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# Introduction of INR18650-30Q

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**SAMSUNG**

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**Energy Business Division**

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## 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

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

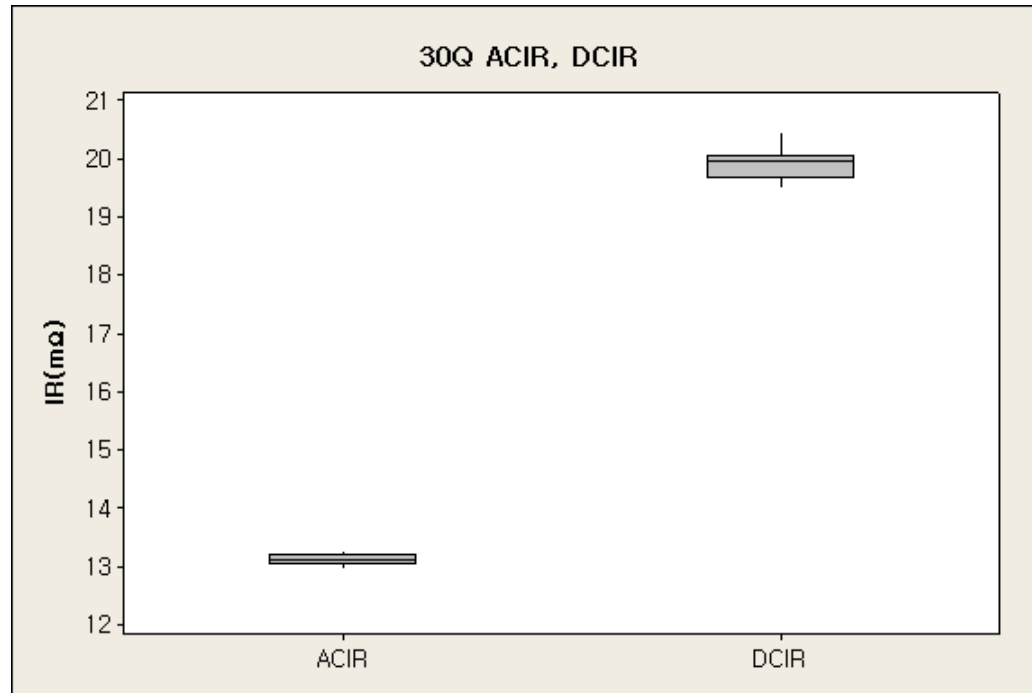
## ▪ 0.2C capacity

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.	<b>3.040</b>	<b>11.0</b>	<b>3.61</b>

