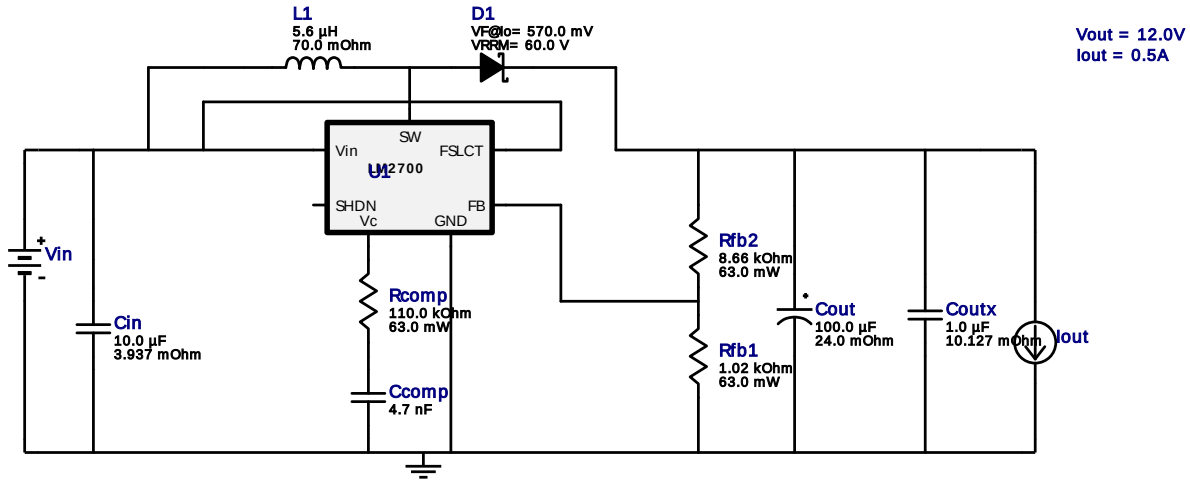
TEXAS INSTRUMENTS

WEBENCH® Design Report

VinMin = 4.6V
VinMax = 5.4V
Vout = 12.0V
Iout = 0.5A

Device = LM2700MTX-ADJ/NOPB
Topology = Boost
Created = 7/18/16 7:11:54 PM
BOM Cost = $2.06
BOM Count = 11
Total Pd = 0.67W

