# Three Terminal Adjustable Voltage Regulators

# 三端可调节稳压管

# LM317A

## 产品特性 Features

| | |
|---|---|
| 输出电压<br>**Output Voltage** | **1.3V to 37V** |
| 最大输出电流<br>**Max Output Current** | **1.5A** |
| 过载保护<br>**Internal thermal overload prection** | |
| 短路电流限制<br>**Internal short-current limiting** | |
| 输出端最大安全工作区域<br>**Output transistor safe-area compensation** | |

## 封装形式 Package

1 2 3

1:ADJ 2:Output 3. Input

## 功能图 Functional diagram

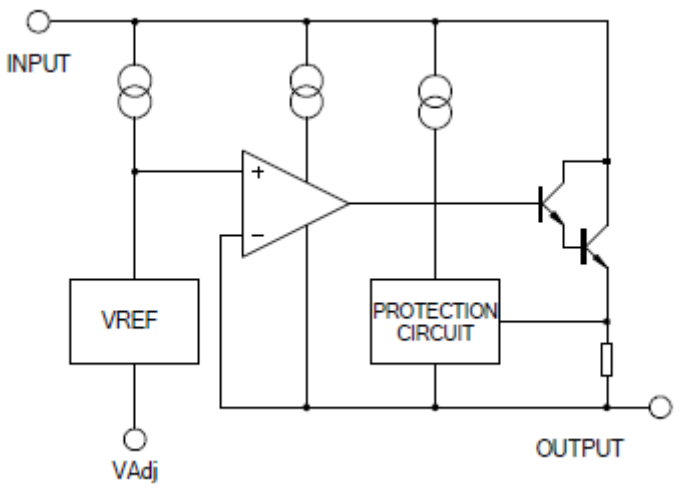



**Fig.1**

## 绝对最大额定值 Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

| **Parameter**<br>**项目** | **Symbol**<br>**符号** | **Limit**<br>**极限值** | **Unit**<br>**单位** |
|---|---|---|---|
| 输入-输出电压差<br>Input-Output Voltage Difference | Vi-Vo | -40 | V |
| 功率损耗<br>Power Dissipation | $P_D$ | Internal Limited | W |
| 结温<br>Junction Temperature | Tj | +125 | ℃ |
| 存储温度<br>Storage Temperature Range | $T_{STG}$ | -65~+150 | ℃ |
| 结-壳的热阻<br>Thermal Resistance -Junction to Case | $R_{\Theta JC}$ | 5 | ℃W |
| 结-环境的热阻<br>Thermal Resistance -Junction to Ambient | $R_{\Theta JA}$ | 54 | ℃/W |

## 电参数特性 Electrical Characteristics

(Vi-Vo= 5V, Iout=500mA,Imax=1.5A,Pmax=20W, 0°C≤Tj≤125°C; unless otherwise specified.)

| Parameter | Symbol | Test Condition | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| 参考电压<br>Reference voltage | $V_{REF}$ | 3V≤Vi-Vo≤40V, 10mA≤Io≤Imax, $P_D$≤Pmax | | 1.20 | 1.25 | 1.30 | V |
| 线性调节<br>Line Regulation | REGline | Ta=25℃ ,3V≤Vin≤40V | | -- | 0.01 | 0.04 | %/V |
| | | Ta=0-125℃ ,3V≤Vin≤40V | | -- | 0.02 | 0.07 | |
| 负载调节<br>Load Regulation | REGload | Ta=25℃, 10mA≤Io≤Imax | Vo≤6V | -- | 18 | 25 | mV |
| | | | Vo≤5V | -- | 0.4 | 0.5 | %/Vo |
| | | 10mA≤Io≤Imax | Vo≤5V | -- | 40 | 70 | mV |
| | | | Vo≤6V | -- | 0.8 | 1.5 | %/Vo |
| 可调式引脚端电流<br>Adjustable Pin Current | $I_{ADJ}$ | | | -- | 46 | 100 | μA |
| 可调式引脚电流变化<br>Quiescent Current Change | $\Delta I_{ADJ}$ | 2.5V≤Vi-Vo≤40V<br>10mA≤Io≤Imax, $P_D$≤Pmax | | -- | 2.0 | 5 | |
| 温度稳定性<br>Temperature Stability | STT | | | -- | 0.7 | -- | %/Vo |
| 最小负载调节电流<br>Minimum Load Current for regulation | IL(min) | Vi-Vo=40V | | | 3.5 | 10 | mA |
| 最大输出电流<br>Maximum output Current | Io(max) | Vi-Vo≤15V ， $P_D$≤Pmax | | 1.5 | 2.2 | | A |
| | | Vi-Vo≤15V ， $P_D$≤Pmax，Ta=25℃ | | 0.15 | 0.4 | | |
| 纹波抑制<br>Ripple Rejection Ratio | RR | f=120Hz,Vo=10V,$C_{ADJ}$=0 | | -- | 60 | -- | dB |
| | | f=120Hz,Vo=10V,$C_{ADJ}$=10μF | | 66 | 75 | -- | |
| 均方根噪声，Vo 的百分比<br>RMS Noise V.S.% of Vout | eN | Ta=25℃,10Hz≤f≤10KHz | | | 0.003 | 0.01 | %/Vo |
| 长期稳定度<br>Long-term Stability $T_J$=$T_{HIGH}$ | ST | Ta=25℃, 1000hr | | -- | 0.3 | 1 | % |

