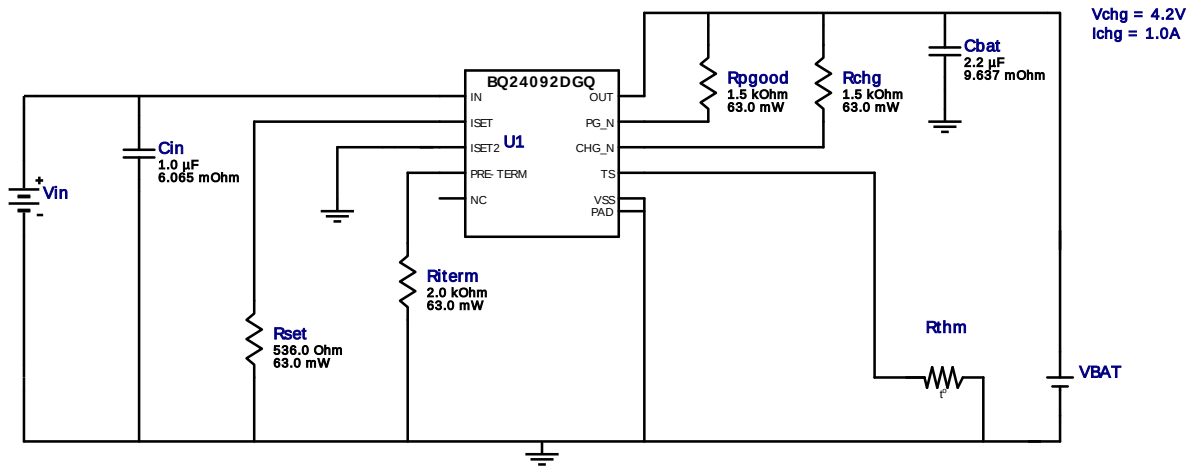
WEBENCH® Design Report

VinMax = 6.0V
Vout = 4.2V
Iout = 1.0A
Ichg = 1.0A

Device = BQ24092DGQR
Topology = BMS_LDO
Created = 8/11/16 8:44:38 PM
BOM Cost = $0.50
BOM Count = 8
Total Pd = 1.8W

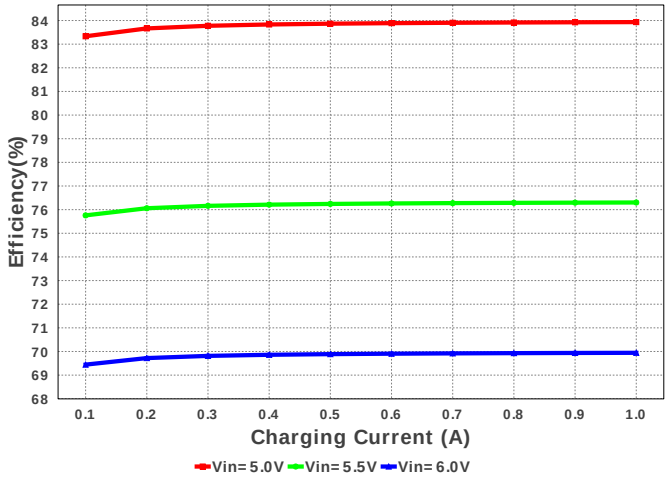
Design : 4331192/30 BQ24092DGQR
BQ24092DGQR 5.0V-6.0V to 4.20V @ 1.0A



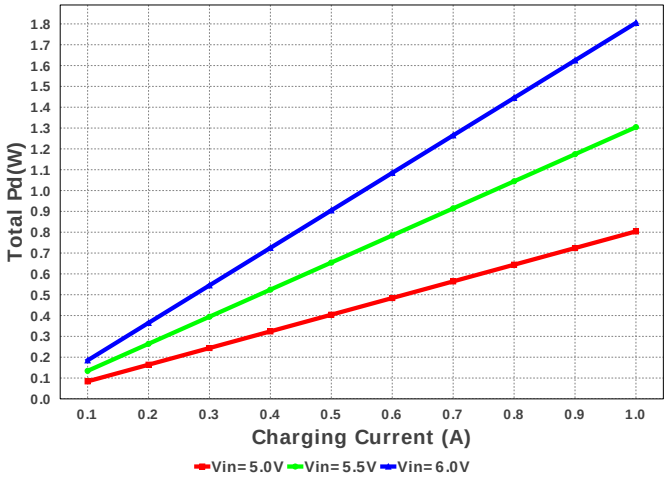
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbat	MuRata	GRM188R61A225KE34D Series= X5R	Cap= 2.2 uF ESR= 9.637 mOhm VDC= 10.0 V IRMS= 1.24283 A	1	$0.02	0603 5 mm²
2.	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
3.	Rchg	Vishay-Dale	CRCW04021K50FKED Series= CRCW..e3	Res= 1.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
4.	Riterm	Vishay-Dale	CRCW04022K00FKED Series= CRCW..e3	Res= 2.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
5.	Rpgood	Vishay-Dale	CRCW04021K50FKED Series= CRCW..e3	Res= 1.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
6.	Rset	Vishay-Dale	CRCW0402536RFKED Series= CRCW..e3	Res= 536.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	Rthm	MuRata	NCP15XH103E03RC Series= NCP15	Thermistor	1	$0.03	0402 3 mm²
8.	U1	Texas Instruments	BQ24092DGQR	Switcher	1	$0.40	DGQ0010D_NV_N 24 mm²

