

STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT NAME Main Power Supply For TFT-LCD Display Module

TYPE **BD8150KVT**

FEATURES 5-channel outputs for TFT-LCD Display  
11-channel OP-AMP included

●ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| PARAMETER                   | SYMBOL | LIMITS  | UNIT |
|-----------------------------|--------|---------|------|
| Power Supply Voltage        | VCC    | 15      | V    |
| Regulator Supply Voltage    | REGVCC | 15      | V    |
| Driver Supply Voltage       | PVCC   | 15      | V    |
| Junction Temperature        | Tjmax  | 125     | °C   |
| Power Dissipation           | Pd     | 1000*1  | mW   |
| Operating Temperature Range | Topr   | -30~85  | °C   |
| Storage Temperature Range   | Tstg   | -55~150 | °C   |

\*1 Pd derated at 10mw/°C for temperatures above Ta=25°C,  
mounted on 70×70×1.6mm Glass-epoxy PCB.

●OPERATING CONDITIONS (Ta=-30°C~+85°C)

| PARAMETER                | SYMBOL | MIN | MAX  | UNIT |
|--------------------------|--------|-----|------|------|
| Power Supply Voltage     | VCC    | 2.7 | 13   | V    |
| Regulator Supply Voltage | REGVCC | 4.5 | 14.7 | V    |
| Driver Supply Voltage    | PVCC   | 2.7 | 13   | 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.

Status of this document

The Japanese version of this document is the formal specification.

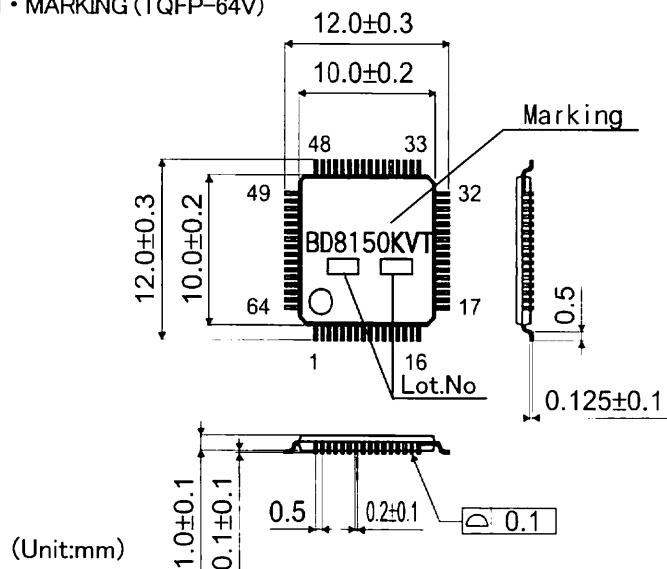
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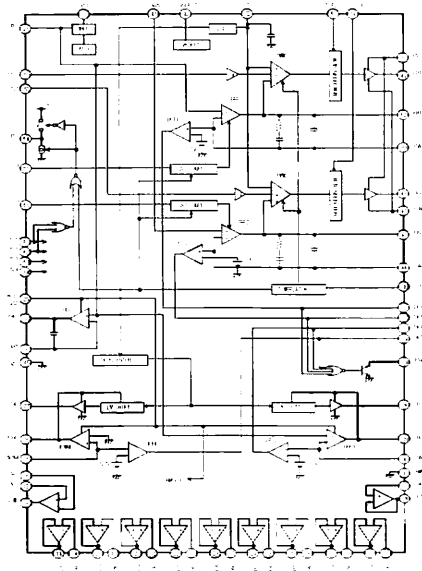
●ELECTRICAL CHARACTERISTICS (Unless otherwise specified VCC=5V,REGVCC=12V,Ta=25°C)

