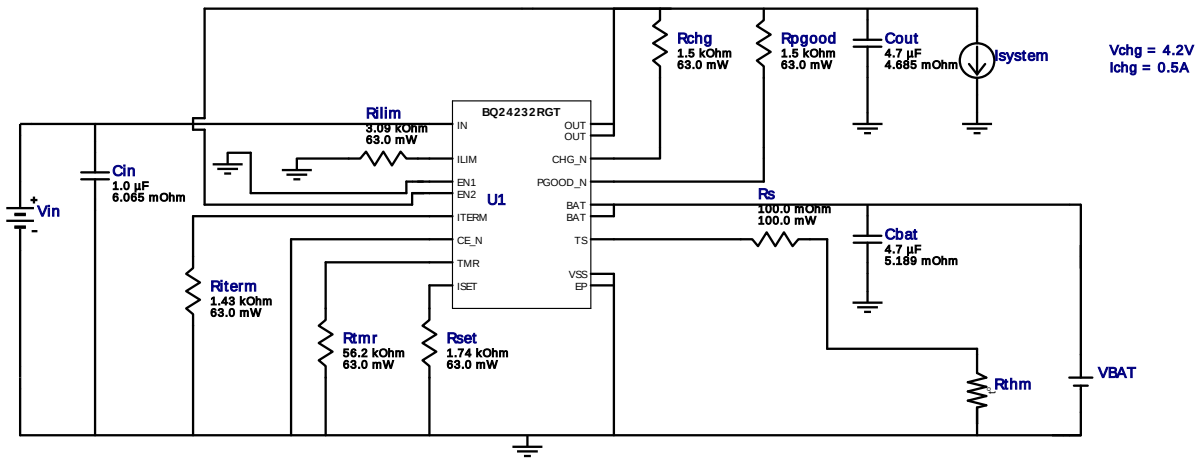
WEBENCH® Design Report

VinMax = 5.25V
IinMax = 0.5A
Vchg = 4.2A
Ichg = 0.5A

Device = BQ24232RGTR
Topology = BMS_LDO
Created = 8/11/16 2:44:00 PM
BOM Cost = $1.18
BOM Count = 12
Total Pd = 0.53W

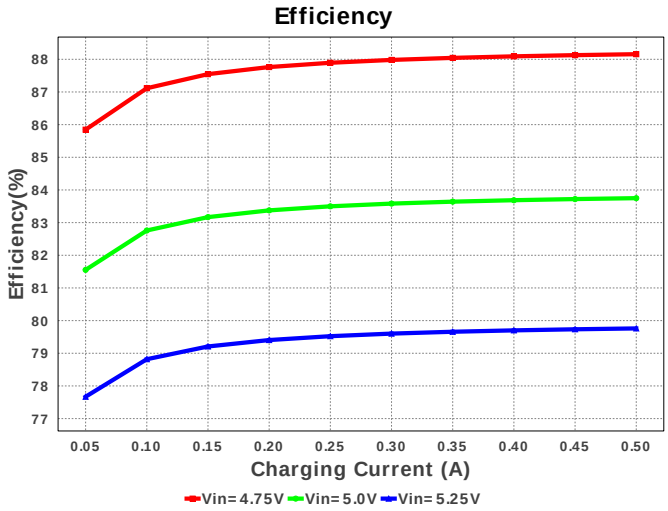
Design : 921712/284 BQ24232RGTR
BQ24232RGTR 4.75V-5.25V to 4.20V @ 0.5A

