

**Small Signal Diode**



**Features**

- ✦ Epitaxial planar die construction
- ✦ Surface device type mounting
- ✦ Moisture sensitivity level 1
- ✦ Matte Tin(Sn) lead finish with Nickel(Ni) underplate
- ✦ Pb free version and RoHS compliant
- ✦ Green compound (Halogen free) with suffix "G" on packing code and prefix "G" on date code

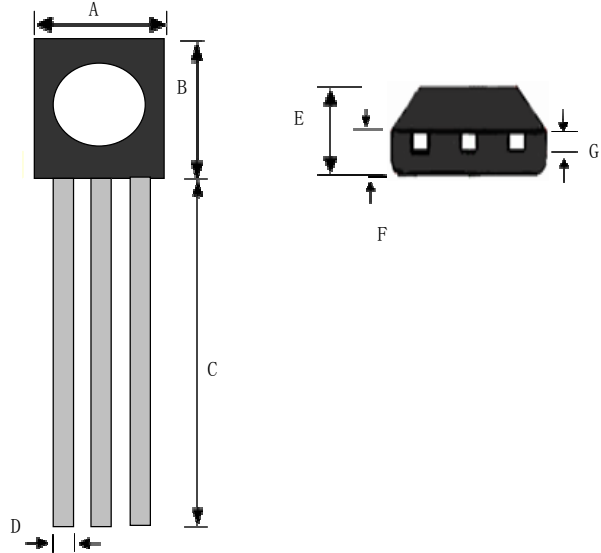
**Mechanical Data**

- ✦ Case : TO-92 plastic package
- ✦ Terminal: Matte tin plated, lead free., solderable per MIL-STD-202, Method 208 guaranteed
- ✦ Weight : 0.19gram (approximately)
- ✦ High temperature soldering guaranteed: 260°C/10s

**Ordering Information**

Package	Part No.	Packing
TO-92	BC337-16 A1	4K/box
TO-92	BC337-16 A1G	4K/box
TO-92	BC337-25 A1	4K/box
TO-92	BC337-25 A1G	4K/box
TO-92	BC337-40 A1	4K/box
TO-92	BC337-40 A1G	4K/box
TO-92	BC338-16 A1	4K/box
TO-92	BC338-16 A1G	4K/box
TO-92	BC338-25 A1	4K/box
TO-92	BC338-25 A1G	4K/box
TO-92	BC338-40 A1	4K/box
TO-92	BC338-40 A1G	4K/box

**TO-92**



Dimensions	Unit (mm)		Unit (inch)	
	Min	Max	Min	Max
A	4.50	4.70	0.177	0.185
B	4.50	4.70	0.177	0.185
C	12.50		0.492	
D	0.35	0.45	0.013	0.017
E	3.50	3.70	0.137	0.145
F	1.00	1.20	0.039	0.047
G	0.29	0.39	0.011	0.015

**Maximum Ratings and Electrical Characteristics**

Rating at 25°C ambient temperature unless otherwise specified.

