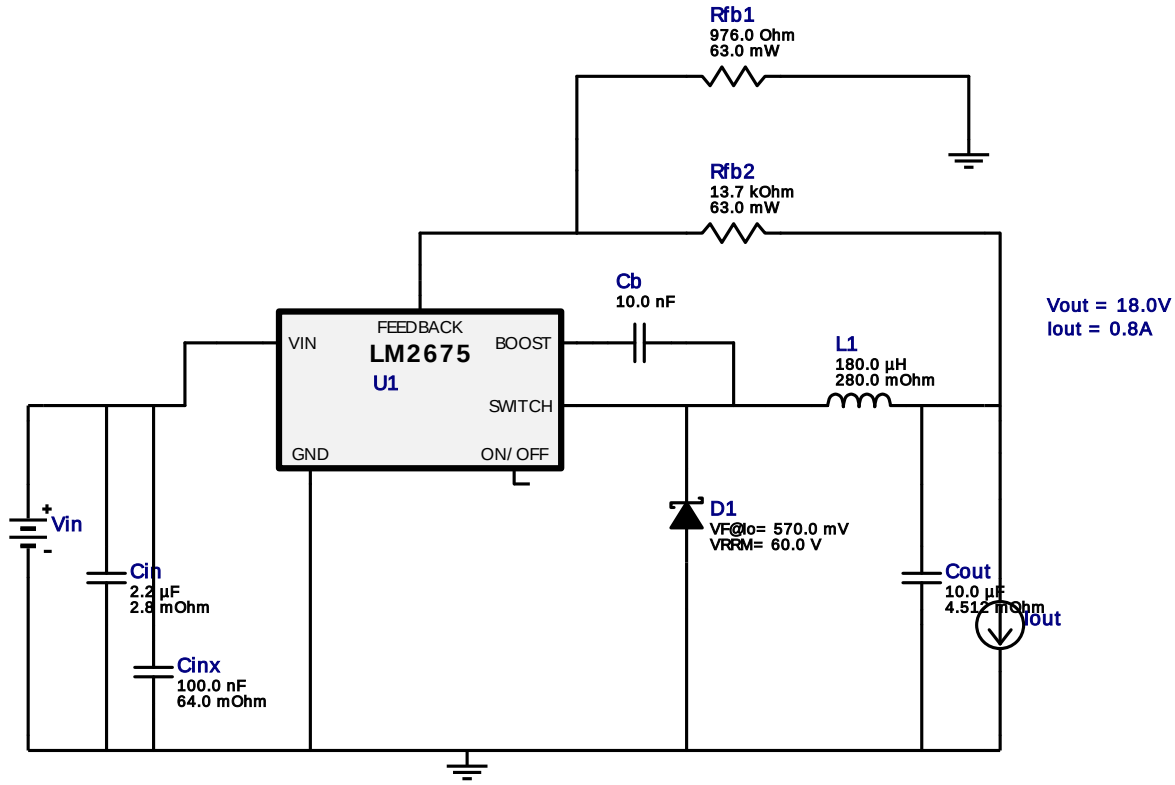
WEBENCH® Design Report

VinMin = 25.0V
VinMax = 40.0V
Vout = 18.0V
Iout = 0.8A

Device = LM2675MX-ADJ/NOPB
Topology = Buck
Created = 12/8/15 10:08:45 PM
BOM Cost = $2.28
BOM Count = 9
Total Pd = 0.76W

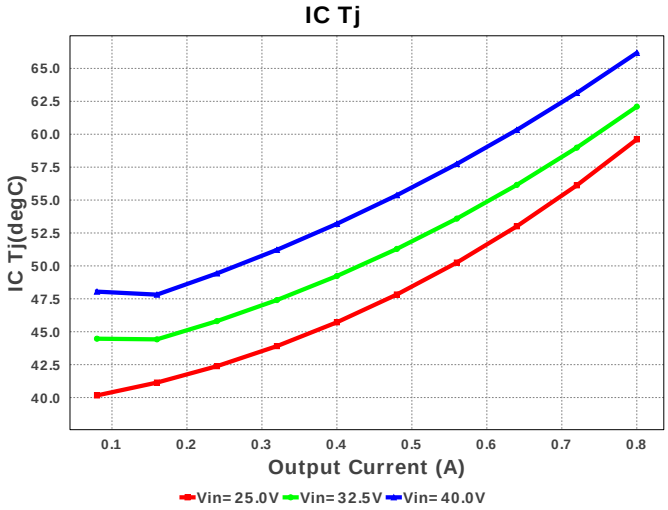
Design : 1114770/187 LM2675MX-ADJ/NOPB
LM2675MX-ADJ/NOPB 25.0V-40.0V to 18.00V @ 0.8A

