

Ordering number: EN3892B

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|---|-----------|----------------------|
|  | No. 3892B | Monolithic Linear IC |
| | | L88R05 Series |

**5 V, 1 A Voltage-regulator ICs
with Reset Function**

Overview

The L88R05 Series is a series of low-saturation voltage regulator ICs that are equipped with a function that generates a reset signal when the power supply for a microcontroller system is turned on or off.

Applications

- Prevents malfunction when the microcontroller power supply is turned on or off.
- Designed to handle malfunction caused by momentary power interruptions.
- Suited for portable electronic equipment, mobile electronic equipment, and other battery-powered equipment with little capacity to handle fluctuation in input voltage; also suited for equipment with large fluctuations in the primary power supply.

Functions

- Power supply reset generation function; the reset threshold voltages are ranked.
 - L88R05C: $V_{RT} = 4.5 \text{ V}$
 - L88R05D: $V_{RT} = 4.2 \text{ V}$
 - L88R05E: $V_{RT} = 3.9 \text{ V}$
- 5 V, 1 A output characteristics

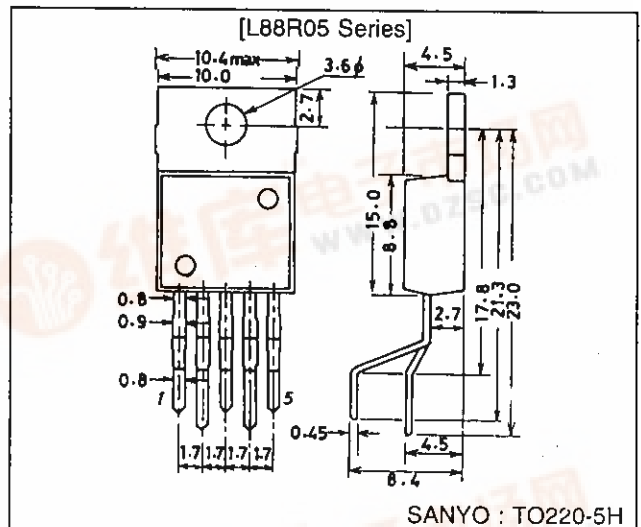
Features

- Minimum I/O voltage difference is small (0.5 V typ.), making power conservation possible, and makes smaller heatsink and transformers possible.
- External capacitor for reset signal output delay time adjustment.
- Sink/source reset output provides compatibility with logic circuitry that has an internal pull-down resistor. Active pull-up facilitates noise suppression.
- Various types of protective circuits on chip (fold back current limiting, thermal protection).
- The package is the TO220-5H; this package facilitates designs for the radiation of heat during the mounting process.

Package Dimensions

unit : mm

3079-T0220-5H



L88R05 Series

Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$

| Parameter | Symbol | Conditions | Ratings | Unit |
|--|----------------|---|-------------|--------------------|
| Maximum input voltage | $V_{IN\ max}$ | | 18 | V |
| Reset pin voltage | $V_{RES\ max}$ | | 18 | V |
| Allowable power dissipation | $P_d\ max$ | $T_a \leq 25^\circ\text{C}$, independent IC | 1.75 | W |
| | | $T_c \leq 50^\circ\text{C}$, ideal radiation of heat | 20 | W |
| Junction-to-ambient thermal resistance | θ_{j-a} | | 71.4 | $^\circ\text{C/W}$ |
| Junction-to-case thermal resistance | θ_{j-c} | | 5 | $^\circ\text{C/W}$ |
| Operating temperature | T_{opr} | | -40 to +85 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | | -55 to +150 | $^\circ\text{C}$ |

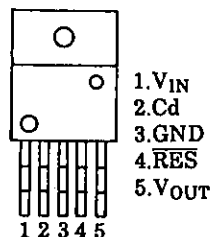
Operating Conditions at $T_a = 25^\circ\text{C}$

| Parameter | Symbol | Conditions | Ratings | Unit |
|-----------------------------|-----------|------------|-----------|---------------|
| Input voltage | V_{IN} | | 5.6 to 17 | V |
| Output current | I_{OUT} | | 0 to 1 | A |
| Reset output source current | I_{ORH} | | 0 to 200 | μA |
| Reset output sink current | I_{ORL} | | 0 to 2 | mA |