注：应采用低占空比脉冲测试，以免产生发热效果。

Note:Testing with low duty pulse should be used to avoid heating effect.

## 典型特性曲线 Typical Characteristics curves

Fig.1. Load Regulation vs temperature

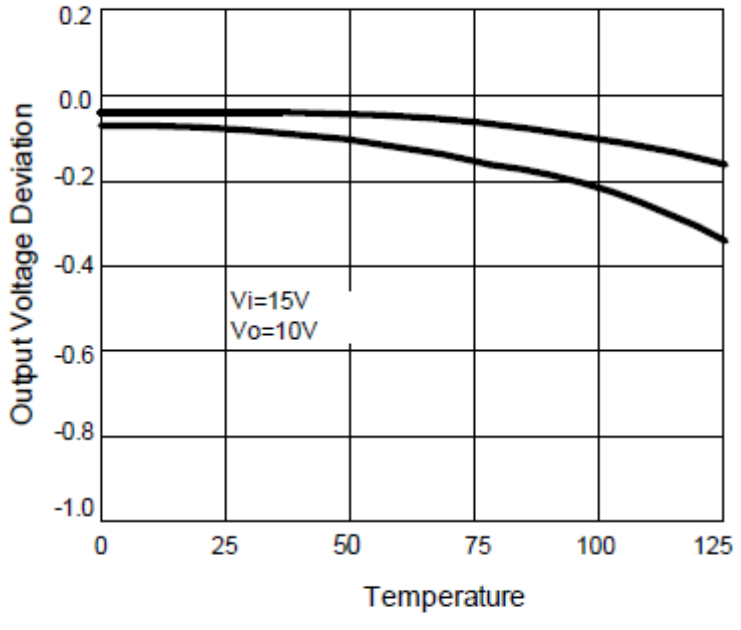



