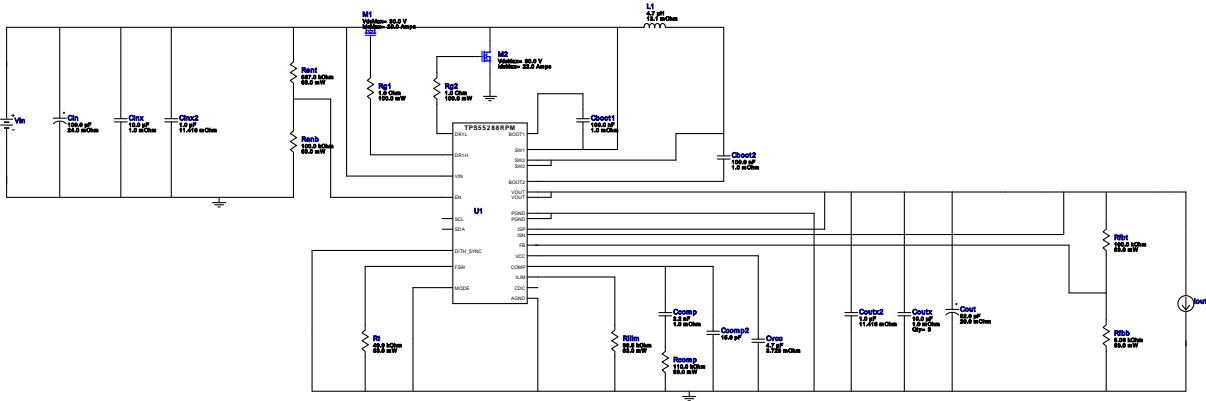


VinMin = 12.0V
 VinMax = 20.0V
 Vout = 15.0V
 Iout = 5.0A

Device = TPS55288RPMR
 Topology = Buck_Boost
 Created = 2022-09-01 02:14:40.007
 BOM Cost = \$6.80
 BOM Count = 26
 Total Pd = 2.13W














