National Semiconductor

WEBENCH® Design Document

Design 28 - LM2676S-ADJ

Introduction

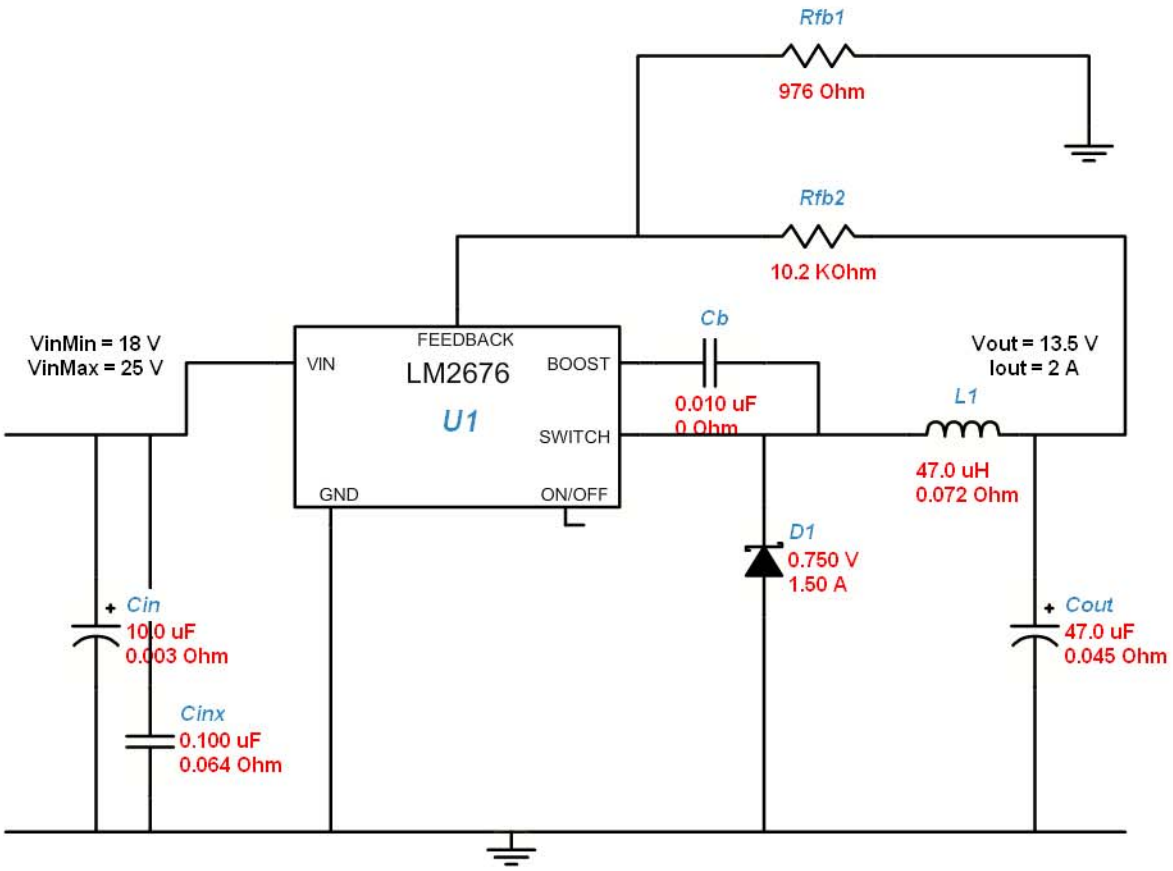
Design Specifications

IC	LM2676
VinMin	18 V
VinMax	25 V

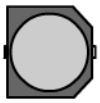
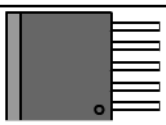
Vout	13.5 V
Iout	2 A
ta	30

