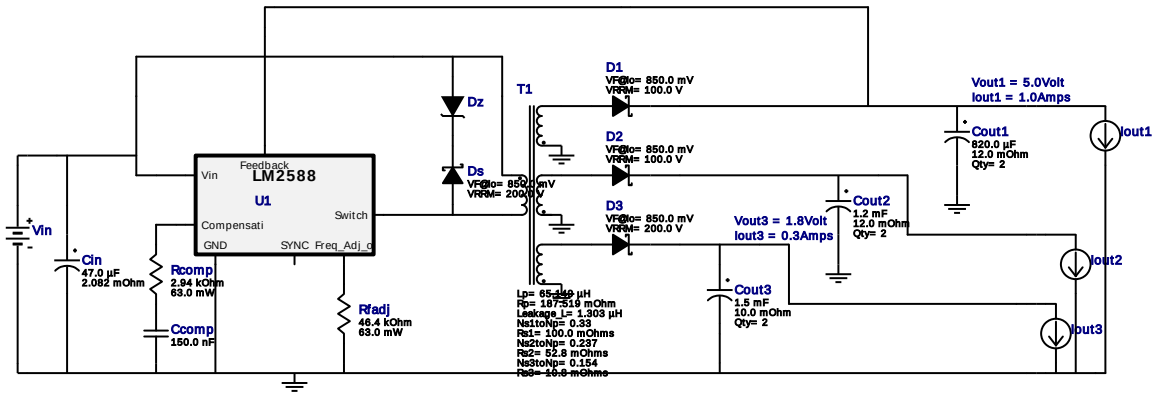
WEBENCH® Design Report

VinMin = 11.5V
VinMax = 12.8V
Vout = 5.0V
Iout = 1.0A

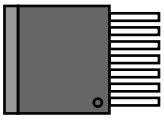
Device = LM2588S-5.0/NOPB
Topology = Flyback
Created = 7/18/16 7:17:42 PM
BOM Cost = $0.00
BOM Count = 17
Total Pd = 3.51W

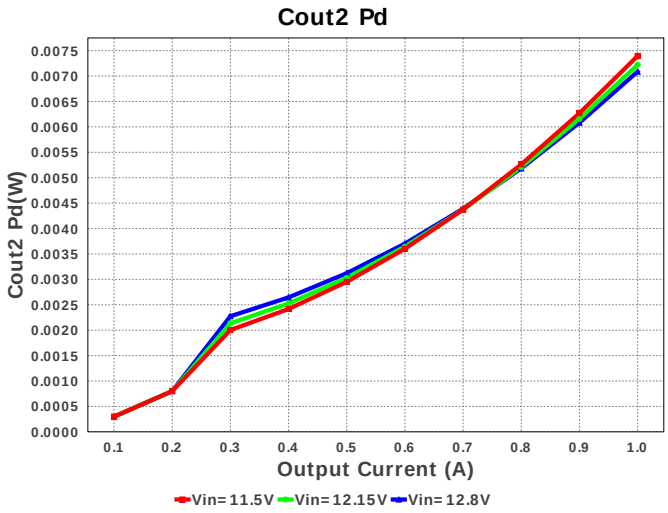
Design : 3496425/15 LM2588S-5.0/NOPB
LM2588S-5.0/NOPB 11.5V-12.8V to 5.00V @ 1.0A

