# LOW DROPOUT VOLTAGE REGULATOR

## ■ GENERAL DESCRIPTION

NJU7771/72/73/74/75/76 is a low dropout voltage regulator designed for cellular phone application etc.

Advanced CMOS technology achieves high ripple rejection and low quiescent current.

When the ON/OFF control is used, NJU7774/75/76 has high transition response characteristics for shunt switch.

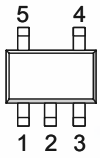
## ■ PACKAGE OUTLINE

NJU777*F

## ■ FEATURES

- High Ripple Rejection 65dB typ. (f=1kHz,Vo=3.0V version)
- Low quiescent Current Iq=18μA (Io=0mA)
- Output capacitor with 1.0μF ceramic capacitor (Vo≤2.0V version)
- Output Current Io(max.)=150mA
- High Precision Output Vo±1.0%
- Low Dropout Voltage 0.15V typ. (Io=100mA,Vo=3.0V)
- Input Voltage Range $V_{IN}$=+2.3V~14V(Vo≤2.0V version)
- ON/OFF Control (Active High)
- With Shunt Switch Only NJU7774/75/76
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- CMOS Technology
- Package Outline SOT-23-5 (MTP5)

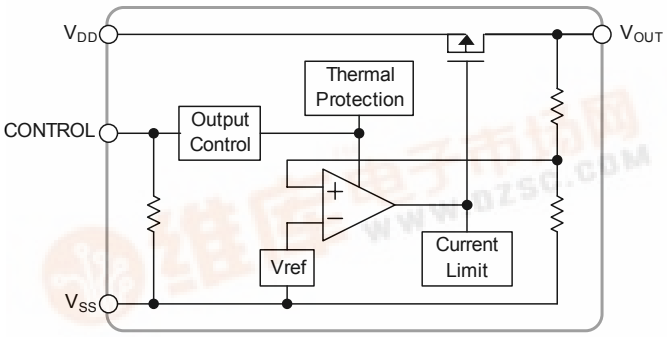
## ■ PIN CONFIGURATION



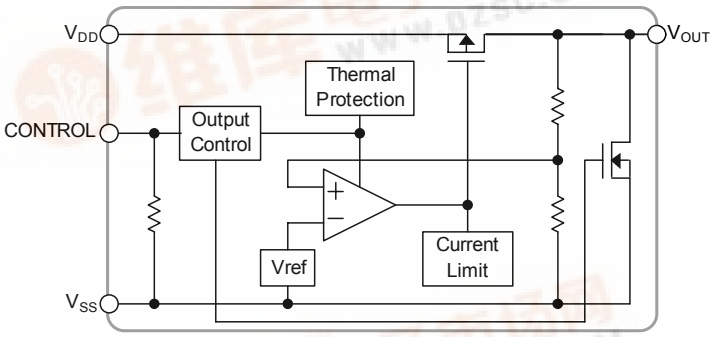

PIN FUNCTION

| NJU7771F | NJU7772F | NJU7773F |
|---|---|---|
| 1.CONTROL | 1.$V_{IN}$ | 1.$V_{OUT}$ |
| 2.GND | 2.GND | 2.GND |
| 3.NC | 3.CONTROL | 3.$V_{IN}$ |
| 4.$V_{OUT}$ | 4.NC | 4.CONTROL |
| 5.$V_{IN}$ | 5.$V_{OUT}$ | 5.NC |
| NJU7774F | NJU7775F | NJU7776F |

## ■ EQUIVALENT CIRCUIT




NJM7771/72/73




NJM7774/75/76

## ■ OUTPUT VOLTAGE RANK LIST

| Device Name | $V_{OUT}$ | Device Name | $V_{OUT}$ | Device Name | $V_{OUT}$ |
|---|---|---|---|---|---|
| NJU777×F15 | 1.5V | NJU777×F27 | 2.7V | NJU777×F38 | 3.8V |
| NJU777×F21 | 2.1V | NJU777×F28 | 2.8V | NJU777×F05 | 5.0V |
| NJU777×F22 | 2.2V | NJU777×F03 | 3.0V | | |
| NJU777×F23 | 2.3V | NJU777×F33 | 3.3V | | |
| NJU777×F25 | 2.5V | NJU777×F35 | 3.5V | | |

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Input Voltage | $V_{IN}$ | +10 | V |
| Control Voltage | $V_{CONT}$ | +10(*note 1) | V |
| Power Dissipation | $P_D$ | 200 | mW |
| Operating Temperature | Topr | –40 ~ +85 | °C |
| Storage Temperature | Tstg | –40 ~ +125 | °C |
| OFF-state Output Sink Current(*note2) | $I_O$ | 10 | mA |

(*note 1): When input voltage is less than +10V, the absolute maximum control voltage is equal to the input voltage.

