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=30mA, 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

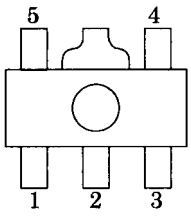
NJM2730U

NJM2730R

■ FEATURES

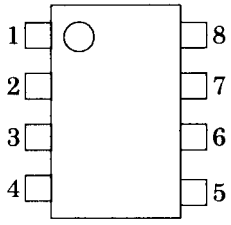
- Output Current (150mA min. (V_O-0.3V))
- Low Dropout Voltage (0.1V typ. (I_O=30mA))
- External Capacitor for Noise Bypass
- ON / OFF Control Function
- Over Current Limit
- Thermal Shutdown
- Bipolar Technology
- Package Outline SOT-89 (5pin), VSP8

■ PIN CONFIGURATION



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

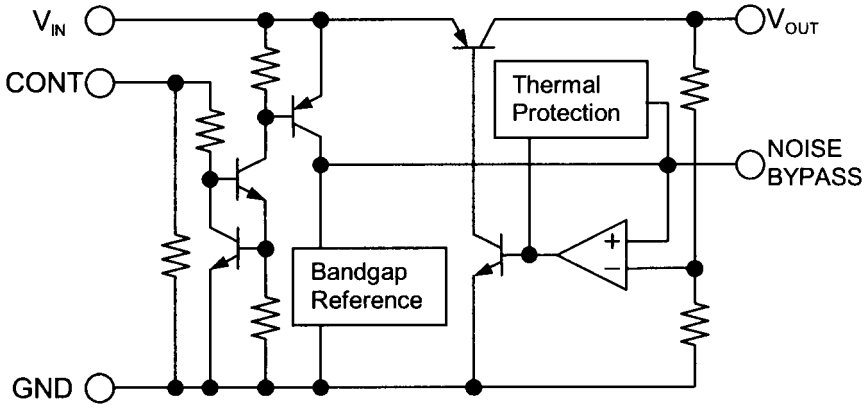
NJM2730U



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

NJM2730R

■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS

(T_a=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 to +85	°C
Storage Temperature Range	T_{stg}	-40 to +125	°C

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

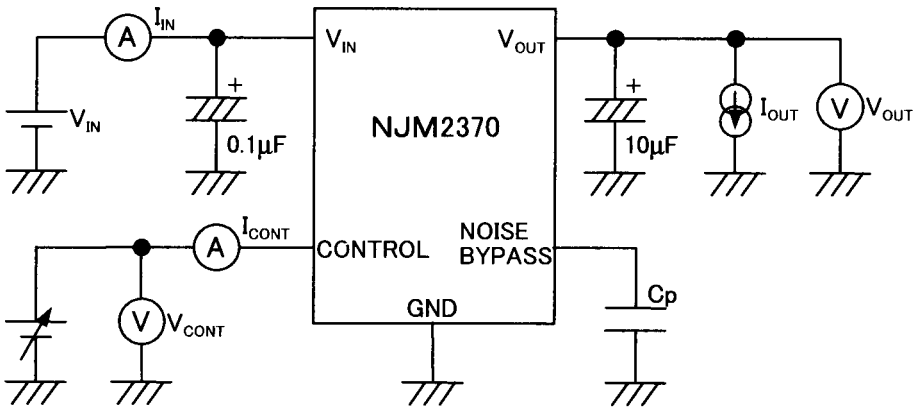
■ ELECTRICAL CHARACTERISTICS

(T_a=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, 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) to (V_O+6V) V_O=2V to 14V	-	-	0.12	% / V
		V_{IN}=(V_O+1V) to (V_O+5V) V_O=15V	-	-	0.12	% / V
Load Regulation	$\Delta V_O / \Delta I_O$	I_O=0 to 60mA	-	-	0.03	% / mA
Dropout Voltage	ΔV_{I-O}	I_O=30mA	-	0.1	0.3	V
Ripple Rejection	R·R	f=400Hz, e_{in}=100mV_{P-P} V_{IN}= V_O+1.5V, I_O=10mA	-	60	-	dB
Average Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T_a$	Ta=-20 to 75°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	-	µVrms

