1. General Description

The WR1010 is an adjustable 1A LDO with high accuracy. The supply voltage ranges from 1.5 V to 6.0V, output voltage ranges from 0.55 V to 5.5V.

The WR1010 is available low quiescent current with enable ability to minimize standby power consumption.

The circuit integrates over temperature protection, current limit and under voltage lockout functions. The WR1010 has the fold-back maximum output current with respect to the output voltage. WR1010 features a short current limit and an output current limit.

The WR1010 regulators are available in Green DFN2×2-6 package.

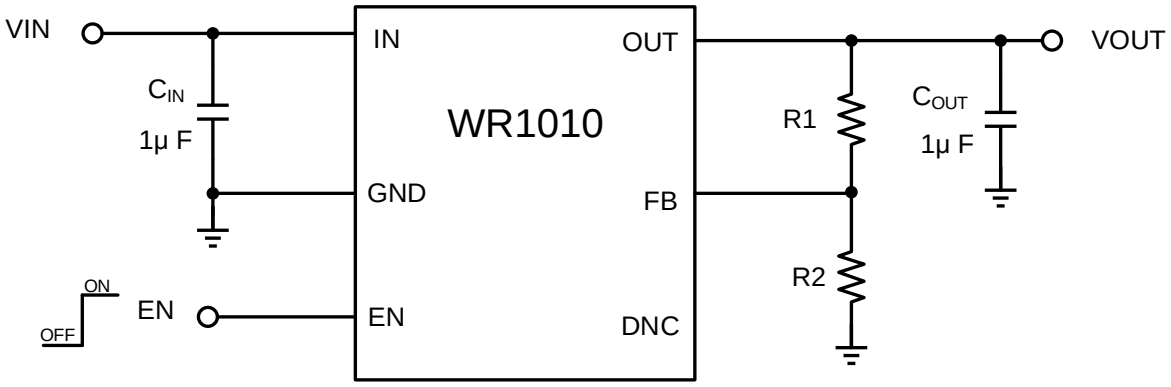
2. Features

- Input Voltage: 1.5V~6V
- Adjustable Output Voltage：0.55V~5.5V
- Output Current: 1A
- High Output accuracy：±0.7%（Typical）
- Low Quiescent Current: 25μA (Typical)
- Shut-down Current: < 1μA
- Dropout Voltage:225mV @ V_{OUT} = 3.3V, I_{OUT}=1A
- Enable Control Function

3. Applications

- Set-Top Boxes , Gaming Consoles
- Home Theater and Entertainment
- Desktop, Notebooks, Ultrabooks
- Printers
- Servers
- Thermostat and Lighting Controls
- Electronic Point of Sale

4. Typical Application

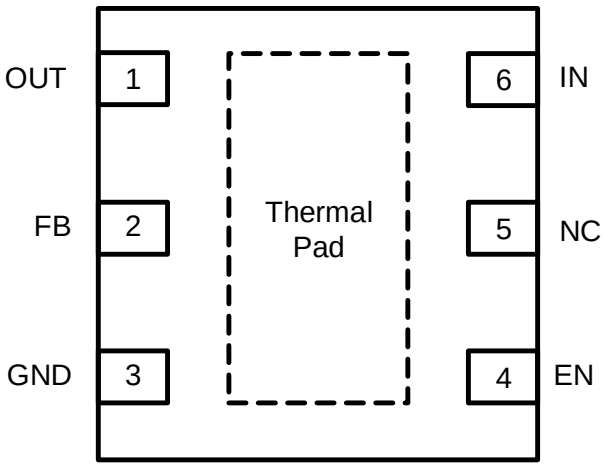


$$V_{OUT} = V_{FB} \times \left(1 + \frac{R_1}{R_2}\right)$$

Figure 1. Adjustable Voltage Regulator

5. Pin Configuration

(Top View)



DFN2×2-6

6. Pin Description

PIN NUMBER	PIN NAME	I/O	PIN FUNCTION
1	OUT	O	Regulated output voltage. A low equivalent series resistance (ESR) capacitor, typically 1μF, is required from OUT to ground for stability. Place the output capacitor as close to the OUT and GND pins of the device as possible.
2	FB	-	Adjustable output voltage feedback input. Connecting this pin to an external resistor divider receives the feedback voltage of the regulator.
3	GND	-	Common ground.
4	EN	I	Enable input.
5	NC	-	Not connect.
6	IN	I	Input voltage supply. Bypass with a typical 1μF capacitor to GND. Place the input capacitor as close to the IN and GND pins of the device as possible.
Pad	Thermal pad	-	Connect the thermal pad to a large area GND plane for improved thermal performance.

