



ELECTRONICS, INC.  
 44 FARRAND STREET  
 BLOOMFIELD, NJ 07003  
 (973) 748-5089  
<http://www.nteinc.com>

## NTE228A Silicon NPN Transistor High Voltage Amp, Video Output

### **Description:**

The NTE228A is a silicon NPN transistor in a TO202M type package designed for high-voltage TV video and chroma output circuits, high-voltage linear amplifiers, and high-voltage transistor regulators.

### **Features:**

- High Collector–Emitter Breakdown Voltage:  $V_{(BR)CEO} = 350V$  (Min) @  $I_C = 1mA$
- Low Collector–Emitter Saturation Voltage:  $V_{CE(sat)} = 600mV$  (Max) @  $I_C = 20mA$
- Low Collector–Emitter Capacitance:  $C_{cb} = 3pF$  (Max) @  $V_{CB} = 30V$
- 2 Watts Free Air Dissipation @  $T_A = +25^\circ C$

### **Absolute Maximum Ratings:**

Collector–Emitter Voltage, $V_{CEO}$ .....	350V
Collector–Base Voltage, $V_{CBO}$ .....	450V
Emitter–Base Voltage, $V_{EBO}$ .....	6V
Collector Current, $I_C$	
Continuous .....	500mA
Peak .....	700mA
Base Current, $I_B$ .....	250mA
Total Power Dissipation ( $T_A = +25^\circ C$ ), $P_D$ .....	2W
Derate Above $25^\circ C$ .....	16mW/ $^\circ C$
Total Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....	10W
Derate Above $25^\circ C$ .....	80mW/ $^\circ C$
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ C$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+150^\circ C$
Thermal Resistance, Junction–to–Ambient, $R_{thJA}$ .....	62.5 $^\circ C/W$
Thermal Resistance, Junction–to–Case, $R_{thJC}$ .....	12.5 $^\circ C/W$
Lead Temperature (During Soldering, 1/16" from case, 10sec), $T_L$ .....	$+250^\circ C$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1mA, I_B = 0$	350	–	–	V
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu A, I_E = 0$	450	–	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 100\mu A, I_C = 0$	6	–	–	V
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = 250V, I_E = 0$	–	–	0.2	$\mu A$
Emitter Cutoff Current	$I_{EBO}$	$V_{BE} = 5V, I_C = 0$	–	–	0.1	$\mu A$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>ON Characteristics (Note 1)</b>						
DC Current Gain	$h_{FE}$	$I_C = 1\text{mA}, V_{CE} = 10\text{V}$	25	-	-	
		$I_C = 30\text{mA}, V_{CE} = 10\text{V}$	40	-	180	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 30\text{mA}, I_B = 3\text{mA}$	-	-	0.6	V
		$I_C = 50\text{mA}, I_B = 5\text{mA}$	-	-	1.5	V
Base-Emitter ON Voltage	$V_{BE(on)}$	$I_C = 30\text{mA}$	-	-	0.85	V
<b>Dynamic Characteristics</b>						
Current Gain-Bandwidth Product	$f_T$	$I_C = 10\text{mA}, V_E = 20\text{V}, f = 20\text{MHz}$	45	-	200	MHz
Collector-Base Capacitance	$C_{cb}$	$V_{CB} = 20\text{V}, I_E = 0, f = 1\text{MHz}$	-	-	3	pF

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

