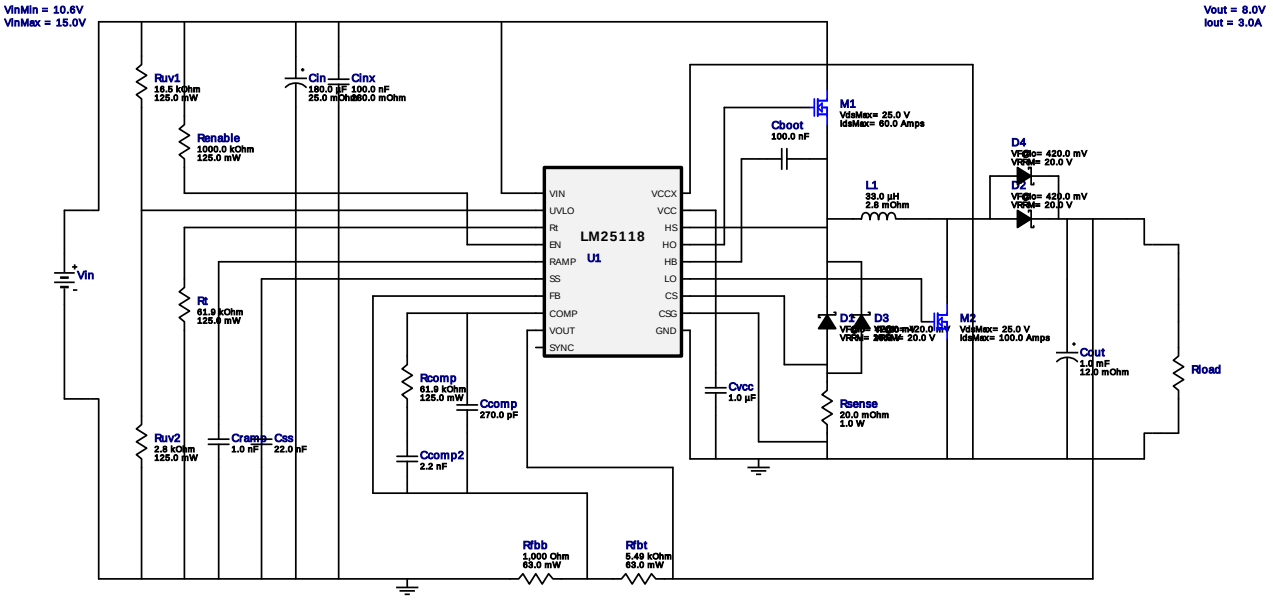
VinMin = 10.6V
VinMax = 15.0V
Vout = 8.0V
Iout = 3.0A

Device = LM25118MH/NOPB
Topology = Buck_Boost
Created = 7/22/14 12:49:55 AM
BOM Cost = $8.61
Footprint = 1,730.0mm2
BOM Count = 25
Total Pd = 2.26W

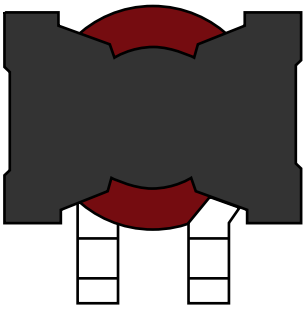
WEBENCH® Design Report

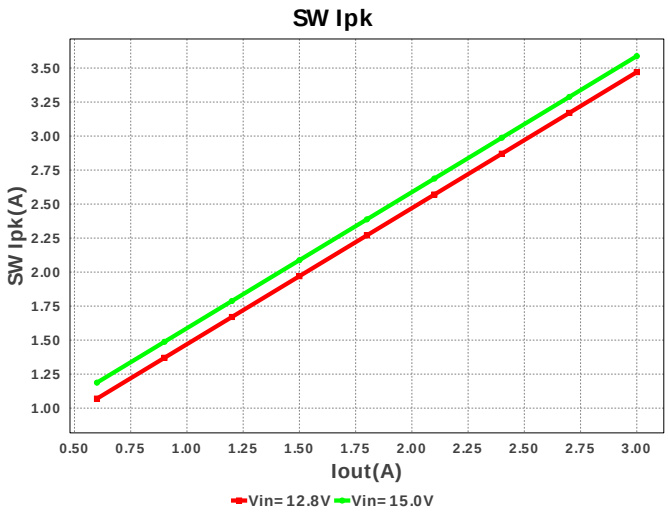
Design : 1175773/515 LM25118MH/NOPB
LM25118MH/NOPB 10.6V-15.0V to 8.0V @ 3.0A

