



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

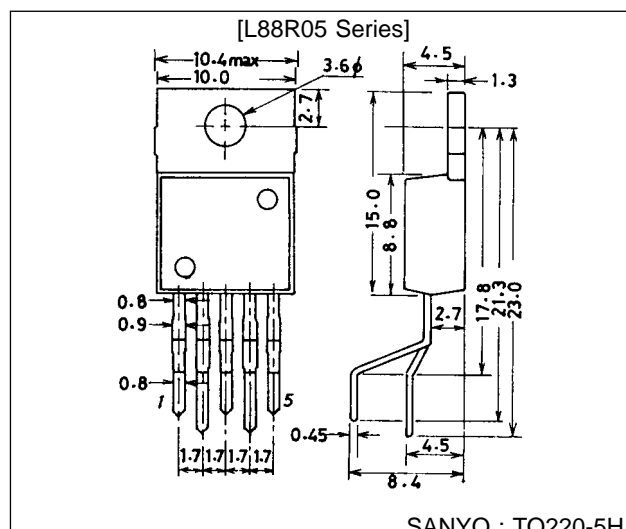
Features

- 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	$V_{\overline{RES}}\ max$		18	V
Allowable power dissipation	$Pd\ max$	$T_a \leq 25^\circ\text{C}$, 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	$^\circ\text{C}$

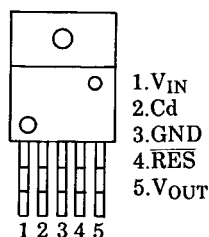
Operating Conditions at $T_a = 25^\circ\text{C}$

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 $T_j = 25^\circ\text{C}$, $V_{IN} = 8\text{ V}$, $I_{OUT} = 1\text{ A}$, $C_{OUT} = 47\ \mu\text{A}$ 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

