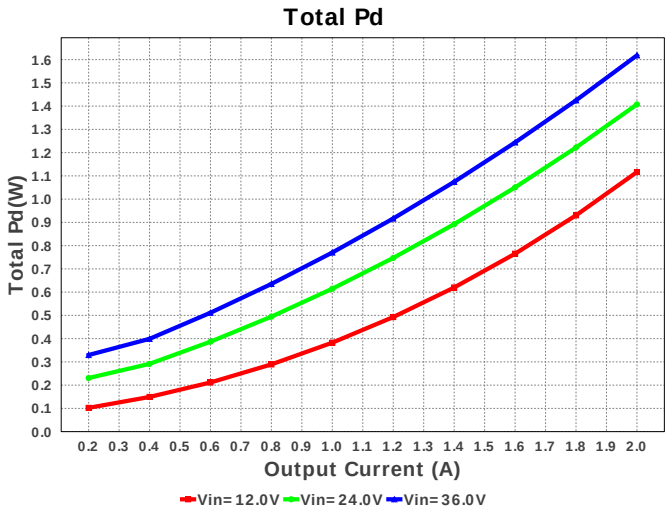


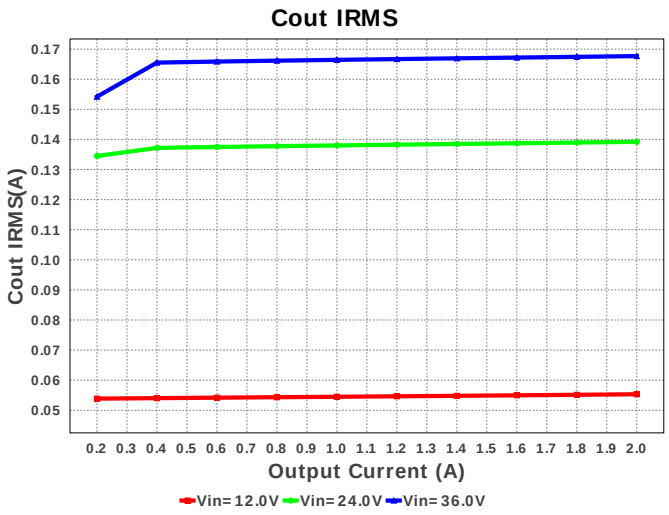


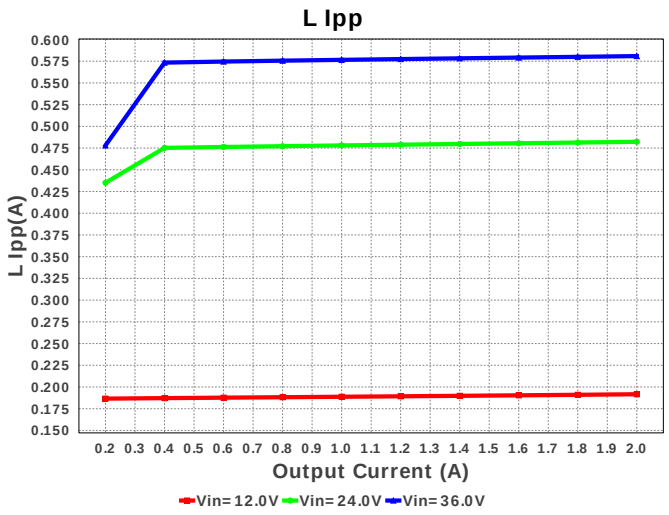


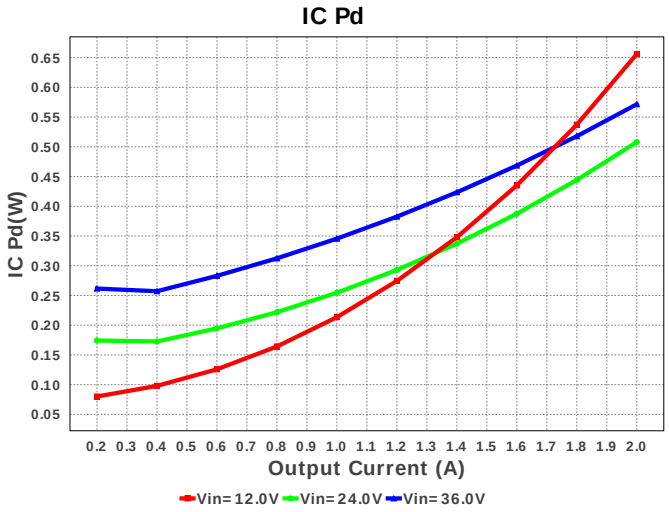


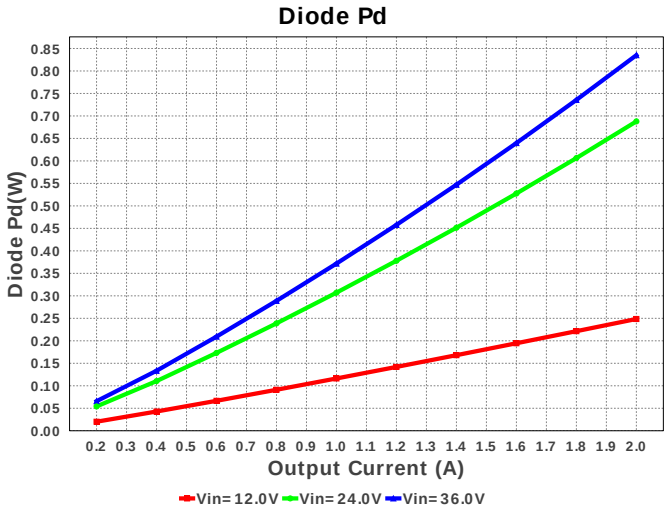












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	489.418 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	167.685 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.29 A	Current	Peak switch current in IC
4.	Iin Avg	544.95 mA	Current	Average input current
5.	L Ipp	580.88 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.025 A	Current	Q Iavg
7.	BOM Count	11	General	Total Design BOM count
8.	FootPrint	515.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	260.0 kHz	General	Switching frequency
10.	IC Tolerance	24.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	178.262 mV	General	Voltage drop across the MosFET
12.	Pout	18.0 W	General	Total output power
13.	Total BOM	$3.19	General	Total BOM Cost
14.	D1 Tj	50.878 degC	Op_Point	D1 junction temperature
15.	Vout Actual	9.063 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	9.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	22.005 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	26.29 %	Op_point	Duty cycle
19.	Efficiency	91.751 %	Op_point	Steady state efficiency
20.	IC Tj	44.861 degC	Op_point	IC junction temperature
21.	ICThetaJA	26.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	2.0 A	Op_point	Iout operating point
23.	Phase Marg	40.265 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	36.0 V	Op_point	Vin operating point
25.	Vout p-p	7.319 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	239.53 µW	Power	Input capacitor power dissipation
27.	Cout Pd	85.395 µW	Power	Output capacitor power dissipation
28.	Diode Pd	835.108 mW	Power	Diode power dissipation
29.	IC Pd	571.576 mW	Power	IC power dissipation
30.	L Pd	211.2 mW	Power	Inductor power dissipation
31.	Total Pd	1.618 W	Power	Total Power Dissipation

#	Name	Value	Category	Description
32.	Vout Tolerance	3.769 %		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	12.0	Minimum input voltage
4.	Vout	9.0	Output Voltage
5.	base_pn	LM2676	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM2676** Product Folder : http://www.ti.com/product/LM2676 : contains the data sheet and other resources.