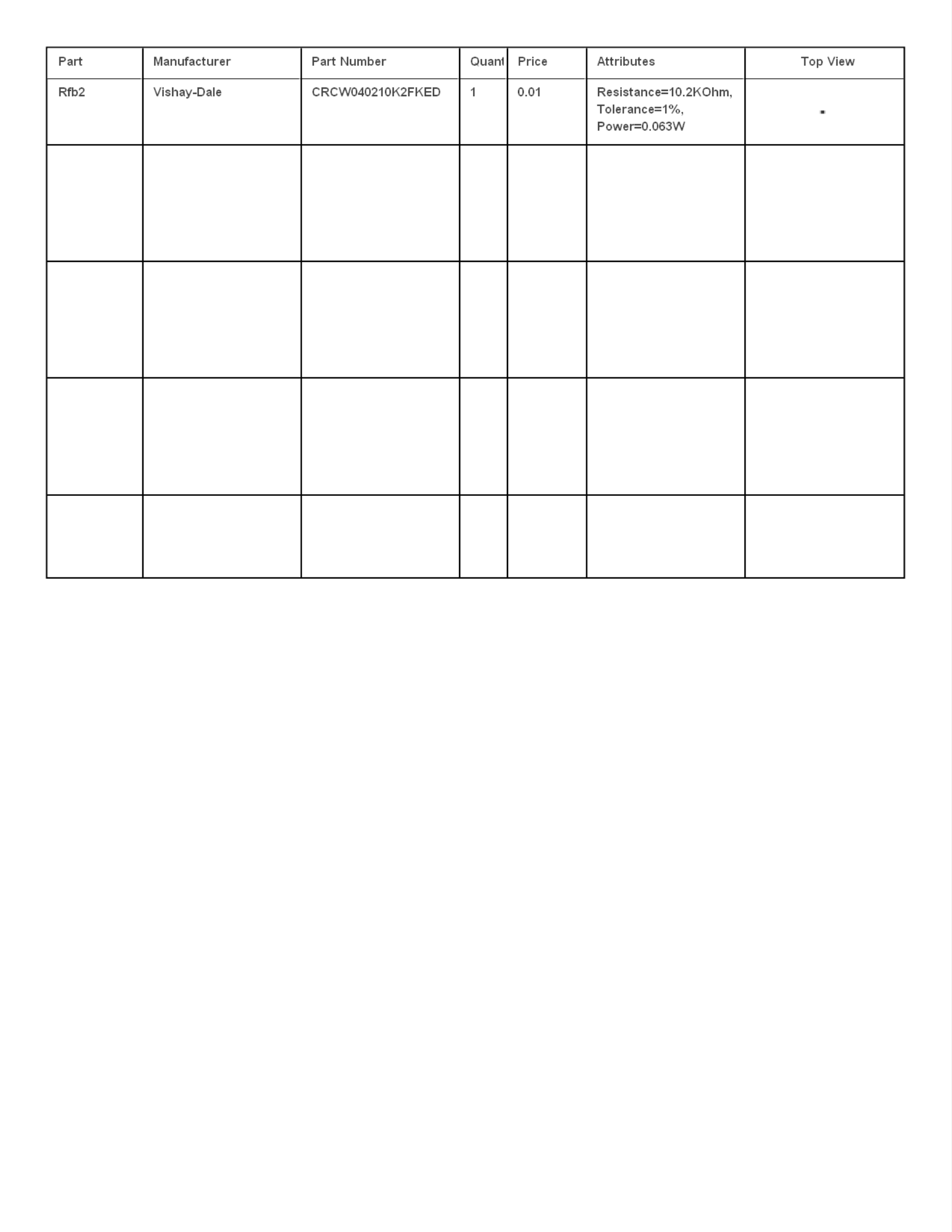
Optimization Factor	3
pricefactor	0
SoftStart Time	0 mili second