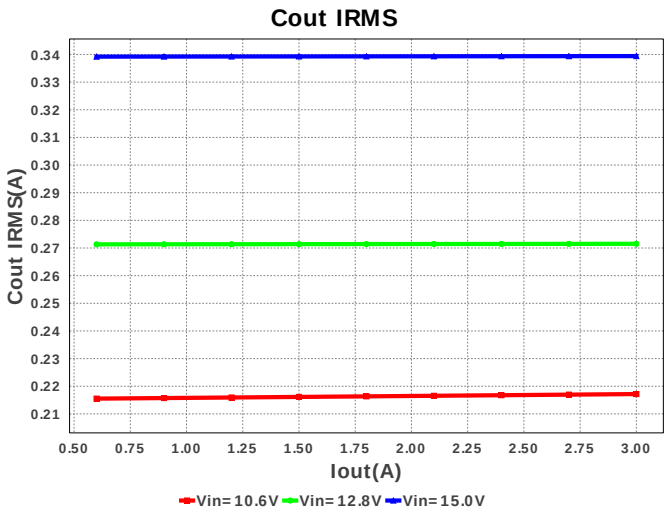


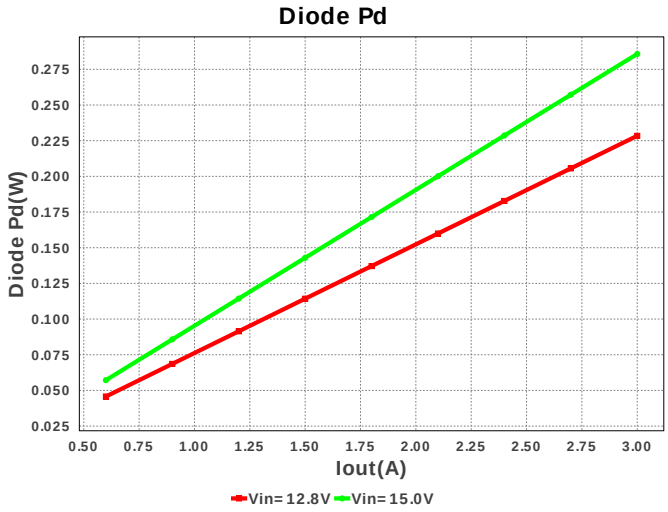
Electrical BOM

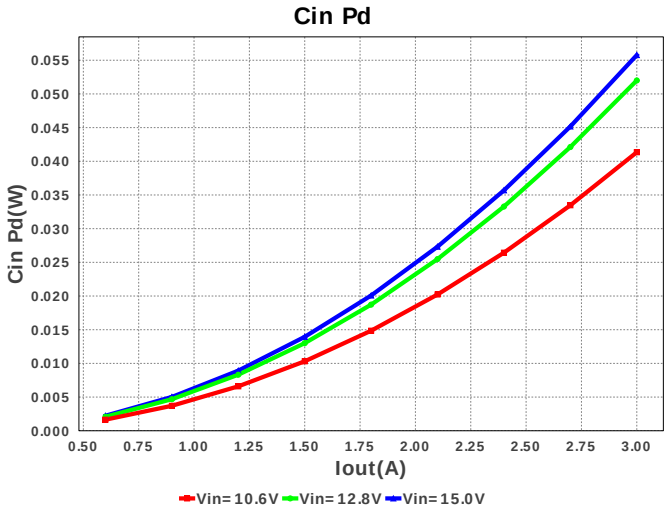
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Yageo America	CC0805KRX7R9BB104 Series= X7R	Cap= 100.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7mm2
2.	Ccomp	Yageo America	CC0805KRX7R9BB271 Series= X7R	Cap= 270.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7mm2
3.	Ccomp2	Yageo America	CC0805KRX7R9BB222 Series= X7R	Cap= 2.2 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7mm2
4.	Cin	Panasonic	20SVPF180M Series= 1273	Cap= 180.0 µF ESR= 25.0 mOhm VDC= 20.0 V IRMS= 3.2 A	1	$0.50	CAPSMT_62_E7 106mm2
5.	Cinx	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 7mm2
6.	Cout	Panasonic	16SVPF1000M Series= 1273	Cap= 1.0 mF ESR= 12.0 mOhm VDC= 16.0 V IRMS= 5.4 A	1	$0.74	CAPSMT_62_F12 151mm2
7.	Cramp	Yageo America	CC0805KRX7R9BB102 Series= X7R	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7mm2
8.	Css	Yageo America	CC0805KRX7R9BB223 Series= X7R	Cap= 22.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7mm2
9.	Cvcc	Taiyo Yuden	EMK212B7105KG-T Series= X7R	Cap= 1.0 µF VDC= 16.0 V IRMS= 0.0 A	1	$0.02	0805 7mm2

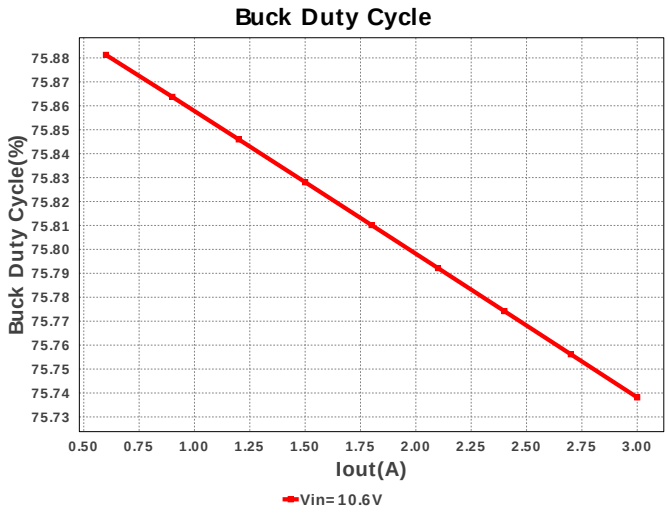
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	D1	Vishay-Semiconductor	SL42-E3/57T	VF@Io= 420.0 mV VRRM= 20.0 V	1	$0.42	 SMC 83mm2
11.	D2	Vishay-Semiconductor	SL42-E3/57T	VF@Io= 420.0 mV VRRM= 20.0 V	1	$0.42	 SMC 83mm2
12.	D3	Vishay-Semiconductor	SL42-E3/57T	VF@Io= 420.0 mV VRRM= 20.0 V	1	$0.42	 SMC 83mm2
13.	D4	Vishay-Semiconductor	SL42-E3/57T	VF@Io= 420.0 mV VRRM= 20.0 V	1	$0.42	 SMC 83mm2
14.	L1	Coilcraft	D1787-AL	L= 33.0 µH DCR= 2.8 mOhm	1	$2.04	 D1787 895mm2
15.	M1	Texas Instruments	CSD16327Q3	VdsMax= 25.0 V IdsMax= 60.0 Amps	1	$0.44	 TRANS_NexFET_Q3 19mm2
16.	M2	Texas Instruments	CSD16342Q5A	VdsMax= 25.0 V IdsMax= 100.0 Amps	1	$0.47	 TRANS_NexFET_Q5A 55mm2
17.	Rcomp	Panasonic	ERJ-6ENF6192V Series= 225	Res= 61.9 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7mm2
18.	Renable	Panasonic	ERJ-6ENF1004V Series= 225	Res= 1000.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7mm2
19.	Rfbb	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1,000 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3mm2
20.	Rfbt	Vishay-Dale	CRCW04025K49FKED Series= CRCW..e3	Res= 5.49 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3mm2
21.	Rsense	Susumu Co Ltd	PRL1632-R020-F-T1 Series= 237	Res= 20.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	$0.19	 1206 11mm2
22.	Rt	Panasonic	ERJ-6ENF6192V Series= 225	Res= 61.9 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7mm2
23.	Ruv1	Panasonic	ERJ-6ENF1652V Series= 225	Res= 16.5 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7mm2
24.	Ruv2	Panasonic	ERJ-6ENF2801V Series= 225	Res= 2.8 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	 0805 7mm2
25.	U1	Texas Instruments	LM25118MH/NOPB	Switcher	1	$2.40	 MXA20A 71mm2

