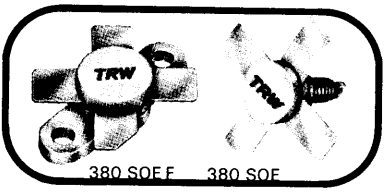
High Frequency Power Transistors

TP 9180 100 W
TP 9170/A 75 W
TP 9160/A 50 W
TP 9150/A 30 W
TP 9140/A 15 W
∞ VSWR

These power transistors are ballasted for ruggedness and will withstand infinite VSWR at all phase angles. A unique emitter structure provides high gain with wider emitter and base fingers resulting in high reliability. Ballast resistor design enables operation at Class A, AB and C.

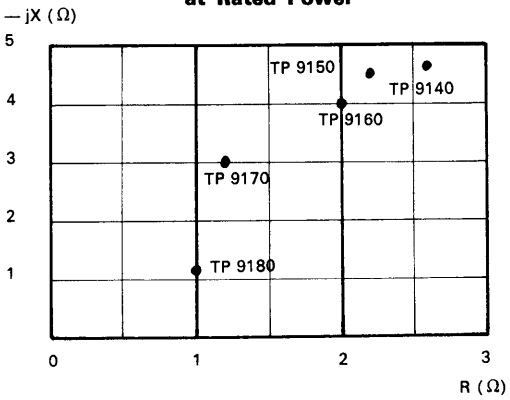


380 SOE F 380 SOE

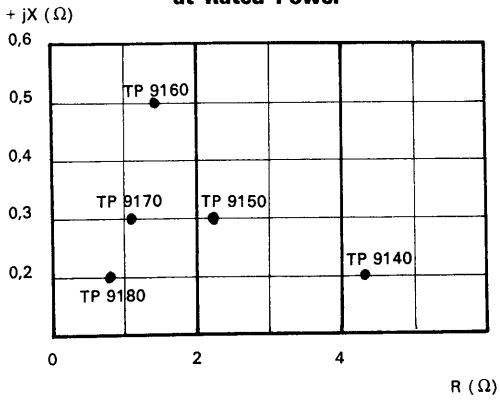
Electrical Characteristics (T_{case} = 25 °C)

	SYMBOL	CHARACTERISTICS	TEST CONDITIONS	TP9140/A	TP9150/A	TP9160/A	TP9170/A	TP9180	UNIT
DC TEST	I_{EBO}	Emitter Base Leakage Current	V_{EB} = 4 V	2	4	6	10	10	mA Max
	I_{CBO}	Collector Base Leakage Current	V_{CB} = 50 V	50	100	100	200	200	mA Max
	I_{CES}	Collector Base cut off current	V_{CE} = 13,5 V Emitter base short circuited	5	10	10	20	20	mA Max
	h_{FE}	DC Current Gain	V_{CE} = 13,5 V I_C = 500 mA / I_C = 1 A / I_C = 2 A	25	25	25	20	20	— Min
RF TEST	P_{out}	Commun Emitter Power output	V_{CE} = 13,5 V F = 27 MHz	15	30	50	75	100	W Min
	P_G	Power Gain	V_{CE} = 13,5 V F = 27 MHz P_{out} at Rated Power	12	12	12	11.5	11	dB Min
	VSWR	Mismatch Tolerance	V_{CE} = 13,5 V F = 27 MHz P_{out} at Rated Power	∞	∞	∞	∞	∞	—
MAXIMUM RATING	V_{EB}	Emitter Base Voltage		4	4	4	4	4	V
	V_{CE}	Collector Emitter Voltage		20	20	20	20	20	V
	V_{CB}	Collector Base Voltage		50	50	50	50	50	V
	I_C	Collector current		4	8	12	15	20	A
	Pd	Power Dissipation	t_{case} = 25 °C	35	70	115	150	200	W
	T_{STG}	Storage Temperature		— 65 to + 200 °C					

