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# Introduction of INR18650-30Q

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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

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Type	Spec.(Tentative)	Typical INR18650-30Q
Chemistry	NCA	NCA
Dimension (mm)	Diameter	$18.33 \pm 0.07$
	Height	$64.85 \pm 0.15$
Weight (g)	Max. 48.0	45.6
Initial IR (mΩ AC 1kHz)	≤ 18	$13.13 \pm 2$
Initial IR (mΩ DC (10A-1A))	≤ 30	$19.94 \pm 2$
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
	Rapid (min), 4A	70min
Charge Current	Standard current (A)	1.5
	Max. current (A)	4.0
Discharge	End voltage (V)	2.5
	Max. cont. current (A)	15
Rated discharge Capacity	Standard (mAh) (0.2C)	3,000
	rated (mAh) (10A)	2,700
		3,040
		2,983

# Capacity \_ 0.2C vs. 10A

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## ▪ 0.2C capacity

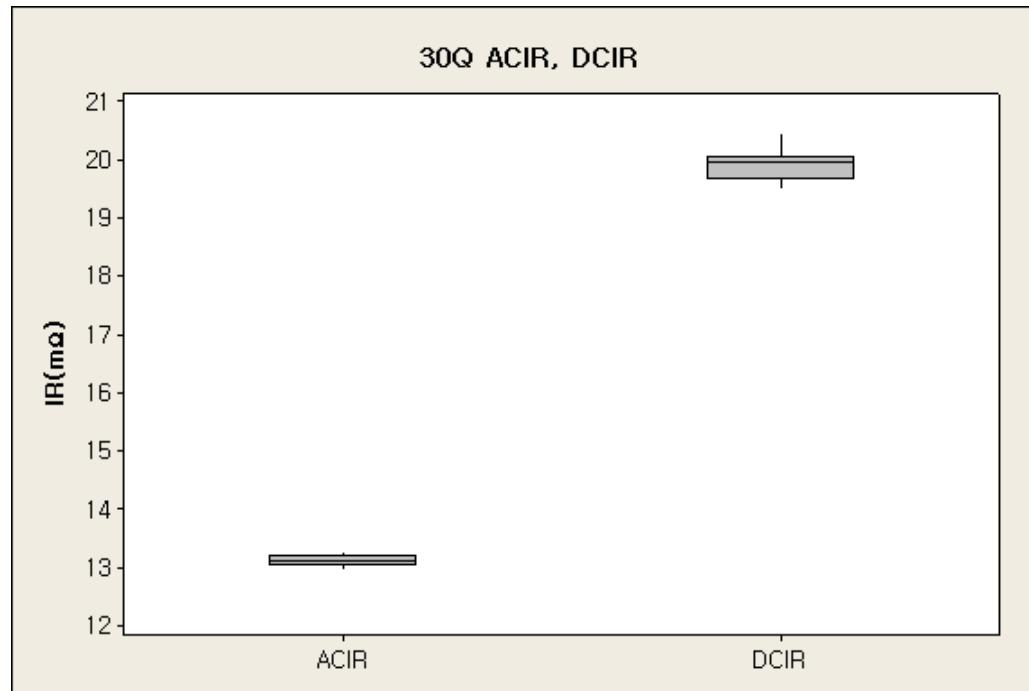
Cell	Capacity(Ah)	Energy(Wh)	Avg. volt(V)
1	3.041	11.0	3.61
2	3.043	11.0	3.61
3	3.035	11.0	3.61
Avg.	<b>3.040</b>	<b>11.0</b>	<b>3.61</b>