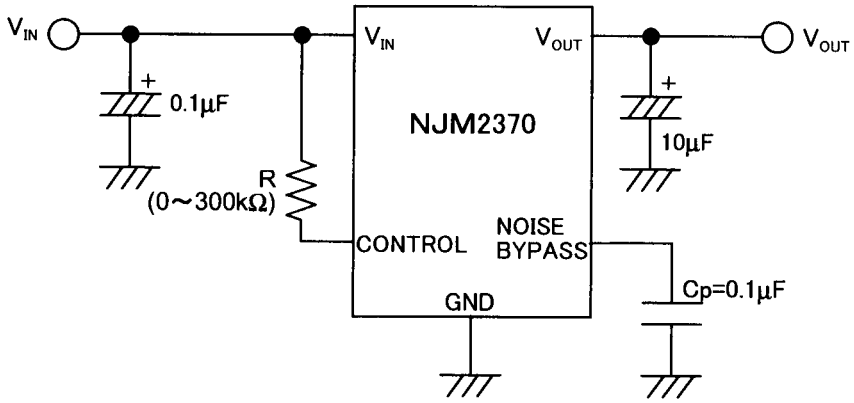
(note 2) Please confirm the specification separately because some parameters depend on output voltage.

■ TEST CIRCUIT



■ **TYPICAL APPLICATION**

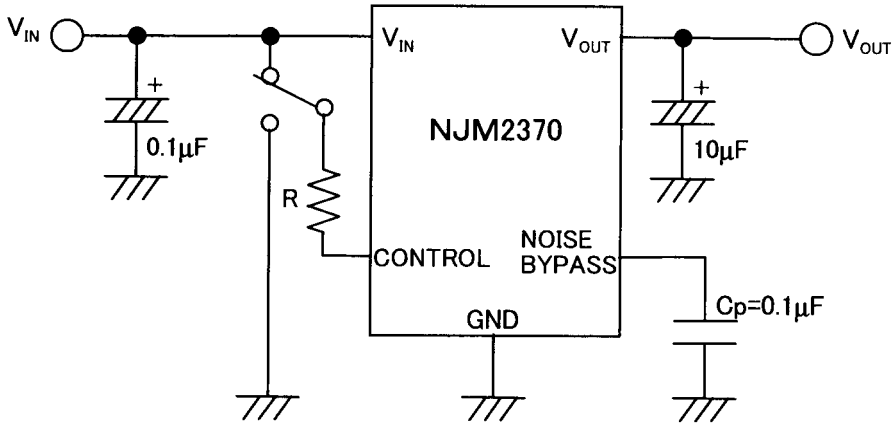
①In Nonuse of ON / OFF Control



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.

②In 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 Cp

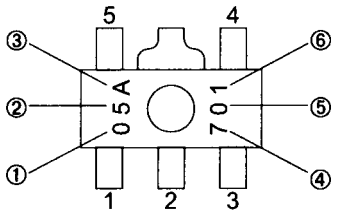
Noise bypass capacitance CP reduces noise generated by band-gap reference circuit.

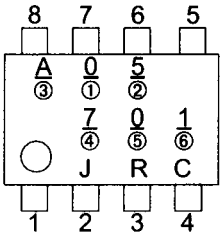
Noise level and ripple rejection will be improved when larger CP is used. Please refer to the typical characteristics to determine the value.

Use of smaller CP value may induce oscillation.

Please make sure to use CP value of greater than 0.1uF to avoid the problem.

