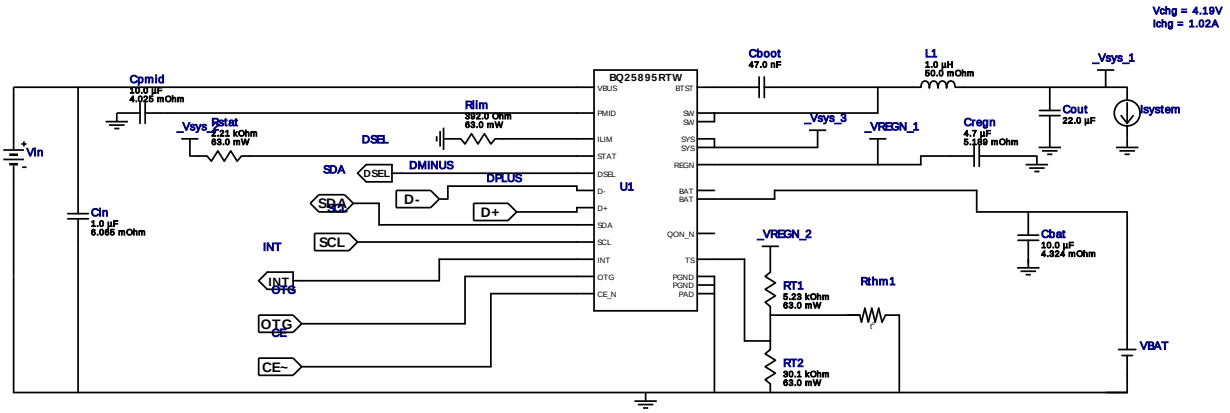
WEBENCH® Design Report

VinMin = 5.0V
VinMax = 6.0V
Vout = 3.3V
Iout = 2.0A
Ichg = 1.02A

Device = BQ25895RTWR
Topology = BMS_BUCK
Created = 8/25/16 4:12:13 PM
BOM Cost = $2.70
BOM Count = 13
Total Pd = 0.39W

