STRUCTURE Silicon Monolithic Integrated Circuit

TYPE Voltage Tracker

PRODUCT SERIES ＢＤ３９２５ＨＦＰ－Ｃ

FEATURES 1.Low dropout voltage/ Low quiescent current
2.Built-in Overcurrent protection circuit/ Thermal shutdown circuit

○ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

Parameter	Symbol	Limit	Unit
Supply Voltage	Vcc	50 ※1	V
Switch Supply Voltage	VSW	50 ※1	V
ADJ Pin Voltage	VADJ	28	V
Vo Pin Voltage	Vo	28	V
Power Dissipation	Pd	1.6 ※2	W
Operating Temperature Range	Topr	-40～+125	℃
Storage Temperature Range	Tstg	-55～+150	℃
Maximum Junction Temperature	Tjmax	150	℃

※1 Not to exceed Pd and ASO.
※2 Reduced by 12.8mW/℃ over Ta=25℃ , when mount on a glass epoxy board:70mm×70mm×1.6mm.

○OPERATING CONDITIONS

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	4.5 ※3	36.0	V
Output Current	Io	－	500	mA
ADJ Pin Voltage ※4	VADJ	2.5	14	V

※3 Please consider that the Output voltage would be dropped (Dropout voltage) according to the Output current.
※4 Not to exceed Vcc-0.5V

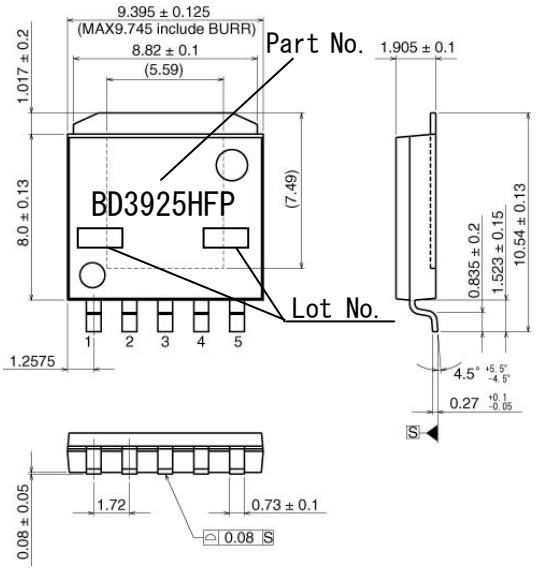
Status of this document
The Japanese version of this document is the formal specification.
A customer may use this translation version only for a reference to help reading the formal version.
If there are any differences in translation version of this document, formal version takes priority.

○ELECTRICAL CHARACTERISTICS(Unless otherwise specified, Ta=-40～125℃, Vcc=13.2V, SW=3V, ADJ=5V)

Parameter	Symbol	Limits			Unit	Conditions
		MIN	Typ	MAX		
Shut Down Current	Ishut	—	—	10	μA	SW=GND
Bias Current	Ib	—	45	90	μA	Io=0mA
Offset Voltage	⊿Vo	-15	—	15	mV	6V<Vcc<36V, 5mA<Io<200mA
Output Current	Io	0.5	—	—	A	
Dropout Voltage	⊿Vd	—	0.25	0.48	V	Vcc=5V, ADJ=5V, Io=200mA
Ripple Rejection	R.R.	45	55	—	dB	f=120Hz, ein=1Vrms, Io=100mA
Switch Threshold Voltage H	SWH	2.0	—	—	V	ACTIVE MODE
Switch Threshold Voltage L	SWL	—	—	0.5	V	OFF MODE
Switch Bias Current	SWI	—	22	60	μA	SW=5V
ADJ Bias Current	ADJI	—	5	12	μA	ADJ=5V

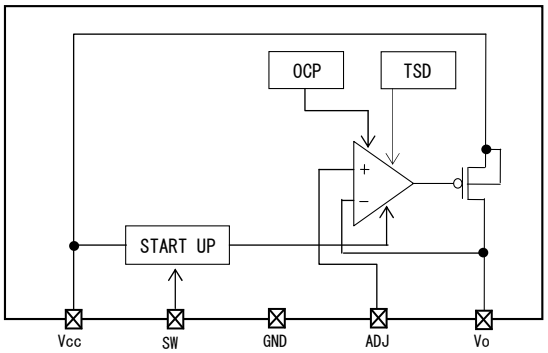
This product is not designed for protection against radio active rays.

○PHYSICAL DIMENSIONS・MARKING



HRP-5 (Unit : mm)

○BLOCK DIAGRAM



○PIN No.・PIN NAME・FUNCTION

Pin No.	Pin Name	Function
1	Vcc	Power Supply
2	SW	Output Voltage ON/OFF Control
3	N.C.	No Connection
4	ADJ	Output Voltage setting
5	Vo	Output Voltage
Fin	GND	Grand

○OPERATING NOTES

1) Absolute maximum ratings
Use of the IC in excess of absolute maximum ratings such as the applied voltage or operating temperature range may result in IC damage. Assumptions should not be made regarding the state of the IC (short mode or open mode) when such damage is suffered. A physical safety measure such as a fuse should be implemented when use of the IC in a special mode where the absolute maximum ratings may be exceeded is anticipated.