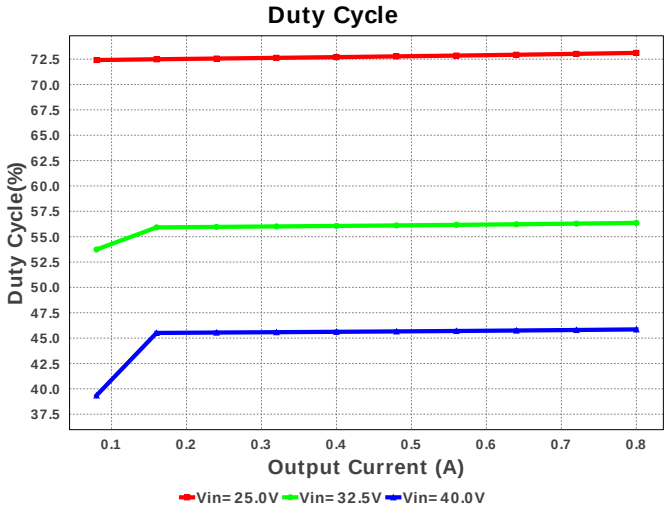


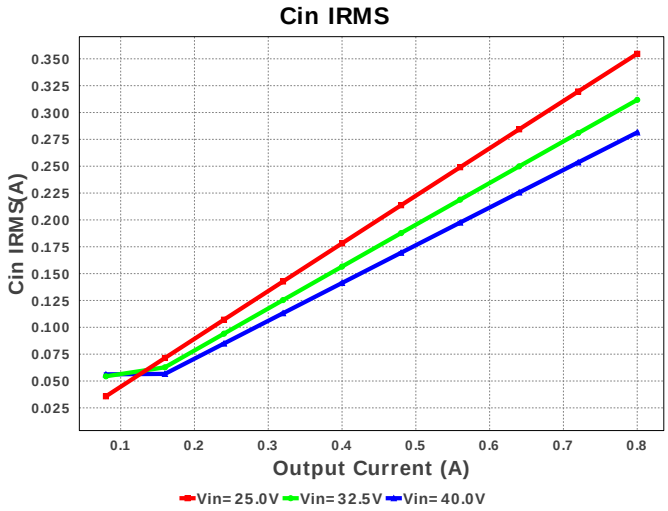
Electrical BOM

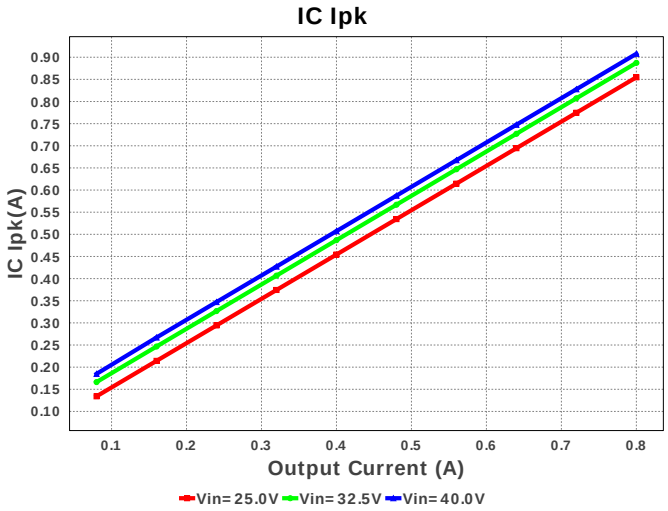
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cb	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cin	TDK	C3225X7R2A225K230AB Series= X7R	Cap= 2.2 uF ESR= 2.8 mOhm VDC= 100.0 V IRMS= 9.8247 A	1	$0.19	1210 15 mm²
3.	Cinx	Kemet	C0805C104K5RACTU 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	MuRata	GRM31CR61E106KA12L Series= X5R	Cap= 10.0 uF ESR= 4.512 mOhm VDC= 25.0 V IRMS= 2.447 A	1	$0.06	1206_190 11 mm²
5.	D1	NXP Semiconductor	PMEG6010CEH,115	VF@Io= 570.0 mV VRRM= 60.0 V	1	$0.04	SOD-123F 12 mm²
6.	L1	Bourns	SDR1307-181KL	L= 180.0 µH DCR= 280.0 mOhm	1	$0.35	SDR1307 227 mm²

