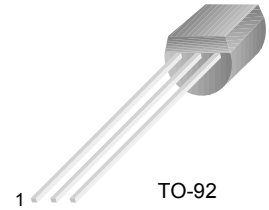
FAIRCHILD SEMICONDUCTOR®

August 2010

# 2N6517
# NPN Epitaxial Silicon Transistor

## Features

- High Voltage Transistor
- Collector Dissipation: $P_C$(max) = 625mW
- Complement to 2N6520
- Suffix “-C” means Center Collector (1. Emitter 2. Collector 3. Base)



TO-92

1. Emitter 2. Base 3. Collector

## Absolute Maximum Ratings $T_a$ = 25°C unless otherwise noted

| Symbol | Parameter | | Value | Units |
|---|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 2N6517<br>2N6517C | 350<br>400 | V<br>V |
| $V_{CEO}$ | Collector-Emitter Voltage | 2N6517<br>2N6517C | 350<br>400 | V<br>V |
| $V_{EBO}$ | Emitter-Base Voltage | | 6 | V |
| $I_C$ | Collector Current | | 500 | mA |
| $P_C$ | Collector Power Dissipation | | 625 | mW |
| $T_J$ | Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature | | -55 ~ 150 | °C |

## Electrical Characteristics $T_a$ = 25°C unless otherwise noted

| Symbol | Parameter | Conditions | Min. | Max. | Units |
|---|---|---|---|---|---|
| $BV_{CBO}$ | Collector-Base Breakdown Voltage | | | | |
| | 2N6517 | $I_C$ = 100μA, $I_E$ = 0 | 350 | | V |
| | 2N6517C | $I_C$ = 100μA, $I_E$ = 0 | 400 | | V |
| $BV_{CEO}$ | Collector-Emitter Breakdown Voltage * | | | | |
| | 2N6517 | $I_C$ = 1mA, $I_B$ = 0 | 350 | | V |
| | 2N6517C | $I_C$ = 1mA, $I_B$ = 0 | 400 | | V |
| $BV_{EBO}$ | Emitter-Base Breakdown Voltage | $I_E$ = 10μA, $I_C$ = 0 | 6 | | V |
| $I_{CBO}$ | Collector Cut-off Current | $V_{CB}$ = 250V, $I_E$ = 0 | | 50 | nA |
| $I_{EBO}$ | Emitter Cut-off Current | $V_{EB}$ = 5V, $I_C$ = 0 | | 50 | nA |
| $h_{FE}$ | DC Current Gain * | | | | |
| | 2N6517/2N6517C | $V_{CE}$ = 10V, $I_C$ = 1mA | 20 | | |
| | 2N6517/2N6517C | $V_{CE}$ = 10V, $I_C$ = 10mA | 30 | | |
| | 2N6517/2N6517C | $V_{CE}$ = 10V, $I_C$ = 30mA | 30 | 200 | |
| | 2N6517/2N6517C | $V_{CE}$ = 10V, $I_C$ = 50mA | 20 | 200 | |
| | 2N6517/2N6517C | $V_{CE}$ = 10V, $I_C$ = 100mA | 15 | | |
| | 2N6517C | $V_{CE}$ = 10V, $I_C$ = 5mA | 50 | 200 | |

## Electrical Characteristics (Continued) $T_a$ = 25°C unless otherwise noted

| Symbol | Parameter | Conditions | Min. | Max. | Units |
|---|---|---|---|---|---|
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C$ = 10mA, $I_B$ = 1mA<br>$I_C$ = 20mA, $I_B$ = 2mA<br>$I_C$ = 30mA, $I_B$ = 3mA<br>$I_C$ = 50mA, $I_B$ = 5mA | | 0.3<br>0.35<br>0.5<br>1 | V<br>V<br>V<br>V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | $I_C$ = 10mA, $I_B$ = 1mA<br>$I_C$ = 20mA, $I_B$ = 2mA<br>$I_C$ = 30mA, $I_B$ = 3mA | | 0.75<br>0.85<br>0.9 | V<br>V<br>V |
| $C_{ob}$ | Output Capatitance | $V_{CB}$ = 20V, $I_E$ = 0, f = 1MHz | | 6 | pF |
| $f_T$ | Current Gain Bandwidth Product * | $I_C$ = 10mA, $V_{CE}$ = 20V, f = 20MHz | 40 | 200 | MHz |
| $V_{BE(on)}$ | Base-Emitter On Voltage | $I_C$ = 100mA, $V_{CE}$ = 10V | | 2 | V |

* Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

## Typical Performance Characteristics

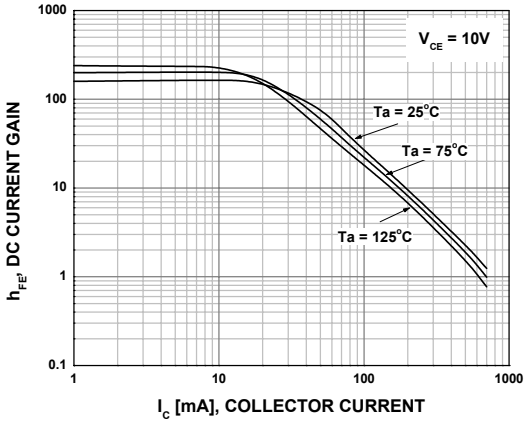



Figure 1. DC Current Gain

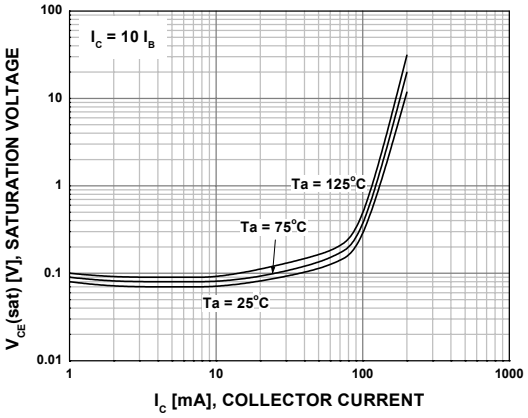



Figure 2. Saturation Voltage

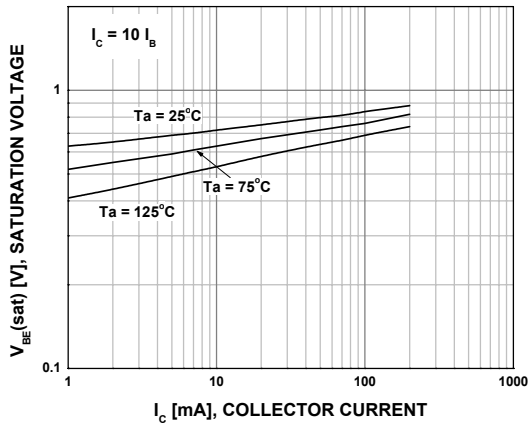



Figure 3. Saturation Voltage

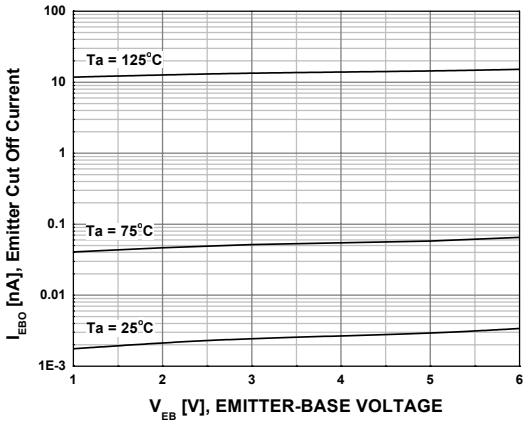



Figure 4. Emitter Cut Off Current

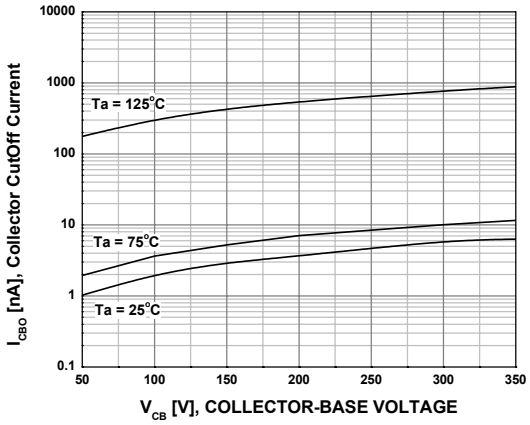



Figure 5. Collector CutOff Current

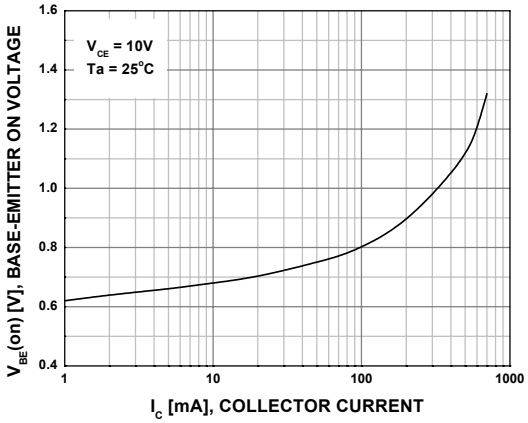



Figure 6. Base-Emitter On Voltage

## Typical Performance Characteristics (Continued)

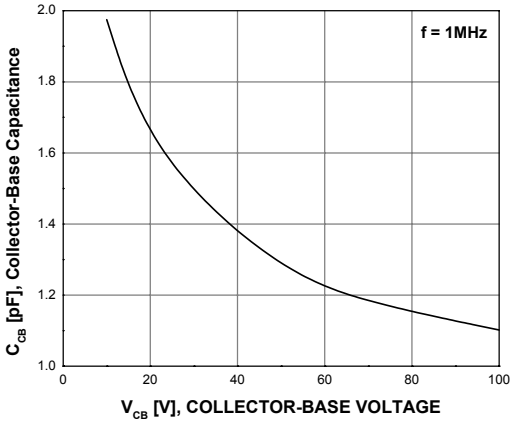



**Figure 7. Output Capacitance**

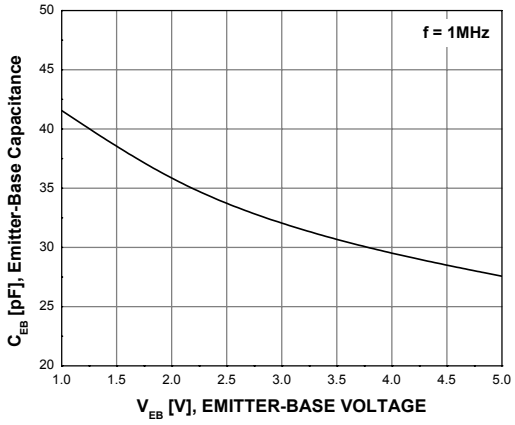



**Figure 8. Input Capacitance**

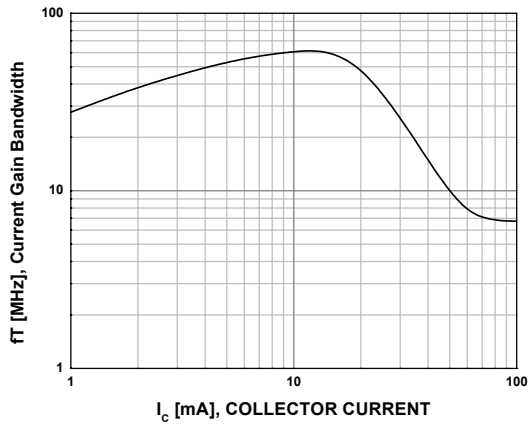



**Figure 9. Current Gain Bandwidth Product**

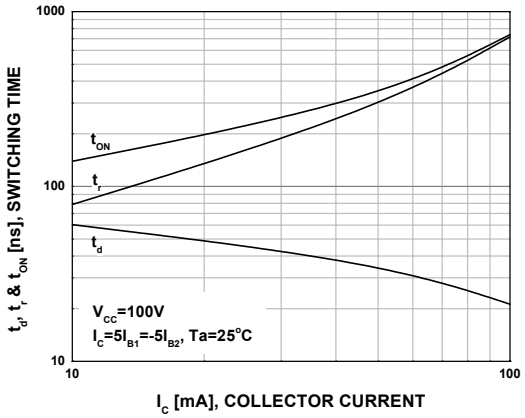



**Figure 10. Resistive Load Switching**

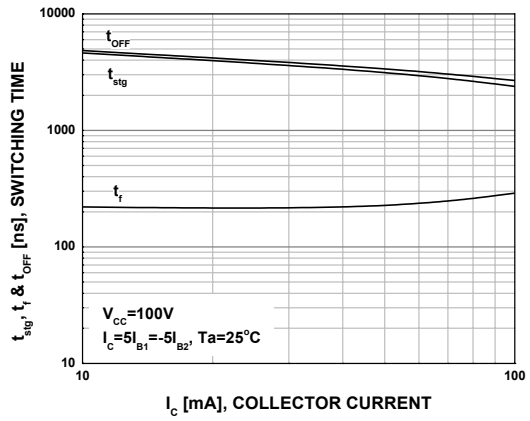
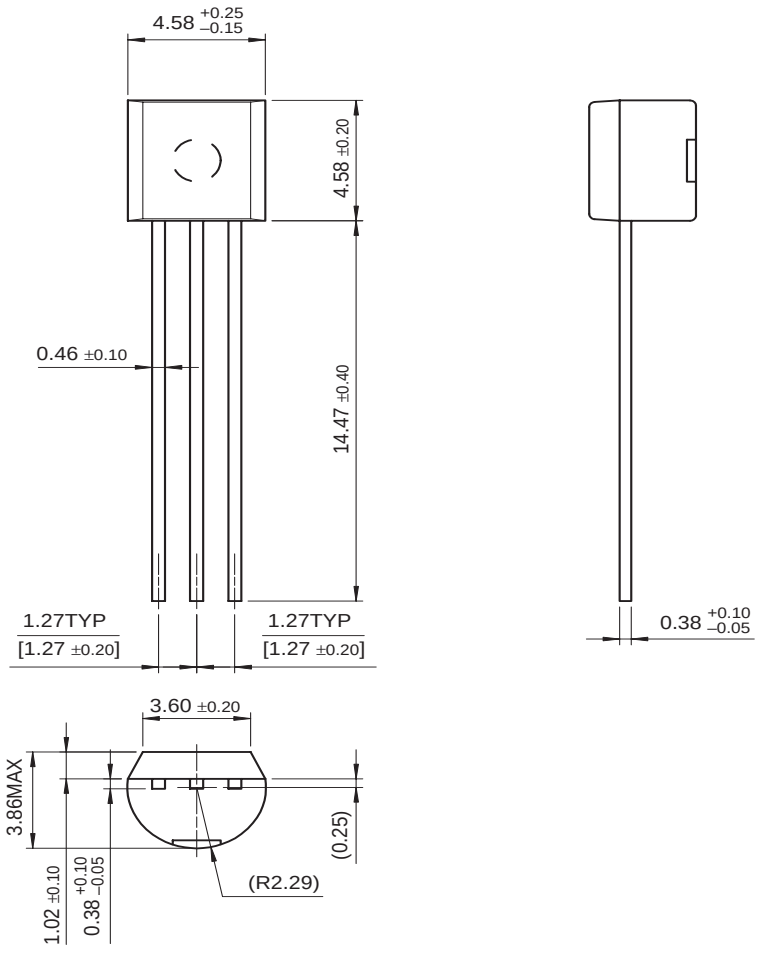



