Structure Silicon monolithic integrated circuits

Product Name 1CH LDO Regulator of mounting on micro side for 15V input

Model Name **BD9995NUV**

Function
(1) Input voltage: 15[V](MAX)
(2) Output current: 0.6[A](MAX)
(3) Low current consumption
    At the standby: 1[μA] or less(Standard)
(4) Built-in soft start function
(5) Built-in on/off function
(6) Built-in output voltage change ability function
(7) Over current protection・Heating protection
(8) VSON008V2030 Space saving achievement by package

○Absolute maximum ratings (Ta=25℃)

Item	Symbol	Limit	Unit
Supply voltage	Vcc	−0.3～15.5	V
Power dissipation (※1)(※2)	Pd	2.82	W
Operating temperature range	Topt	−25～+85	℃
Storage temperature range	Tstg	−55～+150	℃
VOUT terminal maximum input voltage	VINVOUT	-0.3～Vcc+ 0.3	V
FB terminal maximum input voltage	VINFB	-0.3～Vcc+ 0.3	V
EN terminal maximum input voltage	VINEN	-0.3～Vcc+ 0.3	V
SEL terminal maximum input voltage	VINSEL	-0.3～Vcc+ 0.3	V
Junction temperature	Tjmax	+150	℃

(※1)ROHM 4 layer board: 76.2×114.3×1.6[mm^3] (The copper area on 2,3 layer 5655 mm^2)
(※2)Power dissipation depends on the mounted wiring pattern.

○Operating conditions (Ta＝25℃)

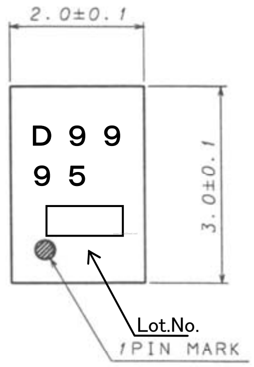
Item	Symbol	Min.	Typ.	Max.	Unit
Supply voltage1(SEL=Vcc) (※3)	Vcc1	8.7	12.0	15.0	V
Supply voltage2(SEL=Open) (※3)	Vcc2	9.7	12.0	15.0	V
Supply voltage3(SEL=GND) (※3)	Vcc3	10.7	12.0	15.0	V
Output current(Vcc−Vout=1.1V) (※3)	Iout	−	−	0.60	A

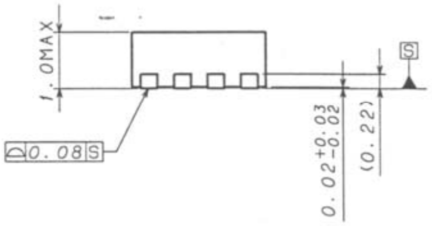
(※3) Do not, however exceed Pd.

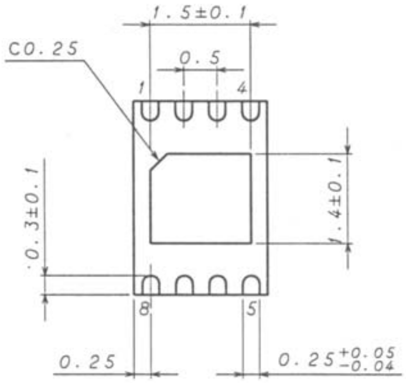
○Electric Characteristics （Unless otherwise specified, Vcc=12.0[V],Ta=25[℃]

Parameter	Symbol	Limit			Unit	Condition
		Min.	Typ.	Max.		
Current consumption at stand by	ICC1	－	1.0	10.0	μA	Vcc=12.0[V], SEL=GND
Current consumption when operating	ICC2	351	540	729	μA	Vcc=12.0[V], SEL=GND No load
Output voltage1	VOUT1	7.84	8.00	8.24	V	Vcc=12.0[V], SEL=Vcc
Output voltage2	VOUT2	8.82	9.00	9.27	V	Vcc=12.0[V], SEL=Open
Output voltage3	VOUT3	9.80	10.00	10.30	V	Vcc=12.0[V], SEL=GND
Soft start time	TSOFT	0.45	0.85	1.25	mS	Time of output voltage 85[%]
EN Low Input threshold voltage	VthENL	0	－	0.5	V	
EN High Input threshold voltage	VthENH	2.4	－	Vcc	V	
EN Input Current	ICCEN	53	75	97	uA	EN=3.0[V] ,Vcc=12.0[V]
Minimum I/O voltage difference	VIO	—	—	0.8	V	VOUT=10.0[V], Output load =450[mA]

