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March 2008

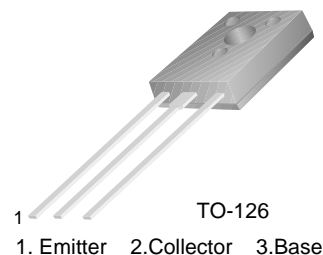
# 2SC3503/KSC3503 NPN Epitaxial Silicon Transistor

## Applications

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

## Features

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



## Absolute Maximum Ratings\* $T_a = 25^\circ C$ 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, $T_C = 25^\circ C$ $T_C = 125^\circ C$	7 1.2	W 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

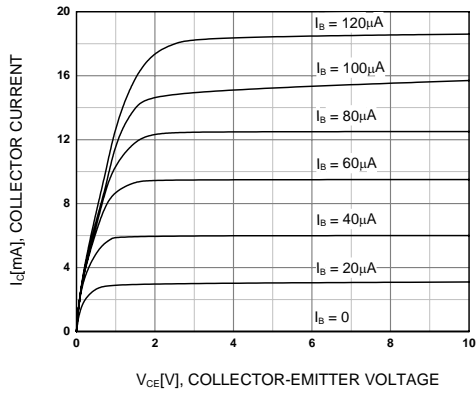
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\mu\text{A}, I_E = 0$	300			V
$BV_{CEO}$	Collector- Emitter Breakdown Voltage	$I_C = 1\text{mA}, I_B = 0$	300			V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\mu\text{A}, I_C = 0$	5			V
$I_{CBO}$	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	$V_{CB} = 30\text{V}, f = 1\text{MHz}$		2.6		pF
$C_{re}$	Reverse Transfer Capacitance	$V_{CB} = 30\text{V}, f = 1\text{MHz}$		1.8		pF

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

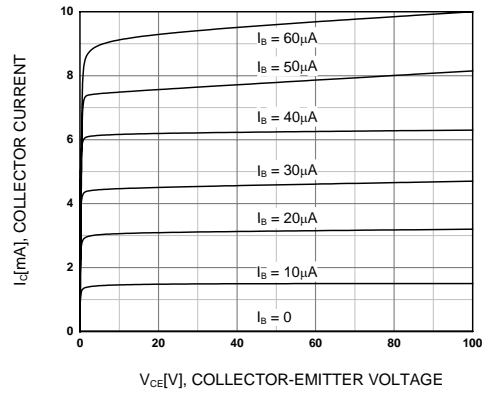
Part Number*	Marking	Package	Packing Method	Remarks
2SC3503CSTU	2SC3503C	TO-126	TUBE	hFE1 C grade
2SC3503DSTU	2SC3503D	TO-126	TUBE	hFE1 D grade
2SC3503ESTU	2SC3503E	TO-126	TUBE	hFE1 E grade
2SC3503FSTU	2SC3503F	TO-126	TUBE	hFE1 F grade
KSC3503CSTU	C3503C	TO-126	TUBE	hFE1 C grade
KSC3503DSTU	C3503D	TO-126	TUBE	hFE1 D grade
KSC3503ESTU	C3503E	TO-126	TUBE	hFE1 E grade
KSC3503FSTU	C3503F	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.

