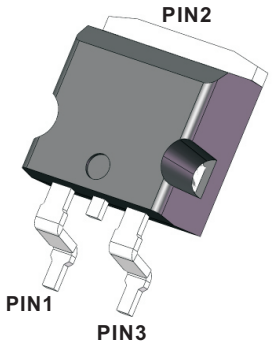
# Linear Integrated Circuit 3-Terminal 1.0A Positive Voltage Regulator

TO-263-2L(Prefix :G)




RoHS COMPLIANT

## Description

The 78XXG family is monolithic fixed voltage regulator integrated circuit. They are suitable for applications that required supply current up to 1.0A.

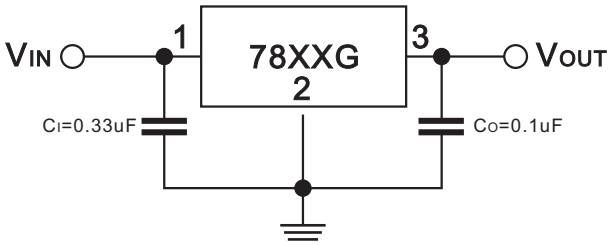
## Features

- Output current up to 1A
- Fixed output voltage of 5V, 6V, 8V, 9V, 12V, 15V available
- Thermal overload shutdown protection
- Output transistor SOA protection

## Mechanical data

- Case: TO-263-2L
- Approx. Weight: 1.52g ( 0.049oz)
- RoHS compliant
- Case Material: “Green” molding compound, UL flammability classification 94V-0,“Halogen-free”.

APPLICATION CIRCUIT




■**ABSOLUTE MAXIMUM RATINGS** (Operating temperature range applies unless otherwise specified)

| PARAMETER | | SYMBOLS | RATINGS | UNIT |
|---|---|---|---|---|
| Drain-Source Voltage | $V_{OUT}$=5~15V | $V_{IN}$ | 35 | V |
| Output Current | | $I_{OUT}$ | 1 | A |
| Power Dissipation | | $P_D$ | Internally Limited | W |
| Operating Temperature | | $T_{OPR}$ | -40 ~ +125 | °C |
| Storage Temperature | | $T_{STG}$ | -55 ~ +150 | °C |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■**THERMAL DATA**

| PARAMETER | SYMBOLS | RATINGS | UNIT |
|---|---|---|---|
| Junction to Ambient | $R_{thJA}$ | 61.5 | °C/W |
| Junction to Case | $R_{thJC}$ | 2.0 | °C/W |

■**ELECTRICAL CHARACTERISTICS** ($I_{OUT}$=1.0A, $T_J$= 0°C~125°C, $C_I$ =0.33μF, $C_O$=0.1μF, unless otherwise specified) (Note 1)

**7805G** ($V_{IN}$=10V)

| PARAMETER | SYMBOLS | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $T_J$ =25°C, $I_{OUT}$=5mA ~ 1.0A | 4.8 | 5.0 | 5.2 | V |
| | | $V_{IN}$ =7.5V ~ 20V, $I_{OUT}$=5mA ~ 1.0A,$P_D$≤15W | 4.75 | | 5.25 | V |
| Dropout Voltage | $V_D$ | $T_J$ =25°C | | 2.0 | | V |
| Load Regulation | △$V_{OUT}$ | $T_J$ =25°C,$I_{OUT}$=5mA ~ 1.0A | | | 50 | mV |
| | | $T_J$ =25°C,$I_{OUT}$=0.25A ~ 0.75A | | | 25 | mV |
| Line regulation | | $V_{IN}$ =7V ~ 25V, $T_J$ =25°C | | | 50 | mV |
| | | $V_{IN}$ =7.5V ~ 20V, $T_J$ =25°C, $I_{OUT}$=1.0A | | | 50 | mV |
| Quiescent Current | $I_Q$ | $T_J$ =25°C, $I_{OUT}$≤1.0A | | | 8.0 | mA |
| Quiescent Current Change | △$I_Q$ | $V_{IN}$ =7.5V ~ 20V | | | 1.0 | mA |
| | | $I_{OUT}$=5mA ~ 1.0A | | | 0.5 | mA |
| Output Noise Voltage | eN | 10Hz ≤ f ≤ 100kHz | | 40 | | uV |
| Ripple Rejection | RR | $V_{IN}$ =8V ~ 18V,f=120Hz, $T_J$ =25°C | 59 | 80 | | dB |
| Peak Output Current | $I_{PEAK}$ | $T_J$ =25°C | | 1.8 | | A |