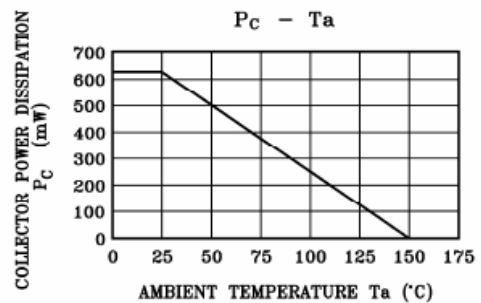
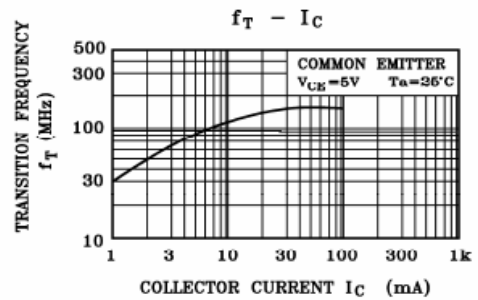
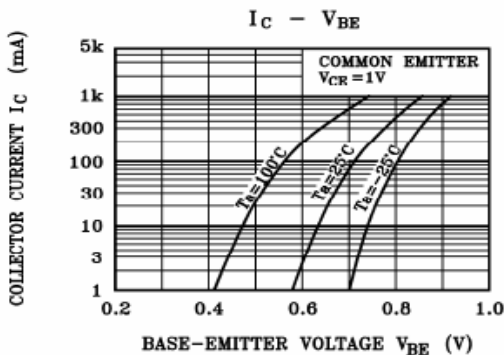
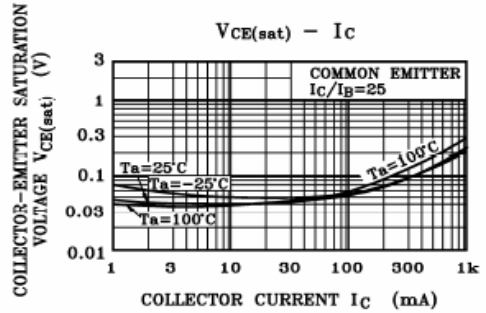
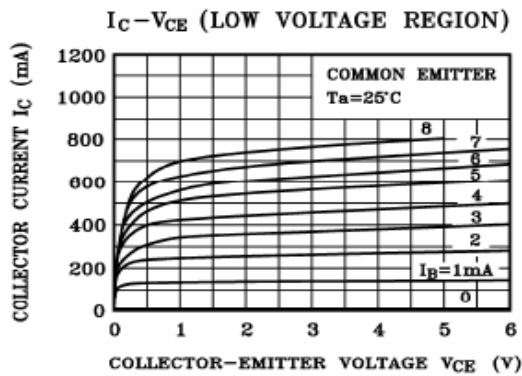
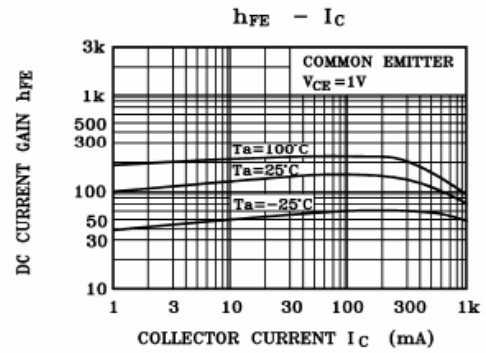
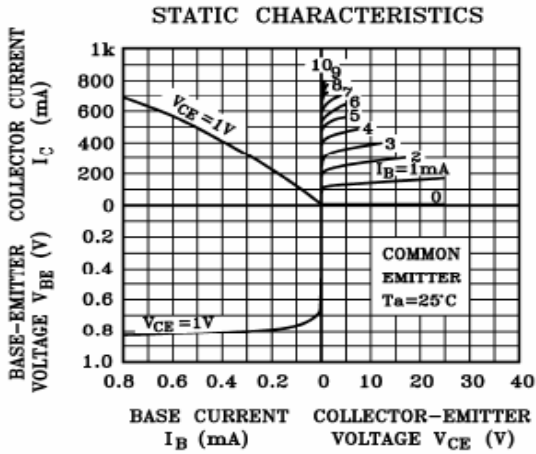
**Maximum Ratings**

Type Number	Symbol	BC337	BC338	Units
Power Dissipation	$P_D$	625		mW
Collector-Base Voltage	$V_{CBO}$	50	30	V
Collector-Emitter Voltage	$V_{CEO}$	45	25	V
Emitter-Base Voltage	$V_{EBO}$	5		V
Peak Collector Current	$I_{CM}$	1		A
Collector Current	$I_C$	800		mA
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to + 150		°C

