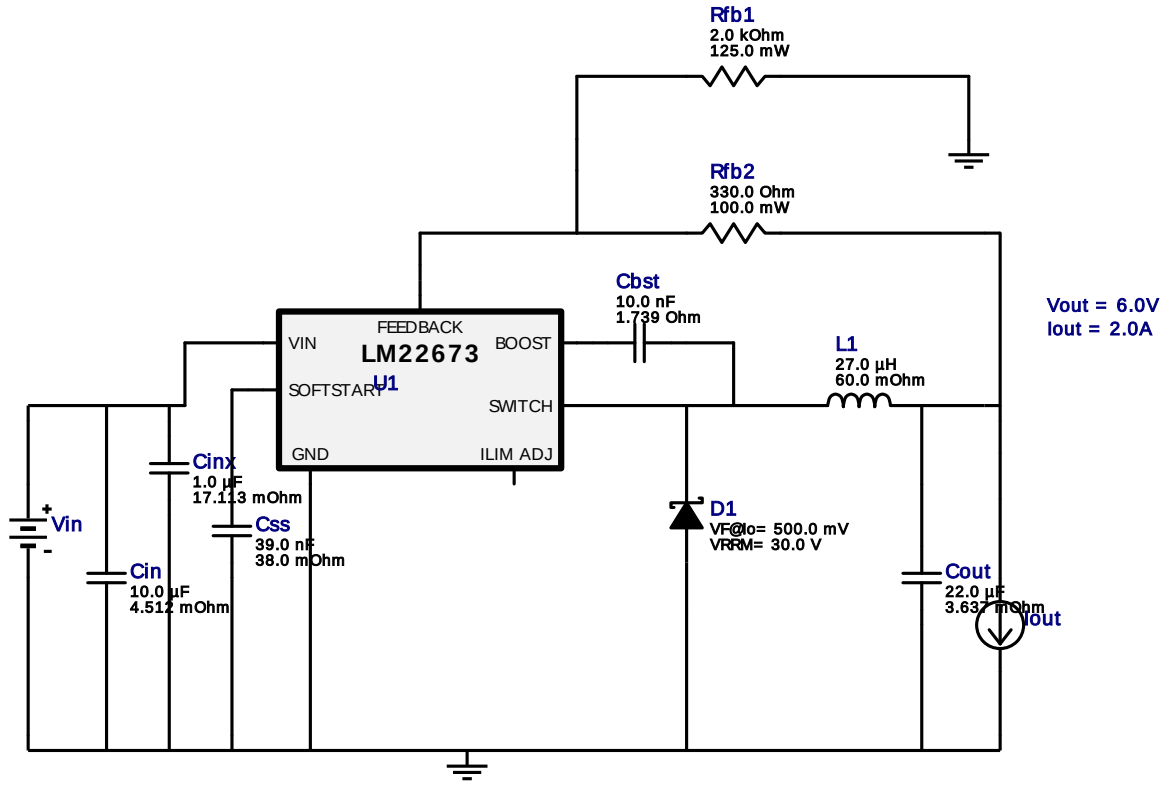
WEBENCH® Design Report

VinMin = 16.0V
VinMax = 18.0V
Vout = 6.0V
Iout = 2.0A

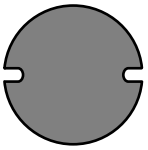
Device = LM22673MRE-5.0/NOPB
Topology = Buck
Created = 9/22/16 2:05:41 AM
BOM Cost = $2.76
BOM Count = 10
Total Pd = 1.43W

