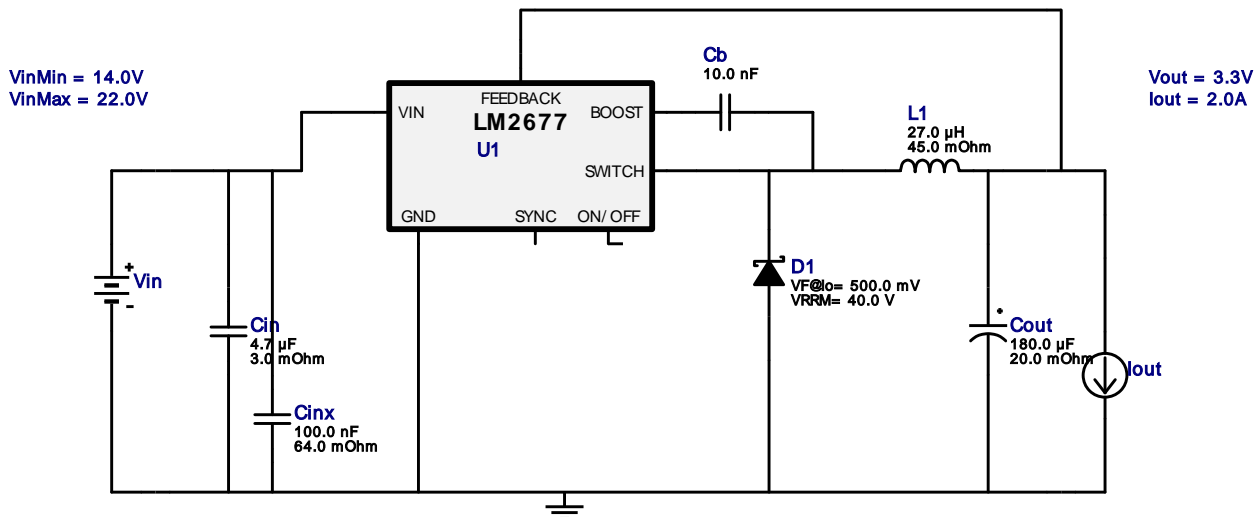


# WEBENCH<sup>®</sup> Design Report



Design : 4064225/19 LM2677T-3.3/NOPB  
LM2677SX-3.3/NOPB 14.0V-22.0V to 3.3V @ 2.0A

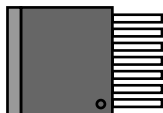
VinMin = 14.0V  
VinMax = 22.0V  
Vout = 3.3V  
Iout = 2.0A

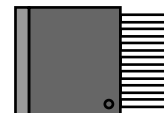
Device = LM2677T-3.3/NOPB  
Topology = Buck  
Created = 6/7/14 2:34:13 AM  
BOM Cost = \$3.18  
Footprint = 630.0mm<sup>2</sup>  
BOM Count = 7  
Total Pd = 1.31W



## Electrical BOM

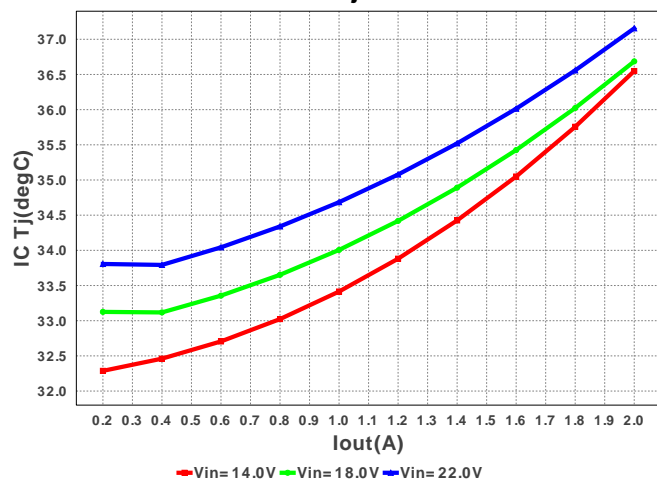
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cb	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7mm2
2.	Cin	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 µF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	\$0.10	 1206 11mm2
3.	Cinx	Kemet	C0805C104K5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	 0805 7mm2
4.	Cout	Panasonic	16SVP180M Series= 261	Cap= 180.0 µF ESR= 20.0 mOhm VDC= 16.0 V IRMS= 3.64 A	1	\$0.29	 SM_RADIAL_8MM 113mm2
5.	D1	Diodes Inc.	B340-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.11	 SMC 83mm2
6.	L1	Bourns	SRR1260-270M	L= 27.0 µH DCR= 45.0 mOhm	1	\$0.41	 SRR1260 210mm2

