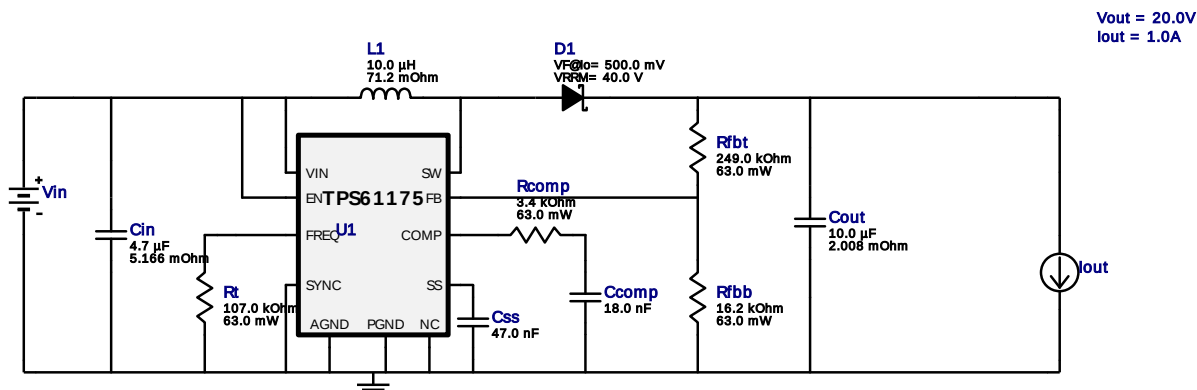


WEBENCH® Design Report

Design : 906020/2242 TPS61175PWPR
TPS61175PWPR 10.0V-17.0V to 20.00V @ 1.0A

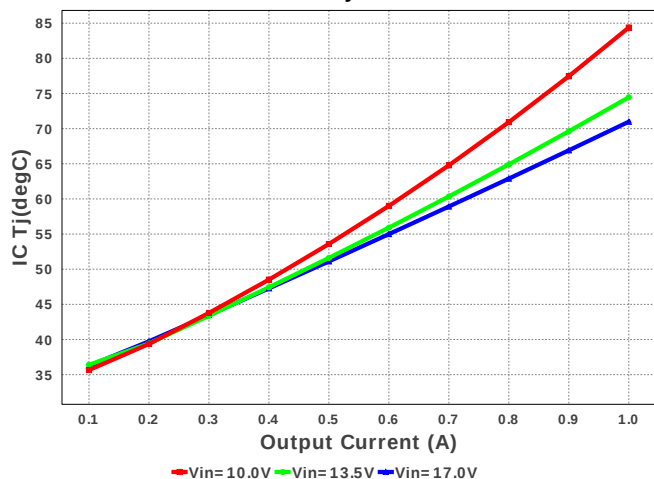


Electrical BOM

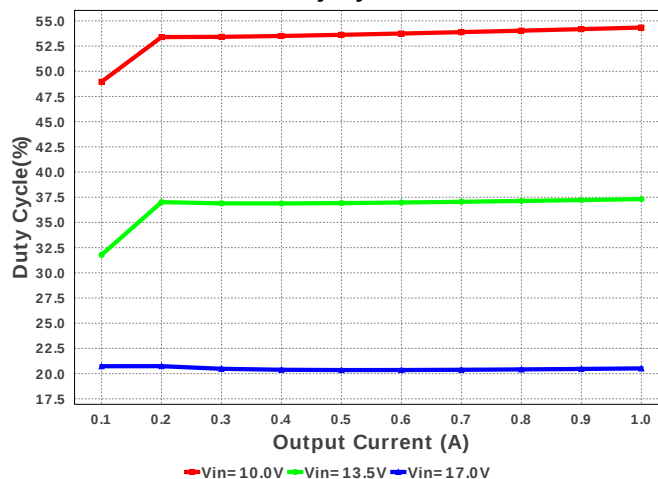
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Ccomp	Yageo America	CC0805KRX7R9BB183 Series= X7R	Cap= 18.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
2.	Cin	MuRata	GRM21BC81E475KA12L Series= X6S	Cap= 4.7 uF ESR= 5.166 mOhm VDC= 25.0 V IRMS= 2.03531 A	1	\$0.02	0805 7 mm ²
3.	Cout	MuRata	GRM32ER7YA106KA12L Series= X7R	Cap= 10.0 uF ESR= 2.008 mOhm VDC= 35.0 V IRMS= 4.6772 A	1	\$0.22	1210_280 15 mm ²
4.	Css	Taiyo Yuden	TMK212B7473KD-T Series= X7R	Cap= 47.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
5.	D1	Diodes Inc.	B340A-13-F	VF@Io= 500.0 mV VRRM= 40.0 V	1	\$0.11	SMA 37 mm ²
6.	L1	Vishay-Dale	IHLP2525CZER100M11	L= 10.0 uH DCR= 71.2 mOhm	1	\$0.74	IHLP-2525CZ 75 mm ²
7.	Rcomp	Vishay-Dale	CRCW04023K40FKED Series= CRCW..e3	Res= 3.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
8.	Rfbb	Vishay-Dale	CRCW040216K2FKED Series= CRCW..e3	Res= 16.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
9.	Rfbb	Vishay-Dale	CRCW0402249KFKED Series= CRCW..e3	Res= 249.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
10.	Rt	Vishay-Dale	CRCW0402107KFKED Series= CRCW..e3	Res= 107.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11. U1		Texas Instruments	TPS61175PWPR	Switcher	1	\$1.40	 R-PDSO-G14 61 mm ²

