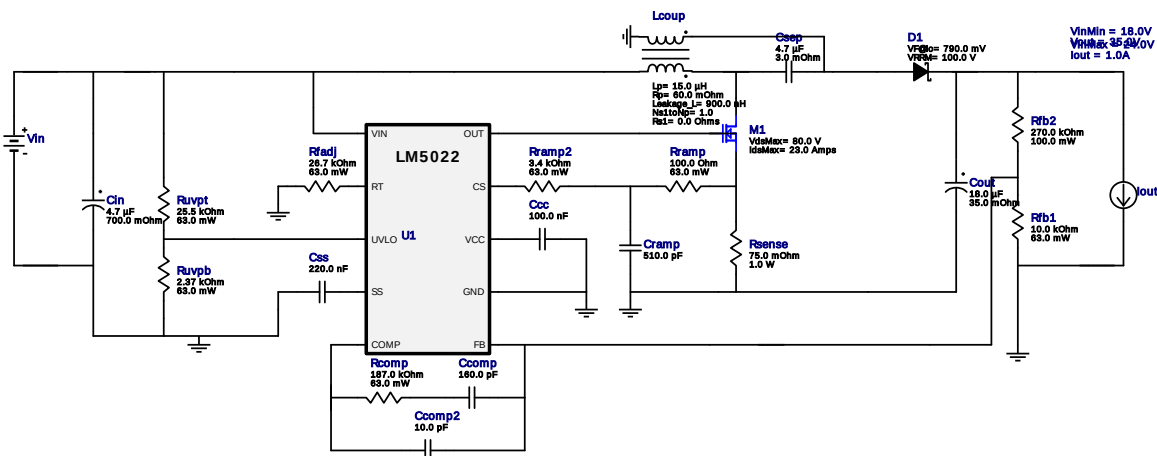


WEBENCH® Design Report

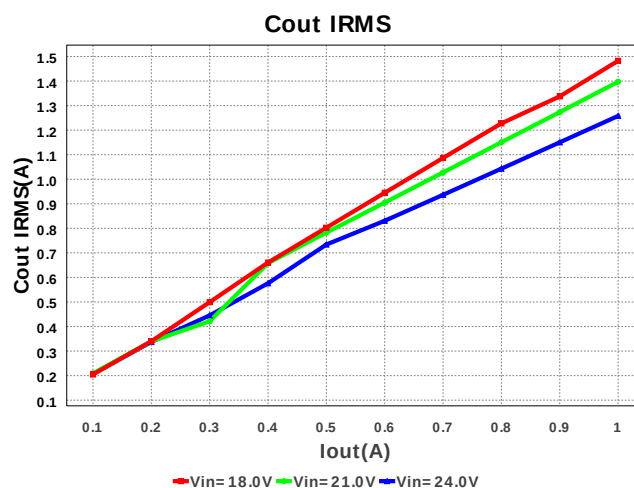
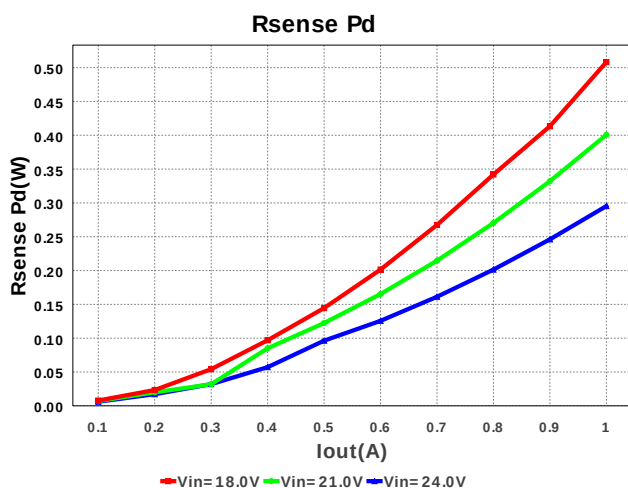
Design : 1089656/90 LM5022MM/NOPB
LM5022MM/NOPB 18.0V-24.0V to 35.0V @ 1.0A

