5 é / Descriptions

(8) 2 @ @ ©%² . * , 4 ˜ 2 / x U Y + % -eO P g É v É 9 - ’ ò ¤ è èož¥˜ ^ Ä B , ä ³ } ’ k ¬ } Ù B v y Š y Š v 8 â ’ož (8) 2 @ @ Q ¬ } â 5 Ù « ˜ ^ k ³ o 9 Ž ` ” • Å ¿ož (8) 2 @ @ É 9 - 9 < k ¤ † k - v * %² Ù B Š — åož ½ ² ò è U Y ¨ ˜ ^ ô A û Ý ê ñ ê Ë “ † A û ä ž ˜ 1 / Ì “ † O ò ¨ ¶ 8 Äož ¢ ÿ µ 9 J ž k (8) 2 @ @ µ z ô 6 2 % ” k 4 ž P v ƒ ô 4 9 ['ož ¿ , ÿ µ 9 z g k Ç - k / Ì … ÿ µ € k P “ † ! O Y C Ù Á 6 P ^ ož

¤C¯ / Features

- U Ú i - v 1.0A
- ÿ µ 9 8 y 4.5~6.5V
- — ¬ Ù 5MOSFETo• y Š ê Š v 8 â ’
- Ä —4.2V - 9 k ¤ † r 1%
- J É v / É 9 / É “ % ” - k ˜ U Y … - v Â Ý k A U Y … 2 / Ì ½
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- - Ù Á E ° 6 Po• — P y { ž Ù Á ª P
- › 9 J ž µ z ô 6 2 % ”
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- k … € O ò
- k • ½ Ì DFN2 ˜ 2-8L / x k —)í D }

€ Ð / Applications

- g ¢ g ›
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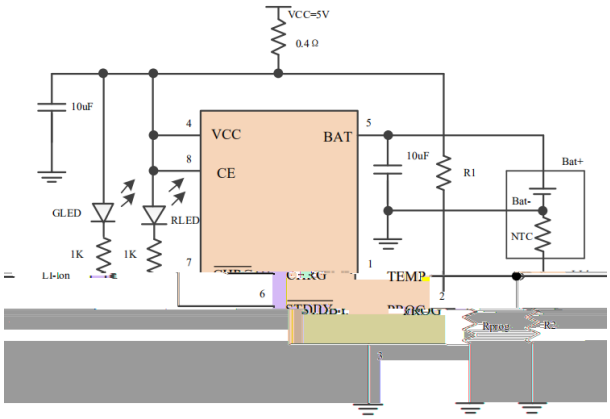
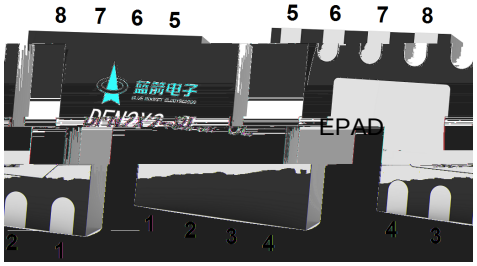
- ; 9 (È ¿ ^ - ˜

€ Ð Ô · / Application Circuit



• Û - æ / Pinning



PIN Num.	Symbol	Function
1	TEMP	P“† yÿµ€ož1:+36’ Nñ P 4:)nß˜ ÿß€žòç:+36’ 94 9ÿµ 9 êñÝ9ÿµ 9 kÞv5 P“† äê zké- 1t¶ož òç:+36¨ÿµ 9 y $•ké- 1ÐÒožòç1:+36’ Nñªk P“† !y 1tW2ož
2	PROG	Év- v—åy- v!y€žR685-’ N%² ÙB ŠñªUY+- v g—åž¨Ä- ‰<k4’ 9t²ò¨ <z¨Év- ‰<k4’ 9t²ò ¨ <ož¨- ÙÁ ñÄ%”k4’ 9CUYÿG µ ¸”Û!y- vy/ (': # g<685- 8685-h×
3	-4*	›ª
4	VCC	ÿµ 93ÿµ€ož4’ 9 ÄB è W• ›ž¢<)) (':’ 9[49 S<žk(8)2 @@1 µz ô 62%”k4ž(':’ v49 ['ož
5	BAT	P N€ož1 P 3€ Nñ4’ož¨/ÌtW2W•êñ62%”k(':’ v 49 ['ož(':’ g PUˆ- vy < ²ò 9ož
6	9:*(?	P- è6P€ož¢ P- èžtÄB•¼ ñz uk6P- èožkék4’ 1Ô9äŠÁož
7	).8-	- ÙÁ6P€ož¢- ˜g P- žkÄB•¼ z uk6P- 3¨ gožkék 4’ Ô9äŠÁož
8	CE	/Ì… ÿµ€žä uÿµ… 3oW•ÙÁkz uÿµ µtW2- ÙÁož)+’ U Yt::2 uêñ)359 uÜ ož
9	EPAD	y°D & ,B ož¥– •@U ´ ˜^D Nñ6)(ªkY ë N‡yÌ ½Å ož

