System Motor Driver for CD/DVD Player

4.5ch System Motor Driver for Car AV

BD8263EFV-M

General Description

BD8263EFV-M is a 4.5-Channel system motor driver developed for DC motors (Spindle motor, Sled motor, Loading motor) and coils (Tracking, Focus) drive for actuator. This IC can drive the motor and the coil of a CD/DVD drive.

Features

- AEC-Q100 Qualified (Note 1)
- 4.5ch BTL Driver
- POWVCC for CHs 1 and 2 (DC motors) and VFCRNF, VMTKRNF for CHs 3 and 4 (actuator) are independent for efficient drive configuration.
- Built-in protection functions (TSD, UVLO, BIAS Drop Mute)
- Built-in VCC Short And GND Short Circuit Protection For Sled/Loading Driver Output

(Note 1) Grade3

Application

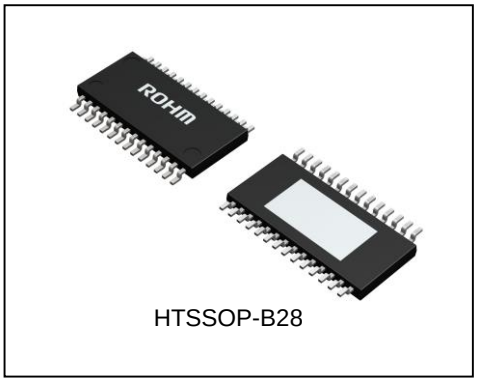
- Car Audio

Key Specifications

- Output Offset Voltage : ±50mV(Max)
- Maximum Output Range : 6.0V(Typ)
- Closed Circuit Loop Gain : 17.5dB(Typ)
- Operating Temperature Range : -40°C to +85°C

Package

	W(Typ) x D(Typ) x H(Max)
HTSSOP-B28	9.70mm x 6.40mm x 1.00mm



Typical Application Circuit

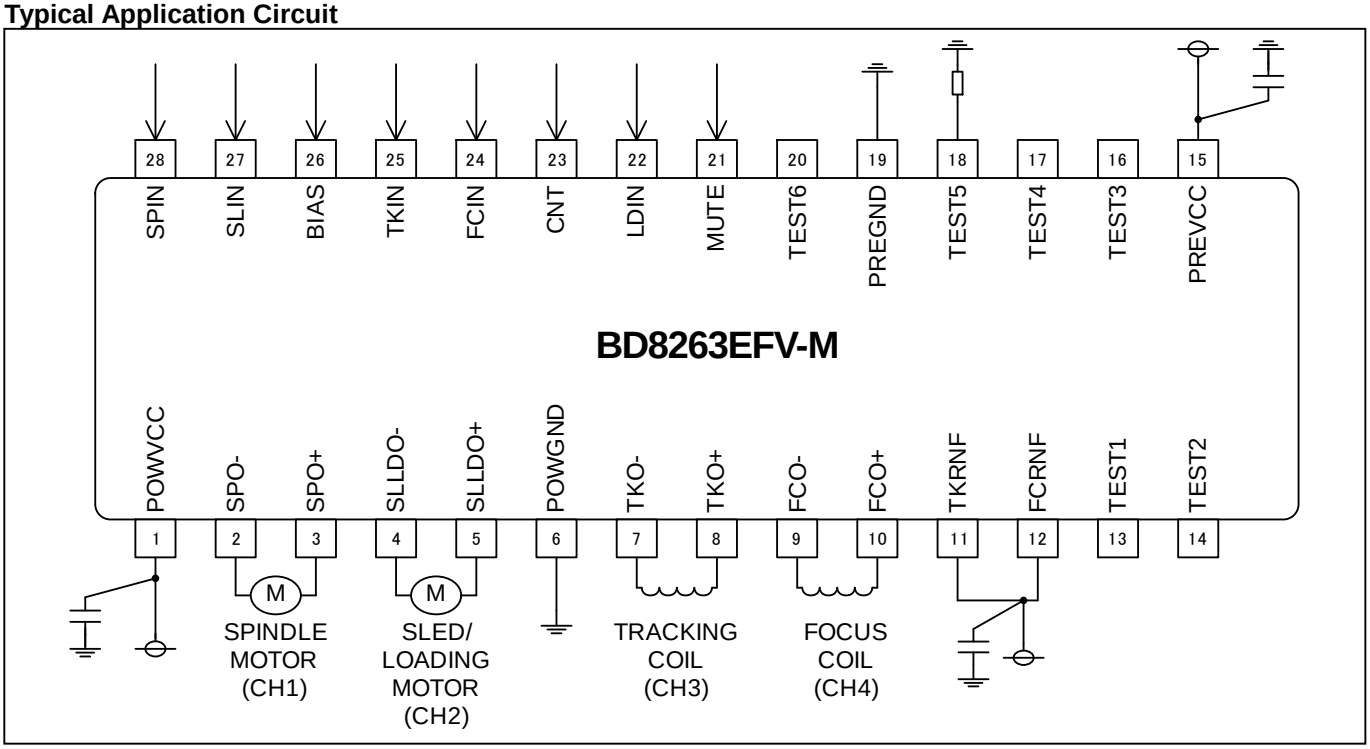


Figure 1. Typical Application Circuit

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Pin Configuration

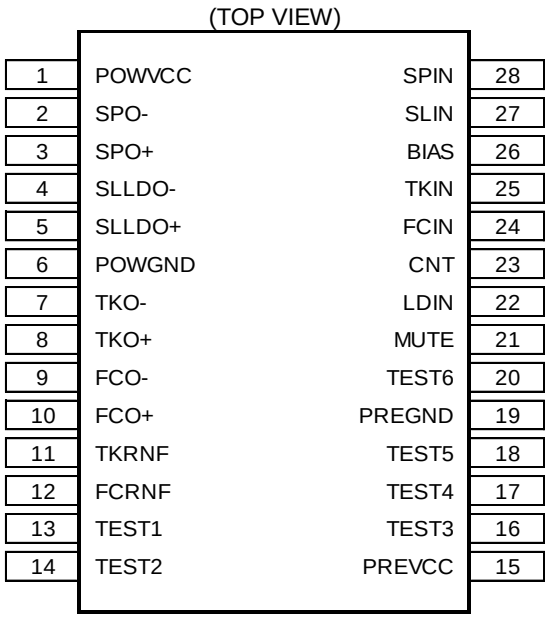


Figure 2. Pin Configuration

Pin Descriptions

No.	Pin Name	Function
1	POWVCC	Power supply for CH1,2
2	SPO-	Spindle driver negative output
3	SPO+	Spindle driver positive output
4	SLLDO-	Sled/Loading driver negative input
5	SLLDO+	Sled/Loading driver positive output
6	POWGND	Power ground
7	TKO-	Tracking driver negative input
8	TKO+	Tracking driver positive output
9	FCO-	Focus driver negative input
10	FCO+	Focus driver positive output
11	TKRNF	Power supply for tracking driver
12	FCRNF	Power supply for focus driver
13	TEST1	Test terminal (Leave open)
14	TEST2	Test terminal (Leave open)
15	PREVCC	Power supply for pre driver
16	TEST3	Test terminal (Leave open)
17	TEST4	Test terminal (Leave open)
18	TEST5	Test terminal (Leave ground short)
19	PREGND	Ground for pre driver
20	TEST6	Test terminal (Leave open)
21	MUTE	Mute input
22	LDIN	Loading driver input
23	CNT	Control input
24	FCIN	Focus driver input
25	TKIN	Tracking driver input
26	BIAS	Reference voltage input
27	SLIN	Sled driver input
28	SPIN	Spindle driver input

