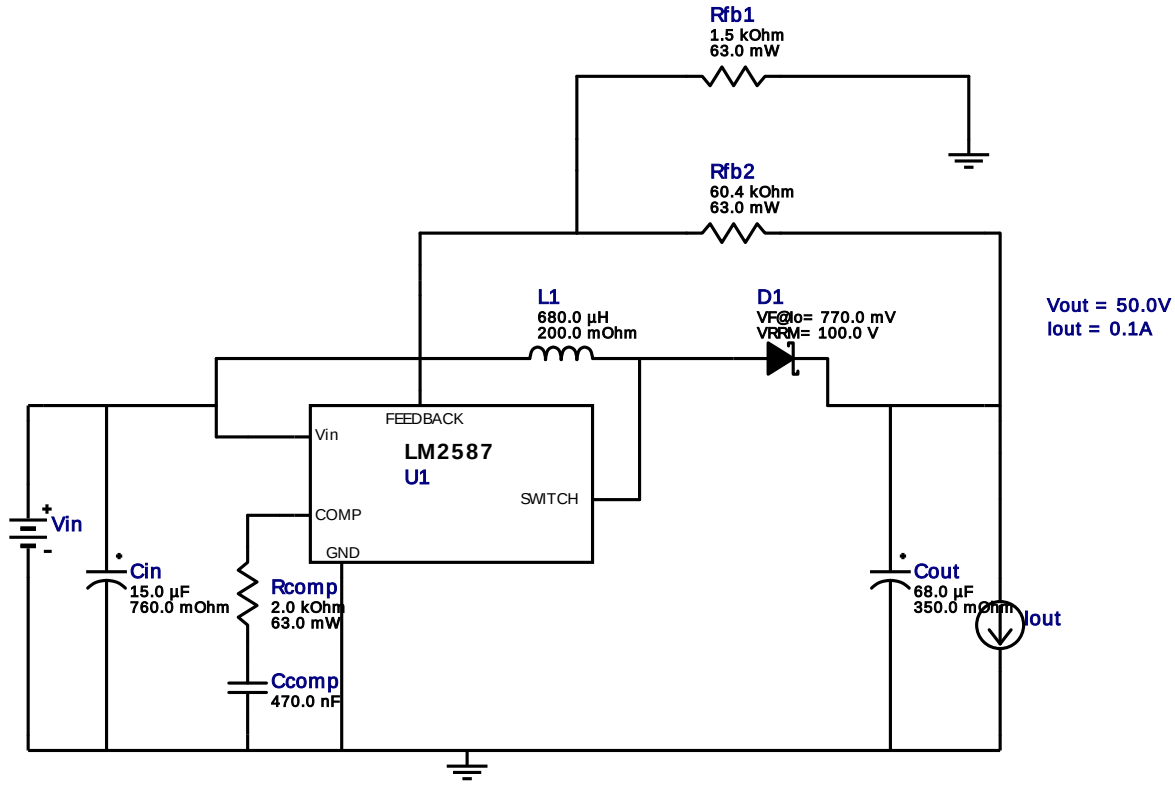
TEXAS INSTRUMENTS

WEBENCH® Design Report

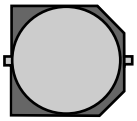
VinMin = 10.0V
VinMax = 16.0V
Vout = 50.0V
Iout = 0.1A

Device = LM2587S-ADJ/NOPB
Topology = Boost
Created = 2017-11-09 03:22:36.693
BOM Cost = $8.07
BOM Count = 9
Total Pd = 0.58W

Design : 663314/46 LM2587S-ADJ/NOPB
LM2587S-ADJ/NOPB 10.0V-16.0V to 50.00V @ 0.1A



Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	Kemet	C2220C474J5GACTU Series= C0G/NP0	Cap= 470.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$1.61	 2220 54 mm²
2.	Cin	Nichicon	UUD1E150MCL1GS Series= uD	Cap= 15.0 uF ESR= 760.0 mOhm VDC= 25.0 V IRMS= 150.0 mA	1	$0.11	 SM_RADIAL_5MM 58 mm²
3.	Cout	Panasonic	EEE-FK1J680UP Series= FK	Cap= 68.0 uF ESR= 350.0 mOhm VDC= 63.0 V IRMS= 400.0 mA	1	$0.22	 SM_RADIAL_G 172 mm²
4.	D1	Diodes Inc.	DFLS1100-7	VF@Io= 770.0 mV VRRM= 100.0 V	1	$0.15	 PowerDI123 13 mm²

