



MB39C326-EVBSK-01/02

6MHz Buck-boost DC/DC Converter Evaluation Board Operation Guide

Doc. No. 002-08675 Rev. *B

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Preface



This manual explains how to use the evaluation board. Be sure to read this manual before using the product. For this product, please consult with sales representatives or support representatives.

Handling and use

Handling and use of this product and notes regarding its safe use are described in the manuals.

Follow the instructions in the manuals to use this product.

Keep this manual at hand so that you can refer to it anytime during use of this product.

Notice on this document

All information included in this document is current as of the date it is issued. Such information is subject to change without any prior notice.


Please confirm the latest relevant information with the sales representatives.

Cautions




Caution of the products described in this document

The following precautions apply to the product described in this manual.

| | |
|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  WARNING | Indicates a potentially hazardous situation which could result in death or serious injury and/or a fault in the user's system if the product is not used correctly. |
|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electric shock, Damage | Before performing any operation described in this manual, turn off all the power supplies to the system. Performing such an operation with the power on may cause an electric shock or device fault. |
| Electric shock, Damage | Once the product has been turned on, do not touch any metal part of it. Doing so may cause an electric shock or device fault. |

| | |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  CAUTION | Indicates the presence of a hazard that may cause a minor or moderate injury, damages to this product or devices connected to it, or may cause to lose software resources and other properties such as data, if the device is not used appropriately. |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cuts, Damage | Before moving the product, be sure to turn off all the power supplies and unplug the cables. Watch your step when carrying the product. Do not use the product in an unstable location such as a place exposed to strong vibration or a sloping surface. Doing so may cause the product to fall, resulting in an injury or fault. |
| Cuts | The product contains sharp edges that are left unavoidably exposed, such as jumper plugs. Handle the product with due care not to get injured with such pointed parts. |
| Damage | Do not place anything on the product or expose the product to physical shocks. Do not carry the product after the power has been turned on. Doing so may cause a malfunction due to overloading or shock. |
| Damage | Since the product contains many electronic components, keep it away from direct sunlight, high temperature, and high humidity to prevent condensation. Do not use or store the product where it is exposed to much dust or a strong magnetic or electric field for an extended period of time. Inappropriate operating or storage environments may cause a fault. |
| Damage | Use the product within the ranges given in the specifications. Operation over the specified ranges may cause a fault. |
| Damage | To prevent electrostatic breakdown, do not let your finger or other object come into contact with the metal parts of any of the connectors. Before handling the product, touch a metal object (such as a door knob) to discharge any static electricity from your body. |

| | |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Damage | When turning the power on or off, follow the relevant procedure as described in this document. Before turning the power on, in particular, be sure to finish making all the required connections. Furthermore, be sure to configure and use the product by following the instructions given in this document. Using the product incorrectly or inappropriately may cause a fault. |
| Damage | Always turn the power off before connecting or disconnecting any cables from the product. When unplugging a cable, unplug the cable by holding the connector part without pulling on the cable itself. Pulling the cable itself or bending it may expose or disconnect the cable core, resulting in a fault. |
| Damage | Because the product has no casing, it is recommended that it be stored in the original packaging. Transporting the product may cause a damage or fault. Therefore, keep the packaging materials and use them when re-shipping the product. |