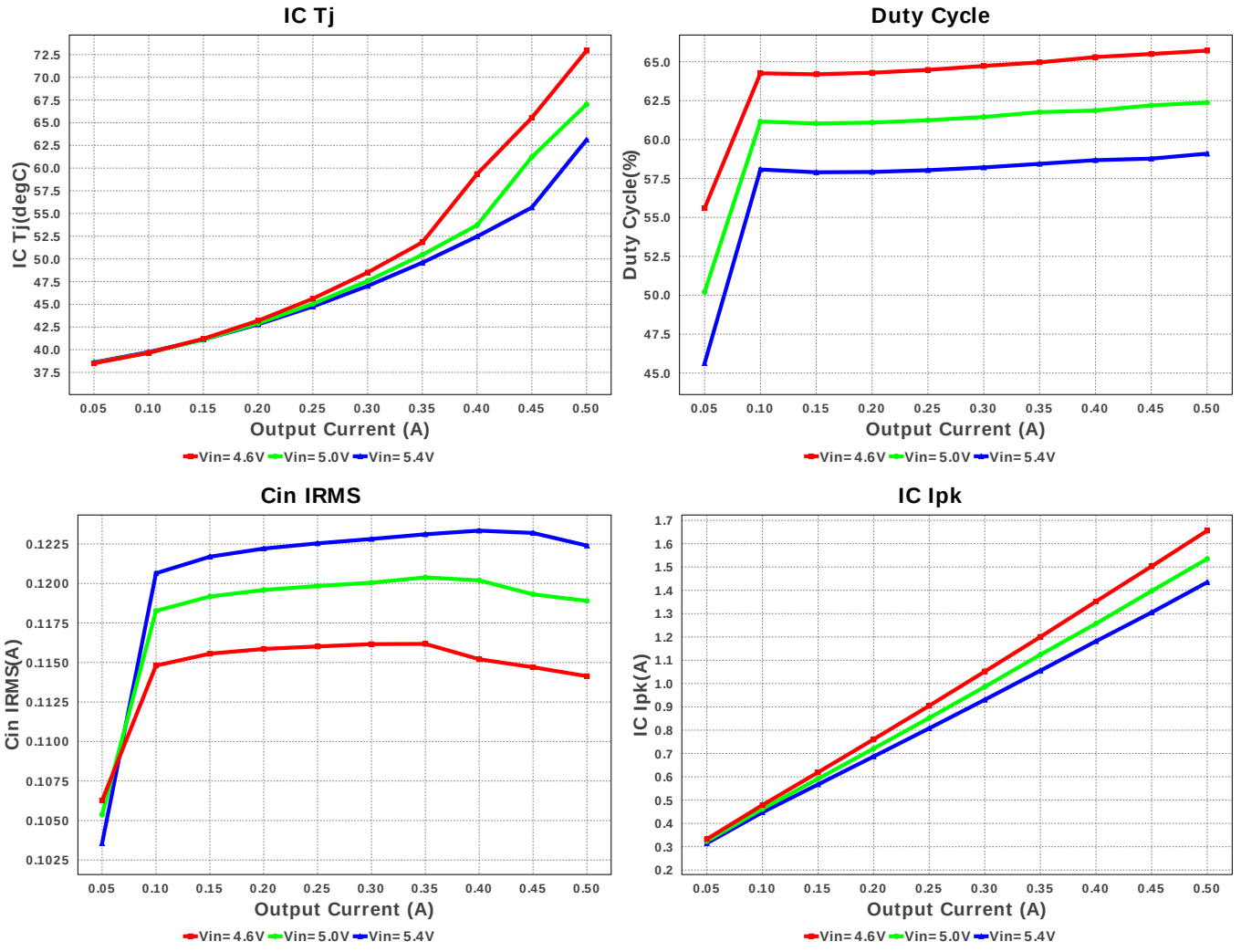
Design : 3496425/8 LM2700MTX-ADJ/NOPB
LM2700MTX-ADJ/NOPB 4.6V-5.4V to 12.00V @ 0.5A