Operating Characteristics at $T_j = 25^\circ\text{C}$, $V_{IN} = 8\text{ V}$, $I_{OUT} = 1\text{ A}$, $C_{OUT} = 47\ \mu\text{F}$ for specified circuits

| Parameter | Symbol | Condition | min | typ | max | Unit |
|--|-------------------------|---|------|------|------|----------------------------|
| [Power Supply] | | | | | | |
| Output voltage | V_{OUT} | | 4.85 | 5.0 | 5.15 | V |
| Dropout voltage | V_{DROP1} | | | 0.5 | 1.0 | V |
| | V_{DROP2} | $I_{OUT} = 300\text{ mA}$ | | 0.25 | 0.50 | V |
| Line regulation | ΔV_{OLN} | $5.6\text{ V} \leq V_{IN} \leq 17\text{ V}$ | | 10 | 70 | mV |
| Load regulation | ΔV_{OLD} | $5\text{ mA} \leq I_{OUT} \leq 1\text{ A}$ | | 50 | 150 | mV |
| Peak output current | I_{OP} | | 1 | 1.8 | | A |
| Output short-circuit current | I_{OSC} | | | 0.3 | 1.2 | A |
| Current drain | I_{Q1} | $I_{OUT} = 0$ | | 2.1 | 4 | mA |
| | I_{Q2} | | | 32 | 80 | mA |
| Output noise voltage | V_{NO} | $10\text{ Hz} \leq f \leq 100\text{ kHz}$ | | 70 | | μVrms |
| Output voltage temperature coefficient | $\Delta V_o/\Delta T_a$ | $T_j = 25\text{ to }125^\circ\text{C}$ | | -0.5 | | $\text{mV}/^\circ\text{C}$ |
| Ripple rejection ratio | R_{rej} | $f = 120\text{ Hz}$, $6\text{ V} \leq V_{IN} \leq 17\text{ V}$ | | 60 | | dB |
| [Reset] | | | | | | |
| High-level reset output voltage | V_{ORH} | $I_{ORH} = 200\ \mu\text{A}$, CD open | 4.83 | 4.98 | 5.13 | V |
| Low-level reset output voltage | V_{ORL} | $I_{ORL} = 2\text{ mA}$, CD grounded | | 100 | 200 | mV |
| Reset threshold voltage | V_{RT} | C-rank | 4.3 | 4.5 | 4.7 | V |
| | | D-rank | 4.0 | 4.2 | 4.4 | V |
| | | E-rank | 3.7 | 3.9 | 4.1 | V |
| Reset hysteresis voltage | V_{hys} | | 50 | 100 | 200 | mV |
| Output delay time | t_d | $C_d = 0.1\ \mu\text{F}$ | 7.5 | 10 | 12.5 | ms |

