2N5645 (SILICON)

NPN SILICON RF POWER TRANSISTOR

. . . designed for 12.5 Volt, UHF large signal amplifier applications required in industrial and consumer FM equipment operating to 520 MHz.

- Low lead inductance stripline package for ease of design and increased broadband capability
- Balanced Emitter Construction to protect against device damage due to load mismatch
- Specified 12.5 Volt, 470 MHz Characteristics —
  Output Power = 4.0 Watt
  Minimum Gain = 6.0 dB
  Efficiency = 60%

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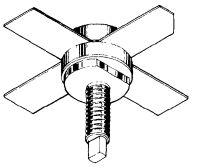


*MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	18	Vdc
Collector-Base Voltage	V_{CB}	36	Vdc
Emitter-Base Voltage	V_{EB}	4.0	Vdc
Collector Current — Continuous	I_C	1.0	Adc
Total Device Dissipation @ $T_C = 25^oC$ Derate above 25^oC	P_D	12 0.068	Watts $W/^oC$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	^oC

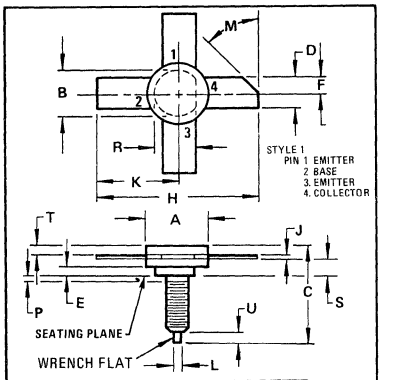
* ELECTRICAL CHARACTERISTICS ($T_C = 25^oC$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (Note 1) (I_C = 100 mAdc, I_B = 0)	BV_{CEO}	18	–	Vdc
Collector-Emitter Breakdown Voltage (Note 1) (I_C = 100 mAdc, V_{BE} = 0)	BV_{CES}	36	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 1.0 mAdc, I_C = 0)	BV_{EBO}	4.0	–	Vdc
Collector Cutoff Current (V_{CE} = 15 Vdc, V_{BE} = 0, $T_A = 125^oC$)	I_{CES}	–	10	mAdc
Collector Cutoff Current (V_{CB} = 15 Vdc, I_E = 0)	I_{CBO}	–	0.5	mAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = 0.5 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	15	–	–
DYNAMIC CHARACTERISTICS				
Current-Gain — Bandwidth Product (Note 2) (I_C = 100 mAdc, V_{CE} = 12 Vdc, f = 100 MHz)	f_T	400	–	MHz
Output Capacitance (V_{CB = 12 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	–	20	pF
FUNCTIONAL TEST				
Common-Emitter Amplifier Power Gain (Figure 1) (P_{out} = 4.0 W, V_{CC} = 12.5 Vdc, I_C = 0.53 Adc, f = 470 MHz)	G_{PE}	6.0	–	dB
Collector Efficiency (P_{out} = 4.0 W, V_{CC} = 12.5 Vdc, I_C = 0.53 Adc, f = 470 MHz)	η	60	–	%

*Indicates JEDEC Registered Data.

Note 1: Pulsed through 25 mH inductor.

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



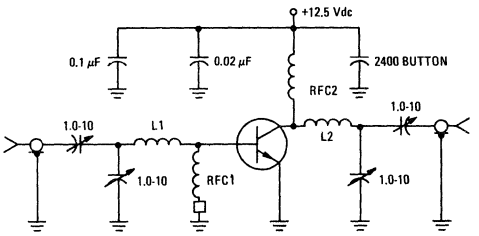
DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	9.40	9.78	0.370	0.385
B	8.13	8.38	0.320	0.330
C	18.03	19.05	0.710	0.750
D	5.59	5.84	0.220	0.230
E	1.78	2.03	0.070	0.080
F	2.79	2.92	0.110	0.115
H	26.42	28.70	1.040	1.130
J	0.10	0.15	0.004	0.006
K	13.21	14.35	0.520	0.565
L	1.40	1.65	0.055	0.065
M	45° NOM		45° NOM	
P	–	1.27	–	0.050
R	7.59	7.80	0.299	0.307
S	4.01	4.52	0.158	0.178
T	2.16	2.41	0.085	0.095
U	2.54	3.30	0.100	0.130

