ROHM

STRUCTURE　Silicon Monolithic Integrated Circuit

PRODUCT NAME　γ-correction IC for TFT-LCD Panel

TYPE　BD8139EFV

FEATURES
- Built-in 10ch γ-correction + Vcom outputs
- I^2C Bus Interface Control (Built-in Auto Read)

○ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

PARAMETER	SYMBOL	LIMITS	UNIT
Power Supply Voltage 1	DVCC	7	V
Power Supply Voltage 2	VCC	20	V
REFIN Voltage	REF	20	V
Amplifier Drive Current	Io	50*1	mA
Junction Temperature	Tjmax	150	℃
Power Dissipation	Pd	1600*2	mW
Operating Temperature Range	Topr	-30～+85	℃
Storage Temperature Range	Tstg	-55～+150	℃

*1 Do not however exceed Pd, ASO and Tjmax=150℃.
*2 Pd decreased at 12.8mV/℃ for temperatures above Ta=25℃,mounted on 70×70×1.6mm Glass-epoxy PCB.

○OPERATING CONDITION (Ta=25℃)

PARAMETER	SYMBOL	MIN	MAX	UNIT
Power Supply Voltage 1	DVCC	2.3	4.0	V
Power Supply Voltage 2	VCC	6	18	V
REFIN Voltage	REF	6	18	V
Amplifier Drive Current	Io	-	40	mA
I^2C Bus Frequency	fCLK	-	400	KHZ
OSC Frequency	fosc	10	200	KHz

*The product described in this specification is a strategic product (and/or service) subject to COCOM regulations.
It should not be exported without authorization from the appropriate government.

*This product is not designed for normal operation within a radio active environment.

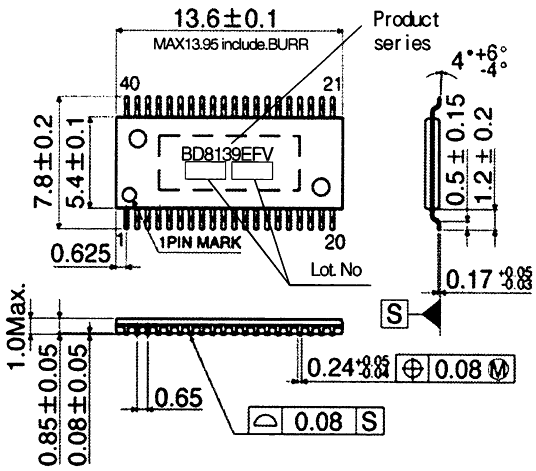
*Status of this document
The Japanese version of this document is the formal specification.
A customer may use this translation version only for a reference to help reading the formal version.
If there are any differences in translation version of this document, formal version takes priority.

○ELECTRICAL CHARACTERISTICS (Unless otherwise specified VCC=15V, DVCC=3.3V, Ta=25℃)

PARAMETER	SYMBOL	LIMIT			UNIT	CONDITIONS
		MIN	TYP	MAX		
【 REFIN 】						
Sink Current	IREF	25	50	75	μA	REF=10V
【 γ-CORRECTION AMP】						
Drive Current	Io	150	300	–	mA	DAC=3V, OUTx=0V
Load Regulation	ΔV	–	5	20	mV	Io=+10mA ~ -10mA, OUTx=6V
Output Voltage High	VOH	VCC-0.16	VCC-0.1	–	V	Io=-5mA
Output Voltage Low	VOL	–	0.1	0.16	V	Io=5mA
【 COMMON AMP 】						
Input Bias Current	Ib	–	0	1	μA	VFB=6V
Drive Current	Io	150	300	–	mA	DAC=3V, OUTx=0V
Load Regulation	ΔV	–	5	20	mV	Io=+10mA ~ -10mA, OUTx=3V
Input Voltage Range	VFB	0	–	VDAC	V	Ro=100KΩ, Co=100pF
Output Voltage high	VOH	VCC-0.16	VCC-0.1	–	V	Io=-5mA
Output voltage Low	VOL	–	0.1	0.16	V	Io=5mA
【 DAC 】						
Resolution Coding	Res	–	10	–	Bit	
Non-Linear Error	LE	-2	–	2	LSB	Range of 00A ~ 3F5 error with ideal straight
Differential Error	DLE	-2	–	2	LSB	Range of 00A ~ 3F5 error with ideal amount of Increase in 1LSB
【 OSC 】						
Frequency	fosc	–	210	–	KHz	Internal oscillator mode
【 CONTROL SIGNAL 】						
Sink Current	IctL	–	16	25	uA	
SDA output voltage Low	VSDA	–	–	0.4	V	ISDA=3.0mA
Input leakage Current	ILi	-10	–	10	μA	0.4V~0.9DVCC
Threshold Voltage	VTH	0.7	–	2.6	V	DVCC=3.3V
Reset Time	trst	–	45	–	μs	CCT=1000pF
【 WHOLE DEVICE 】						
Circuit Current	Icc	–	18	–	mA	All outputs = 5V

