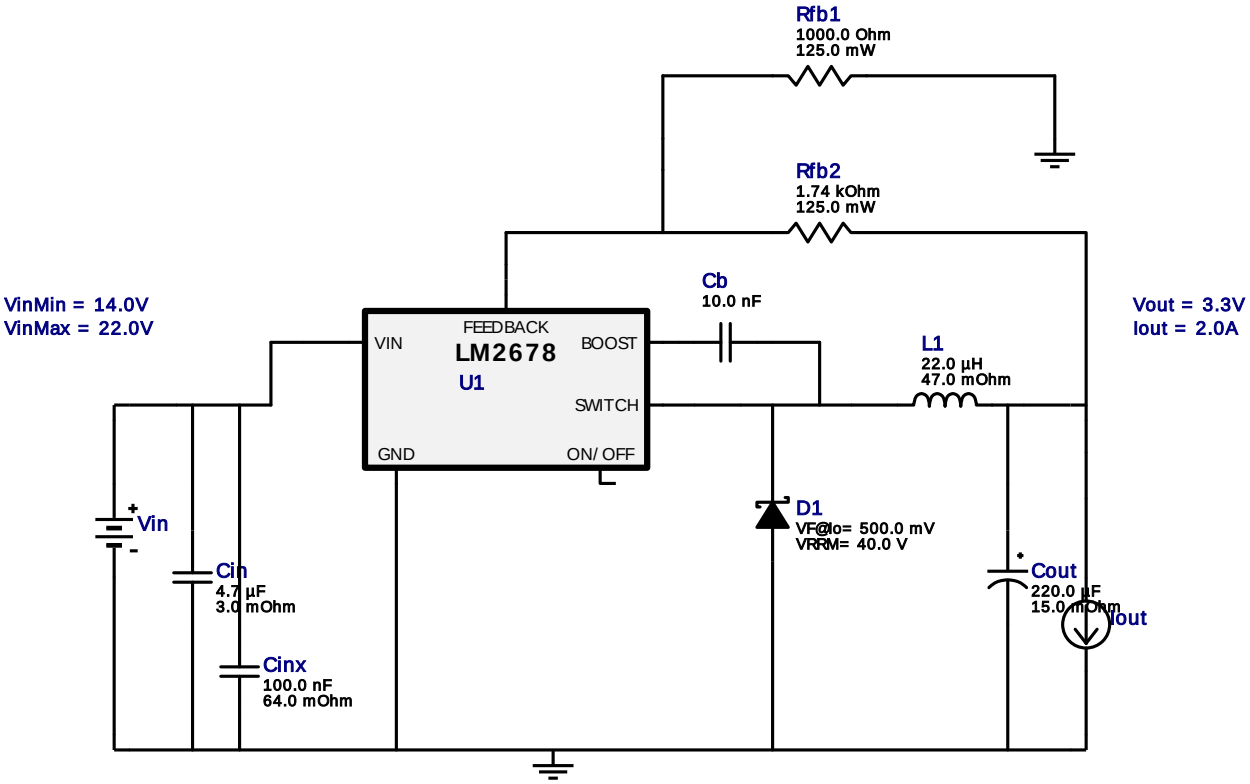
WEBENCH® Design Report

VinMin = 14.0V
VinMax = 22.0V
Vout = 3.3V
Iout = 2.0A

Device = LM2678SX-ADJ/NOPB
Topology = Buck
Created = 6/7/15 1:03:54 AM
BOM Cost = $2.91
Footprint = 554.0 mm²
BOM Count = 9
Total Pd = 1.2W

