



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 - 90• - vo• y 90• y vo• ½o• ? è ^ _ ¾ ' ^
 k G ' / ¶ k ä |ª W • ož
 (8)2 * @ 8 J *, 4 ~ (2 / x k Û Q ¬ } %² Š y %² k • â ç • l k W •
 ¶ U ´ ož

□ª / Features

< Ä å S S 3 5 9, + : z
 < *, 4 ~ (2 / x z
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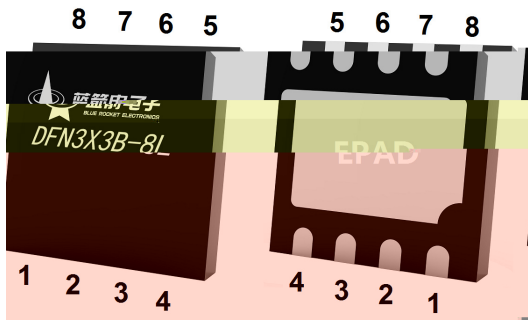
Ð ÷ / Applications

% -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 K X X _ X K / Q I Q X M Y K O G T H M R K K H R G O Z Z

À¹ € 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 } µ D k Š 8 À 1 ož

• Ú - æ / Pinning



- Ú Z	- df	- a ¢
6 OT 4[SHKX6 OT 4GSK		6 OT *KYIXOVZOUT
	VDD	> €
	- 4 *	/ ì a k N P / ç â
	< 3	- ~ ç 9 N µ €
+ 6 ' *	- 4 *	/ ì a k N P / ç â

, M V / Marking

• - ~ a ¢ o ž

See Marking Instructions.

3 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

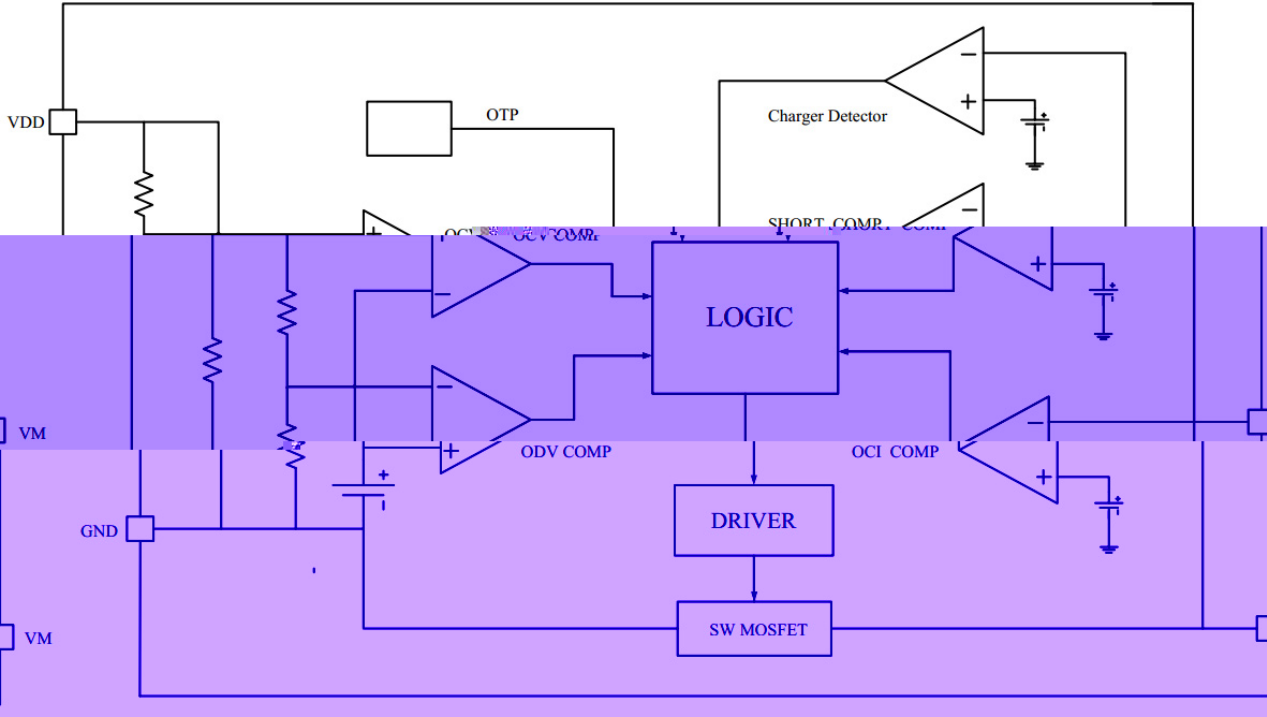
4 Electrical Characteristics(Unless otherwise specified,Ta=25℃ ;)