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	U1	Texas Instruments	LM2677SX-3.3/NOPB	Switcher	1	\$2.25	 TS7B 199mm2

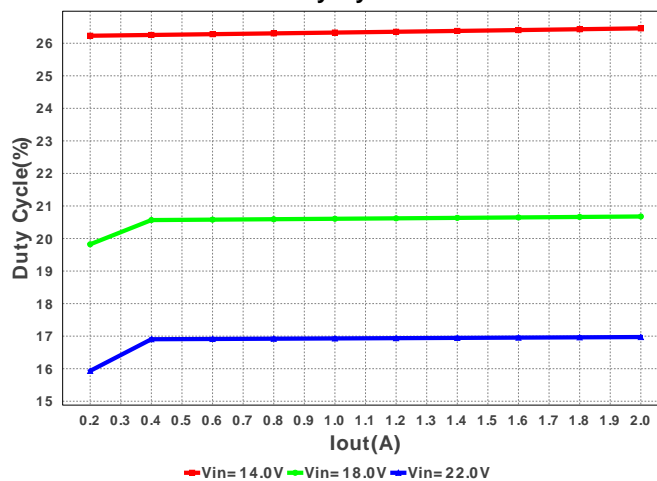


TS7B 199mm2

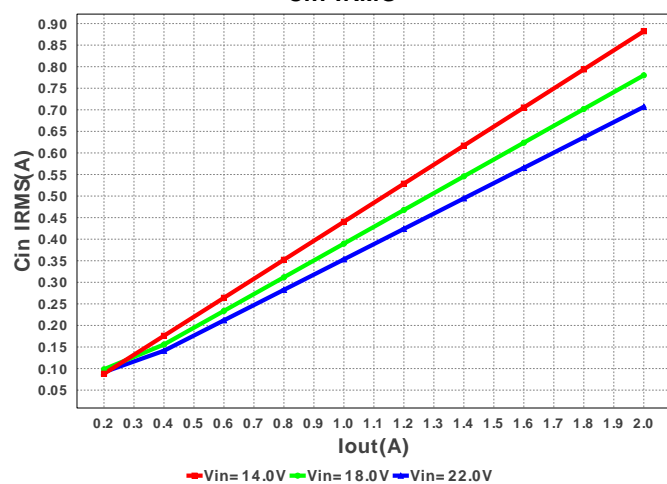
