



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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企业微信二维码



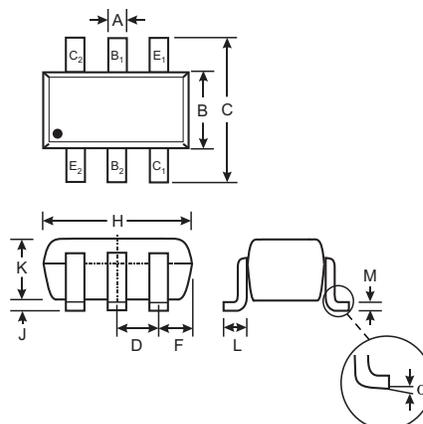
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## Features

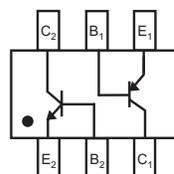
- Complementary Pair
- Epitaxial Planar Die Construction
- One 2222A Type (NPN),
- One 2907A Type (PNP)
- Ideal for Low Power Amplification and Switching

## Mechanical Data

- Case: SOT-26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish - Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Ordering & Date Code Information: See Page 3
- Marking (See Page 3): K27
- Weight: 0.006 grams (approximate)



Note: E1, B1, and C1 = 2907A Type (PNP),  
 E2, B2, and C2 = 2222A Type (NPN).  
 Type marking indicates orientation.



| SOT-26               |       |      |      |
|----------------------|-------|------|------|
| Dim                  | Min   | Max  | Typ  |
| A                    | 0.35  | 0.50 | 0.38 |
| B                    | 1.50  | 1.70 | 1.60 |
| C                    | 2.70  | 3.00 | 2.80 |
| D                    |       |      | 0.95 |
| F                    |       |      | 0.55 |
| H                    | 2.90  | 3.10 | 3.00 |
| J                    | 0.013 | 0.10 | 0.05 |
| K                    | 1.00  | 1.30 | 1.10 |
| L                    | 0.35  | 0.55 | 0.40 |
| M                    | 0.10  | 0.20 | 0.15 |
|                      | 0     | 8    |      |
| All Dimensions in mm |       |      |      |

## Maximum Ratings, 2222A Type (NPN)

@ T<sub>A</sub> = 25 °C unless otherwise specified

| Characteristic                 | Symbol           | 2222A (NPN) | Unit |
|--------------------------------|------------------|-------------|------|
| Collector-Base Voltage         | V <sub>CB0</sub> | 75          | V    |
| Collector-Emitter Voltage      | V <sub>CE0</sub> | 40          | V    |
| Emitter-Base Voltage           | V <sub>EBO</sub> | 6.0         | V    |
| Collector Current - Continuous | I <sub>C</sub>   | 600         | mA   |

## Maximum Ratings, 2907A Type (PNP)

@ T<sub>A</sub> = 25 °C unless otherwise specified

| Characteristic                 | Symbol           | 2907A (PNP) | Unit |
|--------------------------------|------------------|-------------|------|
| Collector-Base Voltage         | V <sub>CB0</sub> | -60         | V    |
| Collector-Emitter Voltage      | V <sub>CE0</sub> | -60         | V    |
| Emitter-Base Voltage           | V <sub>EBO</sub> | -5.0        | V    |
| Collector Current - Continuous | I <sub>C</sub>   | -600        | mA   |

## Maximum Ratings, Total

@ T<sub>A</sub> = 25 °C unless otherwise specified

| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 1)                 | P <sub>d</sub>                    | 300         | mW   |
| Thermal Resistance, Junction to Ambient (Note 1) | R <sub>JA</sub>                   | 417         | C/W  |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | C    |