WEBENCH® Design Report

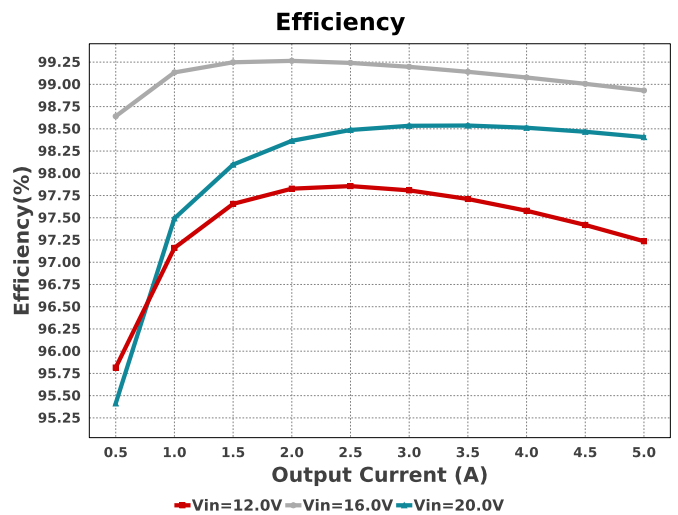
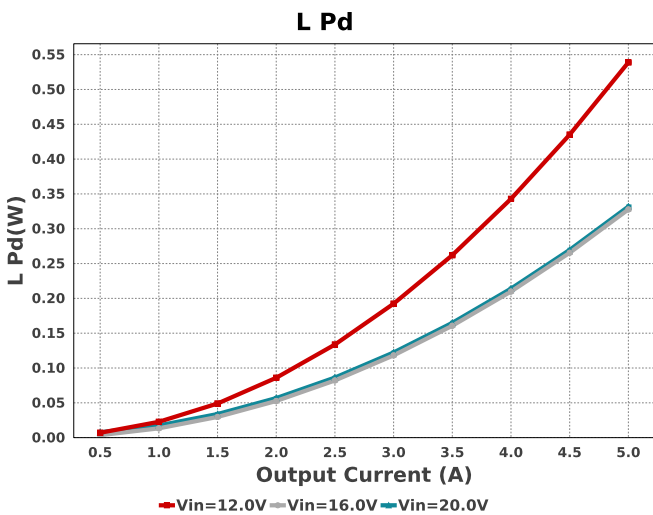
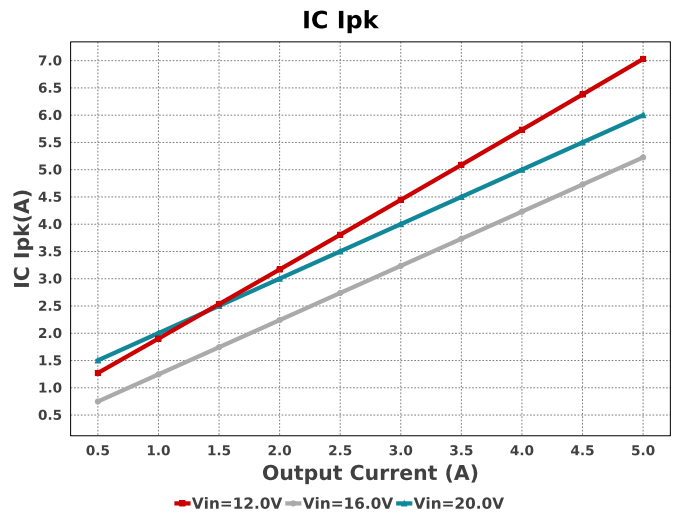
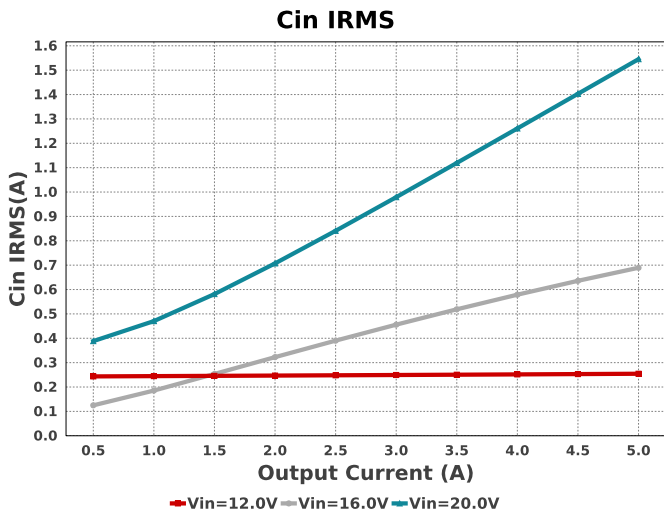
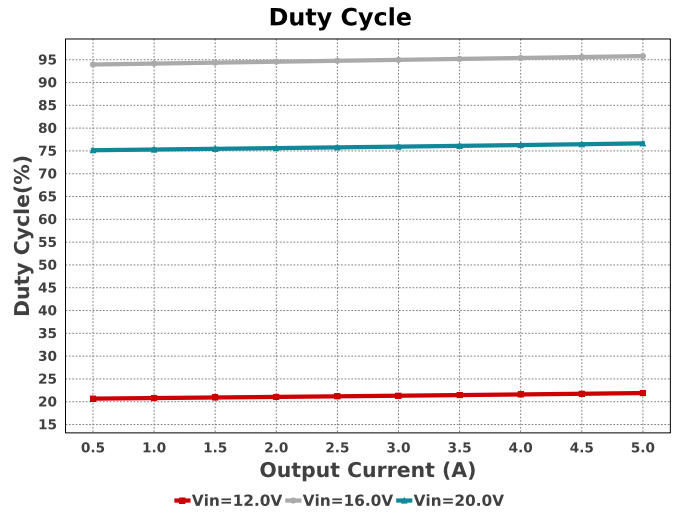
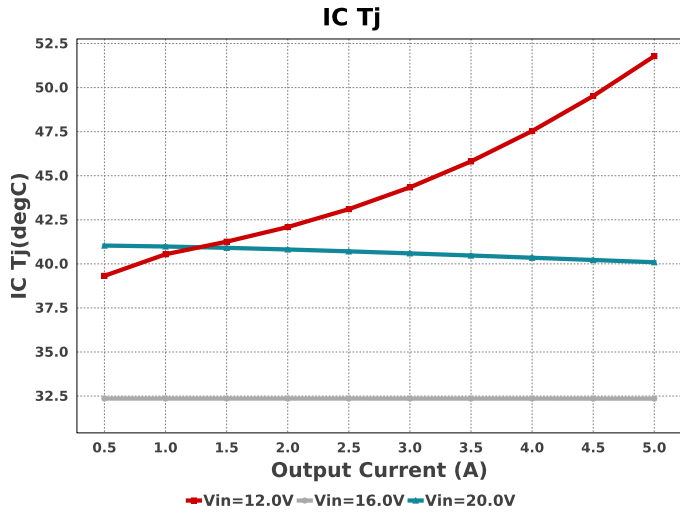
Design : 8223 TPS55288RPMR
 TPS55288RPMR 20V-36V to 20.00V @ 5A

