

## 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

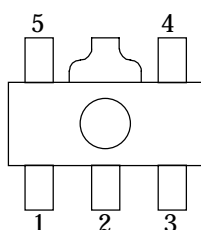


NJM2370R

### ■ FEATURES

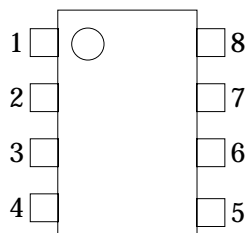
- Output Current (150mA min. ( $V_o=0.3\text{V}$ ))
- Low Dropout Voltage (0.1V typ. ( $I_o=30\text{mA}$ ))
- External Capacitor for Noise Bypass
- ON/OFF Control Function
- Over Current Limit
- Thermal Shutdown
- Bipolar Technology
- Package Outline SOT-89(5pin), VSP8

### ■ PIN CONFIGURATION



NJM2370U

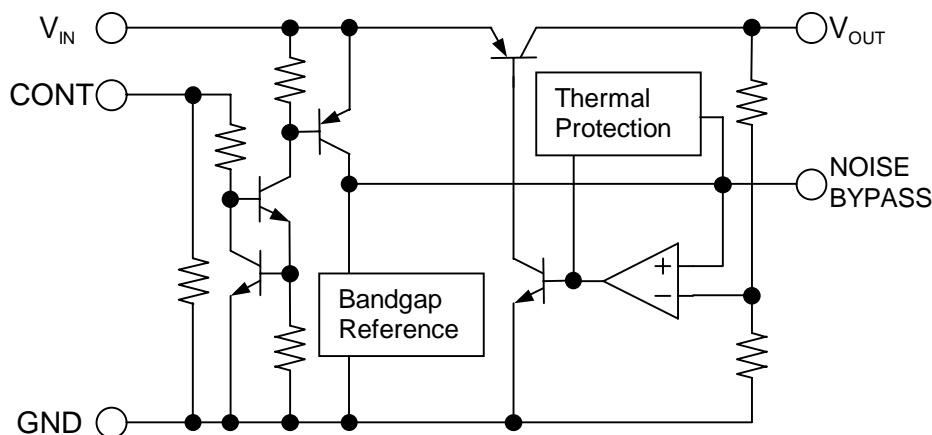
- PIN FUNCTION
1. CONTROL
  2. GND
  3. NOISE BYPASS
  4.  $V_{OUT}$
  5.  $V_{IN}$



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

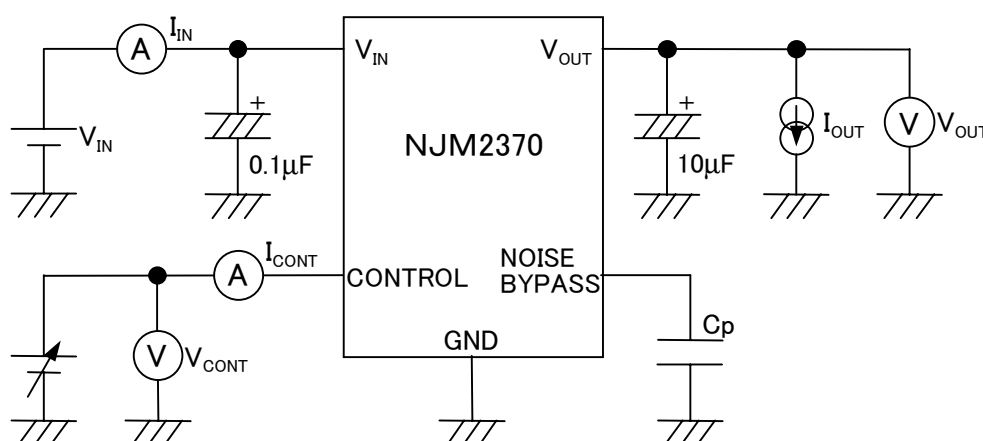
(note 1)When input voltage is less than +20V, the absolute maximum control voltage is equal to the input voltage.

