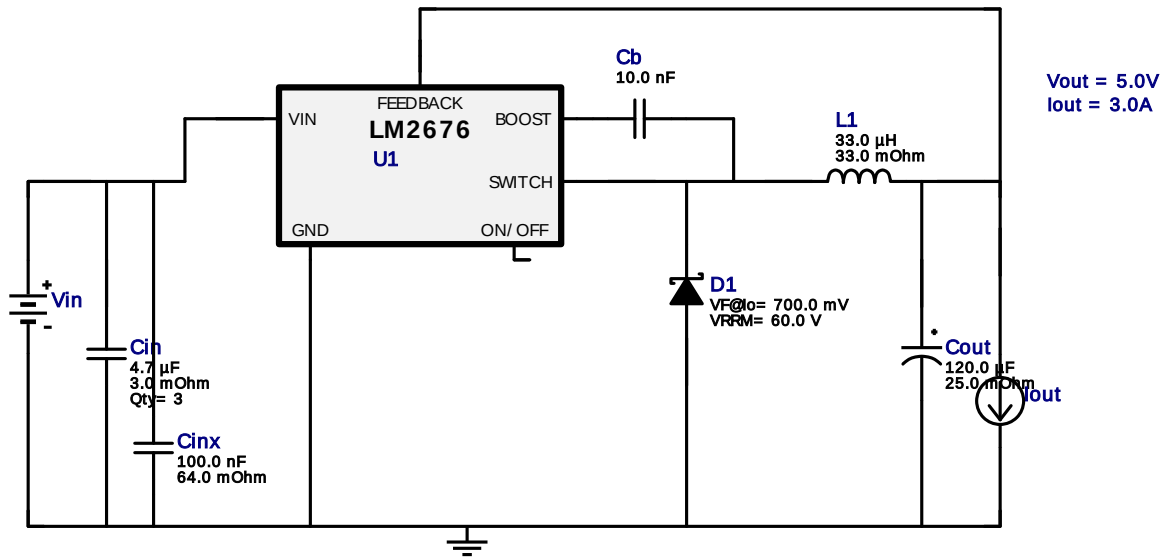
WEBENCH® Design Report

VinMin = 10.0V
VinMax = 30.0V
Vout = 5.0V
Iout = 3.0A

Device = LM2676SX-5.0/NOPB
Topology = Buck
Created = 3/2/16 11:23:56 PM
BOM Cost = $3.44
BOM Count = 9
Total Pd = 2.11W

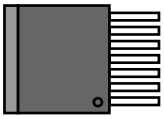
Design : 73500/68 LM2676SX-5.0/NOPB
tex 5V 3A



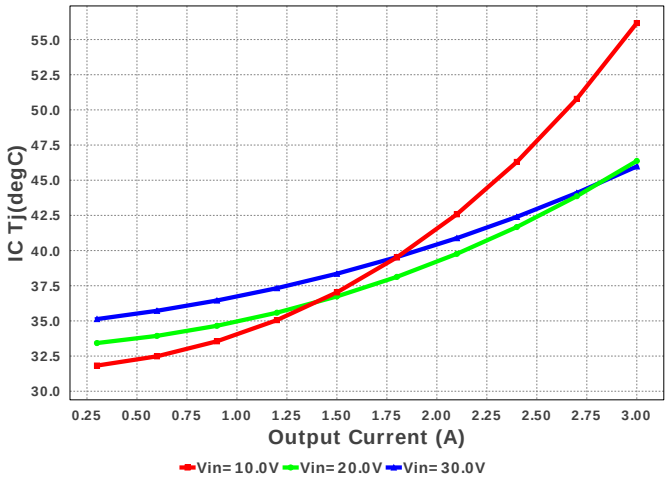
Electrical BOM

#	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	Chemi-Con	APXE100ARA121MF61G Series= PXE	Cap= 120.0 uF ESR= 25.0 mOhm VDC= 10.0 V IRMS= 2.53 A	1	$0.43	CAPSMT_62_F61 74 mm²
5.	D1	Diodes Inc.	B560C-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	$0.17	SMC 83 mm²
6.	L1	Coilcraft	MSS1210-333MEB	L= 33.0 µH DCR= 33.0 mOhm	1	$0.81	MSS1210 204 mm²