**7806G** ($V_{IN}$=11V)

| PARAMETER | SYMBOLS | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $T_J$ =25°C, $I_{OUT}$=5mA ~ 1.0A | 5.76 | 6.0 | 6.24 | V |
| | | $V_{IN}$ =8.5V ~ 21V, $I_{OUT}$=5mA ~ 1.0A,$P_D$≤15W | 5.70 | | 6.30 | V |
| Dropout Voltage | $V_D$ | $T_J$ =25°C | | 2.0 | | V |
| Load Regulation | △$V_{OUT}$ | $T_J$ =25°C,$I_{OUT}$=5mA ~ 1.0A | | | 60 | mV |
| | | $T_J$ =25°C,$I_{OUT}$=0.25A ~ 0.75A | | | 30 | mV |
| Line regulation | | $V_{IN}$ =8V ~ 25V, $T_J$ =25°C | | | 60 | mV |
| | | $V_{IN}$ =8.5V ~ 21V, $T_J$ =25°C, $I_{OUT}$=1.0A | | | 60 | mV |
| Quiescent Current | $I_Q$ | $T_J$ =25°C, $I_{OUT}$≤1.0A | | | 8.0 | mA |
| Quiescent Current Change | △$I_Q$ | $V_{IN}$ =8.5V ~ 21V | | | 1.0 | mA |
| | | $I_{OUT}$=5mA ~ 1.0A | | | 0.5 | mA |
| Output Noise Voltage | eN | 10Hz ≤ f ≤ 100kHz | | 45 | | uV |
| Ripple Rejection | RR | $V_{IN}$ =9V ~ 19V,f=120Hz, $T_J$ =25°C | 56 | 75 | | dB |
| Peak Output Current | $I_{PEAK}$ | $T_J$ =25°C | | 1.8 | | A |

**7808G** ($V_{IN}$=14V)

| PARAMETER | SYMBOLS | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $T_J$ =25°C, $I_{OUT}$=5mA ~ 1.0A | 7.68 | 8.0 | 8.32 | V |
| | | $V_{IN}$ =10.5V ~ 23V, $I_{OUT}$=5mA ~ 1.0A,$P_D$≤15W | 7.60 | | 8.40 | V |
| Dropout Voltage | $V_D$ | $T_J$ =25°C | | 2.0 | | V |
| Load Regulation | △$V_{OUT}$ | $T_J$ =25°C,$I_{OUT}$=5mA ~ 1.0A | | | 80 | mV |
| | | $T_J$ =25°C,$I_{OUT}$=0.25A ~ 0.75A | | | 40 | mV |
| Line regulation | | $V_{IN}$ =10.5V ~ 25V, $T_J$ =25°C | | | 80 | mV |
| | | $V_{IN}$ =10.5V ~ 23V, $T_J$ =25°C, $I_{OUT}$=1.0A | | | 80 | mV |
| Quiescent Current | $I_Q$ | $T_J$ =25°C, $I_{OUT}$≤1.0A | | | 8.0 | mA |
| Quiescent Current Change | △$I_Q$ | $V_{IN}$ =10.5V ~ 23V | | | 1.0 | mA |
| | | $I_{OUT}$=5mA ~ 1.0A | | | 0.5 | mA |
| Output Noise Voltage | eN | 10Hz ≤ f ≤ 100kHz | | 58 | | uV |
| Ripple Rejection | RR | $V_{IN}$ =11.5V ~ 21.5V,f=120Hz, $T_J$ =25°C | 53 | 72 | | dB |
| Peak Output Current | $I_{PEAK}$ | $T_J$ =25°C | | 1.8 | | A |

