/ Descriptions

BRCL4058PZR-4.2 ĩ ₲ Ḣ ̃Ǫ Vِ ص ĭ ح ح ﻭ ă ů ح ớ Y ⅝ ` ̃ Ḍ ɔ − ɔ

BRCL4058PZR-4.2 پ ɾ ở ḧ ɔ ╚ / ở ḧ ɔ ɻ ớ í ـ ﻱ Ṉ ᵕ մh ţ ̈Ǫ ´ ệ BRCL4058PZR-4.2 ă ʁ ̈Ạ Ã Ẓ ɾ ⅞ ɲ ỳ J̈ ̈O ψ ̀H گ USB ɔ ◊ گپ ɔ ◊ Ṫ

BRCL4058PZR-4.2 پ ɾ մhPMOSFET " ═ ɾ i گ ɔ ت ̈A j ـ ļ ᵕ մh ₅ ╝ ɔ گ ڭ ̃ ╢ ٦ ♬ ɨ Ḿ ɔ ɔ ╚ ف Φ ₅ ט ذ ` ɱ ᶻ ı ' ̃Ḥ ă ح ע ᴸ □ ẙ ţ ţ ï Ḿ ƀ Ɑ □ ẙ ɾ ں ◗ ɔ ɖ ḧ 4.2V ɔ ɔ ╚ ن ص PROG ů ᵕ ɻ ɔ گ ذ ` ﻭ ح ڑ 1.0A

Ẹ ژ ɔ ɑ ũ ὲ ̀H BRCL4058PZR-4.2 ₅ ט ف Ḥ ɔ ╚ ↑ õ ɔ − ◖ ɔ ╚ ɱ 2μA ï BRCL4058PZR-4.2 Ʊ Ḛ ≠ ᴾ ὺ ɔ ɔ ╚ ˇ í ژ ص ï ڎ ڃ ₅ ʊ W ɔ ƀ ɾ ̃Y˜ ɔ ɻ ژ ɔ ì ↑ õ Ậ ő

BRCL4058PZR-4.2 پ ɾ ﾉ ً ע DFN Ṃ Ƀ ﻭ Ṉ 6 ᵕ ɱ ţ ũ ᾧ ṇ ɔ ت PCB ų — Ⅵ ژ BRCL4058PZR-4.2 Ṫ -40¯C to +85¯C

