DESCRIPTION

The A8230A is a high performance ultra low-dropout constant current bias supply for white LEDs. It can be used as an alternative to the simple ballast resistors in conventional parallel white LEDs applications. For dimming control, an enable input pin is controlled by processor GPIO output pulses for 32 level linear current. Using a low frequency PWM waveform to this enable input pin also controls the average LED current which is proportional to the PWM duty.

The A8230A is suitable for single cell Li-ion bat-tery power device that using low forward voltage white LEDs. The white LEDs can be powered directly from battery without extra external components. This takes an advantage of highest efficiency and creates no EMI problem.

The A8230A is available in SOT-26 package.

ORDERING INFORMATION

Package Type		Part Number
SOT-26	E6	A8230AE6R
		A8230AE6VR
Note	R: Tape & Reel	
	V: Green Package	
AiT provides all Pb free products		
Suffix " v " means Green Package		

FEATURES

● Ultra Low 200mV Dropout at 20mA

● 0.6% High Accuracy Current Matching

● 20mA Full Scale Current

● 32 Level Linear Current Brightness Control

● PWM Brightness Control

● 2.5V to 6V Supply Voltage Range

● Thermal shutdown function

● Under-voltage protection function

● Available in SOT-26 Package

APPLICATION

● Mobile Phones

● White LED backlighting

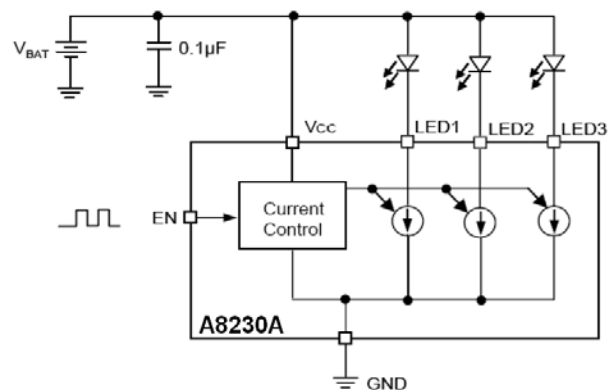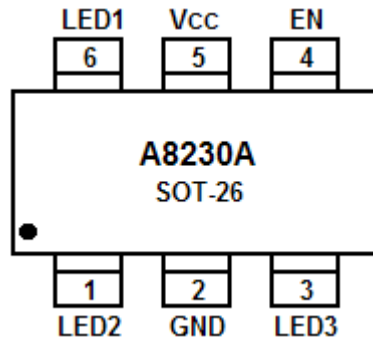● Camera Flash LED Lighting

TYPICAL APPLICATION

Figure 1

PIN DESCRIPTION

Top View

PIN #	Symbol	Function
1	LED2	LED2 bias current input
2	GND	Ground
3	LED3	LED3 bias current input
4	EN	Enable Dimming control
5	V_{CC}	Power supply
6	LED1	LED1 bias current input

ABSOLUTE MAXIMUM RATINGS

V_{CC} to GND	-0.3V to +7.0V
EN, LED1, LED2, LED3 to GND	-0.3V to V_{CC}+0.3V
Operating Temperature Range	-40°C to 85°C
Junction Temperature	125°C
Storage Temperature	-65°C to 150°C
Reflow Temperature (soldering, 10sec)	260°C

Stresses above may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

V_{IN} = 3.6V, EN = 3.6V (T_A = 25℃, except specify)