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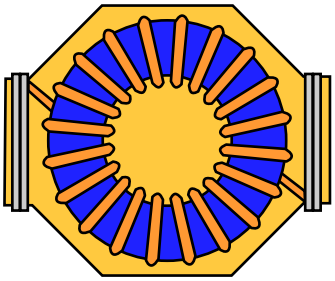
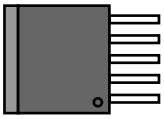
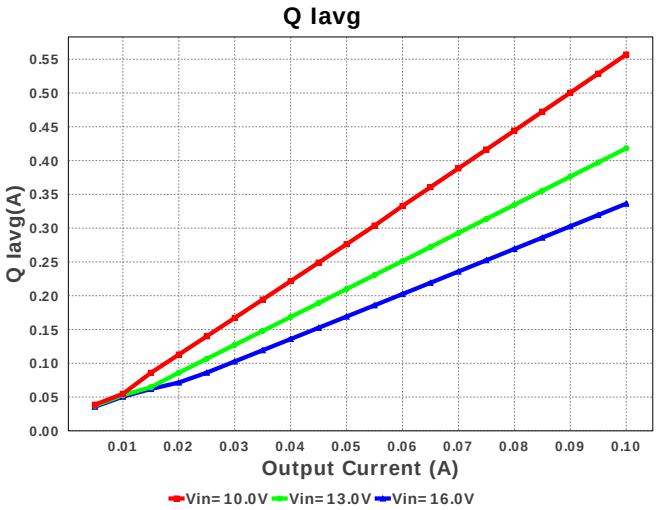
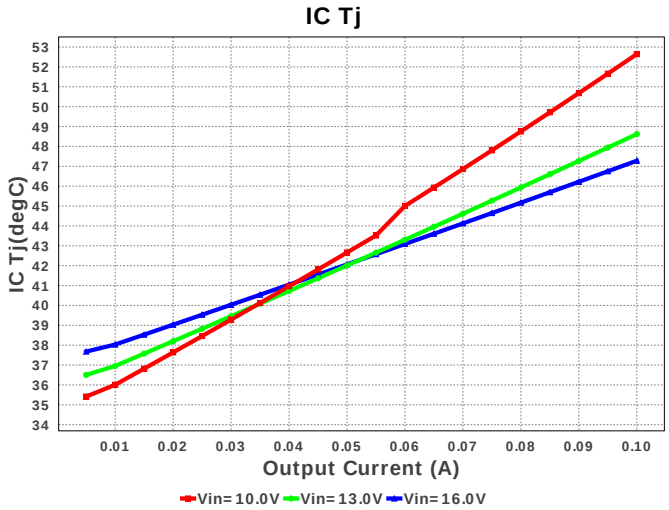
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
5.	L1	Bourns	PM2110-681K-RC	L= 680.0 µH DCR= 200.0 mOhm	1	$1.21	 PM2110 890 mm²
6.	Rcomp	Vishay-Dale	CRCW04022K00FKED Series= CRCW..e3	Res= 2.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
7.	Rfb1	Vishay-Dale	CRCW04021K50FKED Series= CRCW..e3	Res= 1.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
8.	Rfb2	Vishay-Dale	CRCW040260K4FKED Series= CRCW..e3	Res= 60.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
9.	U1	Texas Instruments	LM2587S-ADJ/NOPB	Switcher	1	$4.74	 TS5B 199 mm²





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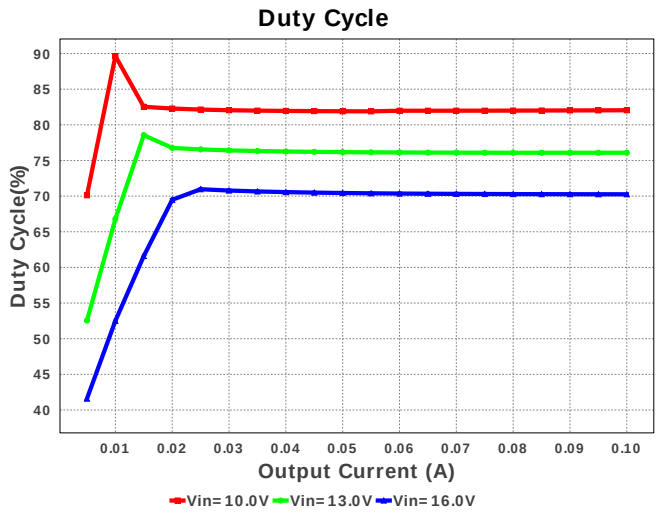

