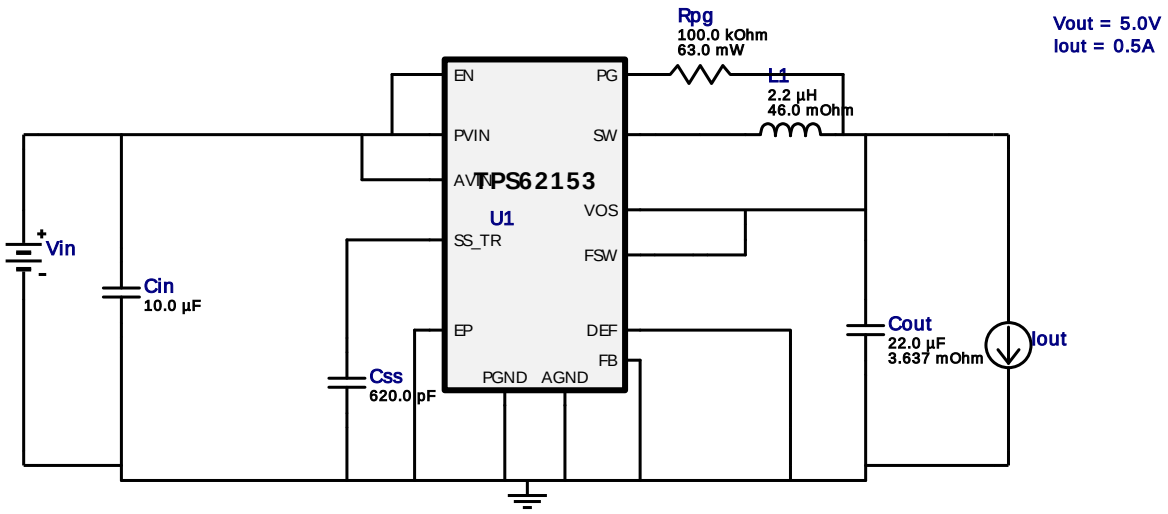
WEBENCH® Design Report

VinMin = 10.0V
VinMax = 12.0V
Vout = 5.0V
Iout = 0.5A

Device = TPS62153RGTR
Topology = Buck
Created = 7/21/16 2:11:31 AM
BOM Cost = $1.49
BOM Count = 6
Total Pd = 0.22W

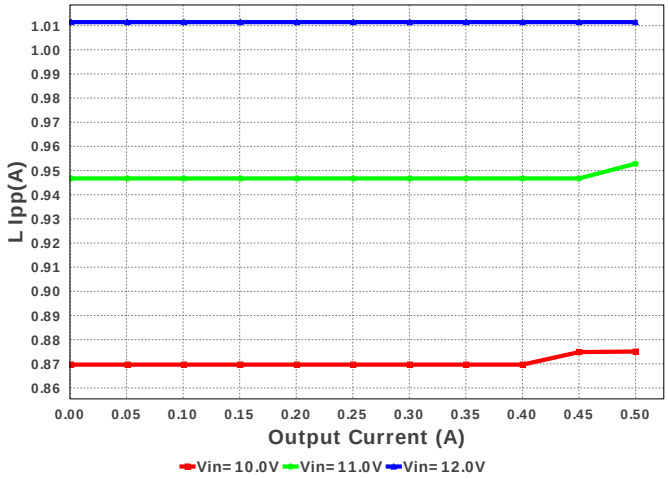
Design : 4742013/222 TPS62153RGTR
TPS62153RGTR 10.0V-12.0V to 5.00V @ 0.5A



