## 5 é / Descriptions

( 8 ) 2 * @ 8 ©%² . Ä å 3 5 9 , + : % -eO P ‘ / Ìož ¥ / Ì À Ä ³ o z ô y ³ o z Š Ä å 3 5 9 , + :ož ¥ / Ì Ä - 9o• - vo• y 9o• y vo• ½o• ? è ˆ _ ¾ ‘ ˆ k G ‘ / ¶ k ä | ª W •ož

( 8 ) 2 * @ 8 J * , 4 ˜ ( 2 / x kÙ Q ¬ }%² Š y%² k• â ¿ • l kW • ¶ U ´ož

## ¤ ª / Features

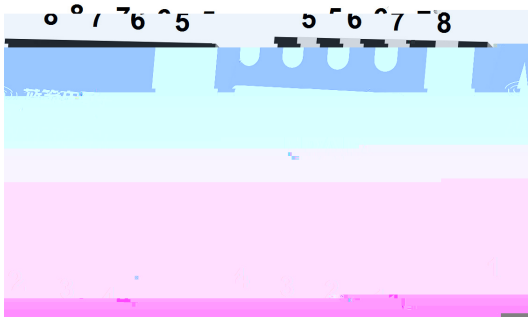
‹ Ä å S S 3 5 9 , + : z
‹ * , 4 ˜ ( 2 / x z
‹ Ä å “ ‘ z
‹ M y y ‘ z
‹ Ý 4 ² Á v v ' z
‹ Ý 4 g 2 v v '
‹ —)í D }ož

## Ð ÷ / Applications

% -eO Y ÿ U - P Á k % -eO ü ` Ò U - P Áož
9 O T M R K R O Z N O [ S O U T X K I N G X M K G H R K HRG_ZSZKKXX_X KVIGNIGQX MYKOGTHMRRKK HRGOZZZ

## À ¹ € Ð Ô · ¢

h Þ y Š 8 P < Š › Q 4 Q 4 ) P < › [ , k N / e / Ì Ü ¬ t k / Ì 3 o W •ož ò ç P } µD k Š 8 À 1ož



| – ÚZ<br>6OT 4[SHKX6OT 4GSK | – df | – ª¢<br>6OT *KYIXOVZOUT |
|---|---|---|
| | VDD | › € |
| | -4* | /Ìª kN P/¿â |

<3

## Ã a ? d / Absolute Maximum Ratings(Ta=25 ; )

| @ ƒ/Parameter | … Z/Symbol | ƒ › /Value | % y/Unit |
|---|---|---|---|
| $V_{DD}$ input pin voltage | $V_{IN}$ | -0.3 to +8 | V |
| $V_{VM}$ input pin voltage | $V_{VM}$ | -8 to +10 | V |
| Maximum Junction Temperature | $T_J$ | -40 to +145 | |
| Storage Temperature | $T_{stg}$ | -55 to +145 | |
| ESD g HBM Mode h | ESD | f 4000 | V |

