



NHUMD9

Preliminary

DUAL TRANSISTOR

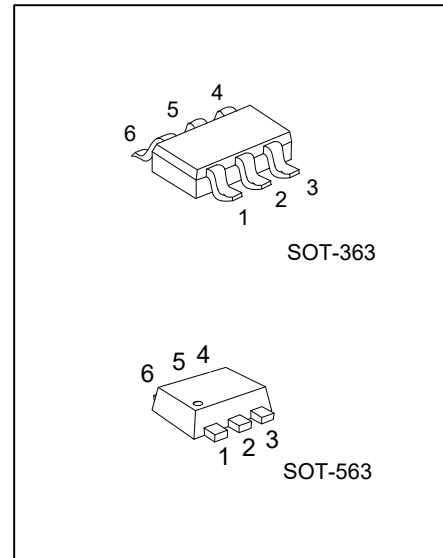
**DUAL DIGITAL TRANSISTOR
(BUILT- IN BIAS RESISTORS)**

■ DESCRIPTION

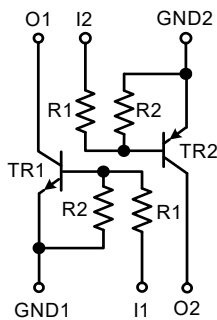
The UTC **NHUMD9** is an dual transistor; it uses UTC's advanced technology to provide the customers with low collector -emitter saturation voltage, etc.

■ FEATURES

- * NPN/PNP silicon transistor(Built-in resistor type)
- * Low collector-emitter saturation voltage
- * With built-in bias resistors
- * Simplify circuit design



■ EQUIVALENT CIRCUIT



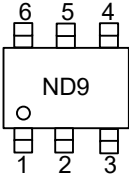
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
NHUMD9L-AL6-R	NHUMD9G-AL6-R	SOT-363	G1	I1	O2	G2	I2	O1	Tape Reel
NHUMD9L-AN6-R	NHUMD9G-AN6-R	SOT-563	G1	I1	O2	G2	I2	O1	Tape Reel

Note: Pin Assignment: G: GND I: IN O: OUT

<p>NHUMD9G-AL6-R</p>	(1) Packing Type	(1) R: Tape Reel
	(2) Package Type	(2) AL6: SOT-363, AN6: SOT-563
	(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER	SYMBOL	RATINGS		UNIT
		TR1 (NPN)	TR2 (PNP)	
Collector-Base Voltage	V_{CBO}	80	-80	V
Collector-Emitter Voltage	V_{CEO}	80	-80	V
Emitter-Base Voltage	V_{EBO}	7	-7	V
Input Voltage	V_{IN}	-7 ~ +40	-40 ~ +7	V
Output Current	I_{OUT}	100	-100	mA
Power Dissipation	SOT-363	P_C	300	mW
	SOT-563		250	mW
Junction Temperature	T_J	+150		$^{\circ}\text{C}$
Ambient Temperature	T_A	-55 ~ +150		$^{\circ}\text{C}$
Storage Temperature	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	SOT-363	θ_{JA}	417 (Note)	$^{\circ}\text{C}/\text{W}$
	SOT-563		500 (Note)	$^{\circ}\text{C}/\text{W}$

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

TR1 (NPN)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=100\mu\text{A}$, $I_E=0\text{A}$	80			V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=2\text{mA}$, $I_B=0\text{A}$	80			V
Collector-Base Cut-Off Current	I_{CBO}	$V_{CB}=80\text{V}$, $I_E=0\text{A}$			100	nA
Collector-Emitter Cut-Off Current	I_{CEO}	$V_{CE}=60\text{V}$, $I_B=0\text{A}$			1	μA
Emitter-Base Cut-Off Current	I_{EBO}	$V_{EB}=7\text{V}$, $I_C=0\text{A}$			230	μA
DC Current Gain	h_{FE}	$V_{CE}=5\text{V}$, $I_C=10\text{mA}$	100			
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=10\text{mA}$, $I_B=0.5\text{mA}$			100	mV
Off-State Input Voltage	$V_{I(OFF)}$	$V_{CE}=5\text{V}$, $I_C=100\mu\text{A}$			0.8	V
On-State Input Voltage	$V_{I(ON)}$	$V_{CE}=0.3\text{V}$, $I_C=10\text{mA}$	3			V
Bias Resistor 1 (Input)	R1		7	10	13	K Ω
Bias Resistor Ratio	R2/R1		3.7	4.7	5.7	
Transition Frequency	f_T	$V_{CE}=5\text{V}$, $I_C=10\text{mA}$, $f=100\text{MHz}$		170		MHz

TR2 (PNP)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=-100\mu\text{A}$, $I_E=0\text{A}$	-80			V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=-2\text{mA}$, $I_B=0\text{A}$	-80			V
Collector-Base Cut-Off Current	I_{CBO}	$V_{CB}=-80\text{V}$, $I_E=0\text{A}$			-100	nA
Collector-Emitter Cut-Off Current	I_{CEO}	$V_{CE}=-60\text{V}$, $I_B=0\text{A}$			-1	μA
Emitter-Base Cut-Off Current	I_{EBO}	$V_{EB}=-7\text{V}$, $I_C=0\text{A}$			-150	μA
DC Current Gain	h_{FE}	$V_{CE}=-5\text{V}$, $I_C=-5\text{mA}$	100			
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=-5\text{mA}$, $I_B=-0.25\text{mA}$			-100	mV
Off-State Input Voltage	$V_{I(OFF)}$	$V_{CE}=-5\text{V}$, $I_C=-100\mu\text{A}$			-0.8	V
On-State Input Voltage	$V_{I(ON)}$	$V_{CE}=-0.3\text{V}$, $I_C=-10\text{mA}$	-3			V
Bias Resistor 1 (Input)	R1		7	10	13	K Ω
Bias Resistor Ratio	R2/R1		3.7	4.7	5.7	
Transition Frequency	f_T	$V_{CE}=-5\text{V}$, $I_C=-10\text{mA}$, $f=100\text{MHz}$		150		MHz

Note: Transition frequency of the device.

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