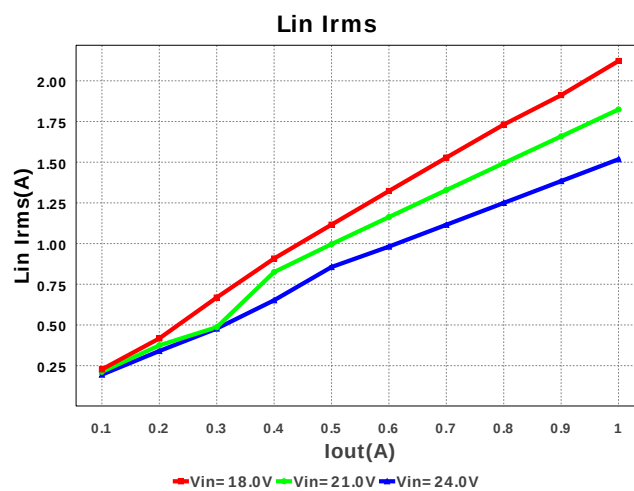
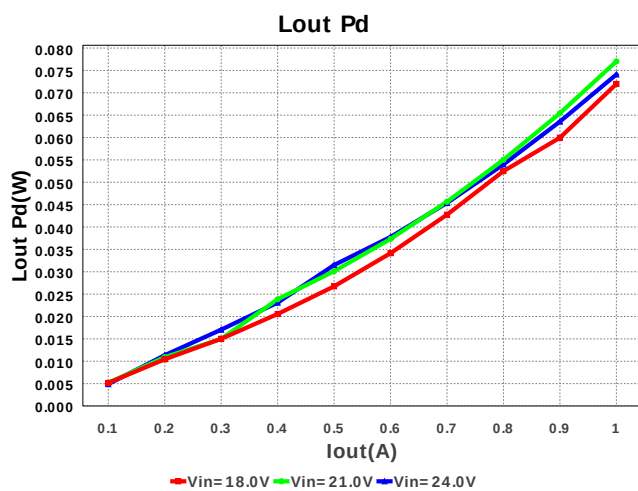
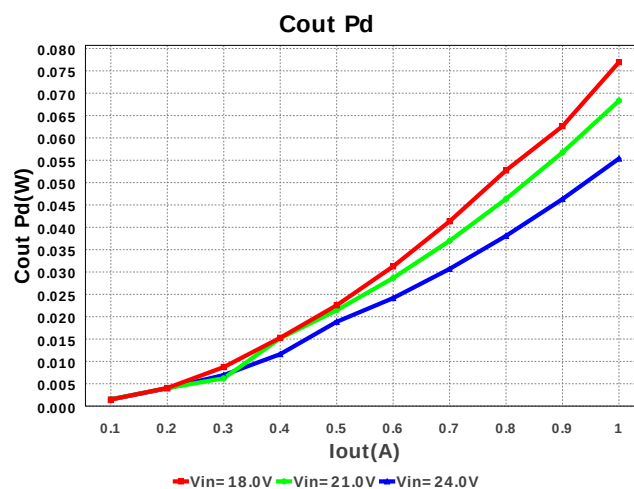
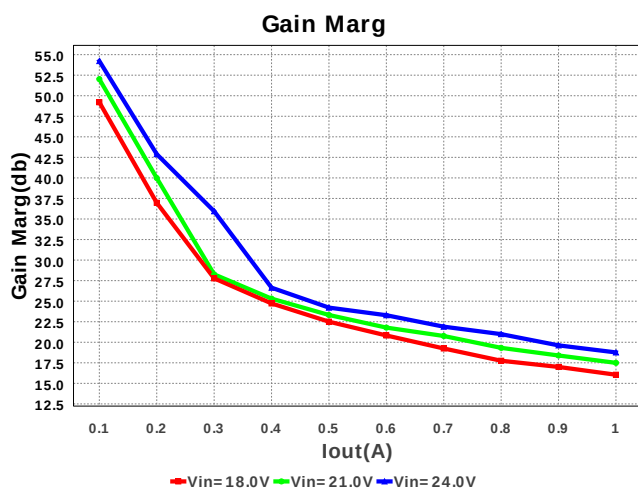
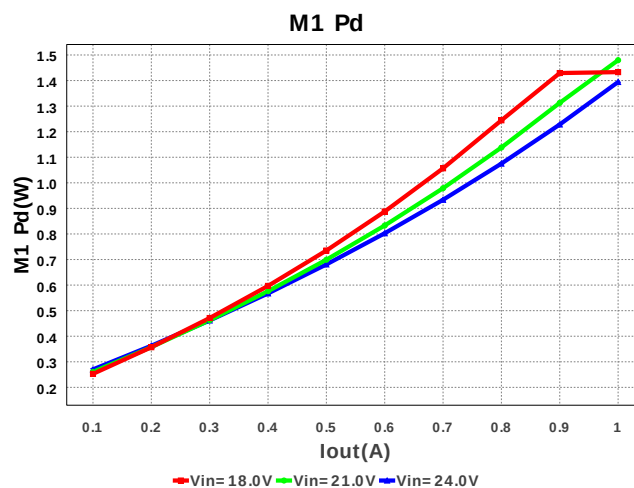
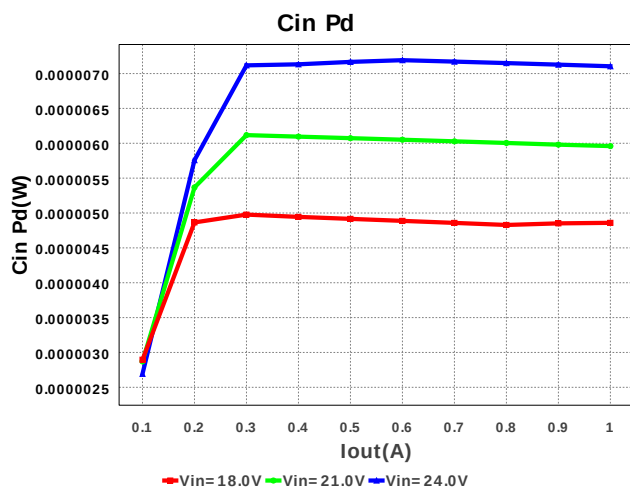


