

LOW DROPOUT VOLTAGE REGULATOR WITH ON/OFF CONTROL

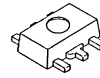
■ GENERAL DESCRIPTION

The NJM2370 is a low dropout voltage regulator with ON/OFF control.

It features dropout voltage of 0.1V at $I_o=30\text{mA}$, low output noise and high ripple rejection by connecting an external capacitor to noise bypass terminal.

It's suitable for portable items such as cellular phones, video camera and others.

■ PACKAGE OUTLINE



NJM2370U

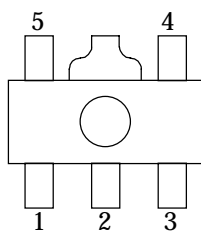


NJM2370R

■ FEATURES

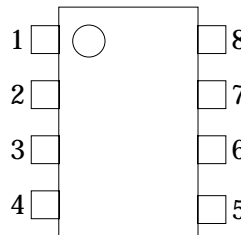
- Output Current (150mA min. ($V_o-0.3\text{V}$))
- Low Dropout Voltage (0.1V typ. ($I_o=30\text{mA}$))
- External Capacitor for Noise Bypass
- ON/OFF Control Function
- Over Current Limit
- Thermal Shutdown
- Bipolar Technology
- Package Outline SOT-89(5pin), VSP8

■ PIN CONFIGURATION



NJM2370U

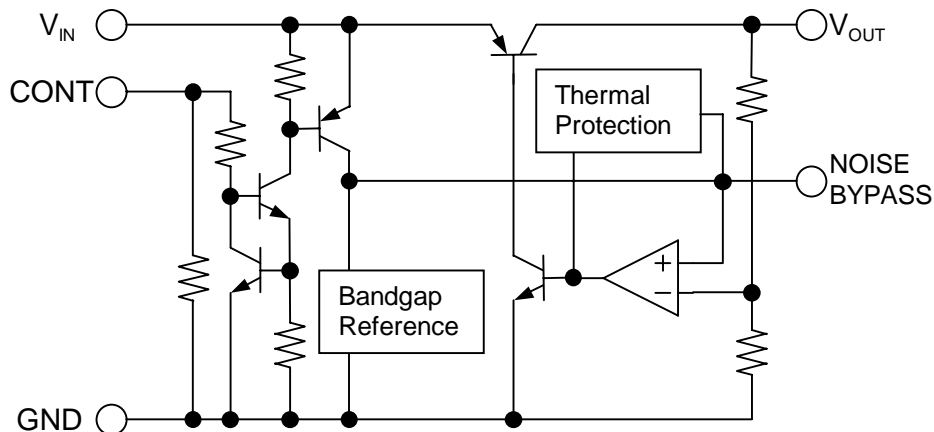
- PIN FUNCTION
1. CONTROL
 2. GND
 3. NOISE BYPASS
 4. V_{OUT}
 5. V_{IN}



NJM2370R

- PIN FUNCTION
1. CONTROL
 2. GND
 3. NC
 4. NOISE BYPASS
 5. V_{OUT}
 6. NC
 7. NC
 8. V_{IN}

■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	20	V
Control Voltage	V_{CONT}	20(note 1)	V
Power Dissipation	P_D	(SOT-89) 350 (VSP8) 320	mW
Operating Temperature Range	T_{opr}	-40 ~ +85	°C
Storage Temperature Range	T_{stg}	-40 ~ +125	°C

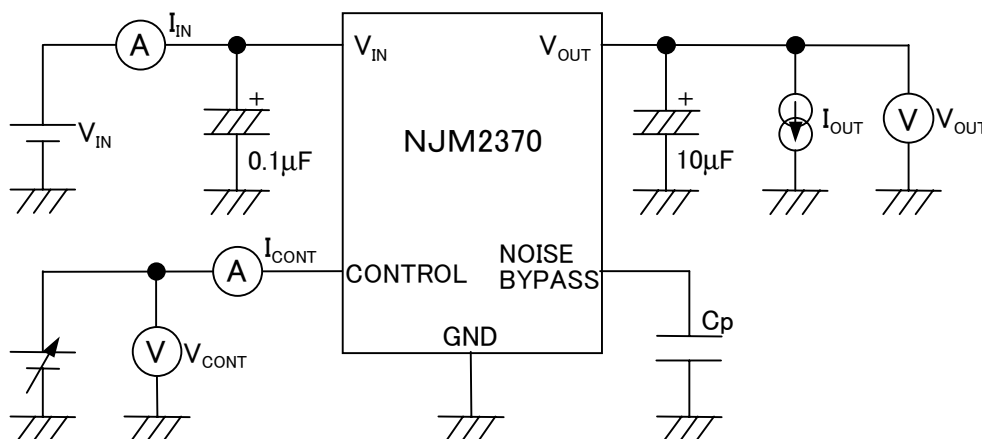
(note 1)When input voltage is less than +20V, the absolute maximum control voltage is equal to the input voltage.