**7809G** ($V_{IN}$=15V)

| PARAMETER | SYMBOLS | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $T_J$ =25°C, $I_{OUT}$=5mA ~ 1.0A | 8.64 | 9.0 | 9.36 | V |
| | | $V_{IN}$ =11.5V ~ 24V, $I_{OUT}$=5mA ~ 1.0A,$P_D$≤15W | 8.55 | | 9.45 | V |
| Dropout Voltage | $V_D$ | $T_J$ =25°C | | 2.0 | | V |
| Load Regulation | △$V_{OUT}$ | $T_J$ =25°C,$I_{OUT}$=5mA ~ 1.0A | | | 90 | mV |
| | | $T_J$ =25°C,$I_{OUT}$=0.25A ~ 0.75A | | | 45 | mV |
| Line regulation | | $V_{IN}$ =11.5V ~ 25V, $T_J$ =25°C | | | 90 | mV |
| | | $V_{IN}$ =11.5V ~ 24V, $T_J$ =25°C, $I_{OUT}$=1.0A | | | 90 | mV |
| Quiescent Current | $I_Q$ | $T_J$ =25°C, $I_{OUT}$≤1.0A | | | 8.0 | mA |
| Quiescent Current Change | △$I_Q$ | $V_{IN}$ =11.5V ~ 24V | | | 1.0 | mA |
| | | $I_{OUT}$=5mA ~ 1.0A | | | 0.5 | mA |
| Output Noise Voltage | eN | 10Hz ≤ f ≤ 100kHz | | 58 | | uV |
| Ripple Rejection | RR | $V_{IN}$ =12.5V ~ 22.5V,f=120Hz, $T_J$ =25°C | 53 | 72 | | dB |
| Peak Output Current | $I_{PEAK}$ | $T_J$ =25°C | | 1.8 | | A |

**7812G** ($V_{IN}$=19V)

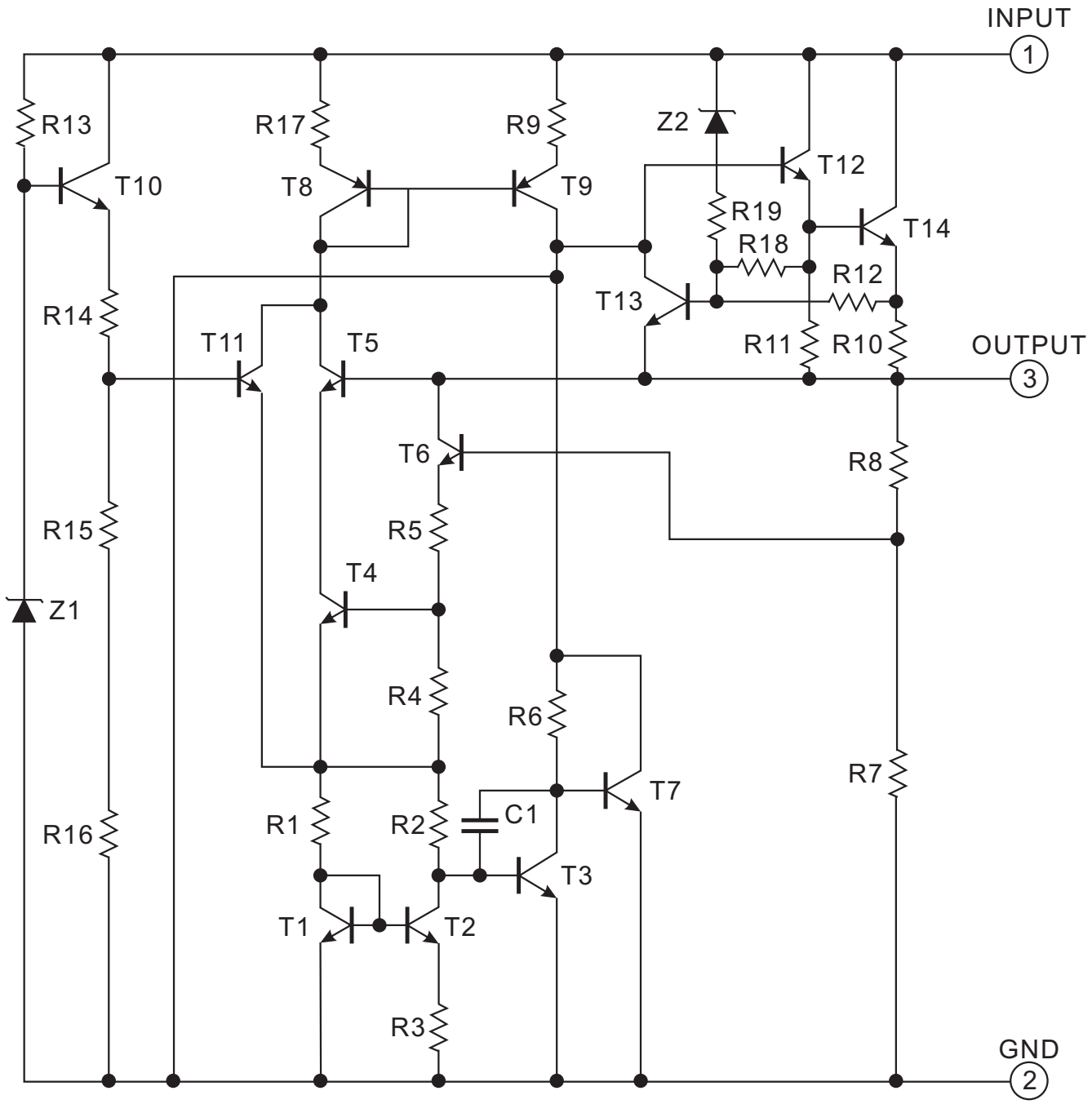
| PARAMETER | SYMBOLS | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $T_J$ =25°C, $I_{OUT}$=5mA ~ 1.0A | 11.52 | 12 | 12.48 | V |
| | | $V_{IN}$ =14.5V ~ 27V, $I_{OUT}$=5mA ~ 1.0A,$P_D$≤15W | 11.4 | | 12.6 | V |
| Dropout Voltage | $V_D$ | $T_J$ =25°C | | 2.0 | | V |
| Load Regulation | △$V_{OUT}$ | $T_J$ =25°C,$I_{OUT}$=5mA ~ 1.0A | | | 120 | mV |
| | | $T_J$ =25°C,$I_{OUT}$=0.25A ~ 0.75A | | | 60 | mV |
| Line regulation | | $V_{IN}$ =14.5V ~ 30V, $T_J$ =25°C | | | 120 | mV |
| | | $V_{IN}$ =14.5V ~ 27V, $T_J$ =25°C, $I_{OUT}$=1.0A | | | 120 | mV |
| Quiescent Current | $I_Q$ | $T_J$ =25°C, $I_{OUT}$≤1.0A | | | 8.0 | mA |
| Quiescent Current Change | △$I_Q$ | $V_{IN}$ =14.6V ~ 30V | | | 1.0 | mA |
| | | $I_{OUT}$=5mA ~ 1.0A | | | 0.5 | mA |
| Output Noise Voltage | eN | 10Hz ≤ f ≤ 100kHz | | 75 | | uV |
| Ripple Rejection | RR | $V_{IN}$ =15V ~ 25V,f=120Hz, $T_J$ =25°C | 52 | 72 | | dB |
| Peak Output Current | $I_{PEAK}$ | $T_J$ =25°C | | 1.8 | | A |