Notes:1. Valid provided that electrodes are kept at ambient temperature

Small Signal Diode

Rating and Characteristic Curves

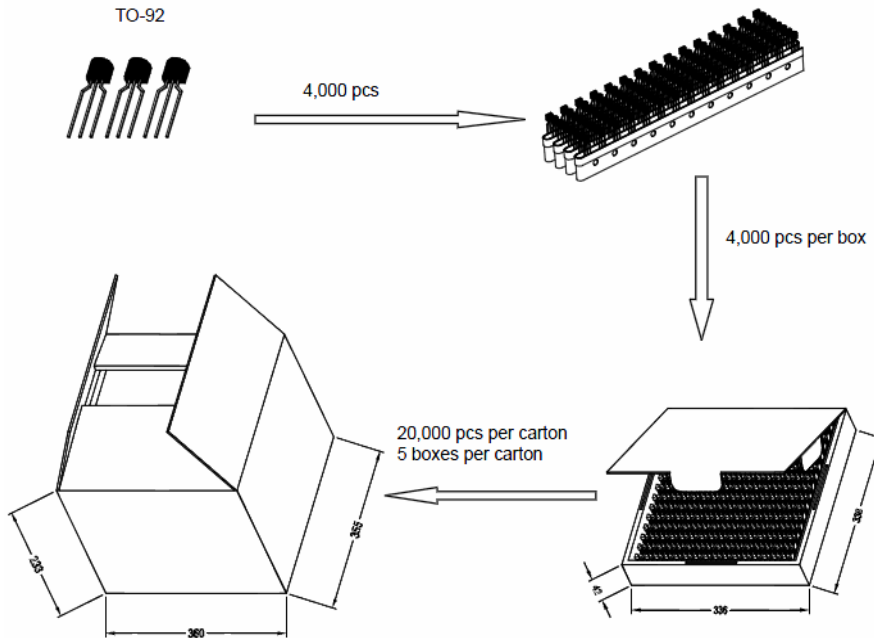


**Small Signal Diode**

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

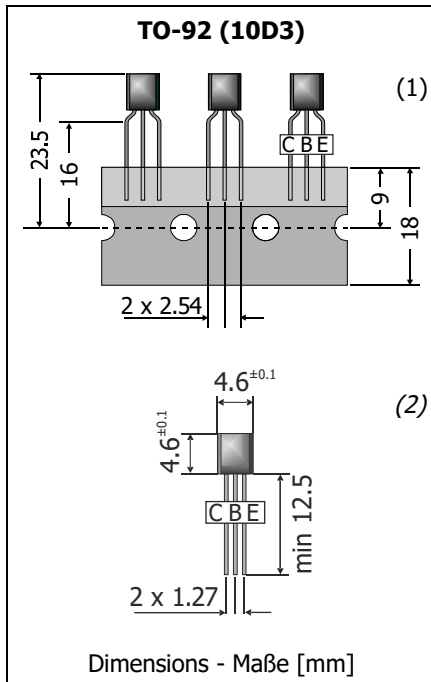
Type Number	Symbol	Min	Max	Units
Collector-Base Breakdown Voltage BC337 BC338	$I_C=100\mu\text{A}$ $V_{(BR)CBO}$	50 30	- -	V
Collector-Emitter Breakdown Voltage BC337 BC338	$I_C=2\text{mA}$ $V_{(BR)CEO}$	45 25	- -	V
Emitter-Base Breakdown Voltage	$I_E=100\mu\text{A}$ $V_{(BR)EBO}$	5	-	V
Collector Cut-off Current BC337 BC338	$V_{CB}=50\text{V}$ $V_{CB}=30\text{V}$ $I_{CBO}$	-	100 100	nA
DC current gain current gain Group16 25 40	$V_{CE}=1\text{V}$ $V_{CE}=1\text{V}$ $V_{CE}=1\text{V}$ $I_C=100\text{mA}/300\text{mA}$ $I_C=100\text{mA}/300\text{mA}$ $I_C=100\text{mA}/300\text{mA}$ $h_{FE}$	100/60 160/60 250/60	250 400 630	- - -
Collector-Emitter saturation voltage	$I_C=500\text{mA}$ $I_B=50\text{mA}$ $V_{CE(sat)}$	- -	0.7	V
Base-Emitter on voltage	$V_{CE}=1\text{V}$ $I_C=300\text{mA}$ $V_{BE(on)}$	-	1.2	V
Transition Frequency $V_{CE}=5\text{V}$	$I_C=10\text{mA}$ $f=50\text{MHz}$ $f_T$	100	-	MHz
Collector Base Capacitance	$V_{CB}=10\text{V}$ $f=1\text{MHz}$ $C_{CB}$	-	12	PF

**Tape & Reel specification**



<b>BC337 ... BC338</b> <b>General Purpose NPN Transistors</b> <b>Universal-NPN-Transistoren</b>	<b>I<sub>C</sub> = 800 mA</b> <b>h<sub>FE</sub> = 160/250/400</b> <b>T<sub>jmax</sub> = 150°C</b>	<b>V<sub>CEO</sub> = 25...45 V</b> <b>P<sub>tot</sub> = 625 mW</b>
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Version 2017-02-09