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

PARAMETER	SYMBOL	RATINGS	UNITS
Input Supply Voltage		-0.3~10	V
TEMP, CE ÈPROG Pins Voltage		-0.3~V_{CC}+0.3	
BAT Pin Voltage		-0.3~8	
STDBY,CHRG Pins Voltage		-0.3~10	
STDBY,CHRG Pins Output sink current		10	mA
Operating Ambient Temperature Range	T_A	-40~85	°C
Junction Temperature	T_J	-40~150	°C
Storage Temperature	T_{stg}	-40~125	°C

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

PARAMETER	SYMBOL	RATINGS	UNITS
Lead Temperature (Soldering, 10s)	T_{solder}	260	°C
ESD	HBM	2000	V
	MM	200	V

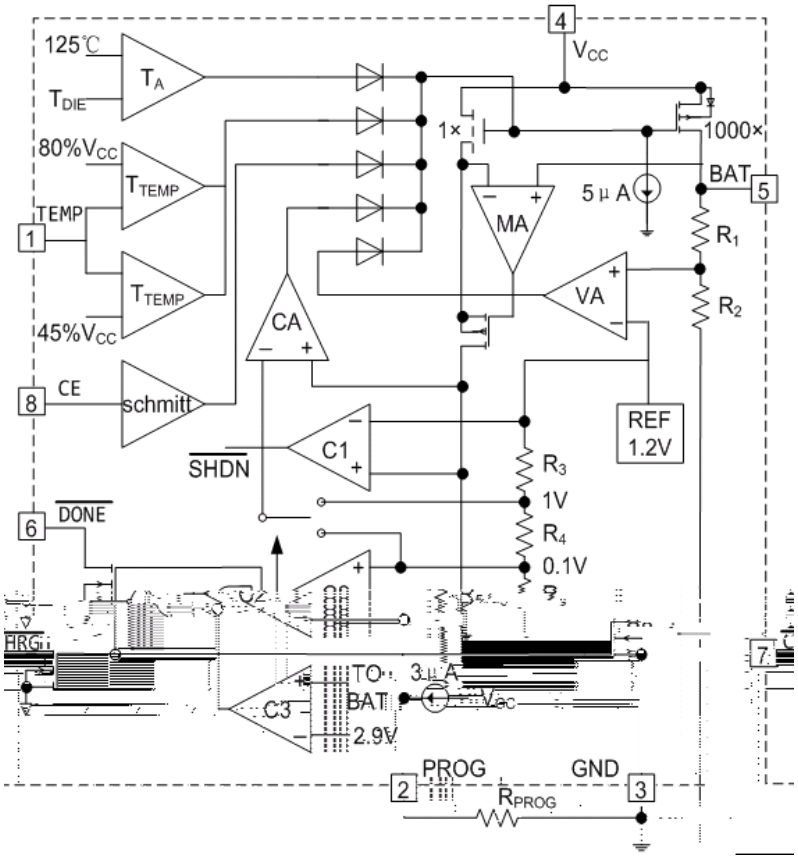
Ô4ì × ? d / Electrical Characteristics(Ta=25)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Supply Voltage			4.5		6.5	V
V_{CC} Under voltage Lockout Threshold	V_{UVL}	V_{CC} from Low to High		3.9		V
V_{CC} Under voltage Lockout Hysteresis	ûV_{UVL}			150		mV
Input Supply Current	I_{CC}	Charge Mode, R_{PROG}=10K		150	500	µA
		Standby Mode (Charge Terminated)		50	100	
		Shutdown Mode: R_{PROG} Not Connected, V_{CC}<V_{BAT}, or V_{CC}<V_{UVL}		50	100	
CE "High" Level Voltage	V_{CEH}		1.5		V_{CC}	V
CE "Low" Level Voltage	V_{CEL}				0.4	V
Trickle Charge Threshold	V_{TRIKL}	R_{PROG}=10K, V_{BAT} Rising		2.9		V
Trickle Charge Hysteresis	ûV_{TRIKL}	R_{PROG}=10K		100		mV
Trickle Charge Current	I_{TRIKL}	R_{PROG}=1K	90	100	110	mA
BAT Pin Current	I_{BAT}	R_{PROG}=1K, Current Mode(V_{BAT}=4.0V)	900	1000	1100	mA
		R_{PROG}=2K, Current Mode(V_{BAT}=4.0V)	450	500	550	
		Standby Mode, V_{BAT}=V_{FLOAT}	0	-2.5	-6.0	µA
		Shutdown Mode (R_{PROG} Not Connected)		f 1	f 2	
		Sleep Mode, V_{CC}=0V			-2	
PROG Pin Voltage	V_{PROG}	R_{PROG}=1K, Current Mode	0.9	1.0	1.1	V
PROG Pin Pull-Up Current	I_{PROG}			3		µA
Regulated Output (Float) Voltage	V_{FLOAT}	R_{PROG}=10K	4.158	4.200	4.242	V
C/10 Termination Current Threshold	I_{TERM}	R_{PROG}=1K		0.1		mA/mA

