# Low power consumption, Low dropout voltage, With CE function

## General Description

GX6213 series are highly precise, low power consumption, high voltage, positive voltage regulators manufactured using CMOS and laser trimming technologies .The series provides large currents with a significantly small dropout voltage.

The current limiter's foldback circuit also operates as a short protect for the output current limiter and the output pin. The CE function allows the output of regulator to be turned off, resulting in greatly reduced power consumption.

## Features

- Highly Accurate：Vout=3.3V：±1%
  Others：±2%
- Output voltage range：1.2V~5.0V
- Low power consumption：7.5uA(TYP.)
- Large output current：
  300mA ($V_{IN}$＝3.8V,$V_{OUT}$＝2.8V)
- Input voltage: up to 6 V
- Dropout voltage：
  0.11V at 100mA and 0.23V at 200mA
- CE Pin Function : Active High
- Short-circuit Current：45mA(TYP.)
- Excellent Input Stability
- Be available to regulator and reference voltage

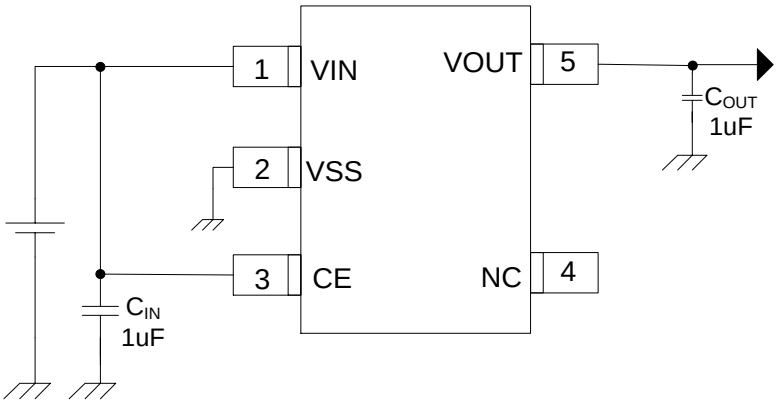
## Typical Application

- Battery powered equipment
- Communication tools
- Mobile phones
- Portable games
- Portable AV systems
- Cameras, Video systems
- Reference voltage sources