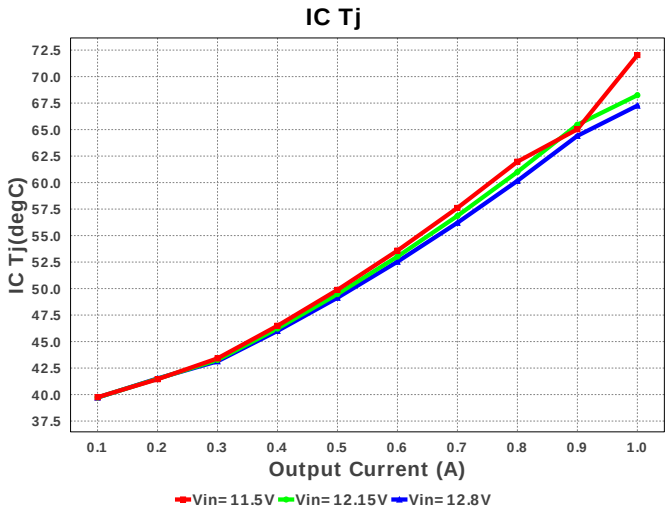


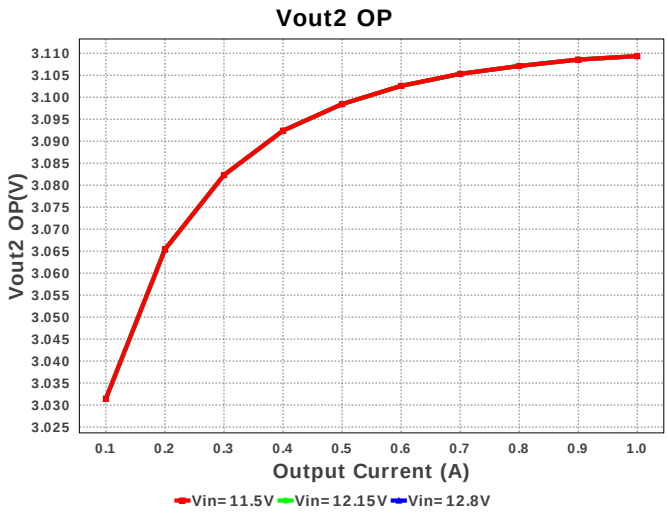
Electrical BOM

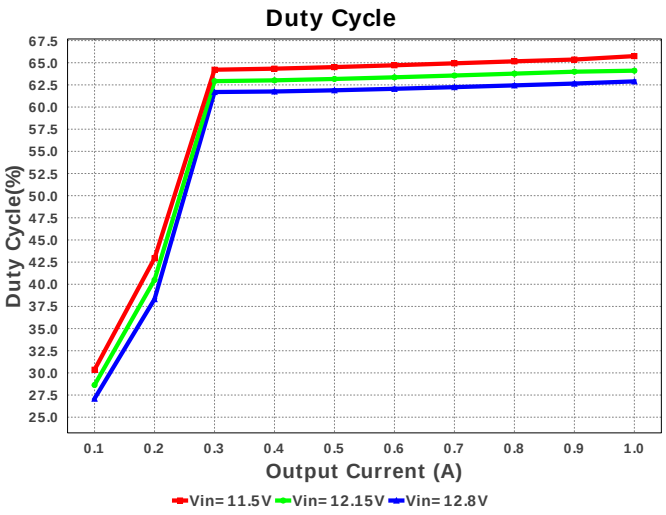
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	MuRata	GRM155R60J154KE01D Series= X5R	Cap= 150.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
2.	Cin	TDK	C3216X5R1E476M160AC Series= X5R	Cap= 47.0 uF ESR= 2.082 mOhm VDC= 25.0 V IRMS= 5.0279 A	1	$0.35	1206 11 mm²
3.	Cout1	Panasonic	6SVPC820M Series= SVPC	Cap= 820.0 uF ESR= 12.0 mOhm VDC= 6.3 V IRMS= 4.7 A	2	$0.72	SM_RADIAL_8MM 113 mm²
4.	Cout2	Panasonic	4SVPC1200M Series= SVPC	Cap= 1.2 mF ESR= 12.0 mOhm VDC= 4.0 V IRMS= 4.7 A	2	$0.72	SM_RADIAL_8MM 113 mm²
5.	Cout3	Panasonic	2R5SVPC1500M Series= SVPC	Cap= 1.5 mF ESR= 10.0 mOhm VDC= 2.5 V IRMS= 5.15 A	2	$0.72	SM_RADIAL_8MM 113 mm²
6.	D1	Micro Commercial Components	SK310A-TP	VF@Io= 850.0 mV VRRM= 100.0 V	1	$0.10	SMA 37 mm²
7.	D2	Micro Commercial Components	SK310A-TP	VF@Io= 850.0 mV VRRM= 100.0 V	1	$0.10	SMA 37 mm²
8.	D3	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	$0.21	PowerDI123 13 mm²
9.	Ds	Diodes Inc.	DFLS1200-7	VF@Io= 850.0 mV VRRM= 200.0 V	1	$0.21	PowerDI123 13 mm²
10.	Dz	Micro Commercial Components	3SMAJ5938B-TP	Zener	1	$0.12	SMA 37 mm²

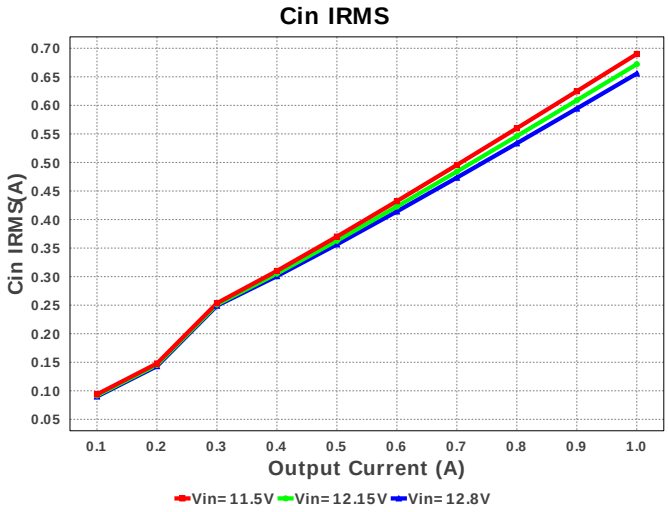
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rcomp	Vishay-Dale	CRCW04022K94FKED Series= CRCW..e3	Res= 2.94 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	Rfadj	Vishay-Dale	CRCW040246K4FKED Series= CRCW..e3	Res= 46.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
13.	T1	CUSTOM	CUSTOM	Lp= 65.149 µH Rp= 187.519 mOhm Leakage_L= 1.303 µH Ns1toNp= 0.33 Rs1= 100.0 mOhms Ns2toNp= 0.237 Rs2= 52.8 mOhms Ns3toNp= 0.154 Rs3= 10.8 mOhms	1	NA	CUSTOM 0 mm^2
14.	U1	Texas Instruments	LM2588S-5.0/NOPB	Switcher	1	$5.10	 TS7B 199 mm^2