IC Tj



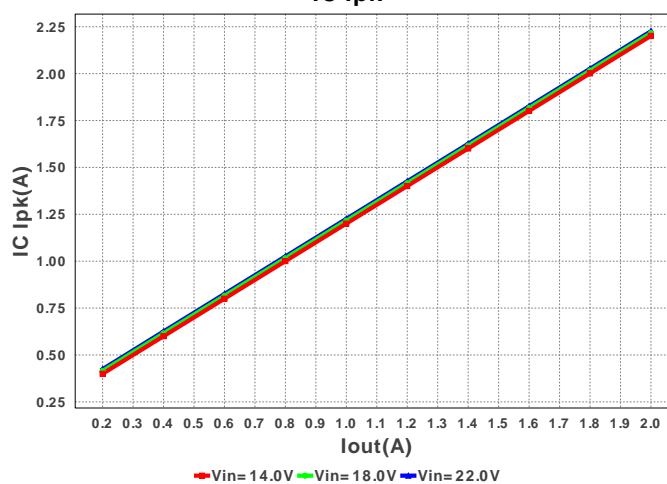
Duty Cycle



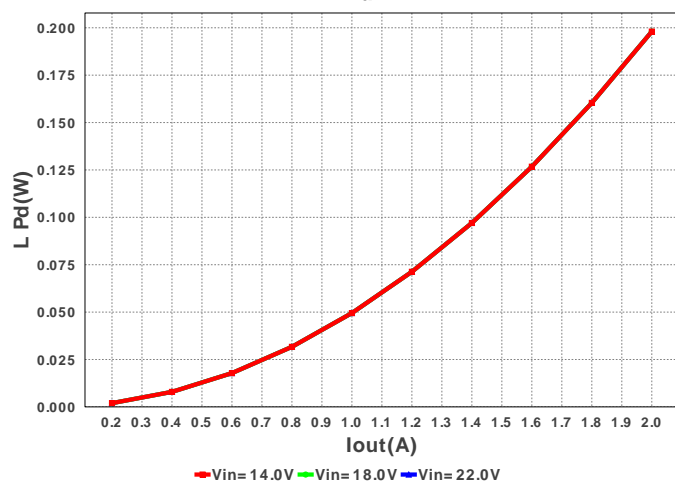
Cin IRMS



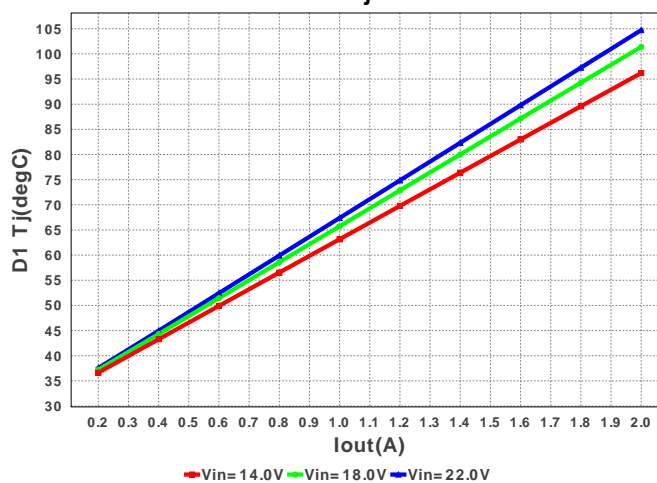
IC Ipk

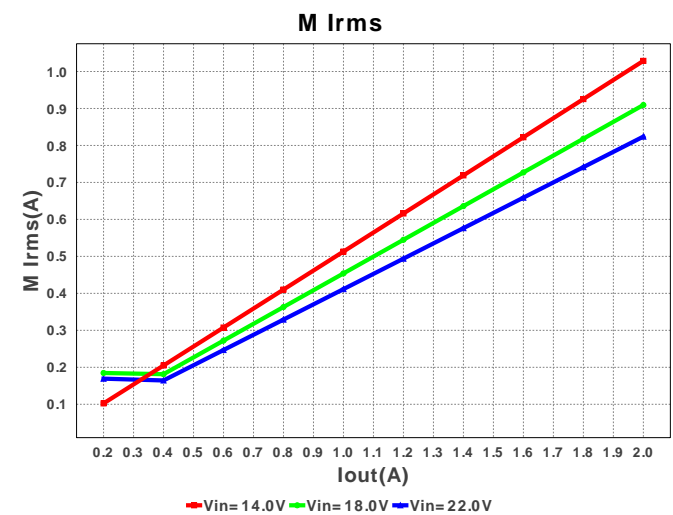