7. Absolute Maximum Ratings[1]

SYMBOL	PARAMETER		RATING	UNIT
V_{IN}	IN Input Voltage range		-0.3 to 6.5	V
V_{EN}	EN Input Voltage range		-0.3 to 6.5	V
V_{OUT}	Output Voltage range		-0.3 to V_{IN}+0.3	V
I_{OUT}	Output current		1	A
P_D	Power Dissipation, $P_{D(max)}$@T_A=25°C		1.47	W
$R_{\theta JA}$	Thermal resistance	DFN2×2-6	85	℃/W
T_J	Maximum Junction Temperature		150	℃
T_{STG}	Storage Temperature		-65 to 150	℃
T_{SDR}	Maximum Lead Soldering Temperature, 10 Seconds		260	℃
ESD	HBM		2000	V

NOTE1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

8. Recommended Operating Conditions

SYMBOL	PARAMETER	MIN	MAX	UNIT
V_{IN}	Input Voltage	1.5	6.0	V
V_{EN}	Enable Voltage	0	6.0	V
V_{OUT}	Output Voltage	0.55	5.5	V
I_{OUT}	Output Current	0	1	A
C_{IN}	Input Capacitor	1		μF
C_{OUT}	Output Capacitor	1	220	μF
T_J	Operating junction temperature	-40	125	°C

9. Electrical Characteristics

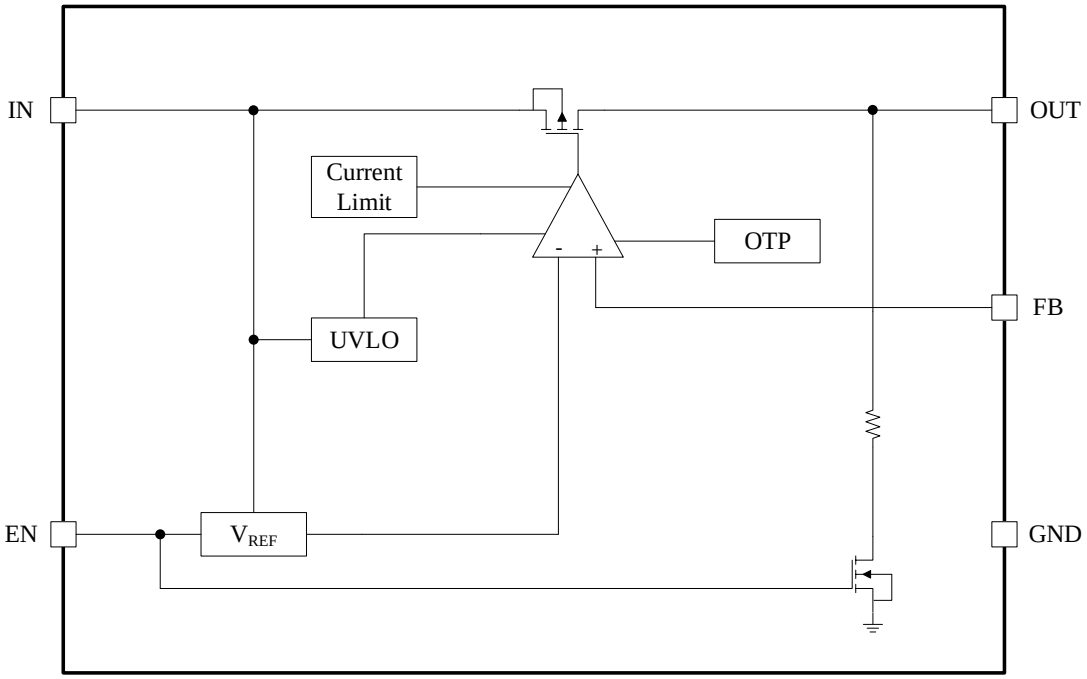
(V_{IN} = $V_{OUT(NOM)}$ +0.5V or 1.5 V(whichever is greater), V_{EN} = V_{IN}, I_{OUT}=1mA, C_{IN}=1μF, C_{OUT}=1μF, T_A=25°C, unless otherwise noted)

