



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 and Benefits

- $BV_{CE0} > -30V$
- Maximum Continuous Collector Current  $I_C = -1A$
- 500mW power dissipation
- Complementary type:
  - NK-FMMT549 – NK-FMMT449
  - NK-FMMT549A – N/A

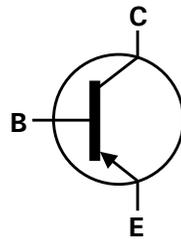
## Mechanical Data

- Case: SOT23
- UL Flammability Rating 94V-0
- Case material: molded Plastic.
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (Approximate)

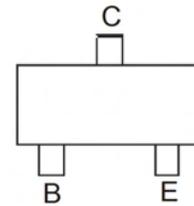
SOT23



Top View



Device Symbol



Top View  
Pin-Out

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

| Characteristic               | Symbol    | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage       | $V_{CB0}$ | -35   | V    |
| Collector-Emitter Voltage    | $V_{CEO}$ | -30   | V    |
| Emitter-Base Voltage         | $V_{EBO}$ | -5    | V    |
| Continuous Collector Current | $I_C$     | -1    | A    |
| Peak Pulse Current           | $I_{CM}$  | -2    | A    |
| Base Current                 | $I_B$     | -200  | mA   |

**Thermal Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

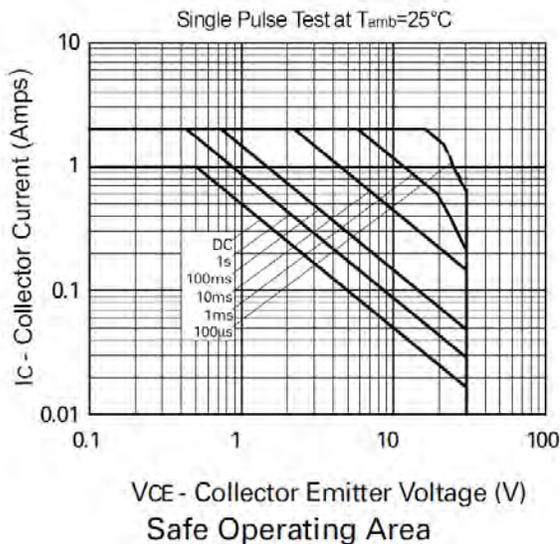
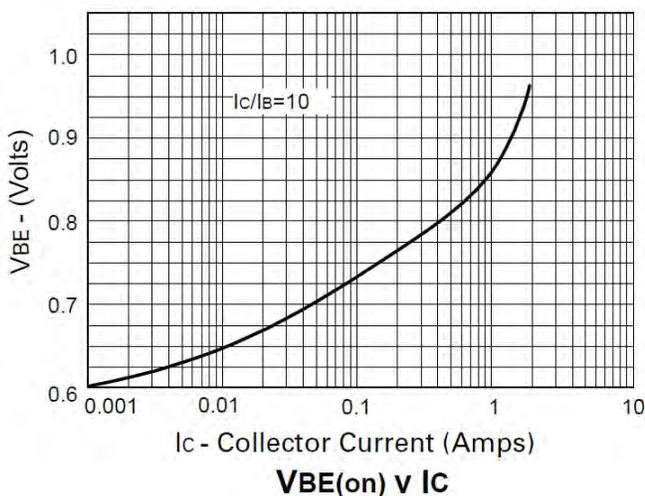
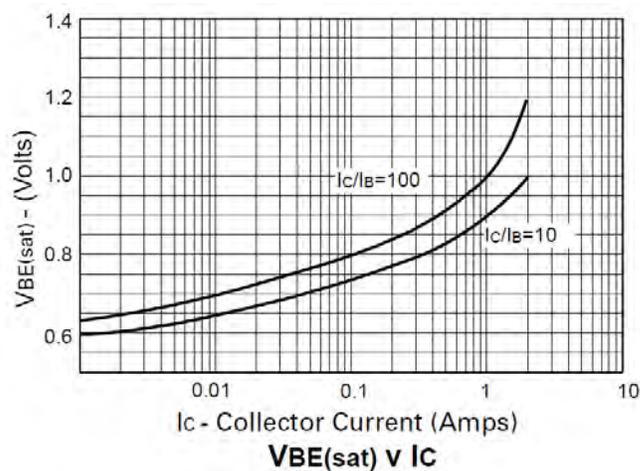
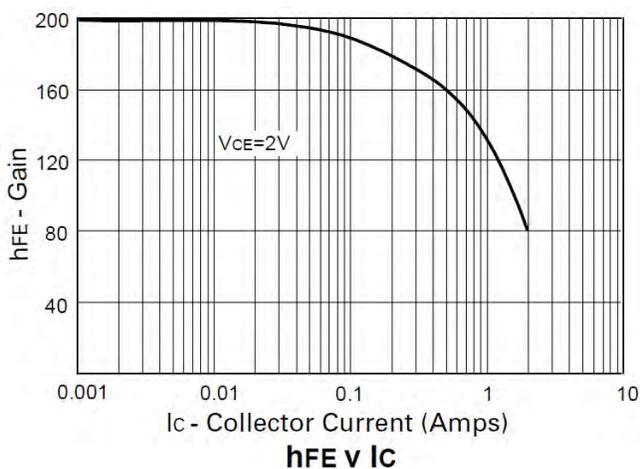
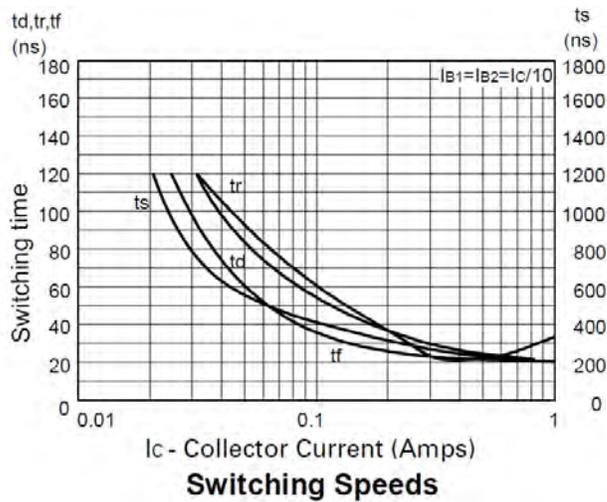
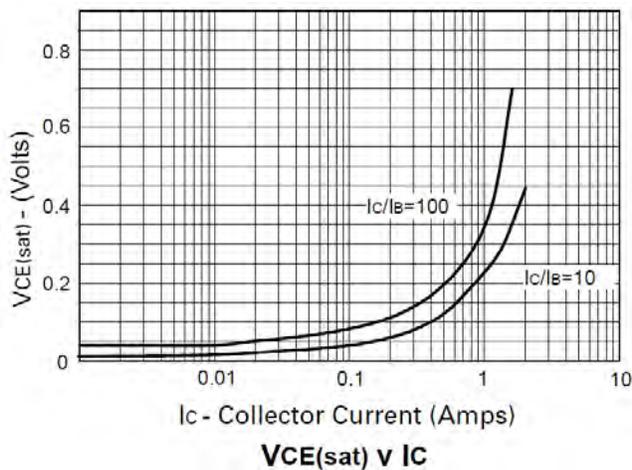
| Characteristic                                   | Symbol          | Value       | Unit                      |
|--------------------------------------------------|-----------------|-------------|---------------------------|
| Power Dissipation (Note 4)                       | $P_D$           | 500         | mW                        |
| Thermal Resistance, Junction to Ambient (Note 4) | $R_{\theta JA}$ | 250         | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Lead (Note 5)    | $R_{\theta JL}$ | 197         | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range          | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$          |