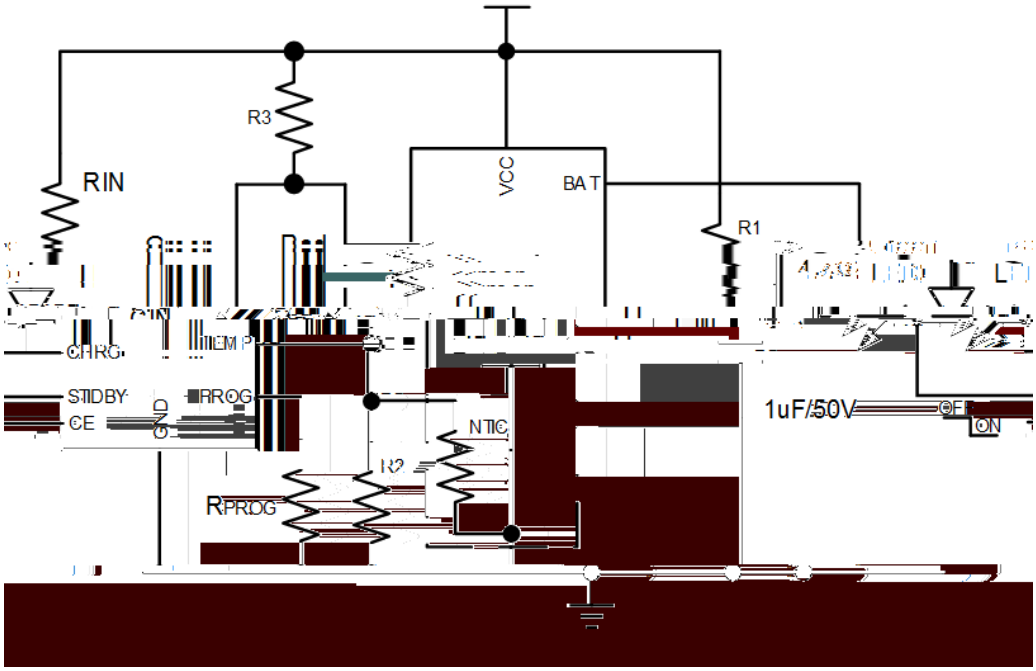
/ Features

- ﻭ ح 36V ژ ɔ 6.1V ص ï
- ɻ ů ز 1% 4.2V Ỉ ₰ ɔ ﾉ ₿ ɔ
- ɔ − ì ï
- ʊ ũ BAT-VDD گ ı ĩ
- ể ɔ ╚ <2μA
- ₩ Ã ï ı ắ 55μA
- ̃Ḥ ̇Y 0V ɔ − ɔ
- ﻭ ᶻ 1.0A ɻ ớ ɔ ɔ ╚
- ╚ / ở ╚ / ở s ɟ Ã ɔ
- ɔ ɔ ╚ ᵕ մh ذ
- ɔ ɔ ╚ ú ĩ ♬ ذ `
- ɻ ט ں ⫞ ⫫ ɔ ╚
- ₅ ʊ W ɔ
- ɔ ↑ õ ˜Y˜
- ɻ RoHS‰ ḷ

/ Applications

- ヽ ט ɔ ʕ SGDs P S6 ̇Ḥ ᾧ
- XVE ̈Ǫ ̃Ω
- Ⓦ Z V ắ ɔ
- ɔ − ɔ ɔ ت
- Ʊ Ḛ ὲ ̇Y ₰ ᵻ

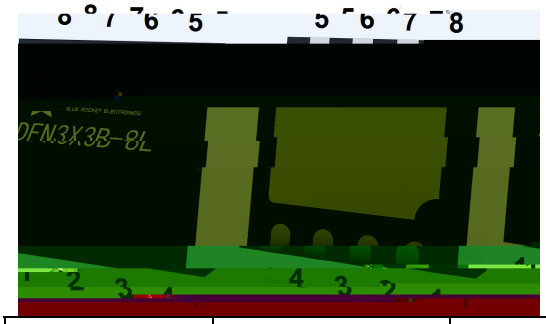
/ Application Circuit



├4χ Ę ₓ ɩ ɡYFF ↿ ɾ ɔ ķ ↿ ñYFF ɔ ˙H ₓ ɩ ɡ ɔ ķFLQ i ǐ 71:Ω ŧ ⿴ɔ گ گ₿♬ ά ö ˙HYFF ↿ ɨ ┤ ╨ ɔ ψ

├5χ ĘFHĄ ő j ɾ PFX í ˙H ت ŃFHĄ ő Ừ ↿ ă ì JQG EUF0738;S]U0715 ſ * Ẃ Ť ↑ õ j ŃFHĄ ő´ ì ì YFF

