WEBENCH® Design Report

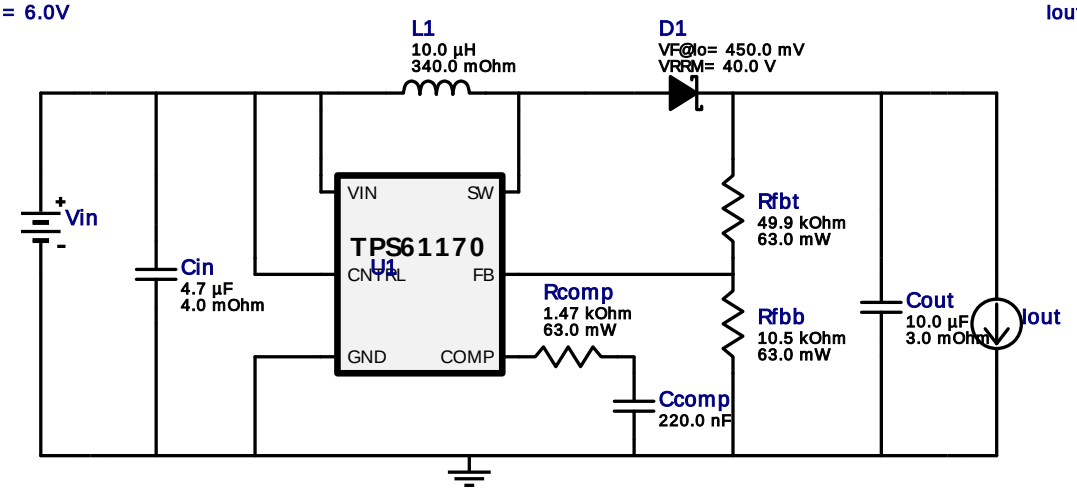
VinMin = 3.0V
VinMax = 6.0V
Vout = 7.0V
Iout = 0.15A

Device = TPS61170DRVR
Topology = Boost
Created = 9/2/14 2:24:08 AM
BOM Cost = $1.53
Footprint = 59.0mm2
BOM Count = 9
Total Pd = 0.24W

