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

NTE102 (PNP) & NTE103 (NPN)
Germanium Complementary Transistors
Power Output, Driver

Description:

The NTE102 (PNP) and NTE103 (NPN) are Germanium complementary transistors designed for medium–speed saturated switching applications.

Features:

- Low Collector–Emitter Saturation Voltage:
  $V_{CE(sat)}$ = 200mV Max @ I_C = 24mA
- High Emitter–Base Breakdown Voltage:
  $V_{(BR)EBO}$ = 12V Min @ I_E = 20μA

Absolute Maximum Ratings:

Collector–Base Voltage, V_{CBO} 25V
Collector–Emitter Voltage, V_{CES} 24V
Emitter–Base Voltage, V_{EBO} 12V
Continuous Collector Current, I_C 150mA
Emitter Current, I_E 100mA
Total Device Dissipation (T_A = +25°C), P_D 150mW
Derate Above +25° . . . . . 2mW/°C
Total Device Dissipation (T_C = +25°C), P_D 300mW
Derate Above +25° . . . . . 4mW/°C
Operating Junction Temperature Range, T_J . . . . . –65° to +100°C
Storage Junction Temperature Range, T_{stg} . . . . . –65° to +100°C

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 20μA, I_E = 0	25	–	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 20μA, I_C = 0	12	–	–	V
Punch–Through Voltage	V_{PT}	V_{EBfl} = 1V, Note 1	24	–	–	V
Collector Cutoff Current	I_{CBO}	V_{CB} = 12V, I_E = 0	–	0.8	5.0	μA
		V_{CB} = 12V, I_E = 0, T_A = +80°C	–	20	90	μA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 2.5V, I_C = 0	–	0.5	2.5	μA

Note 1. V_{PT} is determined by measuring the Emitter–Base floating potential V_{EBfl}, using a voltmeter with 11MΩ minimum input impedance. The Collector–Base Voltage, V_{CB}, is increased until V_{EBfl} = 1V; this value of V_{CB} = (V_{PT} + 1).

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics						
DC Current Gain	h_{FE}	V_{CE} = 150mV, I_C = 12mA	30	80	–	
		V_{CE} = 200mV, I_C = 24mA	24	90	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 12mA, I_B = 0.4mA	–	0.09	0.15	V
		I_C = 24mA, I_B = 1mA	–	0.09	0.20	V
Base–Emitter Voltage	V_{BE}	I_C = 12mA, I_B = 0.4mA	–	0.27	0.35	V
		I_C = 24mA, I_B = 1mA	–	0.30	0.40	V
Small–Signal Characteristics						
Alpha Cutoff Frequency	f_{hfb}	V_{CB} = 6V, I_E = 1mA	4	25	–	MHz
Output Capacitance	C_{ob}	V_{CB} = 6V, I_E = 1mA, f = 1MHz	–	8	20	pF
Input Impedance	h_{ie}	V_{CE} = 6V, I_E = 1mA, f = 1MHz	–	3.6	–	kΩ
Voltage Feedback Ratio	h_{re}		–	8	–	x 10^{-4}
Small–Signal Current Gain	h_{fe}		–	135	–	
Output Admittance	h_{oe}		–	50	–	µmhos
Switching Characteristics						
Delay Time	t_d		–	0.07	–	µs
Rise Time	t_r		–	0.12	–	µs
Storage Time	t_s		–	0.20	–	µs
Fall Time	t_f		–	0.10	–	µs
Stored Base Charge	Q_{sb}		–	300	1400	pC