2) GND potential
Ensure a minimum GND pin potential in all operating conditions.

3) Thermal design
The Power dissipation indicated on this specification is the value without heat sink. Use a thermal design that allows for a sufficient margin by attaching with heat sink in light of the power dissipation (Pd) in actual operating conditions.

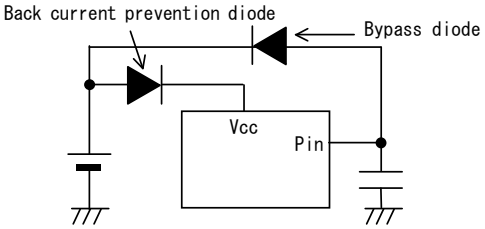
4) Pin short and mistake mounting
Use caution when orienting and positioning the IC for mounting on printed circuit boards. Improper mounting may result in damage to the IC. Shorts between output pins and the power supply and GND pins caused by the presence of a foreignobject may result in damage to the IC. Ensure a minimum GND pin potential in all operating conditions.

5) Actions in strong magnetic field
Keep in mind that the IC may malfunction in strong magnetic fields.

6) Testing on application boards
When testing the IC on an application board, connecting a capacitor to a pin with low impedance subjects the IC to stress. Always discharge capacitors after each process or step. Always turn the IC's power supply off before connecting it to or removing it from a jig or fixture during the inspection process. Ground the IC during assembly steps as an antistatic measure, and use similar caution when transporting or storing the IC.

7) Ground patterns
When using both small signal and large current GND patterns, it is recommended to isolate the two ground patterns, placing a single ground point at the application's reference point so that the pattern wiring resistance and voltage variations caused by large currents do not cause variations in the small signal ground voltage. Be careful not to change the GND wiring pattern of any external parts, either.

8) Applications or inspection processes where the potentials of the Vcc pin and other pins may be reversed from their normal states may cause damage to the IC's internal circuitry or elements. Use an output pin capacitance of 470μF or lower in case Vcc is shorted with the GND pin while the external capacitor is charged. It is recommended to insert a diode for preventing back current flow in series with Vcc or bypass diodes between Vcc and each pin.

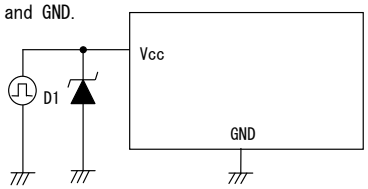


9) SW Pin, ADJ Pin
Do not apply the voltage to SW pin and ADJ pin when the Vcc is not applied.
And when the Vcc is applied, the voltage of SW pin and ADJ pin must not exceed Vcc.

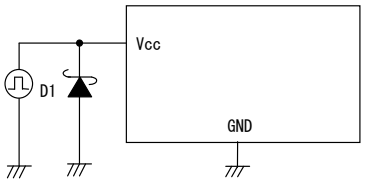
10) Thermal shutdown circuit (TSD)
This IC incorporates a built-in TSD circuit for the protection from thermal destruction. The IC should be used within the specified power dissipation range. However, in the event that the IC continues to be operated in excess of its power dissipation limits, the attendant rise in the junction temperature (Tj) will trigger the TSD circuit to turn off all output power elements(175℃:Typ). The circuit automatically resets once the junction temperature (Tj) drops (150℃:Typ). Operation of the TSD circuit presumes that the IC's absolute maximum ratings have been exceeded. Application designs should never make use of the TSD circuit.

11) Overcurrent protection circuit (OCP)
The IC incorporates a built-in overcurrent protection circuit that operates according to the output current capacity. This circuit serves to protect the IC from damage when the load is shorted. The protection circuit is designed to limit current flow by not latching in the event of a large and instantaneous current flow originating from a large capacitor or other component. This protection circuits is effective in preventing damage due to sudden and unexpected accidents. However, the IC should not be used in applications characterized by the continuous operation or transitioning of the protection circuits. At the time of thermal designing, keep in mind that the current capacity has negative characteristics to temperatures.

12) About positive surge voltage
To protect against a surge voltage that exceeds 50V between Vcc and GND please insert a power zenner diode between Vcc terminal and GND.

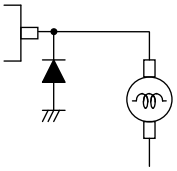


13) About negative surge voltage
To protect against a negative surge voltage, please insert a Schottky diode between the Vcc terminal and GND.