(*note 2): This maximum rating is applied to NJU7774/75/76.

■ ELECTRICAL CHARACTERISTICS

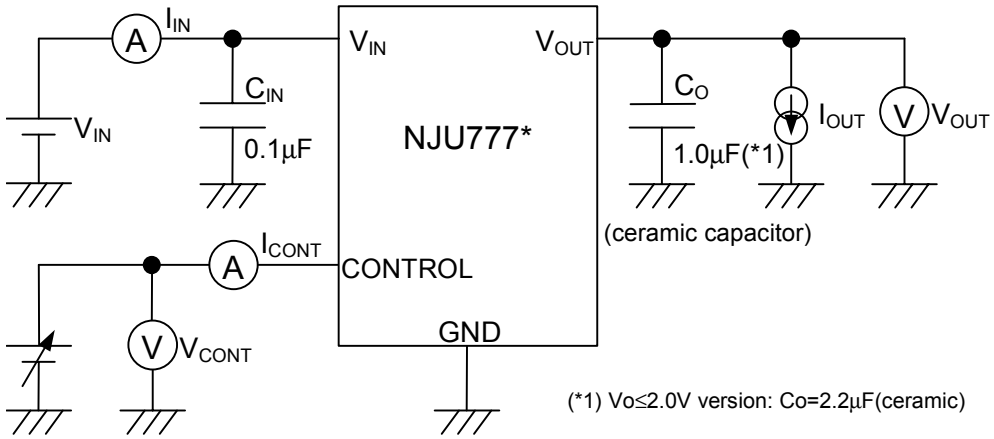
($V_{IN}$=Vo+1V, $C_{IN}$=0.1μF, Co=1.0μF(Co=2.2μF: Vo≤2.0V), Ta=25°C)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Output Voltage | Vo | Io=30mA | -1.0% | – | +1.0% | V |
| Input Voltage | $V_{IN}$ | | 2 | Vo+1V | 9 | V |
| Quiescent Current | $I_Q$ | Io=0mA, $V_{CONT}$=$V_{IN}$ | – | 18 | 35 | μA |
| Quiescent Current at Control OFF | $I_{Q(OFF)}$ | $V_{CONT}$=0V | – | 0.1 | 1 | μA |
| Output Current | Io | Vo-0.1V (Vo≤2.0V)<br>Vo-0.3V (Vo≥2.1V) | 150 | – | – | mA |
| Short Current Limit | $I_{LIM}$ | Vo=0V | 30 | 50 | 110 | mA |
| Line Regulation | Δ Vo/Δ $V_{IN}$ | $V_{IN}$=Vo+1V ~ Vo+6.0V (Vo<3.0V)<br>$V_{IN}$=Vo+1V ~ 9.0V (Vo≥3.0V),<br>Io=30mA | – | – | 0.20 | %/V |
| Load Regulation | Δ Vo/Δ Io | Io=0 ~ 100mA | – | – | 0.03 | %/mA |
| Dropout Voltage(*note 3) | Δ $V_{I-O}$ | Io=100mA, 2.1V≤Vo≤2.4V | – | 0.2 | 0.3 | V |
| | | Io=100mA, 2.5V≤Vo≤2.7V | – | 0.18 | 0.28 | V |
| | | Io=100mA, 2.8V≤Vo≤3.3V | – | 0.15 | 0.25 | V |
| | | Io=100mA, 3.4V≤Vo≤5.0V | – | 0.12 | 0.22 | V |
| Ripple Rejection | RR | ein=200mVrms,f=1kHz,Io=10mA,<br>Vo=3.0V Version | – | 65 | – | dB |
| Average Temperature Coefficient of Output Voltage | Δ Vo/Δ Ta | Ta=0 ~ 85°C, Io=10mA | – | ±100 | – | ppm/°C |
| Output Noise Voltage | $V_{NO1}$ | f=10Hz ~ 80kHz,Io=0mA,Vo=3.0V Version | – | 40 | – | μVrms |
| | $V_{NO2}$ | f=10Hz ~ 80kHz,Io=10mA,Vo=3.0V Version | – | 70 | – | μVrms |
| Pull-down Resistance | $R_{CONT}$ | | 2.5 | 5 | 10 | MΩ |
| Control Voltage for ON-state | $V_{CONT(ON)}$ | | 1.6 | – | – | V |
| Control Voltage for OFF-state | $V_{CONT(OFF)}$ | | 0 | – | 0.3 | V |

