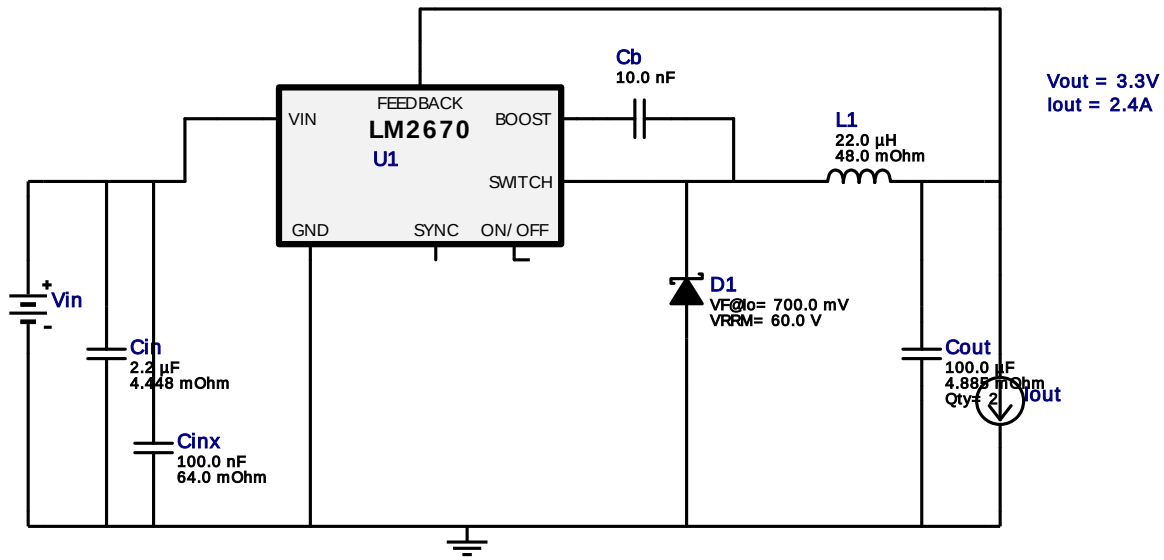
WEBENCH® Design Report

VinMin = 20.0V
VinMax = 35.0V
Vout = 3.3V
Iout = 2.4A

Device = LM2670SX-3.3/NOPB
Topology = Buck
Created = 8/23/16 7:26:31 AM
BOM Cost = $2.74
BOM Count = 8
Total Pd = 1.75W

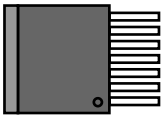
Design : 4774498/18 LM2670SX-3.3/NOPB
LM2670SX-3.3/NOPB 20.0V-35.0V to 3.30V @ 2.4A

