

SERIES REGULATOR WITH RESET FUNCTION

■ GENERAL DESCRIPTION

The NJM78LR05 is a series regulator with reset function.

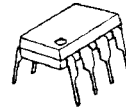
In case of shut down or output voltage drop, the IC generates reset signal to a microcomputer.

That is suitable for items with microcomputer, such as TV sets, remote controller, refrigerator and others.

■ FEATURES

- Output Current  $I_o = 150\text{mA}$  max.
- Reset Function Including
- Reset Delay Time can be Adjusted by an External Capacitance.
- Internal Over Current Protection
- Thermal Shut Down
- Bipolar Technology
- Package Outline DIP8, DMP8, SIP8, SOT-89 (5Pin)

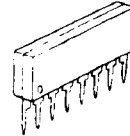
■ PACKAGE OUTLINE



NJM78LR05BD/CD/DD



NJM78LR05BM/CM/DM



NJM78LR05BL/GL/DL



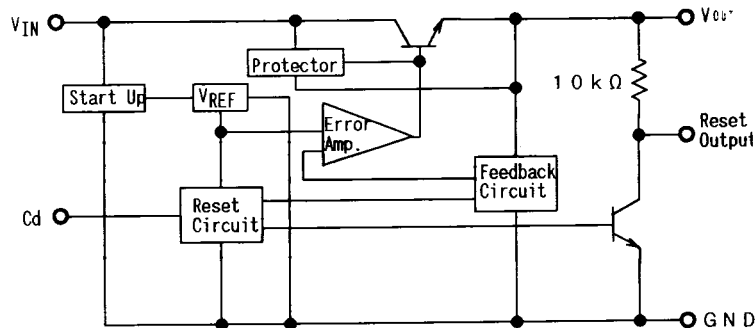
NJM78LR05BU/CU/DU

■ RESET THRESHOLD VOLTAGE LINE-UP

Reset Threshold Voltage	Version	Part Number
4.0V	D	NJM78LR05DX
4.2V	C	NJM78LR05CX
4.3V	B	NJM78LR05DX

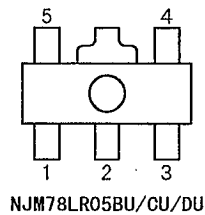
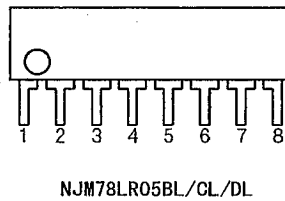
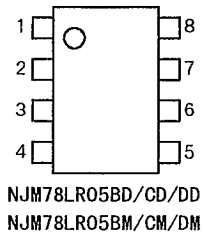
"X" is package suffix.

■ BLOCK DIAGRAM



# NJM78LR05

## PIN CONFIGURATION



### PIN FUNCTION

1. INPUT
2. NC
3. Cd
4. NC
5. GND
6. RESET-OUTPUT
7. NC
8. OUTPUT

### PIN FUNCTION

1. Cd
2. GND
3. RESET-OUTPUT
4. OUTPUT
5. INPUT

## ABSOLUTE MAXIMUM RATINGS

( $T_a = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	MAXIMUM RATINGS	UNIT
Input Voltage	$V_{IN}$	+20	V
Power Dissipation	$P_D$	(DIP8) 500 (DMP8) 500※ (SIP8) 800 (SOT-89) 350	mW
Operating Temperature Range	$T_{opr}$	-40 ~ +85	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-50 ~ +150	$^\circ\text{C}$

※At on PC board.

## RECOMMENDED OPERATING CONDITIONS

( $T_a = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	CONDITIONS	UNIT
Input Voltage	$V_{IN}$	7.5 ~ 18	V
Output Current	$I_o$	1 ~ 100	mA

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■ ELECTRICAL CHARACTERISTICS ( $V_{IN}=10V$ ,  $I_o=40mA$ ,  $C_{IN}=1\mu F$ ,  $C_o=10\mu F$ ,  $T_a=25^\circ C$ )  
 [Power Supply Block]