## ■ 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	$I_{Q1}$	$I_O=0mA$ , expect $I_{CONT}$	-	180	-	$\mu A$
Quiescent Current 2	$I_{Q2}$	CONTROL-GND short	-	-	100	nA
Output Current	$I_O$	( $V_O-0.3V$ )	150	180	-	mA
Line Regulation	$\Delta V_O/\Delta V_{IN}$	$V_{IN}=(V_O+1V) \sim (V_O+6V)$ $V_O=2V$ 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	$\Delta V_{I-O}$	$I_O=30mA$	-	0.1	0.3	V
Ripple Rejection	$R \bullet R$	$f=400Hz$ , $e_{in}=100mVp-p$ $V_{IN}=V_O+1.5V$ , $I_O=10mA$	-	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	-	$\mu V_{rms}$

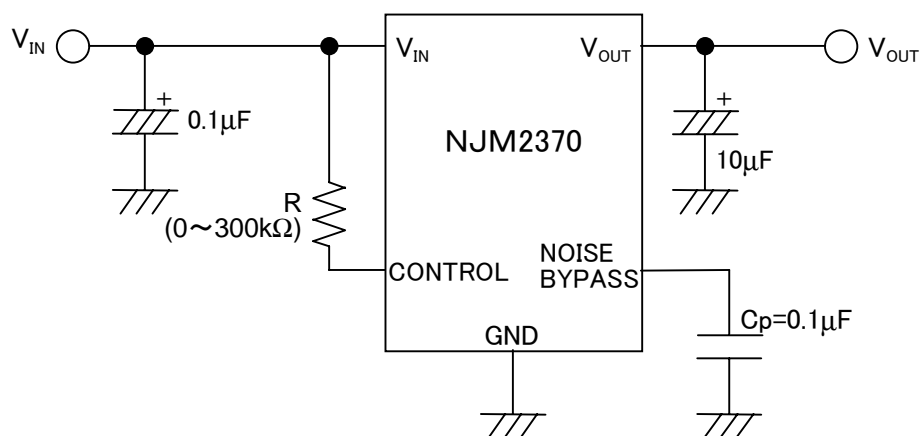
(note 2)Please confirm the specification separately because some parameters depend on output voltage.

## ■ TEST CIRCUIT



## ■ TYPICAL APPLICATION

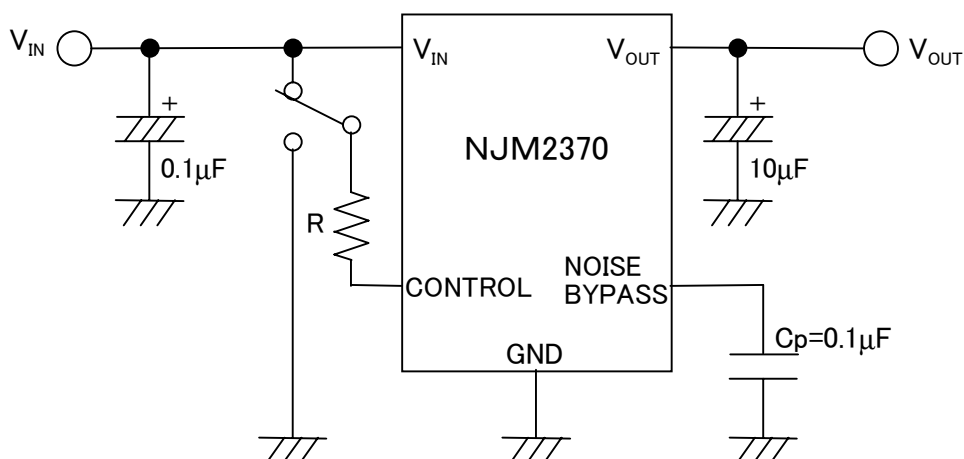
### ① In Nonuse of ON/OFF Control



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 $C_p$

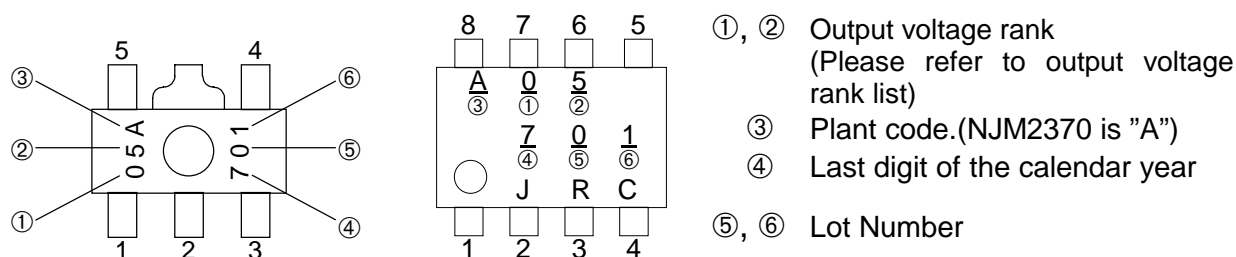
Noise bypass capacitance  $C_p$  reduces noise generated by band-gap reference circuit.