Schematic



Bill of Materials

Part	Manufacturer	Part Number	Quant	Price	Attributes	Top View
Cb	MuRata	GRM216R71H103KA01D	1	0.01	Cap=10nF, ESR=0Ohm, VDC=50V	
Cin	TDK	C5750X7R1H106M	1	0.63	Cap=10uF, ESR=3mOhm, VDC=50V	
Cinx	Kemet	C0805C104K5RACTU	1	0.01	Cap=100nF, ESR=0.064Ohm, VDC=50V	
Cout	Nippon Chemi-Con	APXH200ARA470MH70G	1	0.59	Cap=47uF, ESR=0.045Ohm, VDC=20V	
D1	Vishay-Semiconductor	BYS12-90-E3/TR	1	0.0749	VFatIo=0.75V, Io=1.5A, VRRM=90V	
L1	Coiltronics	HC9-470-R	1	0.92	L=47uH, DCR=0.072Ohm, IDC=3.65A	
U1	National Semiconductor	LM2676S-ADJ	1	1.92		
Rfb1	Vishay-Dale	CRCW0402976RFKED	1	0.01	Resistance=976Ohm, Tolerance=1%, Power=0.063W	

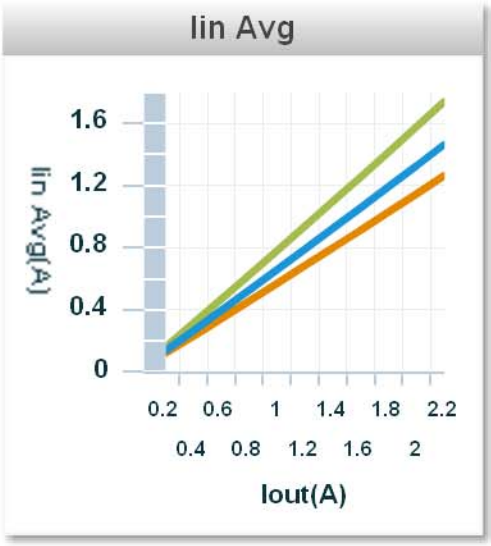
Part	Manufacturer	Part Number	Quant	Price	Attributes	Top View
Rfb2	Vishay-Dale	CRCW040210K2FKED	1	0.01	Resistance=10.2KOhm, Tolerance=1%, Power=0.063W	