SYMBOL	PARAMETER	TEST CONDITIONS		MIN	TYP.	MAX	UNIT
V_{FB}	Feedback voltage				0.55		V
	Output accuracy			-0.7%		0.7%	
		-40°C≤T_J≤125°C[1]		-1.5%		1.5%	
LNR	Line Regulation	$V_{OUT(NOM)}$ +0.5V≤ V_{IN} ≤ 6.0V			5		mV
LDR	Load Regulation	0.1mA≤I_{OUT}≤1A, V_{IN} ≥ 2.0V			0.03		V/A
I_Q	Quiescent Current	I_{OUT}=0mA		10	25	31	μA
			-40°C≤T_J≤125°C[1]			35	
I_{SD}	Shutdown Current	V_{EN}≤0.3V, 1.5V ≤ V_{IN} ≤ 6.0V			0.1	1	μA
I_{FB}	FB Input Current				0.01	0.1	μA
I_{LIM}	Output Current Limit	V_{IN} =$V_{OUT(NOM)}$ +1.0V,I_{OUT}=1A			1.5		A
I_{SHORT}	Short-circuit Current Limit	V_{IN} =$V_{OUT(NOM)}$ +1.0V, V_{OUT}=0V			550		mA
V_{DROP}	Dropout Voltage	I_{OUT}=1A, V_{OUT}=0.95 $V_{OUT(NOM)}$	0.65V≤V_{OUT}<0.8V		950	1100	mV
			0.8V≤V_{OUT}<1.0V		750	970	
			1.0V≤V_{OUT}<1.2V		650	800	
			1.2V≤V_{OUT}<1.5V		515	635	
			1.5V≤V_{OUT}<1.8V		380	490	
			1.8V≤V_{OUT}<2.5V		315	410	
			2.5V≤V_{OUT}<3.3V		245	320	
			3.3V≤V_{OUT}≤5.5V		210	275	

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP.	MAX	UNIT
PSRR	Power-supply Rejection Ration	V_{IN} =$V_{OUT(NOM)}$ +1.0V, I_{OUT}=50mA, f=1kHz		40		dB
V_{UVLO}	Rising V_{IN} Threshold	V_{IN} Rising		1.20		V
$V_{UVLO,HYST}$	V_{IN} Hysteresis			40		mV
t_{STR}	Startup Time	From EN Low-to-high Transition to V_{OUT}=$V_{OUT(NOM)}$×95%		100		μs
$V_{EN(HI)}$	EN Pin High Voltage		1.0			V
$V_{EN(LO)}$	EN Pin Low Voltage				0.3	V
I_{EN}	Enable Pin Current			10		nA
R_{DIS}	Pulldown Resistance	V_{IN}=6.0V, V_{EN}=0V, V_{OUT}=1.0V		90		Ω
T_{SD}	Thermal shutdown temperature	Shutdown, temperature increasing		170		℃
		Reset, temperature decreasing		145		

NOTE1: Guaranteed by design, not tested in production.

10. Block Diagram



11. Power Supply Recommendations

The WR1010 has a V_{IN} range of between 1.5V and 6V and an input capacitance of 1μF. The input voltage should have some redundancy to ensure a stable output voltage when the load fluctuates. If the input supply is noisy, additional input capacitors can be used to improve the noise performance of the output.

12. Evaluation Modules

Evaluation Modules (EVMs) are available to help evaluate initial circuit performance. We have evaluation modules for different packages, you can contact us to get the evaluation module or schematic.

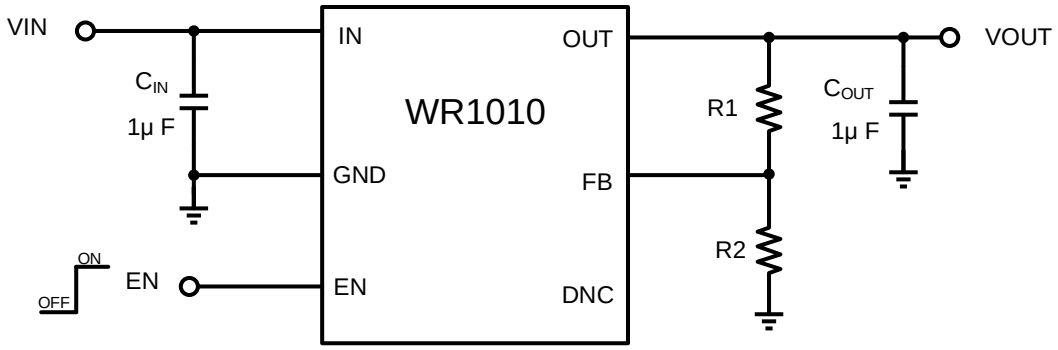
The module names are listed in the following table.

