NTE ELECTRONICS, INC.
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NTE322
Silicon NPN Transistor
RF Power Output

Description:

The NTE322 is a silicon NPN RF power transistor in a TO202N type package designed for use in Citizen–Band and other high–frequency communications equipment operating to 30MHz. Higher breakdown voltages allow a high percentage of up–modulation in AM circuits.

Features:

- Output Power: 3.5W (Min) @ V_{CC} = 13.6V
- Power Gain: 11.5dB (Min)
- High Collector Emitter Breakdown Voltage: $V_{(BR)CES} \geq 65V$
- DC Current Gain: Linear to 500mA

Absolute Maximum Ratings:

Collector–Emitter Voltage, V_{CES} 65V
Emitter–Base Voltage, V_{EB} 3V
Continuous Collector Current, I_C 500mA
Total Power Dissipation (T_A = +25°C), P_D 1.0W
Derate above 25°C . . . . 8.0mW/°C
Total Power Dissipation (T_C = +25°C), P_D 10W
Derate above 25°C . . . . 80mW/°C
Operating Junction Temperature Range, T_J . . . . –55° to +150°C
Storage Junction Temperature Range, T_{stg} . . . . –55° to +150°C
Thermal Resistance, Junction–to–Case, R_{thJC} . . . . 12.5°C/W
Thermal Resistance, Junction to Ambient (Note 1), R_{thJA} . . . . 125°C/W

Note 1. R_{thJA} is measured with the device soldered into a typical printed circuit board.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector–Emitter Breakdown Voltage	$V_{(BR)CES}$	I_C = 150mA, V_{BE} = 0, Note 2	65	–	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 1mA, I_C = 0	3	–	–	V
Collector Cutoff Current	I_{CBO}	V_{CB} = 50V, I_E = 0	–	–	0.01	mA
ON Characteristics						
DC Current Gain	h_{FE}	I_C = 100mA, V_{CE} = 10V, Note 3	10	–	–	
Dynamic Characteristics						
Output Capacitance	C_{ob}	V_{CB} = 12V, I_E = 0, f = 1MHz	–	–	40	pF
Functional Test						
Common–Emitter Amplifier Power Gain	G_{PE}	P_O = 3.5W, V_{CC} = 13.6V, f = 27MHz	11.5	–	–	dB
Output Power	P_O	P_{IN} = 250mW, V_{CC} = 13.6V, f = 27MHz	3.5	–	–	W
Collector Efficiency	η	P_O = 3.5W, V_{CC} = 13.6V, f = 27MHz, Note 4	–	70	–	%
Percentage Up–Modulation		f = 27MHz, Note 5	–	85	–	%

Note 2. Pulsed thru a 25mH inductor

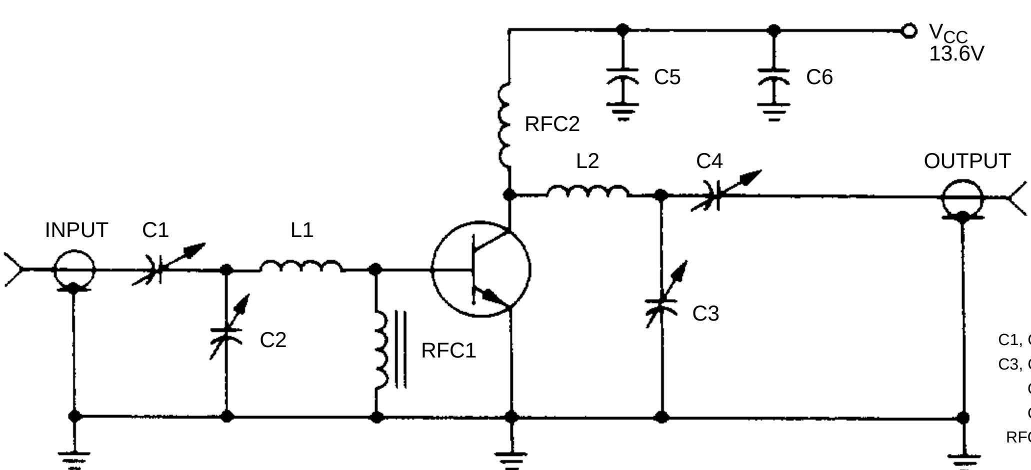
Note 3. Pulse test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

Note 4. $\eta = \frac{R_F\ P_O}{(V_{CC})\ (I_C)} \bullet 100$

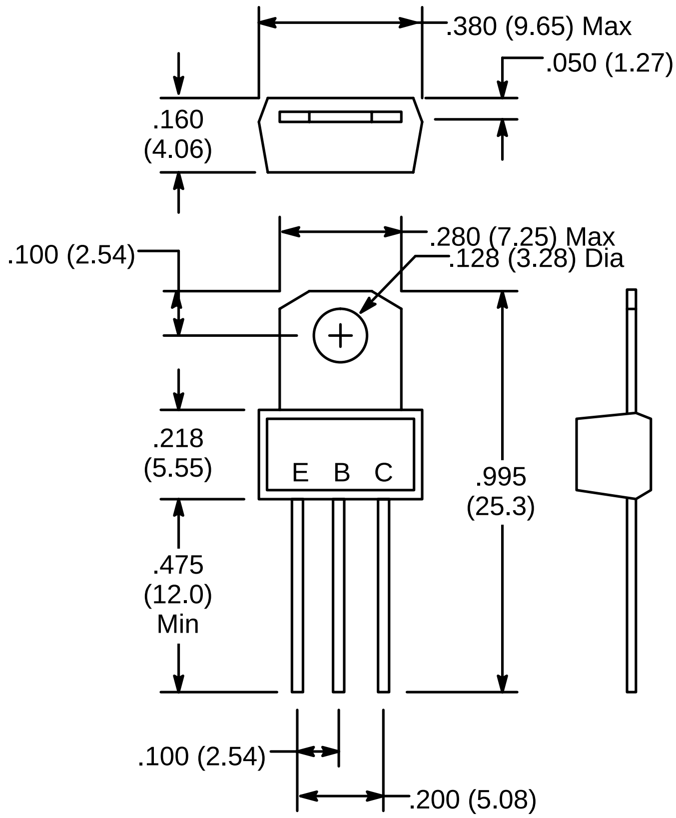
Note 5. Percentage Up–Modulation is measured by setting the Carrier Power (P_C) to 3.5 Watts with V_{CC} = 13.6V and noting the power input. Then the peak envelope power (PEP) is noted after doubling the original power input to simulate driver modulation (at a 25% duty cycle for thermal considerations) and raising the V_{CC} to 25V (to simulate the modulating voltage). Percentage Up–Modulation is then determined by the relation:

$$\text{Percentage Up–Modulation} = \left[\left(\frac{PEP}{P_C} \right)^{1/2} - 1 \right] \bullet 100$$

27MHz Test Circuit



C1, C2	9.0 – 180pF ARCO 463 or Equivalent
C3, C4	5.0 – 80pF ARCO 462 or Equivalent
C5	0.02μF Ceramic Disc
C6	0.1μF Ceramic Disc
RFC1	4 Turns #30 Enameled Wire Wound on Ferroxcube Bead Type 56–590–65/3B
RFC2	26 Turns #22 Enameled Wire (2 Layers – 13 Turns Each Layer) 1/4" Inner Diameter
L1	0.22μH Molded Choke
L2	0.68μH Molded Choke



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