ELECTRONICS, INC.
44 FARRAND STREET
BLOOMFIELD, NJ 07003
(973) 748–5089

NTE123
Silicon NPN Transistor
General Purpose Audio Amplifier, Switch

Absolute Maximum Ratings:

Collector–Emitter Voltage, V_{CEO} 40V

Collector–Base Voltage, V_{CBO} 75V

Emitter–Base Voltage, V_{EBO} 6V

Continuous Collector Current, I_C 800mA

Total Device Dissipation (T_A = +25°C), P_D 800mW
Derate Above 25°C . . . . . 5.33mW/°C

Total Device Dissipation (T_C = +25°C), P_D 3.0W
Derate Above 25°C . . . . . 20mW/°C

Operating Junction Temperature Range, T_J . . . . . –65° to +200°C

Storage Temperature Range, T_{stg} . . . . . –65° to +200°C

Electrical Characteristics: (T_A = +25°C unless otherwise specified)

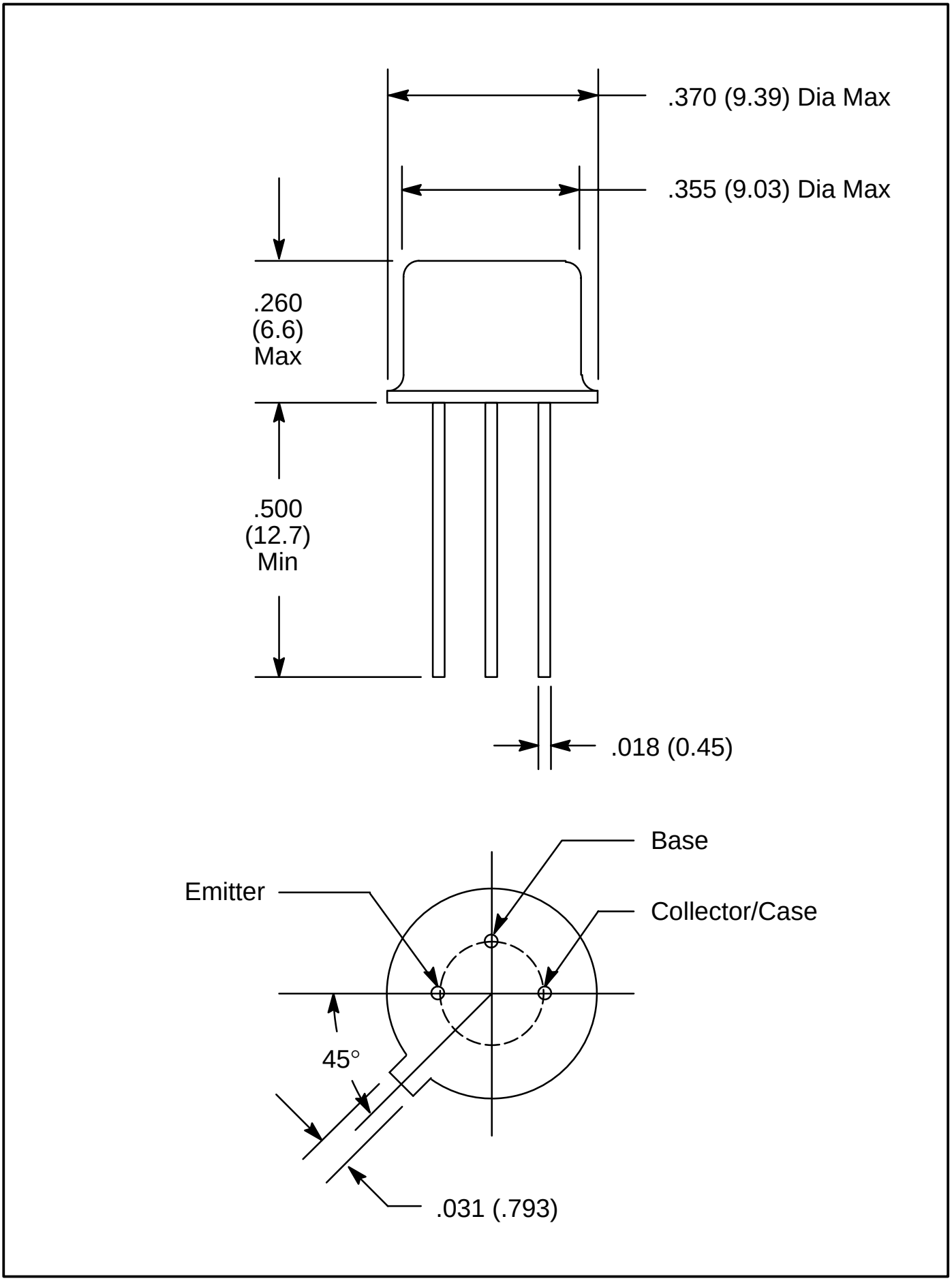
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 10mA, I_B = 0	40	–	–	V
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 10μA, I_E = 0	75	–	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 10μA, I_C = 0	6	–	–	V
Collector Cutoff Current	I_{CBO}	V_{CE} = 60V, I_E = 0	–	–	0.01	μA
		V_{CE} = 60V, I_E = 0, T_A = +150°C	–	–	10	μA
	I_{CEX}	V_{CE} = 60V, $V_{EB(off)}$ = 3V	–	–	10	nA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 3V, I_C = 0	–	–	10	nA
Base Cuttoff Current	I_{BL}	V_{CE} = 60V, $V_{EB(off)}$ = 3V	–	–	20	nA