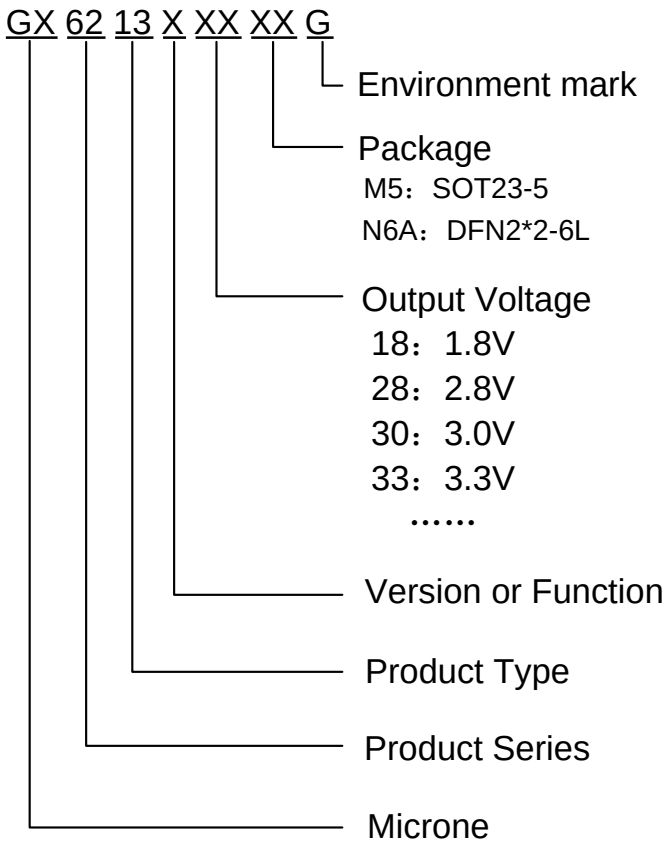
## Package

- 5-pin SOT23-5
- 6-pin DFN2×2-6L

## Typical Application Circuit



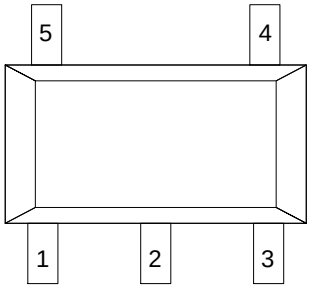

## Selection Guide



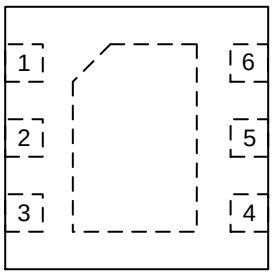

| product series | Output voltage | Package |
|---|---|---|
| GX6213C18M5G | 1.8V | SOT23-5 |
| GX6213C28M5G | 2.8V | SOT23-5 |
| GX6213C30M5G | 3.0V | SOT23-5 |
| GX6213C33M5G | 3.3V | SOT23-5 |
| GX6213C33N6AG | 3.3V | DFN2*2-6L |

**NOTE:** If you need other voltage and package, please contact our sales staff。

## Pin Configuration




SOT23-5



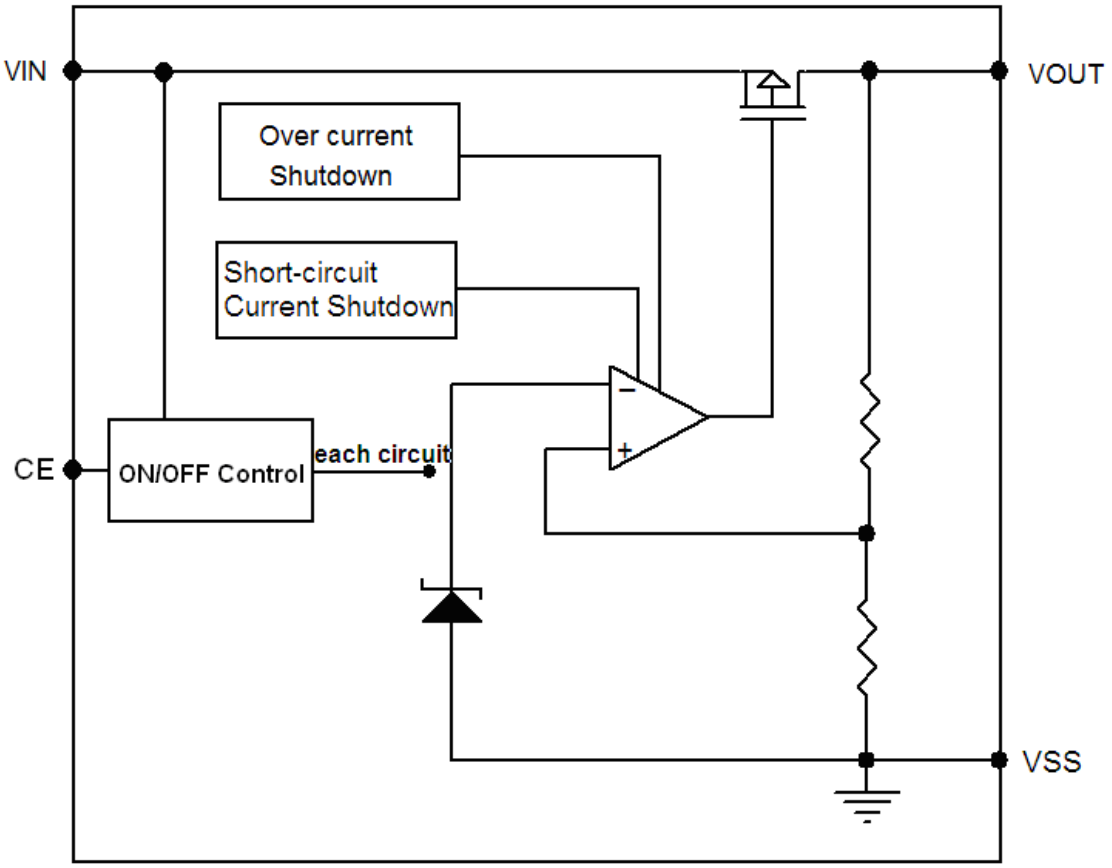

DFN2*2-6L

## Pin Assignment

| Pin Number<br>SOT23-5 | Pin Name | Functions |
|---|---|---|
| 1 | $V_{IN}$ | Power Input |
| 2 | $V_{SS}$ | Ground |
| 3 | CE | ON / OFF Control |
| 4 | NC | No Connect |
| 5 | $V_{OUT}$ | Output |

| Pin Number<br>DFN2×2-6L | Pin Name | Functions |
|---|---|---|
| 1 | CE | ON / OFF Control |
| 2 | $V_{SS}$ | Ground |
| 3 | $V_{IN}$ | Power Input |
| 4 | $V_{OUT}$ | Output |
| 5 | NC | No Connect |
| 6 | NC | No Connect |