/ Pinning



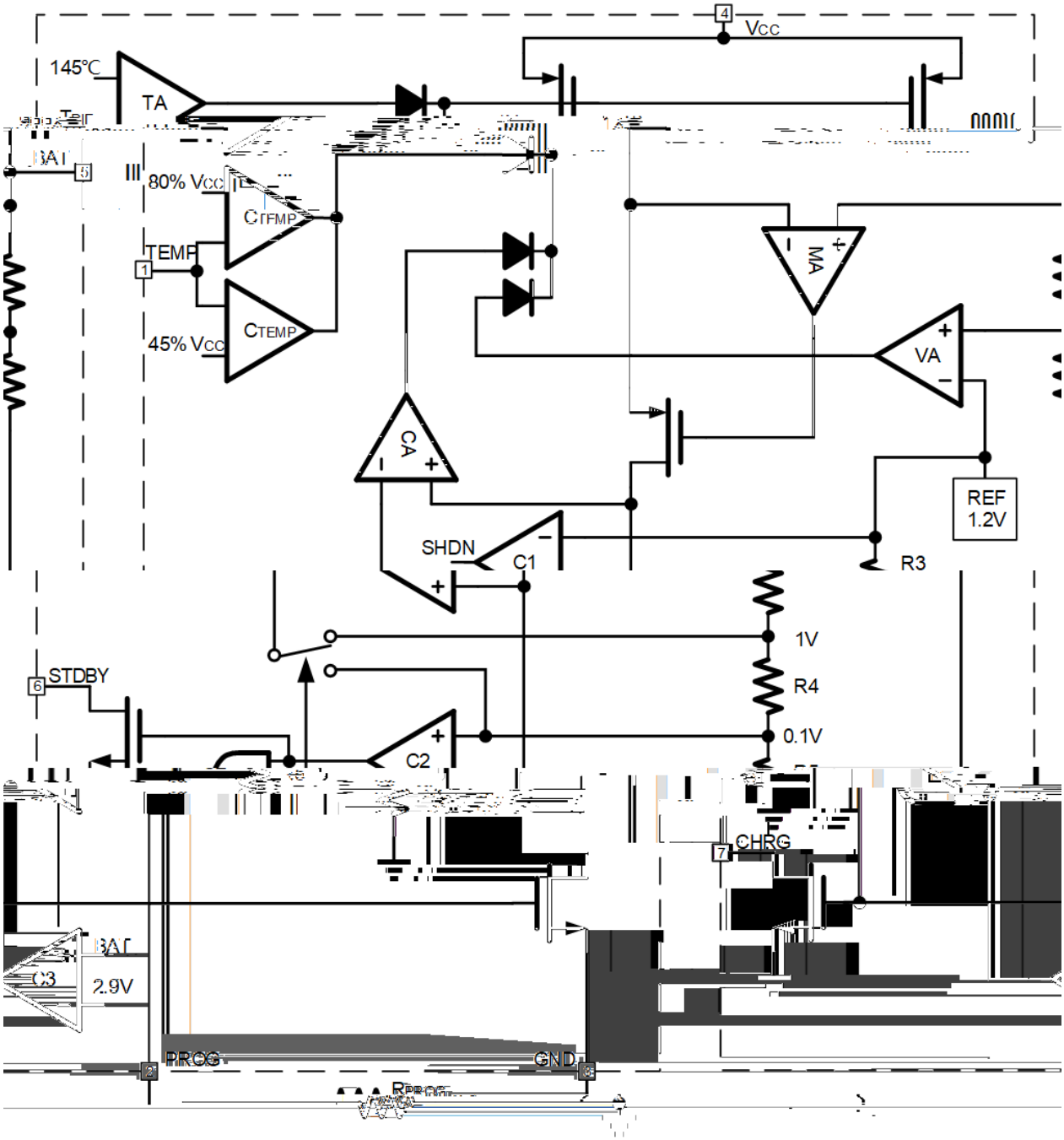
PIN Num.	Symbol	Function
1	TEMP	ɔ ɔ – □ ẙ ₅ ╨ ↿
2	SUR J	ɔ ɔ ╙ ɻ ⁼Ǫ ↿ ᵘ ɹ ɔ گ JQG ɻ ` ɔ ɔ ╙ ᶻ ṇ
3	GND	ƀ ᗡ ş
4	VCC	ɔ ◊ ɀ ↿
5	BAT	ɔ – ɀ ↿
6	STDBY	Ầ ◖ ɀ ⿴ ɔ Ḣ ă ˝Y˜ ↿
7	CHRG	Ầ ◖ ɀ ⿴ ɔ ↑ õ ˝Y˜ ↿
8	CE	ǐ ɀ ↿ Ḥ ɔ Ẉ ǐ

PARAMETER	SYMBOL	RATINGS	UNITS
VCC Pin Voltage	V_{VCC}	-0.3~36.0	V
BAT Pin Voltage	V_{BAT}	-4.2~18.0	
CHRG/STDBY Pin Voltage	$V_{CHRG/STDBY}$	-0.3~13.0	
PROG Pin Voltage	V_{PROG}	-0.3~5.5	
Other Pin Voltage	$V_{TEMP/GND/CE}$	-0.3~5.5	
Operating Ambient Temperature Range	T_{OP}	-40~+85	°C
Storage Temperature	T_{stg}	-65~+150	°C
Lead Temperature (Soldering, 10s)	T_{solder}	260	°C
ESD	HBM	4000	V
	CDM	1000	V