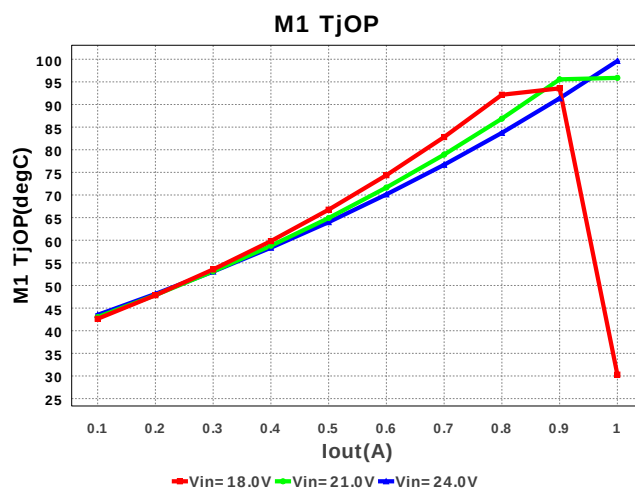
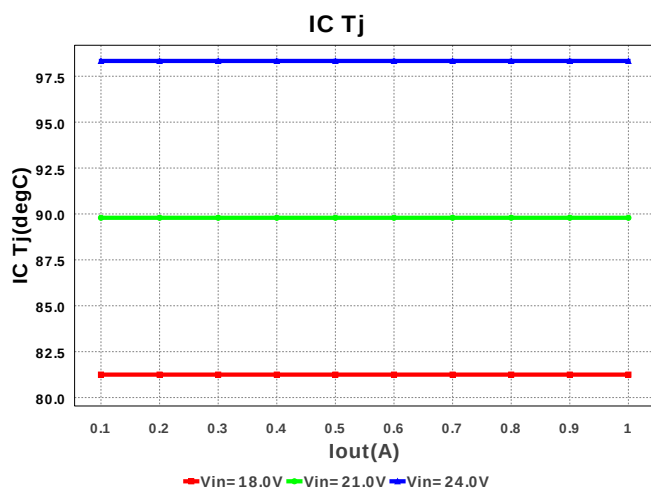
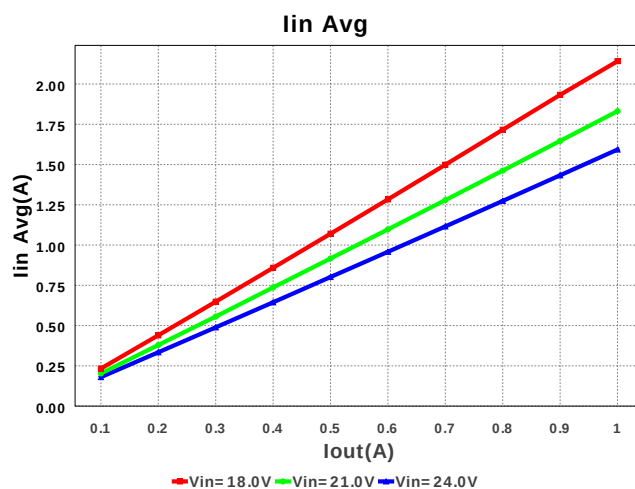
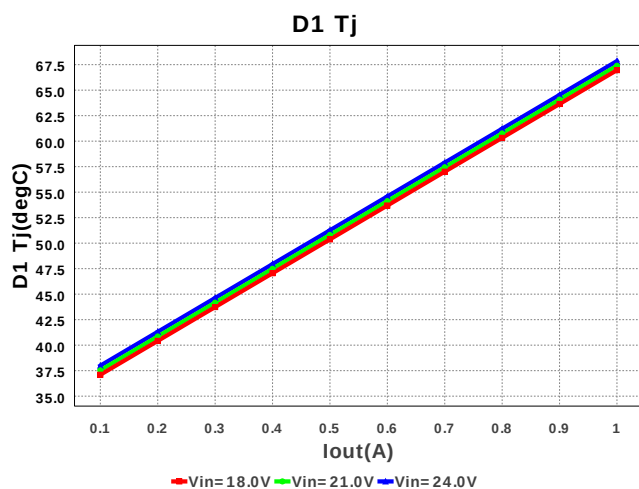
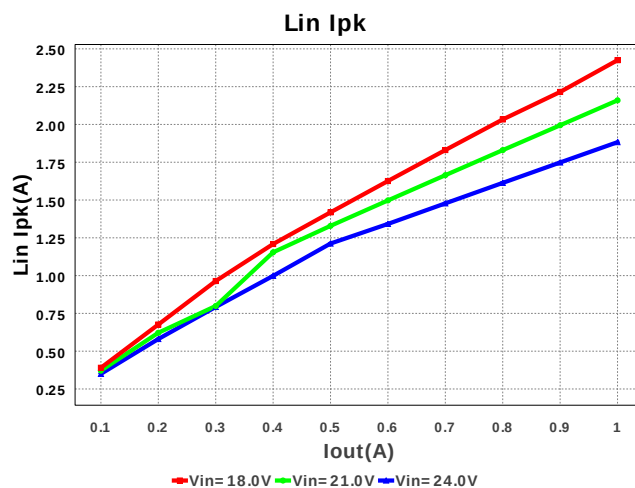
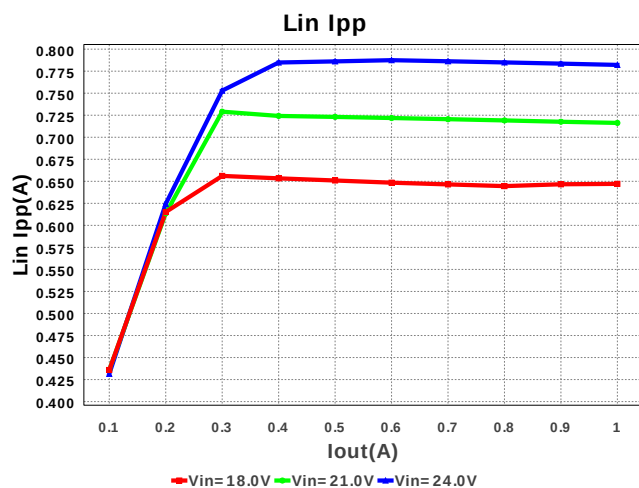
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccc	Kemet	C0603C104Z4VACTU Series= Y5V	Cap= 100.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0603 5mm2
2.	Ccomp	MuRata	GRM1555C1H161JA01D Series= C0G/NP0	Cap= 160.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
3.	Ccomp2	Yageo America	CC0805JRNPO9BN100 Series= C0G/NP0	Cap= 10.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7mm2
4.	Cin	AVX	TPSB475K035R0700 Series= TPS	Cap= 4.7 µF ESR= 700.0 mOhm VDC= 35.0 V IRMS= 314.0 mA	1	\$0.33	3528-21 17mm2
5.	Cout	Sanyo	50SVPF18M Series= 1273	Cap= 18.0 µF ESR= 35.0 mOhm VDC= 50.0 V IRMS= 2.7 A	1	\$0.53	CAPSMT_62_E7 106mm2
6.	Cramp	MuRata	GRM1555C1H511JA01D Series= C0G/NP0	Cap= 510.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0402 3mm2
7.	Csep	MuRata	GRM31CR71H475KA12L Series= X7R	Cap= 4.7 µF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 4.98 A	1	\$0.10	1206 11mm2
8.	Css	Kemet	C0603C224Z4VACTU Series= Y5V	Cap= 220.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0603 5mm2
9.	D1	Diodes Inc.	B3100-13-F	VF@Io= 790.0 mV VRRM= 100.0 V	1	\$0.22	SMC 83mm2
10.	Lcoup	Coiltronics	DRQ125-150-R	Lp= 15.0 µH Rp= 60.0 mOhm Leakage_L= 900.0 nH Ns1toNp= 1.0 Rs1= 0.0 Ohms	1	\$0.86	DRQ125 0mm2