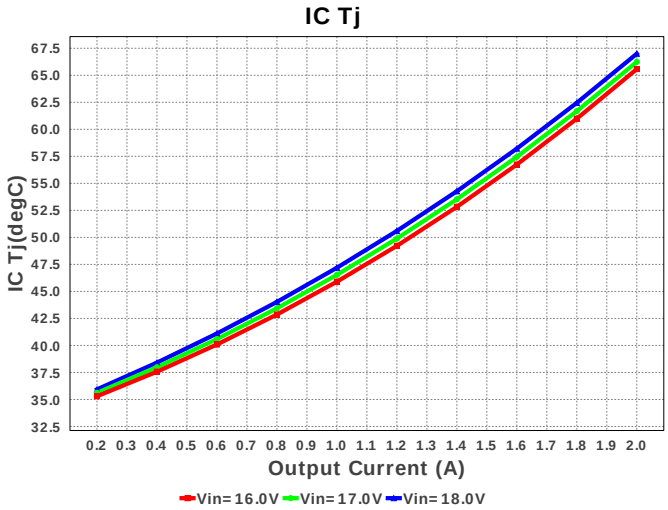
Design : 4800933/4 LM22673MRE-5.0/NOPB
LM22673MRE-5.0/NOPB 16.0V-18.0V to 6.00V @ 2.0A