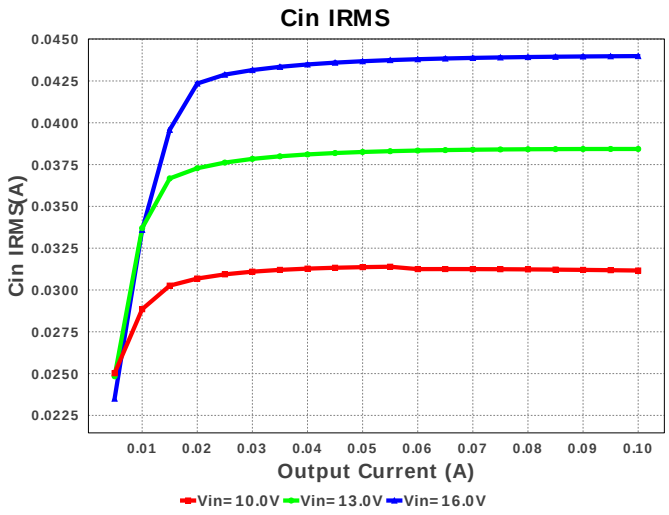

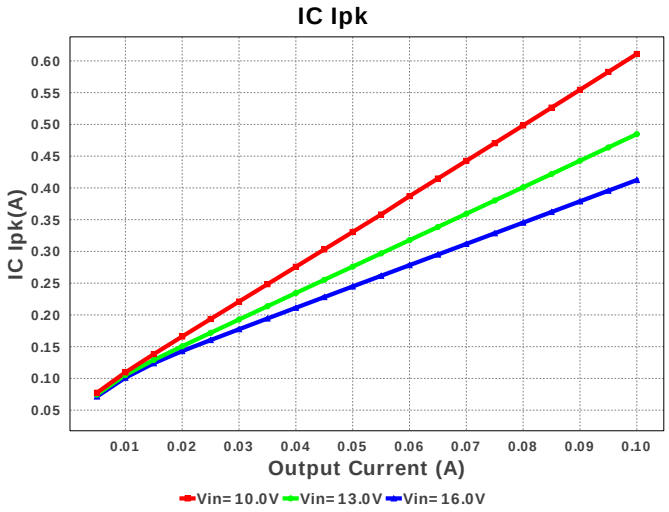

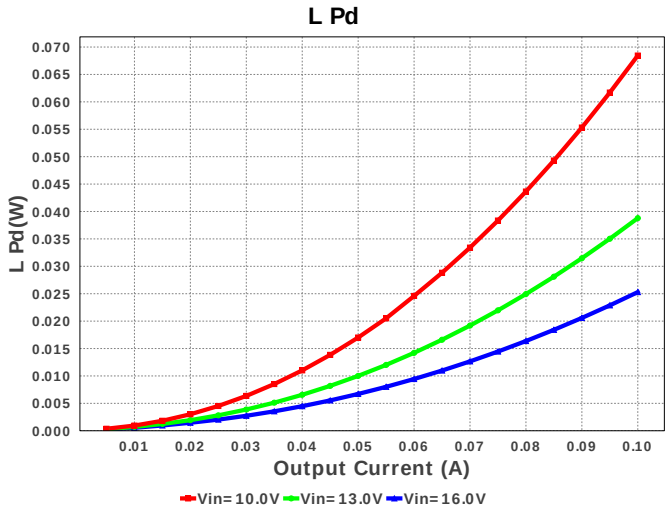

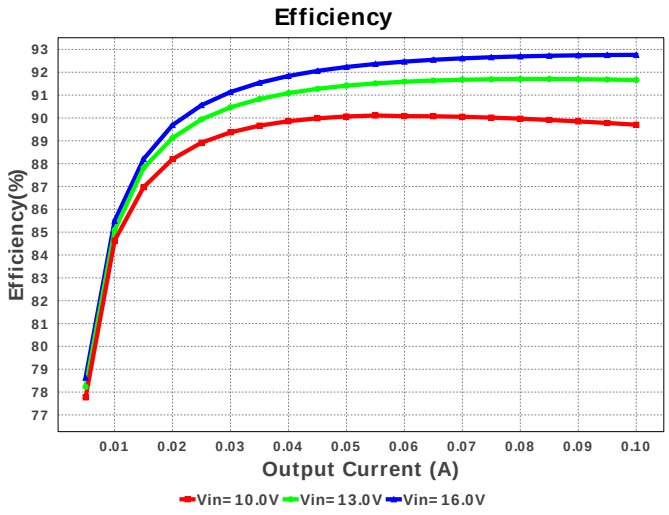