| Parameter	Symbols	Conditions	Min	Typ	Max	Unit
Input Supply Voltage	V_{IN}		2.5	-	6	V
Undervoltage Lockout Threshold	V_{UVLO}		-	1.8	-	V
Current into LED 1,2,3 and 4	I_{LED}	MAX I_{LED}	18	20	22	mA
Shutdown Current	I_{SHDN}	V_{IN} = 5V, EN = 0V	-1	-	+1	uA
LED Pin Voltage Dropout	$V_{LED-DROP}$	VLED(DROP), 90% Max I_{LED}	-	150	200	mV
Output Current Line Regulation	$I_{LED-LINEAR}$	V_{LED} = 0.5V ~ 2V	-0.6	-	+0.6	%/V
Current Matching	$I_{LED-LED-ERR}$	2mA < I_{LED} < 30mA	-4	-	+4	%
Thermal Shutdown Threshold	-		-	150	-	℃
EN Pin Input Voltage High	V_{IH}		2	-	-	V
EN Pin Input Voltage Low	V_{IL}		-	-	0.8	V
EN Pin Input Current	I_{EN}		-1	-	+1	uA
EN Pin Off Timeout	T_{OFF}		40	80	200	uS
EN Pin End of Pulse Timeout	T_{EOP}		40	80	200	uS
EN Pin Pulse High Time	T_{HIGH}		5	-	30	uS
EN Pin Pulse Low Time	T_{LOW}		5	-	30	uS

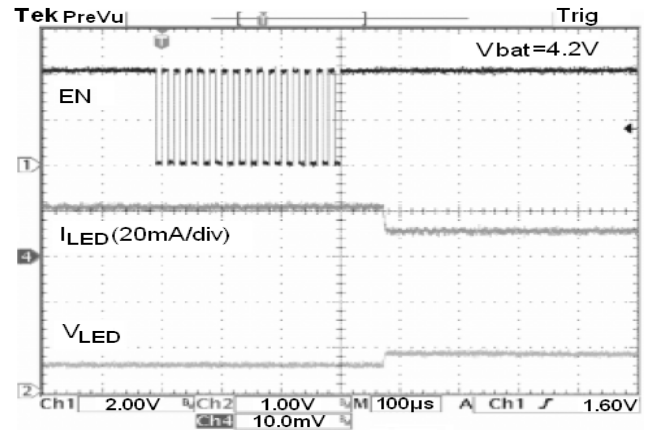## TYPICAL CHARACTERISTICS

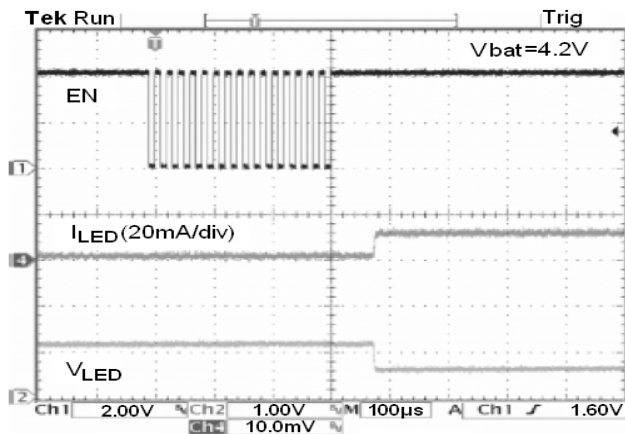V_{CC} = V_{EN} = 3.6V, V_{LED} = 0.5V, T = 25°C, unless otherwise noted.

