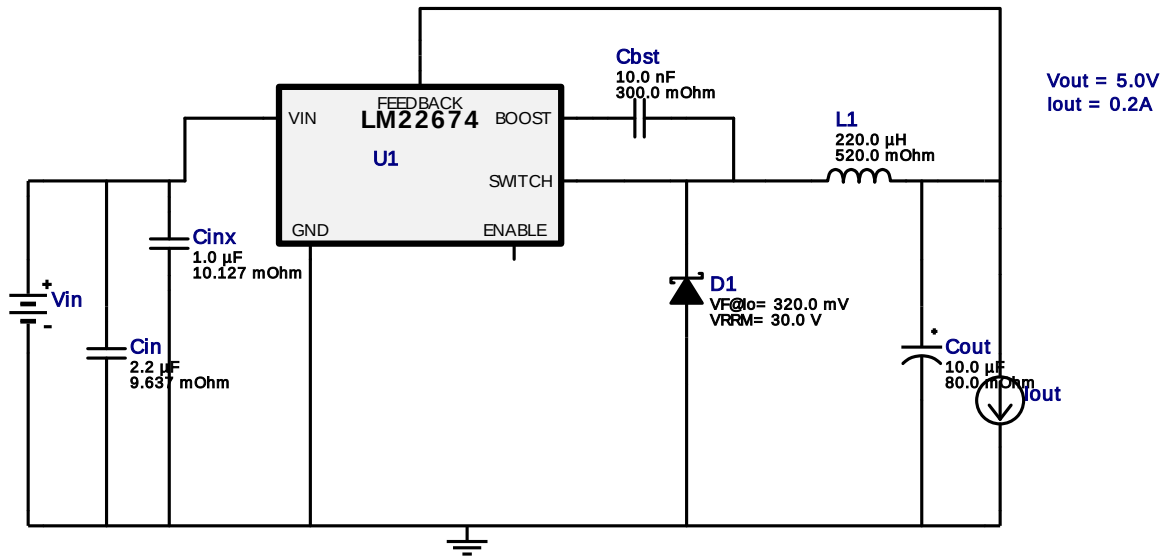
TEXAS INSTRUMENTS

WEBENCH® Design Report

VinMin = 12.0V
VinMax = 12.0V
Vout = 5.0V
Iout = 0.2A

Device = LM22674MRE-5.0/NOPB
Topology = Buck
Created = 9/4/16 8:32:20 AM
BOM Cost = $2.47
BOM Count = 7
Total Pd = 0.11W

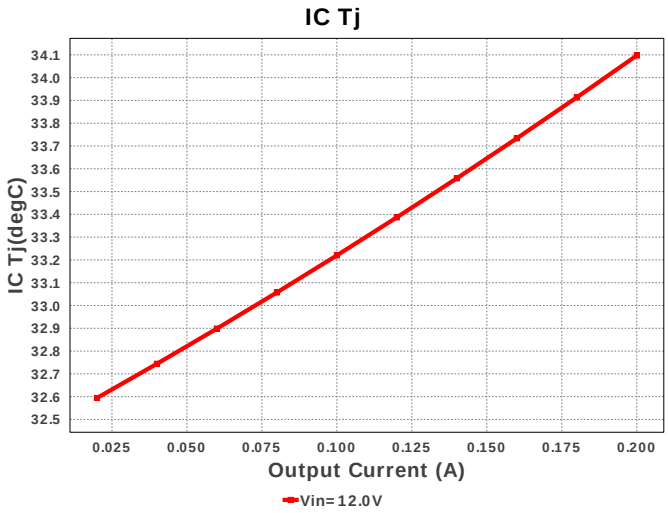
Design : 4009018/156 LM22674MRE-5.0/NOPB
LM22674MRE-5.0/NOPB 12.0V-12.0V to 5.00V @ 0.2A

