

Structure : Silicon Monolithic Integrated Circuit
 Product Name : Power Driver for car CDs, DVDs

Device Name : **BD7966EKV**

- Features :
- Single chip IC with drivers for Act (2 ch) / Loading (3 ch) / Sled (1 ch)
 - Providing with 2 ports of control terminals enables controlling ON/OFF of the drivers for Act/Sled
 - Built-in 3.3V regulator installed
 - Employing the package: HTQFP64V equipped with a radiating metal on the mount side
 - A built-in thermal shutdown circuit installed

<Loading Part>

- The LDCTL terminal is used to specify the output voltage.

<Sled Part>

- Supporting 2-phase stepping motors
- Supporting linear input
- PWM driving method achieves a high efficient drive.

<Actuator Part>

- Supporting 2-phase stepping motors
- Supporting linear input

○ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Limits	Unit
POWER MOS Power Supply Voltage	SLRNF	12	V
Pre-part and Pow-part Power Supply Voltage	VCC,AVM,LDVM	12	V
Power Dissipation	Pd	1.9*	W
Operating Temperature Range	Topr	-40 to 85	°C
Storage Temperature Range	Tstg	-55 to 150	°C

*ROHM standard board (size: 70×70 [mm], thickness: 1.6 [mm])

○ OPERATING CONDITIONS

(To determine a power supply voltage, the power dissipation must be taken into consideration.)

Parameter	Symbol	MIN	TYP	MAX	Unit
POWER MOS Power Supply Voltage	SLRNF	4.5	8	10	V
Pre-part and Pow-part Power Supply Voltage	VCC,AVM,LDVM	4.5	8	10	V

*VCC ≥ LDVM

This product has not been checked for the strategic materials (or service) defined in the Foreign Exchange and Foreign Trade Control Law of Japan so that a verification work is required before exporting it.

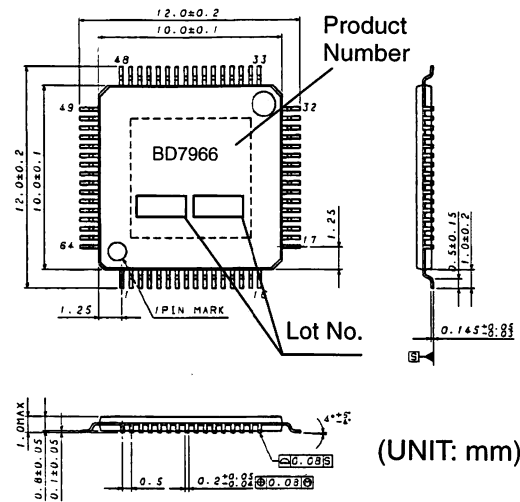
Not designed for radiation resistance.

○ ELECTRIC CHARACTERISTICS

(Ta=25°C, VCC=POWVCC(LD,SL)=8V, AVM=5V, VC=1.65V, SLRNF=0.5Ω, unless otherwise noted.)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Circuit Current						
Quiescent Circuit Current 1	IQ1	-	26.5	38.4	mA	When VCC=REGVOC=PowVCC=8[V]
MUTE Circuit Current 1	IST1	-	19.5	28.3	mA	When VCC=REGVOC=PowVCC=8[V]
Feed Motor Driver Part						
Input Dead Band Width (one side)	VDZSL	5	30	55	MV	
Input/Output Gain	gmSL	0.77	1.0 (0.5)	1.23	A/V (V/V)	SLRNF=0.5Ω
Output ON Resistance (top side)	RONUSL	-	2.4	3.6	Ω	IL=500mA
Output ON Resistance (bottom side)	RONLSL	-	0.7	1.1	Ω	IL=500mA
Output Limit Current	ILIMSL	0.76	0.9 (0.45)	1.04	A (V)	SLRNF=0.5Ω
PWM Frequency	fosc	-	100	-	kHz	
Actuator Driver Part						
Output Offset Voltage	VOFFT	-50	0	50	mV	
Output Saturation Voltage H	VOHFT	-	0.45	0.8	V	IL=500mV
Output Saturation Voltage L	VOLFT	-	0.45	0.8	V	IL=500mV
Voltage Gain	GVFT	10.0	11.5	13.0	dB	
Bias Terminal Inflow Current	IBIAS	-	75	120	μA	VBIAS=2.5V
Operational Amplifier Part						
Input Offset Voltage	VOPOF	-5	0	+5	mV	
Input Bias Current	IOPIB	-	-	300	nA	
Common Mode Input Voltage Range	VOPICM	0.3	-	VCC-1.2	V	
Maximum Output Source Current	ISOURCE	500	800	-	μA	
Maximum Output Sink Current	ISINK	2	-	-	mV	
Slew Rate	SR	-	0.8	-	V/μs	
Loading Driver Part						
Input Terminal Inflow Current	IINL	-	87	130	μA	LDIN=5V
LDCTL Terminal Outflow Current	ILDCL	-	-	0.5	mA	LDCTL=5V
Output Offset Voltage	VOFLD	-	0	-	mV	
Output Saturation Voltage H	VOHLD	-	1.1	1.4	V	IL=500mA
Output Saturation Voltage L	VOLL	-	0.45	0.8	V	IL=500mA
Voltage Gain	GVLD	7.5	9.0	10.5	dB	LDCTL=1V
Regulator						
REG Output Voltage	VPEG	3.13	3.3	3.47	V	IL=200mA
MUTE						
Input High-level Voltage	VIH	2.0	-	-	V	
Input Low-level Voltage	VIL	-	-	0.5	V	
Input High-level Current	IiH	-	180	270	uA	VIMUTE=5V
Input Low-level Current	IiL	-10	0	10	uA	VIMUTE=0V