## ▪ 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

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AC-IR

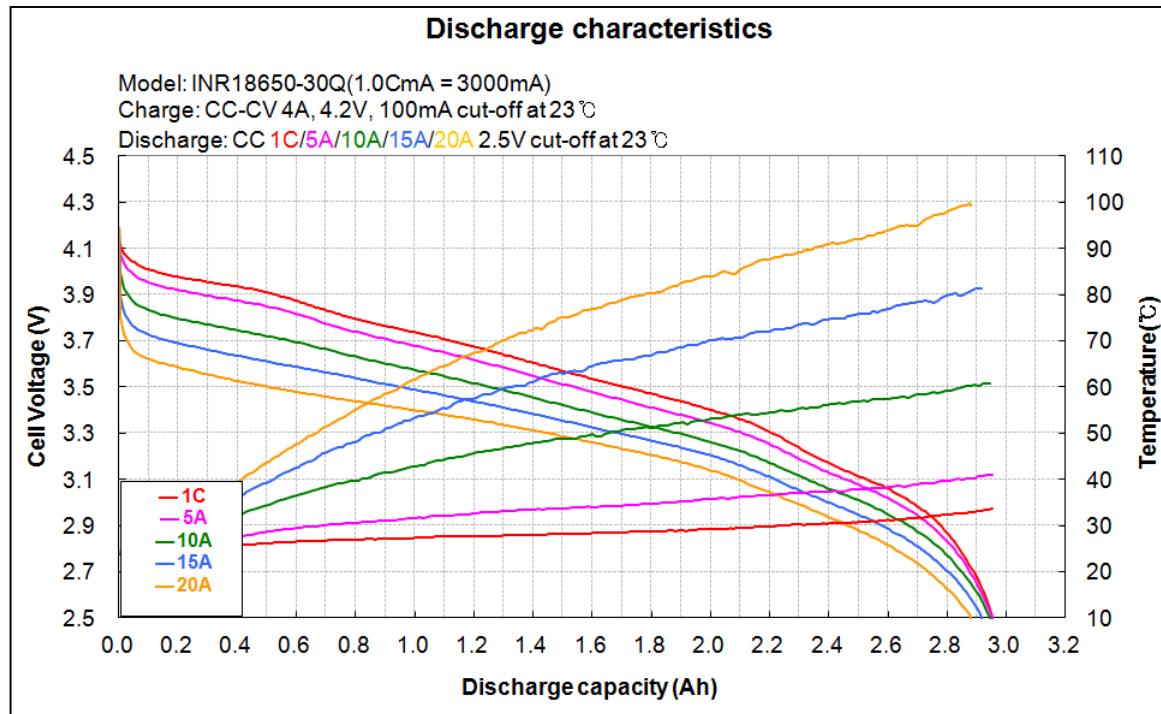
$13.13 \pm 2\text{m}\Omega$

DC-IR

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

# Capacity & Temperature vs. discharge capacity

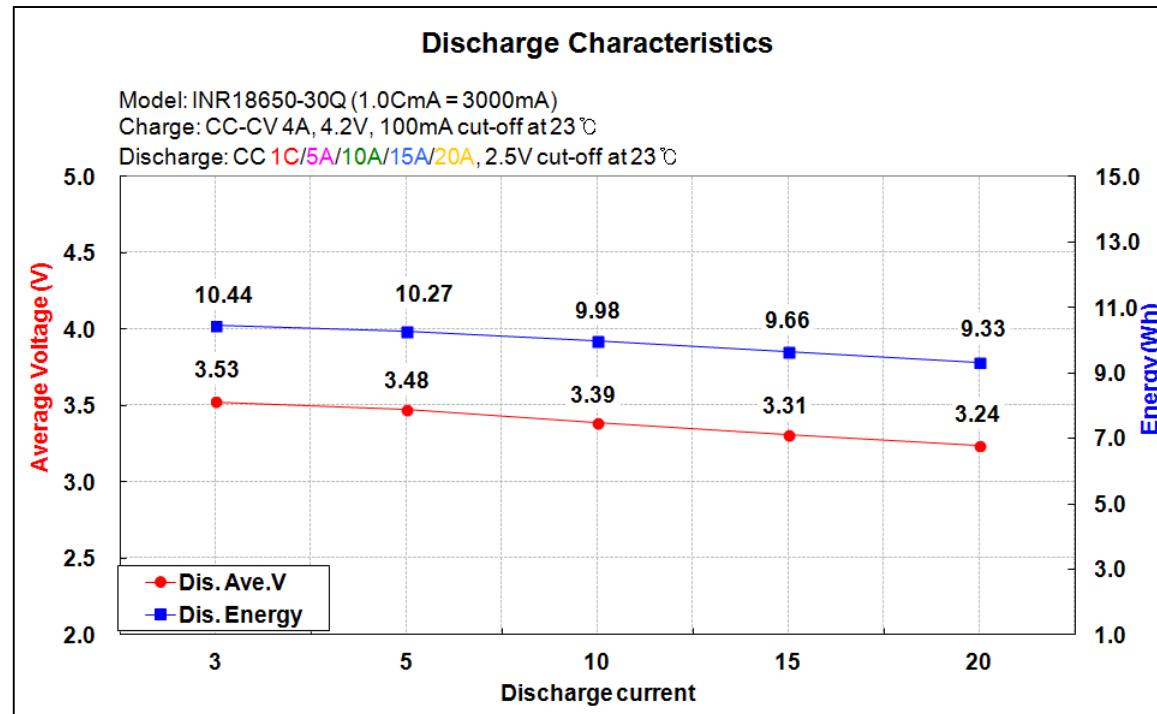
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Discharge current					
	1C	5A	10A	15A	20A
Capa.(Ah)	2.953	2.950	2.945	2.917	2.879
Temp.(°C)	33.7	41.0	60.9	81.2	99.4
Time(min.)	59.1	35.4	17.7	11.7	8.6