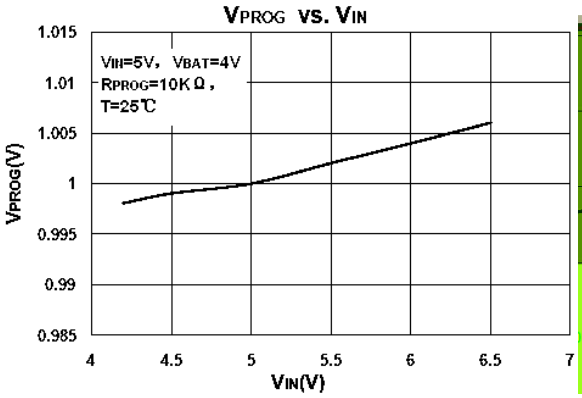
Ô4ì × ? d / Electrical Characteristics(Ta=25)

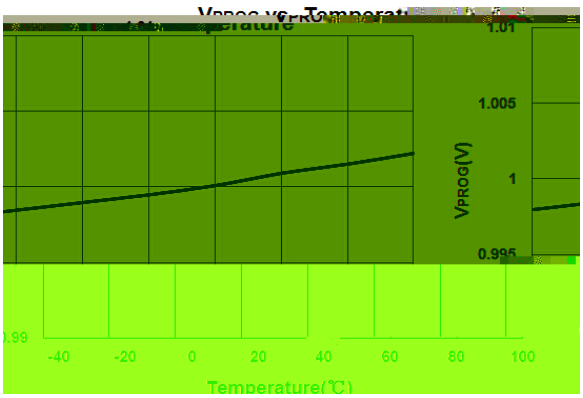
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Termination Comparator Filter Time	t_{Term}	I_{BAT} Falling Below I_{TERM}	0.3	0.8	2.0	mS
Recharge Battery Threshold	¸ V_{RECHG}	V_{FLOAT} ÉV_{RECHG}		150		mV
Recharge Comparator Filter Time	$t_{RECHARGE}$	V_{BAT} High to Low	0.3	0.8	2.0	mS
V_{CC} – V_{BAT} Lockout Threshold	AMSD	V_{CC} from Low to High		100		mV
		V_{CC} from High to Low		80		mV
TEMP High Shift Voltage Level			76	80	82	%V_{CC}
TEMP Low Shift Voltage Level			43	45	49	
Soft-Start Time	t_{SS}	I_{BAT}=0 to I_{BAT}=1000V/R_{PROG}		20		µS
Power FET “ON” Resistance (Between V_{CC} and BAT)	R_{ON}	I_{BAT}=1000mA		400		m
Junction Temperature in Constant Temperature Mode	$T_{J(REG)}$			125		°C

