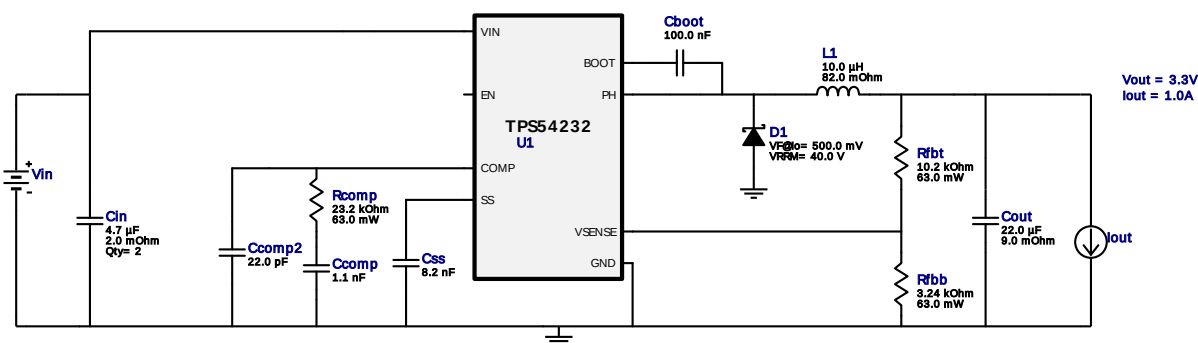


WEBENCH® Design Report

Design : 4757053/1 TPS54232DR
TPS54232DR 5.0V-26.0V to 3.30V @ 1.0A



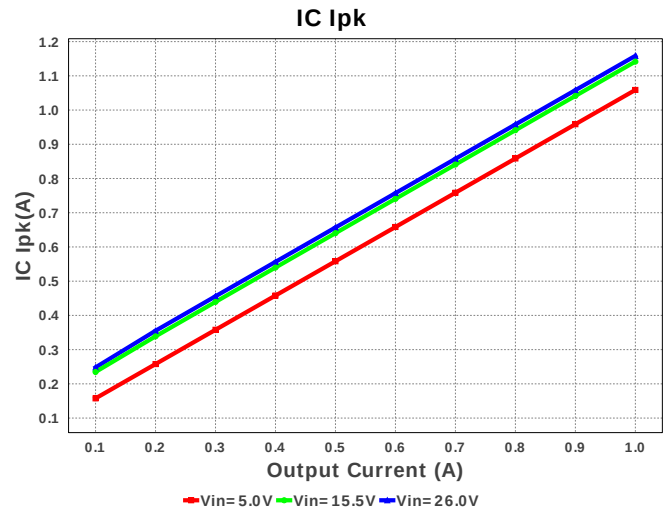
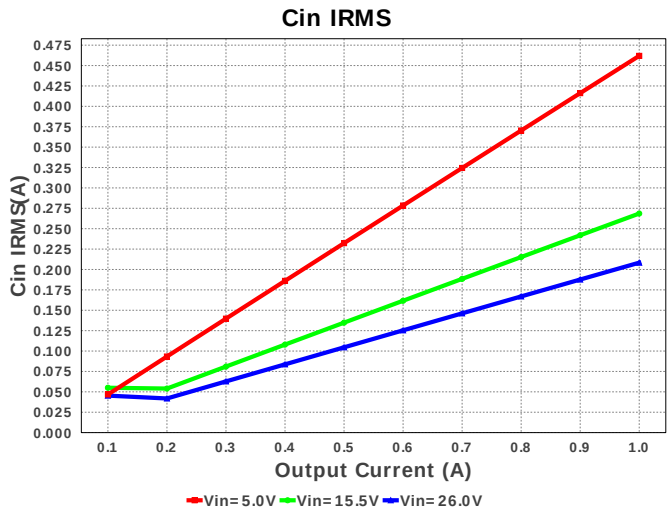
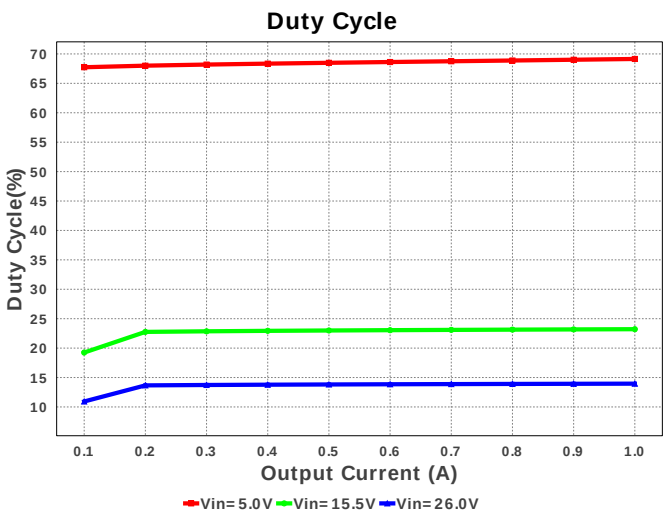
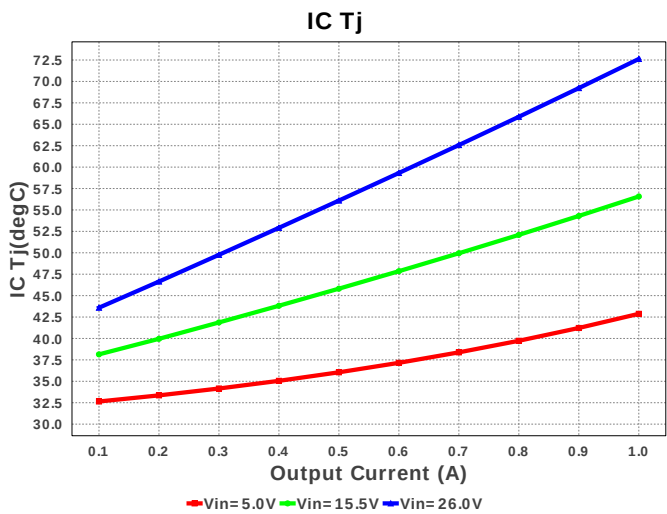
Electrical BOM

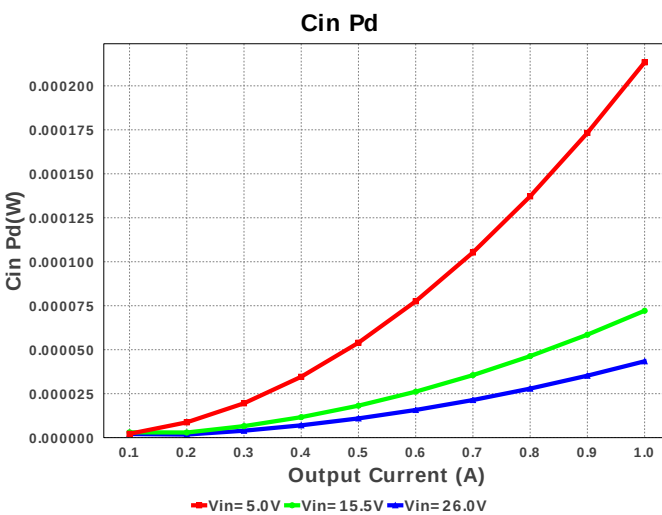
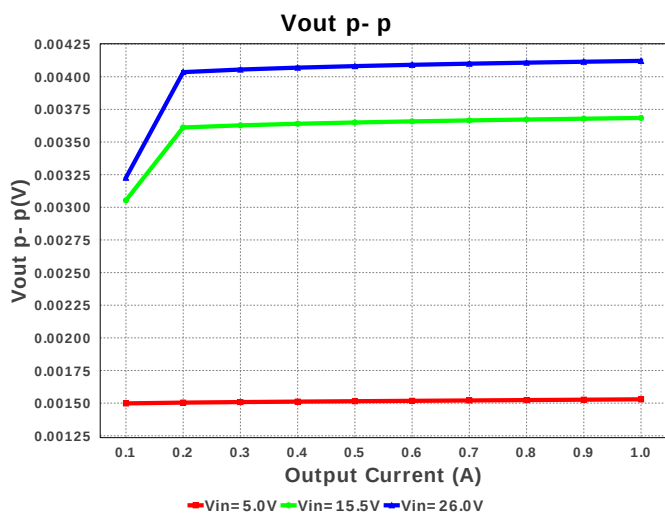
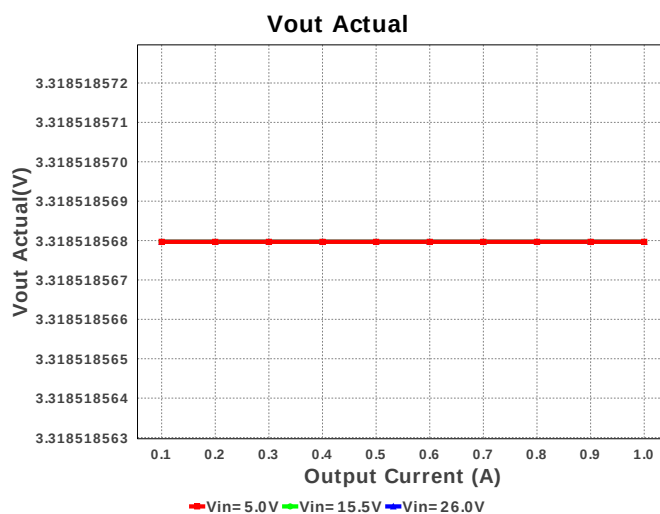
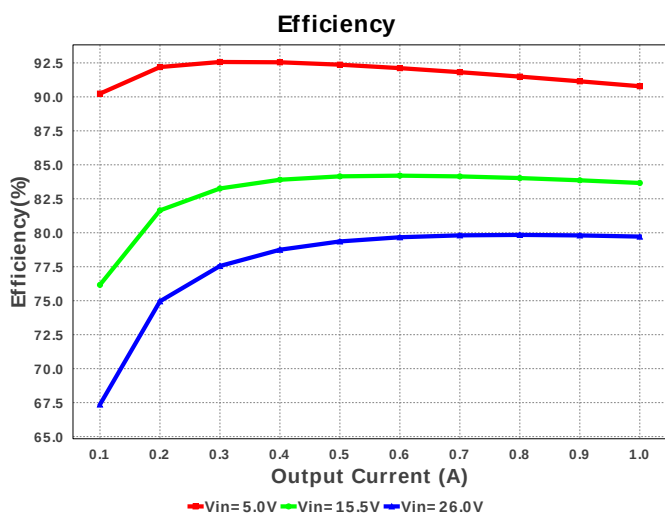
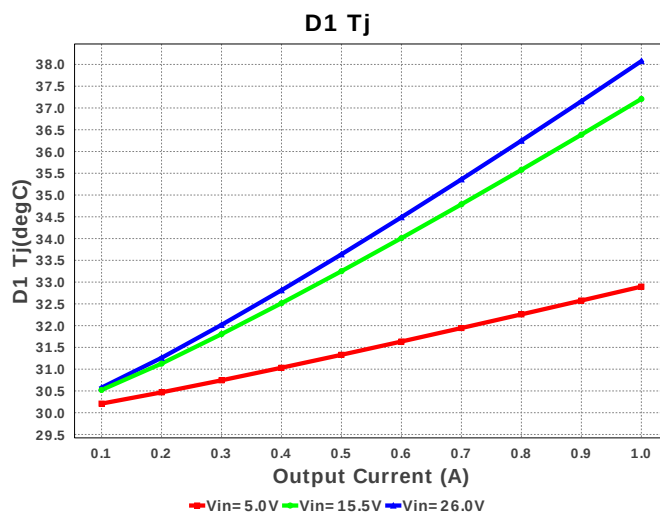
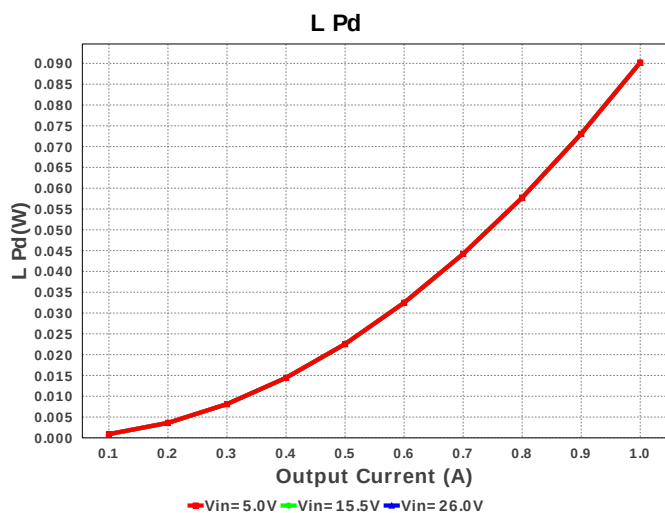
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cboot	MuRata	GRM155R61A104KA01D Series= X5R	Cap= 100.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
