

## 150mA CMOS High Performance LDO Regulator

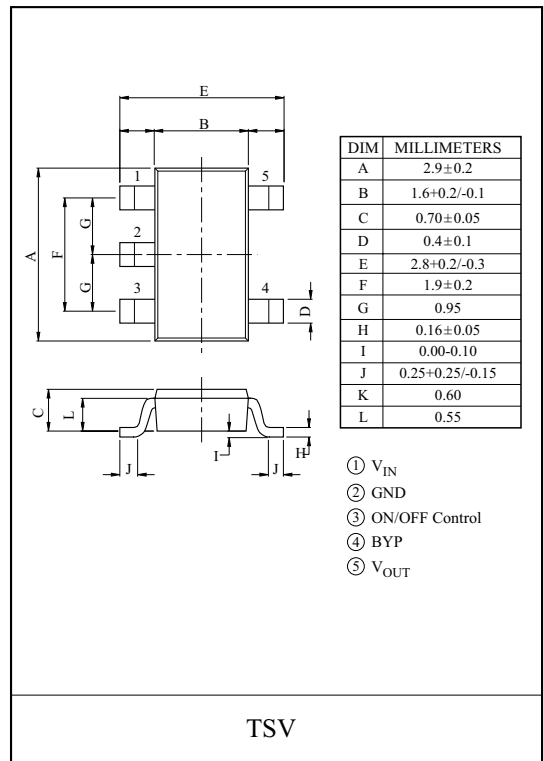
The KIC3210T series Low Dropout Linear Regulator is ideally suited for portable applications. It offers 1% initial accuracy, extremely-low dropout voltage(135mV at 150mA) and low ground current (typically 90uA). Designed specifically for handheld and battery-powered devices, the KIC3210T provides a TTL-logic-compatible ON/OFF control pin. When disabled, power consumption drops nearly to zero. The KIC3210T also works with low-ESR ceramic capacitors, reducing the amount of board space necessary for power applications, critical in handheld wireless devices.

### Features

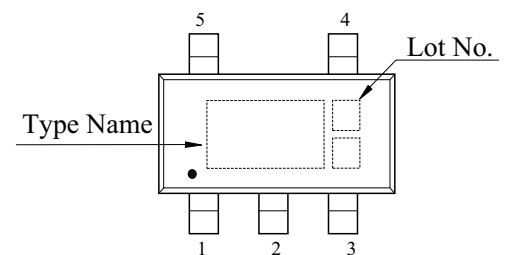
- Input voltage range : 2.7V to 6.0V
- Stability with ceramic output capacitors
- Ultra-low dropout : 135mV @ 150mA
- High output accuracy : 1.0% accuracy
- Low quiescent current : 90μA
- TTL-Logic-compatible ON/OFF control input
- "Zero" off-mode current
- Thermal shutdown and current limit protection

### Applications

- Cellular phones, Smart Phones, PDA
- Battery-powered equipment
- Laptop, notebook and palmtop computers
- Consumer/personal electronics



### Marking

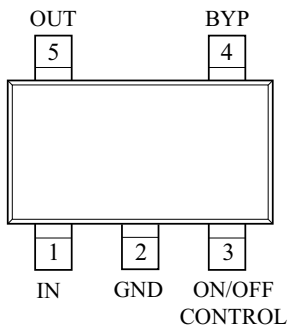


# KIC3210T-025 ~ KIC3210T-035

## Line up

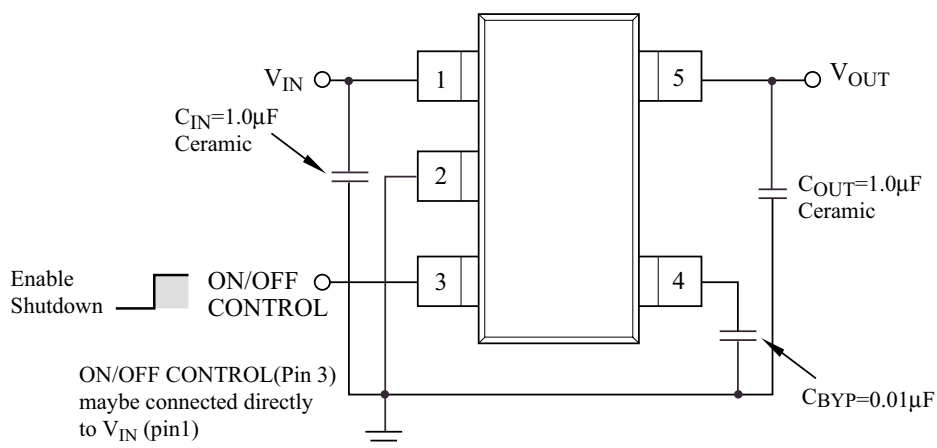
| Item         | Output Voltage | Marking | Package | Item         | Output Voltage | Marking | Package |
|--------------|----------------|---------|---------|--------------|----------------|---------|---------|
| KIC3210T-025 | 2.5V           | 25A     | TSV     | KIC3210T-030 | 3.0V           | 30A     | TSV     |
| KIC3210T-026 | 2.6V           | 26A     |         | KIC3210T-031 | 3.1V           | 31A     |         |
| KIC3210T-027 | 2.7V           | 27A     |         | KIC3210T-032 | 3.2V           | 32A     |         |
| KIC3210T-275 | 2.75V          | 27B     |         | KIC3210T-033 | 3.3V           | 33A     |         |
| KIC3210T-028 | 2.8V           | 28A     |         | KIC3210T-034 | 3.4V           | 34A     |         |
| KIC3210T-285 | 2.85V          | 28B     |         | KIC3210T-035 | 3.5V           | 35A     |         |
| KIC3210T-029 | 2.9V           | 29A     |         |              |                |         |         |

