

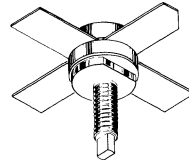
2N5849 (SILICON)

NPN SILICON RF POWER TRANSISTOR

... designed primarily for use in large-signal amplifier output stages, the 2N5849 is intended for use in industrial communications equipment operating at frequencies to 80 MHz.

- Optimized for Operation from a 12.5 Volt Supply
- 40 Watts (Min) RF Power Output at 50 MHz
- Balanced Emitter Construction for Burn Out Protection

**40-W-50 MHz
RF POWER
TRANSISTOR
NPN SILICON**

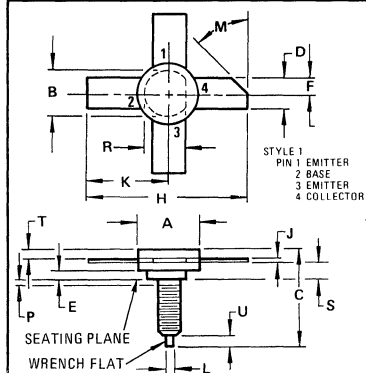


*MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	24	Vdc
Collector-Base Voltage	V_{CB}	48	Vdc
Emitter-Base Voltage	V_{EB}	4.0	Vdc
Collector Current — Continuous	I_C	7.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	100 571	Watts mW/°C
Storage Temperature Range	T_{stg}	-65 to +200	°C

*Indicates JEDEC Registered Data.

This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.57	12.90	0.459	0.508
B	10.54	10.80	0.415	0.425
C	21.21	21.46	0.835	0.845
D	5.59	5.84	0.220	0.230
E	1.83	1.98	0.072	0.078
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	1.65	1.90	0.065	0.075
M	45° NOM		45° NOM	
P	-	1.27	-	0.050
R	9.78	10.01	0.385	0.394
S	3.89	4.45	0.153	0.175
T	2.03	2.29	0.080	0.090
U	2.54	3.30	0.100	0.130

NOTE: 145A-02 USES 10-32NF2A STUD.
CASE 145A-02

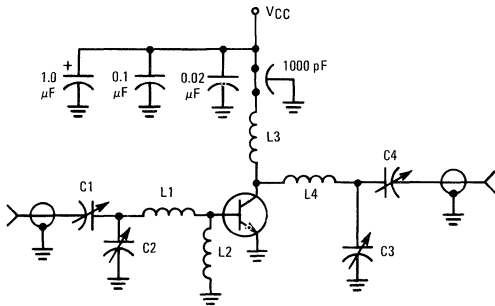
***ELECTRICAL CHARACTERISTICS** ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage(1) ($I_C = 200 \text{ mAdc}, I_B = 0$)	BV_{CEO}	24	—	—	Vdc
Collector-Emitter Breakdown Voltage(1) ($I_C = 100 \text{ mAdc}, V_{BE} = 0$)	BV_{CES}	48	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \text{ mAdc}, I_C = 0$)	BV_{EBO}	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CE} = 15 \text{ Vdc}, V_{BE} = 0, T_A = +125^\circ\text{C}$)	I_{CES}	—	—	10	mAdc
Collector Cutoff Current ($V_{CB} = 15 \text{ Vdc}, I_E = 0$)	I_{CBO}	—	—	1.0	mAdc
ON CHARACTERISTICS					
DC Current Gain ($I_C = 2.4 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	3.0	—	—	—
DYNAMIC CHARACTERISTICS					
Output Capacitance ($V_{CB} = 12.5 \text{ Vdc}, I_E = 0, f = 0.1$ to 1.0 MHz)	C_{ob}	—	180	230	pF
FUNCTIONAL TEST					
Common-Emitter Amplifier Power Gain ($P_{out} = 40 \text{ W}, V_{CC} = 12.5 \text{ Vdc}, f = 50 \text{ MHz}$)	G_{pE}	7.5	—	—	dB
Collector Efficiency ($P_{out} = 40 \text{ W}, V_{CC} = 12.5 \text{ Vdc}, f = 50 \text{ MHz}$)	η	50	—	—	%

*Indicates JEDEC Registered Data.

(1) Pulsed thru a 25 mH Inductor.

FIGURE 1 — 50 MHz POWER GAIN TEST CIRCUIT



- C1 25-280 pF, Arco 464 or Equivalent
- C2 80-480 pF, Arco 466 or Equivalent
- C3 0-75 pF, Hammarlund MAPC 75 or Equivalent
- C4 0-50 pF, Hammarlund MAPC 50 or Equivalent
- L1 1 Turn #14 AWG 5/16" I.D.
- L2 2-1/2 Turns #22 AWG on 3/8" Ferrite Bead
- L3 18 Turns #18 AWG 3/8" I.D. 2 Layers, 9 Turns Each
- L4 4 Turns #14 AWG 7/16" I.D. 7/16" Long

