
Introduction of INR18650-30Q



SAMSUNG

SAMSUNG SDI

August 2014

Energy Business Division

This material is proprietary to Samsung SDI Co., Ltd. It shall not be used, reproduced, copied, disclosed, transmitted, in whole or in part, without the express written consent of Samsung SDI Co., Ltd.

SAMSUNG

SAMSUNG SDI

INR18650-30Q

- **Specification**
- **Capacity (0.2C vs. 10A)**
- **AC/DC impedance**
- **Capacity & temperature vs. discharge capacity**
- **Energy & avg. voltage at different current**
- **Cycle life**
- **Storage characteristics**
- **Safety test**

Specification

PROPRIETARY AND
CONFIDENTIAL

Type		Spec.(Tentative)	Typical INR18650-30Q
Chemistry		NCA	NCA
Dimension (mm)	Diameter	18.33 ± 0.07	18.33 ± 0.07
	Height	64.85 ± 0.15	64.85 ± 0.15
Weight (g)		Max. 48.0	45.6
Initial IR (mΩ AC 1kHz)		≤ 18	13.13 ± 2
Initial IR (mΩ DC (10A-1A))		≤ 30	19.94 ± 2
Nominal Voltage (V)		3.60	3.61
Charge Method (100mA cut-off)		CC-CV (4.2±0.05V)	CC-CV (4.2±0.05V)
Charge Time	Standard (min), 0.5C	180min	134min
	Rapid (min), 4A	70min	68min
Charge Current	Standard current (A)	1.5	1.5
	Max. current (A)	4.0	4.0
Discharge	End voltage (V)	2.5	2.5
	Max. cont. current (A)	15	15
Rated discharge Capacity	Standard (mAh) (0.2C)	3,000	3,040
	rated (mAh) (10A)	2,700	2,983

Capacity _ 0.2C vs. 10A

PROPRIETARY AND
CONFIDENTIAL

▪ 0.2C capacity

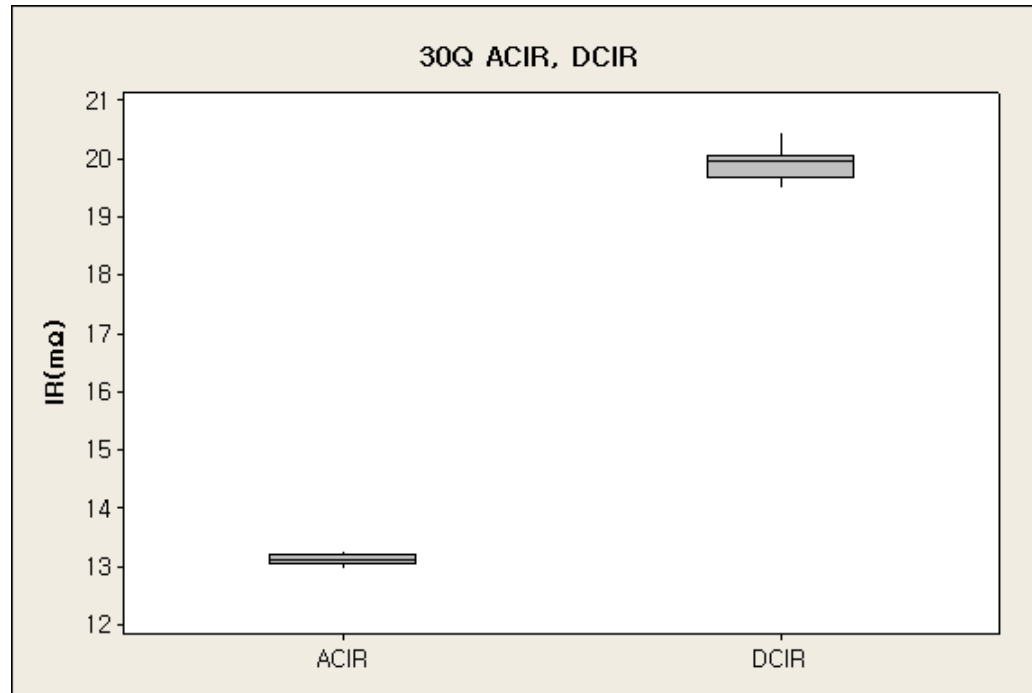
Cell	Capacity(Ah)	Energy(Wh)	Avg. volt(V)
1	3.041	11.0	3.61
2	3.043	11.0	3.61
3	3.035	11.0	3.61
Avg.	3.040	11.0	3.61

▪ 10A capacity

Cell	Capacity(Ah)	Energy(Wh)	Avg. volt(V)
1	2.978	10.1	3.38
2	2.992	10.1	3.39
3	2.980	10.1	3.39
Avg.	2.983	10.1	3.39