Fig.2 Adjustment Current vs Temperature

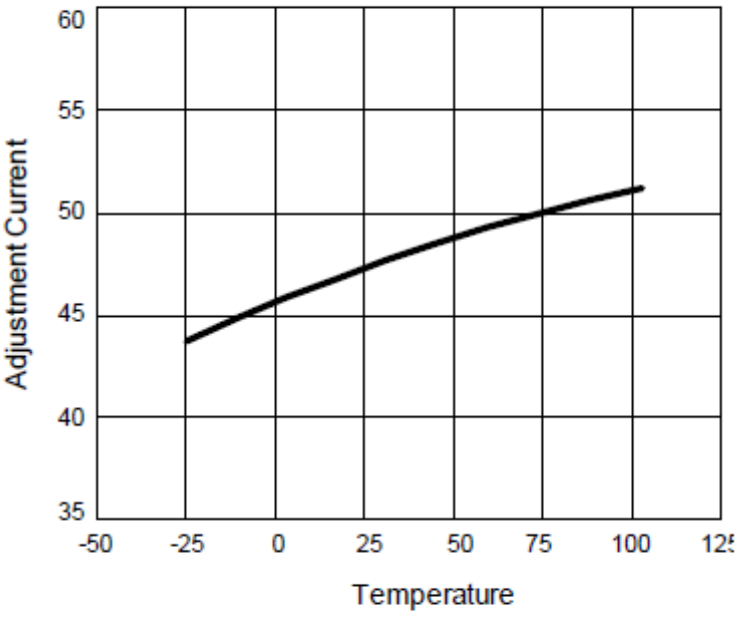



Fig.3. Dropout Voltage vs Input-Output Voltage Difference

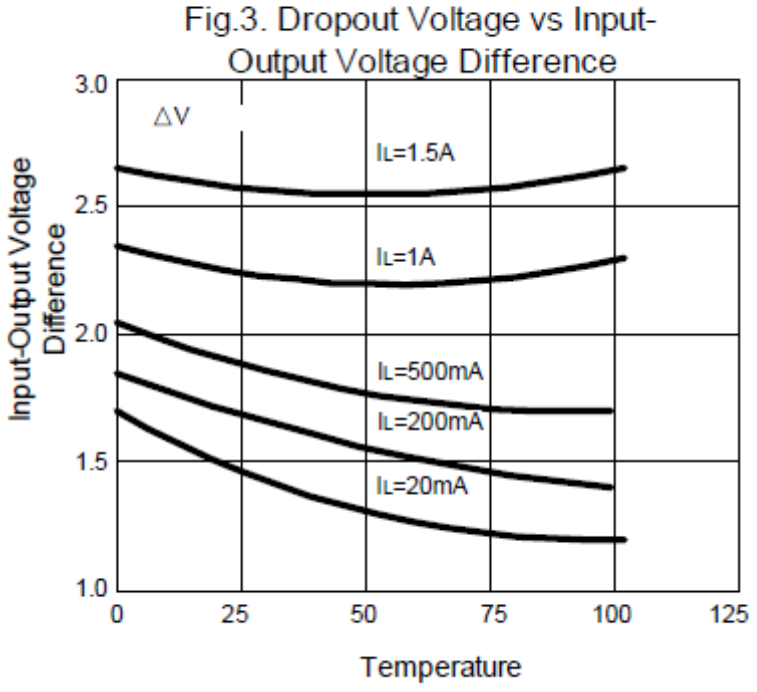
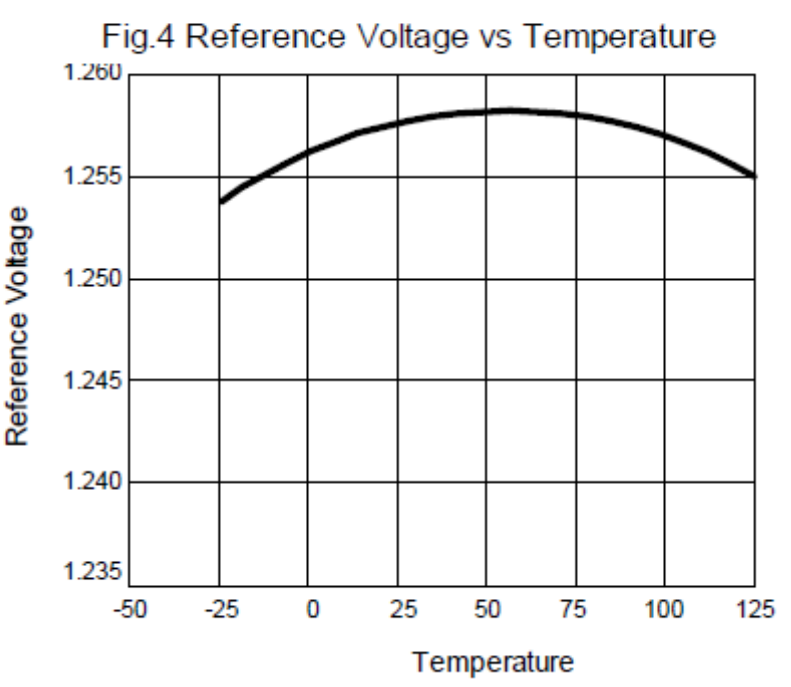