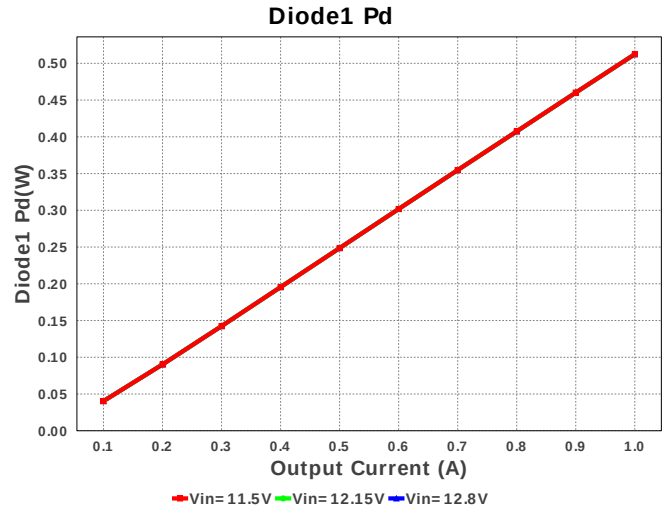


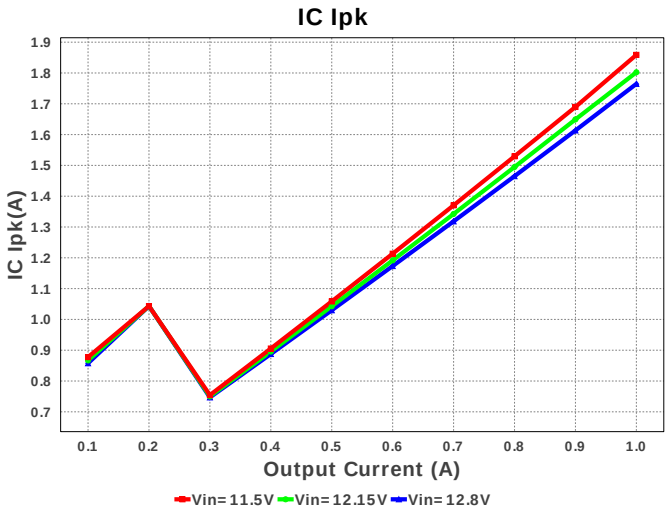


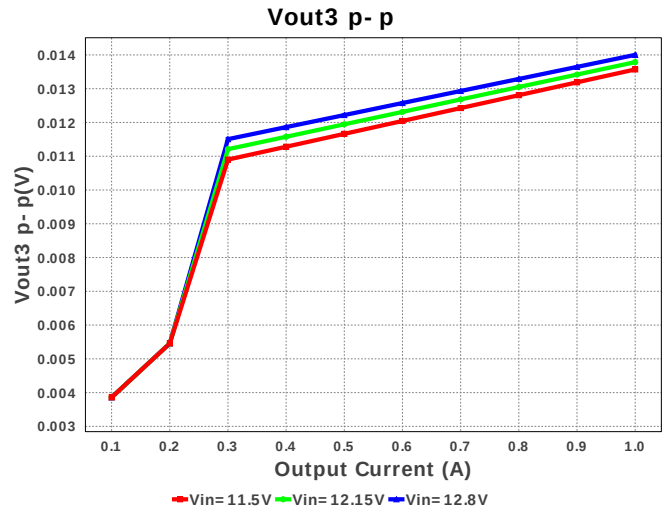


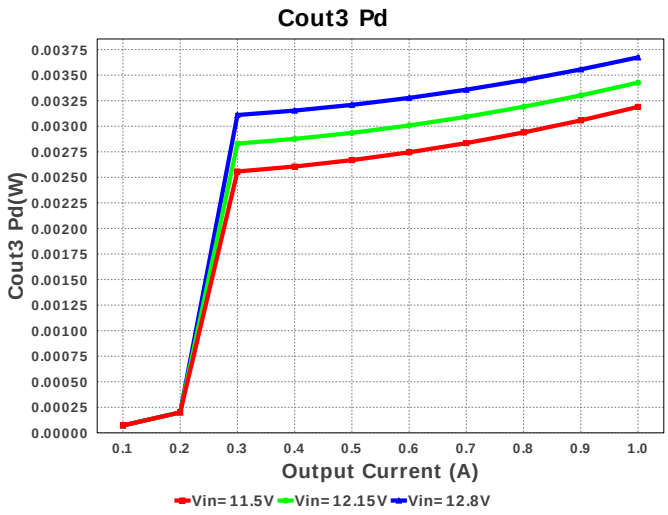


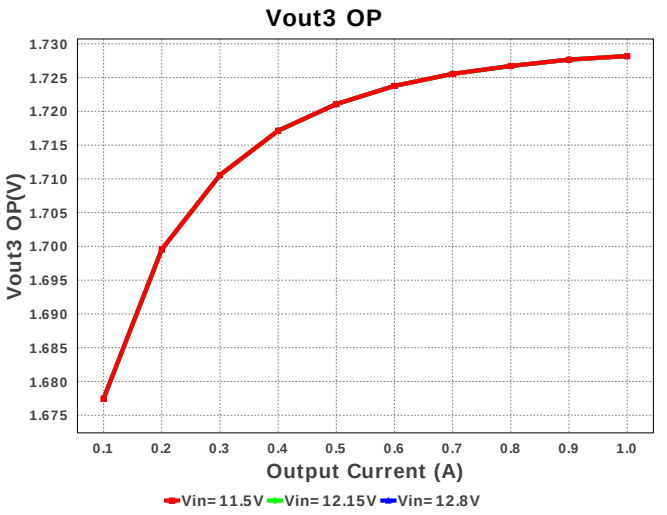


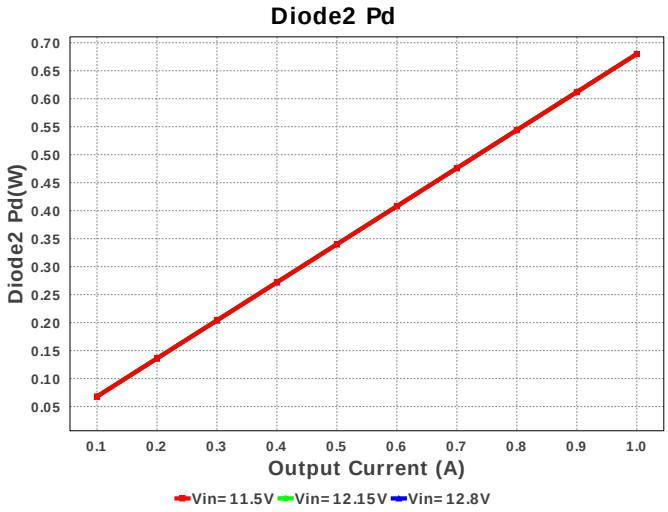


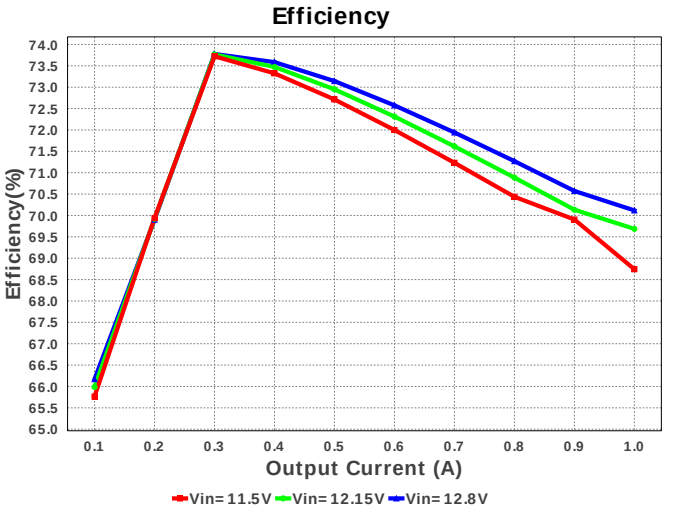


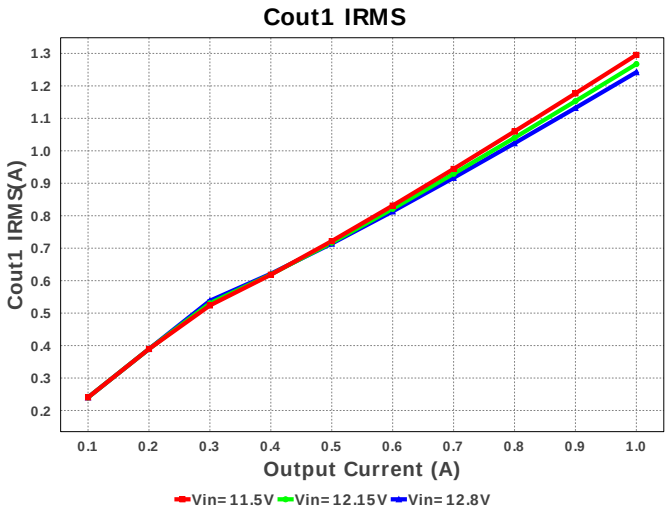


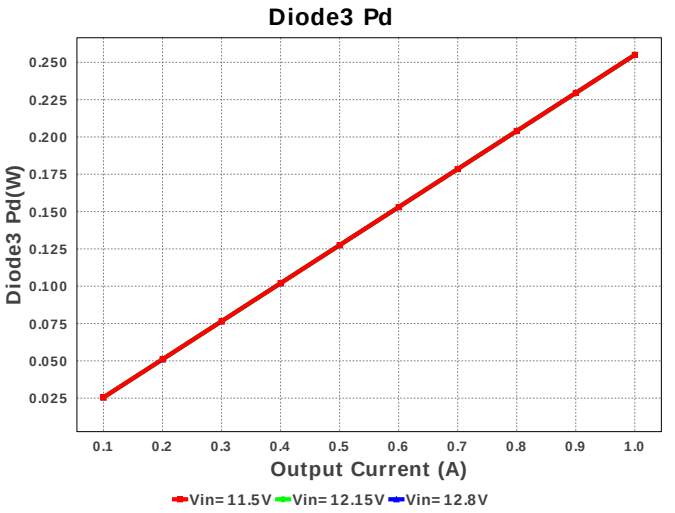


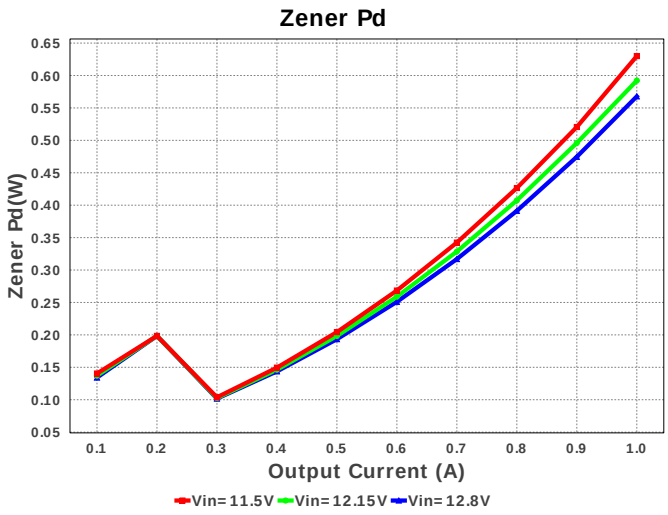


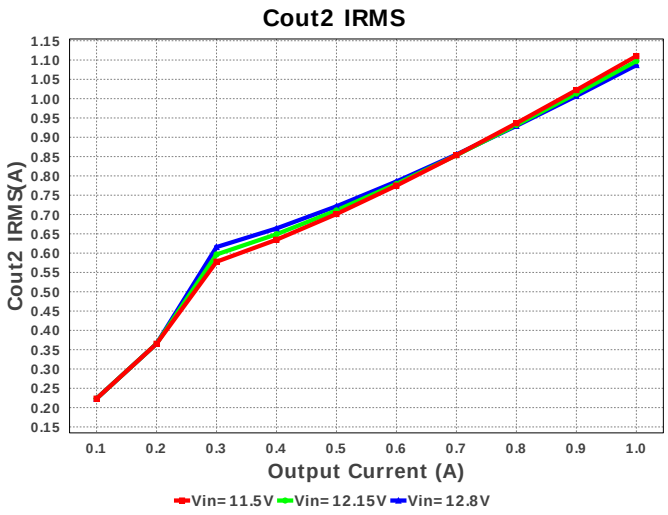


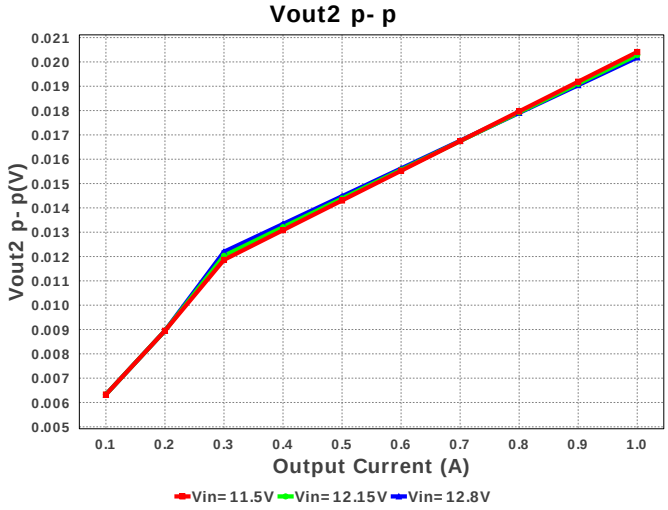


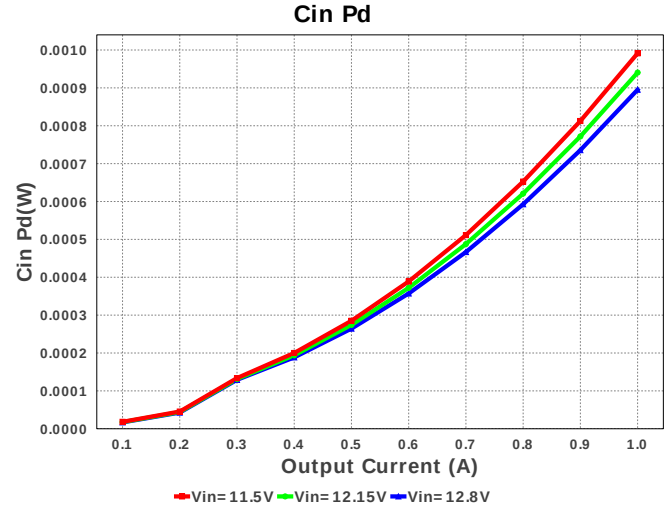


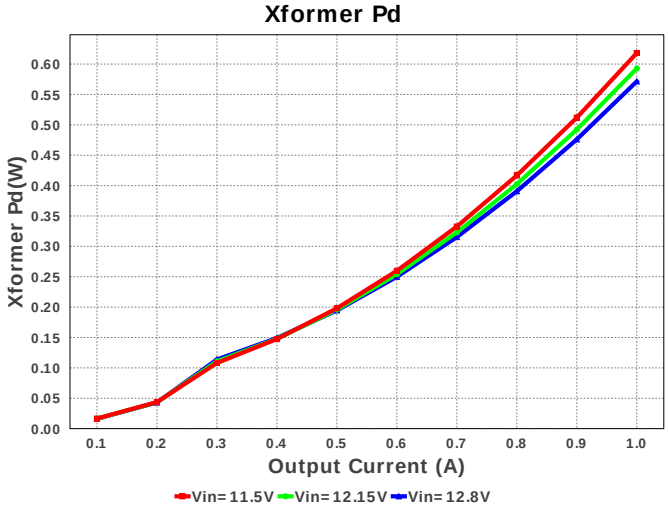


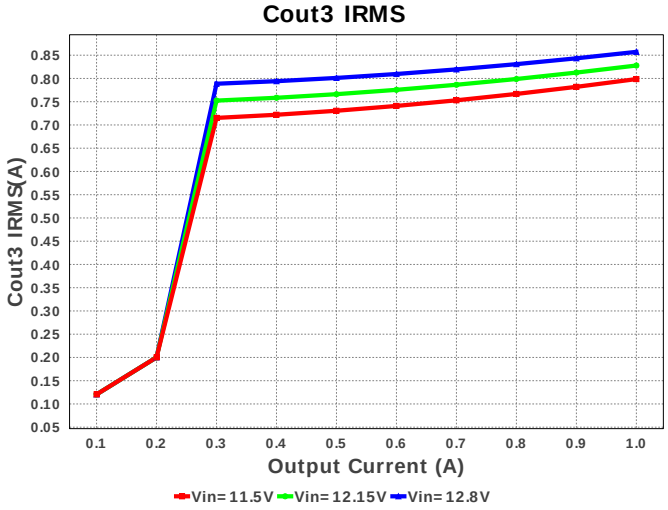


