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# KA378R12C

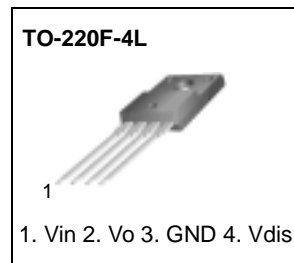
## Low Dropout Voltage Regulator

### Features

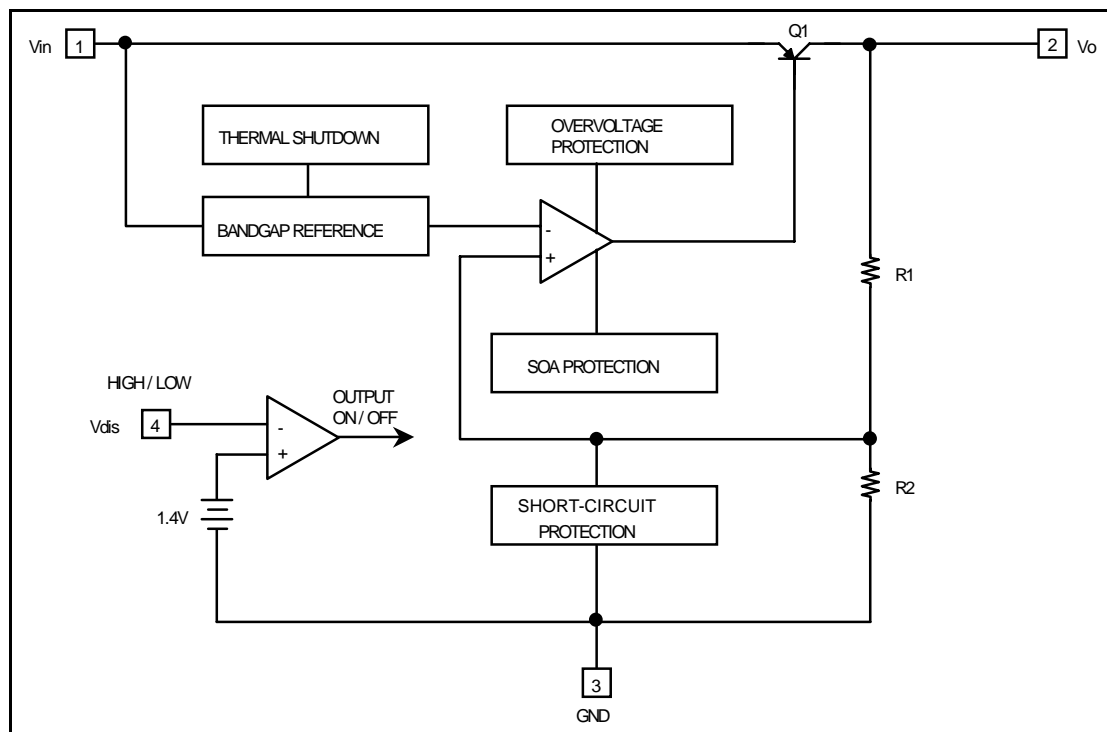
- 3A/12V Output Low Dropout Voltage Regulator
- TO-220 Full-Mold Package (4Pin)
- Overcurrent Protection, Thermal Shutdown
- Overvoltage Protection, Short Circuit Protection
- With Output Disable Function

### Description

The KA378R12C is a low-dropout voltage regulator suitable for various electronic equipments. It provide constant voltage power source with TO-220 4 lead full mold package. Dropout voltage of KA378R12C is below 0.5V in full rated current(3A). This regulator has various function such as peak current protection, thermal shut down, overvoltage protection and output disable function.



