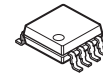


POSITIVE/NEGATIVE 2CH LOW DROPOUT VOLTAGE REGULATOR

■ GENERAL DESCRIPTION

The NJM2839 is a positive/negative 2-channel low dropout voltage regulator featuring a low noise, high precision of $\pm 1.5\%$ (both channels), high ripple rejection ratio of 75dB (positive typ.), 65dB (negative typ.), and 100mA output current (both outputs). It also offers useful functions of an ON/OFF control, thermal overload protection and short circuit current limit, and it can use ceramic capacitor of $1\mu\text{F}$ as an output capacitor. Further taking voltage output sequence into consideration, the NJM2839 provides an soft-start function and output shunt switch in negative voltage channel. It is available in a small surface mount 8-lead MSOP (VSP) package. It is suitable for a power supply circuit for CCD and others.

■ PACKAGE OUTLINE



NJM2839R
(MSOP8 (VSP8))

■ FEATURES

<Positive CH>

- High Ripple Rejection 75dB typ. (f=1kHz, Vo1=3V Version)
- Low Output Noise Voltage $V_{NO1}=45\mu\text{Vrms}$ typ.
- Output capacitor with $1.0\mu\text{F}$ ceramic capacitor. (Vo1 \geq 5.5V)
- Output Current Io1(max.)=100mA
- High Precision Output Vo1 \pm 1.5%
- Low Drop Out Voltage 0.10V typ. (Io1=60mA)
- ON/OFF Control
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limit

<Negative CH>

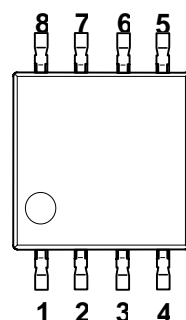
- High Ripple Rejection 65dB typ. (f=1kHz, Vo2=-7V Version)
- Low Output Noise Voltage $V_{NO2}=100\mu\text{Vrms}$ typ
- Output capacitor with $1.0\mu\text{F}$ ceramic capacitor.
- Output Current Io2(max.)=100mA
- High Precision Output Vo2 \pm 1.5%
- Low Drop Out Voltage 0.13V typ. (Io2=60mA)
- ON/OFF Control (with output shunt SW)
- Soft-start Function
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limit

<Others>

- Bipolar Technology
- Package Outline

MSOP8 (VSP8)*MEET JEDEC MO-187-DA

■ PIN CONFIGURATION



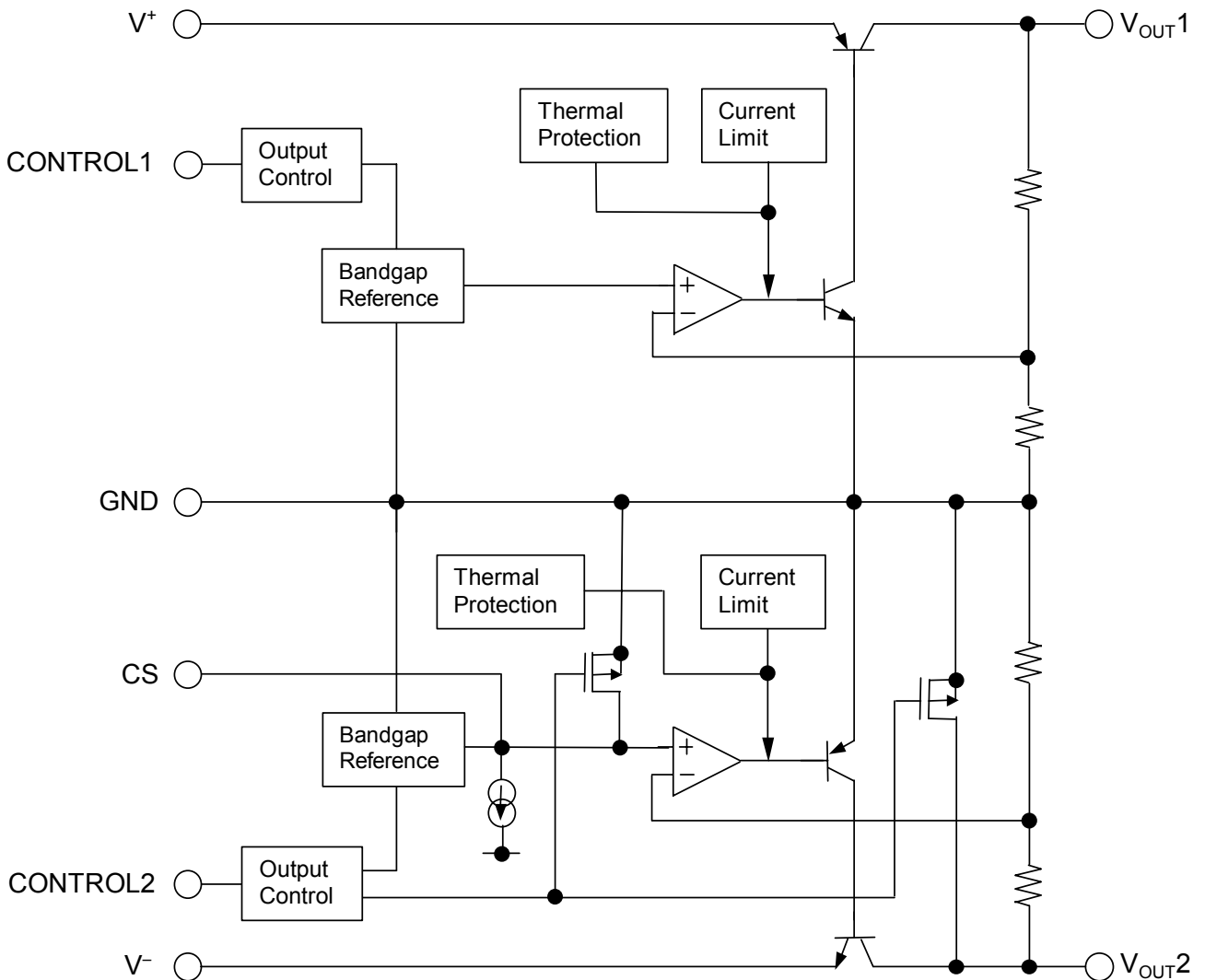
- 1. CONTROL1
- 2. V⁺
- 3. CS
- 4. CONTROL2
- 5. V⁻
- 6. V_{OUT2}
- 7. GND
- 8. V_{OUT1}