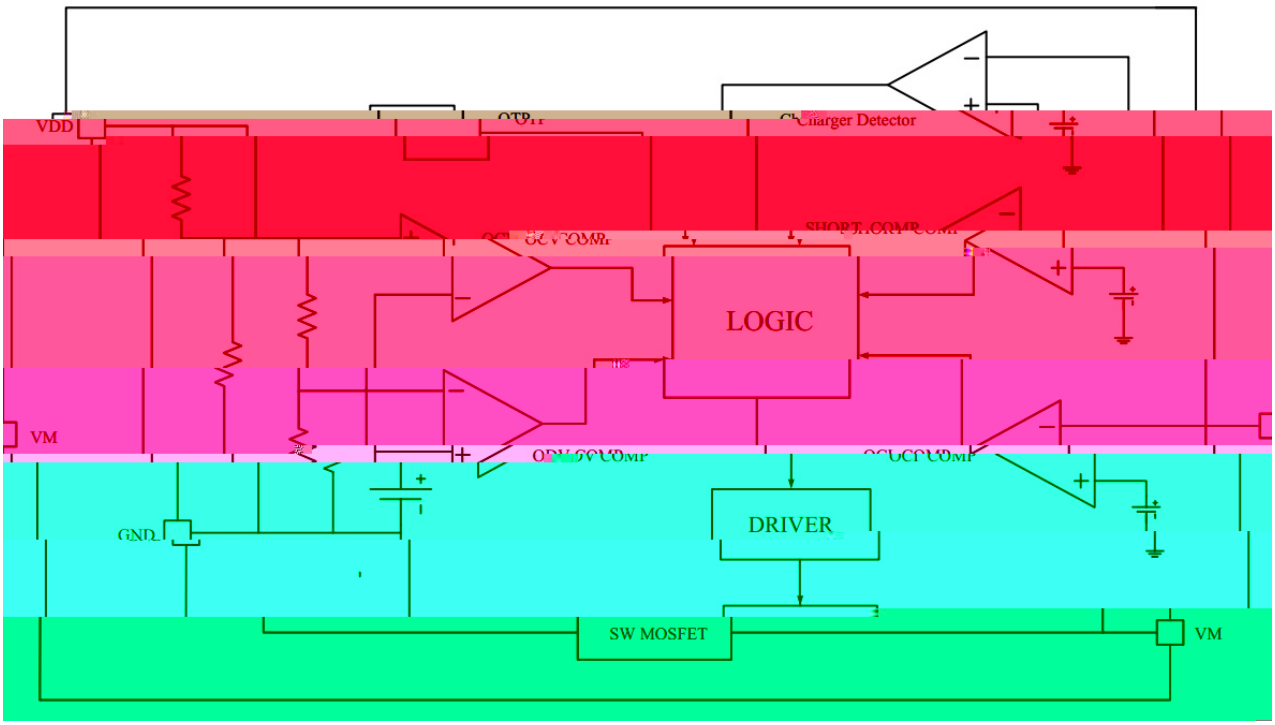
## Ô4ì × ? d / Electrical Characteristics( Unless otherwise specified,Ta=25 ; )

| @ ƒ<br>Parameter | … Z<br>Symbol | y ¡ Ú ^<br>Test Condition | Â 4 ›<br>Min | Á º ›<br>Typ | Â Ý ›<br>Max | % y<br>Unit |
|---|---|---|---|---|---|---|
| Power supply | | | | | | |
| Supply Voltage | $V_{DD}$ | | 0 | | 6 | V |
| Charger input voltage | $V_M$ | | -6 | | 6 | V |
| Detection voltage | | | | | | |
| Overcharge Detection Voltage | $V_{OCV}$ | | 4.25 | 4.3 | 4.35 | V |
| Overcharge Release Voltage | $V_{OCR}$ | | 4.04 | 4.10 | 4.16 | V |
| Overdischarge Detection Voltage | $V_{ODV}$ | | 2.30 | 2.40 | 2.50 | V |
| Overdischarge Release Voltage | $V_{ODR}$ | | 2.90 | 3.00 | 3.10 | V |
| Detection current | | | | | | |
| Overdischarge Current Detection | $I_{OCI}$ | | 9 | 11.5 | 14 | A |
| Load Short-Circuiting Detection | $I_{SHORT}$ | | 15 | 25 | 35 | A |
| Overcharge Current Detection | $I_{CHA}$ | | 7 | 10 | 13 | A |
| Static current | | | | | | |
| Current Consumption in Normal Operation | $I_{OPE}$ | $V_M$=0V | | 3.5 | 7 | A |
| Current Consumption in Dormancy | $I_{PDN}$ | $V_{DD}$=1.8V | | 0.6 | 1.5 | A |
| Pull-up and Pull-down Current from VM | | | | | | |
| Internal pull-up current | $I_{PU}$ | | | 14 | | A |
| Internal pull-down current | $I_{PD}$ | $V_M$=1V | | 14 | | A |
| Equivalent FET on Resistance | | | | | | |
| Equivalent FET on Resistance | $R_{DS}$ | $I_{VM}$=1A | 12.5 | 16 | 18 | m |