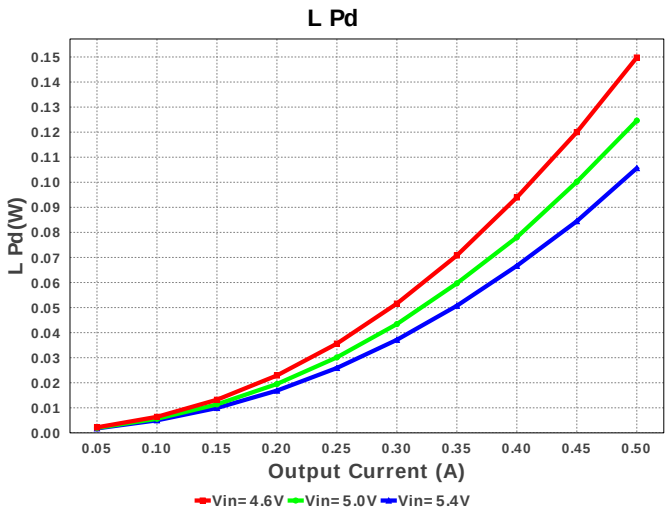


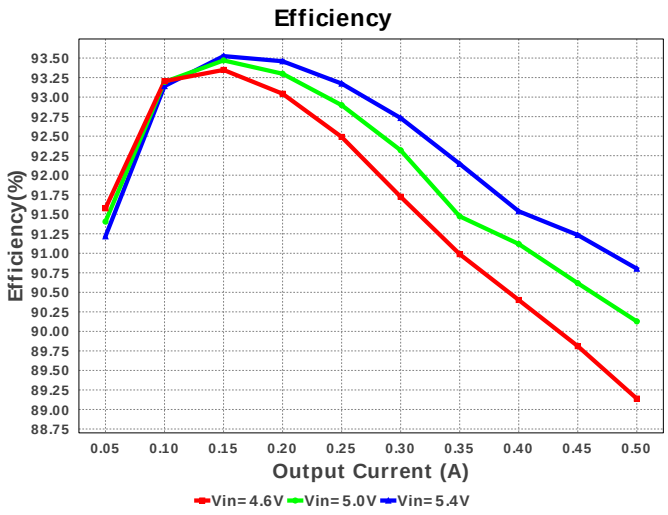
Electrical BOM

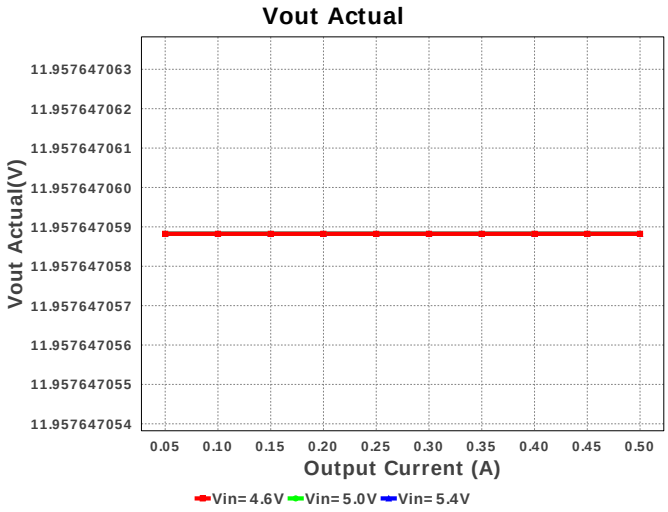
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	Yageo America	CC0805KRX7R9BB472 Series= X7R	Cap= 4.7 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
2.	Cin	MuRata	GRM219R61A106KE44D Series= X5R	Cap= 10.0 uF ESR= 3.937 mOhm VDC= 10.0 V IRMS= 2.7713 A	1	$0.03	0805 7 mm²
3.	Cinx	MuRata	GRM155R60J104KA01D Series= X5R	Cap= 100.0 nF VDC= 6.3 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
4.	Cout	Panasonic	16SVPC100M Series= SVPC	Cap= 100.0 uF ESR= 24.0 mOhm VDC= 16.0 V IRMS= 2.49 A	1	$0.29	SM_RADIAL_6.3AMM 80 mm²
5.	Coutx	MuRata	GRM188R61C105KA93D Series= X5R	Cap= 1.0 uF ESR= 10.127 mOhm VDC= 16.0 V IRMS= 994.63 mA	1	$0.01	0603 5 mm²
6.	D1	NXP Semiconductor	PMEG6010CEH,115	VF@Io= 570.0 mV VRRM= 60.0 V	1	$0.04	SOD-123F 12 mm²
7.	L1	NIC Components	NPI54C5R6MTRF	L= 5.6 µH DCR= 70.0 mOhm	1	$0.09	IND_NPI54C 61 mm²
8.	Rcomp	Vishay-Dale	CRCW0402110KFKED Series= CRCW..e3	Res= 110.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	Rfb1	Vishay-Dale	CRCW04021K02FKED Series= CRCW..e3	Res= 1.02 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rfb2	Vishay-Dale	CRCW04028K66FKED Series= CRCW..e3	Res= 8.66 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

