STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT NAME TFT-LCD Bias Boost Converter

TYPE **BD8158FVM**

FEATURES 2.1V～4.0V Low Operating Voltage
Built-in 0.25Ω Power FET included

● ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

Parameter	Symbol	Rating	Unit
Supply Voltage	Vcc	7	V
Power Dissipation	Pd	588*	mW
Operating Temperature Range	Topr	-40～+125	℃
Storage Temperature Range	Tstg	-55～+150	℃
SW Pin Current	Isw	1.5**	A
SW Pin Voltage	Vsw	15	V
Junction Temperature	Tjmax	150	℃

* Derating in done 4.7mW/℃ for operating above Ta≧25℃(On 70.0mm×70.0mm×1.6mm board)
** Pd should not be exceeded.

●OPERATING CONDITIONS (Ta=-40℃～+125℃)

Parameter	Symbol	Limit			Unit
		Min	Typ	Max	
Supply Voltage	Vcc	2.1	2.5	4.0	V
SW Sink Current	ISW	—	—	1.4	A
SW Pin Voltage	VSW	—	—	14	V

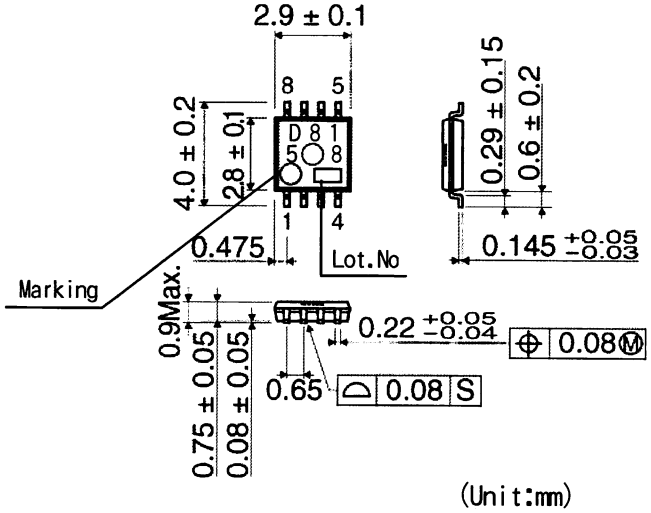
★This product is not designed for protection against radioactive rays.
★The product described in this specification is a strategic product(and/or Service) subject to COCOM regulations. It should not be exported without Authorization from the appropriate government.

●ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Ta=25℃ Vcc=2.5V ENB=2.5V)

Parameter	Symbol	Limit			Unit	Condition
		Min	Typ	Max		
【OSCILLATION BLOCK】						
Oscillation Frequency 1	FOSC1	480	600	720	kHz	FCLK=0V
Oscillation Frequency 2	FOSC2	0.96	1.20	1.44	MHz	FCLK=Vcc
【OVER CURRENT PROTECT BLOCK】						
Switch Current Limit	ISW	—	2	—	A	
【SOFT START BLOCK】						
SS Source Current	ISO	6	10	14	uA	Vss=0.5V
SS Sink Current	ISi	0.2	0.3	0.4	mA	Vss=0.5V
【UNDER VOLTAGE LOCK OUT BLOCK】						
OFF Threshold Voltage	VUTOFF	1.7	1.8	1.9	V	
ON Threshold Voltage	VUTON	1.6	1.7	1.8	V	
【ERROR AMPLIFIER BLOCK】						
Input Bias Current	IB	—	0.1	0.5	uA	
Feed Back Voltage	VFB	1.232	1.245	1.258	V	Buffer
Voltage Gain	AV	—	200	—	V/V	
COMP Sink Current	IOI	20	45	70	uA	VFB=1.5V
COMP Source Current	IOO	20	45	70	uA	VFB=1.0V
【SW BLOCK】						
ON Resistance	RON	—	250	—	mΩ	※ ISW=1A
Leak Current	ILEAK	—	0	10	uA	VSW=15V
Maximum duty Cycle	DMAX	—	85	—	%	RL=100Ω
【ENB BLOCK】						
ENB ON Voltage	VON	Vcc ×0.7	Vcc	—	V	
ENB OFF Voltage	VOFF	—	0	Vcc ×0.3	V	
【DEVICE】						
Stand-by Current	ISTB	—	0	10	uA	VENB=0V
Average Supply Current	ICC	—	1.2	2.4	mA	no switching

※ Design Guarantee (Outgoing inspection is not done all products.)