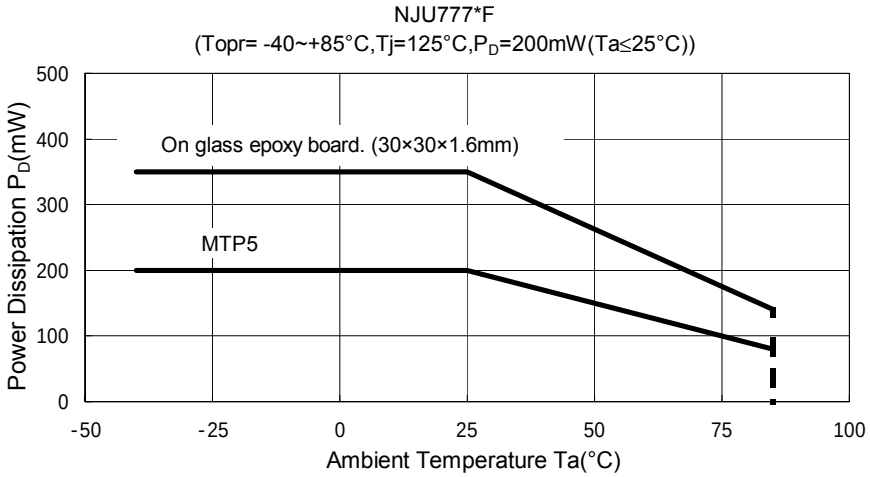
(*note 3): Except output voltage less than 2.1V.

(*note 4): The above specification is a common specification for all output voltages.
Therefore, it may be different from the individual specification for a specific output voltage.