## Pin Configuration



| No. | Symbol         | Description                                                                                                                                                |
|-----|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | INPUT          | Supply Input                                                                                                                                               |
| 2   | GND            | Ground                                                                                                                                                     |
| 3   | ON/OFF CONTROL | Enable/Shutdown (Input) : CMOS compatible input. Logic high=enable, logic low=shutdown. Do not leave open.                                                 |
| 4   | BYP            | Reference Bypass : Connect external $0.01 \mu\text{F} \leq C_{\text{BYP}} \leq 1.0 \mu\text{F}$ capacitor to GND to reduce output noise. May be left open. |
| 5   | OUTPUT         | Regulator Output                                                                                                                                           |

## Application Circuit



# KIC3210T-025 ~ KIC3210T-035

## Absolute Maximum Ratings

| Characteristics                   | Symbol    | Rating    | Units |
|-----------------------------------|-----------|-----------|-------|
| Input Voltage                     | $V_{IN}$  | 6         | V     |
| Output Current                    | $I_{OUT}$ | 150       | mA    |
| Output Voltage                    | $V_{OUT}$ | 2.5~3.5   | V     |
| Power Dissipation <sup>Note</sup> | $P_D$     | 900       | mW    |
| Operating Temperature             | $T_{OPR}$ | -40 ~ 85  | °C    |
| Storage Temperature               | $T_{STG}$ | -65 ~ 125 | °C    |

Note) Package Mounted on a Ceramic board (600mm<sup>2</sup> × 0.8mm)

## Electrical Characteristics

( $V_{IN}=V_{OUT}+1V$ ,  $V_{EN}=V_{IN}$ ,  $I_{OUT}=100\mu A$ ,  $T_a=25^\circ C$ )

| Parameter                             | Symbol        | Conditions                                                       | Min | Typ  | Max | Units         |
|---------------------------------------|---------------|------------------------------------------------------------------|-----|------|-----|---------------|
| Output Voltage Accuracy               | $V_O$         | $I_{OUT}=100\mu A$                                               | -1  | -    | 1   | %             |
| Load Regulation                       | Reg Load      | $I_{OUT}=0.1mA \sim 150mA$                                       | -   | 1.5  | 2.5 | %             |
| Line Regulation                       | Reg Line      | $V_{IN}=V_{OUT}+1V \sim 6V$                                      | -   | 0.1  | 0.2 | %/V           |
| Dropout Voltage <sup>Note 1)</sup>    | $V_D$         | $I_{OUT}=100\mu A$                                               | -   | 0.1  | 5   | mV            |
|                                       |               | $I_{OUT}=100mA$                                                  | -   | 90   | 150 | mV            |
|                                       |               | $I_{OUT}=150mA$                                                  | -   | 135  | 200 | mV            |
| Quiescent Current                     | $I_Q$         | $V_{EN} \leq 0.4V$ (shutdown)                                    | -   | 0.2  | 1   | $\mu A$       |
| Ground Pin Current <sup>Note 2)</sup> | $I_{GND}$     | $I_{OUT}=0mA$                                                    | -   | 90   | 150 | $\mu A$       |
|                                       |               | $I_{OUT}=150mA$                                                  | -   | 117  | 150 | $\mu A$       |
| Ripple Rejection                      | R.R           | $f=10Hz$ , $C_{OUT}=1.0\mu F$ , $C_{BYP}=0.01\mu F$              | -   | 60   | -   | dB            |
|                                       |               | $f=100Hz$ , $V_{IN}=V_{OUT}+1$                                   | -   | 60   | -   | dB            |
|                                       |               | $f=10kHz$ , $V_{IN}=V_{OUT}+1$                                   | -   | 50   | -   | dB            |
| Current Limit                         | $I_{LIM}$     | $V_{OUT}=0V$                                                     | 160 | 425  | -   | mA            |
| Output Noise Voltage                  | $V_{NO}$      | $C_{OUT}=1.0\mu F$ , $C_{BYP}=0.01\mu F$<br>$f=10Hz \sim 100kHz$ | -   | 50   | -   | $\mu V_{rms}$ |
| Output Control Voltage (ON-State)     | $V_{C(ON)}$   | $V_{IN}=2.7V \sim 5.5V$ , regulator enable                       | 1.6 | -    | -   | V             |
| Output Control Voltage (OFF-State)    | $V_{C(OFF)}$  | $V_{IN}=2.7V \sim 5.5V$ , regulator shutdown                     | -   | -    | 0.4 | V             |
| Output Control Current                | $I_C$         | $V_C \geq 1.6V$ , regulator enable                               | -   | 0.01 | -   | $\mu A$       |
|                                       |               | $V_C \leq 0.4V$ , regulator shutdown                             | -   | 0.01 | -   | $\mu A$       |
| Thermal Shutdown Temperature          | $T_{SD}$      |                                                                  | -   | 150  | -   | °C            |
| Thermal Shutdown Hysteresis           | $T_{SD\_HYS}$ |                                                                  | -   | 10   | -   | °C            |