# Energy & Avg. voltage at different current

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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

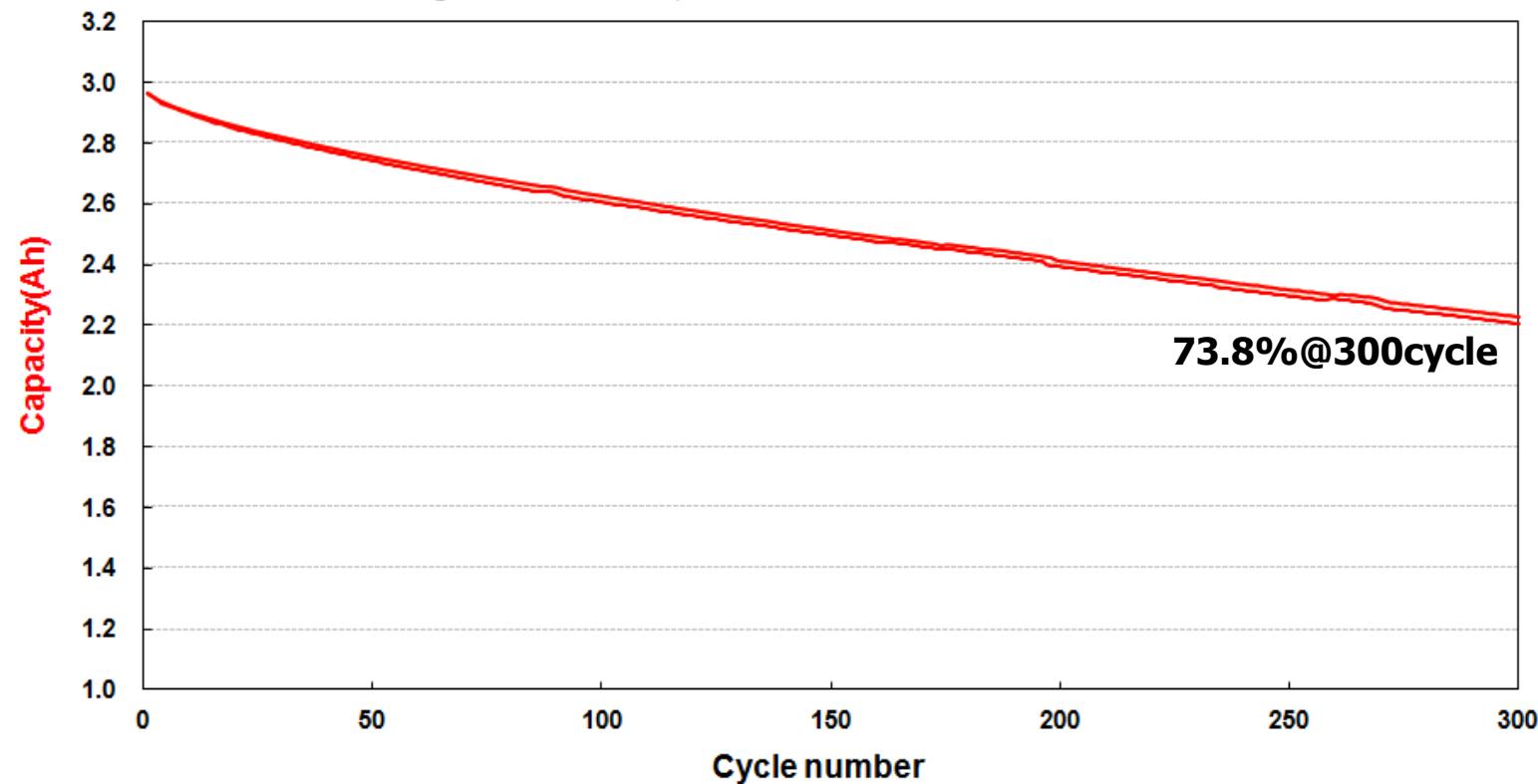
# Cycle life \_ 15A cycle

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## 15A discharge cycle life of 30Q