**Typical Applications**

Signal processing,  
Switching, Amplification  
Commercial grade <sup>1)</sup>

**Features**

General Purpose  
Three current gain groups  
Compliant to RoHS, REACH,  
Conflict Minerals <sup>1)</sup>

**Mechanical Data <sup>1)</sup>**

- (1) Taped in ammo pack (Raster 2.54) 4000
- (2) On request: in bulk (Raster 1.27, suffix "BK") 5000

Weight approx. 0.01 g  
Case material UL 94V-0  
Solder & assembly conditions 260°C/10s  
MSL N/A



**Typische Anwendungen**

Signalverarbeitung,  
Schalten, Verstärken  
Standardausführung <sup>1)</sup>

**Besonderheiten**

Universell anwendbar  
Drei Stromverstärkungsklassen  
Konform zu RoHS, REACH,  
Konfliktmineralien <sup>1)</sup>

**Mechanische Daten <sup>1)</sup>**

- (1) Gegurtet in Ammo-Pack (Raster 2.54)
- (2) Auf Anfrage: Schüttgut (Raster 1.27, Suffix "BK")

Gewicht ca. 0.01 g  
Gehäusematerial UL 94V-0  
Löt- und Einbaubedingungen 260°C/10s

Current gain groups Stromverstärkungsgruppen		Recommended complementary PNP transistors Empfohlene komplementäre PNP-Transistoren
BC337-16 BC337-25 BC337-40	BC338-16 BC338-25 BC338-40	BC327 ... BC328

**Maximum ratings <sup>2)</sup>**

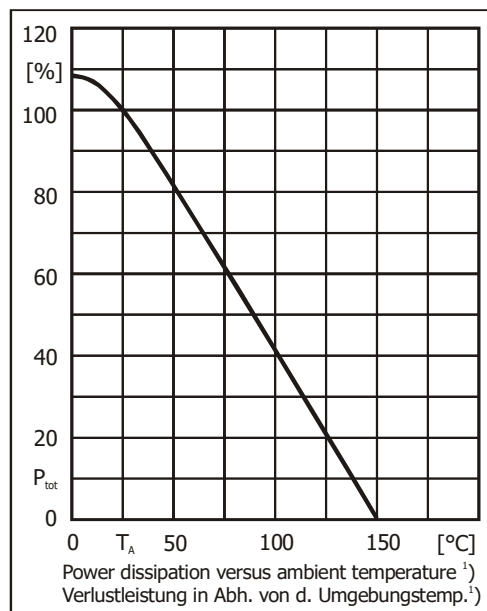
**Grenzwerte <sup>2)</sup>**

			BC337	BC338
Collector-Emitter-volt. – Kollektor-Emitter-Spannung	E-B short	V <sub>CEs</sub>	50 V	30 V
Collector-Emitter-volt. – Kollektor-Emitter-Spannung	B open	V <sub>CEO</sub>	45 V	25 V
Emitter-Base-voltage – Emitter-Basis-Spannung	C open	V <sub>EBO</sub>	5 V	
Power dissipation – Verlustleistung		P <sub>tot</sub>	625 mW <sup>3)</sup>	
Collector current – Kollektorstrom (dc)		I <sub>C</sub>	800 mA	
Peak Collector current – Kollektor-Spitzenstrom		I <sub>CM</sub>	1 A	
Base current – Basisstrom		I <sub>B</sub>	100 mA	
Junction temperature – Sperrschichttemperatur		T <sub>J</sub>	-55...+150°C	
Storage temperature – Lagerungstemperatur		T <sub>S</sub>	-55...+150°C	

1 Please note the [detailed information on our website](#) or at the beginning of the data book  
Bitte beachten Sie die [detaillierten Hinweise auf unserer Internetseite](#) bzw. am Anfang des Datenbuches  
2 T<sub>A</sub> = 25°C, unless otherwise specified – T<sub>A</sub> = 25°C, wenn nicht anders angegeben  
3 Valid, if leads are kept at ambient temperature at a distance of 2 mm from case  
Gültig wenn die Anschlussdrähte in 2 mm Abstand vom Gehäuse auf Umgebungstemperatur gehalten werden