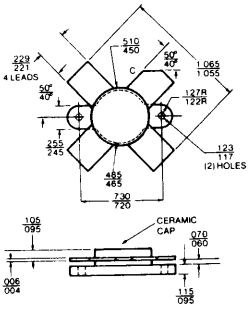
Typical Series Input Impedance at Rated Power



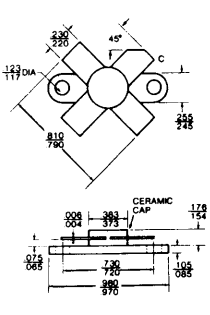
Typical Series Load Impedance at Rated Power



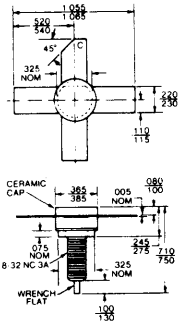
TP 9180



TP 9140
TP 9150
TP 9160
TP 9170



TP 9140 A
TP 9180 A
TP 9160 A
TP 9170 A

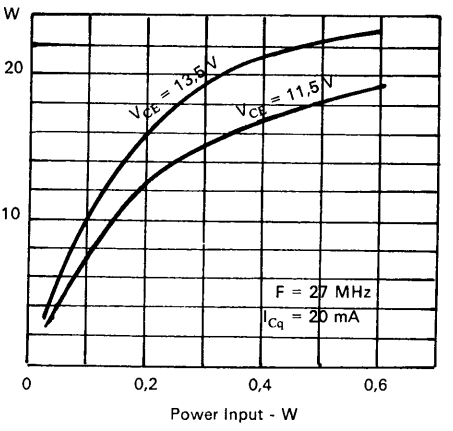


Mechanical Specifications

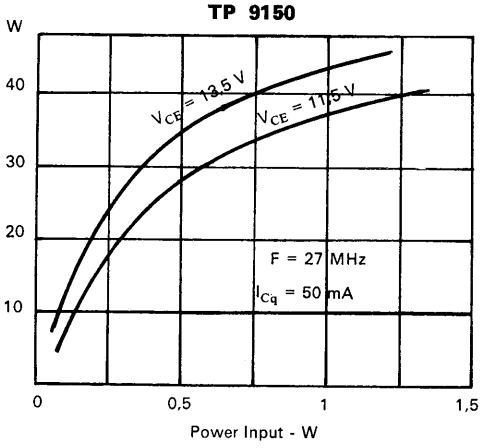
- Stud Torque, 10 in. lbs., max.
- Lead Soldering, 300°C, 15 sec. max.
- Lead Fatique, 3 bends @ 90°
- Flange Flatness, 0.0008 in. typ.

