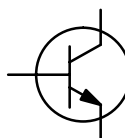


# SWITCHMODE™ NPN Silicon Planar Power Transistor

The BUD43B has an application specific state-of-the-art die designed for use in 220 V line operated Switchmode Power supplies and electronic ballast ("light ballast"). The main advantages brought by this new transistor are:

- Improved Efficiency Due to Low Base Drive Requirements:
- High and Flat DC Current Gain  $h_{FE}$
- Fast and Tightened Switching Distributions
- No Coil Required in Base Circuit for Fast Turn-off (no current tail)



## MAXIMUM RATINGS

| Rating                                               | Symbol         | Value      | Unit                |
|------------------------------------------------------|----------------|------------|---------------------|
| Collector-Emitter Sustaining Voltage                 | $V_{CEO}$      | 350        | Vdc                 |
| Collector-Base Breakdown Voltage                     | $V_{CBO}$      | 650        | Vdc                 |
| Collector-Emitter Breakdown Voltage                  | $V_{CES}$      | 650        | Vdc                 |
| Emitter-Base Voltage                                 | $V_{EBO}$      | 9          | Vdc                 |
| Collector Current — Continuous                       | $I_C$          | 2          | Adc                 |
| — Peak (1)                                           | $I_{CM}$       | 4          |                     |
| Base Current — Continuous                            | $I_B$          | 1          | Adc                 |
| — Peak (1)                                           | $I_{BM}$       | 2          |                     |
| *Total Device Dissipation @ $T_C = 25^\circ\text{C}$ | $P_D$          | 25         | Watt                |
| *Derate above $25^\circ\text{C}$                     |                | 0.2        | W/ $^\circ\text{C}$ |
| Operating and Storage Temperature                    | $T_J, T_{stg}$ | -65 to 150 | $^\circ\text{C}$    |

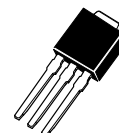
## THERMAL CHARACTERISTICS

|                                                                               |                 |      |                    |
|-------------------------------------------------------------------------------|-----------------|------|--------------------|
| Thermal Resistance                                                            |                 |      | $^\circ\text{C/W}$ |
| — Junction to Case                                                            | $R_{\theta JC}$ | 5    |                    |
| — Junction to Ambient                                                         | $R_{\theta JA}$ | 71.4 |                    |
| Maximum Lead Temperature for Soldering Purposes: 1/8" from case for 5 seconds | $T_L$           | 260  | $^\circ\text{C}$   |

(1) Pulse Test: Pulse Width = 5 ms, Duty Cycle.

## BUD43B

POWER TRANSISTORS  
2 AMPERES  
700 VOLTS  
25 WATTS

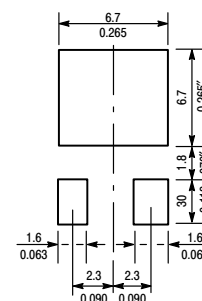


CASE 369-07



CASE 369A-13

MINIMUM PAD SIZES  
RECOMMENDED FOR  
SURFACE MOUNTED  
APPLICATIONS



# BUD43B

## ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

### OFF CHARACTERISTICS

|                                                                                                                                              |                |     |  |           |                 |
|----------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----|--|-----------|-----------------|
| Collector–Emitter Sustaining Voltage<br>( $I_C = 100\text{ mA}$ , $L = 25\text{ mH}$ )                                                       | $V_{CEO(sus)}$ | 350 |  |           | Vdc             |
| Collector Cutoff Current<br>( $V_{CE} = \text{Rated } V_{CEO}$ , $I_B = 0$ )                                                                 | $I_{CEO}$      |     |  | 100       | $\mu\text{Adc}$ |
| Collector Cutoff Current<br>( $V_{CE} = \text{Rated } V_{CES}$ , $V_{BE} = 0$ )<br>@ $T_C = 25^\circ\text{C}$<br>@ $T_C = 125^\circ\text{C}$ | $I_{CES}$      |     |  | 10<br>200 | $\mu\text{Adc}$ |
| Emitter–Cutoff Current<br>( $V_{EB} = 9\text{ Vdc}$ , $I_C = 0$ )                                                                            | $I_{EBO}$      |     |  | 100       | $\mu\text{Adc}$ |