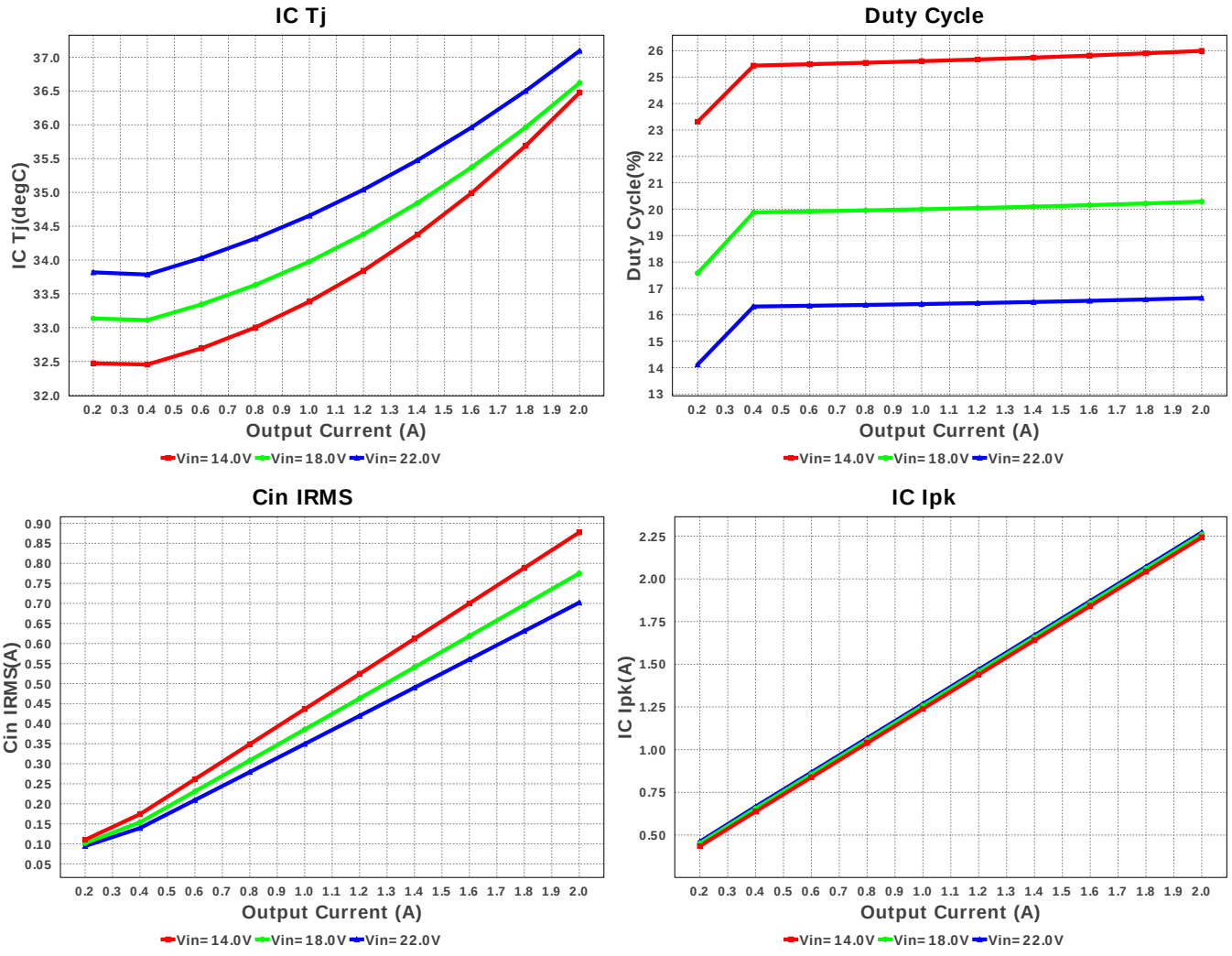
Design : 4387526/1 LM2678SX-ADJ/NOPB
LM2678SX-ADJ/NOPB 14.0V-22.0V to 3.30V @ 2.0A