Block Diagram

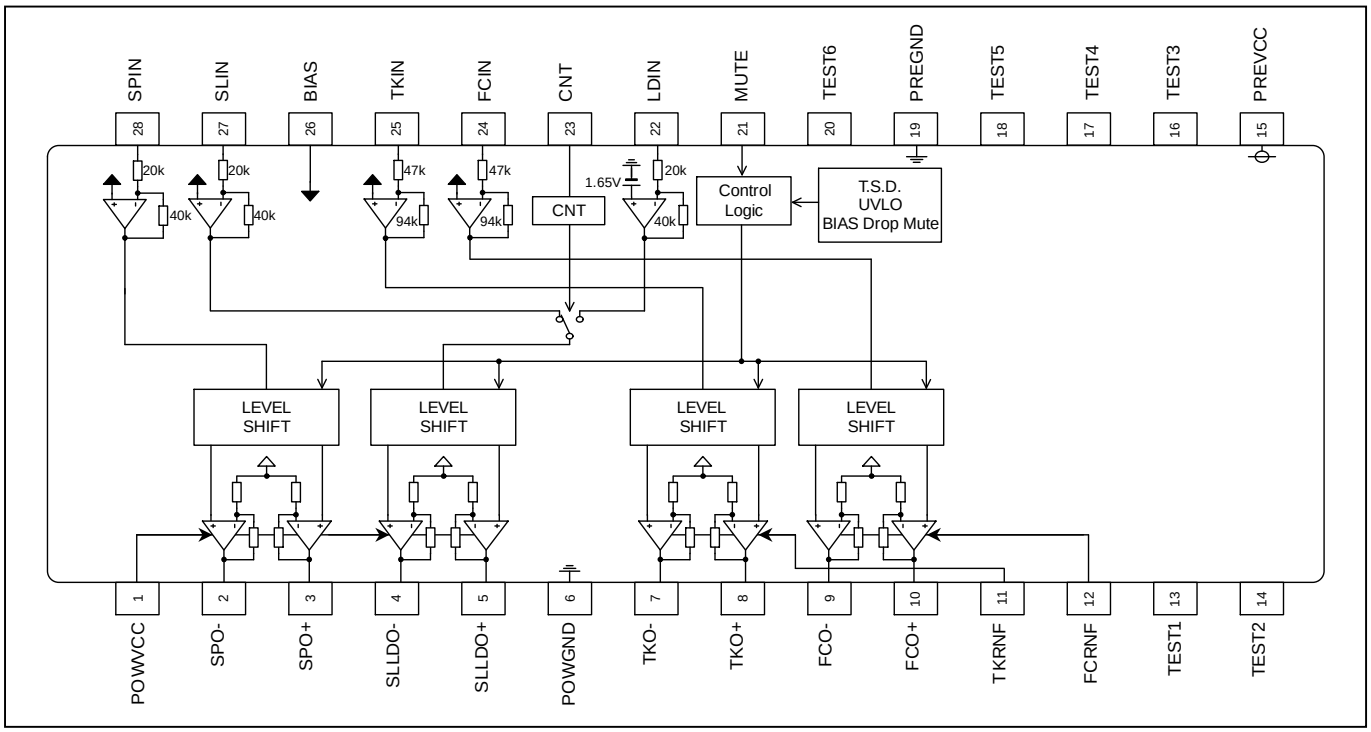


Figure 3. Block Diagram

Absolute Maximum Ratings (Ta = 25°C)

Parameter	Symbol	Rating	Unit
Power Supply Voltage 1	V_{PREVCC}	12	V
Power Supply Voltage 2	V_{POWVCC}, V_{FCRNF}, V_{TKRNF}	V_{PREVCC}	V
Input Pin Voltage 1	V_{IN1} (Note 1)	12	V
Input Pin Voltage 2	V_{IN2} (Note 2)	7	V
Input Pin Voltage 3	V_{IN3} (Note 3)	V_{PREVCC}	V
Operating Temperature Range	Topr	-40 to +85	°C
Maximum Junction Temperature	Tj	-40 to +150	°C
Storage Temperature Range	Tstg	-55 to +150	°C

(Note 1) This is applicable to pins MUTE,CNT,TEST4,TEST5.
(Note 2) This is applicable to pins SPIN,SLIN,TKIN,FCIN,LDIN, BIAS.
(Note 3) This is applicable to pins TEST1,TEST2.
Caution: Operating the IC over the absolute maximum ratings may damage the IC. The damage can either be a short circuit between pins or an open circuit between pins and the internal circuitry. Therefore, it is important to consider circuit protection measures, such as adding a fuse, in case the IC is operated over the absolute maximum ratings.

Recommended Operating Conditions (Ta= -40°C to +85°C)

Parameter	Symbol	Min	Typ	Max	Unit
Pre Driver Power Supply (Note 1)	V_{PREVCC}	4.5	8	10	V
Driver Power Supply (Note 1)	V_{POWVCC}, V_{FCRNF}, V_{TKRNF}	4.5	8	V_{PREVCC}	V

(Note 1) Please decide the power supply voltage after considering power dissipation.

Thermal Resistance (Note 1)

Parameter	Symbol	Thermal Resistance (Typ)		Unit
		1s (Note 2)	2s2p (Note 3)	
HTSSOP-B28				
Junction to Ambient	θ_{JA}	107.0	25.1	°C/W
Junction to Top Characterization Parameter	ψ_{JT}	6	3	°C/W

(Note 1) Based on JESD51-2A (Still-Air).

(Note 2) Using a PCB board based on JESD51-3.

Layer Number of Measurement Board	Material	Board Size
Single	FR-4	114.3mm x 76.2mm x 1.57mmt

Top	
Copper Pattern	Thickness
Footprints and Traces	70µm

(Note 3) Using a PCB board based on JESD51-5, 7.

Layer Number of Measurement Board	Material	Board Size	Thermal Via (Note 4)	
			Pitch	Diameter
4 Layers	FR-4	114.3mm x 76.2mm x 1.6mmt	1.20mm	Φ0.30mm

Top		2 Internal Layers		Bottom	
Copper Pattern	Thickness	Copper Pattern	Thickness	Copper Pattern	Thickness
Footprints and Traces	70µm	74.2mm x 74.2mm	35µm	74.2mm x 74.2mm	70µm

(Note 4) This thermal via connects with the copper pattern of all layers.

