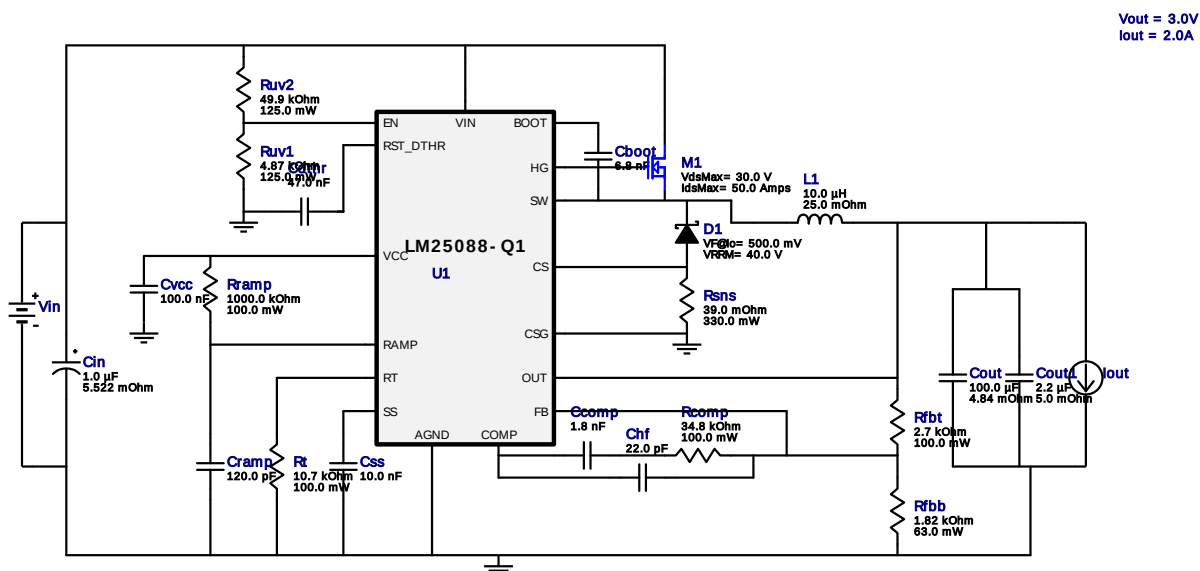


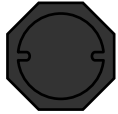
WEBENCH® Design Report

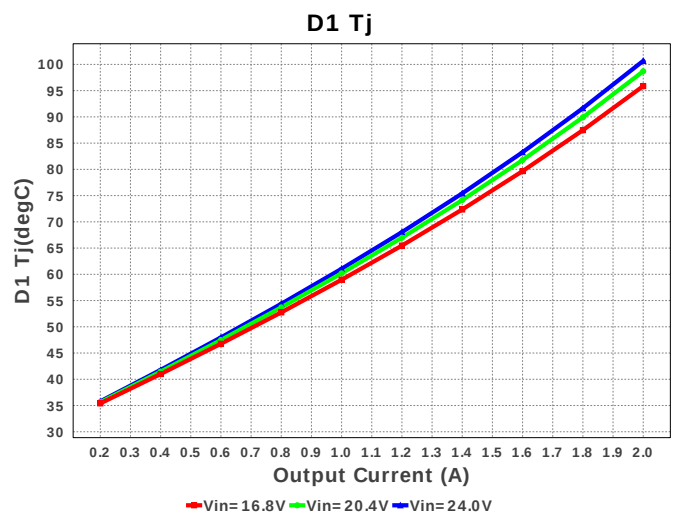
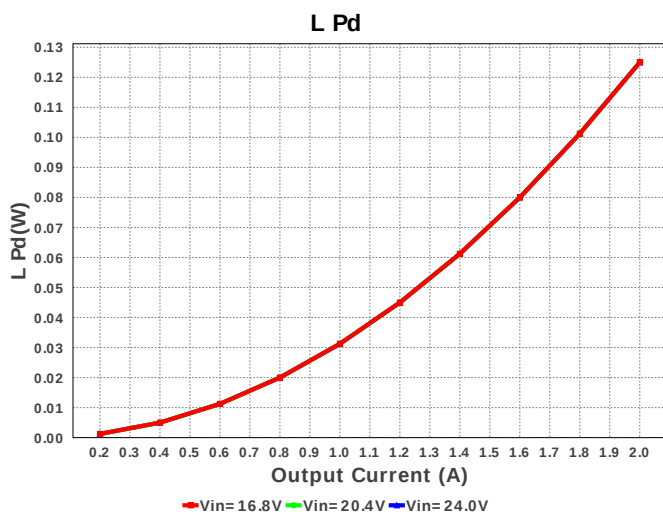
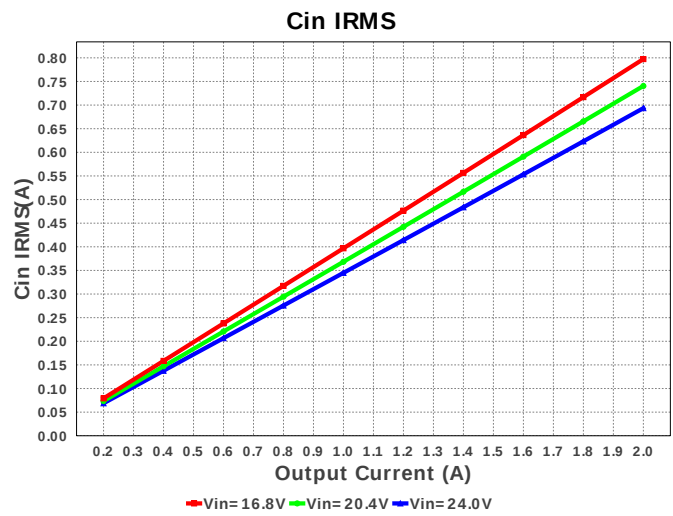
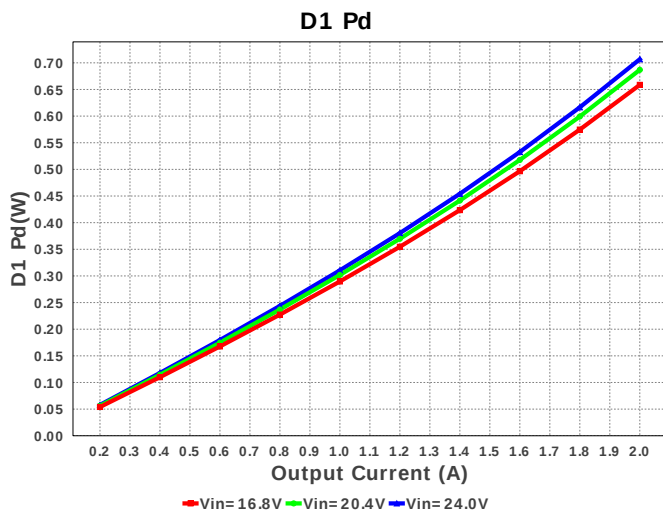
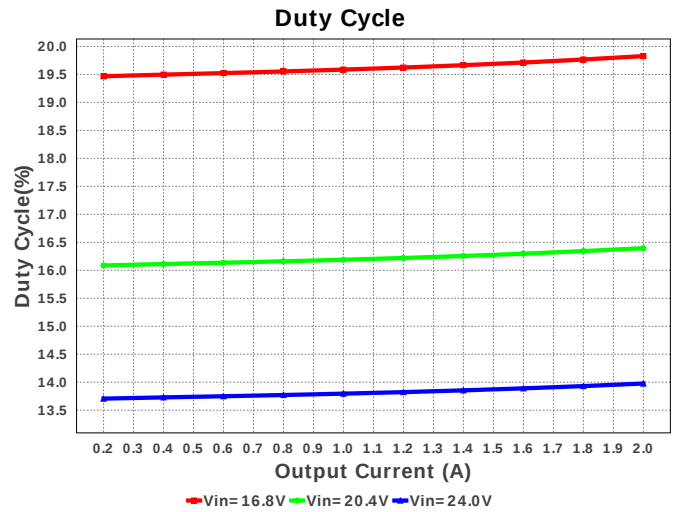
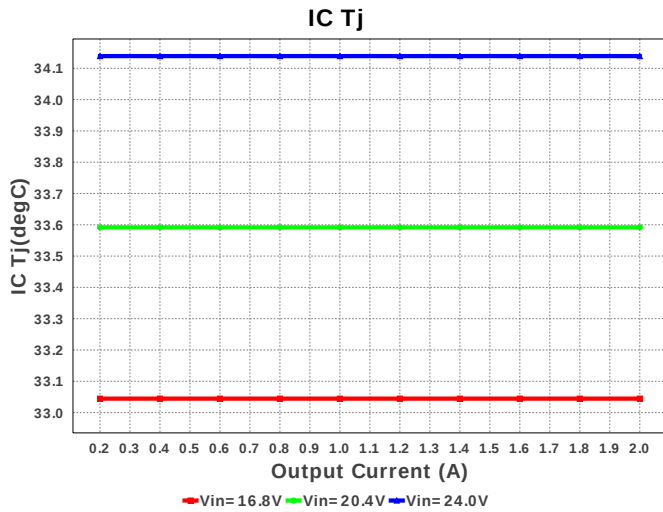
Design : 4749713/4 LM25088QMHX-1/NOPB
LM25088QMHX-1/NOPB 16.8V-24.0V to 3.00V @ 2.0A



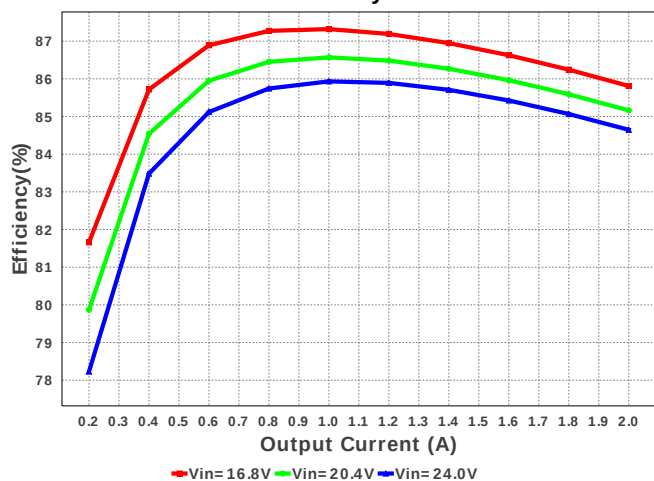
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	Kemet	C0603C682K5RACTU Series= X7R	Cap= 6.8 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²
2.	Ccomp	MuRata	GRM1885C1H182JA01J Series= C0G/NP0	Cap= 1.8 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²