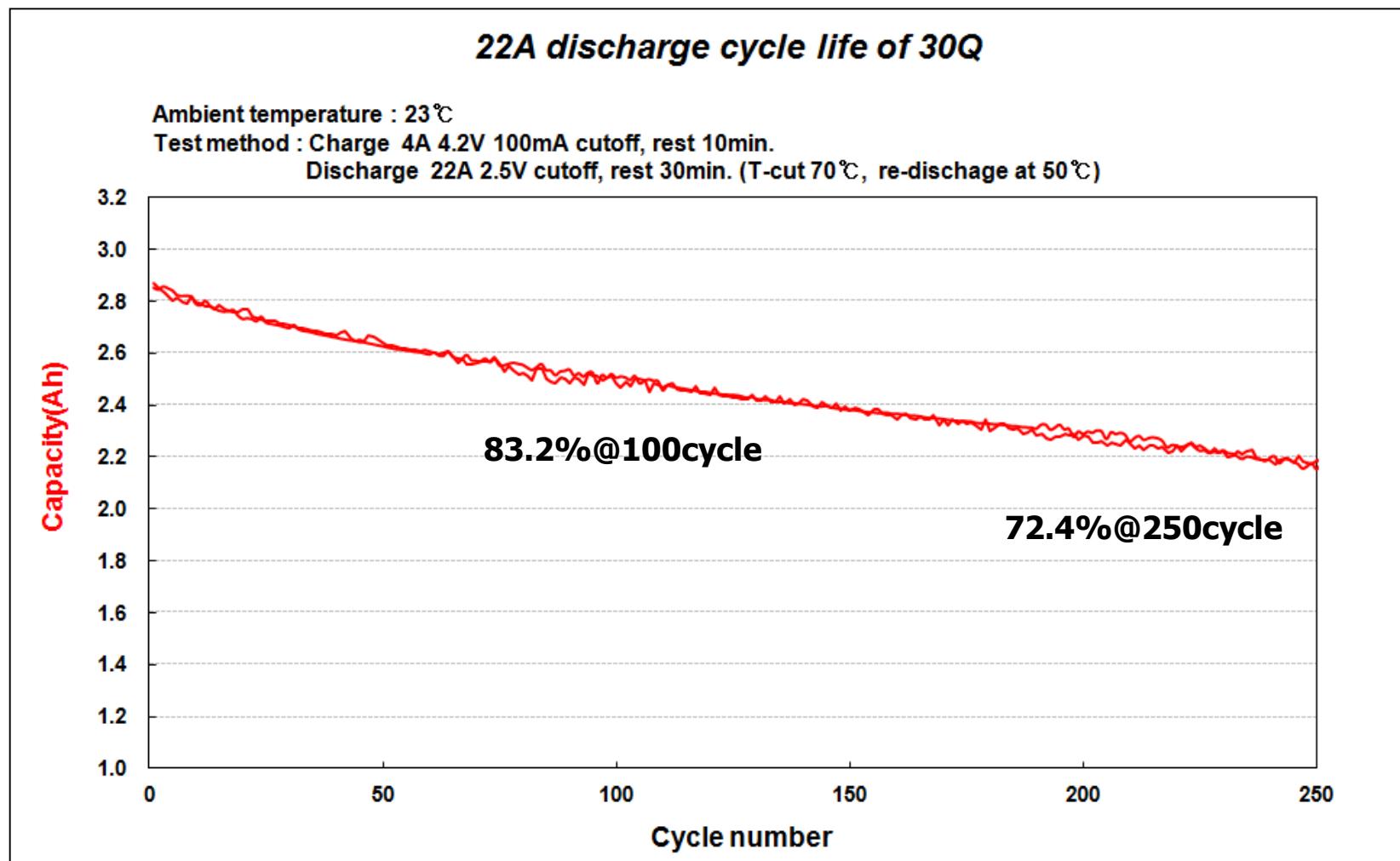
Ambient temperature : 23°C

Test method : Charge 4A 4.2V 100mA cutoff, rest 10min.  
Discharge 15A 2.5V cutoff, rest 30min.