■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_o	$V_{IN}=V_o+1V, I_o=30mA$	-3%	-	+3%	V
Quiescent Current 1	I_{Q1}	$I_o=0mA, \text{expect } I_{CONT}$	-	180	-	μA
Quiescent Current 2	I_{Q2}	CONTROL-GND short	-	-	100	nA
Output Current	I_o	($V_o-0.3V$)	150	180	-	mA
Line Regulation	$\Delta V_o/\Delta V_{IN}$	$V_{IN}=(V_o+1V) \sim (V_o+6V)$ $V_o=2V \text{ to } 14V$	-	-	0.12	%/V
		$V_{IN}=(V_o+1V) \sim (V_o+5V)$ $V_o=15V$	-	-	0.12	%/V
Load Regulation	$\Delta V_o/\Delta I_o$	$I_o=0 \sim 60mA$	-	-	0.03	%/mA
Dropout Voltage	ΔV_{I-O}	$I_o=30mA$	-	0.1	0.3	V
Ripple Rejection	$R \cdot R$	$f=400Hz, e_{in}=100mVp-p$ $V_{IN}=V_o+1.5V, I_o=10mA$	-	60	-	dB
Average Temperature Coefficient of Output Voltage	$\Delta V_o/\Delta T_a$	$T_a=-20 \sim 75^\circ C, I_o=10mA$ $V_{IN}=V_o+1.5V$	-	0.2	-	mV/°C
Output Noise Voltage	V_{NO}	$10Hz < f < 80kHz, I_o=10mA, V_o=3V$	-	30	-	μV_{rms}

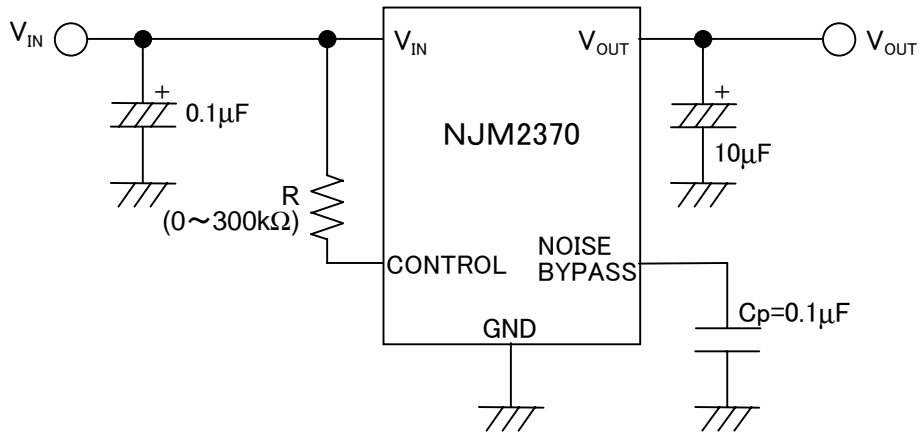
(note 2)Please confirm the specification separately because some parameters depend on output voltage.