○Package outline

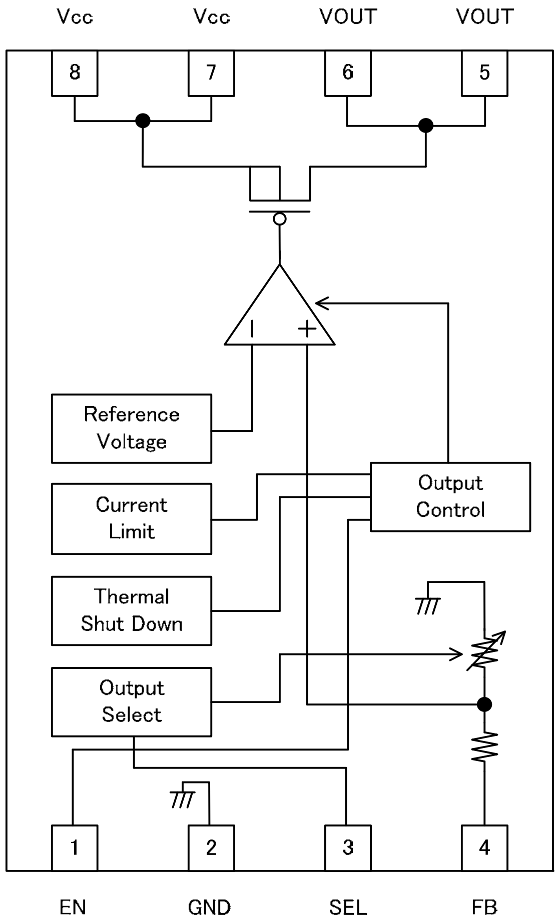






(UNIT:mm)

○Block Diagram



○Terminal No./Terminal name

Terminal No	Terminal name
1	EN
2	GND
3	SEL
4	FB
5	VOUT
6	VOUT
7	Vcc
8	Vcc

○Operation Notes

1. About ground potential
   - .The ground line is where the lowest potential and transient voltages are connected to the IC. Moreover, all terminals except the terminal GND must not become the voltage of GND or less actually including transients.

2. About starting
   - Keep light Load at VOUT output while start-up.

3. About board pattern
   - Use separates ground lines for small control signals and high current outputs. Because these high current outputs that flows to the wire impedance changes the GND voltage for control signal. Therefore each ground of IC must be connected at one point on the set circuit board. As for GND of external parts, it's similar to the above-mentioned.

4. About peripheral circuit
   - Bypass capacitor between power supply and ground should be use low ESR ceramic capacitor and placed close to the IC pin as possible. The output condenser is necessary to be placed as near to the IC as possible with shortest distance. Monitor the output voltage at both end of capacitor connected to VOUT.

5. About absolute maximum rating
   - Exceeding supply voltage and operating Temp. over Absolute Maximum Ratings may cause degradation of IC and even may destroy the IC. If special mode such that exceeding Absolute Maximum Ratings is expected, please have safe countermeasure such as adding POLY SWITCH and fuse to avoid from over stressing.

6. About heat design
   - Do not exceed the power dissipation (PD) of the package specification rating under actual operation.

7. About Short between pins and the mis-installation
   - While mounting IC on the printing board, check direction and position of the IC. If inadequately mounted, the IC may destroy. Moreover this IC might be destroyed when dust short the terminals between pins or pin and ground.

8. About operation in strong electromagnetic field
   - Strong electromagnetic radiation can cause operation failures.

9. About heat interception circuit (TSD)
   - The heat interception circuit is built into this IC. When the junction temperature (Tj) reaches 175℃, the output is switched to off. It is a circuit to aim to intercept IC from thermal reckless driving to the last, and it aims at no protection and the guarantee of neither set nor IC. Therefore, operate this circuit and use neither continuous use from now on nor operation.

10. About over current protection circuit
    - The over current protection circuit is built into this IC. It operates by the effective one of the protection circuit continuous for the destruction prevention due to broken accident, and avoids the load about this circuit about use to which the operation of this function is required because it is not the one to the use when it is excessive IC destruction.

11. About inspection by set substrate
    - The stress might hang to IC by connecting the capacitor to the terminal with low impedance. Then, please discharge electricity in each and all process. Moreover, in the inspection process, please turn off the power before mounting the IC, and turn on after mounting the IC. In addition, please take into consideration the countermeasures for electrostatic damage, such as giving the earth in assembly process, transportation or preservation.

12. About each input terminal
    - This IC is a monolithic IC, and has P^+ isolation and P substrate for the element separation. Therefore, a parasitic PN junction is firmed in this P-layer and N-layer of each element. When the GND voltage potential is greater than the voltage potential at Terminals A or B, the PN junction operates as a parasitic diode. In addition, the parasitic NPN transistor is formed in said parasitic diode and the N layer of surrounding elements close to said parasitic diode. These parasitic elements are formed in the IC because of the voltage relation. The parasitic element operating causes the wrong operation and destruction. Therefore, please be careful so as not to operate the parasitic elements by impressing to input terminals lower voltage than GND (P substrate). Please do not apply the voltage to the input terminal when the power -supply voltage is not impressed. Moreover, please impress each input terminal lower than the power-supply voltage or equal to the specified range in the guaranteed voltage when the power-supply voltage is impressing.

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