■ PACKAGE MARKING





①,② Output voltage rank
(Please refer to output voltage rank list)
③ Plant code. (**NJM2370** is "A")
④ Last digit of the calendar year
⑤,⑥ Lot Number

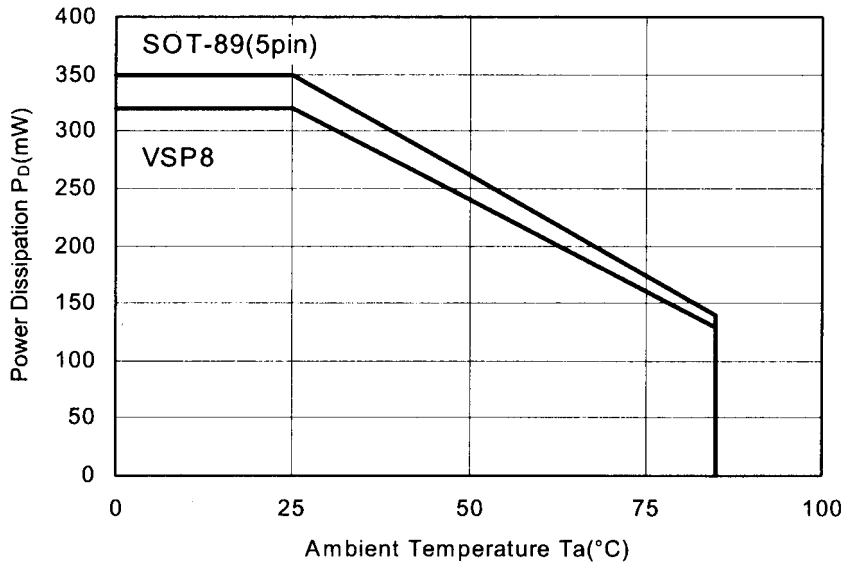
■ OUTPUT VOLTAGE RANK LIST

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

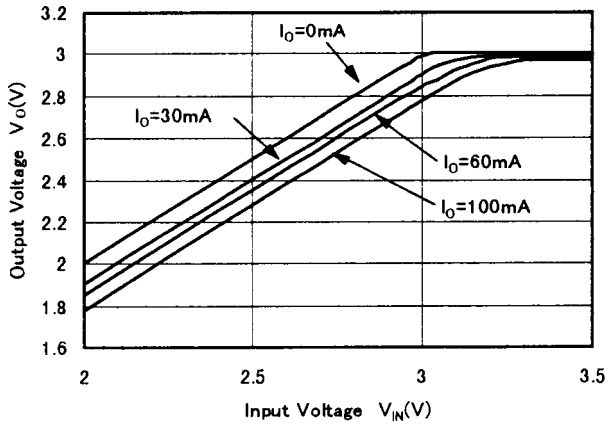
■ POWER DISSIPATION VS. AMBIENT TEMPERATURE



■ TYPICAL CHARACTERISTICS

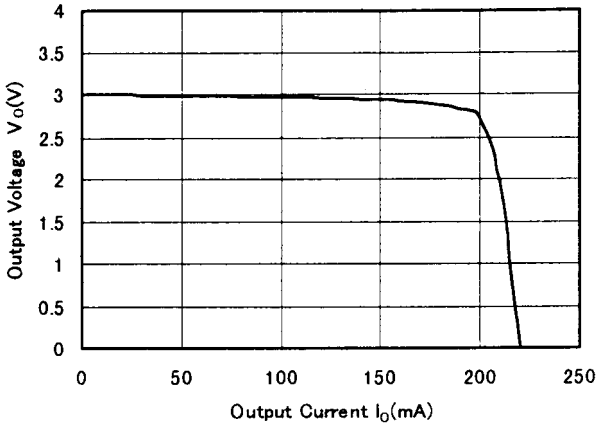
NJM2370U03 / R03 Dropout Voltage

(V_{IN}=V_{CONT}, Ta=25°C)