## Ô4ì × ? d / Electrical Characteristics( c , ¤ ï g Ta=25 ; )

| @ ƒ<br>Parameter | … Z<br>Symbol | y ¡ Ú ^<br>Test Condition | Â 4 ›<br>Min | Á º ›<br>Typ | Â Ý ›<br>Max | % y<br>Unit |
|---|---|---|---|---|---|---|
| Over temperature protection | | | | | | |
| Over-temperature protection | OTP | | | 145 | | |
| Over-temperature protection release temperature | OTPR | | | 120 | | |
| Detection delay | | | | | | |
| Overcharge Voltage Detection Delay Time | $T_{OCV}$ | | | 100 | | ms |
| Overdischarge Voltage Detection Delay Time | $T_{ODV}$ | | | 100 | | ms |
| Overdischarge Current1 Detection Delay Time | $T_{IOV1}$ | | | 8 | | ms |
| Overdischarge Current2 Detection Delay Time | $T_{IOV2}$ | | | 2 | | ms |
| Load Short-Circuiting Detection Delay Time | $T_{SHORT}$ | | | 150 | | ms |

## × ä ¢ Functionl Block Diagram



## × 5 é Functional Description

## ¬ Ô — ó Z Charger Detection

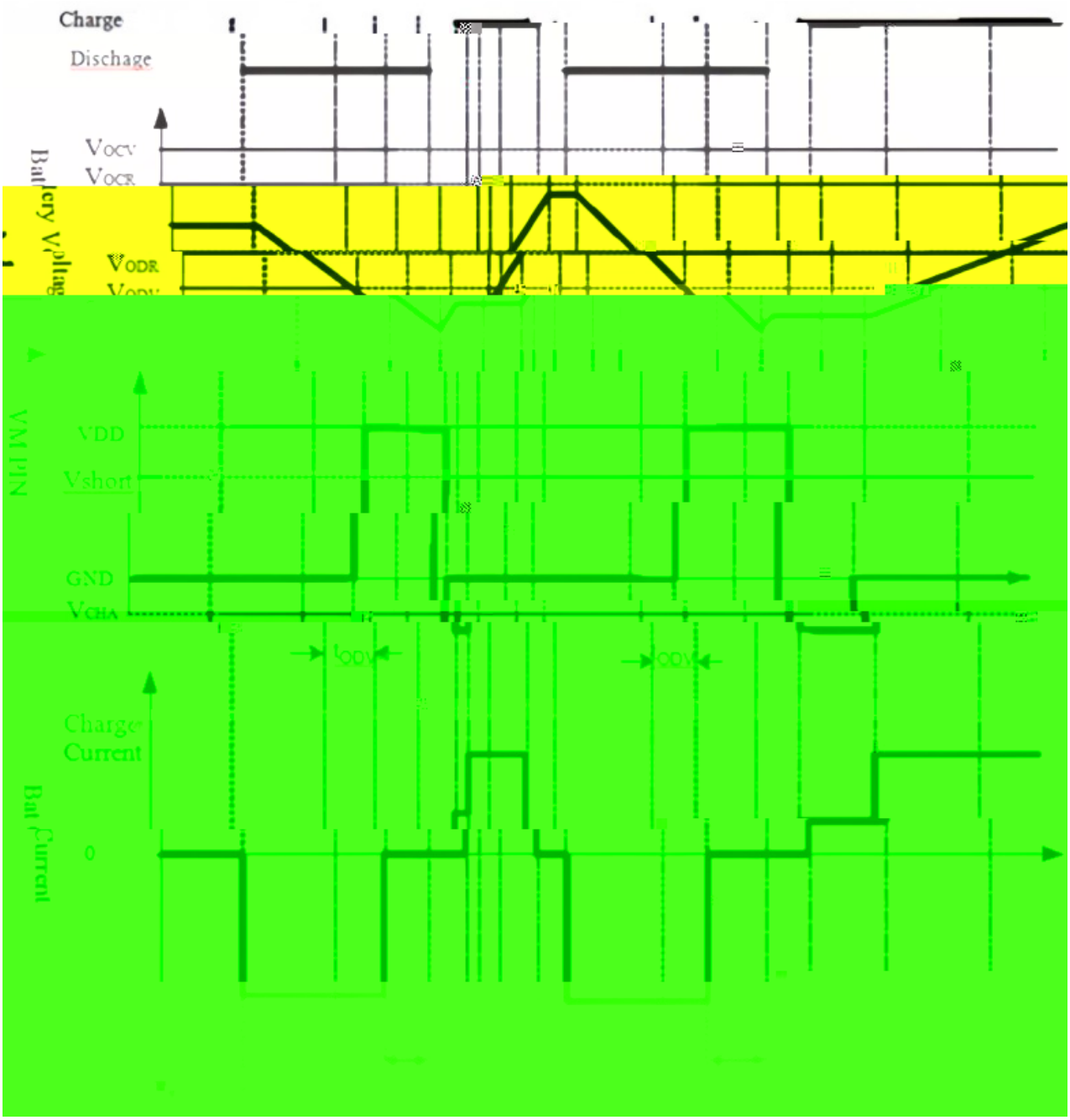
¢ Ô 9 y Ù Á P y - ˜ , k 3 < 3 ' 9 4 9 ˆ 9 - ˜ y 9 < ). ' k ¢ P 9 Ý 9 ˆ 9 y y 9 < 5 * < k ( 8 ) 2 * @ 8 1 K y y Ù Áož