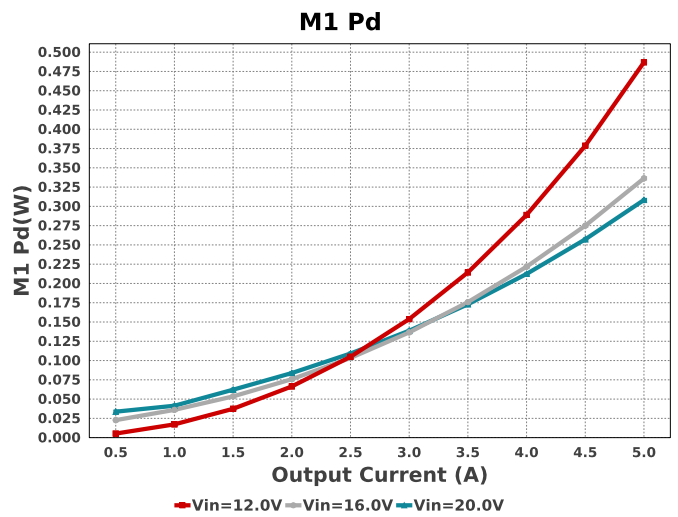
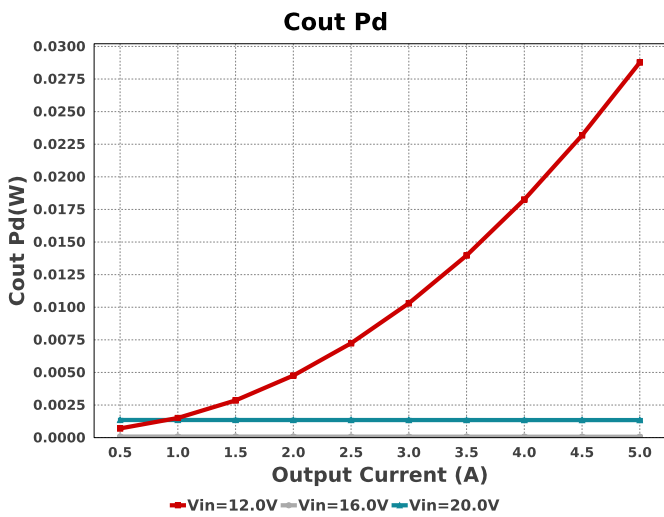
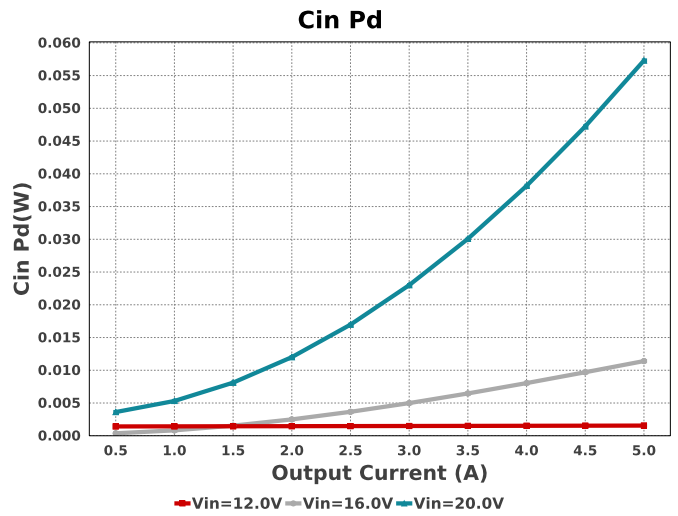
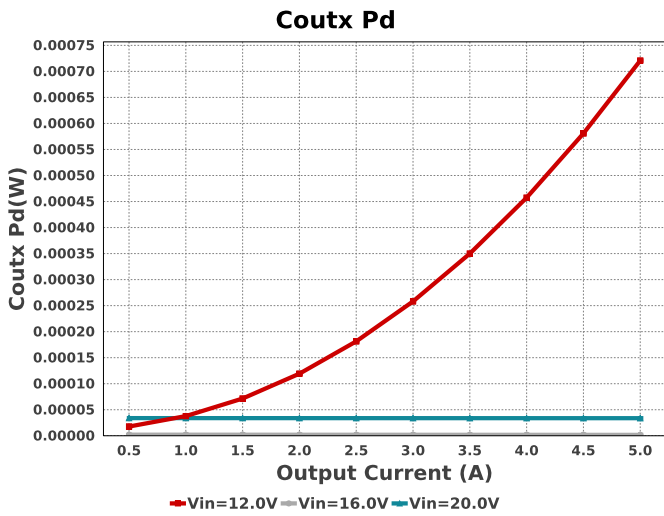
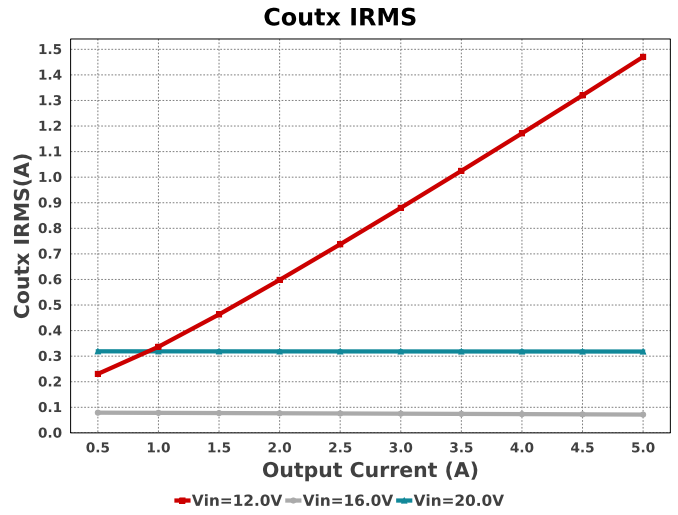
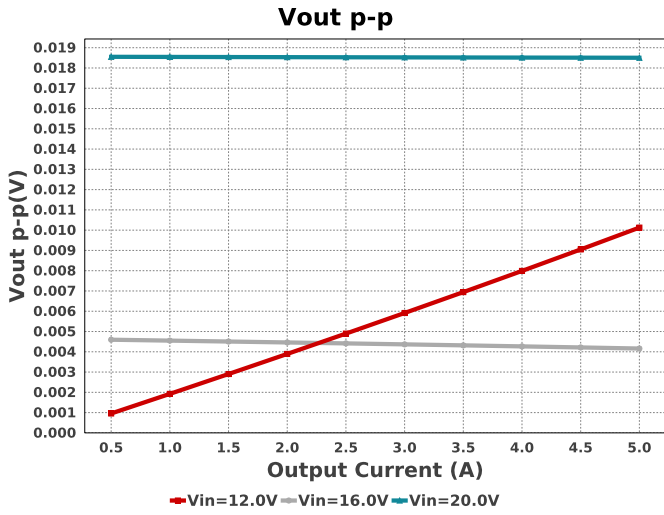


