

2N5646 (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 = 12 Watt
Minimum Gain = 4.7 dB
Efficiency = 60%

*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	2.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	30 0.171	Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	$^\circ\text{C}$

*ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (Note 1) ($I_C = 200$ mAdc, $I_B = 0$)	BV_{CEO}	18	–	Vdc
Collector-Emitter Breakdown Voltage (Note 1) ($I_C = 200$ 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, $V_{BE} = 0$, $T_A = 125^\circ\text{C}$)	I_{CES}	–	10	mAdc
Collector Cutoff Current ($V_{CB} = 15$ Vdc, $I_E = 0$)	I_{CBO}	–	1.0	mAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 1.0$ Adc, $V_{CE} = 5.0$ Vdc)	h_{FE}	15	–	–
---	----------	----	---	---

DYNAMIC CHARACTERISTICS

Current-Gain – Bandwidth Product (Note 2) ($I_C = 250$ 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}	–	40	pF

FUNCTIONAL TEST

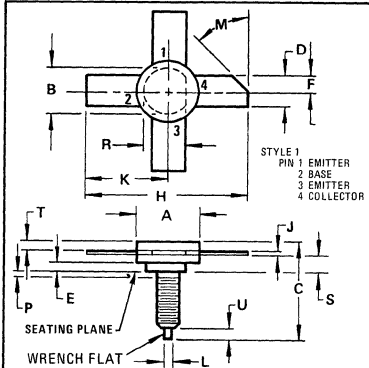
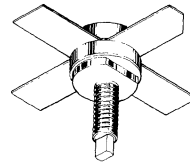
Common-Emitter Amplifier Power Gain (Figure 1) ($P_{out} = 12$ W, $V_{CC} = 12.5$ Vdc, $I_C = 1.6$ Adc, $f = 470$ MHz)	G_{pE}	4.7	–	dB
Collector Efficiency ($P_{out} = 12$ W, $V_{CC} = 12.5$ Vdc, $I_C = 1.6$ Adc, $f = 470$ MHz)	η	60	–	%

* 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.

NPN SILICON RF POWER TRANSISTOR



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	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

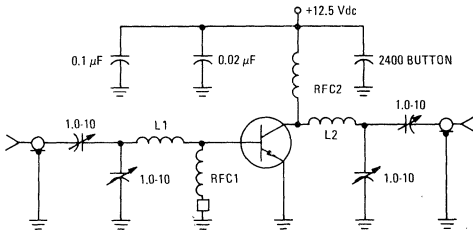
NOTE:

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 = 0.15 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

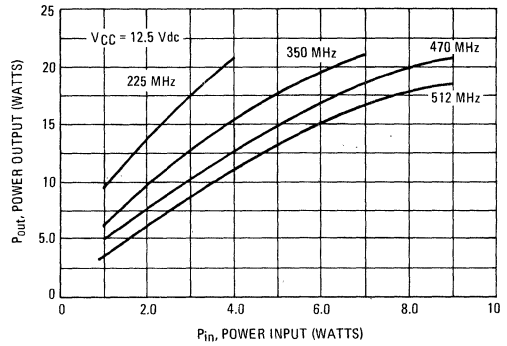


FIGURE 3 - POWER OUTPUT versus FREQUENCY

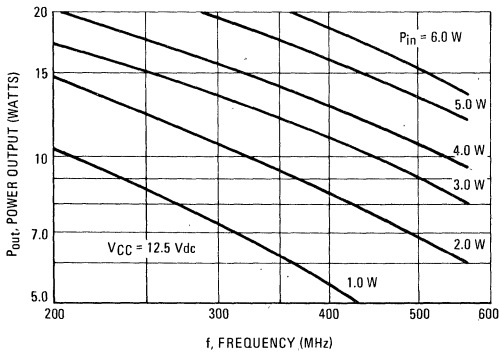


FIGURE 4 - PARALLEL EQUIVALENT OUTPUT CAPACITANCE versus FREQUENCY

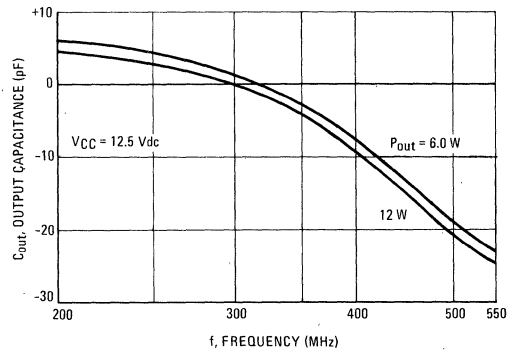


FIGURE 5 - PARALLEL EQUIVALENT INPUT RESISTANCE versus FREQUENCY

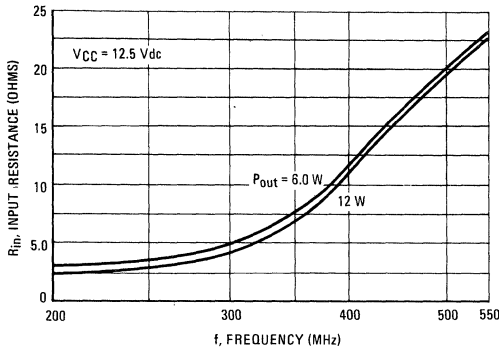
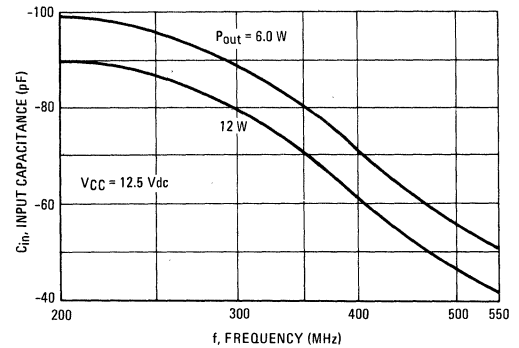


FIGURE 6 - PARALLEL EQUIVALENT INPUT CAPACITANCE versus FREQUENCY



2N5829 (SILICON)

For Specifications See 2N4957 Data, Volume I.