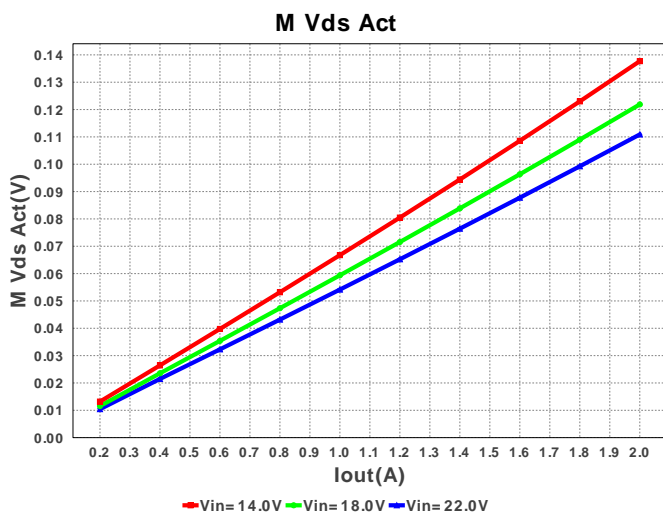
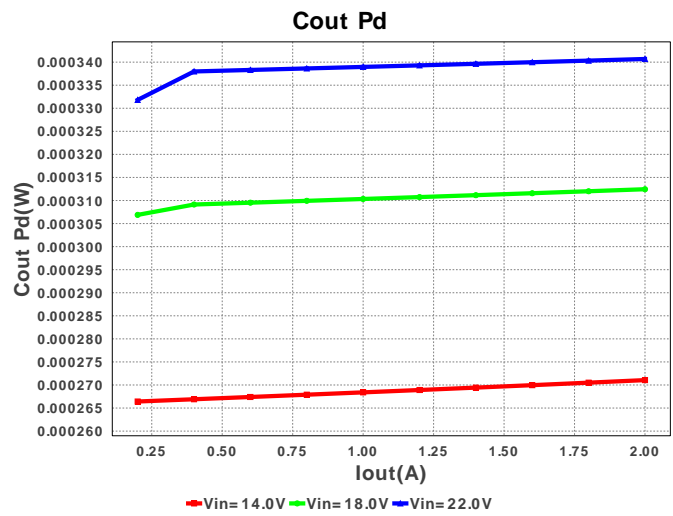
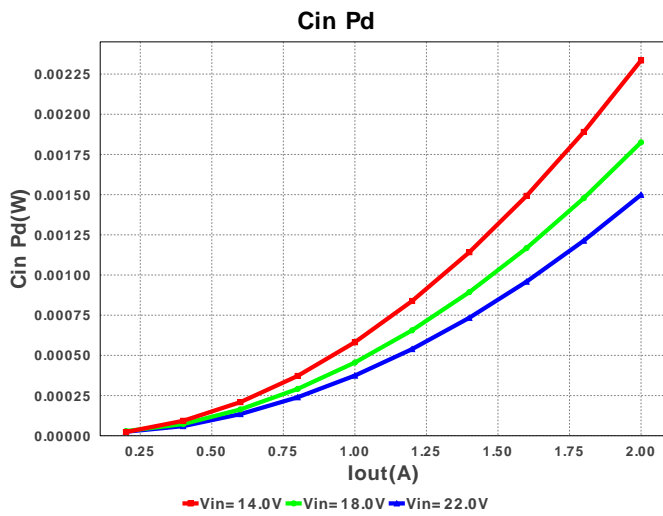
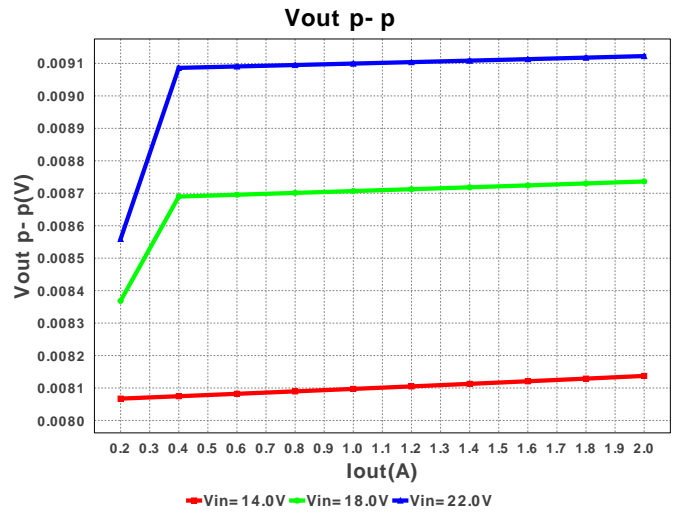
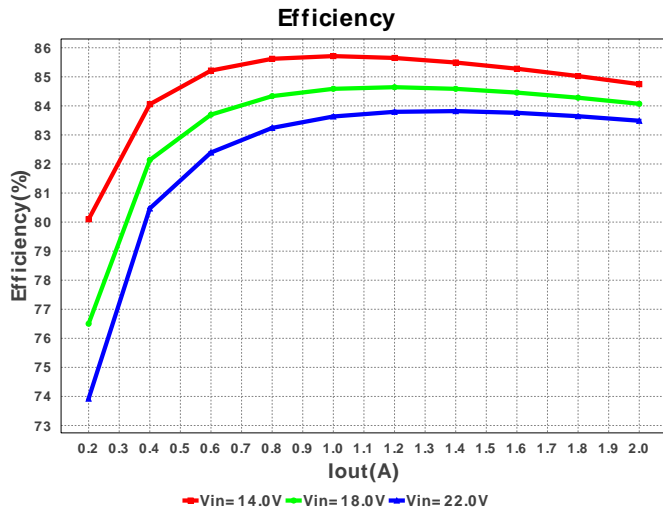


