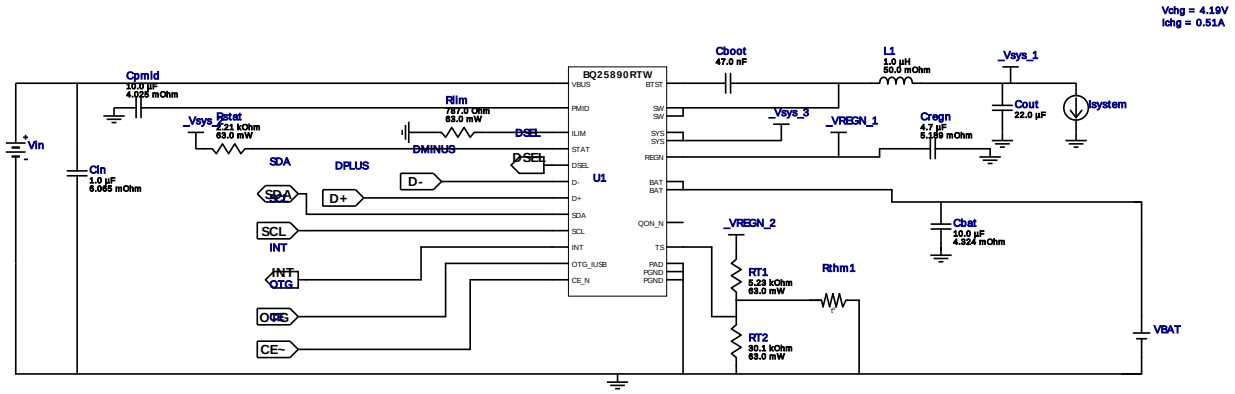
WEBENCH® Design Report

VinMin = 4.75V
VinMax = 5.25V
Vout = 3.3V
Iout = 2.0A
Ichg = 0.51A

Device = BQ25890RTWR
Topology = BMS_BUCK
Created = 7/25/16 7:33:00 AM
BOM Cost = $3.20
BOM Count = 13
Total Pd = 0.19W