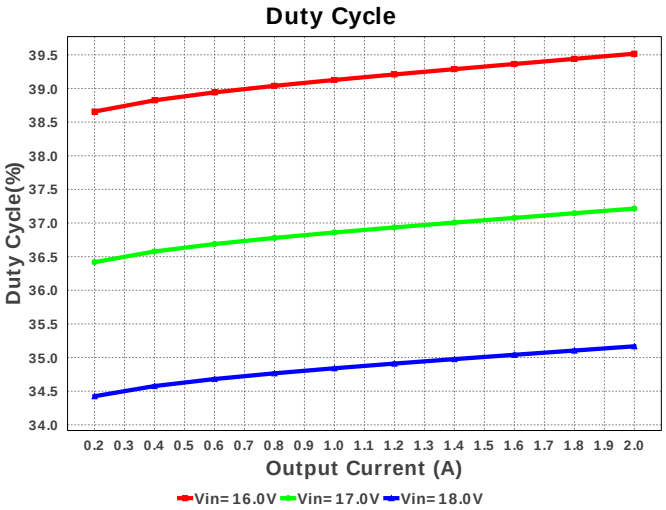


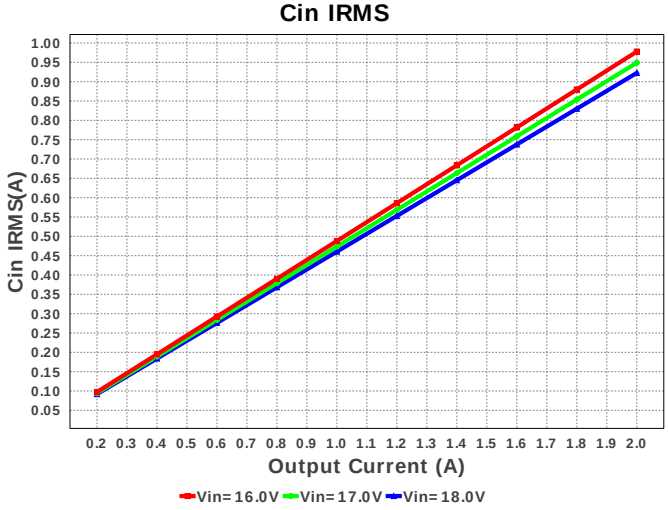
Electrical BOM

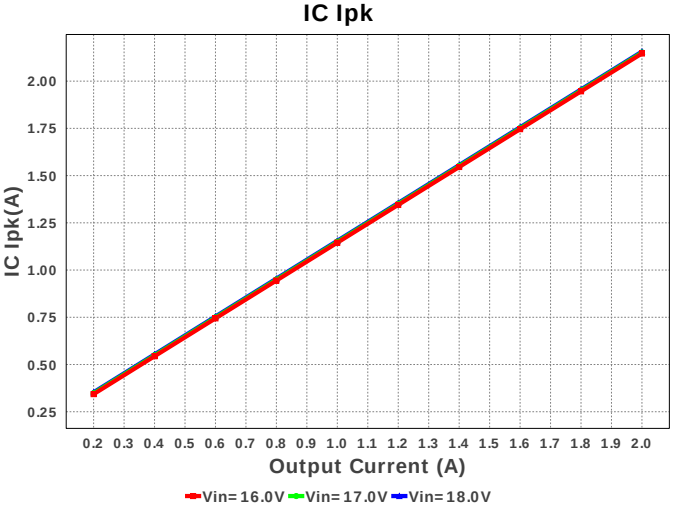
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	Kemet	C0805C103K5RACTU Series= X7R	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM31CR61E106KA12L Series= X5R	Cap= 10.0 uF ESR= 4.512 mOhm VDC= 25.0 V IRMS= 2.447 A	1	$0.05	1206_190 11 mm²
3.	Cinx	MuRata	GRM188R61E105KA12D Series= X5R	Cap= 1.0 uF ESR= 17.113 mOhm VDC= 25.0 V IRMS= 979.39 mA	1	$0.01	0603 5 mm²
4.	Cout	MuRata	GRM31CR61A226ME19L Series= X5R	Cap= 22.0 uF ESR= 3.637 mOhm VDC= 10.0 V IRMS= 3.56456 A	1	$0.08	1206_190 11 mm²
5.	Css	AVX	08055C393KAT2A Series= X7R	Cap= 39.0 nF ESR= 38.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	$0.02	0805 7 mm²
6.	D1	Diodes Inc.	B230A-13-F	VF@Io= 500.0 mV VRRM= 30.0 V	1	$0.09	SMA 37 mm²

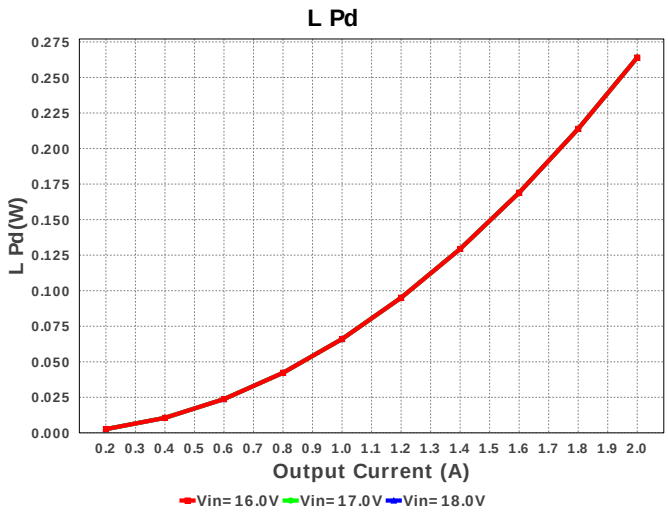
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	L1	Bourns	SDR1307-270ML	L= 27.0 µH DCR= 60.0 mOhm	1	$0.35	 SDR1307 227 mm²
8.	Rfb1	Panasonic	ERJ-6ENF2001V Series= ERJ-6E	Res= 2.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7 mm²
9.	Rfb2	Yageo America	RC0603FR-07330RL Series= ?	Res= 330.0 Ohm Power= 100.0 mW Tolerance= 1.0%	1	$0.01	 0603 5 mm²
10.	U1	Texas Instruments	LM22673MRE-5.0/NOPB	Switcher	1	$2.13	 MRA08B 56 mm²

