

5 é / Descriptions

(8)2 * @ 8 ©%² . Ä å 3 5 9 , + : % -eO P ' / òž ¥ / Ì Ä Ä³ o z ô y³ o z Š
 Ä å 3 5 9 , + : ož ¥ / Ì Ä - 9o• - vo• y 9o• y vo• ½o• ? è ^ _ ¾ ' ^
 k G ' / ¶ k ä |ª W • ož
 (8)2 * @ 8 J * , 4 ~ (2 / x k Ù Q - } %² Š y %² k • â ç • I 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 4² Á v v ' z
- < Ý 4 g 2 v v ' z
- < —) í D } ož

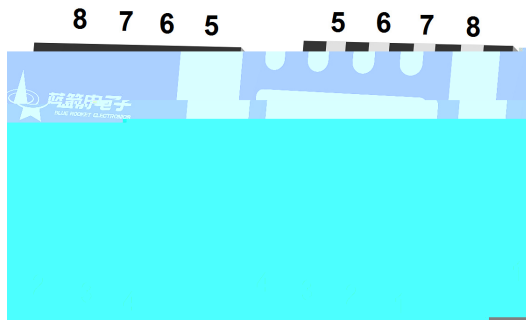
Ð ÷ / Applications

% -eO Y ÿ U - P Á k % -eO ü ` Ò U - P Á ož
 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 H R G _ Z S Z K X X X K / I C I C X M K G H M R K K H R G Z Z

À¹ € Ð Ô • ¢

h P 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 } µ D k Š 8 À 1 ož

• Ú - æ / Pinning



- Ú Z	- df	- a ϕ
6 OT 4 [SHKX6 OT 4 GSK		6 OT *KYIXOVZOUT
	VDD	› €
	- 4 *	/ ì ^a kN P / ÿ â
	< 3	- ~ ÿ 9 N µ €
+ 6' *	- 4 *	/ ì ^a kN P / ÿ â

, M V / Marking

- - ~^a ϕ ož

See Marking Instructions.

Absolute Maximum Ratings(Ta=25 ;)

@ f/Parameter	... Z/Symbol	f › /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

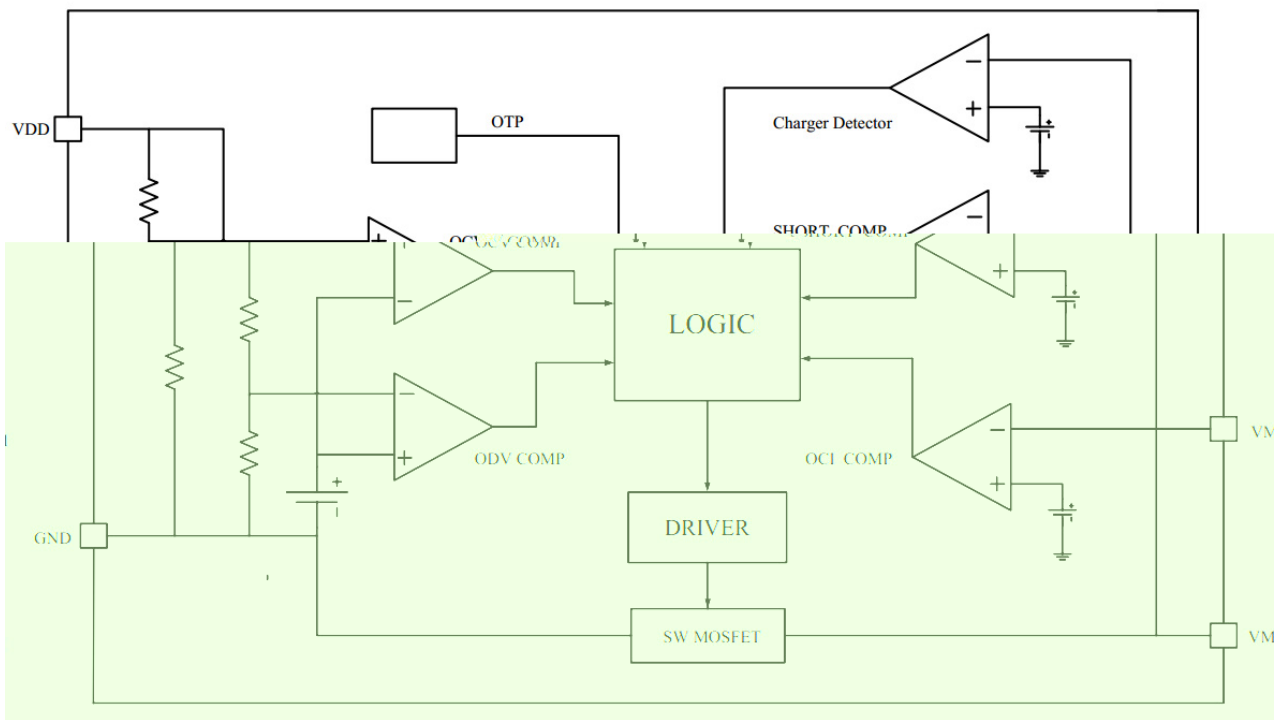
Electrical Characteristics(Unless otherwise specified,Ta=25 ;)