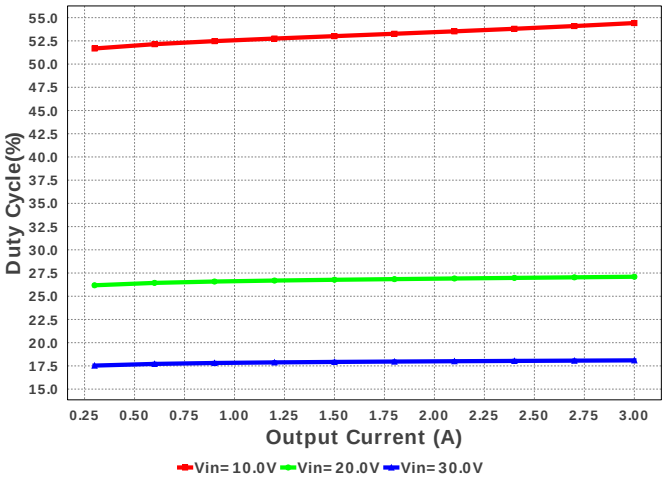
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	U1	Texas Instruments	LM2676SX-5.0/NOPB	Switcher	1	$1.80	TS7B 199 mm²



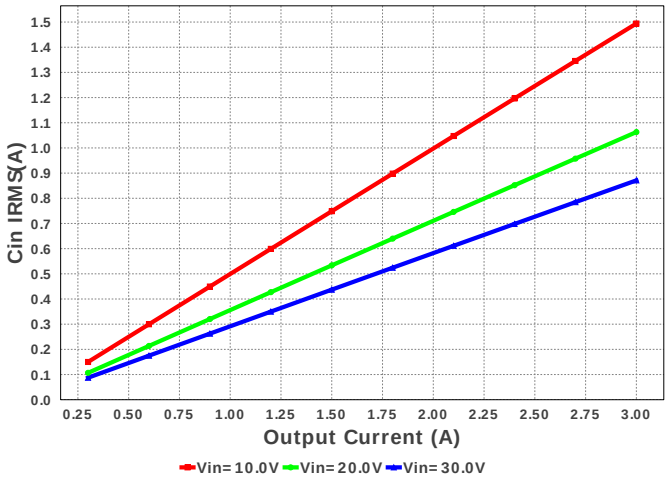
IC Tj



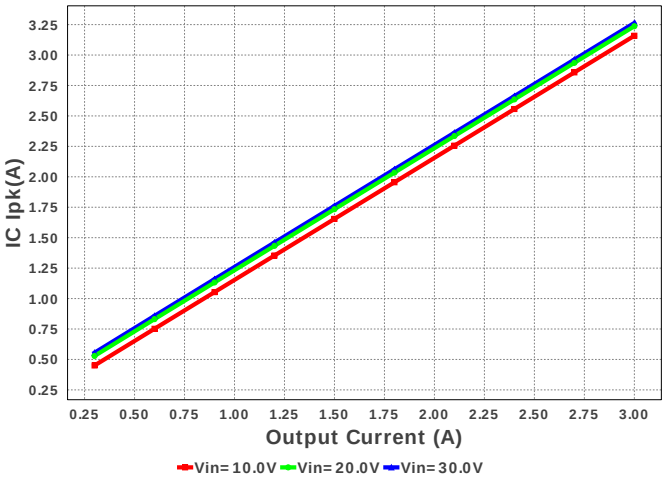
Duty Cycle



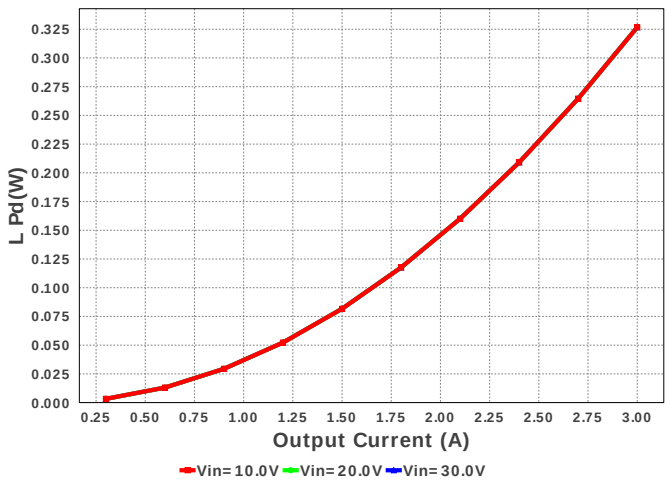
Cin IRMS



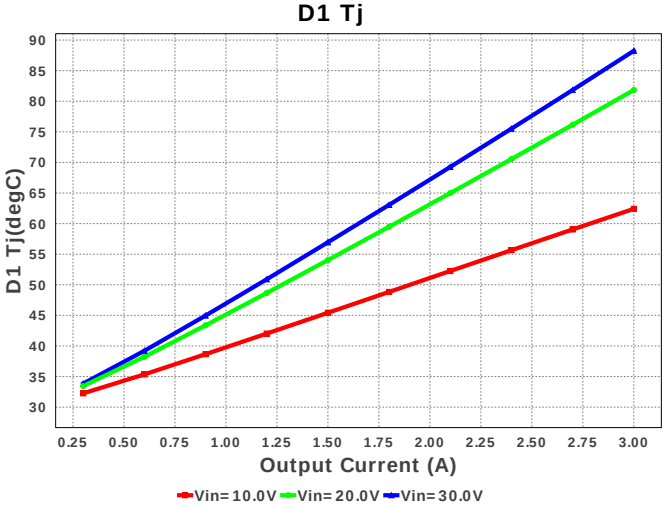
IC Ipk

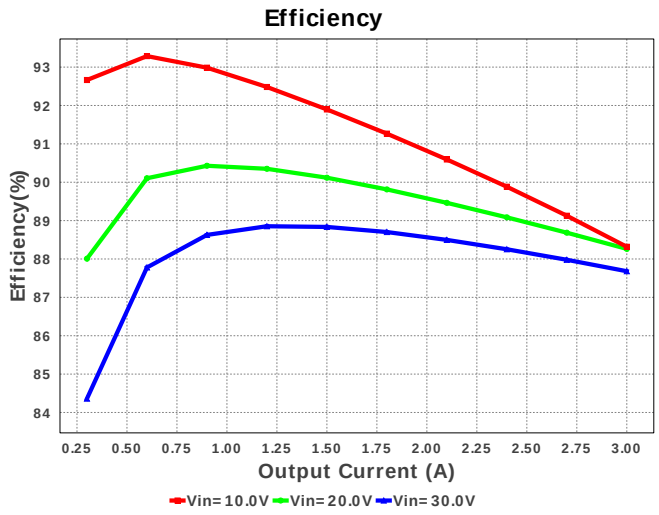


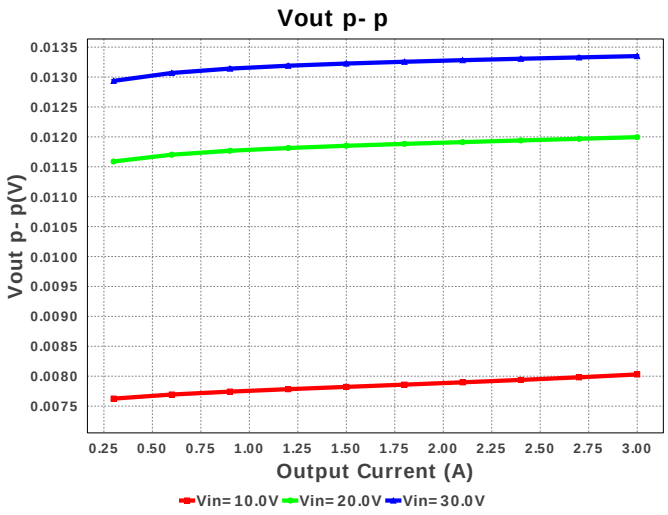
L Pd

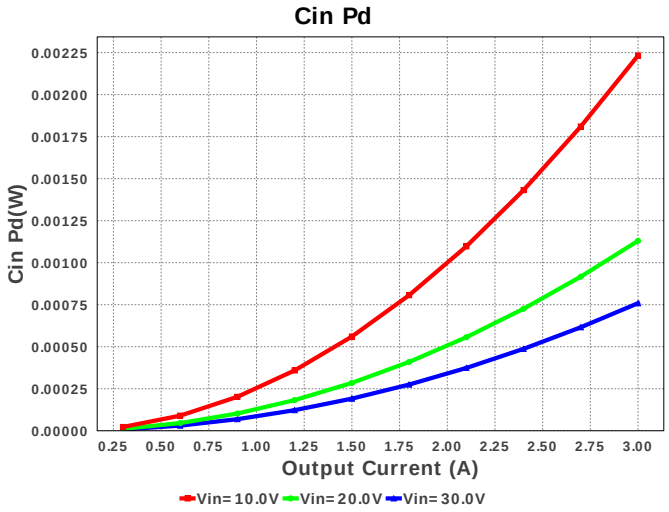