## ▪ 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.	<b>2.983</b>	<b>10.1</b>	<b>3.39</b>

# AC/DC Impedance



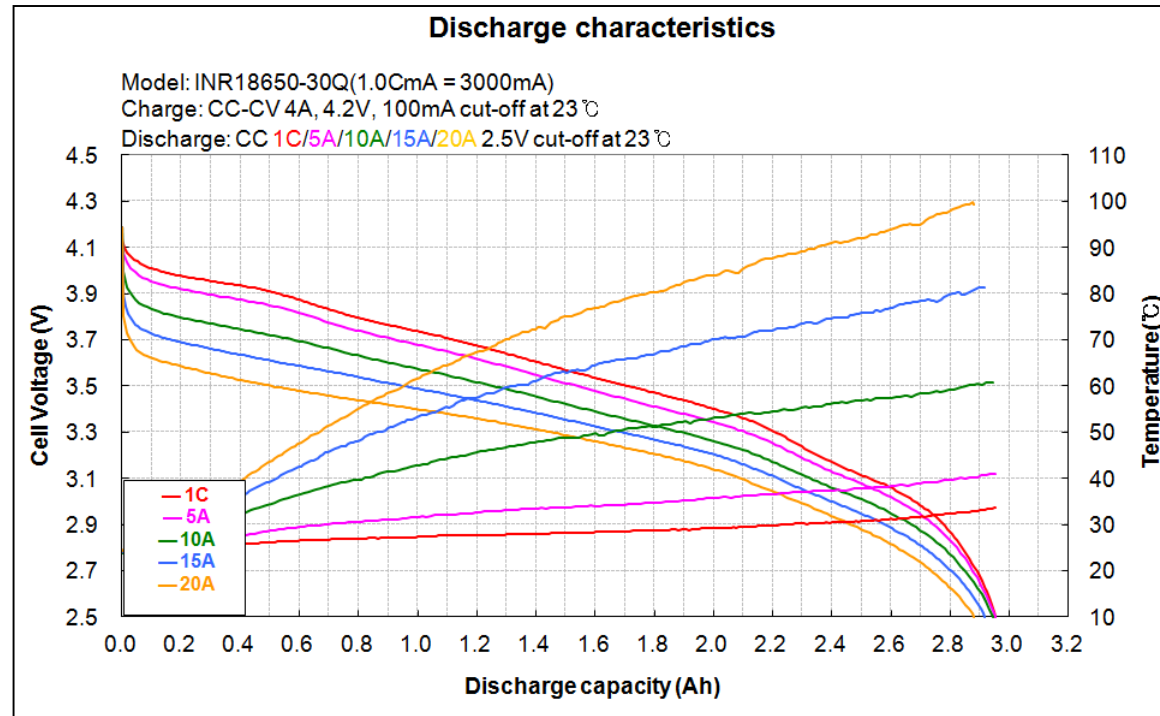
**AC-IR**

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

**DC-IR**

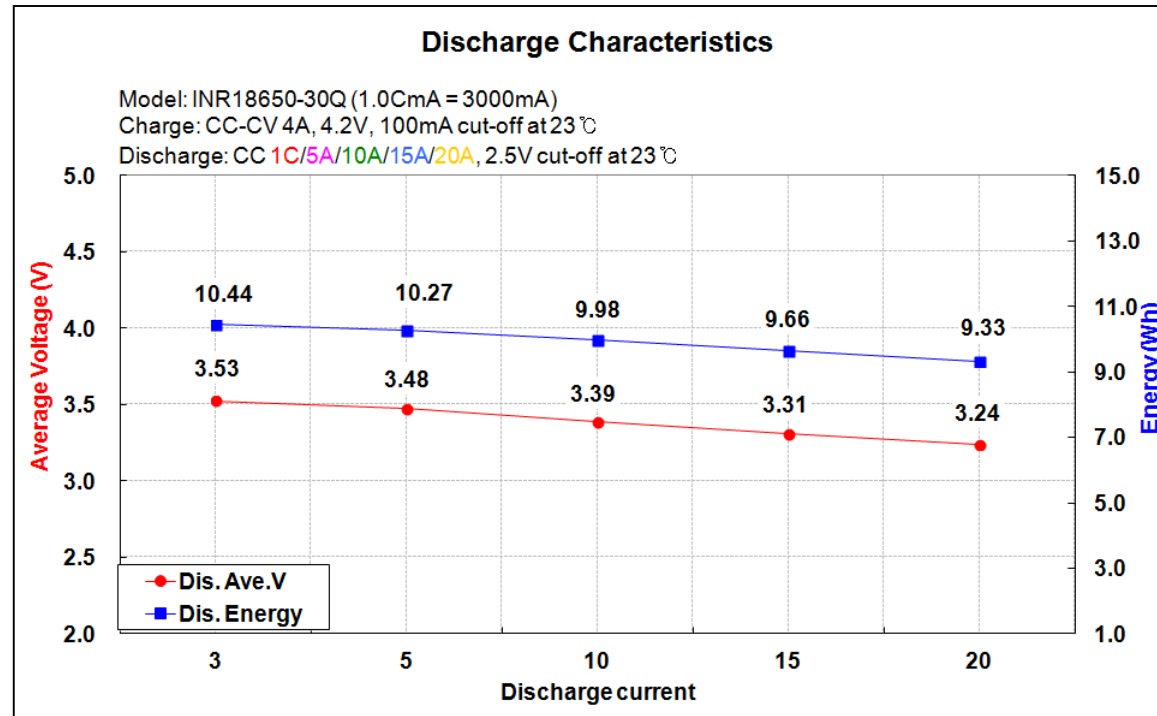