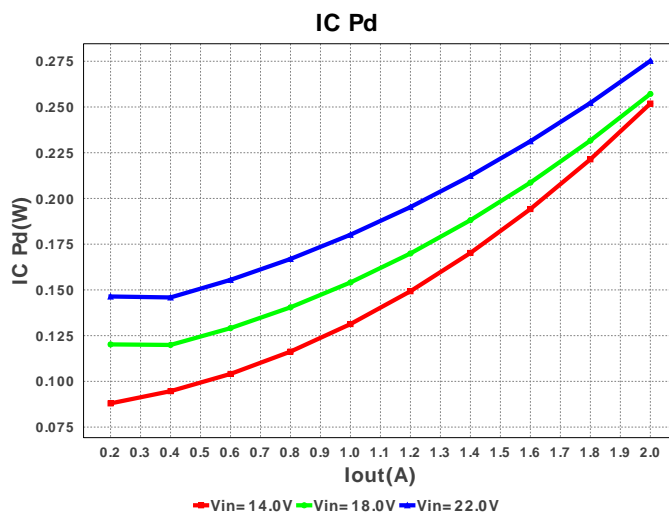
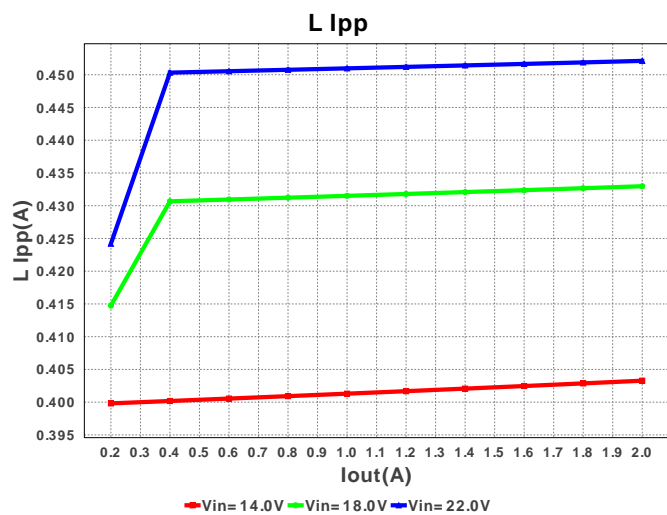
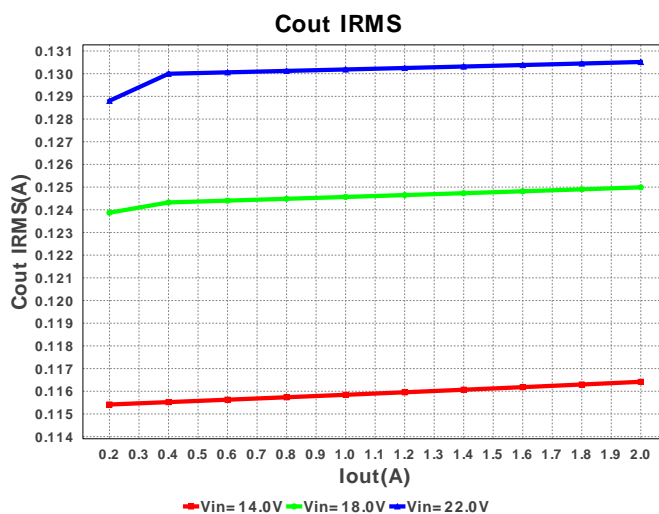
