

**DLC-01W**

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**VARITRONIC AG**

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**DLC-01W**

**Data Sheet**

13.02.2004 / Rev.B

**8-pin Flash based Download- Controller**

## **Important**

Information contained in this publication regarding device applications and the like is intended through suggestion only and may be superseded by updates.

It is your responsibility to ensure that your application meets with your specifications.

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## Pin Diagrams:

### Introduction:

The **DLC-01W** download controller enables a simple programming Interface to every H8-Tiny micro-controller.

The device controls the data flow over the serial download port and switches the H8-Controller automatically in the **boot mode** when the synch. bytes from the Renesas Tools are detected. After the software update the H8 restarts in run mode.

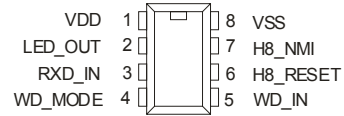


Figure 1

### Features:

- No external key used
- Wide operating voltage range 3V-5V
- Low power typ. 800µA @5V
- Status led for boot mode identification
- Selectable build in watchdog timer
- Works with original Renesas tools FDT, Simple interface and HEW

### Limitations:

The baud rate 2400 baud is reserved for the boot mode detection. (Switch to others baud rates is possible, ask use)

### Pin Description:

Pin	Name	Type	Description
1	VDD	Power	Positive voltage +3V-+5V
2	LED_OUT	Output	Status led output, active low
3	RXD_IN	Input	RS232 input (5V Level)
4	WD_MODE	Input	Watchdog enable pin
5	WD_IN	Input	Watchdog trigger input
6	H8_RESET	Output / tree state	H8 RESET output (floated when not used)
7	H8_NMI	Output / tree state	H8 NMI output (floated when not used)
8	VSS	Power	Ground

Table 1

### Watchdog:

- Watchdog setup

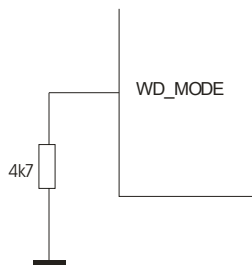


Figure 2

Watchdog is disabled

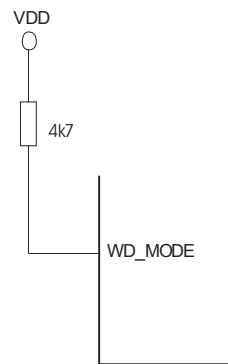


Figure 3

Watchdog is enabled

## Internal Reset Output

The DLC01-W makes a reset in following two situations.

### 1.) During power-up

When VCC reaches brown out detect voltage threshold limit (*Table6*), RESET is a guaranteed logic low of 0.6V or less. As VCC rises, RESET stays low. When VCC rises above the reset threshold, an internal timer releases RESET after about 72ms.

### 2.) During brown out detect

The active-low RESET output pulses low for 72ms when a voltage below the brown out trigger level (*Table6*) is detected, and stays low whenever VCC is below the reset threshold voltage. It remains low for 72ms after VCC rises above the reset threshold.

If brownout occurs in the middle of a previously initiated reset pulse, the pulse continues for at least another 72ms.

Caution: In the reset state, the H8\_RESET pin is floating!

## H8\_Reset Output conditions

### 1.) Initiate a software download

When a synchronization byte from a Renesas tool over the serial port is received, the DLC01-W switch's the H8-CPU in the boot mode. If the process finished, the H8 initiate automatically the run mode and starts the application program.

### 2.) A Watchdog overflow is detected

Show description in the following section.

## Watchdog Timer

The DLC01-W watchdog circuit monitors the  $\mu P$ 's activity. If the  $\mu P$  does not toggle the watchdog input (WDI) within 1.6sec and WDI is not three-stated, WDO goes low. As long as RESET is asserted or as soon as reset is released and WDI is driven high or low, the timer will start counting. Pulses as short as 200ns can be detected.

At startup, the watchdog timeout time is 5.5 sec. and is greater than the nominal time from 1.6 sec.