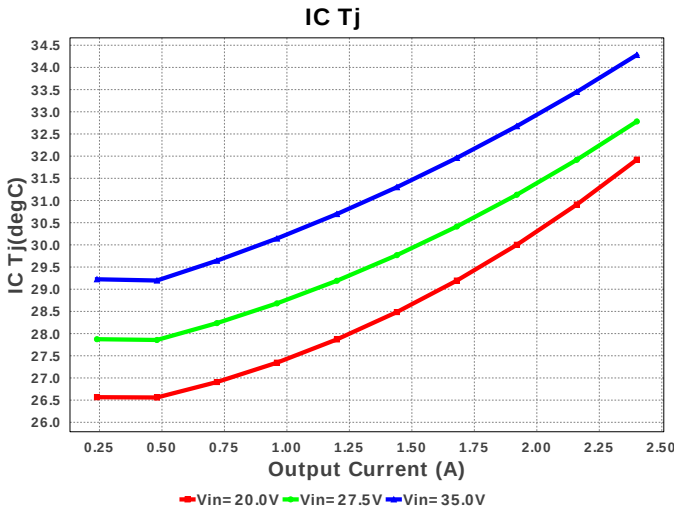


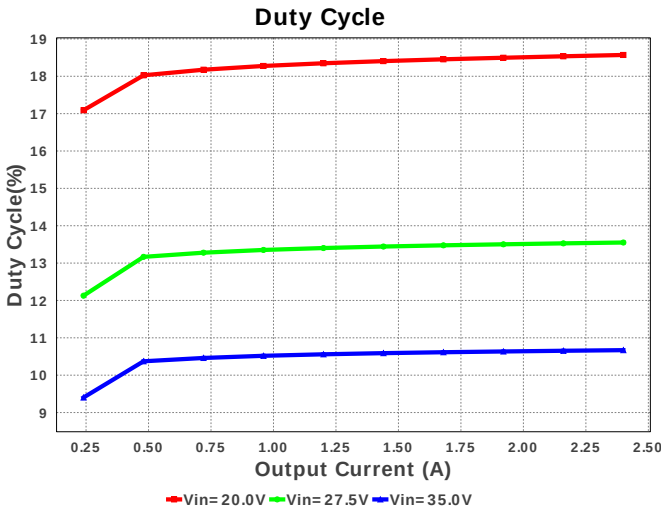
Electrical BOM

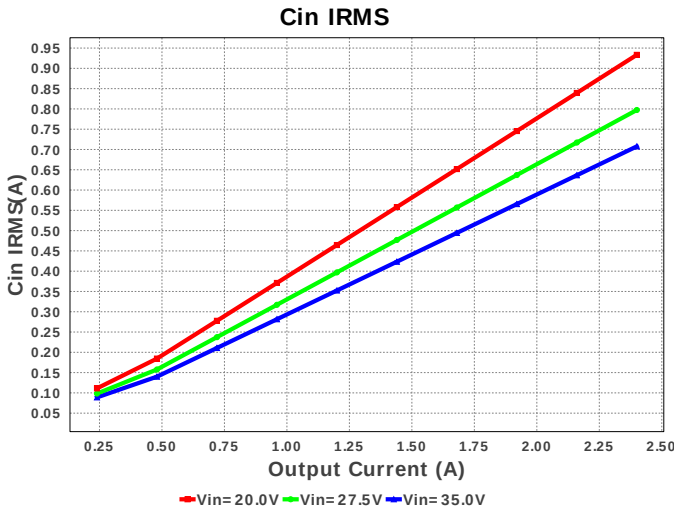
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cb	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM31CR71H225KA88L Series= X7R	Cap= 2.2 uF ESR= 4.448 mOhm VDC= 50.0 V IRMS= 2.2252 A	1	$0.05	1206_190 11 mm²
3.	Cinx	Kemet	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	MuRata	GRM31CR60J107ME39L Series= X5R	Cap= 100.0 uF ESR= 4.885 mOhm VDC= 6.3 V IRMS= 4.4118 A	2	$0.14	1206_190 11 mm²
5.	D1	Diodes Inc.	B560C-13-F	VF@Io= 700.0 mV VRRM= 60.0 V	1	$0.17	SMC 83 mm²
6.	L1	Bourns	SRR1208-220ML	L= 22.0 µH DCR= 48.0 mOhm	1	$0.37	SRR1208 216 mm²

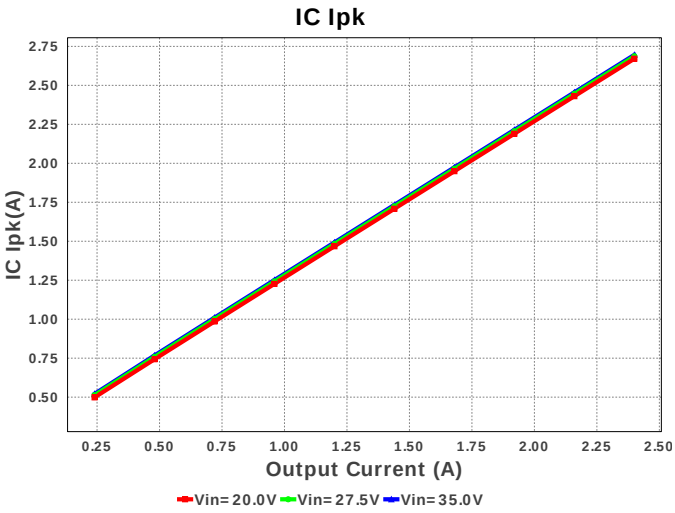
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
7.	U1	Texas Instruments	LM2670SX-3.3/NOPB	Switcher	1	$1.85	TS7B 199 mm²