## Block Diagram




## Absolute Maximum Ratings

| Parameter | | Symbol | Ratings | Units |
|---|---|---|---|---|
| Input Voltage | | $V_{IN}$ | 6.5 | V |
| Output Current | | $I_{OUT}$ | 420 | mA |
| Output Voltage | | $V_{OUT}$ | Vss-0.3～$V_{IN}$ +0.3 | V |
| CE Pin Voltage | | $V_{CE}$ | Vss-0.3～$V_{IN}$ +0.3 | V |
| Power Dissipation | SOT23-5 | $P_D$ | 250 | mW |
| Operating Temperature Range | | $T_{OPR}$ | －40～＋85 | ℃ |
| Storage Temperature Range | | $T_{STG}$ | －55～＋150 | ℃ |
| Lead Temperature | | | 260℃，4sec | |

## Electrical Characteristics

### GX6213C28

($V_{IN}$= $V_{OUT}$+1V，$V_{CE}$＝$V_{IN}$ ，$C_{IN}$=$C_{OUT}$=1uF，Ta=25$^{O}$C，unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$(E)<br>(Note 2) | $I_{OUT}$=30mA,<br>$V_{IN}$= $V_{OUT}$+1V | X 0.98 | $V_{OUT}$ (T)<br>(Note 1) | X 1.02 | V |
| Input Voltage | $V_{IN}$ | | 2.8 | | 6 | V |
| Maximum Output Current | $I_{OUTMAX}$ | $V_{IN}$= $V_{OUT}$+1V | | 300 | | mA |
| Load Regulation | $\Delta V_{OUT}$ | $V_{IN}$= $V_{OUT}$+1V , | | 4 | | mV |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 1mA≤$I_{OUT}$≤100mA | | | | |
| Dropout Voltage(Note 1) | $V_{DIF1}$ | $I_{OUT}$ =100mA | | 110 | | mV |
| | $V_{DIF2}$ | $I_{OUT}$ =200mA | | 230 | | mV |
| Supply Current | $I_{SS}$ | $V_{IN}$= $V_{OUT}$+1V | | 7.5 | | μA |
| Stand-by Current | $I_{CEL}$ | $V_{CE}$＝0V | | 0.02 | | μA |
| Line Regulation | $\Delta V_{OUT}$ | $I_{OUT}$ =30mA<br>$V_{OUT}$+1V ≤$V_{IN}$≤6V | | 5 | | mV |
| CE “High” Voltage | VCEH | Start up | 1.0 | | | V |
| CE “Low” Voltage | VCEL | Shut down | | | 0.5 | V |
| Short-circuit Current | $I_{SHORT}$ | $V_{IN}$= $V_{OUT}$+1V, $V_{CE}$＝$V_{IN}$,<br>$V_{OUT}$＝0V | | 45 | | mA |
| Over Current Protection | $I_{limit}$ | $V_{IN}$= 3.8V | | 430 | | mA |

**GX6213C33**

($V_{IN}$= $V_{OUT}$+1V，$V_{CE}$＝$V_{IN}$ ，$C_{IN}$=$C_{OUT}$=1uF，Ta=25$^{O}$C，unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$(E)<br>(Note 2) | $I_{OUT}$=30mA,<br>$V_{IN}$= $V_{OUT}$+1V | X 0.99 | $V_{OUT}$ (T)<br>(Note 1) | X 1.01 | V |
| Input Voltage | $V_{IN}$ | | 3.3 | | 6 | V |
| Maximum Output Current | $I_{OUTMAX}$ | $V_{IN}$= $V_{OUT}$+1V | | 350 | | mA |
| Load Regulation | $\Delta V_{OUT}$ | $V_{IN}$= $V_{OUT}$+1V ,<br>1mA≤$I_{OUT}$≤100mA | | 4 | | mV |
| Dropout Voltage (Note 1) | $V_{DIF1}$ | $I_{OUT}$ =100mA | | 100 | | mV |
| | $V_{DIF2}$ | $I_{OUT}$ =200mA | | 200 | | mV |
| Supply Current | $I_{SS}$ | $V_{IN}$= $V_{OUT}$+1V | | 7.5 | | μA |
| Stand-by Current | $I_{CEL}$ | $V_{CE}$＝0V | | 0.02 | | μA |
| Line Regulation | $\Delta V_{OUT}$ | $I_{OUT}$ =30mA<br>$V_{OUT}$+1V ≤$V_{IN}$≤6V | | 4 | | mV |
| CE “High” Voltage | VCEH | Start up | 1.0 | | | V |
| CE “Low” Voltage | VCEL | Shut down | | | 0.5 | V |
| Short-circuit Current | $I_{SHORT}$ | $V_{IN}$= $V_{OUT}$+1V, $V_{CE}$＝$V_{IN}$,<br>$V_{OUT}$＝0V | | 45 | | mA |
| Over Current Protection | $I_{limit}$ | $V_{IN}$= 4.3V | | 440 | | mA |