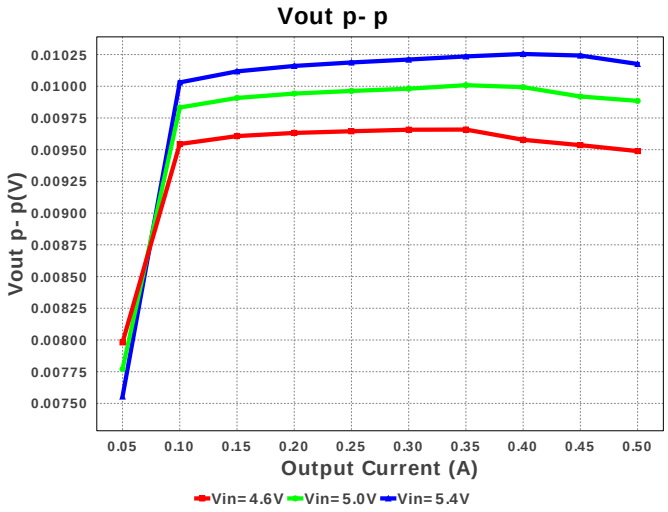
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	U1	Texas Instruments	LM2700MTX-ADJ/NOPB	Switcher	1	$1.55	MTC14 59 mm^2