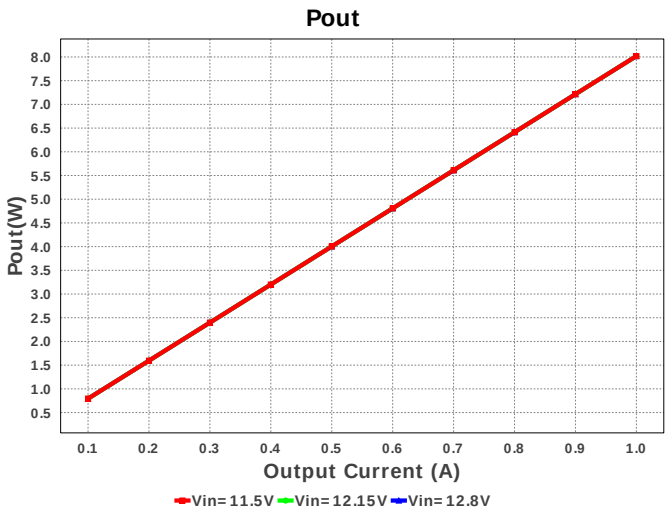


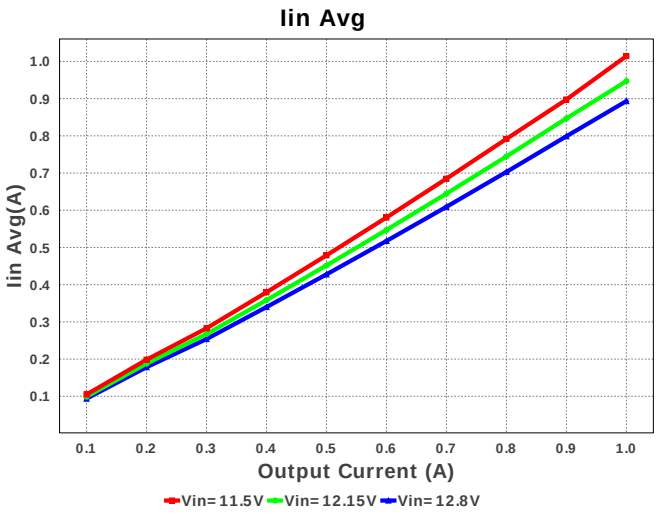


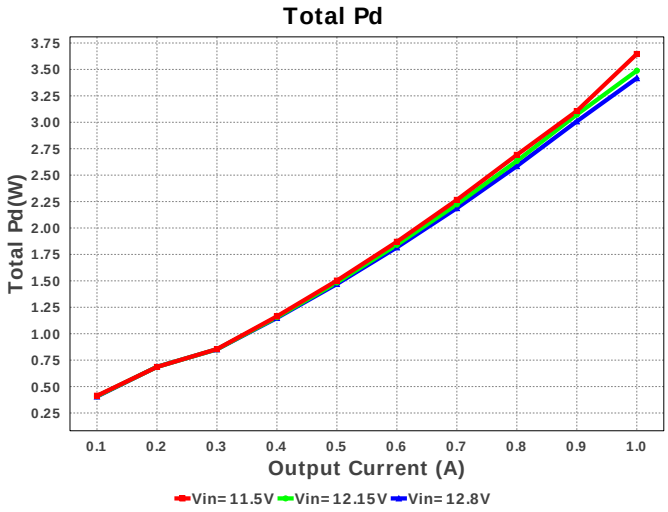


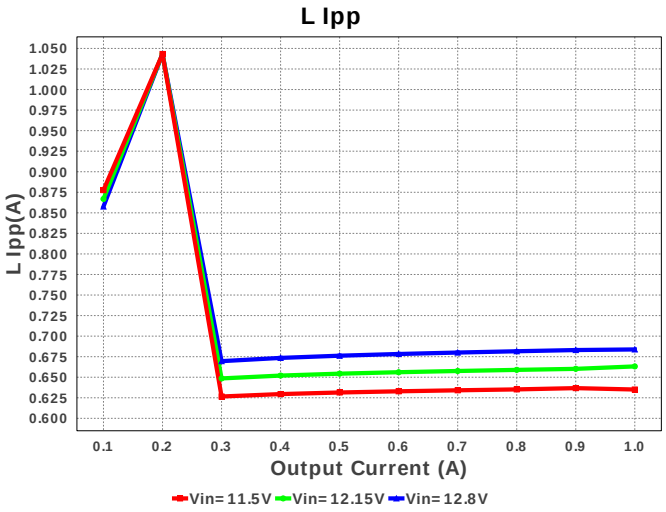


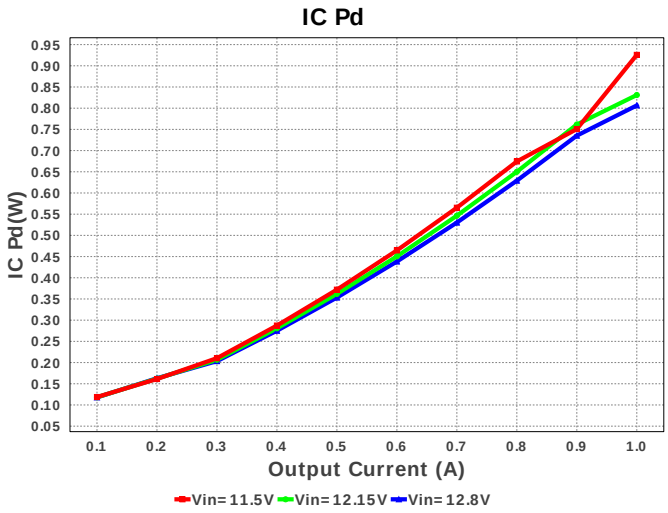


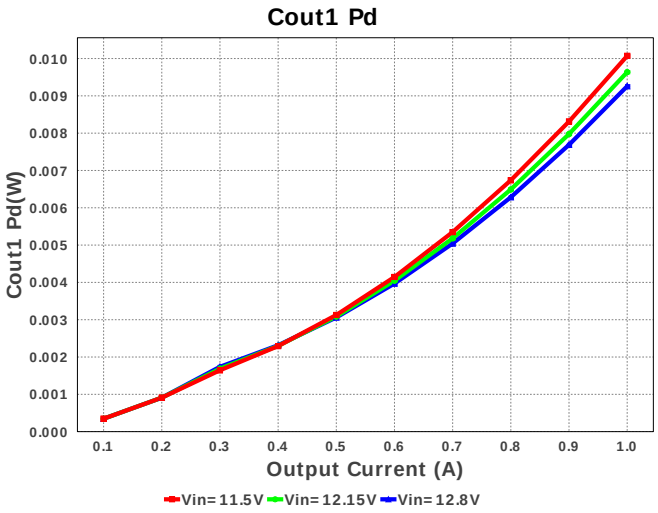


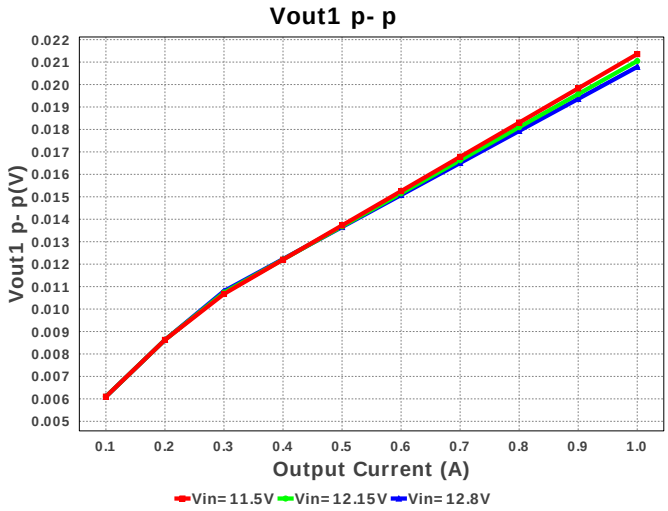












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	720.573 mA	Current	Input capacitor RMS ripple current
2.	Cout1 IRMS	1.349 A	Current	Output capacitor1 RMS ripple current
3.	Cout2 IRMS	1.158 A	Current	Output capacitor2 RMS ripple current
4.	Cout3 IRMS	878.665 mA	Current	Output capacitor3 RMS ripple current