@ f Parameter	... Z Symbol	y j Ú ^ Test Condition	Â 4 › Min	Á ° › Typ	Â Ý › Max	% y 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

Electrical Characteristics ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Test Condition	Min	Typ	Max	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

Functional Block Diagram



x 5 é Functional Description

(8)2 * @ 8!O P 9y vkw* ••- ~êñ ĵ úkŮ' %-U- eO P k
œ - 9o• y 9o• y vYC?è^ŌÑòC°ož? C...U- PW•"6 8
Äož ¥ / ÌN -%²h, ÛN y%² ÛN Šk359, +:]Ä å k ^ | Š Á °, S Sož
(8)2 * @ 8u4š_ g% "y3oW•% "o•- W•% "o•y W•% "yg2W•% "ož

n V € " Normal Operating mode

òçZÄ yñ`~'oŌÑk- yy iC1 ôEk _ŌÑf 3oW•% "ož

Ú - Ô 85Š Đ Overcharge Voltage Condition

"3oÚ^ - i kç P 9ä9 - y 9 < 5) < kw4Ōž• ñ - 9 y•
ž• : 5) < ê ¾ x k(8)2 * @ 81Oò359, +: Y 2- ož _ŌÑf - 9ŌÑožòç'
oŌÑ" - 9 y• ž• : 5) < Äf å k @ Ī1 •ož Y _ŌÑ k - 9ŌÑ1tKyy
o• - ~ NŌÑ k < 3€ 9z9- ~ y 9 <) . k P 9J - Ky 9 < 5) 8 ož
o• - ~ ì NŌÑ k P 9J - y 9 < UI \ ož ç - ~ ì t Nžk 9QÀ
ä9 - y 9k P1* ÄB8â'y ož

Ú - Ô W5Š Đ 5 \ K X I N G X M K) [X X K T Z) U T J O Z O U T

"- W•% " kòç v ›Ý /) . w4Ō%² < ž• : 5) / ê ¾ x k / Ì1Oò359, +: Y
2- k _ŌÑtf - vŌÑož(8)2 * @ 814Ō!O vŮÁk N ĵ ú ê ñ - ~ •
•k / Ì1Ky - vŌÑož

Ú Z Ô 85Š Đ Overdischarge Voltage Condition

"3oÚ^ y i kç P 9J y y 9 < 5* < kw4Ōž• ñ y 9 y
• ž• : 5* < ê ¾ x k(8)2 * @ 81ä• Py ĵ ú NkY 2y ož _ŌÑtf y
9ŌÑož4žy Oò359, +: ••kÄB v'ø•ožç < ** 949^9 < Á °, k v
f ô 1'z g2ŮÁ v f ô / 6*4 _ŌÑtf g2ŌÑožç < ** 9^9 < Á °,
ê ¾ ä ž kg2Ů^1tKyož P 9Ý9^9 y yKy 9 < 5* 8 žk(8)2 * @ 81 › ñ 3
oW•Ů^ož

