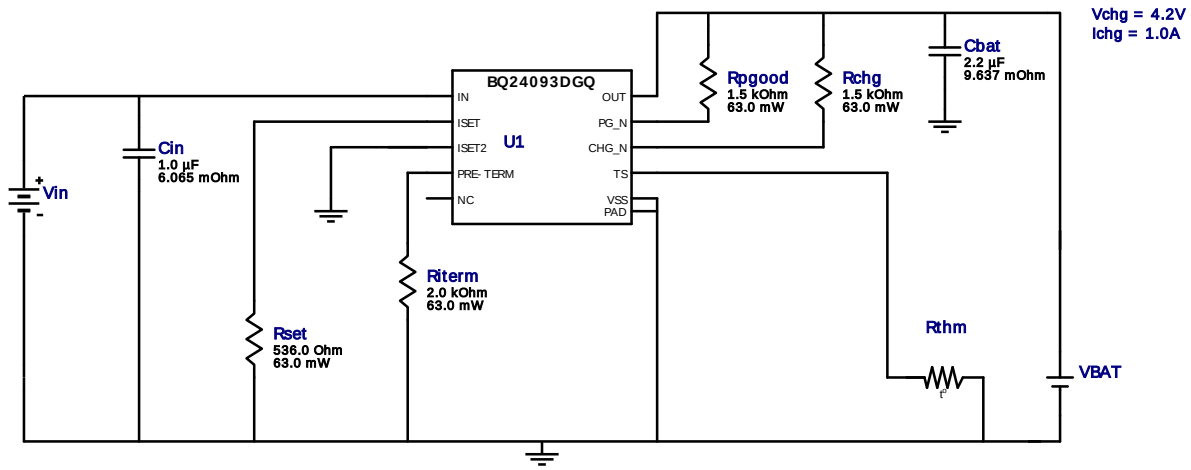
WEBENCH® Design Report

VinMax = 6.0V
Vout = 3.3V
Iout = 2.0A
Ichg = 1.0A

Device = BQ24093DGQR
Topology = BMS_LDO
Created = 7/25/16 7:31:10 AM
BOM Cost = $0.50
BOM Count = 8
Total Pd = 1.8W

Design : 1194016/2223 BQ24093DGQR
BQ24093DGQR 5.0V-6.0V to 4.20V @ 1.0A



My Comments

No comments

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	NCP15WF104E03RC Series= NCP15	Thermistor	1	$0.03	0402 3 mm²
8.	U1	Texas Instruments	BQ24093DGQR	Switcher	1	$0.40	DGQ0010D_NV_N 24 mm²

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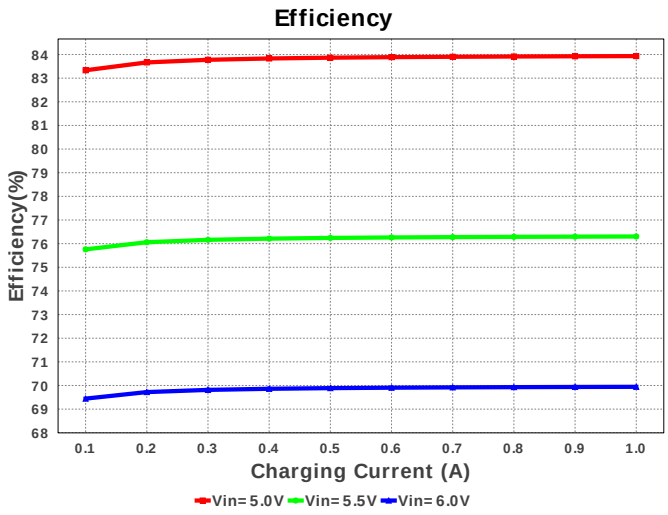