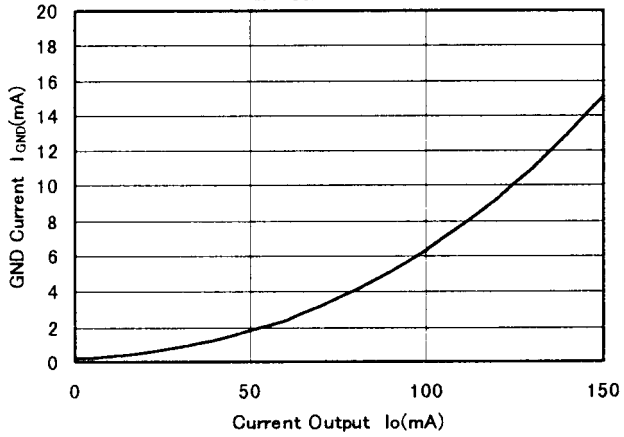
NJM2370U03 / R03 Load Regulation

(V_{IN}=V_{CONT}=4V, Ta=25°C)



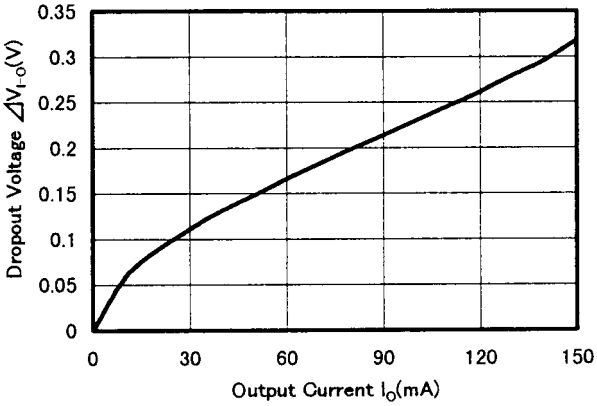
NJM2370U03/R03 GND Current vs. Output Current

(V_{IN}=V_{CONT}=4V, Ta=25°C)



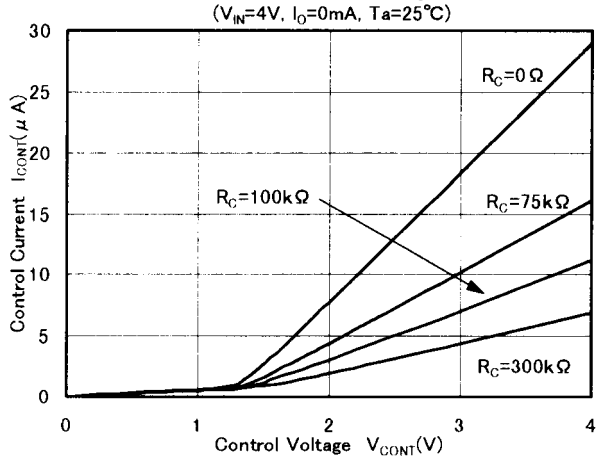
NJM2370U03/R03 Dropout Voltage vs. Output Current

(Ta=25°C)

