



March 2015

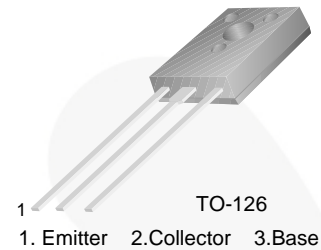
BD136 / BD138 / BD140 PNP Epitaxial Silicon Transistor

Features

- Complement to BD135, BD137 and BD139 respectively

Applications

- Medium Power Linear and Switching



Ordering Information

Part Number	Marking	Package	Packing Method
BD13610S	BD136-10	TO-126 3L	Bulk
BD13610STU	BD136-10	TO-126 3L	Rail
BD13616S	BD136-16	TO-126 3L	Bulk
BD13616STU	BD136-16	TO-126 3L	Rail
BD13810STU	BD138-10	TO-126 3L	Rail
BD13816STU	BD138-16	TO-126 3L	Rail
BD14010STU	BD140-10	TO-126 3L	Rail
BD14016S	BD140-16	TO-126 3L	Bulk
BD14016STU	BD140-16	TO-126 3L	Rail

BD136 / BD138 / BD140 — PNP Epitaxial Silicon Transistor

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter		Value	Unit
V_{CBO}	Collector-Base Voltage	BD136	-45	V
		BD138	-60	
		BD140	-80	
V_{CEO}	Collector-Emitter Voltage	BD136	-45	V
		BD138	-60	
		BD140	-80	
V_{EBO}	Emitter-Base Voltage		-5	V
I_C	Collector Current (DC)		-1.5	A
I_C	Collector Current (Pulse)		-3.0	A
I_B	Base Current		-0.5	A
P_C	Collector Dissipation	$T_C = 25^\circ\text{C}$	12.5	W
		$T_A = 25^\circ\text{C}$	1.25	
T_J	Junction Temperature		150	$^\circ\text{C}$
T_{STG}	Storage Temperature		-55 to +150	$^\circ\text{C}$

Electrical Characteristics

Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage ⁽¹⁾	BD136	$I_C = -30\text{ mA}, I_B = 0$			V
		BD138				
		BD140				
I_{CBO}	Collector Cut-Off Current	$V_{CB} = -30\text{ V}, I_E = 0$			-0.1	μA
I_{EBO}	Emitter Cut-Off Current	$V_{EB} = -5\text{ V}, I_C = 0$			-10	μA
h_{FE1}	DC Current Gain ⁽¹⁾	$V_{CE} = -2\text{ V}, I_C = -5\text{ mA}$	25			
h_{FE2}	DC Current Gain ⁽¹⁾	$V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$	25			
h_{FE3}	DC Current Gain ⁽¹⁾	$V_{CE} = -2\text{ V}, I_C = -150\text{ mA}$	40		250	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ⁽¹⁾	$I_C = -500\text{ mA}, I_B = -50\text{ mA}$			-0.5	V
$V_{BE(on)}$	Base-Emitter On Voltage ⁽¹⁾	$V_{CE} = -2\text{ V}, I_C = -0.5\text{ A}$			-1	V

Note:

1. Pulse test: pulse width = 350 μs , duty cycle = 2.0% pulsed.

h_{FE} Classification

Classification	10	16
h_{FE3}	63 ~ 160	100 ~ 250

Typical Performance Characteristics

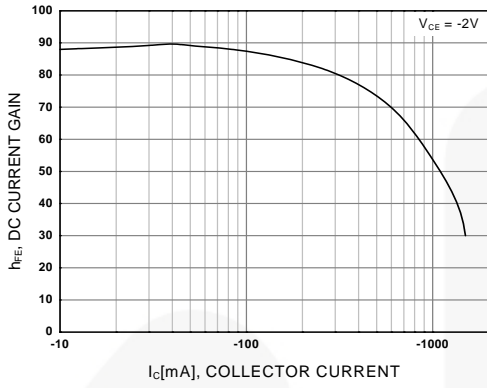


Figure 1. DC Current Gain

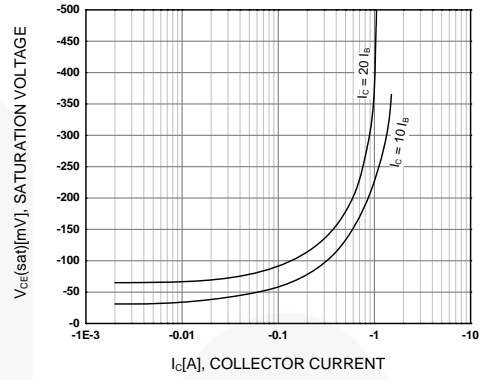


Figure 2. Collector-Emitter Saturation Voltage

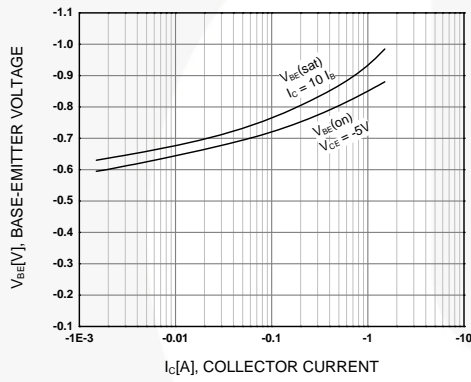


Figure 3. Base-Emitter Voltage

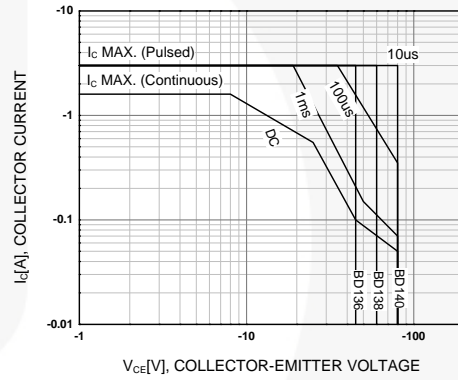


Figure 4. Safe Operating Area

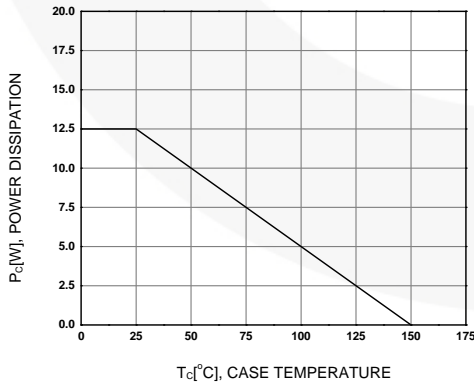
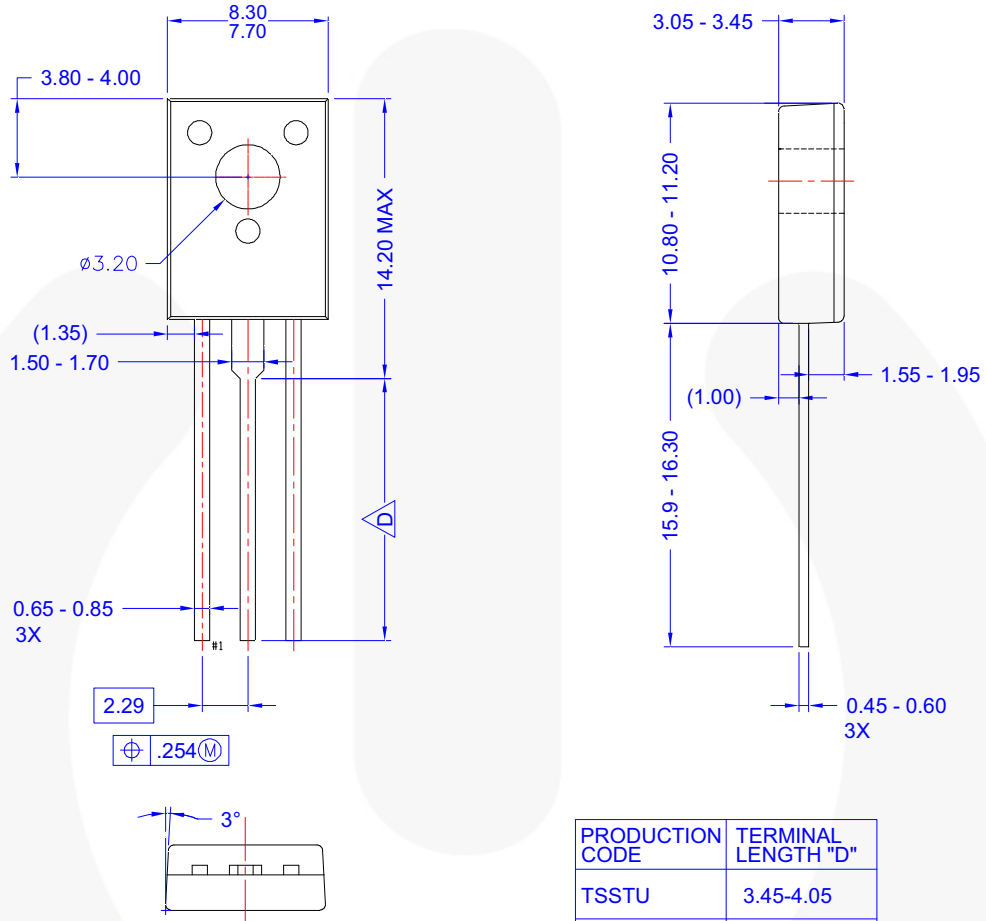