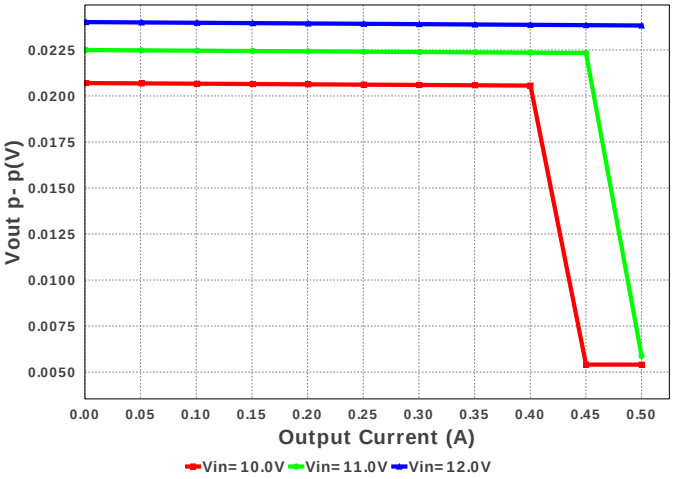
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cin	Taiyo Yuden	TMK316BJ106KL-T Series= X5R	Cap= 10.0 uF VDC= 25.0 V IRMS= 0.0 A	1	$0.05	1206 11 mm²
2.	Cout	MuRata	GRM31CR61A226KE19L Series= X5R	Cap= 22.0 uF ESR= 3.637 mOhm VDC= 10.0 V IRMS= 3.56456 A	1	$0.07	1206_190 11 mm²
3.	Css	Samsung Electro-Mechanics	CL21C621JBCNNNC Series= C0G/NP0	Cap= 620.0 pF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 7 mm²
4.	L1	Vishay-Dale	IHLP1212BZER2R2M11	L= 2.2 µH DCR= 46.0 mOhm	1	$0.56	IHLP-1212BZ 19 mm²
5.	Rpg	Vishay-Dale	CRCW0402100KFKED Series= CRCW..e3	Res= 100.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
6.	U1	Texas Instruments	TPS62153RGTR	Switcher	1	$0.79	S-PVQFN-N16 17 mm²

