

# 2SA1381/KSA1381

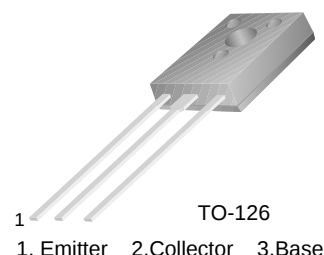
## PNP Epitaxial Silicon Transistor

### Applications

- Audio, Voltage Amplifier and Current Source
- CRT Display, Video Output
- General Purpose Amplifier

### Features

- High Voltage :  $V_{CEO} = -300V$
- Low Reverse Transfer Capacitance :  $C_{re} = 2.3pF$  at  $V_{CB} = -30V$
- Excellent Gain Linearity for low THD
- High Frequency: 150MHz
- Full thermal and electrical Spice models are available
- Complement to 2SC3503/KSC3503



### Absolute Maximum Ratings\* $T_a = 25^\circ C$ unless otherwise noted

| Symbol         | Parameter                                                           | Ratings     | Units      |
|----------------|---------------------------------------------------------------------|-------------|------------|
| $BV_{CBO}$     | Collector-Base Voltage                                              | -300        | V          |
| $BV_{CEO}$     | Collector-Emitter Voltage                                           | -300        | V          |
| $BV_{EBO}$     | Emitter-Base Voltage                                                | -5          | V          |
| $I_C$          | Collector Current(DC)                                               | -100        | mA         |
| $I_{CP}$       | Collector Current(Pulse)                                            | -200        | mA         |
| $P_C$          | Total Device Dissipation, $T_C = 25^\circ C$<br>$T_C = 125^\circ C$ | 7<br>1.2    | W<br>W     |
| $T_J, T_{STG}$ | Junction and Storage Temperature                                    | - 55 ~ +150 | $^\circ C$ |

\* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

### Thermal Characteristics\* $T_a = 25^\circ C$ unless otherwise noted

| Symbol          | Parameter                            | Max. | Units        |
|-----------------|--------------------------------------|------|--------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 17.8 | $^\circ C/W$ |

\* Device mounted on minimum pad size

### $h_{FE}$ Classification

| Classification | C       | D        | E         | F         |
|----------------|---------|----------|-----------|-----------|
| $h_{FE}$       | 40 ~ 80 | 60 ~ 120 | 100 ~ 200 | 160 ~ 320 |

**Electrical Characteristics\***  $T_a = 25^\circ\text{C}$  unless otherwise noted

| Symbol        | Parameter                            | Test Condition                             | Min.  | Typ. | Max.  | Units         |
|---------------|--------------------------------------|--------------------------------------------|-------|------|-------|---------------|
| $BV_{CBO}$    | Collector-Base Breakdown Voltage     | $I_C = -10\mu\text{A}, I_E = 0$            | - 300 |      |       | V             |
| $BV_{CEO}$    | Collector- Emitter Breakdown Voltage | $I_C = -1\text{mA}, I_B = 0$               | - 300 |      |       | V             |
| $BV_{EBO}$    | Emitter-Base Breakdown Voltage       | $I_E = -10\mu\text{A}, I_C = 0$            | - 5   |      |       | V             |
| $I_{CBO}$     | Collector Cut-off Current            | $V_{CB} = -200\text{V}, I_E = 0$           |       |      | - 0.1 | $\mu\text{A}$ |
| $I_{EBO}$     | Emitter Cut-off Current              | $V_{EB} = -4\text{V}, I_C = 0$             |       |      | - 0.1 | $\mu\text{A}$ |
| $h_{FE}$      | DC Current Gain                      | $V_{CE} = -10\text{V}, I_C = -10\text{mA}$ | 40    |      | 320   |               |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = -20\text{mA}, I_B = -2\text{mA}$    |       |      | - 0.6 | V             |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage      | $I_C = -20\text{mA}, I_B = -2\text{mA}$    |       |      | - 1   | V             |
| $f_T$         | Current Gain Bandwidth Product       | $V_{CE} = -30\text{V}, I_C = -10\text{mA}$ |       | 150  |       | MHz           |
| $C_{ob}$      | Output Capacitance                   | $V_{CB} = -30\text{V}, f = 1\text{MHz}$    |       | 3.1  |       | pF            |
| $C_{re}$      | Reverse Transfer Capacitance         | $V_{CB} = -30\text{V}, f = 1\text{MHz}$    |       | 2.3  |       | pF            |

