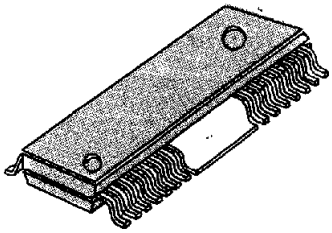
4-CH MOTOR DRIVER

The KA9258BD is a monolithic integrated circuit, and suitable for 4-CH motor driver which drives tracking actuator,focus actuator, sled motor and loading motor of CD/CD-ROM/DVD system, and can also drive spindle motor of CD system.

28-SSOPH-375



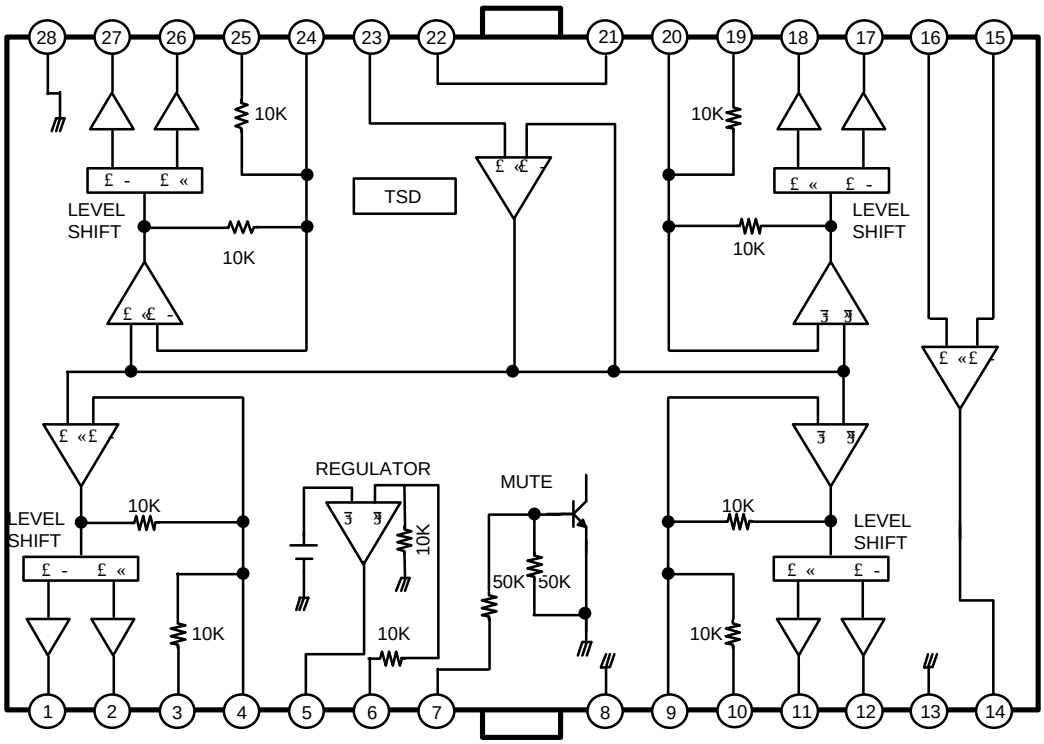
FEATURES

- 1-phase, full-wave, linear DC motor driver
- Output gain adjustable
- Built in OP-Amp
- Built in Mute function
- Built in Level shift circuit
- Built in Thermal shutdown function
- Operating Range 6~13.2V

