



## 13003ADA

Preliminary

**NPN SILICON TRANSISTOR**

### NPN SILICON BIPOLAR TRANSISTORS FOR LOW FREQUENCY AMPLIFICATION

#### DESCRIPTION

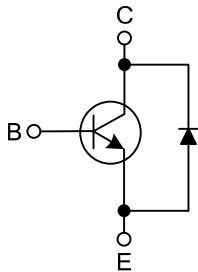
The UTC **13003ADA** is a silicon NPN power switching transistor; it uses UTC's advanced technology to provide customers high collector-base breakdown voltage, low reverse leakage current and high reliability, etc.

The UTC **13003ADA** 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

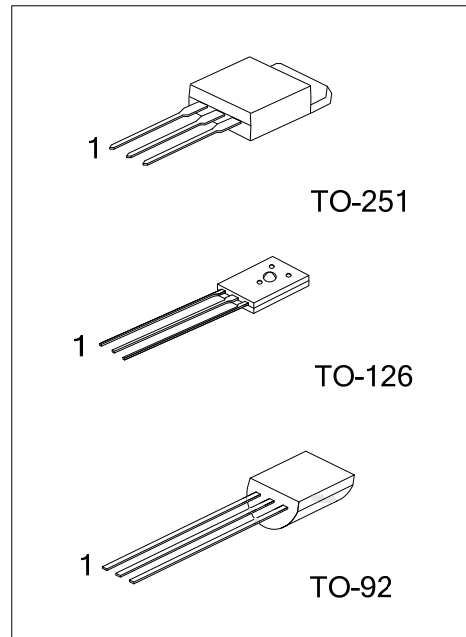


#### ORDERING INFORMATION

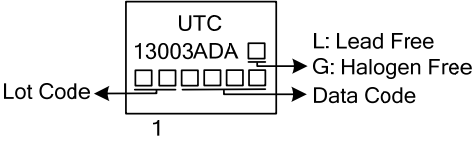
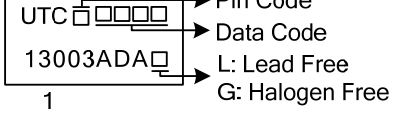
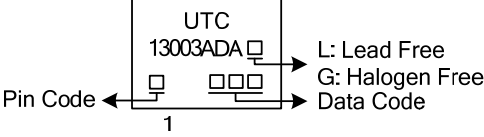
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
13003ADAL-TM3-T	13003ADAG-TM3-T	TO-251	B	C	E	Tube
13003ADAL-T60-F-K	13003ADAG-T60-F-K	TO-126	B	C	E	Bulk
13003ADAL-T92-F-B	13003ADAG-T92-F-B	TO-92	B	C	E	Tape Box
13003ADAL-T92-F-K	13003ADAG-T92-F-K	TO-92	B	C	E	Bulk

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

<p>13003ADAL-T60-F-B</p> <p>(1) Packing Type (2) Pin Assignment (3) Package Type (4) Green Package</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 and Lead 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 '13003ADA' followed by a small square. Below this is a row of five small squares, with an arrow pointing left labeled 'Lot Code' and an arrow pointing right labeled 'Data Code'. A '1' is centered below the row of squares. To the right of the package, 'L: Lead Free' and 'G: Halogen Free' are listed.</p>
TO-126	 <p>Diagram showing marking on a TO-126 package. The marking includes 'UTC' followed by a row of four small squares, with an arrow pointing right labeled 'Pin Code' and an arrow pointing left labeled 'Data Code'. Below this is '13003ADA' followed by a small square, with an arrow pointing right labeled 'L: Lead Free' and an arrow pointing left labeled 'G: Halogen Free'. A '1' is centered below the row of squares.</p>
TO-92	 <p>Diagram showing marking on a TO-92 package. The marking includes 'UTC' and '13003ADA' followed by a small square. Below this is a row of three small squares, with an arrow pointing left labeled 'Pin Code' and an arrow pointing right labeled 'Data Code'. A '1' is centered below the row of squares. To the right of the package, 'L: Lead Free' and 'G: Halogen Free' are listed.</p>

■ ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ\text{C}$ , 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
Continuous Collector Current		$I_C$	1.5	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	$\theta_{JA}$	95	$^\circ\text{C/W}$
	TO-126		107	
	TO-92		150	
Junction to Case	TO-251	$\theta_{JC}$	13	$^\circ\text{C/W}$
	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	$BV_{CBO}$	$I_C=0.1\text{mA}$ , $I_E=0$	700			V
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	$I_C=1\text{mA}$ , $I_B=0$	450			V
Emitter-Base Breakdown Voltage	$BV_{EBO}$	$I_E=0.1\text{mA}$ , $I_C=0$	9			V
Collector Cut-Off Current	$I_{CBO}$	$V_{CB}=700\text{V}$ , $I_E=0$			100	$\mu\text{A}$
Collector-Emitter Cut-Off Current	$I_{CEO}$	$V_{CE}=450\text{V}$ , $I_B=0$			50	$\mu\text{A}$
Emitter-Base Cut-Off Current	$I_{EBO}$	$V_{EB}=7\text{V}$ , $I_C=0$			10	$\mu\text{A}$
DC Current Gain (Note)	$h_{FE}$	$V_{CE}=5\text{V}$ , $I_C=5\text{mA}$	6		40	
		$V_{CE}=10\text{V}$ , $I_C=200\text{mA}$	8		40	
		$V_{CE}=5\text{V}$ , $I_C=1.5\text{mA}$	4			
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	0.8		
		$h_{FE2}$ : $V_{CE}=5\text{V}$ , $I_C=0.2\text{A}$				
Collector-Emitter Saturation Voltage (Note)	$V_{CE(SAT)}$	$I_C=0.5\text{A}$ , $I_B=0.1\text{A}$		0.18	0.8	V
Base-Emitter Saturation Voltage (Note)	$V_{BE(SAT)}$	$I_C=1.5\text{A}$ , $I_B=0.5\text{A}$		0.9	2.0	V
Storage Time	$t_S$	$V_{CC}=24\text{V}$ , $I_C=0.5\text{A}$ , $I_{B1}=-I_{B2}=0.1\text{A}$			4	$\mu\text{s}$
Rise Time	$t_R$					$\mu\text{s}$
Fall Time	$t_F$				0.7	$\mu\text{s}$
Transition Frequency	$f_T$	$V_{CE}=10\text{V}$ , $I_C=0.2\text{A}$	4			MHz

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

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