



## 13003DE

Preliminary

**NPN SILICON TRANSISTOR**

### SILICON TRIPLE DIFFUSION NPN BIPOLAR TRANSISTORS

#### DESCRIPTION

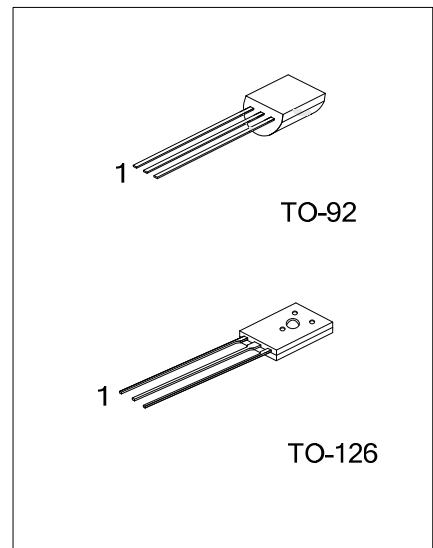
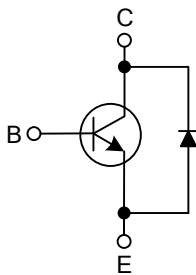
The UTC **13003DE** is a silicon NPN power switching transistor; it uses UTC's advanced technology to provide customers high collector-base breakdown voltage, low reverse leakage current and high reliability, etc.

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-F-K	13003DEG-x-T60-F-K	TO-126	B	C	E	Bulk
13003DEL-x-T92-A-B	13003DEG-x-T92-A-B	TO-92	E	C	B	Tape Box
13003DEL-x-T92-A-K	13003DEG-x-T92-A-K	TO-92	E	C	B	Bulk

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

<p>13003DEL-T60-F-B</p>	<p>(1) B: Bluk, K: Bulk (2) refer to Pin Assignment (3) T60: TO-126, T92: TO-92 (4) L: Lead Free, G: Halogen Free</p>
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#### MARKING

TO-126	TO-92

■ 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	$\theta_{JA}$	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	$\mu\text{s}$
Rise Time	$t_R$				1	$\mu\text{s}$
Fall Time	$t_F$				1	$\mu\text{s}$
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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