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

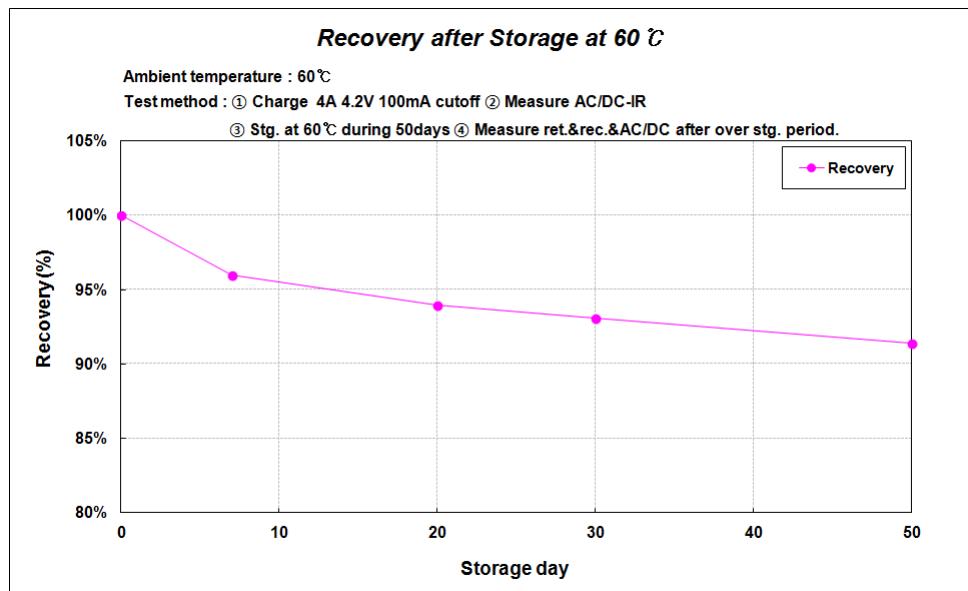
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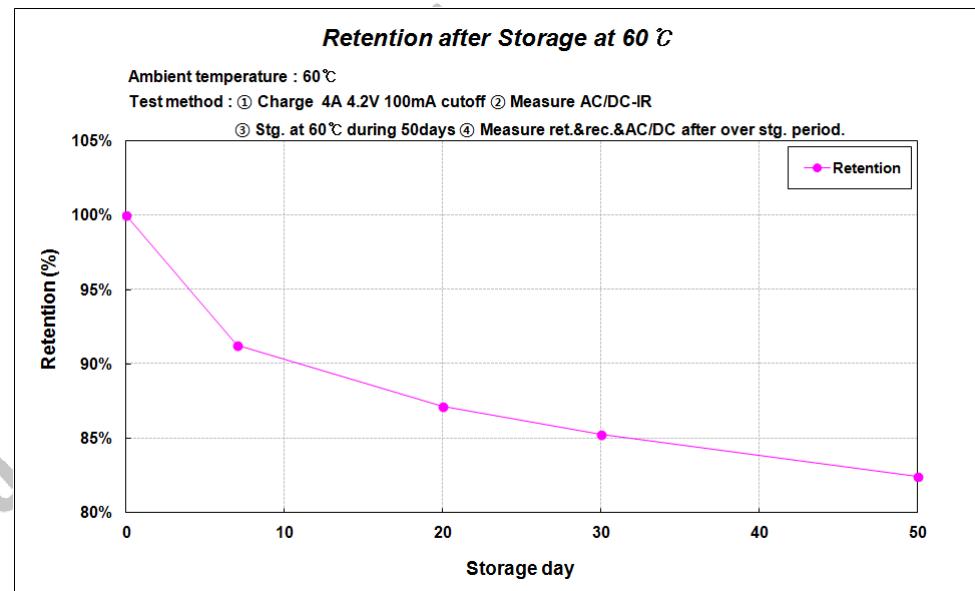
# Storage at 60 °C