| PARAMETER                              | SYMBOL | LIMIT      |            |       | UNIT | CONDITIONS          |
|--|--------|------------|------------|-------|------|---------------------|
|  |        | MIN        | TYP        | MAX   |      |                     |
| [ERR AMP1, 2 BLOCK]                    |        |            |            |       |      |                     |
| Input Offset Voltage                   | Vos12  | -10        | 0          | 10    | mV   |                     |
| Feed Back Voltage                      | FB1    | 1.225      | 1.25       | 1.275 | V    | ERRAMP1 Only        |
| [PWM&DRV BLOCK]                        |        |            |            |       |      |                     |
| Sink Current                           | Ipsk12 | 70         | 130        | 200   | mA   | GD1, 2=5V           |
| Source Current                         | Ipsc12 | -245       | -160       | -85   | mA   | GD1, 2=0V           |
| [OSCILLATOR BLOCK]                     |        |            |            |       |      |                     |
| Switching Frequency                    | Fsw12  | 0.8        | 1.0        | 1.2   | MHz  |                     |
| [CHARGE PUMP DRIVER ERR AMP3, 4 BLOCK] |        |            |            |       |      |                     |
| Feed Back Voltage                      | FB3    | 1.212      | 1.25       | 1.288 | V    |                     |
|  | FB4    | —          | 0          | —     | V    |                     |
| [DRIVER BLOCK]                         |        |            |            |       |      |                     |
| Switching Frequency                    | Fsw34  | 200        | 250        | 300   | kHz  |                     |
| [LOW DROPOUT REGULATOR]                |        |            |            |       |      |                     |
| Feed Back Voltage                      | FBR    | 1.237      | 1.25       | 1.263 | V    | Buffer, Io=-10mA    |
| Short Current                          | Io     | —          | -130       | -50   | mA   | VREG=0V             |
| Load Regulation                        | RegL   | —          | 1          | 10    | mV   | Io=1→10mA           |
| [OP-AMP BLOCK]                         |        |            |            |       |      |                     |
| Input Offset Voltage                   | Voso   | -10        | 0          | 10    | mV   |                     |
| Drive Current                          | IoO    | 20         | 50         | —     | mA   |                     |
| Load Regulation                        | ΔVo    | —          | 1          | 10    | mV   | Io=+1~-1mA          |
| Output Voltage High                    | Voho   | REGVCC-1.0 | REGVCC-0.8 | —     | V    | Io=-1mA, IN+=REGVCC |
| Output Voltage Low                     | Vohl   | —          | 0.1        | 0.16  | V    | Io=1mA, IN+=0V      |
| [BG BLOCK]                             |        |            |            |       |      |                     |
| BG Voltage                             | Vref   | 1.225      | 1.250      | 1.275 | V    | Io=-0.1mA           |
| Short Current                          | Iovr   | 0.2        | 1          | —     | mA   | BG=0V               |
| [VREF17 BLOCK]                         |        |            |            |       |      |                     |
| VREF17 Voltage                         | Vref17 | 1.666      | 1.700      | 1.734 | V    | Io=-0.1mA           |
| Short Current                          | Iovr17 | 0.2        | 1          | —     | mA   | VREF17=0V           |
| [UNDER VOLTAGE LOCK OUT BLOCK]         |        |            |            |       |      |                     |
| Threshold Voltage                      | Vuvlo  | 2.327      | 2.45       | 2.573 | V    |                     |
| [SUPPLY CURRENT ]                      |        |            |            |       |      |                     |
| Stand-by Current                       | Istb   | —          | 0          | 10    | uA   |                     |
| Average Supply Current                 | Icc    | 1.1        | 2          | 2.9   | mA   |                     |

●PHYSICAL DIMENSION • MARKING (TQFP-64V)



