2N5846 (SILICON)
2N5847

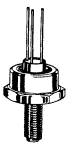
The RF Line

3.5 W, 7.0 W – 50 MHz
RF POWER
TRANSISTORS
NPN SILICON

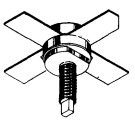
NPN SILICON RF POWER TRANSISTORS

. . . designed primarily for use in large-signal amplifier driver and pre-driver stages, these devices are intended for use in industrial communications equipment operating at frequencies to 80 MHz.

- Optimized for Operation from a 12.5 Volt Supply
- Power Output @ 12.5 Vdc, 50 MHz
  P_{out} = 3.5 W – 2N5846
  8.0 W – 2N5847
- Large-Signal Impedance Data Permit Convenient Matching Network Design



TO-102
CASE 24



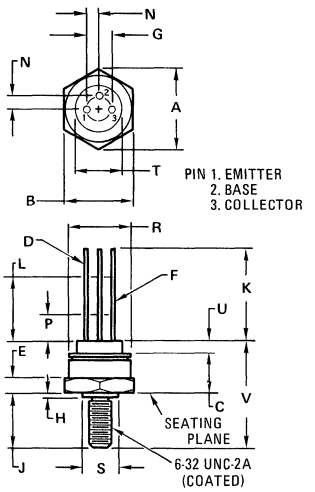
CASE 145A-01

***MAXIMUM RATINGS**

Rating	Symbol	2N5846	2N5847	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	2.0	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	10 57.2	20 114	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		°C

*Indicates JEDEC Registered Data.

2N5846



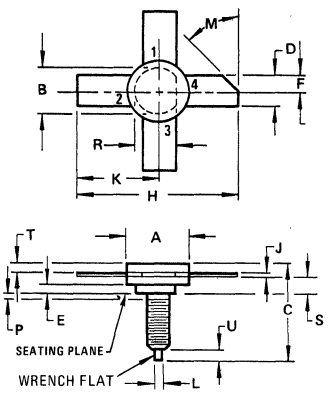
DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	10.49	11.00	0.413	0.433
B	9.19	9.53	0.362	0.375
C	5.33	5.72	0.210	0.225
D	0.406	0.533	0.016	0.021
E	1.65	1.78	0.065	0.070
F	0.406	0.483	0.016	0.019
G	2.54 BSC		0.100 BSC	
H	0.508	0.889	0.020	0.035
J	6.73	7.42	0.265	0.292
K	12.70	–	0.500	–
L	6.35	–	0.250	–
N	1.27 BSC		0.050 BSC	
P	–	1.27	–	0.050
R	8.89	9.14	0.350	0.360
S	4.45	4.83	0.175	0.190
T	4.11	4.29	0.162	0.169
U	1.14	1.52	0.045	0.060

CASE 24
TO-102

All JEDEC dimensions and notes apply

2N5847

CASE 145A-01



STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR

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

***ELECTRICAL CHARACTERISTICS** (T_C = 25°C unless otherwise noted)

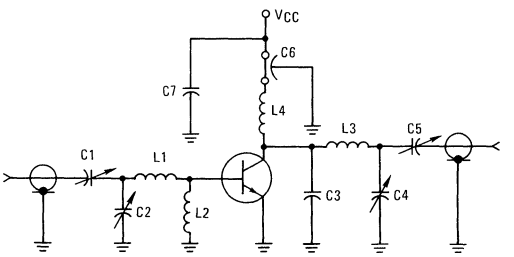
Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (1) (I_C = 200 mAdc, I_B = 0)		BV_{CEO}	18	–	Vdc
Collector-Emitter Breakdown Voltage (1) (I_C = 50 mAdc, V_{BE} = 0)		BV_{CES}	36	–	Vdc
Emitter-Base Breakdown Voltage		BV_{EBO}			Vdc
(I_E = 0.25 mAdc, I_C = 0)	2N5846		4.0	–	
(I_E = 5.0 mAdc, I_C = 0)	2N5847		4.0	–	
Collector Cutoff Current		I_{CES}			mAdc
(V_{CE} = 15 Vdc, V_{BE} = 0, T_C = 125°C)	2N5846		–	5.0	
	2N5847		–	10	
Collector Cutoff Current		I_{CBO}			mAdc
(V_{CB} = 15 Vdc, I_E = 0)	2N5846		–	0.5	
	2N5847		–	1.0	
ON CHARACTERISTICS					
DC Current Gain		h_{FE}			–
(I_C = 250 mAdc, V_{CE} = 5.0 Vdc)	2N5846		5.0	–	
(I_C = 500 mAdc, V_{CE} = 5.0 Vdc)	2N5847		5.0	–	
DYNAMIC CHARACTERISTICS					
Output Capacitance		C_{ob}			pF
(V_{CB} = 15 Vdc, I_E = 0, f = 0.1 to 1.0 MHz)	2N5846		–	25	
	2N5847		–	90	
FUNCTIONAL TEST					
Common-Emitter Amplifier Power Gain		G_{PE}			dB
(V_{CC} = 12.5 Vdc, P_{out} = 3.5 W, f = 50 MHz)	2N5846		10	–	
(V_{CC} = 12.5 Vdc, P_{out} = 8.0 W, f = 50 MHz)	2N5847		10	–	
Power Output		P_{out}			Watts
(V_{CC} = 12.5 Vdc, P_{in} = 350 mW, f = 50 MHz)	2N5846		3.5	–	
(V_{CC} = 12.5 Vdc, P_{in} = 800 mW, f = 50 MHz)	2N5847		8.0	–	
Collector Efficiency		η			%
(V_{CC} = 12.5 Vdc, P_{out} = 3.5 W, f = 50 MHz)	2N5846		50	–	
(V_{CC} = 12.5 Vdc, P_{out} = 8.0 W, f = 50 MHz)	2N5847		50	–	