■ TEST CIRCUIT



■ TYPICAL APPLICATION

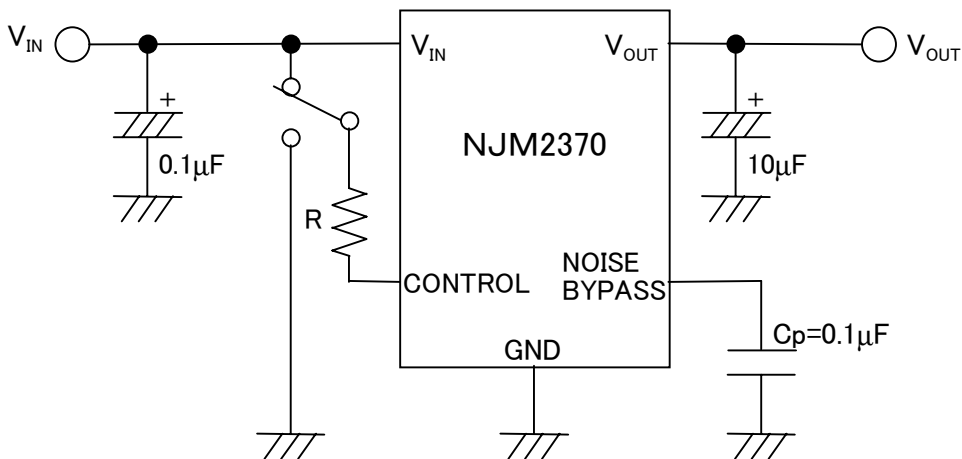
① In Nonuse of ON/OFF Control



Connect control terminal(1Pin) to V_{IN} terminal(5Pin)

When a resistance "R" is connected, the quiescent current decreases, but minimum operating voltage increases. Please refer to a figure of Output Voltage vs. Control Voltage.

② In Use of ON/OFF CONTROL



When the control terminal is "H", it is ON.

When the control terminal is "L" or "open", it is OFF.

★Noise bypass Capacitance C_p

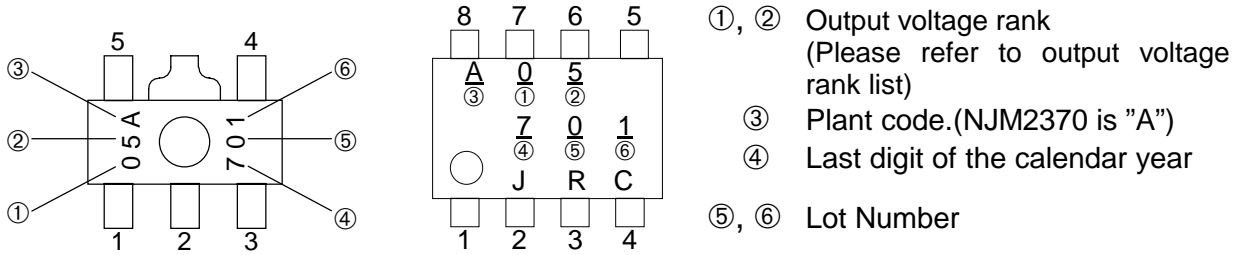
Noise bypass capacitance C_p reduces noise generated by band-gap reference circuit.

Noise level and ripple rejection will be improved when larger C_p is used. Please refer to the typical characteristics to determine the value.

Use of smaller C_p value may induce oscillation.

Please make sure to use C_p value of greater than 0.1µF to avoid the problem.

■ PACKAGE MARKING



■ OUTPUT VOLTAGE RANK LIST

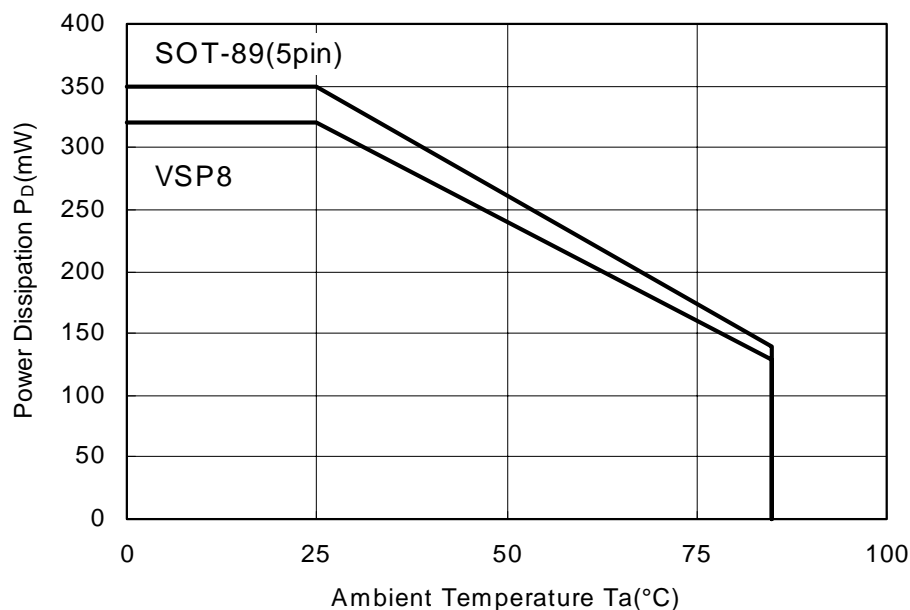
Output Voltage	Part Number	Marking		
		①	②	
2.0V	NJM2370X02	0	2	
2.1V	NJM2370X21	2	1	(★1)
2.2V	NJM2370X22	2	2	(★1)
2.3V	NJM2370X23	2	3	(★1)
2.4V	NJM2370X24	2	4	(★1)
2.5V	NJM2370X25	2	5	
2.6V	NJM2370X26	2	6	(★1)
2.7V	NJM2370X27	2	7	
2.8V	NJM2370X28	2	8	(★1)
2.9V	NJM2370X29	2	9	(★1)
3.0V	NJM2370X03	0	3	
3.1V	NJM2370X31	3	1	
3.2V	NJM2370X32	3	2	(★1)
3.3V	NJM2370X33	3	3	
3.5V	NJM2370X35	3	5	