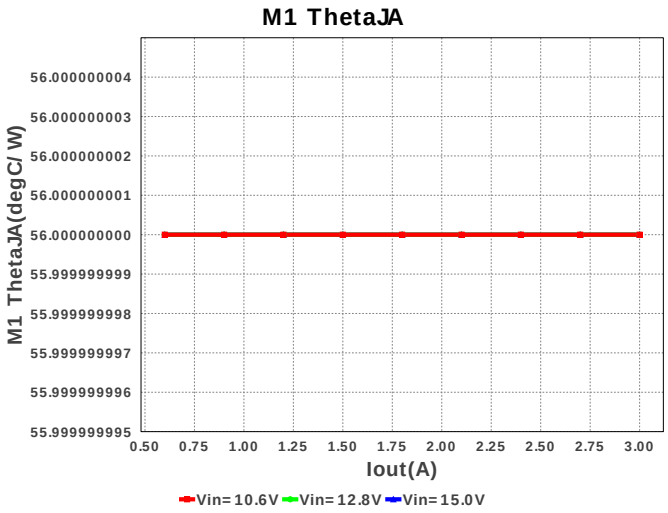


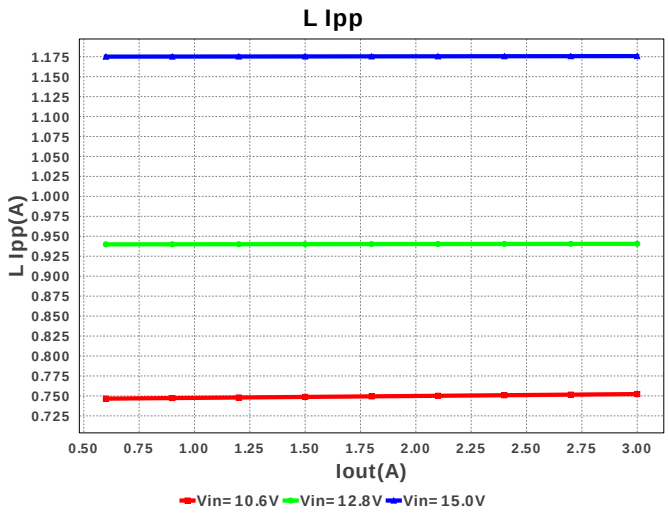


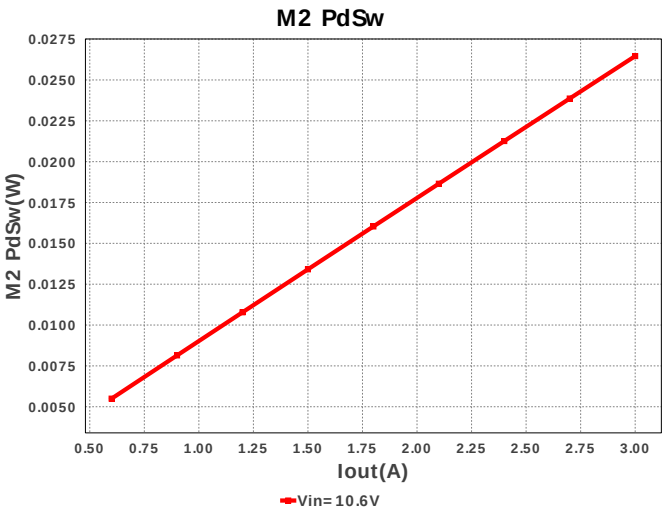


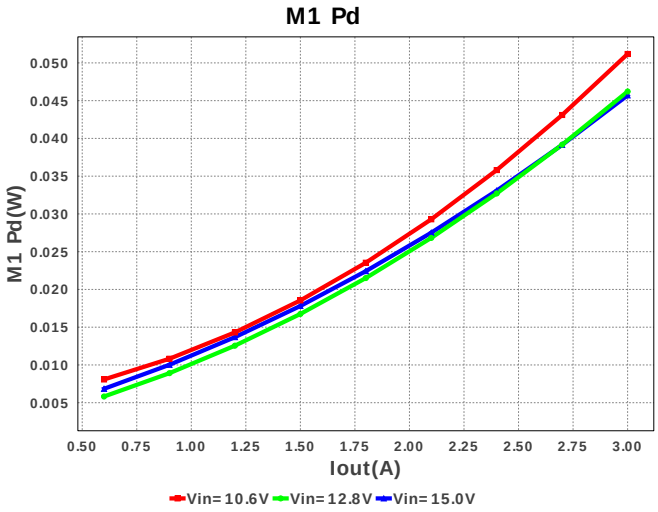


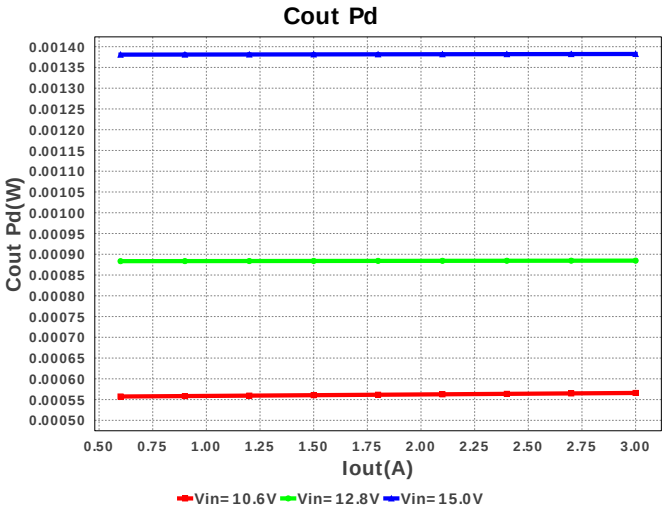


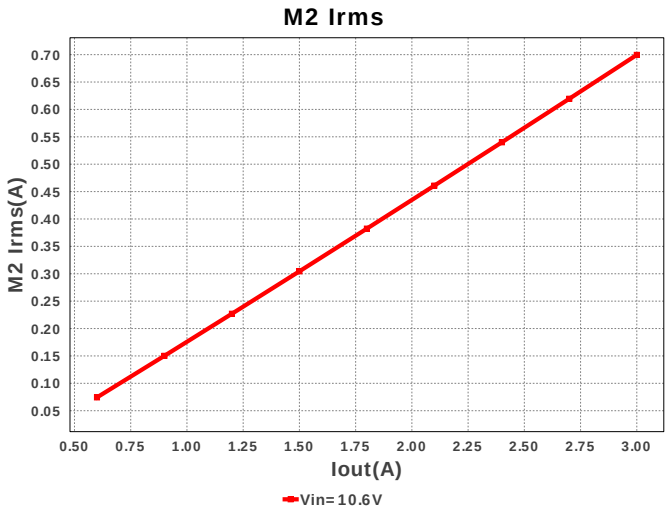


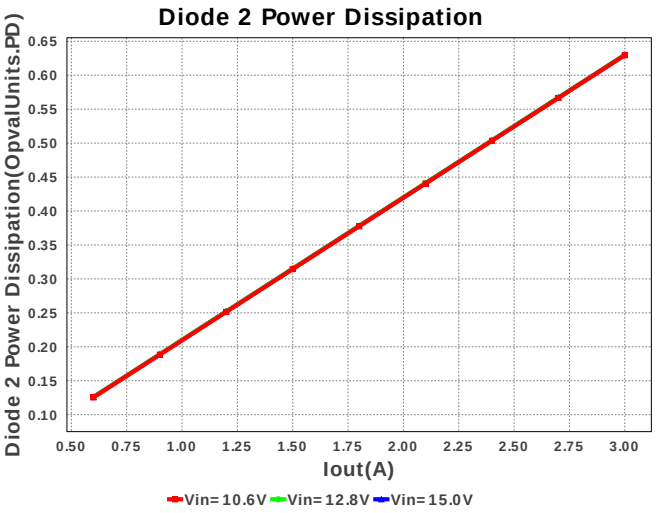


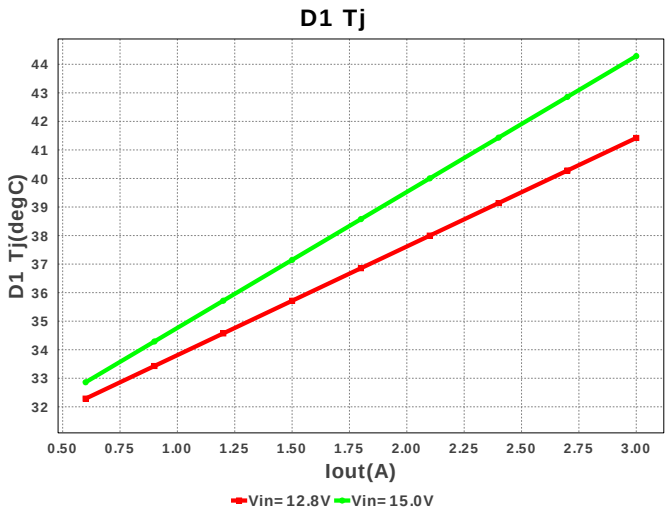


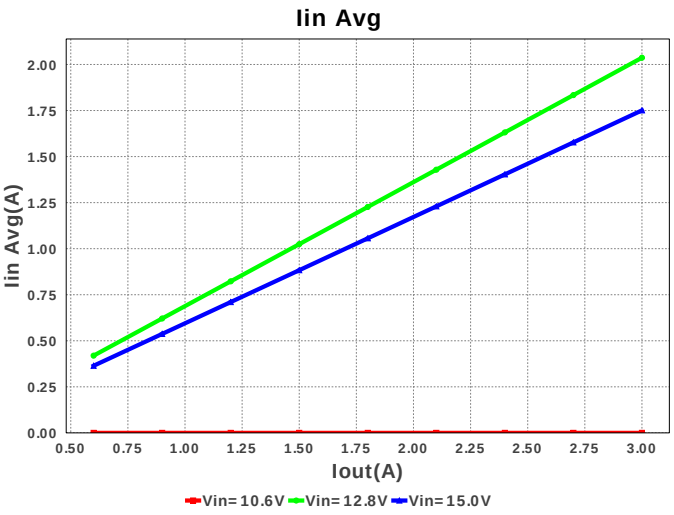


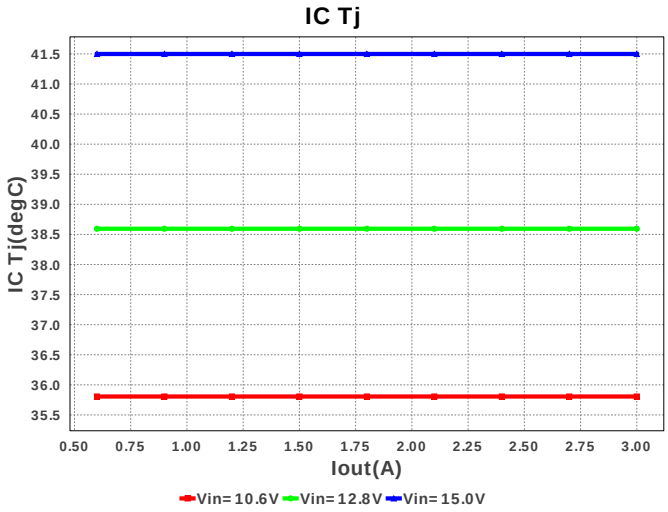


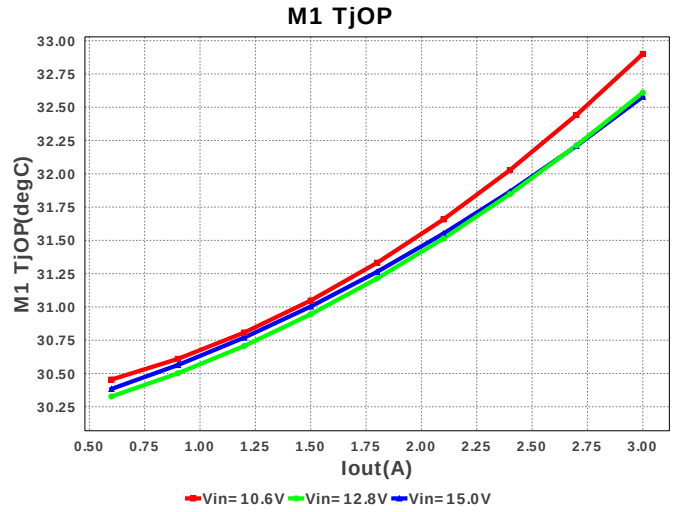


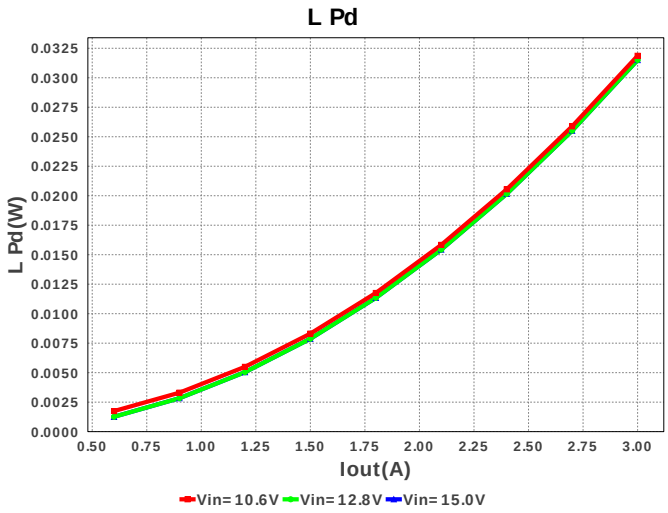


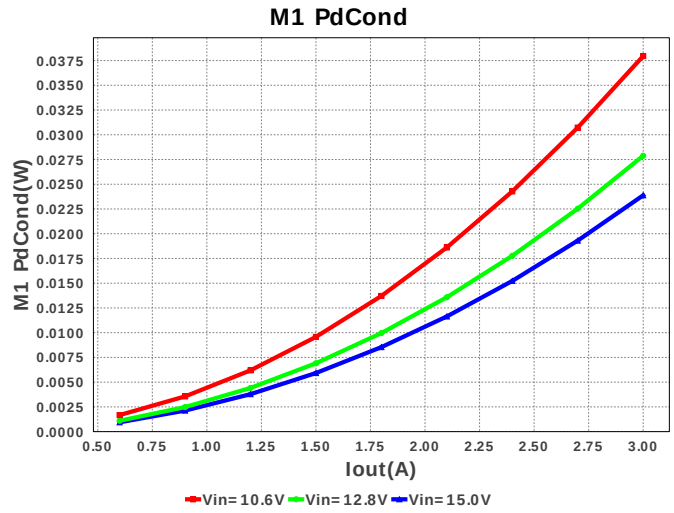


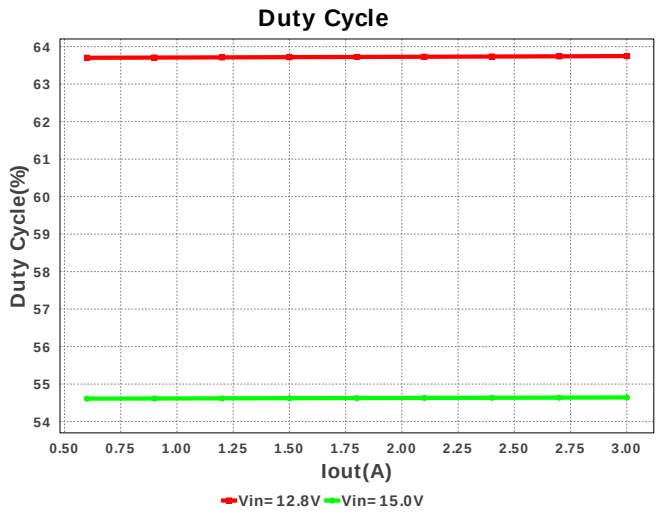


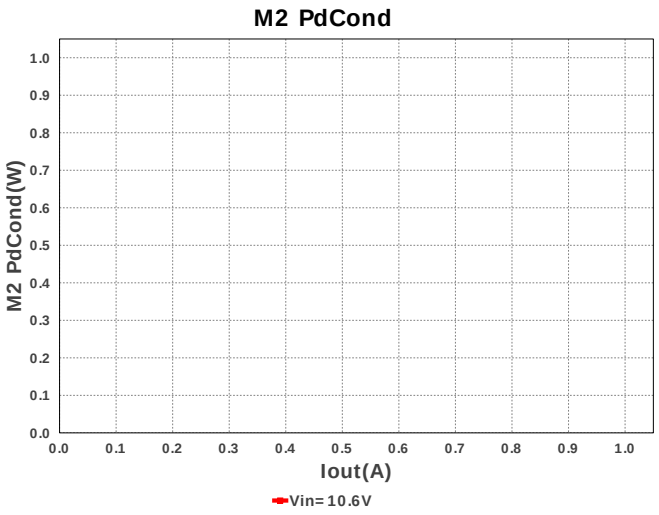


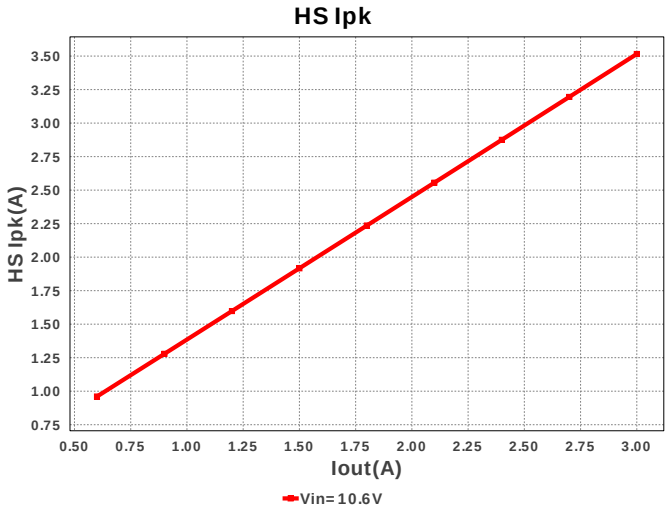


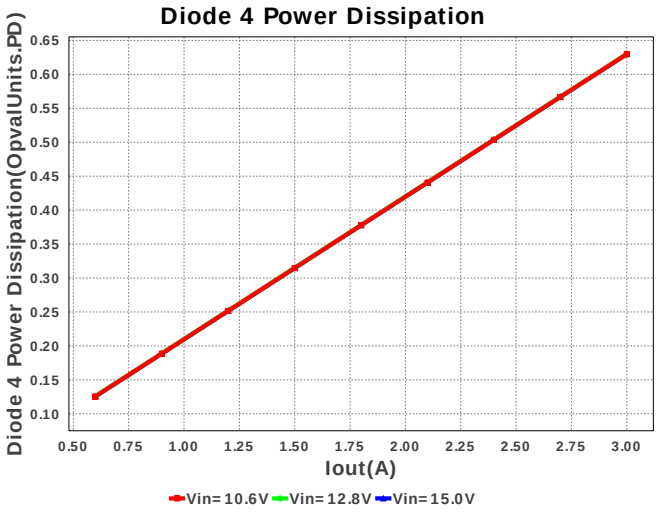


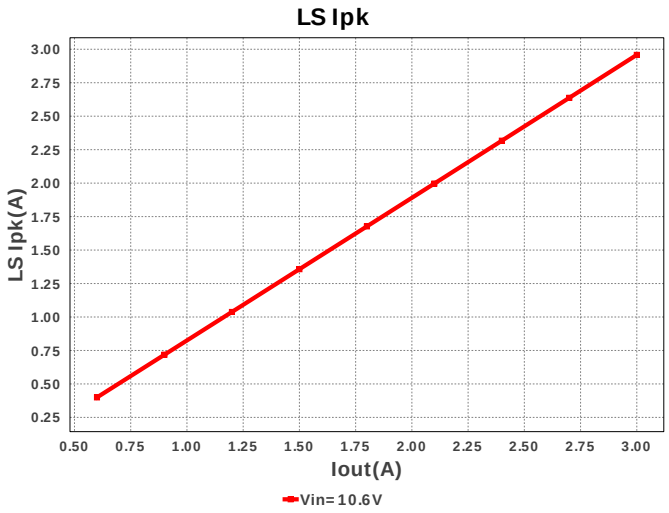


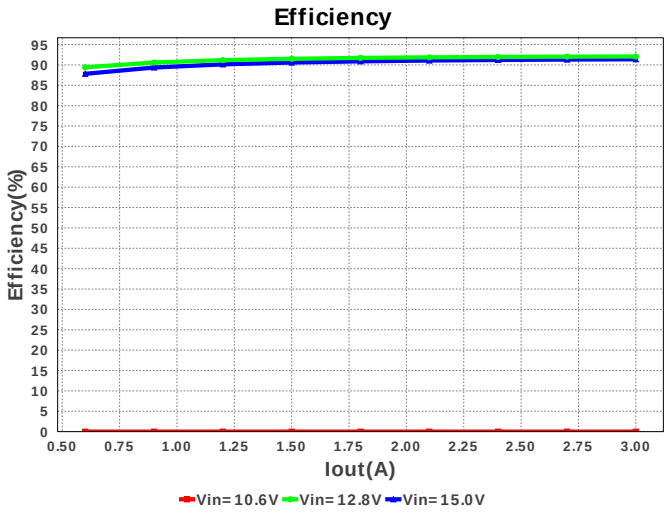


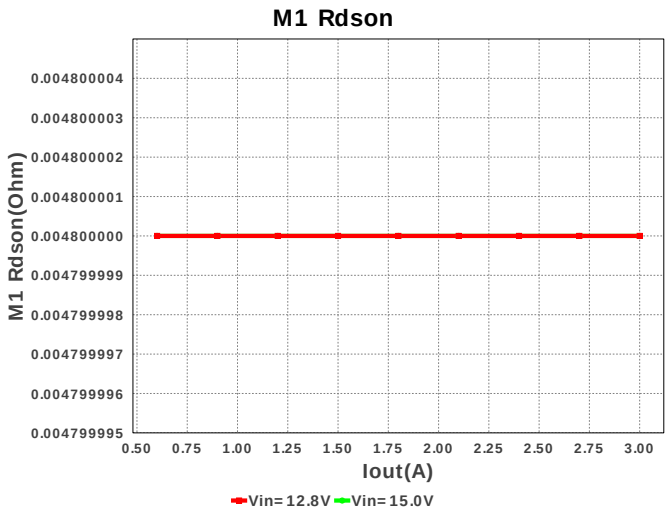