During the software download the watchdog is inactive

## - Watchdog and reset timing diagram

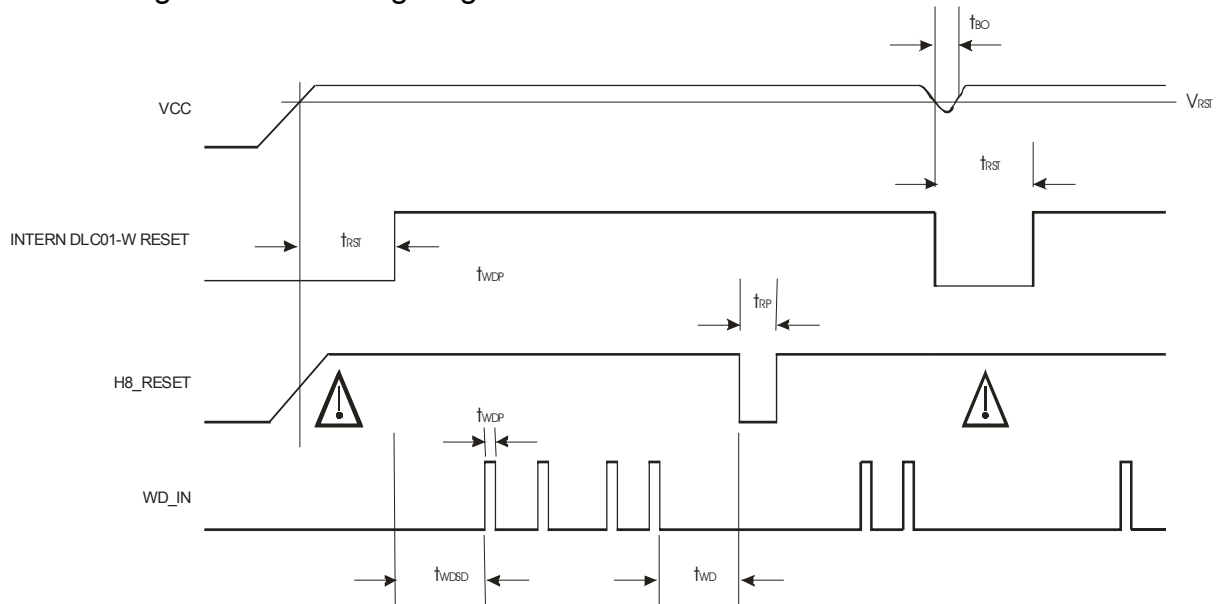


Figure 4



In the DLC01-W reset state, the H8\_RESET output pin is floating.

# DLC-01W

## Application notes:

### Interfacing to additional reset controller with bidirectional push-pull reset pin:

Reset controllers with bidirectional reset pins, such as the Maxim 707 series, can contend with the DLC01-W RESET output. If, for example, the RESET output is driven high and the MAX707 wants to pull it low, indeterminate logic levels may result.

To correct this, connect a Schottky diode or a diode between the RESET output and the MAX707 reset I/O, as in Figure 5. Connect the RESET line to other systems over an open collector output.