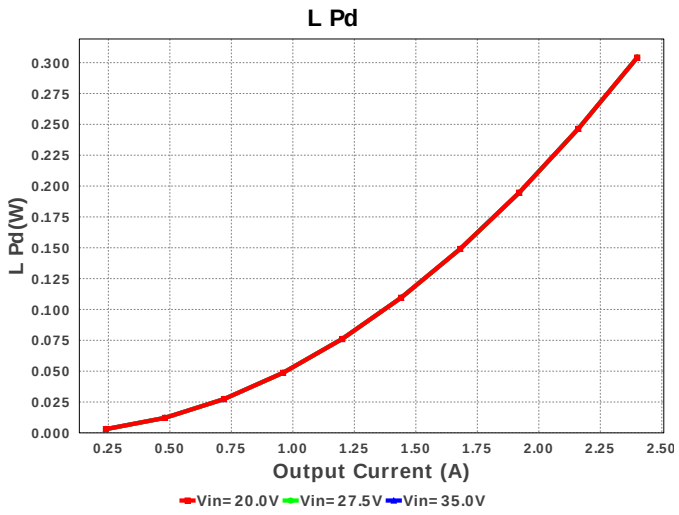


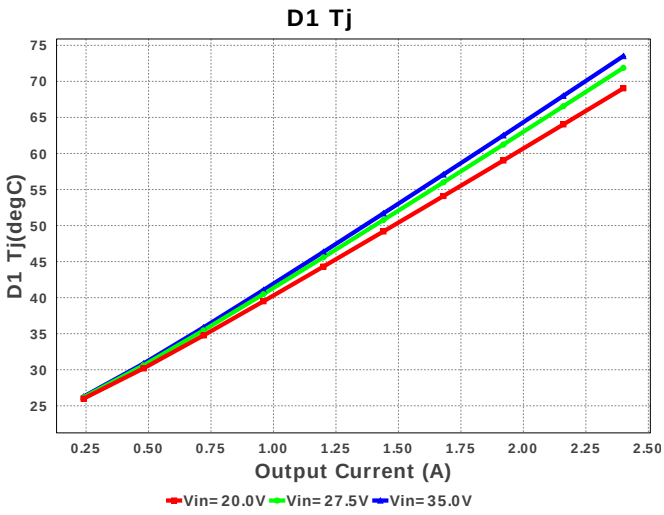


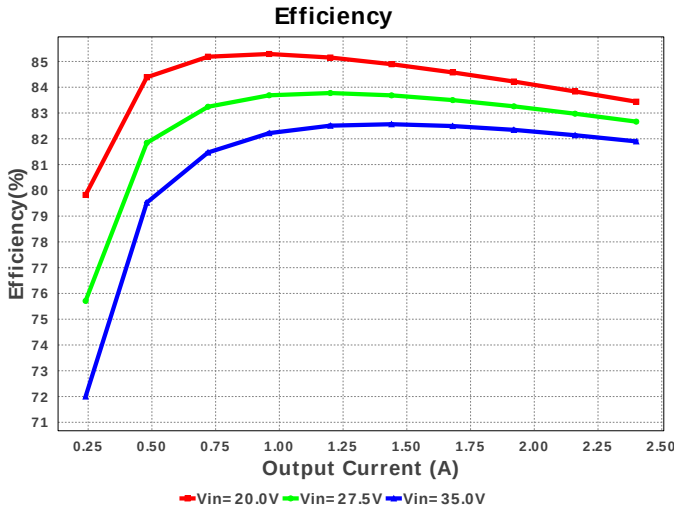


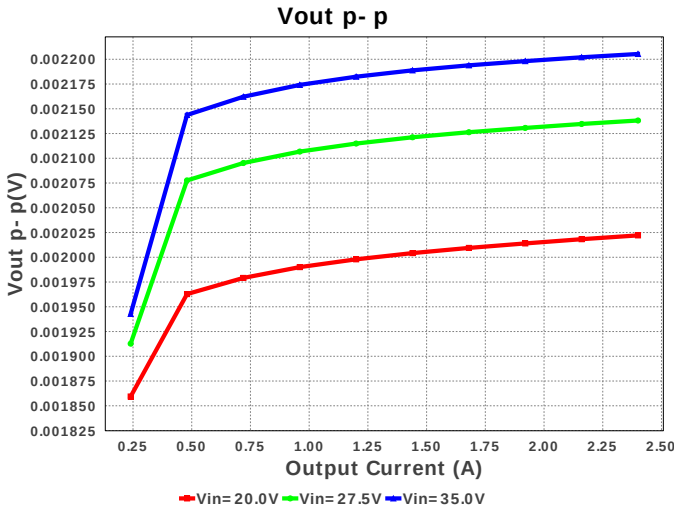


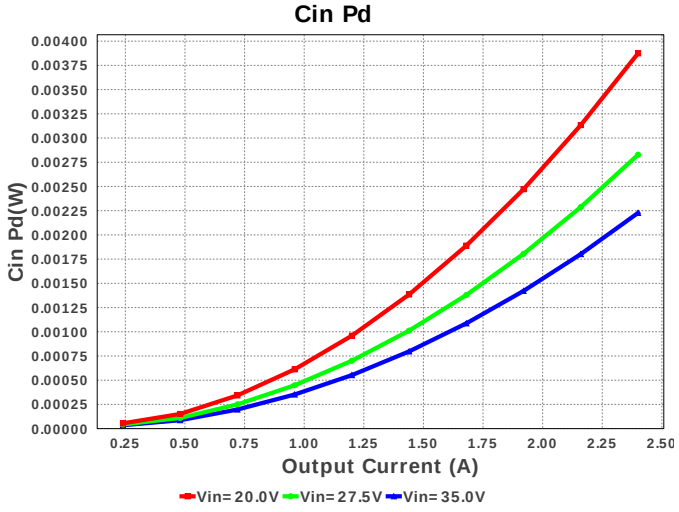


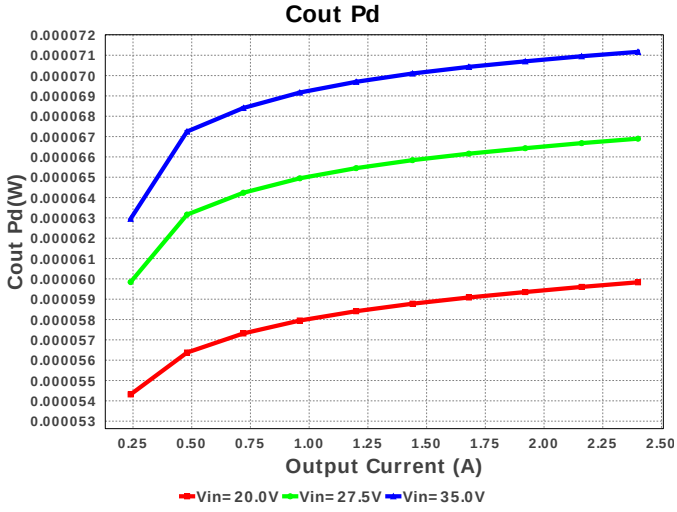


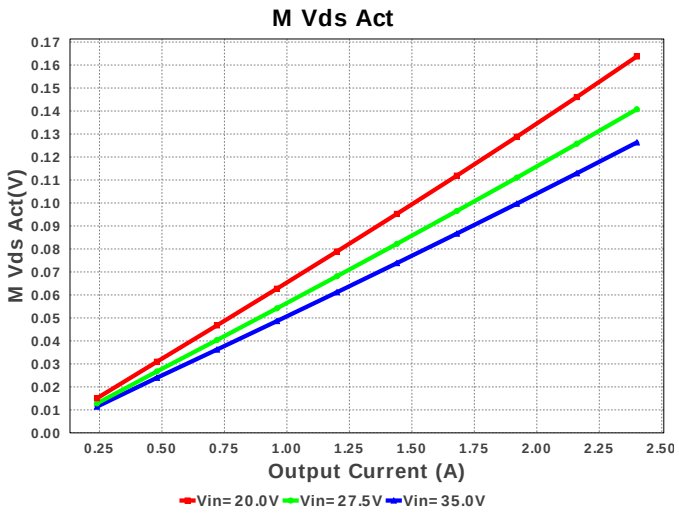


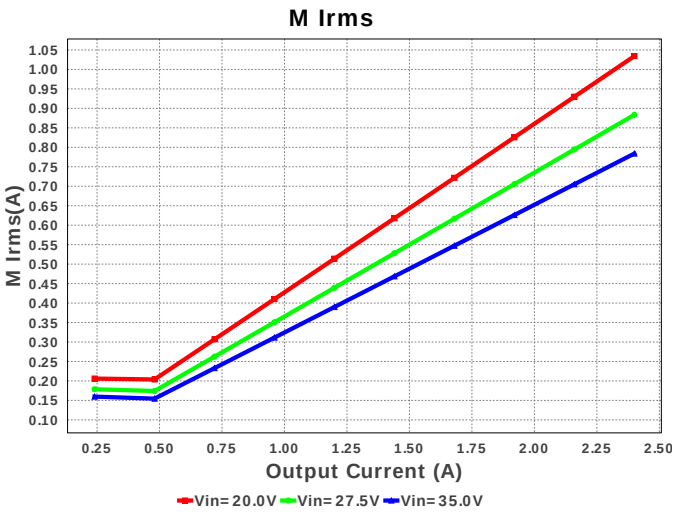


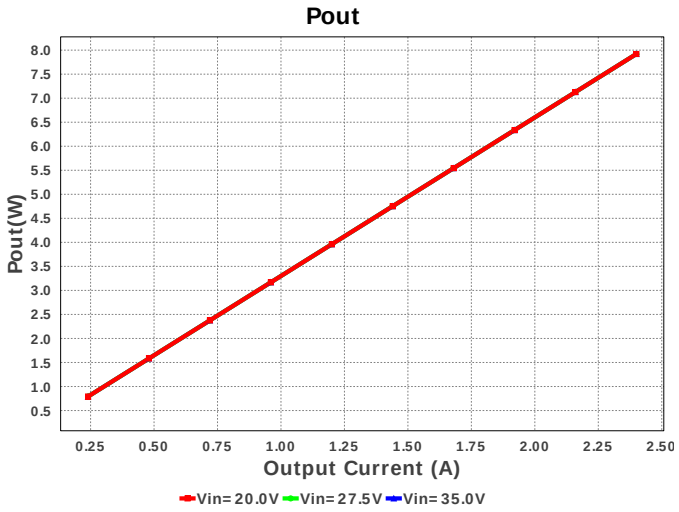


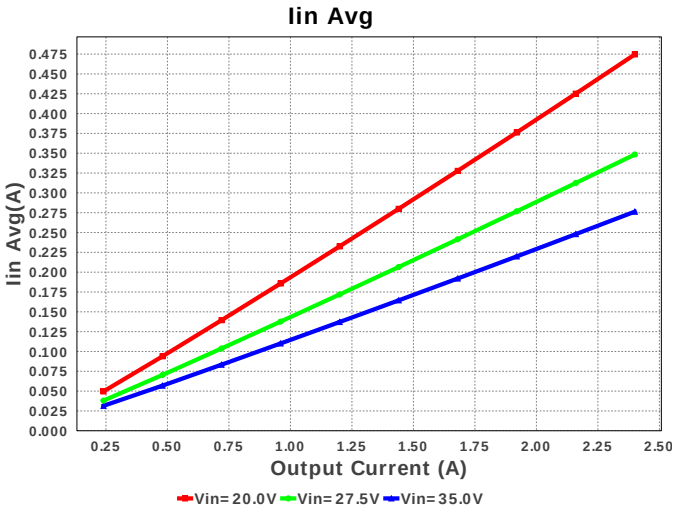


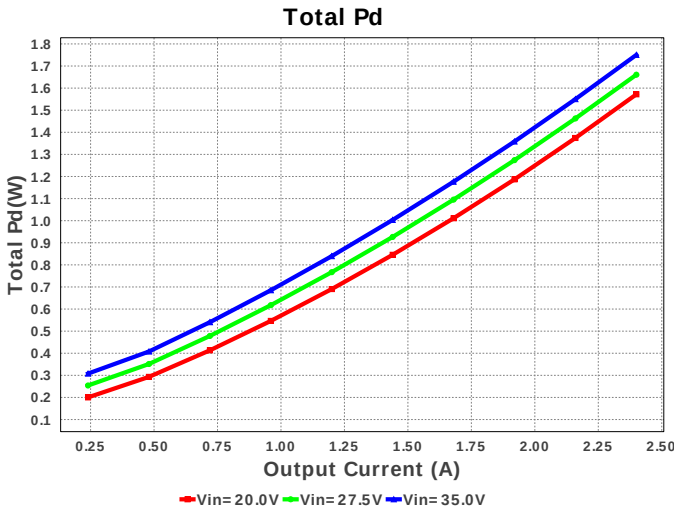


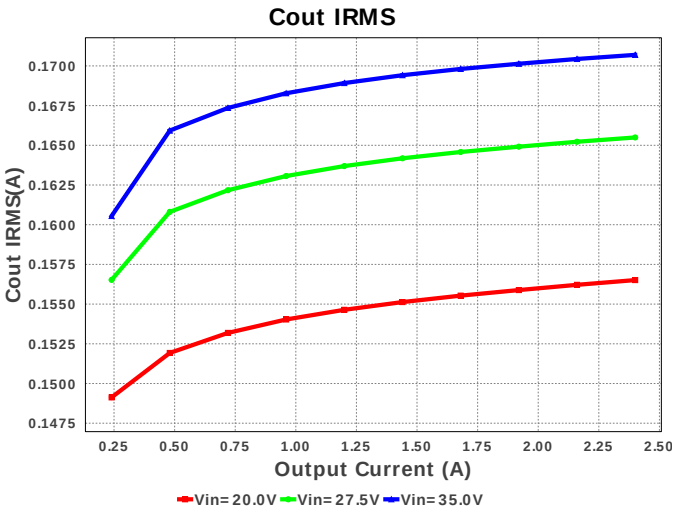


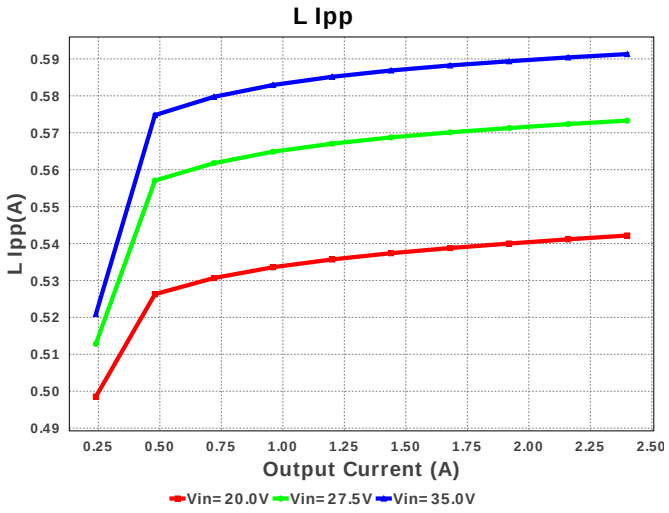