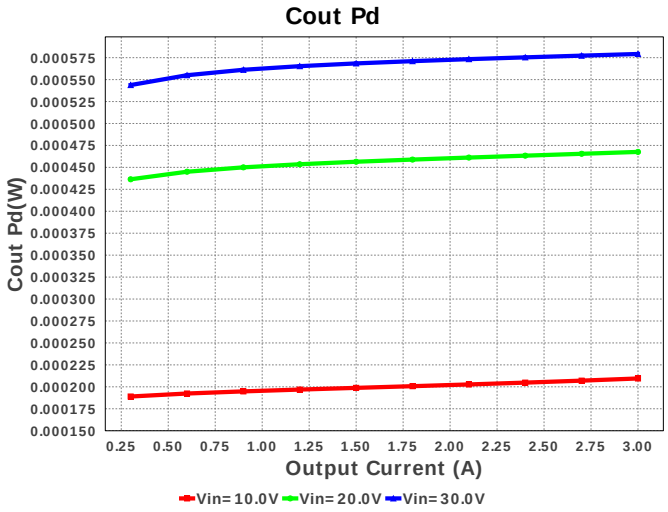
D1 Tj

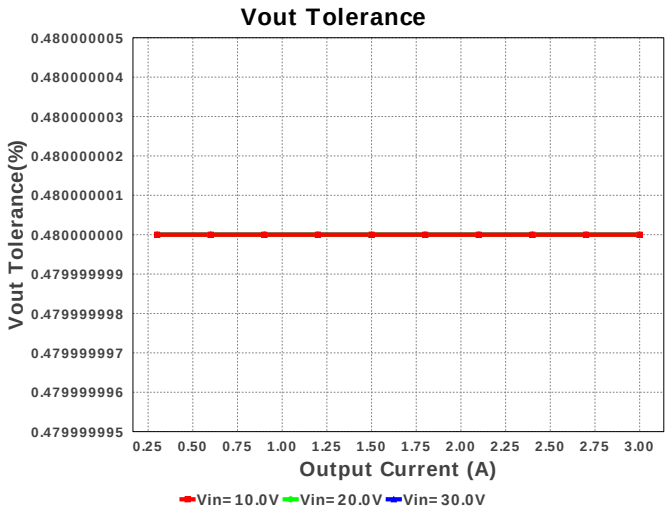


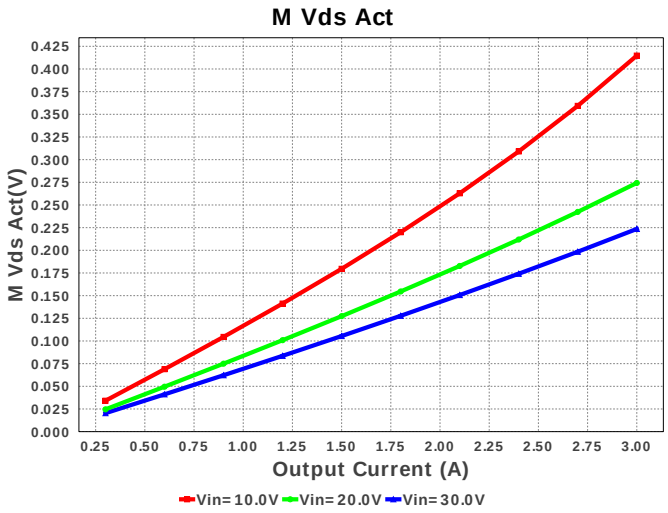


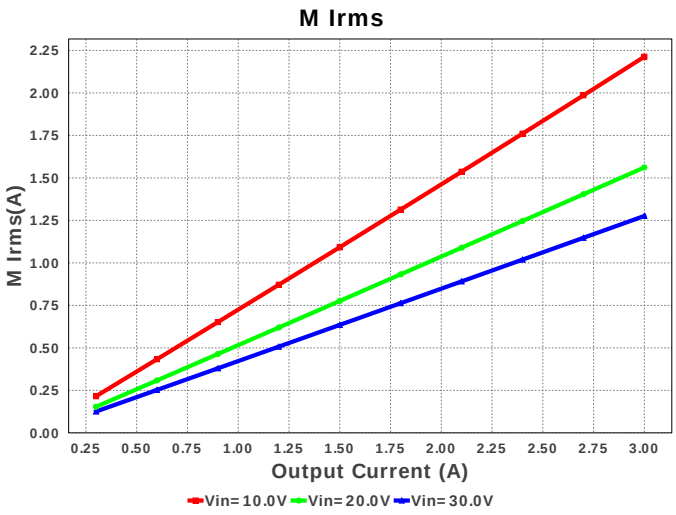


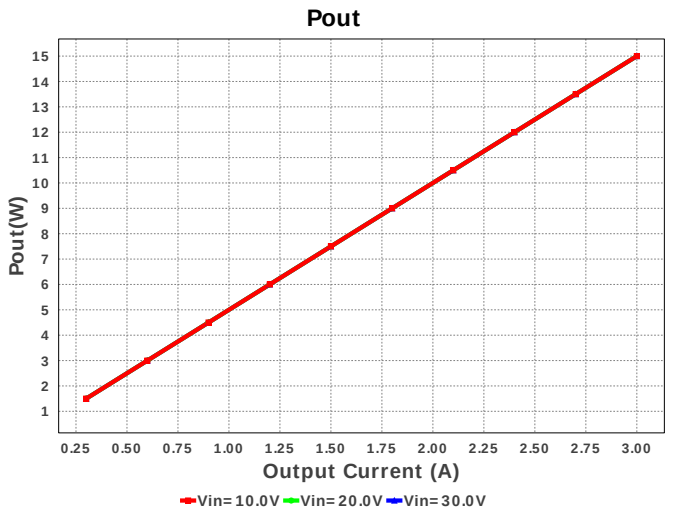


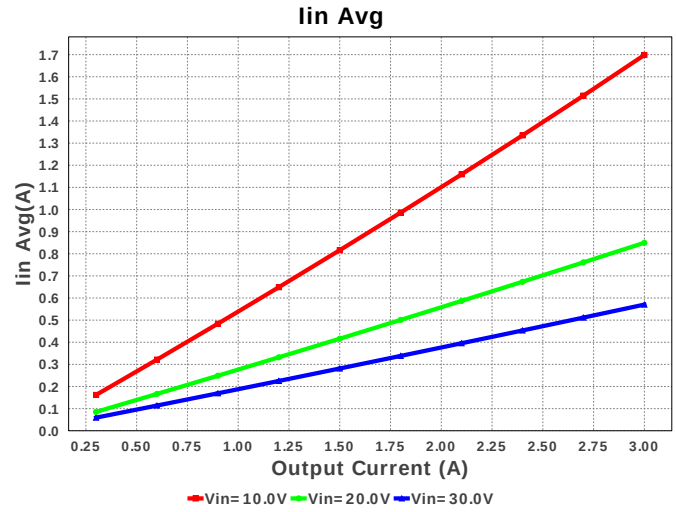


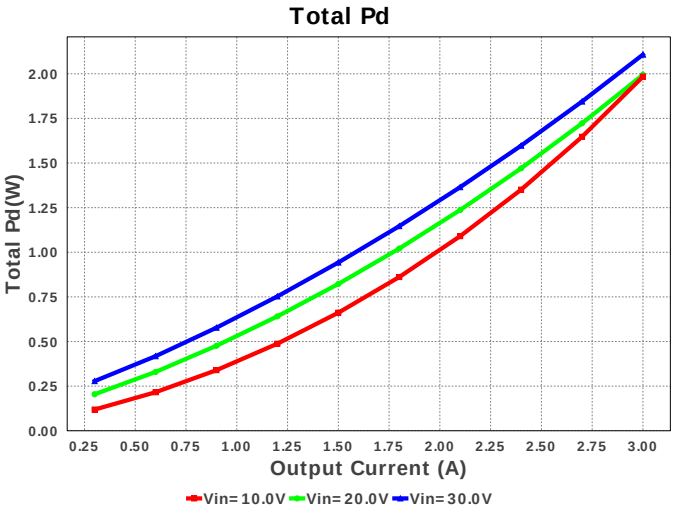


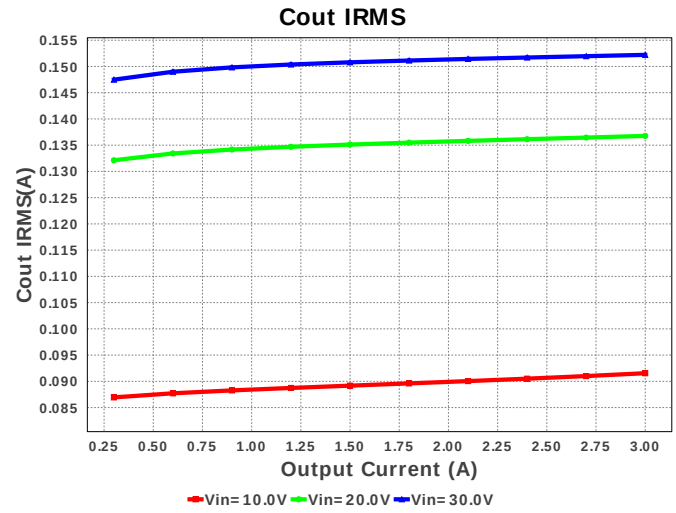


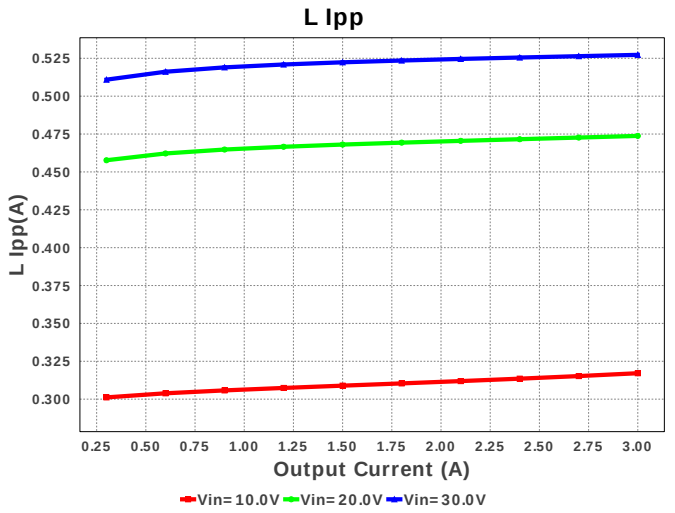


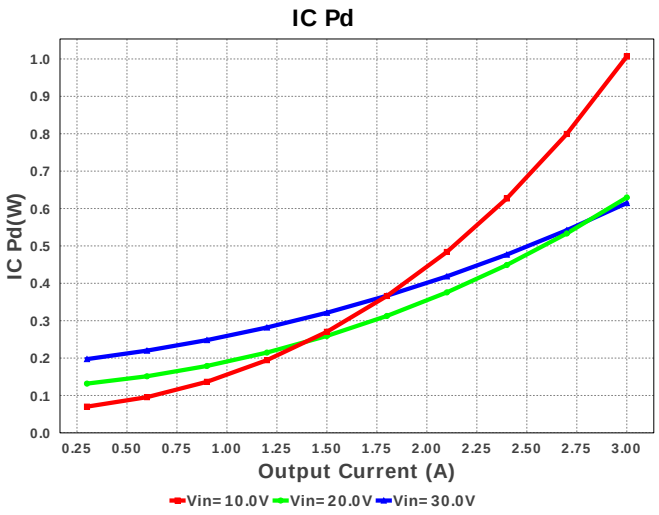


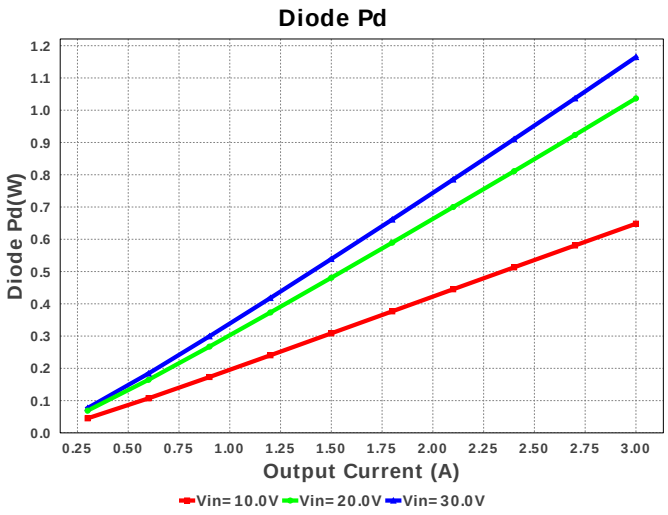