$19.94 \pm 2\text{m}\Omega$

# Capacity & Temperature vs. discharge capacity



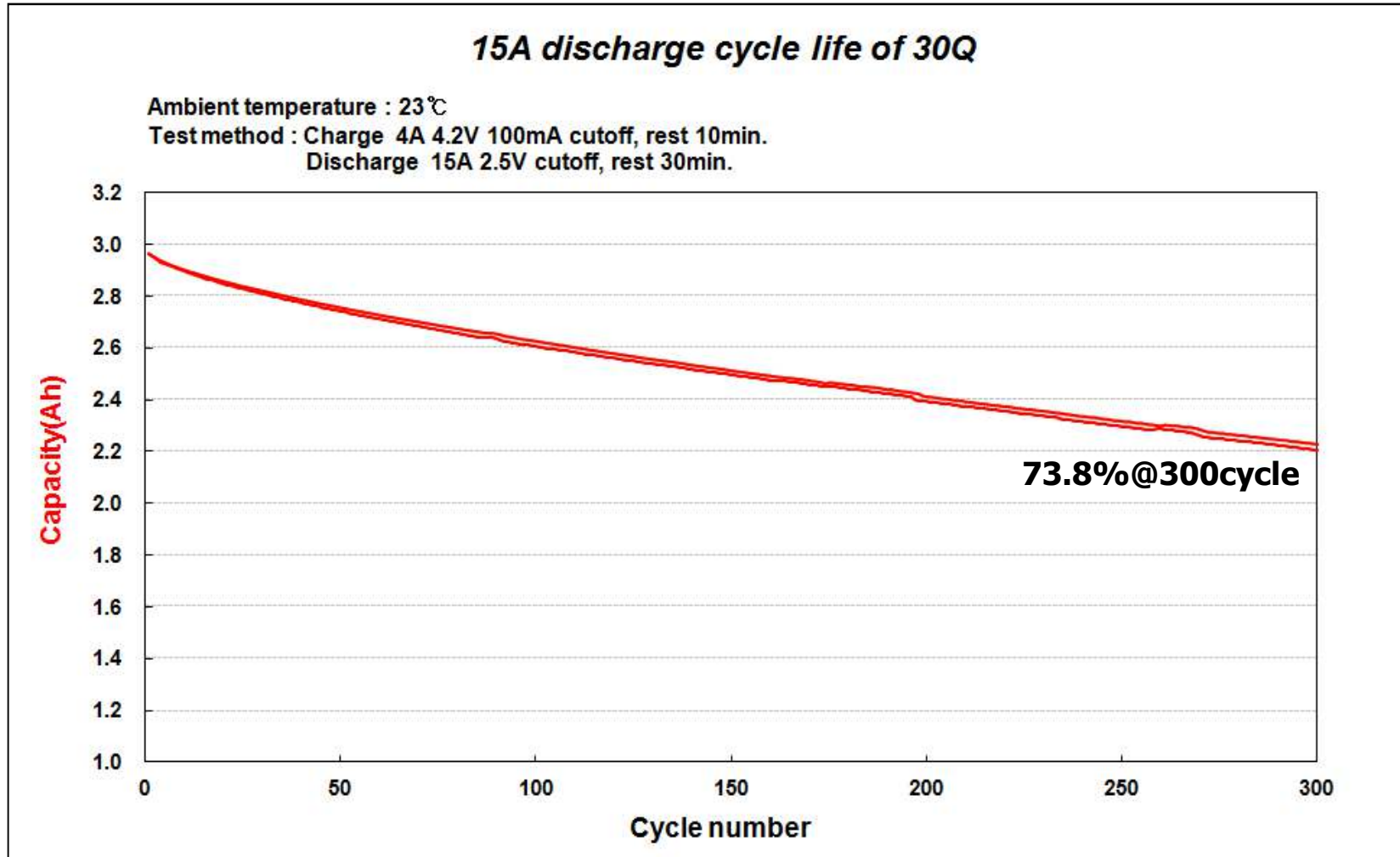
Discharge current					
	1C	5A	10A	15A	20A
Capa.(Ah)	2.953	2.950	2.945	2.917	2.879
Temp.(°C)	33.7	41.0	60.9	81.2	99.4
Time(min.)	59.1	35.4	17.7	11.7	8.6