AC/DC Impedance

PROPRIETARY AND
CONFIDENTIAL



AC-IR

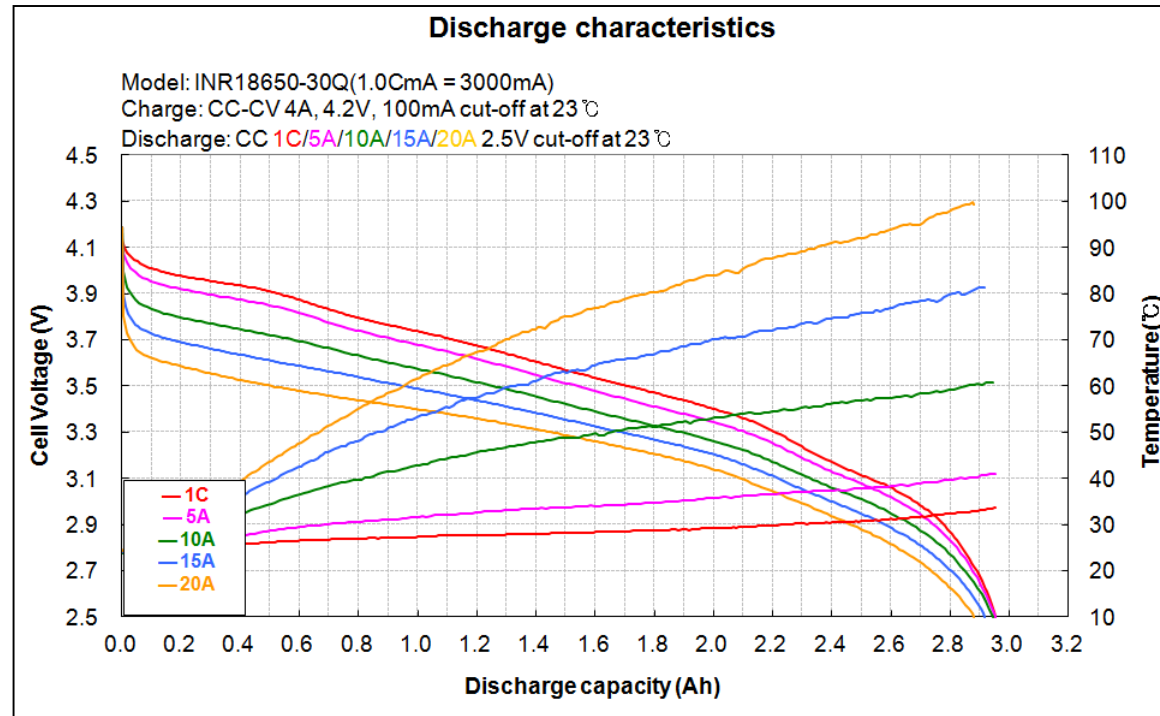
$13.13 \pm 2\text{m}\Omega$

DC-IR

$19.94 \pm 2\text{m}\Omega$

Capacity & Temperature vs. discharge capacity

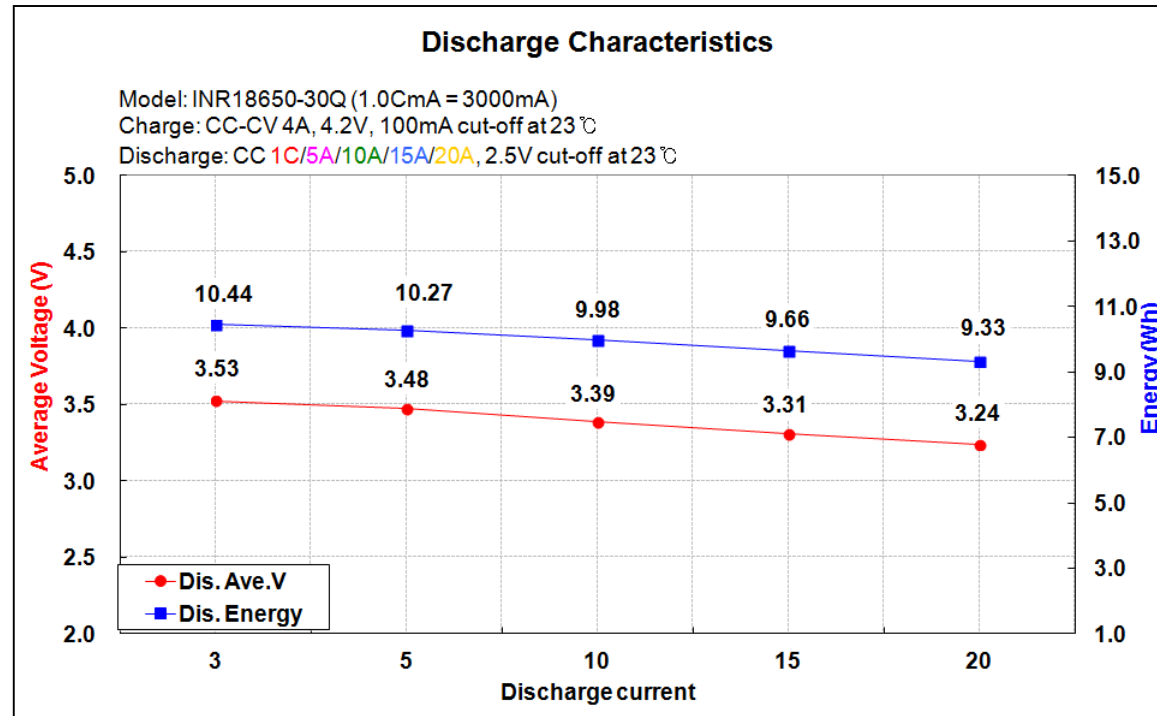
PROPRIETARY AND CONFIDENTIAL



Discharge current					
	1C	5A	10A	15A	20A