**Characteristics**
**Kennwerte**

				$T_j = 25^\circ\text{C}$		
				Min.	Typ.	Max.
DC current gain – Kollektor-Basis-Stromverhältnis						
$V_{CE} = 1\text{ V}, I_C = 100\text{ mA}$	Group -16	$h_{FE}$		100	160	250
	Group -25			160	250	400
	Group -40			250	400	630
$V_{CE} = 1\text{ V}, I_C = 300\text{ mA}$	Group -16	$h_{FE}$		60	130	–
	Group -25			100	200	–
	Group -40			170	320	–
Collector-Emitter saturation voltage – Kollektor-Sättigungsspannung <sup>1)</sup>						
$I_C = 500\text{ mA}, I_B = 50\text{ mA}$			$V_{CEsat}$	–	–	0.7 V
Base-Emitter-voltage – Basis-Emitter-Spannung <sup>1)</sup>						
$V_{CE} = 1\text{ V}, I_C = 300\text{ mA},$			$V_{BE}$	–	–	1.2 V
Collector-Emitter cutoff current – Kollektor-Emitter-Reststrom						
$V_{CE} = 45\text{ V}$ $V_{CE} = 25\text{ V}$	B-E short	BC337 BC338	$I_{CES}$	–	2 nA	100 nA
				–	2 nA	100 nA
$V_{CE} = 45\text{ V}$ $V_{CE} = 25\text{ V}$	$T_j = 125^\circ\text{C}$	B-E short	BC337 BC338	$I_{CES}$	–	10 $\mu\text{A}$
					–	10 $\mu\text{A}$
Gain-Bandwidth Product – Transitfrequenz						
$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}, f = 50\text{ MHz}$			$f_T$	–	100 MHz	–
Collector-Base Capacitance – Kollektor-Basis-Kapazität						
$V_{CB} = 10\text{ V}, I_E = I_C = 0, f = 1\text{ MHz}$			$C_{CBO}$	–	12 pF	–
Thermal resistance junction to ambient Wärmewiderstand Sperrschicht – Umgebung			$R_{thA}$	< 200 K/W <sup>2)</sup>		



**Disclaimer:** See data book page 2 or [website](#)  
**Haftungsausschluss:** Siehe Datenbuch Seite 2 oder [Internet](#)

- 1 Tested with pulses  $t_p = 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$   
Gemessen mit Impulsen  $t_p = 300\ \mu\text{s}$ , Schaltverhältnis  $\leq 2\%$
- 2 Valid, if leads are kept at ambient temperature at a distance of 2 mm from case  
Gültig wenn die Anschlussdrähte in 2 mm Abstand vom Gehäuse auf Umgebungstemperatur gehalten werden

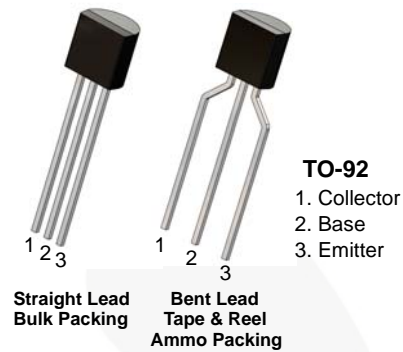


September 2015

# BC337 / BC338 NPN Epitaxial Silicon Transistor

## Features

- Switching and Amplifier Applications
- Suitable for AF-Driver Stages and Low-Power Output Stages
- Complement to BC327 / BC328



## Ordering Information

Part Number	Top Mark	Package	Packing Method
BC33716BU	BC33716	TO-92 3L	Bulk
BC33716TA	BC33716	TO-92 3L	Ammo
BC33716TFR	BC33716	TO-92 3L	Tape and Reel
BC33725BU	BC33725	TO-92 3L	Bulk
BC33725TA	BC33725	TO-92 3L	Ammo
BC33725TAR	BC33725	TO-92 3L	Ammo
BC33725TF	BC33725	TO-92 3L	Tape and Reel
BC33725TFR	BC33725	TO-92 3L	Tape and Reel
BC33740BU	BC33740	TO-92 3L	Bulk
BC33740TA	BC33740	TO-92 3L	Ammo
BC33825TA	BC33825	TO-92 3L	Ammo