5.	IC Ipk	1.928 A	Current	Peak switch current
6.	Iin Avg	1.032 A	Current	Average input current
7.	L Ipp	696.95 mA	Current	Peak-to-peak inductor ripple current
8.	BOM Count	17	General	Total Design BOM count
9.	FootPrint	1.042 k mm^2	General	Total Foot Print Area of BOM components
10.	Frequency	151.071 kHz	General	Switching frequency
11.	IC Tolerance	87.0 mV	General	IC Feedback Tolerance
12.	Pout	8.366 W	General	Total output power
13.	Total BOM	$0.0	General	Total BOM Cost
14.	Vout3 OP	1.987 V	Op_Point	Operational Voltage 3
15.	Duty Cycle	65.126 %	Op_point	Duty cycle
16.	Efficiency	70.465 %	Op_point	Steady state efficiency
17.	IC Tj	73.611 degC	Op_point	IC junction temperature
18.	ICThetaJA	40.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
19.	IOUT_OP	1.0 A	Op_point	Iout operating point
20.	VIN_OP	11.5 V	Op_point	Vin operating point
21.	Vout1 OP	5.012 V	Op_point	Operational Voltage 1
22.	Vout1 p-p	22.359 mV	Op_point	Peak-to-peak output1 ripple voltage
23.	Vout2 OP	3.447 V	Op_point	Operational Voltage 2
24.	Vout2 p-p	21.613 mV	Op_point	Peak-to-peak output2 ripple voltage
25.	Vout3 p-p	15.201 mV	Op_point	Peak-to-peak output3 ripple voltage
26.	Cin Pd	1.081 mW	Power	Input capacitor power dissipation
