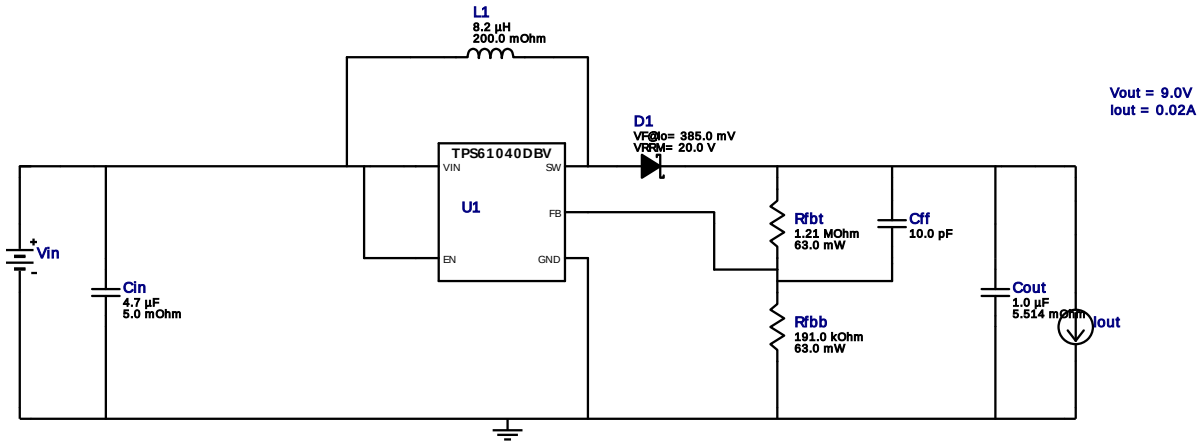
WEBENCH® Design Report

VinMin = 2.0V
VinMax = 3.3V
Vout = 9.0V
Iout = 0.02A

Device = TPS61040DBVR
Topology = Boost
Created = 9/13/16 1:01:46 AM
BOM Cost = $0.90
BOM Count = 8
Total Pd = 0.04W