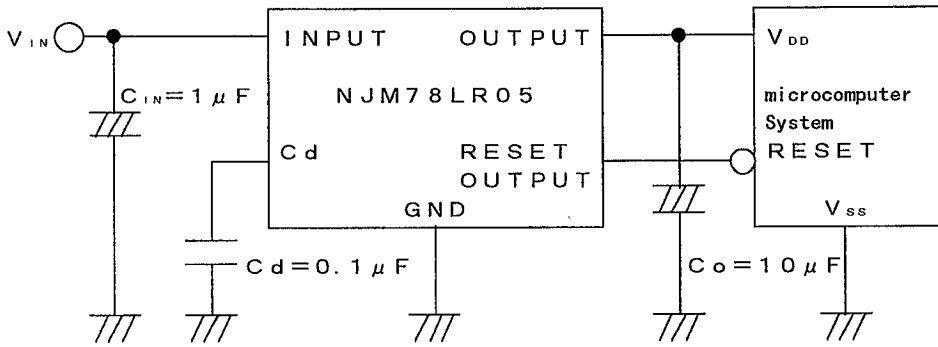
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_o$	$I_o=1mA$	4.80	5.00	5.20	V
Quiescent Current	$I_q$	$I_o=100mA$	—	1.40	3.40	mA
Output Short Current	$I_{osc}$	OUTPUT-GND short	150	300	450	mA
Line Regulation 1	$\Delta V_o/V_{IN1}$	$7V \leq V_{IN} \leq 18V$	—	6.0	65.0	mV
Line Regulation 2	$\Delta V_o/V_{IN2}$	$8V \leq V_{IN} \leq 18V$	—	3.0	42.0	mV
Load Regulation 1	$\Delta V_o/I_{o1}$	$I_o=1 \sim 100mA$	—	9.0	60.0	mV
Load Regulation 2	$\Delta V_o/I_{o2}$	$I_o=1 \sim 40mA$	—	3.0	30.0	mV
Ripple Rejection	RR	$f=120Hz$ , $e_{i,rms}=1V_{p-p}$ , $V_{IN}=8 \sim 18V$	—	79	—	dB
Output Noise Voltage	$V_{no}$	$10Hz \leq f \leq 100kHz$ , $I_o=1mA$	—	80	—	$\mu V$
Dropout Voltage	$\Delta V_{I-o}$		—	1.5	2.2	V

[Reset Block]

(H) Reset Output Voltage	$V_{ORH}$		4.80	5.00	5.20	V
(L) Reset Output Voltage	$V_{ORL}$	$V_{IN}=3V$ , $I_o=1mA$	—	10	200	mV
Reset Threshold Voltage	$V_{RT}$	B Version	4.12	4.30	4.48	V
		C Version	4.03	4.20	4.37	
		D Version	3.84	4.00	4.16	
Reset Threshold Hysteresis Voltage	$V_{RTH}$		50	100	200	mV
Reset Output Delay Time	$t_d$	$C_d=0.1\mu F$	7.50	10.0	12.5	ms

# NJM78LR05

## APPLICATION CIRCUIT

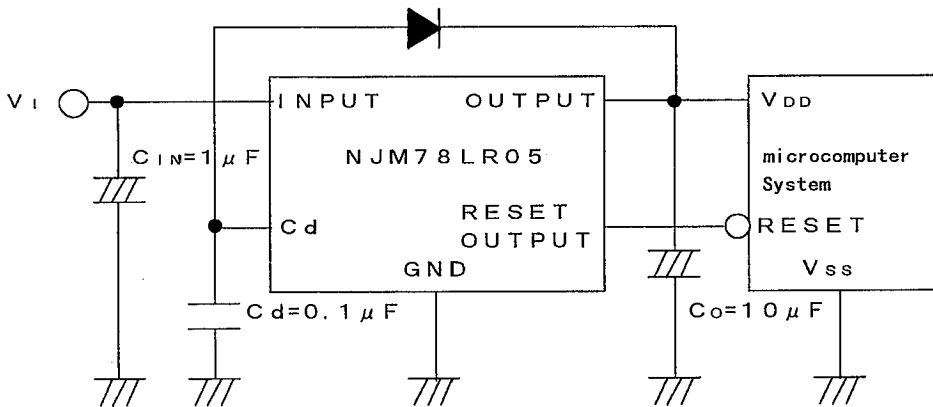


$$t_d [\text{ms}] = 100 \times C_d [\mu\text{F}]$$

Note1: When the capacitance  $C_d$  is too large, the actual delay time is shorter than the calculated result because an electrical charge of  $C_d$  is discharged incompletely.