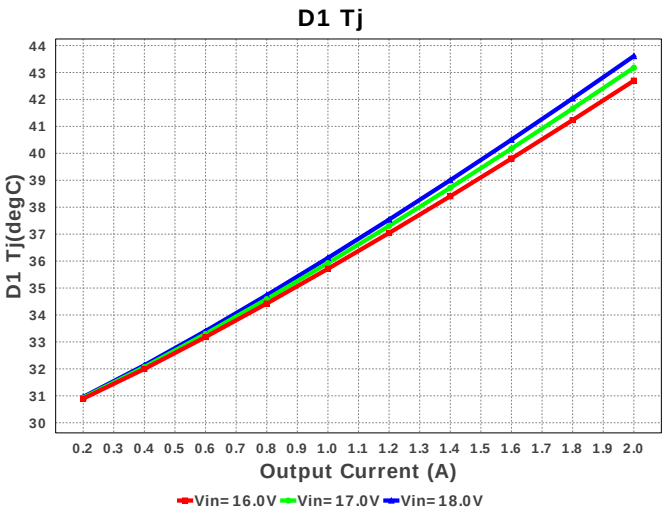


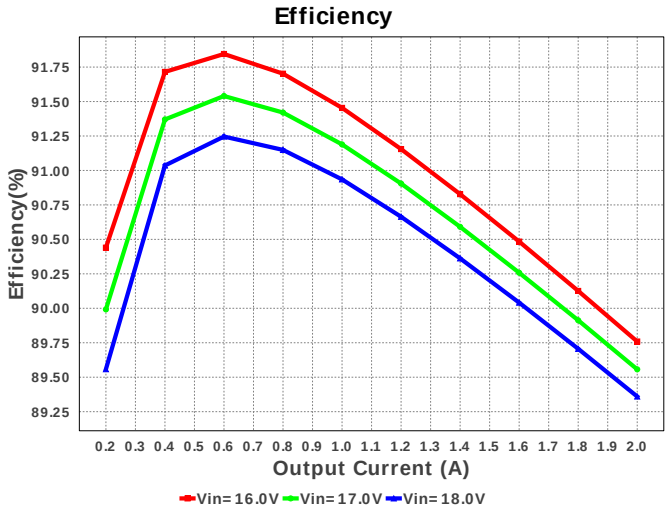


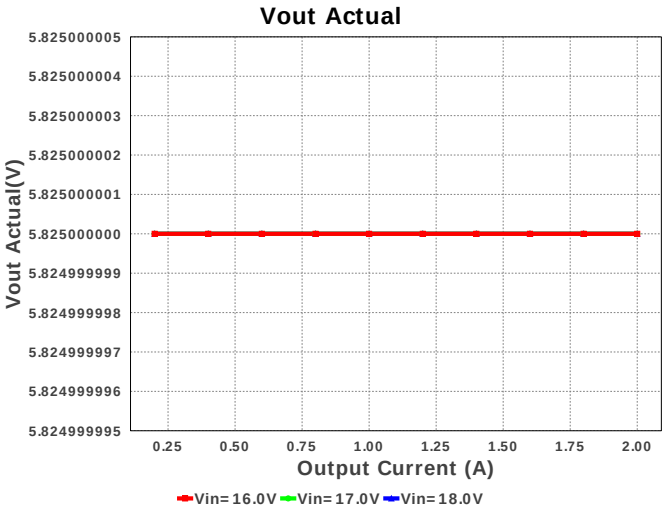


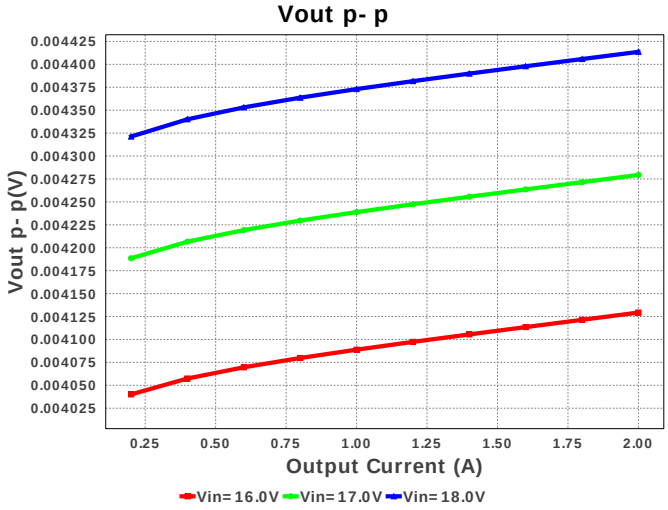


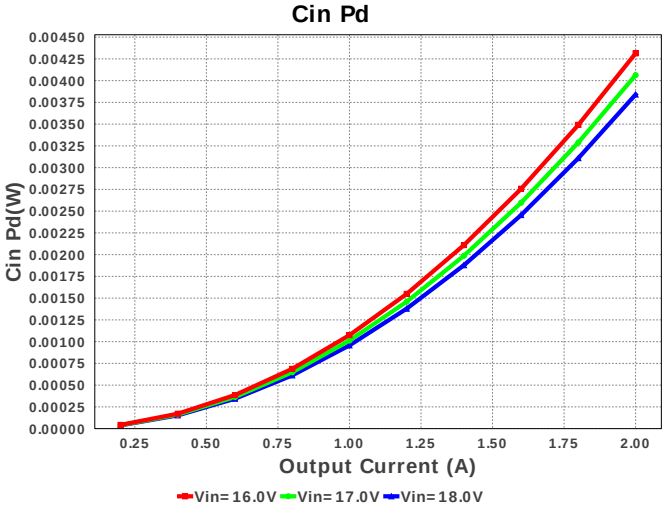


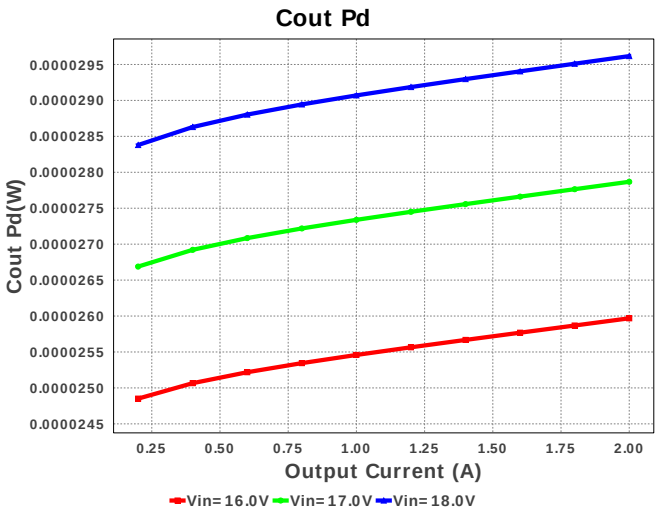


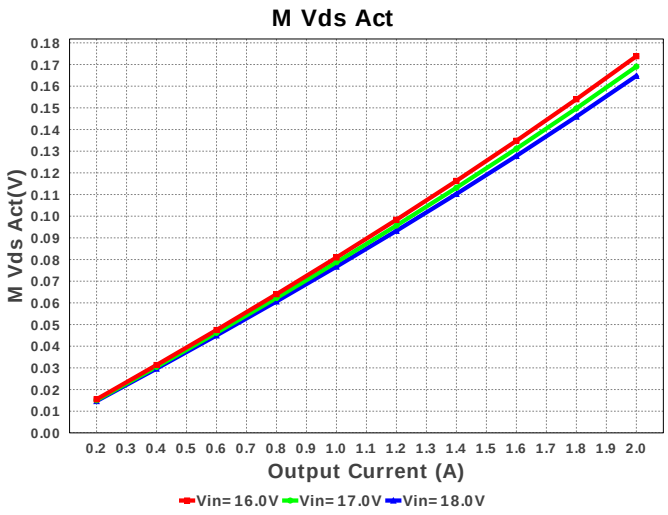


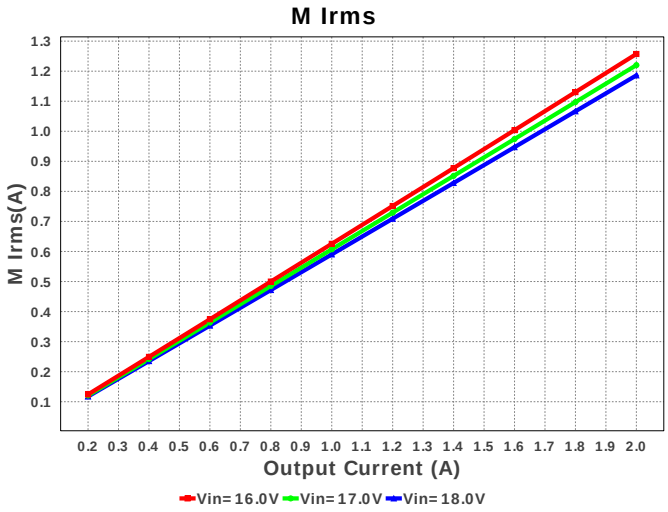


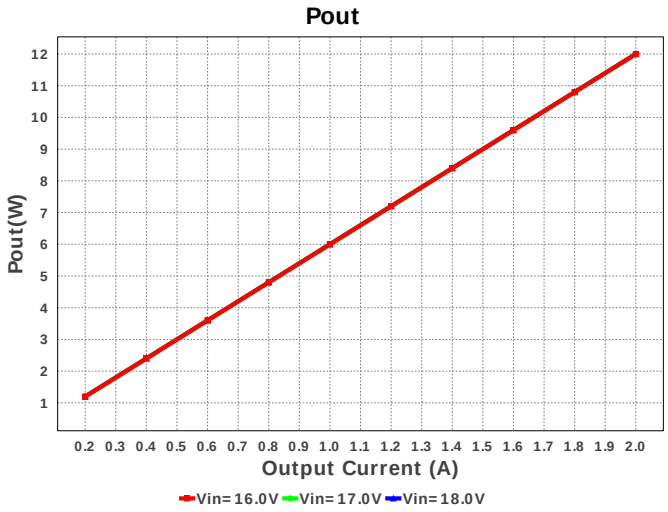


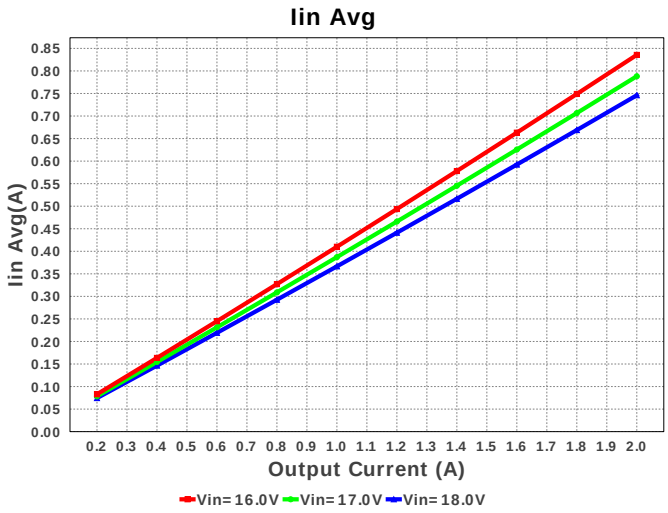


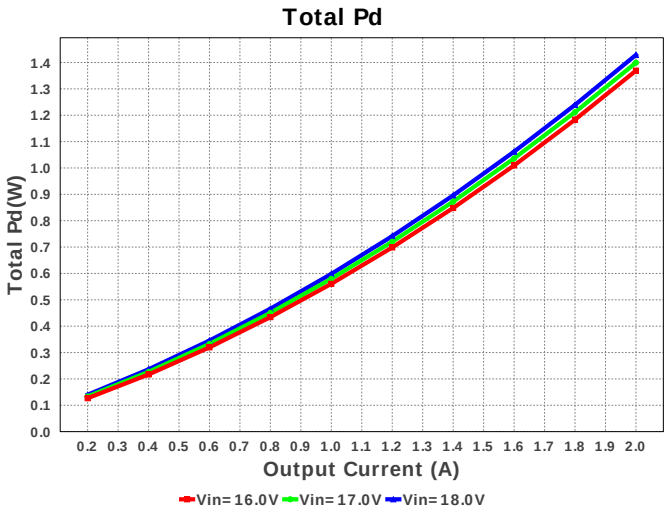


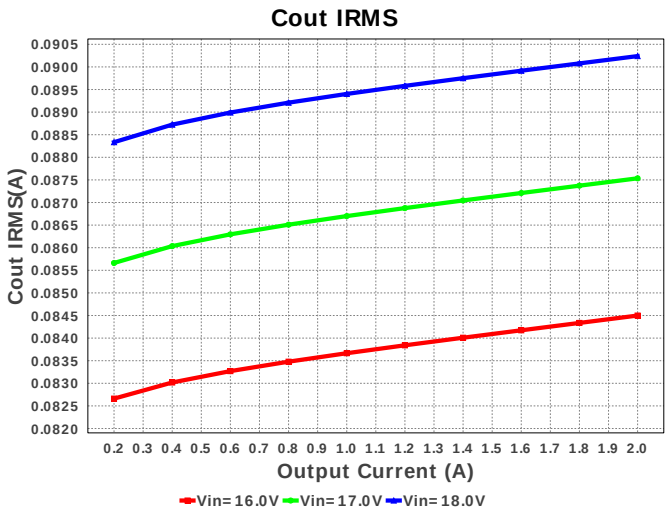


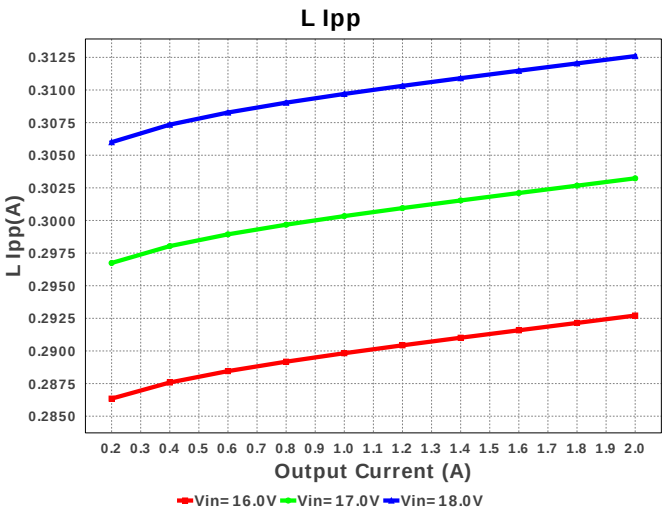


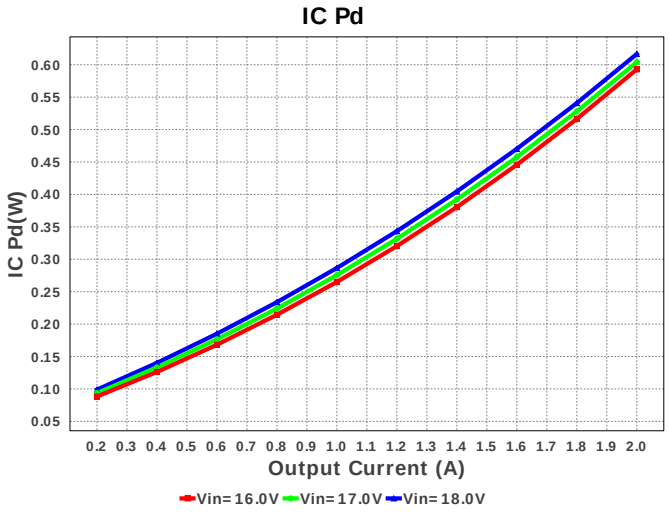


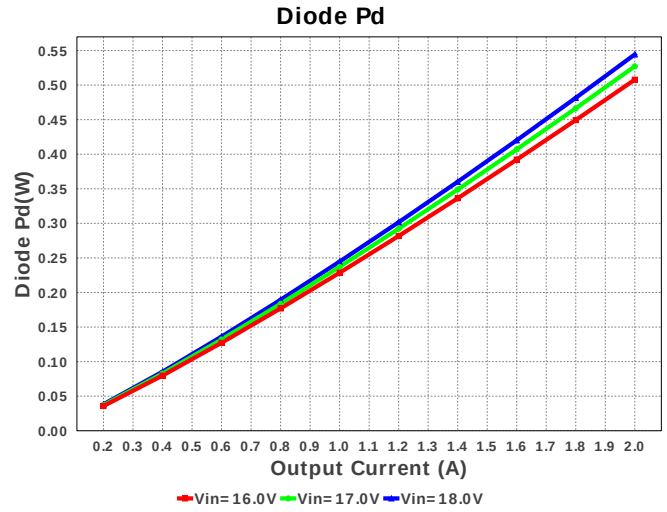