**7815G** ($V_{IN}$=23V)

| PARAMETER | SYMBOLS | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $T_J$ =25°C, $I_{OUT}$=5mA ~ 1.0A | 14.4 | 15.0 | 15.6 | V |
| | | $V_{IN}$ =17.5V ~ 30V, $I_{OUT}$=5mA ~ 1.0A,$P_D$≤15W | 14.25 | | 15.75 | V |
| Dropout Voltage | $V_D$ | $T_J$ =25°C | | 2.0 | | V |
| Load Regulation | △$V_{OUT}$ | $T_J$ =25°C,$I_{OUT}$=5mA ~ 1.0A | | | 150 | mV |
| | | $T_J$ =25°C,$I_{OUT}$=0.25A ~ 0.75A | | | 75 | mV |
| Line regulation | | $V_{IN}$ =18.5V ~ 30V, $T_J$ =25°C | | | 150 | mV |
| | | $V_{IN}$ =17.7V ~ 30V, $T_J$ =25°C, $I_{OUT}$=1.0A | | | 150 | mV |
| Quiescent Current | $I_Q$ | $T_J$ =25°C, $I_{OUT}$≤1.0A | | | 8.0 | mA |
| Quiescent Current Change | △$I_Q$ | $V_{IN}$ =17.5V ~ 30V | | | 1.0 | mA |
| | | $I_{OUT}$=5mA ~ 1.0A | | | 0.5 | mA |
| Output Noise Voltage | eN | 10Hz ≤ f ≤ 100kHz | | 90 | | uV |
| Ripple Rejection | RR | $V_{IN}$ =18.5V ~ 28.5V,f=120Hz, $T_J$ =25°C | 51 | 70 | | dB |
| Peak Output Current | $I_{PEAK}$ | $T_J$ =25°C | | 1.8 | | A |