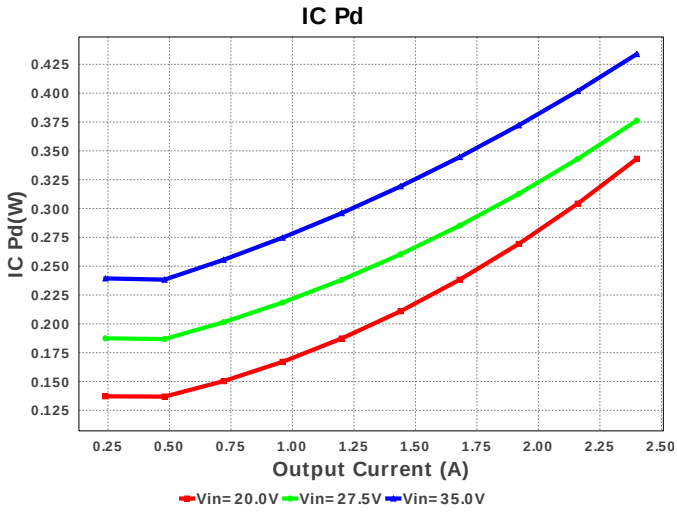


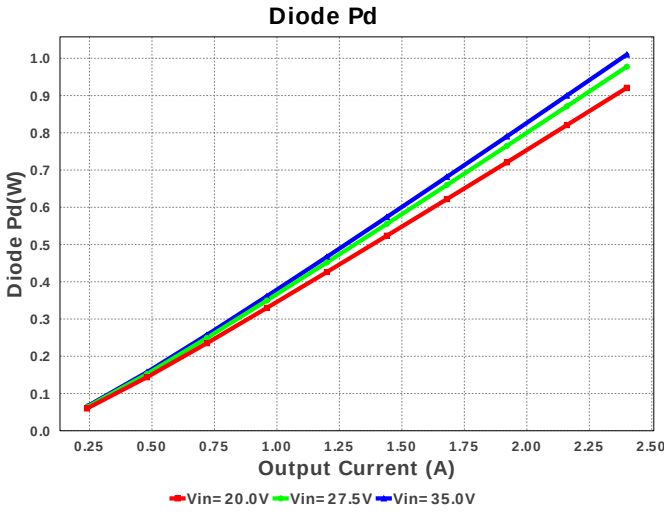












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	707.567 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	170.695 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.696 A	Current	Peak switch current in IC
4.	Iin Avg	276.3 mA	Current	Average input current
5.	L Ipp	591.3 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	783.944 mA	Current	Q Iavg
7.	BOM Count	8	General	Total Design BOM count