Note ：

1. $V_{OUT}$ (T) ： Specified Output Voltage

2.$V_{OUT}$ (E) ： Effective Output Voltage ( Ie. The output voltage when “$V_{OUT}$ (T)+1.0V”is provided at the Vin pin while maintaining a certain Iout value.)

3.$V_{DIF}$： $V_{IN1}$ –$V_{OUT}$ (E)’

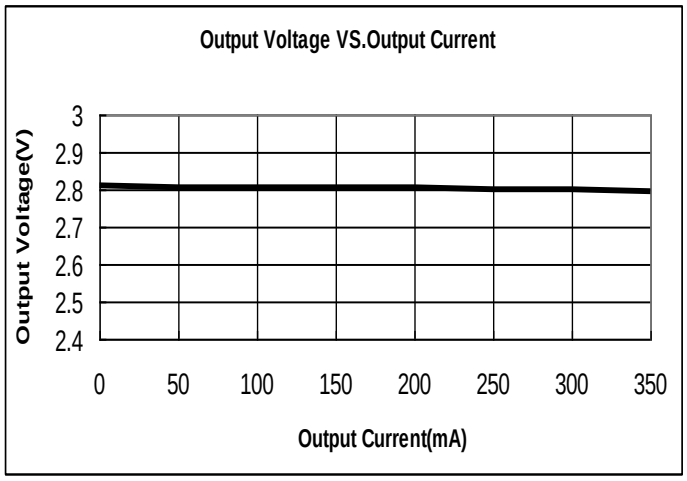
$V_{IN1}$ ： The input voltage when $V_{OUT}$(E)’ appears as input voltage is gradually decreased.

$V_{OUT}$ (E)’=A voltage equal to 98% of the output voltage whenever an amply stabilized Iout {$V_{OUT}$ (T)+1.0V} is input.