FIGURE 2 — POWER OUTPUT versus POWER INPUT

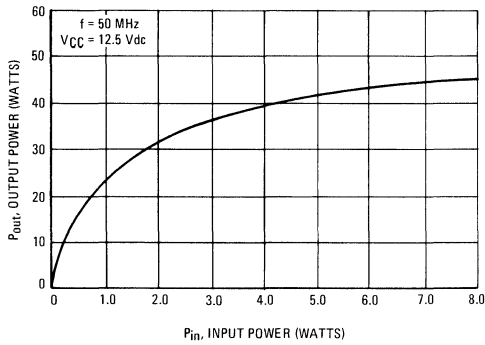


FIGURE 3 — POWER OUTPUT versus FREQUENCY

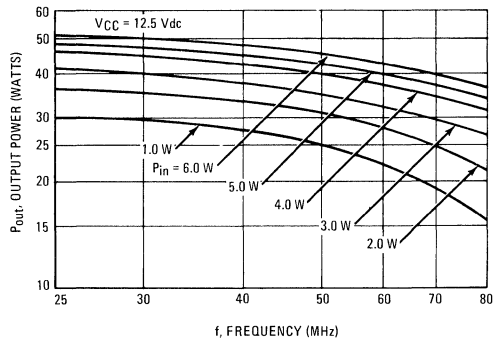


FIGURE 4 — PARALLEL EQUIVALENT INPUT RESISTANCE versus FREQUENCY

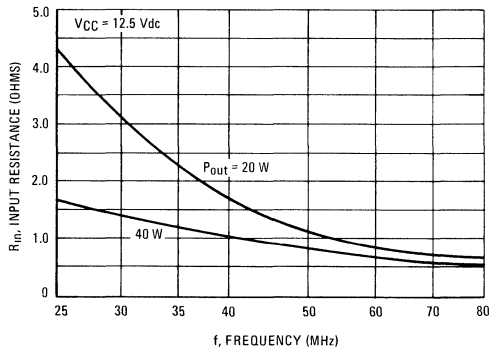


FIGURE 5 — PARALLEL EQUIVALENT INPUT CAPACITANCE versus FREQUENCY

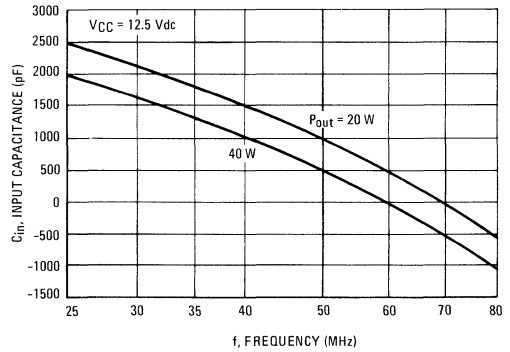


FIGURE 6 — PARALLEL EQUIVALENT OUTPUT CAPACITANCE versus FREQUENCY

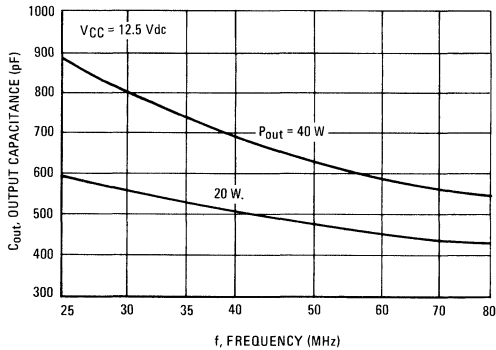
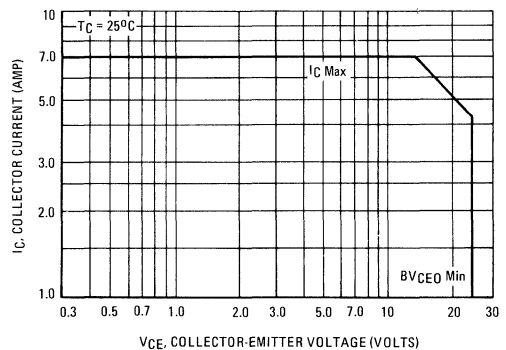
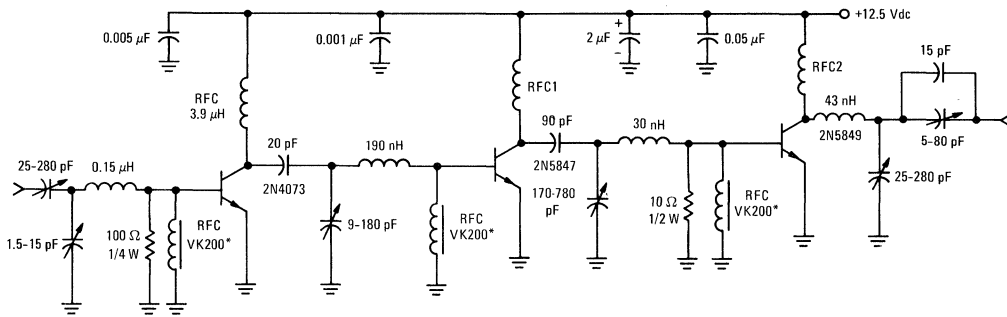


FIGURE 7 — DC SAFE OPERATING AREA



40 WATT, 50 MHz TRANSMITTER SCHEMATIC
(Information obtained from AN-502A)



$P_o = 40 \text{ W}$
 $P_{in} = 20 \text{ mW}$
 Overall Gain = 33 dB
 Overall Efficiency = 59.2%

* Ferroxcube Part Number
 RFC1 - 20 Turns #18 AWG, 3/16" I.D., 2 Layers,
 10 Turns Each, Close Wound.
 RFC2 - 18 Turns, #18 AWG, 3/16" I.D., 2 Layers,
 9 Turns Each, Close Wound.

APPLICATION INFORMATION

In addition to a fine selection of quality RF Semiconductors, Motorola provides applications information in the form of Application Notes. Any of the notes listed on this page may be obtained by writing to the Technical Information Center, Motorola Semiconductor Products Inc., P.O. Box 20924, Phoenix, Arizona 85036.

- AN-267 Matching Network Designs with Computer Solutions
- AN-282A Systemizing RF Power Amplifier Design
- AN-481 A Broadband 4-Watt Aircraft Transmitter
- AN-495 A 25-Watt, 175-MHz Transmitter for 12.5-Volt Operation
- AN-502A A 40-Watt, 50-MHz Transmitter for 12.5-Volt Operation
- AN-507 A 13-Watt Broadband AM Aircraft Transmitter