

STRUCTURE Silicon Monolithic Integrated Circuit  
 PRODUCT SERIES 0.5ch Motor Driver for Mobile Phone

TYPE **BH6453GUL**

FEATURES

- Built in 1 Constant-Current Driver
- Built in resistor for output current detect

○Absolute maximum ratings (Ta=+25°C)

Parameter	Symbol	Limit	Unit
Power supply voltage	VCC	-0.5~+4.5	V
Control input voltage	VIN	-0.5~VCC+0.5	V
Input voltage for Constant-Current setting	CLIM	-0.5~VCC+0.5	V
Power dissipation	Pd	430* <sup>1</sup>	mW
Operating temperature range	Topr	-25~+85	°C
Junction temperature	Tjmax	+125	°C
Storage temperature range	Tstg	-55~+125	°C
Half-bridge output current	Iout	-300~+300* <sup>2</sup>	mA

\*<sup>1</sup> Reduce by 4.3mW/°C over 25°C, when mounted on a glass epoxy board (50mm×58mm×1.75mm ; 8layers)

\*<sup>2</sup> Must not exceed Pd, ASO, or Tjmax of 125°C.

○Operating Conditions(Ta=-25~+85°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	VCC	2.3	3.0	3.6	V
Control input voltage	VIN	0	-	VCC	V
Input voltage for Constant-Current setting	CLIM	0	-	VCC	V
Half-bridge output current	Iout	-	-	±200* <sup>3</sup>	mA

\*<sup>3</sup> Must not exceed Pd or ASO.

This product isn't designed for protection against radioactive rays.

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=25°C, VCC=3.0V)

Parameter	Symbol	Limit			Unit	Conditions
		Min.	Typ.	Max.		
Over all						
Circuit current during standby operation	ICCST	-	0	5.0	μA	PS=0V
Circuit current	ICC	-	0.9	1.3	mA	PS=3V, IN=3V, no load
Control input						
High level input voltage	VINH	1.5	-	VCC	V	1.8V can be put into each control input terminal
Low level input voltage	VINL	0	-	0.5	V	1.8V can be put into each control input terminal
High level input current	IINH	15	30	60	μA	VINH=3V, pull down resistance typ.100kΩ
Low level input current	IINL	-1	0	-	μA	VINL=0V
UVLO						
UVLO voltage	VUVLO	1.6	-	2.2	V	
Constant-Current Drive block						
PMOS output ON resistance	RONP	-	1.2	1.5	Ω	Io=-200mA
NMOS output ON resistance	RONN	-	0.4	0.5	Ω	Io=+200mA
Offset current	Iofs	0	1	5	mA	CLIM=0V
Output current	Iout	180	200	220	mA	CLIM=0.8V, RL=5Ω

○ Drive system of Constant-Current

$$I_{SINK}[A] = \frac{CLIM[V]}{2 \times 2.0(Typ.)[\Omega]}$$

- $\left\{ \begin{array}{l} I_{SINK}: \text{VCC-OUT current} \\ CLIM: \text{VCC-OUT current setting voltage} \\ R_{RNF}: \text{VCC-OUT current detection resistance} \end{array} \right.$

○Package Outline

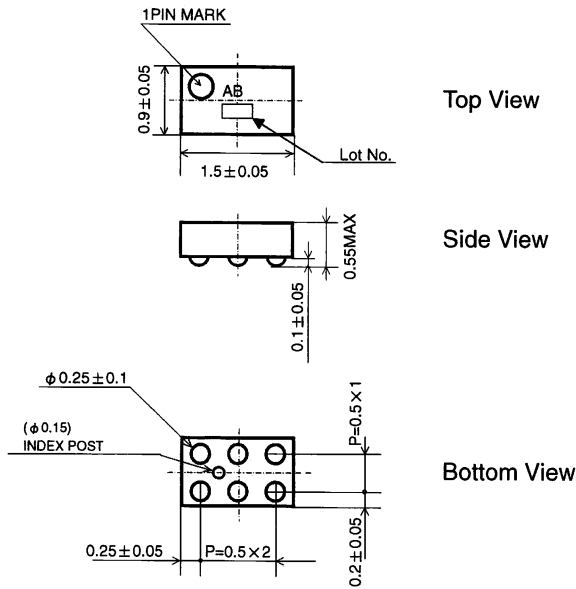


Fig.1 VCSP50L1 Package (Unit; mm)