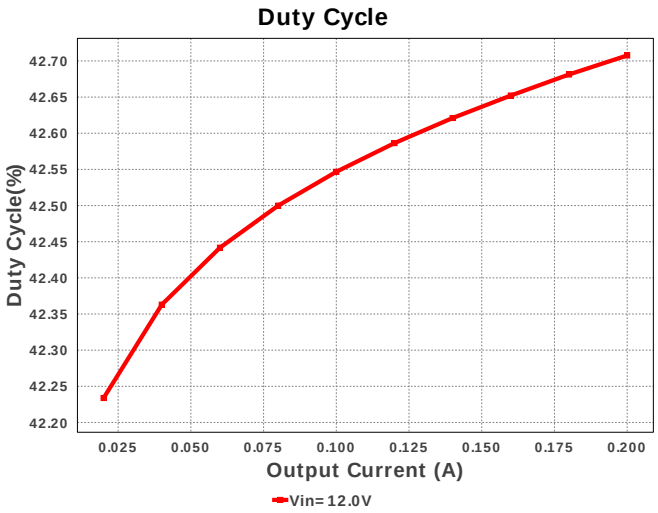


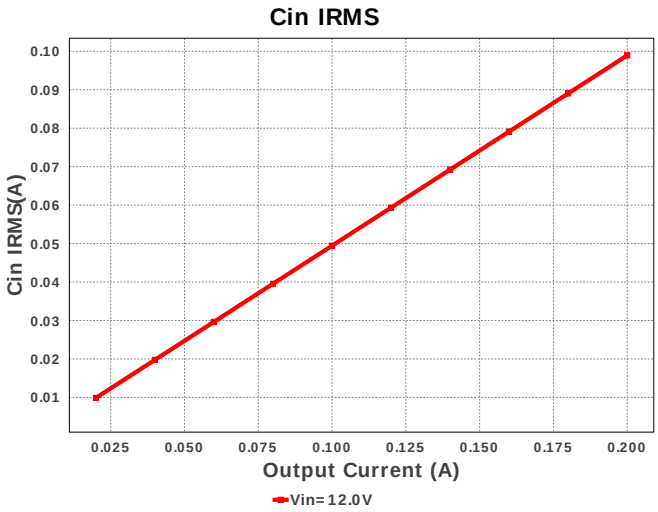
Electrical BOM

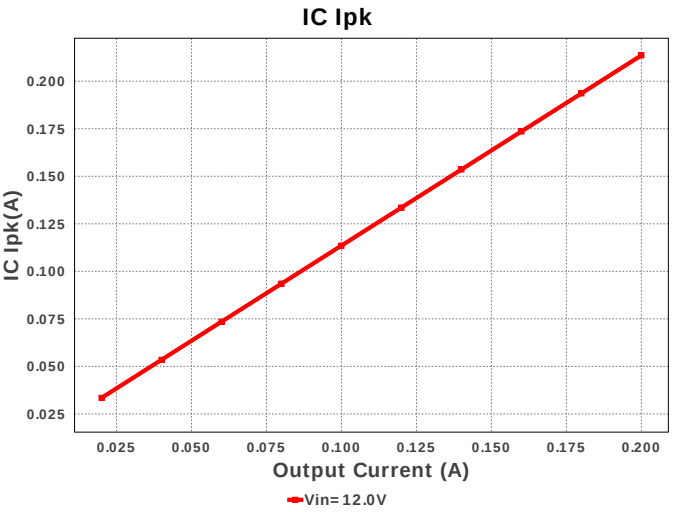
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbst	MuRata	GRM188R71E103KA01D Series= X7R	Cap= 10.0 nF ESR= 300.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm²
2.	Cin	MuRata	GRM188R61C225KE15D Series= X5R	Cap= 2.2 uF ESR= 9.637 mOhm VDC= 16.0 V IRMS= 1.20373 A	1	$0.02	0603 5 mm²
3.	Cinx	MuRata	GRM188R61C105KA93D Series= X5R	Cap= 1.0 uF ESR= 10.127 mOhm VDC= 16.0 V IRMS= 994.63 mA	1	$0.01	0603 5 mm²
4.	Cout	Panasonic	12TPC10M Series= ?	Cap= 10.0 uF ESR= 80.0 mOhm VDC= 12.5 V IRMS= 800.0 mA	1	$0.35	CAPSMT_6_B1G 17 mm²
5.	D1	Toshiba	CMS06	VF@Io= 320.0 mV VRRM= 30.0 V	1	$0.19	M-FLAT 19 mm²
6.	L1	TDK	SLF7045T-221MR33-PF	L= 220.0 µH DCR= 520.0 mOhm	1	$0.45	SLF7045 81 mm²