Ú Z Ô W5Š Đ Overdischarge Current Condition

òçy vÝ ì ›k 4Ōž•Ý9^9 y v y• ž•k Py ĵ ú 1t••ož ò
ç" y v y• ž•Äk vA' ì ›8 \$Äk @ Ī1 •ož / ÌÄB v < 3k
ç < 3 949ê^9 y v @ ð 9k y vŮÁ1tÖyož

Ž É -5Š Đ Load Short-circuiting Condition

3 < 3' 949^9?è' 9 < 9.58: k @ Ī1 2y Py ĵ ú N1••ož
: 9.58: @ ä• v ÂÝ• ž•ožç < 3 949ê^9 y v @ ð 9k ĵ ú?èŮÁ1tÖ
yož

Charger Detection

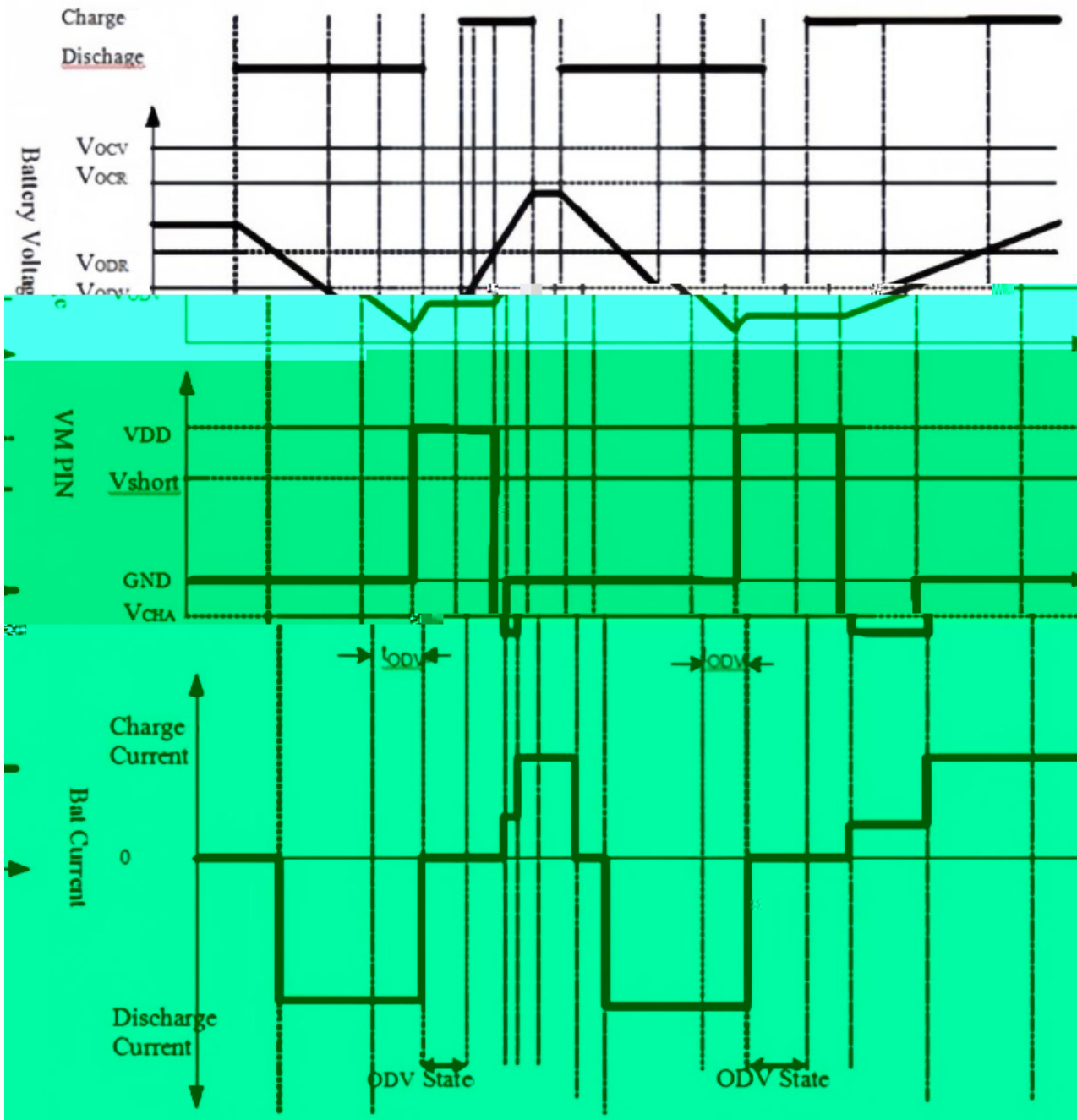
$\phi \hat{O} 9 y \hat{U} \hat{A} P y - \sim, k 3 < 3' 9 4 9 \hat{9} - \sim y 9 <$ $) . ' k \phi P$
 $9 \hat{Y} 9 \hat{9} y y 9 < \quad 5 \cdot < k (8) 2 \quad * @ 8 1 K y y \hat{U} \hat{A} o \hat{z}$