Electrical Characteristics

(Unless otherwise specified Ta=25°C, V_{PREVCC}=V_{POWVCC}= V_{TKRNF}=V_{FCRNF} =8V, V_{BIAS}=1.65V, R_L=8Ω)

Parameter	Symbol	Limit			Unit	Condition
		Min	Typ	Max		
< Circuit Current >						
Quiescent Current	I_Q	–	10	30	mA	At no-load, V_{MUTE}=H
< Driver >						
Output Offset Voltage	V_{OOF}	-50	0	50	mV	
Maximum Output Range	V_{OM}	5.4	6.0	–	V	Total RON=2.5Ω(Typ) Equivalent
Closed Circuit Loop Gain	G_V	15.5	17.5	19.5	dB	
Input Impedance (CH1,2)	R_{IN12}	13	20	27	kΩ	
Input Impedance (CH3,4)	R_{IN34}	30	47	64	kΩ	
LDIN Pin Voltage (At Sled Input)	V_{LDIN}	-	0.1	0.3	V	V_{CNT}=L
Internal Bias Voltage	V_{BIN}	1.53	1.65	1.77	V	V_{CNT}=H
< Others >						
MUTE Low Level Voltage	V_{ML}	–	–	0.5	V	
MUTE High Level Voltage	V_{MH}	2.0	–	–	V	
MUTE Input Current	I_{MUTE}	15	26	40	μA	V_{MUTE}=3.3V
CNT Low Level Voltage	V_{CL}	–	–	0.5	V	
CNT High Level Voltage	V_{CH}	2.0	–	–	V	
CNT Input Current	I_{CNT}	32	52	74	μA	V_{CNT}=3.3V
BIAS Drop Mute	V_{BIAS}	0.5	0.7	0.9	V	
BIAS Input Current	I_{BIAS}	32	52	74	μA	V_{BIAS}=1.65V
PREVCC UVLO Detection Voltage	V_{UVLOD}	3.4	3.8	4.2	V	
PREVCC UVLO Release Voltage	V_{UVLOR}	3.6	4.0	4.4	V	

Typical Performance Curves

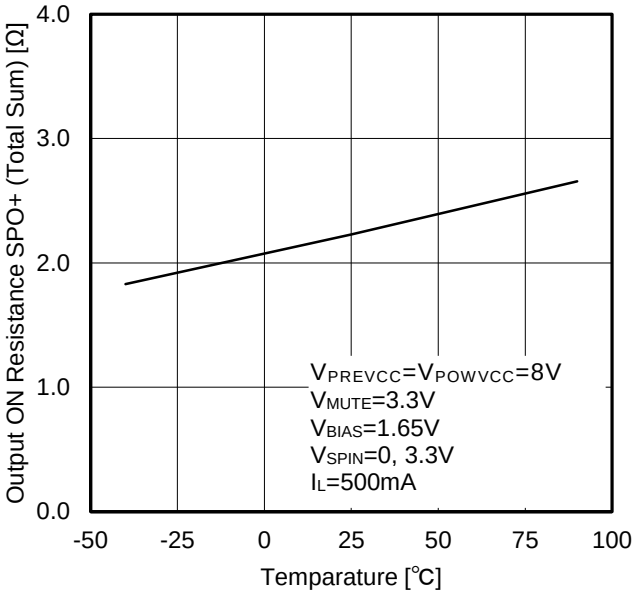


Figure 4. Output ON Resistance SPO+ (Total Sum)

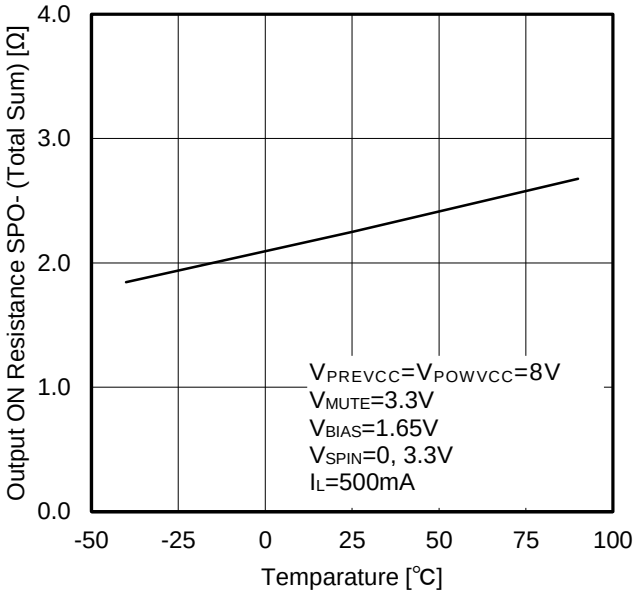


Figure 5. Output ON Resistance SPO- (Total Sum)

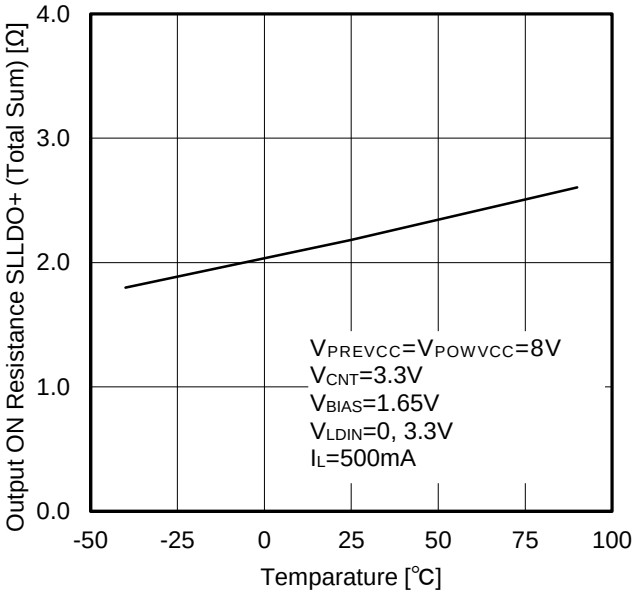


Figure 6. Output ON Resistance SLLDO+ (Total Sum)

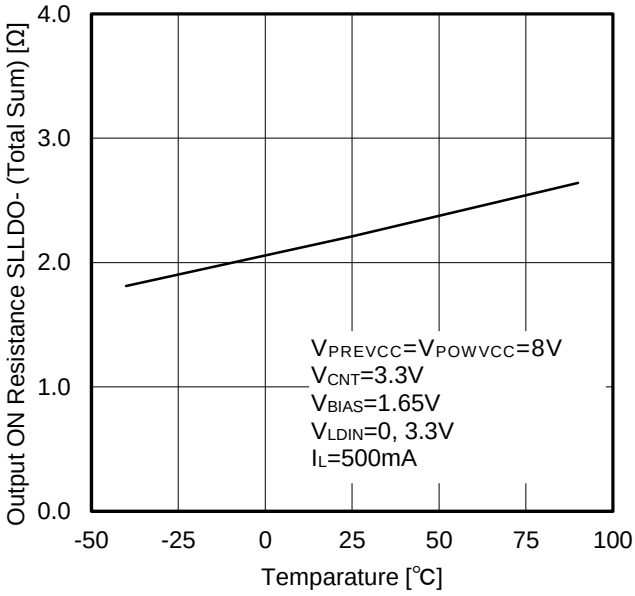


Figure 7. Output ON Resistance SLLDO- (Total Sum)