@ f Parameter	... Z Symbol	y i 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(Ta=25 ;)

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

Functionl Block Diagram





× 5 é Functional Description

(8)2 * @ 8! O P 9 y v kw* ••- ~ ê ñ ċ ú k Ů ' % - U - e O P k
 œ - 9o• y 9o• y v Y C ? è ^ Ō Ń ò C ° ož ? C ... U - P W • " 6 8
 Ä ož ¥ / Ì N - %² h, Ò N y %² Ò N Š k 3 5 9 , + :] Ä å k ^ | Š Á ° > S Sož
 (8)2 * @ 8 u 4 š _ g % " y 3 o W • % " o • - W • % " o • y W • % " y g 2 W • % " ož

n V € " Normal Operating mode

ò ç Z Ä y ñ ` ~ ' o Ō Ń k - y y i C 1 ô E k _ Ō Ń f 3 o W • % " ož

Ú - Ô 85Š Đ Overcharge Voltage Condition

" 3 o Ů ^ - i k ¢ P 9 ä 9 - y 9 < 5) < kw 4 Ò ž • ñ - 9 y •
 ž • : 5) < ê ¾ x k (8) 2 * @ 8 1 O ò 3 5 9 , + : Y 2 - ož _ Ō Ń f - 9 Ō Ń ož ò ç '
 o Ō Ń " - 9 y • ž • : 5) < Ä f â k © Ĭ 1 • ož Y _ Ō Ń k - 9 Ō Ń 1 t K y y
 o • - ~ N Ō Ń k < 3 € 9 z 9 - ~ y 9 <) . ' k P 9 J - K y 9 < 5) 8 ož
 o • - Ì N Ō Ń k P 9 J - y 9 < U I \ ož ¢ - ~ Ì t N ž k 9 Q À
 ä 9 - y 9 k P 1 * Ä B 8 â ' 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

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 • k / Ì 1 K y - v Ō Ń ož

Ú Z Ô 85Š Đ Overdischarge Voltage Condition

" 3 o Ů ^ y i k ¢ P 9 J y y 9 < 5 * < kw 4 Ò ž • ñ y 9 y
 • ž • : 5 * < ê ¾ x k (8) 2 * @ 8 1 ä • P y ċ ú N k Y 2 y ož _ Ō Ń t f y
 9 Ō Ń ož 4 ž y O ò 3 5 9 , + : • • k Ä B v ' ø • ož ¢ < * * 9 4 9 ^ 9 < Á ° > k v
 f ô 1 ' z g 2 Ů Á v f ô / 6 * 4 _ Ō Ń t f g 2 Ō Ń ož ¢ < * * 9 ^ 9 < Á ° >
 ê ¾ ä ž k g 2 Ů ^ 1 t K y ož P 9 Ý 9 ^ 9 y y K y 9 < 5 * 8 ž k (8) 2 * @ 8 1 > ñ 3
 o W • Ů ^ ož

Ú Z Ô W5Š Đ Overdischarge Current Condition

ò ç y v Ý Ì > k 4 Ò ž • Ý 9 ^ 9 y v y • ž • k P y ċ ú 1 t • ož ò
 ç " y v y • ž • Ä k v A ' Ì > 8 \$ Ä k © Ĭ 1 • ož / Ì Ä B v < 3 k
 ¢ < 3 9 4 9 ê ^ 9 y v @ ð 9 k y v Ò Á 1 t Ö y ož