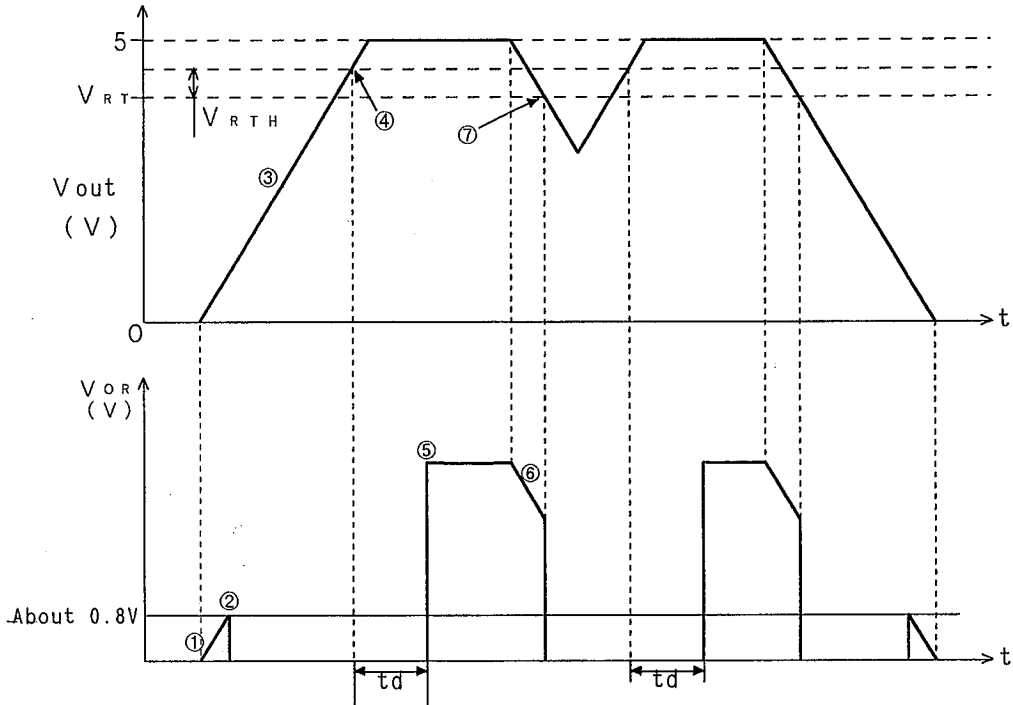
Solution of above problem:

- (1) Connect SBD between output terminal and  $C_d$  terminal. Please refer to the following circuit.
- (2) Select larger capacitance,  $C_{IN}$  than  $C_d$ .