Typical Performance Curves - continued

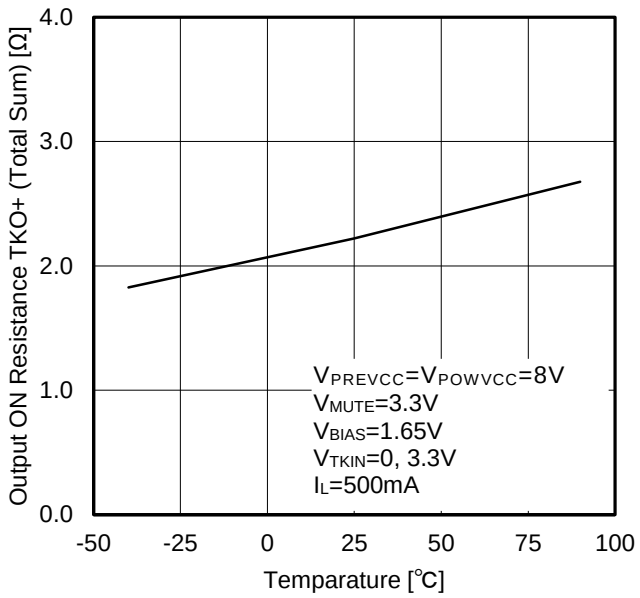


Figure 8. Output ON Resistance TKO+ (Total Sum)

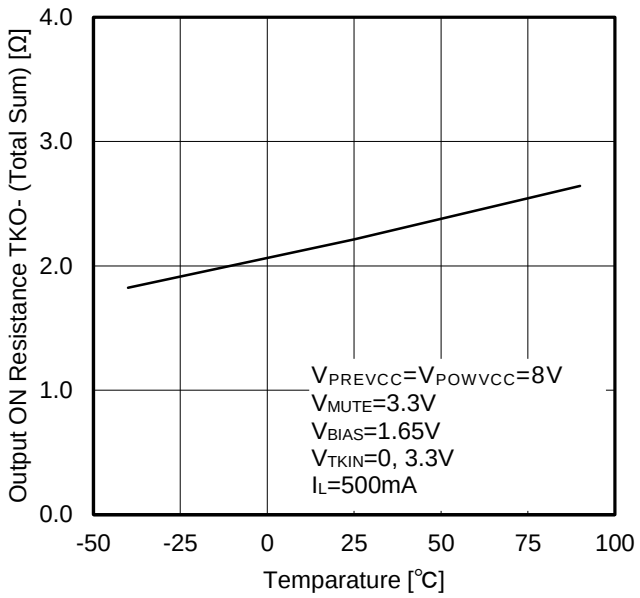


Figure 9. Output ON Resistance TKO- (Total Sum)

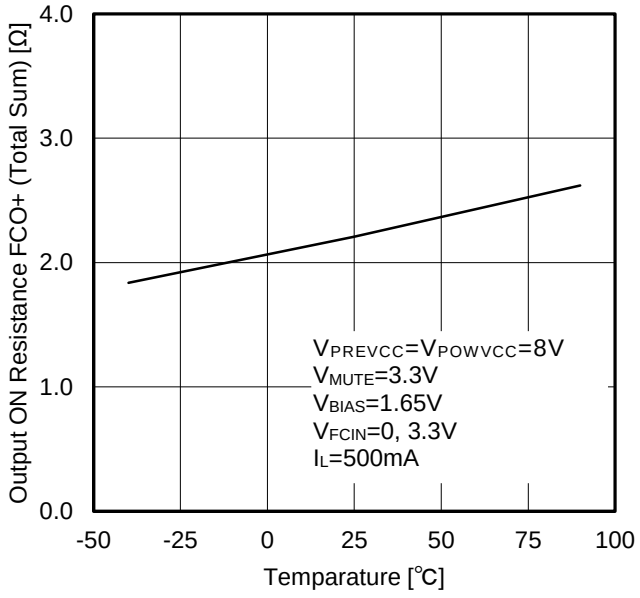


Figure 10. Output ON Resistance FCO+ (Total Sum)

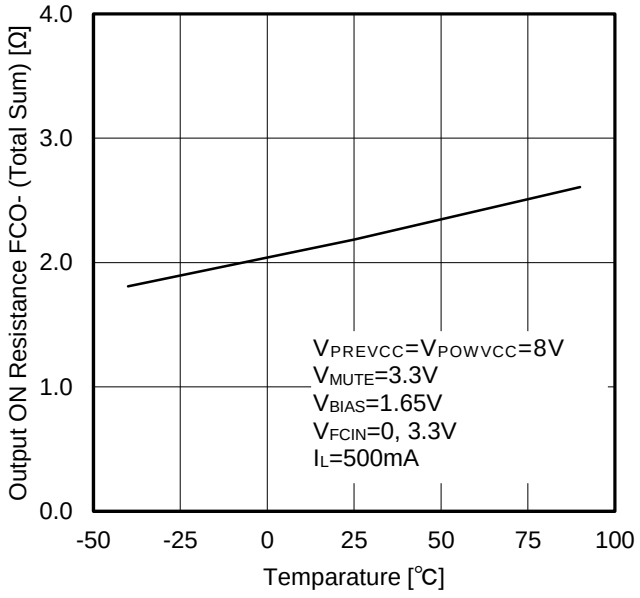


Figure 11. Output ON Resistance FCO- (Total Sum)

Description of Block

1. Driver Control Pin MUTE (Pin21), CNT (Pin23), BIAS (Pin26)

All driver output conditions are controlled by switching the MUTE and CNT to High and Low levels. Shown below is the input-output logic table including BIAS drop Mute.

▼Driver Logic (Normal Operation)

State No.	Input			Output (Note 1)(Note 2)				
	MUTE	CNT	BIAS	CH1(SP)	CH2-1(SL)	CH2-2(LD)	CH3(TK)	CH4(FC)
1	H	H	H	Active	Mute	Active	Active	Active
2	H	L	H	Active	Active	Mute	Active	Active
3	L	H	H	Mute	Mute	Active	Mute	Mute
4	L	L	H	Mute	Mute	Mute	Mute	Mute
5	H	H	L	Mute	Mute	Mute	Mute	Mute
6	H	L	L	Mute	Mute	Mute	Mute	Mute
7	L	H	L	Mute	Mute	Active	Mute	Mute
8	L	L	L	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z

▼Driver Logic (UVLO, TSD Protected Operation)

State No.	Input			Output (Note 1)(Note 2)				
	Mute	CNT	BIAS	CH1(SP)	CH2-1(SL)	CH2-2(LD)	CH3(TK)	CH4(FC)
9	L	L	L	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z
10	Others			Mute	Mute	Mute	Mute	Mute

(Note 1) MUTE : Both positive and negative output voltages are power supply voltage for each output/2≒VREF voltage (POWVCC/2, TKRNF/2, FCRNF/2 ≒ VREF voltage)
(Note 2) Hi-Z : Both positive and negative outputs become Hi-Z.

2. BIAS Drop Mute

If BIAS pin voltage becomes 0.7V (Typ) or less, output of all channels turns OFF.
Please set this value to a minimum of 1.3V for normal use.
Please refer to the above table for the details of output status

3. PREVCC Drop Mute (UVLO)

If PREVCC pin voltage becomes 3.8V (typ) or less, output of all channels turns OFF.
If PREVCC pin voltage becomes 4.0V (typ) or high, output of all channels turns ON again.
Please refer to the above table for the details of output status.

