



13003DW

Preliminary

NPN SILICON TRANSISTOR

NPN SILICON BIPOLAR TRANSISTORS FOR LOW FREQUENCY AMPLIFICATION

DESCRIPTION

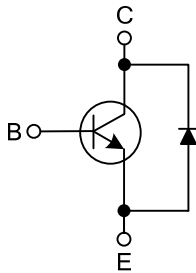
The UTC **13003DW** is a silicon NPN power switching transistor; it uses UTC's advanced technology to provide customers high collector-base breakdown voltage and high reliability, etc.

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

EQUIVALENT CIRCUIT

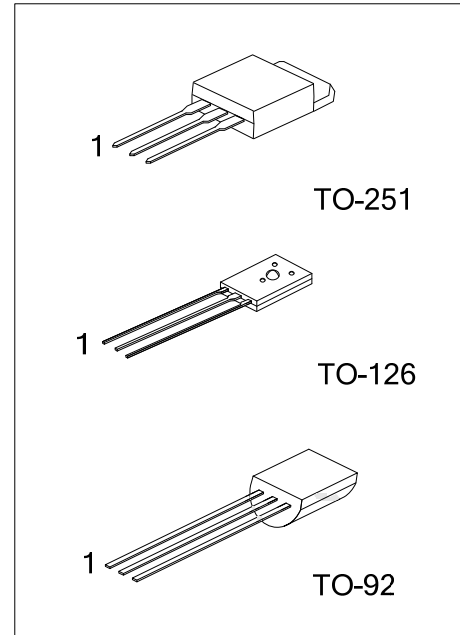


ORDERING INFORMATION

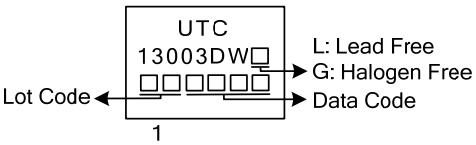
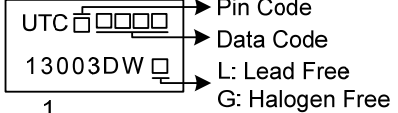
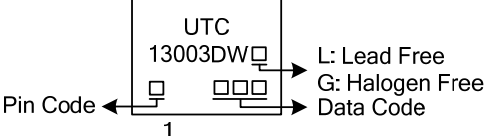
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
13003DWL-x-TM3-T	13003DWG-x-TM3-T	TO-251	B	C	E	Tube
13003DWL-x-T60-F-K	13003DWG-x-T60-F-K	TO-126	B	C	E	Bulk
13003DWL-x-T92-A-B	13003DWG-x-T92-A-B	TO-92	E	C	B	Tape Box
13003DWL-x-T92-A-K	13003DWG-x-T92-A-K	TO-92	E	C	B	Bulk

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

<p>13003DWL-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 '13003DW' followed by a small square. Below this is a row of five small squares, with an arrow pointing left to the label 'Lot Code'. To the right of the row of squares are three arrows pointing right to the labels 'L: Lead Free', 'G: Halogen Free', and 'Data Code'. A '1' is centered below the row of squares.</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 to the label 'Pin Code'. Below this is '13003DW' followed by a small square, with an arrow pointing right to the label 'Data Code'. Below that is 'L: Lead Free' and '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 '13003DW' followed by a small square. Below this is a row of three small squares, with an arrow pointing left to the label 'Pin Code'. To the right of the row of squares are three arrows pointing right to the labels 'L: Lead Free', 'G: Halogen Free', and 'Data Code'. A '1' is centered below the row of squares.</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	$T_A=25^\circ\text{C}$	P_D	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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