



## UDT1605

Preliminary

**NPN EPITAXIAL SILICON TRANSISTOR**

### 120V NPN SILICON HIGH VOLTAGE DARLINGTON TRANSISTOR

#### DESCRIPTION

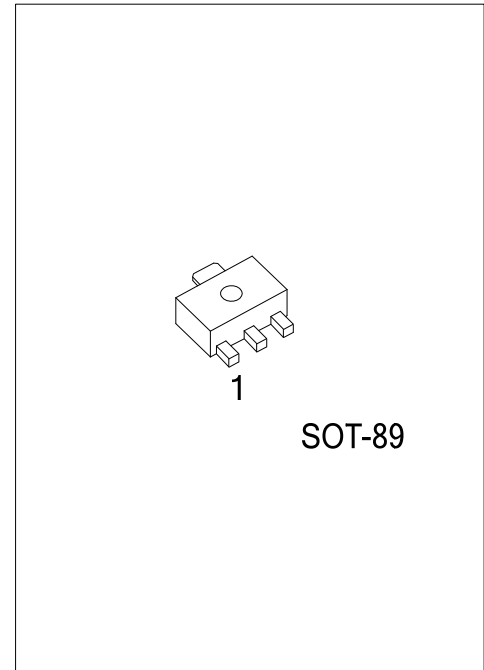
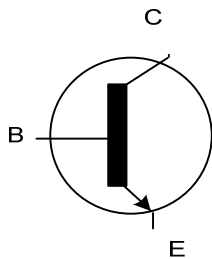
The UTC **UDT1605** is a n NPN Dar lington transistor. Utilizing UTC's advanced techon ology, **UDT1605** features ultra- high D C current gai n and lo w c ollector-emitter saturation volta ge, making it suitable for efficient driving functions.

The UTC **UDT1605** is suita ble for a vari ety of efficient drivin g functions, etc.

#### FEATURES

- \* High breakdown voltage
- \* Low saturation voltage
- \* Ultra-high DC current gain

#### SYMBOL



#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UDT1605L-AB3-R	UDT1605G-AB3-R	SOT-89	B	C	E	Tape Reel

UDT1605L-AB3-R	(1)Packing Type (2)Package Type (3)Halogen Free	(1) R: Tape Reel (2) AB3: SOT-89 (3) G: Halogen Free, L: Lead Free
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### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Base Voltage	$V_{CBO}$	140	V
Collector-Emitter Voltage	$V_{CEO}$	120	V
Emitter-Base Voltage	$V_{EBO}$	10	V
Peak Pulse Current	$I_{CM}$	4	A
Continuous Collector Current	$I_C$	1	A
Power Dissipation at $T_A=25^\circ\text{C}$ (Note 1)	$P_D$	1 W	
Linear Derating Factor		8	mW/ $^\circ\text{C}$
Power Dissipation at $T_A=25^\circ\text{C}$ (Note 2)	$P_D$	2.8 W	
Linear Derating Factor		22	mW/ $^\circ\text{C}$
Junction Temperature	$T_J$	-55~+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	RATINGS	UNIT
Junction to Ambient (Note 1)	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Junction to Ambient (Note 2)	$R_{\theta JA}$	45	$^\circ\text{C}/\text{W}$

Notes: 1. For a device surface mounted on 25mmx25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

2. For a device surface mounted on FR4 PCB measured at  $t \leq 5$  secs.

### ■ ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$ , unless otherwise stated)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Base Breakdown Voltage	$BV_{CBO}$	$I_C=100\mu\text{A}$ 140				V
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	$I_C=10\text{mA}$ (Note 1)	120			V
Emitter-Base Breakdown Voltage	$BV_{EBO}$	$I_E=100\mu\text{A}$ 1	0			V
Collector Cut-Off Current	$I_{CBO}$	$V_{CB}=10\text{V}$			100	nA
		$V_{CB}=120\text{V}$ , $T_{AMB}=100^\circ\text{C}$			10	$\mu\text{A}$
Emitter Cut-Off Current	$I_{EBO}$	$V_{EB}=8\text{V}$			0.1	$\mu\text{A}$
Collector Emitter Cut-Off Current	$I_{CES}$	$V_{CES}=120\text{V}$			10	$\mu\text{A}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=250\text{mA}$ , $I_B=0.25\text{mA}$ (Note 1)			1	V
		$I_C=1\text{A}$ , $I_B=1\text{mA}$ (Note 1)			1.5	V
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	$I_C=1\text{A}$ , $I_B=1\text{mA}$ (Note 1)			1.8	V
Base-Emitter Turn-On Voltage	$V_{BE(ON)}$	$I_C=1\text{A}$ , $V_{CE}=5\text{V}$ (Note 1)			1.7	V
DC Current Gain	$h_{FE}$	$I_C=50\text{mA}$ , $V_{CE}=5\text{V}$ (Note 1)	2K			
		$I_C=500\text{mA}$ , $V_{CE}=5\text{V}$ (Note 1)	5K			
		$I_C=1\text{A}$ , $V_{CE}=5\text{V}$ (Note 1)	2K	100K		
		$I_C=2\text{A}$ , $V_{CE}=5\text{V}$ (Note 1)	0.5			
Transition Frequency	$f_T$	$I_C=100\text{mA}$ , $V_{CE}=10\text{V}$ , $f=20\text{MHz}$	150			MHz
Input Capacitance	$C_{iBO}$	$V_{CB}=500\text{mV}$ , $f=1\text{MHz}$		90		pF
Output Capacitance	$C_{oBO}$	$V_{CB}=10\text{V}$ , $f=1\text{MHz}$		15		pF
Turn-On Time	$t_{(ON)}$	$I_C=500\text{mA}$ , $V_{CE}=10\text{V}$ $I_{B1}=I_{B2}=0.5\text{mA}$	0.5			$\mu\text{s}$
Turn-Off Time	$t_{(OFF)}$	$I_C=500\text{mA}$ , $V_{CE}=10\text{V}$ $I_{B1}=I_{B2}=0.5\text{mA}$	1.6			$\mu\text{s}$

Note: 1. Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle $\leq 2\%$

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