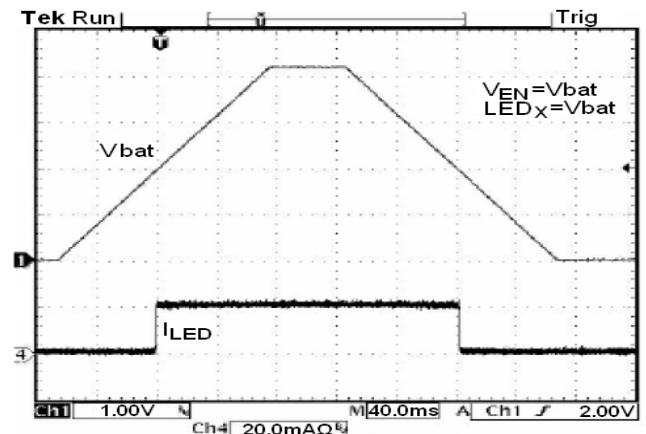1.   PWM Diming Waveform
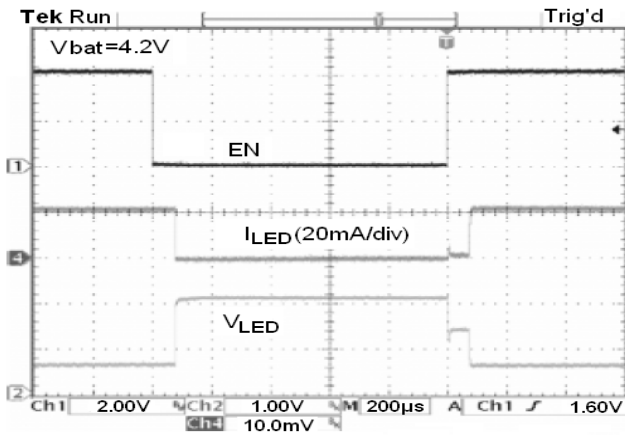
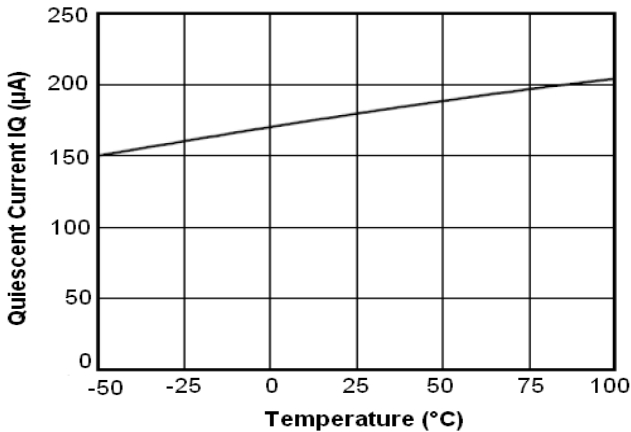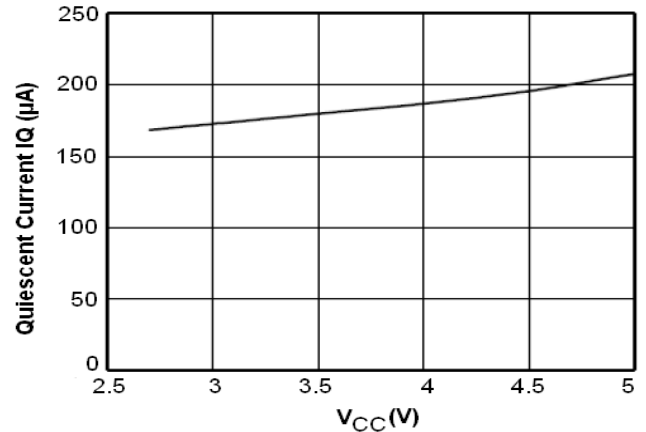2.   Linear Diming Waveform