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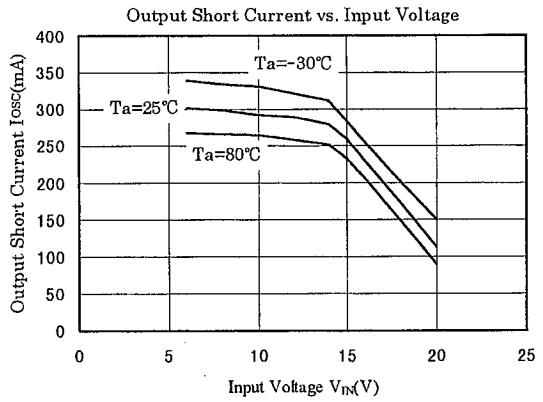
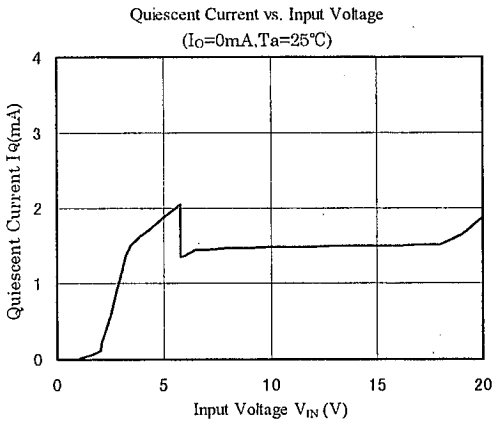
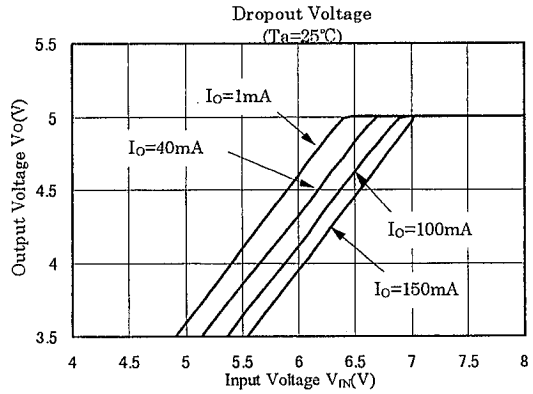
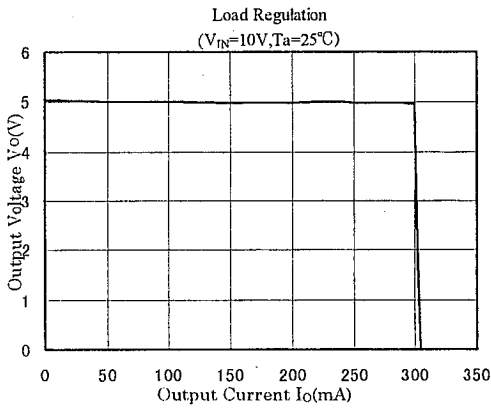
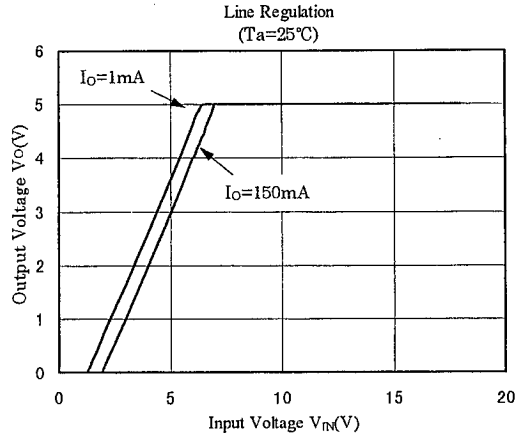
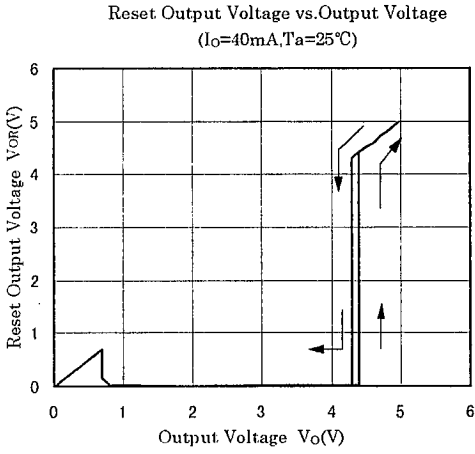
■ TIMING CHART