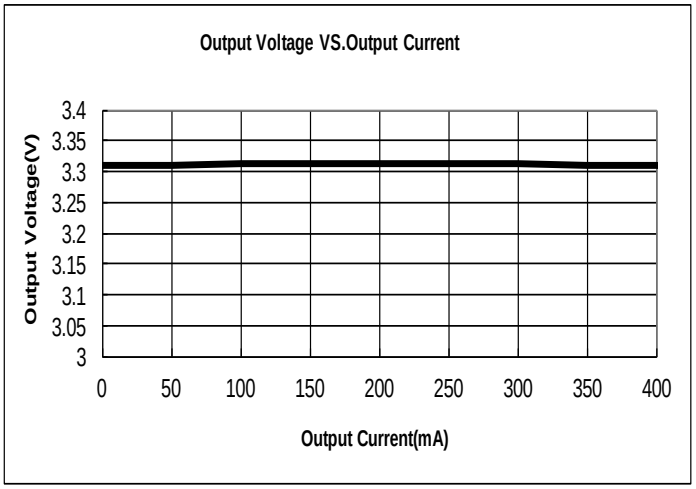
## Type Characteristics

（1）Output Voltage VS. Output Current （$V_{IN}=V_{OUT}+1$, **Ta = 25 °C**）

GX6213C28

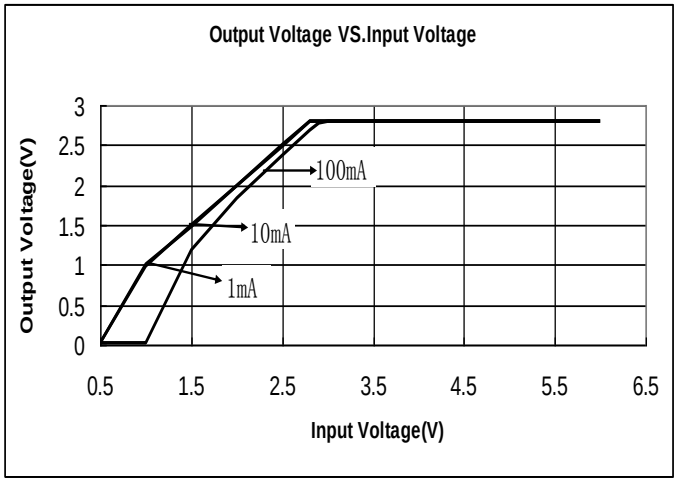



GX6213C33

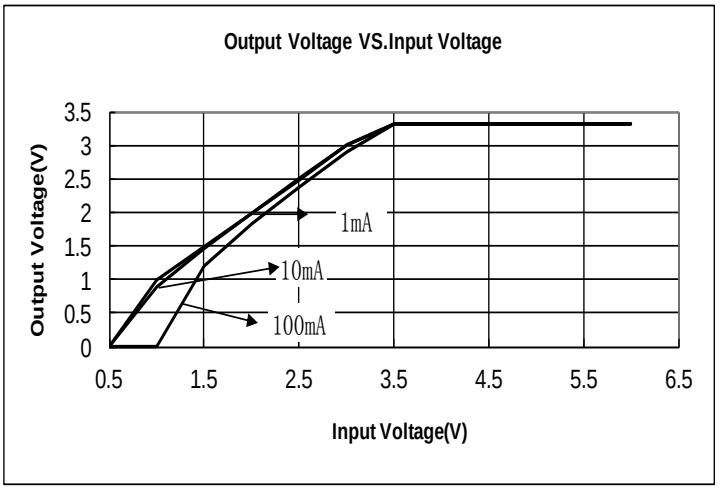



（2）Output Voltage VS. Input Voltage（**Ta = 25 °C**）

GX6213C28

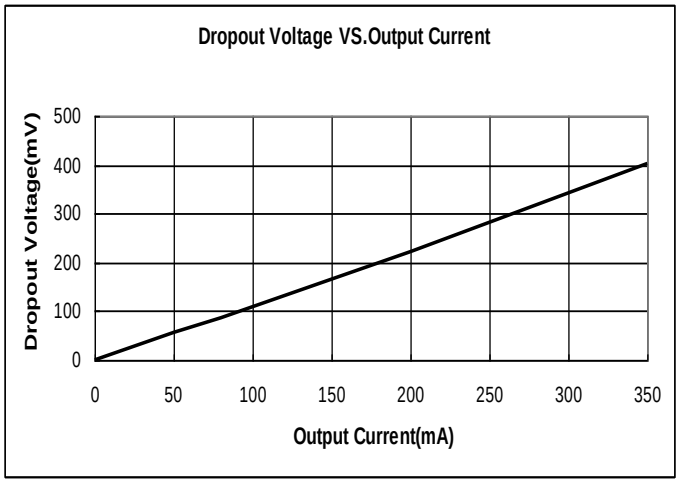



GX6213C33

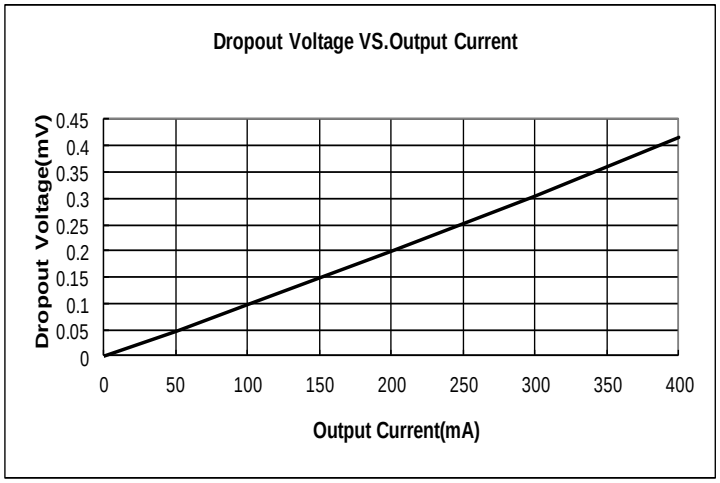



