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## NTE2357 (NPN) & NTE2358 (PNP) Silicon Complementary Transistors Digital <sup>w/2</sup> Built-In 22k Bias Resistors

### Features:

- Built-In Bias Resistor ( $R_1 = 22k\Omega$ ,  $R_2 = 22k\Omega$ )
- Small-Sized Package (TO92 type)

### Applications:

- Switching Circuit
- Inverter
- Interface Circuit
- Driver

### Absolute Maximum Ratings: ( $T_A = +25^\circ\text{C}$ unless otherwise specified)

Collector to Base Voltage, $V_{CB0}$ .....	50V
Collector to Emitter Voltage, $V_{CEO}$ .....	50V
Emitter to Base Voltage, $V_{EBO}$ .....	10V
Collector Current, $I_C$	
Continuous .....	100mA
Peak .....	200mA
Collector Dissipation, $P_C$ .....	300mW
Operating Junction Temperature, $T_J$ .....	+150°C
Storage Temperature Range, $T_{stg}$ .....	-55° to +160°C

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector Cutoff Current	$I_{CB0}$	$V_{CB} = 40V, I_E = 0$	-	-	0.1	$\mu\text{A}$
	$I_{CEO}$	$V_{CE} = 40V, I_B = 0$	-	-	0.5	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = 5V, I_C = 0$	70	113	150	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE} = 5V, I_C = 5mA$	50	-	-	
Gain Band-width Product NTE2357	$f_T$	$V_{CE} = 10V, I_C = 5mA$	-	250	-	MHz
			-	200	-	MHz
Output Capacitance NTE2357	$C_{ob}$	$V_{CB} = 10V, f = 1MHz$	-	3.7	-	pF
			-	5.5	-	pF

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$	–	0.1	0.3	V
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 10\mu\text{A}, I_E = 0$	50	–	–	V
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 100\mu\text{A}, R_{BE} = \infty$	50	–	–	V
Input OFF Voltage	$V_{I(off)}$	$V_{CE} = 5\text{V}, I_C = 100\mu\text{A}$	0.8	1.1	1.5	V
Input ON Voltage	$V_{I(on)}$	$V_{CE} = 200\text{mV}, I_C = 5\text{mA}$	1.0	1.9	3.0	V
Input Resistance	$R_1$		15	22	29	$k\Omega$
Input Resistance Ratio	$R_1/R_2$		0.9	1.0	1.1	

**Schematic Diagram**