3.   Linear Diming Waveform

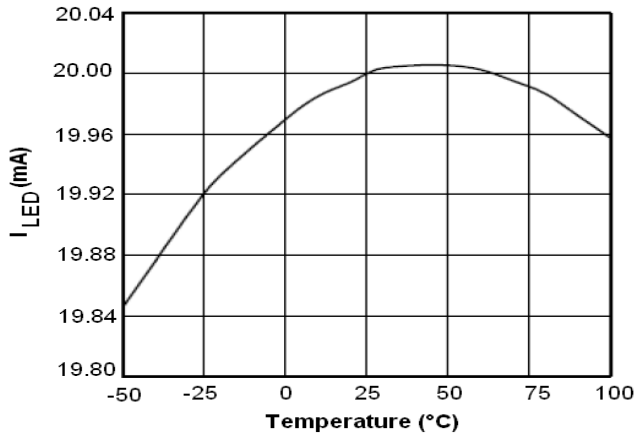4.   Input Voltage UVLO

5.   Quiescent Current vs Temperature
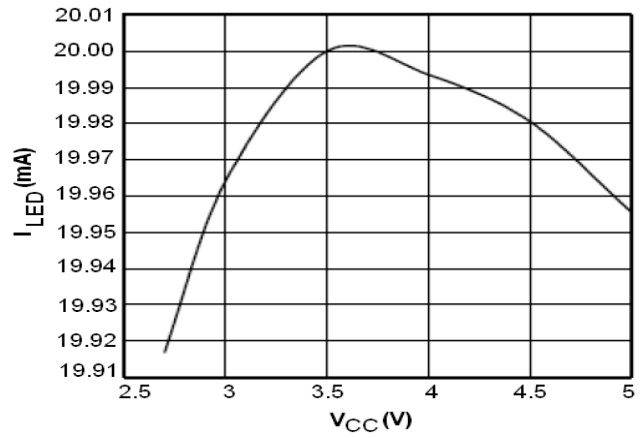

6.   Quiescent Current vs V_{CC}

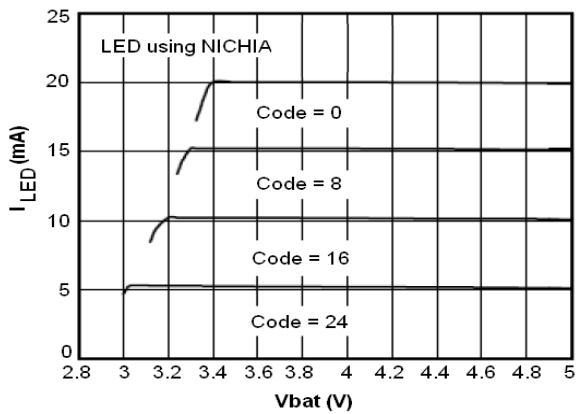$V_{CC} = V_{EN} = 3.6V$, $V_{LED} = 0.5V$, T = 25°C, unless otherwise noted.
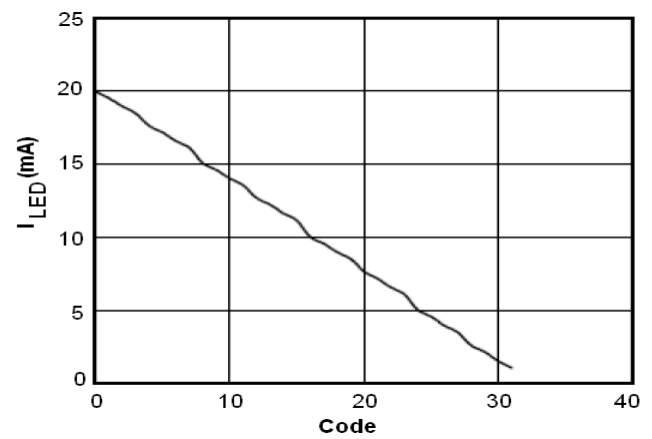
7. I_{LED} vs Temperature