3.	Cdthr	MuRata	GRM188R71C473KA01D Series= X7R	Cap= 47.0 nF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²
4.	Chf	Kemet	C0603C220K3GACTU Series= C0G/NP0	Cap= 22.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²
5.	Cin	TDK	C1608X7R1V105K080AC Series= X7R	Cap= 1.0 uF ESR= 5.522 mOhm VDC= 35.0 V IRMS= 2.2162 A	1	\$0.05	0603 5 mm ²
6.	Cout	MuRata	GRM31CD80G107ME39L Series= X6T	Cap= 100.0 uF ESR= 4.84 mOhm VDC= 4.0 V IRMS= 4.3381 A	1	\$0.14	1206_190 11 mm ²
7.	Cout1	MuRata	GRM155R60J225ME15D Series= X5R	Cap= 2.2 uF ESR= 5.0 mOhm VDC= 6.3 V IRMS= 3.67 A	1	\$0.02	0402 3 mm ²
8.	Cramp	Yageo America	CC0603JRNPO9BN121 Series= C0G/NP0	Cap= 120.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²
9.	Css	Kemet	C0603C103J5RACTU Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²

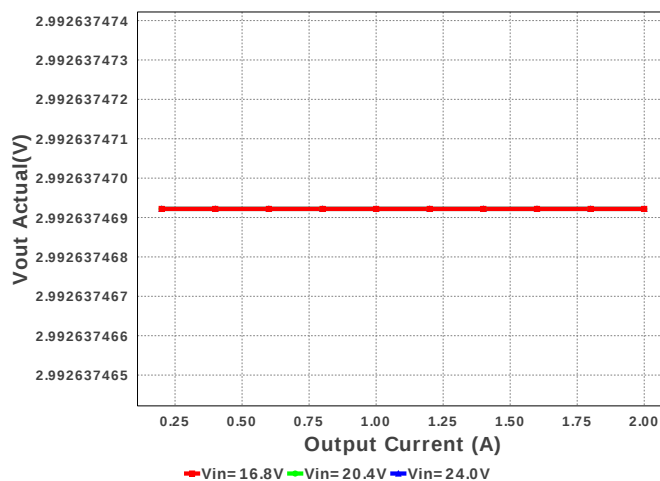
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
10.	Cvcc	Kemet	C0603C104K3RACTU Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm ²
11.	D1	Diodes Inc.	B340A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.11	 SMA 37 mm ²
12.	L1	Bourns	SRU1038-100Y	L= 10.0 µH DCR= 25.0 mOhm	1	\$0.33	 SRU1038 144 mm ²
13.	M1	Texas Instruments	CSD17308Q3	VdsMax= 30.0 V IdsMax= 50.0 Amps	1	\$0.28	 TRANS_NexFET_Q3 18 mm ²
14.	Rcomp	Vishay-Dale	CRCW060334K8FKEA Series= CRCW..e3	Res= 34.8 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
15.	Rfbb	Vishay-Dale	CRCW04021K82FKED Series= CRCW..e3	Res= 1.82 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
16.	Rfbt	Yageo America	RC0603FR-072K7L Series= ?	Res= 2.7 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