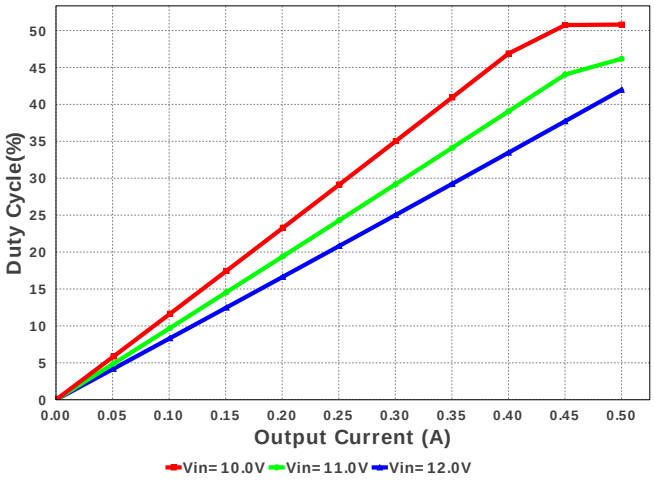
L Ipp



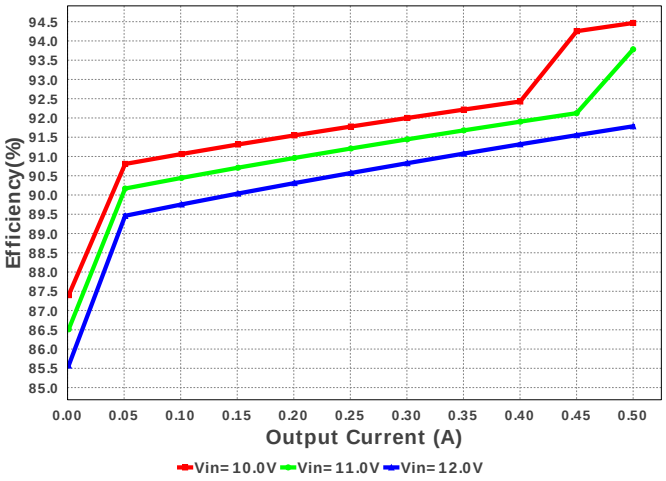
Vout p- p



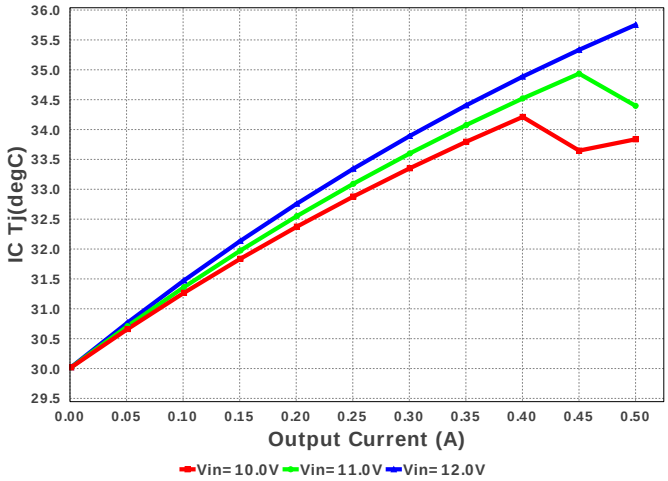
Duty Cycle



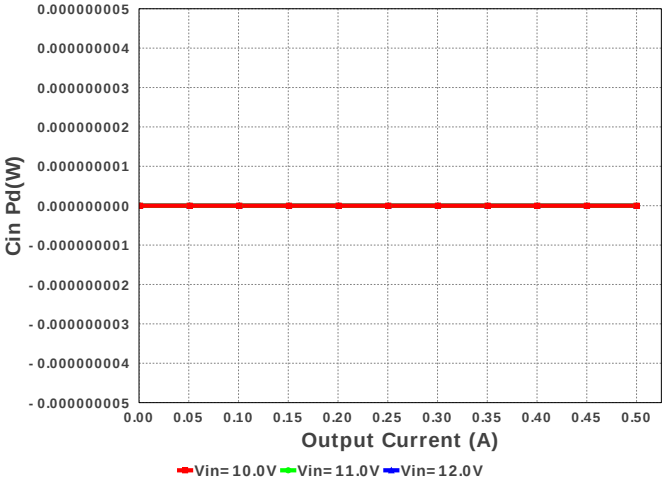
Efficiency

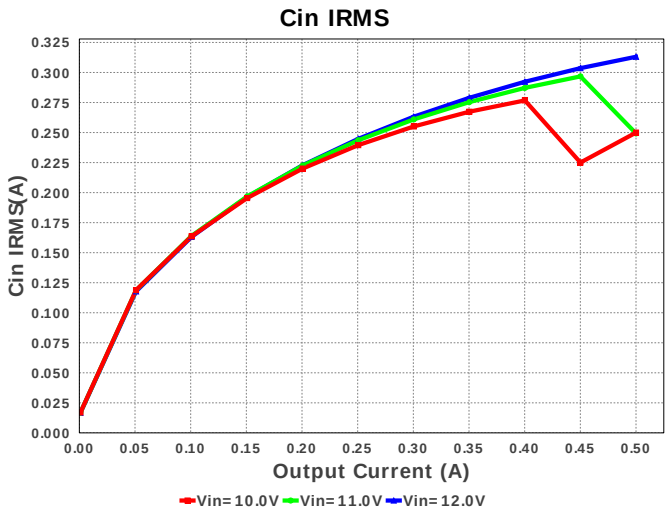


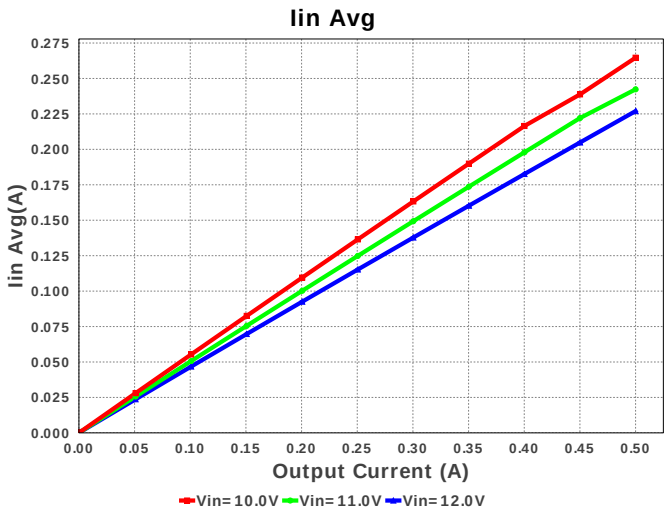
IC Tj

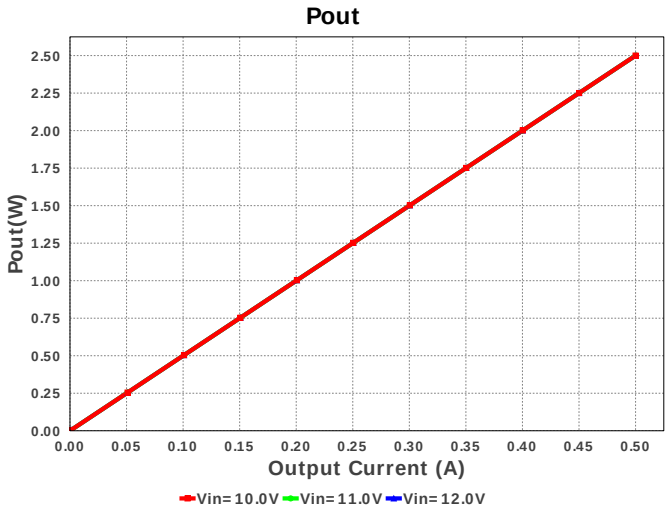


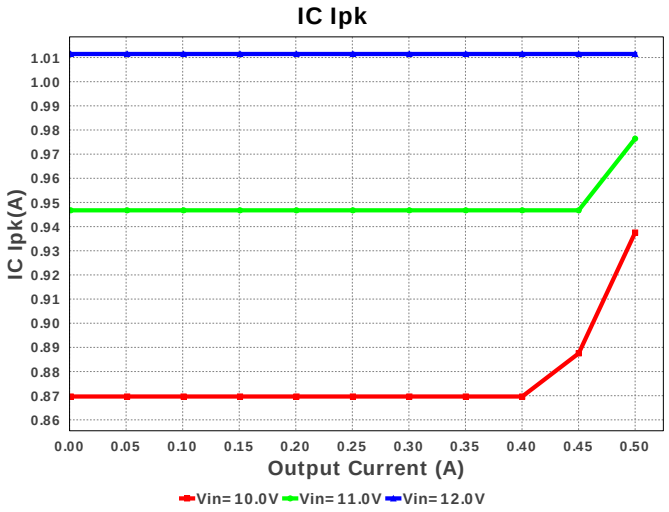
Cin Pd

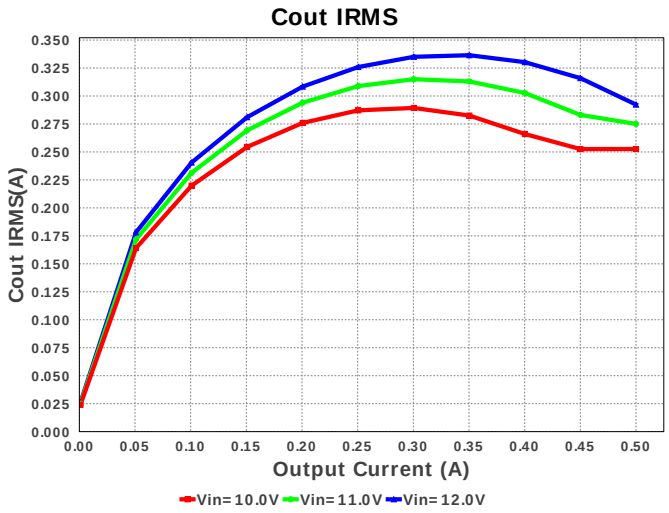


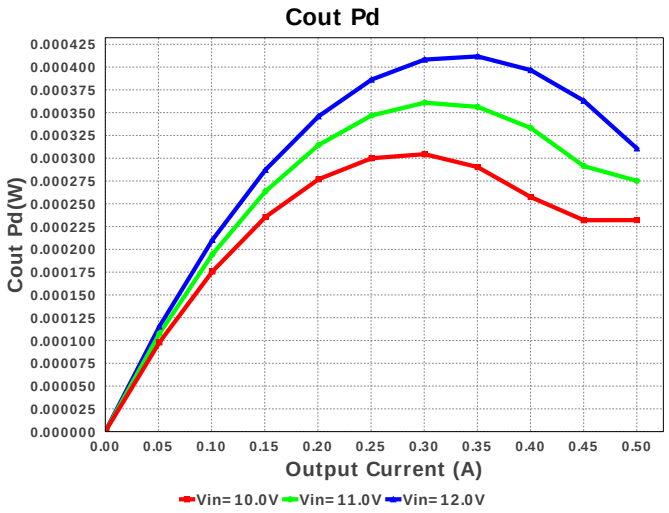


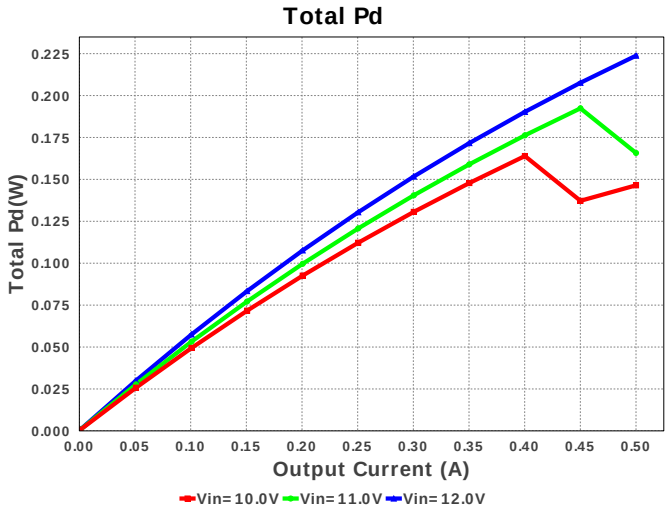


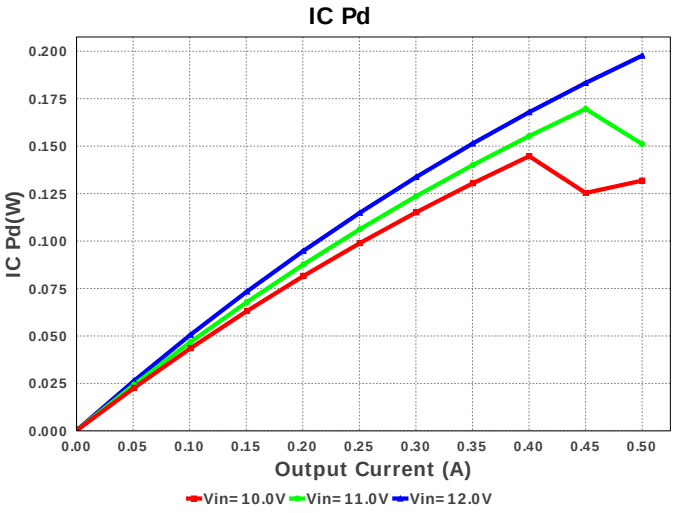


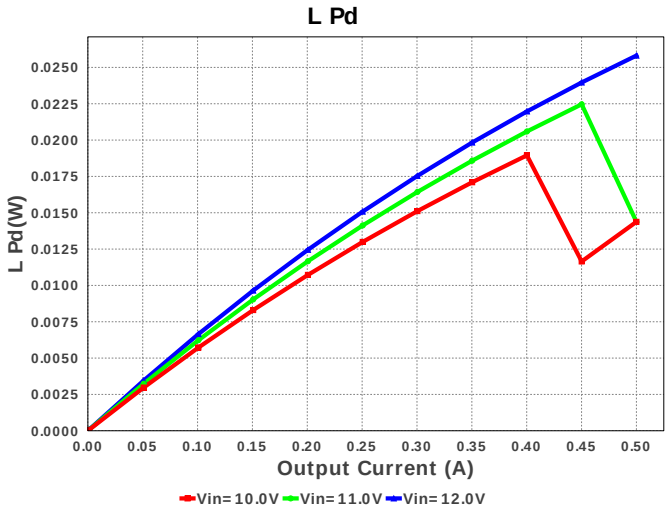


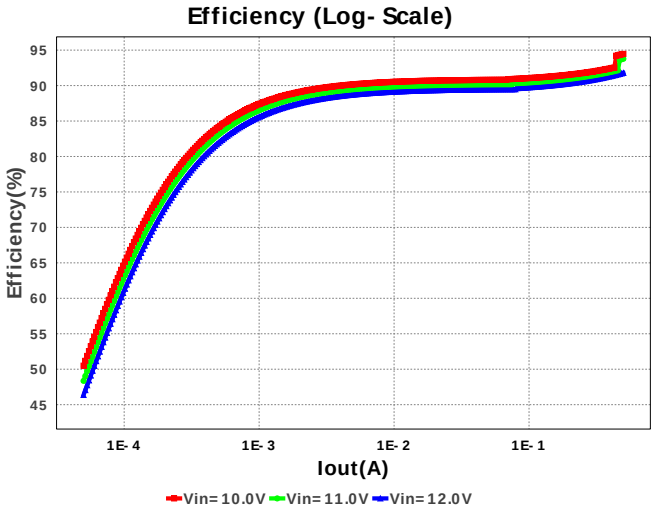