ORDERING INFORMATION

Device	Package	Operating Temperature
KA9258BD	28-SSOPH-375	£ -25¡ É~ + 75¡ É

BLOCK DIAGRAM



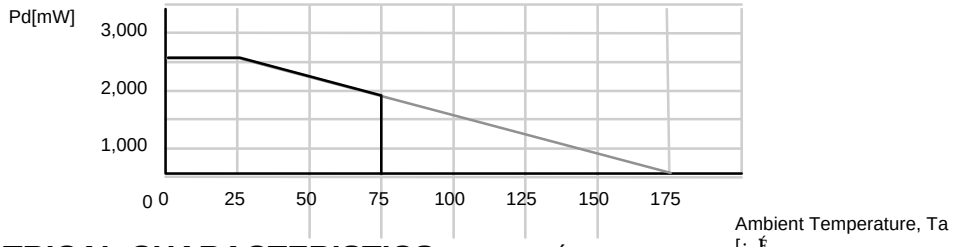
PIN DESCRIPTION

Pin No.	Symbol	I/O	Description
1	DO1.1	O	Drive Output
2	DO1.2	O	Dirve Output
3	DI1.1	I	Drive Input
4	DI1.2	I	Drive Input
5	REG		Regulator
6	REO	O	Regulator Output
7	MUTE	I	Mute
8	GND1	-	Ground
9	DI2.1	I	Drive Input
10	DI2.2	I	Drive Input
11	DO2.1	O	Drive Output
12	DO2.2	O	Dirve Output
13	GND2	-	Ground
14	OPOUT	O	Opamp Output
15	OPIN (-)	I	Opamp Input (-)
16	OPIN (+)	I	Opamp Input (+)
17	DO3.1	O	Drive Output
18	DO3.2	O	Drive Output
19	DI3.1	I	Drive Input
20	DI3.2	I	Drive Input
21	VCC1	-	Supply Voltage
22	VCC2	-	Supply Voltage
23	VREF	I	2.5V Bias Voltage
24	DI4.1	I	Drive Input
25	DI4.2	I	Drive Input
26	DO4.1	O	Drive Output
27	DO4.2	O	Drive Output
28	GND3	-	Ground

ABSOLUTE MAXIMUM RATING (Ta=25¡ É

Characteristics	Symbol	Value	Unit
Supply Voltage	V_{CC}	18	V
Power Dissipation	P_D	@1.7	W
Operating Temperature	T_{OPR}	-25~+75	¡ É
Storage Temperature	T_{STG}	-55~+150	¡ É
Maximum output current	I_{max}	1	A

@ 1. When mounted on 50mmx50mmx1mm PCB (Phenolic resin material).
2. Power dissipation reduces 13.6mW/¡ Éfor using above Ta=25¡ É
3. Do not exceed Pd and SOA.



ELECTRICAL CHARACTERISTICS (Ta=25¡ ÉV_{CC}=8V, Unless Otherwise Specified)

A. REGULATOR PART

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Regulator Output Voltage	V_{REG}	I_L=100mA	4.75	5	5.25	V
Load Regulation	¡ ¥V_{RL}	I_L=0mA to 200mA	-40.0	0	10.0	mV
Line Regulation	¡ ¥V_{CC}	I_L=200mA, V_{CC}=6 to 9V	-10.0	0	20.0	mV

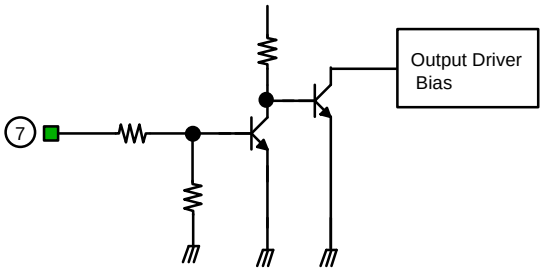
B. DRIVE PART

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Quiescent Circuit Current	I_{CC}	V_I=0	5.5	9.5	13.5	mA
Input Bias Current	I_{BOP}	V_I=0	-	-	300	nA
Input Offset Voltage	V_{OFOP}		-5.0	0	5.0	mV
Output Offset Voltage	V_{OO}		-30	0	30	
Maximum Sink Current	I_{SNK}	R_L=4§ ÙV_{CC}	0.5	0.8	-	A
Maximum Source Current	I_{SOU}	R_L=4§ ÙGND	0.5	0.8	-	
Maximum Output Voltage	V_{OM}	V_I=2V_{RMS}, 1KHz	2.5	3.0	-	V
Closed Loop Voltage Gain	A_{VF}	V_I=0.1V_{RMS}, 1KHz	4.5	6.5	7.5	dB
Ripple Rejection Ratio	RR	V_I= -20dB, 120Hz	60.0	80.0	-	
Slew Rate	SR	100Hz, Squarewave	1.0	2.0	-	V/us

