



13003BS

Preliminary

NPN SILICON TRANSISTOR

NPN SILICON BIPOLAR TRANSISTORS FOR LOW FREQUENCY AMPLIFICATION

DESCRIPTION

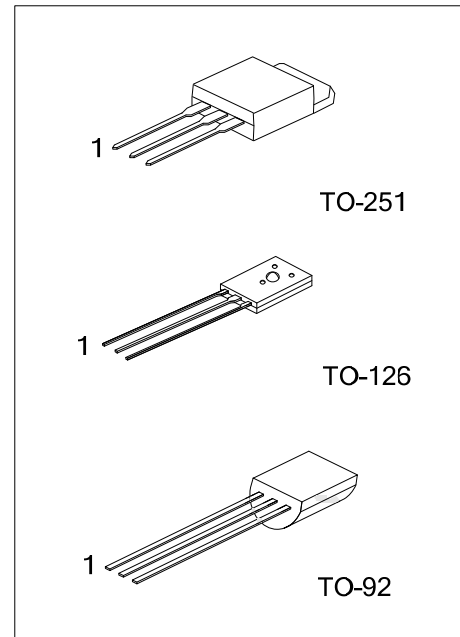
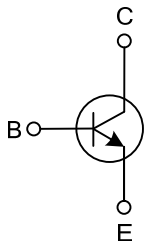
The UTC **13003BS** is a silicon NPN power switching transistor; it uses UTC's advanced technology to provide customers high collector-base breakdown voltage, low reverse leakage current and high reliability, etc.

The UTC **13003BS** is suitable for electronic ballast power switch circuit and the compact electronic energy-saving light.

FEATURES

- * High collector-base breakdown voltage
- * Low reverse leakage current
- * High reliability

EQUIVALENT CIRCUIT



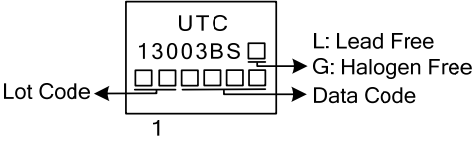
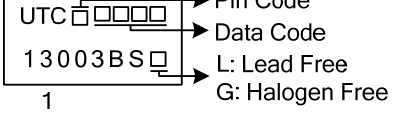
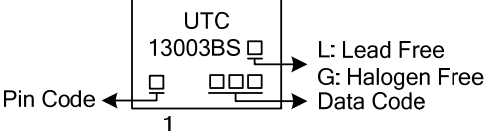
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
13003BSL-TM3-T	13003BSG-TM3-T	TO-251	B	C	E	Tube
13003BSL-T60-F-K	13003BSG-T60-F-K	TO-126	B	C	E	Bulk
13003BSL-T92-F-B	13003BSG-T92-F-B	TO-92	B	C	E	Tape Box
13003BSL-T92-F-K	13003BSG-T92-F-K	TO-92	B	C	E	Bulk

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

<p>13003BSL-T60-F-B</p>	<p>(1) T: Tube, B: Bulk, K: Bulk</p> <p>(2) refer to Pin Assignment</p> <p>(3) TM3: TO-251, T60: TO-126, T92: TO-92</p> <p>(4) L: Lead Free, G: Halogen Free</p>
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■ MARKING

PACKAGE	MARKING
TO-251	 <p>Diagram showing marking on a TO-251 package. The marking includes 'UTC' and '13003BS' followed by a pin code '1'. A 'Lot Code' is indicated by four small squares to the left of the pin code. To the right, 'L: Lead Free', 'G: Halogen Free', and 'Data Code' are indicated by arrows pointing to the pin code area.</p>
TO-126	 <p>Diagram showing marking on a TO-126 package. The marking includes 'UTC' and '13003BS' followed by a pin code '1'. A 'Pin Code' is indicated by four small squares above the pin code. To the right, 'Data Code', 'L: Lead Free', and 'G: Halogen Free' are indicated by arrows pointing to the pin code area.</p>
TO-92	 <p>Diagram showing marking on a TO-92 package. The marking includes 'UTC' and '13003BS' followed by a pin code '1'. A 'Pin Code' is indicated by three small squares to the left of the pin code. To the right, 'L: Lead Free', 'G: Halogen Free', and 'Data Code' are indicated by arrows pointing to the pin code area.</p>

■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$, unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Base Voltage		V_{CBO}	800	V
Collector-Emitter Voltage		V_{CEO}	450	V
Emitter-Base Voltage		V_{EBO}	9	V
Collector Current	Continuous	I_C	2	A
	Peak	I_{CM}	4	A
Base Current	Continuous	I_B	1	A
	Peak	I_{BM}	2	A
Power Dissipation ($T_C=25^\circ\text{C}$)	TO-251	P_D	10	W
	TO-126		20	W
	TO-92		1	W
Junction Temperature		T_J	150	$^\circ\text{C}$
Storage Temperature Range		T_{STG}	-55~+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	RATING	UNIT
Junction to Ambient	TO-251	θ_{JA}	90	$^\circ\text{C/W}$
	TO-126		100	
	TO-92		150	
Junction to Case	TO-251	θ_{JC}	12.5	$^\circ\text{C/W}$
	TO-126		7.5	
	TO-92		100	

■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Base Breakdown Voltage	BV_{CBO}	$I_C=1\text{mA}, I_E=0$	800			V
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C=1\text{mA}, I_B=0$	450			V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E=1\text{mA}, I_C=0$	9			V
Collector Cut-Off Current	I_{CBO}	$V_{CB}=800\text{V}, I_E=0$			0.1	mA
Collector-Emitter Cut-Off Current	I_{CEO}	$V_{CE}=450\text{V}, I_B=0$			0.1	mA
Emitter-Base Cut-Off Current	I_{EBO}	$V_{EB}=9\text{V}, I_C=0$			0.1	mA
DC Current Gain (Note)	h_{FE}	$V_{CE}=5\text{V}, I_C=0.2\text{A}$	20		35	
Low current and high current h_{FE2}/h_{FE1} ratio	h_{FE1}/h_{FE2}	$h_{FE1}: V_{CE}=5\text{V}, I_C=5\text{mA}$	0.75			
		$h_{FE2}: V_{CE}=5\text{V}, I_C=0.2\text{A}$				
Collector-Emitter Saturation Voltage (Note)	$V_{CE(SAT)}$	$I_C=0.5\text{A}, I_B=0.1\text{A}$			0.8	V
Base-Emitter Saturation Voltage (Note)	$V_{BE(SAT)}$	$I_C=0.5\text{A}, I_B=0.1\text{A}$			1.5	V
Storage Time	t_S	UI9600, $I_C=0.25\text{A}$	2		5	μs
Rise Time	t_R				2	μs
Fall Time	t_F				2	μs
Transition Frequency	f_T	$V_{CE}=10\text{V}, I_C=0.1\text{A}, f=1\text{MHz}$	5			MHz

Note: Pulse test, pulse width $t_p \leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

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