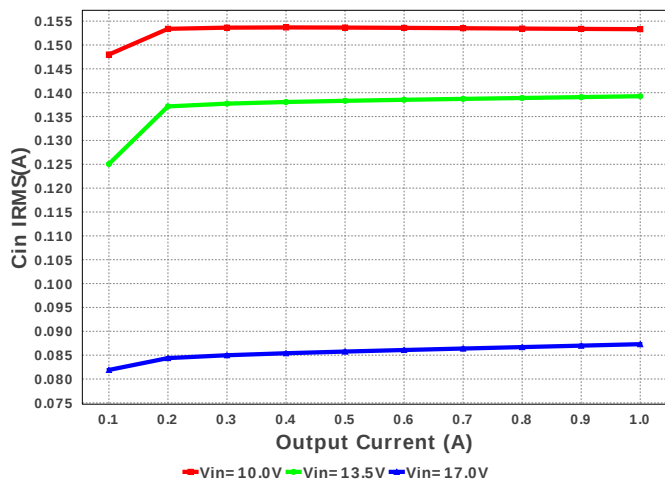
IC Tj



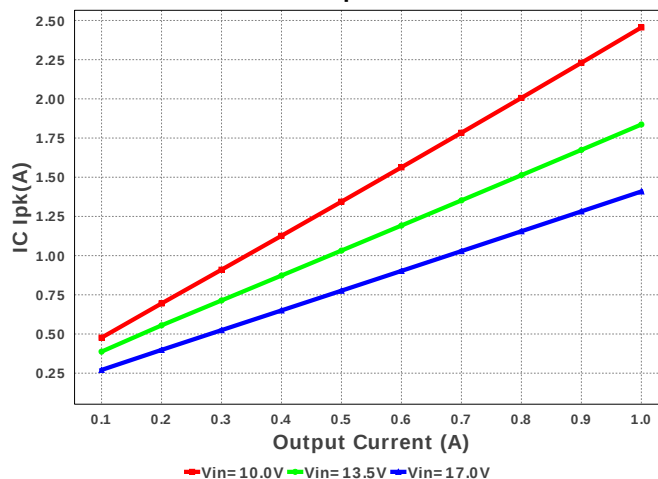
Duty Cycle

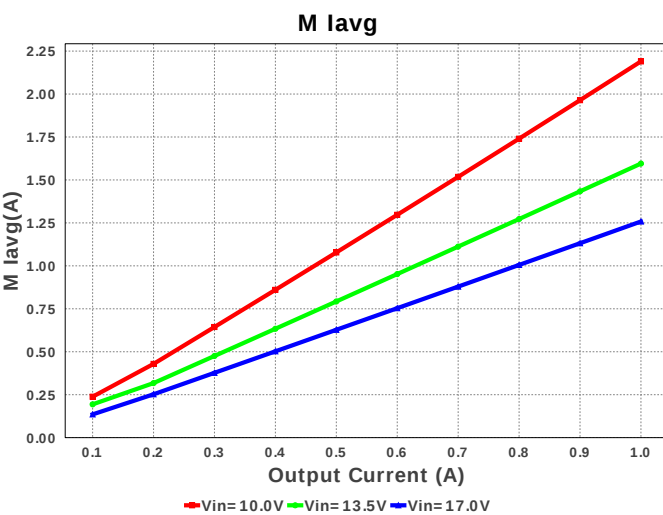
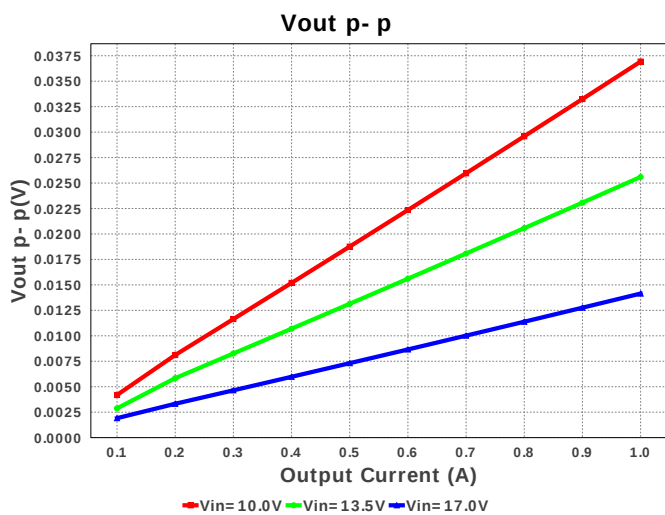