Capa.(Ah)	2.953	2.950	2.945	2.917	2.879
Temp.(°C)	33.7	41.0	60.9	81.2	99.4
Time(min.)	59.1	35.4	17.7	11.7	8.6

Energy & Avg. voltage at different current

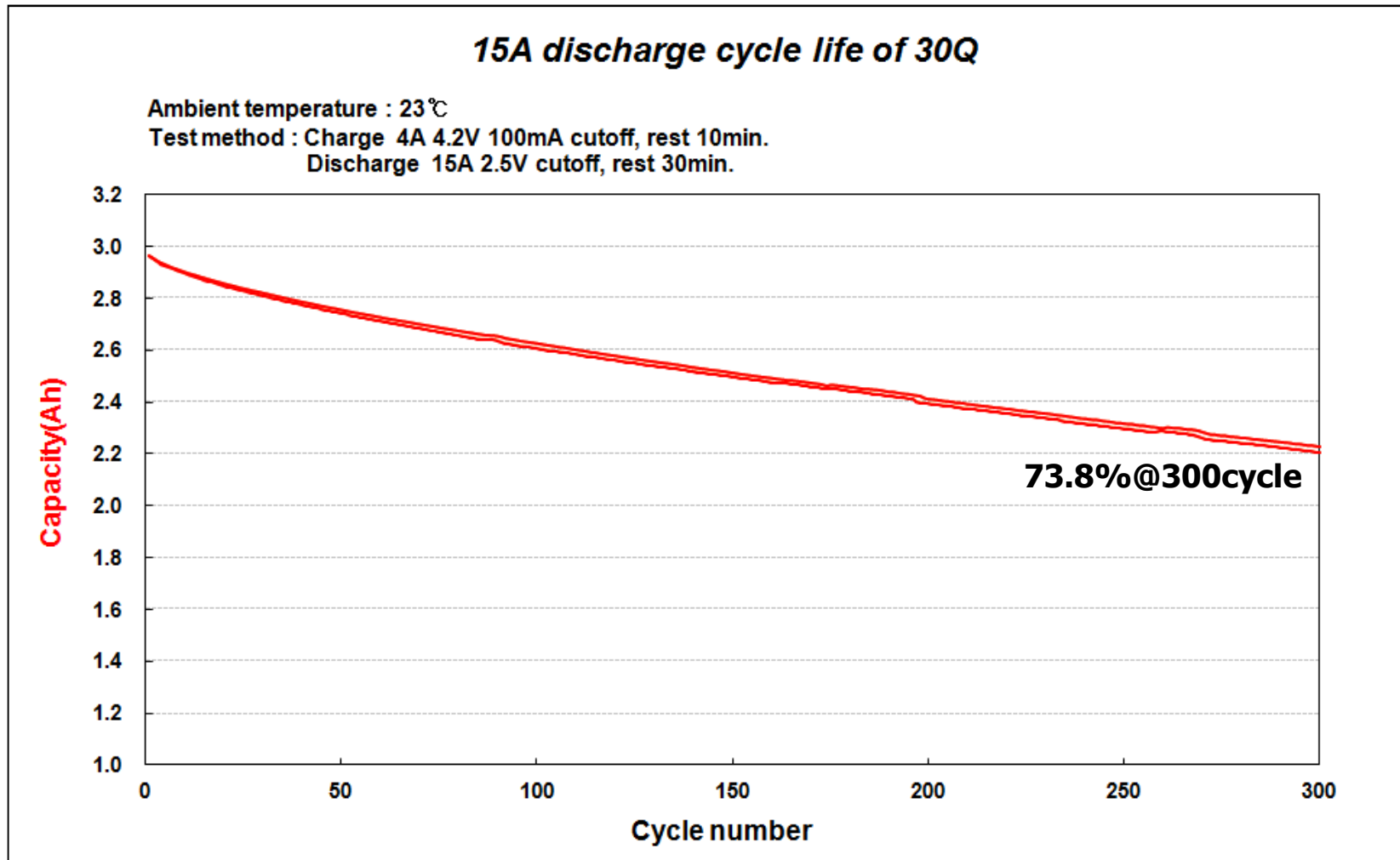
PROPRIETARY AND CONFIDENTIAL



Discharge current					
	1C	5A	10A	15A	20A
Energy(Wh)	10.44	10.27	9.98	9.66	9.33
Avg. voltage(V)	3.53	3.48	3.39	3.31	3.24