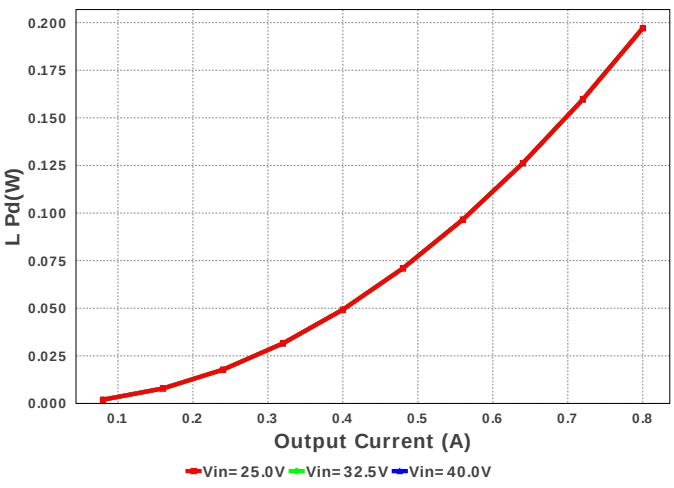
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	Rfb1	Vishay-Dale	CRCW0402976RFKED Series= CRCW..e3	Res= 976.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	Rfb2	Vishay-Dale	CRCW040213K7FKED Series= CRCW..e3	Res= 13.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	U1	Texas Instruments	LM2675MX-ADJ/NOPB	Switcher	1	$1.60	M08A 55 mm²