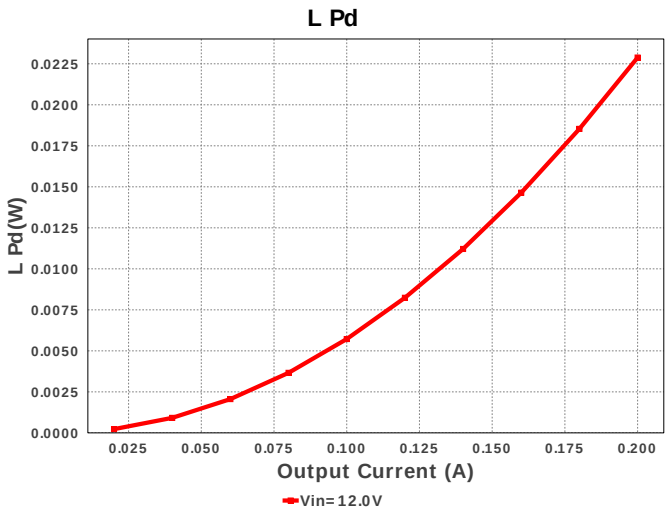
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	U1	Texas Instruments	LM22674MRE-5.0/NOPB	Switcher	1	$1.44	 MRA08B 56 mm^2