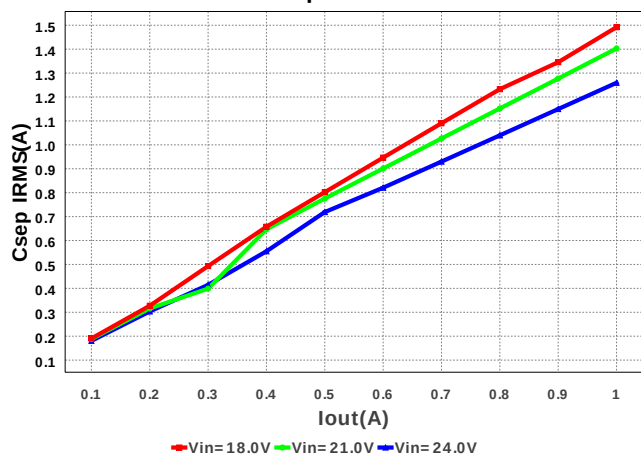
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11.	M1	Infineon Technologies	BSC340N08NS3 G	VdsMax= 80.0 V IdsMax= 23.0 Amps	1	\$0.31	 PG-TDSON-8 55mm2
12.	Rcomp	Vishay-Dale	CRCW0402187KFKED Series= CRCW..e3	Res= 187.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
13.	Rfadj	Vishay-Dale	CRCW040226K7FKED Series= CRCW..e3	Res= 26.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
14.	Rfb1	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
15.	Rfb2	Susumu Co Ltd	RR1220P-274-D Series= 264	Res= 270.0 kOhm Power= 100.0 mW Tolerance= 0.5%	1	\$0.01	 0805 7mm2
16.	Rramp	Vishay-Dale	CRCW0402100RFKED Series= CRCW..e3	Res= 100.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
17.	Rramp2	Vishay-Dale	CRCW04023K40FKED Series= CRCW..e3	Res= 3.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
18.	Rsense	Stackpole Electronics Inc	CSRN2010FK75L0 Series= ?	Res= 75.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	\$0.14	 2010 32mm2
19.	Ruvpb	Vishay-Dale	CRCW04022K37FKED Series= CRCW..e3	Res= 2.37 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
20.	Ruvpt	Vishay-Dale	CRCW040225K5FKED Series= CRCW..e3	Res= 25.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3mm2
21.	U1	Texas Instruments	LM5022MM/NOPB	Switcher	1	\$0.90	 MUB10A 24mm2



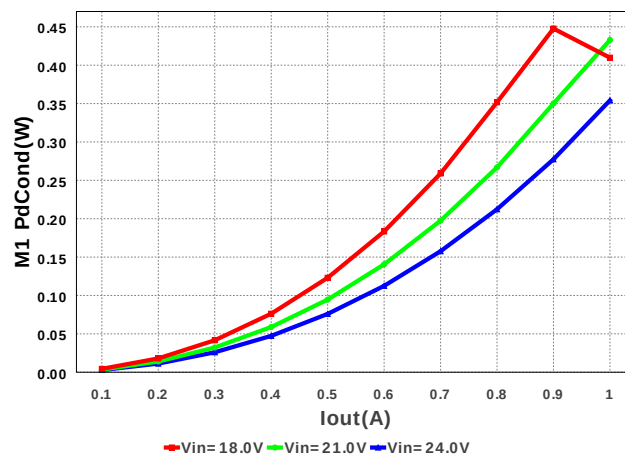




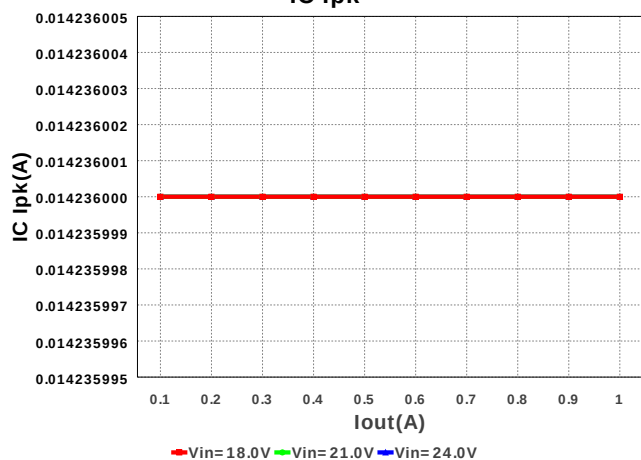
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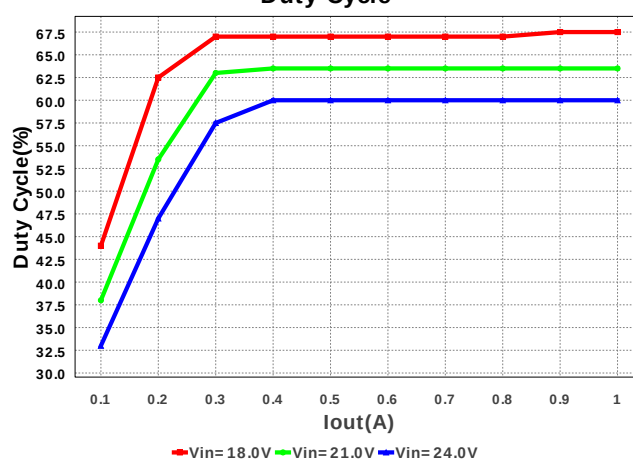
M1 PdCond