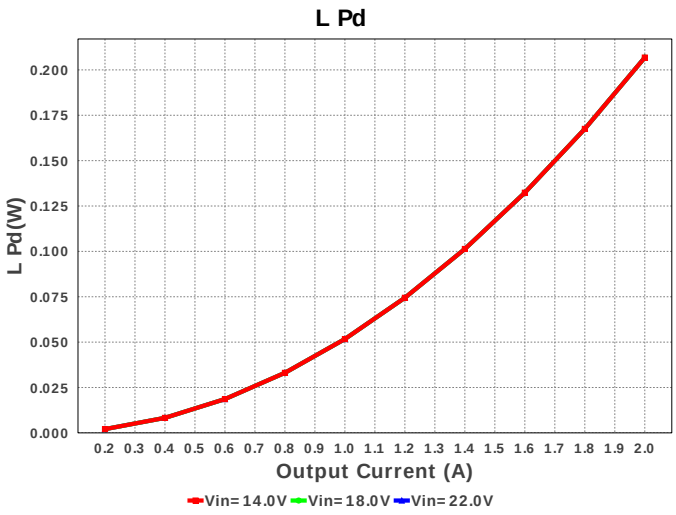


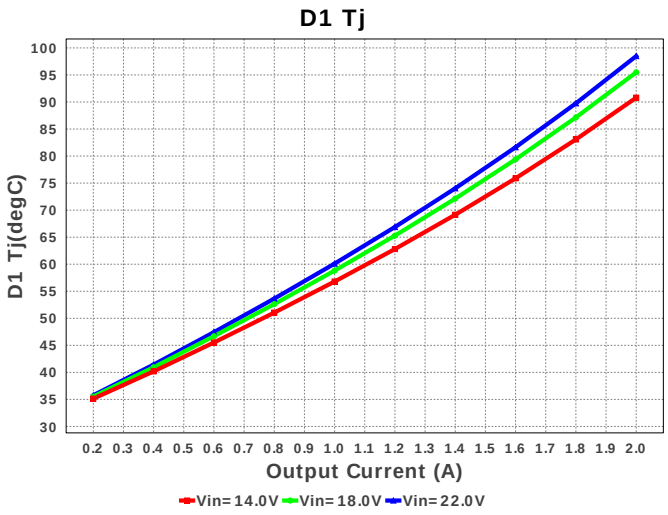
Electrical BOM

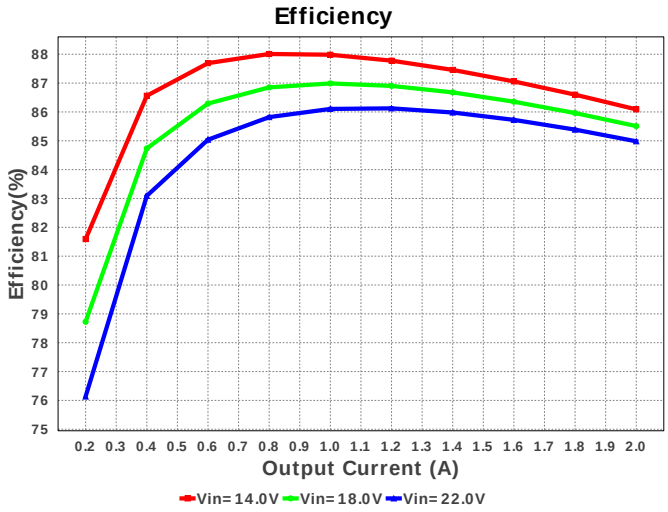
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cb	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 uF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	$0.07	1206 11 mm²
3.	Cinx	Kemet	C0805C104K5RACTU 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	Panasonic	6SVPE220MW Series= 259	Cap= 220.0 uF ESR= 15.0 mOhm VDC= 6.3 V IRMS= 3.15 A	1	$0.14	CAPSMT_62_E61 53 mm²
5.	D1	Diodes Inc.	B340A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	$0.11	SMA 37 mm²
6.	L1	Bourns	SDR1307-220ML	L= 22.0 µH DCR= 47.0 mOhm	1	$0.35	SDR1307 227 mm²