Fig.4 Reference Voltage vs Temperature




## 典型应用电路 Typical application circuit

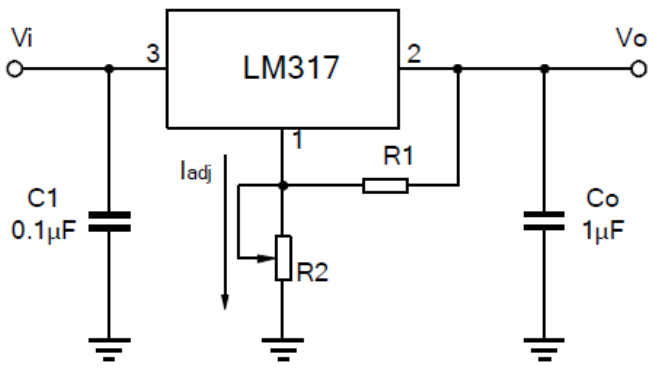



Fig.5 Programmable voltage regulator

Vo=1.25V*(1+R2/R1)+Iadj*R2

C1 is required when regulator is located an appreciated distance from power supply. Co is needed to improve transient response.

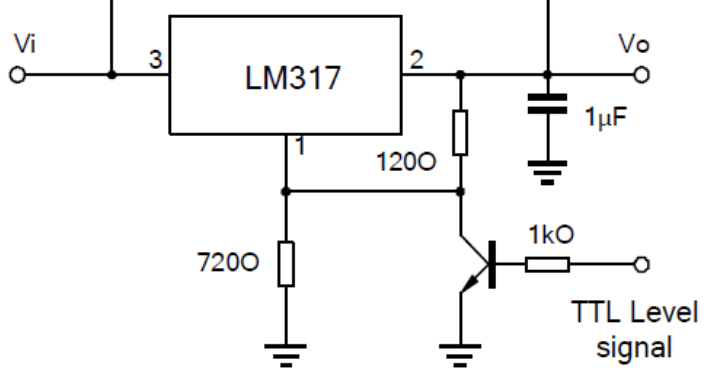



Fig.6 Regulator with On-off control

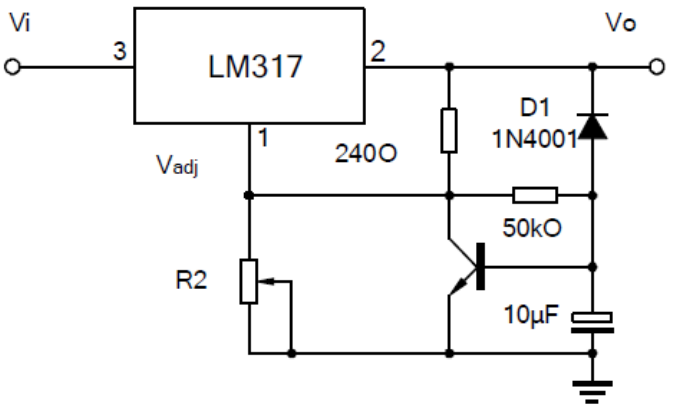



Fig.7 Soft start application

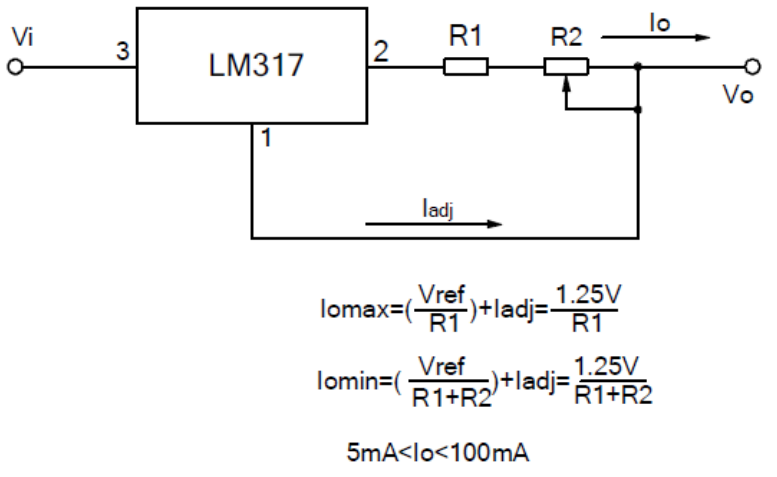
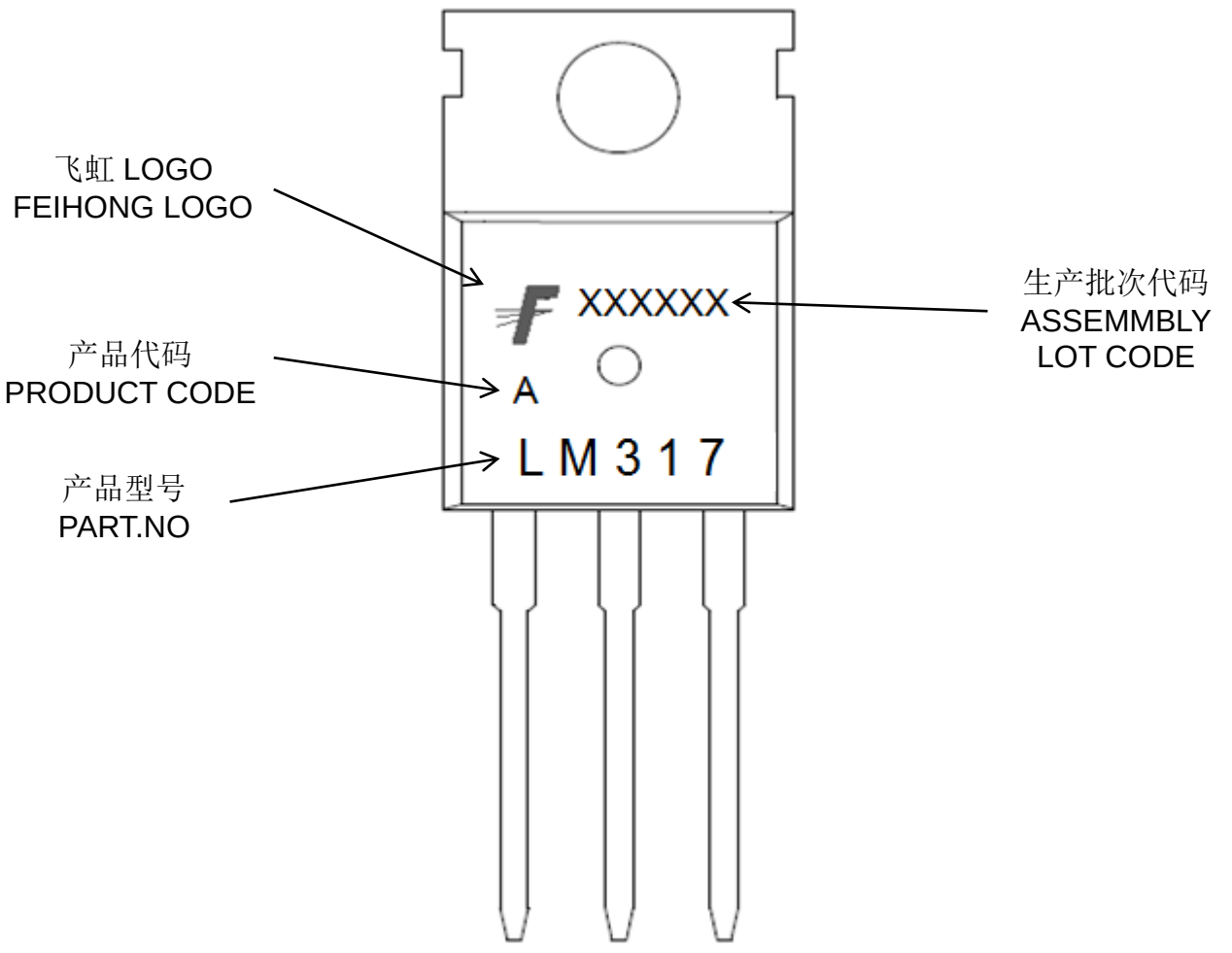