### Internal Block Diagram



## Absolute Maximum Ratings

| Parameter                                   | Symbol           | Value     | Unit | Remark        |
|---|------------------|-----------|------|---------------|
| Input Voltage                               | V <sub>in</sub>  | 35        | V    | -             |
| Disable Voltage                             | V <sub>dis</sub> | 35        | V    | -             |
| Output Current                              | I <sub>o</sub>   | 3.0       | A    | -             |
| Power Dissipation 1                         | P <sub>d1</sub>  | 1.5       | W    | No Heatsink   |
| Power Dissipation 2                         | P <sub>d2</sub>  | 15        | W    | With Heatsink |
| Junction Temperature                        | T <sub>j</sub>   | 150       | °C   | -             |
| Operating Temperature                       | T <sub>opr</sub> | -20 ~ 80  | °C   | -             |
| Thermal Resistance, Junction-to Case(Note2) | R <sub>θjc</sub> | 2.9       | °C/W | -             |
| Thermal Shutdown Temperature                | T <sub>tsd</sub> | 150       | °C   | -             |
| Storage Temperature                         | T <sub>stg</sub> | -65 ~ 150 | °C   | -             |

## Electrical Characteristics

(V<sub>in</sub> = 15V, I<sub>o</sub> = 1.5A, T<sub>a</sub> = 25°C, unless otherwise specified)

| Parameter                 | Symbol            | Conditions                  | Min. | Typ. | Max. | Unit |
|---------------------------|-------------------|-----------------------------|------|------|------|------|
| Output Voltage            | V <sub>o</sub>    | -                           | 11.7 | 12.0 | 12.3 | V    |
| Load Regulation           | R <sub>load</sub> | 5mA < I <sub>o</sub> < 3A   | -    | 0.1  | 2.0  | %    |
| Line Regulation           | R <sub>line</sub> | 13V < V <sub>in</sub> < 29V | -    | 0.5  | 2.5  | %    |
| Ripple Rejection Ratio    | RR                | Note1                       | 45   | 55   | -    | dB   |
| Dropout Voltage           | V <sub>drop</sub> | I <sub>o</sub> = 3A         | -    | -    | 0.5  | V    |
| Disable Voltage High      | V <sub>disH</sub> | Output Active               | 2.0  | -    | -    | V    |
| Disable Voltage Low       | V <sub>disL</sub> | Output Disabled             | -    | -    | 0.8  | V    |
| Disable Bias Current High | I <sub>disH</sub> | V <sub>dis</sub> = 2.7V     | -    | -    | 20   | μA   |
| Disable Bias Current Low  | I <sub>disL</sub> | V <sub>dis</sub> = 0.4V     | -    | -    | -0.4 | mA   |
| Quiescent Current         | I <sub>q</sub>    | I <sub>o</sub> = 0A         | -    | -    | 10   | mA   |

### Note:

1. These parameters, although guaranteed, are not 100% tested in production.
2. Junction -to-case thermal resistance test environments.
  - Pneumatic heat sink fixture.
  - Clamping pressure 60psi through 12mm diameter cylinder.
  - Thermal grease applied between PKG and heat sink fixture