Output Voltage	Part Number	Marking		
		①	②	
3.6V	NJM2370X36	3	6	(★1)
3.7V	NJM2370X37	3	7	(★1)
3.8V	NJM2370X38	3	8	(★1)
3.9V	NJM2370X39	3	9	(★1)
4.0V	NJM2370X04	0	4	
4.7V	NJM2370X47	4	7	
5.0V	NJM2370X05	0	5	
6.0V	NJM2370X06	0	6	
8.0V	NJM2370X08	0	8	(★1)
9.0V	NJM2370X09	0	9	
10.0V	NJM2370X10	1	0	
12.0V	NJM2370X12	1	2	
13.0V	NJM2370X13	1	3	(★2)
15.0V	NJM2370X15	1	5	

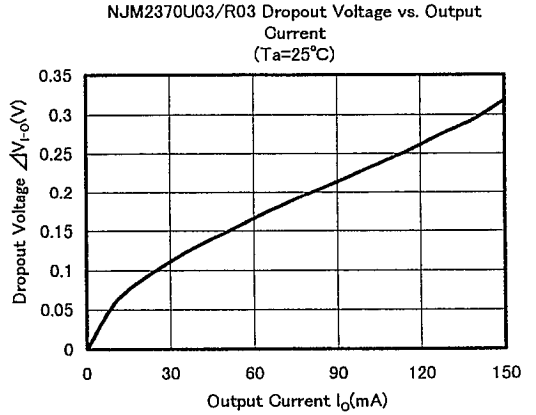
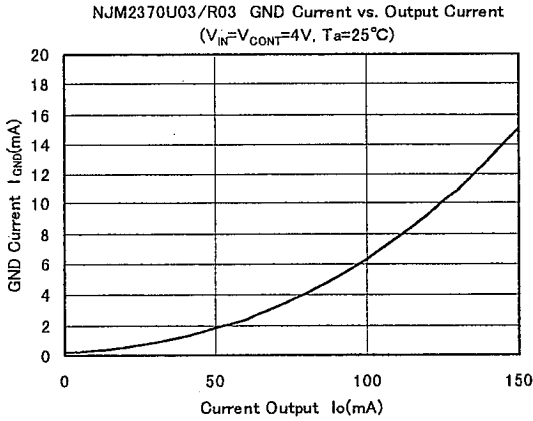
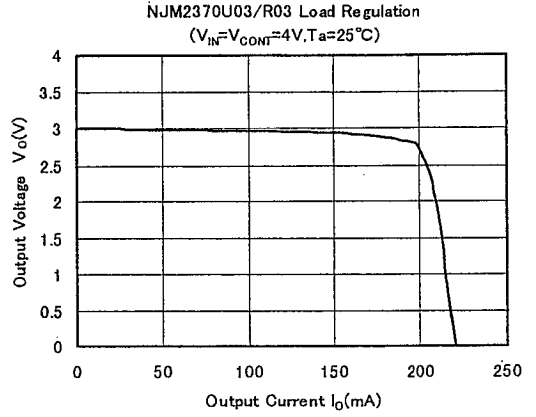
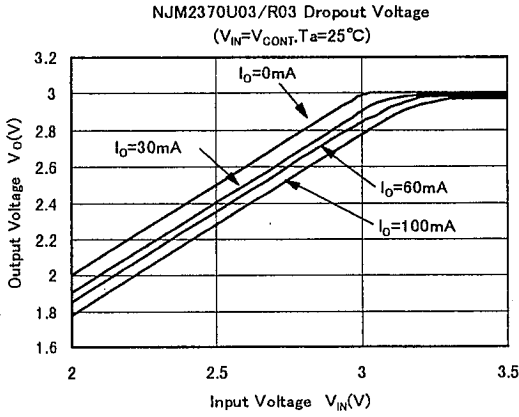
(★1):SOT-89(5pin) ONLY