# Energy & Avg. voltage at different current



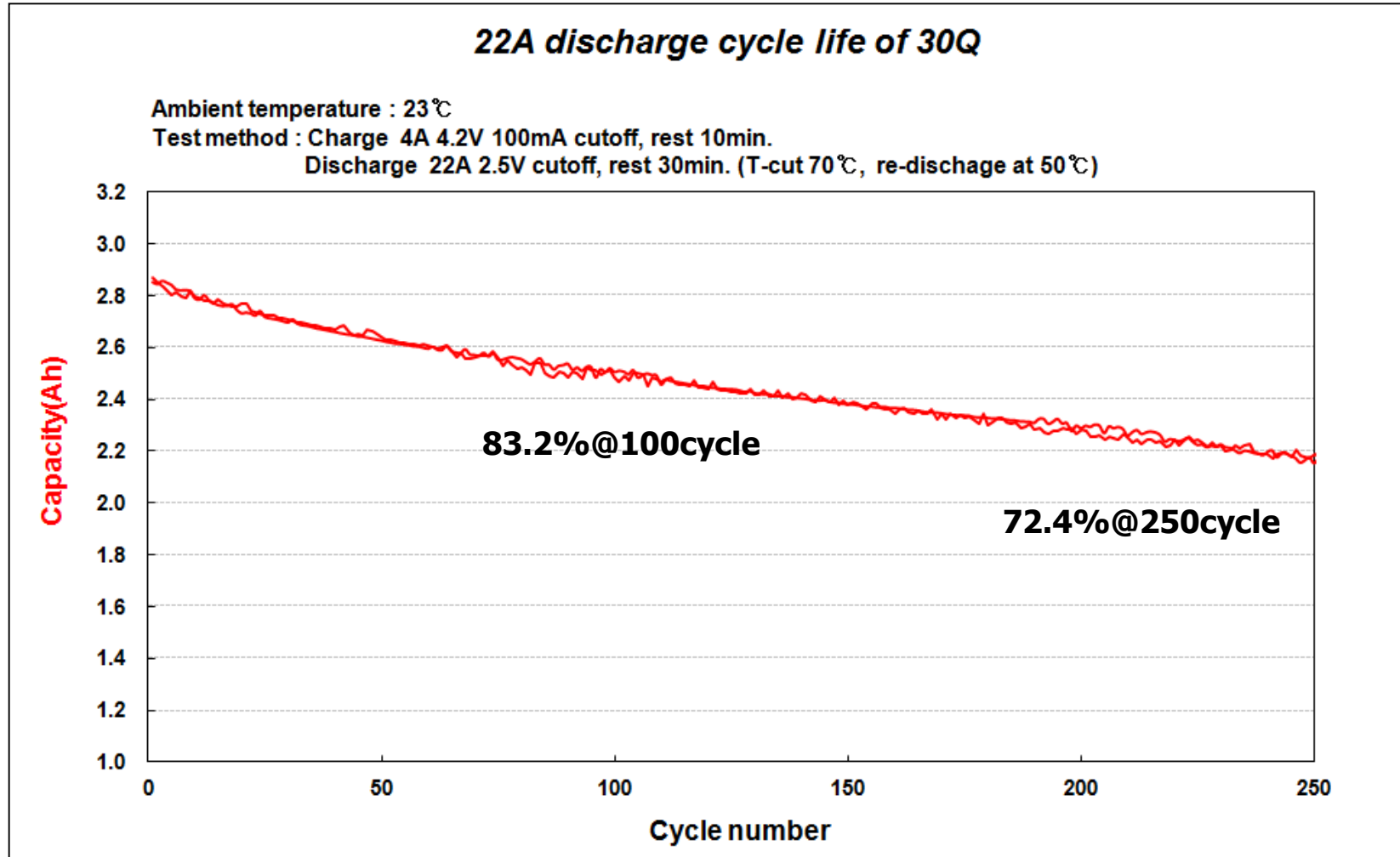
Discharge current					
	1C	5A	10A	15A	20A
Energy(Wh)	10.44	10.27	9.98	9.66	9.33
Avg. voltage(V)	3.53	3.48	3.39	3.31	3.24