*Indicates JEDEC Registered Data.

(1)Pulsed thru a 25 mH inductor.

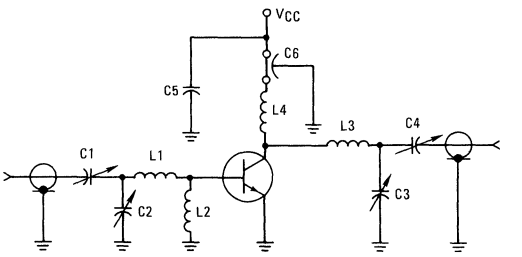
FIGURE 1 – 50 MHz TEST CIRCUITS

2N5846



C1, C2, C5	25-280 pF, Arco 464 or Equivalent
C3	40 pF, 500 Vdc, Unelco
C4	9.0-180 pF, Arco 463 or Equivalent
C6	1000 pF Feedthru
C7	0.1 μF, 75 Vdc
L1	2 Turns, #18 AWG, 3/8" I.D.
L2	Small Ferrite Bead, 2½ Turns
L3	5 Turns, #18 AWG, 3/8" I.D.
L4	1.0 μH, RF Choke

2N5847



C1, C3, C4	25-280 pF, Arco 464 or Equivalent
C2	80-480 pF, Arco 466 or Equivalent
C5	0.1 μF, 75 Vdc
C6	1000 pF Feedthru
L1	1 Turn, #14 AWG ½" I.D.
L2	Large Ferrite Bead 2½ Turns
L3	3 Turns, #14 AWG ½" I.D.
L4	20 Turns, #18 AWG NYCLAD Wire, 2 Layers (10 Turns Per Layer) ¼" I.D.

POWER OUTPUT versus POWER INPUT

FIGURE 2 – 2N5846

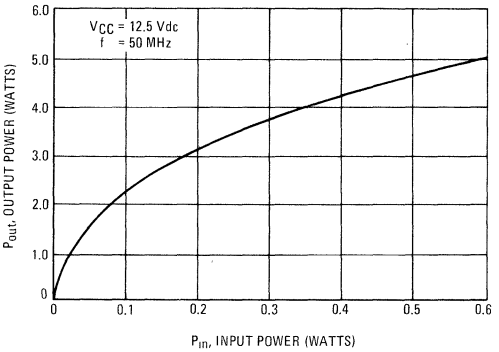
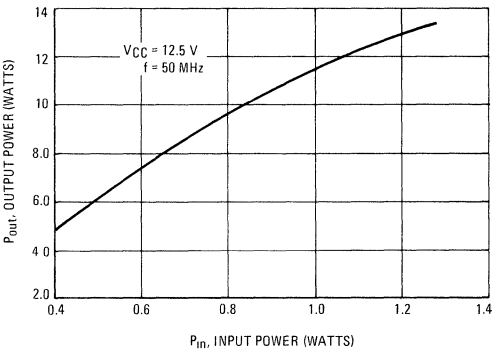


FIGURE 3 – 2N5847



POWER OUTPUT versus FREQUENCY

FIGURE 4 – 2N5846

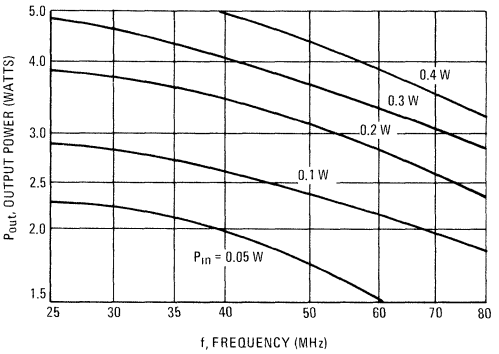
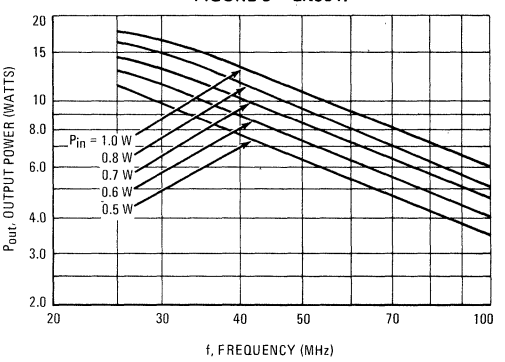