## 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
$V_{CES}$	Collector-Emitter Voltage	BC337	50
		BC338	30
$V_{CEO}$	Collector-Emitter Voltage	BC337	45
		BC338	25
$V_{EBO}$	Emitter-Base Voltage	5	V
$I_C$	Collector Current (DC)	800	mA
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature	-55 to 150	$^\circ\text{C}$

BC337 / BC338 — NPN Epitaxial Silicon Transistor

**Thermal Characteristics<sup>(1)</sup>**Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$P_D$	Power Dissipation	625	mW
	Derate Above $25^\circ\text{C}$	5.0	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	200	$^\circ\text{C}/\text{W}$

**Note:**

1. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

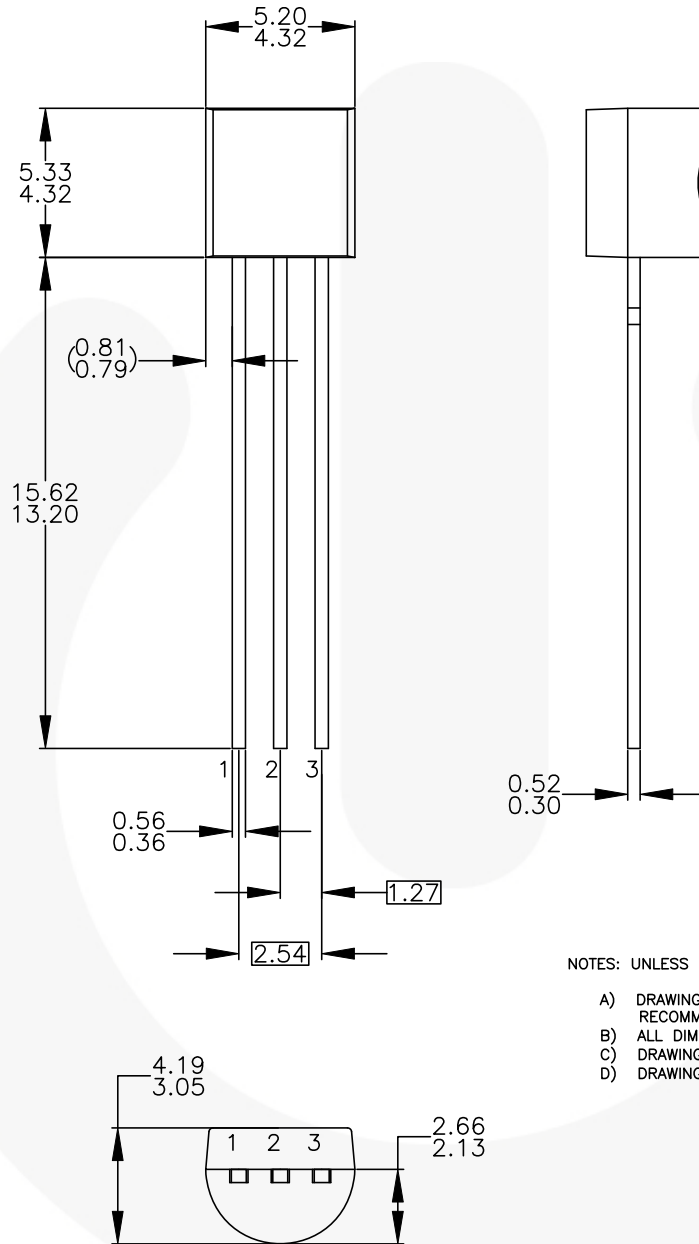
**Electrical Characteristics**Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit	
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	BC337	$I_C = 10\text{ mA}, I_B = 0$	45			V
		BC338		25			
$BV_{CES}$	Collector-Emitter Breakdown Voltage	BC337	$I_C = 0.1\text{ mA}, V_{BE} = 0$	50			V
		BC338		30			
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = 0.1\text{ mA}, I_C = 0$	5			V	
$I_{CES}$	Collector Cut-Off Current	BC337	$V_{CE} = 45\text{ V}, I_B = 0$		2	100	nA
		BC338	$V_{CE} = 25\text{ V}, I_B = 0$		2	100	
$h_{FE1}$	DC Current Gain		$V_{CE} = 1\text{ V}, I_C = 100\text{ mA}$	100		630	
$h_{FE2}$			$V_{CE} = 1\text{ V}, I_C = 300\text{ mA}$	60			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 500\text{ mA}, I_B = 50\text{ mA}$			0.7	V	
$V_{BE(on)}$	Base-Emitter On Voltage	$V_{CE} = 1\text{ V}, I_C = 300\text{ mA}$			1.2	V	
$f_T$	Current Gain Bandwidth Product	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}, f = 50\text{ MHz}$		100		MHz	
$C_{ob}$	Output Capacitance	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$		12		pF	