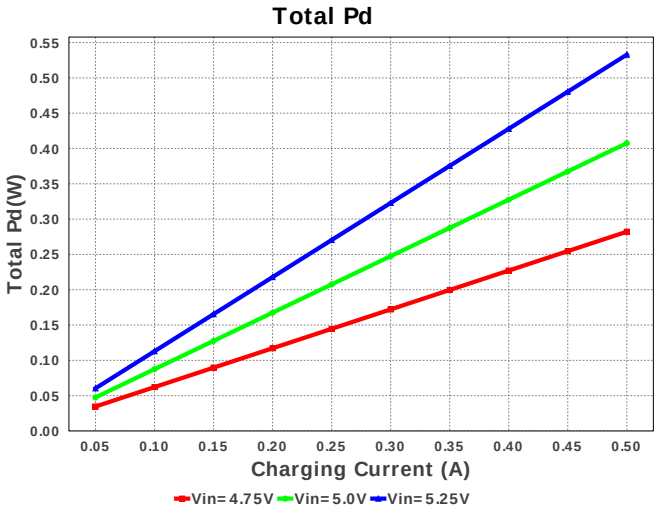


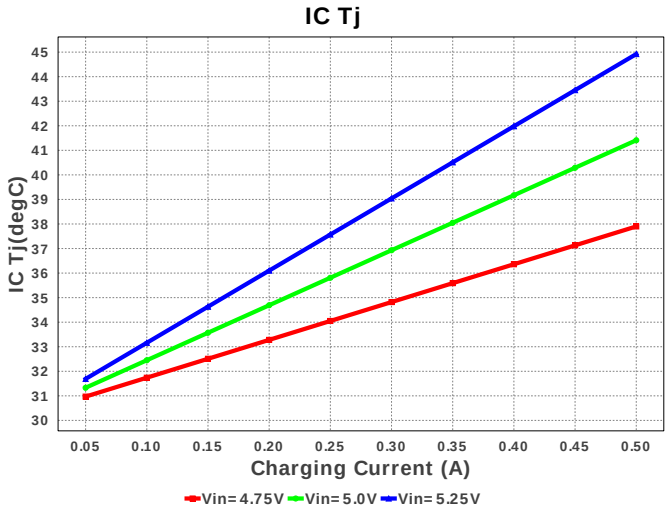
Electrical BOM

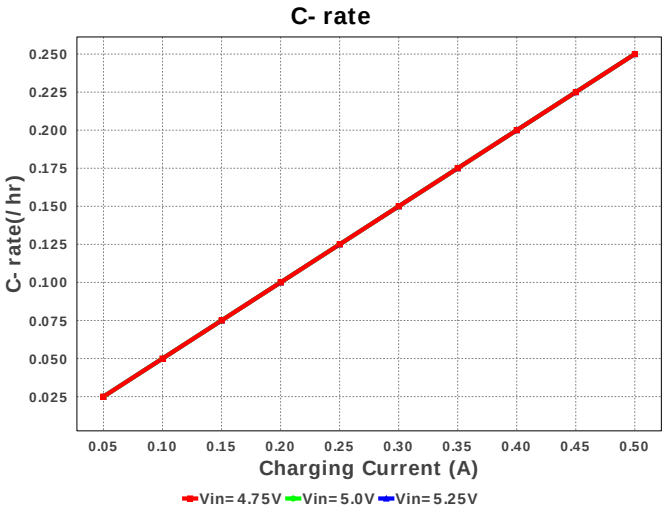
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbat	MuRata	GRM21BR61E475KA12L Series= X5R	Cap= 4.7 uF ESR= 5.189 mOhm VDC= 25.0 V IRMS= 2.03531 A	1	$0.02	0805 7 mm²
2.	Cin	MuRata	GRM188R61A105KA61D Series= X5R	Cap= 1.0 uF ESR= 6.065 mOhm VDC= 10.0 V IRMS= 1.30675 A	1	$0.01	0603 5 mm²
3.	Cout	MuRata	GRM21BR61A475KA73L Series= X5R	Cap= 4.7 uF ESR= 4.685 mOhm VDC= 10.0 V IRMS= 1.84175 A	1	$0.03	0805 7 mm²
4.	Rchg	Vishay-Dale	CRCW04021K50FKED Series= CRCW..e3	Res= 1.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
5.	Rilim	Vishay-Dale	CRCW04023K09FKED Series= CRCW..e3	Res= 3.09 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
6.	Riterm	Vishay-Dale	CRCW04021K43FKED Series= CRCW..e3	Res= 1.43 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
7.	Rpgood	Vishay-Dale	CRCW04021K50FKED Series= CRCW..e3	Res= 1.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
8.	Rs	Panasonic	ERJ-3RSFR10V Series= ERJ-3R	Res= 100.0 mOhm Power= 100.0 mW Tolerance= 1.0%	1	$0.03	0603 5 mm²
9.	Rset	Vishay-Dale	CRCW04021K74FKED Series= CRCW..e3	Res= 1.74 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm²
10.	Rthm	MuRata	NCP15XH103E03RC Series= NCP15	Thermistor	1	$0.03	0402 3 mm²