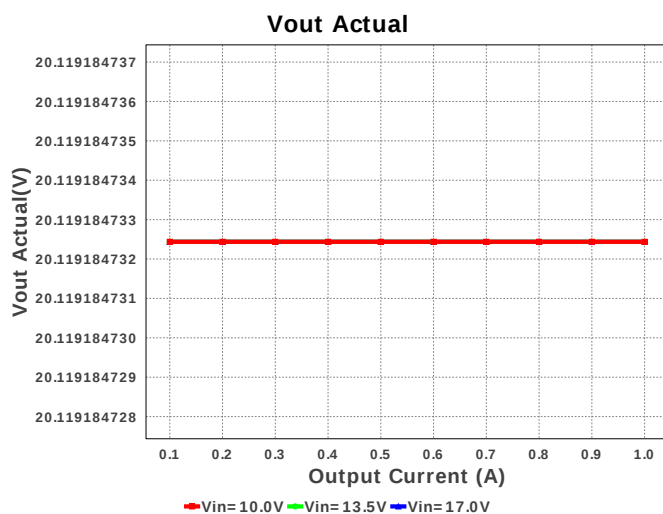
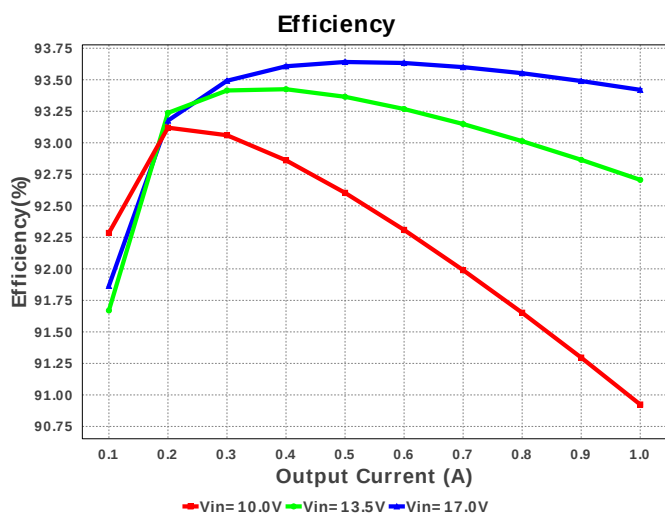
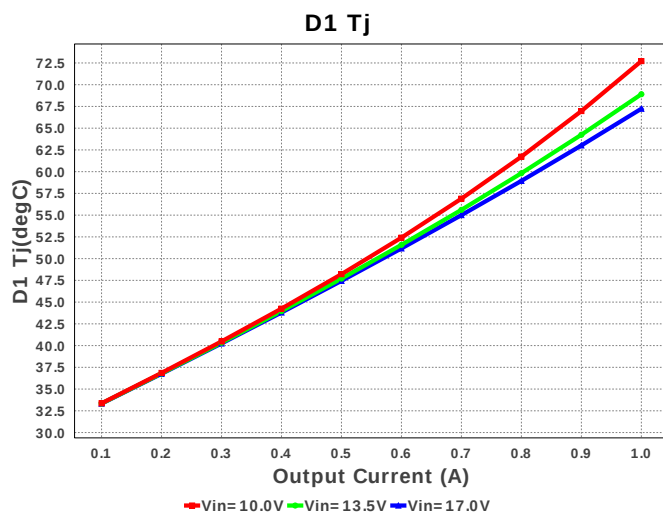
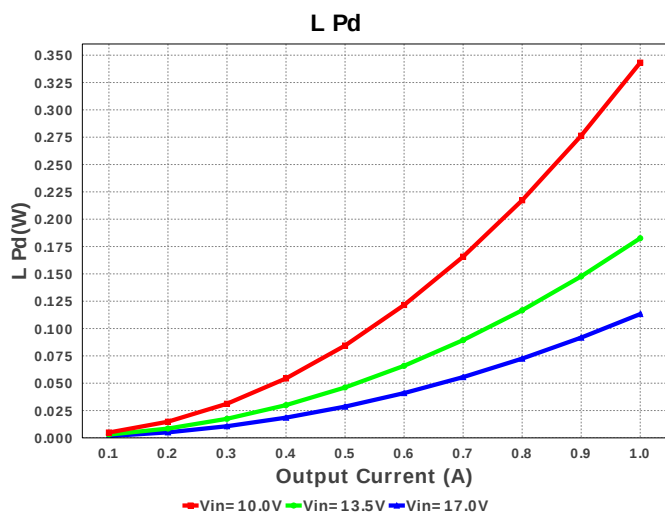