## < Ô 1 ¬ Ô × 0V Battery Charging Function

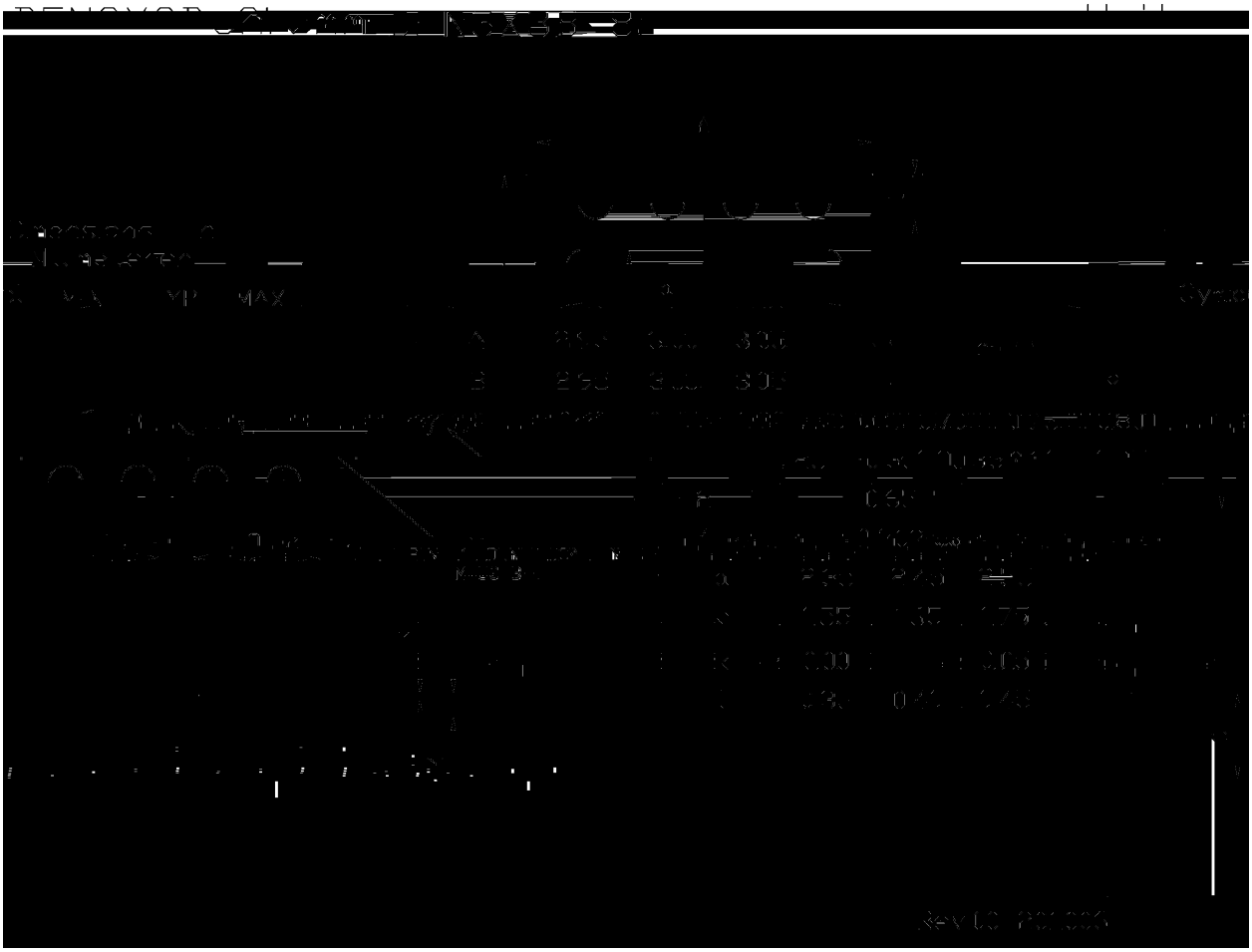
U Y < - k P 9 z 9 < k - / Ì µ g 2 Ù Á k 4 ž 3 5 9 • • k / Ì * } 8 â ' - ož P 9 z 9 < k - v Ý 9 S ' k Y ² P y / Ì C °ož