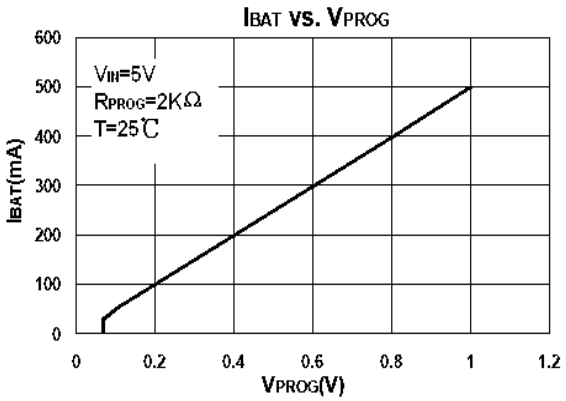
< Â ä ¢ / Principle block diagram

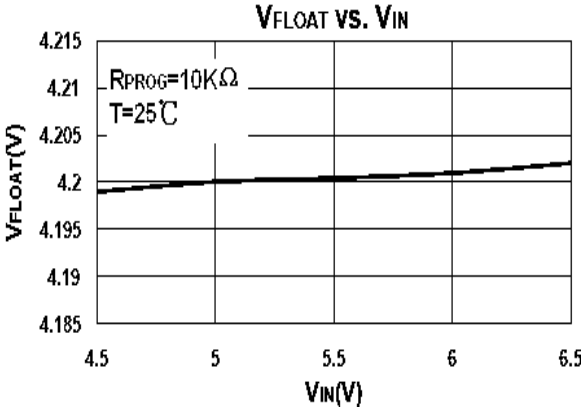


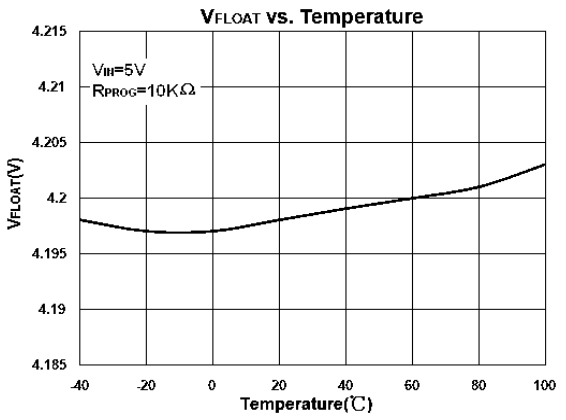
Ô ? d • Ž ¢ / Electrical Characteristic Curve