2.	Ccomp	MuRata	GRM2165C1H112JA01D Series= C0G/NP0	Cap= 1.1 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.03	0805 7 mm ²
3.	Ccomp2	Kemet	C0805C220K3GACTU Series= C0G/NP0	Cap= 22.0 pF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
4.	Cin	MuRata	GRM32ER71H475KA88L Series= X7R	Cap= 4.7 uF ESR= 2.0 mOhm VDC= 50.0 V IRMS= 5.35 A	2	\$0.19	1210 15 mm ²
5.	Cout	MuRata	GRM21BR60J226ME39L Series= X5R	Cap= 22.0 uF ESR= 9.0 mOhm VDC= 6.3 V IRMS= 3.5 A	1	\$0.04	0805 7 mm ²
6.	Css	MuRata	GRM033R61A822KA01D Series= X5R	Cap= 8.2 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0201 2 mm ²
7.	D1	Diodes Inc.	B240A-13-F	Vf@Io= 500.0 mV VRRM= 40.0 V	1	\$0.09	SMA 37 mm ²
8.	L1	Würth Elektronik	74408943100	L= 10.0 uH DCR= 82.0 mOhm	1	\$1.70	SRR4038 34 mm ²
9.	Rcomp	Vishay-Dale	CRCW040223K2FKED Series= CRCW..e3	Res= 23.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
10.	Rfbb	Vishay-Dale	CRCW04023K24FKED Series= CRCW..e3	Res= 3.24 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
11.	Rfbt	Vishay-Dale	CRCW040210K2FKED Series= CRCW..e3	Res= 10.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

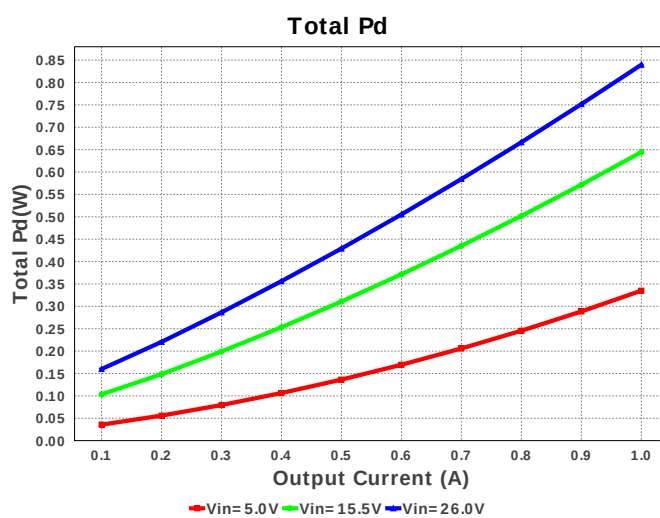
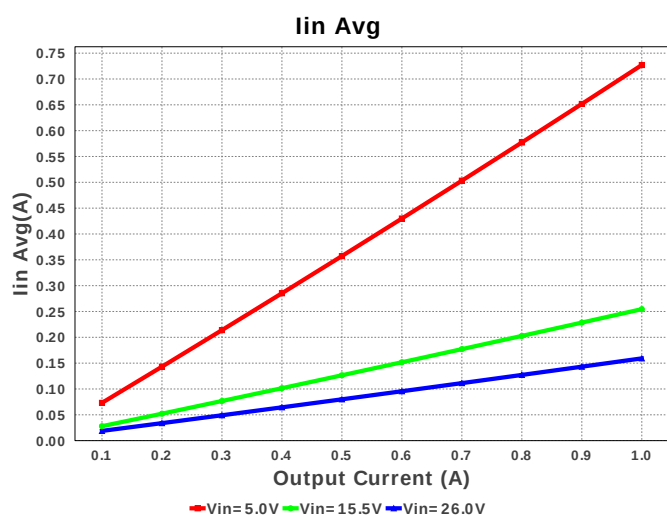
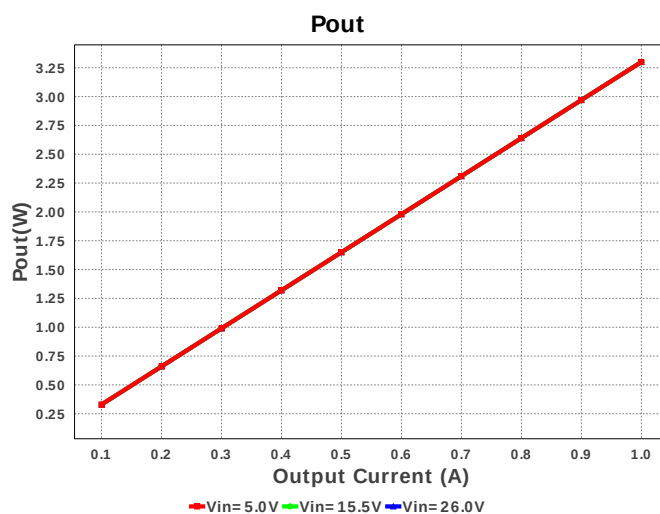
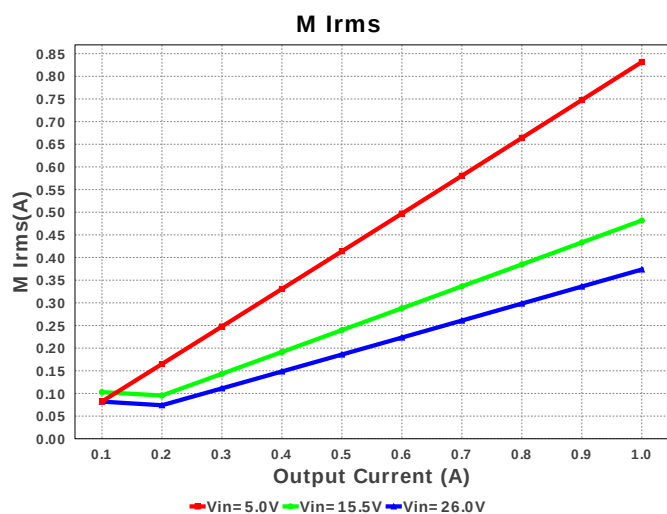