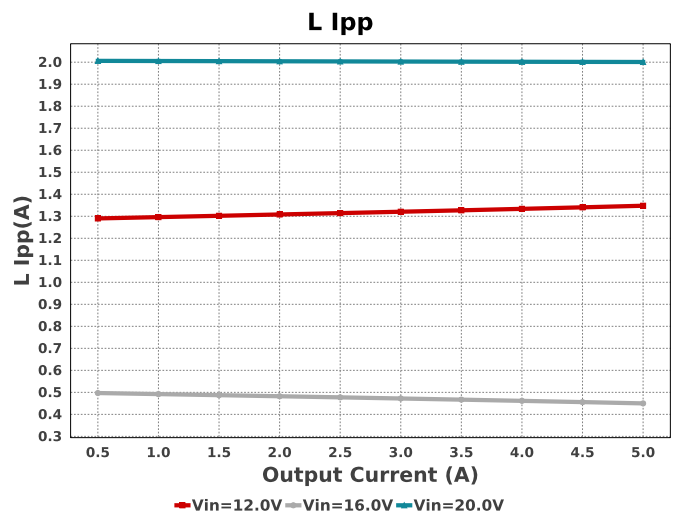
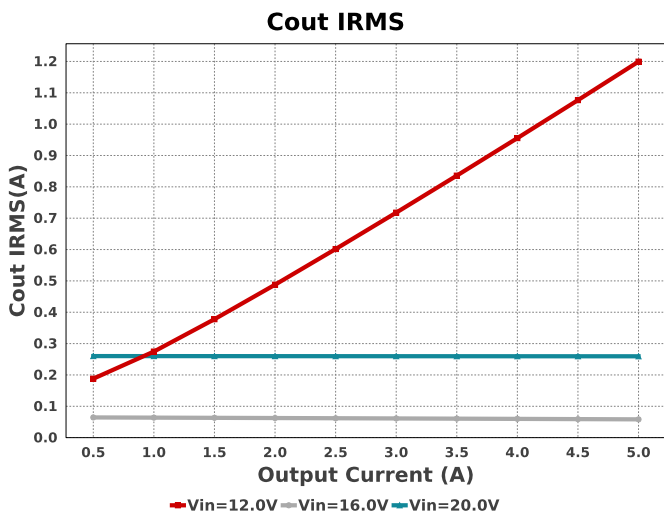
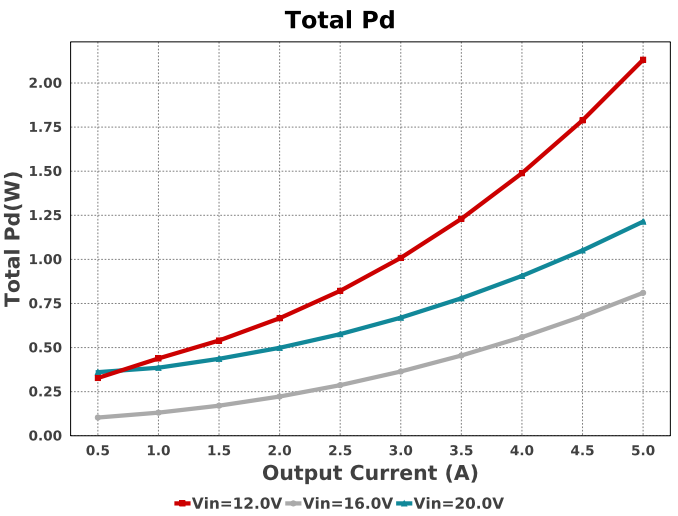
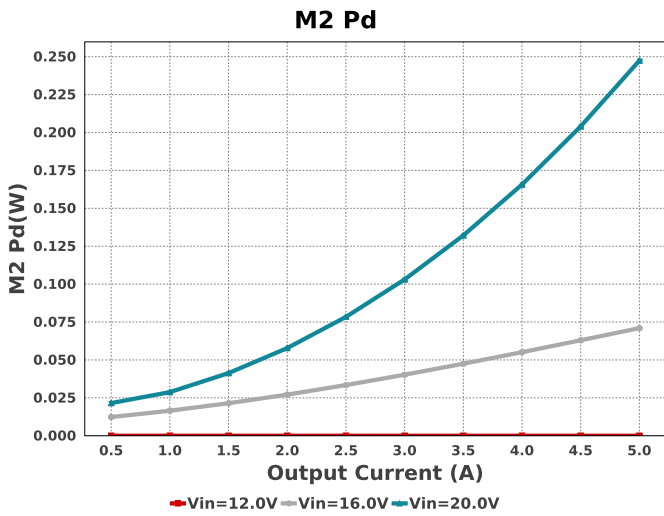
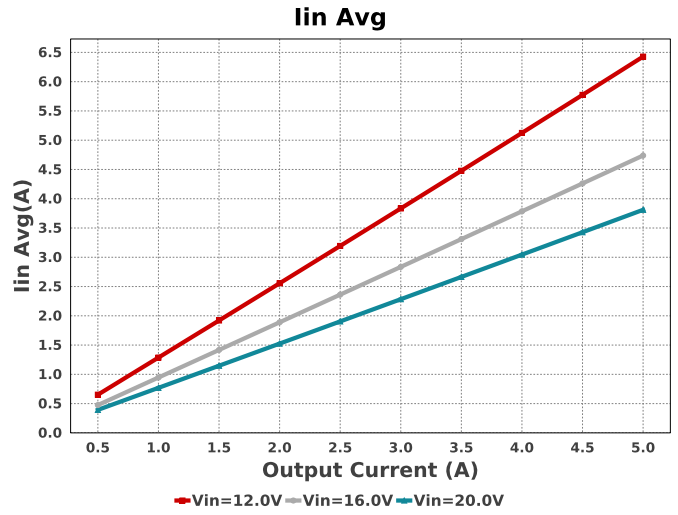
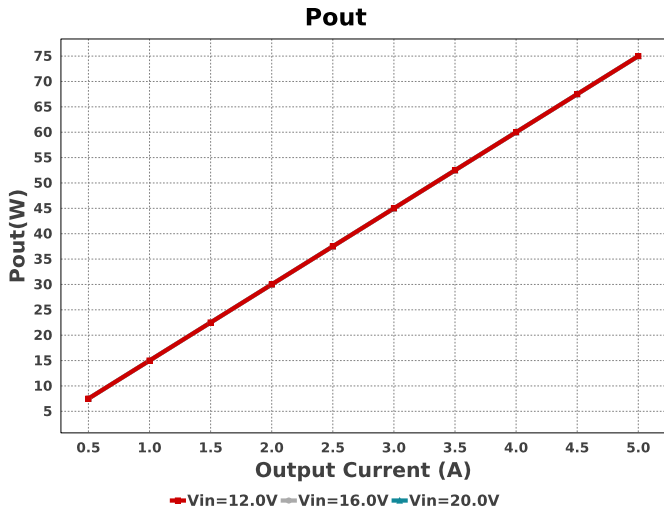
Electrical BOM