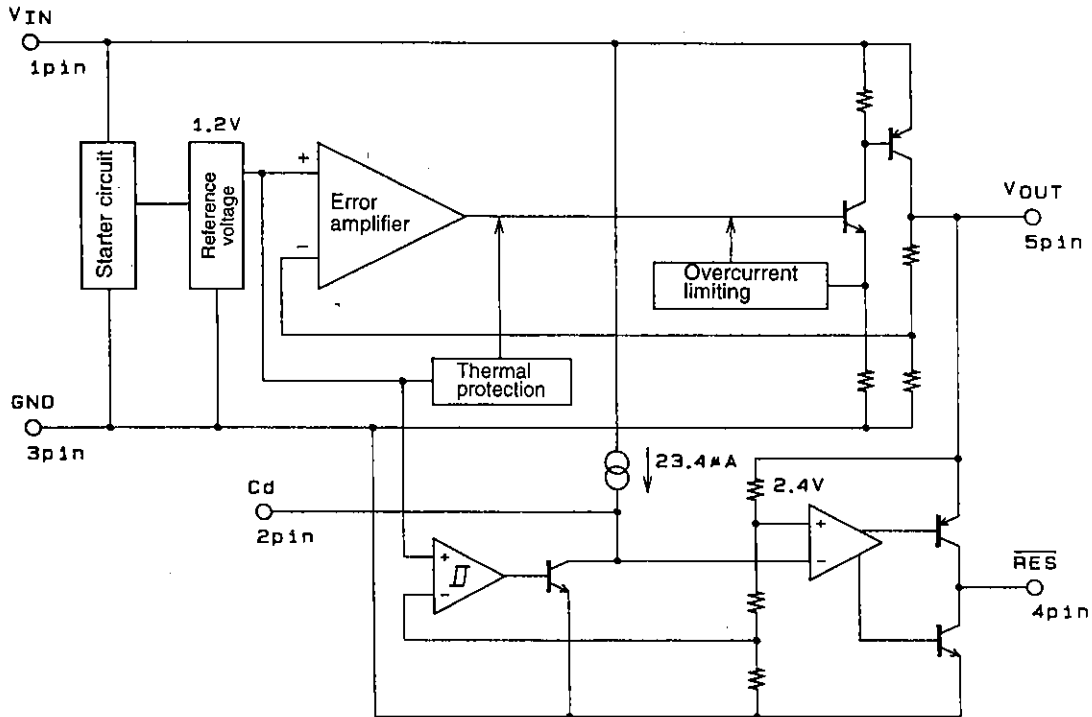
Pin Assignments



Top view

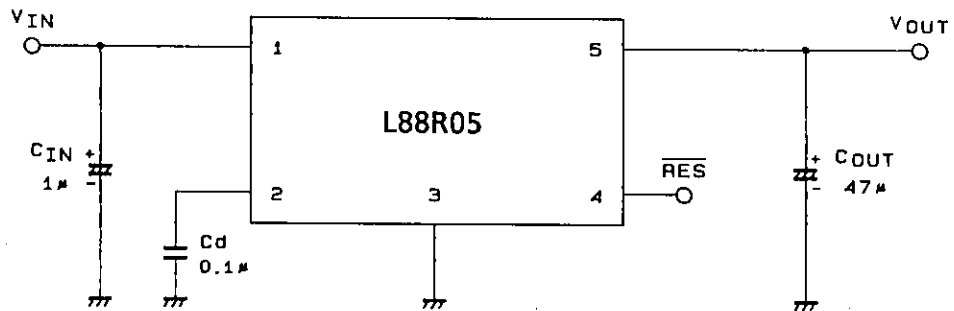
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Equivalent Circuit Block Diagram



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Measurement Circuit

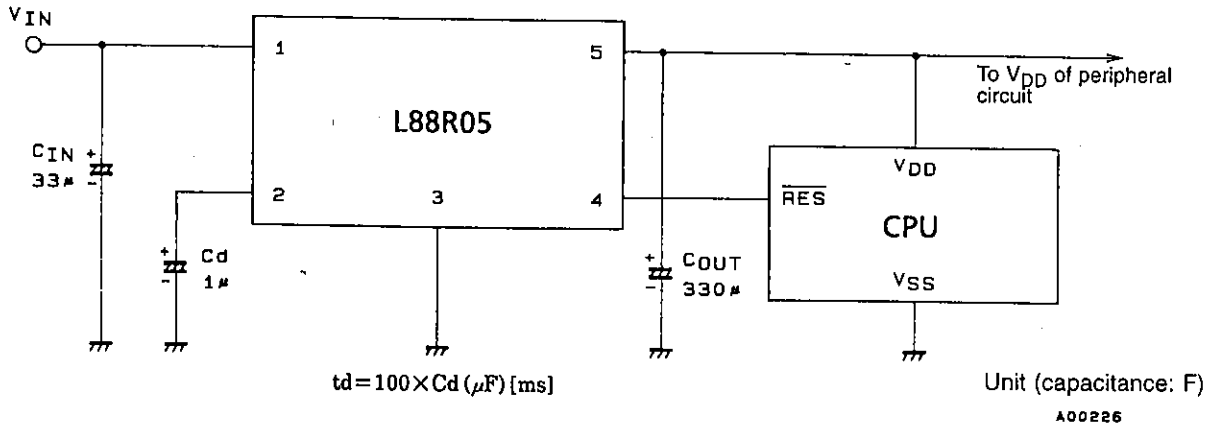


Unit (capacitance: F)