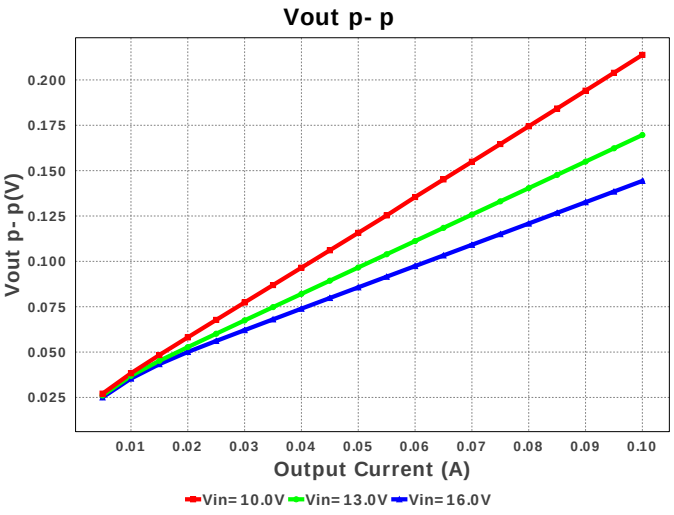

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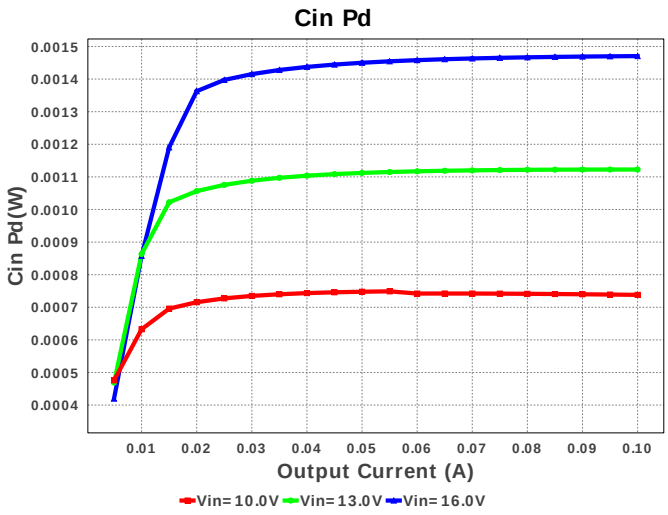