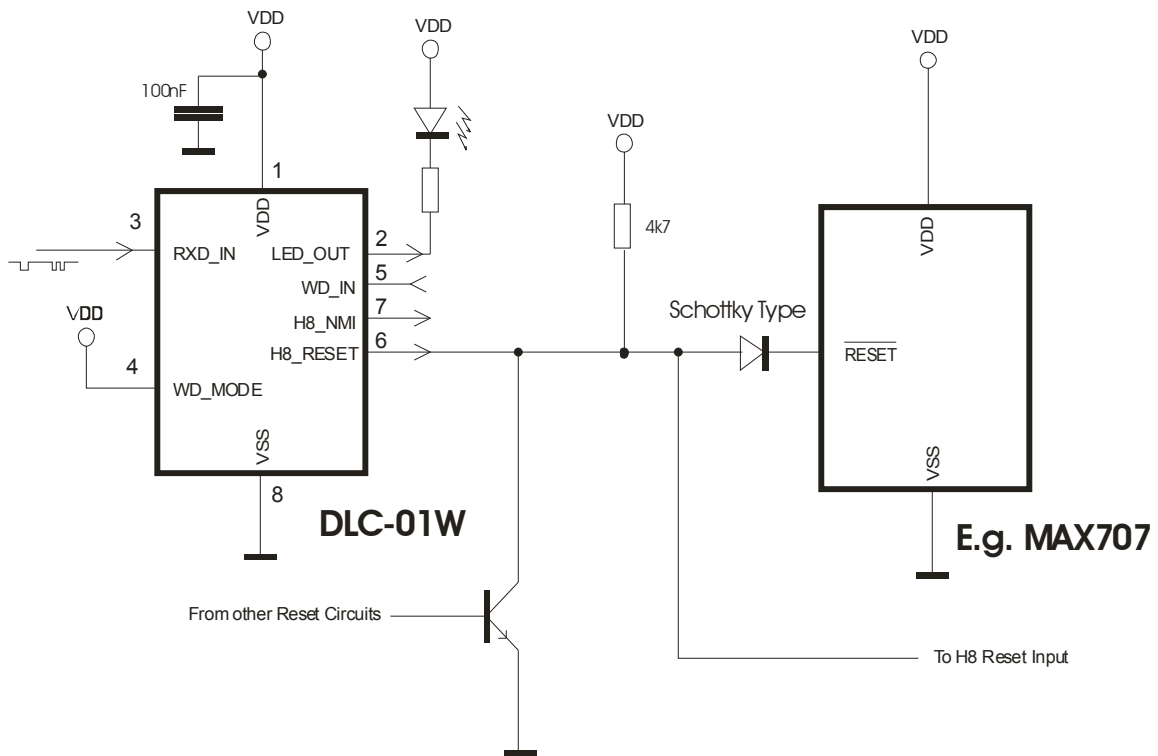


Figure 5

### Status Led:

Led Status	Mode
Dark	Run mode
Flashing	Program mode

Table 2



## ELECTRICAL SPECIFICATIONS

### Absolute Maximum Ratings†

Ambient temperature under bias.....	-40 to +125°C
Storage temperature .....	-65°C to +150°C
Voltage on VDD with respect to VSS .....	-0.3 to +6.5V
Voltage on all other pins with respect to VSS .....	-0.3V to (VDD + 0.3V)
Total power dissipation(1) .....	800 mW
Maximum current out of VSS pin .....	300 mA
Maximum current into VDD pin .....	250 mA
Input clamp current, I <sub>IK</sub> (V <sub>I</sub> < 0 or V <sub>I</sub> > VDD) .....	± 20 mA
Output clamp current, I <sub>OK</sub> (V <sub>O</sub> < 0 or V <sub>O</sub> > VDD) .....	± 20 mA
Maximum output current sunk by any output pins.....	25 mA

† NOTICE: Stresses above those listed under 'Absolute Maximum Ratings' may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operation listings of this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

Table 3 General

Standard operating conditions (unless otherwise stated)						
- Operating temperature -40°C ≤ TA ≤ +85°C for industrial						
- Extended temperature range 40°C ≤ TA ≤ +125°C possible ask						
Characteristic	Min	Typ	Max	Units	Comment	
Supply voltage	3.0	—	5.0	V	VDD	
Supply current (IDD)	—	500	700	μA	3.0	
	—	0.8	1.1	μA	5.0	
RAM data retention voltage(1)	2.0	—	—	V		
VDD start voltage to ensure internal power-on reset signal	—	VSS	—	V		
VDD rise ratio ensure internal power-on reset signal	0.05	—	—	V/ms		

Table 4 Download Controller

Serial data timeout	—	5.5	—	Sec	
Default boot mode detect baudrate	2400			Baud	Bootkernel download speed = 2400 Baud

Table 5 Watchdog

Watchdog reset pulse duration [tRP]	—	100	—	ms	
Startup watchdog timeout period [tWDST]	—	3.8	—	sec	
Watchdog timeout period [tWD]	—	1.5	—	sec	
WD_IN pulse width [tWDP]	200	—	—	ns	

Table 6 Reset circuit

Startup reset pulse width [tRST]	28 <sup>1</sup>	72	132 <sup>1</sup>	ms	
Brown out detect voltage [VRST]	2.0 <sup>2</sup>	—	2.2 <sup>2</sup>	V	
Brown out detect pulse width	100 <sup>1</sup>	—	—	μs	

<sup>1</sup> These parameters are characterized but not tested

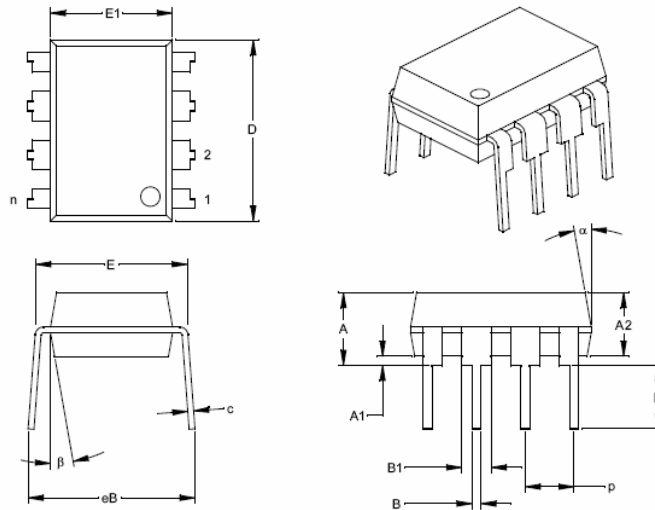
<sup>2</sup> Caution: This is not a valid Value to guaranteed a save H8-Tiny operation. If you need a real power fail reset use an additional reset controller (e.g. MAX707)