**Electrical Characteristics, 2222A Type (NPN)**

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

| Characteristic                       | Symbol        | Min                                     | Max        | Unit    | Test Condition  |
|--------------------------------------|---------------|---|------------|---------|---|
| <b>OFF CHARACTERISTICS (Note 4)</b>  |               |   |            |         |   |
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | 75                                      |            | V       | $I_C = 10\text{ A}, I_E = 0$  |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | 40                                      |            | V       | $I_C = 10\text{mA}, I_B = 0$  |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | 6.0                                     |            | V       | $I_E = 10\text{ A}, I_C = 0$  |
| Collector Cutoff Current             | $I_{CBO}$     |   | 10         | nA<br>A | $V_{CB} = 60\text{V}, I_E = 0$<br>$V_{CB} = 60\text{V}, I_E = 0, T_A = 150\text{ }^\circ\text{C}$   |
| Collector Cutoff Current             | $I_{CEX}$     |   | 10         | nA      | $V_{CE} = 60\text{V}, V_{EB(OFF)} = 3.0\text{V}$  |
| Emitter Cutoff Current               | $I_{EBO}$     |   | 10         | nA      | $V_{EB} = 3.0\text{V}, I_C = 0$   |
| Base Cutoff Current                  | $I_{BL}$      |   | 20         | nA      | $V_{CE} = 60\text{V}, V_{EB(OFF)} = 3.0\text{V}$  |
| <b>ON CHARACTERISTICS (Note 4)</b>   |               |   |            |         |   |
| DC Current Gain                      | $h_{FE}$      | 35<br>50<br>75<br>100<br>40<br>50<br>35 | 300        |         | $I_C = 100\text{ A}, V_{CE} = 10\text{V}$<br>$I_C = 1.0\text{mA}, V_{CE} = 10\text{V}$<br>$I_C = 10\text{mA}, V_{CE} = 10\text{V}$<br>$I_C = 150\text{mA}, V_{CE} = 10\text{V}$<br>$I_C = 500\text{mA}, V_{CE} = 10\text{V}$<br>$I_C = 10\text{mA}, V_{CE} = 10\text{V}, T_A = -55\text{ }^\circ\text{C}$<br>$I_C = 150\text{mA}, V_{CE} = 1.0\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ |   | 0.3<br>1.0 | V       | $I_C = 150\text{mA}, I_B = 15\text{mA}$<br>$I_C = 500\text{mA}, I_B = 50\text{mA}$  |
| Base-Emitter Saturation Voltage      | $V_{BE(SAT)}$ | 0.6                                     | 1.2<br>2.0 | V       | $I_C = 150\text{mA}, I_B = 15\text{mA}$<br>$I_C = 500\text{mA}, I_B = 50\text{mA}$  |
| <b>SMALL SIGNAL CHARACTERISTICS</b>  |               |   |            |         |   |
| Output Capacitance                   | $C_{obo}$     |   | 8          | pF      | $V_{CB} = 10\text{V}, f = 1.0\text{MHz}, I_E = 0$   |
| Input Capacitance                    | $C_{ibo}$     | —                                       | 25         | pF      | $V_{EB} = 0.5\text{V}, f = 1.0\text{MHz}, I_C = 0$  |
| Current Gain-Bandwidth Product       | $f_T$         | 300                                     |            | MHz     | $V_{CE} = 20\text{V}, I_C = 20\text{mA}, f = 100\text{MHz}$   |
| <b>SWITCHING CHARACTERISTICS</b>     |               |   |            |         |   |
| Delay Time                           | $t_d$         |   | 10         | ns      | $V_{CC} = 30\text{V}, I_C = 150\text{mA}, V_{BE(off)} = -0.5\text{V}, I_{B1} = 15\text{mA}$   |
| Rise Time                            | $t_r$         |   | 25         | ns      |   |
| Storage Time                         | $t_s$         |   | 225        | ns      | $V_{CC} = 30\text{V}, I_C = 150\text{mA}, I_{B1} = I_{B2} = 15\text{mA}$  |
| Fall Time                            | $t_f$         |   | 60         | ns      |   |

 Note: 4. Pulse test: Pulse width 300  $\mu\text{s}$ , duty cycle 2%.