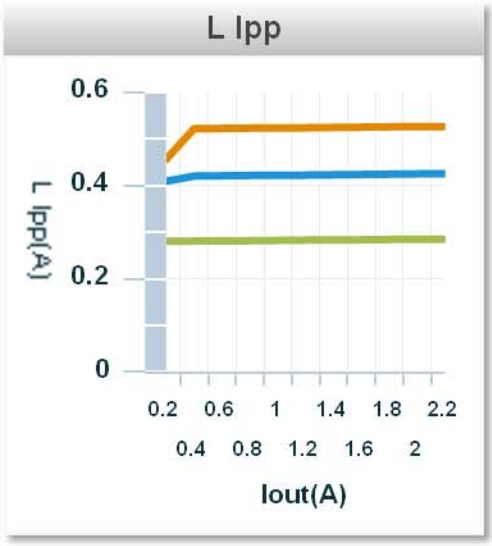
Operating Values

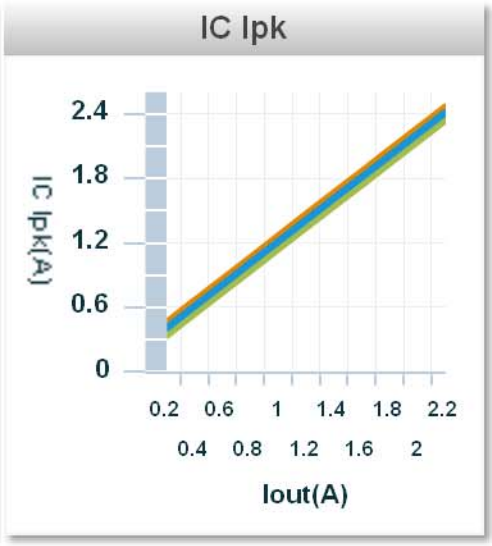
Name	Value	Category	Description
Iin Avg	1.15A	Current	Average input current
L Ipp	0.52A	Current	Peak-to-peak inductor ripple current
IC Ipk	2.26A	Current	Peak switch current in IC
Cout IRMS	0.15A	Current	Output capacitor RMS ripple current
Cin IRMS	0.71A	Current	Input capacitor RMS ripple current
Total BOM	4.17$	General	Total BOM price
Pout	27W	General	Total output power
FootPrint	690mm2	General	Total Foot Print Area of BOM components
Mode	CCM	General	Conduction Mode
BOM Count	9	General	Total BOM count
Frequency	260KHz	General	Switching frequency
D1 Tj	129degC	Op_Point	D1 junction temperature
Cross Freq	14.8KHz	Op_point	Bode plot crossover frequency, indication of bandwidth
Duty Cycle	55.9%	Op_point	Duty cycle
IC Tj	47.3degC	Op_point	IC junction temperature
ICThetaJA	26degC/W	Op_point	IC junction-to-ambient thermal resistance
VIN_OP	25V	Op_point	Vin operating point
IOUT_OP	2A	Op_point	Iout operating point
Efficiency	94.2%	Op_point	Steady state efficiency
Phase Marg	53.7deg	Op_point	Bode Plot Phase Margin
M_Irms_Act	1.50A	Op_point	Q Iavg
M_Vds_Act	0.26V	Op_point	
Vout p-p	0.02V	Op_point	Peak-to-peak output ripple voltage
Diode Pd	0.66W	Power	Diode power dissipation
IC Pd	0.66W	Power	IC power dissipation
Cout Pd	1.04mW	Power	Output capacitor power dissipation
Cin Pd	1.54mW	Power	Input capacitor power dissipation
Total Pd	1.65W	Power	Total Power Dissipation
L Pd	0.31W	Power	Inductor power dissipation

