# 2 CHANNEL LOW-DROPOUT VOLTAGE REGULATOR

### **FEATURES**

- \*Dual Output: 3.3V/1A, 2.5V/1A.
- \*Output Voltage Precision of  $\pm 2\%$ .
- \*Output consists of PNP power transistor with low-dropout voltage.
- \*Built-in over current protection circuit (OCP).
- \*Built-in Thermal Shut Down Circuit (TSD).
- \*Ideal for Hard Disk Drives applications.



1: Vcc 2: NC 3: GND 4: Vo1 5: Vo2

### PIN DISCRIPTION

PIN NAME	FUNCTION	
Vcc	Power Supply	
N.C.	Not internally connected	
GND	Ground	
Vo <sub>1</sub>	3.3V Output	
Vo <sub>2</sub>	2.5V Output	
	SE SE WWW.D	
	Vcc N.C. GND Vo1	Vcc Power Supply  N.C. Not internally connected  GND Ground  Vo1 3.3V Output

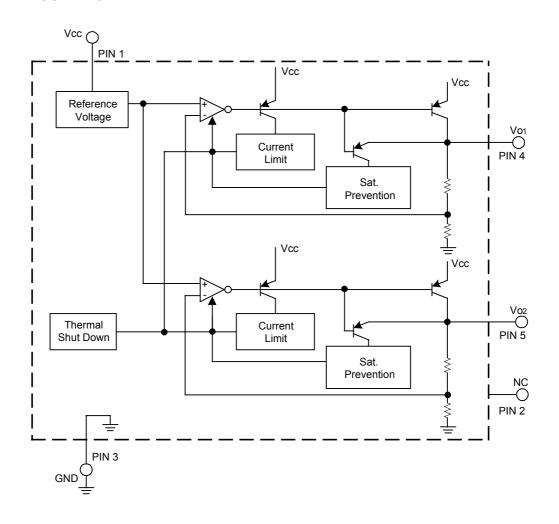
UTC

UNISONIC TECHNOLOGIES CO., LTD.

QW-R102-017,C



**BLOCK DIAGRAM** 



	( /	a.	
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	Vcc	18	V
Power dissipation	Po	1000*	mW
Operating temperature range	Topr	-40 ~ +85	°C
Storage temperature range	Tstg	-55 ~ +150	°C
Junction temperature	Ti	150	°C

<sup>\*</sup> PD derated at 8mW/°C for temperatures above Ta=25°C

### OPERATING RATINGS(Ta=25°C)

	_ : /			
PARAMETER	SYMBOL	MIN	MAX	UNIT
Input Voltage	Vcc	3.0	16.0	V
3.3V Output current	<b>I</b> 01		1	Α
2.5V Output current	lo <sub>2</sub>		1	Α

### **ELECTRICAL CHARACTERISTICS**

(Refer to the test circuit, Ta=25  $^{\circ}$ C, V<sub>CC</sub>=5V unless otherwise specified.)

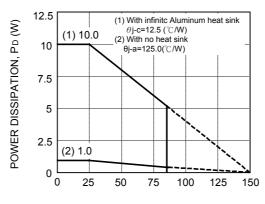
SYMBOL IB	TEST CONDITIONS Io1=0mA, Io2=0mA	MIN	TYP	MAX	UNIT					
Ів	Io1=0mA, Io2=0mA	1								
			8.0	1.5	mA					
	3.3V Output									
Vo <sub>1</sub>	Io1=500mA	3.234	3.30	3.366	V					
$\triangle V_{D1}$	Io1=500mA, Vcc=3.135V		0.25	0.5	V					
lo <sub>1</sub>		1.0	1.7		Α					
R.R.1	f=120Hz, ein=1Vrms Io1=200mA	50	58		dB					
$\triangle V$ LINE1	Vcc=4V ~ 16V, Io1=500mA		5	30	mV					
$\triangle V$ LOAD1	Io1=0mA ~ 1A		30	75	mV					
Tcvo1	Io1=5mA, TJ=0 ~ 125℃		±0.01		%/℃					
los1	Vcc=16V		270		mA					
Vo <sub>2</sub>	Io2=500mA	2.450	2.50	2.550	V					
lo <sub>2</sub>		1.0	1.7		Α					
R.R.2	f=120Hz, ein=1Vrms lo <sub>2</sub> =200mA	50	58		dB					
$\triangle V$ LINE2	Vcc=4V ~ 16V, lo2=500mA		5	30	mV					
△Vload2	Io2=0mA ~ 1A		30	75	mV					
Tcvo2	lo2=5mA, TJ=0 ~ 125°C		±0.01		%/℃					
los2	Vcc=16V		270		mA					
	AVD1 IO1 R.R.1 AVLINE1 AVLOAD1 TCVO1 IOS1 VO2 IO2 R.R.2 AVLINE2 AVLOAD2 TCVO2	\( \text{AVD1} \)	∆VD1	∆VD1         lo1=500mA, Vcc=3.135V         0.25           lo1         1.0         1.7           R.R.1         f=120Hz, ein=1Vrms lo1=200mA         50         58           ∆VLINE1         Vcc=4V ~ 16V, lo1=500mA         5           ∆VLOAD1         lo1=0mA ~ 1A         30           Tcv01         lo1=5mA, TJ=0 ~ 125°C         ±0.01           los1         Vcc=16V         270           Vo2         lo2=500mA         2.450         2.50           lo2         1.0         1.7           R.R.2         f=120Hz, ein=1Vrms lo2=200mA         50         58           ∆VLINE2         Vcc=4V ~ 16V, lo2=500mA         5           ∆VLOAD2         lo2=0mA ~ 1A         30           TcV02         lo2=5mA, TJ=0 ~ 125°C         ±0.01	∆VD1         lo1=500mA, Vcc=3.135V         0.25         0.5           lo1         1.0         1.7         1.0         1.7           R.R.1         f=120Hz, ein=1Vrms lo1=200mA         50         58         58           △VLINE1         Vcc=4V ~ 16V, lo1=500mA         5         30           △VLOAD1         lo1=0mA ~ 1A         30         75           Tcvo1         lo1=5mA, Tj=0 ~ 125℃         ±0.01         ±0.01           los1         Vcc=16V         270         2.50         2.550           lo2         1.0         1.7         1.7         1.7           R.R.2         f=120Hz, ein=1Vrms lo2=200mA         50         58         58           △VLINE2         Vcc=4V ~ 16V, lo2=500mA         5         30           △VLOAD2         lo2=0mA ~ 1A         30         75           Tcvo2         lo2=5mA, Tj=0 ~ 125℃         ±0.01					