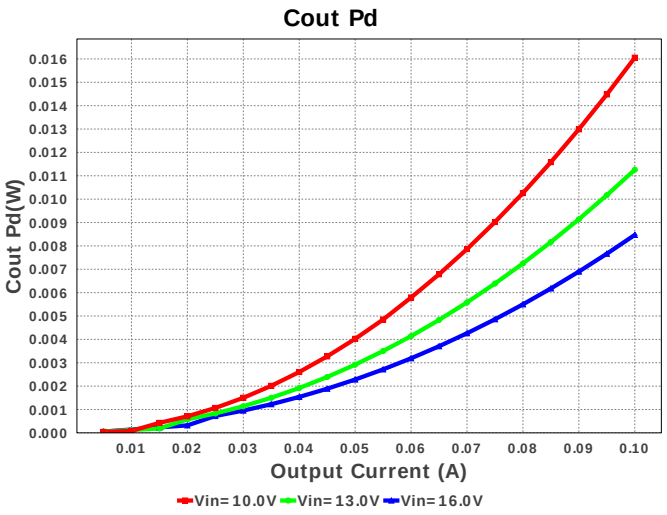

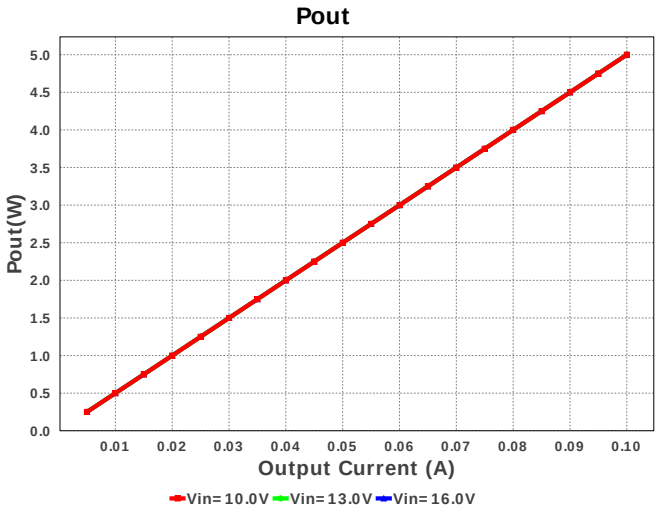

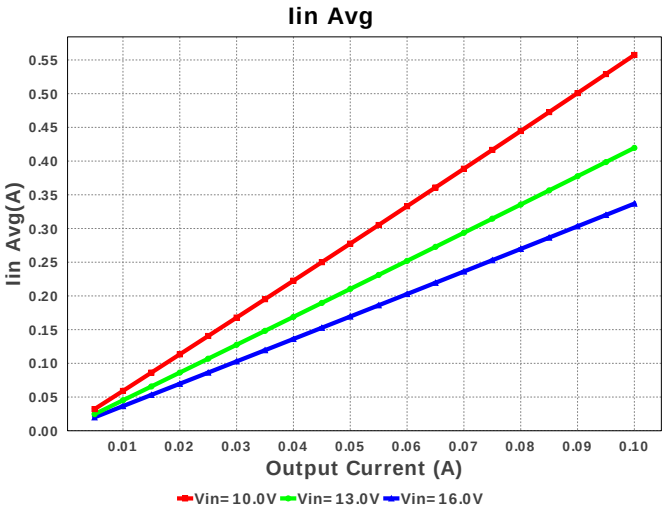

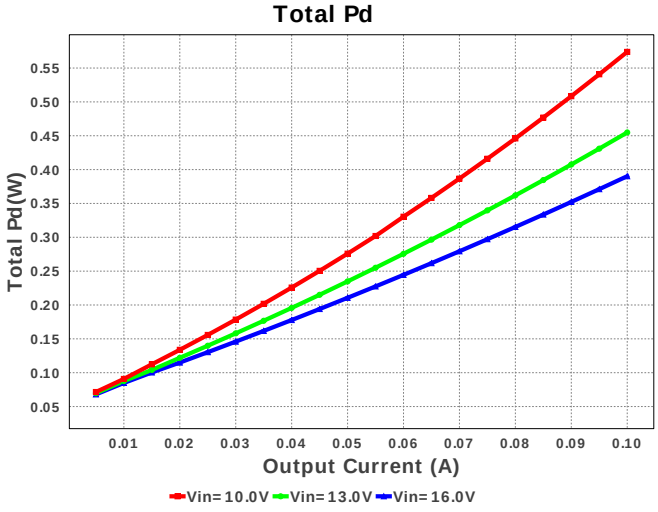

