



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

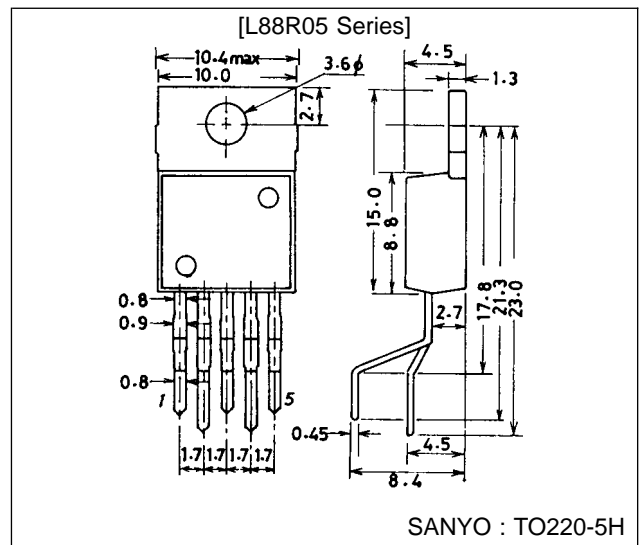
- Minimum I/O voltage difference is small (0.5 V typ.), making power conservation possible, and makes smaller heatsink and transformers possible.
- External capacitor for reset signal output delay time adjustment.
- Sink/source reset output provides compatibility with logic circuitry that has an internal 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.

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Package Dimensions

unit : mm

3079-T0220-5H



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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	$^\circ\text{C}$

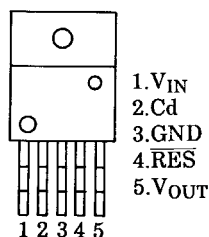
Operating Conditions at $T_a = 25^\circ\text{C}$