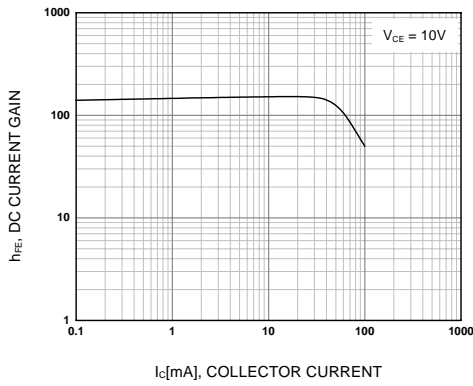
# Typical Characteristics



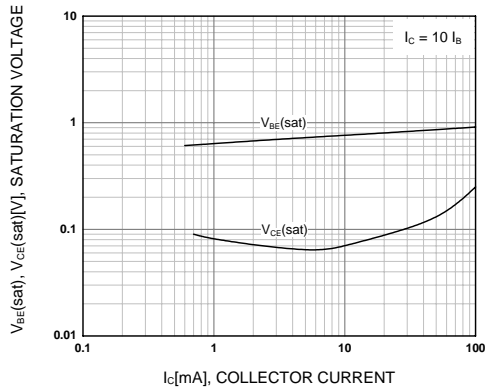
**Figure 1. Static Characteristic**



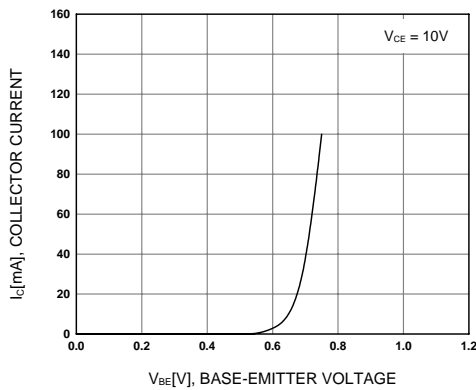
**Figure 2. Static Characteristic**



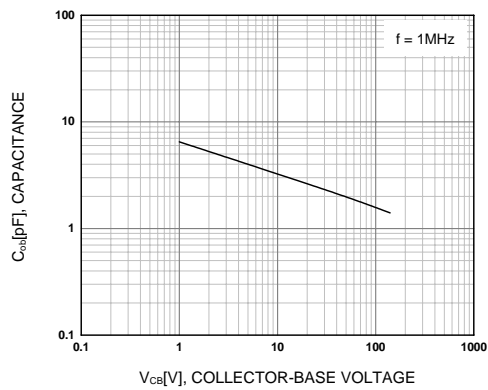
**Figure 3. DC current Gain**



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



**Figure 5. Base-Emitter On Voltage**



**Figure 6. Collector Output Capacitance**

Typical Characteristics (Continued)

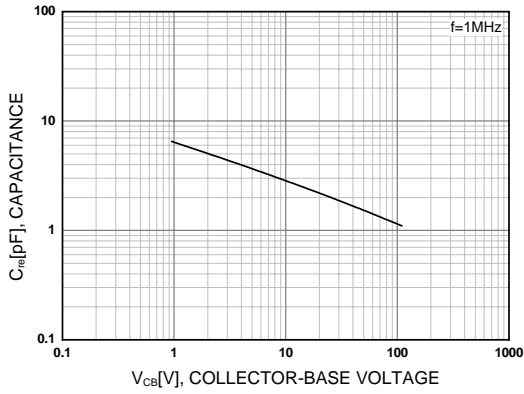


Figure 7. Reverse Transfer Capacitance

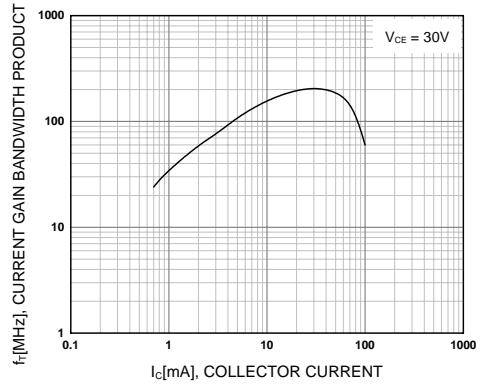


Figure 8. Current Gain Bandwidth Product

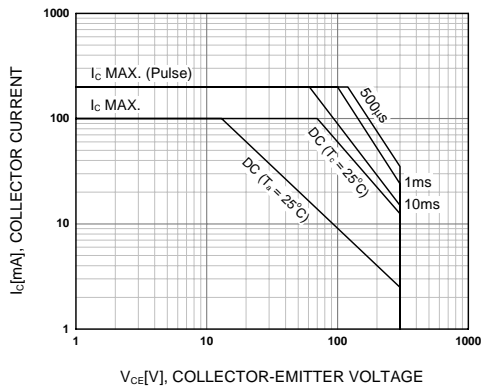


Figure 9. Safe Operating Area

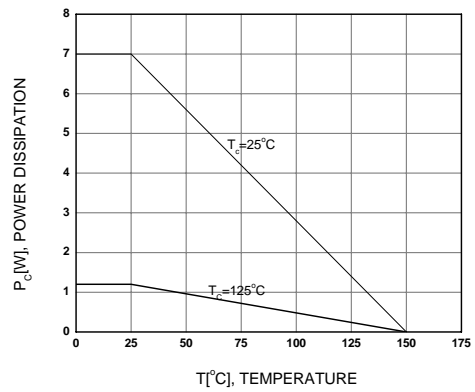


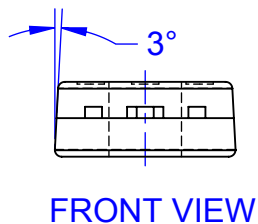
Figure 10. Power Derating



TOP VIEW



SIDE VIEW



FRONT VIEW

PRODUCTION CODE	TERMINAL LENGTH "D"	TERMINAL LENGTH "E"
TSSTU	3.45 - 4.05	6.45-7.45
TSTU	2.36 - 2.96	5.36-6.36
NONE (STD LENGTH)	12.76 - 13.36	15.76-16.76

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- B. ALL DIMENSIONS ARE IN MILLIMETERS
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR PROTRUSIONS

 FOR TERMINAL LENGTH "D", REFER TO TABLE

 FOR TERMINAL LENGTH "E", REFER TO TABLE

F. DRAWING FILENAME: MKT-TO126AArev2



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