NJM2839RXXX

■ OUTPUT VOLTAGE RANK LIST

Device Name	V _{OUT1}	V _{OUT2}	Device Name	V _{OUT1}	V _{OUT2}
NJM2839R1575	15V	-7.5V	NJM2839R1265	12V	-6.5V
NJM2839R1375	13V	-7.5V	NJM2839R1208	12V	-8.0V
NJM2839R1275	12V	-7.5V	NJM2839R1307	13V	-7.0V
NJM2839R1263	12V	-6.3V			
NJM2839R1206	12V	-6.0V			
NJM2839R11606	11.6V	-6.0V			

■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V ⁺	+20	V
	V ⁻	-14	V
Control voltage 1	V _{CONT1}	+20(*1)	V
Control Voltage 2	V _{CONT2}	+5	V
Power Dissipation	P _D	380(*2)	mW
Operating Temperature	Topr	-40 to +85	°C
Storage Temperature	Tstg	-40 to +125	°C
Output Sink Current at OFF-state	T _{SINK(OFF)}	10	mA

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

(*2): Mounted on glass epoxy board. (114.3×76.2×1.6mm : 2layer,FR-4)

■ ELECTRICAL CHARACTERISTICS

Positive Output Electrical Characteristics

 (V⁺=Vo1+1V, C_{IN1}= 0.1μF, Co1= 1.0μF(2.8V<Vo1≤5.4V:Co1=2.2μF, Vo1≤2.8V:Co1=4.7μF), Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Output Voltage 1	Vo1	Io1=30mA	-1.5%	—	+1.5%	V	
Quiescent Current 1	I _{Q1}	Io1=0mA, except I _{CONT1}	Vo1≤5V Version	—	120	180	μA
			5V<Vo1≤10V Version	—	135	195	μA
			10V<Vo1≤15V Version	—	150	210	μA
Quiescent Current at OFF-state 1	I _{Q(OFF) 1}	V _{CONT1} =0V	—	—	100	nA	
Output Current 1	Io1	V _{O1} -0.3V	100	130	—	mA	
Line Regulation 1	ΔVo/ΔV ⁺	V ⁺ =Vo1+1V to Vo1+6V(Vo1≤12V), V ⁺ =Vo1+1V to 18V(Vo1>12V), Io1=30mA	—	—	0.10	%/V	
Load Regulation 1	ΔVo/ΔIo1	Io1=0~60mA	—	—	0.03	%/mA	
Dropout Voltage 1	ΔV _{I-O1}	Io1=60mA	—	0.10	0.18	V	
Ripple Rejection 1	RR1	ein=200mVrms, f=1kHz, Io1=10mA,Vo1=3V Version	—	75	—	dB	
Average Temperature Coefficient of Output Voltage 1	ΔVo/ΔTa1	Ta=0 to 85°C, Io1=10mA	—	±50	—	ppm/°C	
Output Noise Voltage 1	V _{NO1}	f=10Hz to 80kHz, Io1=10mA, Vo1=3V Version	—	45	—	μVrms	
Control Current 1	I _{CONT1}	V _{CONT1} =1.6V	—	3	12	μA	
Control Voltage for ON-state 1	V _{CONT(ON) 1}		1.6	—	—	V	
Control Voltage for OFF-state 1	V _{CONT(OFF) 1}		—	—	0.6	V	
Input Voltage 1	V ⁺		—	—	18	V	