# Cycle life \_ 15A cycle



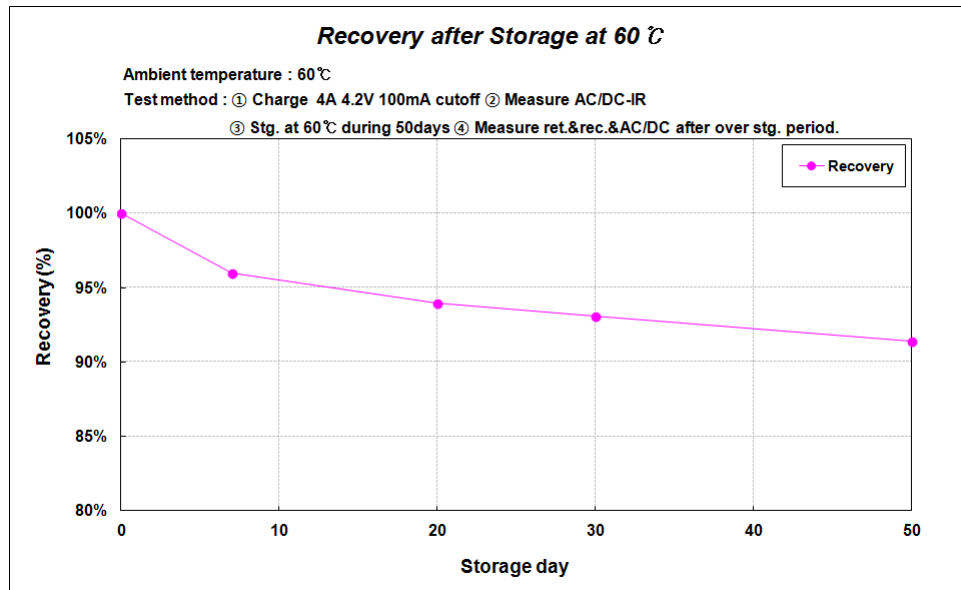


# Cycle life \_ 22A cycle(70 °C T-cut)

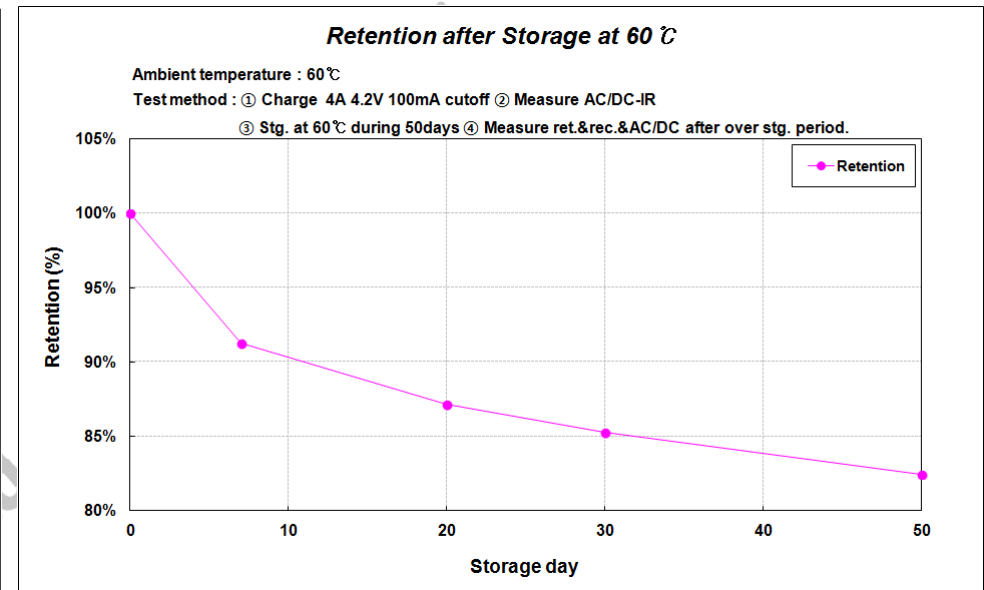


# Storage at 60 °C

## Recovery



## Retention

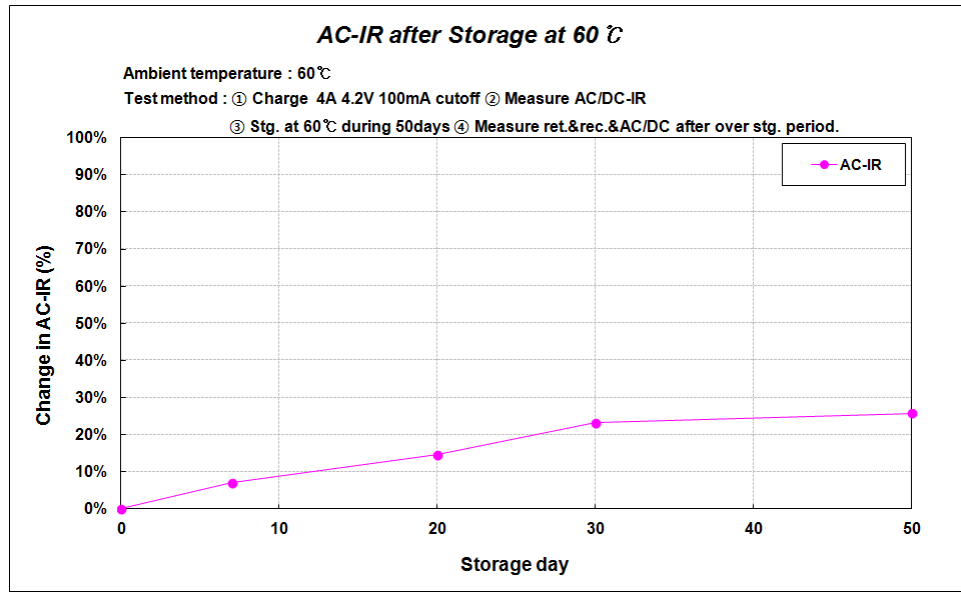


### Storage at 60 °C

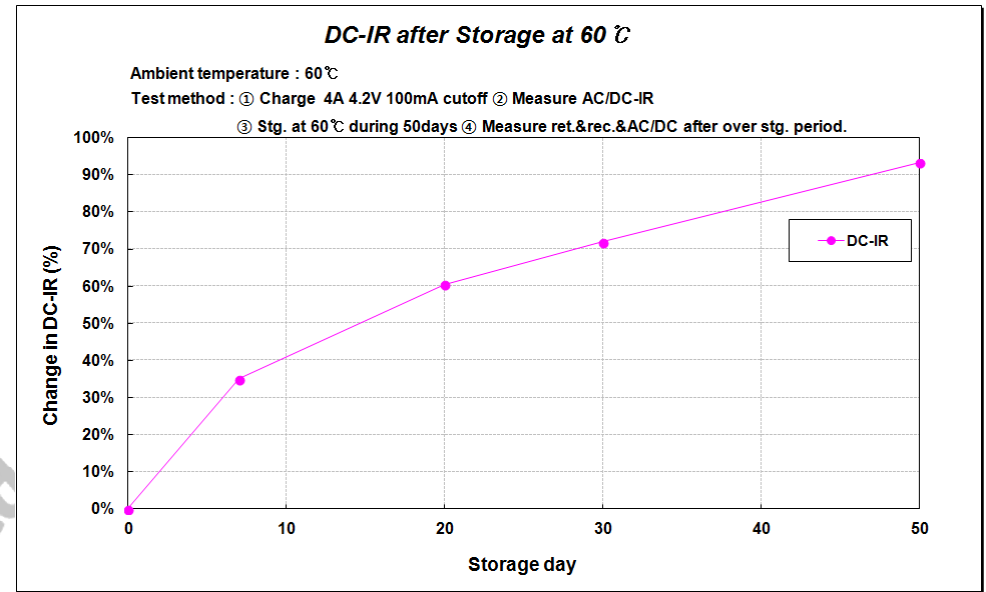
storage day	initial			after storage				Ratio(%)			
	ACIR	DCIR	Capacity	ACIR	DCIR	Retention	Recovery	ACIR	DCIR	Retention	Recovery
7	13.2	20.0	2.981	14.2	27.0	2.720	2.862	7.2	35.1	91.3	96.0
20	13.2	19.9	2.986	15.1	31.9	2.604	2.807	14.7	60.5	87.2	94.0
30	13.1	20.2	2.990	16.1	34.7	2.550	2.783	23.2	72.0	85.3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