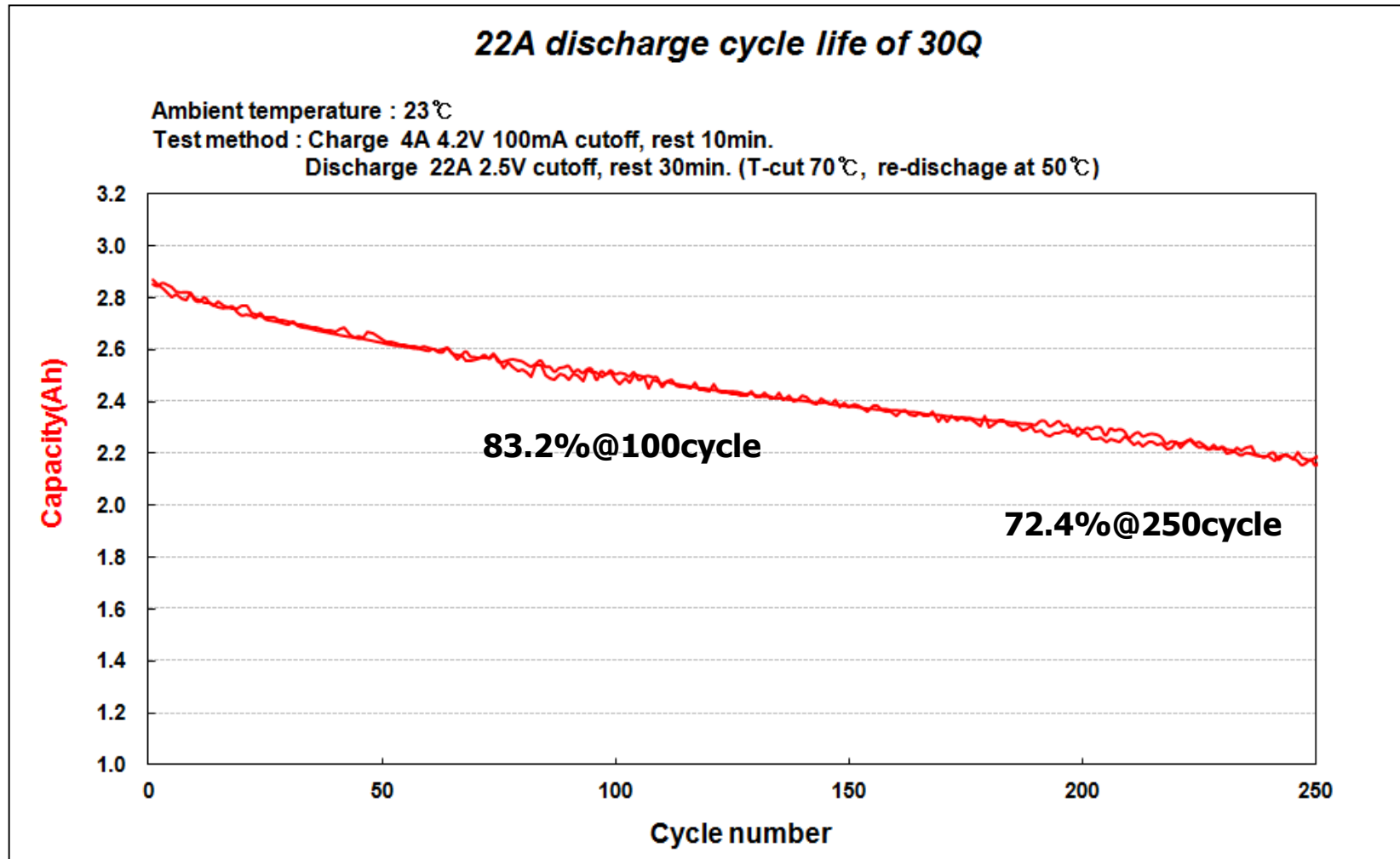
Cycle life _ 15A cycle

PROPRIETARY AND
CONFIDENTIAL



Cycle life _ 22A cycle(70 °C T-cut)