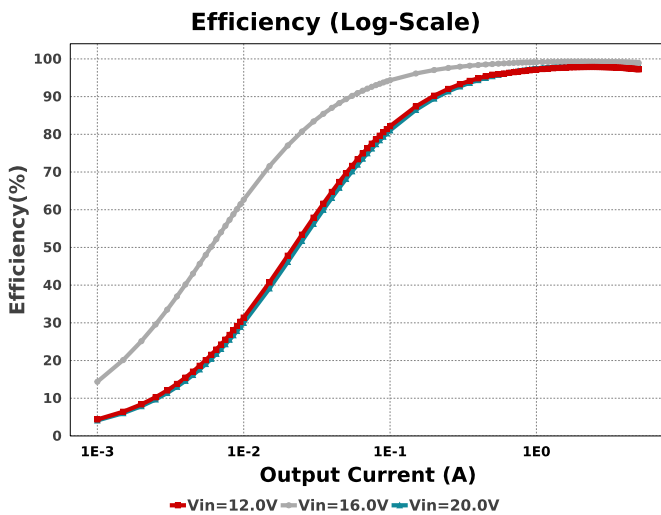
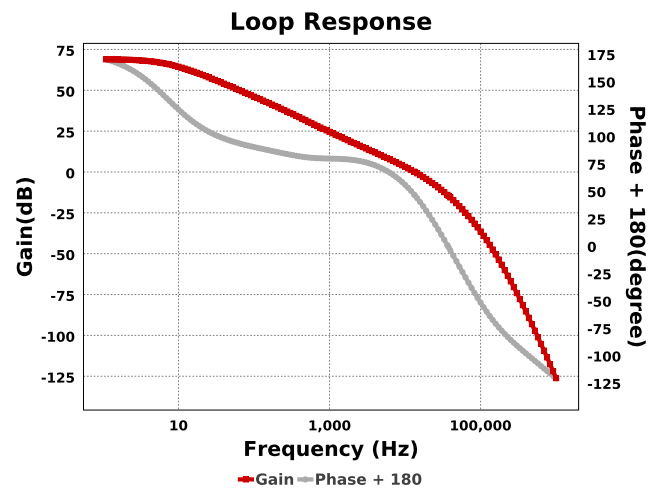
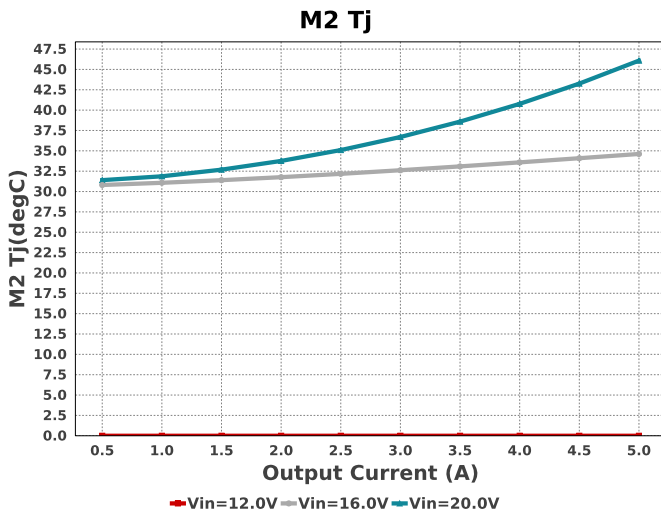
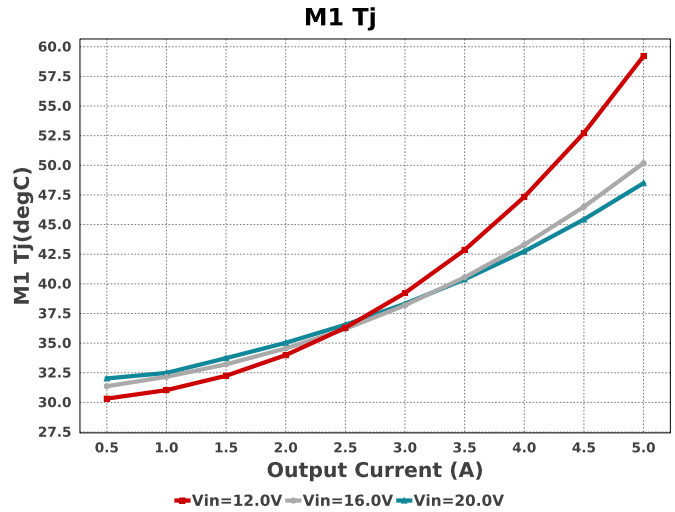
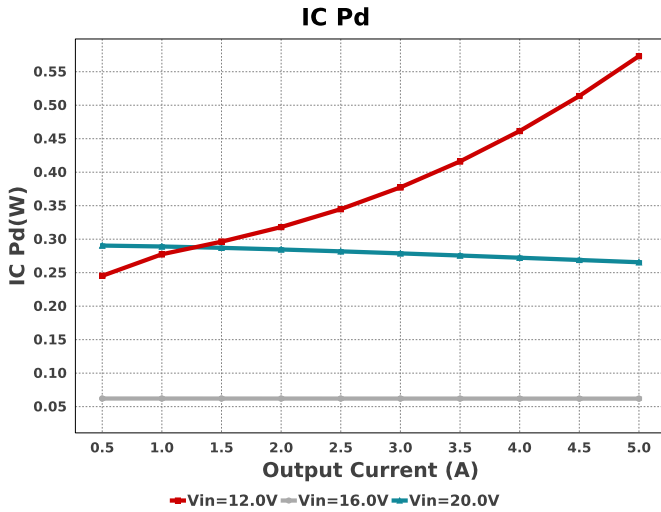
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cboot1	Taiyo Yuden	EMK107B7104KA-T Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²
Cboot2	Taiyo Yuden	EMK107B7104KA-T Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²
Ccomp	MuRata	GRM155R71C222KA01D Series= X7R	Cap= 2.2 nF ESR= 1.0 mOhm VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
Ccomp2	Kemet	C0402C150J4GACTU Series= C0G/NP0	Cap= 15.0 pF VDC= 16.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
Cin	Panasonic	25SVPF100M Series= SVPF	Cap= 100.0 µF ESR= 24.0 mOhm VDC= 25.0 V IRMS= 3.2 A	1	\$0.66	 CAPSMT_62_E7 106 mm ²
Cinx	TDK	C3225X7R1H106M250AC Series= X7R	Cap= 10.0 µF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 5.0 A	1	\$0.27	1210 15 mm ²
Cinx2	TDK	C1005X5R1V105K050BC Series= X5R	Cap= 1.0 µF ESR= 11.416 mOhm VDC= 35.0 V IRMS= 1.483 A	1	\$0.03	0402 3 mm ²
Cout	Panasonic	35SVPF82M Series= SVPF	Cap= 82.0 µF ESR= 20.0 mOhm VDC= 35.0 V IRMS= 4.0 A	1	\$1.17	 CAPSMT_62_E12 106 mm ²
Coutx	TDK	C3225X7R1H106M250AC Series= X7R	Cap= 10.0 µF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 5.0 A	3	\$0.27	1210 15 mm ²

Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Coutx2	TDK	C1005X5R1V105K050BC Series= X5R	Cap= 1.0 uF ESR= 11.416 mOhm VDC= 35.0 V IRMS= 1.483 A	1	\$0.03	 0402 3 mm ²
Cvcc	TDK	C1608X6S1C475K080AC Series= X6S	Cap= 4.7 uF ESR= 3.728 mOhm VDC= 16.0 V IRMS= 2.69359 A	1	\$0.08	 0603 5 mm ²
L1	Coilcraft	XAL6060-472MEB	L= 4.7 uH 13.1 mOhm	1	\$0.82	 XAL6060 72 mm ²
M1	Texas Instruments	CSD17578Q3A	VdsMax= 30.0 V IdsMax= 20.0 Amps	1	\$0.17	 DNH0008A 18 mm ²
M2	Texas Instruments	CSD17571Q2	VdsMax= 30.0 V IdsMax= 22.0 Amps	1	\$0.11	DQK0006C 9 mm ²
Rcomp	Vishay-Dale	CRCW0402110KFKED Series= CRCW..e3	Res= 110.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Renb	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rent	Vishay-Dale	CRCW0402887KFKED Series= CRCW..e3	Res= 887.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rfbb	Vishay-Dale	CRCW04028K06FKED Series= CRCW..e3	Res= 8.06 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rfbt	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rg1	Vishay-Dale	CRCW06031R00FKEA Series= CRCW..e3	Res= 1.0 Ohm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
Rg2	Vishay-Dale	CRCW06031R00FKEA Series= CRCW..e3	Res= 1.0 Ohm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
Rilim	Yageo	AC0402FR-0736K5L Series= ?	Res= 36.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rt	Vishay-Dale	CRCW040249K9FKED Series= CRCW..e3	Res= 49.9 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
U1	Texas Instruments	TPS55288RPMR	Switcher	1	\$2.52	RPM0026A 22 mm ²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	254.428 mA	Capacitor	Input capacitor RMS ripple current
2.	Cin Pd	1.554 mW	Capacitor	Input capacitor power dissipation
3.	Cout IRMS	1.199 A	Capacitor	Output capacitor RMS ripple current
4.	Cout Pd	28.771 mW	Capacitor	Output capacitor power dissipation
5.	Coutx IRMS	1.471 A	Capacitor	Output capacitor_x RMS ripple current
6.	Coutx Pd	720.79 μW	Capacitor	Output capacitor_x power loss
7.	IC Ipk	7.031 A	IC	Peak switch current in IC
8.	IC Pd	573.32 mW	IC	IC power dissipation
9.	IC Tj	51.786 degC	IC	IC junction temperature
10.	IC Tolerance	12.0 mV	IC	IC Feedback Tolerance
11.	ICThetaJA	38.0 degC/W	IC	IC junction-to-ambient thermal resistance

