



13002AH

Preliminary

NPN SILICON TRANSISTOR

NPN SILICON BIPOLAR TRANSISTORS FOR LOW FREQUENCY AMPLIFICATION

DESCRIPTION

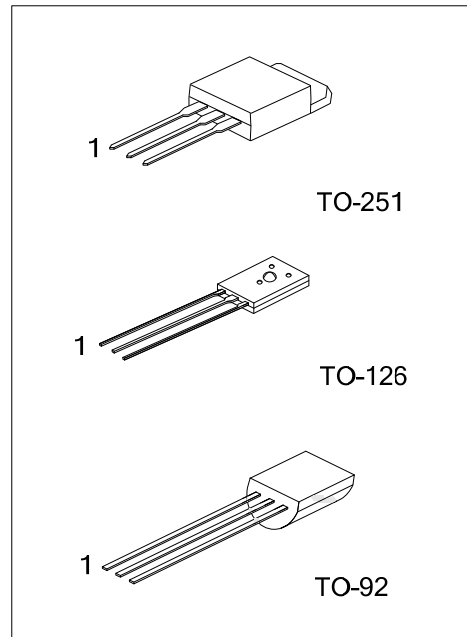
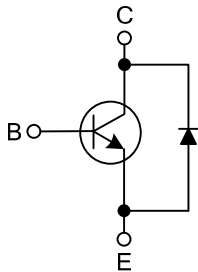
The UTC **13002AH** is a silicon NPN power switching transistor; it uses UTC's advanced technology to provide customers high collector-base breakdown voltage, low reverse leakage current and high reliability, etc.

The UTC **13002AH** 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



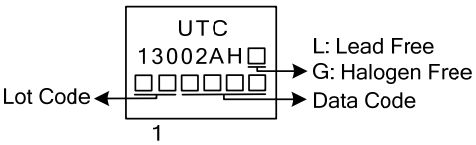
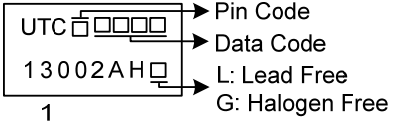
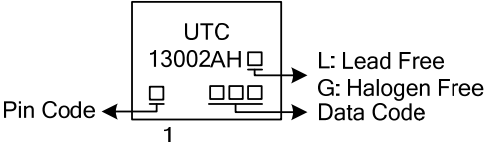
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
13002AHL-TM3-T	13002AHG-TM3-T	TO-251	B	C	E	Tube
13002AHL-T60-F-K	13002AHG-T60-F-K	TO-126	B	C	E	Bulk
13002AHL-T92-F-B	13002AHG-T92-F-B	TO-92	B	C	E	Tape Box
13002AHL-T92-F-K	13002AHG-T92-F-K	TO-92	B	C	E	Bulk

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

<p>13002AHL-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', '13002AH', and a four-digit lot code. Arrows indicate: Lot Code (left), L: Lead Free (top right), G: Halogen Free (middle right), and Data Code (bottom right). A '1' is shown below the package.</p>
TO-126	 <p>Diagram showing marking on a TO-126 package. The marking includes 'UTC', a four-digit pin code, '13002AH', and a four-digit data code. Arrows indicate: Pin Code (top right), Data Code (middle right), L: Lead Free (bottom right), and G: Halogen Free (bottom right). A '1' is shown below the package.</p>
TO-92	 <p>Diagram showing marking on a TO-92 package. The marking includes 'UTC', '13002AH', a two-digit pin code, and a four-digit data code. Arrows indicate: Pin Code (left), L: Lead Free (top right), G: Halogen Free (middle right), and Data Code (bottom right). A '1' is shown below the package.</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Base Voltage		V_{CBO}	700	V
Collector-Emitter Voltage		V_{CEO}	450	V
Emitter-Base Voltage		V_{EBO}	9	V
Collector Current	Continuous	I_C	1.2	A
	Peak	I_{CM}	2.4	A
Power Dissipation ($T_C=25^{\circ}\text{C}$)	TO-251	P_D	10	W
	TO-126		20	W
	TO-92		0.8	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}	95	$^{\circ}\text{C/W}$
	TO-126		100	
	TO-92		150	
Junction to Case	TO-251	θ_{JC}	13	$^{\circ}\text{C/W}$
	TO-126		7.5	
	TO-92		112	

■ 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}	$I_C=1\text{mA}$	700			V
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C=1\text{mA}$	450			V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E=1\text{mA}$	10			V
Collector Cut-Off Current	I_{CBO}	$V_{CB}=700\text{V}, I_E=0$			1	μA
Collector-Emitter Cut-Off Current	I_{CEO}	$V_{CE}=450\text{V}, I_B=0$			5	μA
Emitter-Base Cut-Off Current	I_{EBO}	$V_{EB}=9\text{V}, I_C=0$			1	μA
DC Current Gain (Note)	h_{FE}	$V_{CE}=5\text{V}, I_C=0.1\text{A}$	25		35	
Low current and high current h_{FE2}/h_{FE1} ratio	h_{FE1}/h_{FE2}	$I_C=0.5\text{A}, I_B=0.1\text{A}$		0.2	0.8	
		$I_C=0.5\text{A}, I_B=0.1\text{A}$		0.9	1.5	
Collector-Emitter Saturation Voltage (Note)	$V_{CE(SAT)}$	$I_C=0.2\text{A}, I_B=40\text{mA}$			0.4	V
		$I_C=1.2\text{A}, I_B=500\text{mA}$			3.0	V
Base-Emitter Saturation Voltage (Note)	$V_{BE(SAT)}$	$I_C=0.2\text{A}, I_B=40\text{mA}$			1.0	V
		$I_C=1.2\text{A}, I_B=500\text{mA}$			1.2	V
Storage Time	t_S	UI9600, $I_C=100\text{mA}$	2.0		4.0	μs
Rise Time	t_R				1.0	μs
Fall Time	t_F				1.0	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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