2SC3503/KSC3503
NPN Epitaxial Silicon Transistor

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

Features
• High Voltage : \( V_{CEO} = 300 \text{V} \)
• Low Reverse Transfer Capacitance : \( C_{re} = 1.8 \text{pF at } V_{CB} = 30 \text{V} \)
• Excellent Gain Linearity for low THD
• High Frequency: 150MHz
• Full thermal and electrical Spice models are available
• Complement to 2SA1381/KSA1381.

Absolute Maximum Ratings* \( T_a = 25^\circ \text{C unless otherwise noted} \)

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

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

Thermal Characteristics* \( T_a=25^\circ \text{C unless otherwise noted} \)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>( R_{\text{UJC}} )</td>
<td>Thermal Resistance, Junction to Case</td>
<td>17.8</td>
<td>^\text{C/W}</td>
</tr>
</tbody>
</table>

* Device mounted on minimum pad size

\( h_{FE} \) Classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>( h_{FE} )</td>
<td>40 ~ 80</td>
<td>60 ~ 120</td>
<td>100 ~ 200</td>
<td>160 ~ 320</td>
</tr>
</tbody>
</table>
### Electrical Characteristics*  \( T_a = 25 \, ^\circ C \) unless otherwise noted

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Test Condition</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>( B_{VCB} )</td>
<td>Collector-Base Breakdown Voltage</td>
<td>( I_C = 10 \mu A, I_E = 0 )</td>
<td>300</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>( B_{VCEO} )</td>
<td>Collecto- Emitter Breakdown Voltage</td>
<td>( I_C = 1 mA, I_B = 0 )</td>
<td>300</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>( B_{VEBO} )</td>
<td>Emitter-Base Breakdown Voltage</td>
<td>( I_E = 10 \mu A, I_C = 0 )</td>
<td>5</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>( I_{CBO} )</td>
<td>Collector Cut-off Current</td>
<td>( V_{CB} = 200 \text{V}, I_E = 0 )</td>
<td>0.1</td>
<td>( \mu A )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( I_{EBO} )</td>
<td>Emitter Cut-off Current</td>
<td>( V_{EB} = 4 \text{V}, I_C = 0 )</td>
<td>0.1</td>
<td>( \mu A )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( h_{FE} )</td>
<td>DC Current Gain</td>
<td>( V_{CE} = 10 \text{V}, I_C = 10 \text{mA} )</td>
<td>40</td>
<td></td>
<td>320</td>
<td></td>
</tr>
<tr>
<td>( V_{CE(sat)} )</td>
<td>Collector-Emitter Saturation Voltage</td>
<td>( I_C = 20 \text{mA}, I_E = 2 \text{mA} )</td>
<td>0.6</td>
<td></td>
<td>1</td>
<td>V</td>
</tr>
<tr>
<td>( V_{BE(sat)} )</td>
<td>Base-Emitter Saturation Voltage</td>
<td>( I_C = 20 \text{mA}, I_E = 2 \text{mA} )</td>
<td>1</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>( f_T )</td>
<td>Current Gain Bandwidth Product</td>
<td>( V_{CE} = 30 \text{V}, I_C = 10 \text{mA} )</td>
<td>150</td>
<td></td>
<td>1</td>
<td>MHz</td>
</tr>
<tr>
<td>( C_{ob} )</td>
<td>Output Capacitance</td>
<td>( V_{CB} = 30 \text{V}, f = 1 \text{MHz} )</td>
<td>2.6</td>
<td></td>
<td>1.8</td>
<td>pF</td>
</tr>
<tr>
<td>( C_{re} )</td>
<td>Reverse Transfer Capacitance</td>
<td>( V_{CB} = 30 \text{V}, f = 1 \text{MHz} )</td>
<td>1.8</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
</tbody>
</table>

* Pulse Test: Pulse Width \( \leq 300 \mu s \), Duty Cycle \( \leq 2\% \)