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.

Negative Output Electrical Characteristics

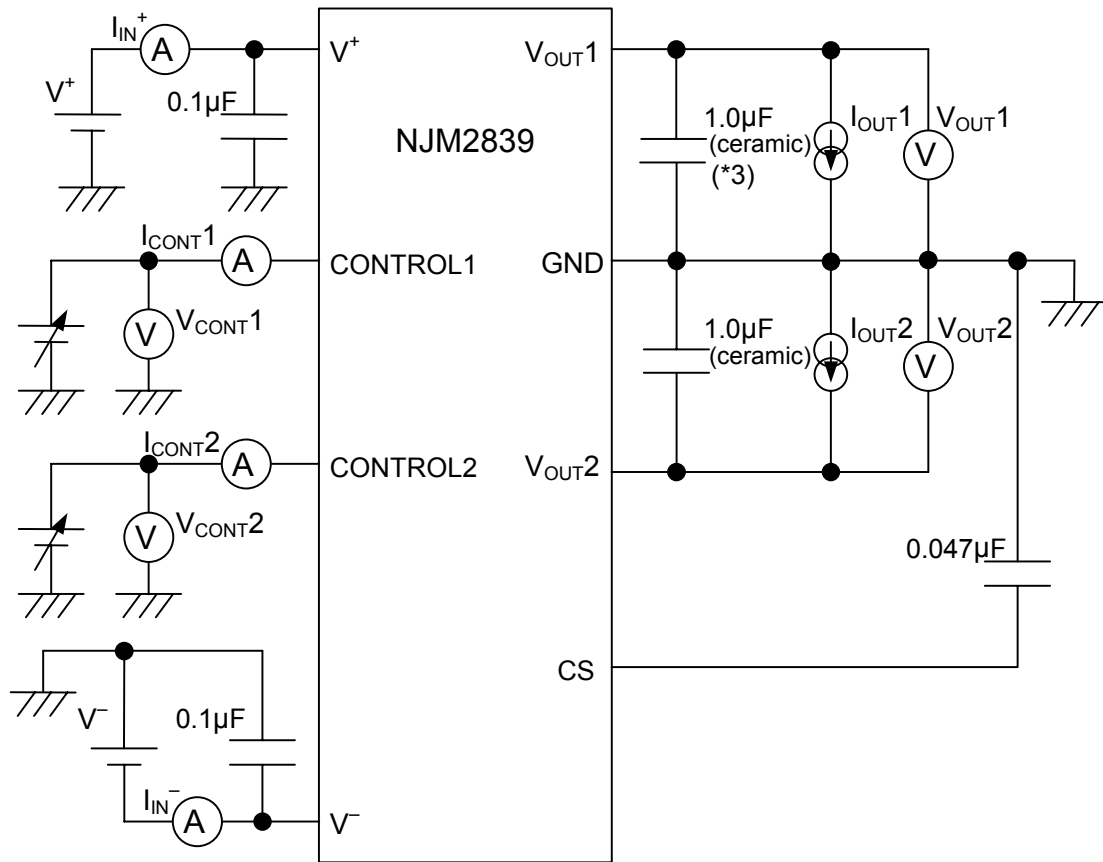
 ($V^- = V_{O2} - 1V$, $V_{CONT2} = 3V$, $C_{IN2} = 0.1\mu F$, $C_{O2} = 1.0\mu F$, $T_a = 25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage 2	V_{O2}	$I_{O2} = 30mA$	+1.5%	–	-1.5%	V
Quiescent Current 2	I_{Q2}	$I_{O2} = 0mA$, except I_{CONT2}	–	130	200	μA
Quiescent Current at OFF-state 2	$I_{Q(OFF)2}$	$V_{CONT2} = 0V$	–	–	100	nA
Output Current 2	I_{O2}	$V_{O2} + 0.3V$	100	130	–	mA
Line Regulation 2	$\Delta V_o / \Delta V^-$	$V^- = V_{O2} - 1V$ to $-12V$, $I_{O2} = 30mA$	–	–	0.10	%/V
Load Regulation 2	$\Delta V_o / \Delta I_{O2}$	$I_{O2} = 0 \sim 60mA$	–	–	0.03	%/mA
Dropout Voltage 2	ΔV_{I-O2}	$I_{O2} = 60mA$	–	0.13	0.23	V
Ripple Rejection 2	RR2	$e_{in} = 200mV_{rms}$, $f = 1kHz$, $I_{O2} = 10mA$, $V_{O2} = -7V$ Version	–	65	–	dB
Average Temperature Coefficient of Output Voltage 2	$\Delta V_o / \Delta T_a2$	$T_a = 0$ to $85^\circ C$, $I_{O2} = 10mA$	–	± 50	–	ppm/ $^\circ C$
Output Noise Voltage 2	V_{NO2}	$f = 10Hz$ to $80kHz$, $I_{O2} = 10mA$, $V_{O2} = -7V$ Version	–	100	–	μV_{rms}
CS Terminal Charge Current	I_{CS}	$V_{CS} = 0V$	4	5	6	μA
Output Resistance at OFF-state	$R_{O(OFF)}$	$V_{CONT2} = 0V$, $V_{O2} = -7V$ Version	–	360	–	Ω
Control Current 2	I_{CONT2}	$V_{CONT2} = 1.6V$	–	2	4	μA
Control Voltage for ON-state 2	$V_{CONT(ON)2}$		1.6	–	–	V
Control Voltage for OFF-state 2	$V_{CONT(OFF)2}$		–	–	0.6	V
Input Voltage 2	V^-		-12	–	–	V