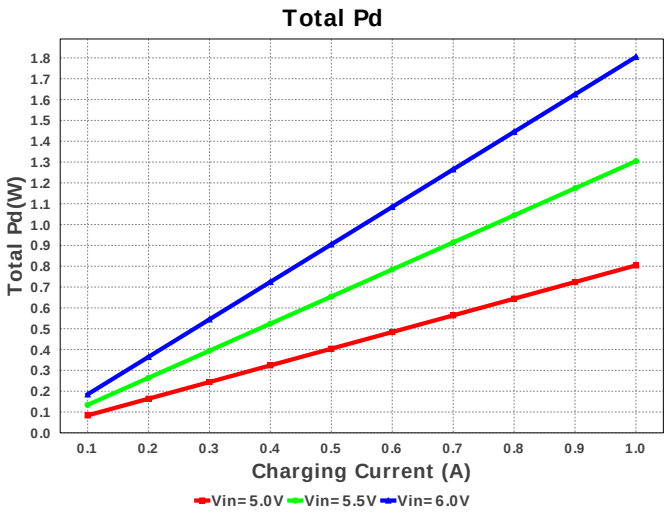

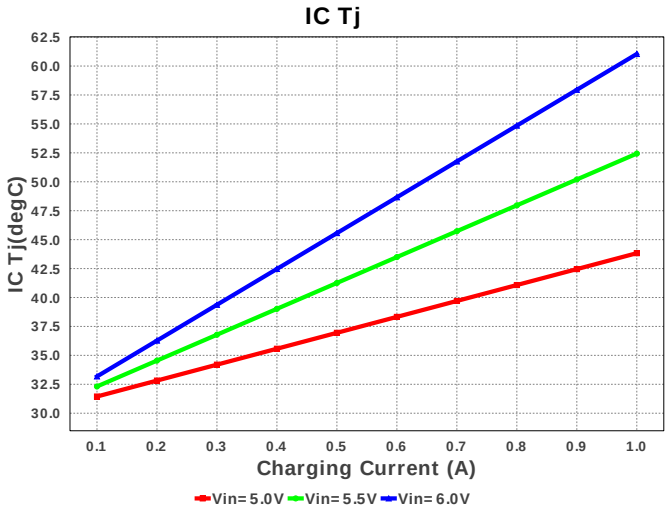

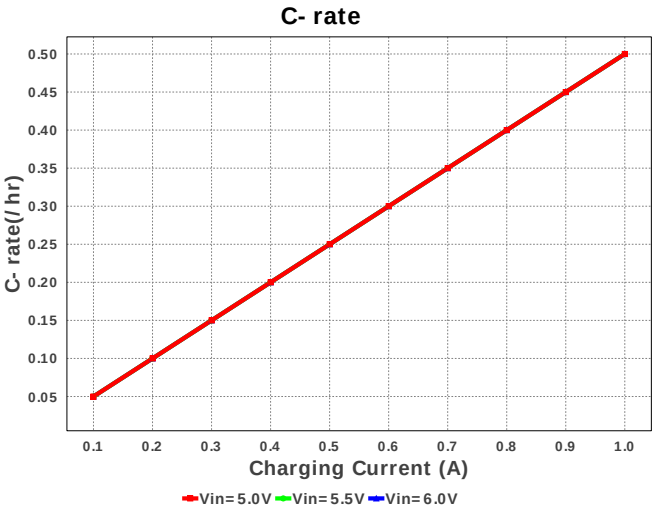

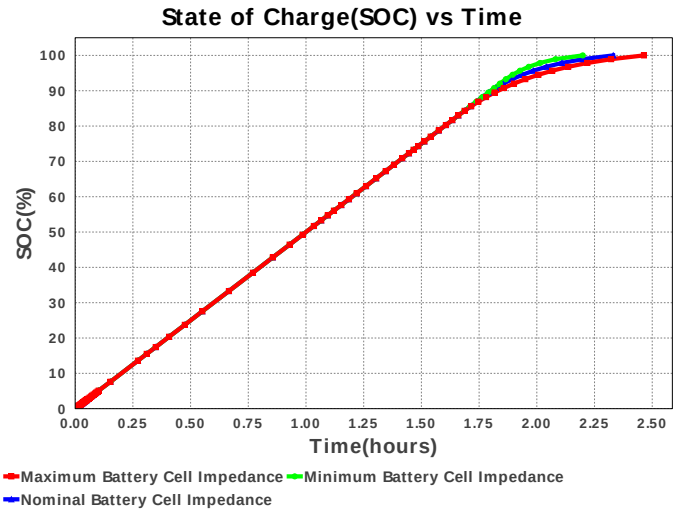

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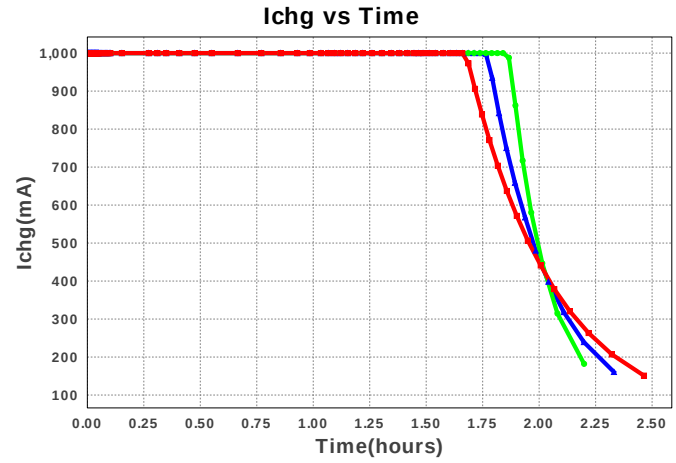

