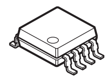
POSITIVE/NEGATIVE 2CH LOW DROPOUT VOLTAGE REGULATOR

■ GENERAL DESCRIPTION

The NJM2839 is a positive/negative 2-channel low dropout voltage regulator featuring a low noise, high precision of ±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 1μF 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 $V_{NO}1$=45μVrms typ.
- Output capacitor with 1.0μF ceramic capacitor. (Vo1≥5.5V)
- Output Current Io1(max.)=100mA
- High Precision Output Vo1±1.5%
- Low Drop Out Voltage 0.10V typ. (Io1=60mA)
- ON/OFF Control
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limit

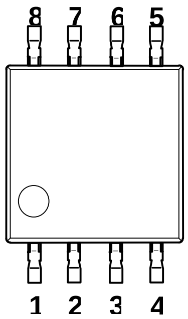
<Negative CH>

- High Ripple Rejection 65dB typ. (f=1kHz,Vo2=-7V Version)
- Low Output Noise Voltage $V_{NO}2$=100μVrms typ
- Output capacitor with 1.0μF ceramic capacitor.
- Output Current Io2(max.)=100mA
- High Precision Output Vo2±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



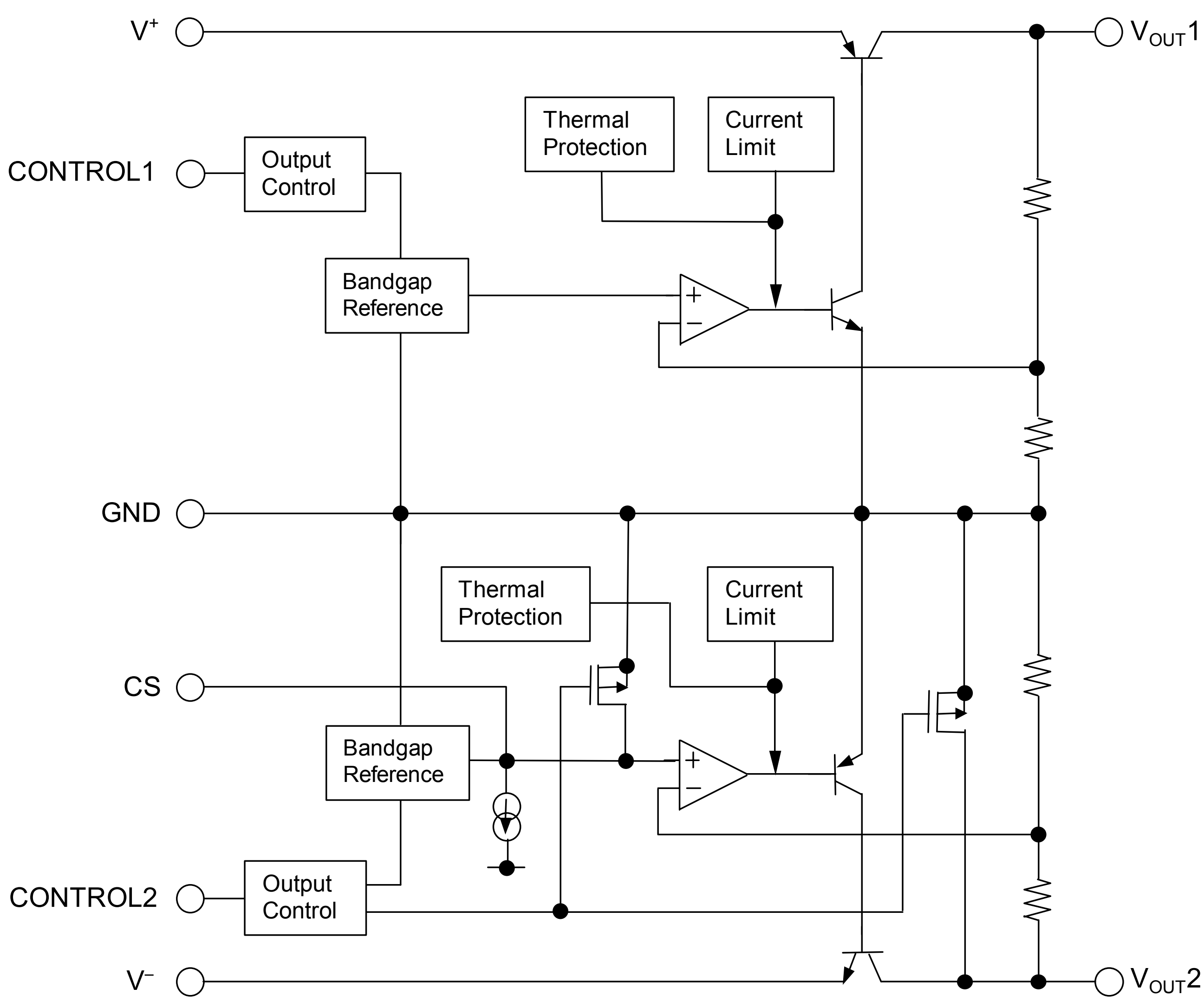
1.CONTROL1
2.V^+
3.CS
4.CONTROL2
5.V^-
6.$V_{OUT}2$
7.GND
8.$V_{OUT}1$