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Supply Voltage	V_{CC}		4.5	5.0	36.0	V
[redacted]		Charging mode				
Regulated Output (Float) Voltage	V_{FLOAT}	0 ≤ T_A ≤ 85 , R_{PROG}=1.02k	4.158	4.2	4.242	V
BAT Pin Current	I_{BAT}					

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
V_{CC} Under voltage Lockout Hysteresis	$V_{CC_UV_HYS}$		100	200	300	mV
V_{CC}-V_{BAT} Lockout Threshold	V_{ASD}	V_{CC} from Low to High	100	125	150	mV
		C/10 ons antr V_{CC} from High to Low	30	65	100	mV
C/10 Charging Termination Current RPROG	I_{TERM}	R_{PROG}=1.02k	90	100	110	mA

/ Principle block diagram



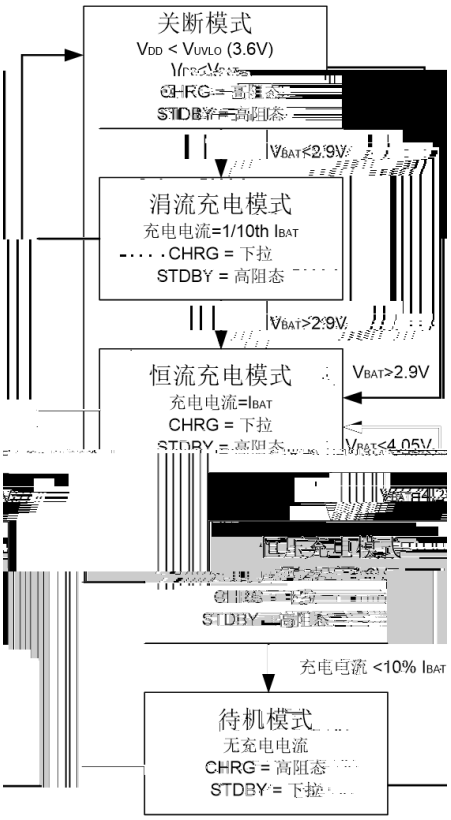
/ Function description

◆

Ę ɔ ɔ ╚ ɒ ɾ ѡ ∤╟ ɔ ѕ₆ ϕ ħ 1/10`H ɔ Ỉ ע q ∤ Ƀ Ỉ ţ ĩ ן ص پ ۲ ىh ▾ └ ⅝ ۍ ḾPROG Ậ ő ف Φ ˇ í ׳ ₅ ╝ Ę PROG Ậ ő ɔ ѕ₆ 100mV ï `H ژ ٨ ص tTERM ε ˇ ₥ 1.8ms ζ `H ɔ q ∤ Ƀ ɔ ɔ ╚ q ԋ Ă BRCL4058PZR-4.2 ف ể ₩ Ã %`H ژ ɔ ◊ ɔ ╚ ѕ₆ 55μA ε ├ χ C/10 ∤ Ƀ ɒ ╚ ɔ ♬ ں ₩ Ã ¸ ѽ ζ

ɔ `H BAT Ậ ő i Ψ ق ذ PROG Ậ ő ɔ ɒ DC ɔ ɔ ╚ ѕ₆ ϕ ħ 1/10 ژ ˜ ṗ ş ѕ₆ 100mV ï ∤ Ƀ ⅝ ۍ i 1.8ms ▾ └ `H ژ ε tTERM ζ ف ٢ ό و Ψ ق ذ j Ṁ ɔ Ỉ ע ص ́E ∤ Ƀ ñ Ẉ ẓ ɔ ɔ ╚ ѕ₆ ϕ ħ 1/10 ï BRCL4058PZR-4.2 o ∤ Ƀ ɔ Ỉ ע Ẋ Ƀ ن ص BAT Ậ ő ώ ɔ ╚ ɒ ف ٢ ↑ õ ï BAT Ậ ő i ¨A ѽ ق ذ ʠ u ọ ء ۰ ɔ –׳ ɔ