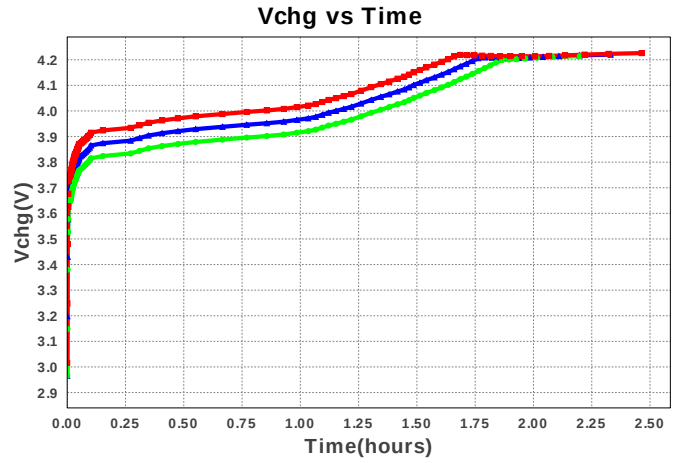

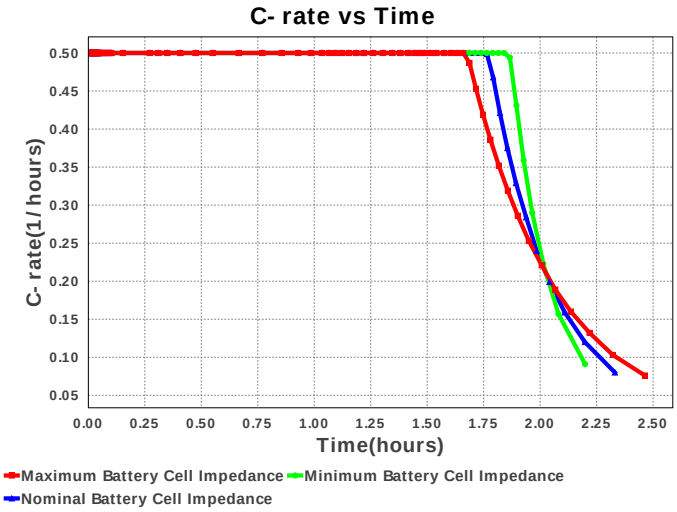

Operating Values

#	Name	Value	Category	Description
1.	BOM Count	8	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	48.0 mm^2	General	Total Foot Print Area of BOM components
6.	Total BOM	$0.5	General	Total BOM Cost
7.	Total Battery Capacity	2.0 000mAh	General	Total Battery Capacity
8.	C-rate	500.0 m/hr	Op_Point	Charge Rate
9.	IBAT_SHORT	15.0 mA	Op_Point	Source current for BAT pin short-circuit detection
10.	ICThetaJA Effective	17.2 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
11.	Ichg_OP	1.0 A	Op_Point	Battery charging current
12.	Ichg_Sch	1.0 A	Op_Point	Charge current selected
13.	IinMax_Sch	1.0 A	Op_Point	Maximum input current selected
14.	Iprecharge	250.0 mA	Op_Point	Pre-charge Current
15.	Itermination	125.0 mA	Op_Point	Termination comparator threshold for termination detection
16.	VBAT_LOWV	2.5 V	Op_Point	Pre-charge to fast-charge transition threshold
17.	VBAT_SHORT	800.0 mV	Op_Point	BAT pin short-circuit detection threshold
18.	Vchg_OP	4.2 V	Op_Point	Battery output voltage
19.	Vchg_Sch	4.2 V	Op_Point	Charge voltage selected
20.	Efficiency	69.944 %	Op_point	Steady state efficiency
21.	IC Tj	61.043 degC	Op_point	IC junction temperature
22.	VIN_OP	6.0 V	Op_point	Vin operating point
23.	Total Pd	1.805 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	IchgMax	1.0	Ichg
2.	IchgMax	1.0	Ichg
3.	IinMax	1.0	IinMax
4.	Vchg	4.2	Vchg

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#	Name	Value	Description
5.	Vchg	4.2	Vchg
6.	VinMax	6.0	Maximum input voltage
7.	VinMin	5.0	Minimum input voltage
8.	base_pn	BQ24093	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. **BQ24093** Product Folder : http://www.ti.com/product/bq24093 : contains the data sheet and other resources.

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