17.	Rramp	Vishay-Dale	CRCW06031M00FKEA Series= CRCW..e3	Res= 1000.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
18.	Rsns	Panasonic	ERJ-L14KF39MU Series= ERJ-L14	Res= 39.0 mOhm Power= 330.0 mW Tolerance= 1.0%	1	\$0.11	 1210 15 mm ²
19.	Rt	Vishay-Dale	CRCW060310K7FKEA Series= CRCW..e3	Res= 10.7 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
20.	Ruv1	Panasonic	ERJ-6ENF4871V Series= ERJ-6E	Res= 4.87 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
21.	Ruv2	Panasonic	ERJ-6ENF4992V Series= ERJ-6E	Res= 49.9 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
22.	U1	Texas Instruments	LM25088QMHX-1/NOPB	Switcher	1	\$1.45	 MXA16A 59 mm ²



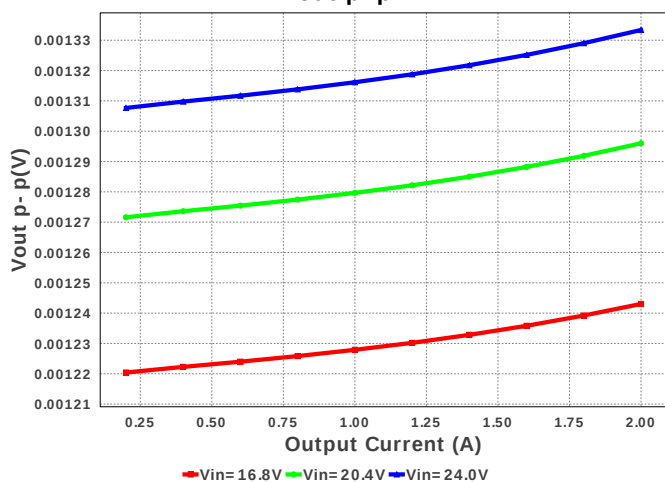
Efficiency