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	871.143 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	152.209 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	3.264 A	Current	Peak switch current in IC
4.	Iin Avg	570.25 mA	Current	Average input current
5.	L Ipp	527.27 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.276 A	Current	Q Iavg
7.	BOM Count	9	General	Total Design BOM count
8.	FootPrint	607.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	260.0 kHz	General	Switching frequency
10.	IC Tolerance	100.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	223.554 mV	General	Voltage drop across the MosFET
12.	Pout	15.0 W	General	Total output power
13.	Total BOM	$3.44	General	Total BOM Cost
14.	D1 Tj	88.241 degC	Op_Point	D1 junction temperature
15.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
16.	Cross Freq	20.813 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	18.096 %	Op_point	Duty cycle
18.	Efficiency	87.681 %	Op_point	Steady state efficiency
19.	IC Tj	45.98 degC	Op_point	IC junction temperature
20.	ICThetaJA	26.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	3.0 A	Op_point	Iout operating point
22.	Phase Marg	58.793 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	30.0 V	Op_point	Vin operating point
24.	Vout p-p	13.35 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	758.89 µW	Power	Input capacitor power dissipation
26.	Cout Pd	579.186 µW	Power	Output capacitor power dissipation
27.	Diode Pd	1.165 W	Power	Diode power dissipation
28.	IC Pd	614.607 mW	Power	IC power dissipation
29.	L Pd	326.7 mW	Power	Inductor power dissipation
30.	Total Pd	2.107 W	Power	Total Power Dissipation
31.	Vout Tolerance	2.0 %	Unknown	Vout Tolerance based on IC Tolerance and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	3.0	Maximum Output Current
2.	VinMax	30.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	5.0	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.