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.

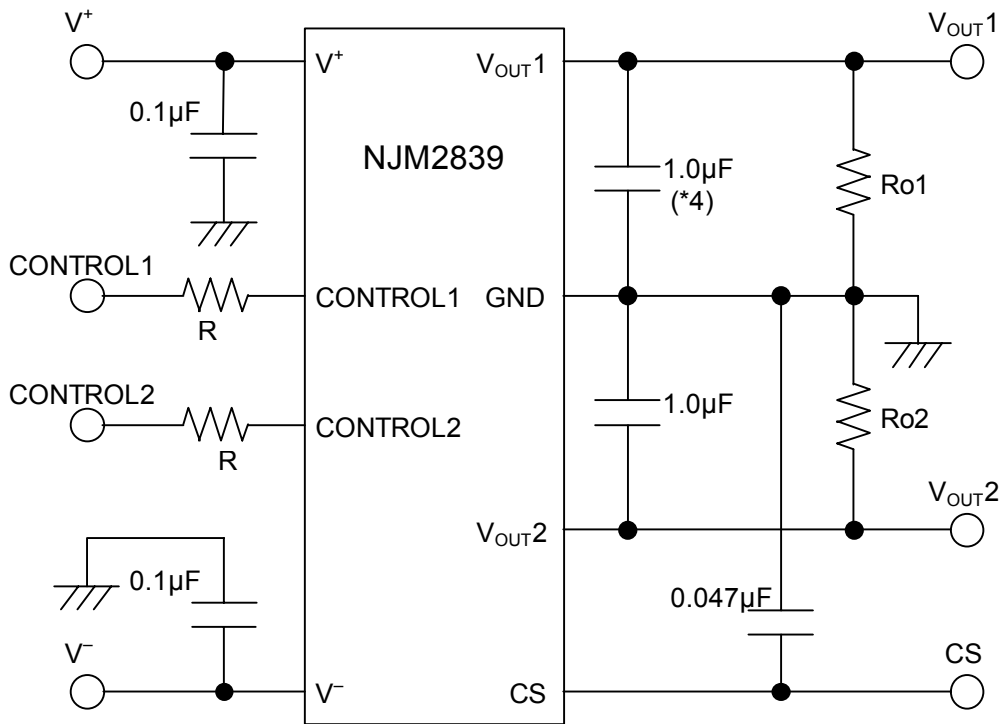
■ TEST CIRCUIT



(*3) 2.8V < V_{o1} ≤ 5.4V version : C_{o1} = 2.2µF (ceramic)
 V_{o1} ≤ 2.8V version : C_{o1} = 4.7µF (ceramic)

