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NTE128 (NPN) & NTE129 (PNP) Silicon Complementary Transistors Audio Output, Video, Driver

Description:

The NTE128 (NPN) and NTE129 (PNP) are silicon complementary transistors in a TO39 type package designed primarily for amplifier and switching applications. These devices features high break-down voltages, low leakage currents, low capacity, and a beta useful over an extremely wide current range.

Absolute Maximum Ratings:

Collector–Emitter Voltage, V_{CEO}	80V
Collector–Base Voltage, V_{CBO}	
NTE128	140V
NTE129	80V
Emitter–Base Voltage, V_{EBO}	
NTE128	7V
NTE129	5V
Continuous Collector Current, I_C	1A
Total Device Dissipation ($T_A = +25^\circ\text{C}$), P_D	
NTE128	0.8W
Derate Above 25°C	4.6mW/ $^\circ\text{C}$
NTE129	1.25W
Derate Above 25°C	7.15mW/ $^\circ\text{C}$
Total Device Dissipation ($T_C = +25^\circ\text{C}$), P_D	
NTE128	5W
Derate Above 25°C	28.6mW/ $^\circ\text{C}$
NTE129	7W
Derate Above 25°C	40mW/ $^\circ\text{C}$
Operating Junction Temperature Range, T_J	-65° to $+200^\circ\text{C}$
Storage Temperature Range, T_{stg}	-65° to $+200^\circ\text{C}$
Thermal Resistance, Junction–to–Case, R_{thJC}	
NTE128	16.5 $^\circ\text{C}/\text{W}$
NTE129	20 $^\circ\text{C}/\text{W}$
Thermal Resistance, Junction–to–Ambient, R_{thJA}	
NTE128	89.5 $^\circ\text{C}/\text{W}$
NTE129	140 $^\circ\text{C}/\text{W}$
Lead Temperature (During Soldering, 1/16" from case, 60sec max), T_L	$+300^\circ\text{C}$

Note 1. NTE129MCP is a matched complementary pair containing 1 each of NTE128 (NPN) and NTE129 (PNP).

Electrical Characteristics: ($T_A = +25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector–Emitter Breakdown Voltage NTE128	$V_{(BR)CEO}$	$I_C = 30\text{mA}$, $I_B = 0$	80	–	–	V
NTE129		$I_C = 10\text{mA}$	80	–	–	V
Collector–Base Breakdown Voltage NTE128	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$, $I_E = 0$	140	–	–	V
NTE129		$I_C = 10\mu\text{A}$	80	–	–	V
Emitter–Base Breakdown Voltage NTE128	$V_{(BR)EBO}$	$I_E = 100\mu\text{A}$, $I_C = 0$	7	–	–	V
NTE129		$I_E = 10\mu\text{A}$	5	–	–	V
Collector Cutoff Current NTE128	I_{CBO}	$V_{CB} = 90\text{V}$, $I_E = 0$	–	–	0.01	μA
		$V_{CB} = 90\text{V}$, $I_E = 0$, $T_A = +150^\circ\text{C}$	–	–	10	μA
NTE129		$V_{CB} = 60\text{V}$	–	–	50	nA
		$V_{CB} = 60\text{V}$, $T_A = +150^\circ\text{C}$	–	–	50	μA
Emitter Cutoff Current NTE128	I_{EBO}	$V_{BE} = 5\text{V}$, $I_C = 0$	–	–	0.010	μA
NTE129		$V_{BE} = 5\text{V}$	–	–	10	μA
ON Characteristics (Note 2)						
DC Current Gain NTE128	h_{FE}	$I_C = 0.1\text{mA}$, $V_{CE} = 10\text{V}$	50	–	–	
		$I_C = 10\text{mA}$, $V_{CE} = 10\text{V}$	90	–	–	
		$I_C = 150\text{mA}$, $V_{CE} = 10\text{V}$	100	–	300	
		$I_C = 150\text{mA}$, $V_{CE} = 10\text{V}$, $T_C = -55^\circ\text{C}$	40	–	–	
		$I_C = 500\text{mA}$, $V_{CE} = 10\text{V}$	50	–	–	
		$I_C = 1.0\text{A}$, $V_{CE} = 10\text{V}$	15	–	–	
NTE129		$I_C = 100\mu\text{A}$, $V_{CE} = 5\text{V}$	75	–	–	
		$I_C = 100\text{mA}$, $V_{CE} = 5\text{V}$	100	–	300	
		$I_C = 100\text{mA}$, $V_{CE} = 5\text{V}$, $T_C = -55^\circ\text{C}$	40	–	–	
		$I_C = 500\text{mA}$, $V_{CE} = 5\text{V}$	70	–	–	
		$I_C = 1.0\text{A}$, $V_{CE} = 5\text{V}$	25	–	–	
Collector–Emitter Saturation Voltage NTE128	$V_{CE(sat)}$	$I_C = 150\text{mA}$, $I_B = 15\text{mA}$	–	–	0.2	V
		$I_C = 500\text{mA}$, $I_B = 50\text{mA}$	–	–	0.5	V
NTE129		$I_C = 150\text{mA}$, $I_B = 15\text{mA}$	–	–	0.15	V
		$I_C = 500\text{mA}$, $I_B = 50\text{mA}$	–	–	0.5	V
Base–Emitter Saturation Voltage NTE128	$V_{BE(sat)}$	$I_C = 150\text{mA}$, $I_B = 15\text{mA}$	–	–	1.1	V
NTE129			–	–	0.9	V
Base–Emitter ON Voltage (NTE129 Only)	$V_{BE(on)}$	$I_C = 500\text{mA}$, $V_{CE} = 500\text{mV}$	–	–	1.1	V