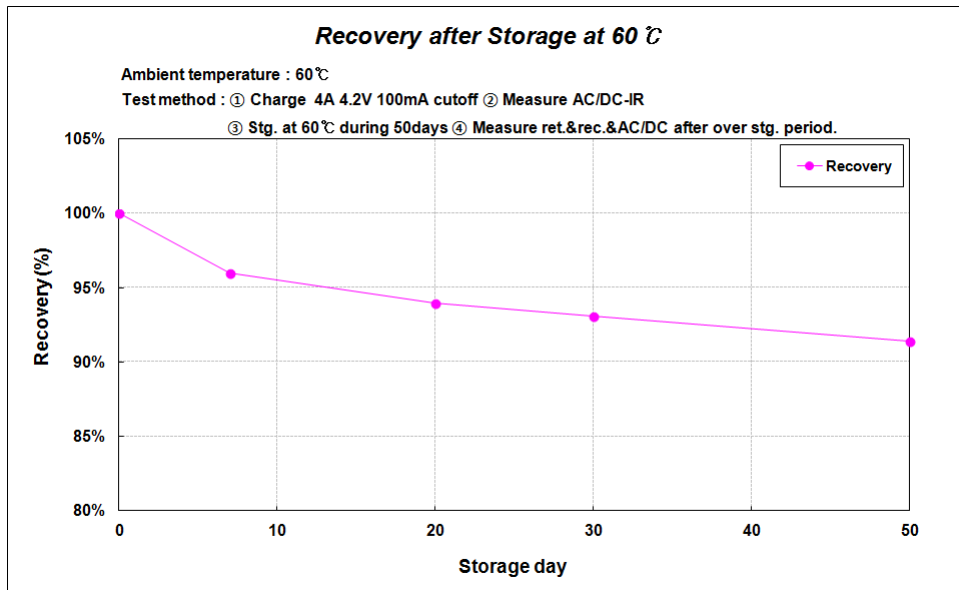
PROPRIETARY AND
CONFIDENTIAL



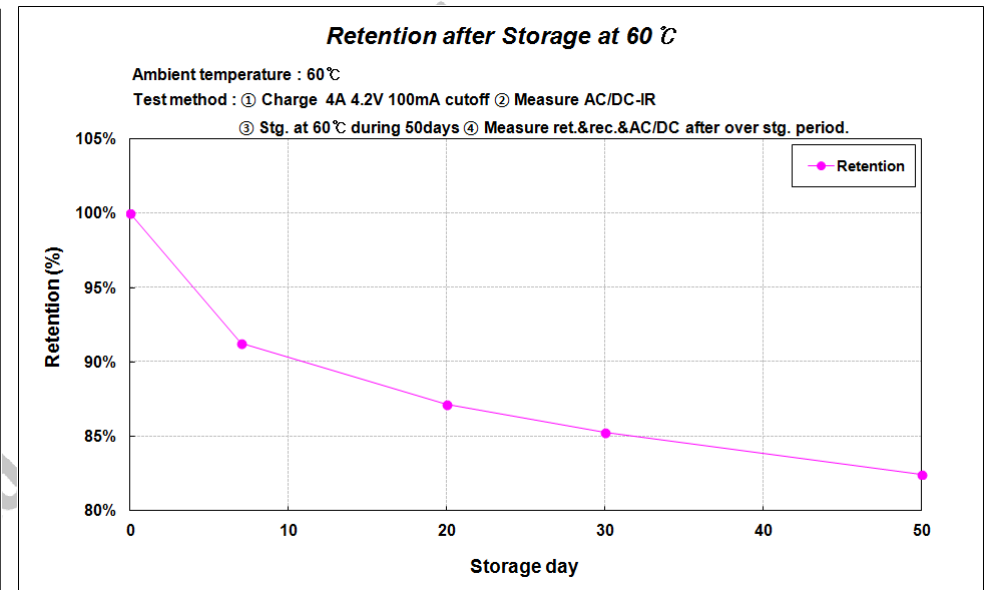
Storage at 60 °C

PROPRIETARY AND CONFIDENTIAL

Recovery



Retention



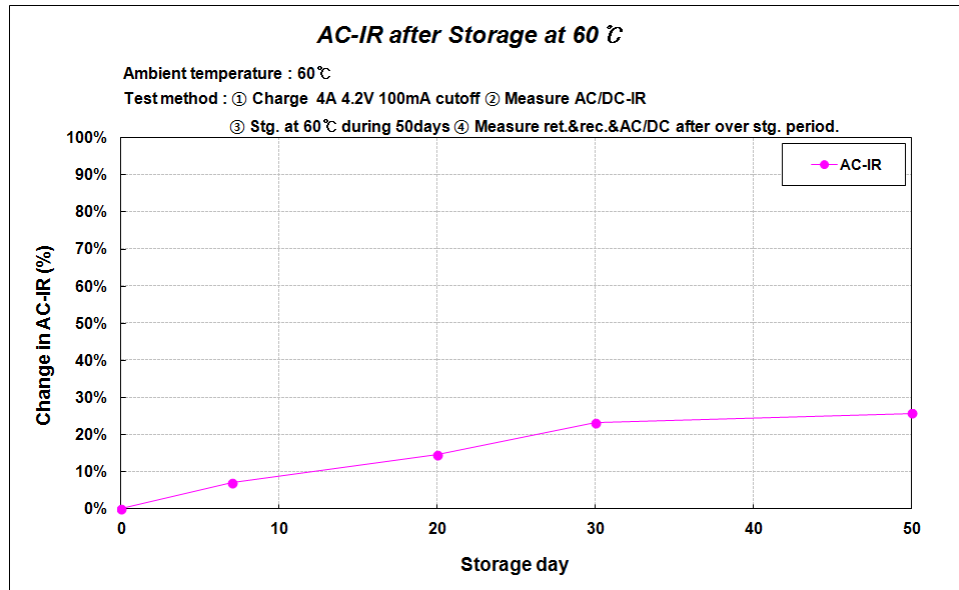
Storage at 60 °C

storage day	initial			after storage				Ratio(%)			
	ACIR	DCIR	Capacity	ACIR	DCIR	Retention	Recovery	ACIR	DCIR	Retention	Recovery
7	13.2	20.0	2.981	14.2	27.0	2.720	2.862	7.2	35.1	91.3	96.0
20	13.2	19.9	2.986	15.1	31.9	2.604	2.807	14.7	60.5	87.2	94.0
30	13.1	20.2	2.990	16.1	34.7	2.550	2.783	23.2	72.0	85.3	93.1