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

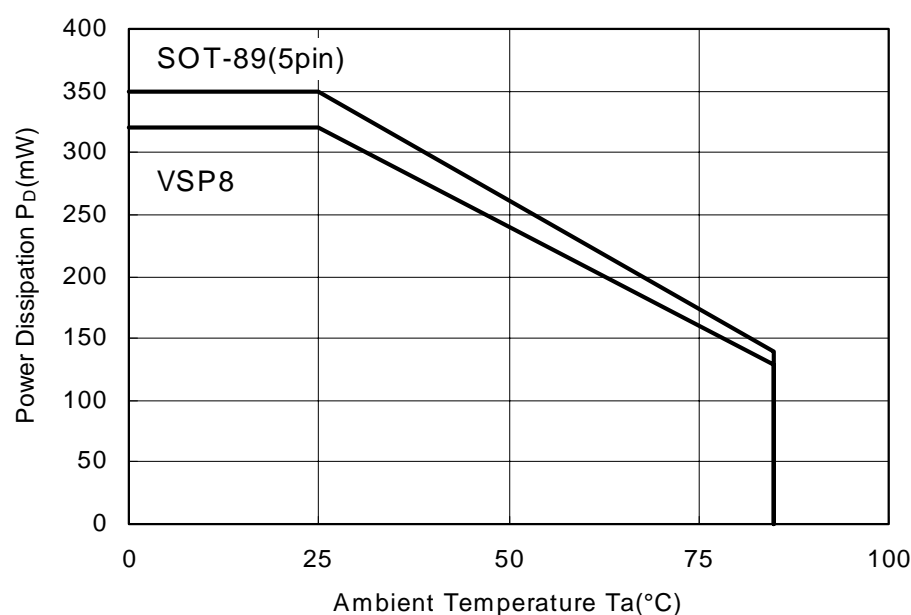
Output Voltage	Part Number	Marking	
		①	②
2.0V	NJM2370X02	0	2
2.1V	NJM2370X21	2	1
2.2V	NJM2370X22	2	2
2.3V	NJM2370X23	2	3
2.4V	NJM2370X24	2	4
2.5V	NJM2370X25	2	5
2.6V	NJM2370X26	2	6
2.7V	NJM2370X27	2	7
2.8V	NJM2370X28	2	8
2.9V	NJM2370X29	2	9
3.0V	NJM2370X03	0	3
3.1V	NJM2370X31	3	1
3.2V	NJM2370X32	3	2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

Output Voltage	Part Number	Marking	
		①	②
3.6V	NJM2370X36	3	6
3.7V	NJM2370X37	3	7
3.8V	NJM2370X38	3	8
3.9V	NJM2370X39	3	9
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
9.0V	NJM2370X09	0	9
10.0V	NJM2370X10	1	0
12.0V	NJM2370X12	1	2
13.0V	NJM2370X13	1	3
15.0V	NJM2370X15	1	5

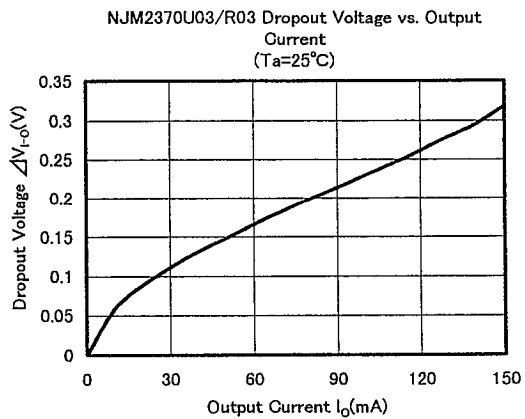
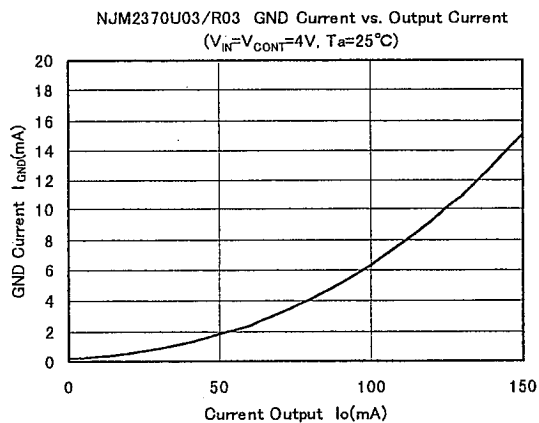
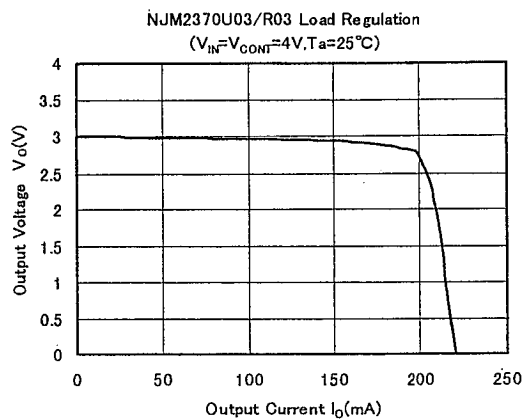
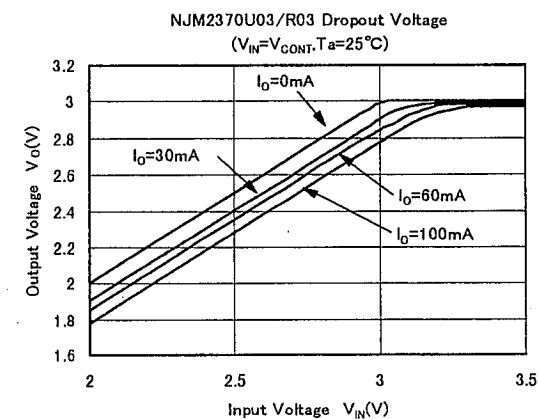
(★1):SOT-89(5pin) ONLY