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

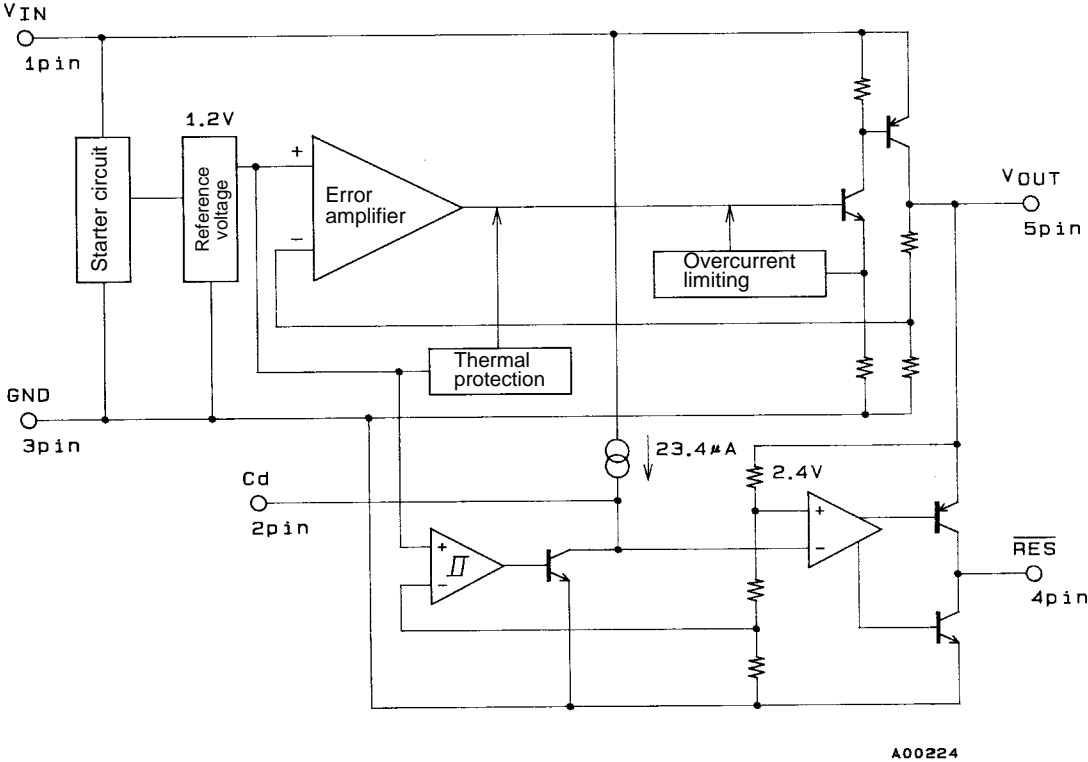
Pin Assignments



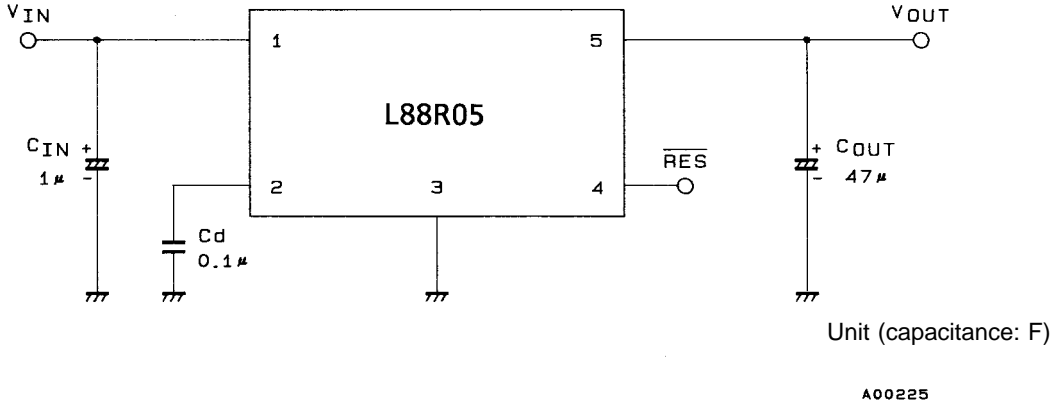
Top view

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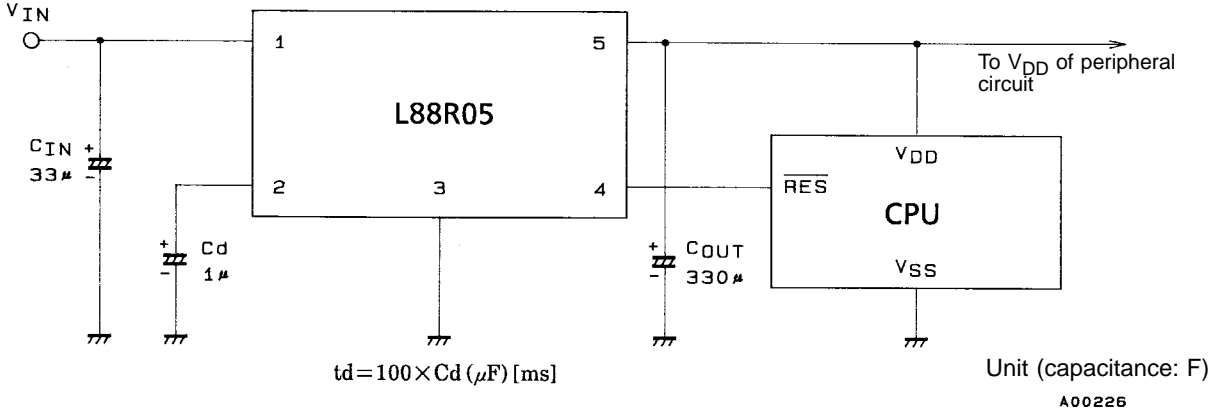
Equivalent Circuit Block Diagram