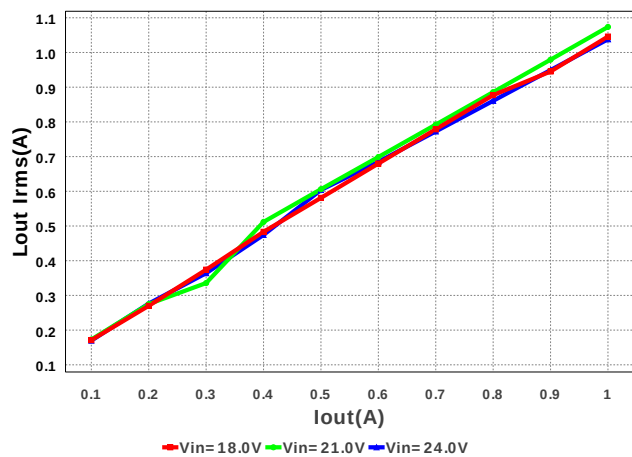
IC Ipk



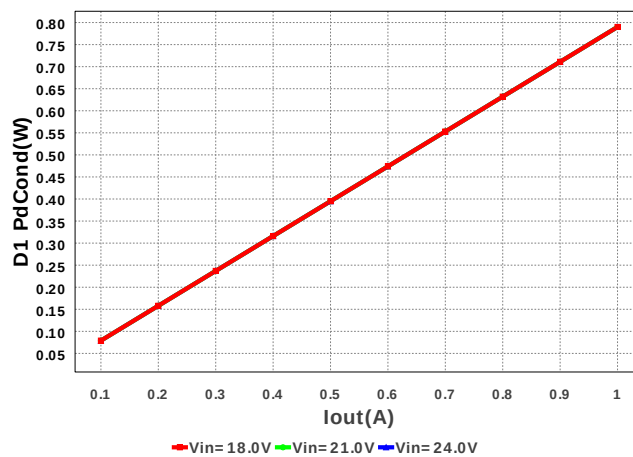
Duty Cycle

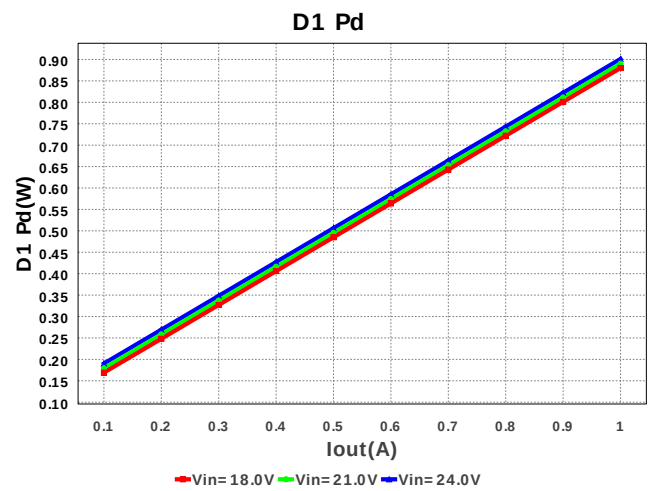
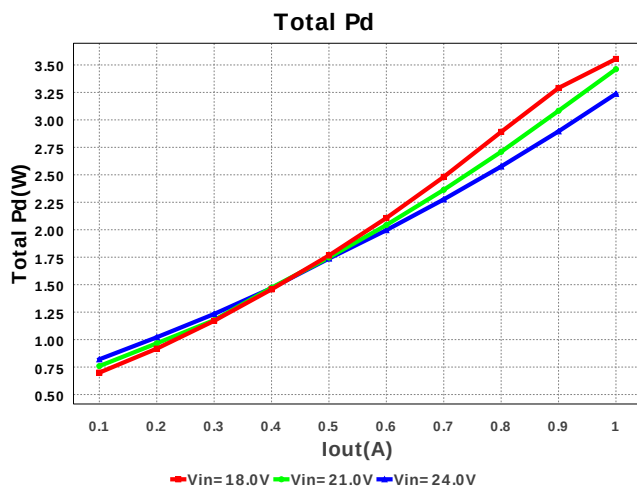
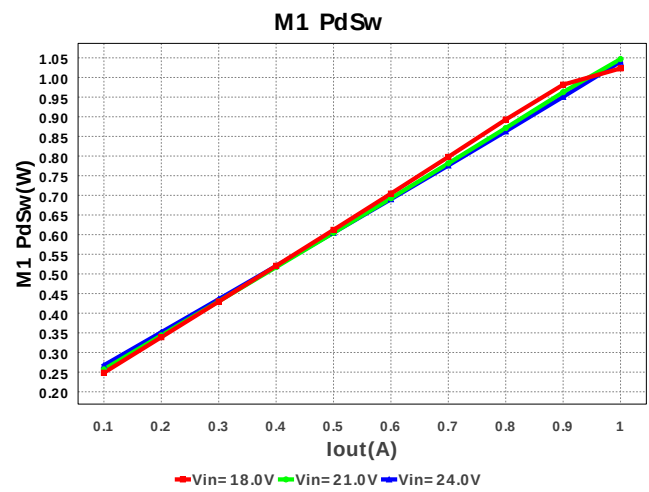
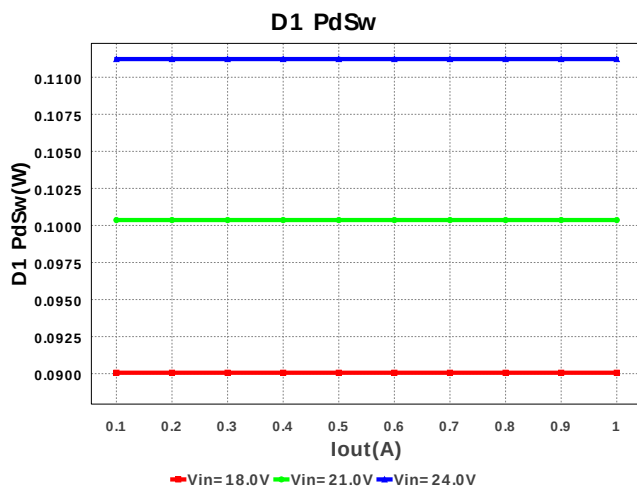
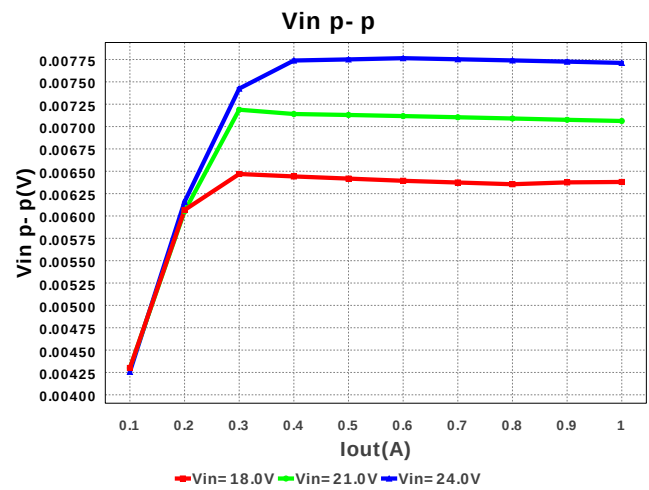
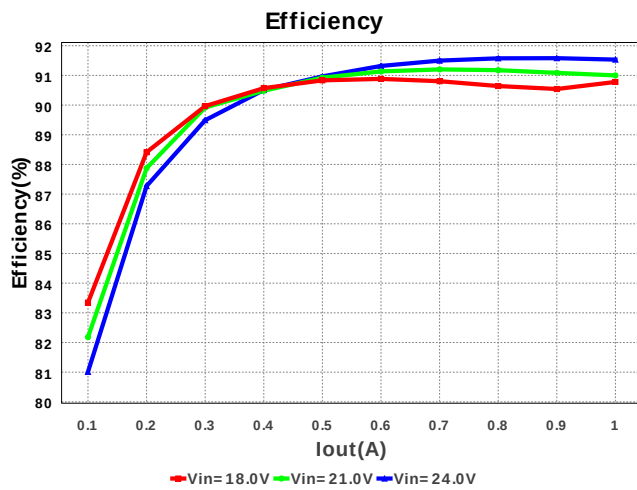


