



NTE366 Silicon NPN Transistor RF Power Output $P_O = 25W @ 512MHz$

Description:

The NTE366 is a silicon NPN transistor designed for 12.5 Volt UHF large-signal amplifier applications in industrial and commercial FM equipment operating to 512MHz.

Features:

- Specified 12.5 Volt, 470MHz Characteristic:
Output Power = 25 Watts
Minimum Gain = 6.2dB
Efficiency = 60%
- Characterized with Series Equivalent Large-Signal Impedance Parameters
- Built-In Matching Network for Broadband Operation
- Tested for Load Mismatch Stress at all Phase Angles with 20:1 VSWR @ 16-volt High Line and Overdrive

Absolute Maximum Ratings:

Collector-Emitter Voltage, V_{CEO}	16V
Collector-Base Voltage, V_{CBO}	36V
Emitter-Base Voltage, V_{EBO}	4V
Collector Current-Continuous, I_C	4A
Total Device Dissipation ($T_C = +25^\circ C$), P_D	103W
Derate above $25^\circ C$	590mW/ $^\circ C$
Storage Temperature Range, T_{stg}	-65° to $+150^\circ C$
Thermal Resistance, Junction-to-Case, R_{thJC}	1.7 $^\circ C/W$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 20mA, I_B = 0$	16	—	—	V
	$V_{(BR)CES}$	$I_C = 20mA, V_{BE} = 0$	36	—	—	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 5mA, I_C = 0$	4	—	—	V
Collector Cutoff Current	I_{CES}	$V_{CE} = 15V, V_{BE} = 0, T_C = +25^\circ C$	—	—	10	mA

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics						
DC Current Gain	h_{FE}	$V_{CE} = 5V, I_C = 4A$	40	70	100	
Dynamic Characteristics						
Output Capacitance	C_{ob}	$V_{CB} = 12.5V, I_E = 0, f = 1\text{MHz}$	–	90	125	pF
Functional Test						
Common-Emitter Amplifier Power Gain	G_{PE}	$P_{OUT} = 25W, V_{CC} = 12.5V, I_{Cmax} = 3.6A, f = 470\text{MHz}$	6.2	7.0	–	dB
Input Power	P_{in}	$P_{OUT} = 25W, V_{CC} = 12.5V, f = 470\text{MHz}$	–	5	6	W
Collector Efficiency	η		55	60	–	%
Output Mismatch Stress	ψ	$V_{CC} = 16V, P_{in} = \text{Note 1}, f = 470\text{MHz}, \text{VSWR} = 20:1, \text{All Phase Angles}$	No Degradation in Output Power			
Series Equivalent Input Impedance	Z_{in}	$P_{OUT} = 25W, V_{CC} = 12.5V, f = 470\text{MHz}$	$-1.2 + j3.3$			Ω
Series Equivalent Output Impedance	Z_{OL}		$-1.9 + j2.1$			Ω

Note 1. $P_{in} = 150\%$ of Drive Requirement for 25W output @ 12.5V.

Note 2. ψ = Mismatch stress factor – the electrical criterion established to verify the device resistance to load mismatch failure. The mismatch stress test is accomplished in a standard test fixture terminated in a 20:1 minimum load mismatch at all phase angles.