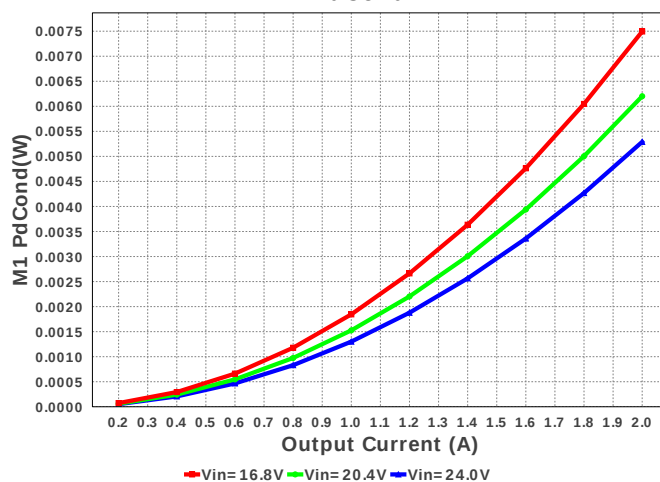
Vout Actual



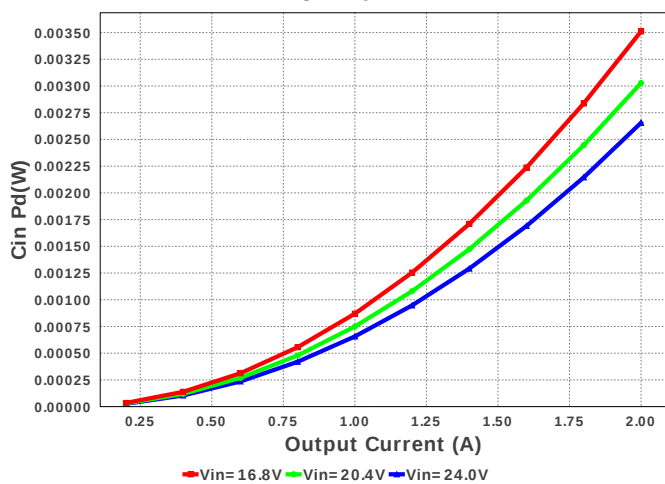
Vout p- p



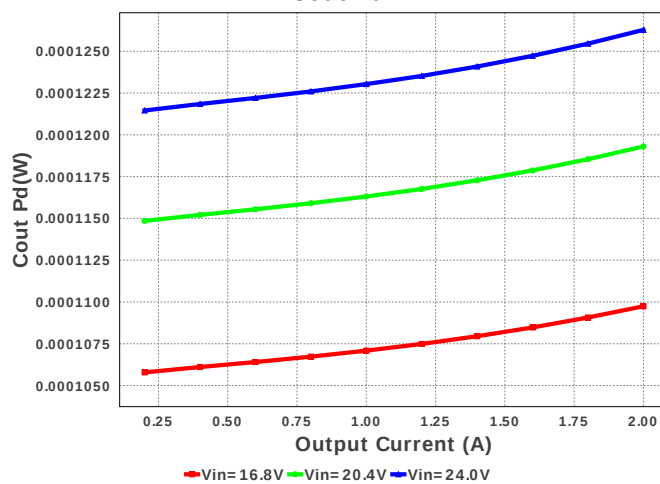
M1 PdCond

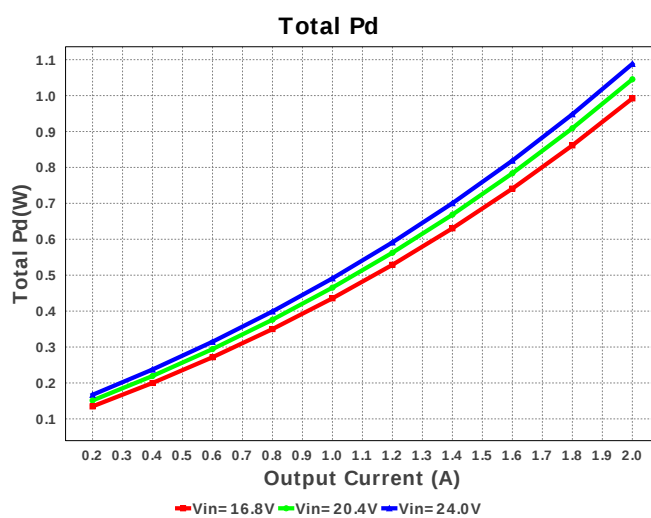
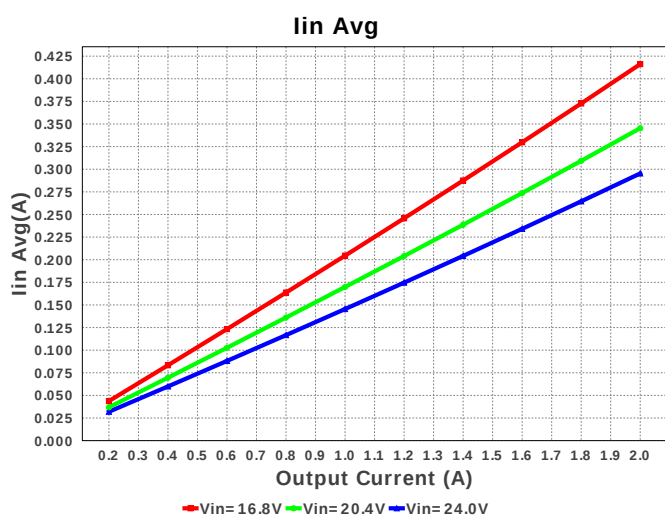
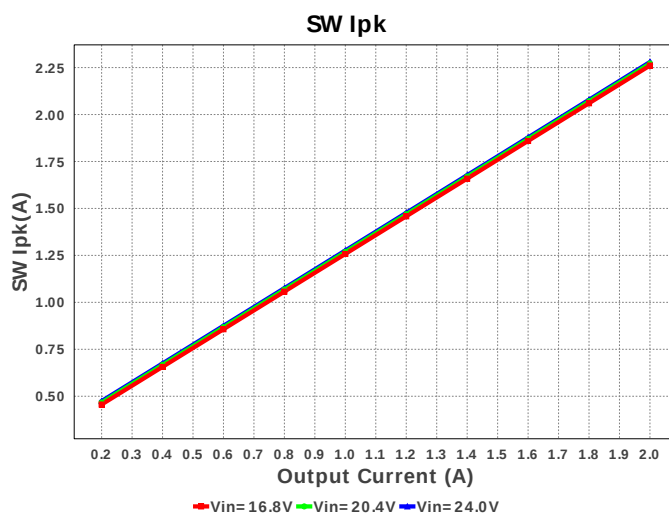
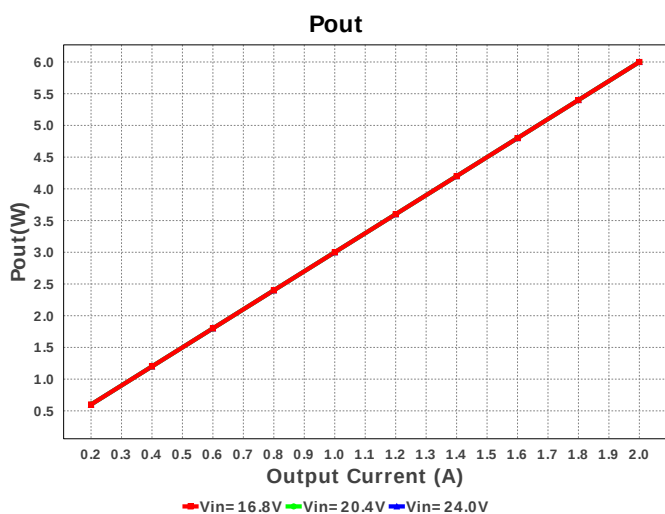
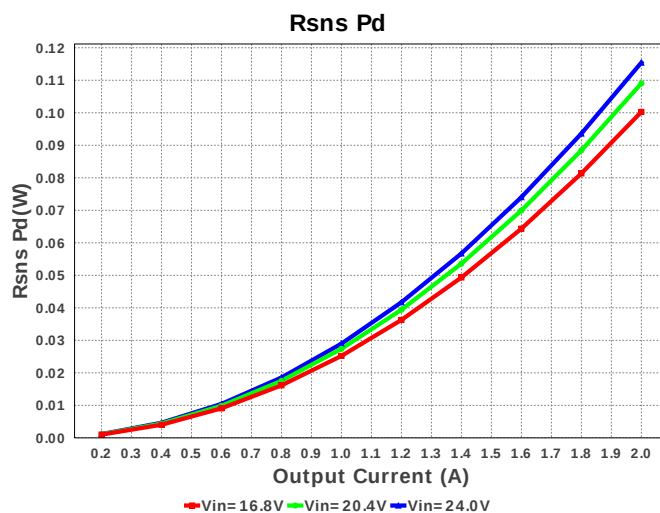
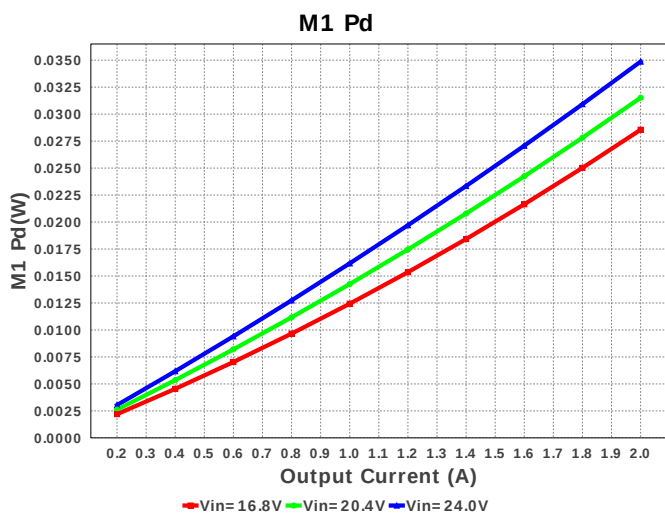


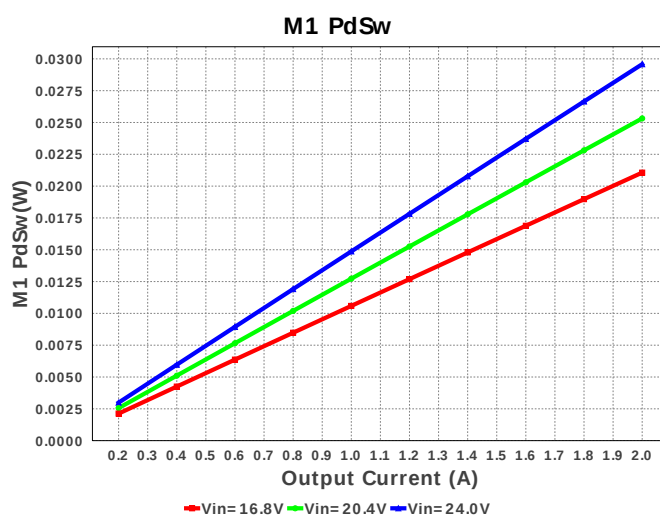
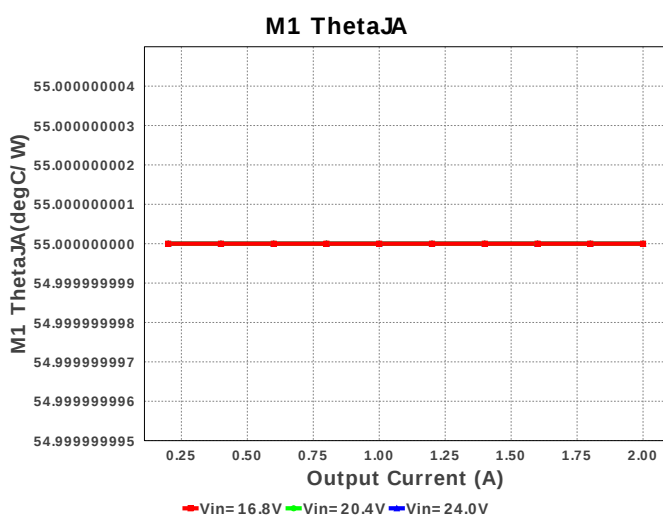
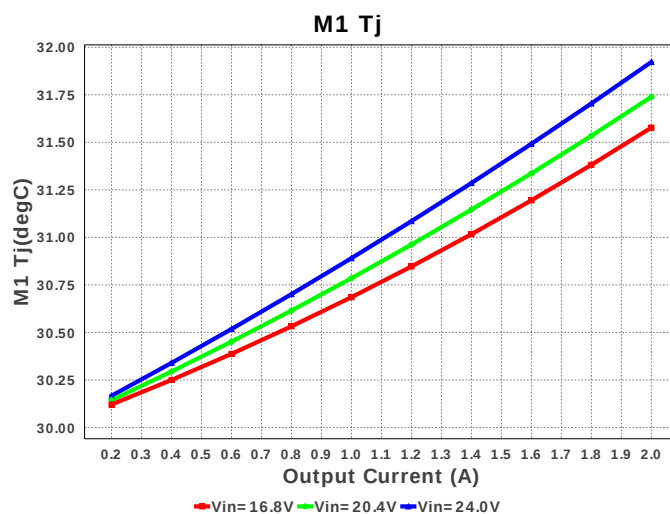
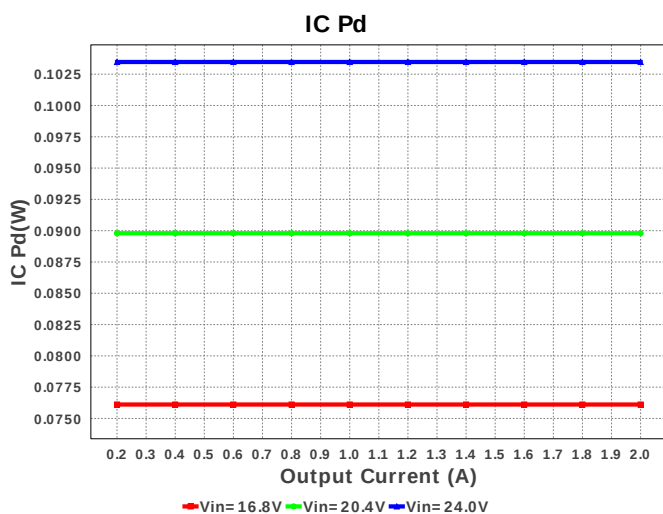
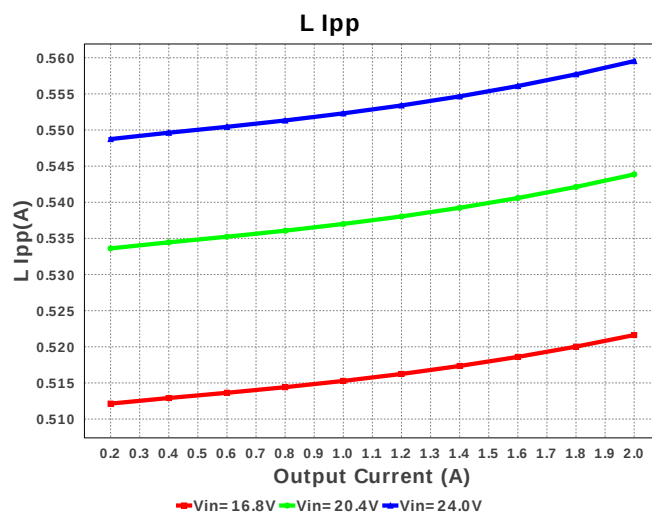
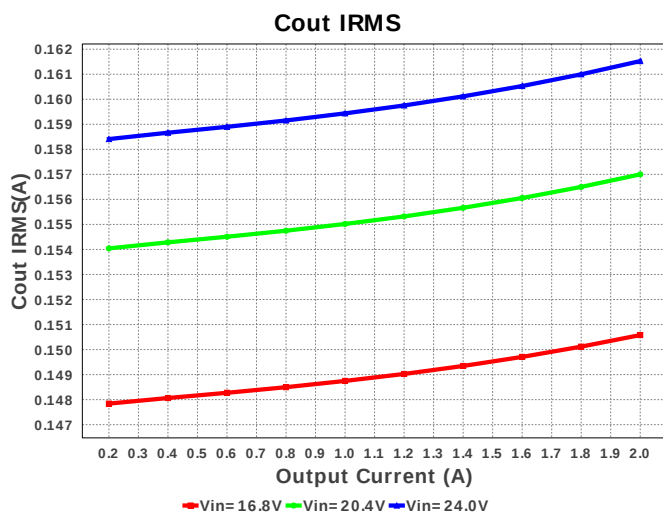
Cin Pd

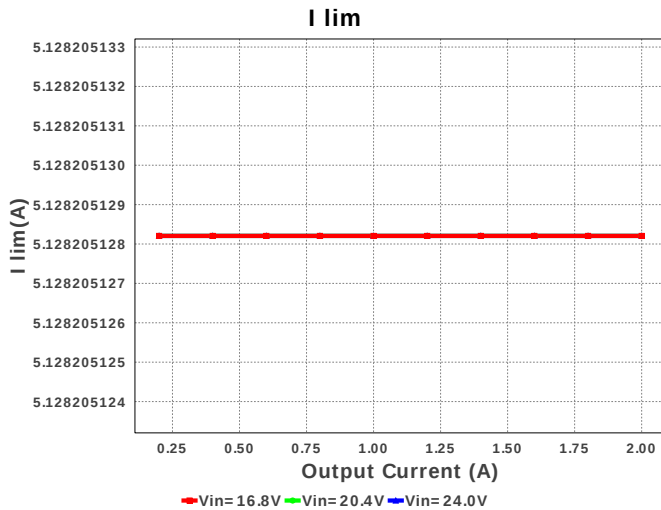


Cout Pd