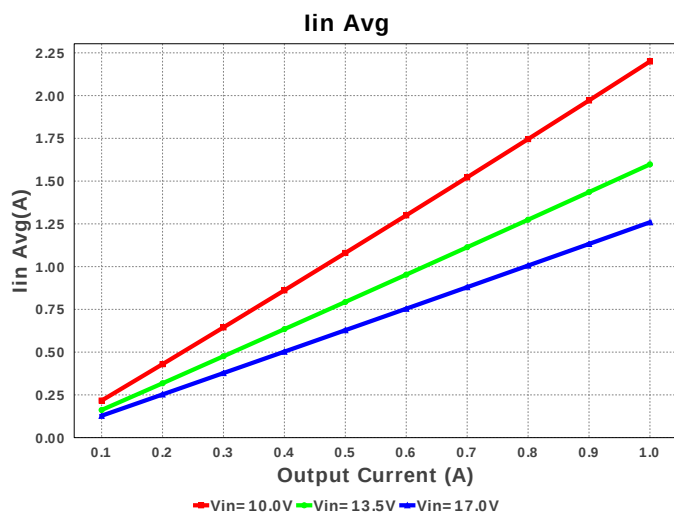
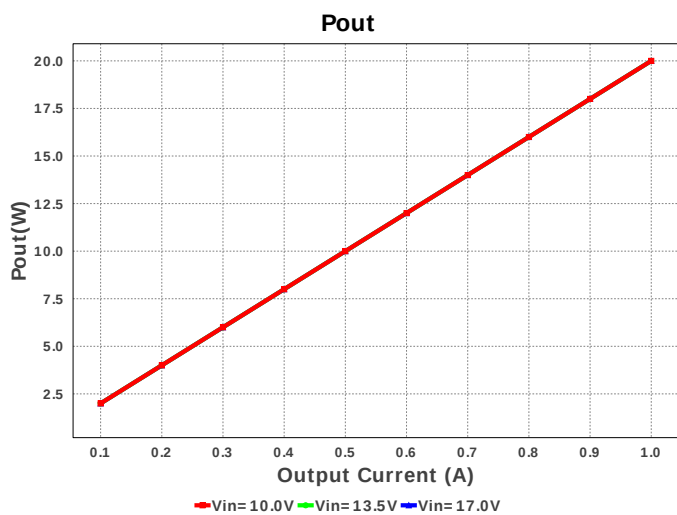
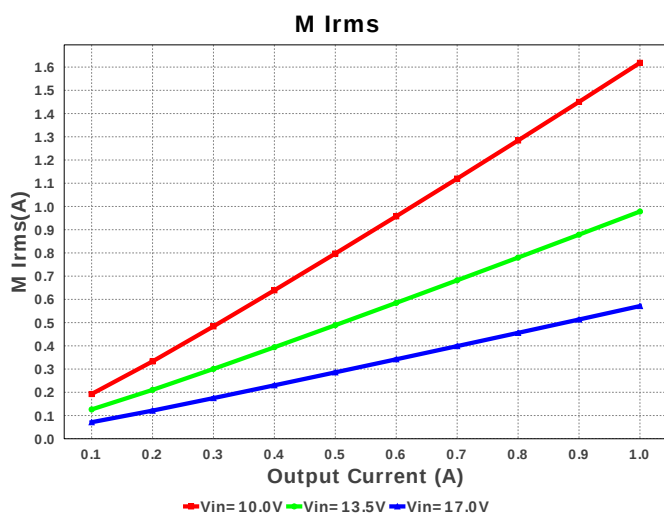