Design : 1177446/102 TPS61040DBVR
TPS61040DBVR 2.0V-3.3V to 9.00V @ 0.02A



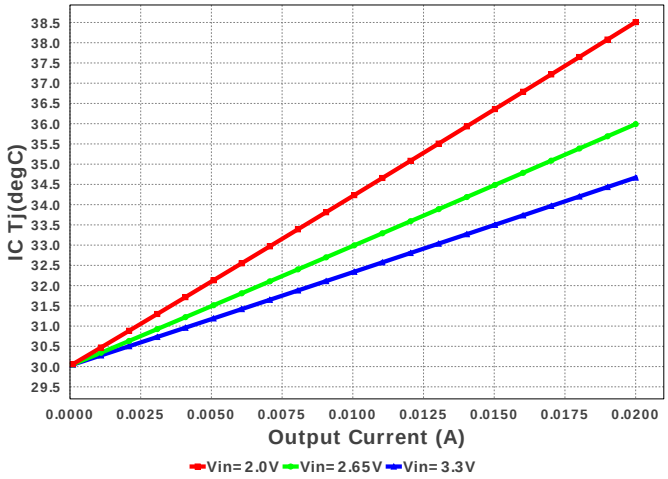
My Comments

No comments

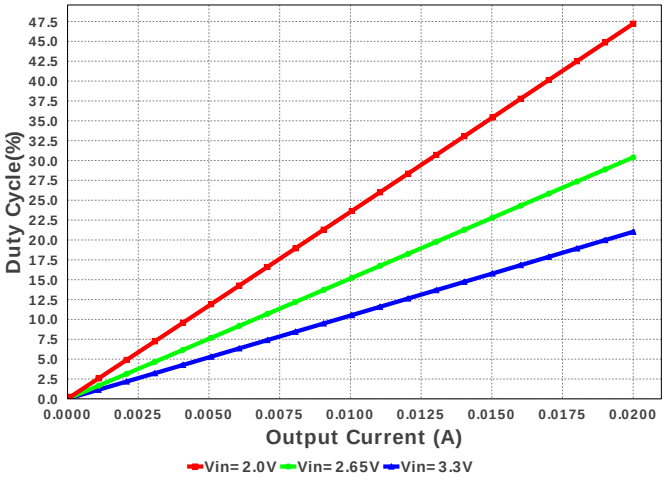
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cff	Kemet	C0603C100K3GACTU Series= C0G/NP0	Cap= 10.0 pF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0603 5 mm²
2.	Cin	MuRata	GRM188R60J475KE19D Series= X5R	Cap= 4.7 uF ESR= 5.0 mOhm VDC= 6.3 V IRMS= 2.0 A	1	$0.01	0603 5 mm²
3.	Cout	MuRata	GRM21BR71E105KA99L Series= X7R	Cap= 1.0 uF ESR= 5.514 mOhm VDC= 25.0 V IRMS= 1.47583 A	1	$0.02	0805 7 mm²
4.	D1	ON Semiconductor	MBR0520LT1G	VF@Io= 385.0 mV VRRM= 20.0 V	1	$0.06	SOD-123 13 mm²
5.	L1	Bourns	SDR0302-8R2ML	L= 8.2 µH DCR= 200.0 mOhm	1	$0.18	SDR0302 15 mm²
6.	Rfbb	Vishay-Dale	CRCW0402191KFKED Series= CRCW..e3	Res= 191.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	Rfbt	Vishay-Dale	CRCW04021M21FKED Series= CRCW..e3	Res= 1.21 MOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	U1	Texas Instruments	TPS61040DBVR	Switcher	1	$0.60	DBV0005A 15 mm²