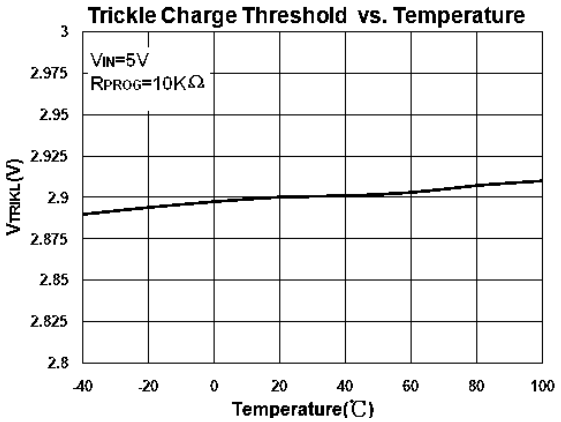


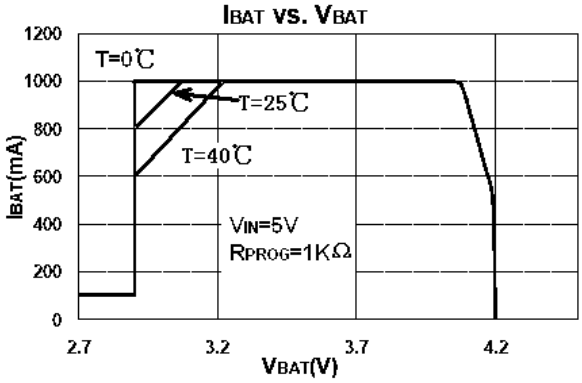


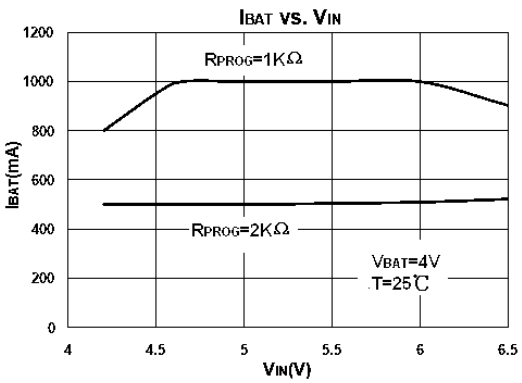




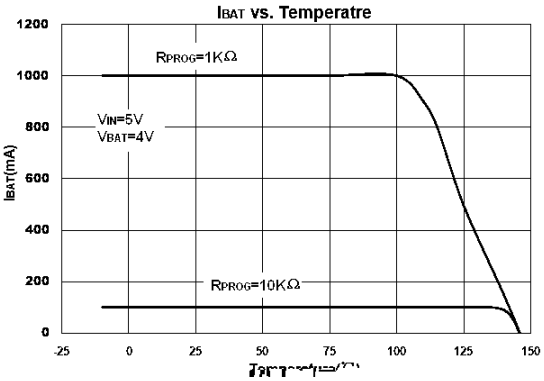


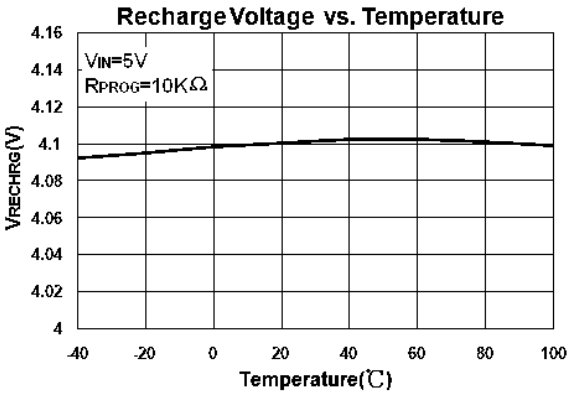






Ô ? d • Ž ¢ / Electrical Characteristic Curve



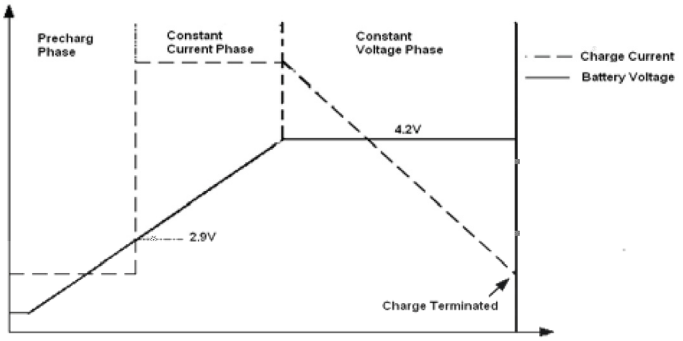


V € < Â / Description of the Principle

BRCL4056ZZ © y %² -eO Y ÿ êeO ü ` Ò P ò — ‹ ¿ Å - ˜ è k ï / Ì Ä B ä ³ } ' + P g É v y É 9 - ož - v U Y Ù B Š Ú i — kÂ Ý 4 Ò - v U ' k ¬ } P Š v 8 â ' y v y Šož BRCL4056ZZ m ¥ â • è ÿ ß Ù Á 6 P ÿ ß € k - Ù Á 6 P € $\overline{\text{CHRG}}$ y - È Ø 6 P ÿ ß € $\overline{\text{STDBY}}$ož / Ì Ä B ä ' ò è ¨ / Ì È " Ý - ž ' z - v k U Y … ï Â Ý ' † ï / Ì ä Ô ò k ¶ / Ì ½ ò C ° / Ì ê ñ Ù B « ˜ ^ož ý k ï ¨ — ‹ - v ž k U Y ð Y Â ° Õ Ñ k ò Q © ÿ G Á º Õ Ñ g — ‹ < U Y 4 k œ ¨ Â ° Õ Ñ k BRCL4056ZZ k × 4 - vož

¢ ÿ µ 9 Ý 9 › z 9 yf9 › y / Ì … ÿ µ € N ä u ž k BRCL4056ZZ • ÷ + P - k $\overline{\text{CHRG}}$ ' ÿ ß z u k n P - 3 ¨ g k ò ç P 9 z 9 < k BRCL4056ZZ 4 v + P g Ä - ož ¢ P 9 Ý < ž k - ˜ J É v % " + P - k - v 6 8 5 - ' y - 4 * $ • Š 8 685- G ož ¢ P 9 N < 9 ž k - v & • × 4 k BRCL4056ZZ µ É 9 - % "ož ¢ - v × 4 ñ - È Øf9 › ž k - u Ê È Øož $\overline{\text{CHRG}}$ ÿ ß ä Š Á k $\overline{\text{STDBY}}$ € ÿ ß z yož - È Øf9 › © É v - v ož