## ■ AC-IR



## ■ DC-IR



## Storage at 60 °C

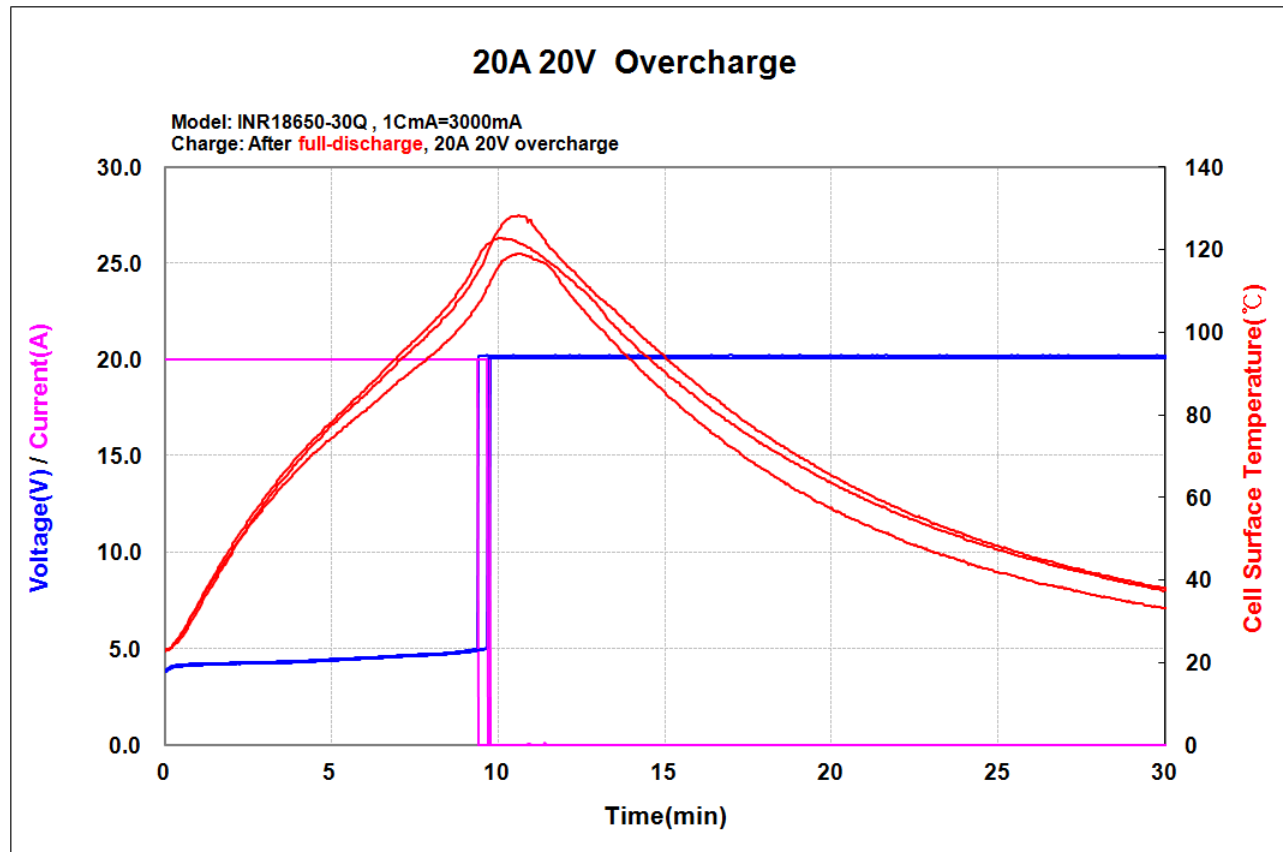
storage day	initial			after storage				Ratio(%)			
	ACIR	DCIR	Capacity	ACIR	DCIR	Retention	Recovery	ACIR	DCIR	Retention	Recovery
7	13.2	20.0	2.981	14.2	27.0	2.720	2.862	7.2	35.1	91.3	96.0
20	13.2	19.9	2.986	15.1	31.9	2.604	2.807	14.7	60.5	87.2	94.0
30	13.1	20.2	2.990	16.1	34.7	2.550	2.783	23.2	72.0	85.3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

			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

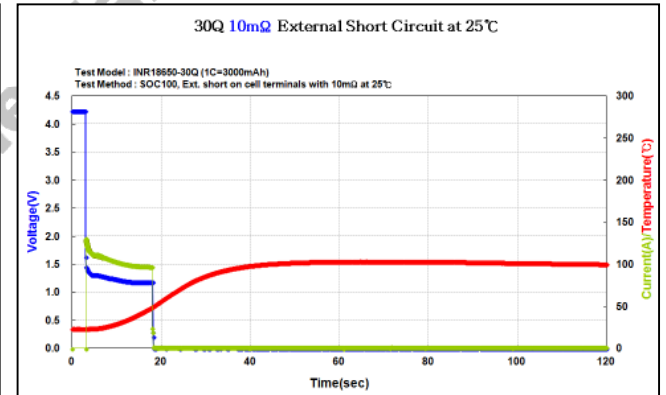
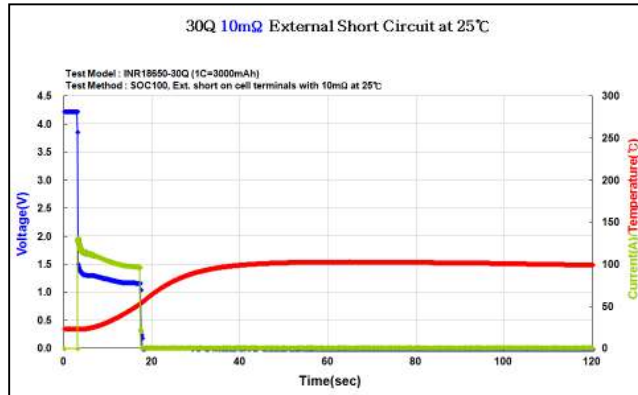
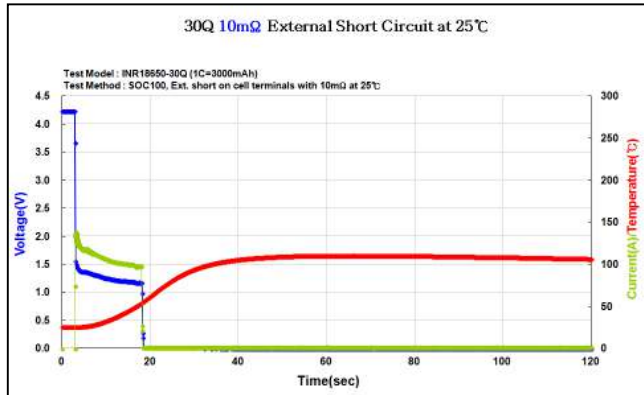