**Electrical Characteristics, 2907A Type (PNP)** @  $T_A = 25\text{ C}$  unless otherwise specified

| Characteristic                       | Symbol        | Min                           | Max          | Unit    | Test Condition   |
|--------------------------------------|---------------|-------------------------------|--------------|---------|--|
| <b>OFF CHARACTERISTICS (Note 5)</b>  |               |                               |              |         |  |
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | -60                           |              | V       | $I_C = -10\text{ A}, I_E = 0$  |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | -60                           |              | V       | $I_C = -10\text{mA}, I_B = 0$  |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | -5.0                          |              | V       | $I_E = -10\text{ A}, I_C = 0$  |
| Collector Cutoff Current             | $I_{CBO}$     |                               | -10          | nA<br>A | $V_{CB} = -50\text{V}, I_E = 0$<br>$V_{CB} = -50\text{V}, I_E = 0, T_A = 125\text{ C}$   |
| Collector Cutoff Current             | $I_{CEX}$     |                               | -50          | nA      | $V_{CE} = -30\text{V}, V_{EB(OFF)} = -0.5\text{V}$   |
| Base Cutoff Current                  | $I_{BL}$      |                               | -50          | nA      | $V_{CE} = -30\text{V}, V_{EB(OFF)} = -0.5\text{V}$   |
| <b>ON CHARACTERISTICS (Note 5)</b>   |               |                               |              |         |  |
| DC Current Gain                      | $h_{FE}$      | 75<br>100<br>100<br>100<br>50 | 300          |         | $I_C = -100\mu\text{A}, V_{CE} = -10\text{V}$<br>$I_C = -1.0\text{mA}, V_{CE} = -10\text{V}$<br>$I_C = -10\text{mA}, V_{CE} = -10\text{V}$<br>$I_C = -150\text{mA}, V_{CE} = -10\text{V}$<br>$I_C = -500\text{mA}, V_{CE} = -10\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ |                               | -0.4<br>-1.6 | V       | $I_C = -150\text{mA}, I_B = -15\text{mA}$<br>$I_C = -500\text{mA}, I_B = -50\text{mA}$   |
| Base-Emitter Saturation Voltage      | $V_{BE(SAT)}$ |                               | -1.3<br>-2.6 | V       | $I_C = 150\text{mA}, I_B = 15\text{mA}$<br>$I_C = 500\text{mA}, I_B = 50\text{mA}$   |
| <b>SMALL SIGNAL CHARACTERISTICS</b>  |               |                               |              |         |  |
| Output Capacitance                   | $C_{obo}$     |                               | 8.0          | pF      | $V_{CB} = -10\text{V}, f = 1.0\text{MHz}, I_E = 0$   |
| Input Capacitance                    | $C_{ibo}$     | —                             | 30           | pF      | $V_{EB} = -2.0\text{V}, f = 1.0\text{MHz}, I_C = 0$  |
| Current Gain-Bandwidth Product       | $f_T$         | 200                           |              | MHz     | $V_{CE} = -20\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$  |
| <b>SWITCHING CHARACTERISTICS</b>     |               |                               |              |         |  |
| Turn-On Time                         | $t_{on}$      |                               | 45           | ns      | $V_{CC} = -30\text{V}, I_C = -150\text{mA}, I_{B1} = -15\text{mA}$   |
| Delay Time                           | $t_d$         |                               | 10           | ns      |  |
| Rise Time                            | $t_r$         |                               | 40           | ns      |  |
| Turn-Off Time                        | $t_{off}$     |                               | 100          | ns      | $V_{CC} = -6.0\text{V}, I_C = -150\text{mA}, I_{B1} = I_{B2} = -15\text{mA}$   |
| Storage Time                         | $t_s$         |                               | 80           | ns      |  |
| Fall Time                            | $t_f$         |                               | 30           | ns      |  |

Note: 5. Short duration pulse test used to minimize self-heating effect.