○Pin Arrangement (Top View)

	1	2	3
A	IN	CLIM	GND
B	PS	VCC	OUT

Fig.2 BH6453GUL Pin Arrangement (Top View)

○Block Diagram

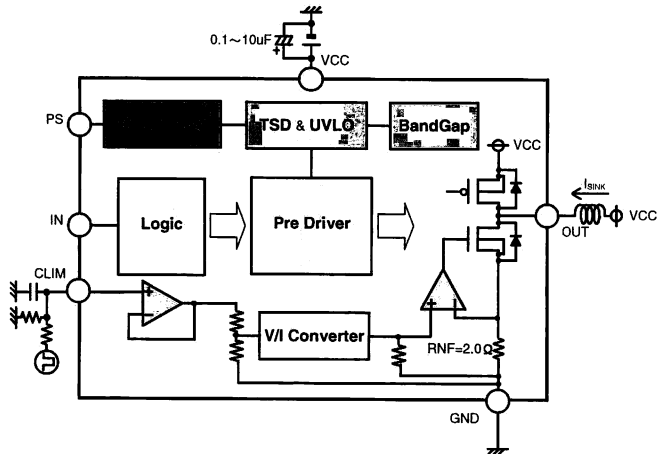


Fig.3 BH6453GUL Block Diagram

○I/O Truth Table

Tab.1 BH6453GUL I/O Truth Table

INPUT		OUTPUT
PS	IN	OUT
L	X	Z
H	L	H
	H	L

L: Low, H: High, X: Don't care, Z: High-impedance

## ○Operation Notes

### (1) Absolute maximum ratings

Use of the IC in excess of absolute maximum ratings such as the applied voltage or operating temperature range ( $T_{opr}$ ) 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. The implementation of a physical safety measure such as a fuse should be considered when use of the IC in a special mode where the absolute maximum ratings may be exceeded is anticipated.

### (2) Power supply lines

Regenerated current may flow as a result of the motor's back electromotive force. Insert capacitors between the power supply and ground pins to serve as a route for regenerated current. Determine the capacitance in full consideration of all the characteristics of the electrolytic capacitor, because the electrolytic capacitor may lose some capacitance at low temperatures. If the connected power supply does not have sufficient current absorption capacity, regenerative current will cause the voltage on the power supply line to rise, which combined with the product and its peripheral circuitry may exceed the absolute maximum ratings. It is recommended to implement a physical safety measure such as the insertion of a voltage clamp diode between the power supply and ground pins.

### (3) Ground potential

Ensure a minimum GND pin potential in all operating conditions.

### (4) Setting of heat

Use a thermal design that allows for a sufficient margin in light of the power dissipation ( $P_d$ ) in actual operating conditions.

### (5) Actions in strong magnetic field

Use caution when using the IC in the presence of a strong magnetic field as doing so may cause the IC to malfunction.

### (6) ASO

When using the IC, set the output transistor for the motor so that it does not exceed absolute maximum ratings or ASO.

### (7) Thermal shutdown circuit

This IC incorporates a TSD (thermal shutdown) circuit (TSD circuit). If the temperature of the chip reaches the following temperature, the motor coil output will be opened. The thermal shutdown circuit (TSD circuit) is designed only to shut the IC off to prevent runaway thermal operation. It is not designed to protect the IC or guarantee its operation. Do not continue to use the IC after operating this circuit or use the IC in an environment where the operation of this circuit is assumed.

TSD ON temperature [°C] (Typ.)	Hysteresis temperature [°C] (Typ.)
150	20

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