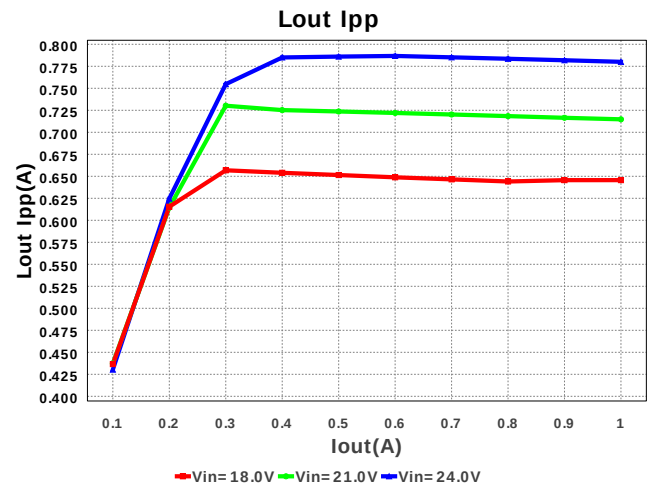
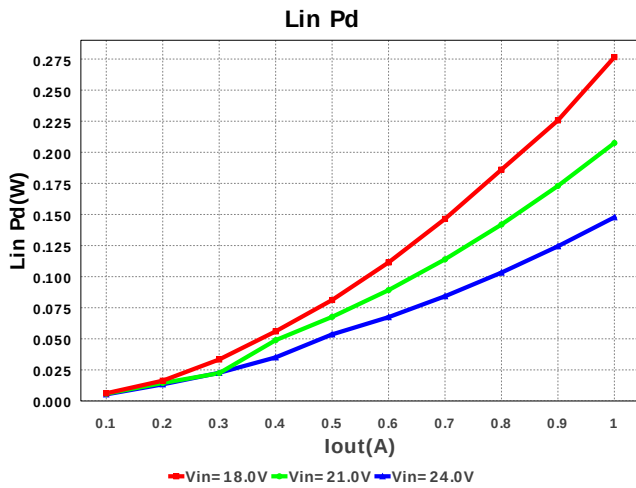
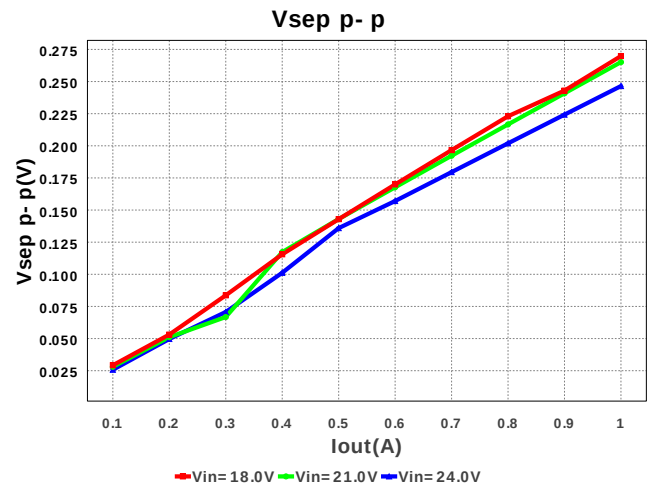
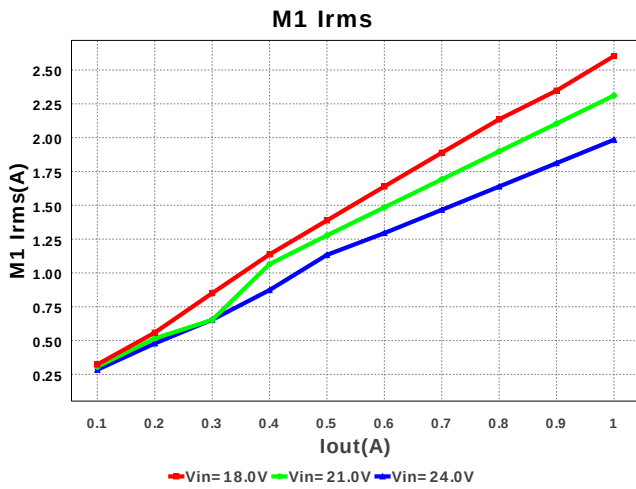
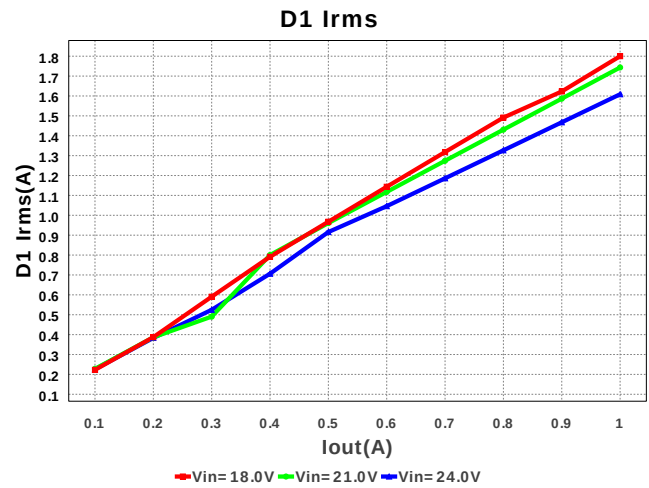
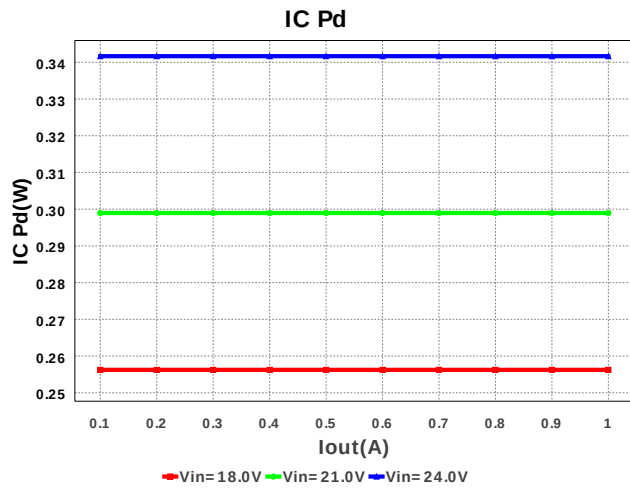
Lout Irms