 **$h_{FE}$  Classification**

Classification	16	25	40
$h_{FE1}$	100 ~ 250	160 ~ 400	250 ~ 630
$h_{FE2}$	60 ~	100 ~	170 ~

Physical Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED

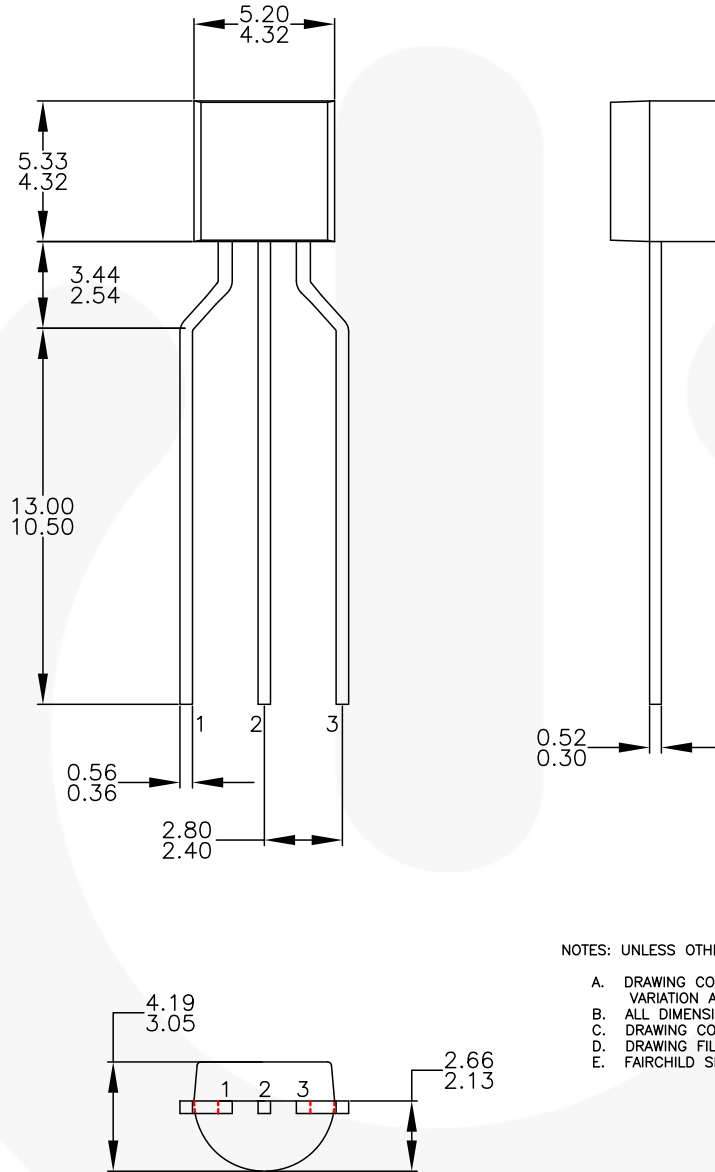
- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-2009.
- D) DRAWING FILENAME: MKT-ZA03DREV4.



Figure 1. 3-Lead, TO-92, JEDEC TO-92 Compliant Straight Lead Configuration, Bulk Type



Physical Dimensions (Continued)



NOTES: UNLESS OTHERWISE SPECIFIED


- A. DRAWING CONFORMS TO JEDEC MS-013, VARIATION AC.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DRAWING CONFORMS TO ASME Y14.5M-2009.
- D. DRAWING FILENAME: MKT-ZA03FREVS.
- E. FAIRCHILD SEMICONDUCTOR.

Figure 2. 3-Lead, TO-92, Molded, 0.2 In Line Spacing Lead Form, Ammo, Tape and Reel Type





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### 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. I77

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