FIGURE 5 – 2N5847



POWER DISSIPATION DERATING CURVES

FIGURE 6 – 2N5846

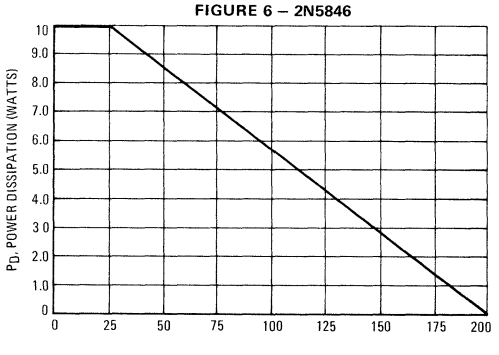
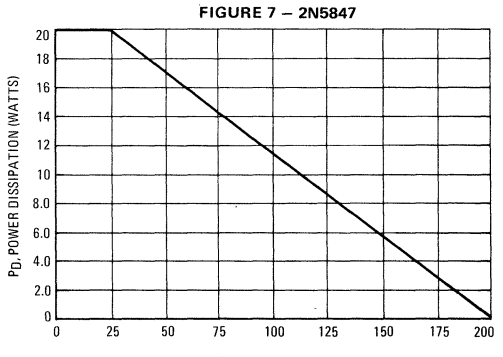


FIGURE 7 – 2N5847



PARALLEL EQUIVALENT INPUT RESISTANCE versus FREQUENCY

FIGURE 8 – 2N5846

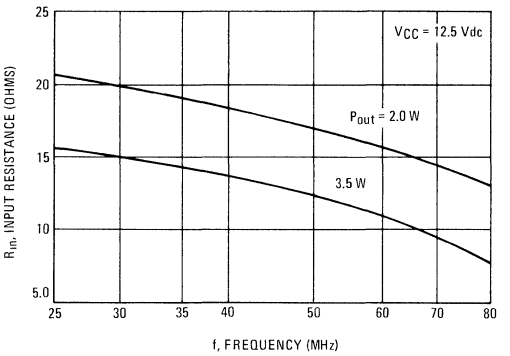
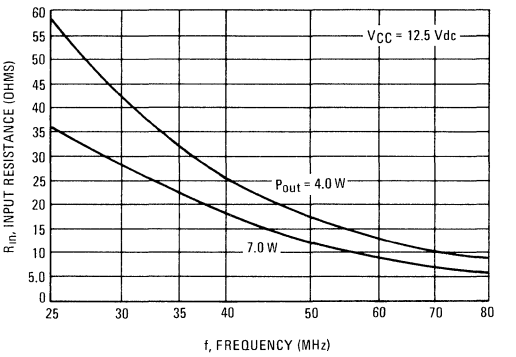


FIGURE 9 – 2N5847



PARALLEL EQUIVALENT INPUT CAPACITANCE versus FREQUENCY

FIGURE 10 – 2N5846

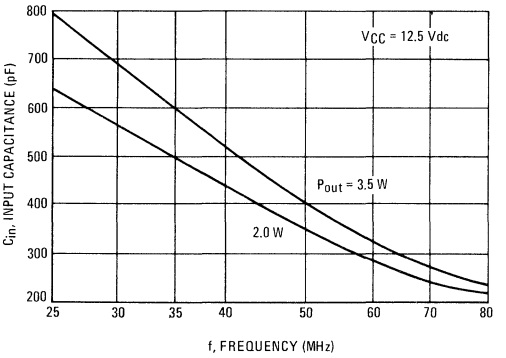
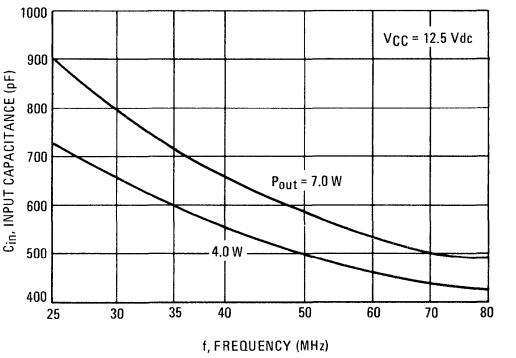


FIGURE 11 – 2N5847



PARALLEL EQUIVALENT OUTPUT CAPACITANCE versus FREQUENCY

FIGURE 12 – 2N5846

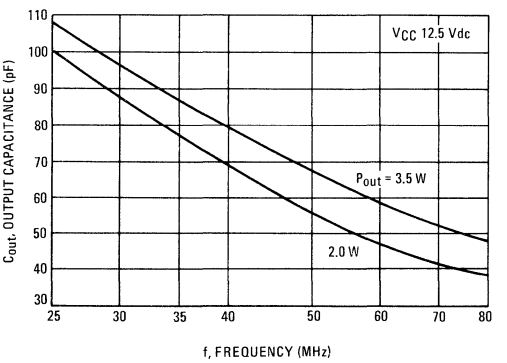


FIGURE 13 – 2N5847