### ON CHARACTERISTICS

|                                                                                                                                                                                         |               |        |  |     |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------|--|-----|-----|
| Base–Emitter Saturation Voltage<br>( $I_C = 2\text{ Adc}$ , $I_B = 0.5\text{ Adc}$ )                                                                                                    | $V_{BE(sat)}$ |        |  | 125 | Vdc |
| Collector–Emitter Saturation Voltage<br>( $I_C = 2\text{ Adc}$ , $I_B = 0.5\text{ Adc}$ )<br>@ $T_C = 25^\circ\text{C}$                                                                 | $V_{CE(sat)}$ |        |  | 1   | Vdc |
| DC Current Gain<br>( $I_C = 1\text{ Adc}$ , $V_{CE} = 2\text{ Vdc}$ )<br>( $I_C = 2\text{ Adc}$ , $V_{CE} = 5\text{ Vdc}$ )<br>@ $T_C = 25^\circ\text{C}$<br>@ $T_C = 25^\circ\text{C}$ | $h_{FE}$      | 8<br>6 |  |     |     |

### DYNAMIC CHARACTERISTICS

|                                                                                                      |          |  |     |  |     |
|------------------------------------------------------------------------------------------------------|----------|--|-----|--|-----|
| Current Gain Bandwidth<br>( $I_C = 0.5\text{ Adc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1\text{ MHz}$ ) | $f_T$    |  | 13  |  | MHz |
| Output Capacitance<br>( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1\text{ MHz}$ )                  | $C_{ob}$ |  | 40  |  | pF  |
| Input Capacitance<br>( $V_{EB} = 8\text{ V}$ )                                                       | $C_{ib}$ |  | 400 |  | pF  |

### SWITCHING CHARACTERISTICS (Resistive Load) (D.C. $\leq 10\%$ , Pulse Width = $20\text{ }\mu\text{s}$ )

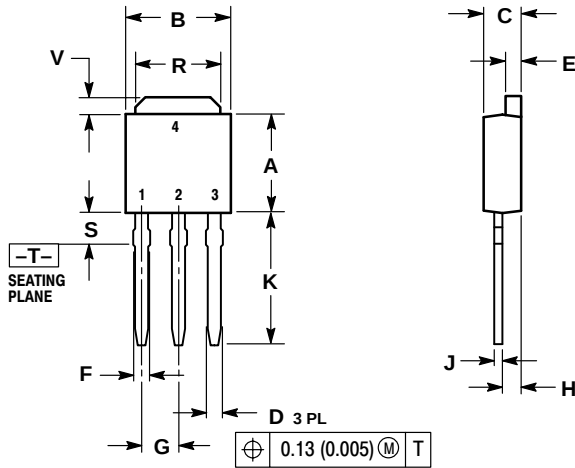
|                                                                                                                                                               |           |     |  |     |               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----|--|-----|---------------|
| Turn–on Time<br>( $I_C = 1.2\text{ Adc}$ , $I_{B1} = 0.4\text{ Adc}$ ,<br>$I_{B2} = 0.1\text{ Adc}$ , $V_{CC} = 300\text{ V}$ )<br>@ $T_C = 25^\circ\text{C}$ | $t_{off}$ | 4.7 |  | 5.8 | $\mu\text{s}$ |
| Fall Time<br>( $I_C = 2.5\text{ Adc}$ , $I_{B1} = 0.5\text{ Adc}$ ,<br>$I_{B2} = 0.5\text{ Adc}$ , $V_{CC} = 150\text{ V}$ )<br>@ $T_C = 25^\circ\text{C}$    | $t_f$     |     |  | 800 | ns            |