NAME	PACKAGE	EVALUATION MODULE
WR1010	DFN2×2-6	WAYON LDO_EVM_DFN2×2-6_V1.1

12.1 Typical Application Circuits

This section discusses the application of the WR1010 in the circuit. The following figure shows the schematic of the application circuit.

Circuit schematic:



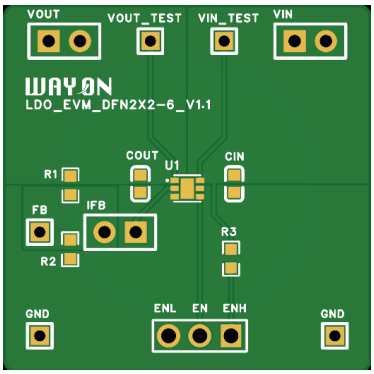
12.2 Layout of Typical Application Circuits

Layout Guidelines

The principle of LDO design is to place all components on the same side of the board and connect them as close as possible to their respective LDO pins. A minimum 1.0μF input capacitor (C_{IN}) is recommended to IN to minimize the effect of resistance and inductance between the source and the LDO input. A minimum 1.0μF output capacitor (C_{OUT}) is recommended to OUT. Connect the ground sides of C_{IN} and C_{OUT} with LDO ground pins as close as possible through a wide copper surface. Through-holes and long wires may seriously affect system performance and is not recommended.

To improve thermal performance, an array of thermal vias is used to connect the thermal pad to the ground plane. A larger ground plane improves the thermal performance of the device and reduces the operating temperature of the device.

Layout Example：



13. Naming Conventions

WR AA BB-CC DDD E

WR: WAYON Regulator;

AA: 10 – Output Current, 1A;

BB: Serial Number;

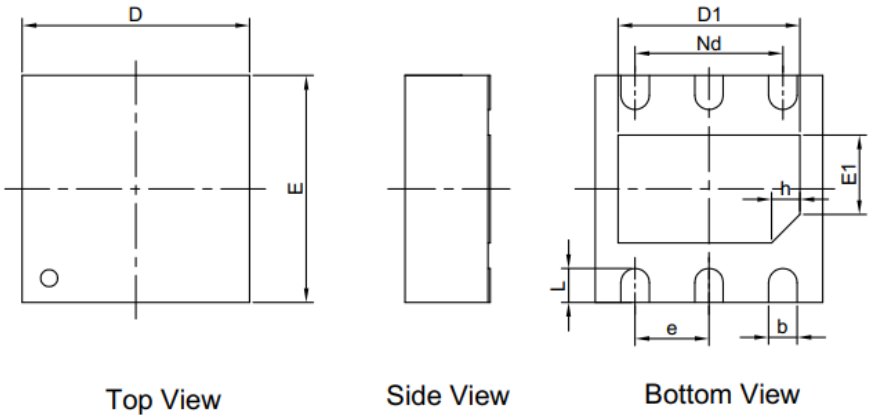
CC: Output Voltage – AD: Adjustable;

DDD: Package – FF6:DFN2×2-6;

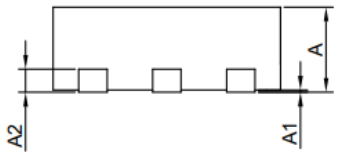
E: R-Reel & T-tube;

14. Package Information

DFN2×2-6



Top View　　Side View　　Bottom View



Side View

SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2		0.203REF	
b	0.18	0.25	0.35
D	1.90	2.00	2.10
D1	1.50	1.60	1.70
E	1.90	2.00	2.10
E1	0.85	0.95	1.10
e		0.65BSC	
Nd		1.30BSC	
L	0.18	0.25	0.35
h	0.15	0.25	0.30

15. Ordering Information

PART NUMBER	PACKAGE	PACKING QUANTITY	MARKING*
WR1010-ADFF6R	DFN2×2-6	3k/Reel	010 AD XXXX

* XXXX is variable.

Contact Information

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For additional information, please contact your local Sales Representative.

Product Specification Statement

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