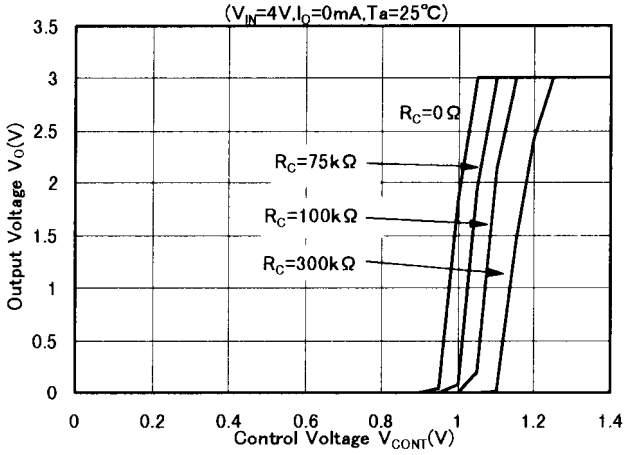


■ TYPICAL CHARACTERISTICS

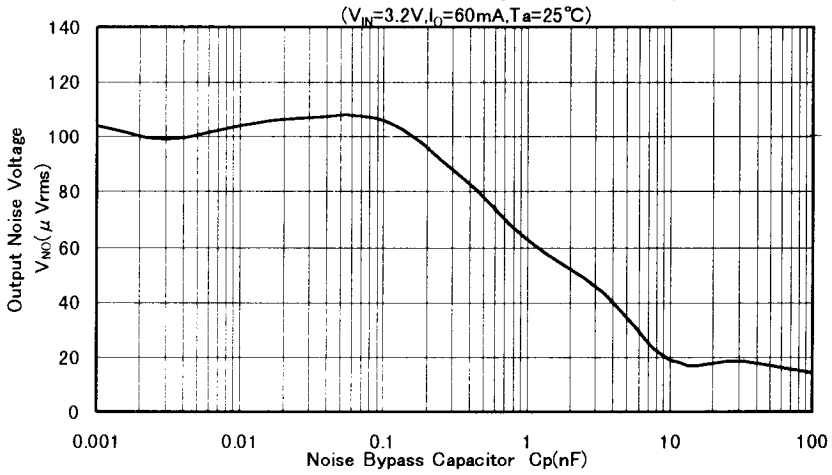
NJM2370U03 / R03 Control Current vs. Control Voltage



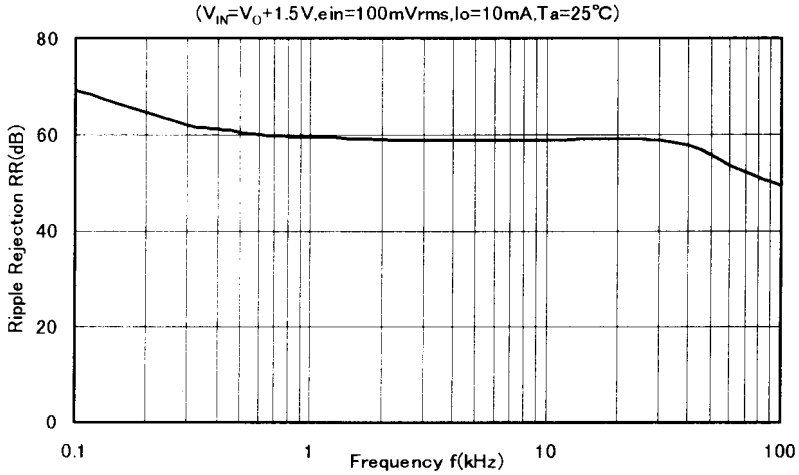
NJM2370U03 / R03 Output Voltage vs. Control Voltage