50	13.1	19.9	2.986	16.4	38.4	2.463	2.730	25.8	93.3	82.5	91.4

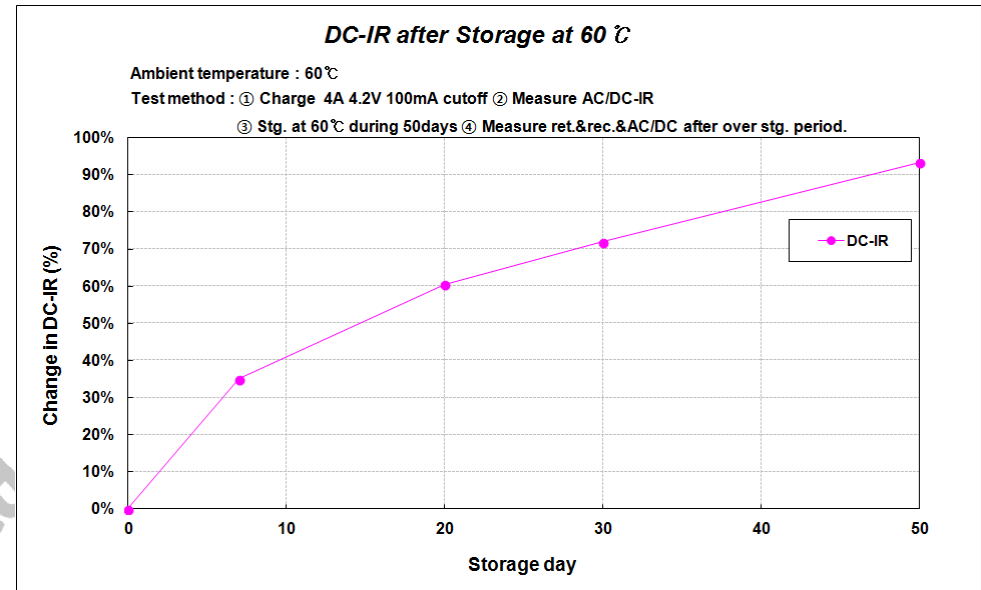
Storage at 60°C

PROPRIETARY AND CONFIDENTIAL

AC-IR



DC-IR



Storage at 60°C

storage day	initial			after storage				Ratio(%)			
	ACIR	DCIR	Capacity	ACIR	DCIR	Retention	Recovery	ACIR	DCIR	Retention	Recovery
7	13.2	20.0	2.981	14.2	27.0	2.720	2.862	7.2	35.1	91.3	96.0
20	13.2	19.9	2.986	15.1	31.9	2.604	2.807	14.7	60.5	87.2	94.0
30	13.1	20.2	2.990	16.1	34.7	2.550	2.783	23.2	72.0	85.3	93.1
50	13.1	19.9	2.986	16.4	38.4	2.463	2.730	25.8	93.3	82.5	91.4