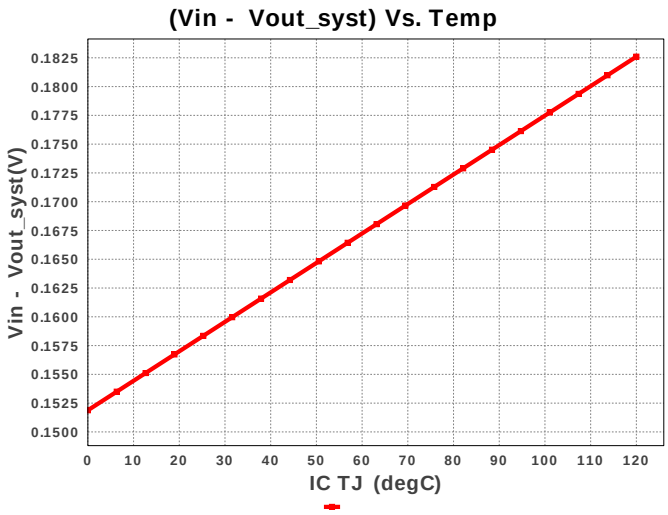
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
11.	Rtmr	Vishay-Dale	CRCW040256K2FKED Series= CRCW..e3	Res= 56.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 3 mm^2
12.	U1	Texas Instruments	BQ24232RGTR	Switcher	1	$1.00	RGT0016C 25 mm^2