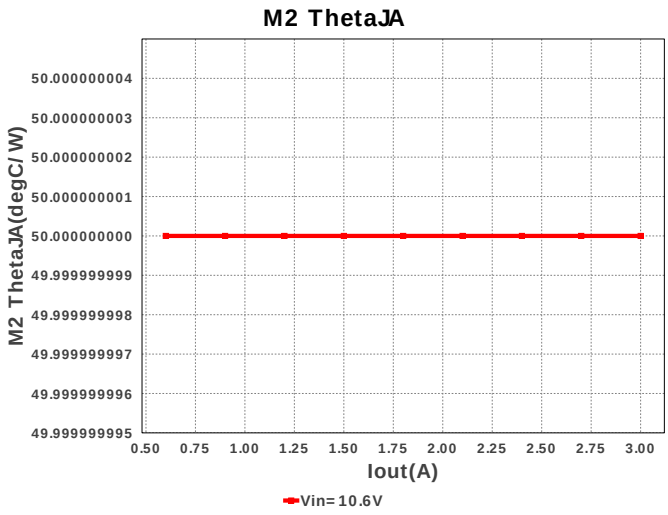


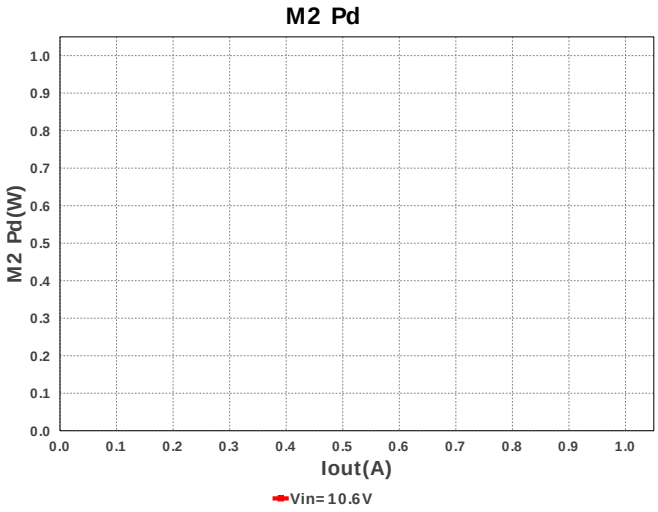


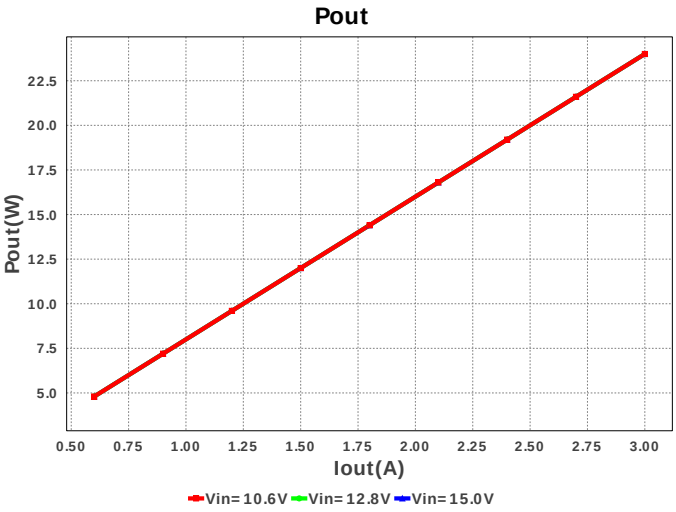


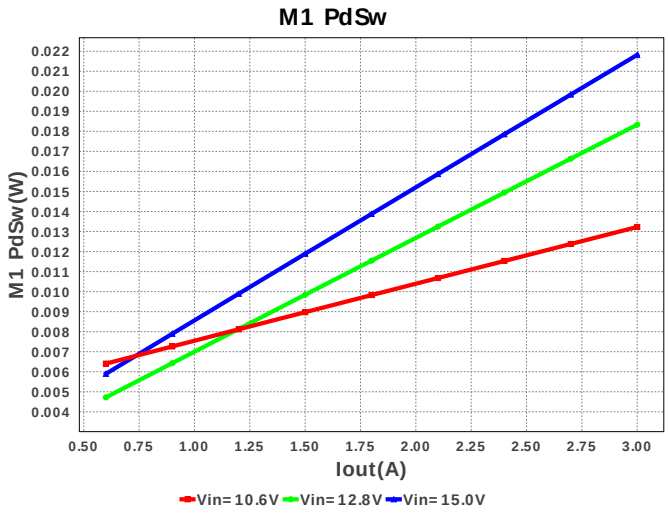


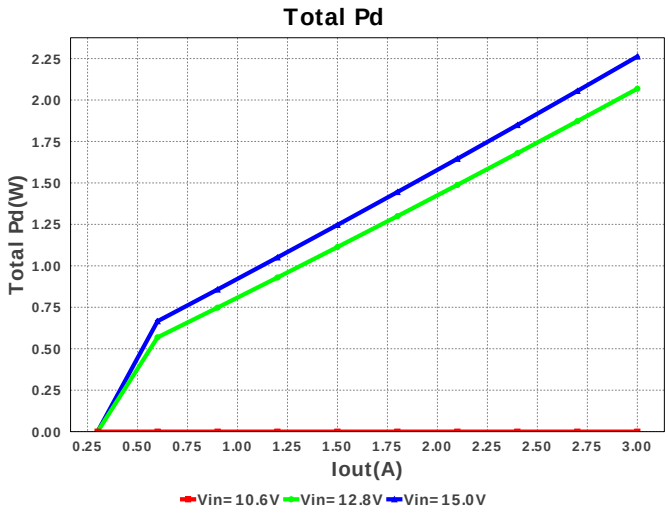


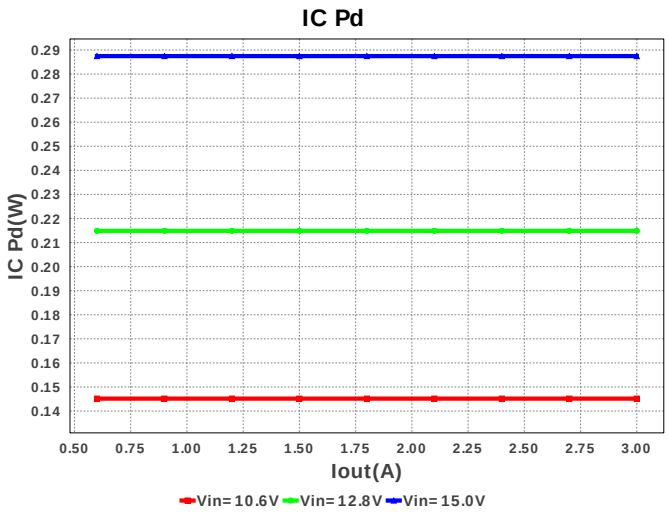


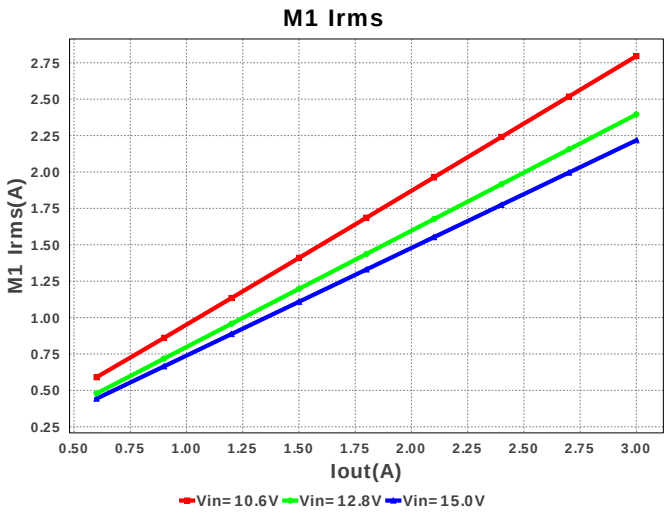


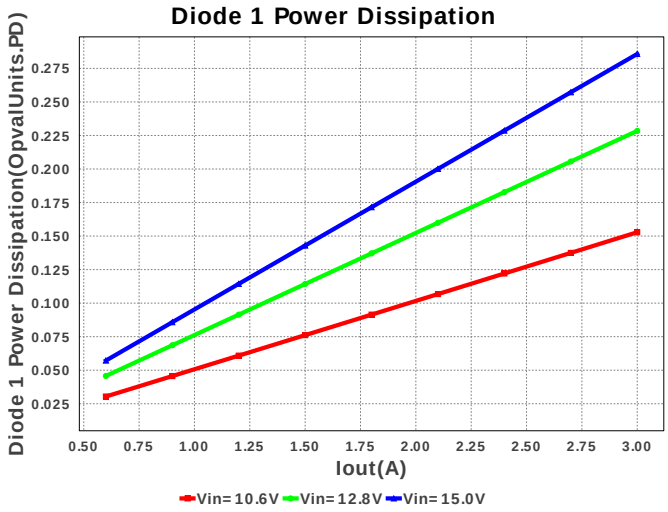


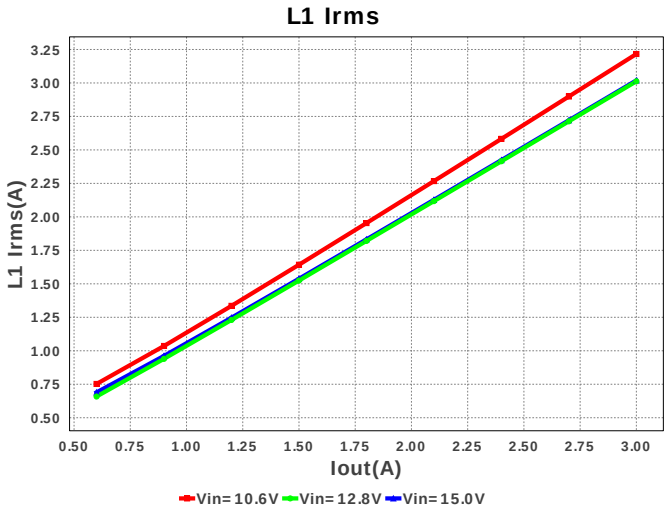


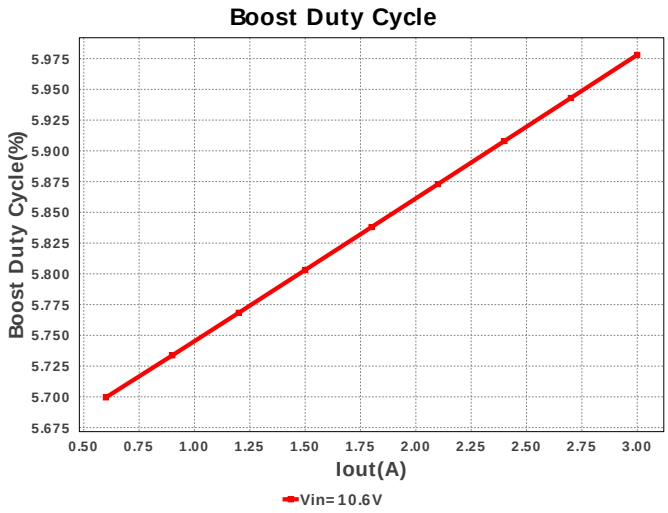


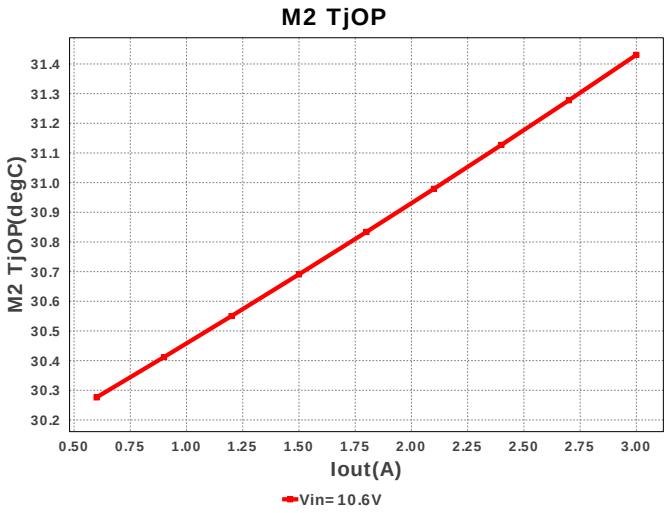


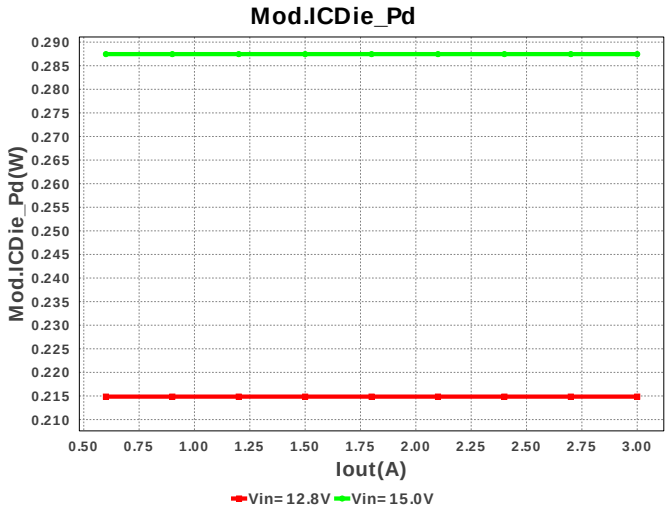


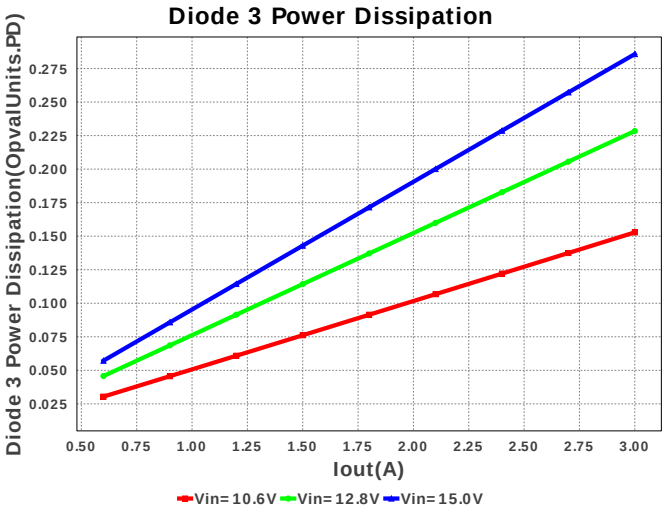


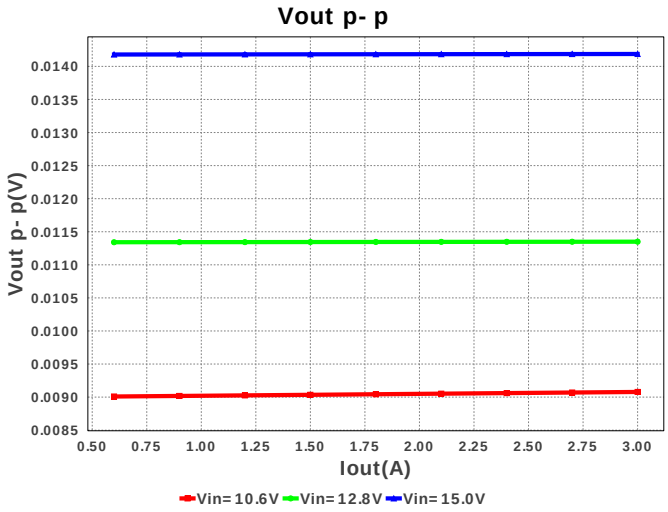


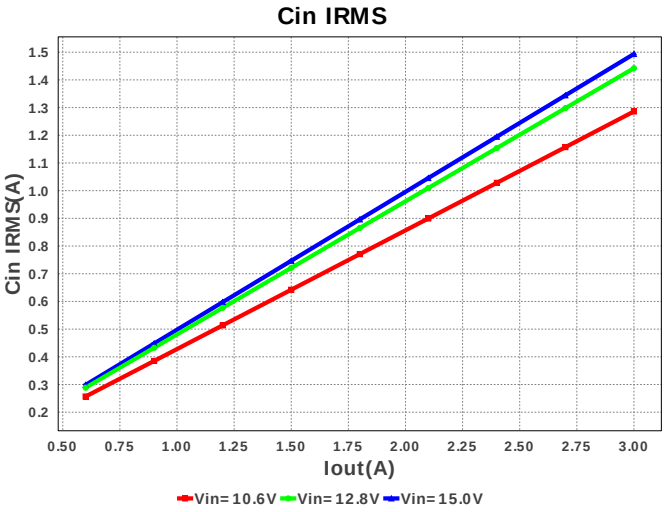


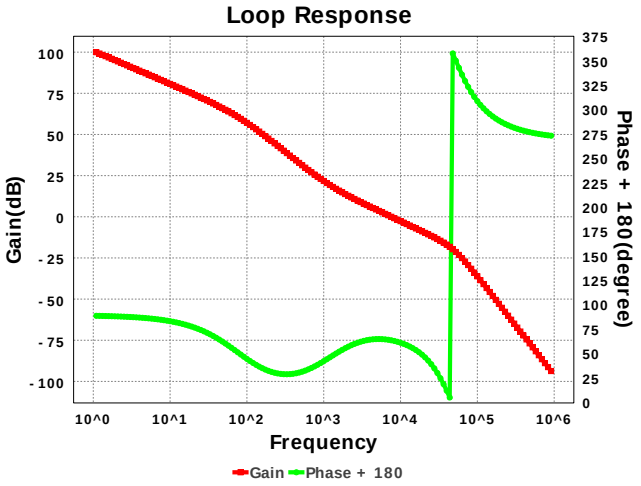












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.494 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	334.601 mA	Current	Output capacitor RMS ripple current