8.	FootPrint	544.0 mm^2	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	126.322 mV	General	Voltage drop across the MosFET
12.	Mode	CCM	General	Conduction Mode
13.	Pout	7.92 W	General	Total output power
14.	Total BOM	$2.74	General	Total BOM Cost
15.	D1 Tj	73.506 degC	Op_Point	D1 junction temperature
16.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
17.	Cross Freq	24.274 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	10.67 %	Op_point	Duty cycle
19.	Efficiency	81.899 %	Op_point	Steady state efficiency
20.	IC Tj	34.281 degC	Op_point	IC junction temperature
21.	ICThetaJA	26.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	2.4 A	Op_point	Iout operating point
23.	Phase Marg	44.761 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	35.0 V	Op_point	Vin operating point
25.	Vout p-p	2.205 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	2.227 mW	Power	Input capacitor power dissipation
27.	Cout Pd	71.166 µW	Power	Output capacitor power dissipation
28.	Diode Pd	1.01 W	Power	Diode power dissipation
29.	IC Pd	433.873 mW	Power	IC power dissipation
30.	L Pd	304.128 mW	Power	Inductor power dissipation
31.	Total Pd	1.75 W	Power	Total Power Dissipation

#	Name	Value	Category	Description
32.	Vout Tolerance	2.0 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.4	Maximum Output Current
2.	VinMax	35.0	Maximum input voltage
3.	VinMin	20.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	LM2670	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	23.0	Ambient temperature

Design Assistance

1. **LM2670** Product Folder : http://www.ti.com/product/LM2670 : contains the data sheet and other resources.