ɒ ể ₩ Ã BRCL4058PZR-4.2 ḾBAT Ậ ő ɔ ف Φ ف ∤ ˇ í ḅ ' Ỉ Ậ ő ɔ ں 4.05V W ɔ ɔ ڈ ں ε VRECHRG ζ ï ɔ Ỉ ע À Ḋ Ẋ W Ⱪ ɔ – Ẓ ɔ ╚ Ę ɒ ể ₩ Ã ف Φ ɔ Ỉ ע é ʊ W ʊ `H ọ ء Ă À ژ ɔ ł W ۔ A ì ژ ɔ ã ä ن ص í PROG Ậ ő׳ ԋ Ă ɔ ł W ʊ ï g˜ Ɛ ʒ ɔ Ỉ ע ↑ õ g



◆

BRCL4058PZR-4.2 Â ◖ ڑ õ˝Y˜ Ậ ő CHRG STDBY Ẹ BRCL4058PZR-4.2 ʃ ɔ õ`H CHRG ڑ ï ˥I Ʊ Ę õ CHRG ڑ ح گ õ ɔ Ḣ ă`H STDBY ڑ ï ˥I Ẹ ɔ – ì ǎ ɔ – □ ỷ â Ẃ`H CHRG STDBY ڑ ح گ õ

Ṅ TEMP Ậ ő ì ş ʜ ɔ – □ ỷ ˇ ╨ ı ť ḅ ' BAT Ậ ő ì 10μF ɔ ķ Ẋ ɔ – j ف ì ʌ ˇ LED ћ ʌ ˇ LED Ṅ 1-4s Ω ڎ ♣

ɔ õ	ʌ ˇ OHG FKUJ	ʌ ˇ OHG VWGE\
ɔ		ŏ
ɔ ʌ Ƀ	ŏ	
ڑ ح ɔ – ì ɔ – ' ف ì ǎ ɔ – □ ỷ â Ẃ	ŏ	ŏ
EDW Ậ ő ì 43u l ɔ ķ ɔ – ' ف ì +WHPS=JQG,	ʌ ˇ OHG ћ ʌ ˇ OHG Ṅ 407s Ω ڎ ♣	

◆

ḅ ' ƀ Ɑ □ ỷ ح ĺ ɸ 145 մh♬ ŧ ע ت Ṅ ṇ ɔ ɔ ╚ Ĵ ı ť گ Ƀ BRCL4058PZR-4.2 ص♬ Ẋ ɒ ɾ Ä ώ ح ʌ ḧ ɔ ت — ı ' ʃ ת ť i ں ǎ ≡ ω̃ Ω q BRCL4058PZR-4.2 l ڑ ɒ - ɔ Ṅ ɒ ѡ q ư ï ѕ ʊ ṇ ɔ ╚ ώ ï ⋮ Ɯ Ɛ ʒ ε ǎ j ĩ ѡ q ư ζ ע ι □ ỷ ſ ɸ ḧ ɔ ɔ ╚

◆

ʁ گ Ƀ □ ỷ ص ح ǎ ă ص Ḥ Ḿ ɔ – ج ă Ω ḱ BRCL4058PZR-4.2 մh ؤ ă õ ɔ – □ ỷ ˇ ╨ ɔ ت ɔ – □ ỷ ˇ ╨ ĩ ن ص ╨ ؽ TEMP ٦ ő ɔ ḫ א TEMP ٦ ő ɔ ĩ ٠ ɔ – NTC

/ Function description

◆ **R1 R2**

ѭR1 R2 ļ ⋮ ℨ ɔ − □ ẙ ˇ ⅄ ƀ ♬ ѽ ɔ ɕ ɔ ɕ ⁋ . ḧ Φ ก ↑

ϕ ϕ ḧ ɔ − □ ẙ ƀ ѭTL~THΦ TLωTH)ψ ɔ − ɤ ĩ ق □ ẙ ㇵ ℨ♬ ѽ ɔ ɕ YNTCΦΦRTLѭ Ʊ ƀ □ ẙ TL`HΦ ΦRTH ѭ Ʊ ƀ □ ẙ TH`HΦ Φ RTL RTHΦ ₒ Φ ƀ □ ẙ TL`HΦ TEMP ㇵ ɔ ѭ χ