# Safety test \_ Overcharge



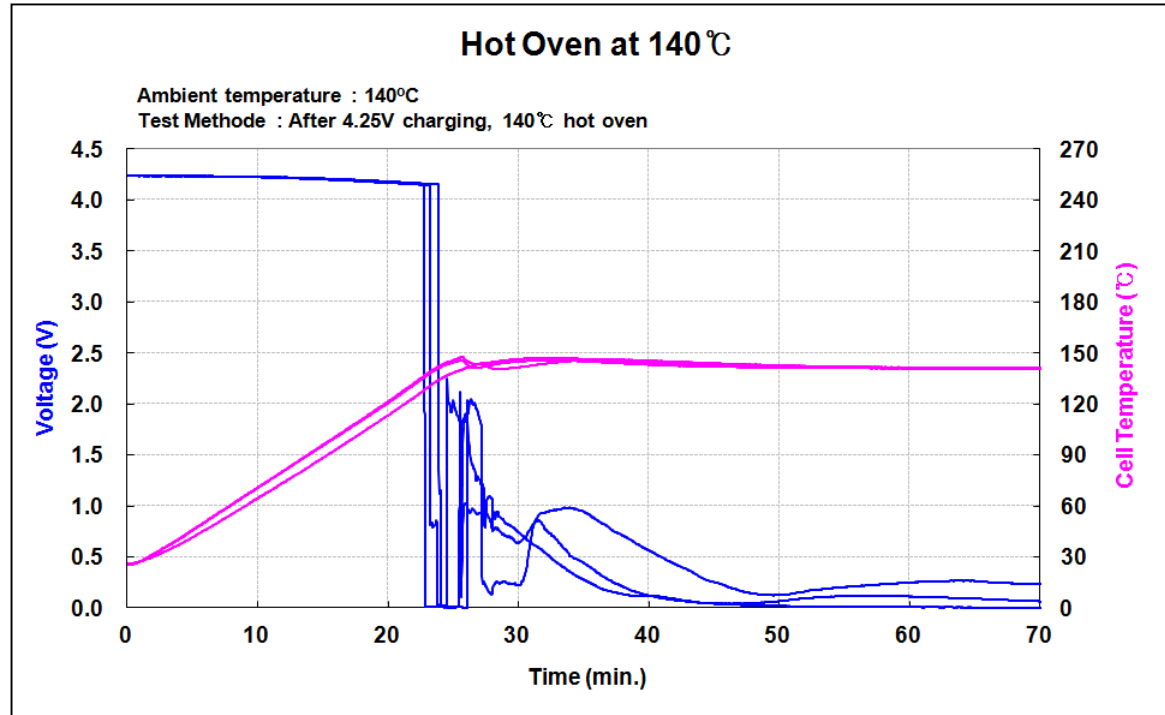
Cell	Results	CID open time	Max. temp.
1	L1	9.76	119.0
2	L1	9.40	122.9
3	L1	9.70	128.4
Avg.		9.62	123.4

# Safety test \_ Short circuit



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

# Safety test \_ Hot oven(140°C)



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

# Safety test \_ Impact



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



**- Thank you -**



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