**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

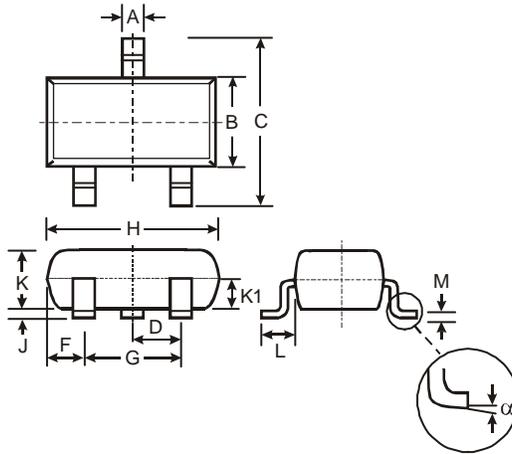
| Characteristic                                 | Symbol        | Min | Typ  | Max   | Unit          | Test Condition                                                |
|------------------------------------------------|---------------|-----|------|-------|---------------|---------------------------------------------------------------|
| Collector-Base Breakdown Voltage               | $BV_{CB0}$    | -35 | -    | -     | V             | $I_C = -100\mu\text{A}$                                       |
| Collector-Emitter Breakdown Voltage (Note 6)   | $BV_{CEO}$    | -30 | -    | -     | V             | $I_C = -10\text{mA}$                                          |
| Emitter-Base Breakdown Voltage                 | $BV_{EBO}$    | -5  | -    | -     | V             | $I_E = -100\mu\text{A}$                                       |
| Collector Cutoff Current                       | $I_{CBO}$     | -   | -    | -0.1  | $\mu\text{A}$ | $V_{CB} = -30\text{V}$                                        |
|                                                |               | -   | -    | -10   |               | $V_{CB} = -30\text{V}, T_A = 100^\circ\text{C}$               |
| Emitter Cutoff Current                         | $I_{EBO}$     | -   | -    | -0.1  | $\mu\text{A}$ | $V_{EB} = -4\text{V}$                                         |
| Static Forward Current Transfer Ratio (Note 6) | $h_{FE}$      | 70  | 200  | -     | -             | $I_C = -50\text{mA}, V_{CE} = -2\text{V}$                     |
|                                                |               | 80  | 130  | -     | -             | $I_C = -1\text{A}, V_{CE} = -2\text{V}$                       |
|                                                |               | 40  | 80   | -     | -             | $I_C = -2\text{A}, V_{CE} = -2\text{V}$                       |
|                                                |               | 100 | 160  | 300   | -             | $I_C = -500\text{mA}, V_{CE} = -2\text{V}$                    |
|                                                |               | 150 | 200  | 500   | -             | $I_C = -500\text{mA}, V_{CE} = -2\text{V}$                    |
| Collector-Emitter Saturation Voltage           | $V_{CE(sat)}$ | -   | -250 | -500  | mV            | $I_C = -1\text{A}, I_B = -100\text{mA}$                       |
|                                                |               | -   | -500 | -750  | mV            | $I_C = -2\text{A}, I_B = -200\text{mA}$                       |
|                                                |               | -   | -    | -300  | mV            | $I_C = -100\text{mA}, I_B = -1\text{mA}$                      |
| Base-Emitter Saturation Voltage (Note 6)       | $V_{BE(sat)}$ | -   | -900 | -1250 | mV            | $I_C = -1\text{A}, I_B = -100\text{mA}$                       |
| Base-Emitter Turn-On Voltage (Note 6)          | $V_{BE(on)}$  | -   | -850 | -1000 | mV            | $I_C = -1\text{A}, V_{CE} = -2\text{V}$                       |
| Output Capacitance                             | $C_{obo}$     | -   | -    | 25    | pF            | $V_{CB} = -10\text{V}, f = 1\text{MHz}$                       |
| Transition Frequency                           | $f_T$         | 100 | -    | -     | MHz           | $V_{CE} = -5\text{V}, I_C = -100\text{mA}, f = 100\text{MHz}$ |
| Switching Times                                | $t_{on}$      | -   | 50   | -     | ns            | $I_C = -500\text{mA}, V_{CC} = -10\text{V}$                   |
|                                                | $t_{off}$     | -   | 300  | -     | ns            | $I_{B1} = I_{B2} = -50\text{mA}$                              |

- Notes:
4. For a device surface mounted FR4 PCB with minimum recommended pad layout; high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  5. Thermal resistance from junction to solder-point (at the end of the collector lead).
  6. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$

**Typical Electrical Characteristics**

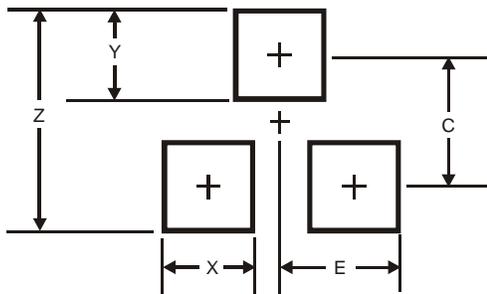


### Package Outline Dimensions



| SOT23                |       |      |       |
|----------------------|-------|------|-------|
| Dim                  | Min   | Max  | Typ   |
| A                    | 0.37  | 0.51 | 0.40  |
| B                    | 1.20  | 1.40 | 1.30  |
| C                    | 2.30  | 2.50 | 2.40  |
| D                    | 0.89  | 1.03 | 0.915 |
| F                    | 0.45  | 0.60 | 0.535 |
| G                    | 1.78  | 2.05 | 1.83  |
| H                    | 2.80  | 3.00 | 2.90  |
| J                    | 0.013 | 0.10 | 0.05  |
| K                    | 0.903 | 1.10 | 1.00  |
| K1                   | -     | -    | 0.400 |
| L                    | 0.45  | 0.61 | 0.55  |
| M                    | 0.085 | 0.18 | 0.11  |
| α                    | 0°    | 8°   | -     |
| All Dimensions in mm |       |      |       |

### Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.9           |
| X          | 0.8           |
| Y          | 0.9           |
| C          | 2.0           |
| E          | 1.35          |