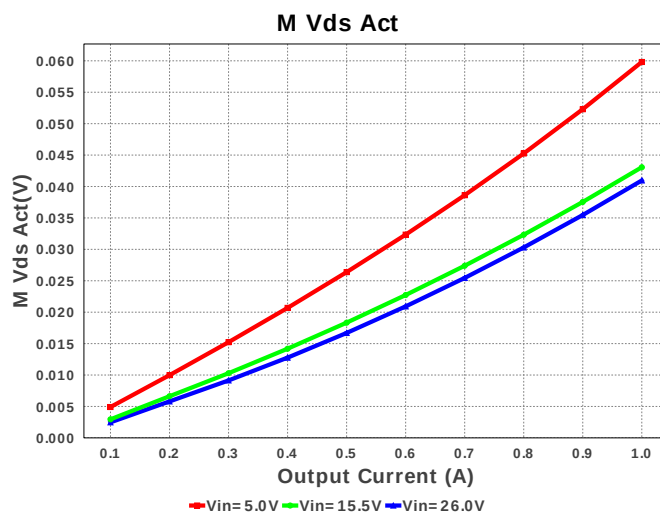
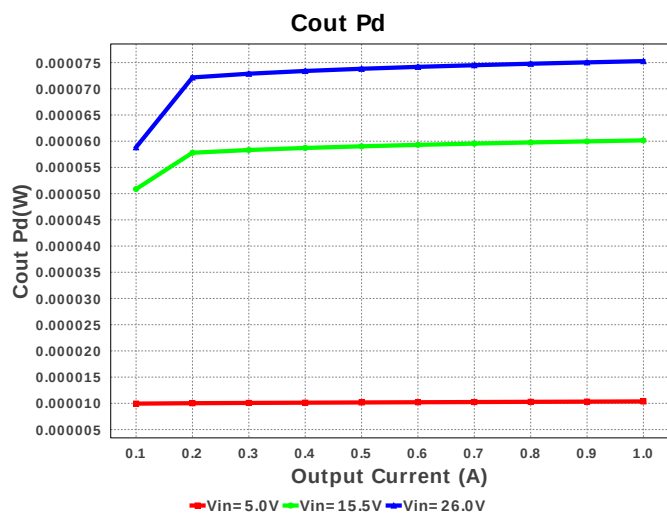
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
12.	U1	Texas Instruments	TPS54232DR	Switcher	1	\$0.55	

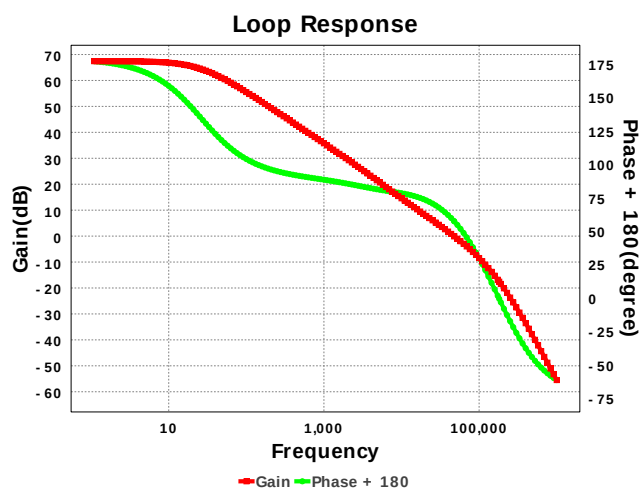
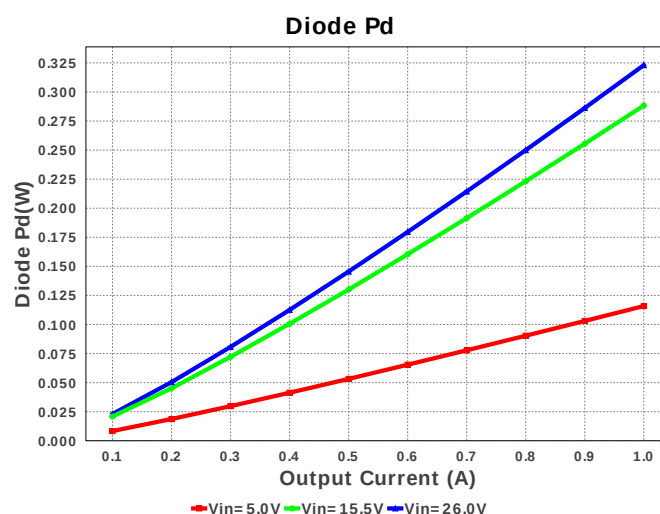
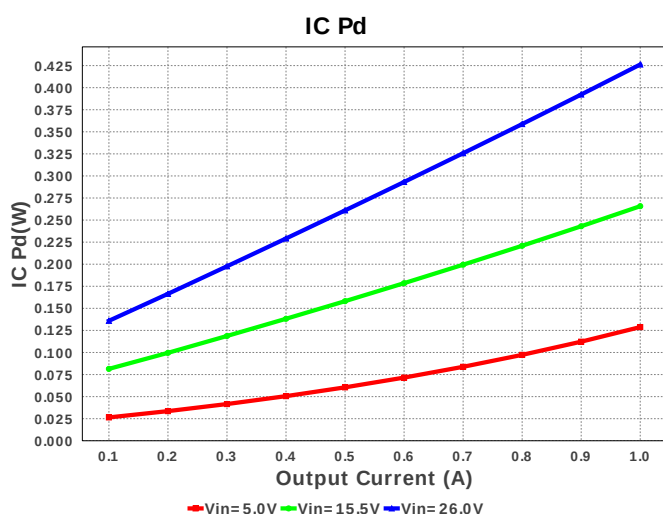
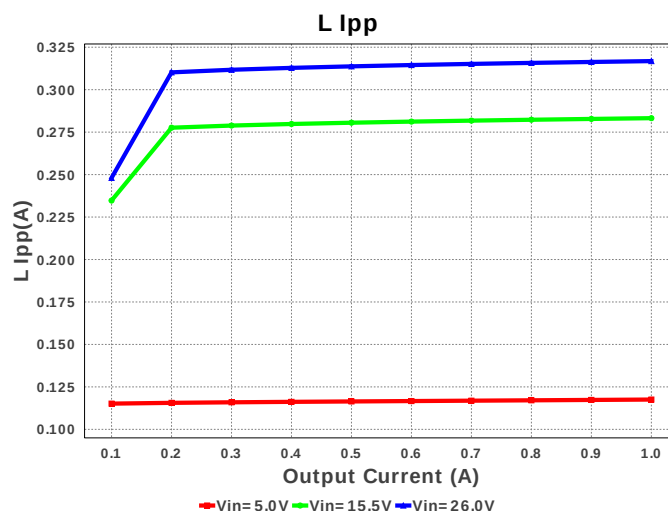
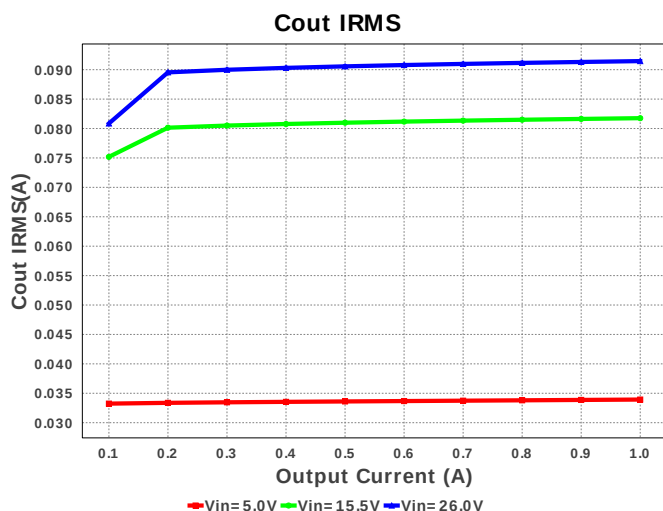


D0008A 57 mm²









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	208.341 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	91.458 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.158 A	Current	Peak switch current in IC
4.	Iin Avg	159.22 mA	Current	Average input current