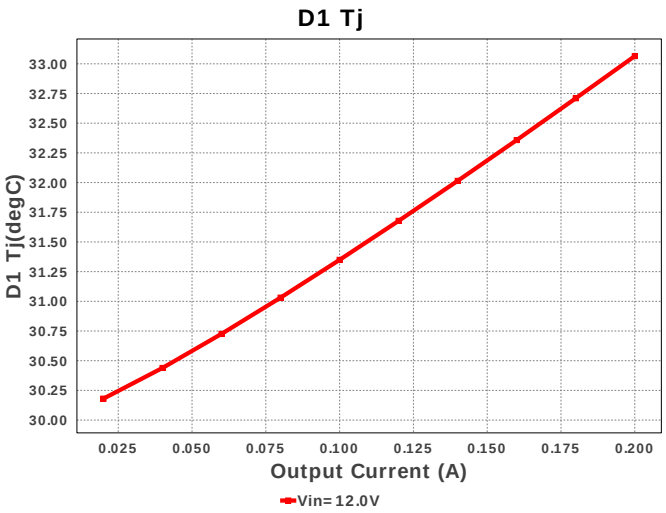


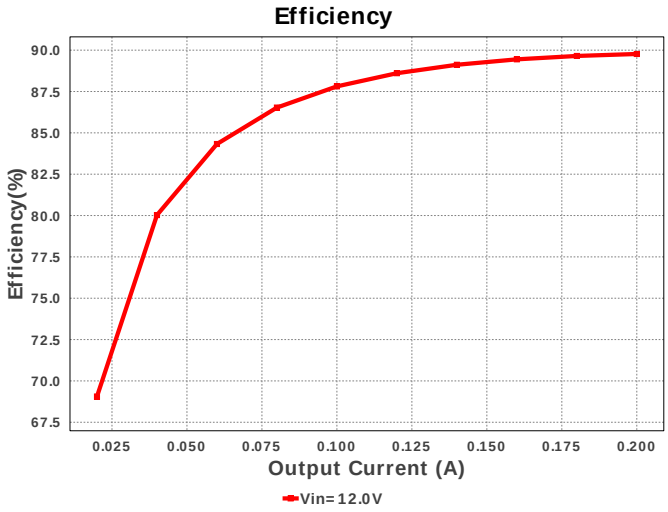


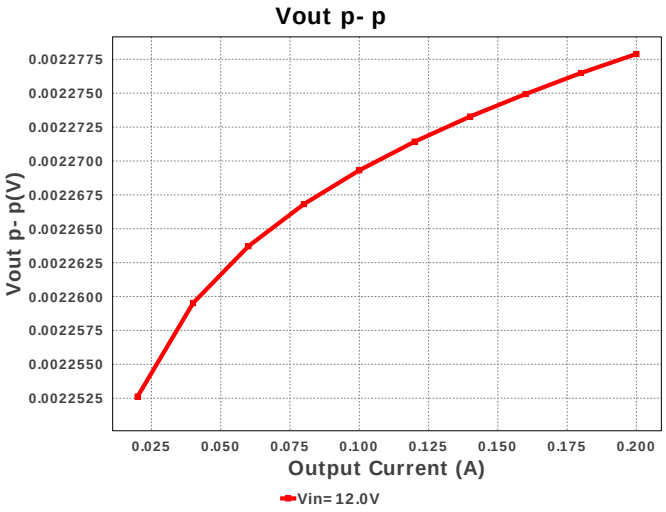


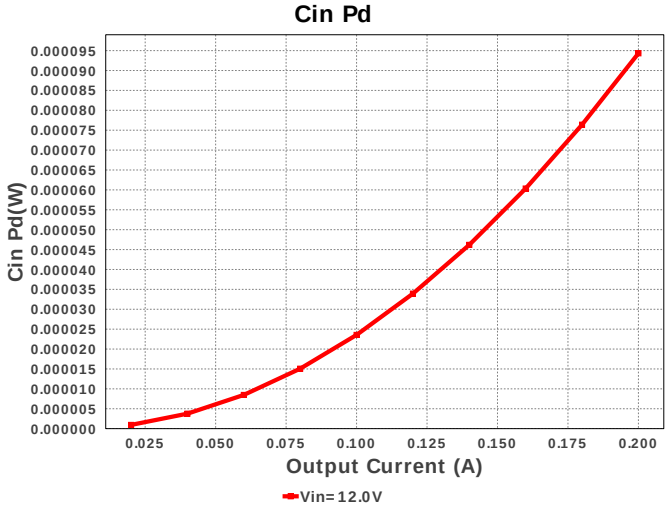


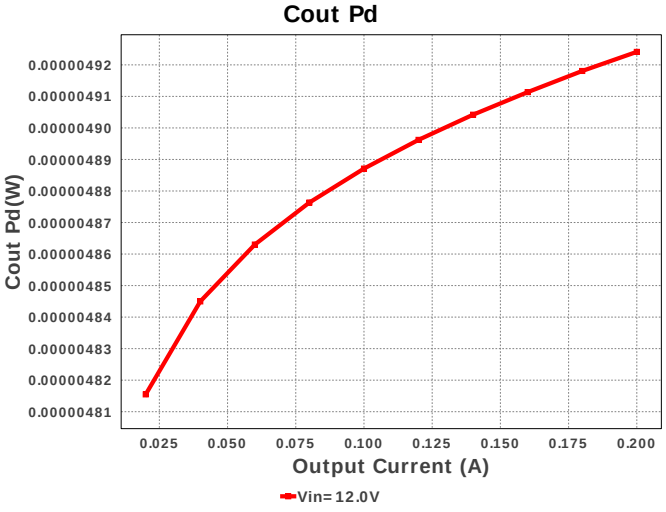


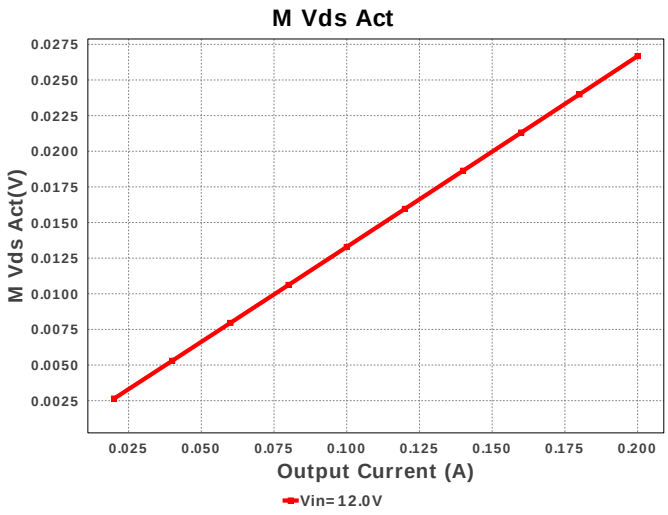


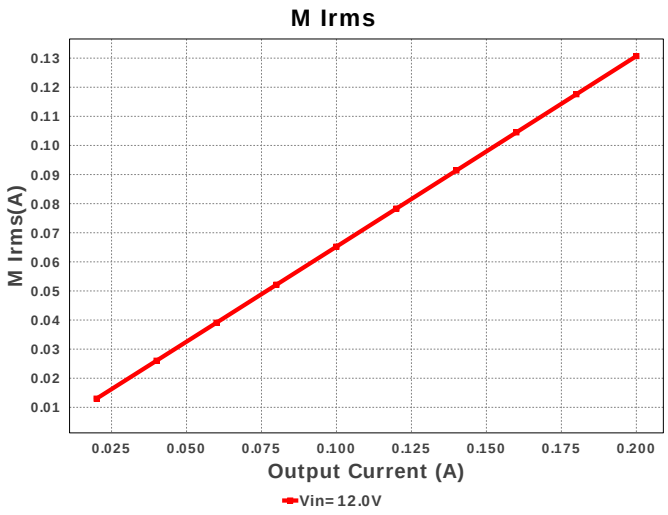


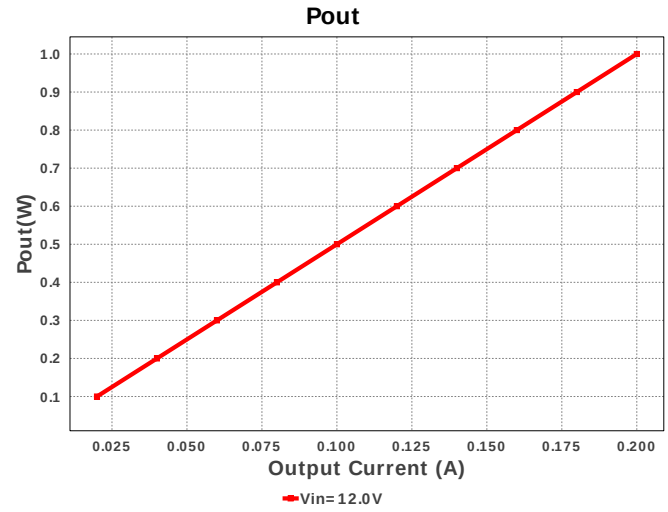


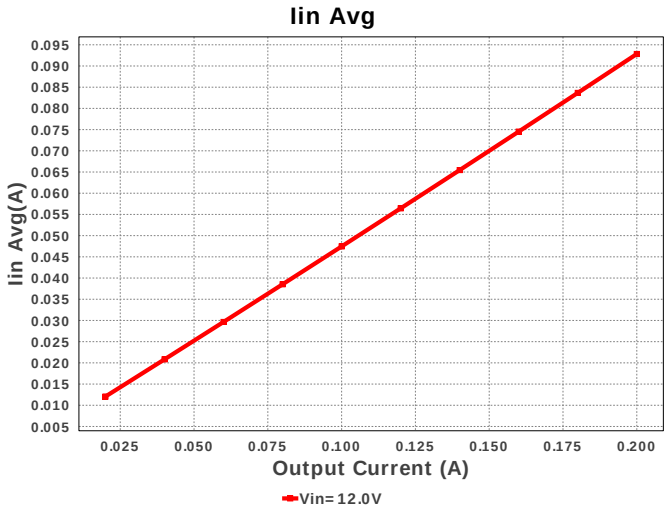


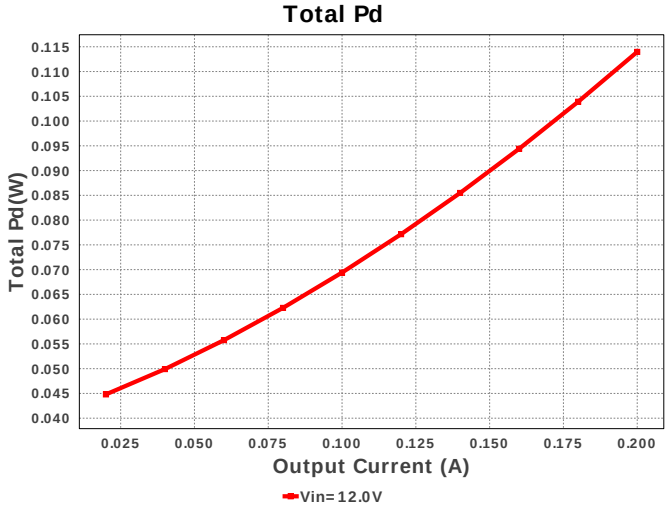


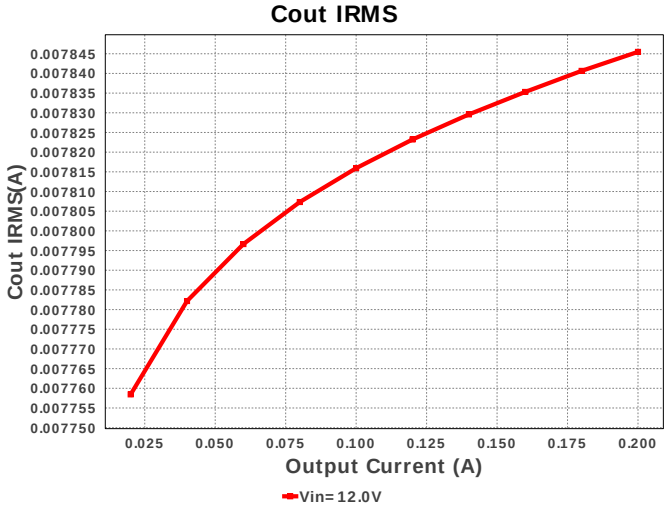


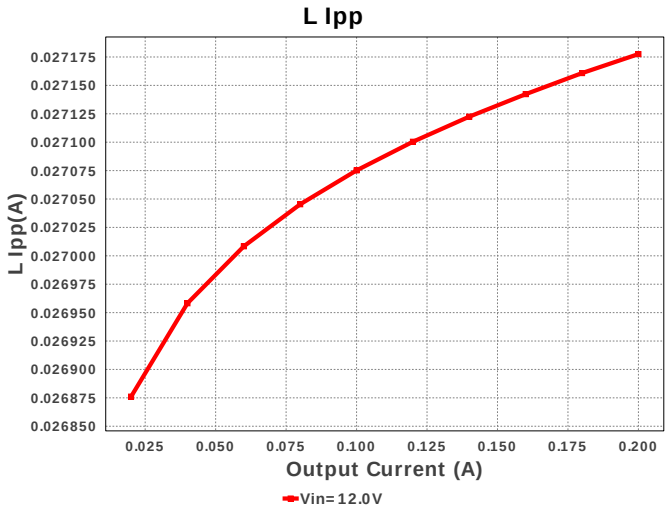


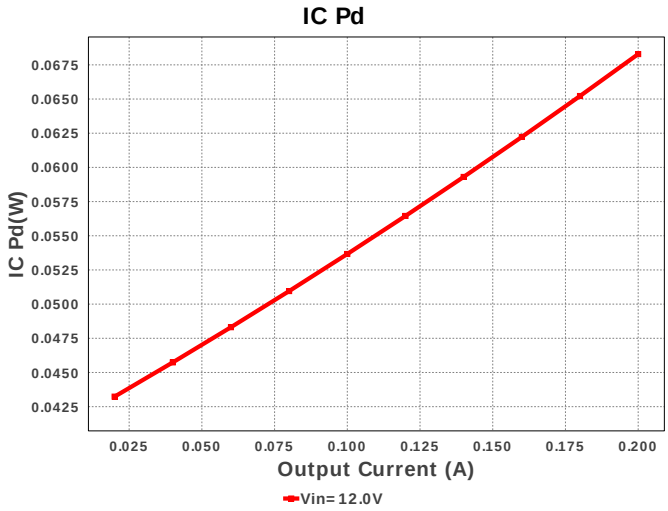


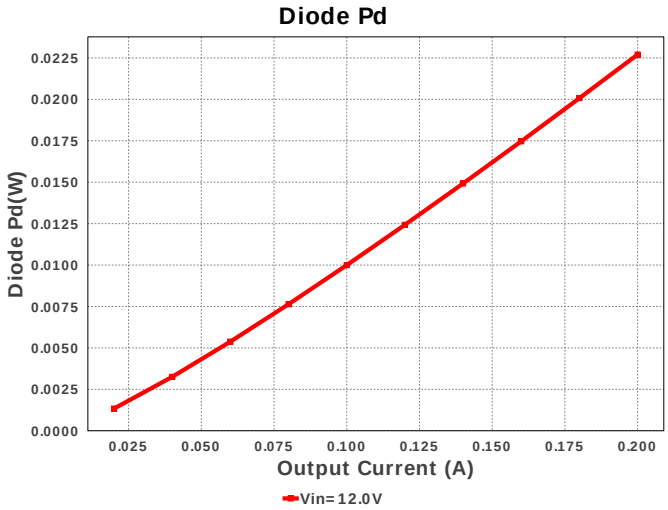