Note 2. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 1\%$.

Electrical Characteristics (Cont'd): $T_A = +25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Small-Signal Characteristics						
Current-Gain – Bandwidth Product (NTE128 Only)	f_T	$I_C = 50\text{mA}$, $V_{CE} = 10\text{V}$, $f = 20\text{MHz}$	100	–	400	MHz
Output Capacitance NTE128	C_{obo}	$V_{CB} = 10\text{V}$, $I_E = 0$, $f = 1\text{MHz}$	–	–	12	pF
NTE129		$V_{CE} = 10\text{V}$, $f = 1\text{MHz}$	–	–	20	pF
Input Capacitance NTE128	C_{ibo}	$V_{BE} = 500\text{mV}$, $I_C = 0$, $f = 1\text{MHz}$	–	–	60	pF
NTE129		$V_{EB} = 500\text{mV}$, $f = 1\text{MHz}$	–	–	110	pF
Small-Signal Current Gain NTE128	h_{fe}	$I_C = 1\text{mA}$, $V_{CE} = 5\text{V}$, $f = 1\text{kHz}$	80	–	400	
NTE129		$I_C = 50\text{mA}$, $V_{CE} = 10\text{V}$, $f = 100\text{MHz}$	1	–	4	
Collector-Base Time Constant (NTE128 Only)	$r_b'C_c$	$I_E = 10\text{mA}$, $V_{CB} = 10\text{V}$, $f = 79.8\text{MHz}$	–	–	400	ps
Noise Figure (NTE128 Only)	NF	$I_C = 100\mu\text{A}$, $V_{CE} = 10\text{V}$, $R_S = 1\text{k}\Omega$, $f = 1\text{kHz}$	–	–	4	dB
Switching Characteristics (NTE129 Only)						
Storage Time	t_s	$I_C = 500\text{mA}$, $I_{B1} = I_{B2} = 50\text{mA}$	–	–	350	ns
Turn-On Time	t_{on}	$I_C = 500\text{mA}$, $I_{B1} = 50\text{mA}$	–	–	100	ns
Fall Time	t_f	$I_C = 500\text{mA}$, $I_{B1} = I_{B2} = 50\text{mA}$	–	–	50	ns