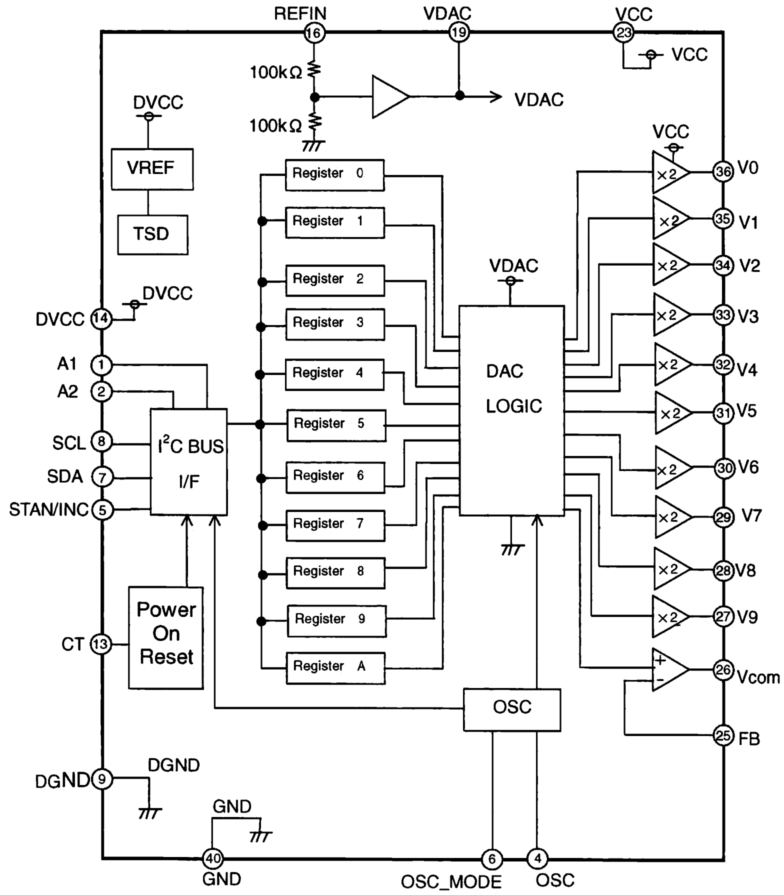
*This product is not designed for protection against radioactive rays.

○PHYSICAL DIMENSIONS・MARKING



HTSSOP-B40 (UNIT:mm)

○BLOCK DIAGRAM



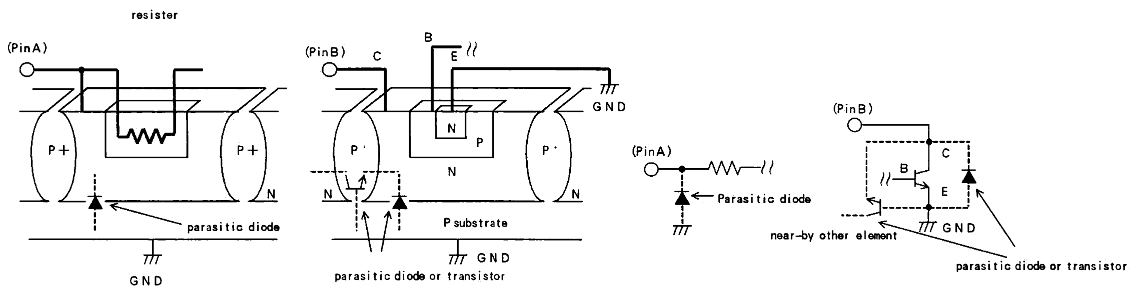
※Refer to the Technical Note about the details of the application.

○ PIN No, Pin Name, Function

PIN No	PIN NAME	Function	PIN No	PIN NAME	Function
1	A1	Slave/Slave adress set① Autoread/word address set① for EEPROM	21	NC	—
2	A2	Slave/Slave adress set② Autoread/word address set② for EEPROM	22	NC	—
3	NC	—	23	VCC	POWER SUPPLY
4	OSC	SYNCHRONIZED CLOCK INPUT	24	NC	—
5	STAN/INC	INPUT MODE SWITCH FOR I²C	25	FB	COM negative feedback INPUT
6	OSC_MODE	OSC MODE SWITCH (INTERNAL/EXTERNAL)	26	VCOM	COM OUTPUT
7	SDA	DATA SIGNAL INPUT FOR I²C	27	V9	GAMMA 9 output
8	SCL	CLOCK SIGNAL INPUT FOR I²C	28	V8	GAMMA 8 output
9	DGND	GROUND	29	V7	GAMMA 7 output
10	DACGND	GROUND FOR DAC	30	V6	GAMMA 6 output
11	NC	—	31	V5	GAMMA 5 output
12	NC	—	32	V4	GAMMA 4 output
13	CT	CAPACITOR CONNECTION FOR POWER ON RESET	33	V3	GAMMA 3 output
14	DVCC	DIGITAL POWER SUPPLY	34	V2	GAMMA 2 output
15	NC		35	V1	GAMMA 1 output
16	REFIN	DAC REFERENCE INPUT	36	V0	GAMMA 0 output
17	NC	—	37	NC	—
18	NC	—	38	NC	—
19	VDAC	DAC VOLTAGE OUTPUT	39	NC	—
20	NC	—	40	GND	GROUND

