

# LT8335A

## 2A, 2MHz Low IQ Boost/ SEPIC/Inverting Converter

### DESCRIPTION

Demonstration circuits 2449A-A and 2449A-B feature the LT<sup>®</sup>8335, in boost and inverting configurations. The demo circuits demonstrate small size and low component count. The boost is designed to convert a 3V–10V source to 12V at 275mA. The inverter converts a 4.5V–13V source to –12V at 350mA. Refer to Figures 4 and 5 for maximum load current at different input voltage levels.

The LT8335 can operate with inputs as high as 25V, but in these demo circuits, the input is limited by the output voltage level in the boost and by the switch voltage rating in the inverter.

The DC2449A includes input UVLO voltage dividers individually tailored for each converter and an EN/UVLO pin for manual ON/OFF control.

The LT8335 includes user configurable undervoltage lock-out, frequency foldback, fixed 2MHz switching frequency and it is easily configured as boost, SEPIC or inverting converter.

The data sheet gives a complete description of the device, operation and application information. The data sheet must be read in conjunction with this demo manual for DC2449A.

**Design files for this circuit board are available at <http://www.linear.com/demo/DC2449A>**

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### PERFORMANCE SUMMARY

Specifications are at  $T_A = 25^\circ\text{C}$

| SYMBOL              | PARAMETER            | CONDITIONS                                     | MIN    | TYP | MAX    | UNITS |
|---------------------|----------------------|--|--------|-----|--------|-------|
| <b>DC2449A-A</b>    |                      |  |        |     |        |       |
| $V_{IN}$            | Input Supply Range   |  | 3      |     | 10     | V     |
| $V_{OUT}$           | Output Voltage Range | $V_{IN} = 3\text{V}, I_{LOAD} = 275\text{mA}$  | 11.64  | 12  | 12.36  | V     |
| Ripple              |                      | $V_{IN} = 3\text{V}, I_{LOAD} = 275\text{mA}$  |        | 50  |        | mV    |
| Efficiency          |                      | $V_{IN} = 6\text{V}, I_{LOAD} = 500\text{mA}$  |        | 92  |        | %     |
| Switching Frequency |                      |  |        | 2   |        | MHz   |
| <b>DC2449A-B</b>    |                      |  |        |     |        |       |
| $V_{IN}$            | Input Supply Range   |  | 4.5    |     | 13     | V     |
| $V_{OUT}$           | Output Voltage Range | $V_{IN} = 5\text{V}, I_{LOAD} = 350\text{mA}$  | -11.64 | -12 | -12.36 | V     |
| Ripple              |                      | $V_{IN} = 5\text{V}, I_{LOAD} = 350\text{mA}$  |        | 20  |        | mV    |
| Efficiency          |                      | $V_{IN} = 12\text{V}, I_{LOAD} = 350\text{mA}$ |        | 87  |        | %     |
| Switching Frequency |                      |  |        | 2   |        | MHz   |

# DEMO MANUAL DC2449A

## QUICK START PROCEDURE

Demo circuit 2449A is easy to set up to evaluate the performance of the LT8335. Refer to Figures 1 and 2 for proper measurement equipment setup and follow the procedure below:

NOTE: When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the VIN or VOUT and GND terminals. See Figure 3 for proper scope probe technique.

1. With power off, connect the input power supply to VIN and GND.

2. Turn on the power at the input.

NOTE: Make sure that the input voltage does not exceed 10V for DC2449A-A and 13V for DC2449A-B.

3. Check for the proper output voltage.

If there is no output, temporarily disconnect the load to make sure that the load is not set too high.

NOTE:

4. Once the proper output voltages are established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

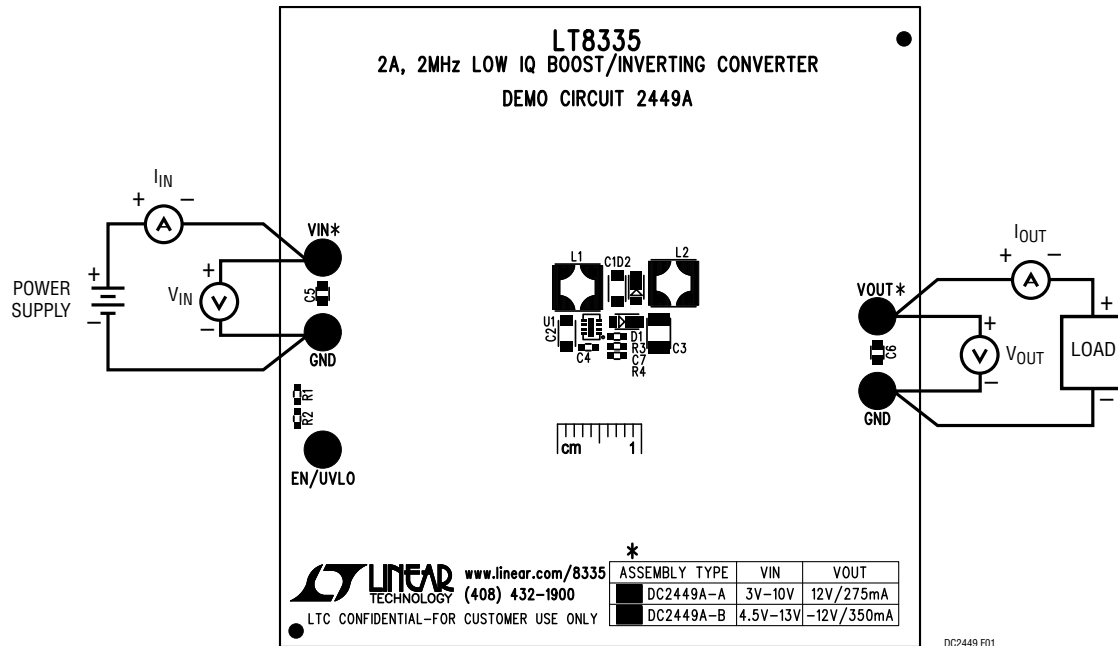


Figure 1. DC2449A-A Proper Equipment Setup

DC2449 F01

## QUICK START PROCEDURE

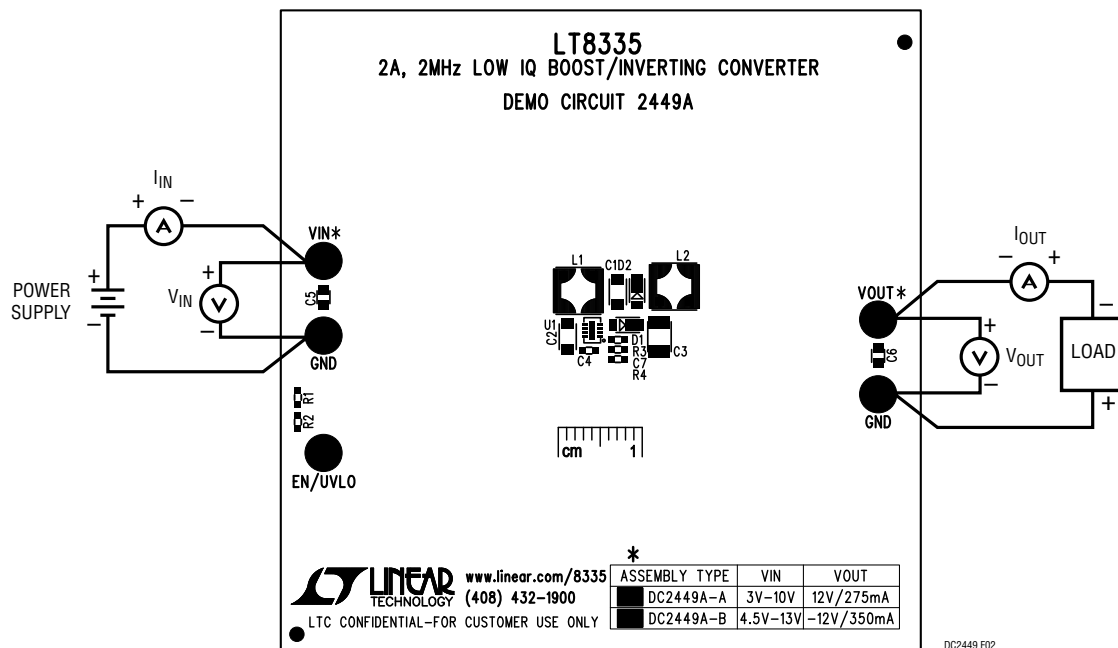


Figure 2. DC2449A-B Proper Equipment Setup

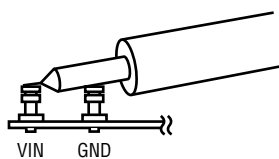


Figure 3. Measuring Input or Output Ripple

## QUICK START PROCEDURE

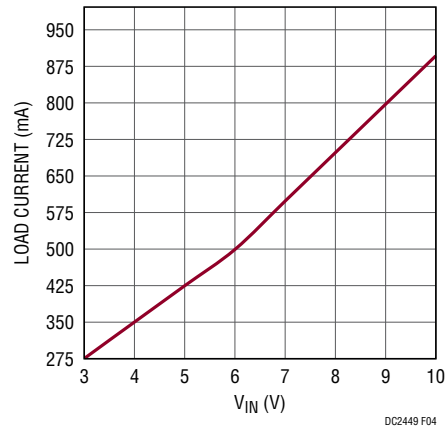


Figure 4. DC2449A-A Maximum Load Current vs Input Voltage

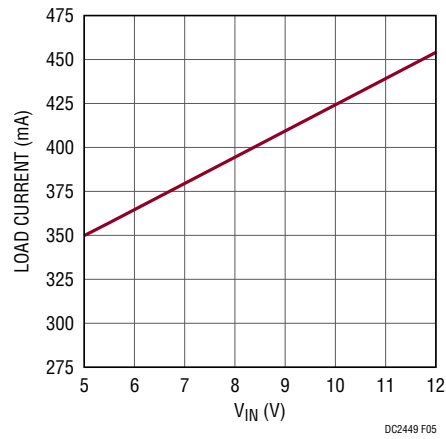
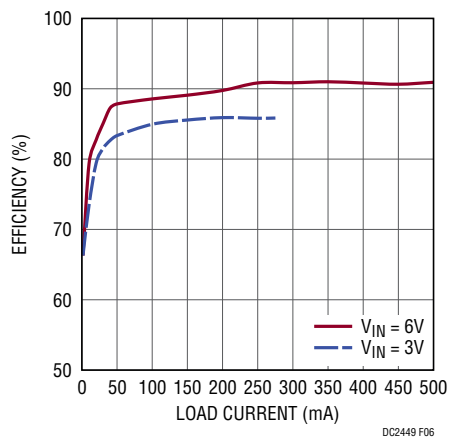
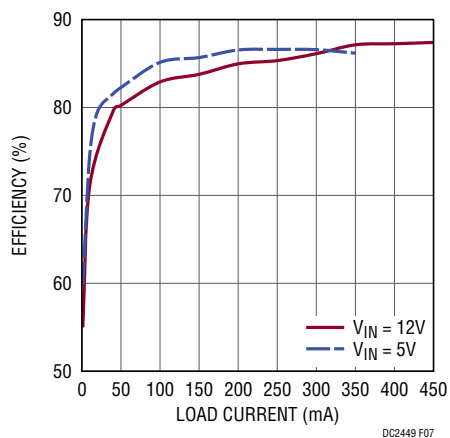


Figure 5. DC2449A-B Maximum Load Current vs Input Voltage

**QUICK START PROCEDURE**



**Figure 6. DC2449A-A Efficiency**



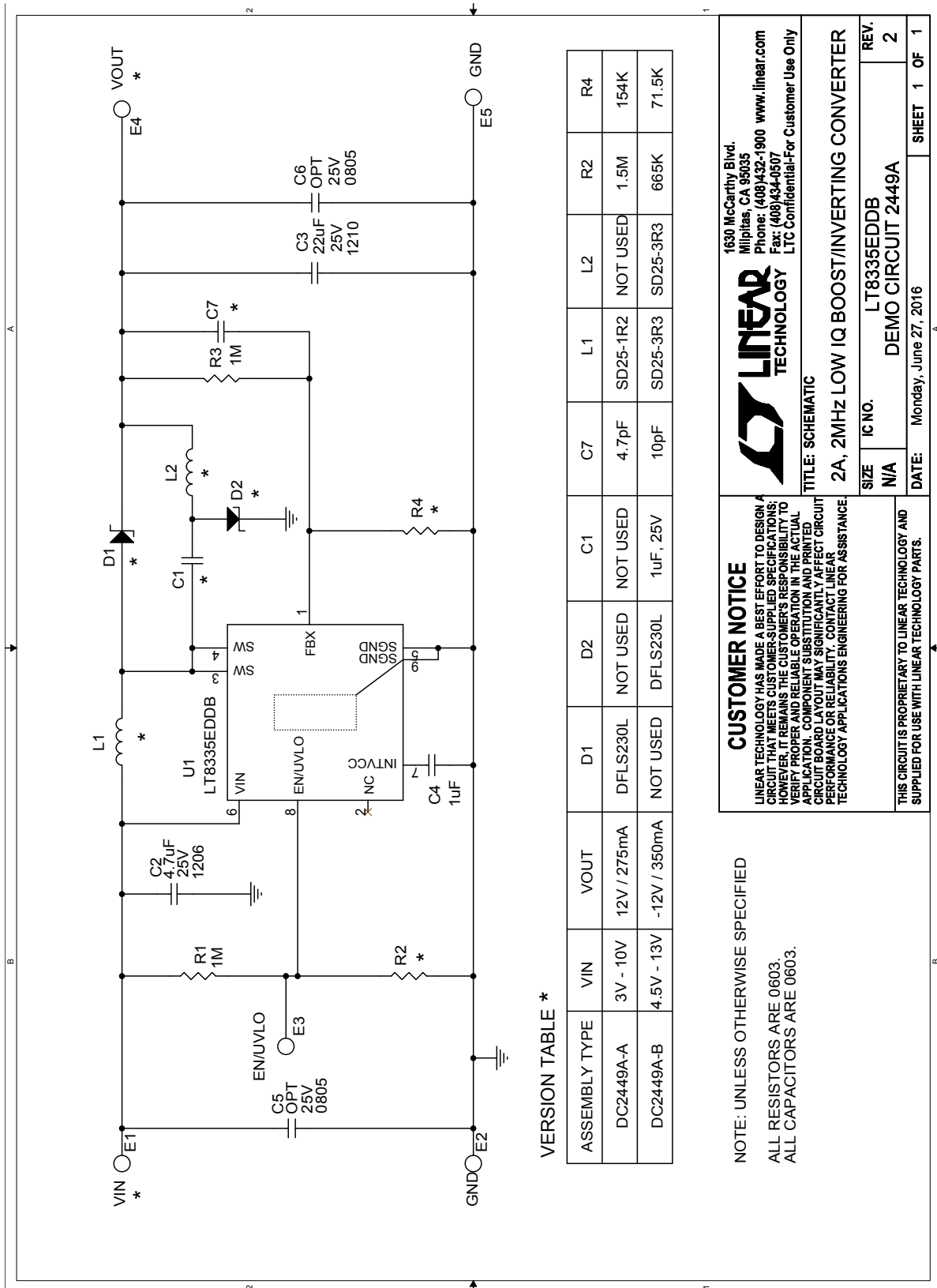
**Figure 7. DC2449A-B Efficiency**

# DEMO MANUAL DC2449A

## PARTS LIST

| ITEM  | QTY | REFERENCE  | PART DESCRIPTION                         | MANUFACTURER/PART NUMBER          |
|---|-----|------------|--|-----------------------------------|
| <b>DC2449A-A Required Circuit Components</b>              |     |            |  |                                   |
| 1   | 1   | C2         | CAP, 4.7 $\mu$ F, X7R, 25V, 10%, 1206    | MURATA, GRM31CR71E475KA88L        |
| 2   | 1   | C3         | CAP, 22 $\mu$ F, X7R, 25V, 10%, 1210     | MURATA, GRM32ER71E226KE15L        |
| 3   | 1   | C4         | CAP, 1 $\mu$ F, X7R, 25V, 10%, 0603      | MURATA, GRM188R71E105KA12D        |
| 3   | 1   | C7         | CAP, 4.7pF, C0G, 25V, $\pm$ 0.25pF, 0603 | AVX, 06033A4R7CAT4A               |
| 4   | 1   | D1         | DIODE, 2A, POWER-DI-123                  | DIODES., DFLS230L-7               |
| 5   | 1   | L1         | INDUCTOR, 1.2 $\mu$ H, SD25              | COOPER, SD25-1R2                  |
| 6   | 2   | R1,R3      | RES., 1M, 1/10W, 1%, 0603                | VISHAY, CRCW06031M00FKEA          |
| 7   | 1   | R2         | RES., 1.5M, 1/10W, 1%, 0603              | VISHAY, CRCW06031M50FKEA          |
| 8   | 1   | R4         | RES., 154k, 1/10W, 1%, 0603              | VISHAY, CRCW0603154KFKEA          |
| 9   | 1   | U1         | IC., LT8335, DPN-8, 3X2MM                | LINEAR TECH., LT8335EDDB#PBF      |
| <b>DC2449A-A Additional Demo Board Circuit Components</b> |     |            |  |                                   |
| 1   | 0   | C5,C6(OPT) | CAP, OPT 0805                            |                                   |
| 2   | 0   | C1(OPT)    | CAP, OPT 1206                            |                                   |
| 3   | 0   | D2(OPT)    | DIODE, OPT                               |                                   |
| 4   | 0   | L2(OPT)    | INDUCTOR, OPT                            |                                   |
| <b>DC2449A-A Hardware: for Demo Board Only</b>            |     |            |  |                                   |
| 1   | 5   | E1-E5      | TESTPOINT, TURRET, 0.094" pbf            | MILL-MAX, 2501-2-00-80-00-00-07-0 |
| <b>DC2449A-B Required Circuit Components</b>              |     |            |  |                                   |
| 1   | 1   | C1         | CAP, 1 $\mu$ F, X7R, 25V, 10%, 1206      | MURATA, GRM31MR71E105KA01L        |
| 2   | 1   | C2         | CAP, 4.7 $\mu$ F, X7R, 25V, 10%, 1206    | MURATA, GRM31CR71E475KA88L        |
| 3   | 1   | C3         | CAP, 22 $\mu$ F, X7R, 25V, 10%, 1210     | MURATA, GRM32ER71E226KE15L        |
| 4   | 1   | C4         | CAP, 1 $\mu$ F, X7R, 25V, 10%, 0603      | MURATA, GRM188R71E105KA12D        |
| 5   | 1   | C7         | CAP, 10pF, C0G, 25V, 5%, 0603            | AVX, 06033A100JAT2A               |
| 6   | 1   | D2         | DIODE, 2A, POWER-DI-123                  | DIODES., DFLS230L-7               |
| 7   | 2   | L1,L2      | INDUCTOR, 3.3 $\mu$ H, SD25              | COOPER, SD25-3R3                  |
| 8   | 2   | R1,R3      | RES., 1M, 1/10W, 1%, 0603                | VISHAY, CRCW06031M00FKEA          |
| 9   | 1   | R2         | RES., 665k, 1/10W, 1%, 0603              | VISHAY, CRCW0603665KFKEA          |
| 10  | 1   | R4         | RES., 71.5k, 1/10W, 1%, 0603             | VISHAY, CRCW060371K5FKEA          |
| 11  | 1   | U1         | IC., LT8335, DPN-8, 3X2MM                | LINEAR TECH., LT8335EDDB#PBF      |
| <b>DC2449A-B Additional Demo Board Circuit Components</b> |     |            |  |                                   |
| 1   | 0   | C5,C6(OPT) | CAP, OPT 0805                            |                                   |
| 2   | 0   | D1(OPT)    | DIODE, OPT                               |                                   |
| <b>DC2449A-B Hardware: for Demo Board Only</b>            |     |            |  |                                   |
| 1   | 5   | E1-E5      | TESTPOINT, TURRET, 0.094" pbf            | MILL-MAX, 2501-2-00-80-00-00-07-0 |

**SCHEMATIC DIAGRAM**



VERSION TABLE \*

| ASSEMBLY TYPE | VIN        | VOUT         | D1       | D2       | C1       | C7    | L1       | L2       | R2   | R4    |
|---------------|------------|--------------|----------|----------|----------|-------|----------|----------|------|-------|
| DC2449A-A     | 3V - 10V   | 12V / 275mA  | DFLS230L | NOT USED | NOT USED | 4.7pF | SD25-1R2 | NOT USED | 1.5M | 154K  |
| DC2449A-B     | 4.5V - 13V | -12V / 350mA | NOT USED | DFLS230L | 1uF, 25V | 10pF  | SD25-3R3 | SD25-3R3 | 665K | 71.5K |

NOTE: UNLESS OTHERWISE SPECIFIED  
ALL RESISTORS ARE 0603.  
ALL CAPACITORS ARE 0603.

**CUSTOMER NOTICE**  
LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.

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**TITLE: SCHEMATIC**  
**2A, 2MHz LOW IQ BOOST/INVERTING CONVERTER**

|       |                       |       |        |
|-------|-----------------------|-------|--------|
| SIZE  | IC NO.                | REV.  |        |
| N/A   | LT8335EDDB            | 2     |        |
| DATE: | Monday, June 27, 2016 | SHEET | 1 OF 1 |

# DEMO MANUAL DC2449A

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