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	693.485 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	161.386 mA	Current	Output capacitor RMS ripple current
3.	I lim	5.128 A	Current	Current limit threshold
4.	Iin Avg	295.35 mA	Current	Average input current
5.	L Ipp	559.06 mA	Current	Peak-to-peak inductor ripple current
6.	SW Ipk	2.28 A	Current	Peak switch current
7.	BOM Count	22	General	Total Design BOM count
8.	FootPrint	360.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	524.549 kHz	General	Switching frequency
10.	IC Tolerance	18.0 mV	General	IC Feedback Tolerance
11.	M1 ThetaJA	55.0 degC/W	General	MOSFET junction-to-ambient thermal resistance
12.	Pout	6.0 W	General	Total output power
13.	Total BOM	\$2.63	General	Total BOM Cost
14.	D1 Tj	100.673 degC	Op_Point	D1 junction temperature
15.	Vout Actual	2.993 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Duty Cycle	13.976 %	Op_point	Duty cycle
17.	Efficiency	84.647 %	Op_point	Steady state efficiency
18.	IC Tj	34.139 degC	Op_point	IC junction temperature
19.	ICThetaJA	40.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	2.0 A	Op_point	Iout operating point
21.	M1 Tj	31.922 degC	Op_point	M1 MOSFET junction temperature
22.	VIN_OP	24.0 V	Op_point	Vin operating point
23.	Vout p-p	1.332 mV	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	2.656 mW	Power	Input capacitor power dissipation
25.	Cout Pd	126.06 μW	Power	Output capacitor power dissipation
26.	D1 Pd	706.728 mW	Power	Diode1 power dissipation
27.	IC Pd	103.474 mW	Power	IC power dissipation
28.	L Pd	125.0 mW	Power	Inductor power dissipation
29.	M1 Pd	34.869 mW	Power	M1 MOSFET total power dissipation
30.	M1 PdCond	5.29 mW	Power	M1 MOSFET conduction losses
31.	M1 PdSw	29.579 mW	Power	M1 MOSFET switching losses
32.	Rsns Pd	115.441 mW	Power	Current Limit Sense Resistor Power Dissipation
33.	Total Pd	1.088 W	Power	Total Power Dissipation
34.	Vout Tolerance	2.719 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	2.0	Maximum Output Current
2.	VinMax	24.0	Maximum input voltage
3.	VinMin	16.8	Minimum input voltage
4.	Vout	3.0	Output Voltage
5.	base_pn	LM25088-Q1	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **LM25088-Q1** Product Folder : <http://www.ti.com/product/LM25088%2DQ1> : contains the data sheet and other resources.

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