**Figure 11. Resistive Load Switching**

## Physical Dimensions

TO-92




Dimensions in Millimeters

FAIRCHILD
SEMICONDUCTOR®

## TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

AccuPower™
Auto-SPM™
Build it Now™
CorePLUS™
CorePOWER™
*CROSSVOLT*™
CTL™
Current Transfer Logic™
DEUXPEED®
Dual Cool™
EcoSPARK®
EfficientMax™
ESBC™
F®
Fairchild®
Fairchild Semiconductor®
FACT Quiet Series™
FACT®
FAST®
FastvCore™
FETBench™
FlashWriter®*
FPS™
F-PFS™
FRFET®
Global Power Resource SM
Green FPS™
Green FPS™ e-Series™
G*max*™
GTO™
IntelliMAX™
ISOPLANAR™
MegaBuck™
MICROCOUPLER™
MicroFET™
MicroPak™
MicroPak2™
MillerDrive™
MotionMax™
Motion-SPM™
OptoHiT™
OPTOLOGIC®
OPTOPLANAR®
PDP SPM™
Power-SPM™
PowerTrench®
PowerXS™
Programmable Active Droop™
QFET®
QS™
Quiet Series™
RapidConfigure™
™
Saving our world, 1mW/W/kW at a time™
SignalWise™
SmartMax™
SMART START™
SPM®
STEALTH™
SuperFET™
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SupreMOS®
SyncFET™
Sync-Lock™
SYSTEM GENERAL ®*
The Power Franchise®
the power franchise
TinyBoost™
TinyBuck™
TinyCalc™
TinyLogic®
TINYOPTO™
TinyPower™
TinyPWM™
TinyWire™
TriFault Detect™
TRUECURRENT™*
µSerDes™
µ SerDes
UHC®
Ultra FRFET™
UniFET™
VCX™
VisualMax™
XS™

* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

## 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 a significant injury of the user.
2. A critical component in 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.

## ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

## PRODUCT STATUS DEFINITIONS

### Definition of Terms

| Datasheet Identification | Product Status | Definition |
|---|---|---|
| Advance Information | Formative / In Design | Datasheet contains the design specifications for product development. Specifications may change in any manner without notice. |
| Preliminary | First Production | 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. |
| No Identification Needed | Full Production | Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design. |
| Obsolete | Not In Production | Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only. |

Rev. I49