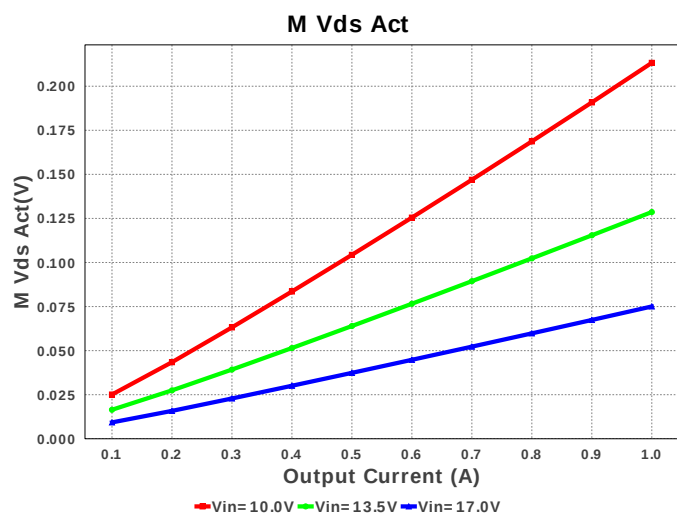
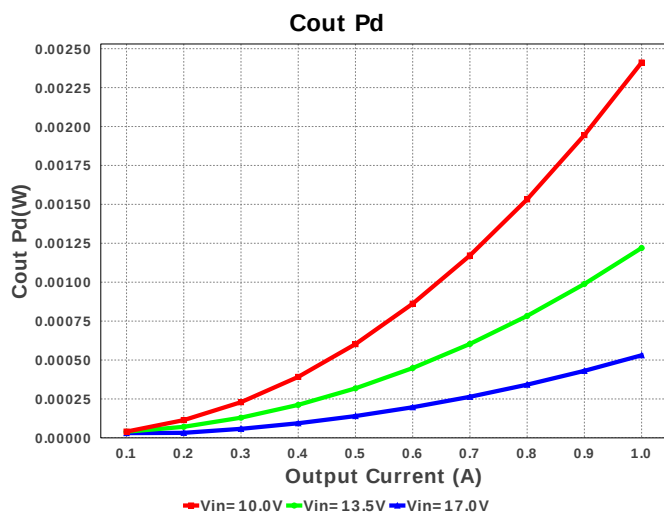
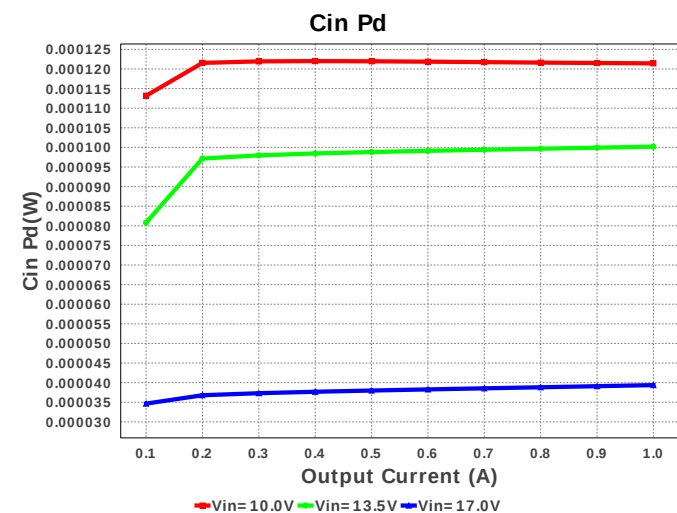
Cin IRMS