0V Battery Charging Function

$U Y < - k P 9 z 9 \quad < k - / \hat{i} \mu g 2 \hat{U} \hat{A} k 4 \hat{z} 3 5 9 \bullet \bullet k / \hat{i} * \} 8 \hat{a} ' - o \hat{z}$
 $P 9 z 9 \quad < k - v \hat{Y} 9 \quad S ' k Y ^ 2 P y / \hat{i} C ^ \circ \hat{o} \hat{z}$

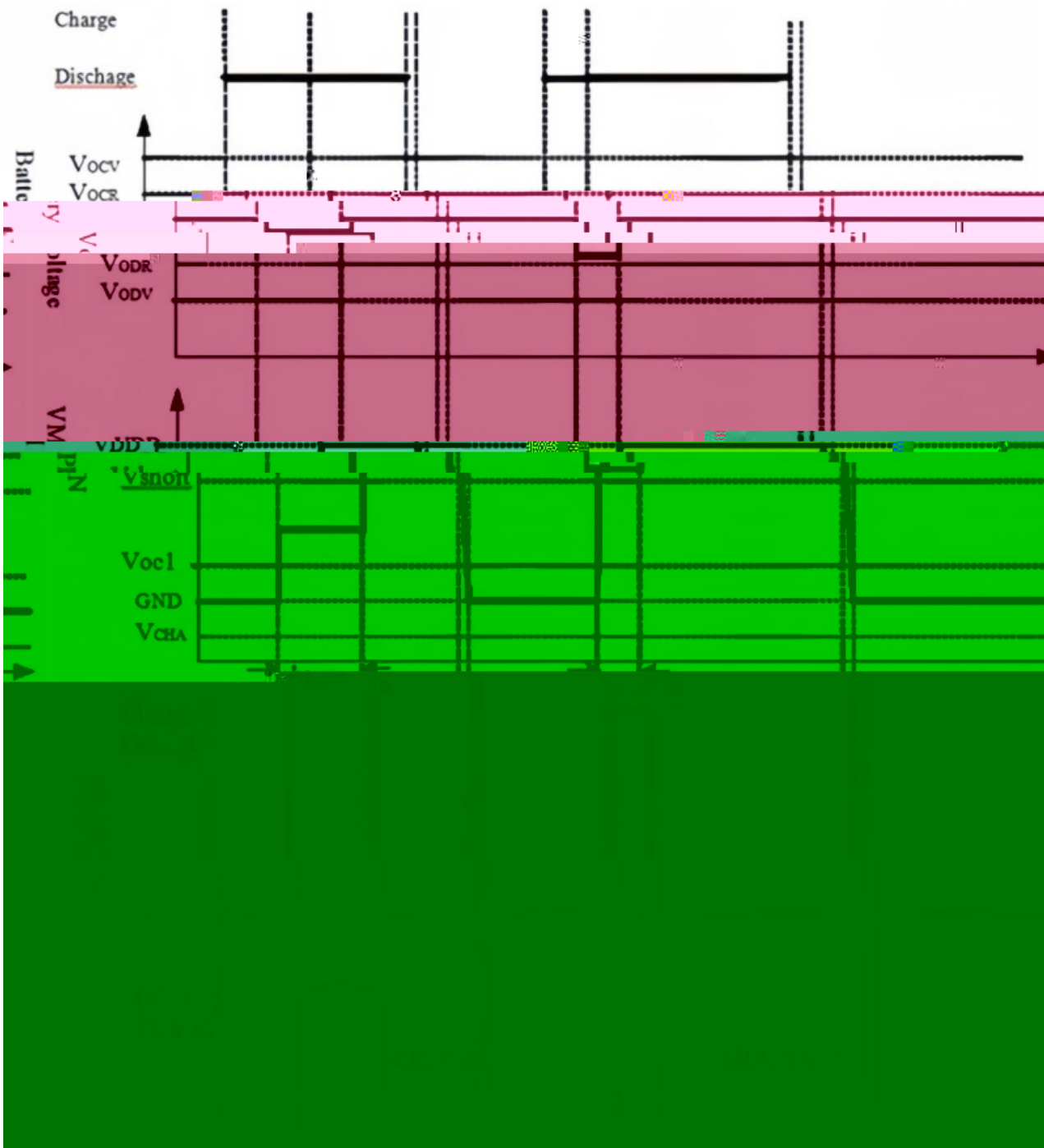
Timing Chart

Overdischarge Charging Normal Operation.