Design : 3779120/639 TPS61170DRVR
TPS61170DRVR 3.0V-6.0V to 7.0V @ 0.15A

VinMax = 6.0V

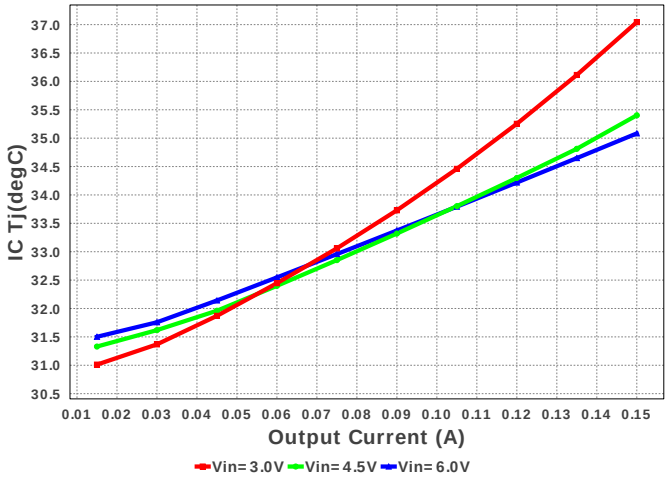
Iout = 0.15A



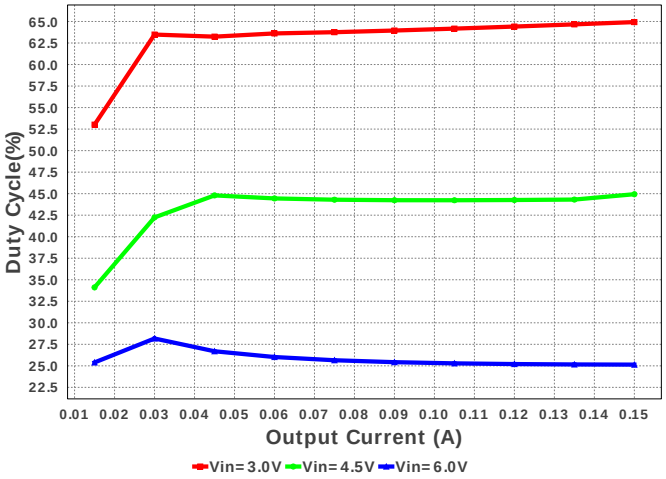
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	MuRata	GRM155C80G224KE01D Series= 379	Cap= 220.0 nF VDC= 4.0 V IRMS= 0.0 A	1	$0.01	0402 3mm2
2.	Cin	Kemet	C0805C475K8PACTU Series= X5R	Cap= 4.7 µF ESR= 4.0 mOhm VDC= 10.0 V IRMS= 9.89 A	1	$0.03	0805 7mm2
3.	Cout	Kemet	C0805C106K8PACTU Series= X5R	Cap= 10.0 µF ESR= 3.0 mOhm VDC= 10.0 V IRMS= 11.43 A	1	$0.04	0805 7mm2
4.	D1	Diodes Inc.	1N5819HW-7-F	VF@Io= 450.0 mV VRRM= 40.0 V	1	$0.08	SOD-123 13mm2
5.	L1	TDK	MLP2520S100MT	L= 10.0 µH DCR= 340.0 mOhm	1	$0.14	MLP2520S-M 12mm2
6.	Rcomp	Vishay-Dale	CRCW04021K47FKED Series= CRCW..e3	Res= 1.47 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3mm2
7.	Rfbb	Vishay-Dale	CRCW040210K5FKED Series= CRCW..e3	Res= 10.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3mm2
8.	Rfbt	Vishay-Dale	CRCW040249K9FKED Series= CRCW..e3	Res= 49.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3mm2
9.	U1	Texas Instruments	TPS61170DRVR	Switcher	1	$1.20	S-PWSON-N6 9mm2