Safety test _ Summary

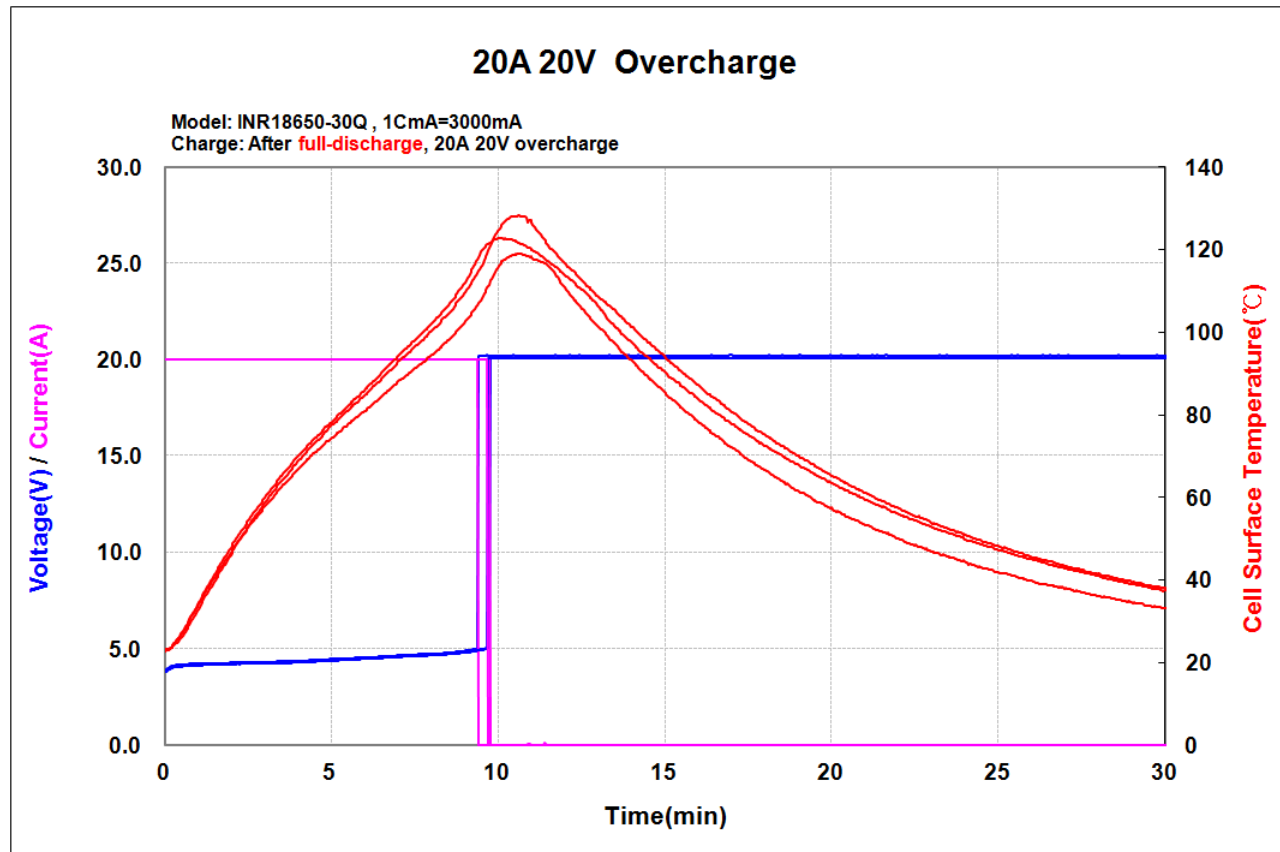
PROPRIETARY AND
CONFIDENTIAL

			30Q		
Test item			Spec.	Results	
				Results	Max. temp.
Electrical Abuse	Overcharge	20A, 20V(UL)	L1	3L1	128.4
	Short circuit	10mΩ at 23℃	L1	3L1	87.0
Mechanical Abuse	Impact	UL	L1	5L0	22.1
Thermal Abuse	Hot oven	140℃	-	3L1	147.6



Safety test _ Overcharge

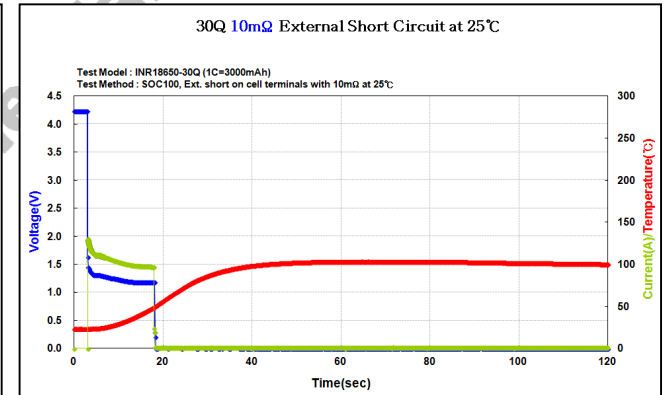
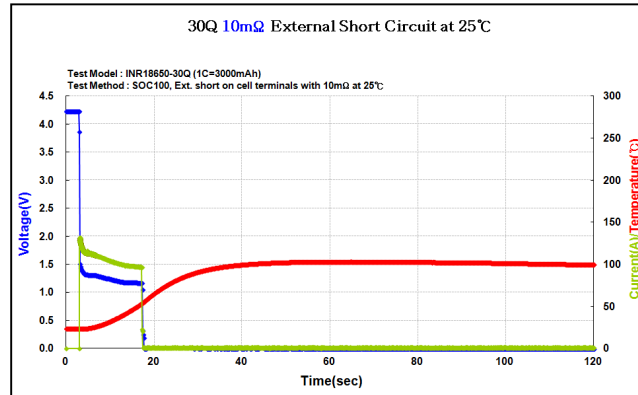
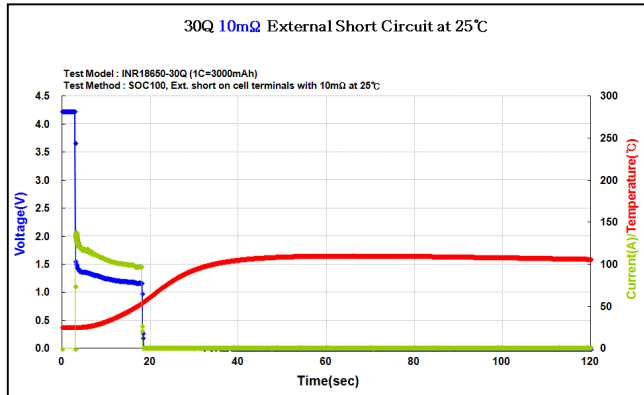
PROPRIETARY AND CONFIDENTIAL