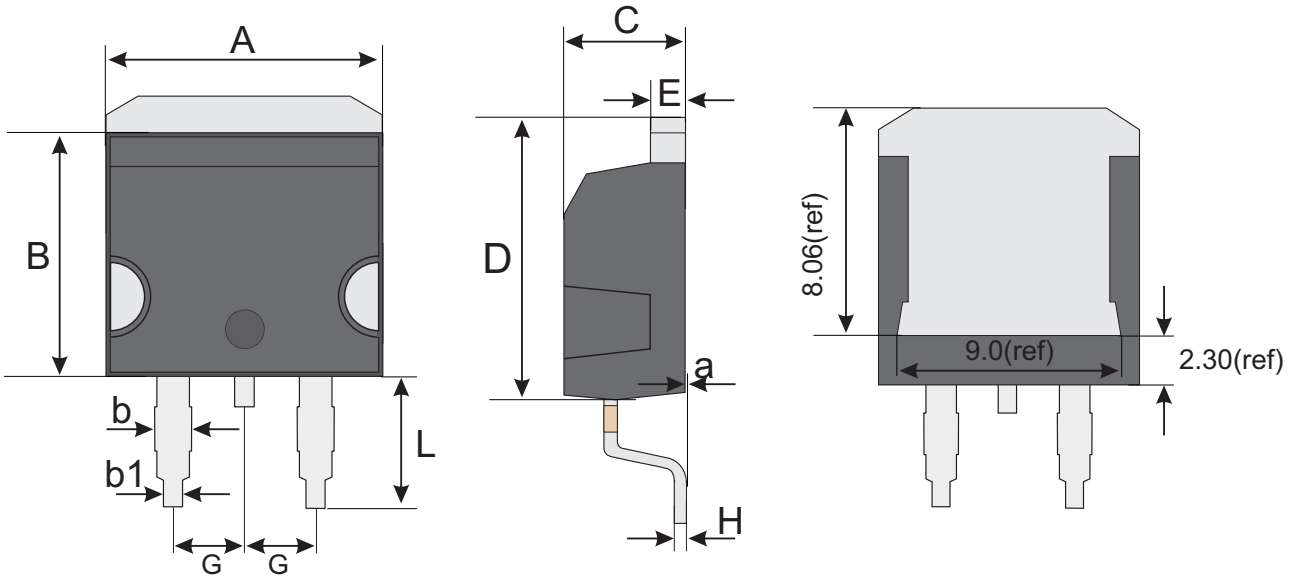
Notes:
1.The Maximum steady state usable output current are dependent on input voltage, heat sinking, lead length of the package and copper pattern of PCB. The data above represents pulse test conditions with junction temperatures specified at the initiation of test.
2. Power dissipation<0.5W

## ■ Test Circuits



Package Outline
Plastic surface mounted package; 2 leads

**TO-263-2L**

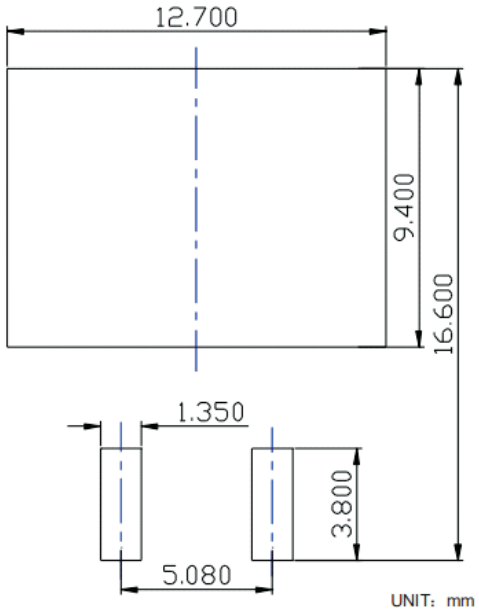



TO-263-2L mechanical data

| UNIT | | A | B | b | b1 | C | D | E | G | H | L | a |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 10.28 | 9.35 | 1.67 | 0.9 | 4.65 | 10.56 | 1.37 | 2.64 | 0.6 | 5.35 | 0.1 ref. |
| | typ | 10.18 | 9.15 | 1.47 | 0.8 | 4.45 | 10.36 | 1.27 | 2.54 | 0.5 | 5.15 | |
| | min | 10.08 | 8.95 | 1.27 | 0.7 | 4.25 | 10.16 | 1.17 | 2.44 | 0.4 | 4.95 | |
| mil | max | 405 | 368 | 66 | 35 | 183 | 416 | 54 | 104 | 24 | 211 | 4.0 ref. |
| | typ | 401 | 360 | 58 | 31 | 175 | 409 | 50 | 100 | 20 | 203 | |
| | min | 397 | 352 | 50 | 28 | 167 | 400 | 46 | 96 | 16 | 195 | |

**Marking**

| Type number | Marking code |
|---|---|
| 78XXG | 78XXG |




SUGGESTED SOLDER PAD LAYOUT

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