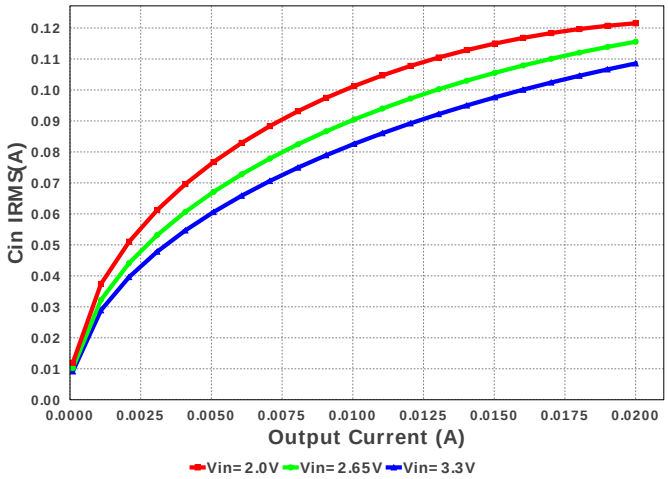
IC Tj



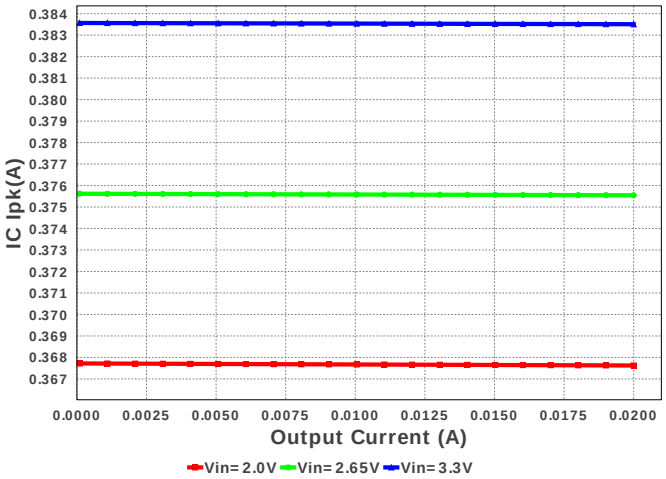
Duty Cycle



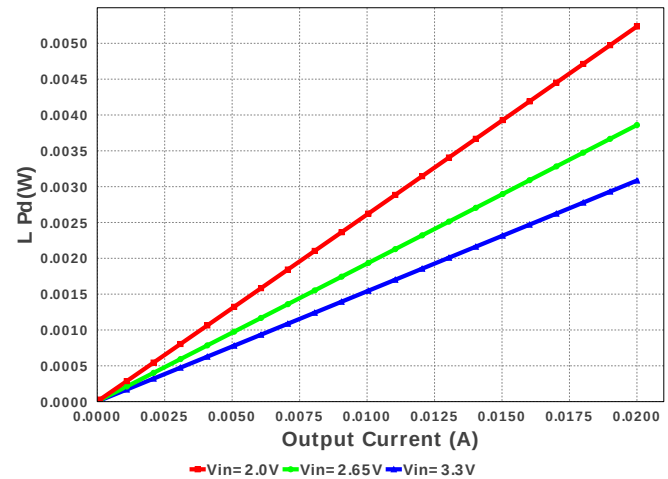
Cin IRMS



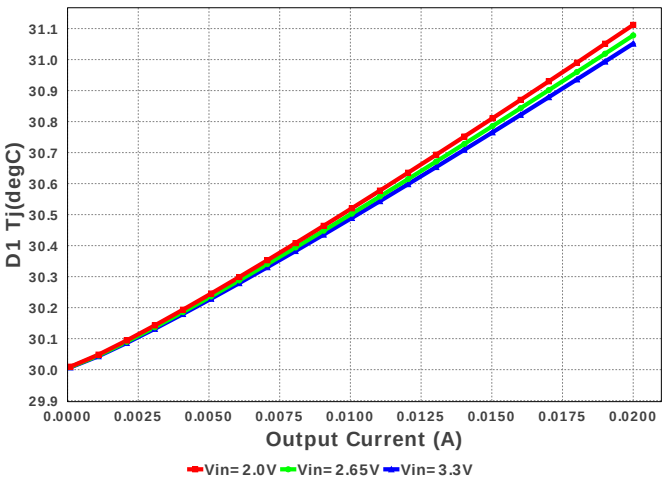
IC Ipk



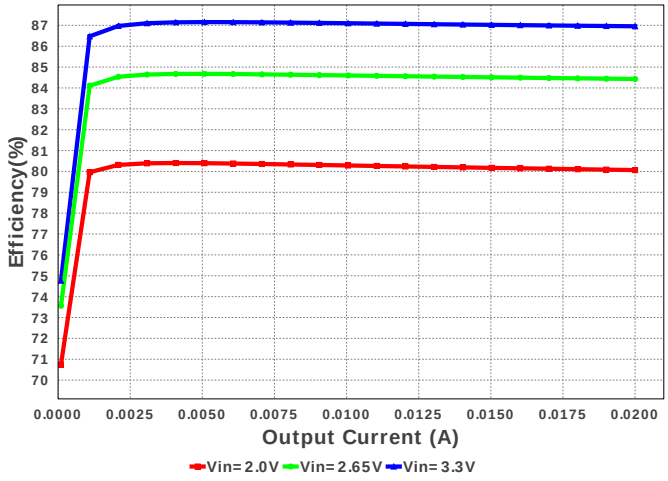
L Pd



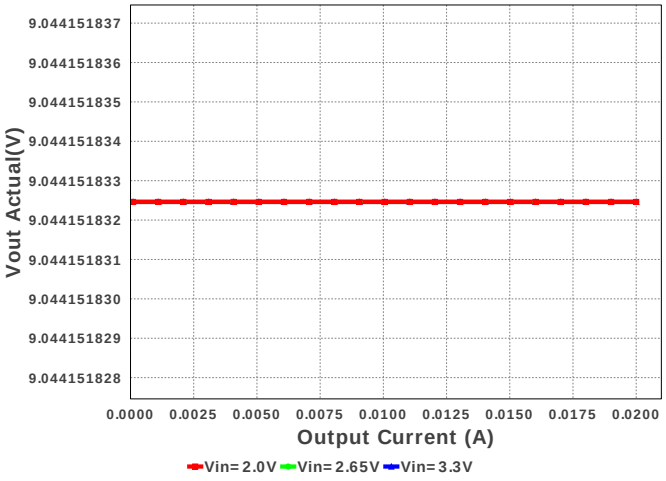
D1 Tj



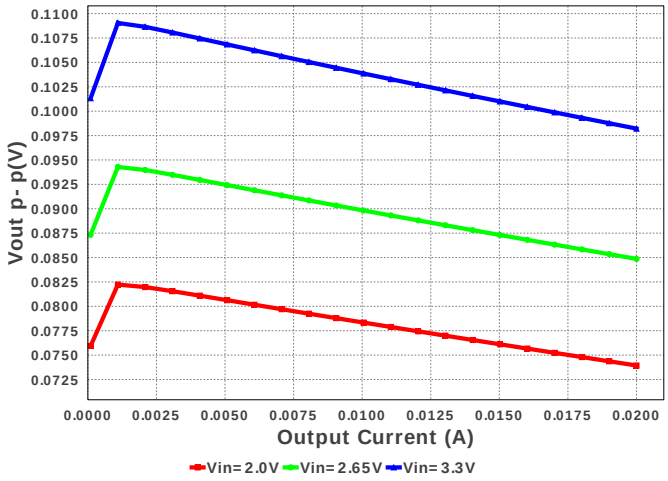
Efficiency



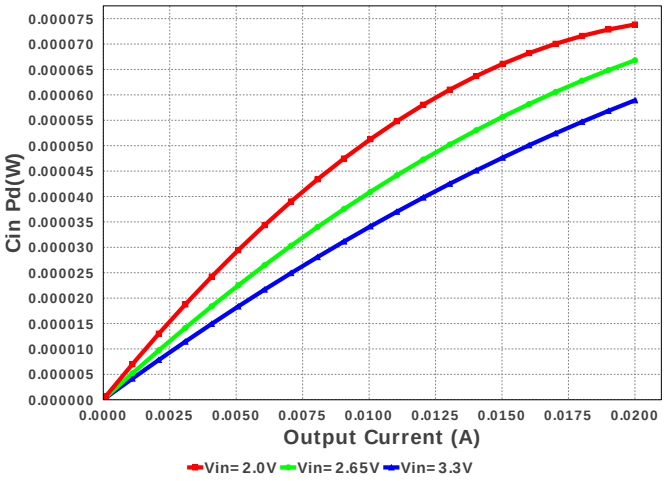
Vout Actual



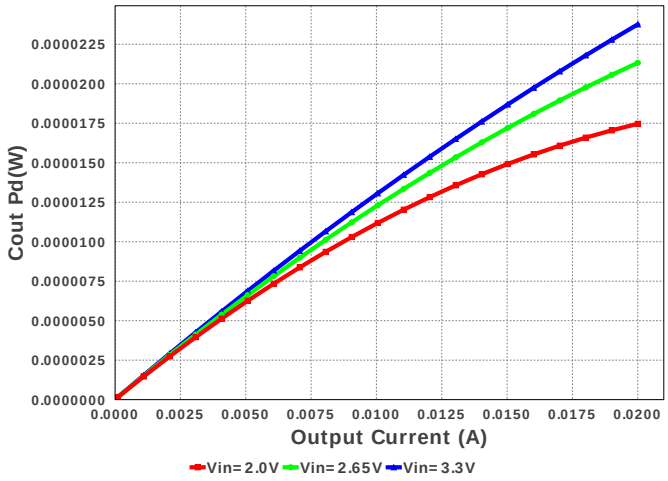
Vout p- p



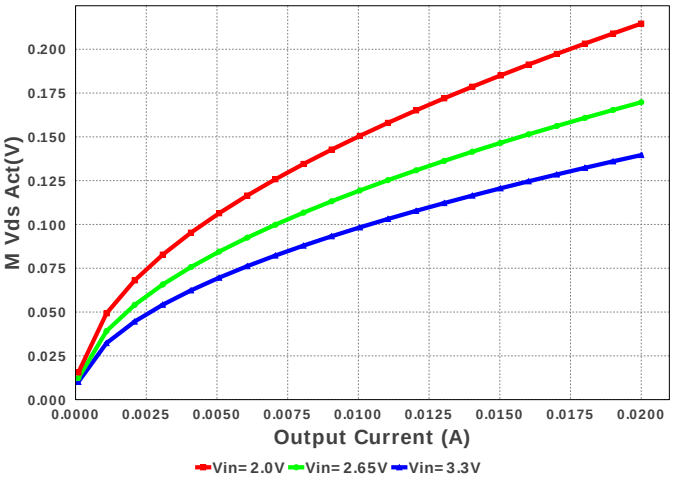
Cin Pd

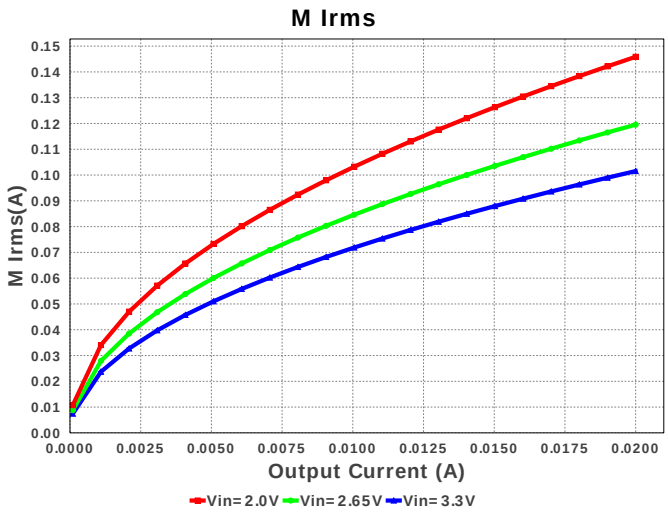


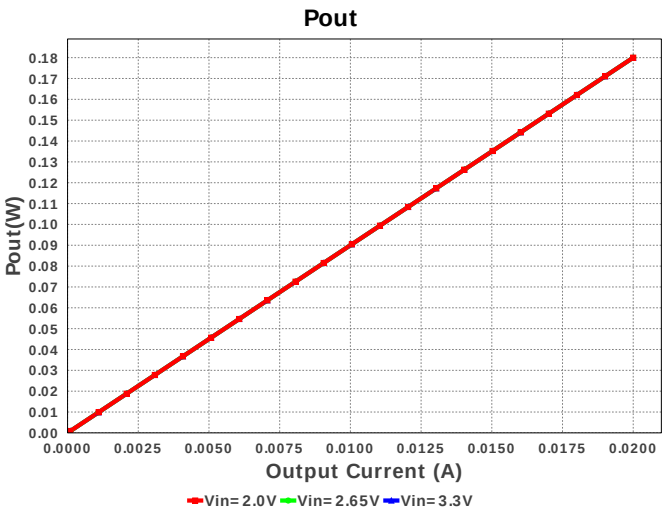
Cout Pd