<sup>\*</sup> Design Guarantee. (Outgoing inspection is not done on all products.)

Note: All characteristic are measured with a capacity across the input (0.33  $\mu$  F) and the output (22  $\mu$  F). Measurement is done at TA≒TJ, and variations in the parameter of all measurement (except for Temperature Coefficient of Output Voltage)caused by temperature change are not considered.

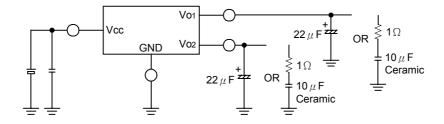
O This product is not designed for protection against radioactive rays.

### POWER DISSIPATION

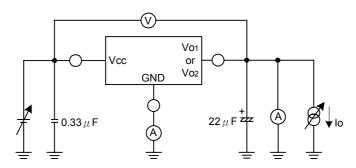


AMBIENT TEMPERATURE, Ta (°C)

### STANDARD APPLICATION CIRCUIT

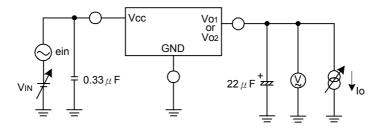


### TEST CIRCUIT FOR EACH CONDITION



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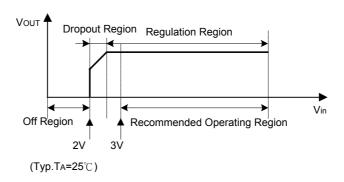
TEST CIRCUIT FOR RIPPLE REJECTION RATIO



## APPLICATION INFORMATION Operation Supply Voltage Range

The circuit functionality is guaranteed within operation of ambient temperature range, as long as it is within operation supply voltage range. The standard electrical characteristic values are guaranteed at the test circuit voltage of Vcc=5V. The cannot be guaranteed at other voltages in the operating range of 3.0V~16.0V, homever, the variation will be small.

### • Input /Output characteristic



For proper regulation, this device must be operated in the Recommended Operating Region shown above.

### **Power Dissipation**

Refer to the thermal duration characteristics shown in Fig.3. Also, be sure to use this IC within a power dissipation rage allowing enough margins.

### **Output and Bypass Capacitor**

To prevent oscillations, place the output capacitor between the output pin and GND for both channel. There is a possibility for oscillation if capacitor's value changes due to temperature, voltage, etc. More than 22  $\mu$ F electrolytic capacitor is recommended. If an extremely large value of (over 1000  $\mu$ F) is used, it may cause oscillations at low frequency. In case of using ceramic capacitor (it is recommended more than 10  $\mu$ F) connect with 1 $\Omega$  resistance

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serially as ESR. For the bypass capacitor, a  $0.33\,\mu$  F capacitor placed as close to Vcc pin and GND pin as possible is recommended.

#### **Over- current Protection Circuit**

The over-current protection circuits are built in at the outputs. They protect the IC from being damaged when the load is short-circuited or subjected to an over current condition. This protection circuits perform holdback current limiting.

### **Thermal Protection Circuit**

A thermal shut down circuit (T.S.D.) is built into the IC to prevent damage due to overheating, Therefore, all the outputs are turned off when the T.S.D. circuit is activated and are turned on when the temperature recedes to the specified level. However, the T.S.D. circuit is only for extreme conditions and the regulator circuit should still be designed for the IC not to exceed  $T_J(max)=150^{\circ}C$ .

### Grounding

It is recommended that every capacitor (bypass and output capacitors) is grounded to PIN3 using single-point connections.

### **Electromagnetic Fields**

The IC is susceptible to strong electromagnetic fields and may cause malfunction. Therefore, caution should be used when placing it on the PCB.

#### **Protection Diodes**

It is recommended that protection diodes be used when the output is connected to an inductive load.

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