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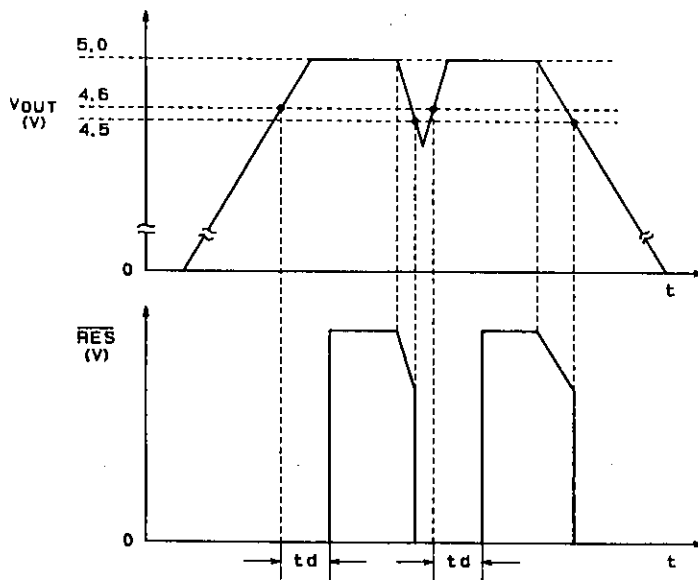
Sample Application Circuit