$$VTEMPL = \frac{R2||RTL}{\quad\quad} VIN$$

ƀ □ ẙ TH`HΦ TEMP ㇵ ɔ ѭ χ

$$VTEMPL = \frac{R2||RTH}{R1 + R2||RTH} VIN$$

ɨ Φ

$$VTEMPL = VHYCH = k2 \times Vcc(k2 = 0.8)$$

$$\Omega W = k1 \times V(k1 = 0.45) \; VTEMPH = VL$$

ɹ ê χ

$$R1 = \frac{RTL \times RTH(k2 - k1)}{(RTL \quad RTH)k2 \times k1}$$

$$\frac{RTL \times RTH(k2 - k1)}{\quad\quad}$$

ת Φ ƀ ' ɔ − ժ ĩ* □ ẙ ㇵ ℨ YPTCΦ♬ ѽ ɔ ɕΦ Φ ă 2

$$R1 = \frac{RTL \times RTH(k2 - k1)}{(RTH - RTL)k2 \times k1}$$

$$R2 = \frac{RTL \times RTH(k2 - k1)}{\quad\quad}$$

ϰ i ₌ ò Ṁ ~ Φ ể ϕ ḧ □ ẙ ƀ ת ɔ ◊ ɔ Vcc ĩ ṇ ԋѭΦ תR1 R2 RTH RTL ѿ ԋ ψ Ʊ ΦRTH RTL ِ ِ ک ԋ ɔ − ė q ă ِ ِ ƀ ڃ ⅄ ⁝ ê

ƀ ƀ ڳ Ƶ ɤ Φ Ɣ ԋ ≈ • ㇵ □ ẙ ⁼ ớ Φ R2 j ɤ Φ R1 o R1 ò Ṁ ψ ê ⅄ Φ

◆ **ΠUVLO**

ժ ڎ ڃ ɔ ت ļ ڑ ɔ ف Φ ˇ í ΦẊ VCC ₆ ڎ ڃ ڈ ں i ɔ ' Y ƀ ₩Ã UVLO ɔ ت Ṅ ɔ ' Y ƀ ₩Ã ƀ ' UVLO⅝ ڍ ㇵ ب ΨΦ ƀ VCC ₆ ⅝ ɔ − ɔ ڜ 100mV ɔ Ṅ j ҍ گ ₩Ã

/ Function description

◆

ñ ɔ Ỉ ע q ﻯ Ⱥ BRCL4058PZR-4.2 ٧ o ﭙ ɾ τ ω 1.8ms ▾ ᒐ H ڑ ⅝ ۍ ˡ ḾBAT Ậ ŭ i ɔ ڤ Φ ف ﻯ ˇ í Ę ɔ – ɔ ص 4.05V ε ᶻ ₇ Ḿ Ẓ ɔ – ķ ۍ 80% ₆ 90% ζ ï ᒐ ɔ Ỉ ע ﭙ Ȁ Ậ Ḋ ف ɔ – q ﻯ ᒐ Y ƥ ε ã ì ġ ζ ◗ ɔ ↑ ő Ẋ ﻁ ڤ Φ Ω ớ ɔ Ỉ ע ט ﷺ ɹ ƥ W ɔ Ỉ ע ص ١ CHRG Ậ ŭ ڑ ڤ ï ˜ I ↑ ő

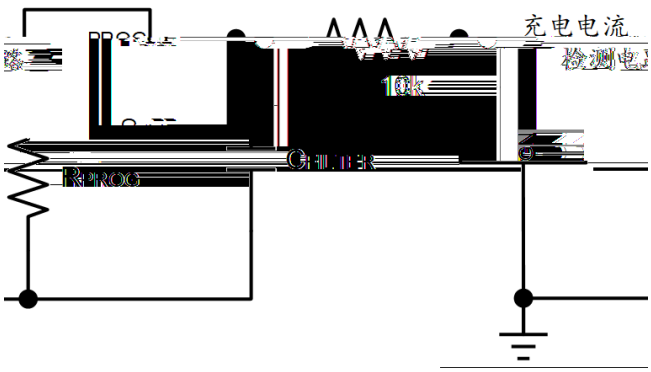
◆

ɻ ɔ – ﻝ ɔ ڑ ٧ ˜ ف ở ħ ɔ ₩ Ã ɪ ע ت ő ĺ ᶻ ƥ ˈ ﭙ ɾ ᵘ ሀ ɔ ķ ﷺ ừ ï ᒐ Y ٧ ħ ƥ ≡ ω ì ɔ – ᒐ H ₩ ɳ ﻯ ᒪ ɔ á ɲ ﭙ ɾ ڑ ɔ ķ Ẹ ﭙ ɾ ᶻ Ợ ﷺ Ḥ ESR ﻫ ɔ ķ ᒐ H á ɲ ᶣ ɾ ﻝ ɔ ķ Ỉ ﷺ 1Ω ɔ ﮓ ƀ ˈ ɾ ɔ ķ j ɹ ɻ Ỉ ɔ ﮓ