# DLC-01W

## 14.2 Package Details

The following sections give the technical details of the packages.

### 8-Lead Plastic Dual In-line (P) – 300 mil (PDIP)



Units		INCHES*			MILLIMETERS		
Dimension Limits		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8			8	
Pitch	p		.100			2.54	
Top to Seating Plane	A	.140	.155	.170	3.56	3.94	4.32
Molded Package Thickness	A2	.115	.130	.145	2.92	3.30	3.68
Base to Seating Plane	A1	.015			0.38		
Shoulder to Shoulder Width	E	.300	.313	.325	7.62	7.94	8.26
Molded Package Width	E1	.240	.250	.260	6.10	6.35	6.60
Overall Length	D	.360	.373	.385	9.14	9.46	9.78
Tip to Seating Plane	L	.125	.130	.135	3.18	3.30	3.43
Lead Thickness	c	.008	.012	.015	0.20	0.29	0.38
Upper Lead Width	B1	.045	.058	.070	1.14	1.46	1.78
Lower Lead Width	B	.014	.018	.022	0.36	0.46	0.56
Overall Row Spacing	§ eB	.310	.370	.430	7.87	9.40	10.92
Mold Draft Angle Top	α	5	10	15	5	10	15
Mold Draft Angle Bottom	β	5	10	15	5	10	15

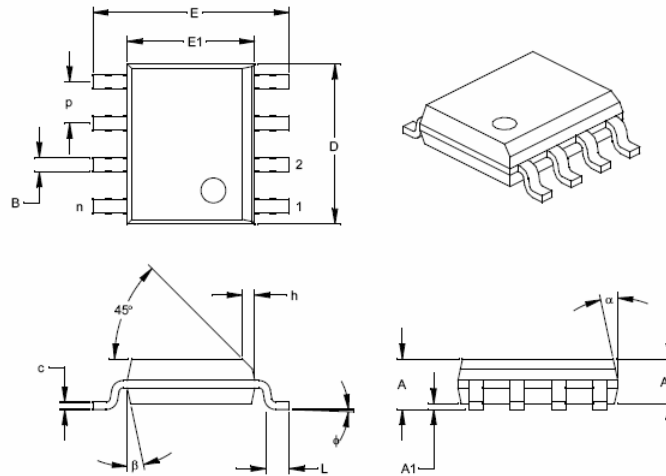
\* Controlling Parameter

§ Significant Characteristic

Notes: Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed JEDEC Equivalent: MS-001 Drawing No. C04-018 .010" (0.254mm) per side.

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8-Lead Plastic Small Outline (SN) – Narrow, 150 mil (SOIC)



Units		INCHES*			MILLIMETERS		
Dimension Limits		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8			8	
Pitch	p		.050			1.27	
Overall Height	A	.053	.061	.069	1.35	1.55	1.75
Molded Package Thickness	A2	.052	.056	.061	1.32	1.42	1.55
Standoff §	A1	.004	.007	.010	0.10	0.18	0.25
Overall Width	E	.228	.237	.244	5.79	6.02	6.20
Molded Package Width	E1	.146	.154	.157	3.71	3.91	3.99
Overall Length	D	.189	.193	.197	4.80	4.90	5.00
Chamfer Distance	h	.010	.015	.020	0.25	0.38	0.51
Foot Length	L	.019	.025	.030	0.48	0.62	0.76
Foot Angle	φ	0	4	8	0	4	8
Lead Thickness	c	.008	.009	.010	0.20	0.23	0.25
Lead Width	B	.013	.017	.020	0.33	0.42	0.51
Mold Draft Angle Top	α	0	12	15	0	12	15
Mold Draft Angle Bottom	β	0	12	15	0	12	15

\* Controlling Parameter § Significant Characteristic

Notes:

Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" (0.254mm) per side. JEDEC Equivalent: MS-012 Drawing No. C04-057

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