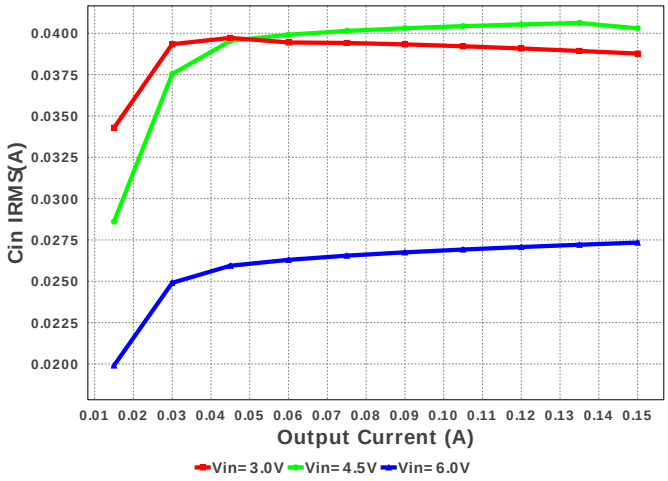
IC Tj



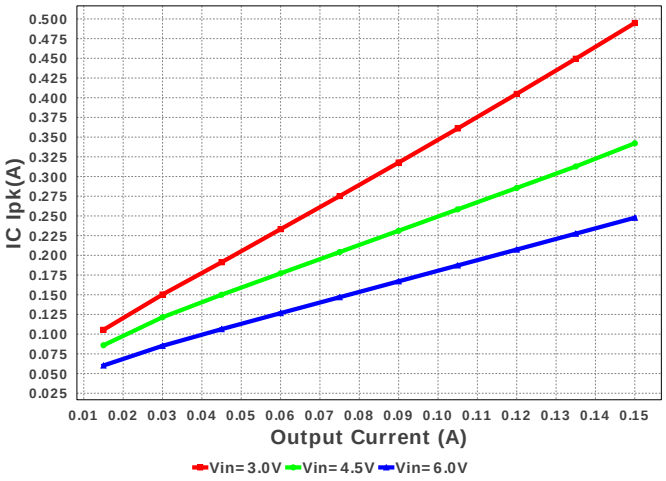
Duty Cycle



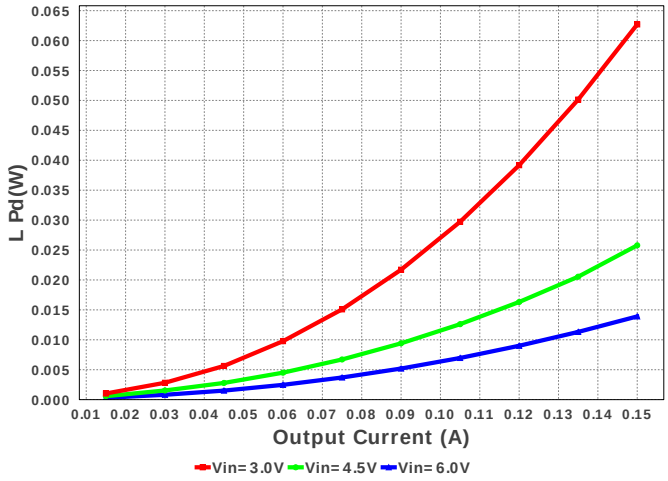
Cin IRMS



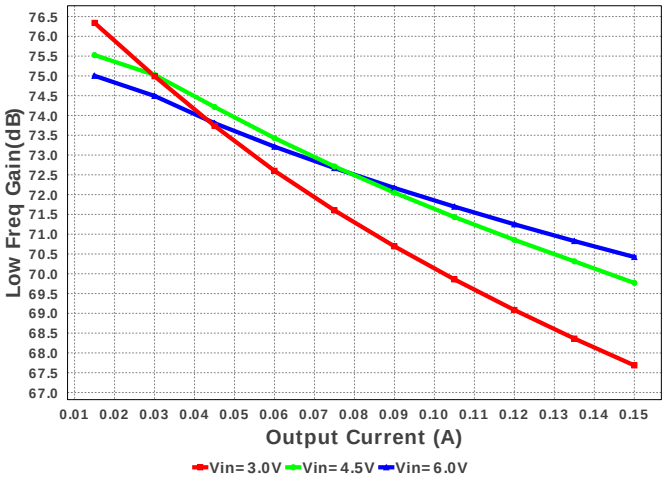
IC Ipk

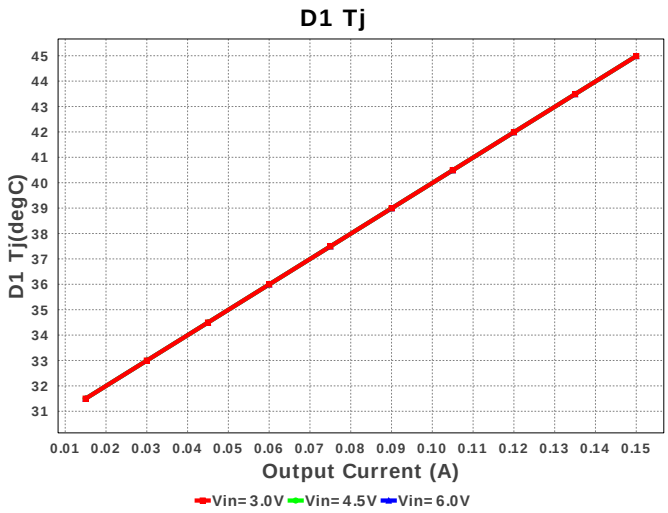


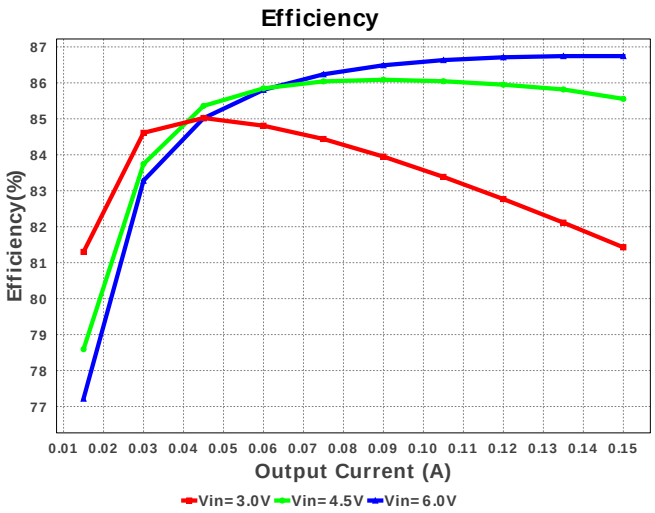
L Pd

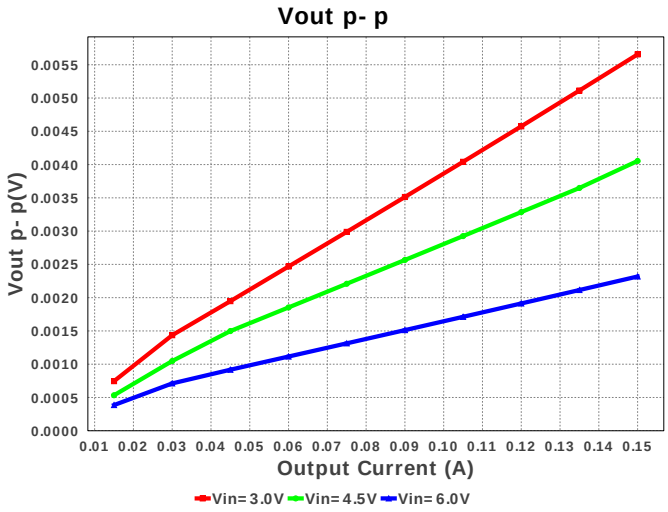


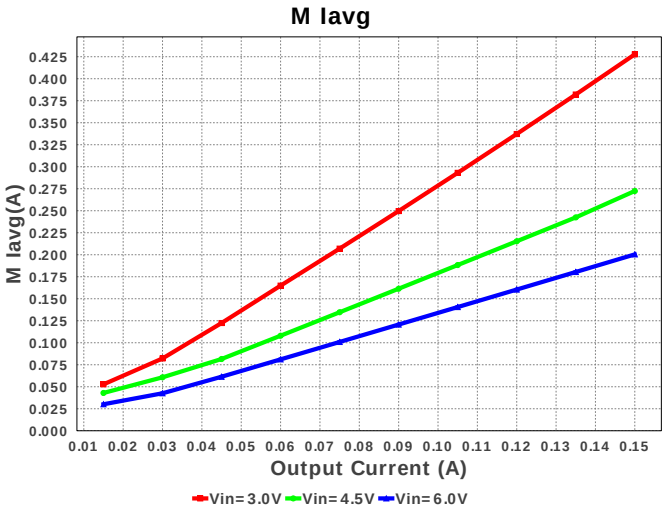
Low Freq Gain

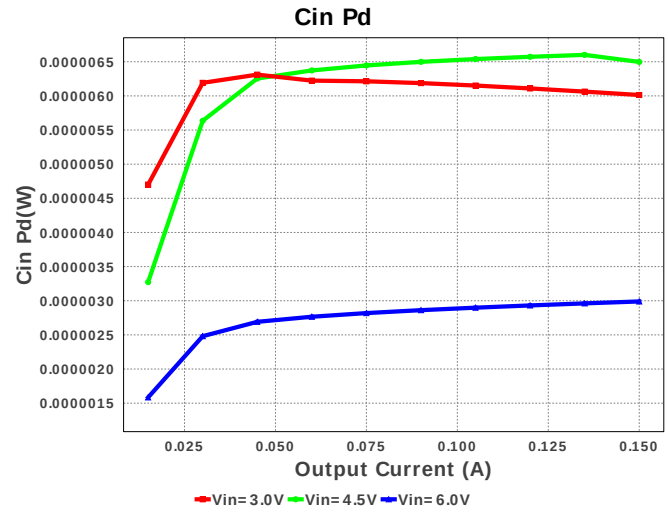


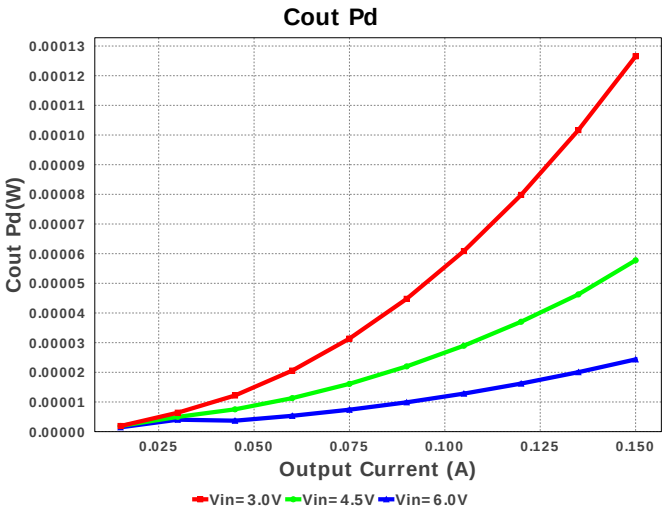


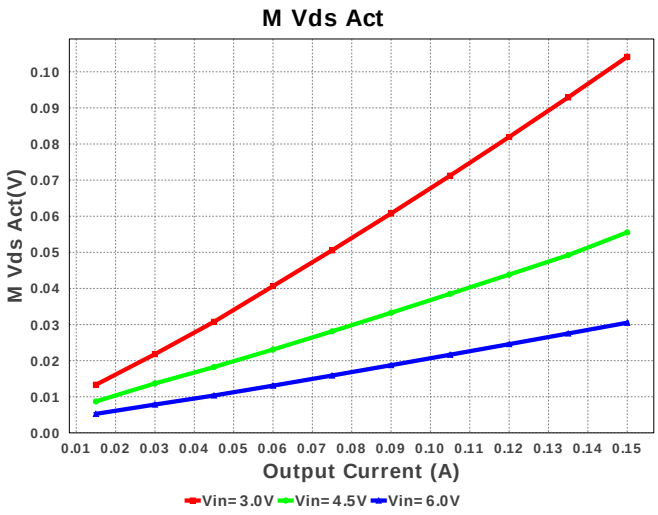


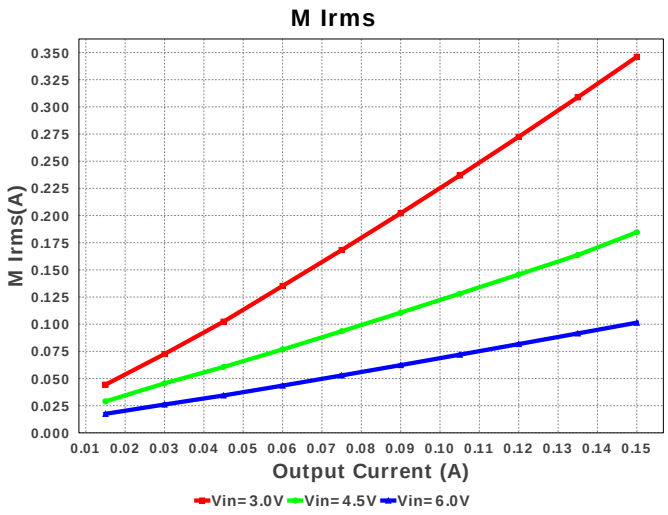