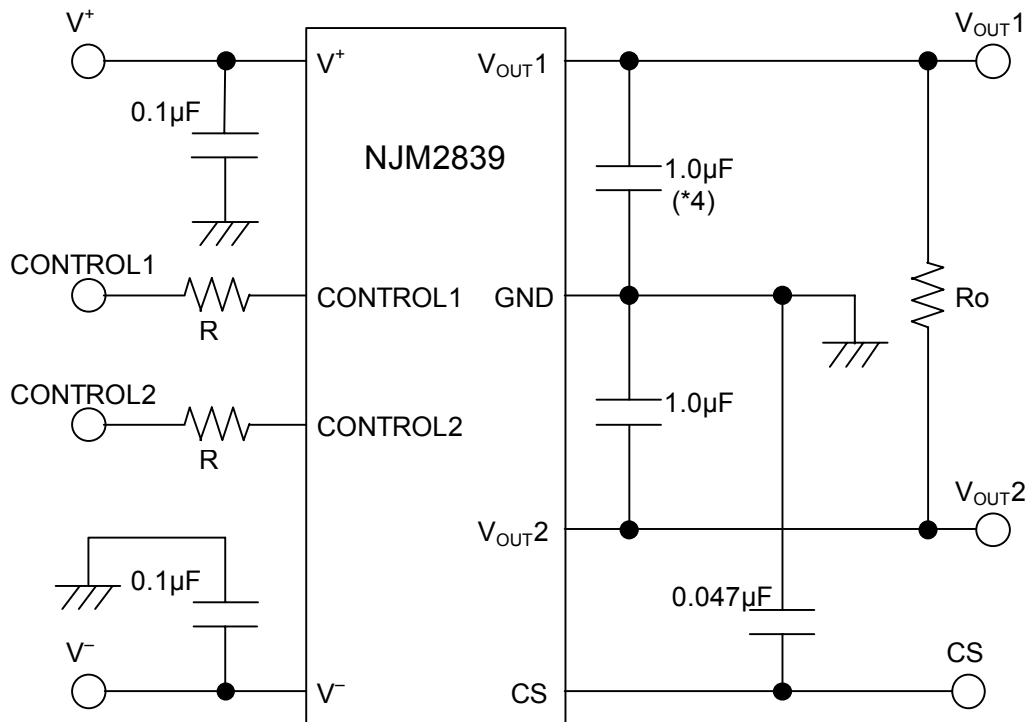
■ TYPICAL APPLICATION

1. In case a load is connected between V_{OUT1} and GND, GND and V_{OUT2} , respectively.



(*4) 2.8V < V_{o1} ≤ 5.4V version : C_{o1} = 2.2µF
 V_{o1} ≤ 2.8V version : C_{o1} = 4.7µF

2. In case that a load is connected between V_{OUT1} and V_{OUT2}



(*4) 2.8V < V_{o1} ≤ 5.4V version : C_{o1} = 2.2µF
 V_{o1} ≤ 2.8V version : C_{o1} = 4.7µF

State of control terminal 1,2:

- “H” → output is enabled.
- “L” or “open” → output is disabled.

Connect control terminal to resistance “R”