● BLOCK DIAGRAM



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

● PIN NO. & FUNCTION TABLE

| PIN NO. | PIN NAME | FUNCTION   | PIN NO. | PIN NAME | FUNCTION                         |
|---------|----------|--|---------|----------|----------------------------------|
| 1       | DET1     | DC/DC detector output 1                                    | 33      | SCP      | Connect timer latch capacitor    |
| 2       | DET2     | DC/DC detector output 2                                    | 34      | ENABLE   | All channel output enable        |
| 3       | DET3     | Charge pump detector output 3                              | 35      | NON4     | Charge pump feed back input 4    |
| 4       | DET4     | Charge pump detector output 4                              | 36      | FB4      | Charge pump E/A output 4         |
| 5       | IN0      | Buffer amp 0 input   | 37      | CD4      | Charge pump driver output 4      |
| 6       | IN1      | Buffer amp 1 input   | 38      | CD3      | Charge pump driver output 3      |
| 7       | IN2      | Buffer amp 2 input   | 39      | FB3      | Charge pump E/A output 3         |
| 8       | IN3      | Buffer amp 3 input   | 40      | INV3     | Charge pump feed back input 3    |
| 9       | IN4      | Buffer amp 4 input   | 41      | BG       | Reference voltage monitor        |
| 10      | IN5      | Buffer amp 5 input   | 42      | VREF17   | 1.7V Reference Voltage           |
| 11      | IN6      | Buffer amp 6 input   | 43      | NON2     | DC/DC E/A non inverting input 2  |
| 12      | IN7      | Buffer amp 7 input   | 44      | INV2     | DC/DC E/A inverting input 2      |
| 13      | IN8      | Buffer amp 8 input   | 45      | FB2      | DC/DC E/A output 2               |
| 14      | IN9      | Buffer amp 9 input   | 46      | GND      | Ground                           |
| 15      | IN+      | Op-amp non inverting input                                 | 47      | PGND     | Power ground                     |
| 16      | IN-      | Op-amp inverting input                                     | 48      | GD2      | DC/DC driver output 2            |
| 17      | AMPGND   | Buffer amp and op-amp ground                               | 49      | GD1      | DC/DC driver output 1            |
| 18      | COM      | Op-amp output  | 50      | PVCC     | Power VCC supply                 |
| 19      | OUT9     | Buffer amp 9 output  | 51      | VCC      | VCC supply                       |
| 20      | OUT8     | Buffer amp 8 output  | 52      | FB1      | DC/DC E/A output 1               |
| 21      | OUT7     | Buffer amp 7 output  | 53      | INV1     | DC/DC E/A inverting input 1      |
| 22      | OUT6     | Buffer amp 6 output  | 54      | PG       | Pch FET switch driver output     |
| 23      | OUT5     | Buffer amp 5 output  | 55      | SS1      | Connect soft start capacitor 1   |
| 24      | OUT4     | Buffer amp 4 output  | 56      | SS2      | Connect soft start capacitor 2   |
| 25      | OUT3     | Buffer amp 3 output  | 57      | UDSEL1   | Step up/down select switch 1     |
| 26      | OUT2     | Buffer amp 2 output  | 58      | UDSEL2   | Step up/down select switch 2     |
| 27      | OUT1     | Buffer amp 1 output  | 59      | DTC1     | Dead time control voltage input1 |
| 28      | OUT0     | Buffer amp 0 output  | 60      | DTC2     | Dead time control voltage input2 |
| 29      | REGVCC   | Charge pump, Regulator, op-amp and buffer amp power supply | 61      | CTL4     | Charge pump control switch 4     |
| 30      | VREG     | Regulator output   | 62      | CTL3     | Charge pump control switch 3     |
| 31      | INV5     | Regulator negative feed back input                         | 63      | CTL2     | DC/DC control switch 2           |
| 32      | CT       | Ramp wave monitor  | 64      | CTL1     | DC/DC control switch 1           |

●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<sub>DD</sub> pin, Output pin and GND pin, or V<sub>DD</sub> 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

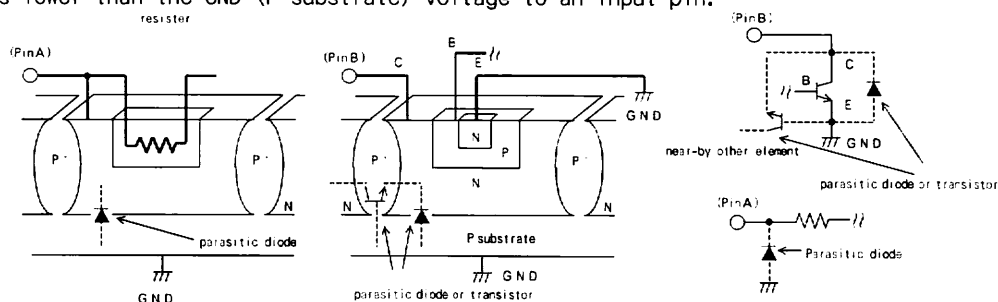
When using both small signal and large current GND patterns, it is recommended to isolate the two ground patterns, placing a single ground point at the application's reference point so that the pattern wiring resistance and voltage variations caused by large currents do not cause variations in the small 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 OFBI-POLAR IC

8. 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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