○ OUTLINE DIMENSIONS, SYMBOLS



○ CAUTIONS ON USE

- (1) Bypass Capacitor
Between the power supplies, connect a bypass capacitor (0.1μF) closely to the IC pins. At the position close to the power part power supply terminal, the capacitor having a large capacitance and a small ESR (approx. 10μF) should be attached in order to reduce the impedance of the power supply.
- (2) Short-circuit between output-power supply, output-GND, or output terminals
Short-circuits between output pin-VCC, output pin-GND, or output terminals (load short) must be avoided. Make sure that the ICs are installed on the board in proper directions. Mounting the ICs in improper directions may damage them or produce smoke.
- (3) TEST terminal
The TEST terminal is pulled down inside the IC, so that it should be set open or shorted to GND for use.
- (4) About absolute maximum ratings
Exceeding the absolute maximum ratings, such as the applied voltage or the operating temperature range, may cause permanent device damage. As these cases cannot be limited to the broken short mode or the open mode, if a special mode where the absolute maximum ratings may be exceeded is assumed, it is recommended to take mechanical safety measures such as attaching fuses.
- (5) About power supply lines
As a measure against the back current regenerated by a counter electromotive force of the motor, a capacitor to be used as a regenerated-current path can be installed between the power supply and GND and its capacitance value should be determined after careful check that any problems, for example, a leak capacitance of the electrolytic capacitor at low temperature, are not found in various characteristics.
- (6) About GND potential
The electric potential of the GND terminal must be kept lowest in the circuitry at any operation states.
- (7) About thermal design
With consideration of the power dissipation (Pd) under conditions of actual use, a thermal design provided with an enough margin should be done.
- (8) About operations in a strong electric field
When used in a strong electric field, note that a malfunction may occur.
- (9) ASO
When using this IC, the output Tr must be set not to exceed the values specified in the absolute maximum ratings and ASO.
- (10) Thermal shutdown circuit (Thermal shutdown: TSD)
This IC incorporates a thermal shutdown circuit (TSD circuit). When the chip temperature reaches the value shown below, the coil output to the motor will be set to open.
The thermal shutdown circuit is designed only to shut off the IC from a thermal runaway and not intended to protect or guarantee the entire IC functions.
Therefore, users cannot assume that the TSD circuit once activated can be used continuously in the subsequent operations.

TSD ON Temperature [°C] (typ.)	Hysteresis Temperature [°C] (typ.)
175	25

- (11) About earth wiring patterns
When a small signal GND and a large current GND are provided, it is recommended that the large current GND pattern and the small signal GND pattern should be separated and grounded at a single point of the reference point of the set in order to prevent the voltage of the small signal GND from being affected by a voltage change caused by the resistance of the pattern wiring and the large current. Make sure that the GND wiring patterns of the external components will not change, too.
- (12) This IC is a monolithic IC which has a P⁺ isolations and P substrate to isolate elements each other. This P layer and an N layer in each element form a PN junction to construct various parasitic elements. Due to the IC structure, the parasitic elements are inevitably created by the potential relationship. Activation of the parasitic elements can cause interference between circuits and may result in a malfunction or, consequently, a fatal damage. Therefore, make sure that the IC must not be used under conditions that may activate the parasitic elements, for example, applying the lower voltage than

the ground level (GND, P substrate) to the input terminals.

In addition, do not apply the voltage to input terminals without applying the power supply voltage to the IC. Also while applying the power supply voltage, the voltage of each input terminal must not be over the power supply voltage, or within the guaranteed values in the electric characteristics.

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