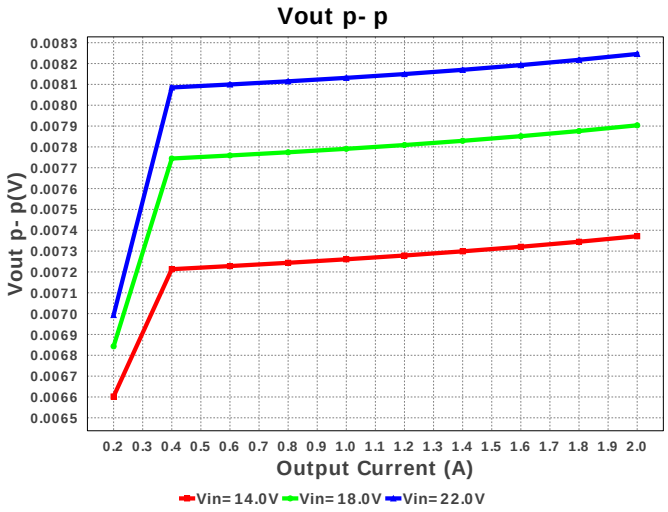
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	Rfb1	Panasonic	ERJ-6ENF1001V Series= 225	Res= 1000.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm²
8.	Rfb2	Panasonic	ERJ-6ENF1741V Series= 225	Res= 1.74 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 7 mm²
9.	U1	Texas Instruments	LM2678SX-ADJ/NOPB	Switcher	1	$2.20	TS7B 199 mm²