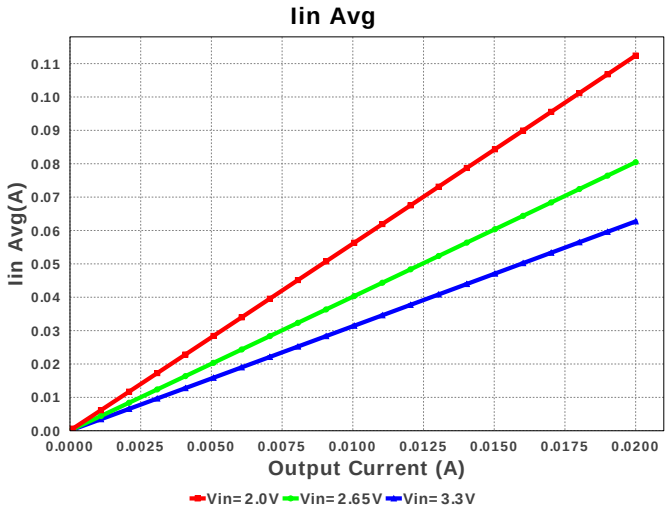


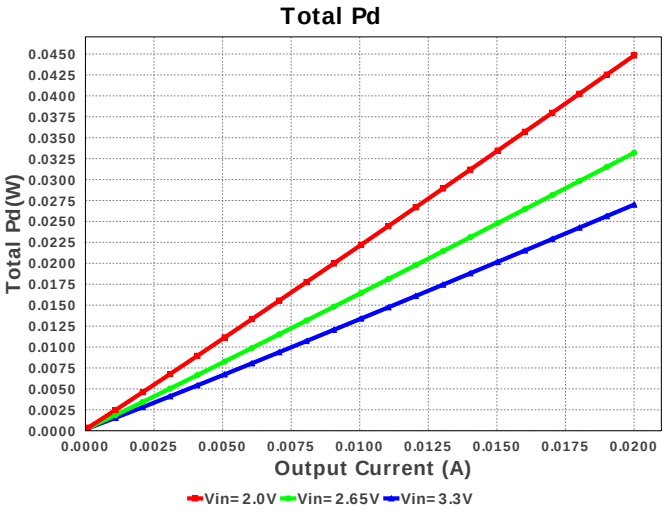
M Vds Act

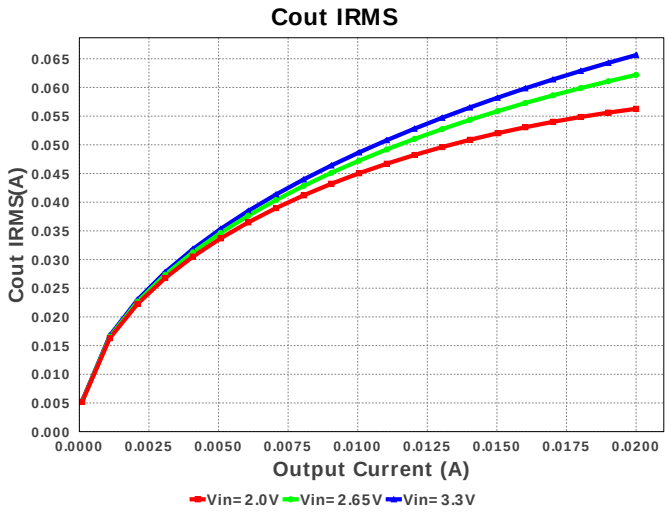


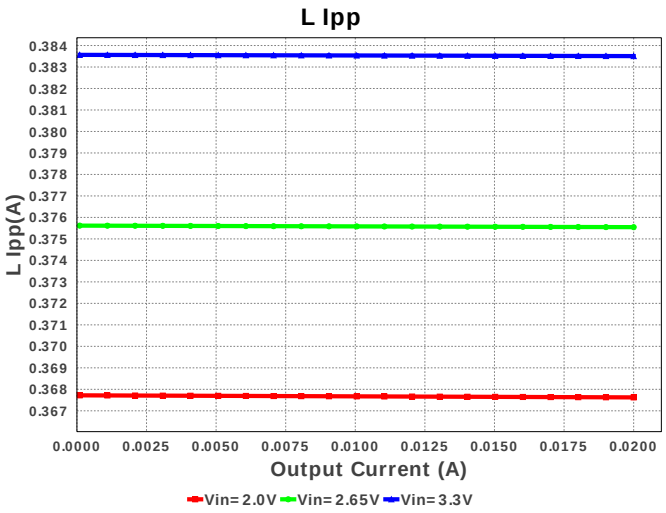


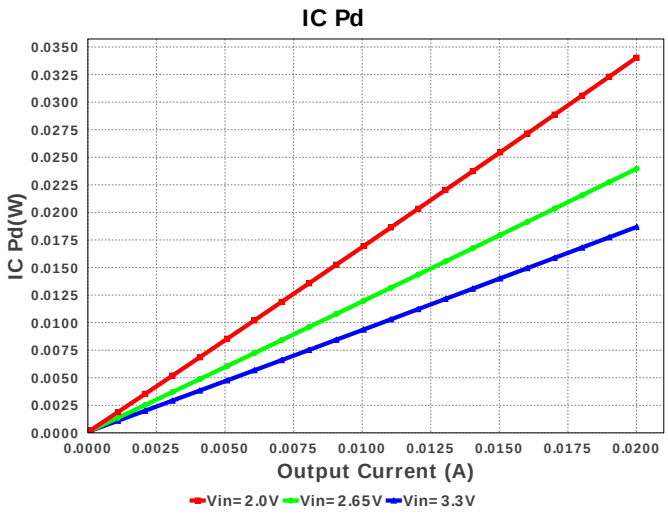


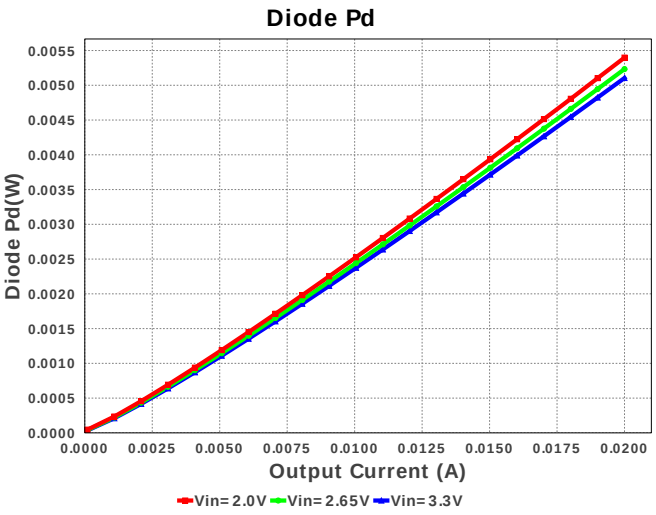


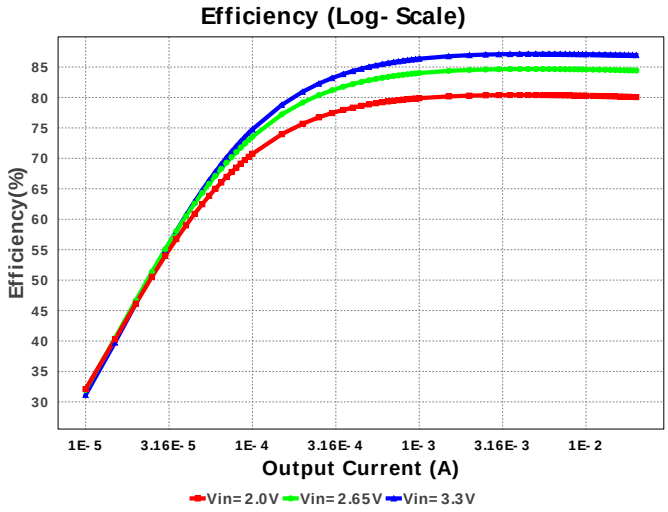












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	121.528 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	56.279 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	367.624 mA	Current	Peak switch current in IC
4.	Iin Avg	112.41 mA	Current	Average input current