Electrical Characteristics (Cont'd): (T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics (Note 1)						
DC Current Gain	h_{FE}	I_C = 0.1mA, V_{CE} = 10V	35	–	–	
		I_C = 1mA, V_{CE} = 10V	50	–	–	
		I_C = 10mA, V_{CE} = 10V	75	–	–	
		I_C = 10mA, V_{CE} = 10V, T_A = –55°C	35	–	–	
		I_C = 150mA, V_{CE} = 10V	100	–	300	
		I_C = 150mA, V_{CE} = 1.0V	50	–	–	
		I_C = 500mA, V_{CE} = 10V	40	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 150mA, I_B = 15mA	–	–	0.3	V
		I_C = 500mA, I_B = 50mA	–	–	1.0	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	I_C = 150mA, I_B = 15mA	0.6	–	1.2	V
		I_C = 500mA, I_B = 50mA	–	–	2.0	V
Small–Signal Characteristics						
Current Gain–Bandwidth Product	f_T	I_C = 20mA, V_{CE} = 20V, f = 100MHz, Note 2	300	–	–	MHz
Output Capacitance	C_{obo}	V_{CB} = 10V, I_E = 0, f = 100kHz	–	–	8	pF
Input Capacitance	C_{ibo}	V_{EB} = 0.5V, I_C = 0, f = 100kHz	–	–	25	pF
Input Impedance	h_{ie}	I_C = 1mA, V_{CE} = 10V, f = 1kHz	2.0	–	8.0	kΩ
		I_C = 10mA, V_{CE} = 10V, f = 1kHz	0.25	–	1.25	kΩ
Voltage Feedback Ratio	h_{re}	I_C = 1mA, V_{CE} = 10V, f = 1kHz	–	–	8	x 10^{-4}
		I_C = 10mA, V_{CE} = 10V, f = 1kHz	–	–	4	x 10^{-4}
Small–Signal Current Gain	h_{fe}	I_C = 1mA, V_{CE} = 10V, f = 1kHz	50	–	300	
		I_C = 10mA, V_{CE} = 10V, f = 1kHz	75	–	375	
Output Admittance	h_{oe}	I_C = 1mA, V_{CE} = 10V, f = 1kHz	5.0	–	35	μmhos
		I_C = 10mA, V_{CE} = 10V, f = 1kHz	25	–	200	μmhos
Collector–Base Time Constant	$rb'C_c$	I_E = 20mA, V_{CB} = 20V, f = 31.8MHz	–	–	150	ps
Noise Figure	NF	I_C = 100μA, V_{CE} = 10V, R_S = 1kΩ, f = 1kHz	–	–	4	dB
Real Part of Common–Emitter High Frequency Input Impedance	$Re(h_{ie})$	I_C = 20mA, V_{CE} = 20V, f = 300MHz	–	–	60	Ω
Switching Characteristics						
Delay Time	t_q	V_{CC} = 30V, $V_{BE(off)}$ = 0.5V, I_C = 150mA, I_{B1} = 15mA	–	–	10	ns
Rise Time	t_r		–	–	25	ns
Storage Time	t_s	V_{CC} = 30V, I_C = 150mA, I_{B1} = I_{B2} = 15mA	–	–	225	ns
Fall Time	t_f		–	–	60	ns
Active Region Time Constant	T_A	I_C = 150mA, V_{CE} = 30V	–	–	2.5	ns

Note 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

Note 2. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.


.370 (9.39) Dia Max
.355 (9.03) Dia Max
.260
(6.6)
Max
.500
(12.7)
Min
.018 (0.45)
Base
Emitter
Collector/Case
45°
.031 (.793)