4. Thermal Shutdown Circuit (TSD)

In order to prevent the IC from thermal destruction, IC has built in thermal shutdown circuit.
Thermal shutdown circuit is designed to turn OFF all output channels when the junction temperature (Tj) reaches 175°C (Typ). IC operation begins again when the junction temperature decreases to 150°C (Typ) or less. Please refer the above table for detail of the output status. However, in this state also where the thermal shutdown is operating, and if heat is applied from the outside continuously, thermal run-away may be carried out and it may result in destruction of IC.

5. Loading Driver VCC-Short or GND-Short Protection Function

The IC has the ability to prevent the destruction of the POWER MOS output when destructive conditions happen.
(a) When the low side power MOS is ON, it is VCC-short protected when the output pin voltage is more than (POWVCC-2V_f), and when current at VCC short is detected at the same time. During this time, output goes OFF and after 100µs, output become active to check if short persists. If VCC-short mode continues, Output goes OFF again.
2V_f = around 1.4V (Typ).
(b)When the high side power MOS is ON, when output pin voltage is less than 2V_f, and detects a ground fault current, a ground fault protection is done, and output goes OFF. After 100µs, output becomes active. If short mode continues, Output goes OFF again. Also, the current depends on the output voltage ground fault sensing
Supply and GND fault protection circuit has a built in filter to remove high frequency noise of 20µs.
Driving current is limited according to the truth table below:

Drive Condition	OUTPUT Voltage	OUTPUT Short Current	Detect Condition	OUTPUT Mode
Low Side Output Power MOS ON	≥ VCC-2V_f	Flow	VCC – Short	Active to MUTE
High Side Output Power MOS ON	≤ 2V_f	Flow	GND – Short	Active to MUTE

6. TEST3 Pin

Voltage of TEST3 Pin changes according to temperature.
Shown below is the temperature characteristics.
TEST3 Pins voltage: 1.482V (25°C), the temperature coefficient:-3.457mV/°C.
Measurement condition：V_{PREVCC}=V_{POWVCC}=V_{FCRNF}=V_{TKRNF}=8V, V_{BIAS}=0V, V_{MUTE}=L, V_{CNT}=L
Connect the voltmeter to TEST3 Pin and monitor voltage for evaluation.
Do not connect other than the voltmeter. (pullup resistance, etc.)
TEST3 Pin is for evaluation not for mass products.
The below data is for reference and not guaranteed values.