（3）Dropout Voltage VS. Output Current （$V_{IN}=V_{OUT}+1V$,**Ta = 25 °C**）

GX6213C28

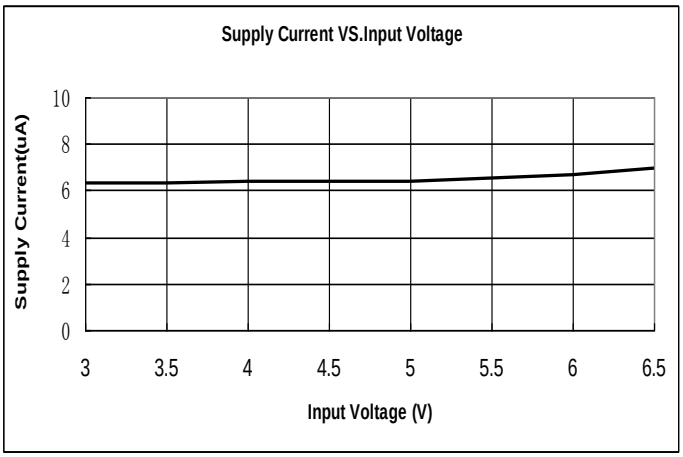



GX6213C33

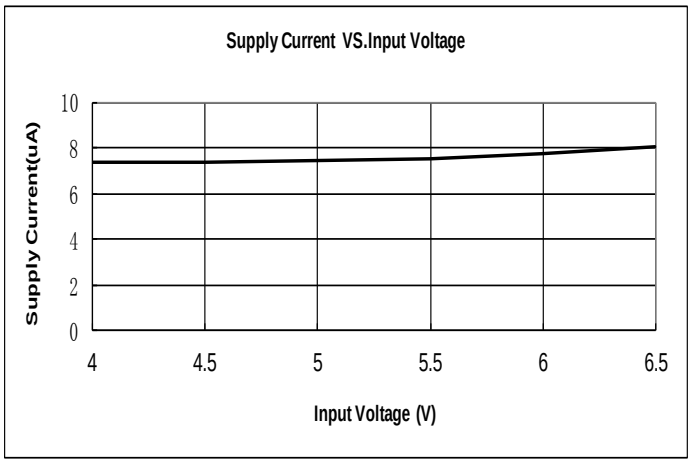


（4）Supply Current VS. Input Voltage （**Ta = 25 °C**）

GX6213C28

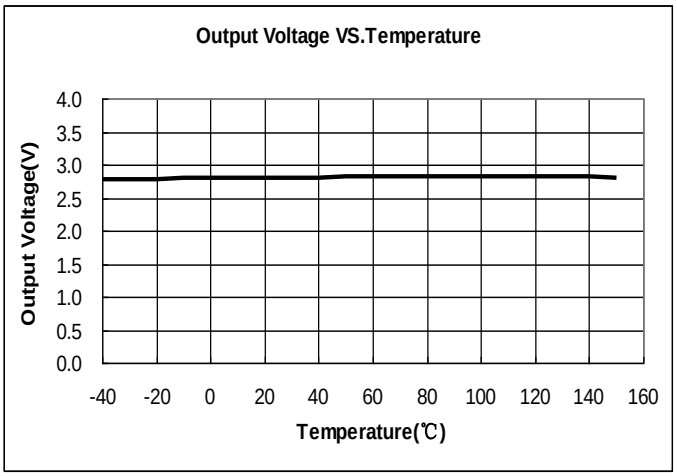



GX6213C33

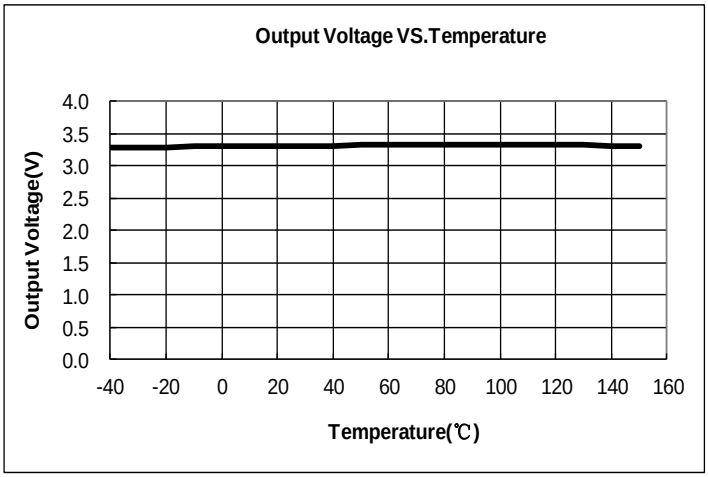



（5）Output Voltage VS. Temperature ($V_{IN}$=$V_{OUT}$+1V, $I_{OUT}$ =10mA)