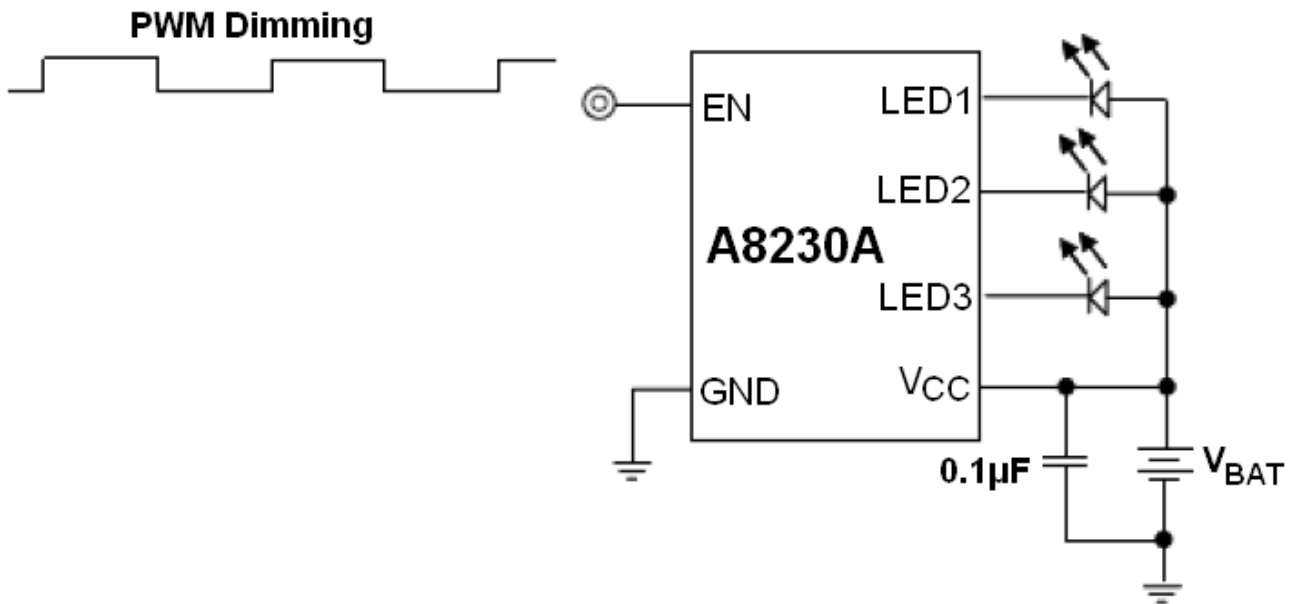8. I_{LED} vs V_{CC}

9. I_{LED} vs Vbat
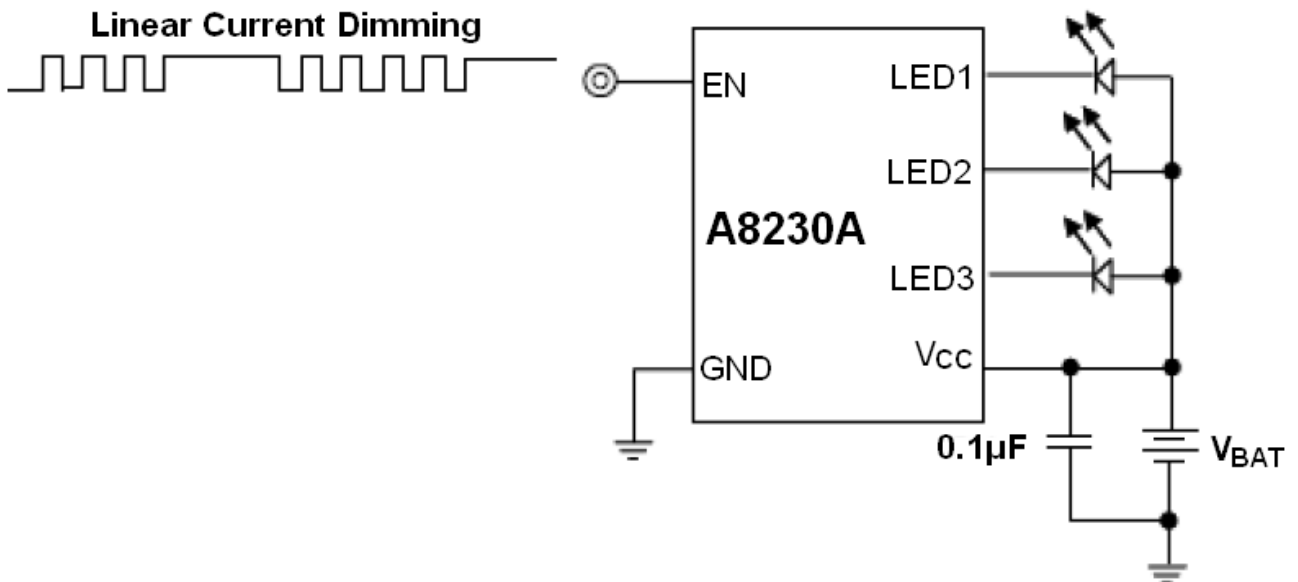

10. I_{LED} vs Code

APPLICATION CIRCUIT

● PWM brightness mode

● 32 linear current brightness adjustment mode

DETAILED INFORMATION