(★2):VSP8 ONLY

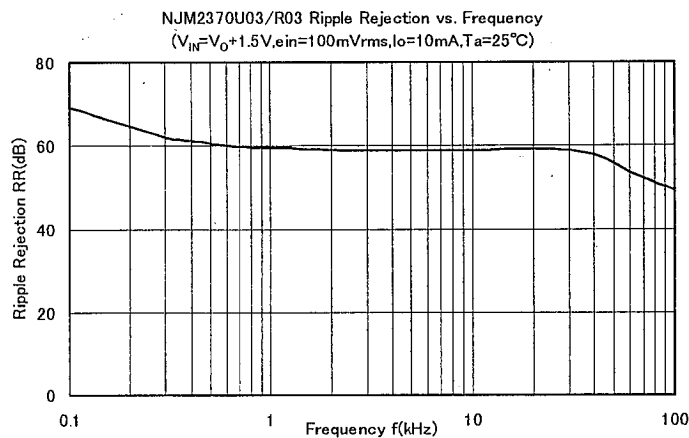
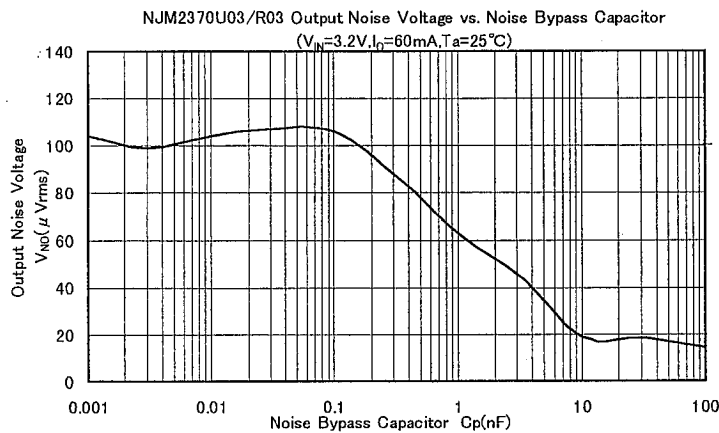
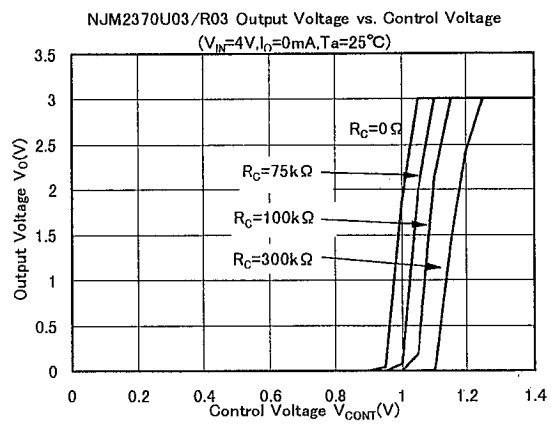
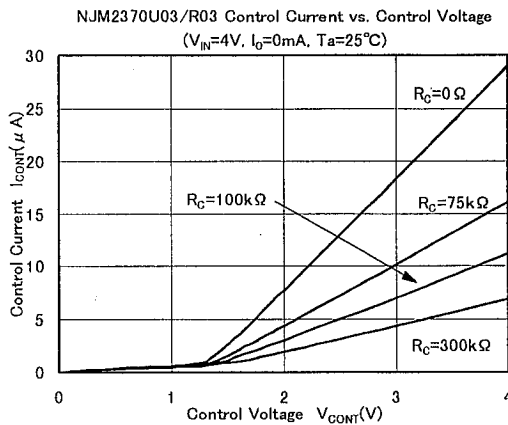
■ POWER DISSIPATION VS. AMBIENT TEMPERATURE