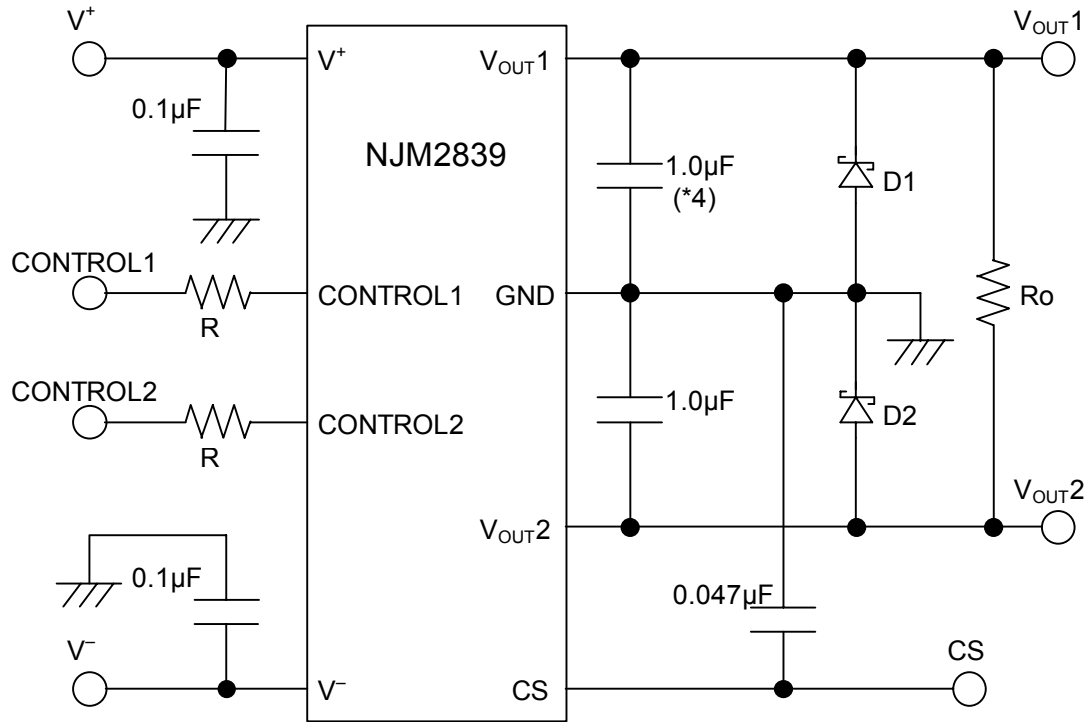
The quiescent current can be reduced by using a resistance “R”. Instead, it increases the minimum operating voltage. For further information, please refer to Figure “Output Voltage vs. Control Voltage”.

When a load is connected between V_{OUT1} and V_{OUT2} , there is a possibility that the error occurs in the following conditions.

- The load is heavy.
- When the control 1 and 2 are turned on indifferently.
- When the capacity value of C_s is small.

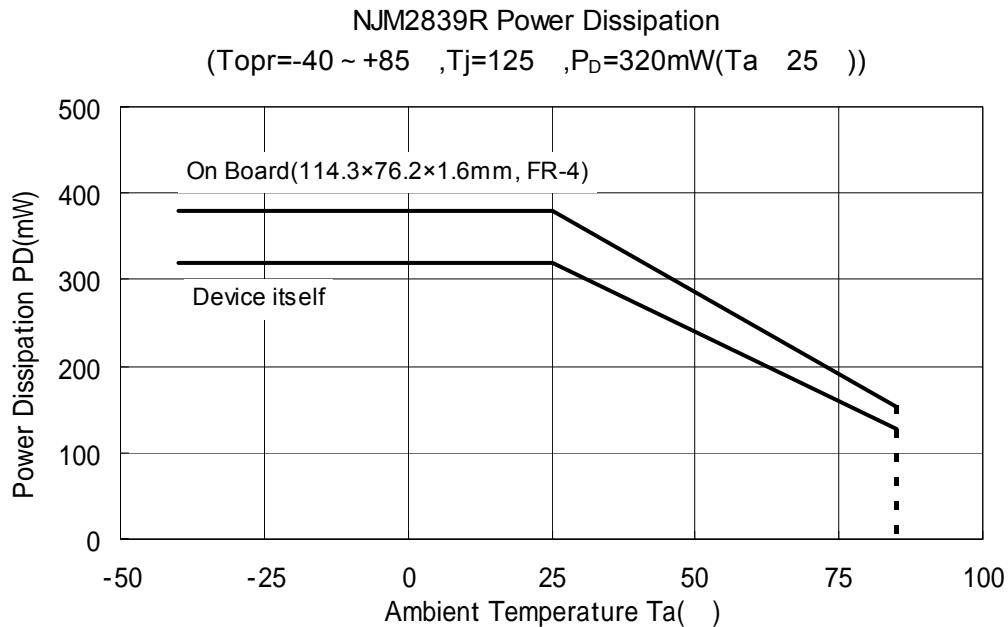
The error can avoid as following.

- Change in the value of load or value of C_s .
- Change turn on sequence of control 1 and 2.
- Schottky barrier diode is inserted between V_{OUT1} and GND, GND and V_{OUT2} respectively as shown in the figure below.



(*4) 2.8V < Vo1 ≤ 5.4V version : Co1 = 2.2µF
 Vo1 ≤ 2.8V version : Co1 = 4.7µF

■ POWER DISSIPATION vs. AMBIENT TEMPERATURE



[CAUTION]

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