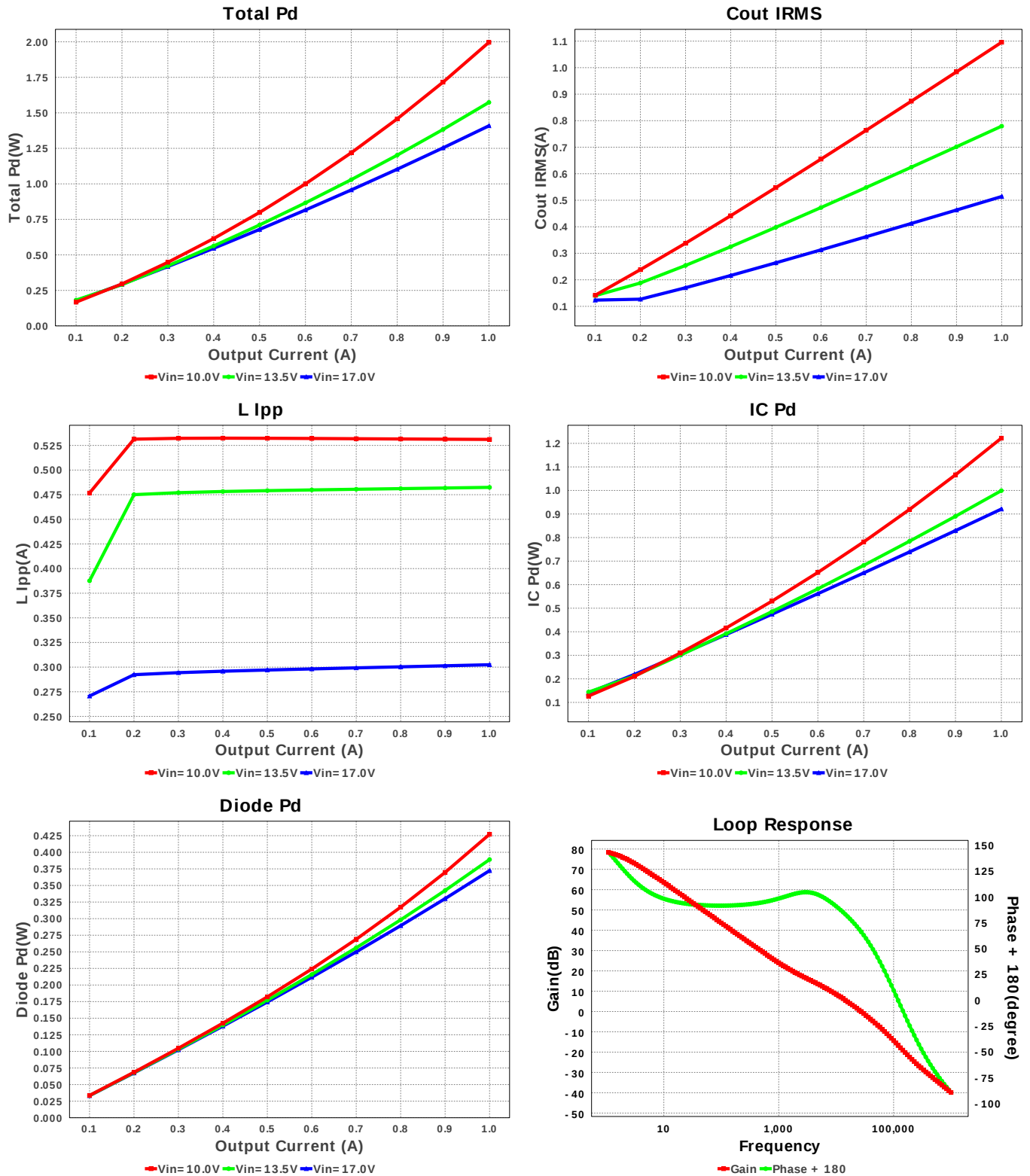


IC Ipk









Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	153.314 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	1.096 A	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.456 A	Current	Peak switch current in IC
4.	Iin Avg	2.2 A	Current	Average input current
5.	L Ipp	531.09 mA	Current	Peak-to-peak inductor ripple current
6.	M Iavg	2.19 A	Current	MOSFET Average current
7.	M Irms	1.618 A	Current	MOSFET RMS current
8.	BOM Count	11	General	Total Design BOM count
9.	FootPrint	220.0 mm ²	General	Total Foot Print Area of BOM components
10.	Frequency	909.876 kHz	General	Switching frequency
11.	IC Tolerance	20.0 mV	General	IC Feedback Tolerance

#	Name	Value	Category	Description
12.	M Vds Act	213.27 mV	General	Voltage drop across the MosFET
13.	Pout	20.0 W	General	Total output power
14.	Total BOM	\$2.55	General	Total BOM Cost
15.	D1 Tj	72.714 degC	Op_Point	D1 junction temperature
16.	Low Freq Gain	77.706 dB	Op_Point	Gain at 10Hz
17.	Vout Actual	20.119 V	Op_Point	Vout Actual calculated based on selected voltage divider resistors
18.	Vout OP	20.0 V	Op_Point	Operational Output Voltage
19.	Cross Freq	13.609 kHz	Op_point	Bode plot crossover frequency