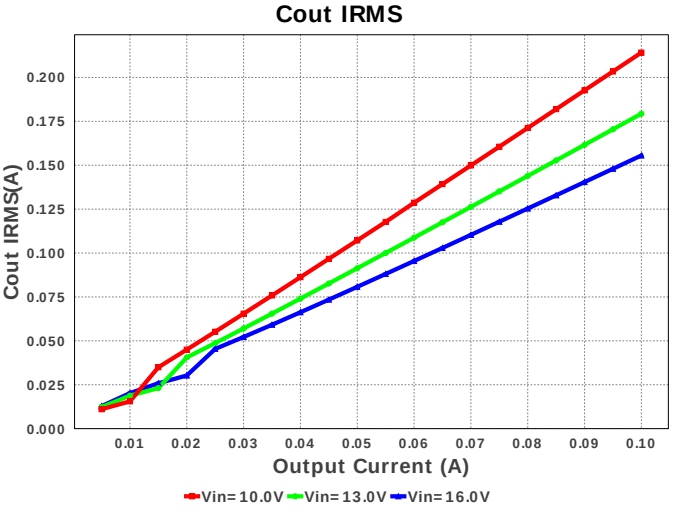

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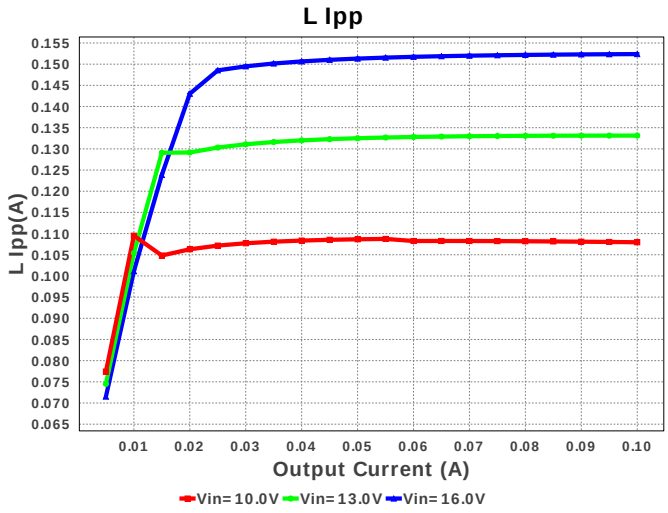