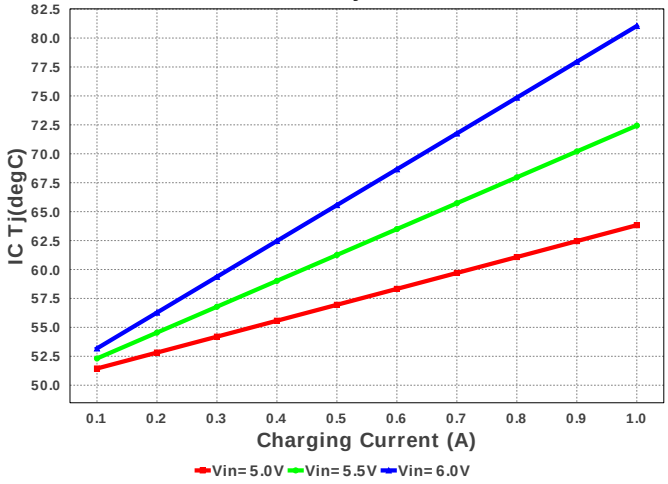
Efficiency



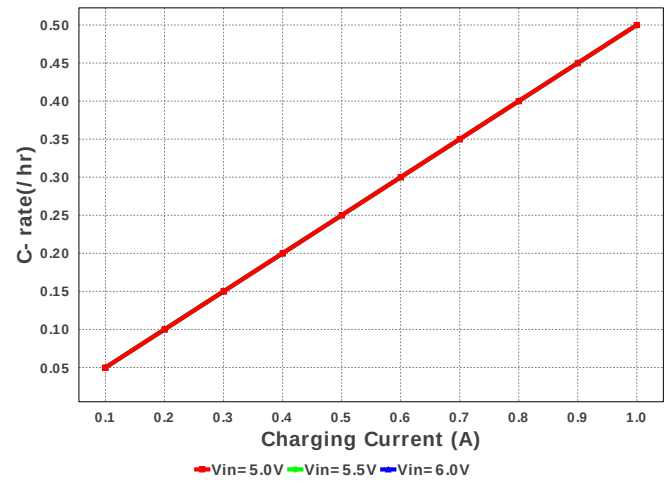
Total Pd



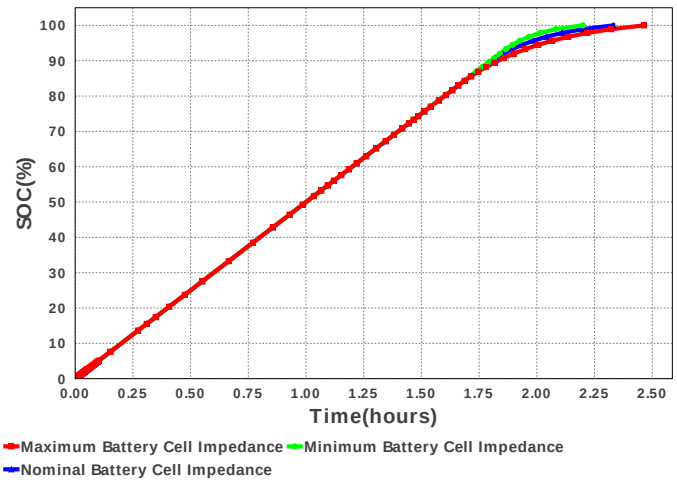
IC Tj

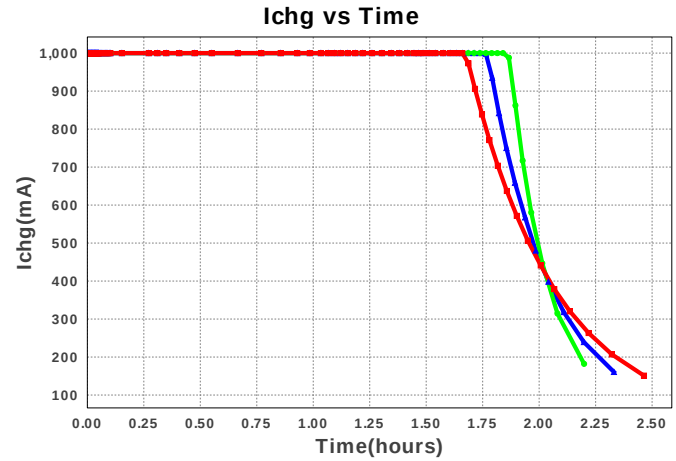


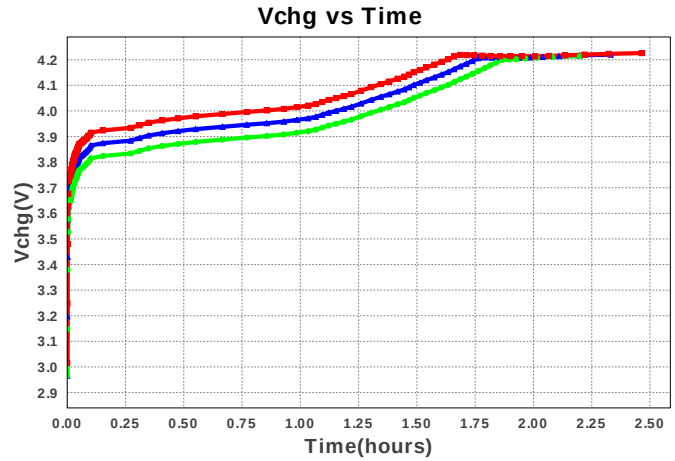
C- rate

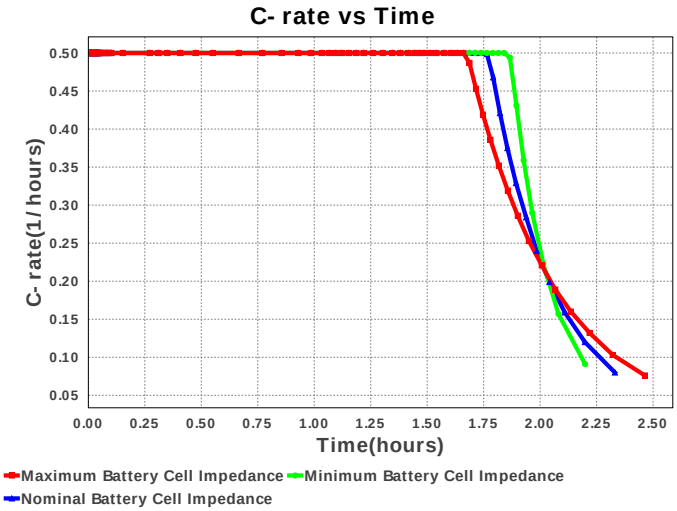


State of Charge(SOC) vs Time









Operating Values

#	Name	Value	Category	Description
1.	BOM Count	8	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	48.0 mm^2	General	Total Foot Print Area of BOM components
7.	Total BOM	$0.5	General	Total BOM Cost
8.	Total Battery Capacity	2000.0mAh	General	Total Battery Capacity
9.	C-rate	500.0 m/hr	Op_Point	Charge Rate
10.	IBAT_SHORT	15.0 mA	Op_Point	Source current for BAT pin short-circuit detection
11.	ICThetaJA Effective	17.2 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Ichg_OP	1.0 A	Op_Point	Battery charging current
13.	Ichg_Sch	1.0 A	Op_Point	Charge current selected
14.	IinMax_Sch	1.0 A	Op_Point	Maximum input current selected
15.	Iprecharge	250.0 mA	Op_Point	Pre-charge Current
16.	Itermination	125.0 mA	Op_Point	Termination comparator threshold for termination detection
17.	Total Charging Time	02:20 (02:12-02:28) hr	Op_Point	Total Charging Time needed to charge the battery taking into account battery cell variations
18.	VBAT_LOWV	2.5 V	Op_Point	Pre-charge to fast-charge transition threshold
19.	VBAT_SHORT	800.0 mV	Op_Point	BAT pin short-circuit detection threshold
20.	Vchg_OP	4.2 V	Op_Point	Battery output voltage
21.	Vchg_Sch	4.2 V	Op_Point	Charge voltage selected
22.	Efficiency	69.944 %	Op_point	Steady state efficiency
23.	IC Tj	81.043 degC	Op_point	IC junction temperature
24.	VIN_OP	6.0 V	Op_point	Vin operating point
25.	Total Pd	1.805 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	IchgMax	1.0	Ichg

#	Name	Value	Description
2.	Vchg	4.2	Vchg
3.	VinMax	6.0	Maximum input voltage
4.	VinMin	5.0	Minimum input voltage
5.	base_pn	BQ24092	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	50.0	Ambient temperature

Design Assistance

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

2. **BQ24092** Product Folder : http://www.ti.com/product/bq24092 : contains the data sheet and other resources.