



BD136-138-140

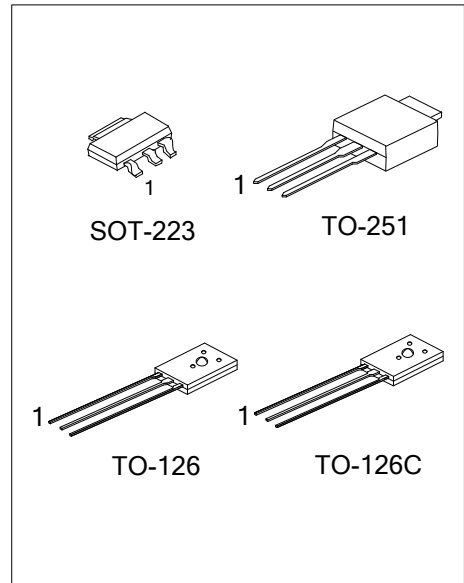
PNP EPITAXIAL SILICON TRANSISTOR

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.



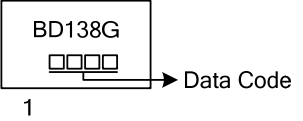
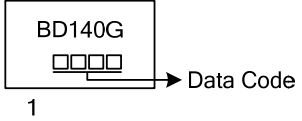
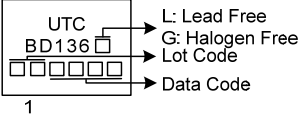
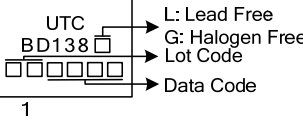
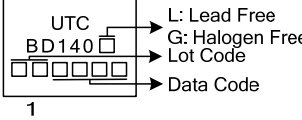
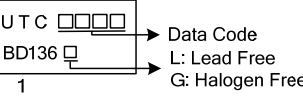
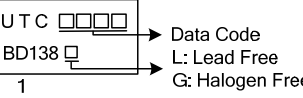
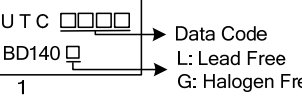
ORDERING INFORMATION

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
-	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
-	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</p> <p>(2) AA3: SOT-23, T60: TO-126, T6C: TO-126C, TM3: TO-251</p> <p>(3) x: refer to Classification of h_{FE}</p> <p>(4) G: Halogen Free and Lead Free, L: Lead Free</p>
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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	$^\circ\text{C}$

- Notes: 1. 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.
 2. The device is guaranteed to meet performance specification within $0^\circ\text{C} \sim 70^\circ\text{C}$ operating temperature range and assured by design from $-20^\circ\text{C} \sim 85^\circ\text{C}$.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	155	$^\circ\text{C}/\text{W}$
	TO-126/TO-126C		100	
	TO-251		83	
Junction to Case	SOT-223	θ_{JC}	15.5	$^\circ\text{C}/\text{W}$
	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}	$V_{CB} = -30\text{V}, I_E = 0$			-0.1	μA
			$V_{CB} = -30\text{V}, I_E = 0, T_C = 125^\circ\text{C}$			-10	
Emitter Cut-off Current		I_{EBO}	$V_{EB} = -5\text{V}, I_C = 0$			-10	μA
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

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