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	313.075 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	292.328 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	1.011 A	Current	Peak switch current in IC
4.	Iin Avg	226.98 mA	Current	Average input current
5.	L Ipp	1.012 A	Current	Peak-to-peak inductor ripple current
6.	BOM Count	6	General	Total Design BOM count
7.	FootPrint	68.0 mm^2	General	Total Foot Print Area of BOM components
8.	Frequency	1.321 MHz	General	Switching frequency
9.	Pout	2.5 W	General	Total output power
10.	Total BOM	$1.49	General	Total BOM Cost
11.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
12.	Duty Cycle	41.981 %	Op_point	Duty cycle
13.	Efficiency	91.784 %	Op_point	Steady state efficiency
14.	IC Tj	35.752 degC	Op_point	IC junction temperature
15.	ICThetaJA	29.1 degC/W	Op_point	IC junction-to-ambient thermal resistance
16.	IOUT_OP	500.0 mA	Op_point	Iout operating point
17.	VIN_OP	12.0 V	Op_point	Vin operating point
18.	Vout p-p	23.827 mV	Op_point	Peak-to-peak output ripple voltage
19.	Cin Pd	0.0 W	Power	Input capacitor power dissipation
20.	Cout Pd	310.802 µW	Power	Output capacitor power dissipation
21.	IC Pd	197.66 mW	Power	IC power dissipation
22.	L Pd	25.814 mW	Power	Inductor power dissipation
23.	Total Pd	223.784 mW	Power	Total Power Dissipation
24.	Vout Tolerance	288.0 m%		Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 m	Maximum Output Current
2.	VinMax	12.0	Maximum input voltage

#	Name	Value	Description
3.	VinMin	10.0	Minimum input voltage
4.	Vout	5.0	Output Voltage
5.	base_pn	TPS62153	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	30.0	Ambient temperature

Design Assistance

1. Feature Highlights: DCS-Control(TM) Architecture with upto 1A output current, 3V to 17V Input Voltage Range, 5.0V Fixed Output voltageSelectable operating frequency, Optional Softstart Capacitor for slow startup, Tracking,Pin selectable output voltage (nominal, +5%) Seamless Power Save Mode for Light Load Efficiency, Power Good Output, 100% Duty Cycle mode, Short Circuit Protection, Thermal Shutdown

2. **TPS62153** Product Folder : http://www.ti.com/product/TPS62153 : contains the data sheet and other resources.