Ž É • 5Š Đ Load Short-circuiting Condition

3 < 3 ' 9 4 9 ^ 9 ? è ' 9 < 9 . 5 8 : k © Ĭ 1 2 y P y ċ ú N 1 • • ož
 : 9 . 5 8 : © ä • v Ä Ý • ž • ož ¢ < 3 9 4 9 ê ^ 9 y v @ ð 9 k ċ ú ? è Ò Á 1 t Ö
 y ož

↳ Ô — ó ZCharger Detection

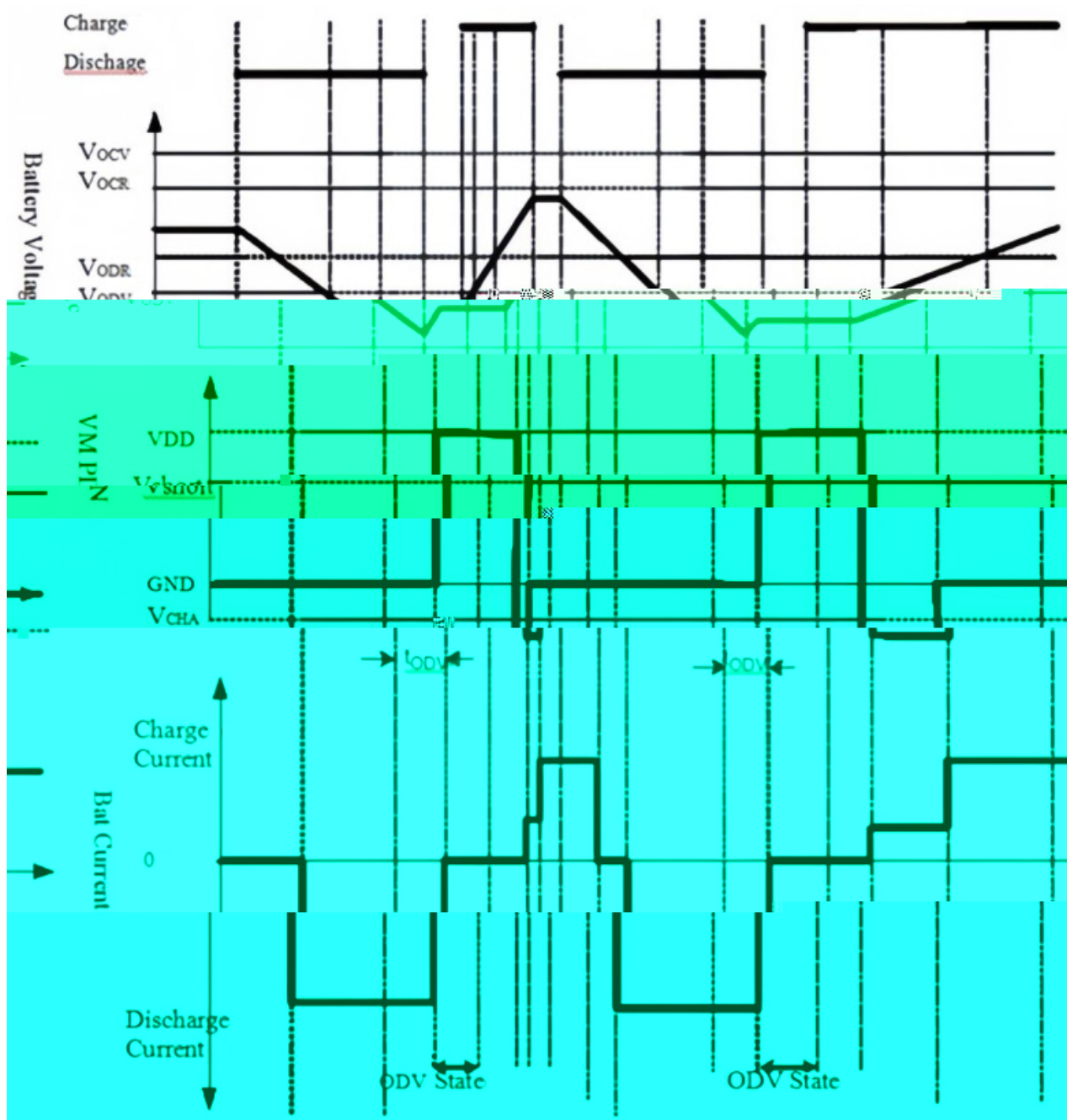
¢ Ô 9 y Ù Á P y - ~ , k 3 < 3 ' 9 4 9 ^ 9 - ~ y 9 <) . ' k ¢ P
9 Ý 9 ^ 9 y y 9 < 5 * < k (8) 2 * @ 8 1 K y y Ù Á o ž