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## ▪ Recovery



## ▪ Retention

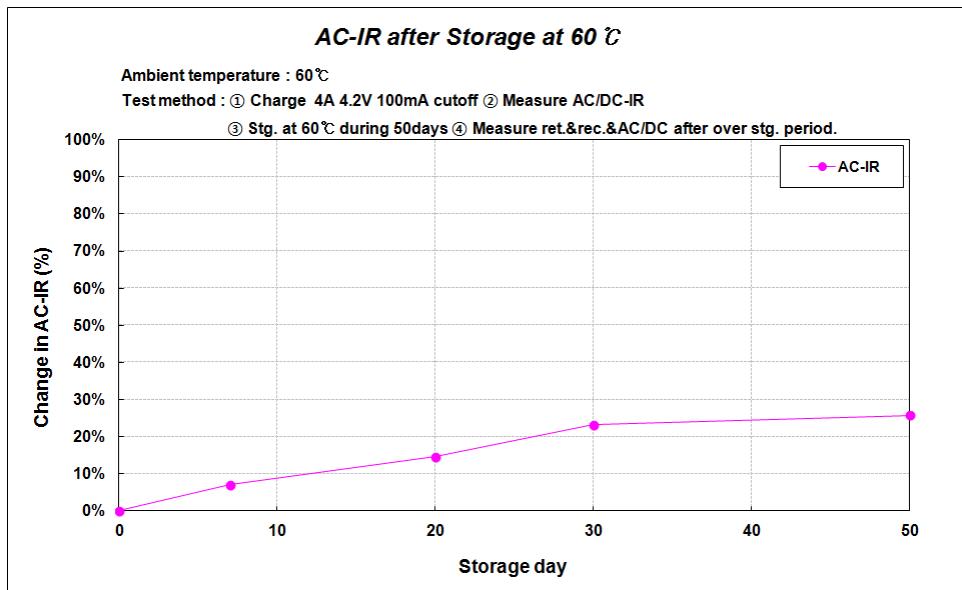


storage day	initial			after storage				Ratio(%)			
	ACIR	DCIR	Capacity	ACIR	DCIR	Retention	Recovery	ACIR	DCIR	Retention	Recovery
7	13.2	20.0	2.981	14.2	27.0	2.720	2.862	7.2	35.1	91.3	96.0
20	13.2	19.9	2.986	15.1	31.9	2.604	2.807	14.7	60.5	87.2	94.0
30	13.1	20.2	2.990	16.1	34.7	2.550	2.783	23.2	72.0	85.3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

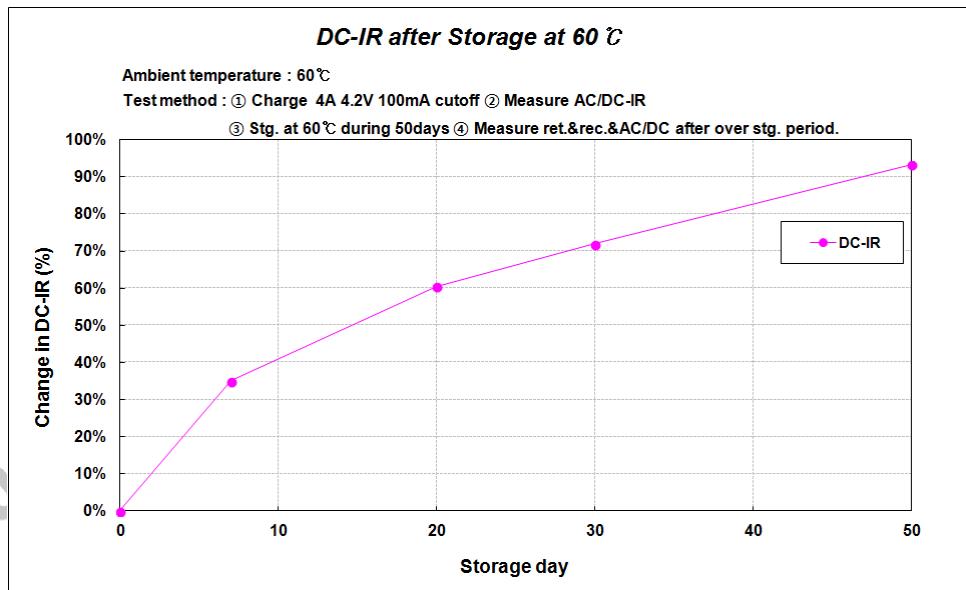
# Storage at 60 °C

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## ▪ 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