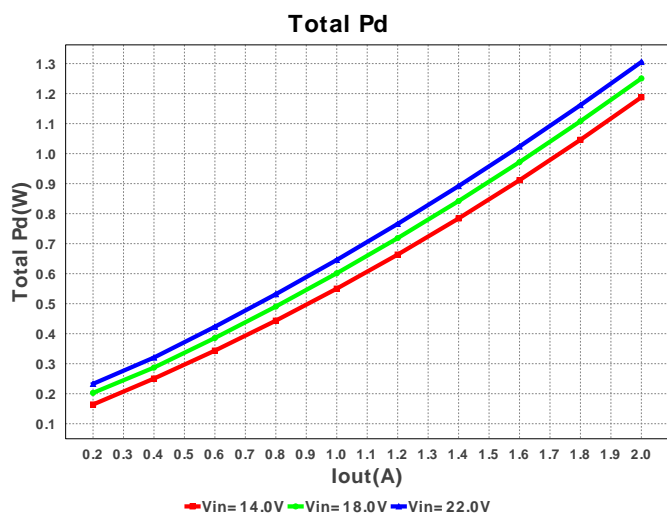
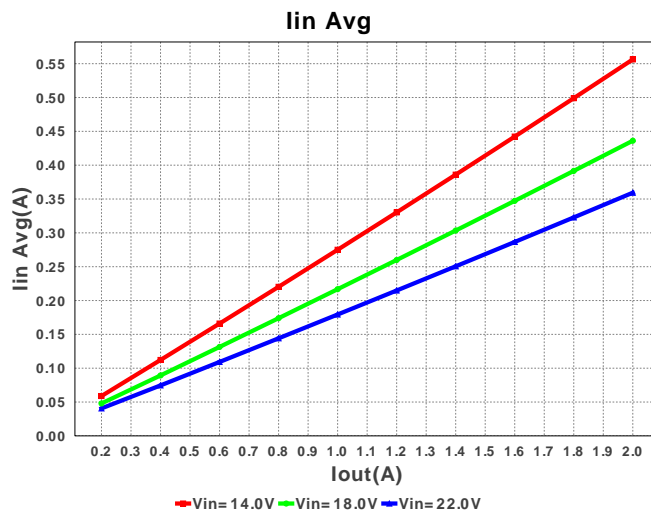
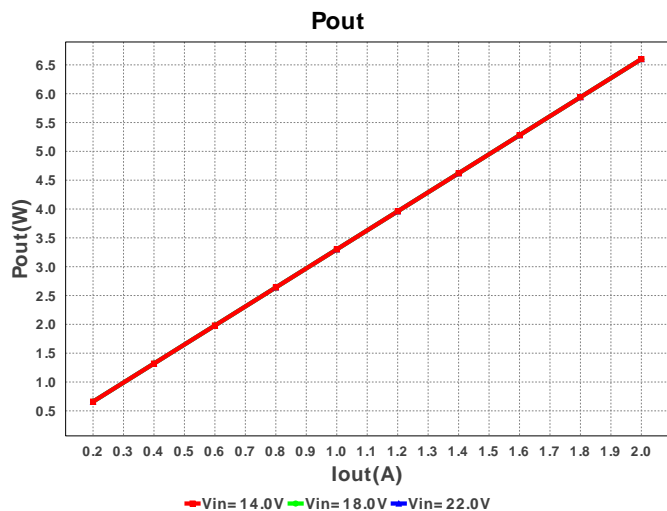
L Pd