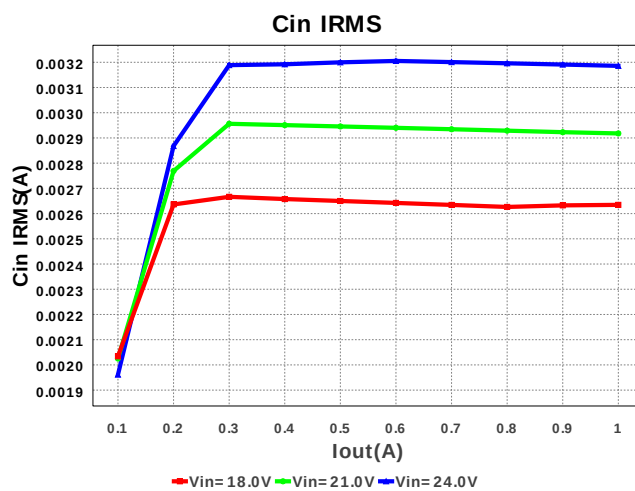
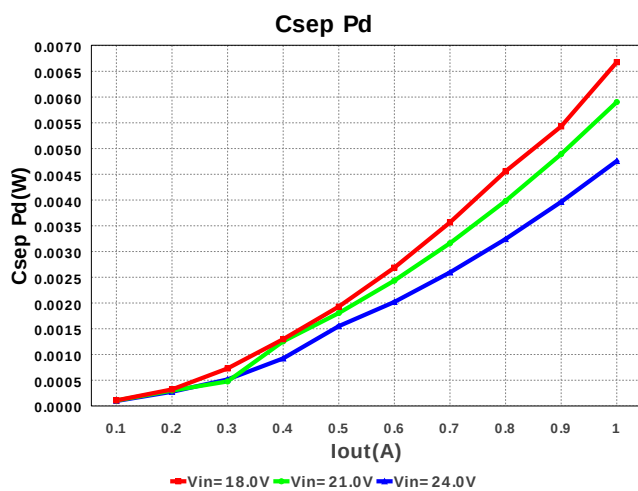
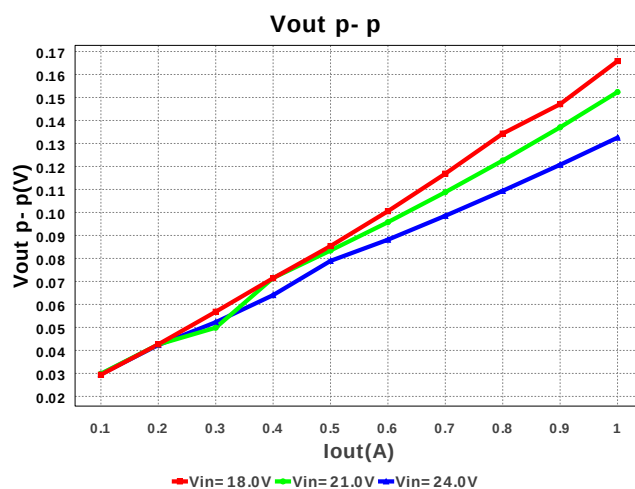
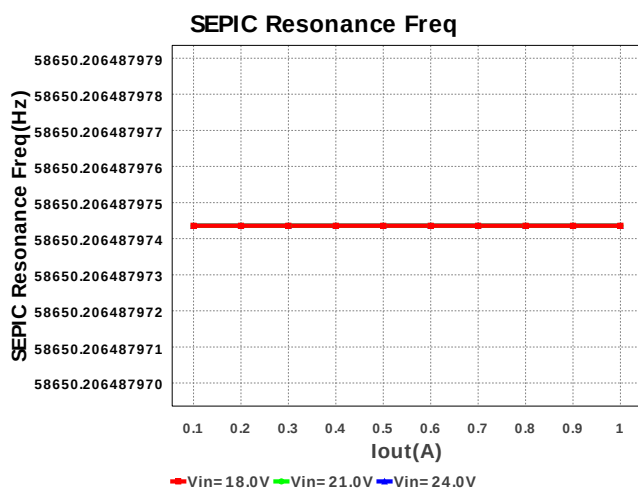
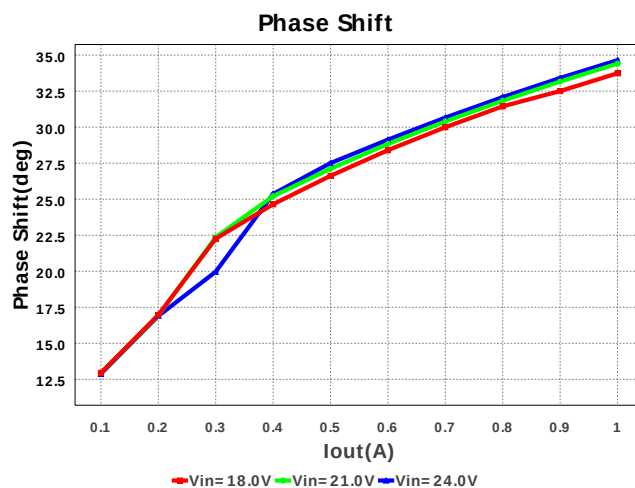
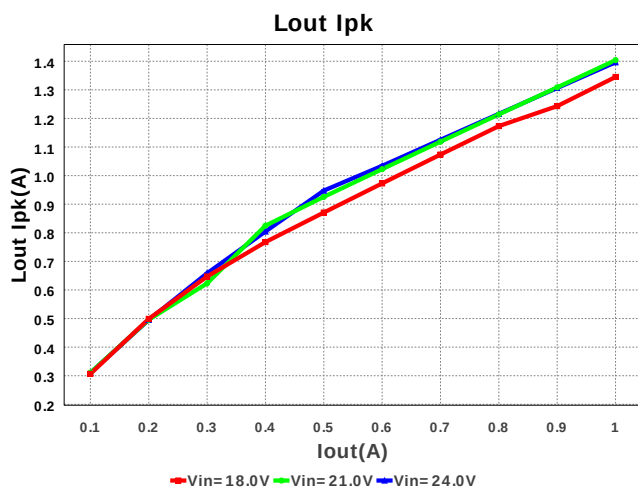