NJM2839RXXXX

■ OUTPUT VOLTAGE RANK LIST

Device Name	$V_{OUT}1$	$V_{OUT}2$	Device Name	$V_{OUT}1$	$V_{OUT}2$
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_{IN}1= 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_{CONT}1	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_{CONT}1=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-O}1	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_{NO}1	f=10Hz to 80kHz, Io1=10mA, Vo1=3V Version		–	45	–	μVrms
Control Current 1	I_{CONT}1	V_{CONT}1 =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

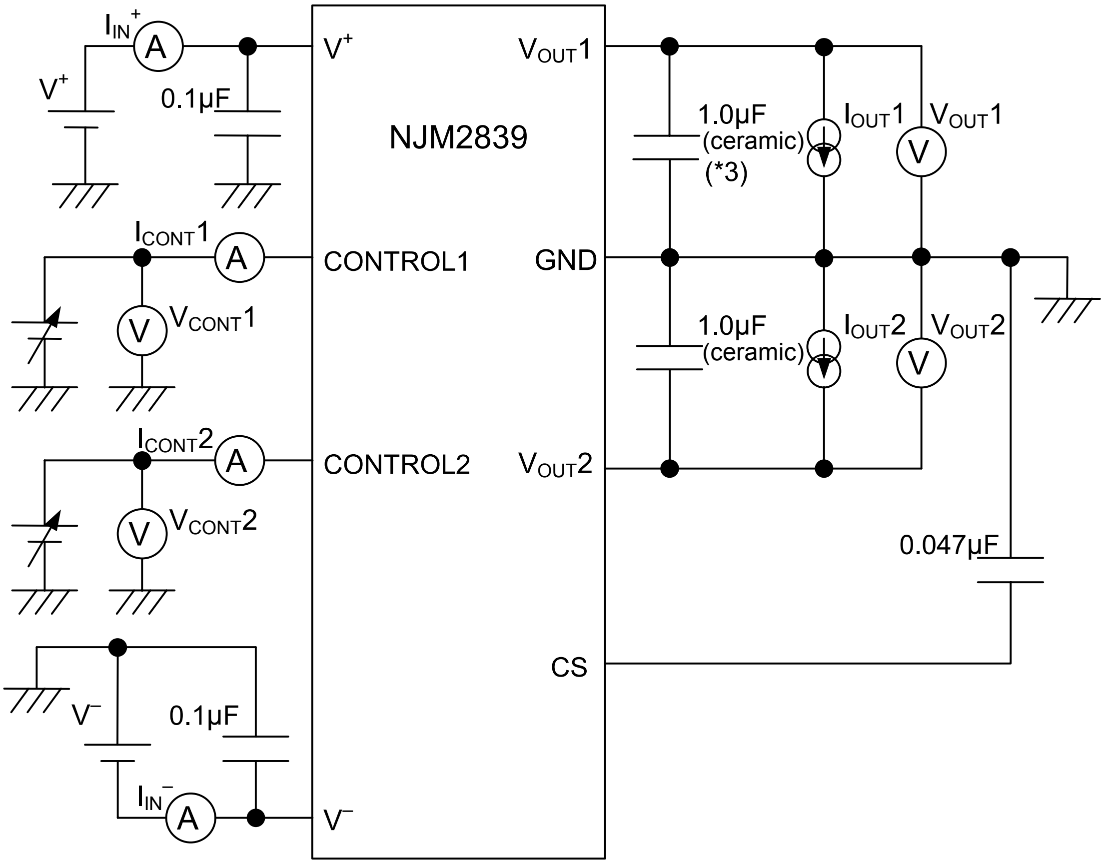
The above specification is a common specification for all output voltages.
Therefore, it may be different from the individual specification for a specific output voltage.