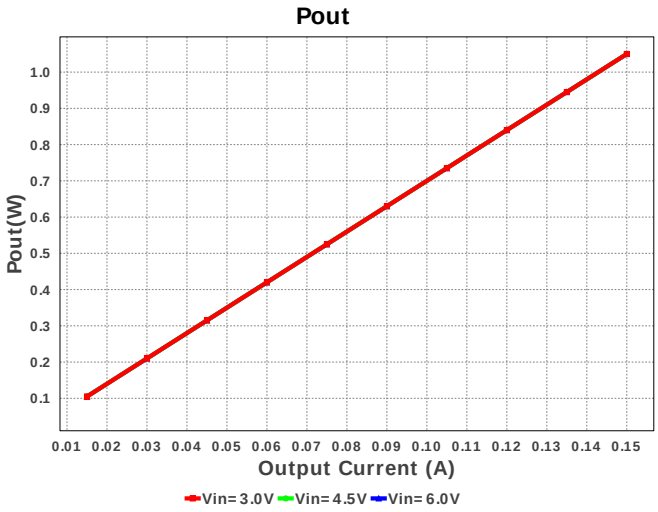


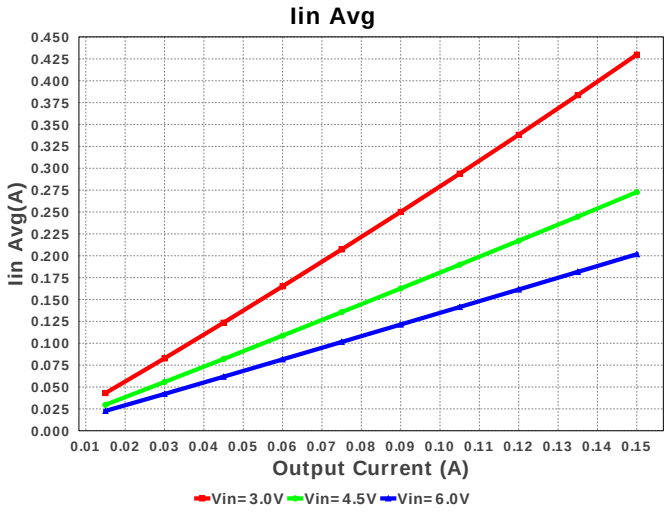


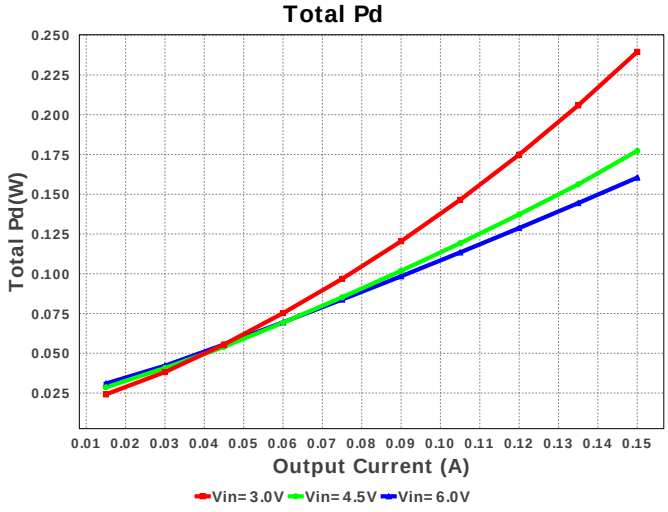


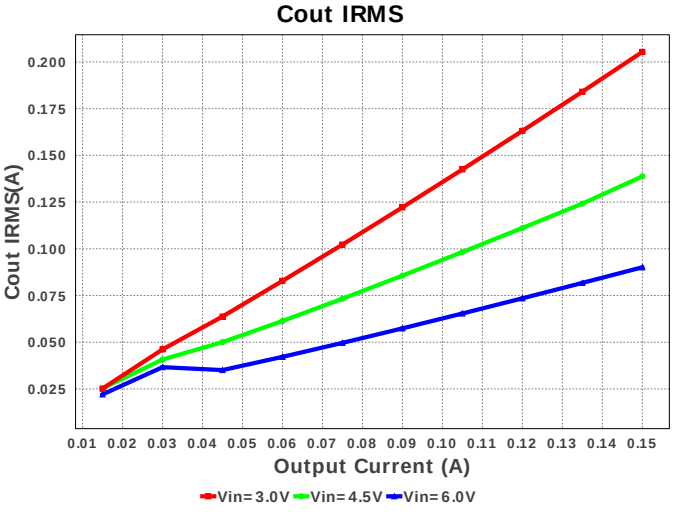


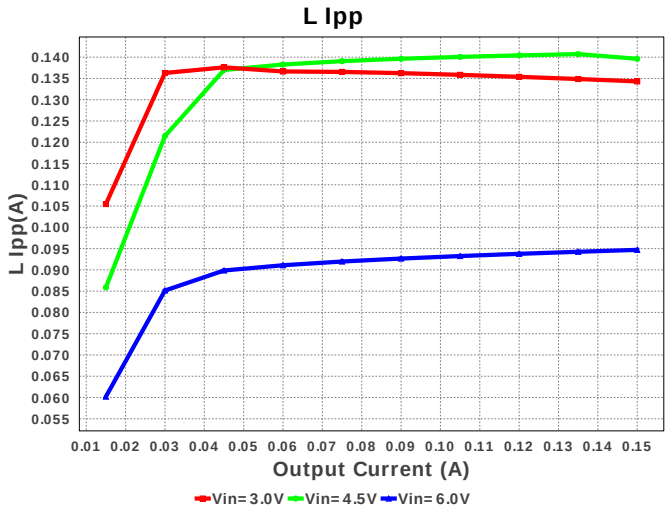


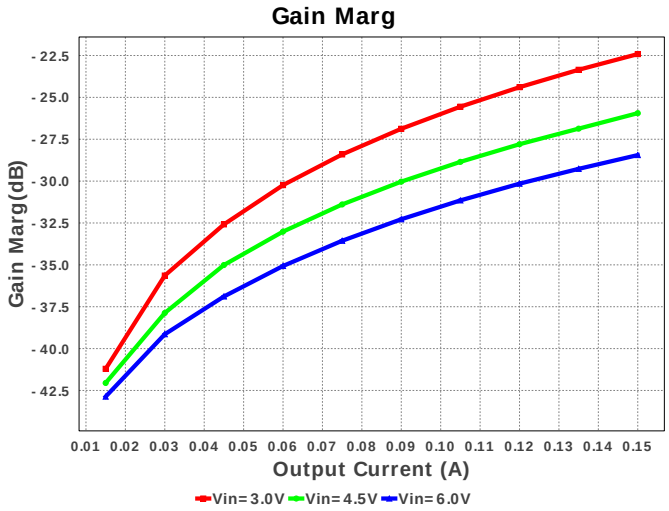


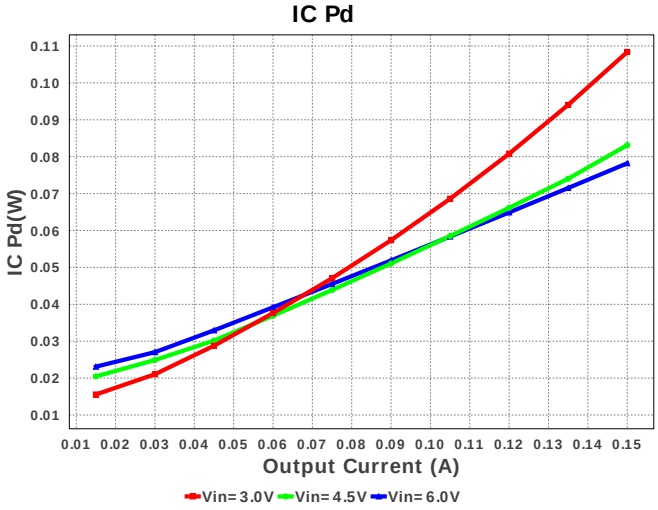


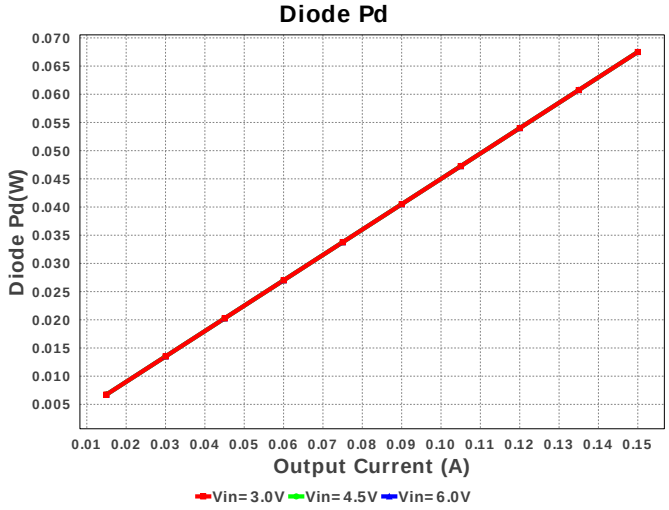


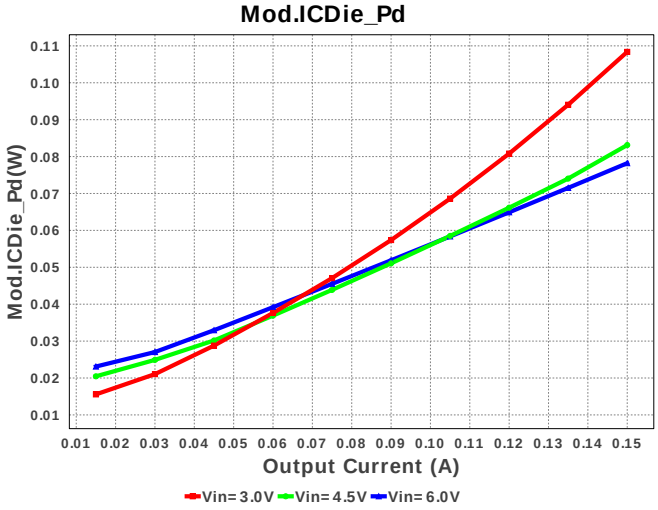


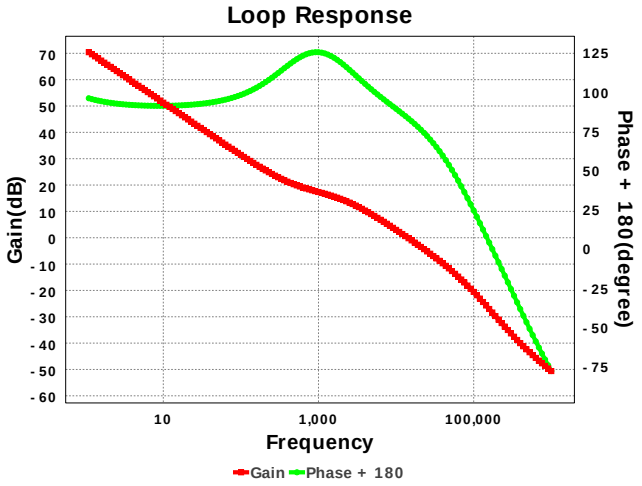












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	38.772 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	