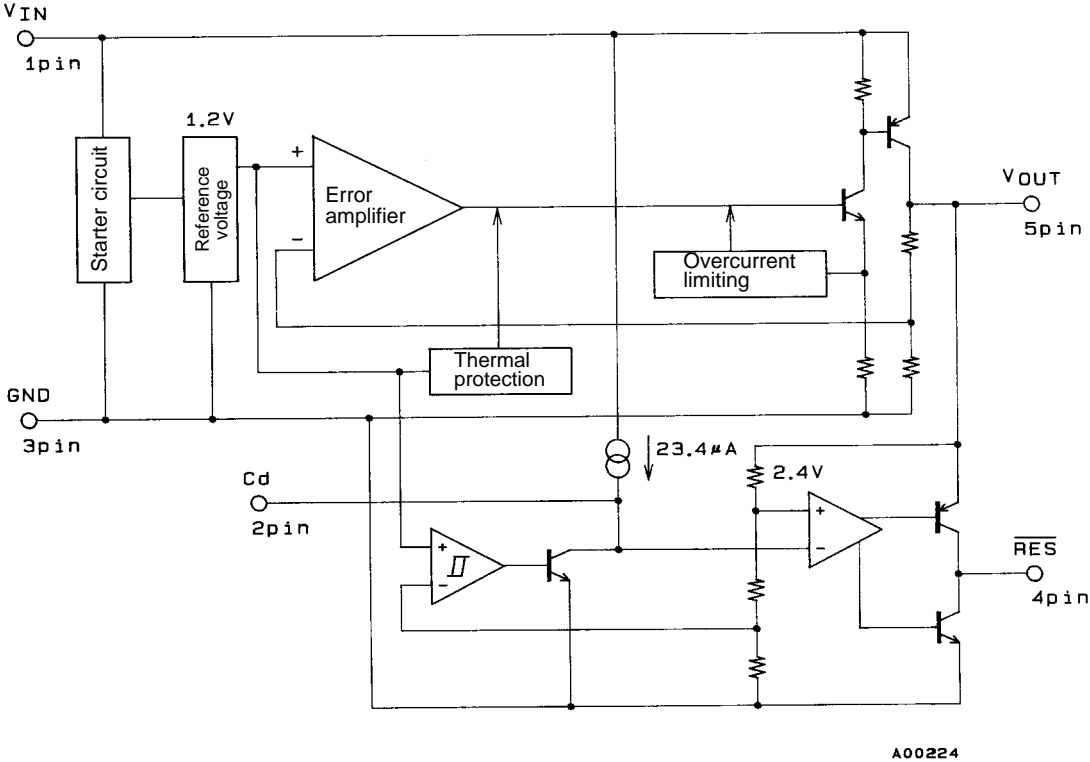
Pin Assignments



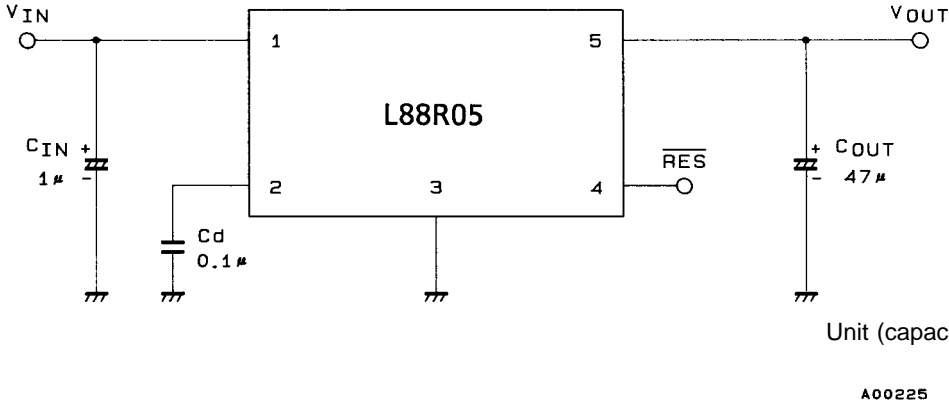
Top view

L88R05 Series

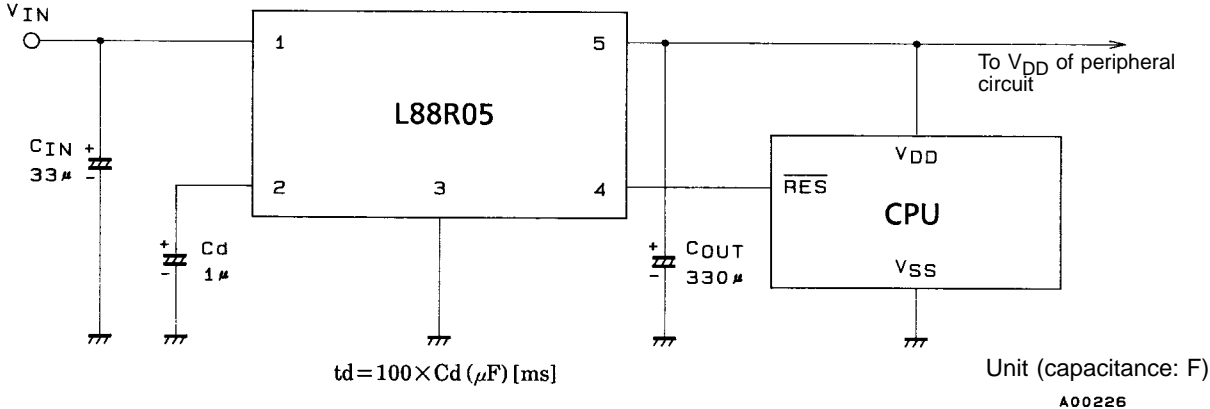
Equivalent Circuit Block Diagram



Measurement Circuit



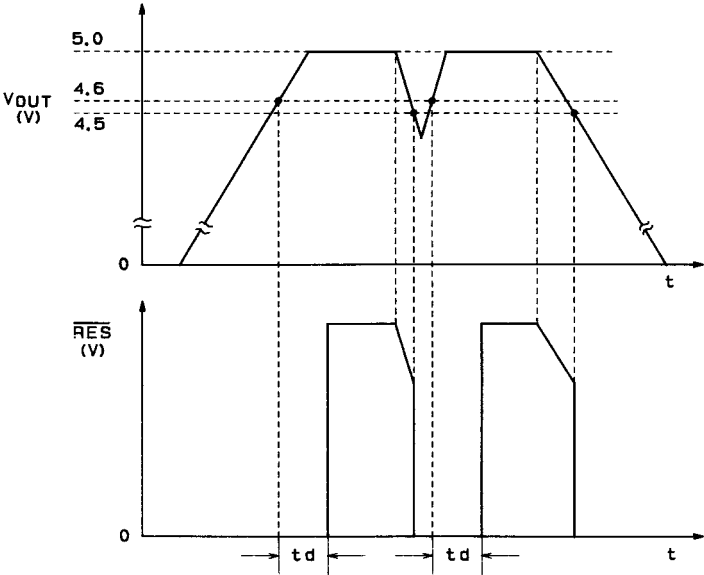
Sample Application Circuit