Fig.8 Constant current application

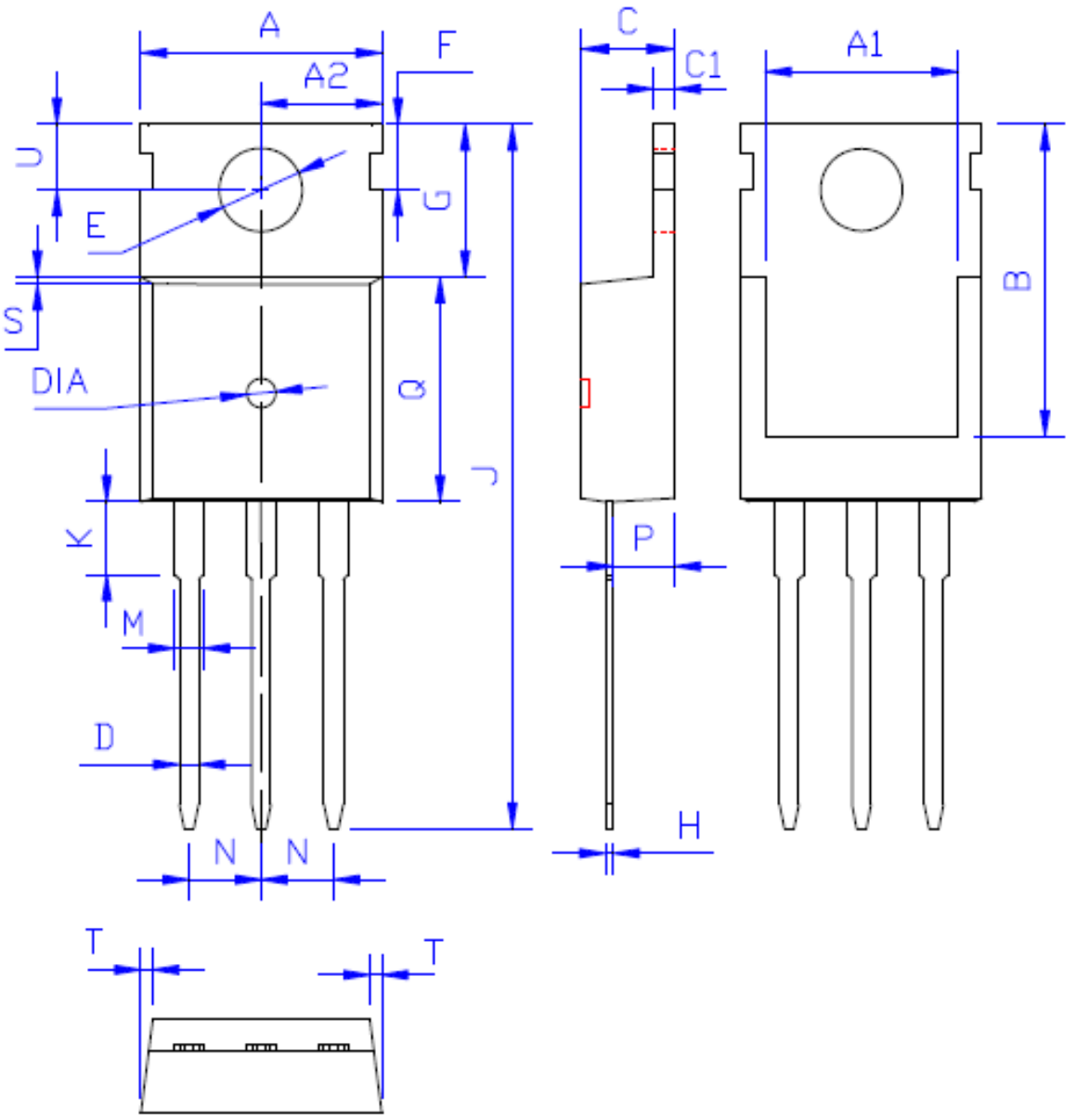
## 印记 Marking:



外形尺寸：

Package Dimension：

TO-220




| DIM | MILLIMETERS |
|---|---|
| A | 10.00±0.30 |
| A1 | 8.00±0.30 |
| A2 | 5.00±0.30 |
| B | 13.20±0.40 |
| C | 4.50±0.20 |
| C1 | 1.30±0.20 |
| D | 0.80±0.20 |
| E | 3.60±0.20 |
| F | 3.00±0.30 |
| G | 6.60±0.40 |
| H | 0.50±0.20 |
| J | 28.88±0.50 |
| K | 3.00±0.30 |
| M | 1.30±0.30 |
| N | Typical 2.54 |
| P | 2.40±0.40 |
| Q | 9.20±0.40 |
| S | 0.25±0.15 |
| T | 0.25±0.15 |
| U | 2.80±0.30 |
| DIA | 宽 1.50±0.10<br>深 0.50 MAX |

（Unit：mm）

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