20.	Duty Cycle	54.339 %	Op_point	Duty cycle
21.	Efficiency	90.924 %	Op_point	Steady state efficiency
22.	Gain Marg	-13.668 dB	Op_point	Bode Plot Gain Margin
23.	IC Tj	84.381 degC	Op_point	IC junction temperature
24.	ICThetaJA	44.5 degC/W	Op_point	IC junction-to-ambient thermal resistance
25.	IOUT_OP	1.0 A	Op_point	Iout operating point
26.	Phase Marg	67.508 deg	Op_point	Bode Plot Phase Margin
27.	VIN_OP	10.0 V	Op_point	Vin operating point
28.	Vout p-p	30.927 mV	Op_point	Peak-to-peak output ripple voltage
29.	Cin Pd	121.427 µW	Power	Input capacitor power dissipation
30.	Cout Pd	2.411 mW	Power	Output capacitor power dissipation
31.	Diode Pd	427.14 mW	Power	Diode power dissipation
32.	IC Pd	1.222 W	Power	IC power dissipation
33.	L Pd	343.177 mW	Power	Inductor power dissipation
34.	Total Pd	1.996 W	Power	Total Power Dissipation
35.	Vout Tolerance	3.555 %		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	17.0	Maximum input voltage
3.	VinMin	10.0	Minimum input voltage
4.	Vout	20.0	Output Voltage
5.	base_pn	TPS61175	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. TPS61175 Product Folder : <http://www.ti.com/product/TPS61175> : contains the data sheet and other resources.

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