



## UDT1605

Preliminary

NPN EPITAXIAL SILICON TRANSISTOR

### 120V NPN SILICON HIGH VOLTAGE DARLINGTON TRANSISTOR

#### DESCRIPTION

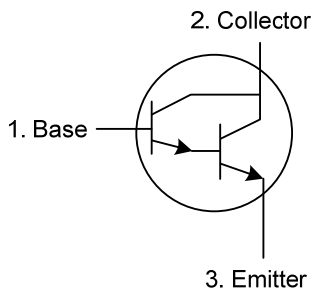
The UTC **UDT1605** is an NPN Darlington transistor. Utilizing UTC's advanced technology, **UDT1605** features ultra-high DC current gain and low collector-emitter saturation voltage, making it suitable for efficient driving functions.

The UTC **UDT1605** is suitable for a variety of efficient driving functions, etc.

#### FEATURES

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

#### SYMBOL

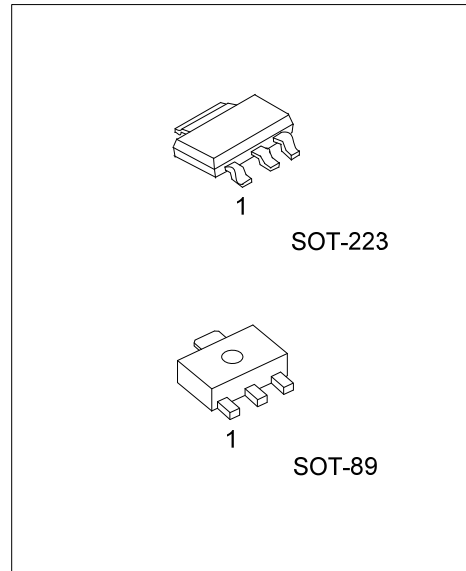


#### ORDERING INFORMATION

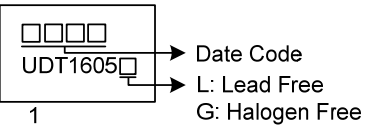
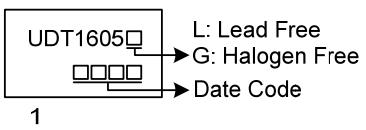
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UDT1605L-AA3-R	UDT1605G-AA3-R	SOT-223	B	C	E	Tape Reel
UDT1605L-AB3-R	UDT1605G-AB3-R	SOT-89	B	C	E	Tape Reel

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

UDT1605G-AA3-R	(1)Packing Type	(1) R: Tape Reel
	(2)Package Type	(2) AA3: SOT-223, AB3: SOT-89
	(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free



■ MARKING

SOT-89	SOT-223
 <p>1</p> <p>□□□ UDT1605□ □</p> <p>→ Date Code → L: Lead Free → G: Halogen Free</p>	 <p>1</p> <p>UDT1605□ □□□</p> <p>→ L: Lead Free → G: Halogen Free → Date Code</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Base Voltage		$V_{CBO}$	140	V
Collector-Emitter Voltage		$V_{CEO}$	120	V
Emitter-Base Voltage		$V_{EBO}$	14	V
Peak Pulse Current		$I_{CM}$	4.0	A
Continuous Collector Current	SOT-223	$I_C$	1.5	A
	SOT-89		1.0	A
Power Dissipation at $T_A=25^\circ\text{C}$ (Note 1) Linear Derating Factor	SOT-223	$P_D$	1.6	W
	SOT-89		12.8	mW/ $^\circ\text{C}$
Power Dissipation at $T_A=25^\circ\text{C}$ (Note 2) Linear Derating Factor	SOT-223	$P_D$	1.0	W
	SOT-89		8.0	mW/ $^\circ\text{C}$
Power Dissipation at $T_A=25^\circ\text{C}$ (Note 2) Linear Derating Factor	SOT-223	$P_D$	1.2	W
	SOT-89		9.5	mW/ $^\circ\text{C}$
			2.8	W
			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)	SOT-223	$R_{\theta JA}$	78.1	$^\circ\text{C}/\text{W}$
	SOT-89		125	$^\circ\text{C}/\text{W}$
Junction to Ambient (Note 2)	SOT-223	$R_{\theta JA}$	104	$^\circ\text{C}/\text{W}$
	SOT-89		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)	120			V
Emitter-Base Breakdown Voltage	$BV_{EBO}$	$I_E=100\mu\text{A}$	14			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	$I_{EBO}$	$V_{EB}=10\text{V}$			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	V
		$I_C=1\text{A}$ , $I_B=1\text{mA}$ (Note)			1.5	V
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	$I_C=1\text{A}$ , $I_B=1\text{mA}$ (Note)			1.8	V
Base-Emitter Turn-On Voltage	$V_{BE(ON)}$	$I_C=1\text{A}$ , $V_{CE}=5\text{V}$ (Note)			1.7	V
DC Current Gain	$h_{FE}$	$I_C=50\text{mA}$ , $V_{CE}=5\text{V}$ (Note)	2K			
		$I_C=500\text{mA}$ , $V_{CE}=5\text{V}$ (Note)	5K			
		$I_C=1\text{A}$ , $V_{CE}=5\text{V}$ (Note)	2K		100K	
		$I_C=2\text{A}$ , $V_{CE}=5\text{V}$ (Note)	0.5K			
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: Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle $\leq$ 2%.

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