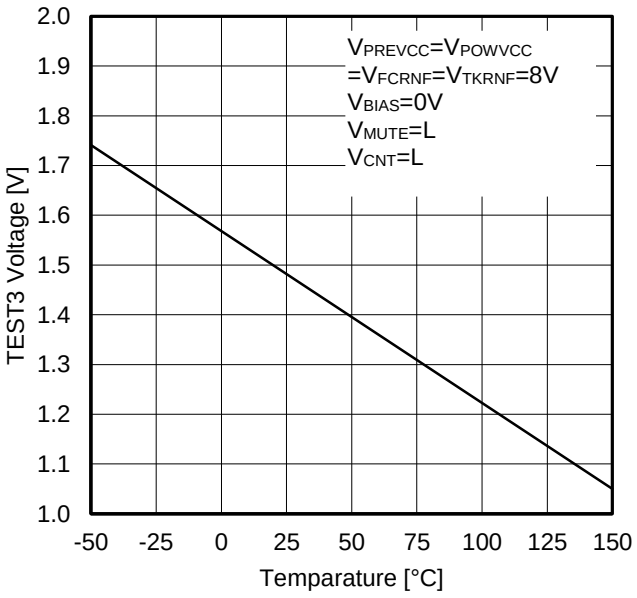


Figure 12. TEST3 Pin Voltage Temperature Characteristics

Application Example

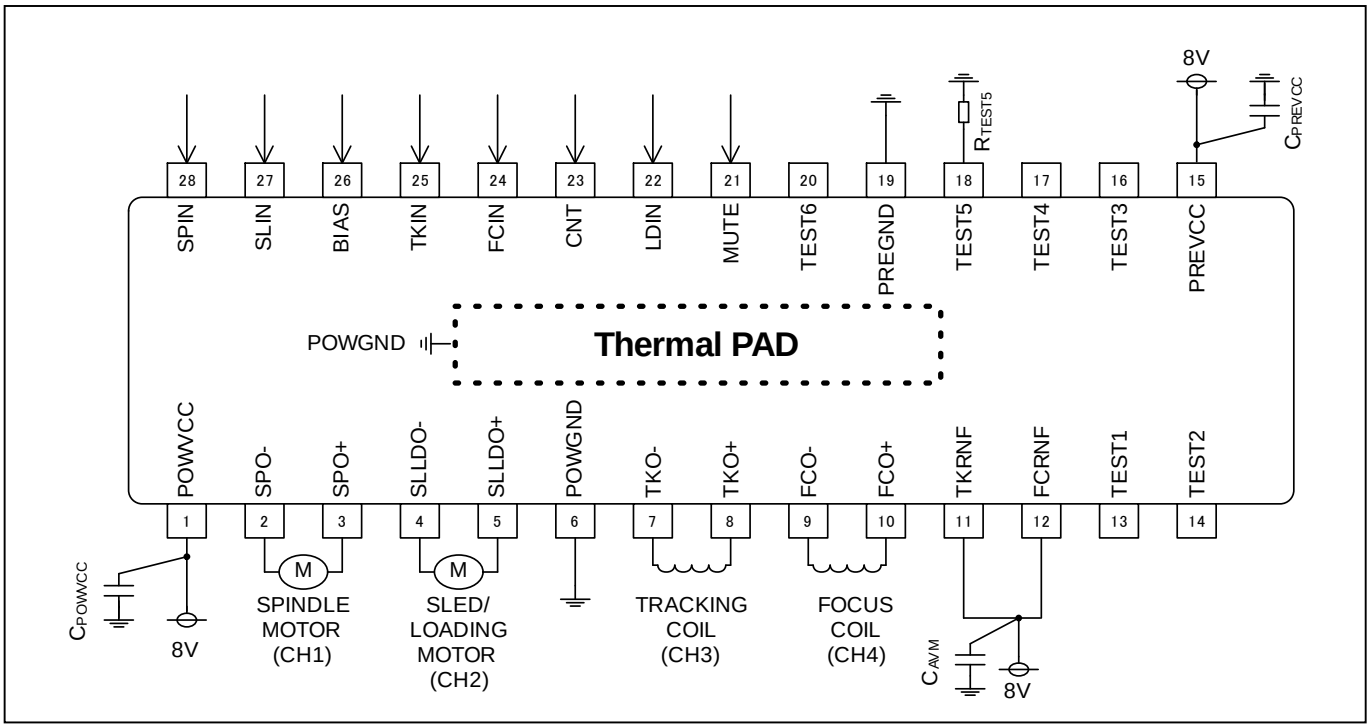


Figure 13. Application Example

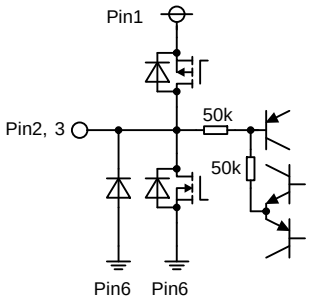
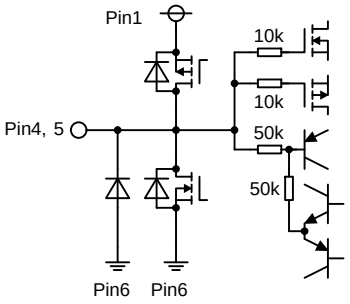
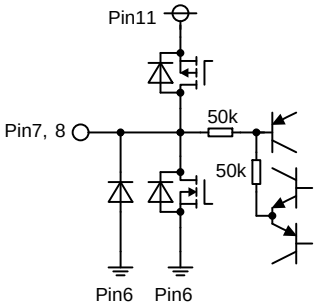
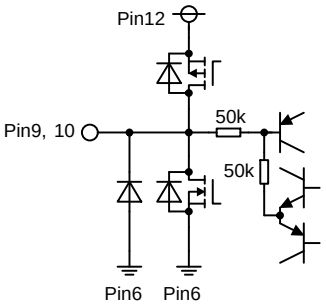
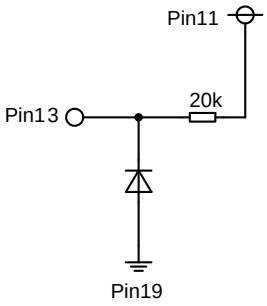
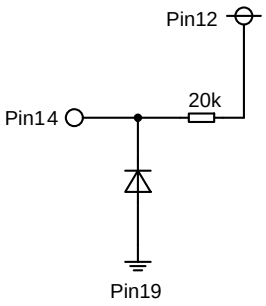
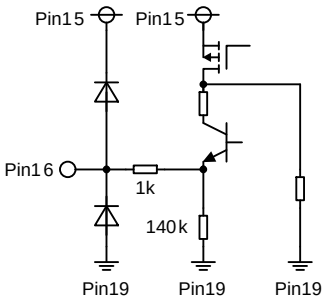
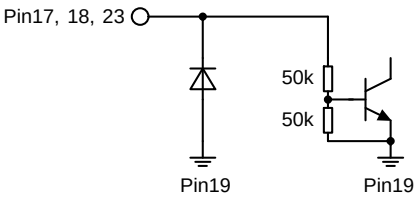
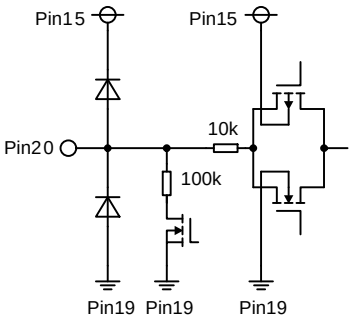
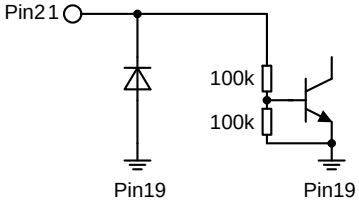
▼Channel Setting Example

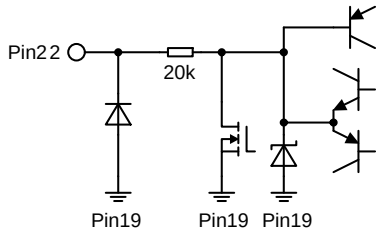
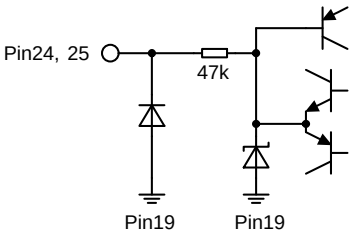
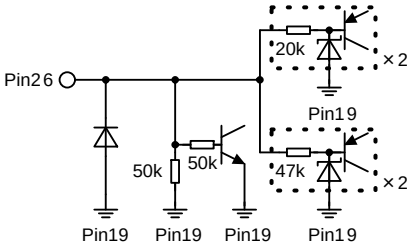
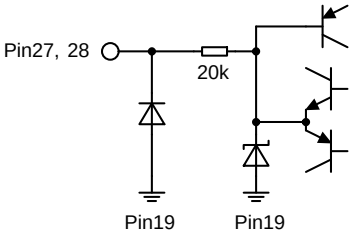
CH1	Spindle
CH2	Sled/Loading
CH3	Tracking
CH4	Focus

▼External Parts List

Component name	Component value	Product name	Manufacturer
C_{POWVCC}	0.1μF	GCM188R11H Series	murata
	47μF	UCD1E470MCL	Nichicon
C_{AVM}	0.1μF	GCM188R11H Series	murata
	47μF	UCD1E470MCL	Nichicon
C_{PREVCC}	0.1μF	GCM188R11H Series	murata
	47μF	UCD1E470MCL	Nichicon
R_{TEST5}	0Ω (GND short)	-	-

I/O Equivalent Circuits

2.SPO-, 3.SPO+	4.SLLDO-, 5.SLLDO+
	
7.TKO-, 8.TKO+	**9.FCO-, 10.FCO+**
	
13.TEST1	**14.TEST2**
	
16.TEST3	**17.TEST4, 18.TEST5, 23.CNT**
	
20.TEST6	**21.MUTE**
	

22.LDIN	24.FCIN, 25.TKIN
	
26.BIAS	27.SLIN, 28.SPIN
	

Operational Notes

1. **Reverse Connection of Power Supply**
   Connecting the power supply in reverse polarity can damage the IC. Take precautions against reverse polarity when connecting the power supply, such as mounting an external diode between the power supply and the IC's power supply pins.

2. **Power Supply Lines**
   Design the PCB layout pattern to provide low impedance supply lines. Separate the ground and supply lines of the digital and analog blocks to prevent noise in the ground and supply lines of the digital block from affecting the analog block. Furthermore, connect a capacitor to ground at all power supply pins. Consider the effect of temperature and aging on the capacitance value when using electrolytic capacitors.

3. **Ground Voltage**
   Ensure that no pins are at a voltage below that of the ground pin at any time, even during transient condition. However, pins that drive inductive loads (e.g. motor driver outputs, DC-DC converter outputs) may inevitably go below ground due to back EMF or electromotive force. In such cases, the user should make sure that such voltages going below ground will not cause the IC and the system to malfunction by examining carefully all relevant factors and conditions such as motor characteristics, supply voltage, operating frequency and PCB wiring to name a few.

4. **Ground Wiring Pattern**
   When using both small-signal and large-current ground traces, the two ground traces should be routed separately but connected to a single ground at the reference point of the application board to avoid fluctuations in the small-signal ground caused by large currents. Also ensure that the ground traces of external components do not cause variations on the ground voltage. The ground lines must be as short and thick as possible to reduce line impedance.

5. **Thermal Consideration**
   Should by any chance the maximum junction temperature rating be exceeded the rise in temperature of the chip may result in deterioration of the properties of the chip. In case of exceeding this absolute maximum rating, increase the board size and copper area to prevent exceeding the maximum junction temperature rating.