● 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 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) Setting of heat
   Use a setting of heat that allows for a sufficient margin in light of the power dissipation (Pd) in actual operating conditions.
4) Pin short and mistake fitting
   Use caution when orienting and positioning the IC for mounting on printed circuit boards. Improper mounting may result in damage to the IC. Use of the IC in excess of absolute maximum ratings such as the applied voltage or operating temperature range may result in IC damage.
5) Actions in strong magnetic field
   Use caution when using the IC in the presence of a strong electromagnetic field as doing so may cause the IC to malfunction.
6) Ground wiring 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 patterns of any external components.
7) Regarding 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 these P layers with the N layers of other elements to create a variety of parasitic elements. For example, when a resistor and transistor are connected to pins. (see the chart below)
   The formation of parasitic NPN transistors according to the relationships of different IC 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 and out



8) Thermal shutdown circuit (TSD)
   This IC incorporates a built-in thermal shutdown 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 chip's temperature Tj will trigger the thermal shutdown circuit to turn off all output power elements. The circuit will automatically reset once the chip's temperature Tj drops. Operation of the thermal shutdown circuit presumes that the IC's absolute maximum ratings have been exceeded. Application designs should never make use of the circuit.
9) 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. Ground the IC during assembly steps as an antistatic measure, and use similar caution when transporting or storing the IC. Always turn the IC's power supply off before connecting it to or removing it from a jig or fixture during the inspection process.

Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO.,LTD. disclaims any warranty that any use of such devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices, other than for buyer's right to use such devices itself, resell or otherwise dispose of the same, no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by
- ROHM CO., LTD. is granted to any such buyer.
- Products listed in this document are no antiradiation design.

The products listed in this document are designed to be used with ordinary electronic equipment or devices (such as audio visual equipment, office-automation equipment, communications devices, electrical appliances and electronic toys).
Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.
In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.

Thank you for your accessing to ROHM product informations.

More detail product informations and catalogs are available,

please contact your nearest sales office.

Please contact our sales offices for details ;

U.S.A / San Diego	TEL : +1(858)625-3630	FAX : +1(858)625-3670
Atlanta	TEL : +1(770)754-5972	FAX : +1(770)754-0691
Dallas	TEL : +1(972)312-8818	FAX : +1(972)312-0330
Germany / Dusseldorf	TEL : +49(2154)9210	FAX : +49(2154)921400
United Kingdom / London	TEL : +44(1)908-282-666	FAX : +44(1)908-282-528
France / Paris	TEL : +33(0)1 56 97 30 60	FAX : +33(0) 1 56 97 30 80
China / Hong Kong	TEL : +852(2)740-6262	FAX : +852(2)375-8971
Shanghai	TEL : +86(21)6279-2727	FAX : +86(21)6247-2066
Dilian	TEL : +86(411)8230-8549	FAX : +86(411)8230-8537
Beijing	TEL : +86(10)8525-2483	FAX : +86(10)8525-2489
Taiwan / Taipei	TEL : +866(2)2500-6956	FAX : +866(2)2503-2869
Korea / Seoul	TEL : +82(2)8182-700	FAX : +82(2)8182-715
Singapore	TEL : +65-6332-2322	FAX : +65-6332-5662
Malaysia / Kuala Lumpur	TEL : +60(3)7958-8355	FAX : +60(3)7958-8377
Philippines / Manila	TEL : +63(2)807-6872	FAX : +63(2)809-1422
Thailand / Bangkok	TEL : +66(2)254-4890	FAX : +66(2)256-6334

Japan /
(Internal Sales)

Tokyo 2-1-1, Yaesu, Chuo-ku, Tokyo 104-0082
TEL : +81(3)5203-0321 FAX : +81(3)5203-0300

Yokohama 2-4-8, Shin Yokohama, Kohoku-ku, Yokohama, Kanagawa 222-8575
TEL : +81(45)476-2131 FAX : +81(45)476-2128

Nagoya Dainagayo Building 9F 3-28-12, Meieki, Nakamura-ku, Nagoya,Aichi 450-0002
TEL : +81(52)581-8521 FAX : +81(52)561-2173

Kyoto 579-32 Higashi Shiokouji-cho, Karasuma Nishi-iru, Shiokoujidori, Shimogyo-ku, Kyoto 600-8216
TEL : +81(75)311-2121 FAX : +81(75)314-6559

(Contact address for overseas customers in Japan)

Yokohama TEL : +81(45)476-9270 FAX : +81(045)476-9271

As of 18th. April 2005