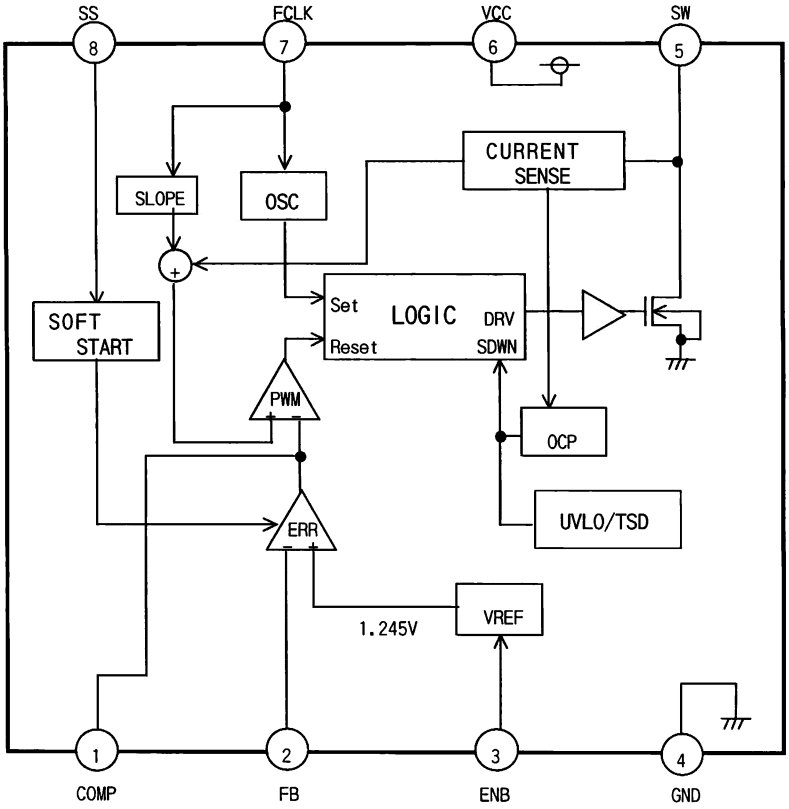
●PHYSICAL DIMENSION・MARKING (MSOP-8)



(Unit:mm)

Rev.B

● BLOCK DIAGRAM



*Please refer to Technical note concerning application circuit, and etc.

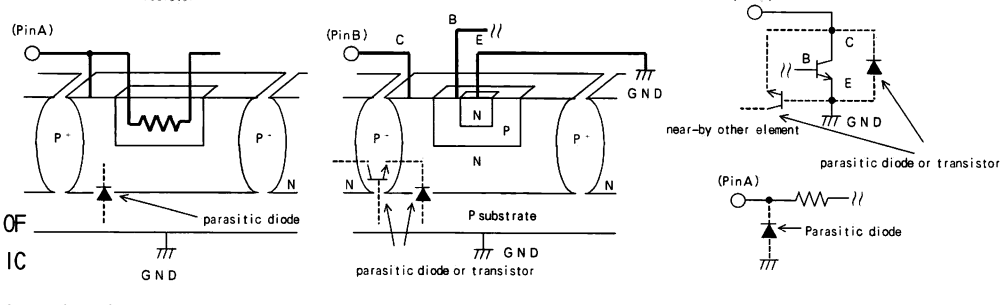
●PIN NO. & FUNCTION TABLE

Pin No.	Pin Name	Function
1	COMP	Error Amp Output
2	FB	Feed Back Input
3	ENB	Chip Enable Input
4	GND	Ground
5	SW	Nch FET Power Switch Drain Output
6	Vcc	Power Input
7	FCLK	Frequency Change Input
8	SS	Soft Start Current Output

●Operation Notes

1. Absolute maximum range
   This product are produced with strict quality control, but might be destroyed in using beyond absolute maximum ratings. Open IC destroyed a failure mode cannot be defined (like Short mode, or Open mode).
   Therefore physical security countermeasure, like fuse, is to be given when a specified mode to be beyond absolute maximum ratings is considered.
2. Ground potential
   GND terminal should be a lowest voltage potential every state.
   Please make sure all pins which is over ground even if include transient feature.
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. Short Circuit between Terminal and Soldering
   Don' t short-circuit between Output pin and V_{DD} pin, Output pin and GND pin, or V_{DD} pin and GND pin. When soldering the IC on circuit board, please be unusually cautious about the orientation and the position of the IC. When the orientation is mistaken the IC may be destroyed.
5. Electromagnetic Field
   Mal-function may happen when the device is used in the strong electromagnetic field.
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. This IC is a monolithic IC which has P+ isolation in the P substrate and between the various pins.
   A P-N junction is formed from this P layer and the N layer of each pin.
   For example, when a resistor and a transistor is connected to a pin.
   Parasitic diodes can occur inevitably in the structure of the IC. The operation of parasitic diodes can result in mutual interference among circuits as well as operation faults and physical damage. Accordingly, you must not use methods by which parasitic diodes operate, such as applying a voltage that is lower than the GND (P substrate) voltage to an input pin.

SIMPLIFIED STRUCTURE OF BI-POLAR IC



8. Over current protection circuit
   The over-current protection circuits are built in at output, according to their respective current outputs and prevent the IC from being damaged when the load is short-circuited or over-current. But, these protection circuits are effective for preventing destruction by unexpected accident. When it' s in continuous protection circuit moving period don' t use please. And for ability, because this chip has minus characteristic, be careful for heat plan.
9. Built-in thermal circuit
   A temperature control circuit is built in the IC to prevent the damage due to overheat.
   Therefore, all the outputs are turned off when the thermal circuit works and are turned on when the temperature goes down to the specified level.
10. 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.

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