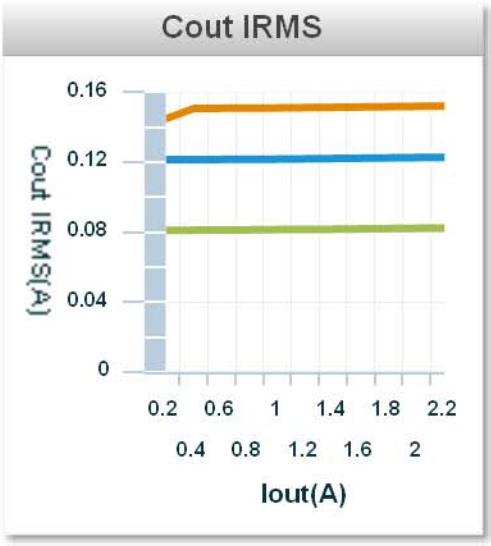
Charts

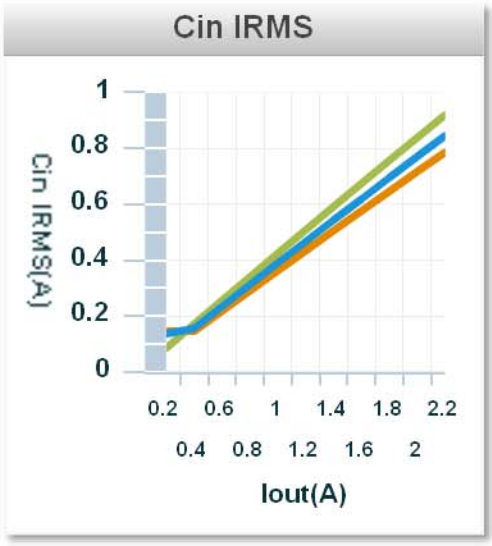
Current











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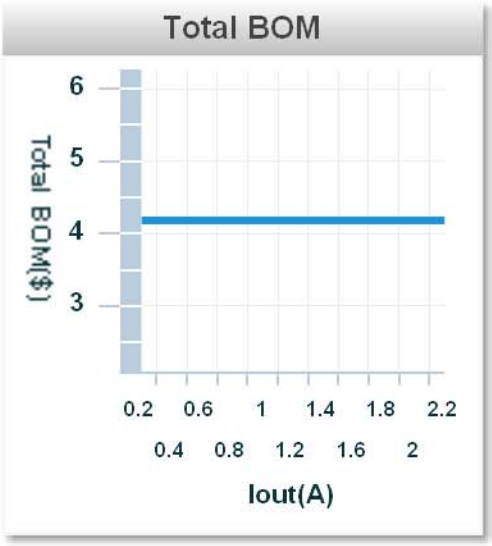
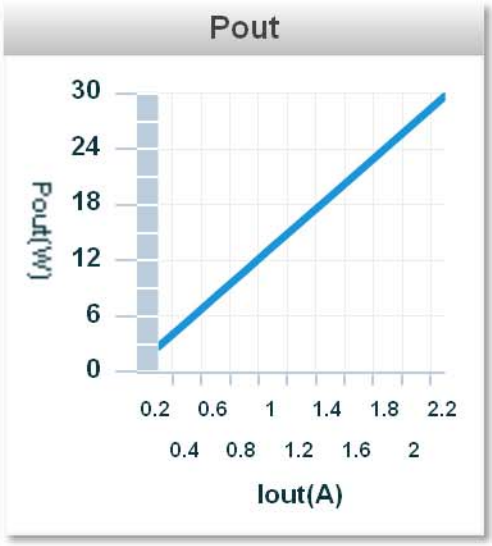
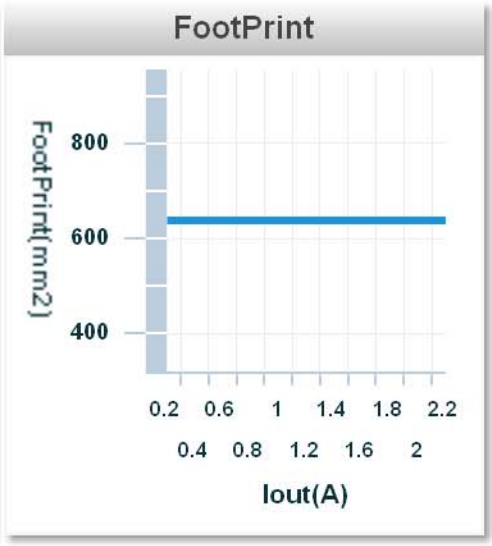
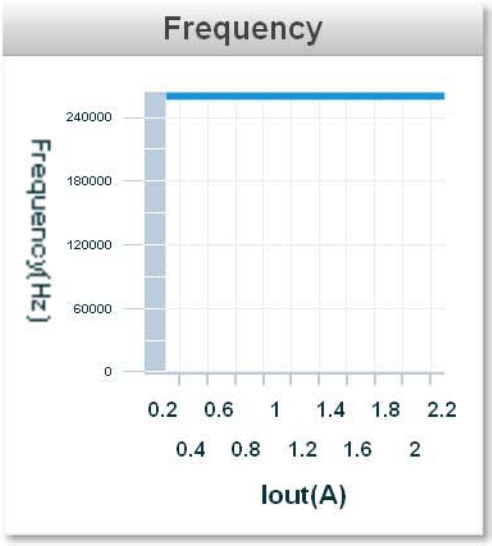
General









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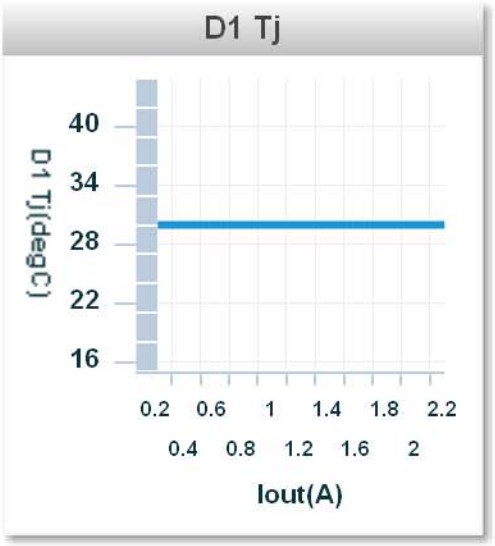
Op_Point



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Op_point