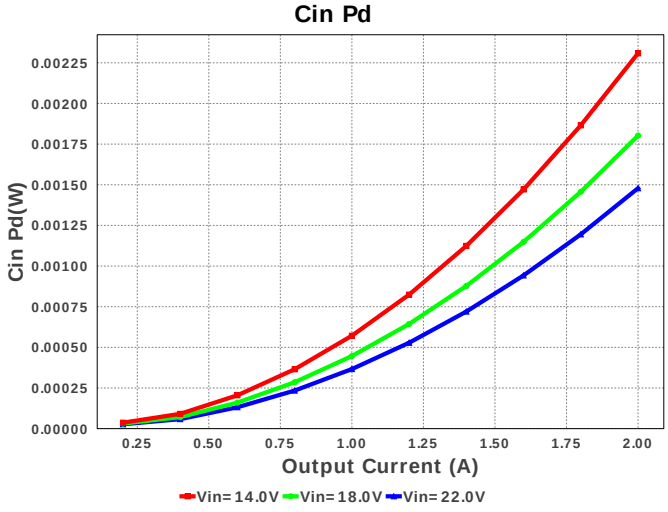


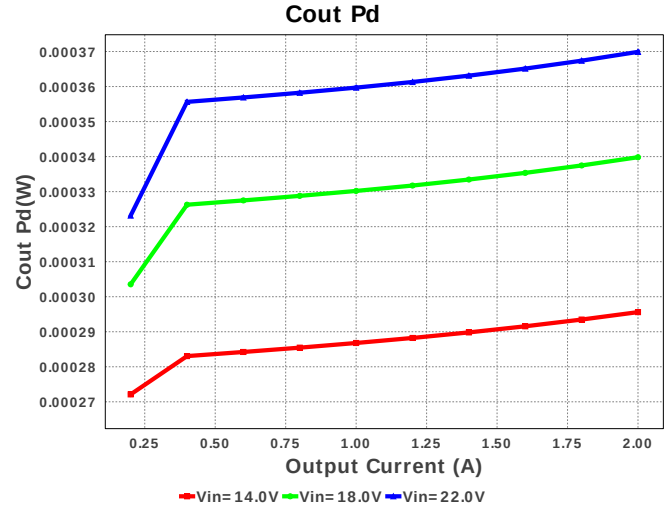


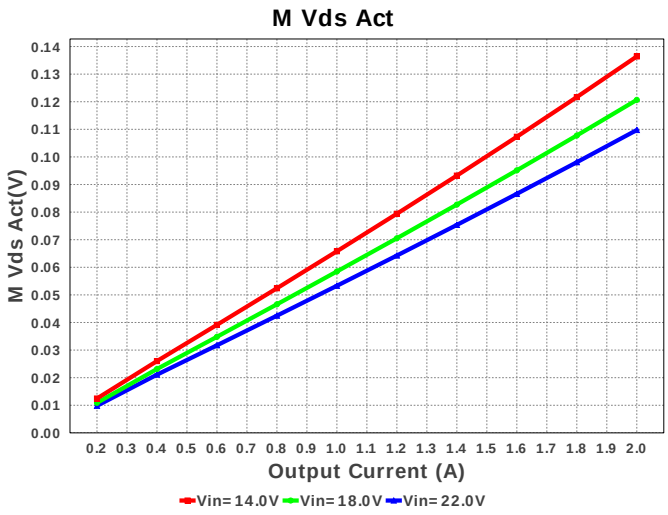


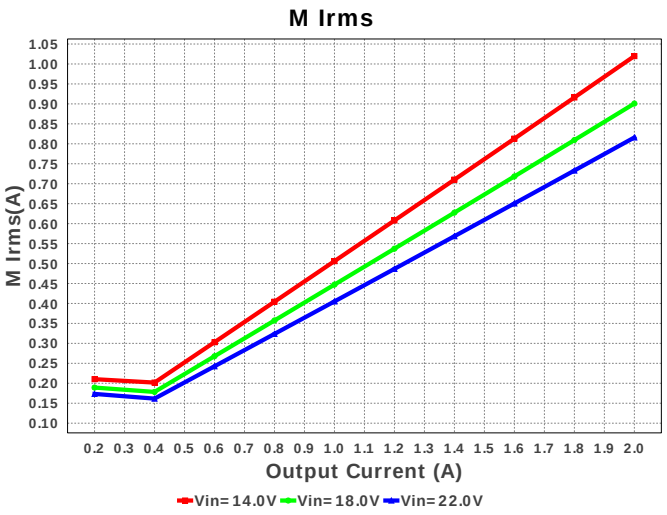


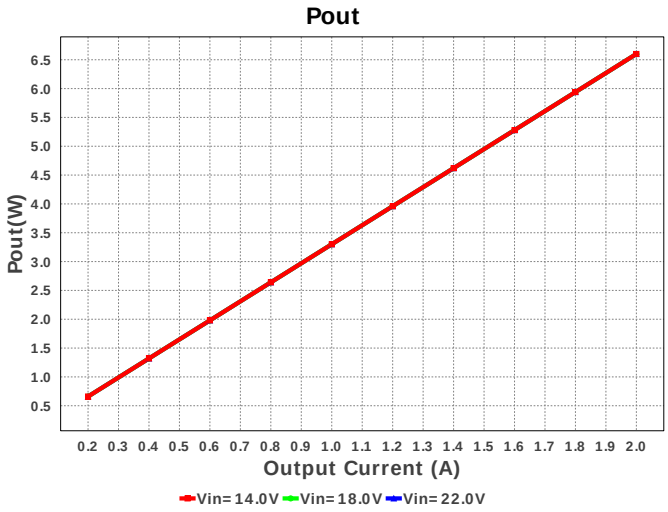


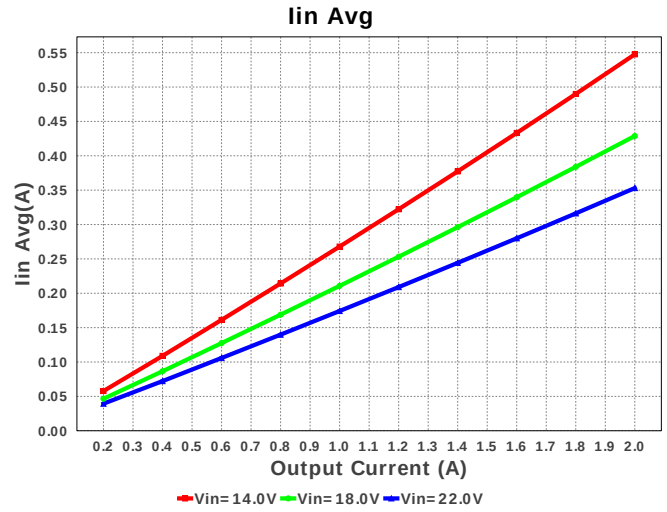


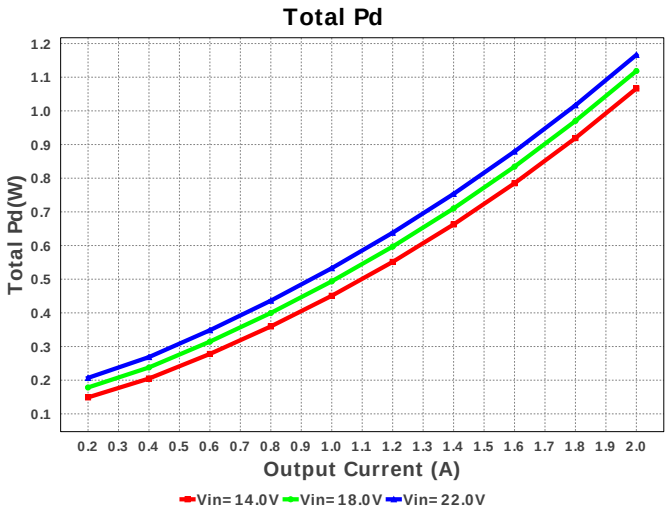


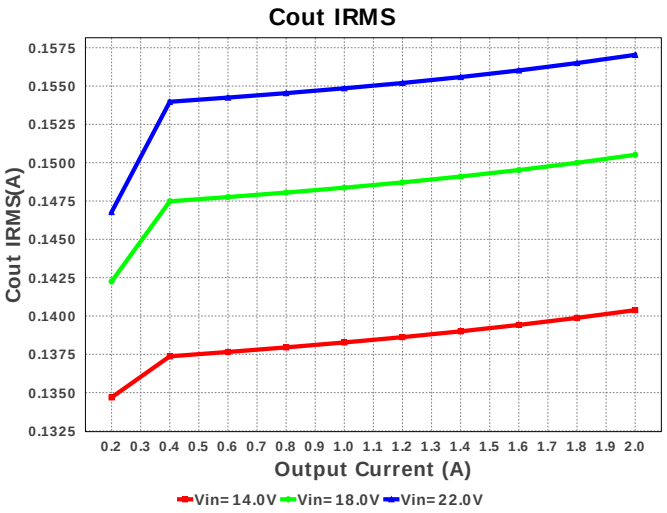


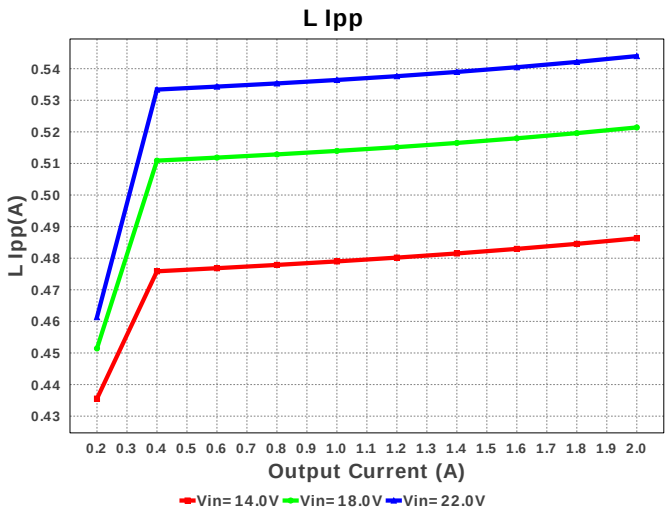


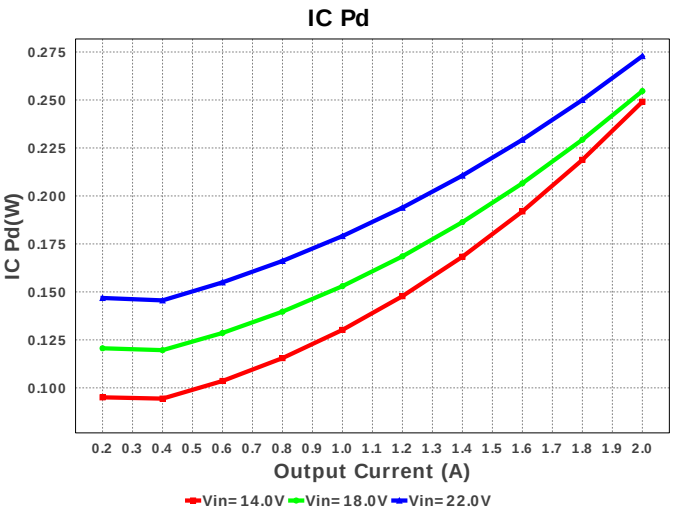


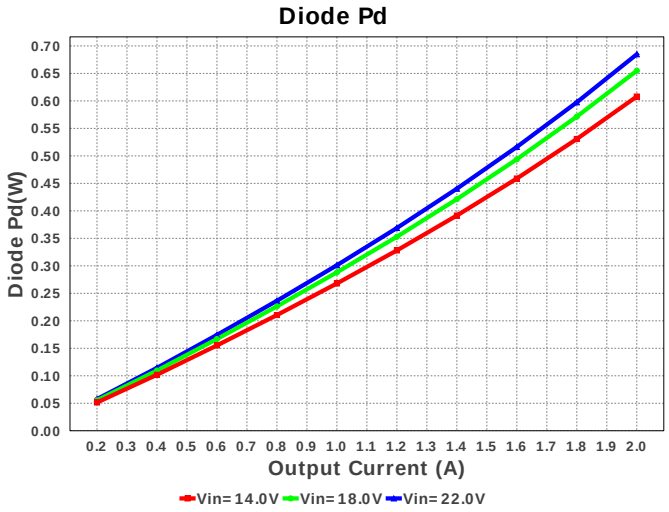












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	703.133 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	157.739 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.273 A	Current	Peak switch current in IC
4.	Iin Avg	354.52 mA	Current	Average input current
5.	L Ipp	546.42 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	817.658 mA	Current	MOSFET RMS current
