



## BD136-138-140

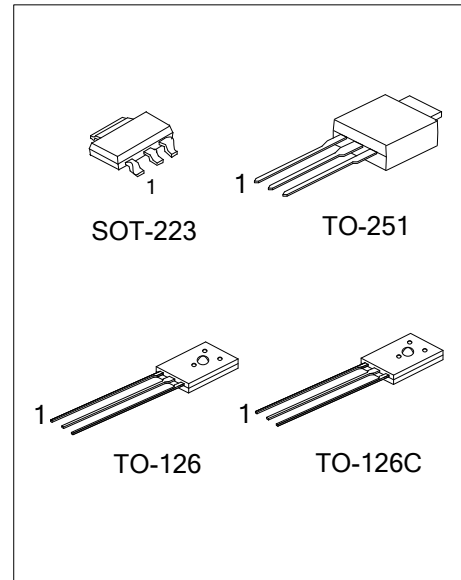
PNP EPITAXIAL SILICON TRANSISTOR

### PNP SILICON TRANSISTOR

#### DESCRIPTION

The UTC **BD136/BD138/BD140** are silicon epitaxial planer PNP transistor, designed for use as audio amplifiers and drivers utilizing complementary or quasi complementary circuits.

The complementary NPN types are the BD135/BD137/ BD139.



#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
BD136L-xx-T60-K	BD136G-xx-T60-K	TO-126	E	C	B	Bulk
BD136L-xx-TM3-T	BD136G-xx-TM3-T	TO-251	B	C	E	Tube
BD138L-xx-AA3-R	BD138G-xx-AA3-R	SOT-223	B	C	E	Tape Reel
BD138L-xx-T60-K	BD138G-xx-T60-K	TO-126	E	C	B	Bulk
BD138L-xx-TM3-T	BD138G-xx-TM3-T	TO-251	B	C	E	Tube
BD140L-xx-AA3-R	BD140G-xx-AA3-R	SOT-223	B	C	E	Tape Reel
BD140L-xx-T60-K	BD140G-xx-T60-K	TO-126	E	C	B	Bulk
BD140L-xx-T6C-K	BD140G-xx-T6C-K	TO-126C	E	C	B	Bulk
BD140L-xx-TM3-T	BD140G-xx-TM3-T	TO-251	B	C	E	Tube

Note: Pin Assignment: E: Emitter C: Collector B: Base

<p>BD136G-xx-AA3-R</p>	<p>(1) R: Tape Reel, K: Bulk, T: Tube            (2) AA3: SOT-23, T60: TO-126, T6C: TO-126C, TM3: TO-251            (3) x: refer to Classification of <math>h_{FE}</math>            (4) G: Halogen Free and Lead Free, L: Lead Free</p>
------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### MARKING

PACKAGE	MARKING		
	BD136	BD138	BD140
SOT-223	-		
TO-251			
TO-126 TO-126C			

### ■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Base Voltage	BD136	$V_{CBO}$	-45	V
	BD138		-60	
	BD140		-80	
Collector-Emitter Voltage	BD136	$V_{CEO}$	-45	V
	BD138		-60	
	BD140		-80	
Emitter-Base Voltage		$V_{EBO}$	-5	V
Collector Current		$I_C$	-1.5	A
Collector Peak Current		$I_{CM}$	-3	A
Base Current		$I_B$	-0.5	A
Power Dissipation	$T_C \leq 25^\circ\text{C}$	SOT-223	8	W
		TO-126/TO-126C	12.5	
		TO-251	15	
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-40 ~ +150	$^\circ\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### ■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	$\theta_{JA}$	155	$^\circ\text{C/W}$
	TO-126/TO-126C		100	
	TO-251		83	
Junction to Case	SOT-223	$\theta_{JC}$	15.5	$^\circ\text{C/W}$
	TO-126/TO-126C		10	
	TO-251		8.3	

Note: Transistor mounted on an FR4 printed circuit board.

### ■ ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Emitter Sustaining Voltage	BD136	$V_{CEO(SUS)}$	$I_C = -30\text{mA}, I_B = 0$ (Note)	-45			V
	BD138			-60			V
	BD140			-80			V
Collector Cut-off Current		$I_{CBO}$	$V_{CB} = -30\text{V}, I_E = 0$ $V_{CB} = -30\text{V}, I_E = 0, T_C = 125^\circ\text{C}$			-0.1 -10	$\mu\text{A}$
Emitter Cut-off Current		$I_{EBO}$	$V_{EB} = -5\text{V}, I_C = 0$			-10	$\mu\text{A}$
DC Current Gain		$h_{FE1}$	$V_{CE} = -2\text{V}, I_C = -5\text{mA}$	25			
		$h_{FE2}$	$V_{CE} = -2\text{V}, I_C = -0.5\text{A}$	25			
		$h_{FE3}$	$V_{CE} = -2\text{V}, I_C = -150\text{mA}$	40		250	
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	$I_C = -0.5\text{A}, I_B = -0.05\text{A}$ (Note)			-0.5	V
Base-Emitter Voltage		$V_{BE}$	$I_C = -0.5\text{A}, V_{CE} = -2\text{V}$ (Note)			-1	V

Note: Pulsed: Pulse duration  $\leq 300\mu\text{s}$ , duty cycle 1.5 %

### ■ CLASSIFICATION OF $h_{FE3}$

RANK	6	10	16
RANGE	40~100	63~160	100~250

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.