27.	Cout1 Pd	10.912 mW	Power	Output capacitor1 power dissipation
28.	Cout1 Pd	10.912 mW	Power	Output capacitor1 power dissipation
29.	Cout2 Pd	8.043 mW	Power	Output capacitor2 power dissipation
30.	Cout3 Pd	3.86 mW	Power	Output capacitor3 power dissipation
31.	Diode1 Pd	512.419 mW	Power	Diode1 power dissipation
32.	Diode2 Pd	409.935 mW	Power	Diode2 power dissipation
33.	Diode3 Pd	177.435 mW	Power	Diode3 power dissipation
34.	IC Pd	965.267 mW	Power	IC power dissipation
35.	Total Pd	3.507 W	Power	Total Power Dissipation
36.	Xformer Pd	673.798 mW	Power	Transformer power dissipation
37.	Zener Pd	740.6 mW	Power	Zener power dissipation
38.	Vout Tolerance	1.74 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	Iout1	1.0	Output Current #1
3.	Iout2	800.0 m	Output Current #2
4.	Iout3	300.0 m	Output Current #3
5.	VinMax	12.8	Maximum input voltage
6.	VinMin	11.5	Minimum input voltage
7.	Vout	5.0	Output Voltage
8.	Vout1	5.0	Output Voltage #1
9.	Vout2	3.3	Output Voltage #2

#	Name	Value	Description
10.	Vout3	1.8	Output Voltage #3
11.	base_pn	LM2588	Texas Instruments Base Part Number
12.	source	DC	Input Source Type
13.	ta	35.0	Ambient temperature

Design Assistance

1. LM2588 Product Folder : http://www.ti.com/product/LM2588 : contains the data sheet and other resources.