Note 1) Dropout Voltage is defined as the input-to-output differential at which the output voltage drops 2% below its nominal value measured at 1V differential. For outputs below 2.7V, dropout voltage is the input-to-output voltage differential with the minimum input voltage 2.7V

Note 2) Ground pin current is the regulator quiescent current. The total current drawn from the supply is the sum of the load current plus the ground pin current.

# KIC3210T-025 ~ KIC3210T-035

Fig. 1 R.R

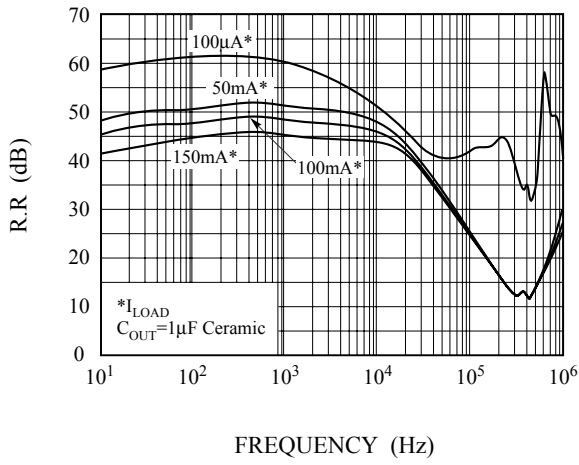