Cell	Results	CID open time	Max. temp.
1	L1	9.76	119.0
2	L1	9.40	122.9
3	L1	9.70	128.4
Avg.		9.62	123.4

Safety test _ Short circuit

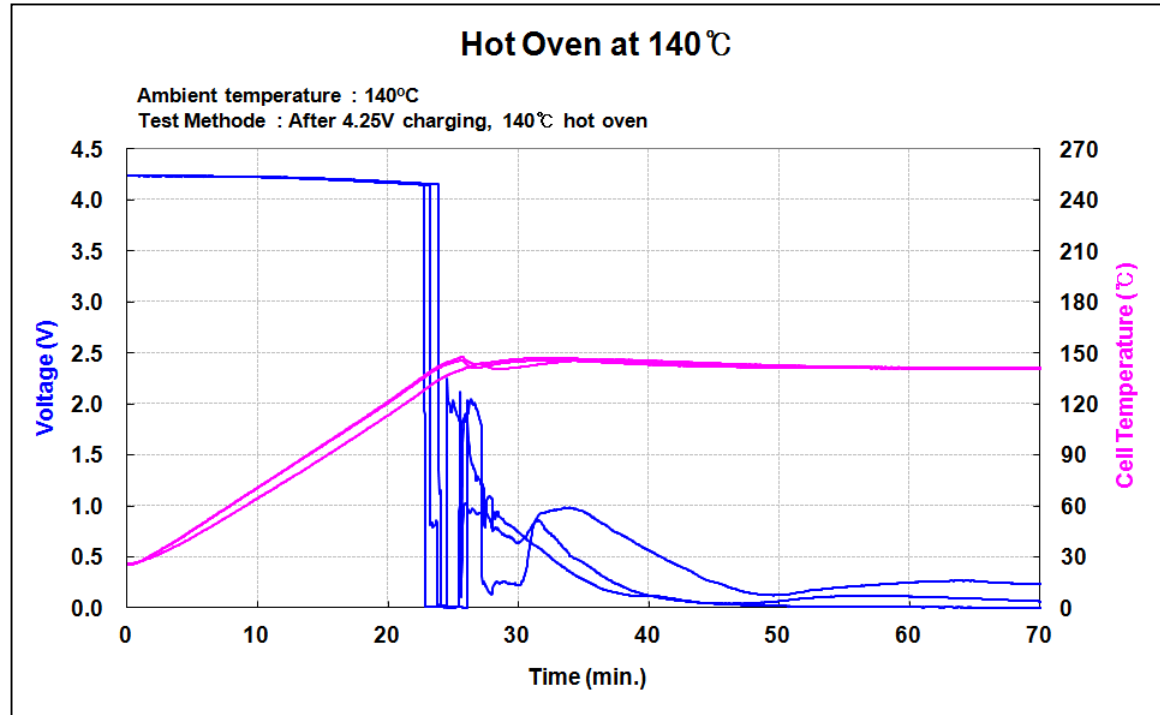
PROPRIETARY AND
CONFIDENTIAL



Cell	Results	Max. current (A)	Max. temp.(°C)
1	L1	138	111
2	L1	132	104
3	L1	130	103
Avg.		133	106

Safety test _ Hot oven(140°C)

PROPRIETARY AND CONFIDENTIAL



Cell	Results	Max. temp.
1	L1 / OK	147.6
2	L1 / OK	145.9
3	L1 / OK	146.1
Avg.		146.5

Safety test _ Impact

PROPRIETARY AND
CONFIDENTIAL



Cell	Results
1	L0 / OK
2	L0 / OK
3	L0 / OK
4	L0 / OK
5	L0 / OK

- Thank you -



SAMSUNG SDI