Typical Power Output vs Power Input

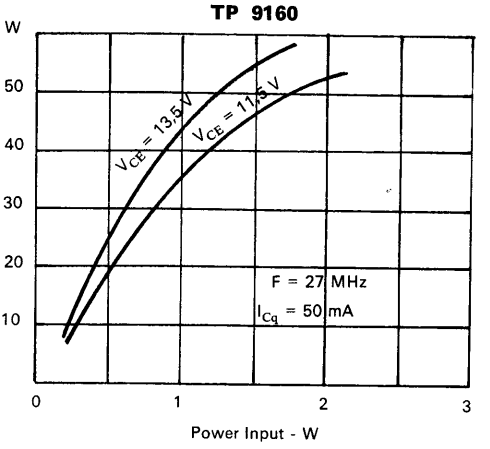
TP 9140



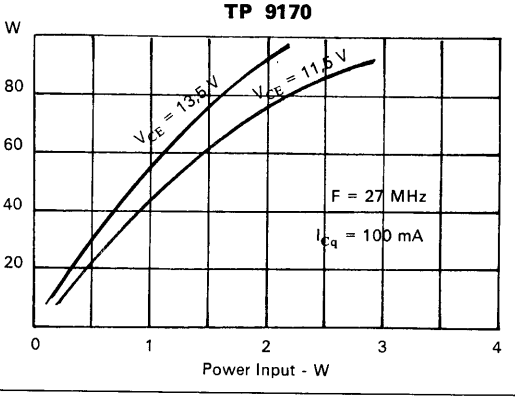
TP 9150



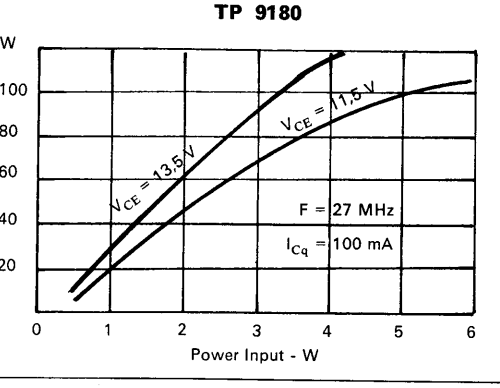
TP 9160



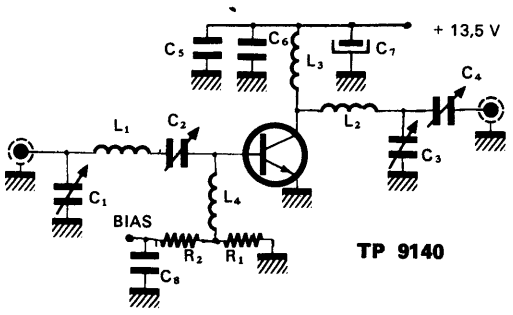
TP 9170



TP 9180



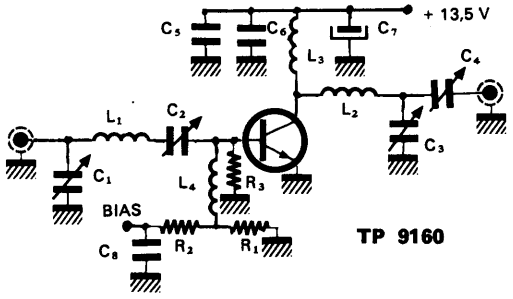
TYPICAL APPLICATIONS



TP 9140

15 W Power Amplifier

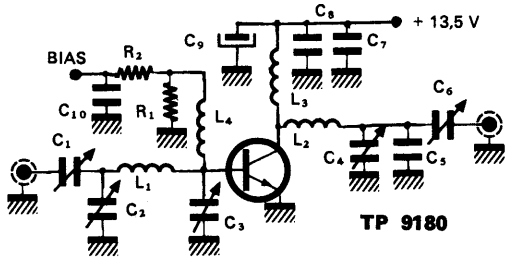
C_1 ARCO 469 170-780 pF
C_2 ARCO 427 55-300 pF
C_3 ARCO 427 55-300 pF
C_3 ARCO 427 55-300 pF
C_4 ARCO 427 55-300 pF
C_5 1000 pF UNELCO
C_6 0,1 µF Disc
C_7 50 µF Electrolytic
C_8 0,1 µF Disc
L_1 6 turns ⌀ 8 mm 1 mm wire
L_2 4 turns ⌀ 11 mm 1,2 mm wire
L_3 10 turns ⌀ 12 mm 1,2 mm wire
L_4 VK 200 ferrite chocke
R_1 1,5 Ω
R_2 10 Ω/5 W



TP 9160

50 W Power Amplifier

C_1 ARCO 427 55-300 pF + 400 pF UNELCO
C_2 ARCO 469 170-680 pF
C_3 ARCO 427 55-300 pF
C_4 ARCO 425 24-200 pF
C_5 1000 pF UNELCO
C_6 0,1 µF Disc
C_7 470 µF Electrolytic
C_8 0,1 µF Disc
L_1 3 turns ⌀ 10 mm 1,4 mm wire
L_2 3 turns ⌀ 10 mm 1,8 mm wire L = 13 mm
L_3 8 turns ⌀ 12 mm 1,2 mm wire
L_4 VK 200 ferrite chocke
R_1 1,5 Ω
R_2 10 Ω/5 W
R_3 39 Ω