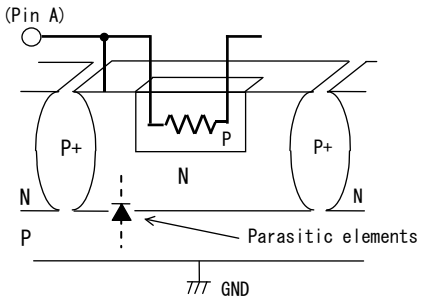
14) We recommend using Diode for protection purpose when the temperature so output voltage is off.
This is to prevent against large loads of impedance or reverse current during initial stages or output off stage.

(Example)

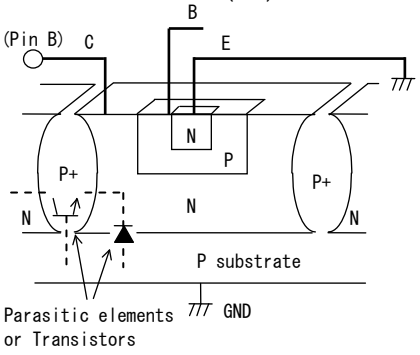


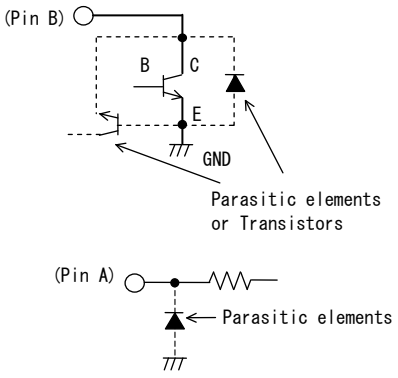
15) This monolithic IC contains P+ isolation and P substrate layers between adjacent elements in order to keep them isolated. P/N junctions are formed at the intersection of these P layers with the N layers of other elements to create a variety of parasitic elements. For example, when the resistors and transistors are connected to the pins as shown in the following figure,
○The P/N junction functions as a parasitic diode when GND > Pin A for the resistor or GND > Pin B for the transistor(NPN).
○Similarly, when GND > Pin B for the transistor (NPN), the parasitic diode described above combines with the N layer of other adjacent elements to operate as a parasitic NPN transistor.
The formation of parasitic elements as a result of the relationships of the potentials of different pins is an inevitable result of the IC's architecture. The operation of parasitic elements can cause interference with circuit operation as well as IC malfunction and damage. For these reasons, it is necessary to use caution so that the IC is not used in a way that will trigger the operation of parasitic elements, such as by the application of voltages lower than the GND (P substrate) voltage to input pins. Keep in mind that the IC may malfunction in strong magnetic fields.

Resistor



Transistor (NPN)





16)For a steep change of the Vcc voltage
Because MOS for output Transistor is used when an input voltage change is very steep, it may evoke large current. When selecting the value of external circuit constants, please make sure that the operation on the actual application takes these conditions into account.

17)For an infinitesimal fluctuations of output voltage.
At the use of the application that infinitesimal fluctuations of output voltage caused by some factors (e.g. disturbance noise, input voltage fluctuations, load fluctuations, etc.), please take enough measures to avoid some influence (e.g. insert the filter, etc.).

Notes

No copying or reproduction of this document, in part or in whole, is permitted without the consent of ROHM Co.,Ltd.

The content specified herein is subject to change for improvement without notice.

The content specified herein is for the purpose of introducing ROHM's products (hereinafter "Products"). If you wish to use any such Product, please be sure to refer to the specifications, which can be obtained from ROHM upon request.

Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

Great care was taken in ensuring the accuracy of the information specified in this document. However, should you incur any damage arising from any inaccuracy or misprint of such information, ROHM shall bear no responsibility for such damage.

The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM and other parties. ROHM shall bear no responsibility whatsoever for any dispute arising from the use of such technical information.

The Products specified in this document are intended to be used with general-use electronic equipment or devices (such as audio visual equipment, office-automation equipment, communication devices, electronic appliances and amusement devices).

The Products specified in this document are not designed to be radiation tolerant.

While ROHM always makes efforts to enhance the quality and reliability of its Products, a Product may fail or malfunction for a variety of reasons.

Please be sure to implement in your equipment using the Products safety measures to guard against the possibility of physical injury, fire or any other damage caused in the event of the failure of any Product, such as derating, redundancy, fire control and fail-safe designs. ROHM shall bear no responsibility whatsoever for your use of any Product outside of the prescribed scope or not in accordance with the instruction manual.

The Products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). ROHM shall bear no responsibility in any way for use of any of the Products for the above special purposes. If a Product is intended to be used for any such special purpose, please contact a ROHM sales representative before purchasing.

If you intend to export or ship overseas any Product or technology specified herein that may be controlled under the Foreign Exchange and the Foreign Trade Law, you will be required to obtain a license or permit under the Law.

ROHM SEMICONDUCTOR

Thank you for your accessing to ROHM product informations.
More detail product informations and catalogs are available, please contact us.

ROHM Customer Support System

http://www.rohm.com/contact/