6. **Recommended Operating Conditions**
   These conditions represent a range within which the expected characteristics of the IC can be approximately obtained. The electrical characteristics are guaranteed under the conditions of each parameter.

7. **Inrush Current**
   When power is first supplied to the IC, it is possible that the internal logic may be unstable and inrush current may flow instantaneously due to the internal powering sequence and delays, especially if the IC has more than one power supply. Therefore, give special consideration to power coupling capacitance, power wiring, width of ground wiring, and routing of connections.

8. **Operation Under Strong Electromagnetic Field**
   Operating the IC in the presence of a strong electromagnetic field may cause the IC to malfunction.

9. **Testing on Application Boards**
   When testing the IC on an application board, connecting a capacitor directly to a low-impedance output pin may subject the IC to stress. Always discharge capacitors completely after each process or step. The IC's power supply should always be turned off completely before connecting or removing it from the test setup during the inspection process. To prevent damage from static discharge, ground the IC during assembly and use similar precautions during transport and storage.

10. **Inter-pin Short and Mounting Errors**
    Ensure that the direction and position are correct when mounting the IC on the PCB. Incorrect mounting may result in damaging the IC. Avoid nearby pins being shorted to each other especially to ground, power supply and output pin. Inter-pin shorts could be due to many reasons such as metal particles, water droplets (in very humid environment) and unintentional solder bridge deposited in between pins during assembly to name a few.

Operational Notes – continued

11. Unused Input Pins

Input pins of an IC are often connected to the gate of a MOS transistor. The gate has extremely high impedance and extremely low capacitance. If left unconnected, the electric field from the outside can easily charge it. The small charge acquired in this way is enough to produce a significant effect on the conduction through the transistor and cause unexpected operation of the IC. So unless otherwise specified, unused input pins should be connected to the power supply or ground line.

12. Regarding the Input Pin of the IC

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 the P layers with the N layers of other elements, creating a parasitic diode or transistor. For example (refer to figure below):

When GND > Pin A and GND > Pin B, the P-N junction operates as a parasitic diode.
When GND > Pin B, the P-N junction operates as a parasitic transistor.

Parasitic diodes inevitably occur in the structure of the IC. The operation of parasitic diodes can result in mutual interference among circuits, operational faults, or physical damage. Therefore, conditions that cause these diodes to operate, such as applying a voltage lower than the GND voltage to an input pin (and thus to the P substrate) should be avoided.

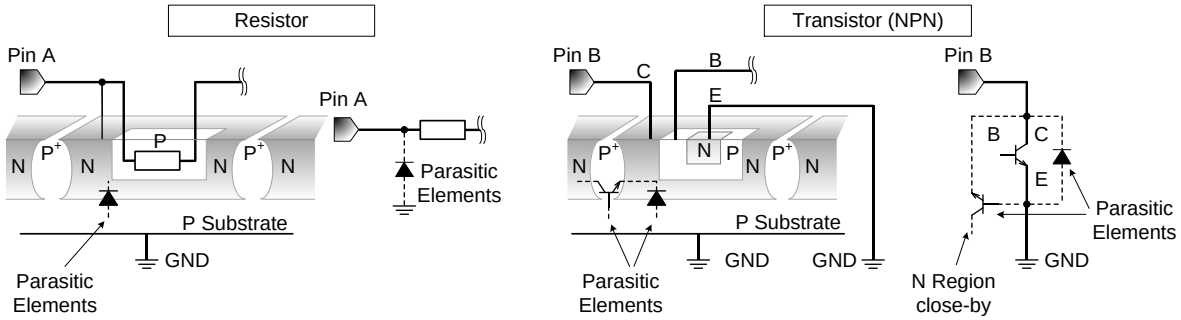


Figure 14. Example of monolithic IC structure

13. Ceramic Capacitor

When using a ceramic capacitor, determine a capacitance value considering the change of capacitance with temperature and the decrease in nominal capacitance due to DC bias and others.

14. Area of Safe Operation (ASO)

Operate the IC such that the output voltage, output current, and the maximum junction temperature rating are all within the Area of Safe Operation (ASO).

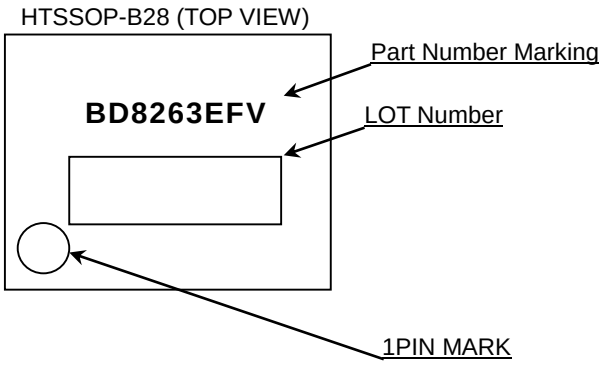
15. Thermal Shutdown Circuit(TSD)

This IC has a built-in thermal shutdown circuit that prevents heat damage to the IC. Normal operation should always be within the IC's maximum junction temperature rating. If however the rating is exceeded for a continued period, the junction temperature (Tj) will rise which will activate the TSD circuit that will turn OFF all output pins. When the Tj falls below the TSD threshold, the circuits are automatically restored to normal operation.
Note that the TSD circuit operates in a situation that exceeds the absolute maximum ratings and therefore, under no circumstances, should the TSD circuit be used in a set design or for any purpose other than protecting the IC from heat damage.