Figure 5. Power Derating

Physical Dimensions



- NOTES:
- A) THIS PACKAGE DOES NOT COMPLY TO ANY CURRENT PACKAGING STANDARD.
 - B) ALL DIMENSIONS ARE IN MILLIMETERS.
 - C) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
 - D) FOR TERMINAL LENGTH SEE TABLE
 - E) DRAWING FILE NAME AND REVISION : MKT-TO126Arev1






PRODUCTION CODE	TERMINAL LENGTH "D"
TSSTU	3.45-4.05
TSTU	2.36-2.96
NONE (STD LENGTH)	12.76-13.36

Figure 6. TO-126 (SOT-32) UNIFIED DRAWING (TSTU, TSSTU, STANDARD)



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™	F-PFS™	OPTOPLANAR®	 SYSTEM GENERAL®
AttitudeEngine™	FRFET®	 ®	TinyBoost®
Awinda®	Global Power Resource™	PowerTrench®	TinyBuck®
AX-CAP®*	GreenBridge™	PowerXS™	TinyCalc™
BitSiC™	Green FPS™	Programmable Active Droop™	TinyLogic®
Build it Now™	Green FPS™ e-Series™	QFET®	TINYOPTO™
CorePLUS™	Gmax™	QS™	TinyPower™
CorePOWER™	GTO™	Quiet Series™	TinyPWM™
CROSSVOLT™	IntelliMAX™	RapidConfigure™	TinyWire™
CTL™	ISOPLANAR™	 ™	TranSiC™
Current Transfer Logic™	Making Small Speakers Sound Louder and Better™	Saving our world, 1mW/W/kW at a time™	TriFault Detect™
DEUXPEED®	MegaBuck™	SignalWise™	TRUECURRENT®*
Dual Cool™	MICROCOUPLER™	SmartMax™	µSerDes™
EcoSPARK®	MicroFET™	SMART START™	 SerDes™
EfficientMax™	MicroPak™	Solutions for Your Success™	UHC®
ESBC™	MicroPak2™	SPM®	Ultra FRFET™
 Fairchild®	MillerDrive™	STEALTH™	UniFET™
Fairchild Semiconductor®	MotionMax™	SuperFET®	VCX™
FACT Quiet Series™	MotionGrid®	SuperSOT™-3	VisualMax™
FACT®	MTi®	SuperSOT™-6	VoltagePlus™
FAST®	MTx®	SuperSOT™-8	XS™
FastvCore™	MVN®	SupreMOS®	Xsens™
FETBench™	mWSaver®	SyncFET™	仙童™
FPS™	OptoHiT™	Sync-Lock™	
	OPTOLOGIC®		

* 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. TO OBTAIN THE LATEST, MOST UP-TO-DATE DATASHEET AND PRODUCT INFORMATION, VISIT OUR WEBSITE AT [HTTP://WWW.FAIRCHILDSEMI.COM](http://www.fairchildsemi.com). 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. I73