## • } ¢ Timing Chart

Ú Z ` ¬ Ô ` n V € Overdischarge ` Charging ` Normal Operation.



## Ø ¤ = ) ¢ / Package Dimensions



## , M y ƒ / Marking Instructions

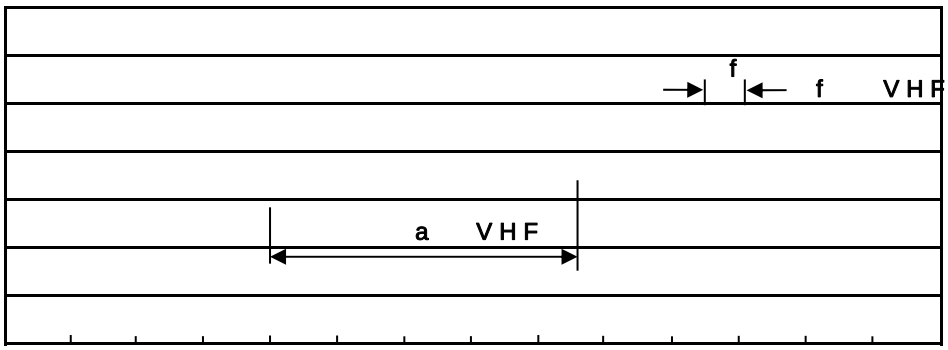
ª ¢ y

( 8 y , [ W A

* y º Z W A

y ÿ D Z W A k š ÿ D Z J

## š WD t … • Ž ¢ ( x / ) / : K S V K X G Z [ X K 6 X U L O R K L U X / 8 8 K L R U ] 9 U R J K X O T M 6




ª ¢ y

1o• Ä ½ “ † 150 ½180 - k ž • 60 ½90sec;

2o• Q › “ † 245 r5 - k ž • 4 Ò 5 r0.5sec;

3o•D N ò i Ò 0 , † 2 ½10 - /sec.

Note:

1.Preheating:150~180 - , Time:60~90sec.

2.Peak Temp.:245 r5 - , Duration:5 r0.5sec.

3. Cooling Speed: 2~10 - /sec.

## ÂD /Cã p ¯ » ] / Resistance to Soldering Heat Test Conditions

“ † y 260 r5 - ž • y 10 r1 sec. Temp.:260±5 Time:10±1 sec

## G P á / Packaging SPEC.

2 & x / REEL

| Package Type 7>û ˜ E | Units ;>û ¦H | | | | | Dimension ;>û p . (unit ÆEmm³) | | |
|---|---|---|---|---|---|---|---|---|
| | Units/Reel / -- | Reels/Inner Box -- /- | Units/Inner Box /- | Inner Boxes/Outer Box - /1ç | Units/Outer Box /1ç | Reel | Inner Box× | Outer Box1ç |
| DFN3×3B-8L | 5,000 | 2 | 10,000 | 6 | 60,000 | 13 s ×12 | 360×360×50 | 380×335×366 |

## „ Ð y ƒ / Notices

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