7.	BOM Count	9	General	Total Design BOM count
8.	FootPrint	554.0 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	109.999 mV	General	Voltage drop across the MosFET
12.	Pout	6.6 W	General	Total output power
13.	Total BOM	$2.91	General	Total BOM Cost
14.	D1 Tj	101.744 degC	Op_Point	D1 junction temperature
15.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
16.	Cross Freq	20.623 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	16.714 %	Op_point	Duty cycle
18.	Efficiency	84.621 %	Op_point	Steady state efficiency
19.	IC Tj	37.108 degC	Op_point	IC junction temperature
20.	ICThetaJA	26.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	2.0 A	Op_point	Iout operating point
22.	Phase Marg	62.592 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	22.0 V	Op_point	Vin operating point
24.	Vout p-p	8.283 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	1.483 mW	Power	Input capacitor power dissipation
26.	Cout Pd	373.222 µW	Power	Output capacitor power dissipation
27.	Diode Pd	717.438 mW	Power	Diode power dissipation
28.	IC Pd	273.389 mW	Power	IC power dissipation
29.	L Pd	206.8 mW	Power	Inductor power dissipation
30.	Total Pd	1.199 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	Iout1	2.0	Output Current #1
3.	VinMax	22.0	Maximum input voltage
4.	VinMin	14.0	Minimum input voltage
5.	Vout	3.3	Output Voltage
6.	Vout1	3.3	Output Voltage #1
7.	base_pn	LM2678	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0	Ambient temperature

Design Assistance

1. LM2678 Product Folder : http://www.ti.com/product/LM2678 : contains the data sheet and other resources.