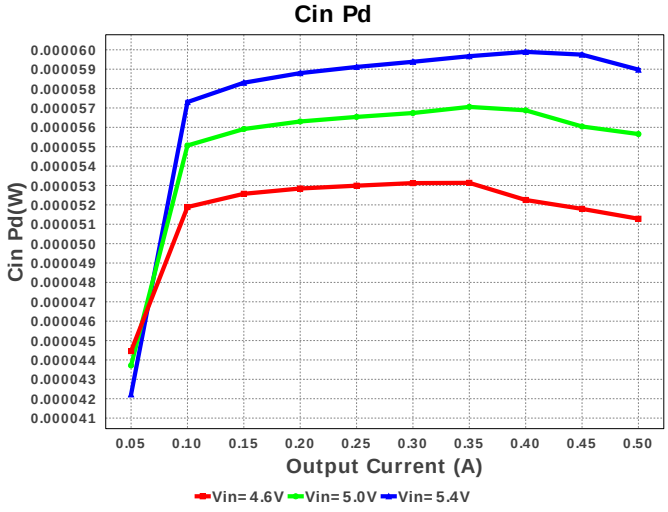


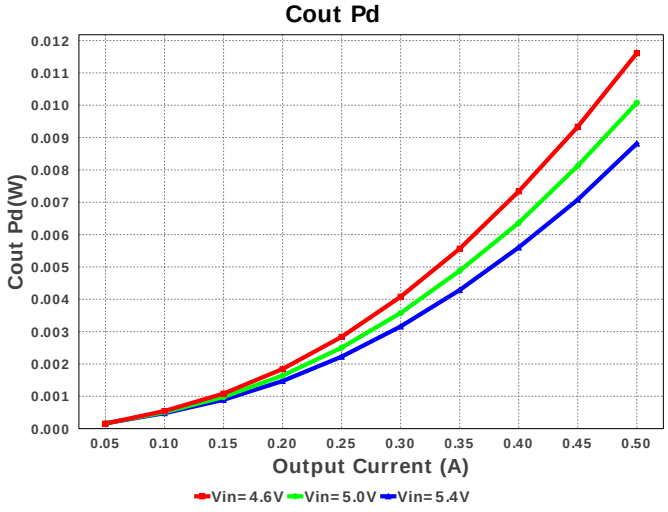


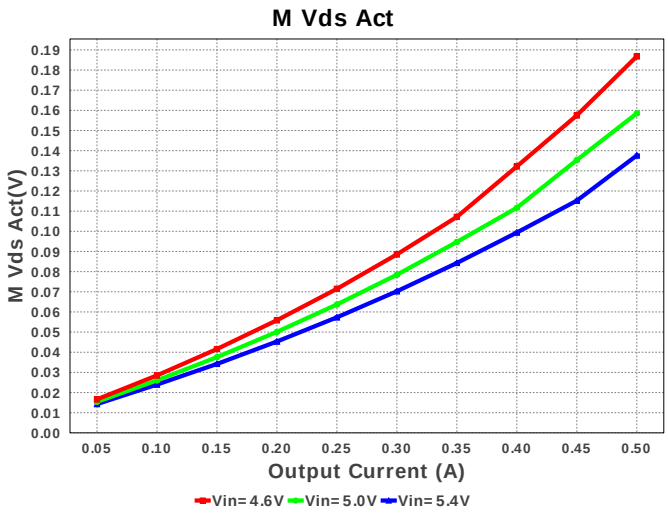


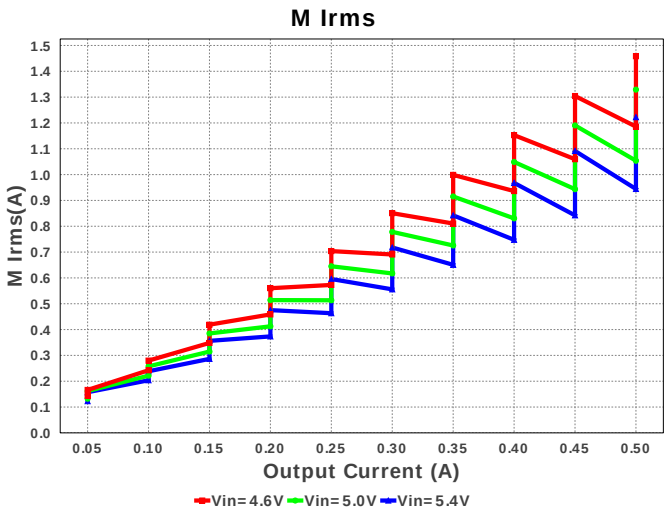


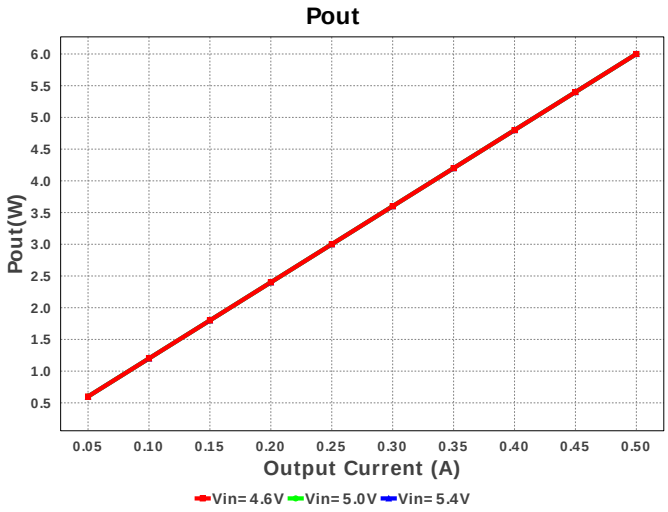


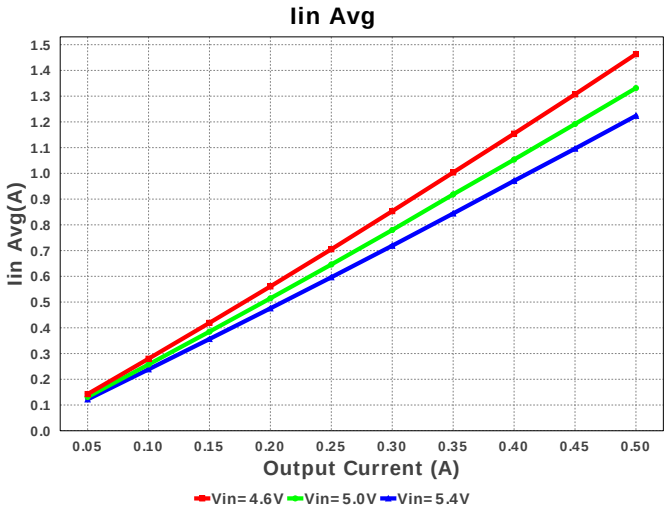


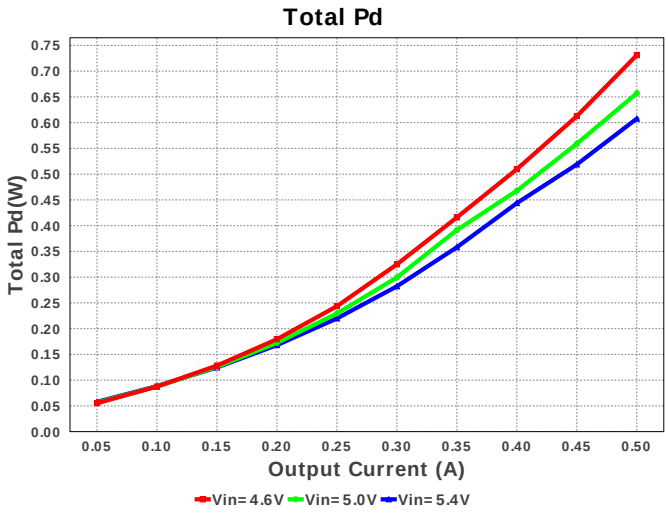


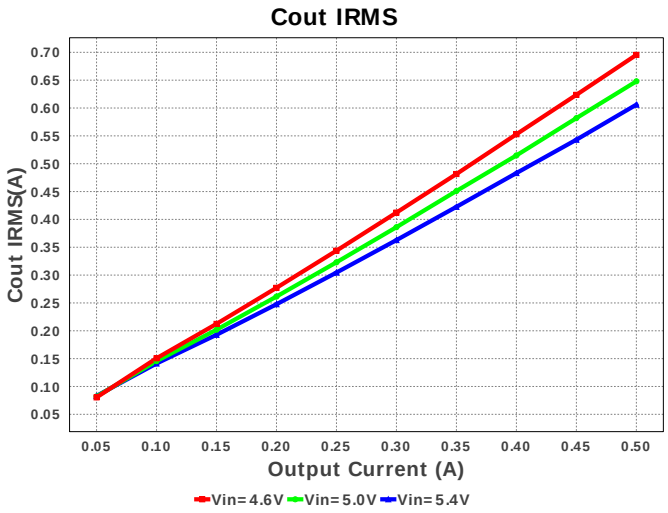


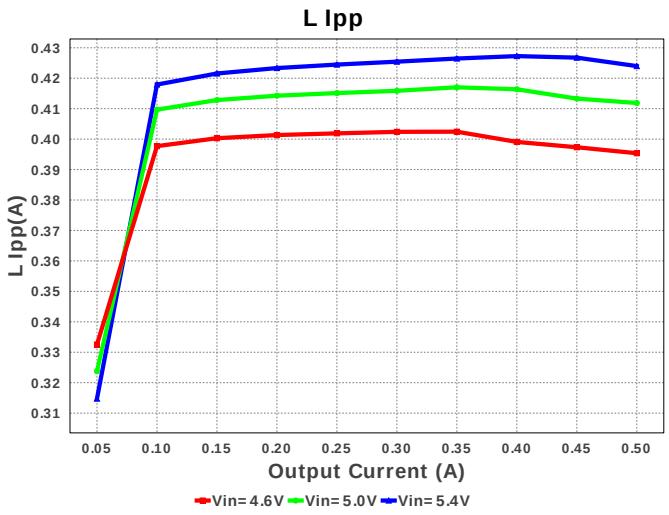


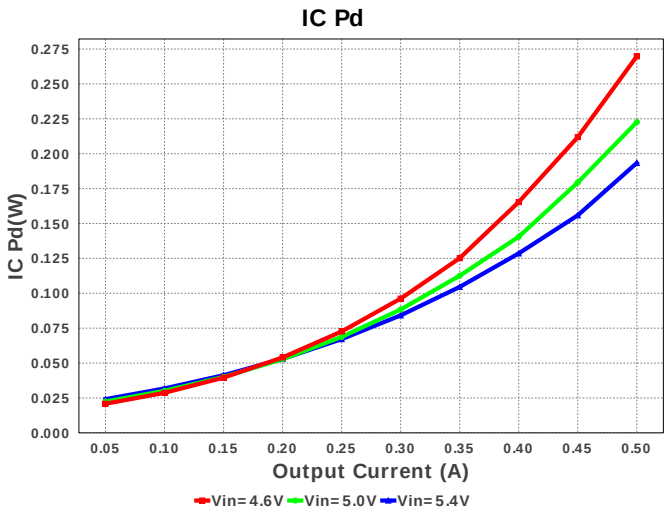


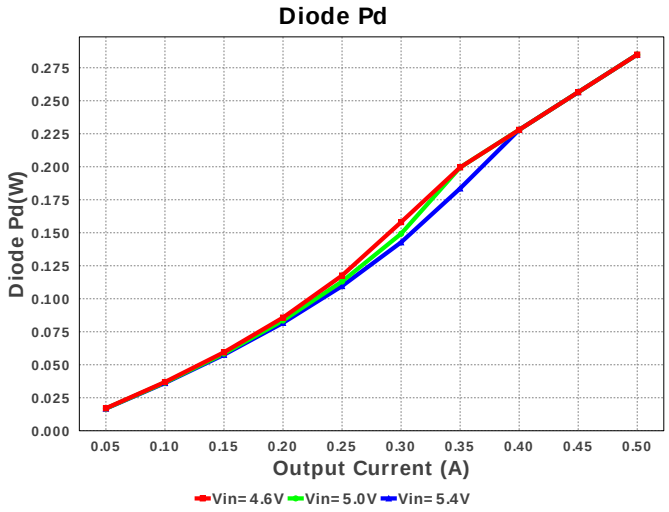












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	113.674 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	691.178 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.643 A	Current	Peak switch current in IC
4.	Iin Avg	1.451 A	Current	Average input current
5.	L Ipp	393.78 mA	Current	Peak-to-peak inductor ripple current
6.	M Irms	1.174 A	Current	MOSFET RMS current