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	98.931 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	7.845 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	213.589 mA	Current	Peak switch current in IC
4.	Iin Avg	92.831 mA	Current	Average input current
5.	L Ipp	27.178 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	130.702 mA	Current	MOSFET RMS current
7.	BOM Count	7	General	Total Design BOM count
8.	FootPrint	187.0 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	26.675 mV	General	Voltage drop across the MosFET
12.	Mode	CCM	General	Conduction Mode
13.	Pout	1.0 W	General	Total output power
14.	Total BOM	$2.47	General	Total BOM Cost
15.	D1 Tj	33.065 degC	Op_Point	D1 junction temperature
16.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	23.19 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	42.708 %	Op_point	Duty cycle
19.	Efficiency	89.769 %	Op_point	Steady state efficiency
20.	IC Tj	34.097 degC	Op_point	IC junction temperature
21.	ICThetaJA	60.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	200.0 mA	Op_point	Iout operating point
23.	Phase Marg	49.081 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	12.0 V	Op_point	Vin operating point
25.	Vout p-p	2.278 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	94.32 µW	Power	Input capacitor power dissipation
27.	Cout Pd	4.924 µW	Power	Output capacitor power dissipation
28.	Diode Pd	22.703 mW	Power	Diode power dissipation
29.	IC Pd	68.287 mW	Power	IC power dissipation
30.	L Pd	22.88 mW	Power	Inductor power dissipation
31.	Total Pd	113.97 mW	Power	Total Power Dissipation

#	Name	Value	Category	Description
32.	Vout Tolerance	1.5 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	200.0 m	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage
3.	VinMin	12.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	LM22674	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. Part Description The LM22674 is a monolithic integrated circuit that provides all of the active functions for a step-down (buck) switching regulator capable of driving up to 0.5A 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. LM22674 Product Folder : http://www.ti.com/product/LM22674 : contains the data sheet and other resources.