Ordering Information

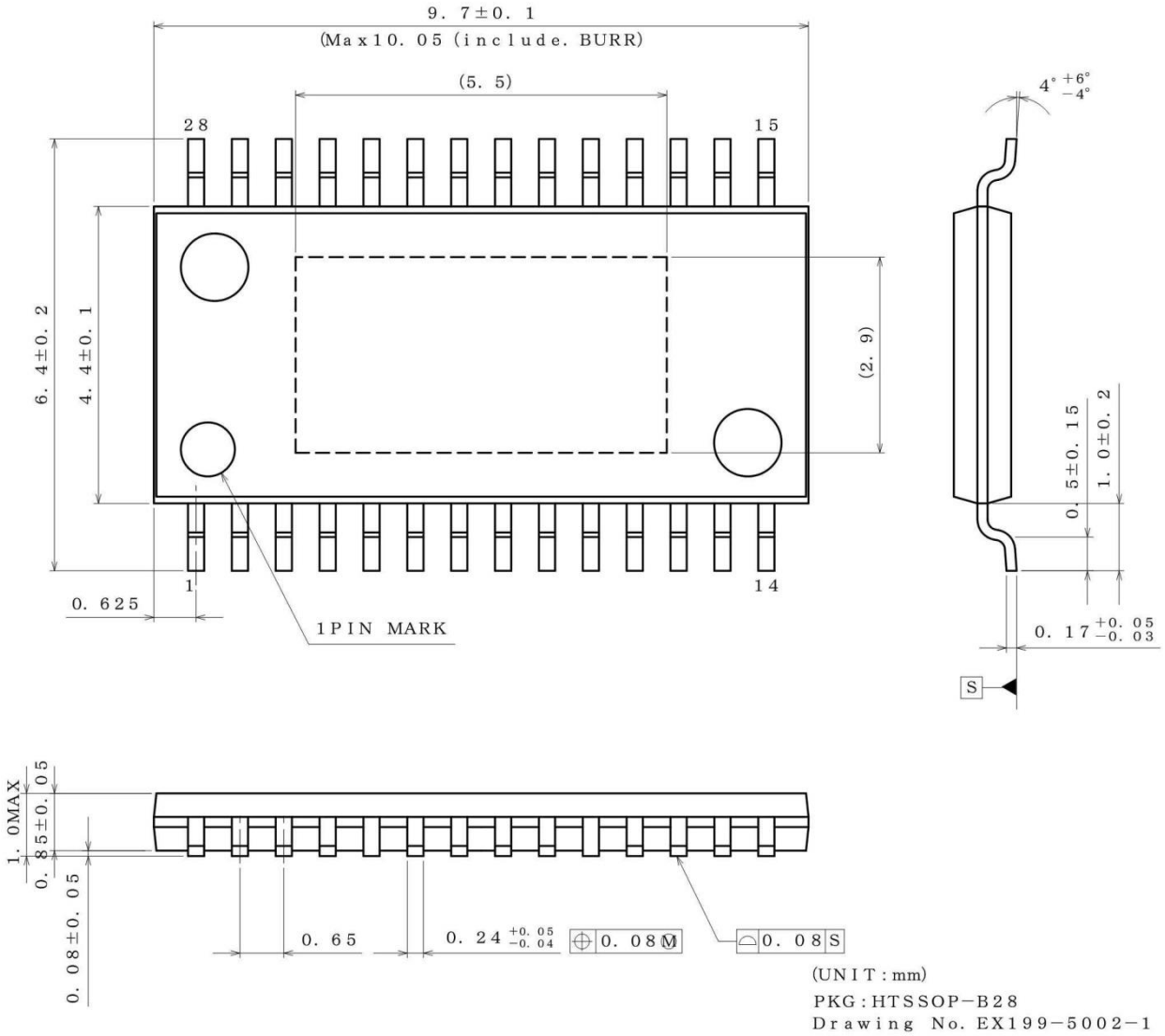
B D 8 2 6 3 E F V	-	M E 2
Part Number		Product Rank M : for Automotive Packaging Specification E2 : Embossed tape and reel
Package EFV : HTSSOP-B28		

Marking Diagram



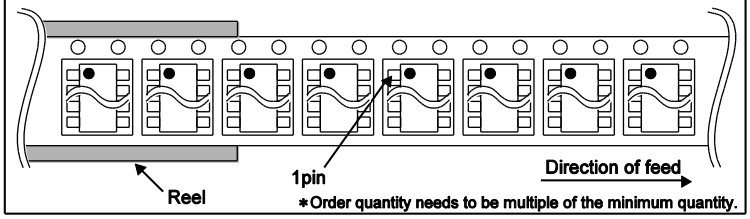
Physical Dimension, Tape and Reel Information

Package Name	HTSSOP-B28



<Tape and Reel information>

Tape	Embossed carrier tape (with dry pack)
Quantity	2500pcs
Direction of feed	E2 (The direction is the 1pin of product is at the upper left when you hold reel on the left hand and you pull out the tape on the right hand)



Revision History

Date	Revision	Changes
2017.2.6	001	New Release

Precautions Regarding Application Examples and External Circuits

1. If change is made to the constant of an external circuit, please allow a sufficient margin considering variations of the characteristics of the Products and external components, including transient characteristics, as well as static characteristics.

2. You agree that application notes, reference designs, and associated data and information contained in this document are presented only as guidance for Products use. Therefore, in case you use such information, you are solely responsible for it and you must exercise your own independent verification and judgment in the use of such information contained in this document. ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of such information.

Precaution for Electrostatic

This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

Precaution for Storage / Transportation

1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
   - [a] the Products are exposed to sea winds or corrosive gases, including Cl2, H2S, NH3, SO2, and NO2
   - [b] the temperature or humidity exceeds those recommended by ROHM
   - [c] the Products are exposed to direct sunshine or condensation
   - [d] the Products are exposed to high Electrostatic

2. Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.

3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.

4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

Precaution for Product Label

A two-dimensional barcode printed on ROHM Products label is for ROHM's internal use only.

Precaution for Disposition

When disposing Products please dispose them properly using an authorized industry waste company.

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Since concerned goods might be fallen under listed items of export control prescribed by Foreign exchange and Foreign trade act, please consult with ROHM in case of export.

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Notice

Precaution on using ROHM Products

1. If you intend to use our Products in devices requiring extremely high reliability (such as medical equipment (Note 1), aircraft/spacecraft, nuclear power controllers, etc.) and whose malfunction or failure may cause loss of human life, bodily injury or serious damage to property ("Specific Applications"), please consult with the ROHM sales representative in advance. Unless otherwise agreed in writing by ROHM in advance, ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of any ROHM's Products for Specific Applications.

(Note1) Medical Equipment Classification of the Specific Applications

JAPAN	USA	EU	CHINA
CLASSⅢ	CLASSⅢ	CLASSⅡb	CLASSⅢ
CLASSⅣ		CLASSⅢ	

2. ROHM designs and manufactures its Products subject to strict quality control system. However, semiconductor products can fail or malfunction at a certain rate. Please be sure to implement, at your own responsibilities, adequate safety measures including but not limited to fail-safe design against the physical injury, damage to any property, which a failure or malfunction of our Products may cause. The following are examples of safety measures:
   [a] Installation of protection circuits or other protective devices to improve system safety
   [b] Installation of redundant circuits to reduce the impact of single or multiple circuit failure

3. Our Products are not designed under any special or extraordinary environments or conditions, as exemplified below. Accordingly, ROHM shall not be in any way responsible or liable for any damages, expenses or losses arising from the use of any ROHM's Products under any special or extraordinary environments or conditions. If you intend to use our Products under any special or extraordinary environments or conditions (as exemplified below), your independent verification and confirmation of product performance, reliability, etc, prior to use, must be necessary:
   [a] Use of our Products in any types of liquid, including water, oils, chemicals, and organic solvents
   [b] Use of our Products outdoors or in places where the Products are exposed to direct sunlight or dust
   [c] Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl_2, H_2S, NH_3, SO_2, and NO_2
   [d] Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
   [e] Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
   [f] Sealing or coating our Products with resin or other coating materials
   [g] Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
   [h] Use of the Products in places subject to dew condensation

4. The Products are not subject to radiation-proof design.

5. Please verify and confirm characteristics of the final or mounted products in using the Products.

6. In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.

7. De-rate Power Dissipation depending on ambient temperature. When used in sealed area, confirm that it is the use in the range that does not exceed the maximum junction temperature.

8. Confirm that operation temperature is within the specified range described in the product specification.

9. ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

Precaution for Mounting / Circuit board design

1. When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.

2. In principle, the reflow soldering method must be used on a surface-mount products, the flow soldering method must be used on a through hole mount products. If the flow soldering method is preferred on a surface-mount products, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

General Precaution

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