NOTE
CASE 145A-01 USE 8-32NC2A STUD

CASE 145A-01

DESIGN DATA

FIGURE 1 – 470 MHz TEST CIRCUIT



L1 = COPPER STRAP 1" Long, 5/32" Wide

L2 = 1 Turn #16 AWG WIRE, 3/32" I.D., Total Length of Coil and Leads = 13/16"

RFC 1 = 0.35 μH MOLDED CHOKE with Ferrite Bead on Ground Lead

RFC 2 = 8 Turns #20 WIRE, 7/32" I.D., 3/8" Long

All Capacitance Values in pF Except As Noted.

FIGURE 2 – POWER OUTPUT versus POWER INPUT

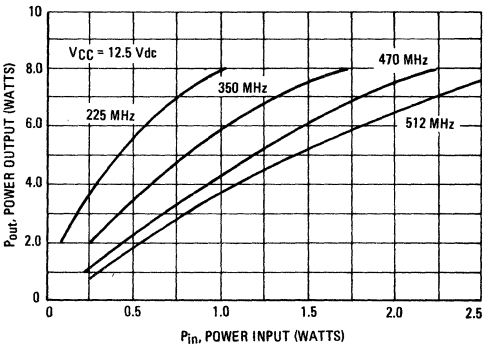


FIGURE 3 – POWER OUTPUT versus FREQUENCY

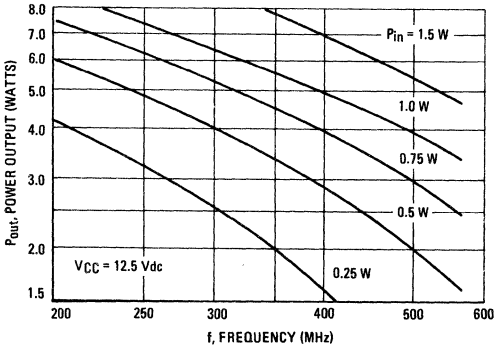


FIGURE 4 – PARALLEL EQUIVALENT OUTPUT CAPACITANCE versus FREQUENCY

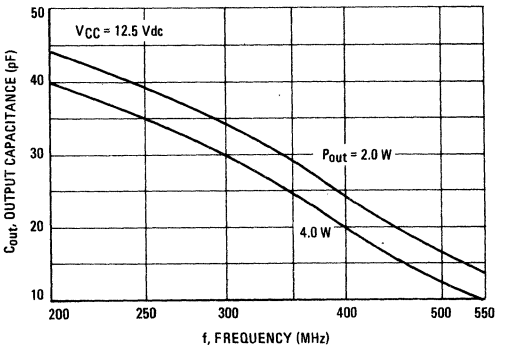


FIGURE 5 – PARALLEL EQUIVALENT INPUT RESISTANCE versus FREQUENCY

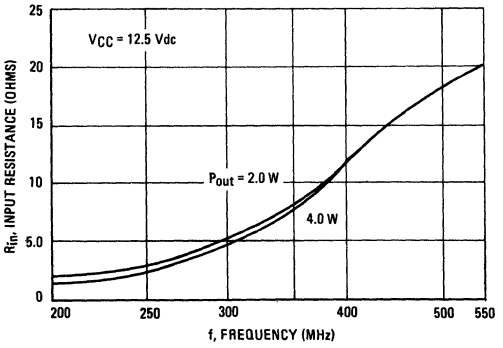


FIGURE 6 – PARALLEL EQUIVALENT INPUT CAPACITANCE versus FREQUENCY