¢ P 9 ' ñ Ç - f9 › Y ž k • ÷ • - u Êož / Ì Ä B ä ¤ † 9 Â Õ › k ¨ [y Ý ˜ y Š ã 9 à Ì G ' P € ² ò 9 ¤ † ¨ Y Ä k á 4eO Y ÿ P yeO ü ` Ò P } Lož ¢ ÿ µ 9 J ê ñ ÿ µ 9 z 9 P 9 ž k - ˜ µ z ô 6 2 % " k P € ƒ ô v 4 9 [' k R ò Í 4 - Ñ ž • ož ò ç 1) + – N ñ - 4 * k - ˜ 2 - ož - ¼ ¿ ª P ¨ Y £ y



V € < Â **/ Description of the Principle**

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ç ¸ ” Û ‹ ‘ož ÿ G ¬ } - v Û G Š ˜ Š ›ož

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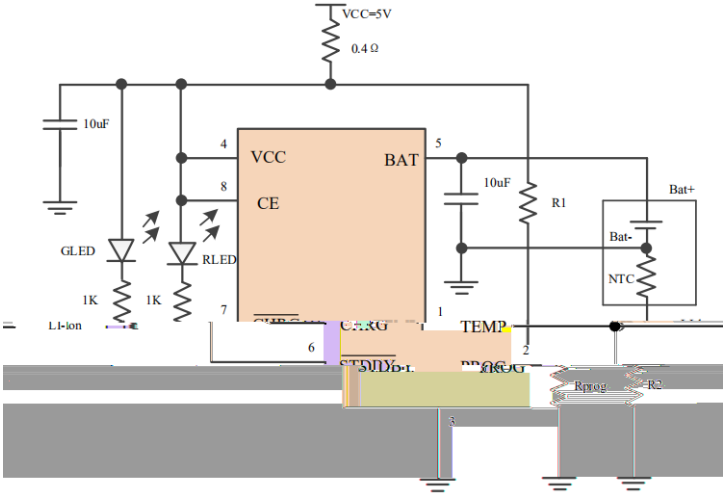
4 … 2 “ † ä ê ñ z + P - è C k (8) 2 @ @ Ä B ¤ è Ä P “ † ! y èož P “ † ! y © * y O : + 3 6 ’ 9 ë k : + 3 6 ’ 9 © P Ä 4 :) ½ } Š y%² Š ã 9 à Ì ë k ò £ ñ Pož



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8 y 8 › } ÿ G P “ † ! y 8 y ½ } Š Š › Û G k ë † ª ¢ ò y

• — — P “ † 8 : $_{2}$ ½ : . kg ¿ : $_{2}${ : . z P … © ¿ “ † © ƒ ½ } Šg 4 :) hk 8 $_{:2}$ ¿ ¨ “ † : $_{2}$ ž Š › k 8 : . ¿ ¨ “ † : . ž Š › k é 8 $_{:2}$ } 8 : .ož

; " k ¨ “ † : . ž k †%² ’ : + 3 6 € 9

$$V_{TEMPH} = \frac{R_2 // R_{TH}}{R_1 + R_2 // R_{TH}} \times V_{IN}$$

¨ “ † : $_{2}$ ž k †%² ’ : + 3 6 € 9

$$V_{TEMPL} = \frac{R_2 // R_{TL}}{R_1 + R_2 // R_{TL}} \times V_{IN}$$

V € < Â / Description of the Principle

À e k < :+36 2# <./-. #1 ≤4g1 # h

:+36.# <≤5=#1 ≤4g1 # h

é U † ±

$$R1=\frac{R_{TL}R_{TH}(K_2-K_1)}{(R_{TL}-R_{TH})K_1K_2}$$

$$\frac{}{K_1K_2)}\quad R2=\frac{R_{...}R_{...}(K_{...}-K_{...})}{R_{TL}(K_1-K_1K_2)-R_{TH}(K_2-}$$

c ò k ò ç P Ä B © 3 " † © ƒ g 6 :) h ½ } Š k RTH ÊRTL k é [U Y ‹ ' ± ñ

$$R1=\frac{R_{TL}R_{TH}(K_2-K_1)}{(R_{TH}-R_{TL})K_1K_2}$$

$$\frac{}{2)}\quad R2=\frac{R_{TL}R_{TH}(K_2-K_1)}{R_{TH}(K_1-K_1K_2)-R_{TL}(K_2-K_1K}$$

R µ P - U Y 0 ß k - — " † 8 › 9 < ₁₁ © — ¼ k N 8 o• 8 o• 8.. o• 8.2 Ä ¼ z ¿ k 8 .. o• 8.2 U * ò ƒ , ¼ P ô Æ ê * à y ¡ ± ñož

¨ Ž • k 3 Q ¼ h î%² € " † Ô Å k A ò ½ ' k é 8 U Y k ò Q 8 / Uož 8 P - - J ± • % k ¨ 4 Ç^9 ož

‹ 6) (f Z I ¿ 6 •

† ' 6 8 5 - - v Ú i Š } @ U ´ (8) 2 @ @ k w } ... † ' 6 8 5 - $ ÿ @ O 4ož

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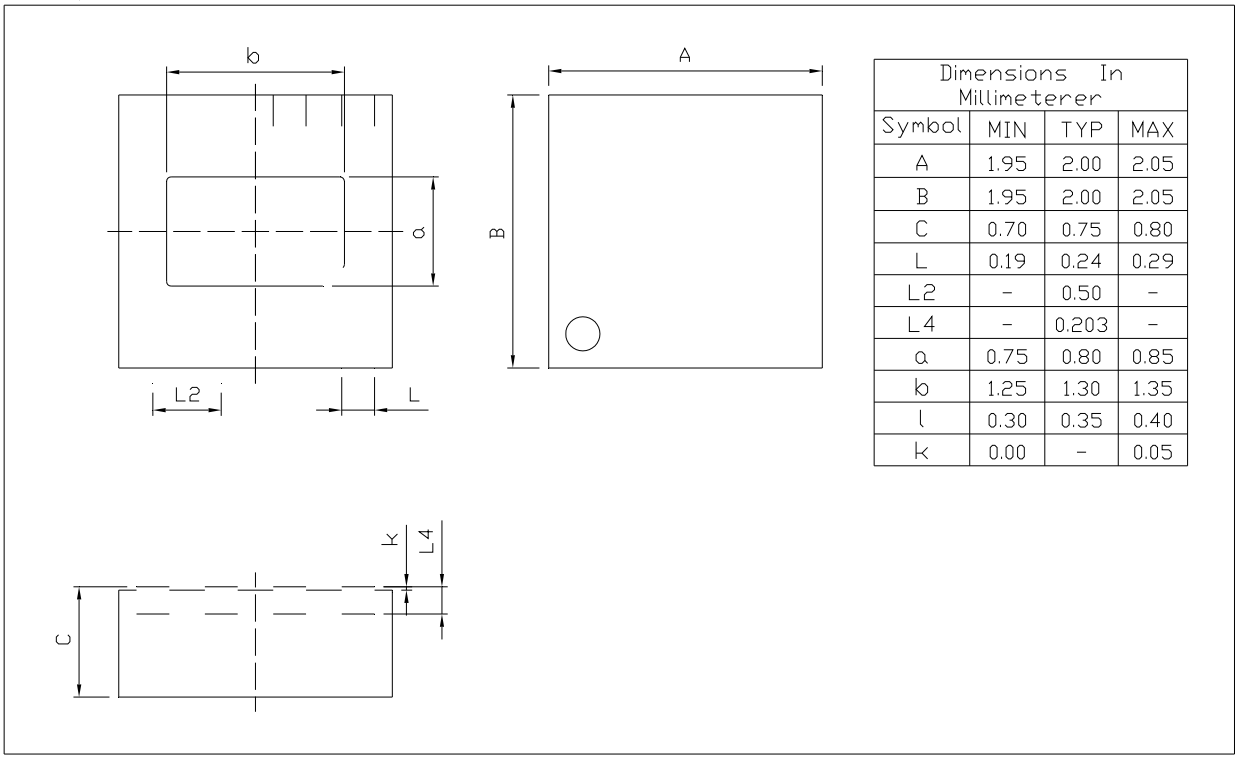
¨ - ž k (8) 2 @ @ " † U A û ä k œ ò P 4 :) Š } @ O Y (8) 2 @ @ k k é 4 :) Š › J 3 o F • P " †ož