■ TEST CIRCUIT

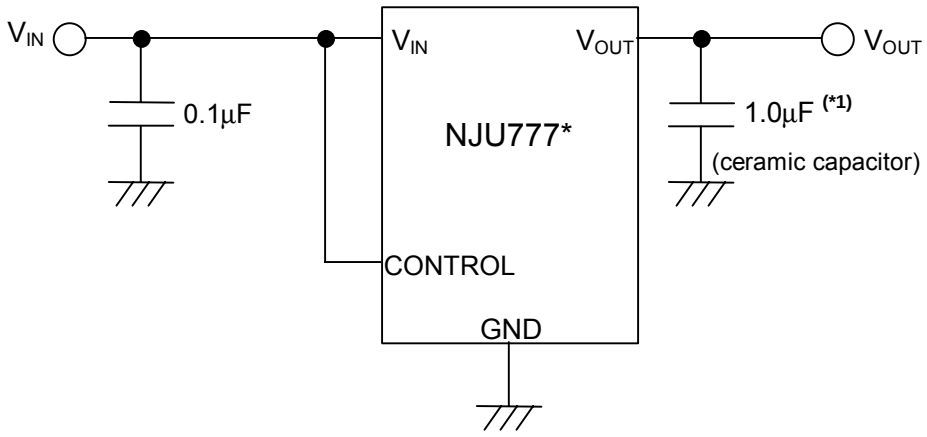



■ POWER DISSIPATION vs. AMBIENT TEMPERATURE



■ TYPICAL APPLICATION

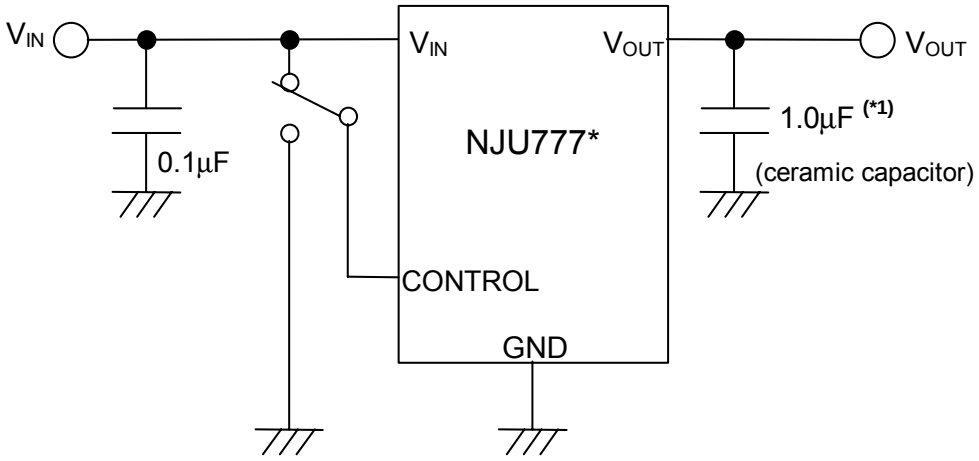
① In case that ON/OFF Control is not required:




(*1) Vo≤2.0V version: Co=2.2μF(ceramic)

Connect control terminal to $V_{IN}$ terminal.

② In use of ON/OFF Control

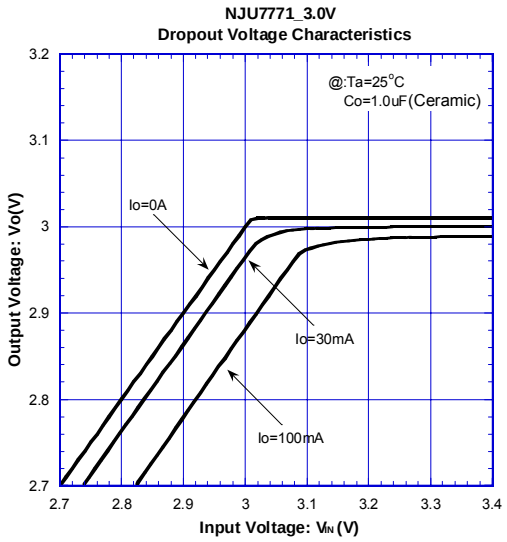


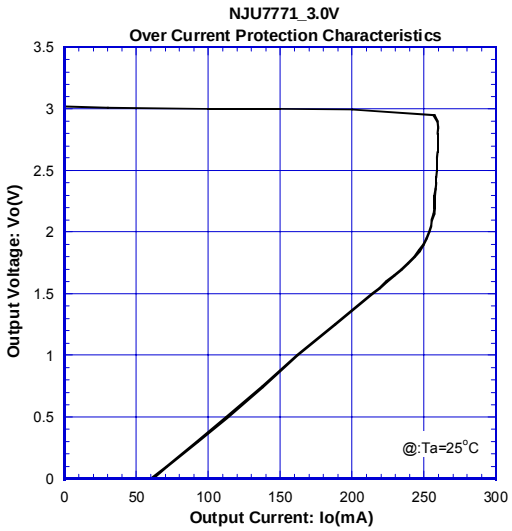

(*1) Vo≤2.0V version: Co=2.2μF(ceramic)

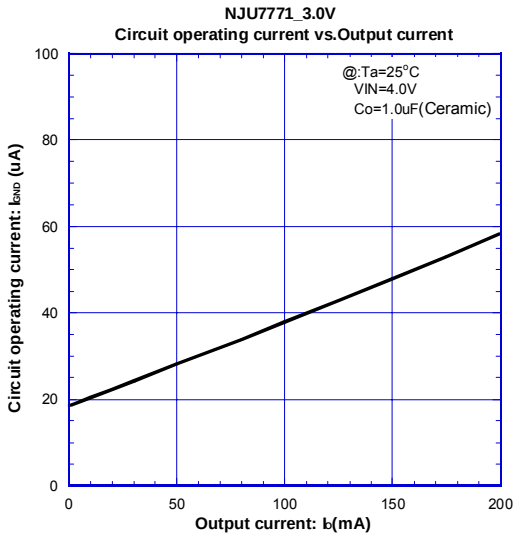
State of control terminal:

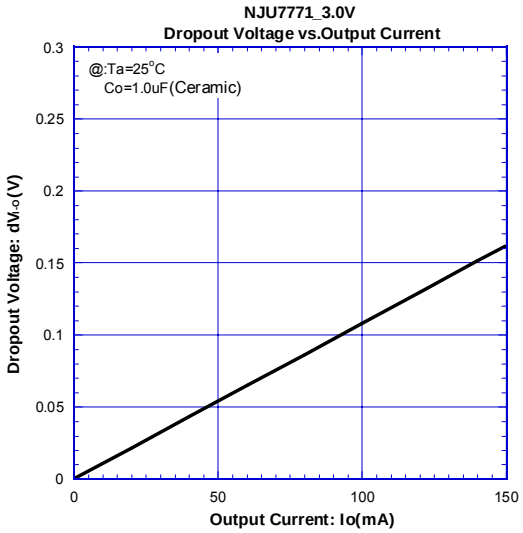
- "H" → output is enabled.
- "L" or "open" → output is disabled.

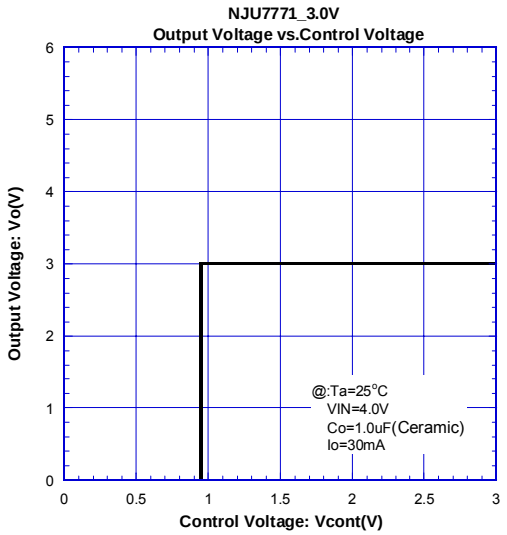
## ■ ELECTRICAL CHARACTERISTICS



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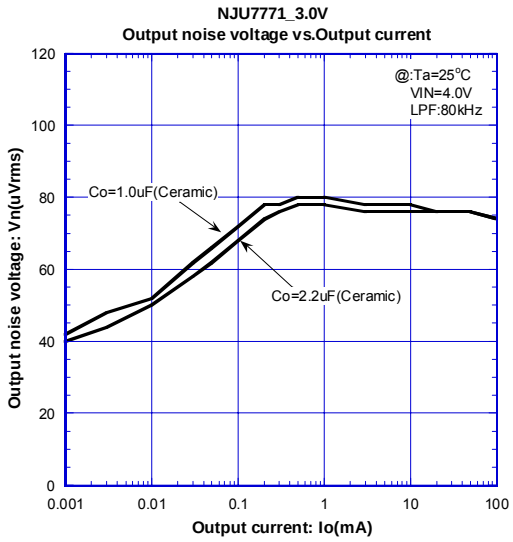