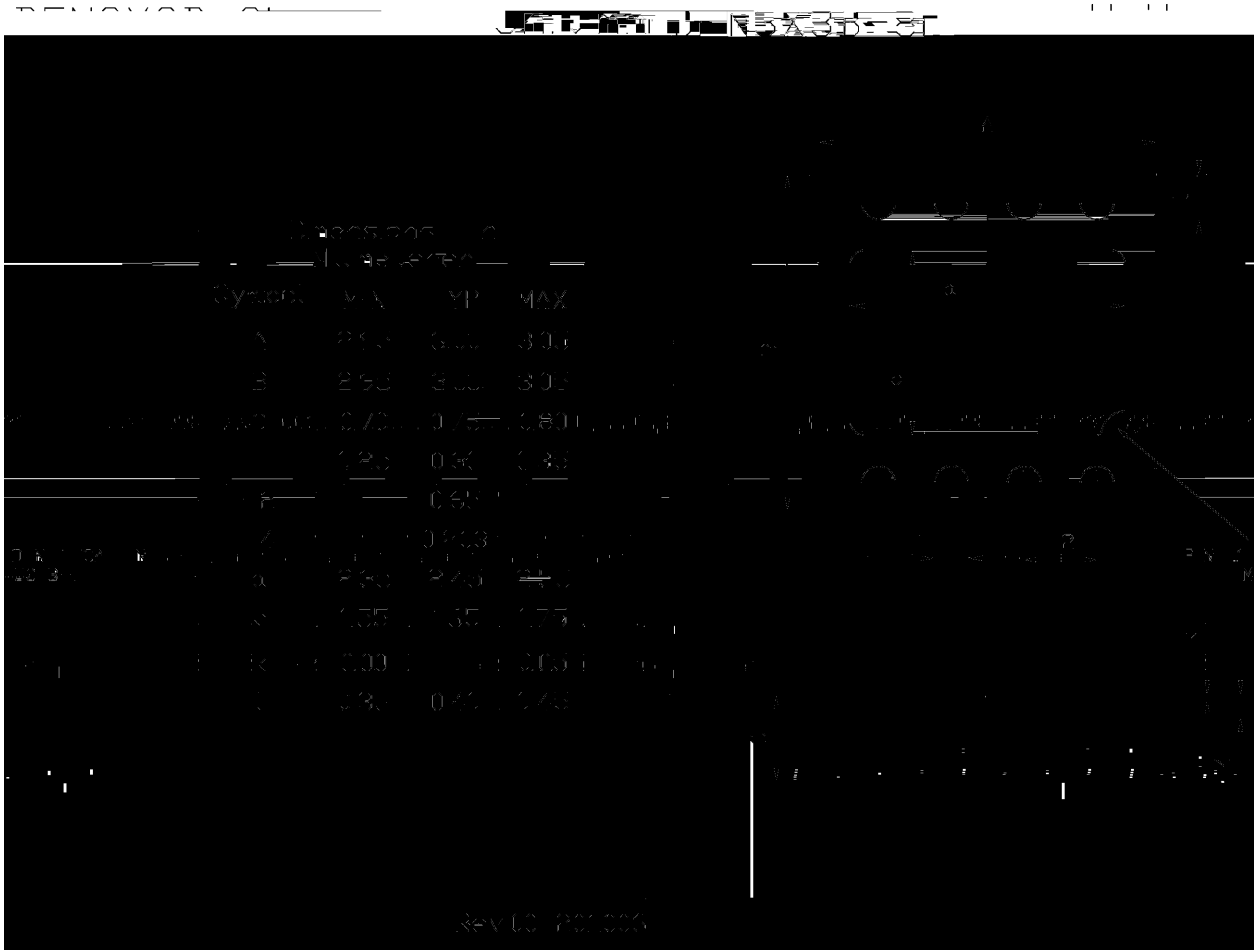


Timing Chart

Discharge Overcurrent Normal Operation.



Ø ≡) ϕ / Package Dimensions

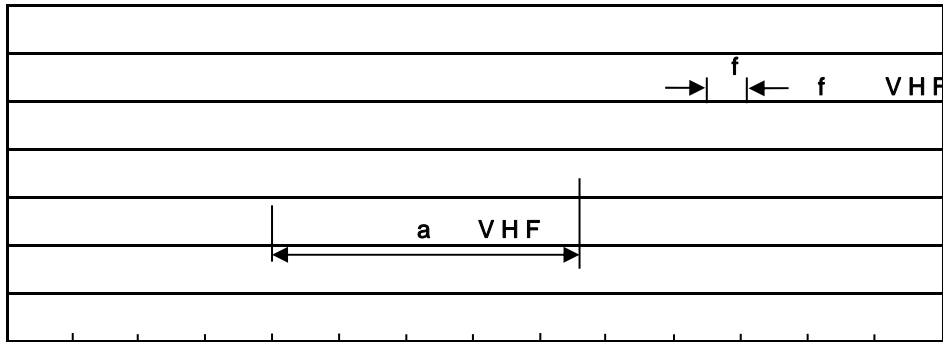


, M y f / Marking Instructions



^a φ y
(8 y , [W A
* y ° Z W A
y ÿ D Z W A k š ÿ D Z J

šWD t...•Žϕ (x/) / :KSVKXGZ[XK 6XULORK LUX /8 8KLRU] 9URJKXOTM 6



7 LPH VHF V%'

a ϕ y

Note:

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

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

2. Peak Temp.: 245 r5 - k ž • 4 Ò 5 r0.5sec;

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

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

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 Åmm³)		
	Units/Reel / --	Reels/Inner Box -- /-	Units/Inner Box /-	Inner Boxes/Outer Box - /!ç	Units/Outer Box /!ç	Reel	Inner Box	Outer Boxç
DFN3x3B-8L	5,000	2	10,000	6	60,000	13 s x12	360x360x50	380x335x366

„Đ y f / Notices

Î† U ^ ñ Ä ' Î @ ! c ^ 2 Á Ò ç ³ Ø o ž

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