%² • ½ Å ' ñ 6) (+ ÿ ß Â Ý - v ® ¼ pož ¤ è è D ÿ ½ * / x P K – ¿ ' • ñ Ù µ k 6) (b C Ü 5 • ½ Ì • k ñ Y ? ' g ; ¿ © - 4 * ' h b C µ e • @ U Ý k Ú y ? * - U ä ½ Ô ò ož ¨ © Ï Ä " 4 - ˜ Y Ù ½ › - k § € - ˜ ÿ ß v k ¨ Ÿ © Ï b B ž - } Ë Y - ã ð Yož 4 Ü ÿ ß Â Ý - v k } L 1 (8) 2 @ @ µ y ° P K á D N ñ - ó ¿ è á ª € b ¿ k Y ñ Â Ý • ½ Å ož k é k / Ì ½ Š 1 Í Ý k - - v × 4ož

Ø ¤ =) ¢ / Package Dimensions

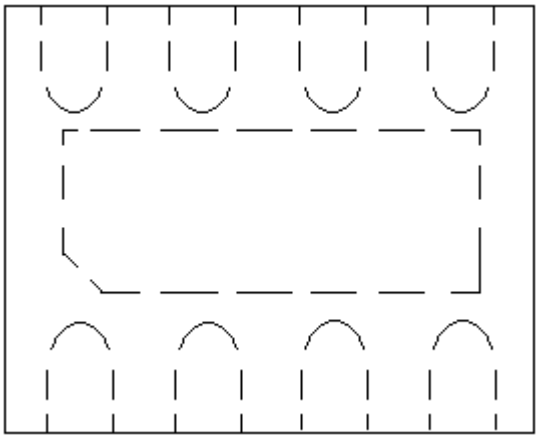
DFN2×2-8L-0.75 Unit:mm



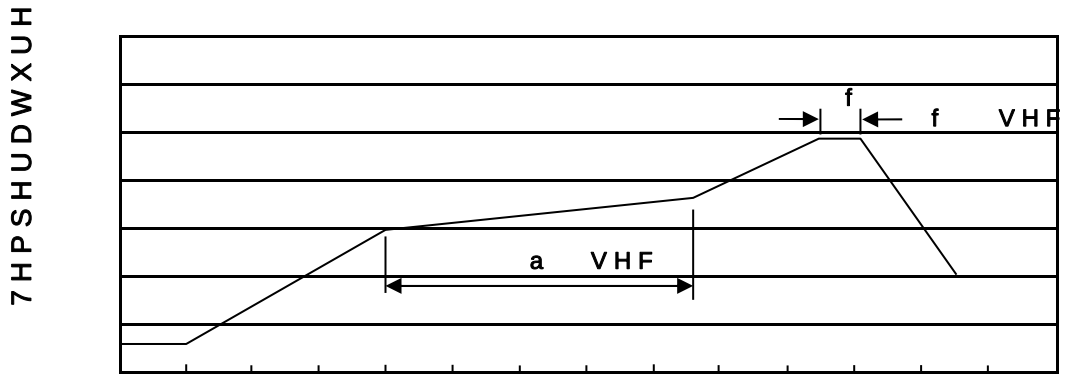
Dimensions In Millimeterer			
Symbol	MIN	TYP	MAX
A	1.95	2.00	2.05
B	1.95	2.00	2.05
C	0.70	0.75	0.80
L	0.19	0.24	0.29
L2	-	0.50	-
L4	-	0.203	-
a	0.75	0.80	0.85
b	1.25	1.30	1.35
l	0.30	0.35	0.40
k	0.00	-	0.05

Rev.00 202012

, M y *f*



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 H



7 L P H V H F

ª ¢ y	Note:
1o• Ä ½ “ † 150 ½180 - k ž • 60 ½90sec;	1.Preheating:150~180 - , Time:60~90sec.
2o• Q › “ † 245 r 5 - k ž • 4 Ò 5 r 0.5sec;	2.Peak Temp.:245 r 5 - , Duration:5 r 0.5sec.
3o•D N ò i Ò 0 , † 2 ½10 - /sec.	3. Cooling Speed: 2~10 - /sec.

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

“ † y 260 r 5 -	ž • y 10 r 1 sec.	Temp.:260 r 5 -	Time:10 r 1 sec

G P á / Packaging SPEC.

2 & x / REEL

Package Type 7>û ˜ E	Units ;>û ¦H					Dimension ;>û p . (unit Æmm³)		
	Units/Reel / --	Reels/Inner Box -- /-	Units/Inner Box /-	Inner Boxes/Outer Box - /1ç	Units/Outer Box /1ç	Reel	Inner Box	Outer Box1ç
DFN2×2-8L	4,000	10	40,000	4	160,000	7 s ×8	210×205×205	445×230×435

„ Ð y ƒ / Notices