## Typical Performance Characteristics

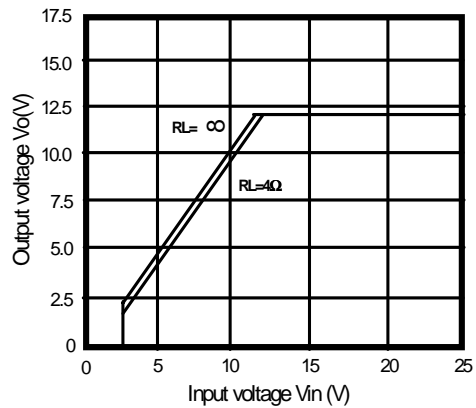


Figure 1. Output Voltage vs. Input Voltage

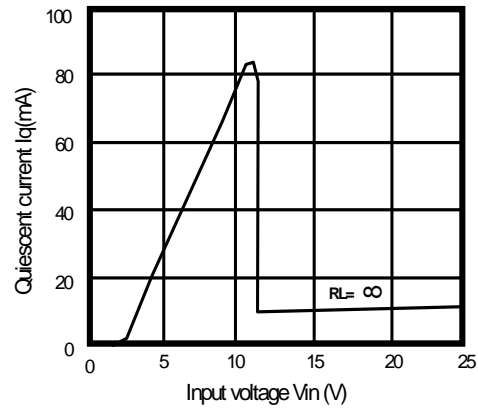


Figure 2. Quiescent Current vs. Input Voltage

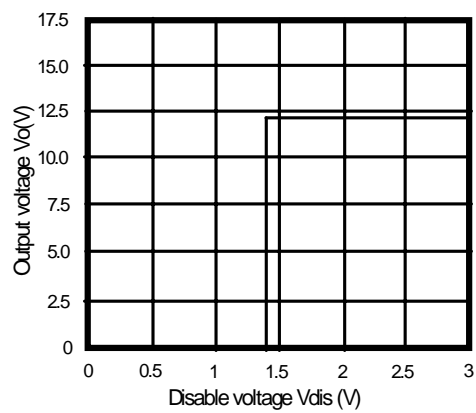


Figure 3. Output Voltage vs. Disable Voltage

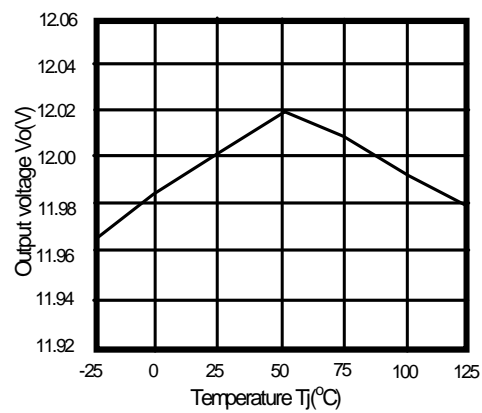


Figure 4. Output Voltage vs. Temperature( $T_j$ )

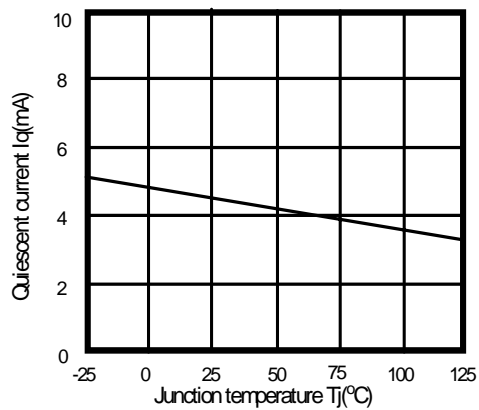


Figure 5. Quiescent Current vs. Temperature( $T_j$ )

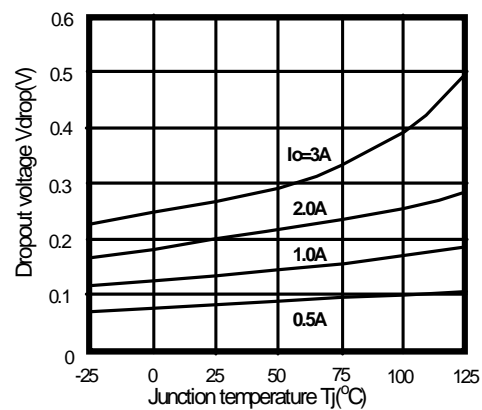


Figure 6. Dropout Voltage vs. Junction Temperature

Typical Performance Characteristics (Continued)

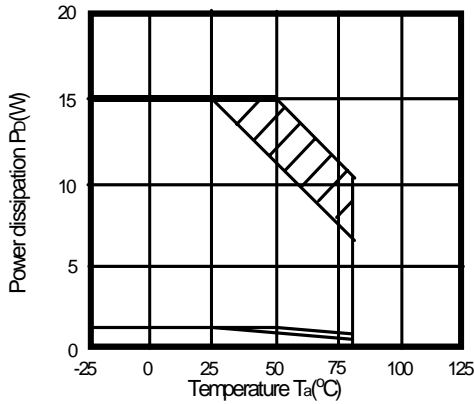


Figure 7. Power Dissipation vs. Temperature(Ta)