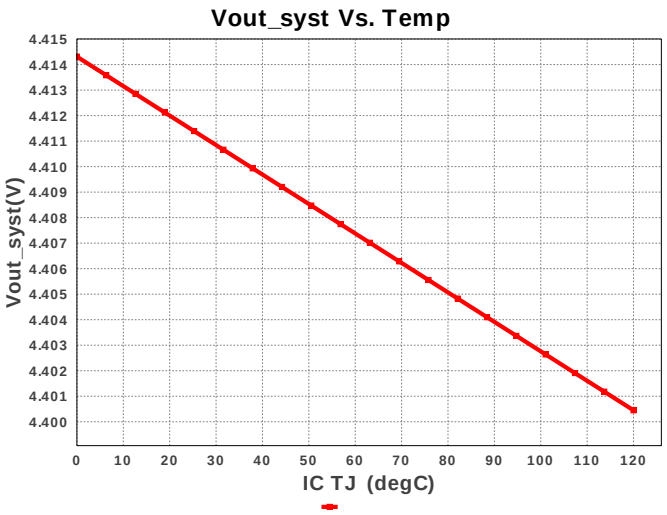


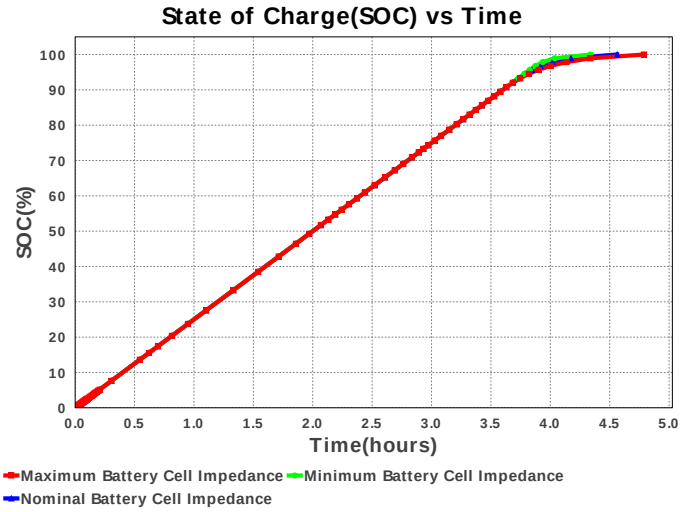


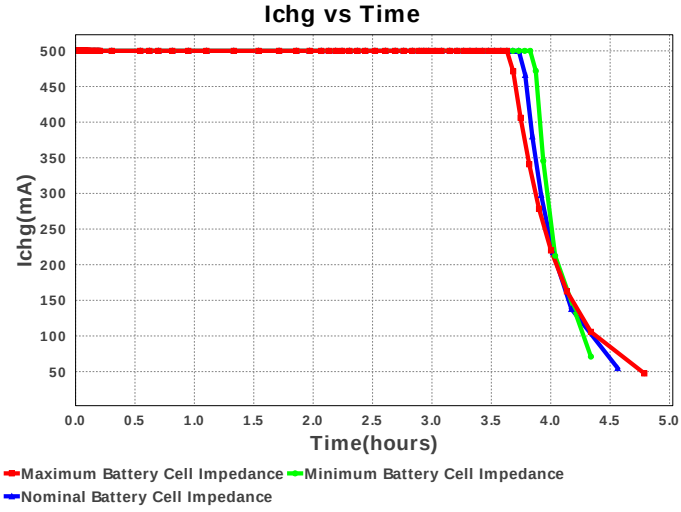


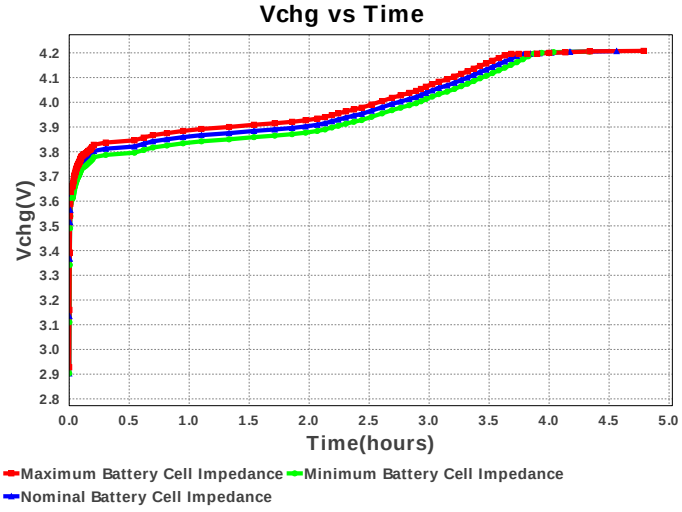


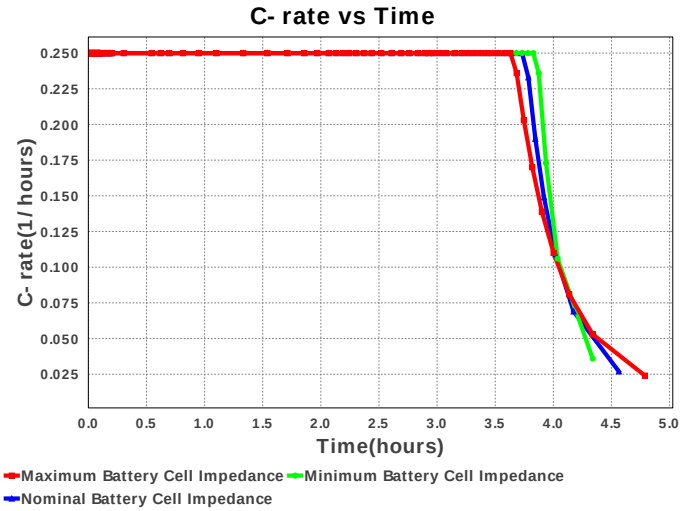












Operating Values

#	Name	Value	Category	Description
1.	BOM Count	12	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	69.0 mm^2	General	Total Foot Print Area of BOM components
7.	Total BOM	$1.18	General	Total BOM Cost
8.	Total Battery Capacity	2000.0mAh	General	Total Battery Capacity
9.	C-rate	250.0 m/hr	Op_Point	Charge Rate
10.	IBAT_SHORT	7.5 mA	Op_Point	Source current for BAT pin short-circuit detection
11.	ICThetaJA Effective	28.0 degC/W	Op_Point	Effective IC Junction-to-Ambient Thermal Resistance
12.	Ichg_OP	500.0 mA	Op_Point	Battery charging current
13.	Ichg_Sch	500.0 mA	Op_Point	Charge current selected
14.	IinMax_Sch	500.0 mA	Op_Point	Maximum input current selected
15.	Iprecharge	58.667 mA	Op_Point	Pre-charge Current
16.	Itermination	24.655 mA	Op_Point	Termination comparator threshold for termination detection
17.	Total Charging Time	04:34 (04:20-04:47) hr	Op_Point	Total Charging Time needed to charge the battery taking into account battery cell variations
18.	VBAT_LOWV	3.0 V	Op_Point	Pre-charge to fast-charge transition threshold
19.	VBAT_SHORT	1.8 V	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	79.761 %	Op_point	Steady state efficiency
23.	IC Tj	43.52 degC	Op_point	IC junction temperature
24.	VIN_OP	5.25 V	Op_point	Vin operating point
25.	Total Pd	532.875 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	IchgMax	500.0 m	Ichg
2.	Vchg	4.2	Vchg
3.	VinMax	5.25	Maximum input voltage
4.	VinMin	4.75	Minimum input voltage
5.	base_pn	BQ24232	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. **BQ24232** Product Folder : http://www.ti.com/product/bq24232 : contains the data sheet and other resources.