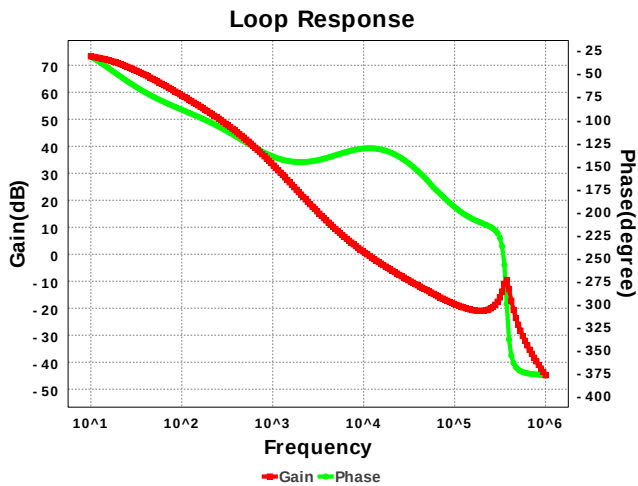
D1 PdCond











Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	2.635 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	1.483 A	Current	Output capacitor RMS ripple current
3.	Csep IRMS	1.492 A	Current	SEPIC capacitor RMS ripple current
4.	D1 Irms	1.8 A	Current	D1 Irms
5.	IC Ipk	14.236 mA	Current	Peak switch current in IC
6.	Iin Avg	2.142 A	Current	Average input current
7.	Lin Ipk	2.425 A	Current	Lin peak current
8.	Lin Ipp	647.116 mA	Current	Peak-to-peak input inductor ripple current
9.	Lin Irms	2.122 A	Current	Lin ripple current
10.	Lout Ipk	1.345 A	Current	Lout peak current
11.	Lout Ipp	645.648 mA	Current	Peak-to-peak output inductor ripple current
12.	Lout Irms	1.046 A	Current	Lout ripple current
13.	M1 Irms	2.603 A	Current	M1 MOSFET Irms
14.	BOM Count	16	General	Total Design BOM count
15.	FootPrint	240.0 mm2	General	Total Foot Print Area of BOM components
16.	Frequency	620.0 kHz	General	Switching frequency
17.	IC Tolerance	25.0 mV	General	IC Feedback Tolerance
18.	Total BOM	\$1.64	General	Total BOM Cost
19.	D1 Tj	66.963 degC	Op_Point	D1 junction temperature
20.	SEPIC Resonance Freq	58.65 kHz	Op_Point	SEPIC Resonance Frequency
21.	Vin p-p	6.38 mV	Op_Point	Peak-to-peak input voltage
22.	Vsep p-p	269.826 mV	Op_Point	Peak-to-peak sepic voltage
23.	Cross Freq	10.353 kHz	Op_point	Bode plot crossover frequency
24.	Duty Cycle	67.5 %	Op_point	Duty cycle
25.	Efficiency	90.78 %	Op_point	Steady state efficiency
26.	Gain Marg	16.049 db	Op_point	Bode Plot Gain Margin
27.	IC Tj	81.25 degC	Op_point	IC junction temperature
28.	IOUT_OP	1.0 A	Op_point	Iout operating point
29.	M1 TjOP	30.3 degC	Op_point	M1 MOSFET junction temperature
30.	Phase Marg	48.614 deg	Op_point	Bode Plot Phase Margin
31.	Phase Shift	33.738 deg	Op_point	Bode Plot Phase Shift
32.	VIN_OP	24.0 V	Op_point	Vin operating point
33.	Vout p-p	165.841 mV	Op_point	Peak-to-peak output ripple voltage
34.	Cin Pd	4.859 μ W	Power	Input capacitor power dissipation
35.	Cout Pd	76.927 mW	Power	Output capacitor power dissipation
36.	Csep Pd	6.677 mW	Power	SEPIC capacitor power dissipation
37.	D1 Pd	880.062 mW	Power	Diode power dissipation
38.	D1 PdCond	790.0 mW	Power	Diode conduction losses
39.	D1 PdSw	90.062 mW	Power	Diode switching losses
40.	IC Pd	256.248 mW	Power	IC power dissipation
41.	Lin Pd	276.548 mW	Power	Lin power dissipation
42.	Lout Pd	71.977 mW	Power	Lout power dissipation
43.	M1 Pd	1.433 W	Power	M1 MOSFET total power dissipation
44.	M1 PdCond	409.779 mW	Power	M1 MOSFET conduction losses
45.	M1 PdSw	1.023 W	Power	M1 MOSFET switching losses
46.	Rsense Pd	508.202 mW	Power	LED Current Rsns Power Dissipation
47.	Total Pd	3.555 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	1.0 A	Maximum Output Current
2.	Iout1	1.0 Amps	Output Current #1
3.	VinMax	24.0 V	Maximum input voltage
4.	VinMin	18.0 V	Minimum input voltage
5.	Vout	35.0 V	Output Voltage
6.	Vout1	35.0 Volt	Output Voltage #1
7.	base_pn	LM5022	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **LM5022** Product Folder : <http://www.ti.com/product/lm5022> : contains the data sheet and other resources.

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