3.	Iin Avg	1.751 A	Current	Average input current
4.	L Ipp	1.159 A	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	3.019 A	Current	Inductor ripple current
6.	M1 Irms	2.218 A	Current	MOSFET RMS ripple current
7.	SW Ipk	3.58 A	Current	Peak switch current
8.	BOM Count	25	General	Total Design BOM count
9.	FootPrint	1.73 kmm2	General	Total Foot Print Area of BOM components
10.	Frequency	100.0 kHz	General	Switching frequency
11.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance

#	Name	Value	Category	Description
12.	M1 Rdson	4.8 mOhm	General	Drain-Source On-resistance
13.	M1 ThetaJA	56.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
14.	Pout	24.0 W	General	Total output power
15.	Total BOM	$8.61	General	Total BOM Cost
16.	D1 Tj	44.287 degC	Op_Point	D1 junction temperature
17.	Vout OP	8.0 V	Op_Point	Operational Output Voltage
18.	Cross Freq	7.607 kHz	Op_point	Bode plot crossover frequency
19.	Duty Cycle	54.643 %	Op_point	Duty cycle
20.	Efficiency	91.383 %	Op_point	Steady state efficiency
21.	IC Tj	41.5 degC	Op_point	IC junction temperature
22.	ICThetaJA	40.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	3.0 A	Op_point	Iout operating point
24.	M1 TjOP	32.595 degC	Op_point	MOSFET junction temperature
25.	Phase Marg	64.383 deg	Op_point	Bode Plot Phase Margin
26.	VIN_OP	15.0 V	Op_point	Vin operating point
27.	Vout p-p	13.984 mV	Op_point	Peak-to-peak output ripple voltage
28.	Cin Pd	55.765 mW	Power	Input capacitor power dissipation
29.	Cout Pd	1.343 mW	Power	Output capacitor power dissipation
30.	Diode Pd	285.75 mW	Power	Diode power dissipation
31.	IC Pd	287.499 mW	Power	IC power dissipation
32.	L Pd	31.5 mW	Power	Inductor power dissipation
33.	M1 Pd	46.175 mW	Power	MOSFET power dissipation