### Ordering Information

<table>
<thead>
<tr>
<th>Part Number*</th>
<th>Marking</th>
<th>Package</th>
<th>Packing Method</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2SC3503CSTU</td>
<td>2SC3503C</td>
<td>TO-126</td>
<td>TUBE</td>
<td>hFE1 C grade</td>
</tr>
<tr>
<td>2SC3503DSTU</td>
<td>2SC3503D</td>
<td>TO-126</td>
<td>TUBE</td>
<td>hFE1 D grade</td>
</tr>
<tr>
<td>2SC3503ESTU</td>
<td>2SC3503E</td>
<td>TO-126</td>
<td>TUBE</td>
<td>hFE1 E grade</td>
</tr>
<tr>
<td>2SC3503FSTU</td>
<td>2SC3503F</td>
<td>TO-126</td>
<td>TUBE</td>
<td>hFE1 F grade</td>
</tr>
<tr>
<td>KSC3503CSTU</td>
<td>C3503C</td>
<td>TO-126</td>
<td>TUBE</td>
<td>hFE1 C grade</td>
</tr>
<tr>
<td>KSC3503DSTU</td>
<td>C3503D</td>
<td>TO-126</td>
<td>TUBE</td>
<td>hFE1 D grade</td>
</tr>
<tr>
<td>KSC3503ESTU</td>
<td>C3503E</td>
<td>TO-126</td>
<td>TUBE</td>
<td>hFE1 E grade</td>
</tr>
<tr>
<td>KSC3503FSTU</td>
<td>C3503F</td>
<td>TO-126</td>
<td>TUBE</td>
<td>hFE1 F grade</td>
</tr>
</tbody>
</table>

* 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. Base-Emitter On Voltage

Figure 6. Collector Output Capacitance
Typical Characteristics (Continued)

Figure 7. Reverse Transfer Capacitance

Figure 8. Current Gain Bandwidth Product

Figure 9. Safe Operating Area

Figure 10. Power Derating
Package Dimensions

TO-126

Dimensions in Millimeters
TRADEMARKS
The following are registered and unregistered trademarks and service marks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACE®
Build it Now™
CorePLUS™
CROSSVOLT™
CTL™
Current Transfer Logic™
EcoSPARK®
Fairchild®
Fairchild Semiconductor®
FACT Quiet Series™
FACT®
FAST®
FastvCore™
FPS™
FRFET®
Global Power ResourceSM

Green FPS™
Green FPS™ e-Series™
GTO™
i-Lo™
IntelliMAX™
ISOPLANAR™
MegaBuck™
MICROCOUPLER™
MicroFET™
MicroPak™
MillerDrive™
Motion-SPM™
OPTOLOGIC®
OPTOPLANAR®
PDP-SPM™
Power220®
Power247®
POWEREDGE®
Power-SPM™
PowerTrench®
Programmable Active Droop™
QFET®
QS™
QT Optoelectronics™
Quiet Series™
RapidConfigure™
SMART START™
SPM®
STEALTH™
SuperFET™
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SyncFET™
The Power Franchise®
	TinyBoost™
	TinyBuck™
	TinyLogic®
	TINYOPTO™
	TinyPower™
	TinyPWM™
	TinyWire™
	µSerDes™
	UHC®
	UniFET™
	VCX™

DISCLAIMER
FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD’S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

LIFE SUPPORT POLICY
FAIRCHILD’S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS
Definition of Terms

<table>
<thead>
<tr>
<th>Datasheet Identification</th>
<th>Product Status</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advance Information</td>
<td>Formative or In Design</td>
<td>This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.</td>
</tr>
<tr>
<td>Preliminary</td>
<td>First Production</td>
<td>This datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.</td>
</tr>
<tr>
<td>No Identification Needed</td>
<td>Full Production</td>
<td>This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.</td>
</tr>
<tr>
<td>Obsolete</td>
<td>Not In Production</td>
<td>This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.</td>
</tr>
</tbody>
</table>