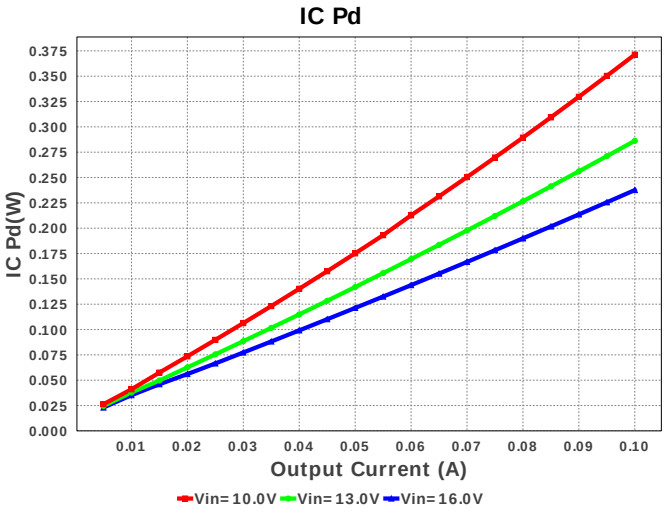

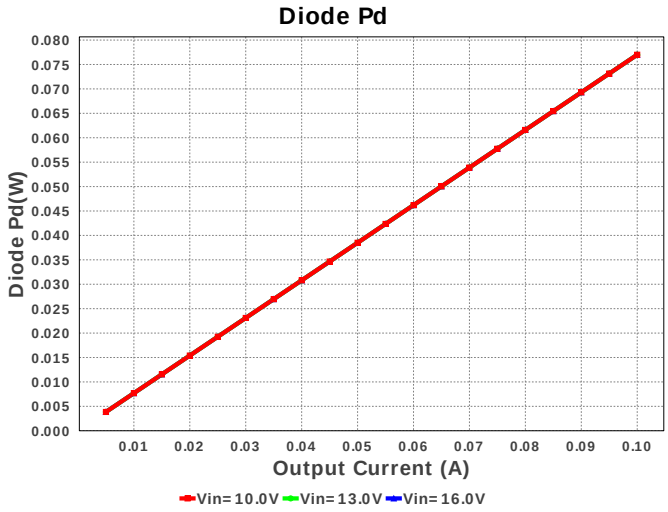

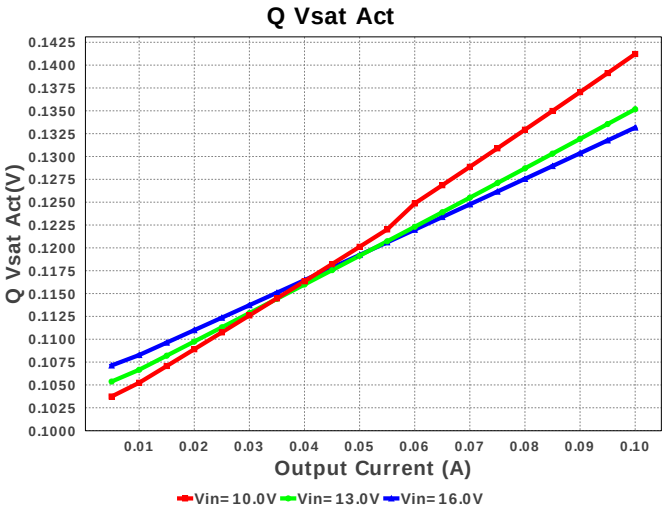

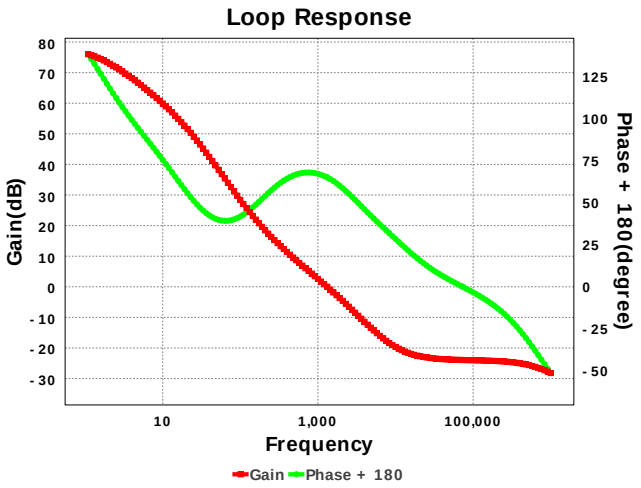

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	31.069 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	214.553 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	612.413 mA	Current	Peak switch current in IC
4.	Iin Avg	558.03 mA	Current	Average input current
5.	L Ipp	107.63 mA	Current	Peak-to-peak inductor ripple current
6.	Q Iavg	558.6 mA	Current	Q Iavg
7.	BOM Count	9	General	Total Design BOM count
8.	FootPrint	1.396 k mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	100.0 kHz	General	Switching frequency
10.	IC Tolerance	0.0 V	General	IC Feedback Tolerance
11.	Mode	CCM	General	Conduction Mode

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#	Name	Value	Category	Description
12.	Pout	5.0 W	General	Total output power
13.	Q Vsat Act	151.306 mV	General	Q Vsat
14.	Total BOM	$8.07	General	Total BOM Cost
15.	Low Freq Gain	77.753 dB	Op_Point	Gain at 1Hz
16.	Vout Actual	50.758 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
17.	Cross Freq	843.776 Hz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	82.098 %	Op_point	Duty cycle
19.	Efficiency	89.601 %	Op_point	Steady state efficiency
20.	Gain Marg	-18.487 dB	Op_point	Bode Plot Gain Margin
21.	IC Tj	59.371 degC	Op_point	IC junction temperature
22.	ICThetaJA	40.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	100.0 mA	Op_point	Iout operating point
24.	Phase Marg	59.961 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	10.0 V	Op_point	Vin operating point
26.	Vout p-p	214.345 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	733.619 µW	Power	Input capacitor power dissipation
28.	Cout Pd	16.111 mW	Power	Output capacitor power dissipation
29.	Diode Pd	77.0 mW	Power	Diode power dissipation
30.	IC Pd	377.215 mW	Power	IC power dissipation
31.	L Pd	68.86 mW	Power	Inductor power dissipation
32.	Total Pd	580.295 mW	Power	Total Power Dissipation
33.	Vout Tolerance	1.971 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	100.0 m	Maximum Output Current
2.	VinMax	16.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	50.0	Output Voltage
5.	base_pn	LM2587	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM2587** Product Folder : http://www.ti.com/product/LM2587 : contains the data sheet and other resources.

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