Design : 3473280/70 BQ25895RTWR
BQ25895RTWR 5.0V-6.0V to 4.19V @ 1.024A



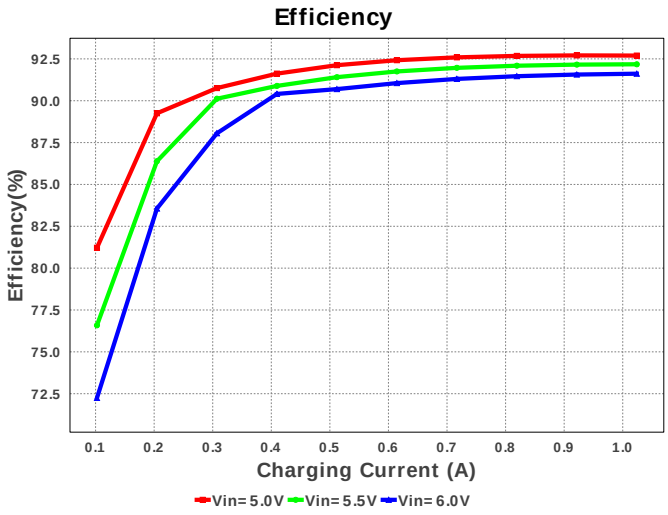
My Comments

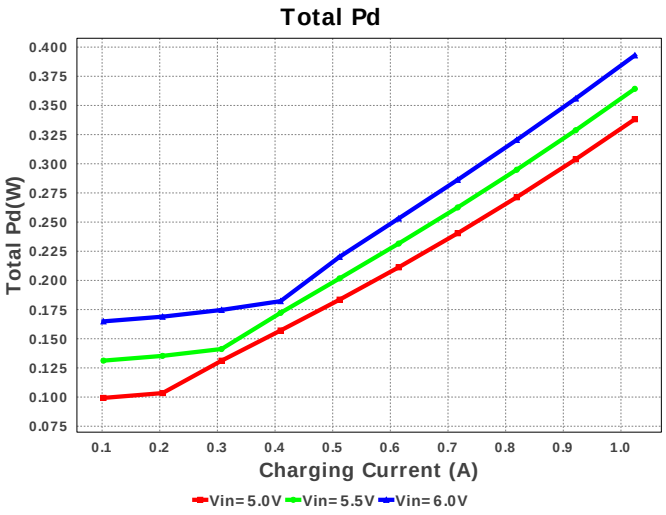
battery

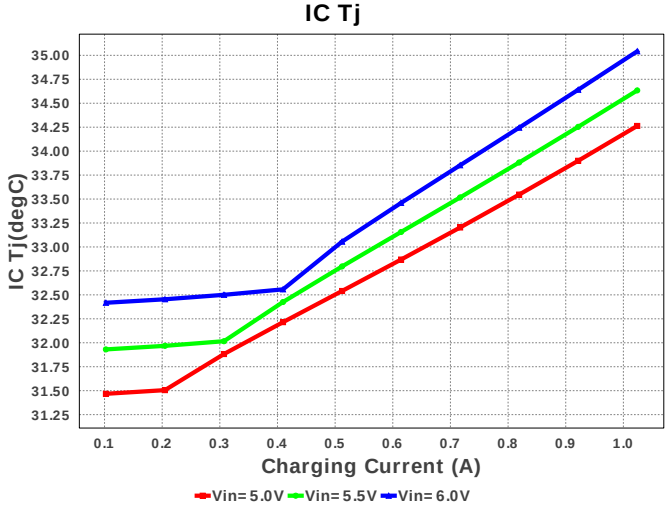
Electrical BOM

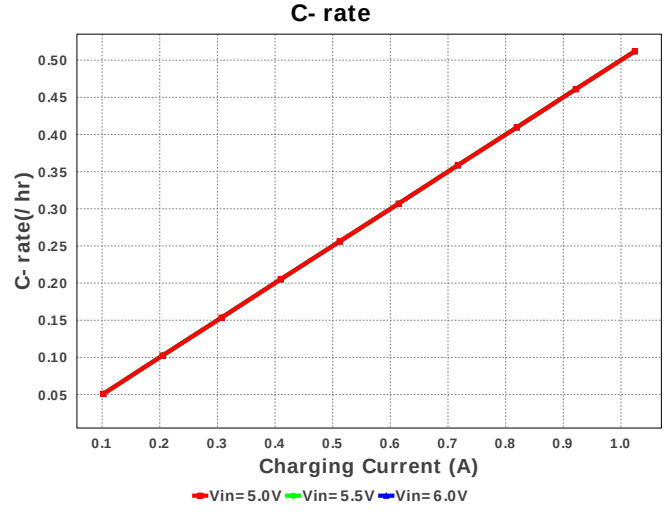
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbat	MuRata	GRM219R60J106KE19D Series= X5R	Cap= 10.0 uF ESR= 4.324 mOhm VDC= 6.3 V IRMS= 2.8728 A	1	$0.02	0805 7 mm²
2.	Cboot	MuRata	GRM155R61A473KA01D Series= X5R	Cap= 47.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
3.	Cin	MuRata	GRM188R61A105KA61D Series= X5R	Cap= 1.0 uF ESR= 6.065 mOhm VDC= 10.0 V IRMS= 1.30675 A	1	$0.01	0603 5 mm²
4.	Cout	Taiyo Yuden	LMK212BJ226MG-T Series= X5R	Cap= 22.0 uF VDC= 10.0 V IRMS= 0.0 A	1	$0.12	0805 7 mm²
5.	Cpmid	MuRata	GRM21BR61A106KE19L Series= X5R	Cap= 10.0 uF ESR= 4.025 mOhm VDC= 10.0 V IRMS= 2.445 A	1	$0.03	0805 7 mm²
6.	Cregn	MuRata	GRM21BR61E475KA12L Series= X5R	Cap= 4.7 uF ESR= 5.189 mOhm VDC= 25.0 V IRMS= 2.03531 A	1	$0.02	0805 7 mm²
7.	L1	TDK	VLF252012MT-1R0N	L= 1.0 µH DCR= 50.0 mOhm	1	$0.42	VLF252012MT 12 mm²
8.	RT1	Vishay-Dale	CRCW04025K23FKED Series= CRCW..e3	Res= 5.23 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
9.	RT2	Vishay-Dale	CRCW040230K1FKED Series= CRCW..e3	Res= 30.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rlim	Vishay-Dale	CRCW0402392RFKED Series= CRCW..e3	Res= 392.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