7.	BOM Count	11	General	Total Design BOM count
8.	FootPrint	241.0 mm^2	General	Total Foot Print Area of BOM components
9.	Frequency	1.25 MHz	General	Switching frequency
10.	IC Tolerance	31.5 mV	General	IC Feedback Tolerance
11.	M Vds Act	184.103 mV	General	
12.	Pout	6.0 W	General	Total output power
13.	Total BOM	$2.06	General	Total BOM Cost
14.	Vout Actual	11.958 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
15.	Cross Freq	3.879 kHz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	65.434 %	Op_point	Duty cycle
17.	Efficiency	89.891 %	Op_point	Steady state efficiency
18.	IC Tj	72.379 degC	Op_point	IC junction temperature
19.	ICThetaJA	150.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	500.0 mA	Op_point	Iout operating point
21.	Phase Marg	87.386 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	4.6 V	Op_point	Vin operating point
23.	Vout p-p	9.451 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	50.873 µW	Power	Input capacitor power dissipation
25.	Cout Pd	11.465 mW	Power	Output capacitor power dissipation
26.	Diode Pd	236.638 mW	Power	Diode power dissipation
27.	IC Pd	264.328 mW	Power	IC power dissipation
28.	L Pd	147.374 mW	Power	Inductor power dissipation
29.	Total Pd	674.735 mW	Power	Total Power Dissipation
30.	Vout Tolerance	4.353 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 m	Maximum Output Current
2.	VinMax	5.4	Maximum input voltage
3.	VinMin	4.6	Minimum input voltage
4.	Vout	12.0	Output Voltage
5.	base_pn	LM2700	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	35.0	Ambient temperature

Design Assistance

1. LM2700 Product Folder : http://www.ti.com/product/LM2700 : contains the data sheet and other resources.