A8230A LED pins act as well matched current source driving LED diode to ground. An EN pin is used to turn on and turn off A8230A.When applying a lower frequency (less than 2kHz) PWM waveform to EN pin, the average LED current will be duty x 20mA (typical). Refer to Fig.1
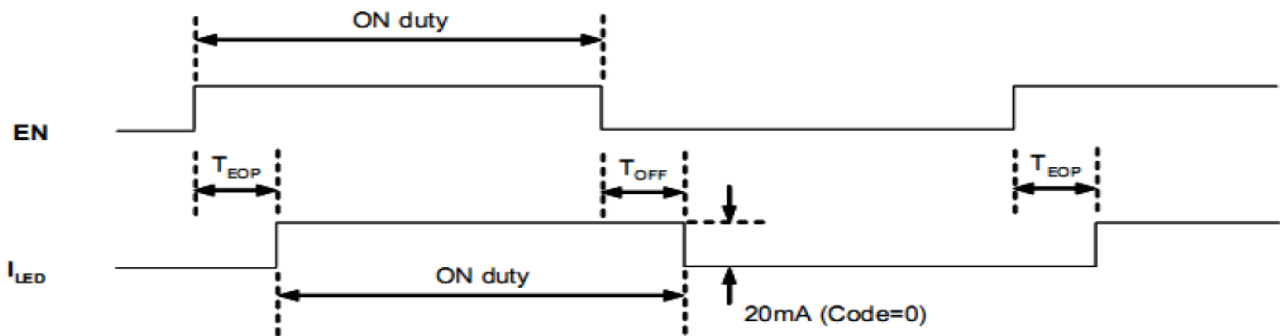