(★2):VSP8 ONLY

■ POWER DISSIPATION VS. AMBIENT TEMPERATURE

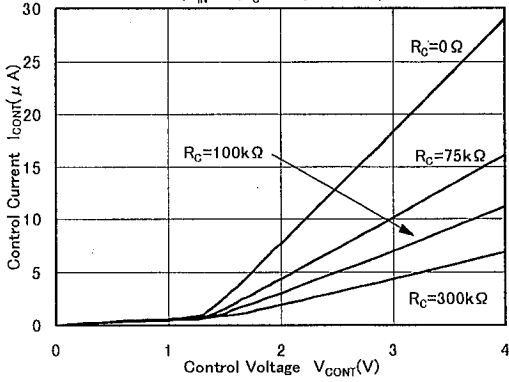


TYPICAL CHARACTERISTICS

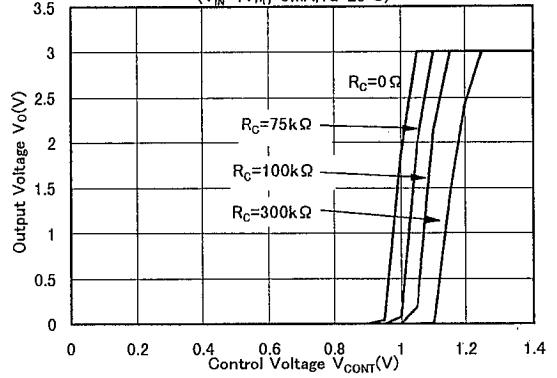


TYPICAL CHARACTERISTICS

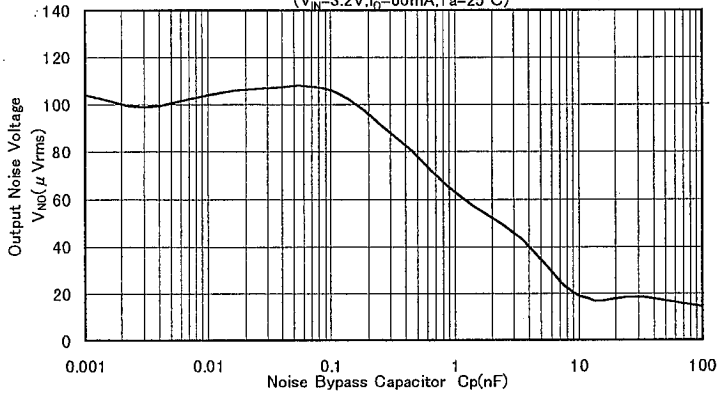
NJM2370U03/R03 Control Current vs. Control Voltage
($V_{IN}=4V, I_O=0mA, T_a=25^\circ C$)



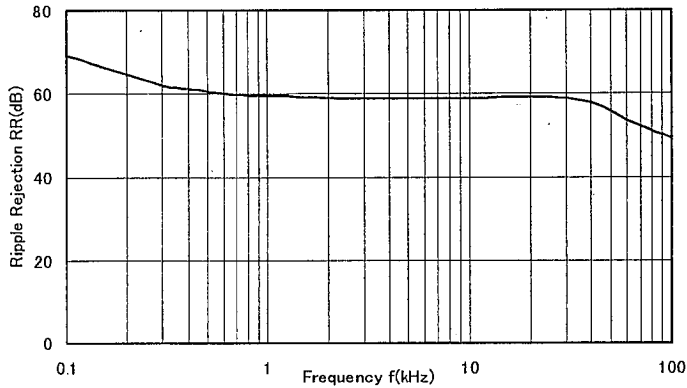
NJM2370U03/R03 Output Voltage vs. Control Voltage
($V_{IN}=4V, I_O=0mA, T_a=25^\circ C$)



