



13003DW

Preliminary

NPN SILICON TRANSISTOR

NPN SILICON BIPOLAR TRANSISTORS FOR LOW FREQUENCY AMPLIFICATION

DESCRIPTION

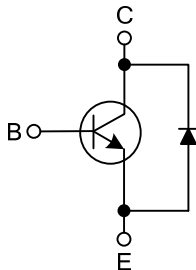
The UTC **13003DW** is a silicon NPN power switching transistor; it uses UTC's advanced technology to provide customers high collector-base breakdown voltage and high reliability, etc.

The UTC **13003DW** is suitable for electronic ballast power switch circuit and low voltage electronic energy-saving light.

FEATURES

- * High collector-base breakdown voltage
- * High reliability
- * Halogen Free

EQUIVALENT CIRCUIT

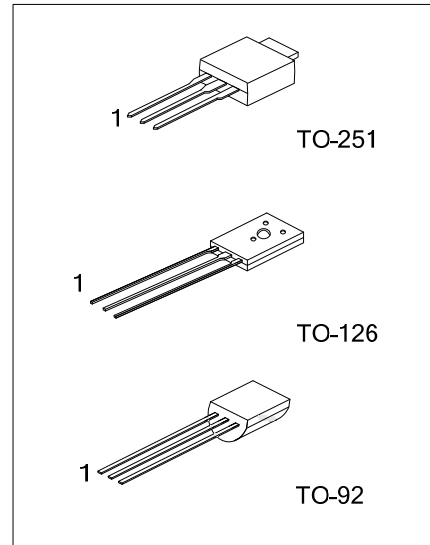


ORDERING INFORMATION

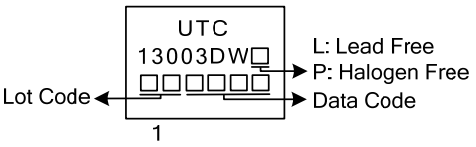
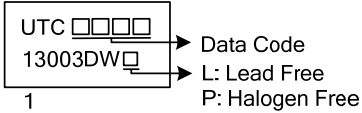
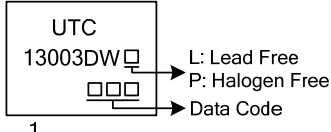
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
13003DWL-x-TM3-T	13003DWG-x-TM3-T	TO-251	B	C	E	Tube
13003DWL-x-T60-K	13003DWG-x-T60-K	TO-126	B	C	E	Bulk
13003DWL-x-T92-B	13003DWG-x-T92-B	TO-92	E	C	B	Tape Box
13003DWL-x-T92-K	13003DWG-x-T92-K	TO-92	E	C	B	Bulk

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

<p>13003DWL-x-TM3-T</p> <ul style="list-style-type: none"> (1)Packing Type (2)Package Type (3)Rank (4)Lead Free 	<ul style="list-style-type: none"> (1) T: Tube, B: Bluk, K: Bulk (2) TM3: TO-251, T60: TO-126, T92: TO-92 (3) x: refer to Classification of h_{FE} (4) L: Lead Free, G: Halogen Free
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MARKING INFORMATION

PACKAGE	MARKING
TO-251	 <p>Marking diagram for TO-251 package: A rectangular box contains the text 'UTC' at the top, '13003DW' in the middle, and a series of five small squares below. An arrow labeled 'Lot Code' points to the first square, and an arrow labeled 'Data Code' points to the last square. Below the box is the number '1'. To the right of the box, 'L: Lead Free' and 'P: Halogen Free' are listed.</p>
TO-126	 <p>Marking diagram for TO-126 package: A rectangular box contains the text 'UTC' at the top, '13003DW' in the middle, and a series of three small squares below. An arrow labeled 'Data Code' points to the first square, and an arrow labeled 'Data Code' points to the last square. Below the box is the number '1'. To the right of the box, 'L: Lead Free' and 'P: Halogen Free' are listed.</p>
TO-92	 <p>Marking diagram for TO-92 package: A rectangular box contains the text 'UTC' at the top, '13003DW' in the middle, and a series of three small squares below. An arrow labeled 'Data Code' points to the first square, and an arrow labeled 'Data Code' points to the last square. Below the box is the number '1'. To the right of the box, 'L: Lead Free' and 'P: Halogen Free' are listed.</p>

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

PARAMETER	SYMBOL	RATINGS	UNIT	
Collector-Base Voltage	V_{CBO}	350	V	
Collector-Emitter Voltage	V_{CEO}	200	V	
Emitter-Base Voltage	V_{EBO}	9	V	
Continuous Collector Current	I_C	2	A	
Power Dissipation	P_D	$T_A=25^\circ\text{C}$	1	W
		$T_C=25^\circ\text{C}$	35	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.

■ 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}	$I_C=1\text{mA}$	350			V
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C=10\text{mA}$	200			V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E=1\text{mA}$	9			V
Collector Cut-Off Current	I_{CBO}	$V_{CB}=350\text{V}, I_E=0$			0.1	mA
Collector-Emitter Cut-Off Current	I_{CEO}	$V_{CE}=200\text{V}, I_B=0$			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 1)	h_{FE}	$I_C=0.5\text{A}, V_{CE}=5.0\text{V}$	15		30	
Low current and high current h_{FE2} h_{FE1} ratio	h_{FE1}/h_{FE2}	$h_{FE1}: V_{CE}=5\text{V}, I_C=50\text{mA}$	0.7	0.9		
		$h_{FE2}: V_{CE}=5\text{V}, I_C=0.5\text{A}$				
Collector-Emitter Saturation Voltage (Note)	$V_{CE(SAT)}$	$I_C=1.5\text{A}, I_B=0.5\text{A}$		0.21	1	V
Base-Emitter Saturation Voltage (Note)	$V_{BE(SAT)}$	$I_C=1.5\text{A}, I_B=0.5\text{A}$		1.1	1.5	V
Storage Time	t_s	UI9600, $I_C=0.1\text{A}$	2.5		4.5	μs
Rise Time	t_R				1	μs
Fall Time	t_F				1	μs
Transition Frequency	f_T	$I_C=0.2\text{A}, V_{CE}=10\text{V}, f=1\text{MHz}$	4			MHz
Diode Forward Voltage	V_F	$I_F=2\text{A}$			2.5	V

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

■ CLASSIFICATION OF h_{FE}

RANK	A	B	C
RANGE	15 ~ 20	20 ~ 25	25 ~ 30

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