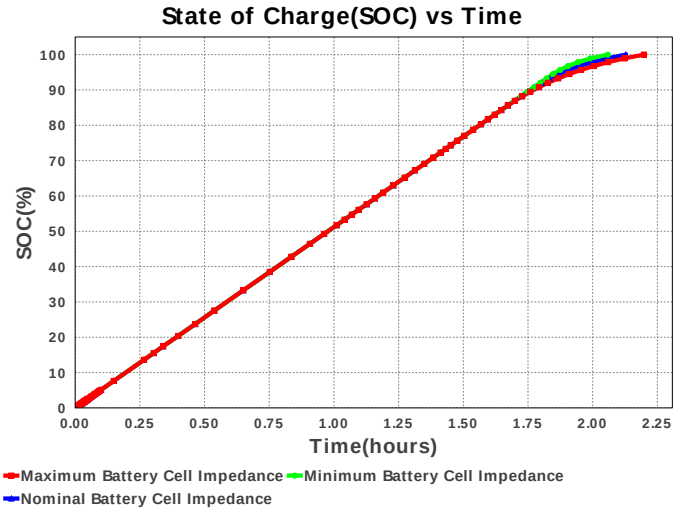
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rstat	Vishay-Dale	CRCW04022K21FKED Series= CRCW..e3	Res= 2.21 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	Rthm1	MuRata	NCP15XH103E03RC Series= NCP15	Thermistor	1	$0.03	0402 3 mm^2
13.	U1	Texas Instruments	BQ25895RTWR	Switcher	1	$2.00	RTW0024H 25 mm^2