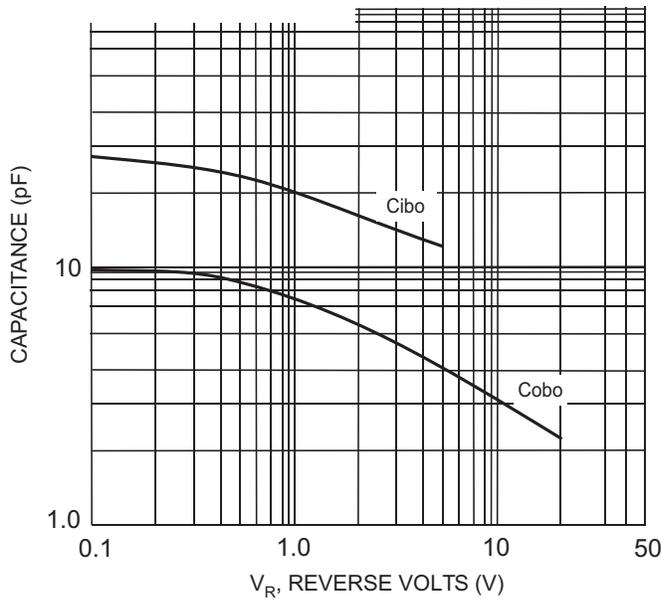


Fig. 1 (2222A) Typical Capacitance

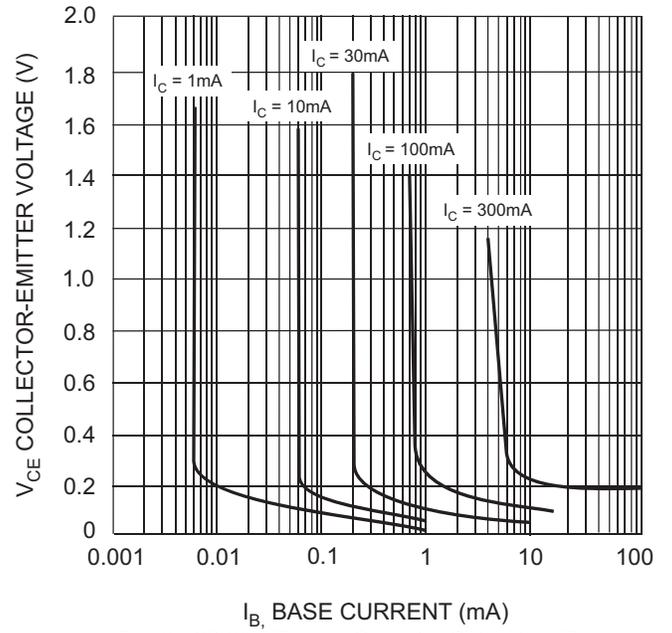


Fig. 2 (2222A) Typical Collector Saturation Region

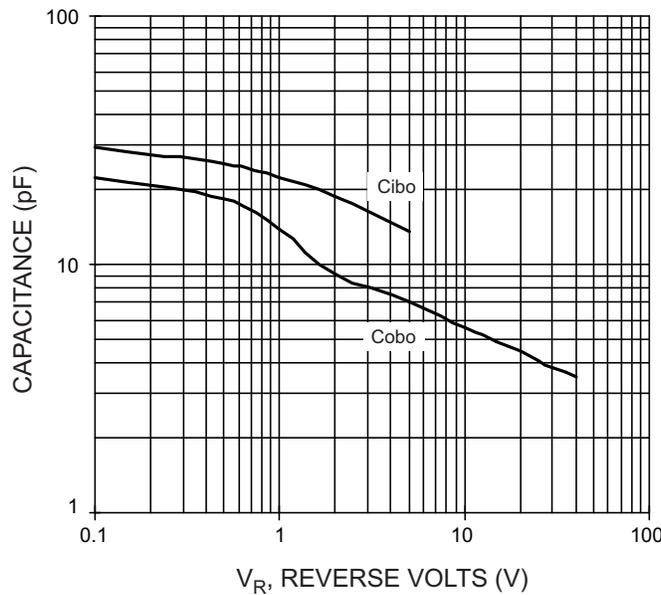


Fig. 3 (2907A) Typical Capacitance

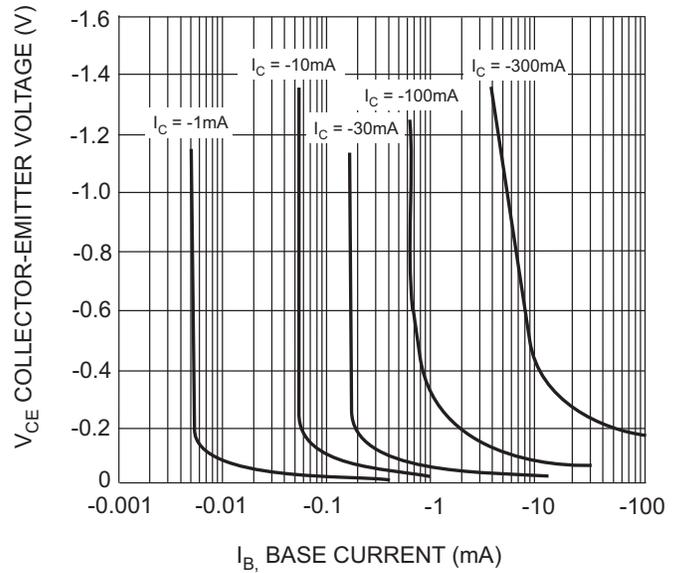


Fig. 4 (2907A) Typical Collector Saturation Region