Negative Output Electrical Characteristics
(V^{-}=Vo2-1V, $V_{CONT}2$ =3V , $C_{IN}2$=0.1µF , Co2=1.0µF, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage 2	Vo2	Io2=30mA	+1.5%	–	-1.5%	V
Quiescent Current 2	I_Q2	Io2=0mA, except I_{CONT} 2	–	130	200	µA
Quiescent Current at OFF-state 2	$I_{Q(OFF)}$ 2	$V_{CONT}2$=0V	–	–	100	nA
Output Current 2	Io2	V_O2+0.3V	100	130	–	mA
Line Regulation 2	ΔVo/ΔV^{-}	V^{-}=Vo2-1V to -12V, Io2=30mA	–	–	0.10	%/V
Load Regulation 2	ΔVo/ΔIo2	Io2=0~60mA	–	–	0.03	%/mA
Dropout Voltage 2	$\Delta V_{I-O}2$	Io2=60mA	–	0.13	0.23	V
Ripple Rejection 2	RR2	ein=200mVrms, f=1kHz, Io2=10mA, Vo2=-7V Version	–	65	–	dB
Average Temperature Coefficient of Output Voltage 2	ΔVo/ΔTa2	Ta=0 to 85°C, Io2=10mA	–	±50	–	ppm/°C
Output Noise Voltage 2	$V_{NO}2$	f=10Hz to 80kHz, Io2=10mA, Vo2=-7V Version	–	100	–	µVrms
CS Terminal Charge Current	Ics	V_{CS}=0V	4	5	6	µA
Output Resistance at OFF-state	$R_{O(OFF)}$	$V_{CONT}2$ =0V, Vo=-7V Version	–	360	–	Ω
Control Current 2	$I_{CONT}2$	$V_{CONT}2$ =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.

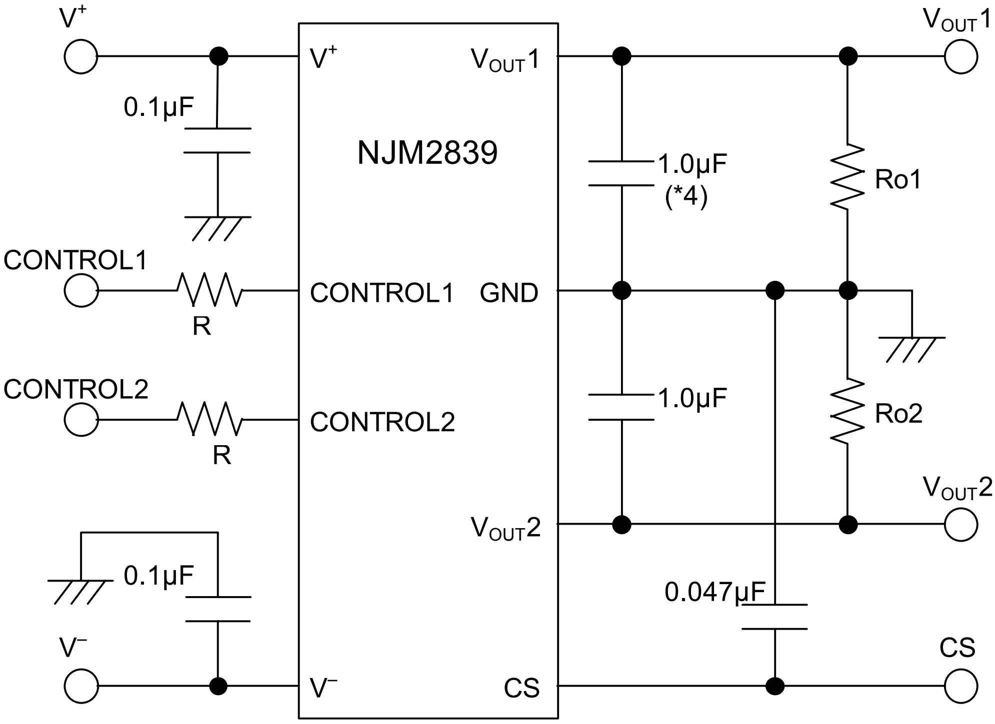
■ TEST CIRCUIT



(*3) 2.8V<Vo1≤5.4V version :Co1=2.2µF(ceramic)
Vo1≤2.8V version :Co1=4.7µF(ceramic)