APPLICATION INFORMATION

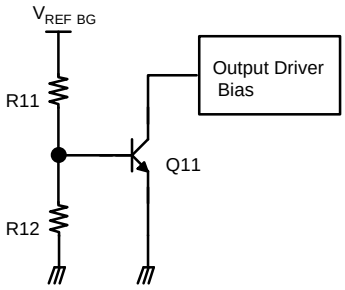
1. MUTE

PIN# 7	Mute Circuit
HIGH	Turn-off
LOW	Turn-on
OPEN	Turn-on



1) When the mute pin #7 is open or the voltage of the mute pin #7 is below 0.5V, the mute circuit is activated so that the output circuit will be muted.
2) When the voltage of the mute pin is above 2V, the mute circuit is stopped and the output circuit is operated normally.
3) If the chip temperature rises above 175¡ Éthen the TSD(Thermal Shutdown) circuit is activated and the output circuit is muted.

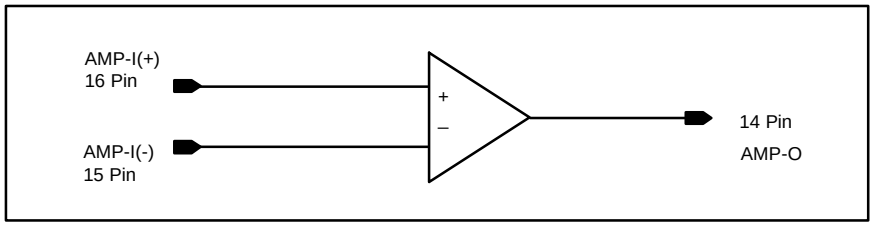
2. TSD(THERMAL SHUTDOWN)



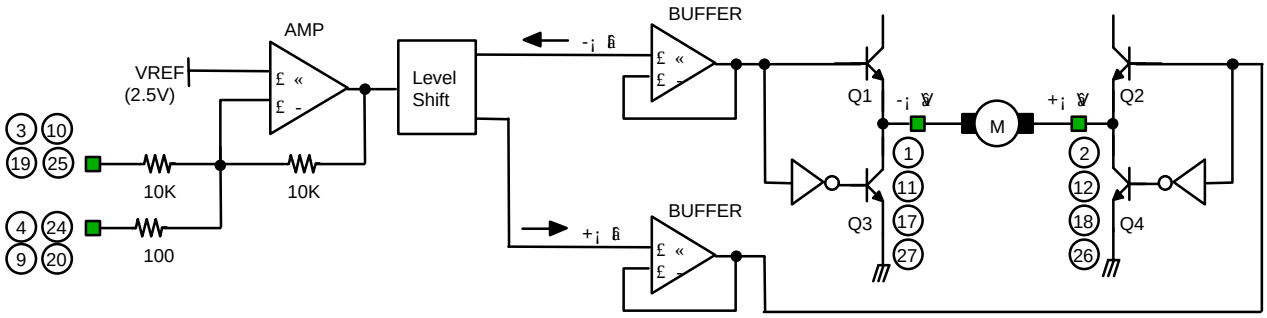
1) The $V_{REF\ BG}$ is the output voltage of the Band-Gap-Referenced Biasing Circuit and acts as the input voltage of the TSD circuit.
2) The base-emitter voltage of the TR,Q11 is designed to turn-on at below voltage.
   $V_{BE} = V_{REF\ BG}$*R12/(R11+R12)=460mV
3) When the chip temperature rises up to 175¡ Éthen the turn-on voltage of the Q11 would drop down to 460mV. (Hysteresis : 25¡ É
   Hence, the Q11 would turn on so the output circuit will be muted.

3. OP-AMP

OP-Amp is integrated in the IC for user¢ ¥ convenience.