Contents



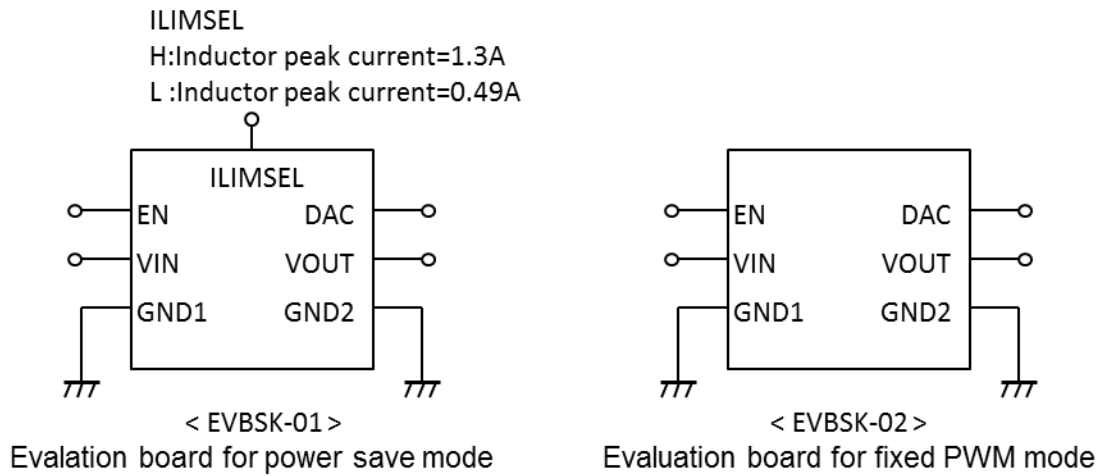
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1. Description



The MB39C326-EVBSK-01/02 is the small size evaluation board for the 6MHzBuck-boost DC/DC converter IC, MB39C326. This evaluation board output preset 3.3V or can be selected the other values by DAC signal input. The board consists of simple two layers. Two different function of boards lineup: MB39C326-EVBSK-01 for power save mode and MB39C326-EVBSK-02 for fixed PWM.

Figure 1-1. Board Outline



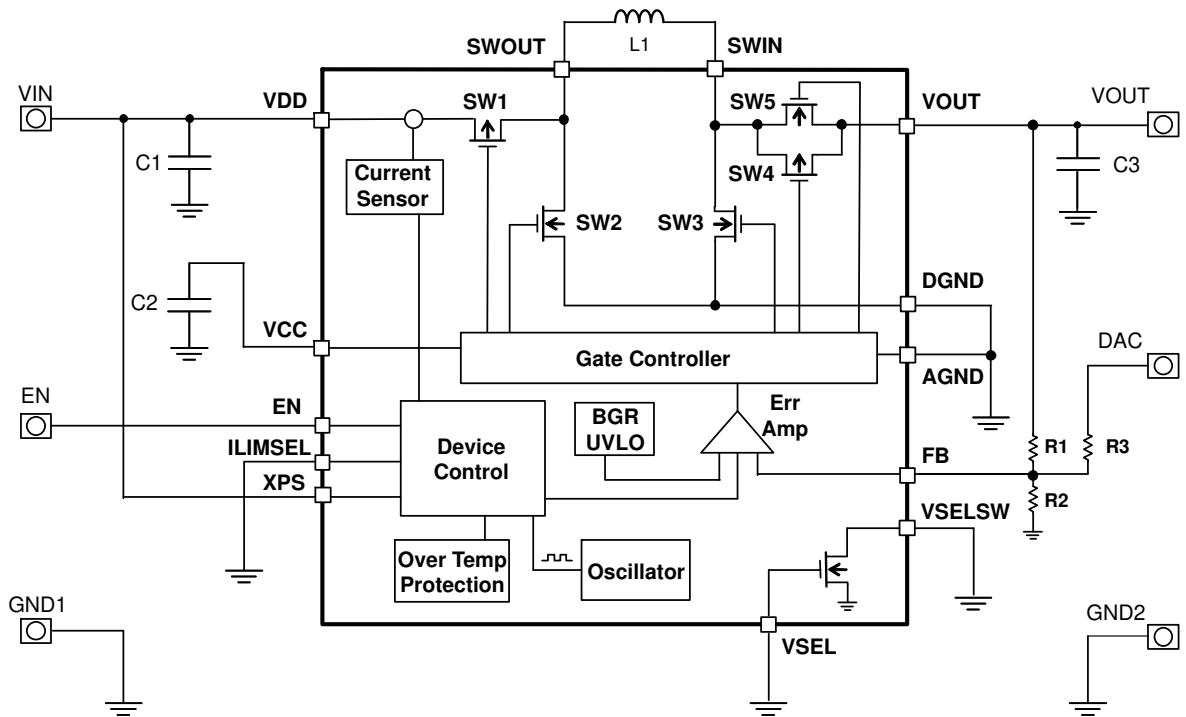
2. Evaluation Board Specification



Table 2-1. Evaluation Board Specification

| Item | Symbol | Condition | Min | Typ | Max | Unit |
|--------------------------------|------------|---------------------------------------|-----------|-----------|-------|------|
| Input voltage | VIN | - | 2.5 | 3.7 | 5.5 | V |
| Output voltage | VOUT | R1=620k Ω , R2=110k Ω | 3.18 5 | 3.31 8 | 3.451 | V |
| Output current | IOUT(MAX1) | VIN=3.3V to 5.5V, EVBSK-02 | - | - | 1200 | mA |
| | IOUT(MAX2) | VIN=2.5V to 3.3V, EVBSK-02 | - | - | 800 | mA |
| | IOUT(MAX3) | VIN=3.3V to 5.5V, EVBSK-01, ILIMSEL=H | - | - | 600 | mA |
| | IOUT(MAX4) | VIN=2.5V to 3.3V, EVBSK-01, ILIMSEL=H | - | - | 500 | mA |
| Switching frequency | FREQUENCY | - | 5.2 | 5.8 | 6.4 | MHz |
| Maximum efficiency | EFFICIENCY | - | - | 93 | - | % |
| Signal input threshold voltage | VIL | EN, ILIMSEL | 0.0 | - | 0.25 | V |
| | VIH | | 1.5 | - | VIN | V |

Figure 3-2. Block Diagram for EVBSK-02



< EVBSK-02 >

4. PIN Descriptions



4.1 Input/Output Pin Descriptions

Table 4-1. Input/Output Pin Descriptions

| Terminal | I/O | Description |
|----------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VIN | I | Power supply terminal |
| VOUT | O | Output terminal |
| EN | I | IC enable terminal EN=H : Enable EN=L : Shutdown |
| DAC | I | Output voltage setting terminal (DAC signal input)(*1) |
| ILIMSEL | I | Inductor peak current select terminal (EVBSK-01)(*2) ILIMSEL=H : Inductor peak current value(I_{PK})= 1.3A ILIMSEL=L : Inductor peak current value(I_{PK})= 0.49A |
| GND1 | - | Input GND terminal |
| GND2 | - | Output GND terminal |

*1: Please refer the MB39C326 datasheet for setting output voltage by DAC.

*2: EVBSK-01: MB39C326 XPS pin is set to L, ILIMSEL pin is set to H and output current limit value(I_{PK})= 1.3A at ILIMSEL=H and 0.49A at ILIMSEL=L.

EVBSK-02: MB39C326 XPS pin is set to H, ILIMSEL pin is set to L and inductor peak current value(I_{PK})= 3.2A.

4.2 Jumper Descriptions

Table 4-2. Jumper Descriptions

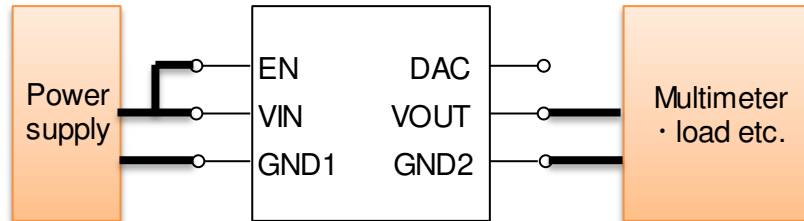
| Jumper | Description | Initial |
|--------|-------------------------------------------------------------------------------------------|--------------|
| JP2 | H: MB39C326 ILIMSEL pin is short to VIN. (L) : MB39C326 ILIMSEL pin is shorted to GND. | Short to VIN |

4.3 Setup and Verification

1. Connect the power supply between VIN and GND1. EN is connected to VIN.
2. 3.3V is output to VOUT terminal after power is supplied.

Low impedance power supply is recommended to use. The power supply line can be stable at evaluation when some capacitor is connected to the line.

Figure 4-1. Image of Connection



5. Component and Wiring Layout



5.1 Component Layout

Figure 5-1. Component Layout (Layer 1)

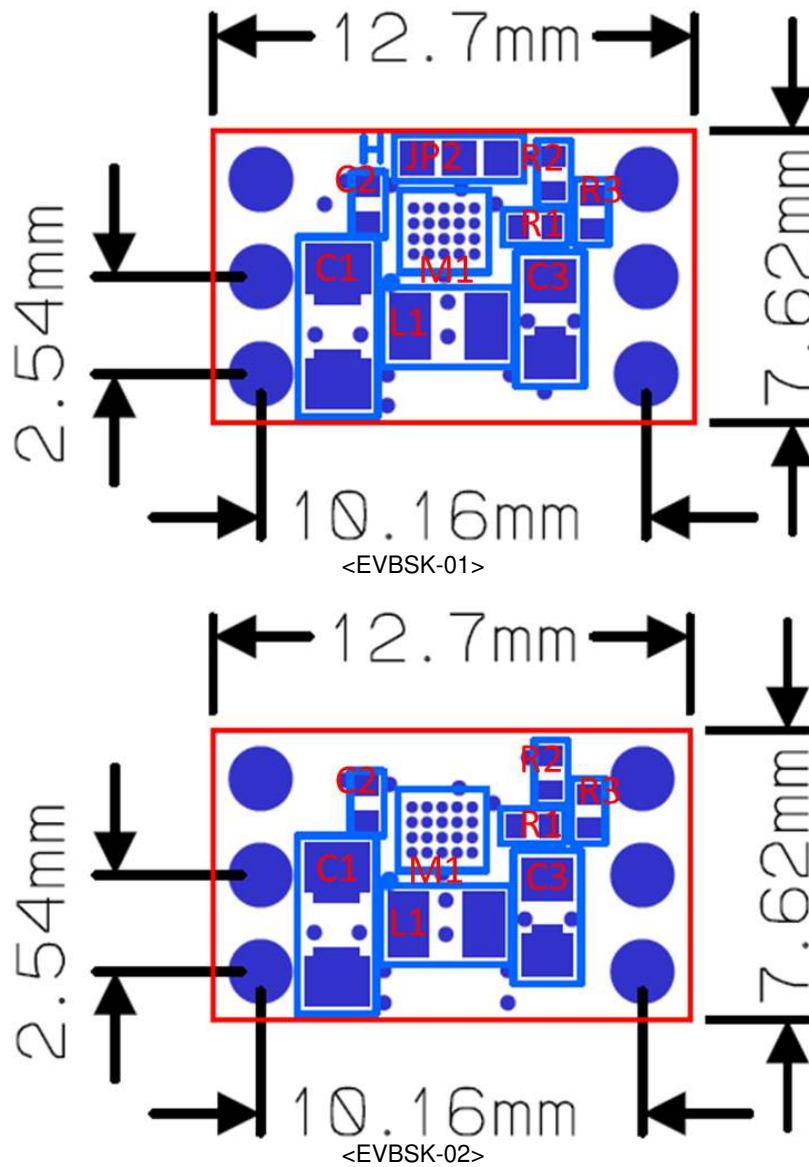
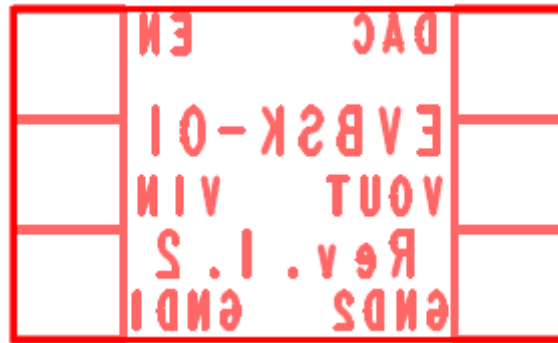
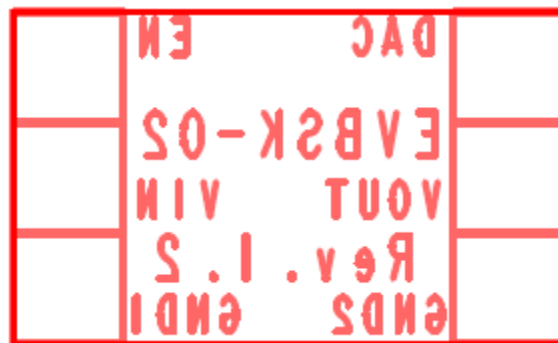


Figure 5-2. Component Layout (Layer 2, Top View)



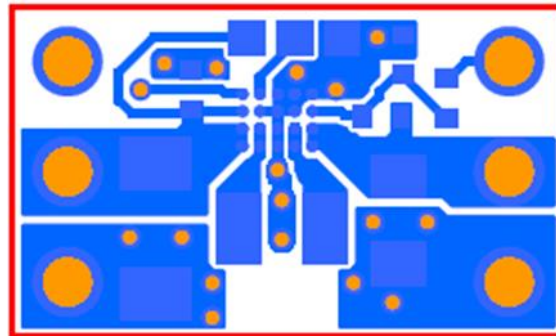
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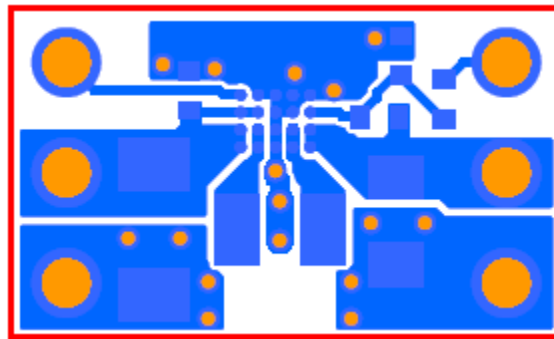
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5.2 Wiring Layout

Figure 5-3. Wiring Layout (Layer 1)

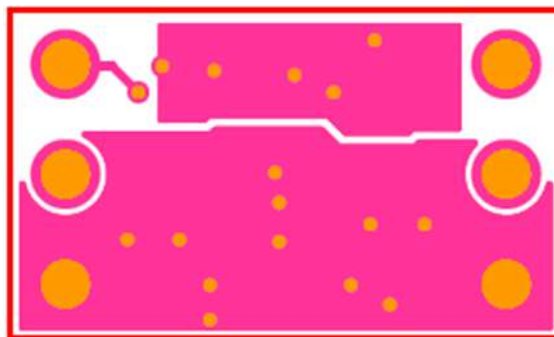


<EVBSK-01>



<EVBSK-02>

Figure 5-4. Wiring Layout (Layer 2, Top View)



<EVBSK-01/02>

6. Schematic Circuit



Figure 6-1. Schematic Circuit for Power Save Mode

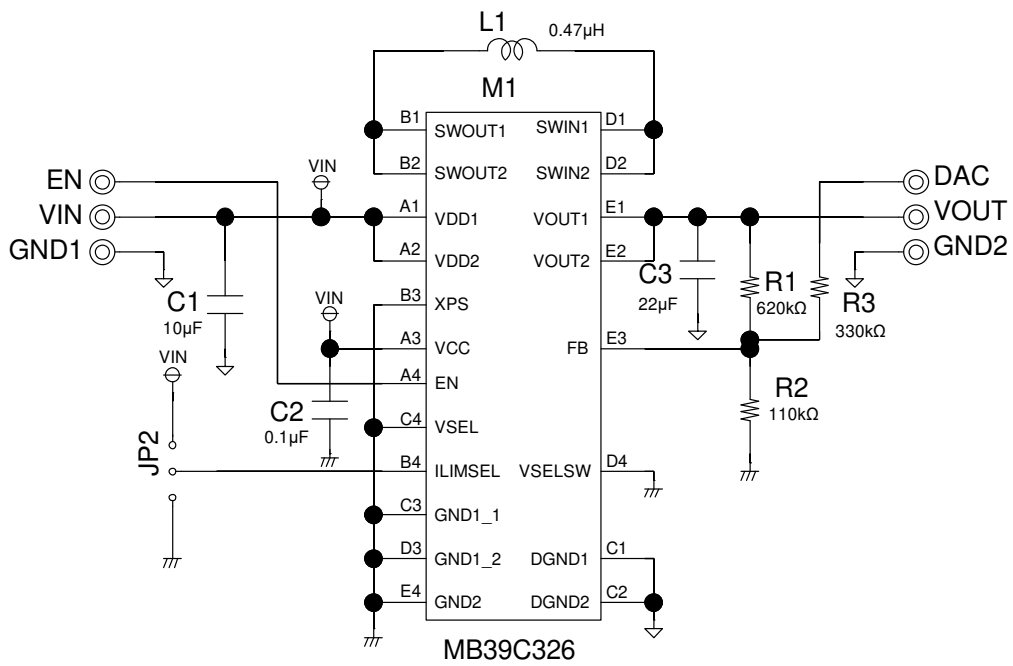
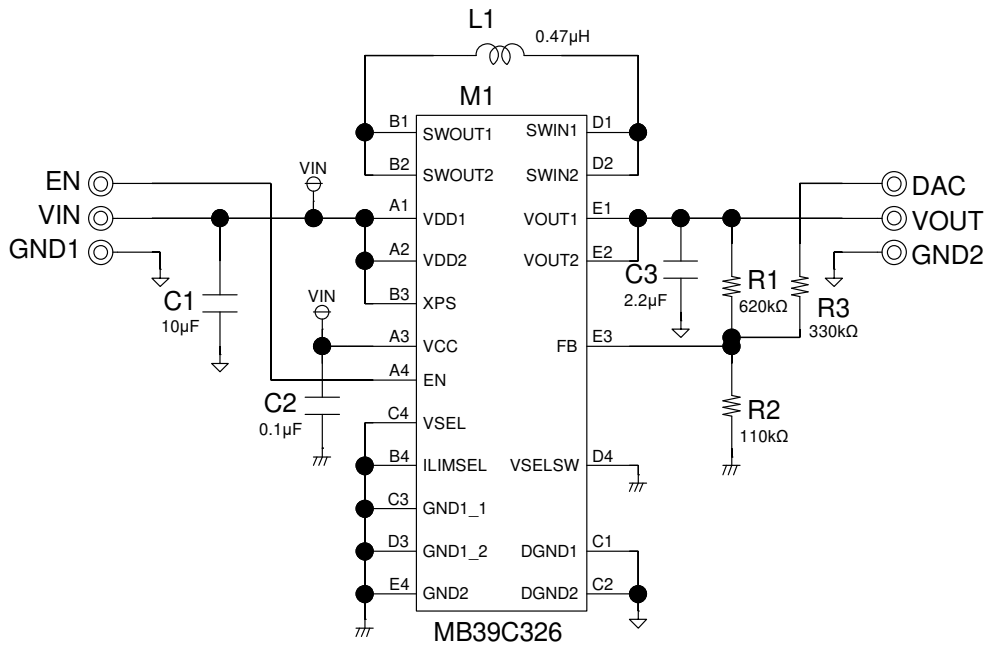


Figure 6-2. Schematic Circuit for Fixed PWM Mode



7. Component List



Table 7-1. Component List

| No. | Component | Item | Parts Number | Vendor | Value | Remarks |
|-----|-----------|-------------------|------------------|-------------|----------|---------------------------|
| 1 | M1 | PMIC | MB39C326 | Cypress | - | |
| 2 | L1 | Inductor | GLCHKR4701A | ALPS | 0.47μH | 35mΩ, 3.7A |
| 3 | C1 | Ceramic Capacitor | EMK107BBJ106MA-T | TAIYO YUDEN | 10μF | 16V, X5R, 1608 |
| 4 | C2 | Ceramic Capacitor | UMK105BJ104KV-F | TAIYO YUDEN | 0.1μF | 50V, X5R, 1005 |
| 5 | C3 | Ceramic Capacitor | EMK105ABJ225MV-F | TAIYO YUDEN | 2.2μF | 16V, X5R, 1005, EVBSK-02 |
| | | Ceramic Capacitor | JMK107BBJ226MA-T | TAIYO YUDEN | 22μF(*1) | 6.3V, X5R, 1608, EVBSK-01 |
| 6 | R1 | Chip Resistor | RK73H1ETTP6203F | KOA | 620kΩ | ±1.0% |
| 7 | R2 | Chip Resistor | RK73H1ETTP1103F | KOA | 110kΩ | ±1.0% |
| 8 | R3 | Chip Resistor | RK73H1ETTP3303F | KOA | 330kΩ | ±1.0% |
| 9 | JP2 | Solder jumper | JPPAD | - | - | H (Short to VIN) |

ALPS :Alps Green Devices Co., Ltd
 TAIYO YUDEN :Taiyo Yuden Co., LTD
 KOA :KOA Corporation

These components are compliant with RoHS. Please ask each vendor for details if necessary.

*1: EVBSK-01 operates by PFM mode at light load. Large output capacitor (around 22μF) is recommended to reduce the output ripple voltage.

8. Evaluation Board Picture



Figure 8-1. Picture of MB39C326-EVBSK-01

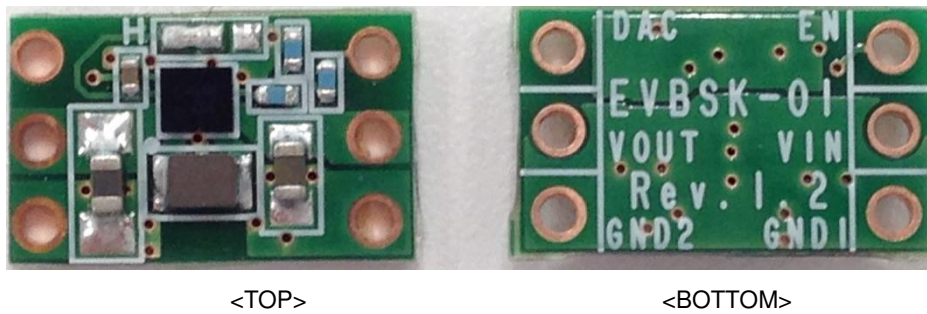
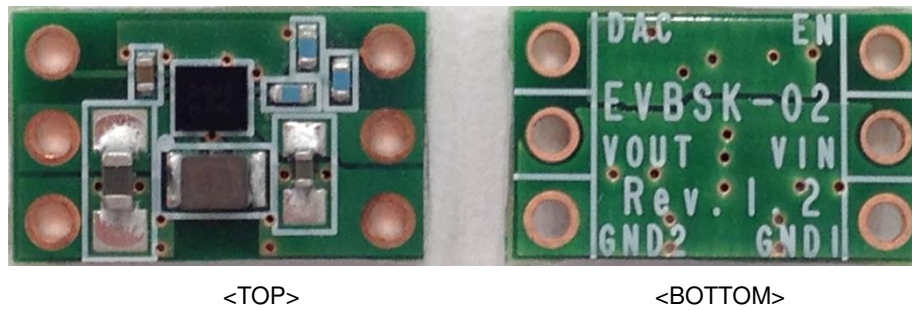


Figure 8-2. Picture of MB39C326-EVBSK-02



9. Ordering Information



Table 9-1. Ordering Information

| Part Number | EVB Revision | Note |
|-------------------|--------------|------|
| MB39C326-EVBSK-01 | Rev 1.2 | --- |
| MB39C326-EVBSK-02 | Rev 1.2 | --- |

Revision History



Document Revision History

| Document Title: MB39C326-EVBSK-01/02 6MHz Buck-boost DC/DC Converter Evaluation Board Operation Guide | | | |
|-------------------------------------------------------------------------------------------------------|------------|------------------|---------------------------------------------------------------------------------------------------------------------------|
| Document Number: 002-08675 | | | |
| Revision | Issue Date | Origin of Change | Description of Change |
| ** | 06/19/2015 | ATTS | Revision 01: Initial release |
| | | | Revision 02: Section 7 " Component List" Revised the Component of Component list GLC series → GLCHKR4701A |
| | | | Section 8 "Evaluation Board Picture" Inserted board pictures |
| *A | 02/05/2016 | ATTS | Migrated Spansion Guide from MB39C326-EVBSK-01/02_SS901-00022-2v0-E to Cypress format |
| *B | 06/11/2018 | ATTS | Updated Cypress Logo and Copyright year. Completing Sunset review. |