Design : 1194016/2224 BQ25890RTWR
BQ25890RTWR 4.75V-5.25V to 4.19V @ 0.512A



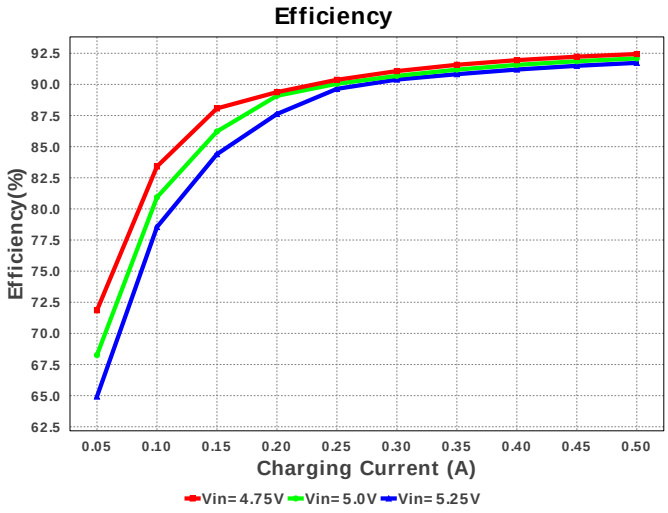
My Comments

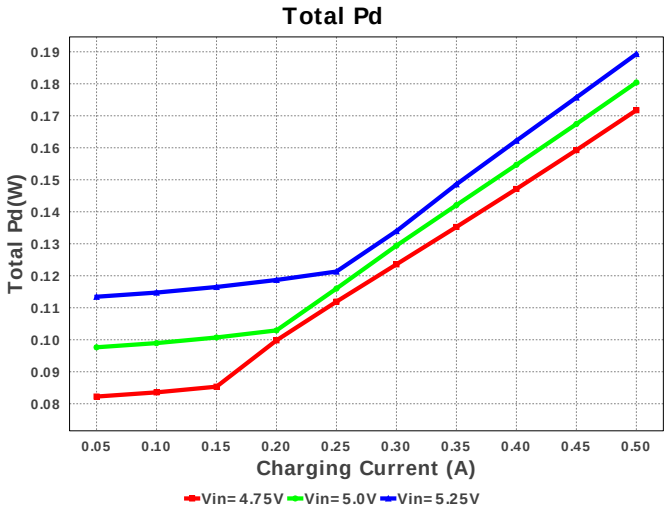
No comments

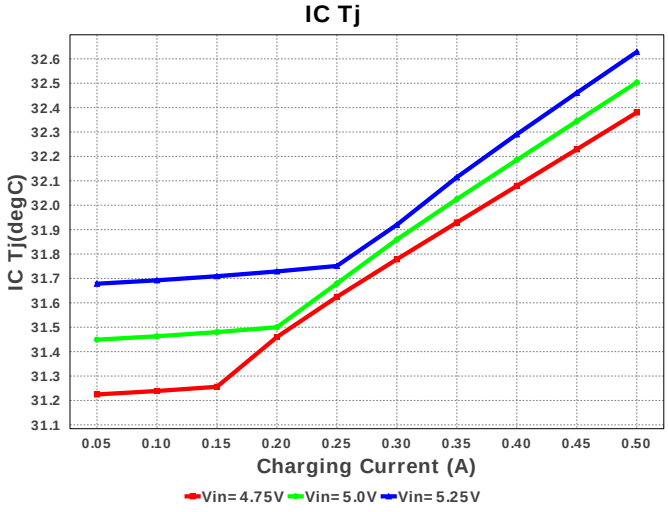
Electrical BOM

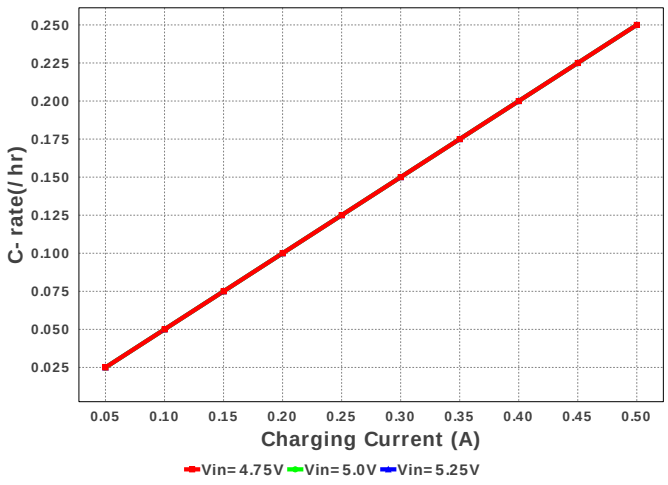
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbat	MuRata	GRM219R60J106KE19D Series= X5R	Cap= 10.0 uF ESR= 4.324 mOhm VDC= 6.3 V IRMS= 2.8728 A	1	$0.02	0805 7 mm²
2.	Cboot	MuRata	GRM155R61A473KA01D Series= X5R	Cap= 47.0 nF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
3.	Cin	MuRata	GRM188R61A105KA61D 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	CRCW0402787RFKED Series= CRCW..e3	Res= 787.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²

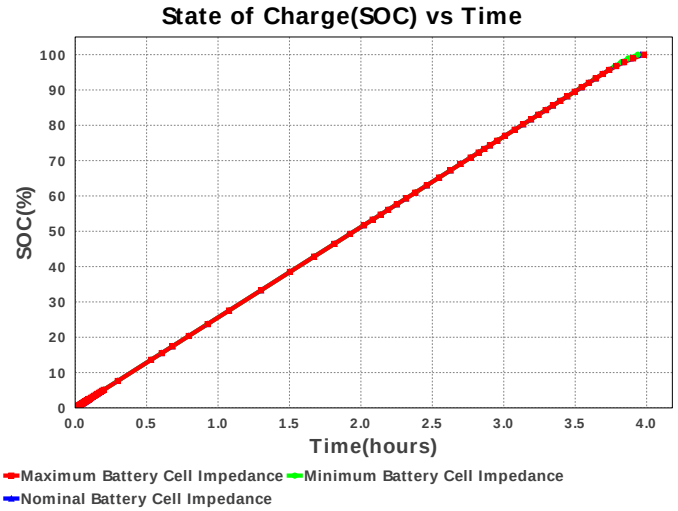
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rstat	Vishay-Dale	CRCW04022K21FKED Series= CRCW..e3	Res= 2.21 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	Rthm1	MuRata	NCP15XH103E03RC Series= NCP15	Thermistor	1	$0.03	0402 3 mm^2
13.	U1	Texas Instruments	BQ25890RTWR	Switcher	1	$2.50	RTW0024H 25 mm^2

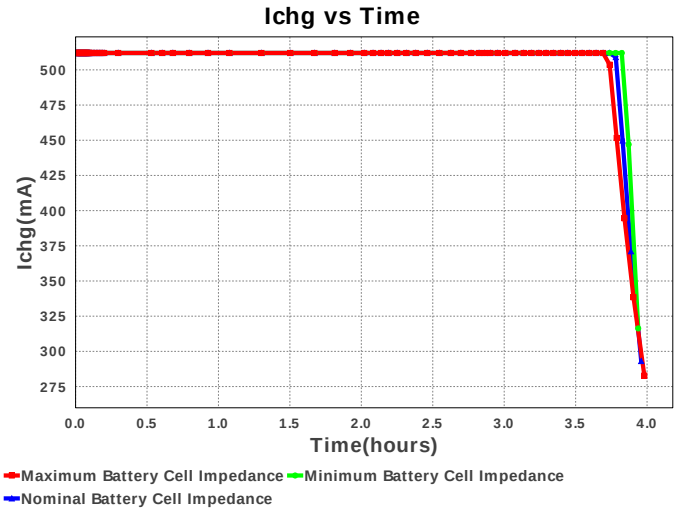


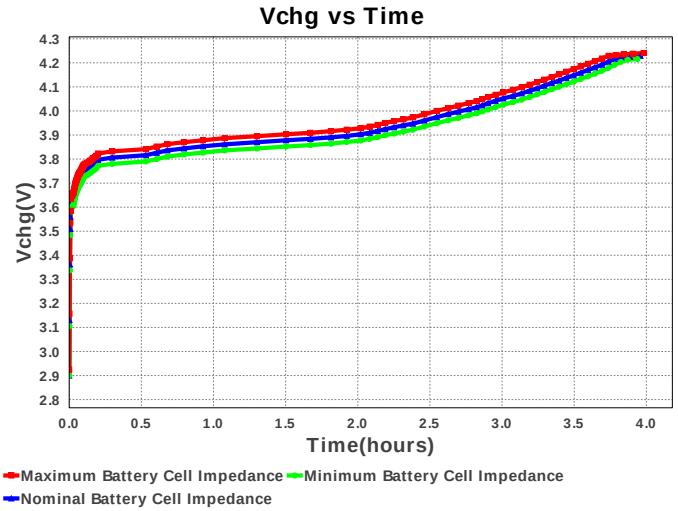


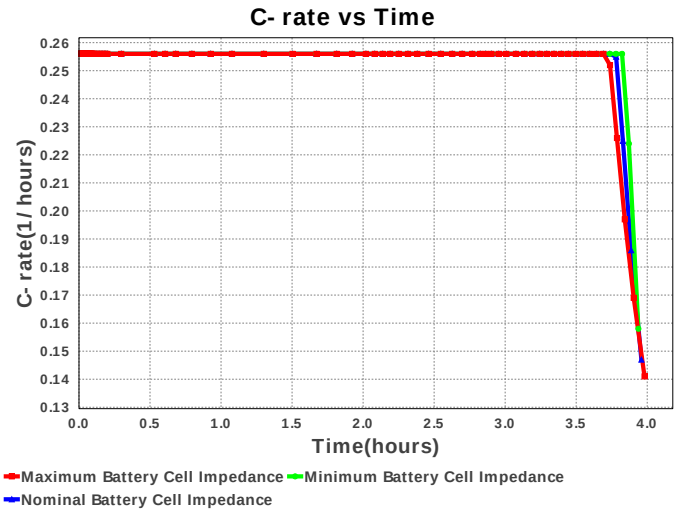












Operating Values

#	Name	Value	Category	Description
1.	BOM Count	13	General	Total Design BOM count
2.	Cell Capacity	500.0 m000mAh	General	Cell Capacity
3.	Cells in Parallel	4.0	General	Cells in Parallel
4.	Cells in Series	1.0	General	Cells in Series
5.	FootPrint	87.0 mm^2	General	Total Foot Print Area of BOM components
6.	Frequency	1.5 MHz	General	Switching frequency
7.	Total BOM	$3.2	General	Total BOM Cost
8.	Total Battery Capacity	2.0 000mAh	General	Total Battery Capacity
9.	C-rate	256.0 m/hr	Op_Point	Charge Rate
10.	IBAT_SHORT	100.0 mA	Op_Point	Source current for BAT pin short-circuit detection
11.	ICThetaJA Effective	15.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance

#	Name	Value	Category	Description
12.	Ichg_OP	512.0 mA	Op_Point	Battery charging current
13.	Ichg_Sch	512.0 mA	Op_Point	Charge current selected
14.	IinMax_Sch	500.0 mA	Op_Point	Maximum input current selected
15.	Iprecharge	128.0 mA	Op_Point	Pre-charge Current
16.	Itermination	256.0 mA	Op_Point	Termination comparator threshold for termination detection
17.	VBAT_LOWV	3.0 V	Op_Point	Pre-charge to fast-charge transition threshold
18.	VBAT_SHORT	2.0 V	Op_Point	BAT pin short-circuit detection threshold
19.	VSYS_MIN	3.5 V	Op_Point	Minimum DC System Voltage Output
20.	Vchg_OP	4.192 V	Op_Point	Battery output voltage
21.	Vchg_Sch	4.192 V	Op_Point	Charge voltage selected
22.	Efficiency	91.768 %	Op_point	Steady state efficiency
23.	IC Tj	32.668 degC	Op_point	IC junction temperature
24.	VIN_OP	5.25 V	Op_point	Vin operating point
25.	Total Pd	192.545 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	IchgMax	500.0 m	Ichg
2.	IchgMax	500.0 m	Ichg
3.	IinMax	500.0 m	IinMax
4.	Vchg	4.2	Vchg
5.	Vchg	4.2	Vchg
6.	VinMax	5.25	Maximum input voltage
7.	VinMin	4.75	Minimum input voltage
8.	base_pn	BQ25890	Base Product Number
9.	source	DC	Input Source Type
10.	Ta	30.0	Ambient temperature

Design Assistance

1. Charge time values are estimates. Please perform board measurements to obtain a more accurate value.
2. **BQ25890** Product Folder : http://www.ti.com/product/bq25890 : contains the data sheet and other resources.