



# BU931

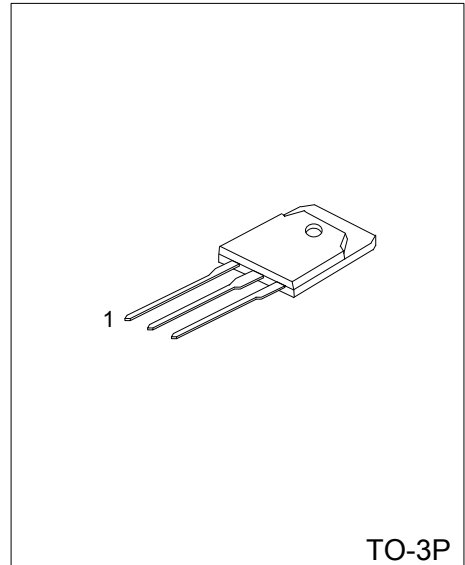
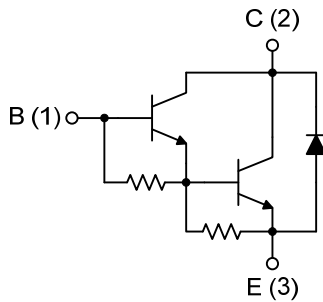
## NPN SILICON TRANSISTOR

### NPN POWER DARLINGTON

■ FEATURES

- \* High operating junction temperature
- \* High voltage ignition coil driver
- \* Very rugged bipolar technology

■ INTERNAL SCHEMATIC DIAGRAM



TO-3P

■ ORDERING INFORMATION

| Ordering Number |              | Package | Pin Assignment |   |   | Packing |
|-----------------|--------------|---------|----------------|---|---|---------|
| Lead Free       | Halogen Free |         | 1              | 2 | 3 |         |
| BU931L-T3P-T    | BU931G-T3P-T | TO-3P   | B              | C | E | Tube    |

|   |   |
|---|---|
| <p>BU931L-T3P-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Plating</p> | <p>(1) T: Tube</p> <p>(2) T3P: TO-3P</p> <p>(3) G: Halogen Free, L: Lead Free</p> |
|---|---|

### ■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| PARAMETER                                      | SYMBOL           | RATINGS    | UNIT |
|--|------------------|------------|------|
| Collector-Emitter Voltage (V <sub>BE</sub> =0) | V <sub>CES</sub> | 500        | V    |
| Collector-Emitter Voltage (I <sub>B</sub> =0)  | V <sub>CEO</sub> | 400        | V    |
| Emitter-Base Voltage (I <sub>C</sub> =0)       | V <sub>EBO</sub> | 5          | V    |
| Collector Current                              | I <sub>C</sub>   | 15         | A    |
| Collector Peak Current                         | I <sub>CM</sub>  | 30         | A    |
| Base Current                                   | I <sub>B</sub>   | 1          | A    |
| Base Peak Current                              | I <sub>BM</sub>  | 5          | A    |
| Power Dissipation (T <sub>C</sub> =25°C)       | P <sub>D</sub>   | 175        | W    |
| Junction Temperature                           | T <sub>J</sub>   | +200       | °C   |
| Storage Temperature                            | T <sub>STG</sub> | -65 ~ +200 | °C   |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### ■ THERMAL DATA

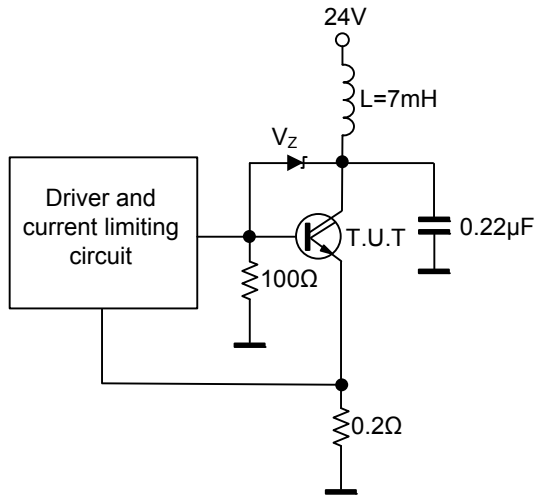
| PARAMETER        | SYMBOL          | RATING | UNIT |
|------------------|-----------------|--------|------|
| Junction to Case | θ <sub>JC</sub> | 1.1    | °C/W |

### ■ ELECTRICAL CHARACTERISTICS

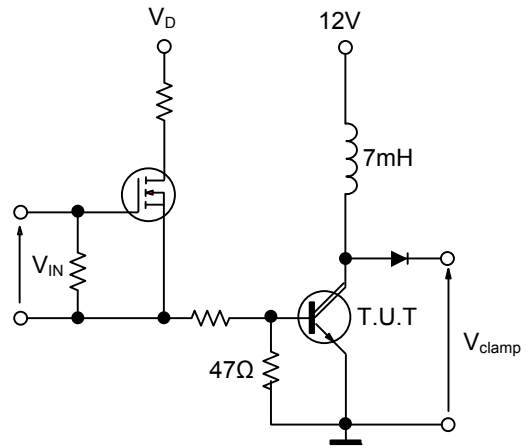
| PARAMETER                                     | SYMBOL               | TEST CONDITIONS  | MIN | TYP | MAX | UNIT |
|---|----------------------|--|-----|-----|-----|------|
| Collector Cut-off Current (I <sub>B</sub> =0) | I <sub>CEO</sub>     | V <sub>CE</sub> = 450 V  |     |     | 100 | μA   |
|   |                      | V <sub>CE</sub> = 450V, T <sub>J</sub> = 125°C   |     |     | 0.5 | mA   |
| Emitter Cut-off Current (I <sub>C</sub> =0)   | I <sub>EBO</sub>     | V <sub>EB</sub> = 5V   |     |     | 20  | mA   |
| Collector-Emitter Saturation Voltage (Note)   | V <sub>CE(SAT)</sub> | I <sub>C</sub> = 7A, I <sub>B</sub> = 70mA   |     |     | 1.6 | V    |
|   |                      | I <sub>C</sub> = 8A, I <sub>B</sub> = 100mA  |     |     | 1.8 | V    |
|   |                      | I <sub>C</sub> = 10A, I <sub>B</sub> = 250mA   |     |     | 1.8 | V    |
| Base-Emitter Saturation Voltage (Note)        | V <sub>BE(SAT)</sub> | I <sub>C</sub> = 7A, I <sub>B</sub> = 70mA   |     |     | 2.2 | V    |
|   |                      | I <sub>C</sub> = 8A, I <sub>B</sub> = 100mA  |     |     | 2.4 | V    |
|   |                      | I <sub>C</sub> = 10A, I <sub>B</sub> = 250mA   |     |     | 2.5 | V    |
| DC Current Gain                               | h <sub>FE</sub>      | I <sub>C</sub> = 5A, V <sub>CE</sub> = 10V   | 300 |     |     |      |
| Diode Forward Voltage                         | V <sub>F</sub>       | I <sub>F</sub> = 10 A  |     |     | 2.5 | V    |
| Functional Test                               |                      | V <sub>CC</sub> = 24V, V <sub>clamp</sub> = 400V<br>L = 7mH                              | 8   |     |     | A    |
| Inductive Load Storage Time / Fall Time       | t <sub>s</sub>       | V <sub>CC</sub> = 12V, V <sub>clamp</sub> = 300V<br>L = 7mH                              |     | 15  |     | μs   |
|   | t <sub>f</sub>       | I <sub>C</sub> = 7A, I <sub>B</sub> = 70mA<br>V <sub>BE</sub> = 0, R <sub>BE</sub> = 47Ω |     | 0.5 |     | μs   |

Note: Pulsed: Pulse duration = 300μs, duty cycle 1.5 %

## ■ TEST CIRCUITS

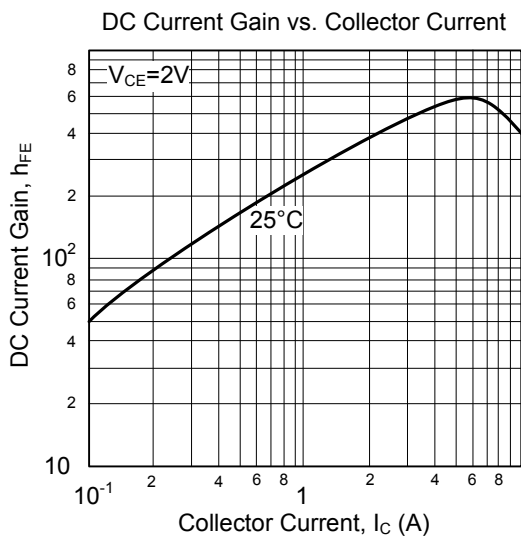
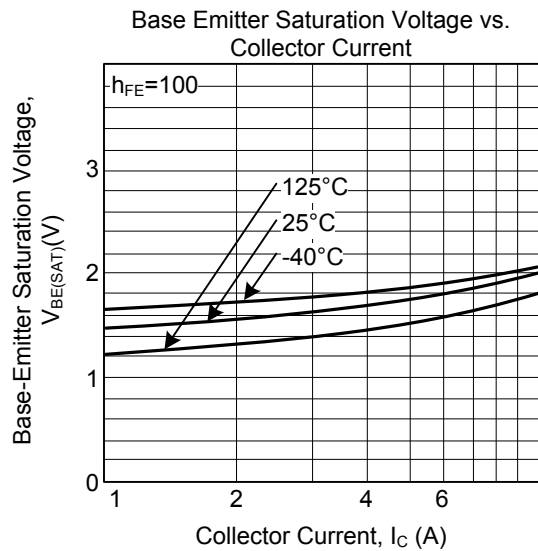
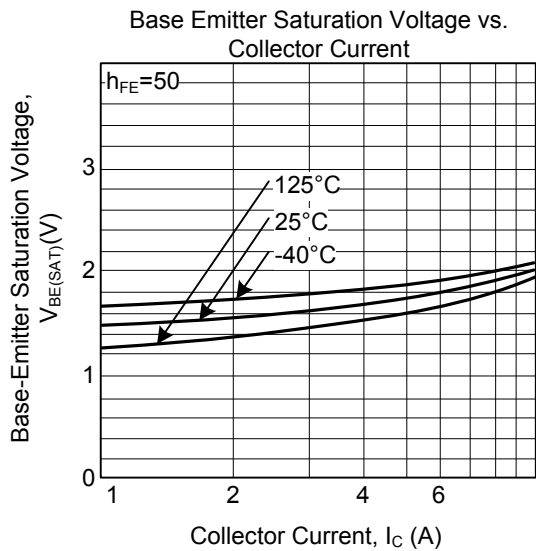
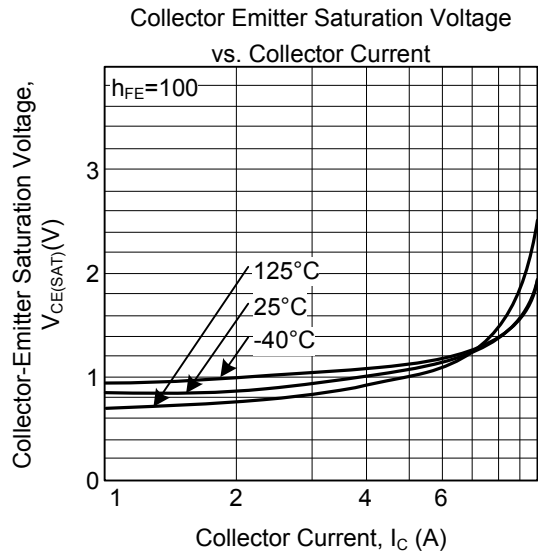
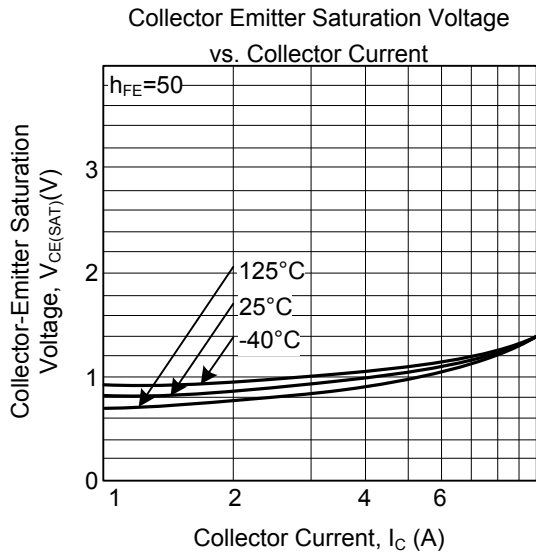


Functional Test Circuit



Switching Time Test Circuit

## TYPICAL CHARACTERISTICS



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