\* Pulse Test: Pulse Width $\leq 300\mu\text{s}$ , Duty Cycles $\leq 2\%$ **Ordering Information**

| Part Number* | Marking  | Package | Packing Method | Remarks      |
|--------------|----------|---------|----------------|--------------|
| 2SA1381CSTU  | 2SA1381C | TO-126  | TUBE           | hFE1 C grade |
| 2SA1381DSTU  | 2SA1381D | TO-126  | TUBE           | hFE1 D grade |
| 2SA1381ESTU  | 2SA1381E | TO-126  | TUBE           | hFE1 E grade |
| 2SA1381FSTU  | 2SA1381F | TO-126  | TUBE           | hFE1 F grade |
| KSA1381CSTU  | A1381C   | TO-126  | TUBE           | hFE1 C grade |
| KSA1381DSTU  | A1381D   | TO-126  | TUBE           | hFE1 D grade |
| KSA1381ESTU  | A1381E   | TO-126  | TUBE           | hFE1 E grade |
| KSA1381FSTU  | A1381F   | TO-126  | TUBE           | hFE1 F grade |

\* 1. Affix "-S-" means the standard TO126 Package.(see package dimensions). If the affix is "-STS-" instead of "-S-", that mean the short-lead TO126 package.  
2. Suffix "-TU" means the tube packing. The Suffix "TU" could be replaced to other suffix character as packing method.