#	Name	Value	Category	Description
12.	Iin Avg	6.428 A	IC	Average input current
13.	L Ipp	1.348 A	Inductor	Peak-to-peak inductor ripple current
14.	L Pd	538.9 mW	Inductor	Inductor power dissipation
15.	M1 Pd	486.86 mW	Mosfet	M1 MOSFET total power dissipation
16.	M1 Tj	59.211 degC	Mosfet	M1 MOSFET junction temperature
17.	M2 Pd	0.0 W	Mosfet	M2 MOSFET total power dissipation
18.	M2 Tj	0.0 degC	Mosfet	M2 MOSFET junction temperature
19.	Cin Pd	1.554 mW	Power	Input capacitor power dissipation
20.	Cout Pd	28.771 mW	Power	Output capacitor power dissipation
21.	Coutx Pd	720.79 µW	Power	Output capacitor_x power loss
22.	IC Pd	573.32 mW	Power	IC power dissipation
23.	L Pd	538.9 mW	Power	Inductor power dissipation
24.	M1 Pd	486.86 mW	Power	M1 MOSFET total power dissipation
25.	M2 Pd	0.0 W	Power	M2 MOSFET total power dissipation
26.	Total Pd	2.132 W	Power	Total Power Dissipation
27.	BOM Count	26	System	Total Design BOM count
28.	Cross Freq	11.35 kHz	System Information	Bode plot crossover frequency
29.	Duty Cycle	21.9 %	System Information	Duty cycle
30.	Efficiency	97.236 %	System Information	Steady state efficiency
31.	FootPrint	449.0 mm ²	System Information	Total Foot Print Area of BOM components
32.	Frequency	397.614 kHz	System Information	Switching frequency
33.	Gain Marg	-9.615 dB	System Information	Bode Plot Gain Margin
34.	Iout	5.0 A	System Information	Iout operating point
35.	Low Freq Gain	60.983 dB	System Information	Gain at 1Hz
36.	Mode	CCM	System Information	Conduction Mode
37.	Phase Marg	45.705 deg	System Information	Bode Plot Phase Margin
38.	Pout	75.0 W	System Information	Total output power
39.	Total BOM	\$6.8	System Information	Total BOM Cost
40.	Vin	12.0 V	System Information	Vin operating point
41.	Vout	15.0 V	System Information	Operational Output Voltage
42.	Vout Actual	3.781 V	System Information	Vout Actual calculated based on selected voltage divider resistors
43.	Vout Tolerance	6.204 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
44.	Vout p-p	10.126 mV	System Information	Peak-to-peak output ripple voltage
45.	Vref	2c6	System Information	Register VREF

Design Inputs

Name	Value	Description
Iout	5.0	Maximum Output Current
VinMax	20.0	Maximum input voltage
VinMin	12.0	Minimum input voltage
Vout	15.0	Output Voltage
base_pn	TPS55288	Base Product Number
source	DC	Input Source Type
Ta	30.0	Ambient temperature

WEBENCH® Assembly

Design Assistance

1. Master key : AE3011FD2EE8F4EB[v1]
2. **TPS55288** Product Folder : <http://www.ti.com/product/TPS55288> : contains the data sheet and other resources.

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