Fig. 2  $V_{IN} - I_{GND}$

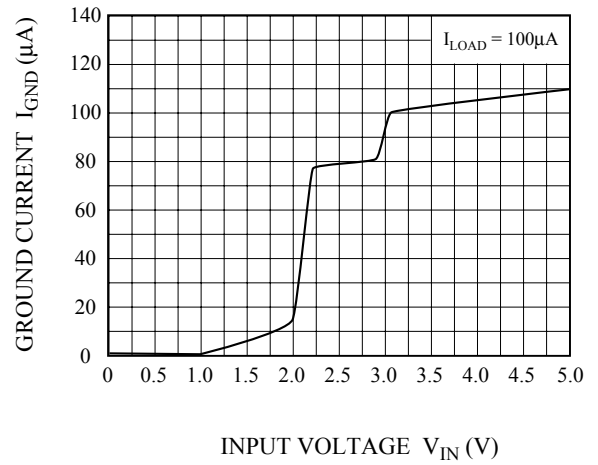


Fig. 3  $V_{IN} - V_{OUT}$

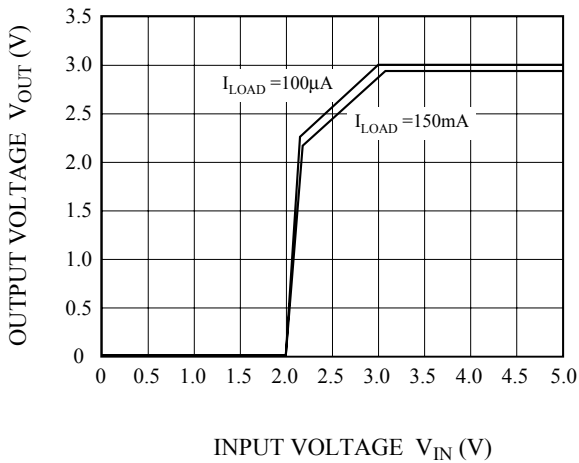


Fig. 4  $T_a - V_{DROP}$

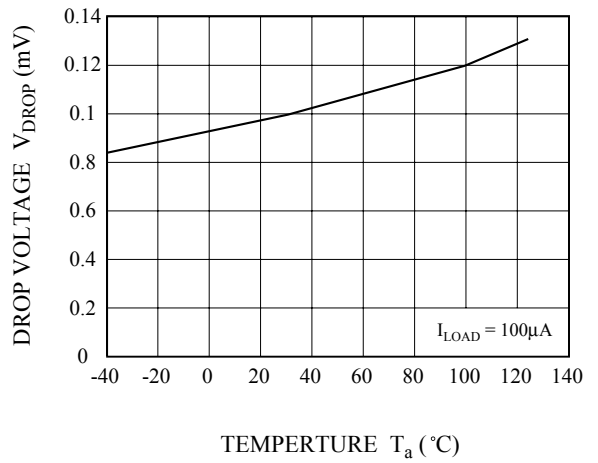


Fig. 5  $T_a - V_{OUT}$

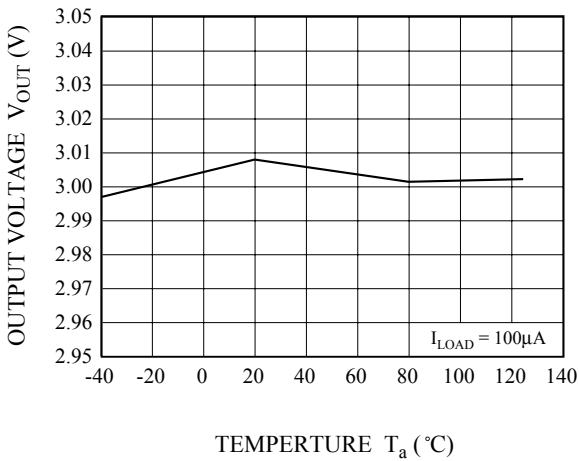


Fig. 6 Line Transient Response

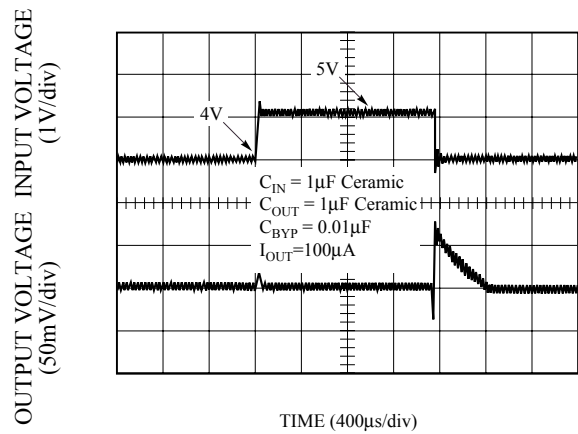


Fig. 7 Load Transient Response

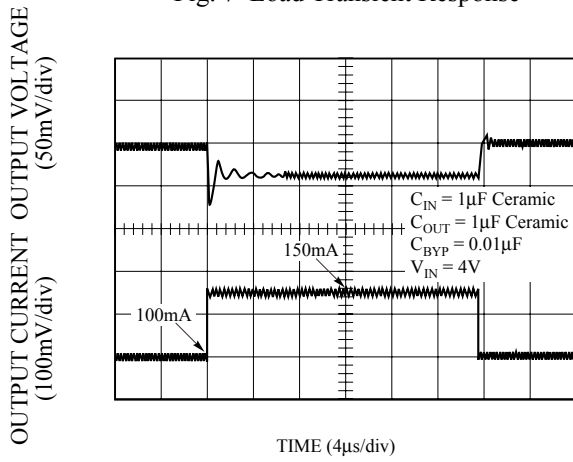


Fig. 8 ON/OFF Control Pin Delay

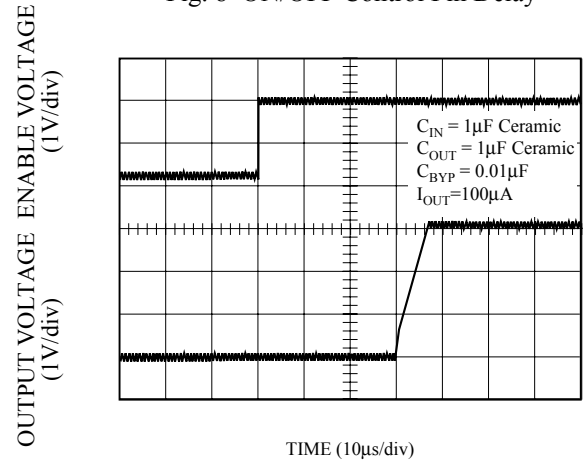


Fig. 9 Shutdown Delay