5.	L Ipp	316.82 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	373.589 mA	Current	Q lavg
7.	BOM Count	13	General	Total Design BOM count
8.	FootPrint	191.0 mm ²	General	Total Foot Print Area of BOM components
9.	Frequency	1000.0 kHz	General	Switching frequency
10.	M Vds Act	40.962 mV	General	Voltage drop across the MosFET
11.	Pout	3.3 W	General	Total output power

#	Name	Value	Category	Description
12.	Total BOM	\$2.85	General	Total BOM Cost
13.	D1 Tj	38.077 degC	Op_Point	D1 junction temperature
14.	Low Freq Gain	67.422 dB	Op_Point	Gain at 10Hz
15.	Vout Actual	3.319 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
16.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
17.	Cross Freq	47.533 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	13.957 %	Op_point	Duty cycle
19.	Efficiency	79.718 %	Op_point	Steady state efficiency
20.	Gain Marg	-17.576 dB	Op_point	Bode Plot Gain Margin
21.	IC Tj	72.623 degC	Op_point	IC junction temperature
22.	ICThetaJA	100.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
23.	IOUT_OP	1.0 A	Op_point	Iout operating point
24.	Phase Marg	58.104 deg	Op_point	Bode Plot Phase Margin
25.	VIN_OP	26.0 V	Op_point	Vin operating point
26.	Vout p-p	4.122 mV	Op_point	Peak-to-peak output ripple voltage
27.	Cin Pd	43.406 µW	Power	Input capacitor power dissipation
28.	Cout Pd	75.282 µW	Power	Output capacitor power dissipation
29.	Diode Pd	323.066 mW	Power	Diode power dissipation
30.	IC Pd	426.233 mW	Power	IC power dissipation
31.	L Pd	90.2 mW	Power	Inductor power dissipation
32.	Total Pd	839.618 mW	Power	Total Power Dissipation
33.	Vout Tolerance	5.087 %		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	VinMax	26.0	Maximum input voltage
3.	VinMin	5.0	Minimum input voltage
4.	Vout	3.3	Output Voltage
5.	base_pn	TPS54232	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. **TPS54232** Product Folder : <http://www.ti.com/product/TPS54232> : contains the data sheet and other resources.

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