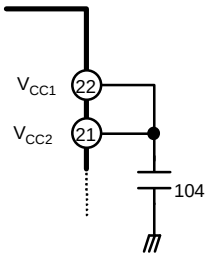


4. DRIVER



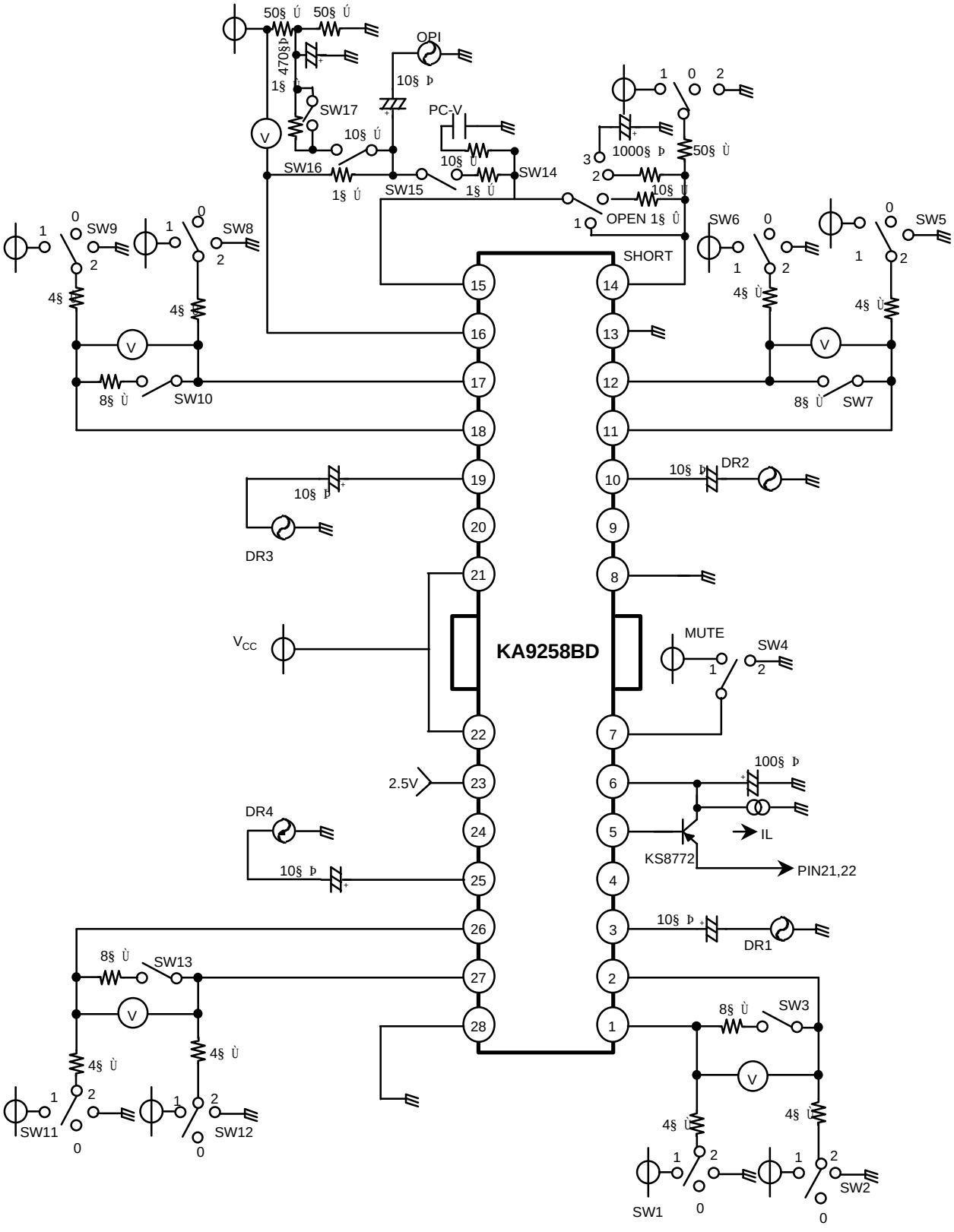
1) The voltage, $V_{REF,}$ is the reference voltage given by the BIAS voltage of the pin #23.
2) The input signal through the pin #3 is amplified by 10K/10K times and then fed to the level shift.
3) The level shift produces the current due to the difference between the input signal and the arbitrary reference signal. The current produced as +¡ ßand -¡ ßis fed into the driver buffer.
4) Driver Buffer operates the power TR of the output stage according to the state of the input signal.
5) The output stage is the BTL Driver and the motor is rotating in forward direction by operating TR Q1 and TR Q4. On the other hand, if TR Q2 and TR Q3 is operating, the motor is rotating in reverse direction
6) When the input voltage through the pin #3 is below the V_{REF}, then the direction of the motor in forward direction.
7) When the input voltage through the pin #3 is above the V_{REF}, then the direction of the motor in reverse direction.
8) If it is desired to change the gain, then the pin #4 or #24 can be used.