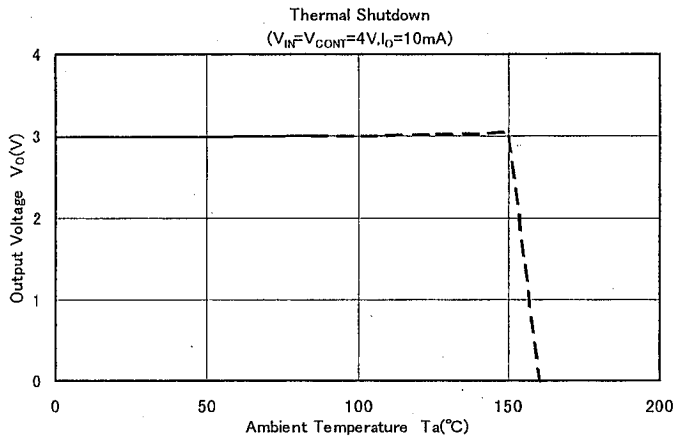
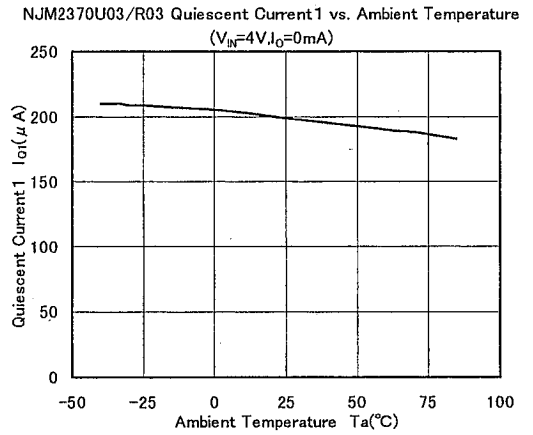
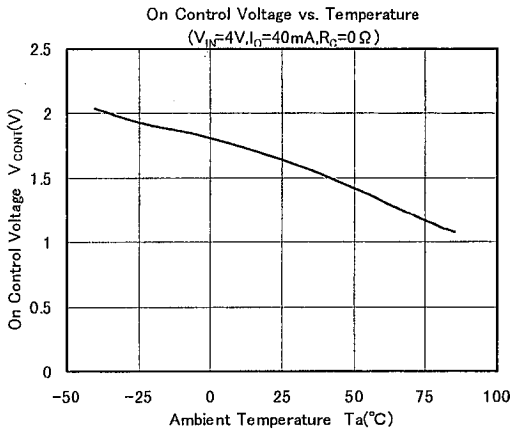
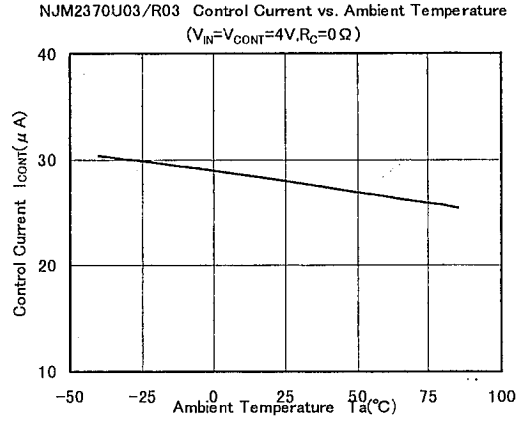
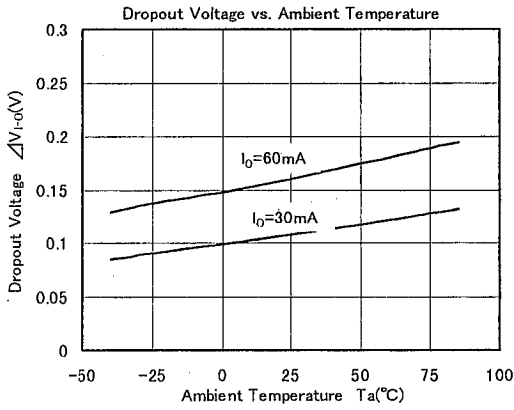
NJM2370U03/R03 Output Noise Voltage vs. Noise Bypass Capacitor
($V_{IN}=3.2V, I_O=60mA, T_a=25^\circ C$)



NJM2370U03/R03 Ripple Rejection vs. Frequency
($V_{IN}=V_O+1.5V, e_{in}=100mV_{rms}, I_O=10mA, T_a=25^\circ C$)



■ TYPICAL CHARACTERISTICS



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MEMO

[CAUTION]

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