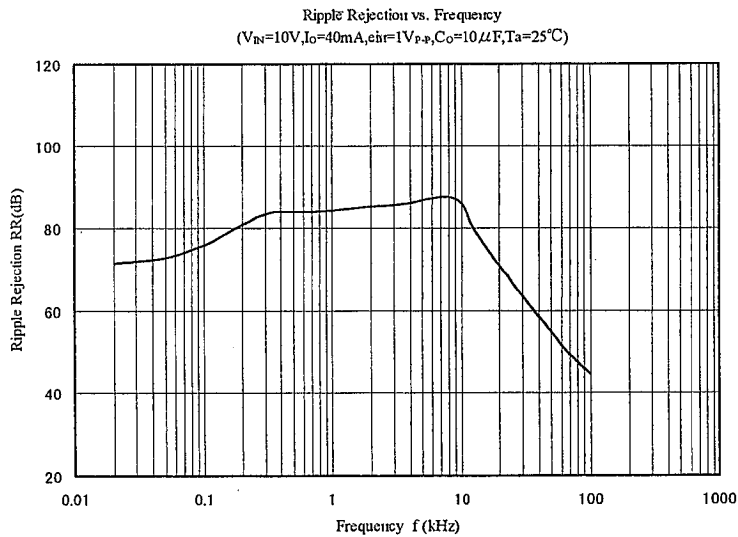
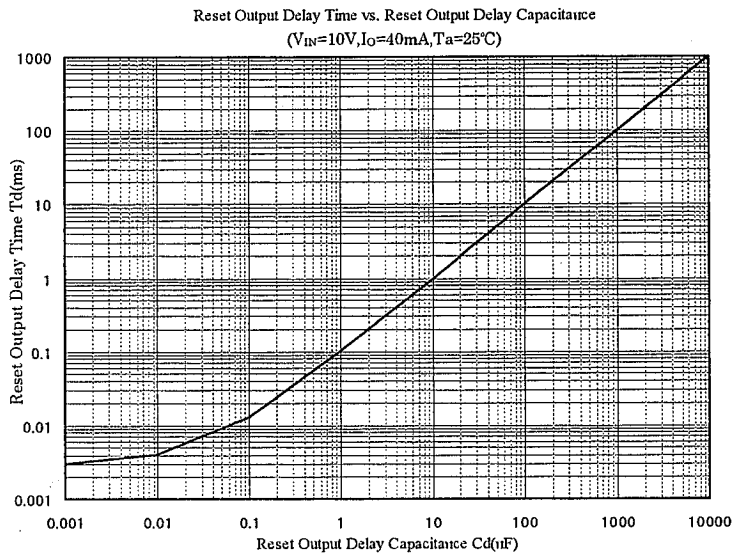
- ① When the input voltage is up to about 0.8V, some voltage is outputted at the reset output because the NJM78LR05 operation is unstable.
- ② When the input voltage goes over about 0.8V, the reset output becomes "L".
- ③ The output voltage is rising up with the input voltage.
- ④ When the output voltage goes over  $(V_{RT} + V_{RTH})$ , the delay circuit of reset output activates.  
 $V_{RT}$ : Reset Threshold Voltage  
 $V_{RTH}$ : Reset Threshold Hysteresis Voltage
- ⑤ After the reset output delay time  $t_d$  has passed, the reset output becomes "H".
- ⑥ The output voltage is falling down with the input voltage.
- ⑦ When the output voltage is less than  $V_{RT}$ , the reset output becomes "L".

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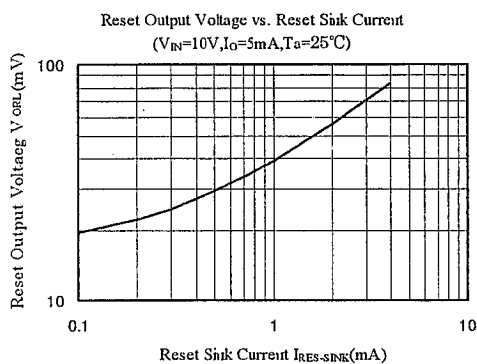
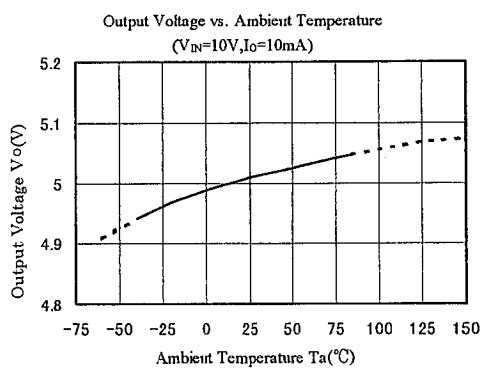
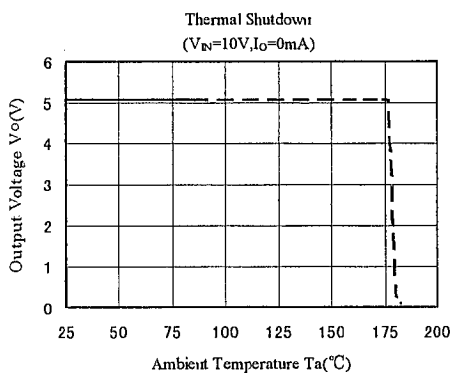
## TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS



## TYPICAL CHARACTERISTICS





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# MEMO

**[CAUTION]**

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