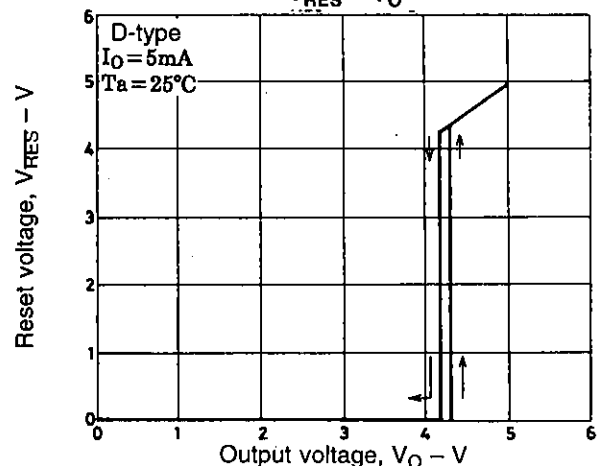
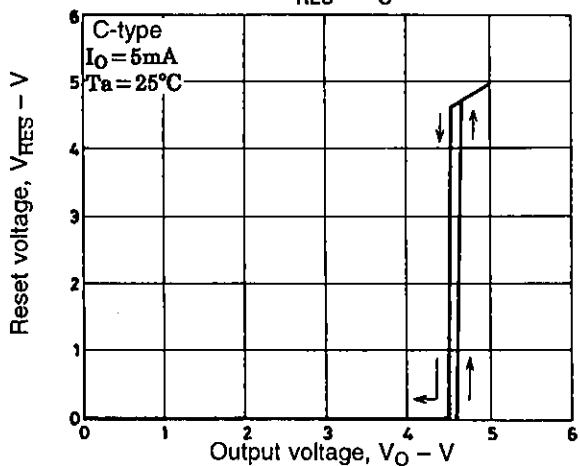
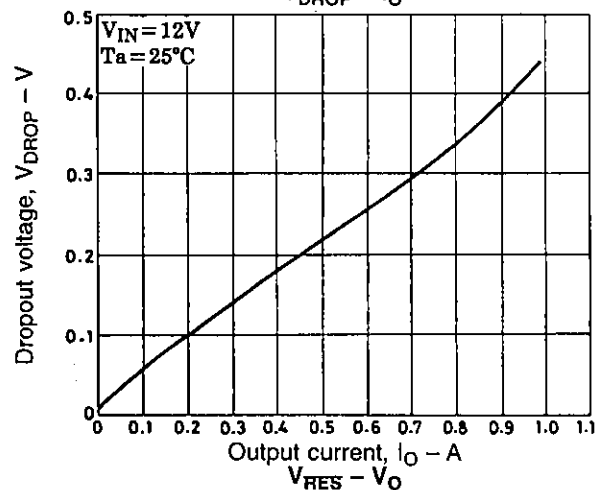
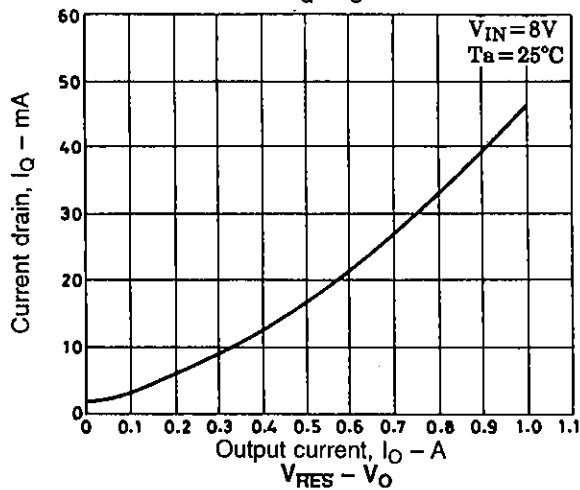
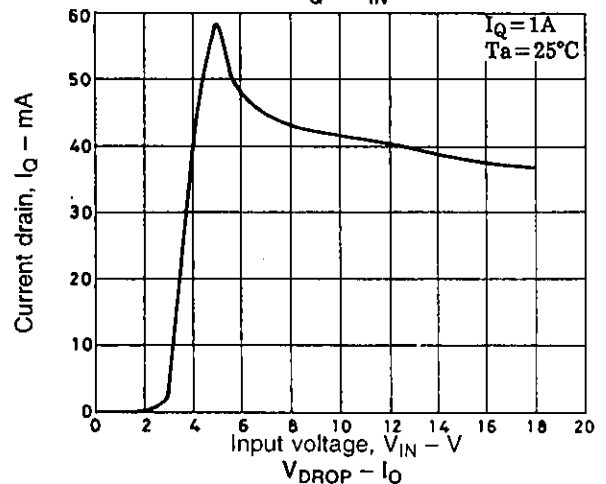
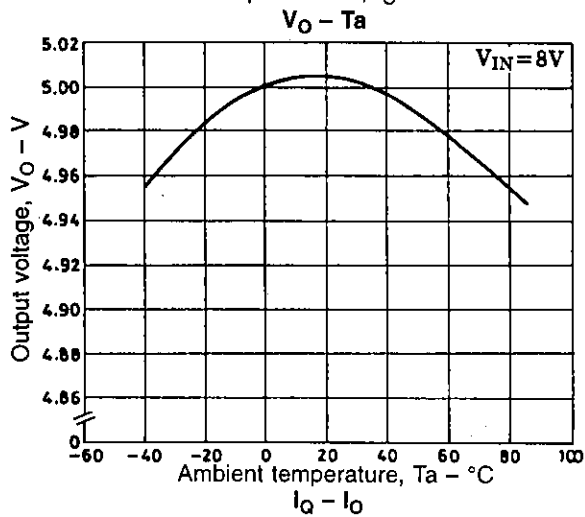
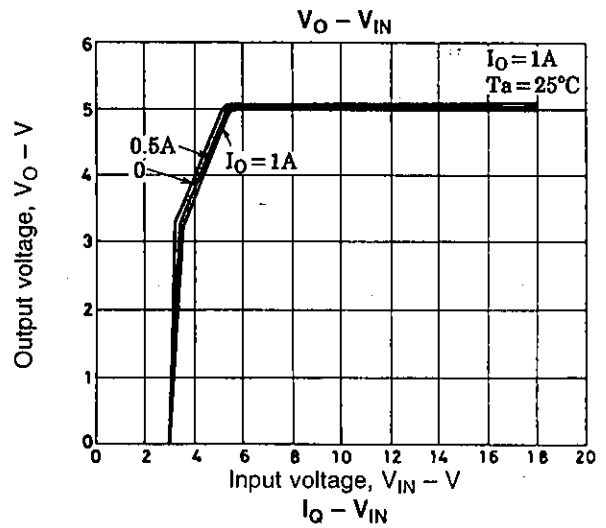
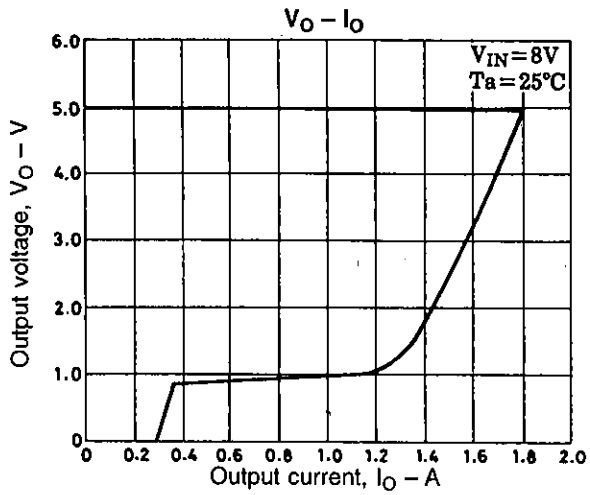
Notes:

1. Set C_{OUT} to be 47 μF or greater and select it according to the applications.
2. Use the capacitors for C_{OUT} and C_d with high-temperature stability.

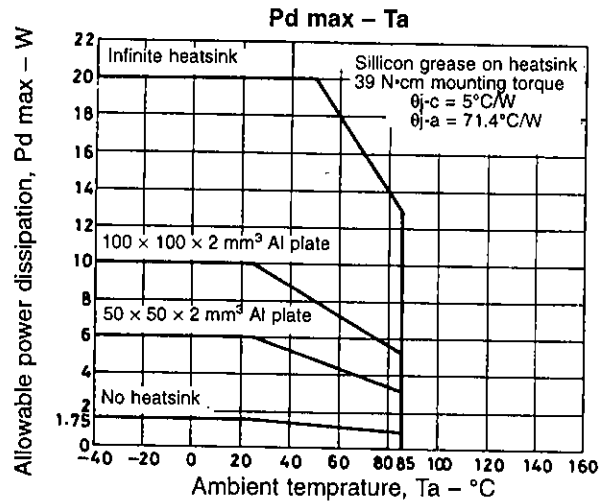
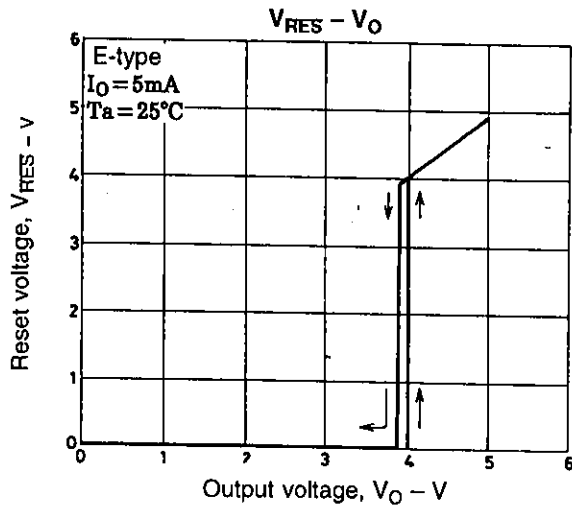
L88R05C's Reset Operation



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