< 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 ' - o ž
P 9 z 9 < k - v Ý 9 S ' k Y ² P y / ì C ° o ž

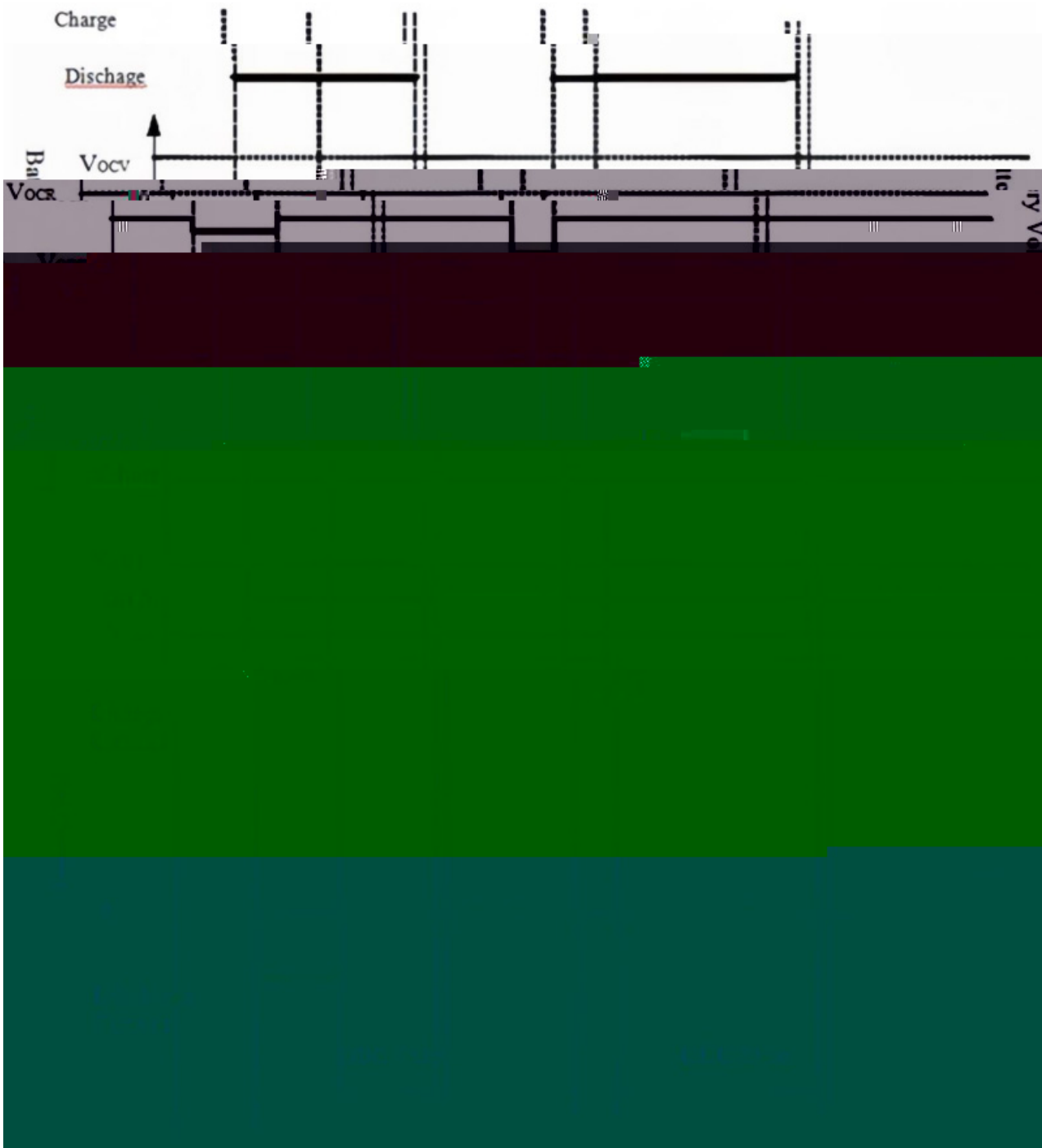
• } ¢ Timing Chart

Ú Z ` Ñ Ô ` ñ V € Overdischarge ` Charging ` Normal Operation.