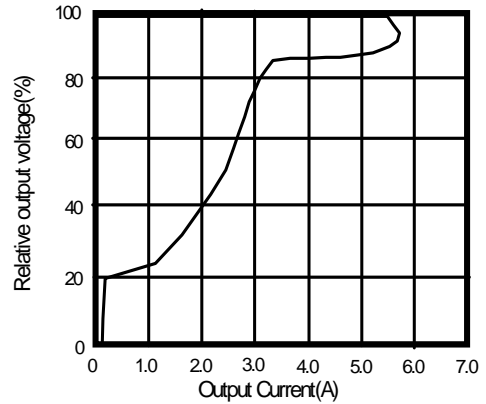


Figure 8. Overcurrent Protection Characteristics (Typical value)

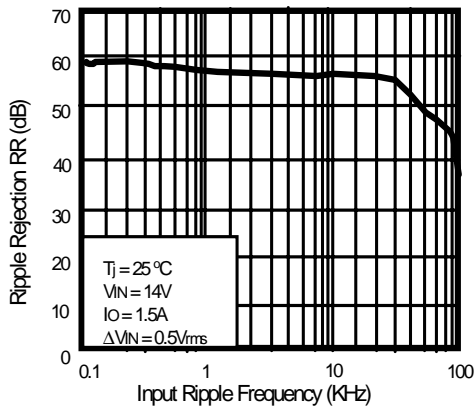


Figure 9. Ripple Rejection vs. Input Ripple Frequency

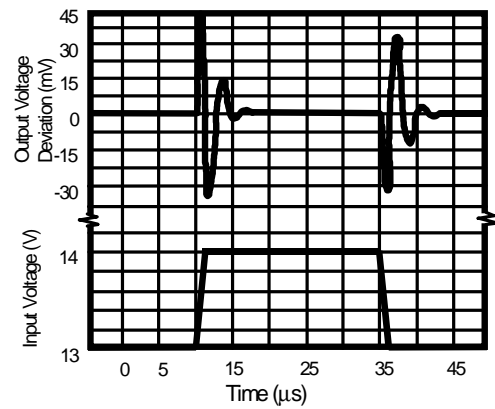


Figure 10. Line Transient Response

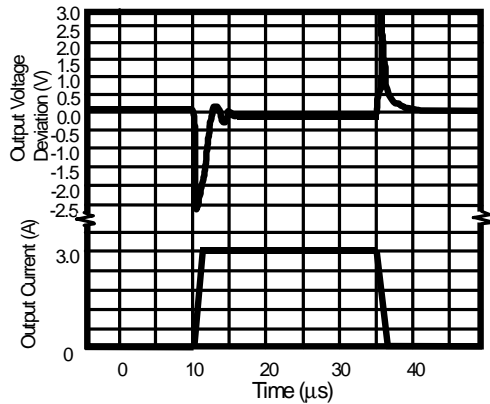
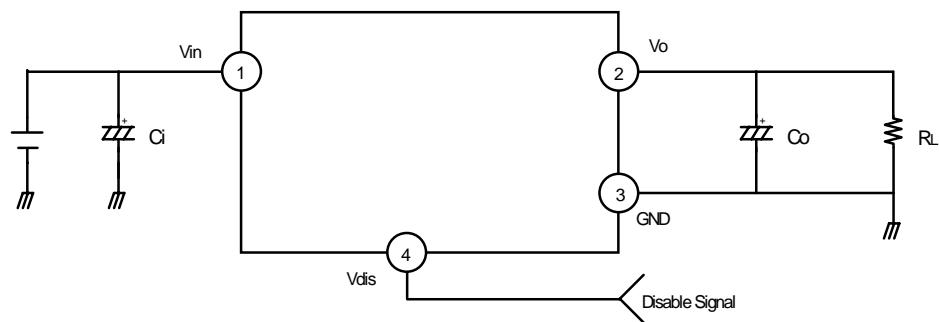