Measurement Circuit



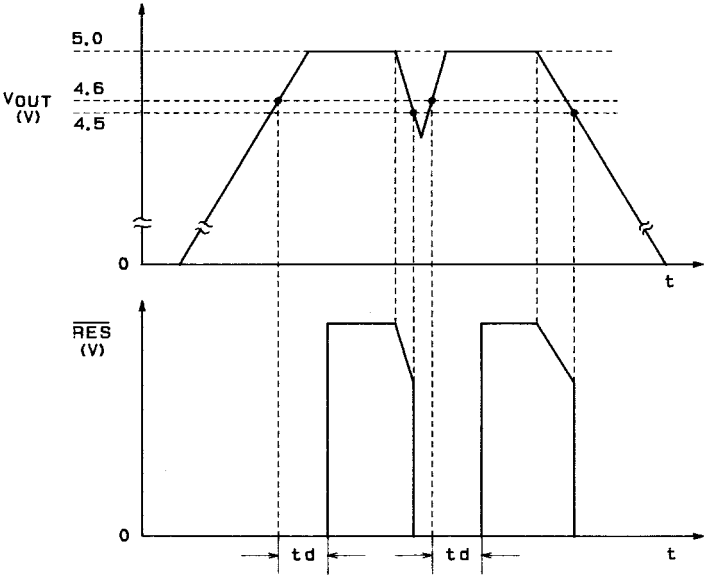
Sample Application Circuit



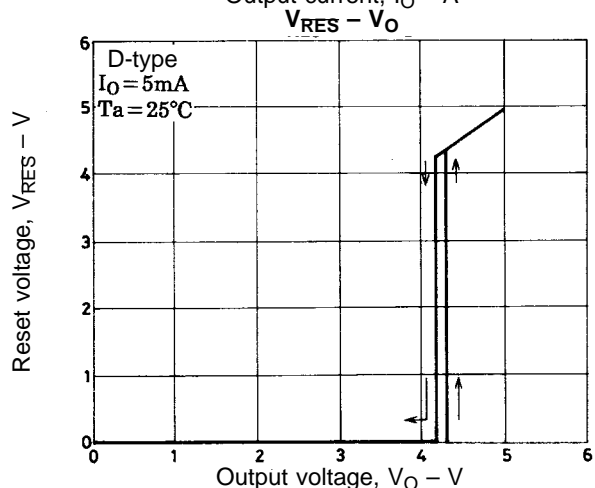
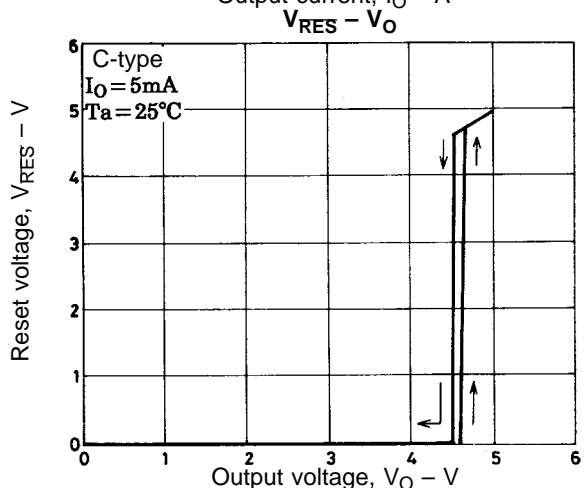
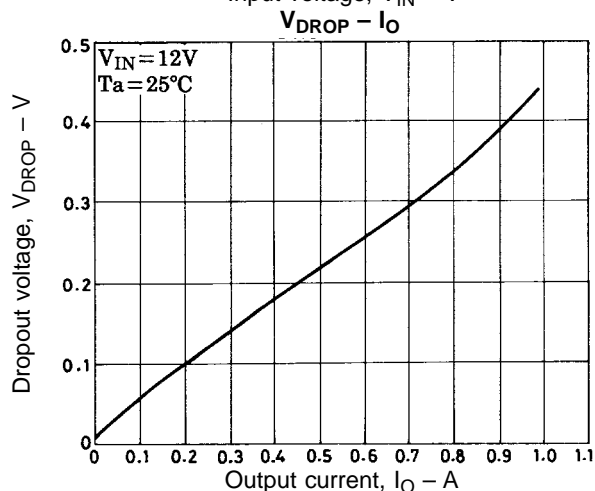
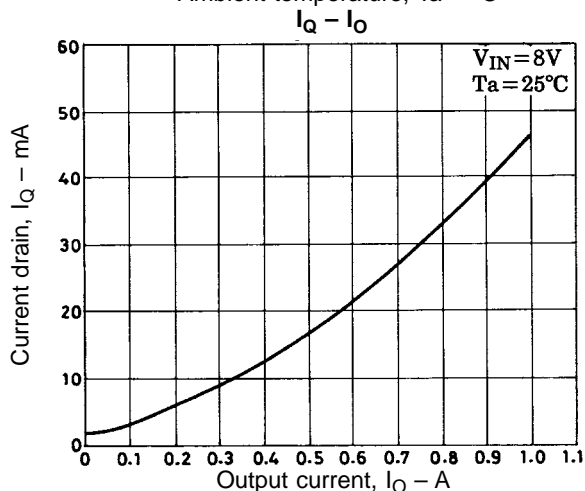
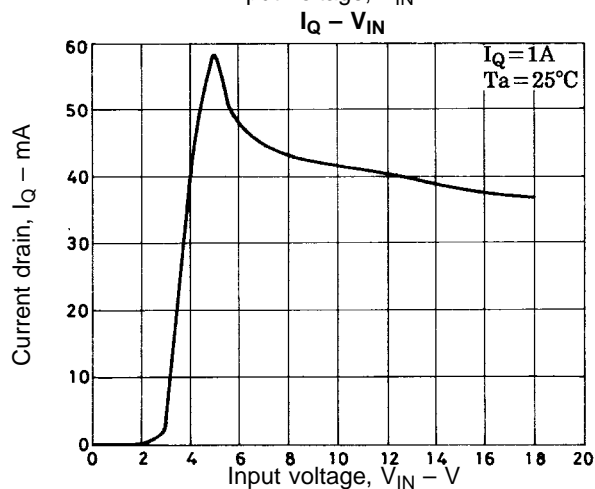
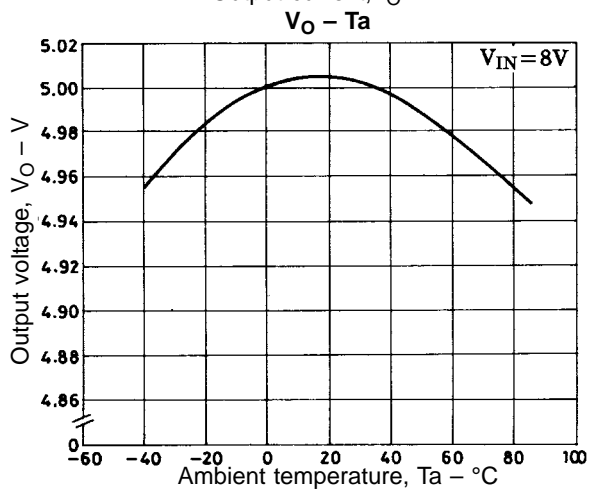
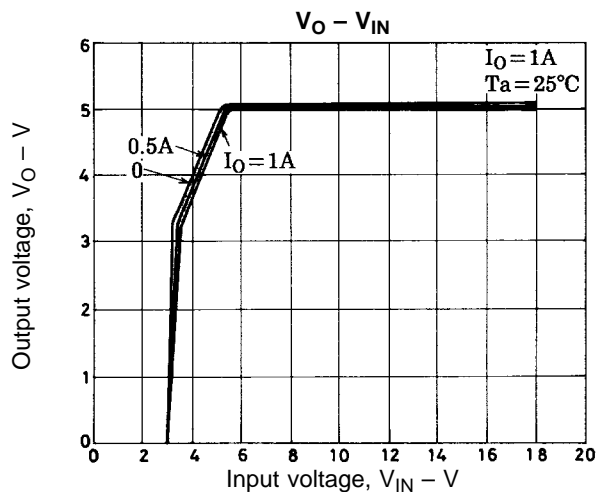
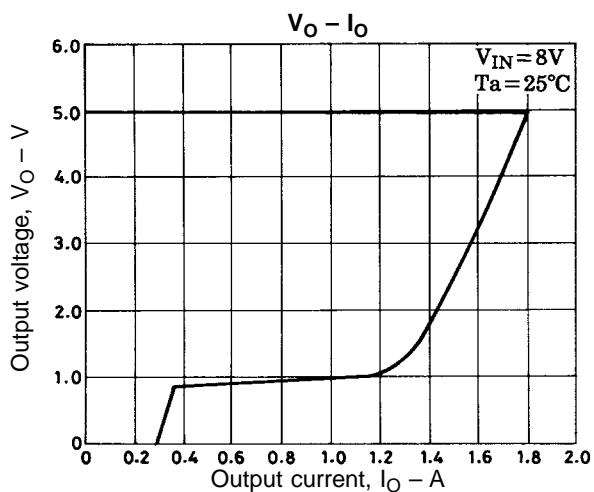
Notes:

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.

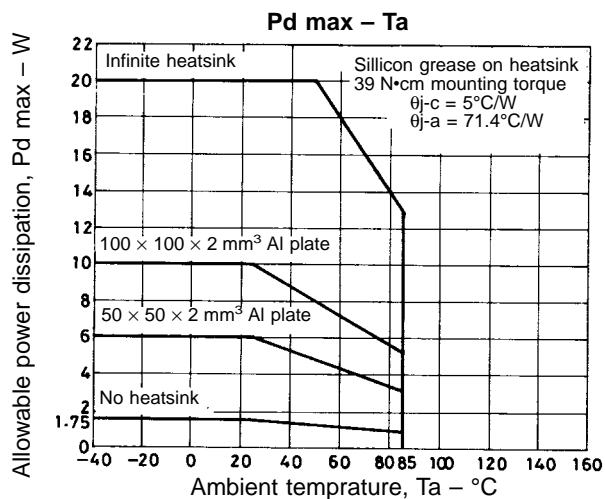
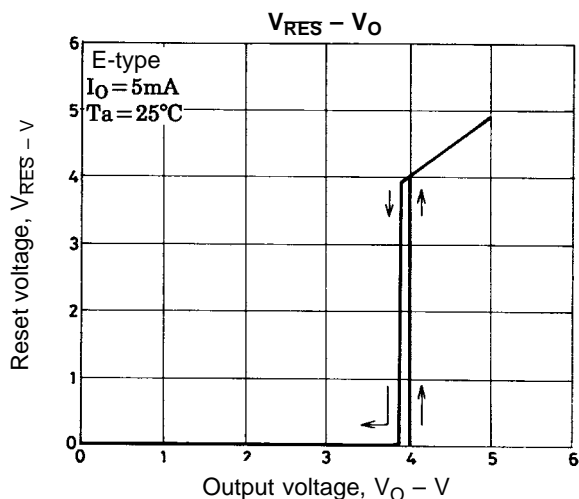
L88R05C's Reset Operation



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