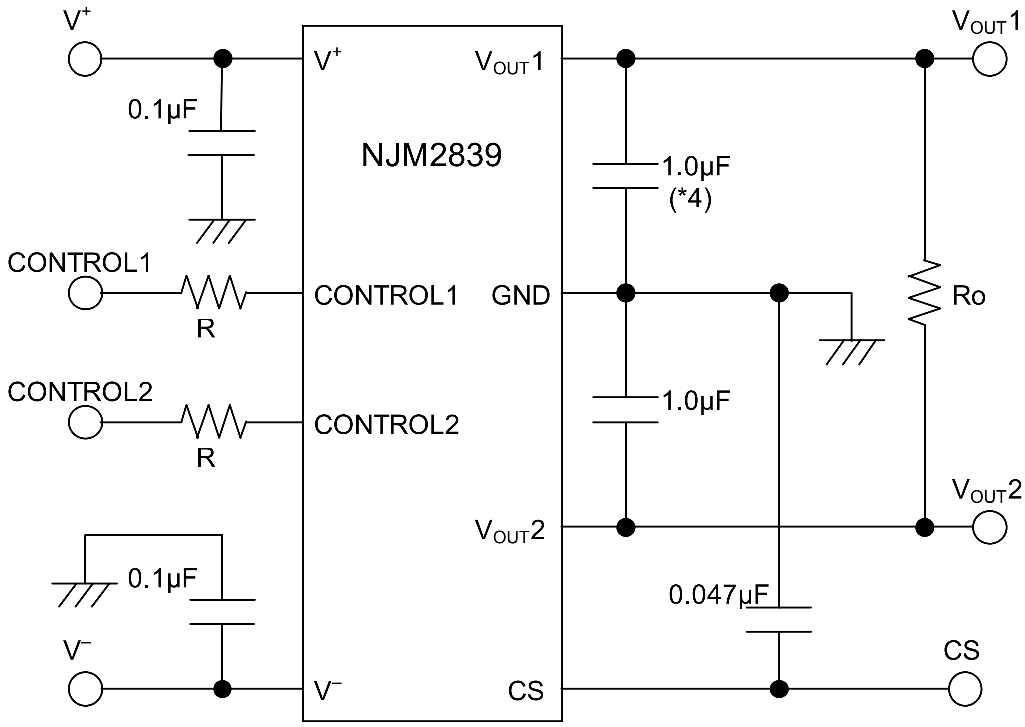
■ TYPICAL APPLICATION

1.In case a load is connected between $V_{OUT}1$ and GND, GND and $V_{OUT}2$, respectively.



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

2. In case that a load is connected between $V_{OUT}1$ and $V_{OUT}2$



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

State of control terminal 1,2:

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

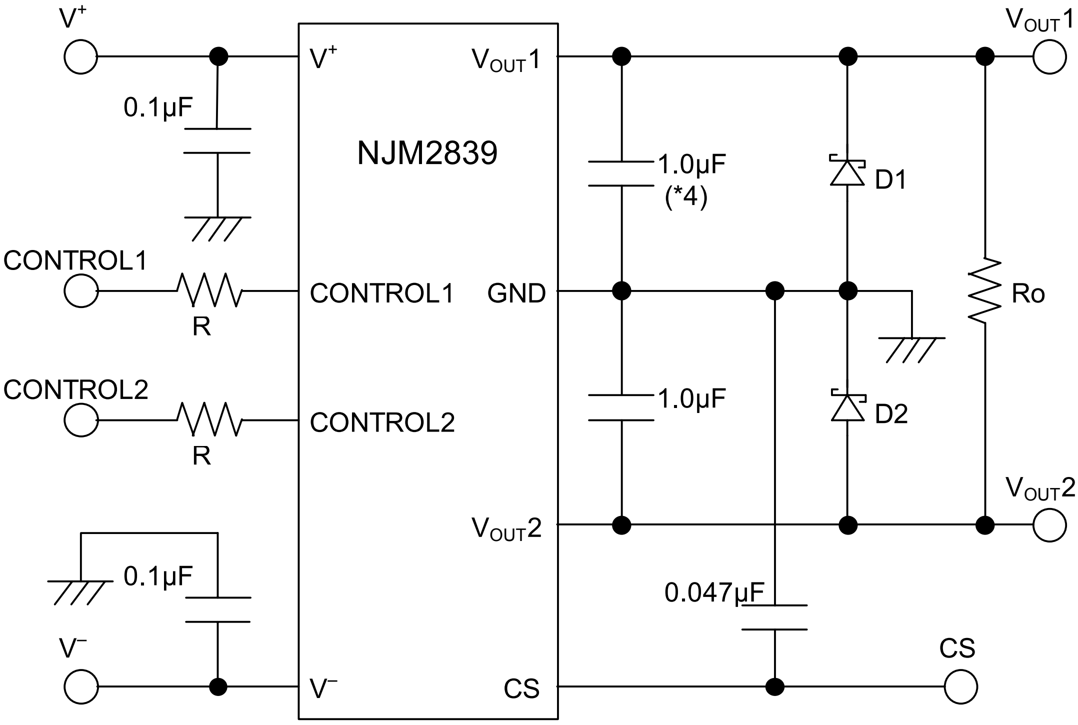
Connect control terminal to resistance "R"
The quiescent current can be reduced by using a resistance "R". Instead, it increases the minimum operating voltage. For further information, please refer to Figure "Output Voltage vs. Control Voltage".

When a load is connected between $V_{OUT}1$ and $V_{OUT}2$, 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 indifference sequence.
·When the capacity value of Cs is small.

The error can avoid as following.

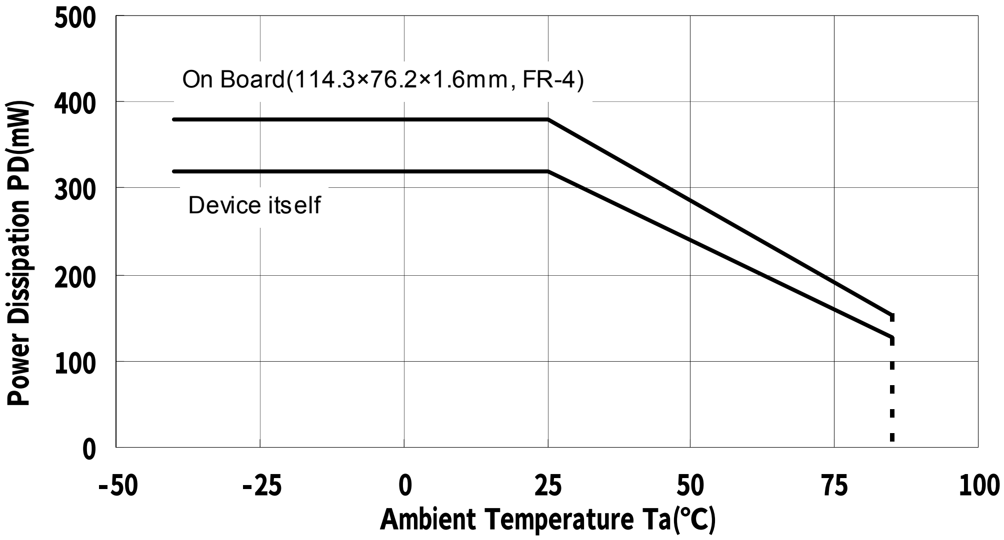
·Change in the value of load or value of Cs.
·Change turn on sequence of control 1 and 2.
·Schottky barrier diode is inserted between $V_{OUT}1$ and GND, GND and $V_{OUT}2$ respectively as shown in the figure below.



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

■ POWER DISSIPATION vs. AMBIENT TEMPERATURE

NJM2839R Power Dissipation
(Topr=-40～+85℃,Tj=125℃,P_D=320mW(Ta≦25℃))



[CAUTION]
The specifications on this databook are only given for information , without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.