5.	L Ipp	367.62 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	145.856 mA	Current	MOSFET RMS current
7.	BOM Count	8	General	Total Design BOM count
8.	FootPrint	65.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	265.18 kHz	General	Switching frequency
10.	IC Tolerance	25.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	214.614 mV	General	Voltage drop across the MosFET
12.	Mode	DCM	General	Conduction Mode
13.	Mode	DCM	General	PWM/PFM Mode
14.	Pout	180.0 mW	General	Total output power
15.	Total BOM	$0.9	General	Total BOM Cost
16.	D1 Tj	31.112 degC	Op_Point	D1 junction temperature
17.	Vout Actual	9.044 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
18.	Vout OP	9.0 V	Op_Point	Operational Output Voltage
19.	Duty Cycle	47.224 %	Op_point	Duty cycle
20.	Efficiency	80.064 %	Op_point	Steady state efficiency
21.	IC Tj	38.509 degC	Op_point	IC junction temperature
22.	ICThetaJA	250.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	20.0 mA	Op_point	Iout operating point
24.	VIN_OP	2.0 V	Op_point	Vin operating point
25.	Vout p-p	73.934 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	73.845 µW	Power	Input capacitor power dissipation
27.	Cout Pd	17.465 µW	Power	Output capacitor power dissipation
28.	Diode Pd	5.398 mW	Power	Diode power dissipation
29.	IC Pd	34.037 mW	Power	IC power dissipation
30.	L Pd	5.236 mW	Power	Inductor power dissipation
31.	Total Pd	44.82 mW	Power	Total Power Dissipation

#	Name	Value	Category	Description
32.	Vout Tolerance	3.808 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	20.0 m	Maximum Output Current
2.	VinMax	3.3	Maximum input voltage
3.	VinMin	2.0	Minimum input voltage
4.	Vout	9.0	Output Voltage
5.	base_pn	TPS61040	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. TPS61040 Product Folder : http://www.ti.com/product/TPS61040 : contains the data sheet and other resources.