5. Connect a by-pass capacitor, 0.1§ Ibetween the supply voltage source.

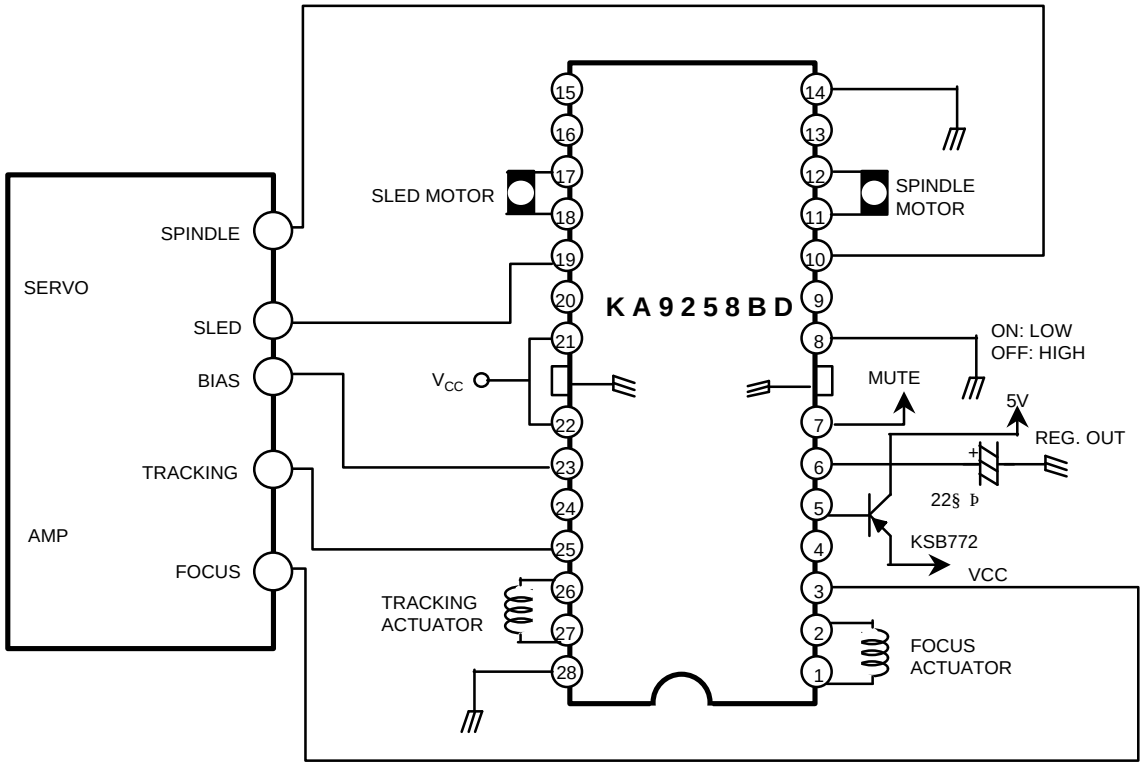


6. Radiation fin is connecting to the internal GND of the package.
Connect the fin to the external GND.

TEST CIRCUIT



APPLICATION CIRCUIT



¡ ÚTHERMAL SHUT DOWN CIRCUIT

The IC is breaked down by the heat when overload condition continue for a long time. So KA9258D have thermal shut down circuit to prevent this case. At that time the temperature of IC rise over 175¡ Éthe circuit is operating and protect the IC against breakdown.