Figure 11. Load Transient Response

## Typical Application



**Figure 1. Application Circuit**

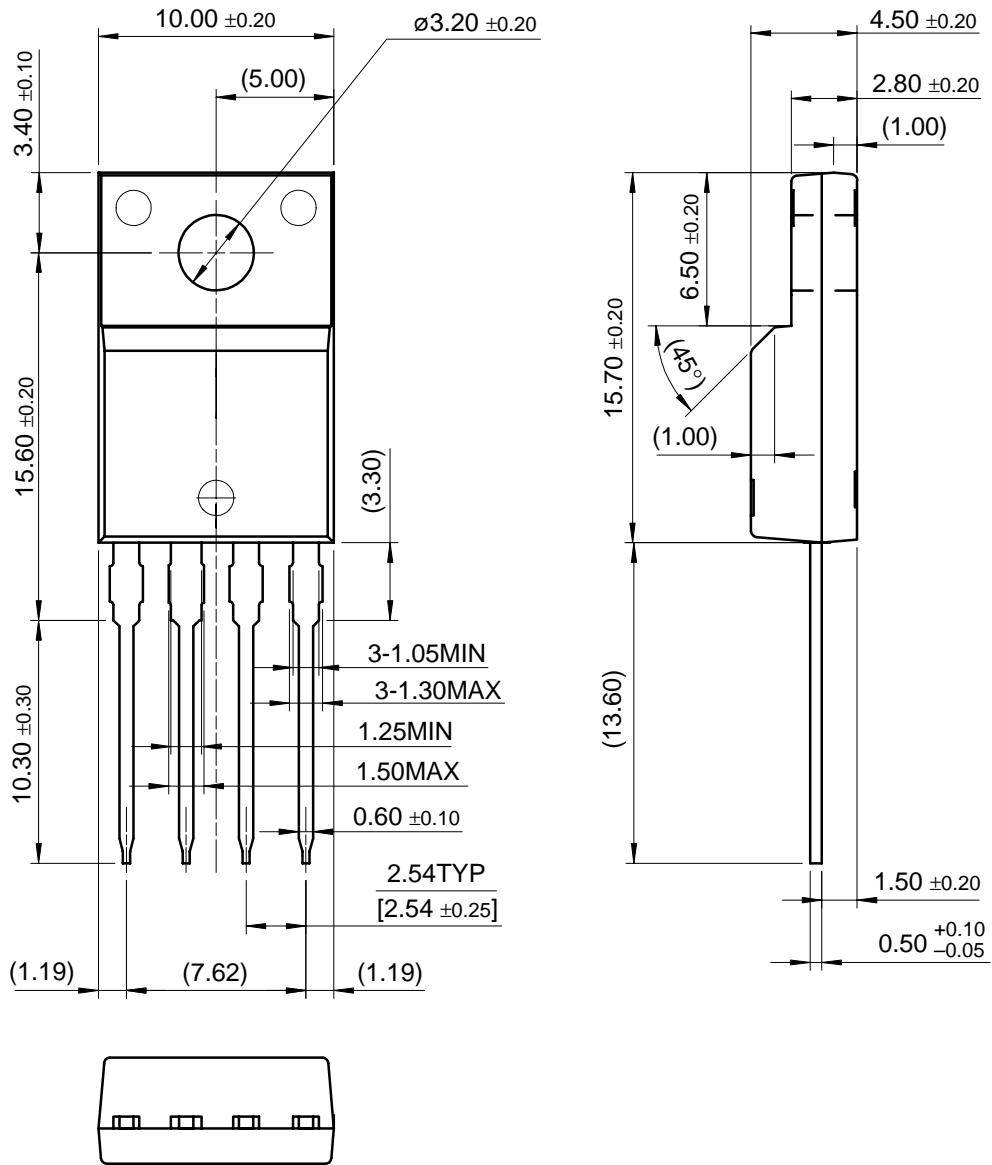
- $C_i$  is required if regulator is located an appreciable distance from power supply filter.
- $C_o$  improves stability and transient response. ( $C_o > 47\mu\text{F}$ )

# Mechanical Dimensions

## Package

Dimensions in millimeters

### TO-220F-4L



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## Ordering Information

| Product Number | Package    | Operating Temperature |
|----------------|------------|-----------------------|
| KA378R12C      | TO-220F-4L | -20°C to +80°C        |



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