NJM2370U03/R03 Output Noise Voltage vs. Noise Bypass Capacitor

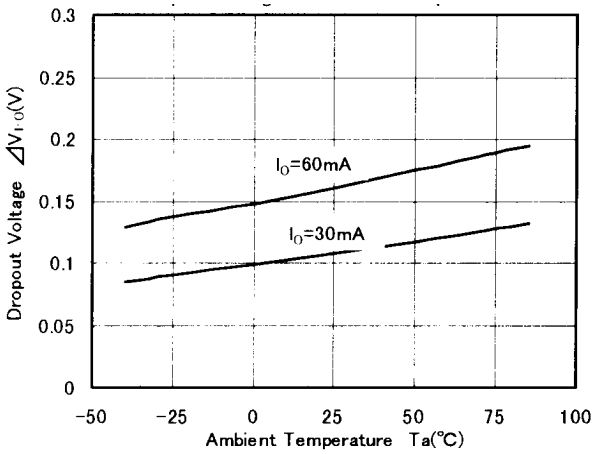


NJM2370U03/R03 Ripple Rejection vs. Frequency



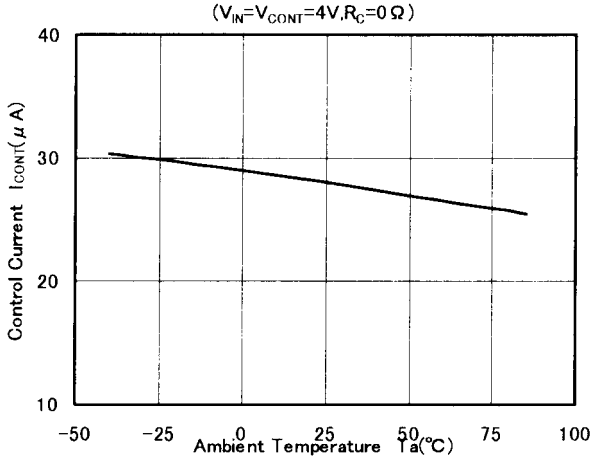
■ TYPICAL CHARACTERISTICS

Dropout Voltage vs. Ambient Temperature



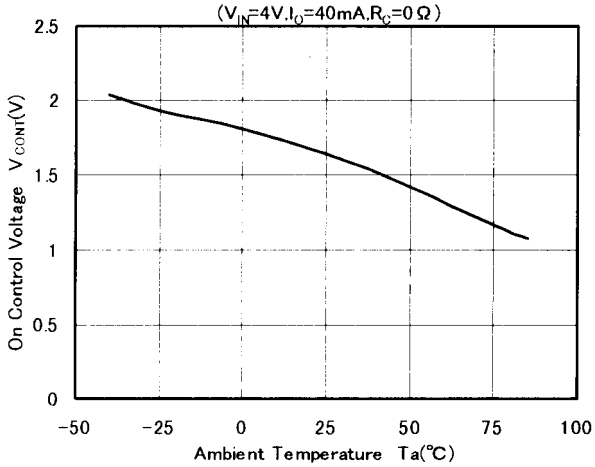
NJM2370U03 / R03 Control Current vs. Ambient Temperature

(V_{IN}=V_{CONT}=4V,R_C=0Ω)



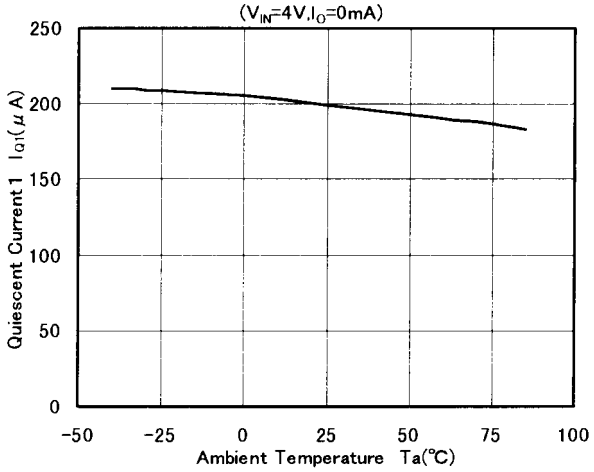
On Control Voltage vs. Temperature

(V_{IN}=4V,I_O=40mA,R_C=0Ω)



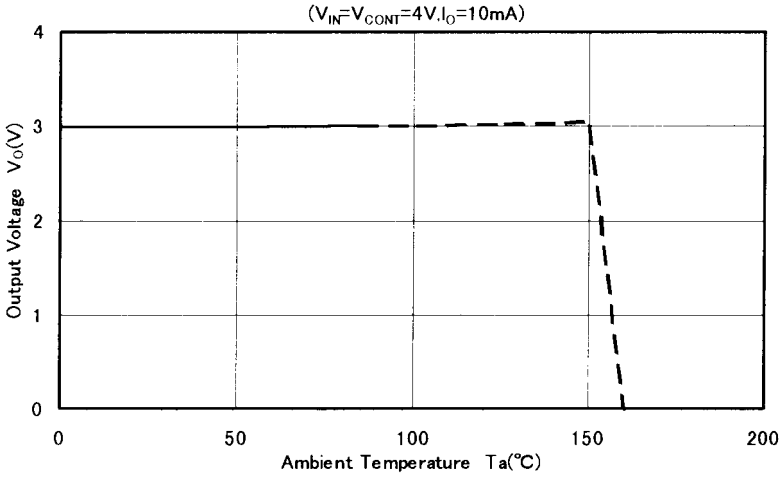
NJM2370U03 / R03 Quiescent Current 1 vs. Ambient Temperature

(V_{IN}=4V,I_O=0mA)



Thermal Shutdown

(V_{IN}=V_{CONT}=4V,I_O=10mA)



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