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	922.567 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	90.239 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.156 A	Current	Peak switch current in IC
4.	Iin Avg	746.04 mA	Current	Average input current
5.	L Ipp	312.6 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	1.186 A	Current	Q Iavg
7.	BOM Count	10	General	Total Design BOM count
8.	FootPrint	371.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	500.0 kHz	General	Switching frequency
10.	IC Tolerance	75.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	164.738 mV	General	Voltage drop across the MosFET
12.	Mode	CCM	General	Conduction Mode
13.	Pout	12.0 W	General	Total output power
14.	Total BOM	$2.76	General	Total BOM Cost
15.	D1 Tj	43.609 degC	Op_Point	D1 junction temperature
16.	Vout Actual	5.825 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
17.	Vout OP	6.0 V	Op_Point	Operational Output Voltage
18.	Cross Freq	65.751 kHz	Op_point	Bode plot crossover frequency
19.	Duty Cycle	35.167 %	Op_point	Duty cycle
20.	Efficiency	89.36 %	Op_point	Steady state efficiency
21.	IC Tj	66.995 degC	Op_point	IC junction temperature
22.	ICThetaJA	60.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	2.0 A	Op_point	Iout operating point
24.	Phase Marg	42.274 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	18.0 V	Op_point	Vin operating point
26.	Vout p-p	4.414 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	3.84 mW	Power	Input capacitor power dissipation
28.	Cout Pd	29.617 µW	Power	Output capacitor power dissipation
29.	Diode Pd	544.345 mW	Power	Diode power dissipation
30.	IC Pd	616.586 mW	Power	IC power dissipation
31.	L Pd	264.0 mW	Power	Inductor power dissipation

#	Name	Value	Category	Description
32.	Total Pd	1.429 W	Power	Total Power Dissipation
33.	Vout Tolerance	1.79 %		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	18.0	Maximum input voltage
3.	VinMin	16.0	Minimum input voltage
4.	Vout	6.0	Output Voltage
5.	base_pn	LM22673	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. Why WEBENCH recomends the 5.0 option for your 6.0V output: The internal compensation for the ADJ version of the LM22673 is optimized for output voltages below 5V. Therefore it is recommended that for outputs greater than 5V, the 5.0 option be used with an additional external resitive feedback divider. Part Description The LM22673 is a monolithic integrated circuit that provides all of the active functions for a step-down (buck) switching regulator capable of driving up to 3.0A loads with excellent line and load regulation characteristics. High efficiency (>90%) is obtained through the use of a low ON-resistance N-channel MOSFET.

2. **LM22673** Product Folder : http://www.ti.com/product/LM22673 : contains the data sheet and other resources.