205.378 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	494.841 mA	Current	Peak switch current in IC
4.	Iin Avg	429.84 mA	Current	Average input current
5.	L Ipp	134.311 mA	Current	Peak-to-peak inductor ripple current
6.	M Iavg	427.685 mA	Current	MOSFET Average current
7.	M1 Irms	346.032 mA	Current	Q Iavg
8.	BOM Count	9	General	Total Design BOM count
9.	FootPrint	59.0 mm2	General	Total Foot Print Area of BOM components
10.	Frequency	1.2 MHz	General	Switching frequency
11.	IC Tolerance	20.0 mV	General	IC Feedback Tolerance

#	Name	Value	Category	Description
12.	M Vds Act	104.143 mV	General	Voltage drop across the MosFET
13.	Pout	1.05 W	General	Total output power
14.	Total BOM	$1.53	General	Total BOM Cost
15.	D1 Tj	44.985 degC	Op_Point	D1 junction temperature
16.	Vout OP	7.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	6.692 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	64.927 %	Op_point	Duty cycle
19.	Efficiency	81.426 %	Op_point	Steady state efficiency
20.	Gain Marg	-22.416 dB	Op_point	Bode Plot Gain Margin
21.	IC Tj	37.044 degC	Op_point	IC junction temperature
22.	ICThetaJA	65.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	150.0 mA	Op_point	Iout operating point
24.	Phase Marg	88.357 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	3.0 V	Op_point	Vin operating point
26.	Vout p-p	5.656 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	6.013 µW	Power	Input capacitor power dissipation
28.	Cout Pd	126.54 µW	Power	Output capacitor power dissipation
29.	Diode Pd	67.5 mW	Power	Diode power dissipation
30.	IC Pd	108.373 mW	Power	IC power dissipation
31.	L Pd	62.702 mW	Power	Inductor power dissipation
32.	Total Pd	239.515 mW	Power	Total Power Dissipation
33.	Low Freq Gain	67.685 dB	Unknown	Gain at 10Hz

Design Inputs

#	Name	Value	Description
1.	Iout	150.0 mA	Maximum Output Current
2.	Iout1	150.0 mAmps	Output Current #1
3.	VinMax	6.0 V	Maximum input voltage
4.	VinMin	3.0 V	Minimum input voltage
5.	Vout	7.0 V	Output Voltage
6.	Vout1	7.0 Volt	Output Voltage #1
7.	base_pn	TPS61170	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **TPS61170** Product Folder : http://www.ti.com/product/tps61170 : contains the data sheet and other resources.