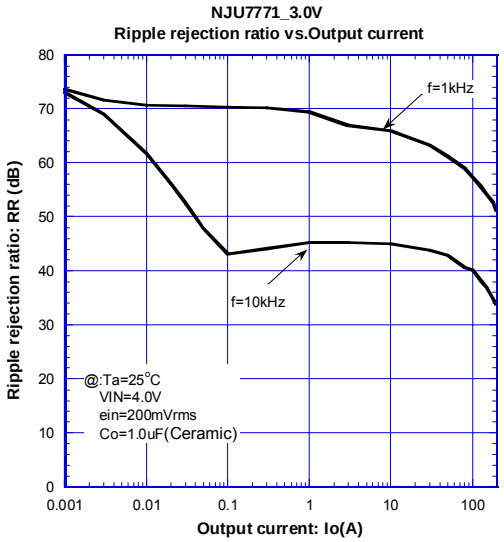


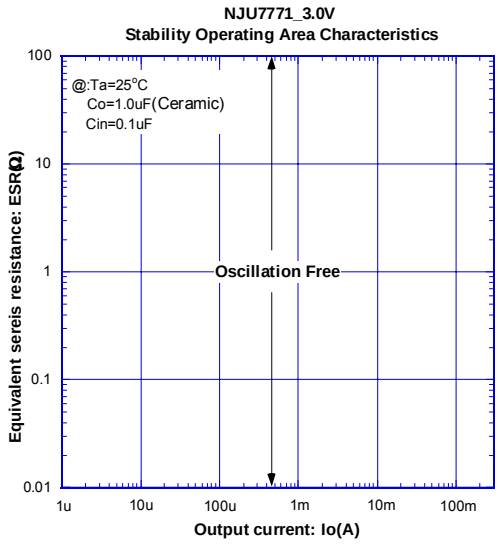

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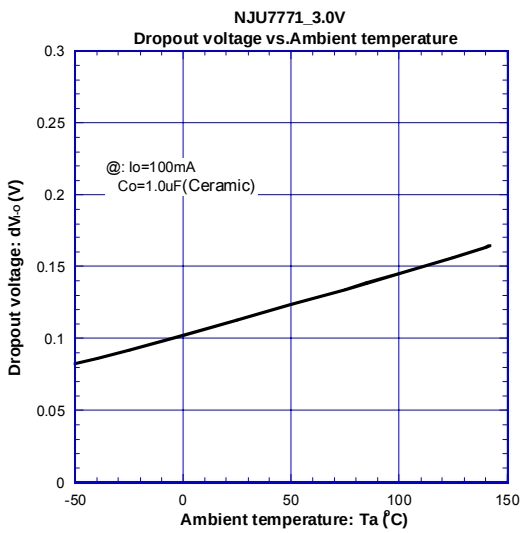


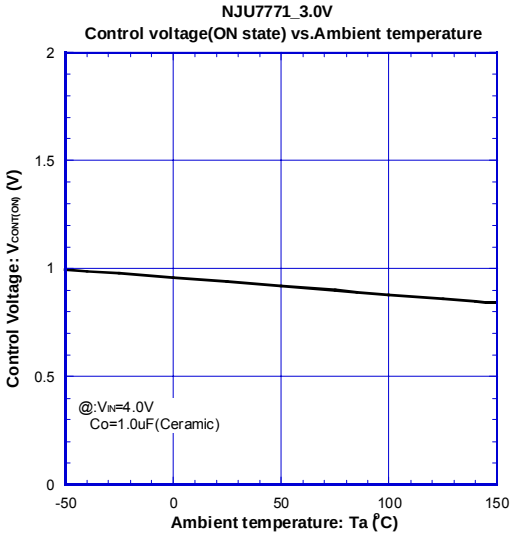


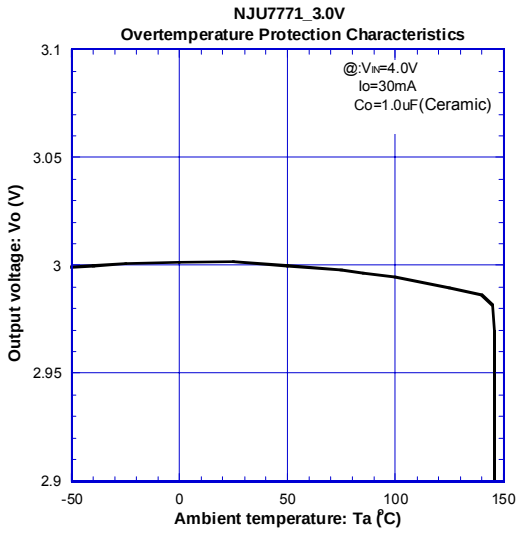


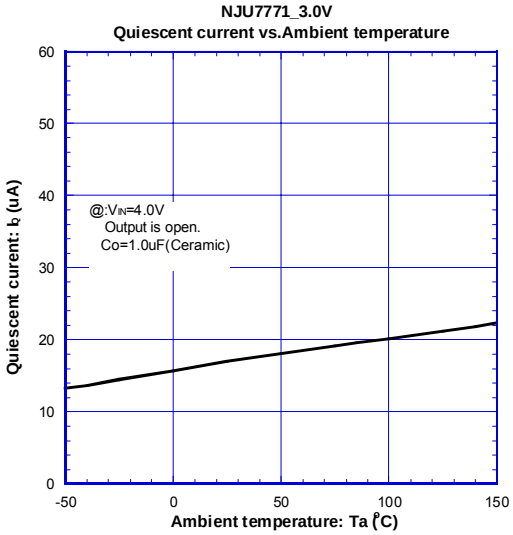

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