



## 13002AH

Preliminary

**NPN SILICON TRANSISTOR**

### NPN SILICON BIPOLAR TRANSISTORS FOR LOW FREQUENCY AMPLIFICATION

#### DESCRIPTION

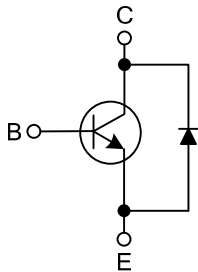
The UTC **13002AH** is a silicon NPN power switching transistor; it uses UTC's advanced technology to provide customers high collector-base breakdown voltage, low reverse leakage current and high reliability, etc.

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

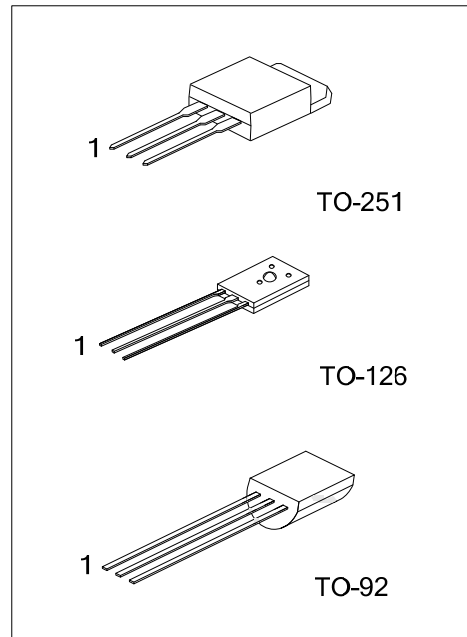


#### ORDERING INFORMATION

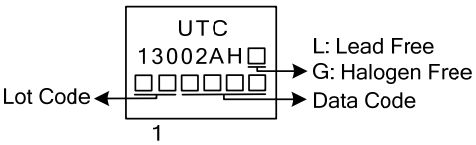
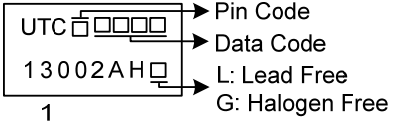
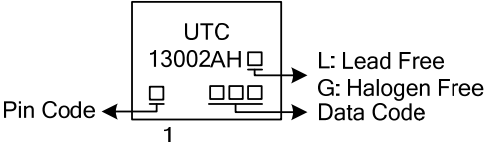
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
13002AHL-TM3-T	13002AHG-TM3-T	TO-251	B	C	E	Tube
13002AHL-T60-F-K	13002AHG-T60-F-K	TO-126	B	C	E	Bulk
13002AHL-T92-F-B	13002AHG-T92-F-B	TO-92	B	C	E	Tape Box
13002AHL-T92-F-K	13002AHG-T92-F-K	TO-92	B	C	E	Bulk

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

<p>13002AHL-T60-F-B</p>	<p>(1) T: Tube, B: Bluk, K: Bulk  (2) refer to Pin Assignment  (3) TM3: TO-251, T60: TO-126, T92: TO-92  (4) L: Lead Free, G: Halogen Free</p>
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■ MARKING

PACKAGE	MARKING
TO-251	 <p>UTC 13002AH □ □ □ □ □ □ □ → Data Code ← Lot Code 1</p> <p>L: Lead Free G: Halogen Free</p>
TO-126	 <p>UTC □ □ □ □ □ → Pin Code → Data Code 13002AH □ ← 1 L: Lead Free G: Halogen Free</p>
TO-92	 <p>UTC 13002AH □ □ □ □ □ □ → Data Code ← Pin Code 1</p> <p>L: Lead Free G: Halogen Free</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	$\theta_{JA}$	95	$^{\circ}\text{C/W}$
	TO-126		100	
	TO-92		150	
Junction to Case	TO-251	$\theta_{JC}$	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	$\mu\text{A}$
Collector-Emitter Cut-Off Current	$I_{CEO}$	$V_{CE}=450\text{V}, I_B=0$			5	$\mu\text{A}$
Emitter-Base Cut-Off Current	$I_{EBO}$	$V_{EB}=9\text{V}, I_C=0$			1	$\mu\text{A}$
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	$\mu\text{s}$
Rise Time	$t_R$				1.0	$\mu\text{s}$
Fall Time	$t_F$				1.0	$\mu\text{s}$
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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