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

Level 0  
•No change

Level 1  
•Leak

Level 2  
•Smoke, < 200 °C

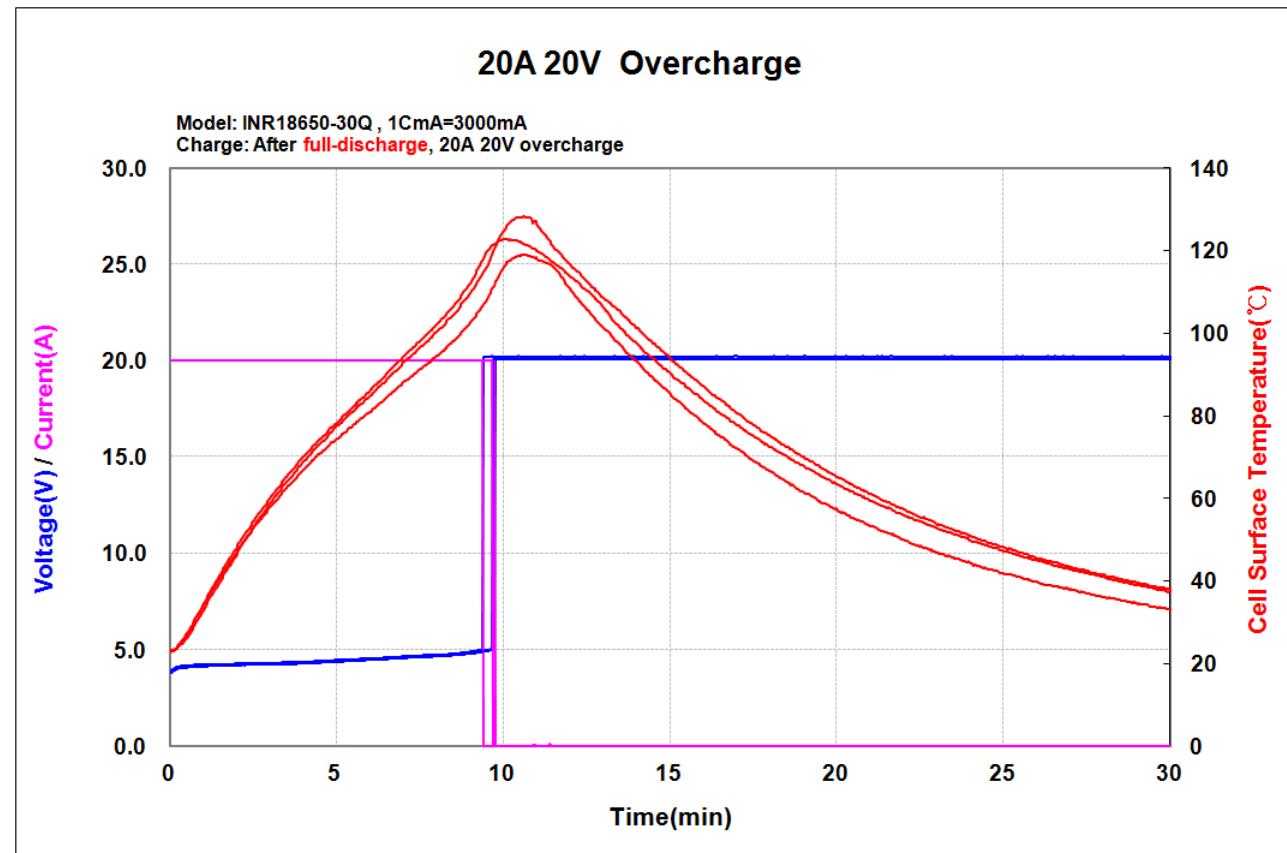
Level 3  
•Smoke, > 200 °C

Level 4  
•Fire

Level 5  
•Explosion

# Safety test \_ Overcharge

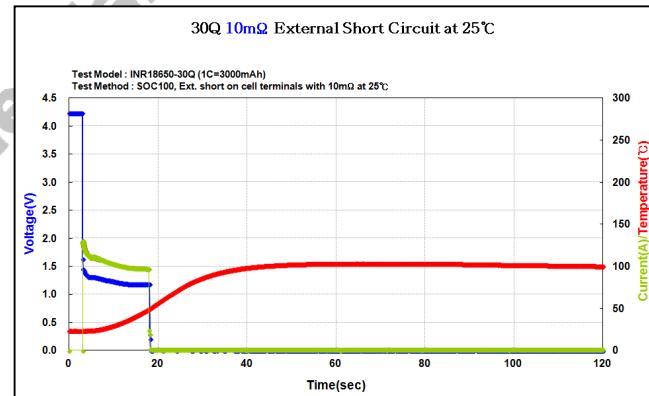
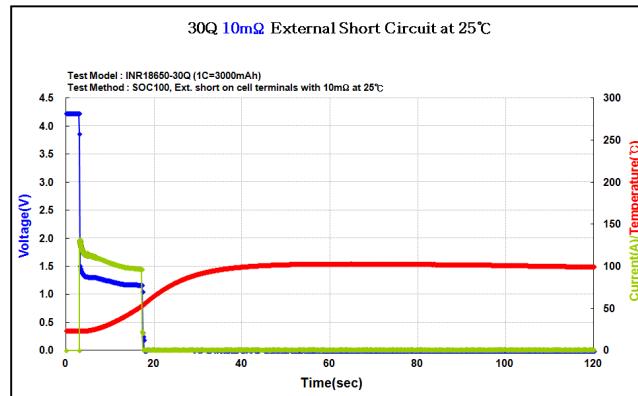
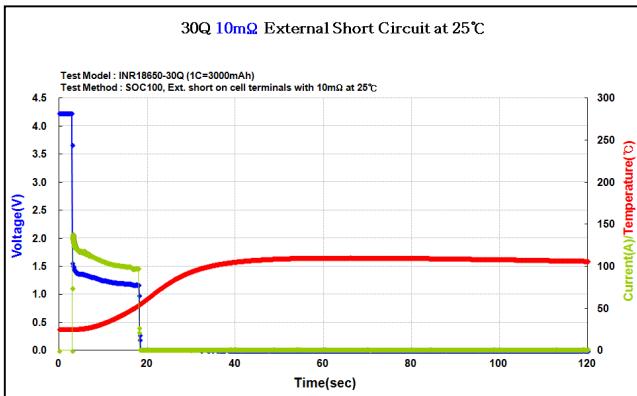
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Cell	Results	CID open time	Max. temp.
1	L1	9.76	119.0
2	L1	9.40	122.9
3	L1	9.70	128.4