34.	M1 PdCond	24.069 mW	Power	M1 MOSFET conduction losses
35.	M1 PdSw	22.107 mW	Power	M1 MOSFET switching losses
36.	Total Pd	2.263 W	Power	Total Power Dissipation
37.	Diode 1 Power Dissipation	285.75 mOpvalUnits.PD	Unknown	Power dissipation in the diode
38.	Diode 2 Power Dissipation	630.0 mOpvalUnits.PD	Unknown	Power dissipation in the diode
39.	Diode 3 Power Dissipation	285.75 mOpvalUnits.PD	Unknown	Power dissipation in the diode
40.	Diode 4 Power Dissipation	630.0 mOpvalUnits.PD	Unknown	Power dissipation in the diode

Design Inputs

#	Name	Value	Description
1.	Iout	3.0 A	Maximum Output Current
2.	Iout1	3.0 Amps	Output Current #1
3.	VinMax	15.0 V	Maximum input voltage
4.	VinMin	10.6 V	Minimum input voltage
5.	Vout	8.0 V	Output Voltage
6.	Vout1	8.0 Volt	Output Voltage #1
7.	base_pn	LM25118	Texas Instruments Base Part Number
8.	source	DC	Input Source Type
9.	ta	30.0 degC	Ambient temperature

Design Assistance

1. The LM5118 is a wide range buck-boost controller which is operable in an ultra wide input range of 3 to 75V. A buck-boost regulator can maintain regulation for input voltages either higher or lower than the output voltage. The challenge is that buck-boost power converters are not as efficient as buck regulators. The LM5118 has been designed as a dual mode controller whereby the power converter acts as a buck regulator while the input voltage is above the output. As the input voltage approaches the output voltage, a gradual transition to the buck-boost mode occurs. This gradual transition between modes eliminates disturbances at the output during transitions.

2. LM25118 Product Folder : http://www.ti.com/product/lm25118 : contains the data sheet and other resources.