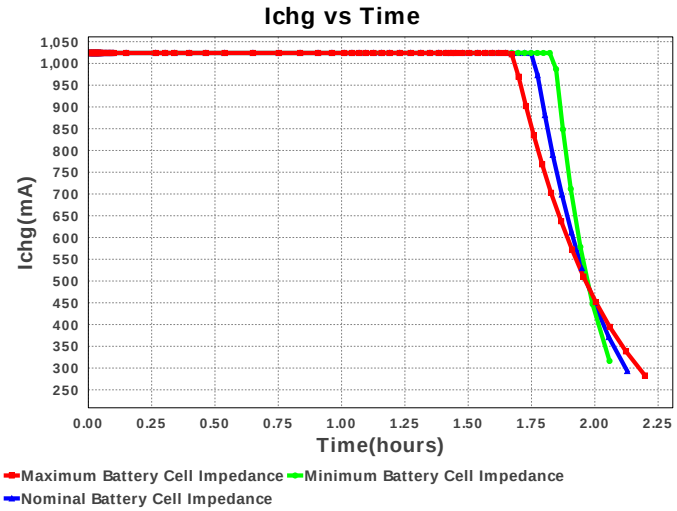


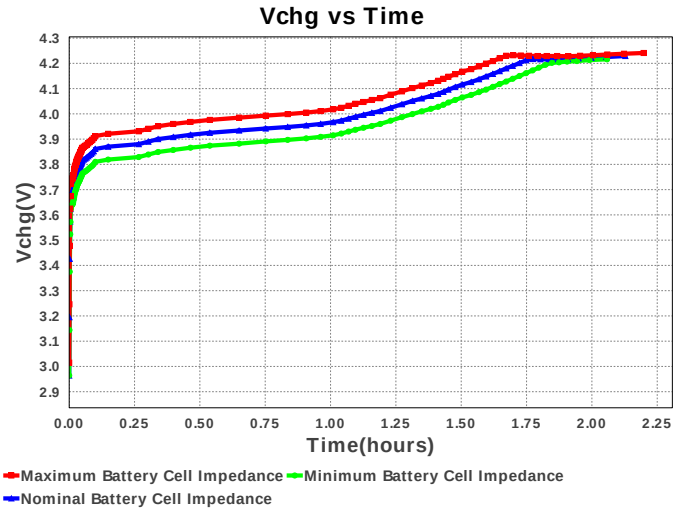


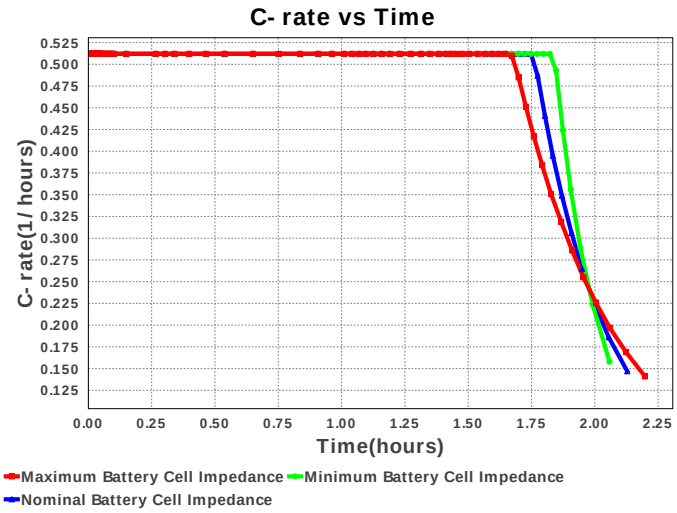












Operating Values

#	Name	Value	Category	Description
1.	BOM Count	13	General	Total Design BOM count
2.	Battery Chemistry	Li-ion	General	Battery Chemistry
3.	Cell Capacity	2000.0mAh	General	Cell Capacity
4.	Cells in Parallel	1.0	General	Cells in Parallel
5.	Cells in Series	1.0	General	Cells in Series
6.	FootPrint	87.0 mm^2	General	Total Foot Print Area of BOM components
7.	Frequency	1.5 MHz	General	Switching frequency
8.	Total BOM	$2.7	General	Total BOM Cost
9.	Total Battery Capacity	2000.0mAh	General	Total Battery Capacity
10.	C-rate	512.0 m/hr	Op_Point	Charge Rate
11.	IBAT_SHORT	100.0 mA	Op_Point	Source current for BAT pin short-circuit detection

#	Name	Value	Category	Description
12.	ICThetaJA Effective	15.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
13.	Ichg_OP	1.024 A	Op_Point	Battery charging current
14.	Ichg_Sch	1.024 A	Op_Point	Charge current selected
15.	IinMax_Sch	1.0 A	Op_Point	Maximum input current selected
16.	Iprecharge	128.0 mA	Op_Point	Pre-charge Current
17.	Itermination	256.0 mA	Op_Point	Termination comparator threshold for termination detection
18.	Total Charging Time	02:08 (02:03-02:12) hr	Op_Point	Total Charging Time needed to charge the battery taking into account battery cell variations
19.	VBAT_LOWV	3.0 V	Op_Point	Pre-charge to fast-charge transition threshold
20.	VBAT_SHORT	2.0 V	Op_Point	BAT pin short-circuit detection threshold
21.	VSYS_MIN	3.5 V	Op_Point	Minimum DC System Voltage Output
22.	Vchg_OP	4.192 V	Op_Point	Battery output voltage
23.	Vchg_Sch	4.192 V	Op_Point	Charge voltage selected
24.	Efficiency	91.614 %	Op_point	Steady state efficiency
25.	IC Tj	35.042 degC	Op_point	IC junction temperature
26.	VIN_OP	6.0 V	Op_point	Vin operating point
27.	Total Pd	392.907 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	IchgMax	1.0	Ichg
2.	Vchg	4.2	Vchg
3.	VinMax	6.0	Maximum input voltage
4.	VinMin	5.0	Minimum input voltage
5.	base_pn	BQ25895	Texas Instruments Base Part Number
6.	source	DC	Input Source Type
7.	ta	30.0	Ambient temperature

Design Assistance

1. Charge time values are estimates. Please perform board measurements to obtain a more accurate value.

2. BQ25895 Product Folder : http://www.ti.com/product/bq25895 : contains the data sheet and other resources.