# BUD43B

## PACKAGE DIMENSIONS

### DPAK CASE 369-07 ISSUE M

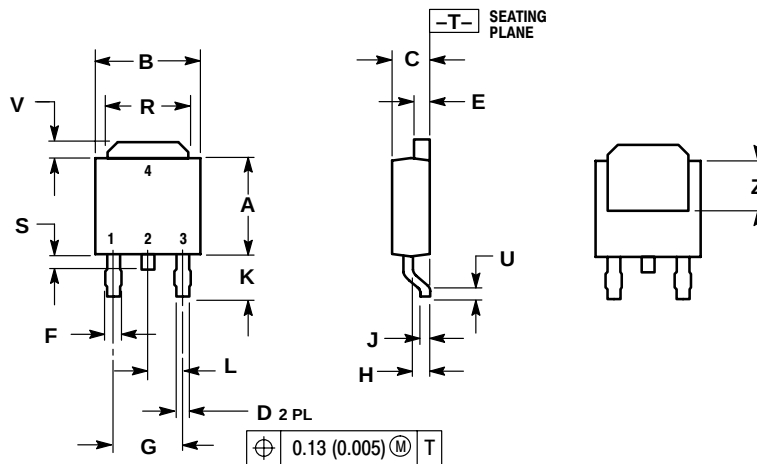
SCALE 1:1



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES    |       | MILLIMETERS |      |
|-----|-----------|-------|-------------|------|
|     | MIN       | MAX   | MIN         | MAX  |
| A   | 0.235     | 0.250 | 5.97        | 6.35 |
| B   | 0.250     | 0.265 | 6.35        | 6.73 |
| C   | 0.086     | 0.094 | 2.19        | 2.38 |
| D   | 0.027     | 0.035 | 0.69        | 0.88 |
| E   | 0.033     | 0.040 | 0.84        | 1.01 |
| F   | 0.037     | 0.047 | 0.94        | 1.19 |
| G   | 0.090 BSC |       | 2.29 BSC    |      |
| H   | 0.034     | 0.040 | 0.87        | 1.01 |
| J   | 0.018     | 0.023 | 0.46        | 0.58 |
| K   | 0.350     | 0.380 | 8.89        | 9.65 |
| R   | 0.175     | 0.215 | 4.45        | 5.46 |
| S   | 0.050     | 0.090 | 1.27        | 2.28 |
| V   | 0.030     | 0.050 | 0.77        | 1.27 |

### DPAK CASE 369A-13 ISSUE AA



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES    |       | MILLIMETERS |      |
|-----|-----------|-------|-------------|------|
|     | MIN       | MAX   | MIN         | MAX  |
| A   | 0.235     | 0.250 | 5.97        | 6.35 |
| B   | 0.250     | 0.265 | 6.35        | 6.73 |
| C   | 0.086     | 0.094 | 2.19        | 2.38 |
| D   | 0.027     | 0.035 | 0.69        | 0.88 |
| E   | 0.033     | 0.040 | 0.84        | 1.01 |
| F   | 0.037     | 0.047 | 0.94        | 1.19 |
| G   | 0.180 BSC |       | 4.58 BSC    |      |
| H   | 0.034     | 0.040 | 0.87        | 1.01 |
| J   | 0.018     | 0.023 | 0.46        | 0.58 |
| K   | 0.102     | 0.114 | 2.60        | 2.89 |
| L   | 0.090 BSC |       | 2.29 BSC    |      |
| R   | 0.175     | 0.215 | 4.45        | 5.46 |
| S   | 0.020     | 0.050 | 0.51        | 1.27 |
| U   | 0.020     | ---   | 0.51        | ---  |
| V   | 0.030     | 0.050 | 0.77        | 1.27 |
| Z   | 0.138     | ---   | 3.51        | ---  |

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