Avg.		9.62	123.4

# Safety test \_ Short circuit

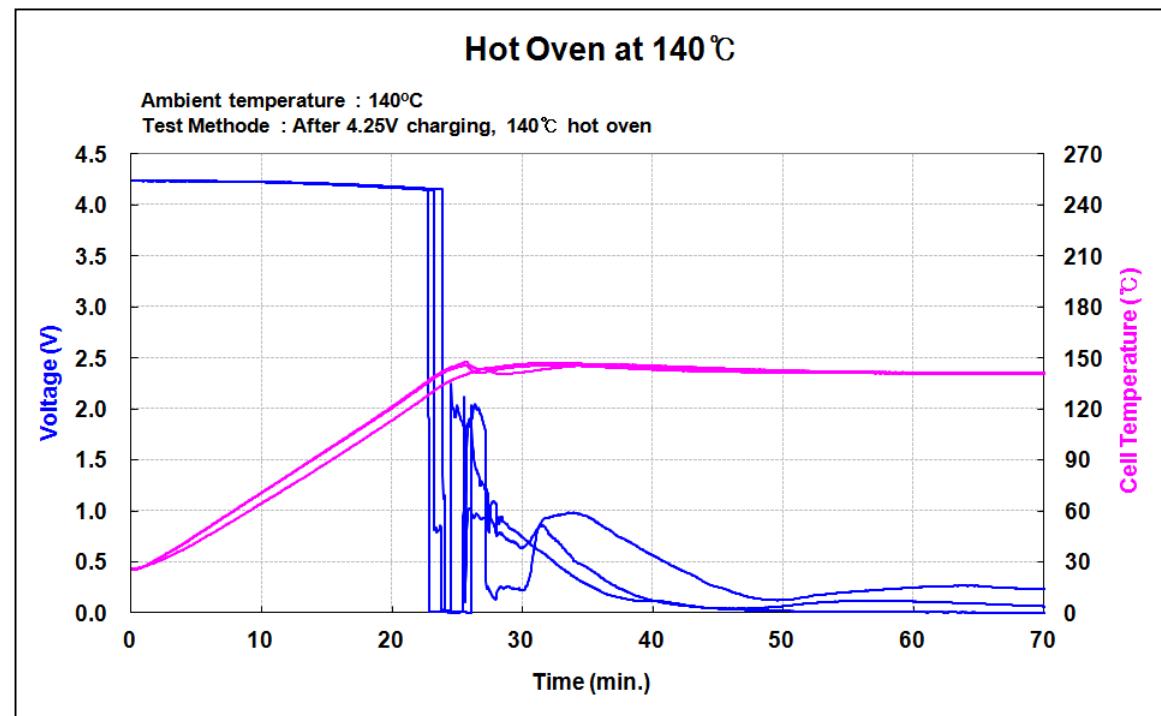
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Cell	Results	Max. current (A)	Max. temp.(°C)
1	L1	138	111
2	L1	132	104
3	L1	130	103
Avg.		133	106

# Safety test \_ Hot oven(140 °C)

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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

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

- Thank you -



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