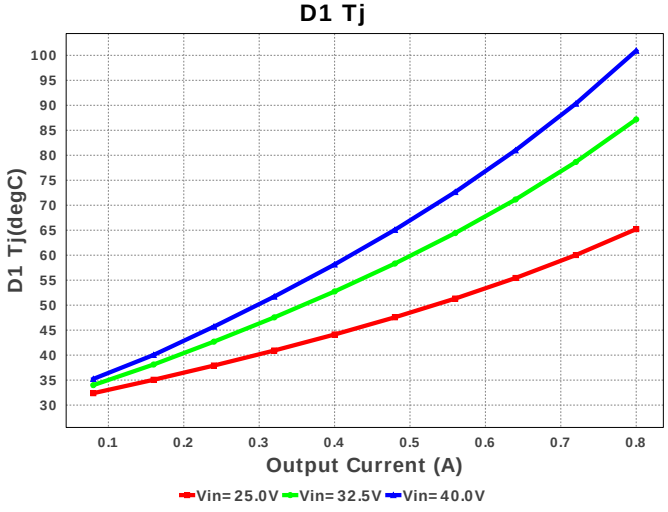




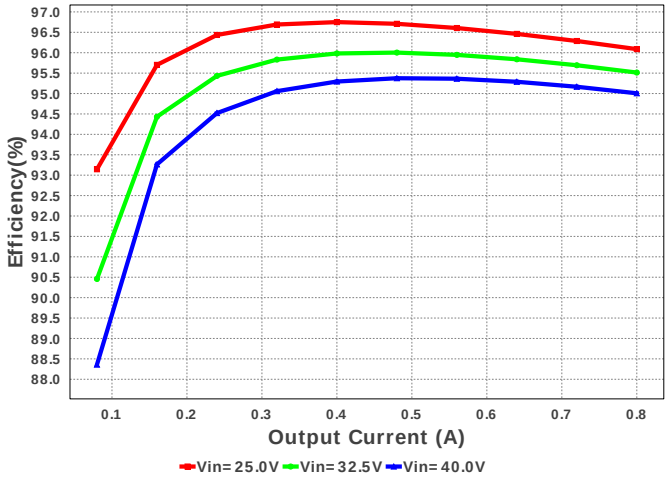




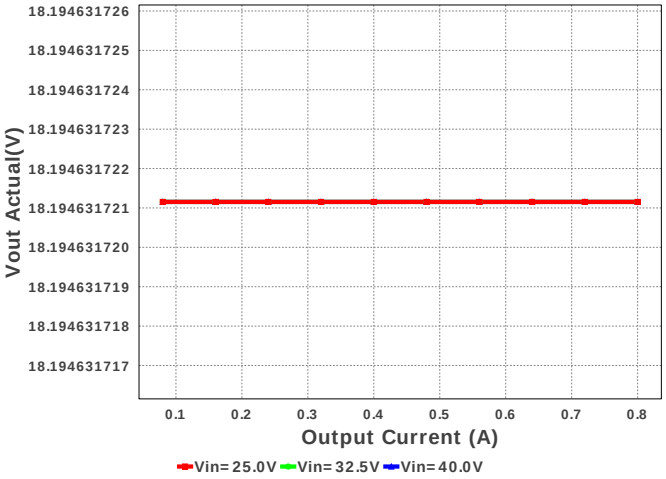




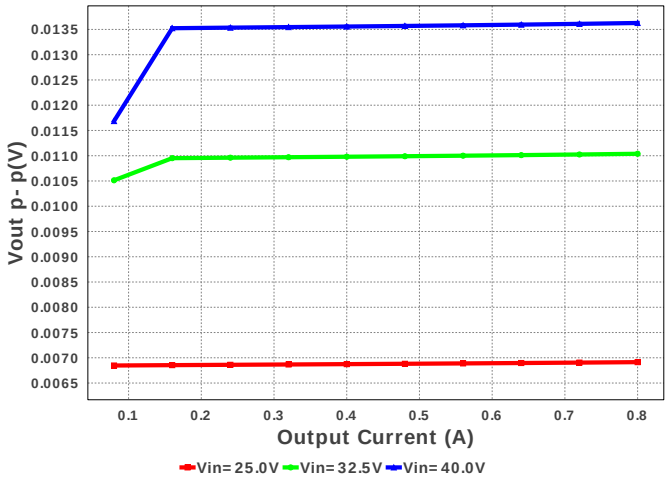
Efficiency



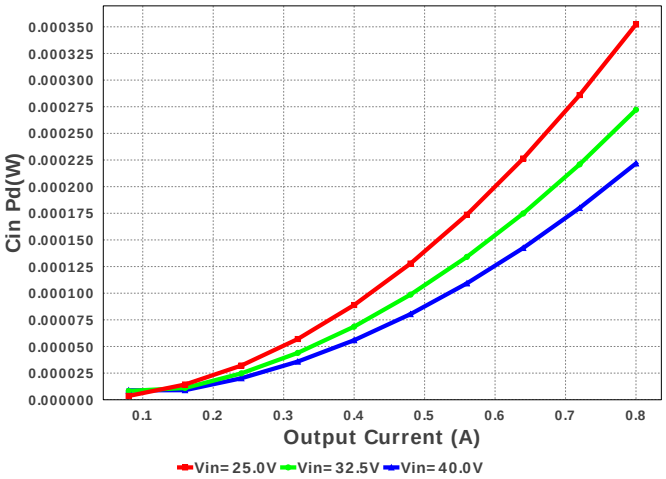
Vout Actual



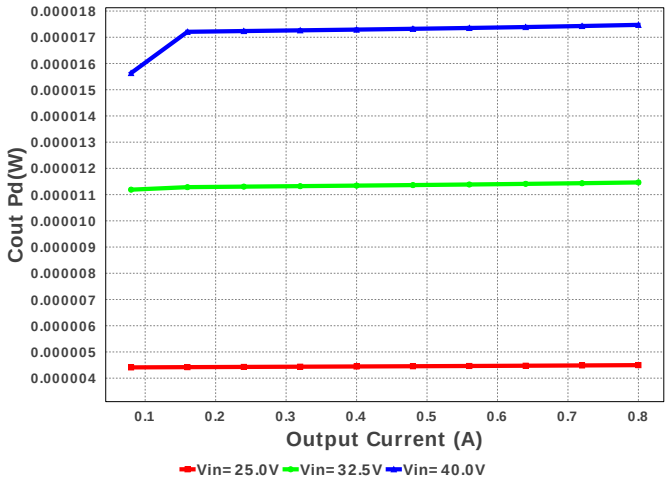
Vout p- p



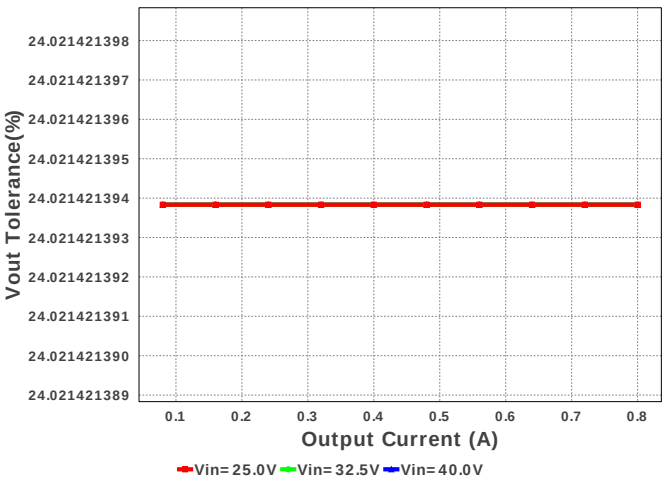
Cin Pd

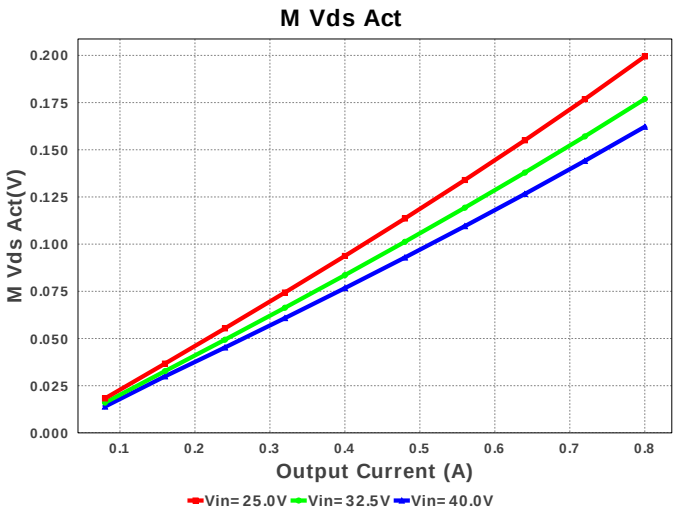


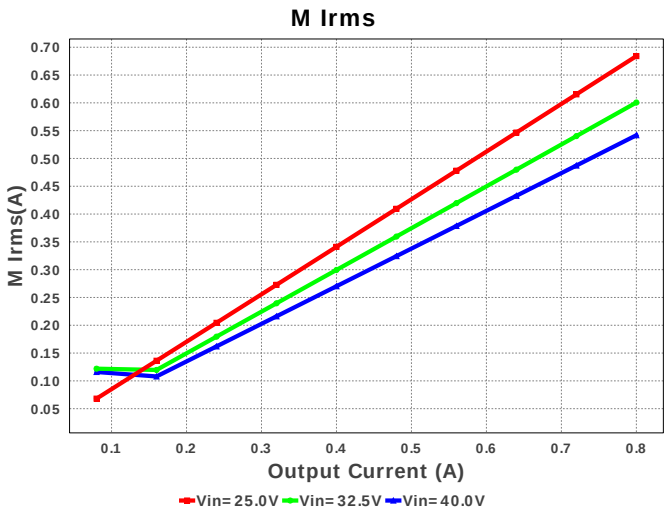
Cout Pd

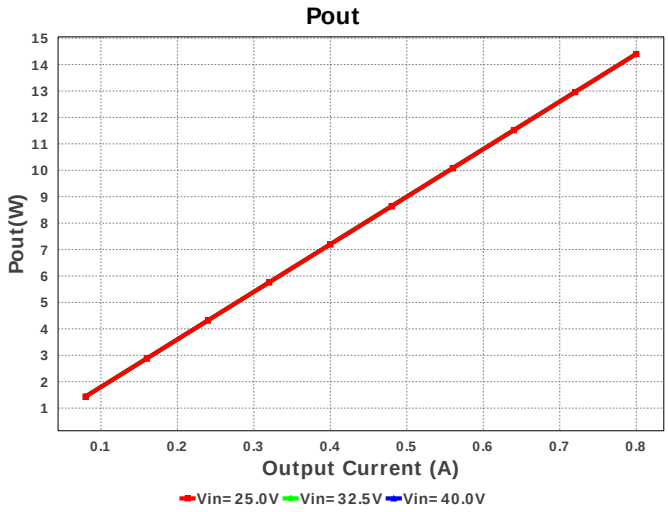


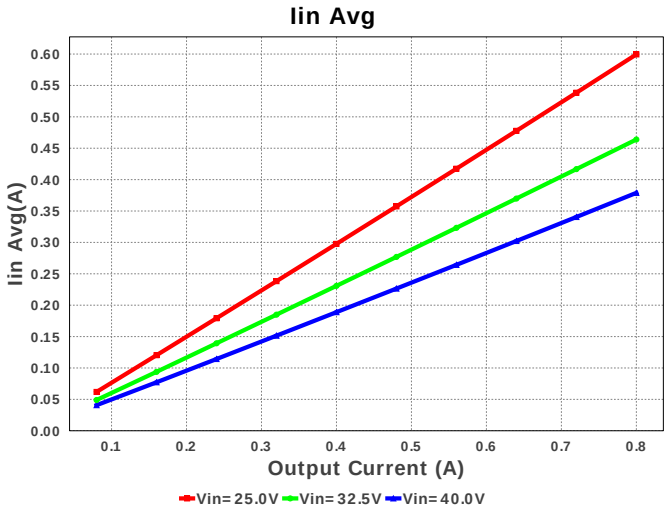
Vout Tolerance

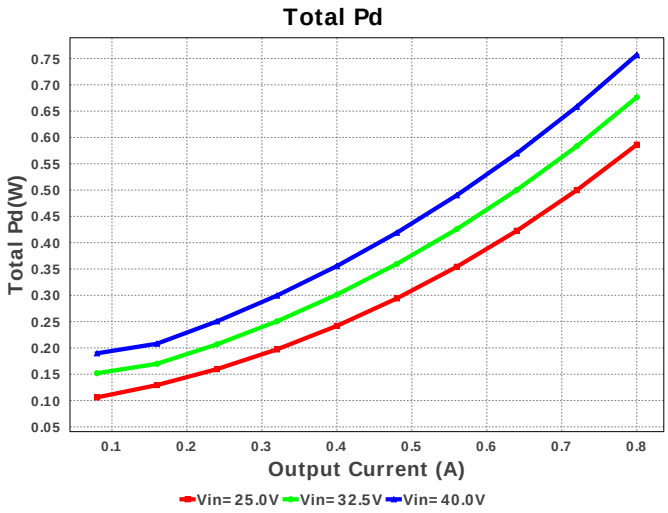


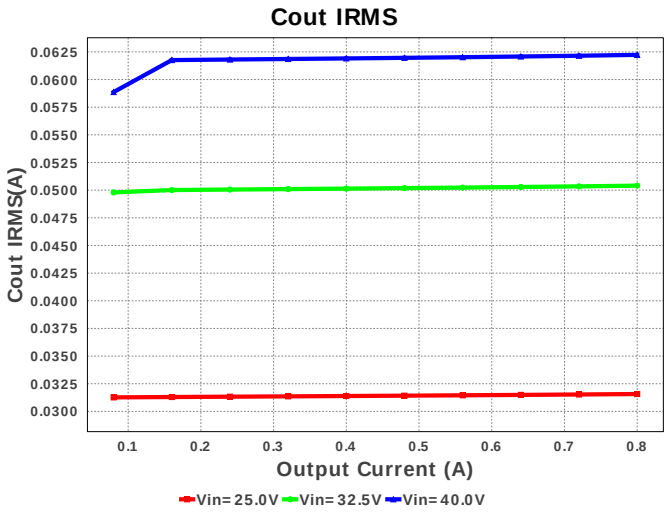


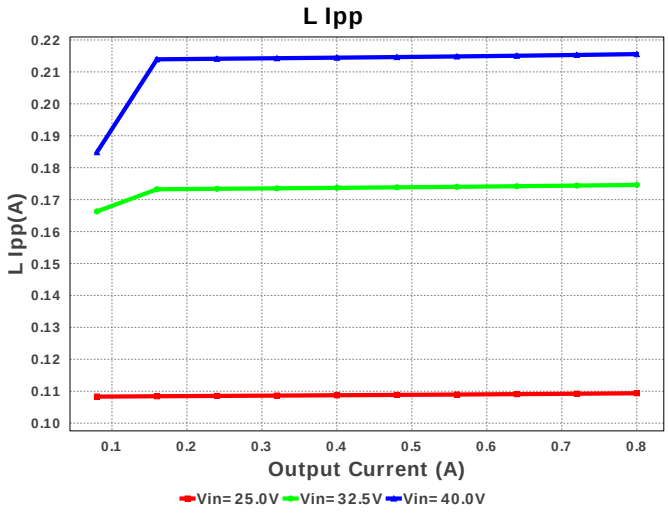


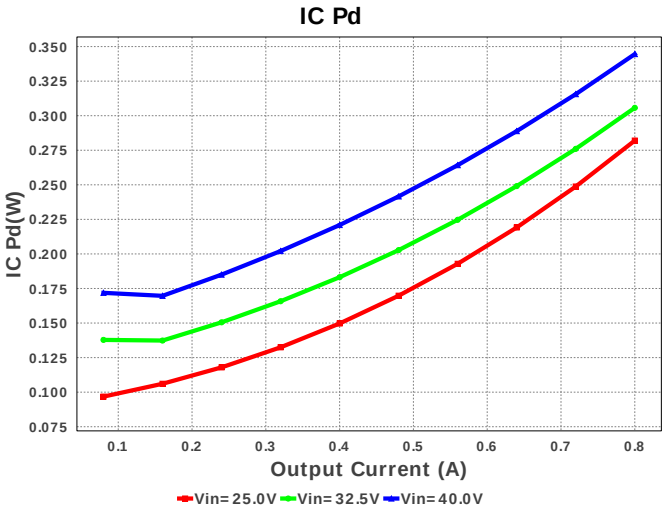