Figure 1. Turn On To PWM Dimming

If the application is not suitable to apply such a low frequency PWM dimming waveform, this EN pin can be negatively pulsed to set continuous LED current. When no negative pulse is input to EN pin (Code = 0), the internal register will latched to set the maximum LED current, typically 20mA. Whenever input N negative pulses to the EN pin, it will get a LED current corresponding to Code N. In this manner, LED current will changed from previous value to new value after the last pulse for typical 80µs (TEOP). Please refer to Fig.2
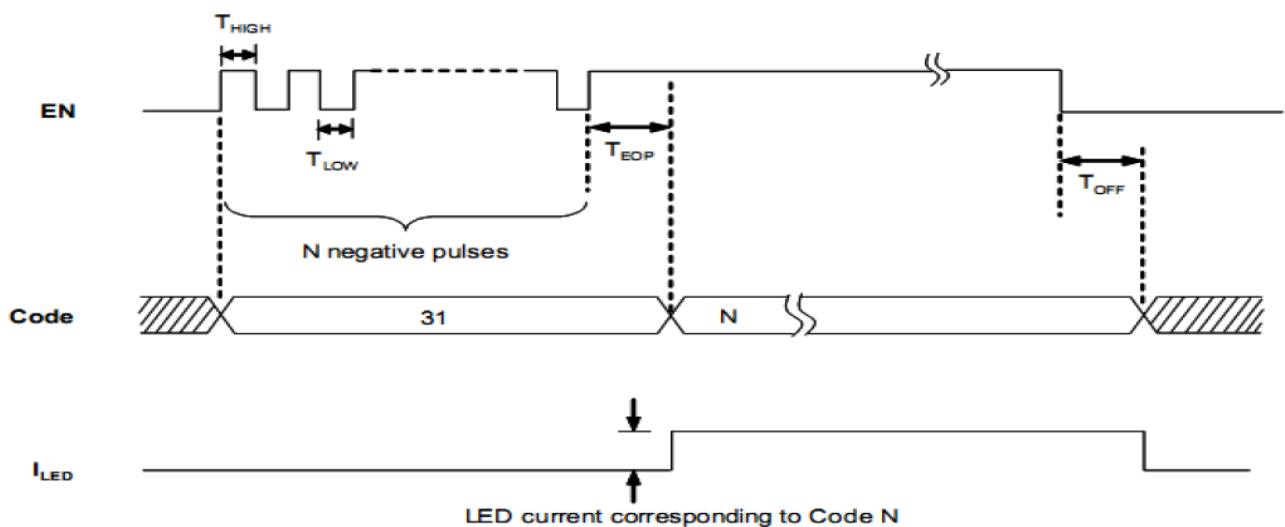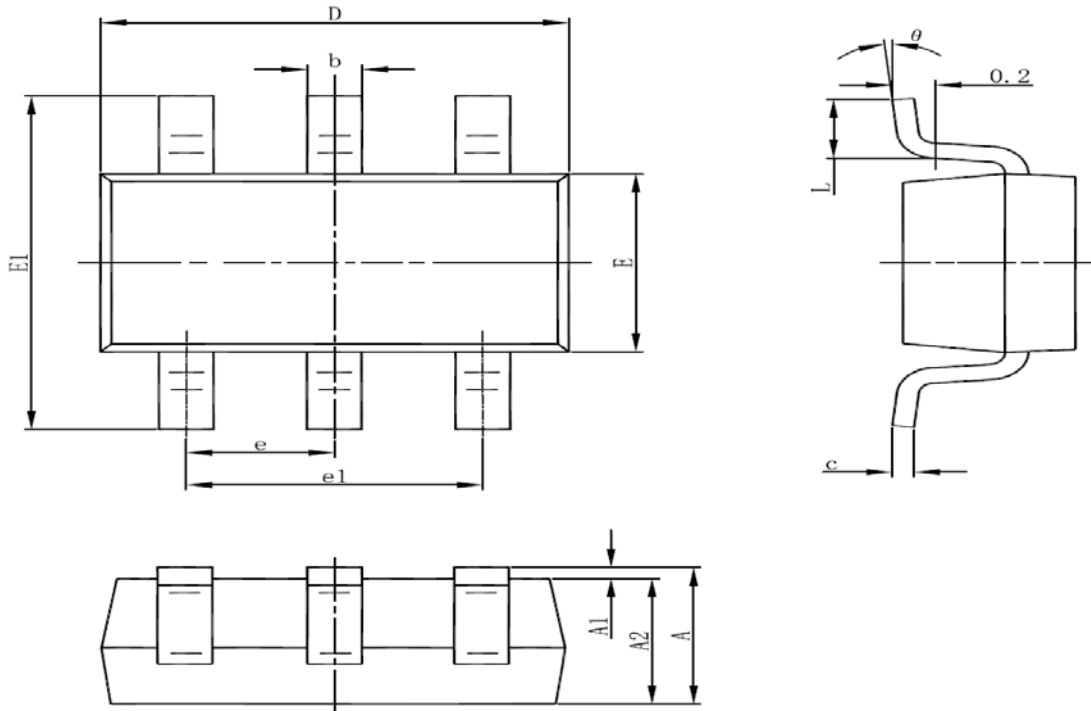

Figure 2. Turn On And Config Code N

PACKAGE INFORMATION

Dimension in SOT-26 Package (Unit: mm)

SYMBOL	MIN	MAX
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950(BSC)	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°

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