ƥ ở ħ ɔ ╚ ₩ Ã ɥ ɪ ע ت ﷺ ĩ PROG Ậ ŭ ă j ĩ ɔ – ở ħ ɔ ╚ ₩ Ã ﷺ ٧ ħ ớ ᴘ PROG Ậ ŭ ﮓ i ﷺ ẽ Ę PROG Ậ ŭ i ≡ ω ﮓ ɾ ɔ ķ RPROG J̌ Ỏ ح ڑ 20kΩ ᒐ H ɔ ٧ ħ ɨ ă PROG ` ᴇ ﷺ ɨ ᵘ ɔ ķ ɲ ɸ ħ ɔ ﮓ ﷺ ω ᶻ ķ ƥ ﮓ PROG Ậ ŭ i ﷺ ‖ ᴇ ļ ' Ẓ ᒐ Y ƥ 100kHz i % ƀ ' PROG Ậ ŭ è ƥ ķ ớ ق ɔ CPROG ﭙ ɾ ï Ã ʃ ɯ ٧ RPROG ﷺ ω ᶻ ɔ ﮓ χ

$$R_{PROG} \leq \frac{1}{2\pi \cdot 10^5 \cdot C_{PROG}}$$

ɾ Ȁ ˜ ỵ G ﻍ ﷺ ĩ ɔ ɔ ╚ ă j ĩ ˀ õ ɔ ╚ ƀ ƀ ˈ ظ Φ ƥ Ḥ ɔ ╚ ₩ Ã ﷺ Â ɦ ɔ ◊ ﻝ ɔ – Ẋ ỉ ᴋ BAT Ậ ŭ ╚ ﷺ Ẉ ẓ ɔ ╚ ụ Ẃ ⅝ õ ɔ ╚ ỉ ˙ ˜ ɾ ﭙ ɻ ƥ ف ٧ ʃ ƥ PROG Ậ ŭ i ﭙ ɾ ٧ ﷺ RC ▾ ᒪ ɾ ‖ ﷺ Ẉ ẓ ﷺ ɔ – ɔ ╚ ε ƀ ï g Ȁ ˜ ζ ƥ PROG Ậ ŭ ▾ ᒪ ɔ ķ ڑ ɯ ɸ 10k ﷺ ɔ ﮓ . ٧ ħ ớ



◆

ƀ Ɑ ﻝ □ ˚ ע ᴸ □ ỷ PCB ụ ṕ ق ɔ Ṃ Ꝉ ɿ ʒ ٧ ^ ٧ ﻯ ⁞ ˜ Ω PD ﻝ □ ˖ ï Ã ∂ ê χ

$$T_J = P_D \times \theta_{JA} + T_A$$

/ Function description

◆

ɬ ό ɔ IC▯ ı ' ̈Ω ă PD ʒ̆ ɭ ˈ Ţ ε V_{IN}-V_{BAT} ζ ɔ ɔ ╙ ε I_{CHG} ζ ˜ ḧ :

