

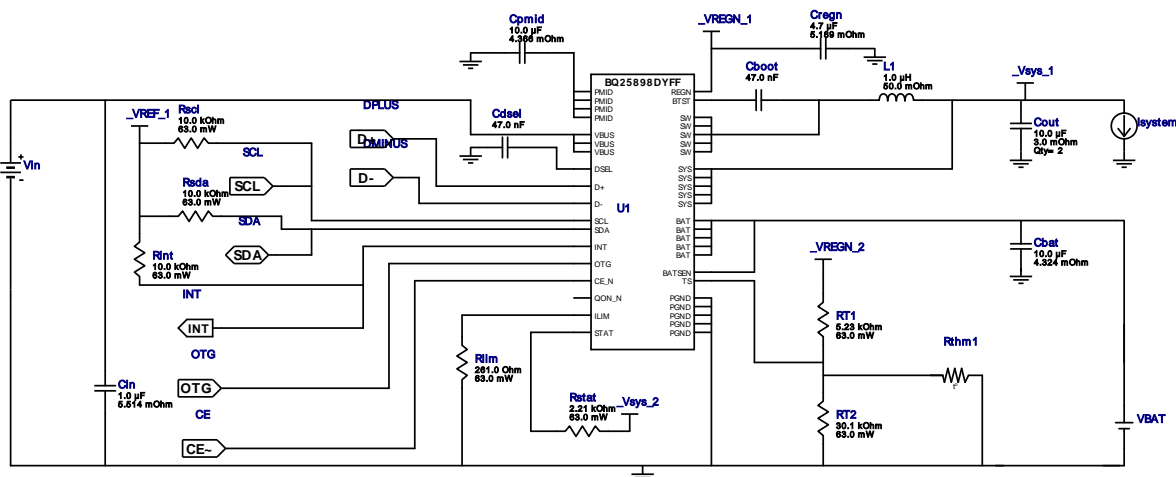
WEBENCH® Design Report

Design : 4999024/3 BQ25898DYFFR
BQ25898DYFFR 4.45V-14.0V to 4.18V @ 1.024A

VinMin = 4.45V
VinMax = 14.0V
Vout = 4.2V
Iout = 1.0A
Ichg = 1.02A

Device = BQ25898DYFFR
Topology = BMS_BUCK
Created = 2017-06-05 08:35:04.714
BOM Cost = \$2.11
BOM Count = 18
Total Pd = 0.52W

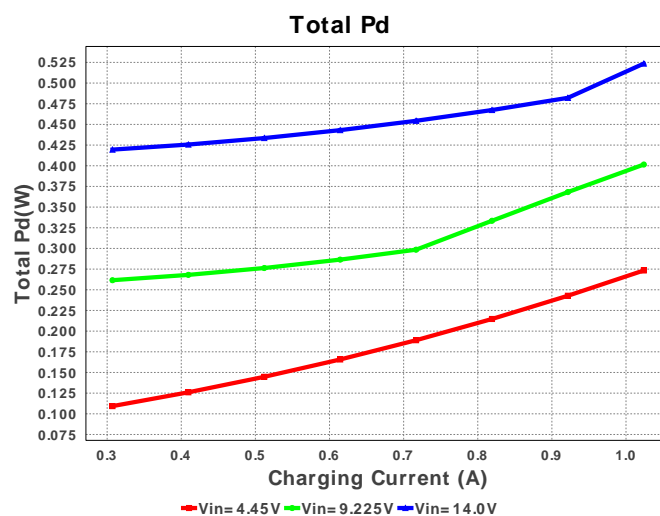
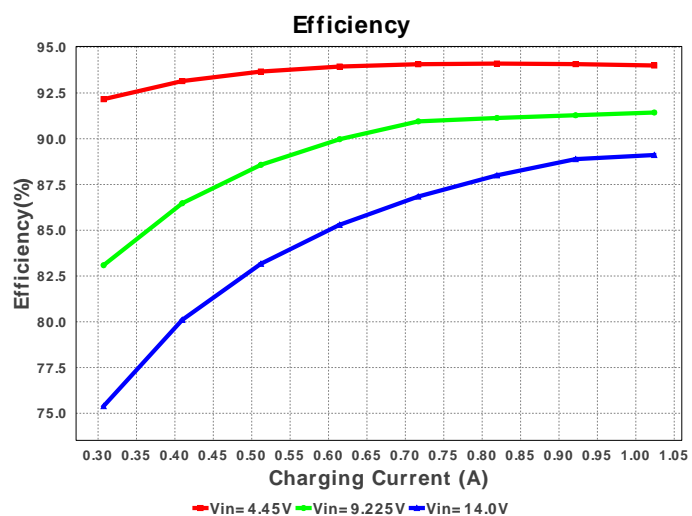
Ichg = 1.02A

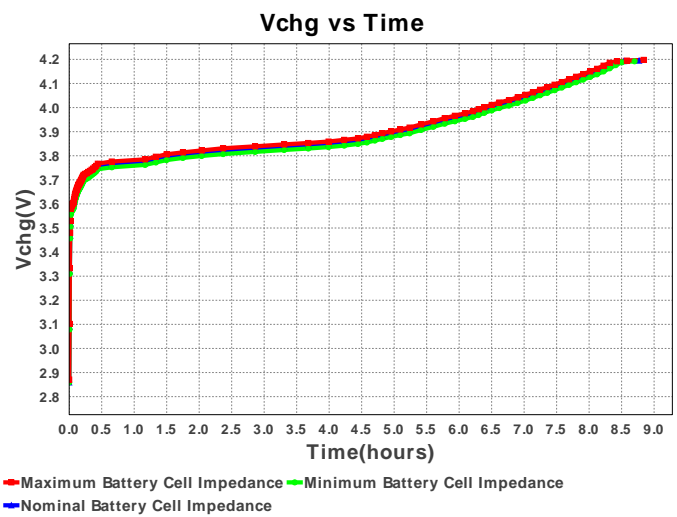
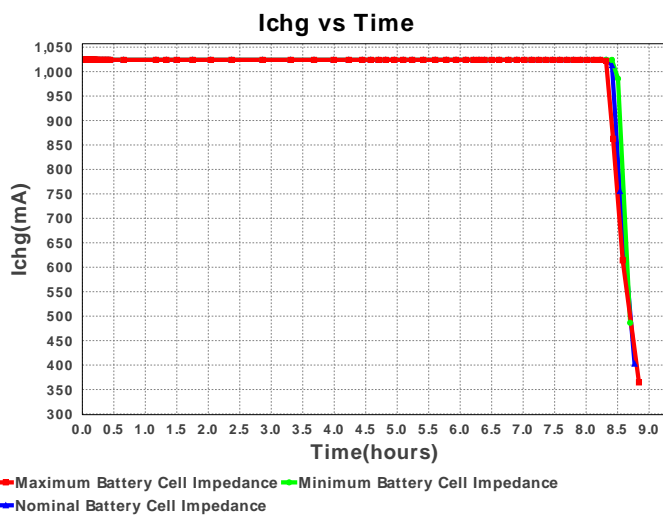
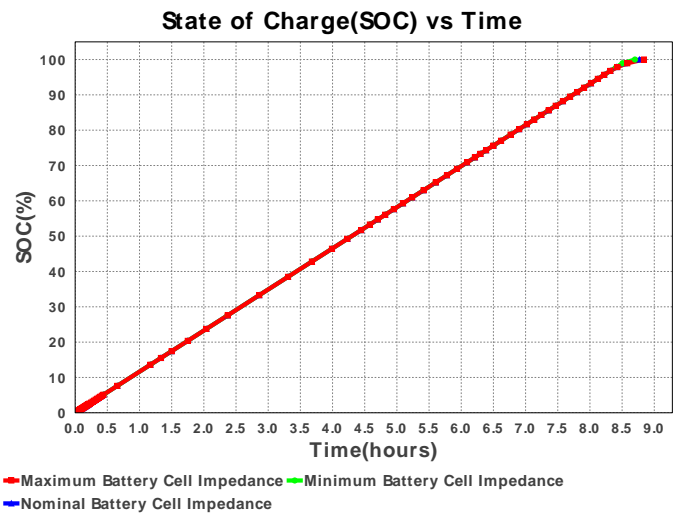
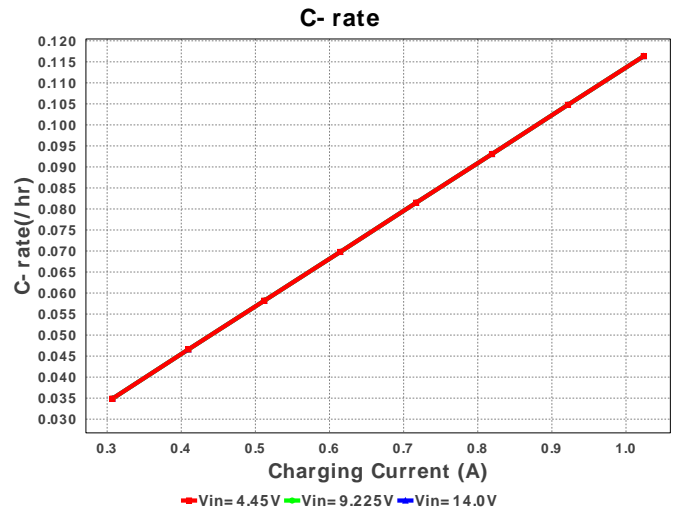
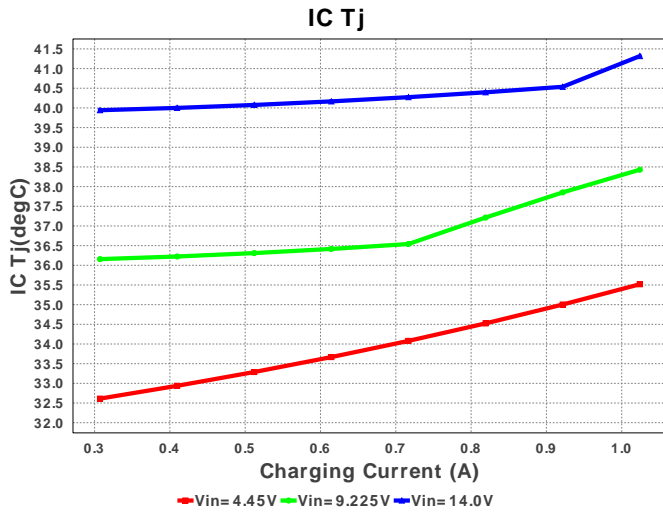


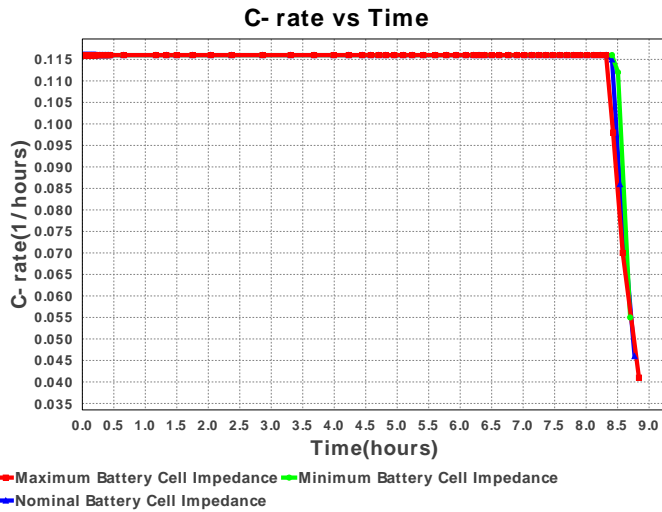
Electrical BOM

#	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 mm ²
2.	Cboot	MuRata	GRM155R71E473KA88D Series= X7R	Cap= 47.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
3.	Cdsel	MuRata	GRM033C80J473KE19D Series= X6S	Cap= 47.0 nF VDC= 6.3 V IRMS= 0.0 A	1	\$0.01	0201 2 mm ²
4.	Cin	MuRata	GRM21BR71E105KA99L Series= X7R	Cap= 1.0 uF ESR= 5.514 mOhm VDC= 25.0 V IRMS= 1.47583 A	1	\$0.02	0805 7 mm ²
5.	Cout	Kemet	C0805C106K8PACTU Series= X5R	Cap= 10.0 uF ESR= 3.0 mOhm VDC= 10.0 V IRMS= 11.43 A	2	\$0.02	0805 7 mm ²
6.	Cpmid	MuRata	GRM31CR71E106KA12L Series= X7R	Cap= 10.0 uF ESR= 4.366 mOhm VDC= 25.0 V IRMS= 2.8022 A	1	\$0.06	1206_190 11 mm ²
7.	Cregn	MuRata	GRM21BR61E475KA12L Series= X5R	Cap= 4.7 uF ESR= 5.189 mOhm VDC= 25.0 V IRMS= 2.03531 A	1	\$0.03	0805 7 mm ²
8.	L1	TDK	VLF252012MT-1R0N	L= 1.0 uH DCR= 50.0 mOhm	1	\$0.42	VLF252012MT 12 mm ²
9.	RT1	Vishay-Dale	CRCW04025K23FKED Series= CRCW..e3	Res= 5.23 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
10.	RT2	Vishay-Dale	CRCW040230K1FKED Series= CRCW..e3	Res= 30.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rint	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
12.	Rlim	Vishay-Dale	CRCW0402261RFKED Series= CRCW..e3	Res= 261.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
13.	Rscl	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
14.	Rsda	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	0402 3 mm ²
15.	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
16.	Rthm1	MuRata	NCP15XH103E03RC Series= NCP15	Thermistor	1	\$0.03	0402 3 mm ²
17.	U1	Texas Instruments	BQ25898DYFFR	Switcher	1	\$1.40	YFF0042AHAC 13 mm ²







Operating Values

#	Name	Value	Category	Description
1.	BOM Count	18	General	Total Design BOM count
2.	Battery Chemistry	Li-ion	General	Battery Chemistry
3.	Cell Capacity	2200.0mAh	General	Cell Capacity
4.	Cells in Parallel	4.0	General	Cells in Parallel
5.	Cells in Series	1.0	General	Cells in Series
6.	FootPrint	99.0 mm ²	General	Total Foot Print Area of BOM components
7.	Frequency	1.5 MHz	General	Switching frequency
8.	Total BOM	\$2.11	General	Total BOM Cost
9.	Total Battery Capacity	8800.0mAh	General	Total Battery Capacity
10.	C-rate	116.364 m/hr	Op_Point	Charge Rate
11.	IBAT_SHORT	100.0 mA	Op_Point	Source current for BAT pin short-circuit detection
12.	ICThetaJA Effective	25.0 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	1.5 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	08:46 (08:42-08:50) h	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	4.184 V	Op_Point	Battery output voltage
23.	Vchg_Sch	4.184 V	Op_Point	Charge voltage selected
24.	Efficiency	89.111 %	Op_point	Steady state efficiency
25.	IC Tj	41.317 degC	Op_point	IC junction temperature
26.	VIN_OP	14.0 V	Op_point	Vin operating point
27.	Total Pd	523.558 mW	Power	Total Power Dissipation

Register Settings

#	Address	Digital Values	Analog Values	Description
1.	REG00<5:0>	011100	1500.00mA	Input Current Limit
2.	REG0E<6:0>	1011110	4.184V	Charge Voltage Limit
3.	REG04<6:0>	0010000	1024mA	Max charge current
4.	REG03<3:1>	101	3.50V	Min System Voltage
5.	REG05<7:4>	0001	128mA	Precharge Current Limit
6.	REG05<3:0>	0011	256mA	Termination Current Limit
7.	REG06<1>	1	3V	Battery Fast Charge Threshold

Design Inputs

#	Name	Value	Description
1.	IchgMax	1.0	Ichg
2.	Vchg	4.2	Vchg
3.	VinMax	14.0	Maximum input voltage
4.	VinMin	4.45	Minimum input voltage
5.	base_pn	BQ25898D	Base Product 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. **BQ25898D** Product Folder : <http://www.ti.com/product/bq25898d> : contains the data sheet and other resources.

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