GX6213C28

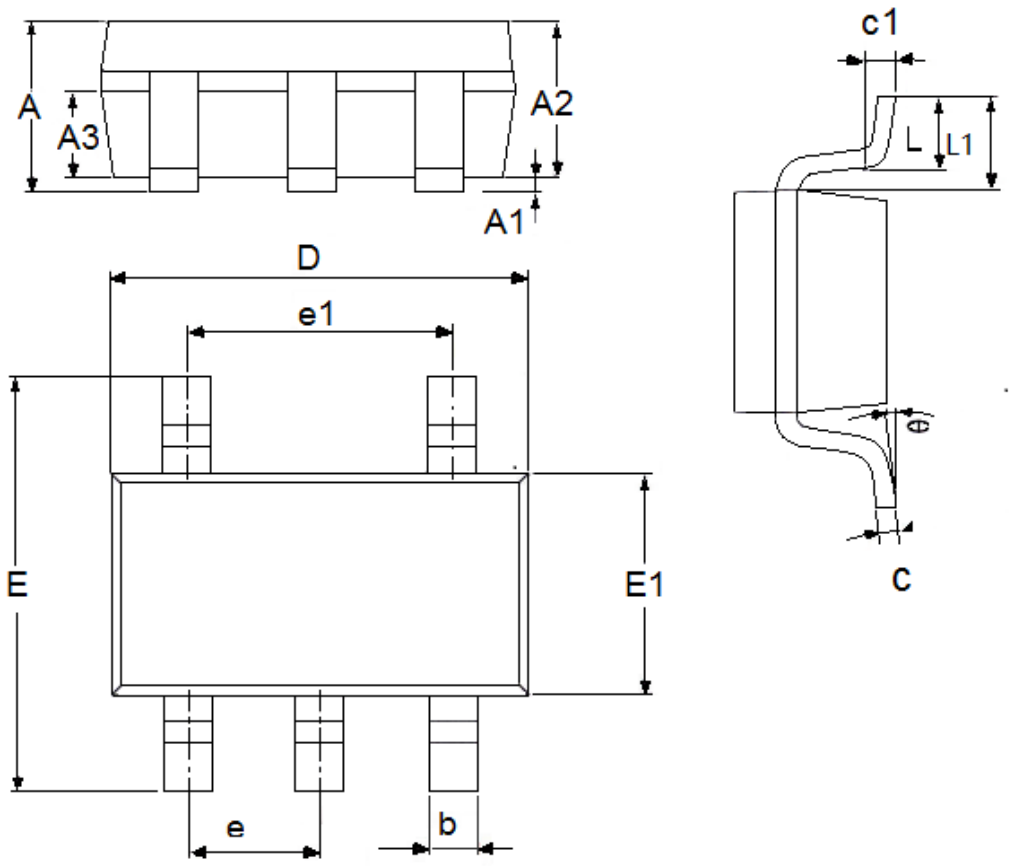



GX6213C33



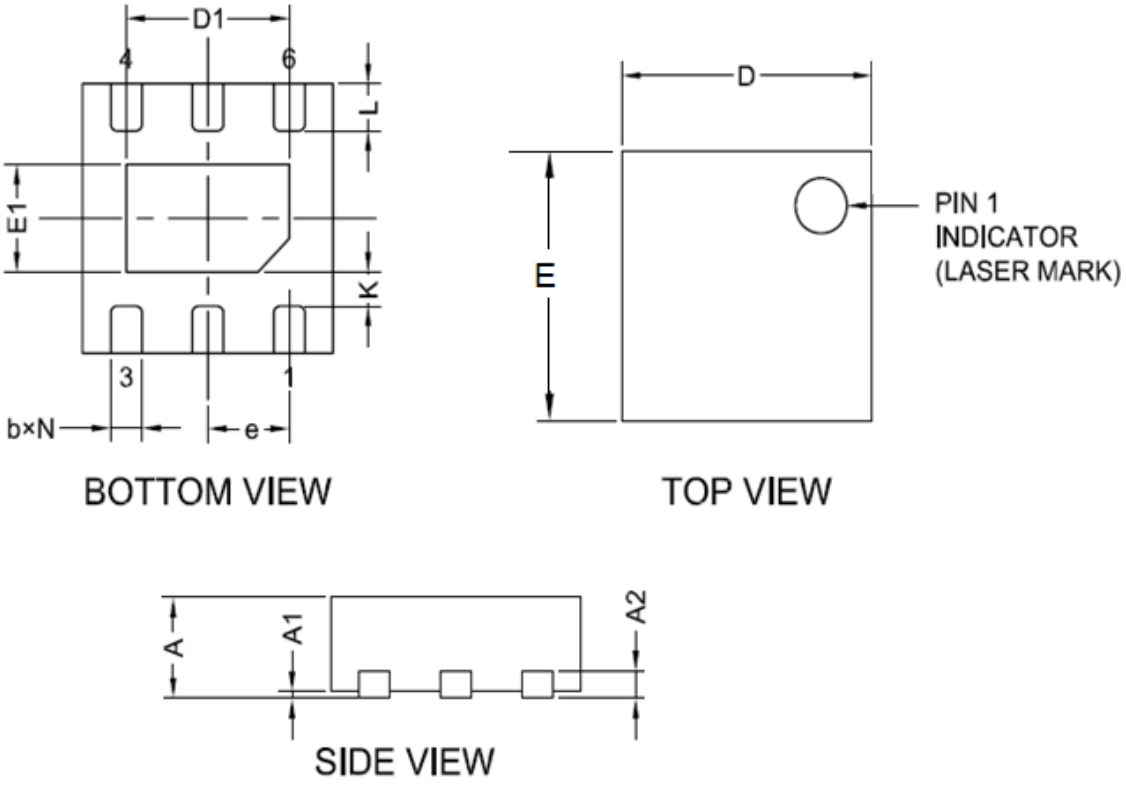
## Packaging Information

- SOT23-5L




| DIM | Millimeters | | Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.05 | 1.45 | 0.0413 | 0.0571 |
| A1 | 0 | 0.15 | 0.0000 | 0.0059 |
| A2 | 0.9 | 1.3 | 0.0354 | 0.0512 |
| A3 | 0.6 | 0.7 | 0.0236 | 0.0276 |
| b | 0.25 | 0.5 | 0.0098 | 0.0197 |
| c | 0.1 | 0.23 | 0.0039 | 0.0091 |
| D | 2.82 | 3.05 | 0.1110 | 0.1201 |
| e1 | 1.9(TYP) | | 0.0748(TYP) | |
| E | 2.6 | 3.05 | 0.1024 | 0.1201 |
| E1 | 1.5 | 1.75 | 0.0512 | 0.0689 |
| e | 0.95(TYP) | | 0.0374(TYP) | |
| L | 0.25 | 0.6 | 0.0098 | 0.0236 |
| L1 | 0.59(TYP) | | 0.0232(TYP) | |
| θ | 0 | 8° | 0.0000 | 8° |
| c1 | 0.2(TYP) | | 0.0079(TYP) | |

- DFN2x2-6L




| DIM | Millimeters | | Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.7 | 0.8 | 0.0276 | 0.0315 |
| A1 | 0 | 0.05 | 0 | 0.002 |
| A2 | 0.203(TYP) | | 0.008(TYP) | |
| b | 0.2 | 0.35 | 0.0078 | 0.0138 |
| D | 1.9 | 2.1 | 0.0748 | 0.0827 |
| E | 1.9 | 2.1 | 0.0748 | 0.0827 |
| E1 | 0.5 | 0.9 | 0.0197 | 0.0354 |
| e | 0.65(TYP) | | 0.0256(TYP) | |
| L | 0.25 | 0.426 | 0.0098 | 0.0168 |
| K | 0.2 | — | 0.0079 | — |
| D1 | 1 | 1.45 | 0.0393 | 0.0571 |

- The information described herein is subject to change without notice.
- Nanjing Micro One Electronics Inc is not responsible for any problems caused by circuits or diagrams described herein whose related industrial properties, patents, or other rights belong to third parties. The application circuit examples explain typical applications of the products, and do not guarantee the success of any specific mass-production design.
- Use of the information described herein for other purposes and/or reproduction or copying without the express permission of Nanjing Micro One Electronics Inc is strictly prohibited.
- The products described herein cannot be used as part of any device or equipment affecting the human body, such as exercise equipment, medical equipment, security systems, gas equipment, or any apparatus installed in airplanes and other vehicles, without prior written permission of Nanjing Micro One Electronics Inc.
- Although Nanjing Micro One Electronics Inc exerts the greatest possible effort to ensure high quality and reliability, the failure or malfunction of semiconductor products may occur. The user of these products should therefore give thorough consideration to safety design, including redundancy, fire-prevention measures, and malfunction prevention, to prevent any accidents, fires, or community damage that may ensue.