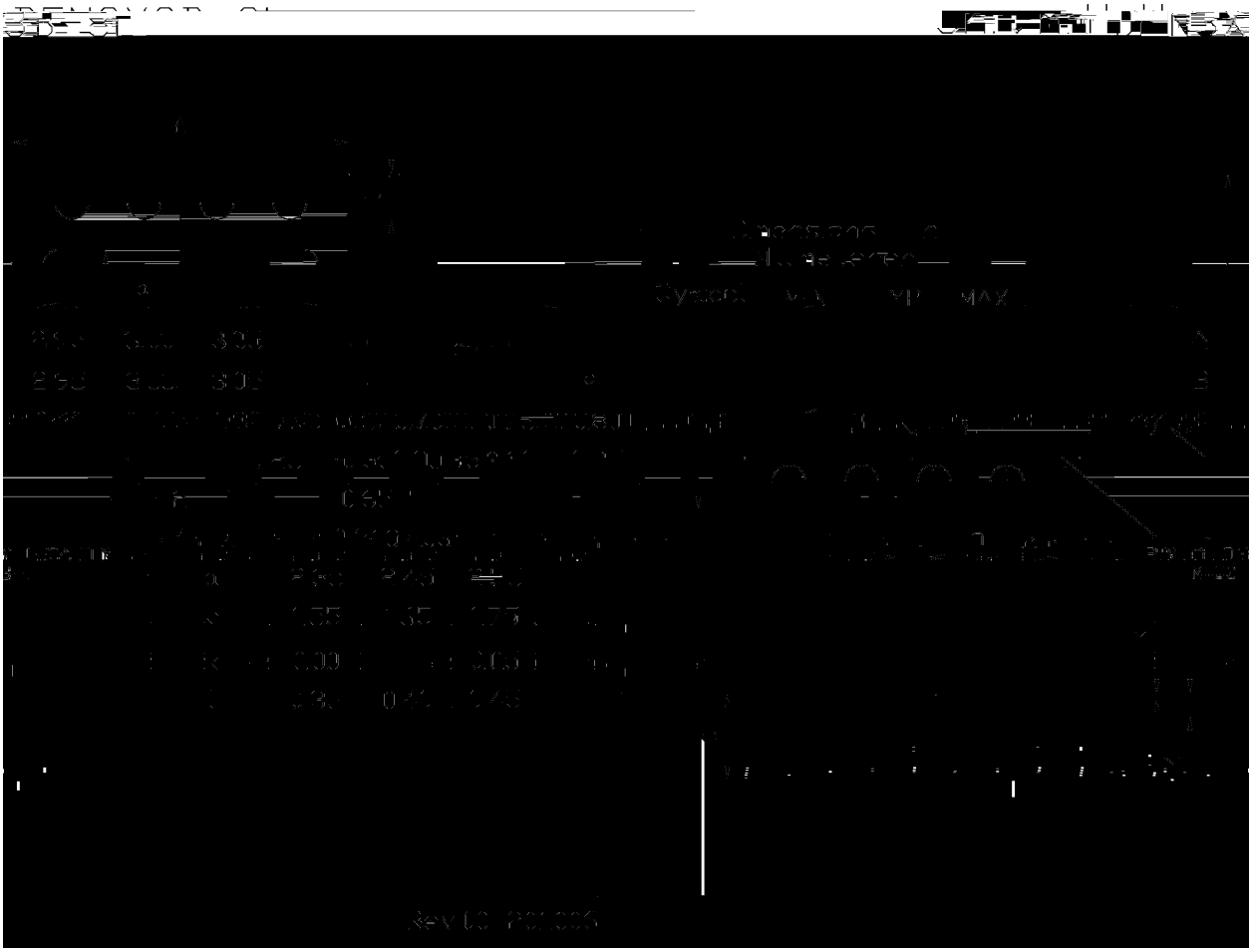
$$P_D = \varepsilon V_{IN}-V_{BAT} \zeta * I_{CHG}$$

Ẹ ɔ − ɔ ̧ Ḥ ε ḅ 3.6V ζ ̀H Ţ ̧ ᶻ ĺ ϕ ɔ ╙ ɔ ₹ ♬ Ⱥ ̱

Ẹ ɔ − ɔ ɤ ε ḅ 4.0V ζ ̀H Ţ ṇ % ̀H ṇ Ẅ ɰ ᶻ ɔ ╙ ε 5%~10% ζ Ƙ ̓Y PD ƥ

ת ƥ ώ ɤ ̃Ω ѽ ' ɔ ѧ ẙ

/ Package Dimensions



/ Marking Instructions

ب ˝ χ

EU χ ѭ и .

738 ; S χ ѭ ʒ N .

75 χ ˊ ڑ ɔ 715Y

---- χ ѭ ı ӈ N . ɕ ı ӈ N Ψ

( ) / Temperature Profile for IR Reflow Soldering(Pb-Free)

ب ˝ χ

1 أ ♬ □ ỷ 150 180 `H ژ 60

Note: