



YOUSHANG SEMICONDUCTOR

**设计研发新型功率器件**

**各类小信号开关**

**中低压及高压大电流等场效应管**

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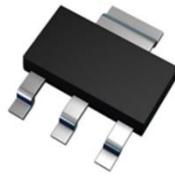
## Features

- $BV_{CEO} > -300V$
- $I_C = -0.5A$  Continuous Current
- $I_{CM} = -1A$  Peak Pulse Current
- Complementary NPN Type: NK-FZT657

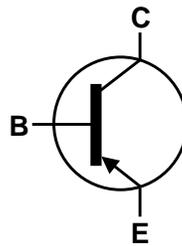
## Mechanical Data

- Package: SOT223
- Package Material: Molded Plastic. "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads; Solderable per MIL-STD-202, Method 208<sup>③</sup>
- Weight: 0.112 grams (Approximate)

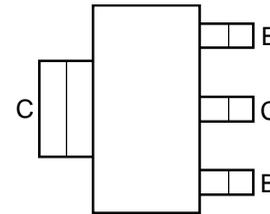
SOT223



Top View



Device Symbol



Top View  
Pin-Out

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CB0</sub> | -300  | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | -300  | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | -7    | V    |
| Continuous Collector Current | I <sub>C</sub>   | -0.5  | A    |
| Peak Pulse Current           | I <sub>CM</sub>  | -1    | A    |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

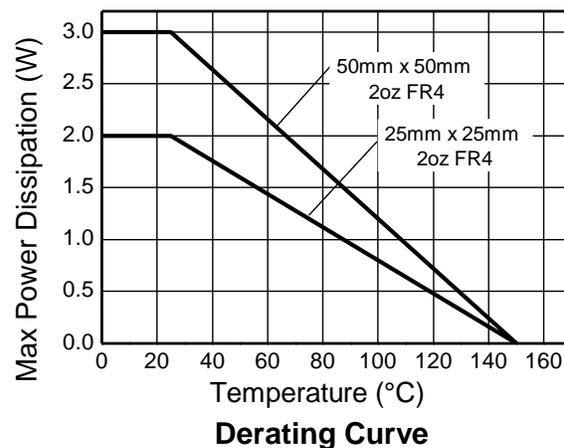
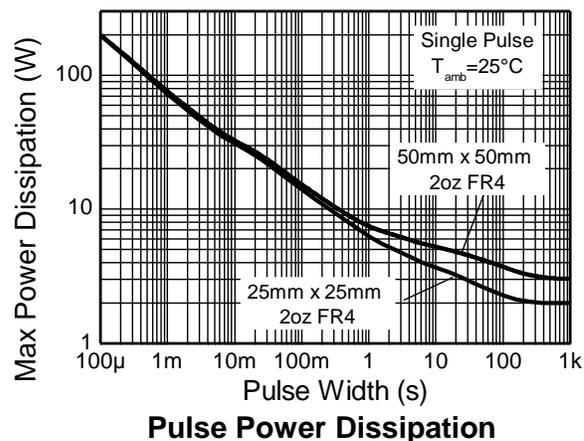
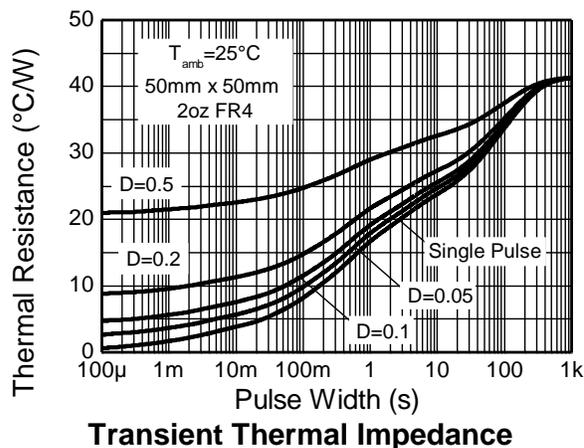
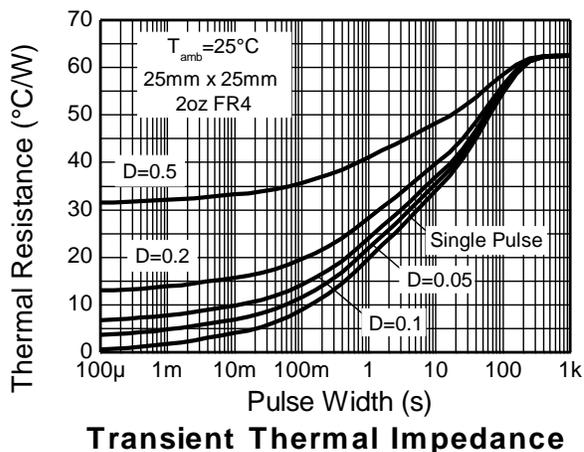
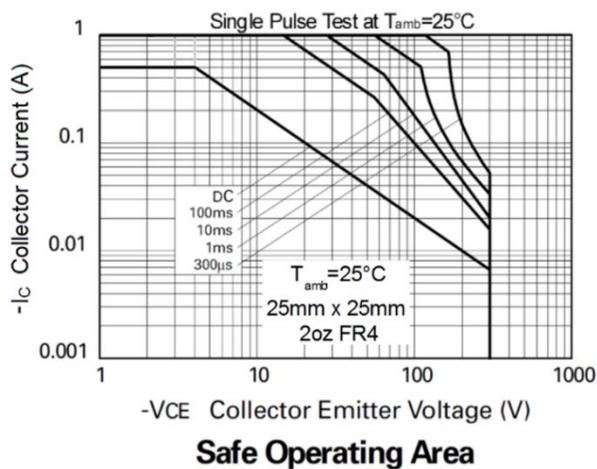
| Characteristic                          | Symbol                            | Value       | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation                       | P <sub>D</sub>                    | 3.0         | W    |
|   |                                   | 2.0         |      |
|   |                                   | 1.6         |      |
|   |                                   | 1.2         |      |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 41.7        | °C/W |
|   |                                   | 62.5        |      |
|   |                                   | 78.1        |      |
|   |                                   | 104         |      |
| Thermal Resistance, Junction to Leads   | R <sub>θJL</sub>                  | 12.9        | °C/W |
| Operating and Storage Temperature Range | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**ESD Ratings** (Note 10)

| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge - Machine Model    | ESD MM  | 400   | V    | C           |

- Notes:
- For a device mounted with the collector lead on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
  - Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.
  - Same as Note 5, except the device is mounted on minimum recommended pad layout.
  - Thermal resistance from junction to solder-point (at the end of the collector lead).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

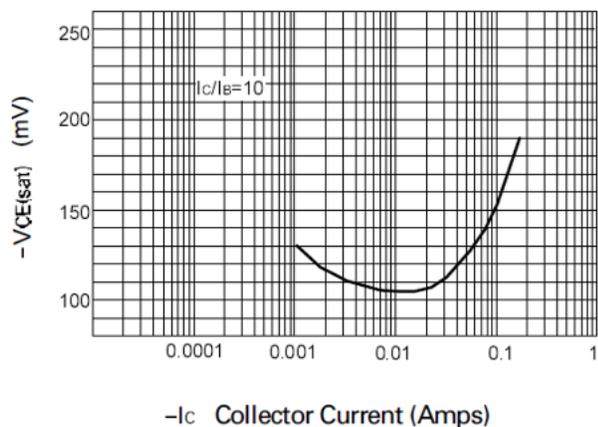


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

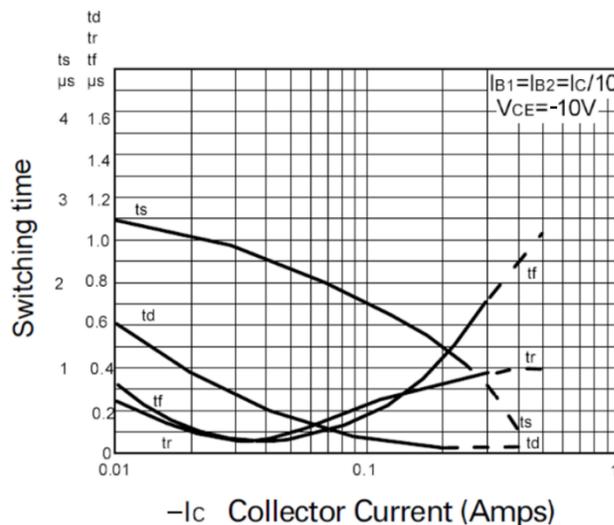
| Characteristic                                 | Symbol               | Min  | Typ | Max  | Unit | Test Condition   |
|--|----------------------|------|-----|------|------|--|
| Collector-Base Breakdown Voltage               | BV <sub>CBO</sub>    | -300 | -   | -    | V    | I <sub>C</sub> = -100μA                                      |
| Collector-Emitter Breakdown Voltage (Note 11)  | BV <sub>CEO</sub>    | -300 | -   | -    | V    | I <sub>C</sub> = -10mA                                       |
| Emitter-Base Breakdown Voltage                 | BV <sub>EBO</sub>    | -7   | -   | -    | V    | I <sub>E</sub> = -100μA                                      |
| Collector Cut-Off Current                      | I <sub>CBO</sub>     | -    | -1  | -100 | nA   | V <sub>CB</sub> = -200V                                      |
| Emitter Cut-Off Current                        | I <sub>EBO</sub>     | -    | -1  | -20  | nA   | V <sub>EB</sub> = -5.6V                                      |
| Collector-Emitter Saturation Voltage (Note 11) | V <sub>CE(sat)</sub> | -    | -   | -0.5 | V    | I <sub>C</sub> = -100mA, I <sub>B</sub> = -10mA              |
| Base-Emitter Saturation Voltage (Note 11)      | V <sub>BE(sat)</sub> | -    | -   | -1.0 | V    | I <sub>C</sub> = -100mA, I <sub>B</sub> = -10mA              |
| Base-Emitter Turn-On Voltage (Note 11)         | V <sub>BE(on)</sub>  | -    | -   | -1.0 | V    | I <sub>C</sub> = -100mA, V <sub>CE</sub> = -5V               |
| DC Current Gain (Note 11)                      | h <sub>FE</sub>      | 40   | -   | -    | -    | I <sub>C</sub> = -10mA, V <sub>CE</sub> = -5V                |
|  |                      | 50   | -   | -    |      | I <sub>C</sub> = -100mA, V <sub>CE</sub> = -5V               |
| Current Gain-Bandwidth Product                 | f <sub>T</sub>       | 30   | -   | -    | MHz  | I <sub>C</sub> = -10mA, V <sub>CE</sub> = -20V,<br>f = 20MHz |
| Output Capacitance                             | C <sub>obo</sub>     | -    | -   | 20   | pF   | V <sub>CB</sub> = -20V, f = 1MHz                             |

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%.

**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

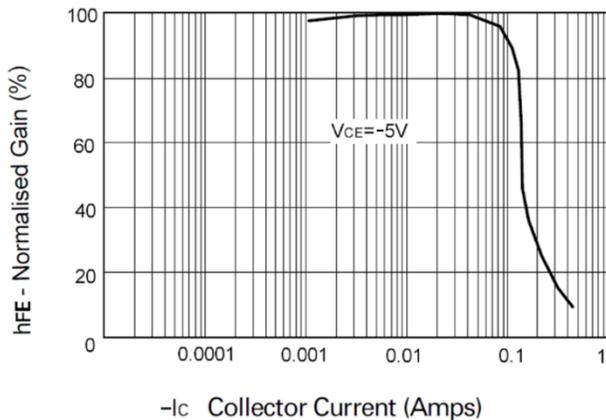


-I<sub>C</sub> Collector Current (Amps)



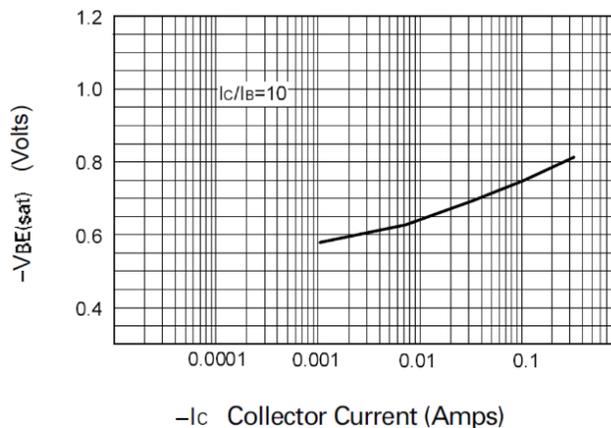
-I<sub>C</sub> Collector Current (Amps)

**V<sub>CE(sat)</sub> v I<sub>C</sub>**



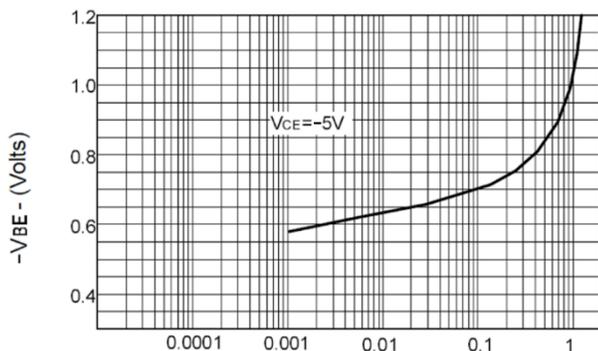
-I<sub>C</sub> Collector Current (Amps)

**hFE v I<sub>C</sub>**



-I<sub>C</sub> Collector Current (Amps)

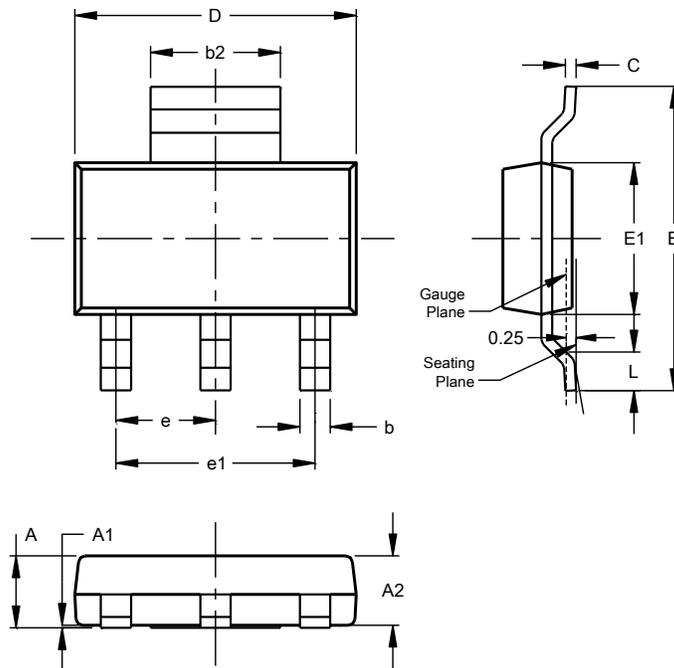
**V<sub>BE(sat)</sub> v I<sub>C</sub>**



-I<sub>C</sub> Collector Current (Amps)

**V<sub>BE(on)</sub> v I<sub>C</sub>**

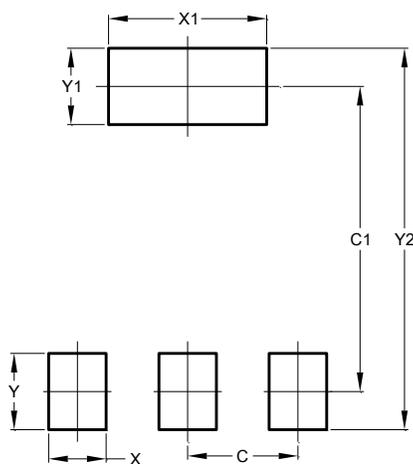
## Package Outline Dimensions



| SOT223 (Type DN)     |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | --   | 1.70 | --   |
| A1                   | 0.01 | 0.15 | --   |
| A2                   | 1.50 | 1.68 | 1.60 |
| b                    | 0.60 | 0.80 | 0.70 |
| b2                   | 2.90 | 3.10 | --   |
| c                    | 0.20 | 0.32 | --   |
| D                    | 6.30 | 6.70 | --   |
| E                    | 6.70 | 7.30 | --   |
| E1                   | 3.30 | 3.70 | --   |
| e                    | --   | --   | 2.30 |
| e1                   | --   | --   | 4.60 |
| L                    | 0.85 | --   | --   |
| All Dimensions in mm |      |      |      |

## Suggested Pad Layout

SOT223 (Type DN)



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 2.30          |
| C1         | 6.40          |
| X          | 1.20          |
| X1         | 3.30          |
| Y          | 1.60          |
| Y1         | 1.60          |
| Y2         | 8.00          |