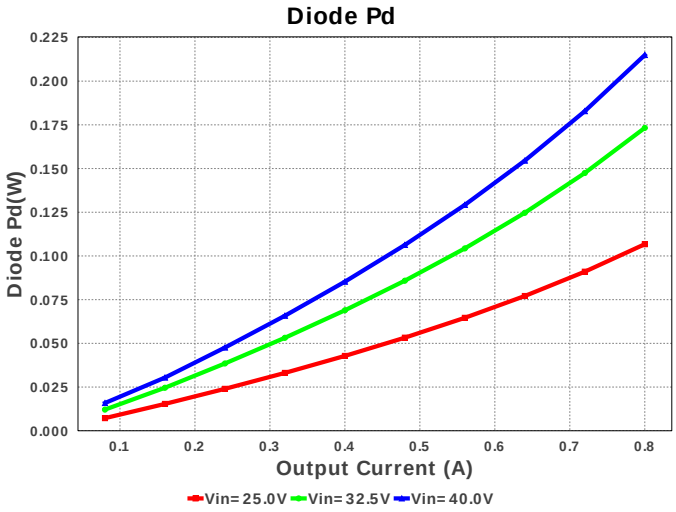












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	281.45 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	62.23 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	907.785 mA	Current	Peak switch current in IC
4.	Iin Avg	378.92 mA	Current	Average input current
5.	L Ipp	215.57 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	541.746 mA	Current	Q Iavg
7.	BOM Count	9	General	Total Design BOM count
8.	FootPrint	339.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	260.0 kHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	162.207 mV	General	Voltage drop across the MosFET
12.	Pout	14.4 W	General	Total output power
13.	Total BOM	$2.28	General	Total BOM Cost