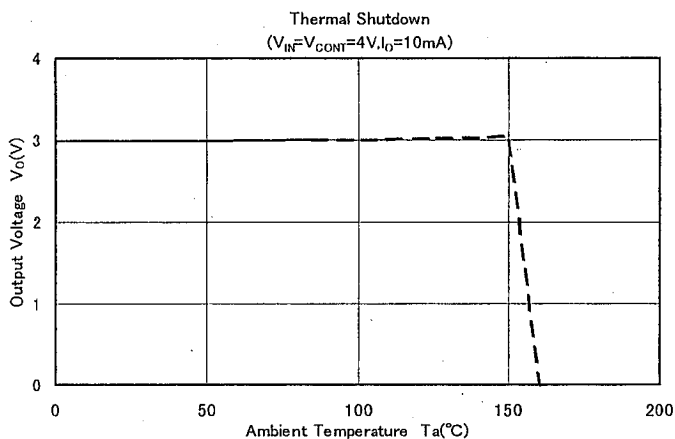
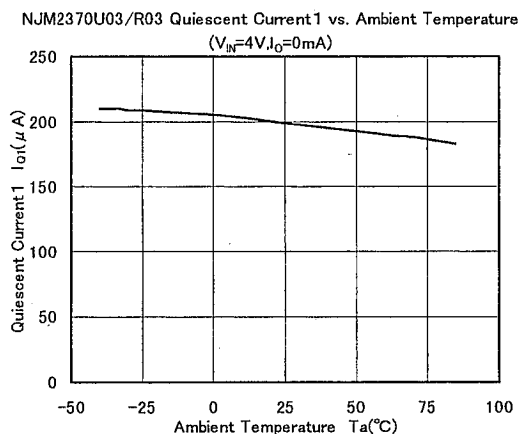
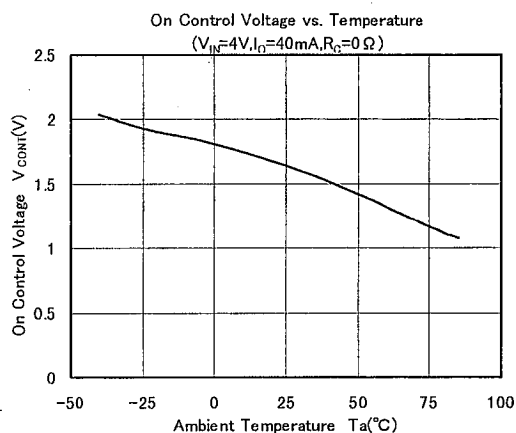
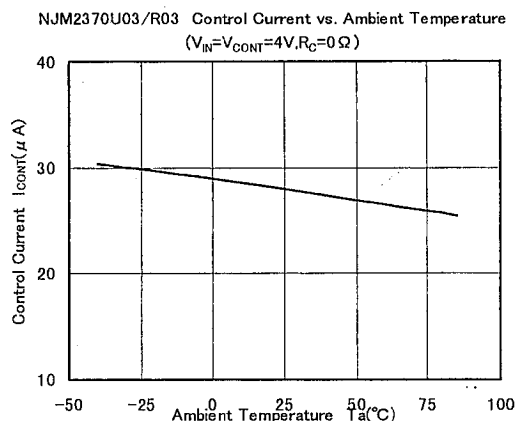
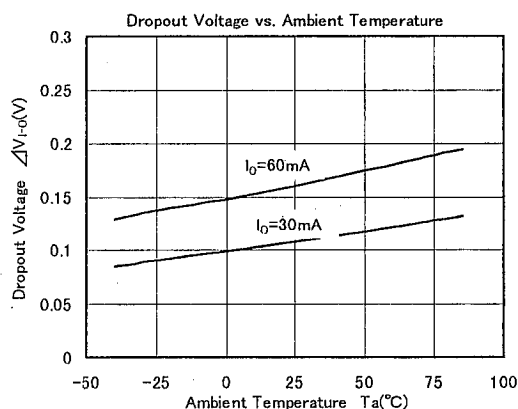
## TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS



## ■ TYPICAL CHARACTERISTICS



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# MEMO

## [CAUTION]

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