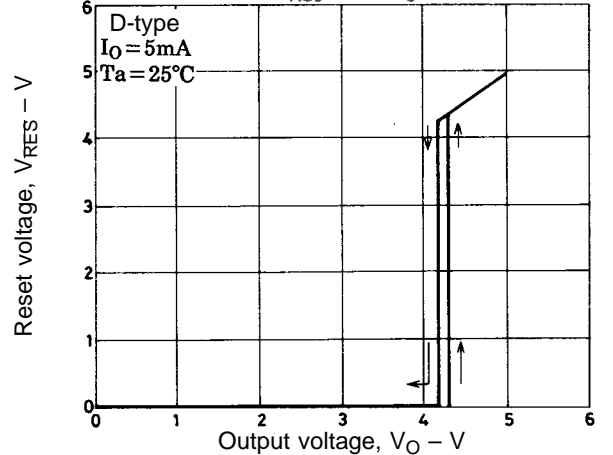
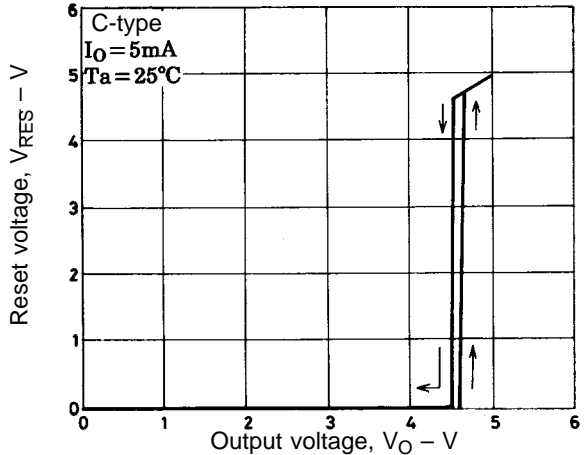
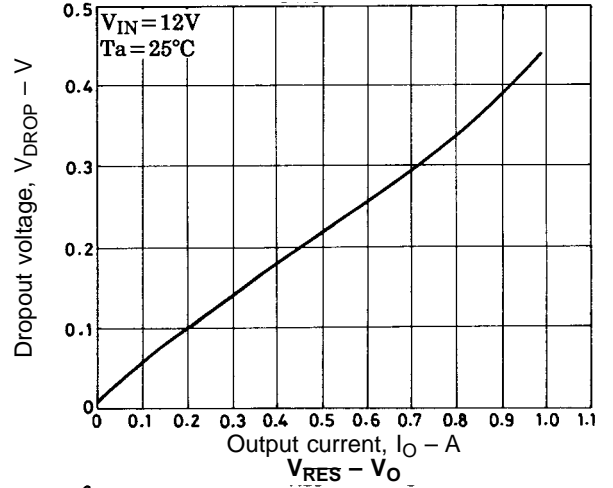
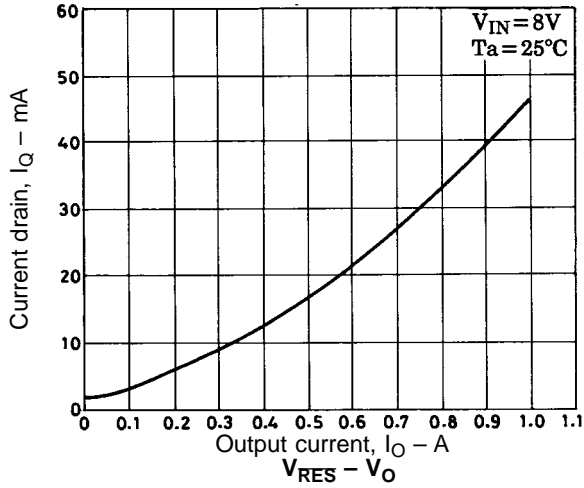
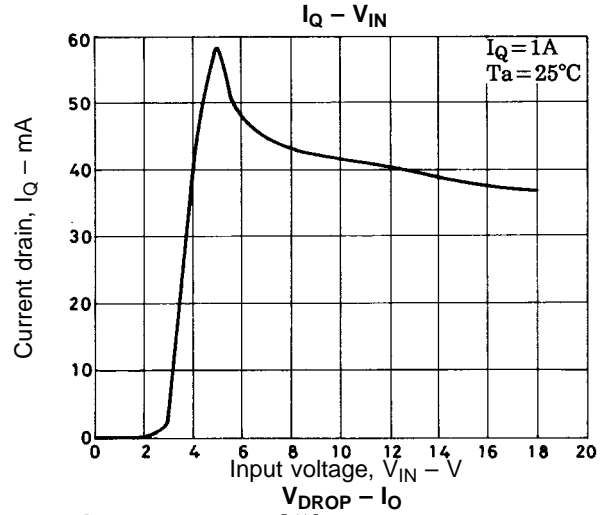
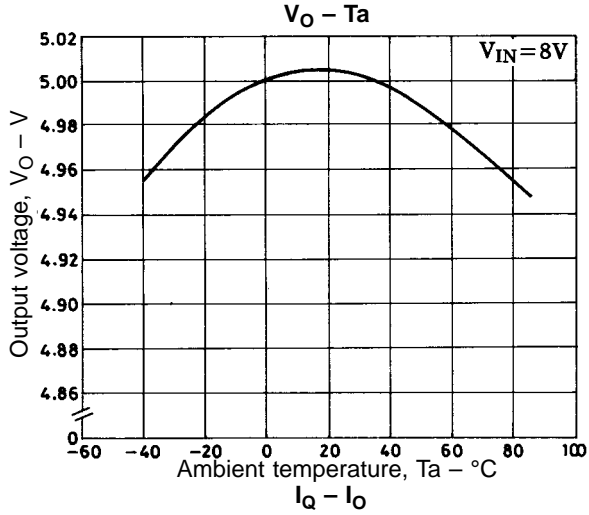
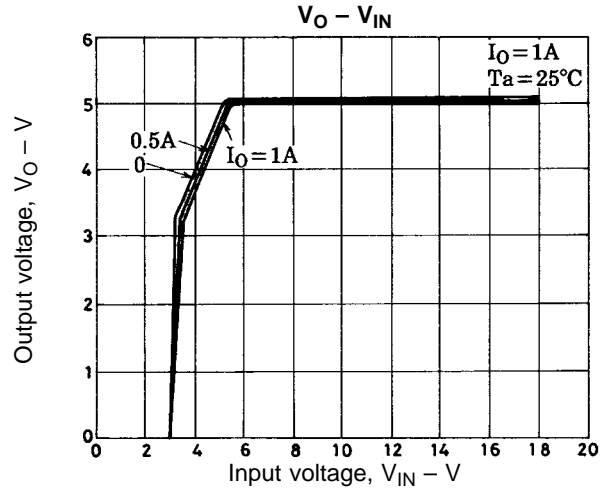
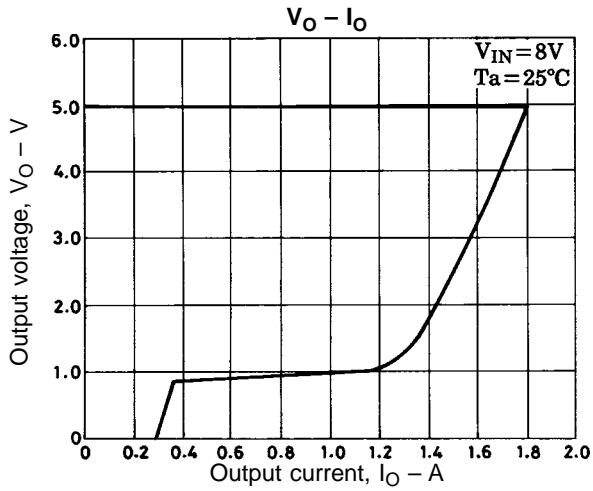
Notes:

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.

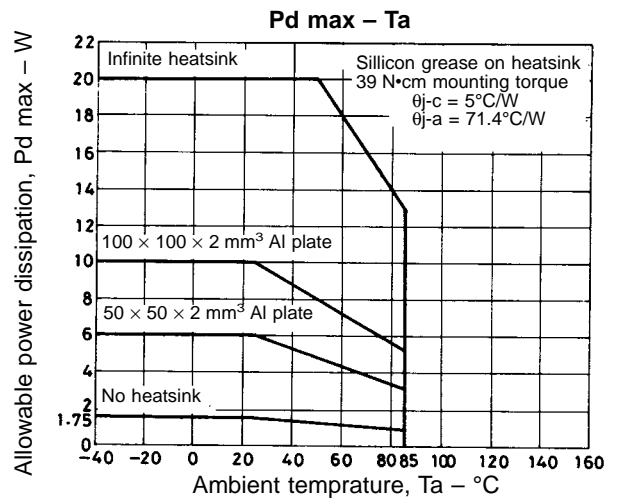
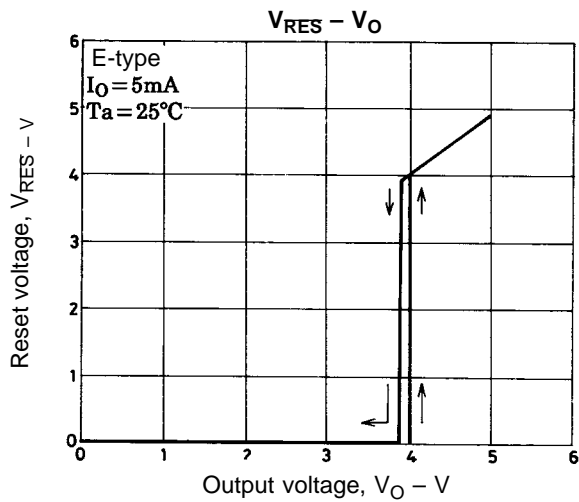
L88R05C's Reset Operation



L88R05 Series



L88R05 Series



- No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.
- Anyone purchasing any products described or contained herein for an above-mentioned use shall:
 - ① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use:
 - ② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of October, 1996. Specifications and information herein are subject to change without notice.