



13003DE

Preliminary

NPN SILICON TRANSISTOR

**SILICON TRIPLE DIFFUSION
NPN BIPOLAR TRANSISTORS**

■ DESCRIPTION

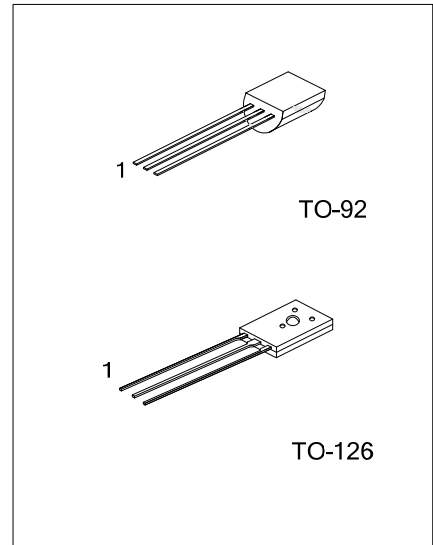
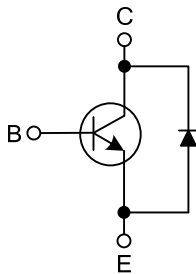
The UTC **13003DE** is a silicon NPN power switching transistor; it uses UTC's advanced technology to provide customers high collector-base breakdown voltage, low reverse leakage current and high reliability, etc.

The UTC **13003DE** is suitable for electronic ballasts and the general power switch circuit, etc.

■ FEATURES

- * High collector-base breakdown voltage
- * High reliability
- * Low reverse leakage current

■ EQUIVALENT CIRCUIT



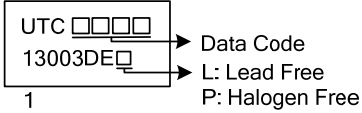
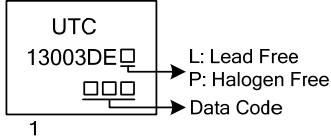
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
13003DEL-x-T60-K	13003DEG-x-T60-K	TO-126	B	C	E	Bulk
13003DEL-x-T92-B	13003DEG-x-T92-B	TO-92	E	C	B	Tape Box
13003DEL-x-T92-K	13003DEG-x-T92-K	TO-92	E	C	B	Bulk

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

<p>13003DEL-x-T60-K</p> <p>(1)Packing Type (2)Package Type (3)Rank (4)Lead Free</p>	<p>(1) B: Bluk, K: Bulk (2) T60: TO-126, T92: TO-92 (3) x: refer to Classification of h_{FE} (4) L: Lead Free, G: Halogen Free</p>
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■ MARKING INFORMATION

PACKAGE	MARKING
TO-126	 <p>UTC □□□□ → Data Code 13003DE□ → L: Lead Free P: Halogen Free</p>
TO-92	 <p>UTC 13003DE□ → L: Lead Free P: Halogen Free □□□ → Data Code</p>

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

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Base Voltage	V_{CBO}	600	V
Collector-Emitter Voltage	V_{CEO}	400	V
Emitter-Base Voltage	V_{EBO}	9	V
Continuous Collector Current	I_C	1.3	A
Power Dissipation	P_D	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	θ_{JA}	156	$^{\circ}\text{C}/\text{W}$

■ 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}	$I_C=0.1\text{mA}$	600			V
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C=1\text{mA}$	400			V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E=0.1\text{mA}$	9			V
Collector Cut-Off Current	I_{CBO}	$V_{CB}=600\text{V}, I_E=0$			0.1	mA
Collector-Emitter Cut-Off Current	I_{CEO}	$V_{CE}=400\text{V}, I_B=0$			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}	$I_C=0.2\text{A}, V_{CE}=5.0\text{V}$	15		30	
Low current and high current h_{FE2}/h_{FE1} ratio	h_{FE1}/h_{FE2}	$h_{FE1}: V_{CE}=5\text{V}, I_C=5\text{mA}$	0.75	0.9		
		$h_{FE2}: V_{CE}=5\text{V}, I_C=0.2\text{A}$				
Collector-Emitter Saturation Voltage (Note)	$V_{CE(SAT)}$	$I_C=0.5\text{A}, I_B=0.1\text{A}$		0.22	0.8	V
Base-Emitter Saturation Voltage (Note)	$V_{BE(SAT)}$	$I_C=0.5\text{A}, I_B=0.1\text{A}$		1	1.5	V
Storage Time	t_S	UI9600, $I_C=0.1\text{A}$	2		4	μs
Rise Time	t_R				1	μs
Fall Time	t_F				1	μs
Transition Frequency	f_T	$I_C=0.2\text{A}, V_{CE}=10\text{V}, f=1\text{MHz}$	5			MHz
Diode Forward Voltage	V_F	$I_F=1\text{A}$			1.5	V

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

■ CLASSIFICATION OF h_{FE}

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

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