## Typical Characteristics

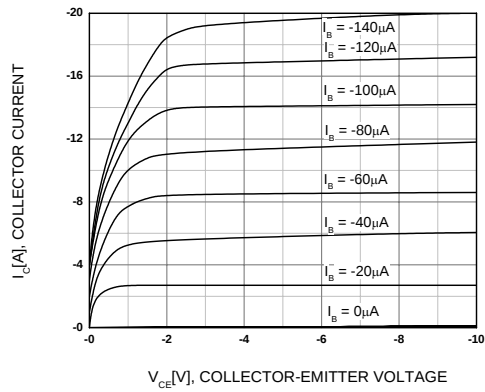


Figure 1. Static Characteristic

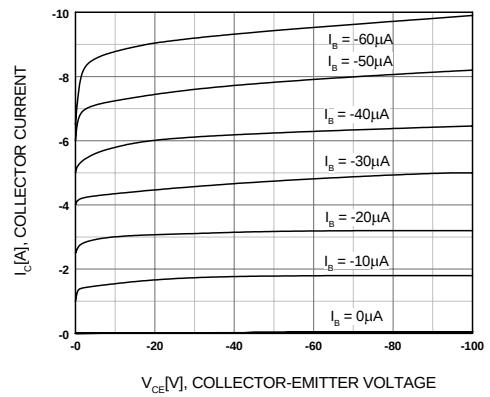


Figure 2. Static Characteristic

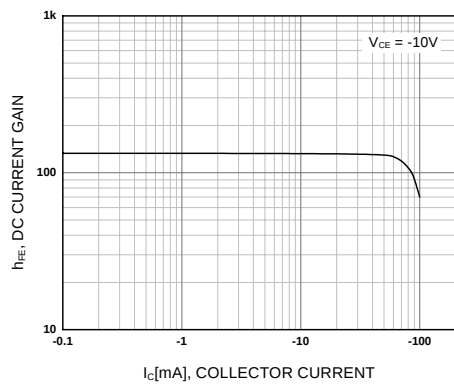


Figure 3. DC current Gain

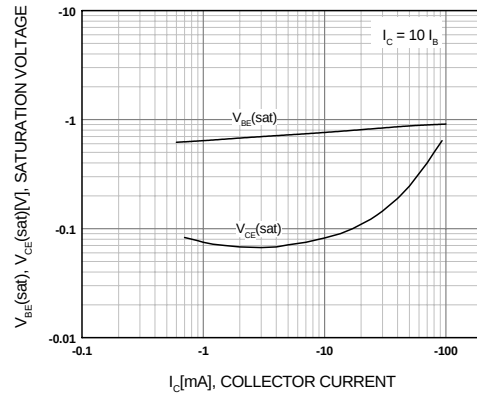


Figure 4. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

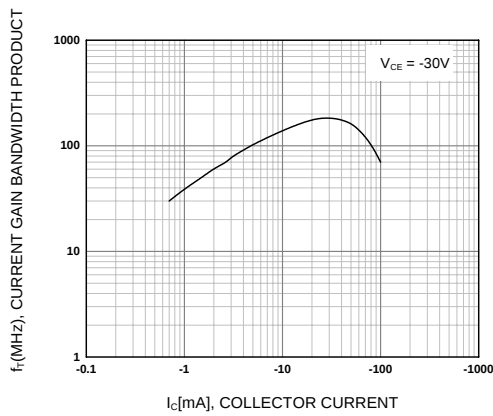


Figure 5. Current Gain Bandwidth Product

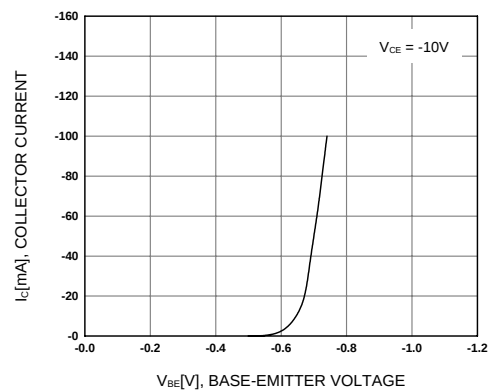


Figure 6. Base-Emitter On Voltage

## Typical Characteristics (Continued)

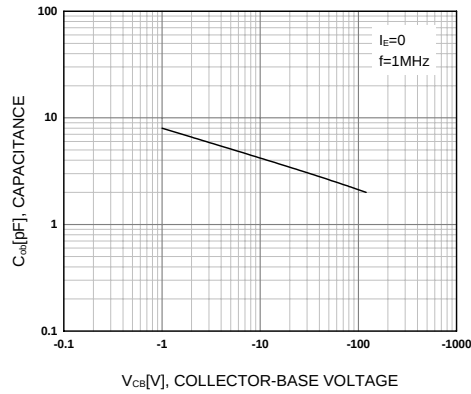


Figure 7. Collector Output Capacitance

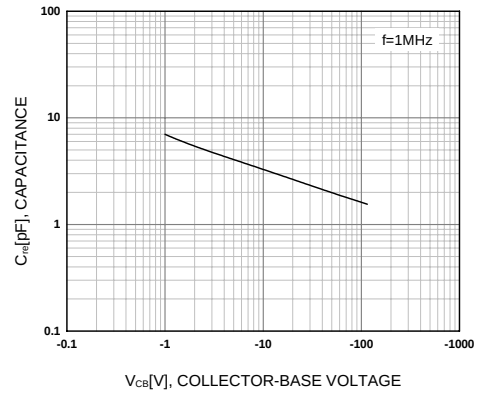


Figure 8. Reverse Transfer Capacitance

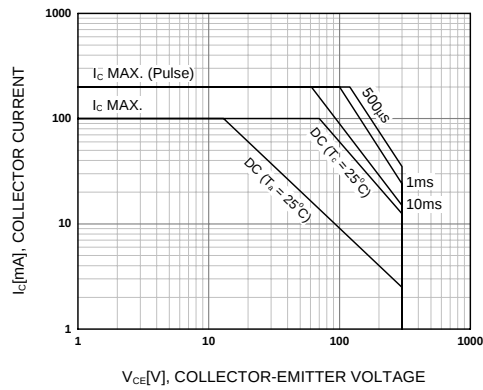


Figure 9. Safe Operating Area

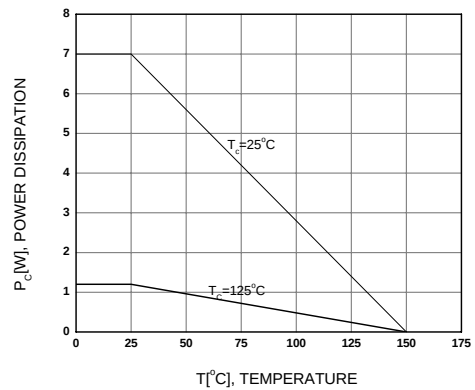
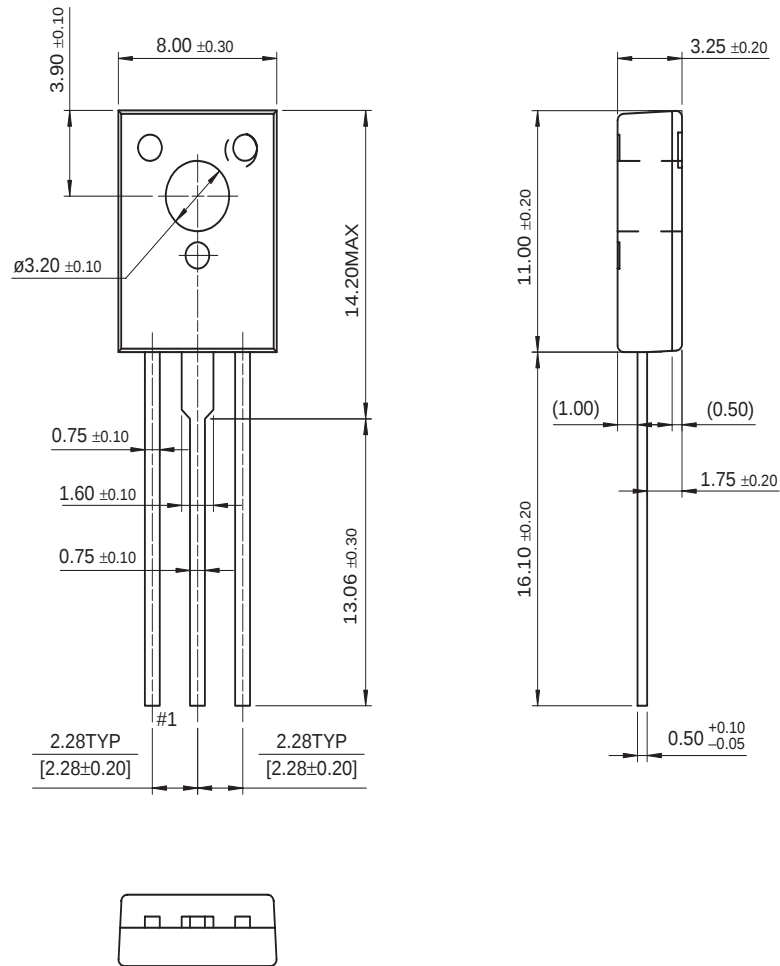


Figure 10. Power Derating

# Package Dimensions

## TO-126



Dimensions in Millimeters



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|                                                                                              |                                                                                            |                            |                                                                                     |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------|
| ACEx®                                                                                        | Green FPS™                                                                                 | Power247®                  | SuperSOT™-8                                                                         |
| Build it Now™                                                                                | Green FPS™ e-Series™                                                                       | POWEREDGE®                 | SyncFET™                                                                            |
| CorePLUS™                                                                                    | GTO™                                                                                       | Power-SPM™                 | The Power Franchise®                                                                |
| CROSSVOLT™                                                                                   | i-Lo™                                                                                      | PowerTrench®               |  |
| CTL™                                                                                         | IntelliMAX™                                                                                | Programmable Active Droop™ | TinyBoost™                                                                          |
| Current Transfer Logic™                                                                      | ISOPLANAR™                                                                                 | QFET®                      | TinyBuck™                                                                           |
| EcoSPARK®                                                                                    | MegaBuck™                                                                                  | QS™                        | TinyLogic®                                                                          |
|  Fairchild® | MICROCOUPLER™                                                                              | QT Optoelectronics™        | TINYOPTO™                                                                           |
| Fairchild Semiconductor®                                                                     | MicroFET™                                                                                  | Quiet Series™              | TinyPower™                                                                          |
| FACT Quiet Series™                                                                           | MicroPak™                                                                                  | RapidConfigure™            | TinyPWM™                                                                            |
| FACT®                                                                                        | MillerDrive™                                                                               | SMART START™               | TinyWire™                                                                           |
| FAST®                                                                                        | Motion-SPM™                                                                                | SPM®                       | μSerDes™                                                                            |
| FastvCore™                                                                                   | OPTOLOGIC®                                                                                 | STEALTH™                   | UHC®                                                                                |
| FPS™                                                                                         | OPTOPLANAR®                                                                                | SuperFET™                  | UniFET™                                                                             |
| FRFET®                                                                                       |  PDP-SPM™ | SuperSOT™-3                | VCX™                                                                                |
| Global Power ResourceSM                                                                      | Power220®                                                                                  | SuperSOT™-6                |                                                                                     |

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