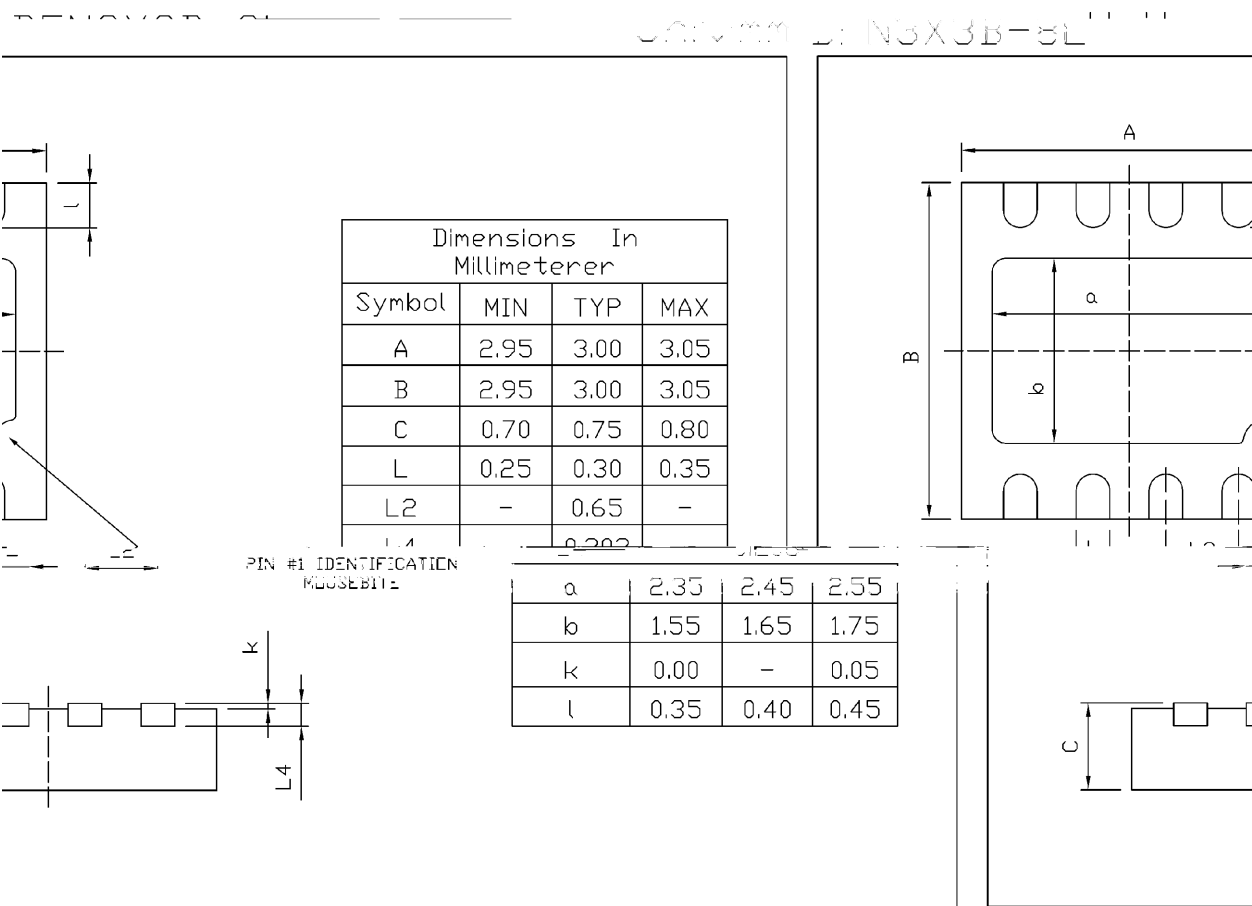


• } ¢ Timing Chart

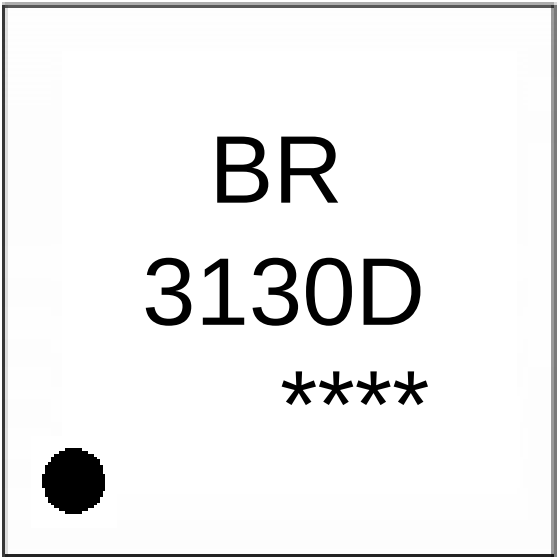
z Ô Ú W` n V € Discharge Overcurrent ` Normal Operation.



Ø ≡) ♂ / Package Dimensions



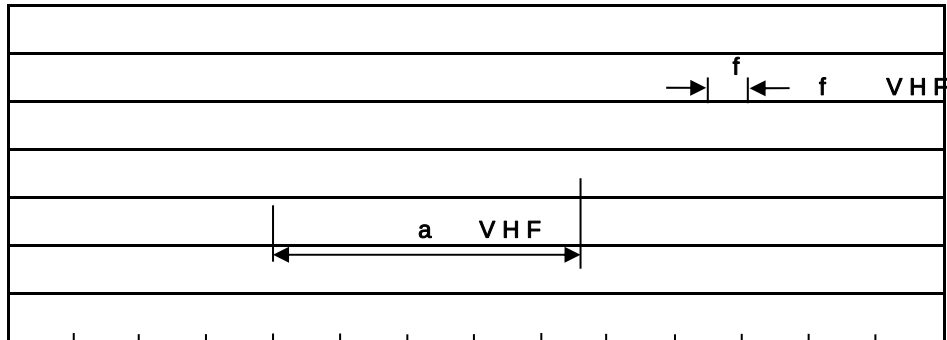
, M y f / Marking Instructions



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



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



7 L P H V H F

^ačy

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

20• Q > “† 245 r5 - k ž • 4 Ò 5 r0.5sec;

30•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 /mm³)		
	Units/Reel /-	Reels/Inner Box -- /-	Units/Inner Box /-	Inner Boxes/Outer Box - /1ç	Units/Outer Box /1ç	Reel	Inner Box	Outer Boxç
DFN3×3B-8L	5,000	2	10,000	6	60,000	13 s ×12	360×360×50	380×335×366

„Đ y f / Notices

Î† U ^ ñ Ä ' Î @ I c ¯ ² Á Ò ç ³ Ø ož

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