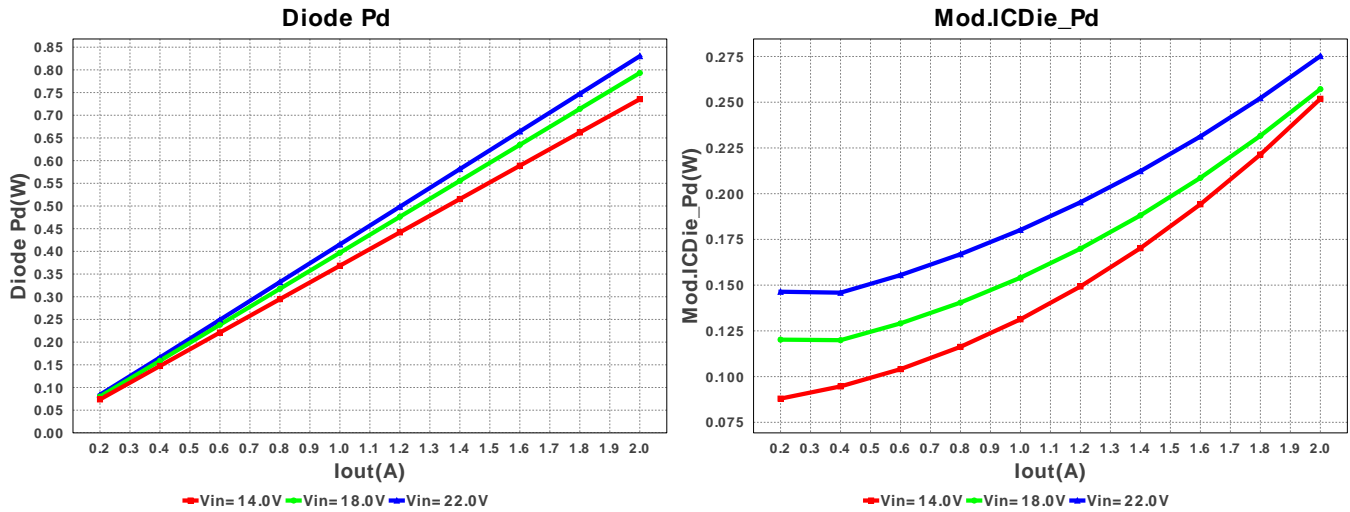


D1 Tj









## Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	706.832 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	130.515 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.226 A	Current	Peak switch current in IC
4.	Iin Avg	359.33 mA	Current	Average input current
5.	L Ipp	452.118 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	823.955 mA	Current	MOSFET RMS current
7.	BOM Count	7	General	Total Design BOM count
8.	FootPrint	630.0 mm2	General	Total Foot Print Area of BOM components
9.	Frequency	260.0 kHz	General	Switching frequency
10.	IC Tolerance	66.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	110.893 mV	General	Voltage drop across the MosFET
12.	Pout	6.6 W	General	Total output power
13.	Total BOM	\$3.18	General	Total BOM Cost
14.	D1 Tj	104.725 degC	Op_Point	D1 junction temperature
15.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
16.	Cross Freq	20.712 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	16.973 %	Op_point	Duty cycle
18.	Efficiency	83.488 %	Op_point	Steady state efficiency
19.	IC Tj	37.156 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	64.585 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	22.0 V	Op_point	Vin operating point
24.	Vout p-p	9.123 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	1.499 mW	Power	Input capacitor power dissipation
26.	Cout Pd	340.684 μW	Power	Output capacitor power dissipation
27.	Diode Pd	830.275 mW	Power	Diode power dissipation
28.	IC Pd	275.214 mW	Power	IC power dissipation
29.	L Pd	198.0 mW	Power	Inductor power dissipation
30.	Total Pd	1.305 W	Power	Total Power Dissipation

## Design Inputs

#	Name	Value	Description
1.	Iout	2.0 A	Maximum Output Current
2.	Iout1	2.0 Amps	Output Current #1
3.	VinMax	22.0 V	Maximum input voltage
4.	VinMin	14.0 V	Minimum input voltage
5.	Vout	3.3 V	Output Voltage
6.	Vout1	3.3 Volt	Output Voltage #1
7.	base_pn	LM2677	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0 degC	Ambient temperature

## Design Assistance

1. LM2677 Product Folder : <http://www.ti.com/product/lm2677> : contains the data sheet and other resources.

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