14.	D1 Tj	100.932 degC	Op_Point	D1 junction temperature
15.	Vout Actual	18.195 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	18.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	18.231 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	45.858 %	Op_point	Duty cycle
19.	Efficiency	95.006 %	Op_point	Steady state efficiency
20.	IC Tj	66.179 degC	Op_point	IC junction temperature
21.	ICThetaJA	105.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	800.0 mA	Op_point	Iout operating point
23.	Phase Marg	45.39 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	40.0 V	Op_point	Vin operating point
25.	Vout p-p	13.628 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	221.8 µW	Power	Input capacitor power dissipation
27.	Cout Pd	17.473 µW	Power	Output capacitor power dissipation
28.	Diode Pd	214.945 mW	Power	Diode power dissipation
29.	IC Pd	344.558 mW	Power	IC power dissipation
30.	L Pd	197.12 mW	Power	Inductor power dissipation
31.	Total Pd	756.931 mW	Power	Total Power Dissipation

#	Name	Value	Category	Description
32.	Vout Tolerance	24.021 %	Unknown	Vout Tolerance based on IC Tolerance and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	800.0 m	Maximum Output Current
2.	VinMax	40.0	Maximum input voltage
3.	VinMin	25.0	Minimum input voltage
4.	Vout	18.0	Output Voltage
5.	base_pn	LM2675	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM2675** Product Folder : http://www.ti.com/product/LM2675 : contains the data sheet and other resources.