TP 9180

100 W Power Amplifier

C_1 ARCO 423 7-100 pF
C_2 ARCO 467 110-680 pF
C_3 ARCO 469 170-780 pF
C_4 ARCO 466 80-480 pF
C_5 400 pF UNELCO
C_6 0,1 µF Disc
C_7 1000 pF UNELCO
C_8 0,1 µF Disc
C_9 470 µF Electrolytic
R_1 1,5 Ω
R_2 10 Ω/5 W

L_1 3 turns ⌀ 11 mm 1 mm wire L = 15 mm
L_2 3 turns ⌀ 15 mm 1,8 mm wire L = 20 mm
L_3 5 turns ⌀ 12 mm 1,8 mm wire
L_4 VK 200 ferrite chocke

TRW® SEMICONDUCTORS

TP 9381

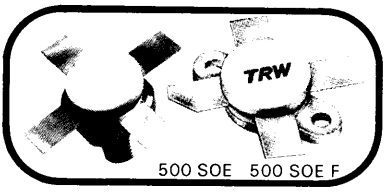
FM Power Transistor

PRELIMINARY DATA SHEET

The TP 9381 is designed for use in the new generation of VHF-FM broadcast transmitters operating from a 28 V supply in class A, B, or C.

Its construction, which now incorporates the new standard TRW process of gold metallization and diffused ballast resistors ensures a long operational life even when run at its maximum ratings.

100 W
108 MHz
28 V
RF POWER
NPN SILICON



500 SOE 500 SOE F

Electrical Characteristics (T_{case} = 25 °C)

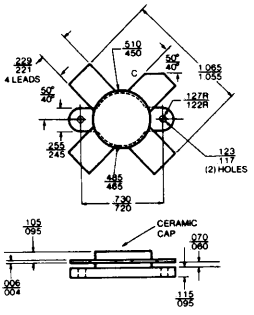
	SYMBOL	CHARACTERISTICS	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
DC TEST	BV_{EBO}	Emitter Base Breakdown Voltage	I_E = 5 mA	4			V
	BV_{CEO}	Collector Emitter Breakdown Voltage	I_C = 50 mA	35			V
	BV_{CES}	Collector Emitter Breakdown Voltage	I_C = 100 mA Emitter base short circuited	60			V
	I_{CES}	Collector cut off current	V_{CE} = 25 V			10	mA
	h_{FE}	DC current gain	V_{CE} = 10 V I_C = 1 A	20		150	—
RF TEST	P_{out}	Commun Emitter Amplifier output power	V_{CE} = 28 V P_{in} = 18 W F = 108 MHz	100			W
	η_C	Collector Efficiency	V_{CE} = 28 V P_{out} = 100 W F = 108 MHz	75			%
	C_{ob}	Output Capacitance	V_{CB} = 28 V F = 1 MHz			200	pF
	VSWR	Voltage Standing wave ratio	V_{CE} = 28 V P_{out} = 100 W F = 108 MHz All phases	∞			—
THERMAL	$Rth_{J.C}$	Thermal Resistance Junction - Case	Pd = 80 W t = 25 °C t = 70 °C		0,85 1	1,1	°C/W °C/W
	$Rth_{C.H}$	Thermal Resistance Case - Heatsink			0,15		°C/W

Absolute Maximum Ratings

Emitter Base Voltage	V_{EB}	4 V
Collector Emitter Voltage	V_{CE}	35 V
Collector Base Voltage	V_{CB}	60 V
Collector current	I_C	12 A
Total device power dissipation t_{case} = 25 °C	P_d	150 W
Storage and Junction temperature	T_{STG}	— 65 to 200 °C

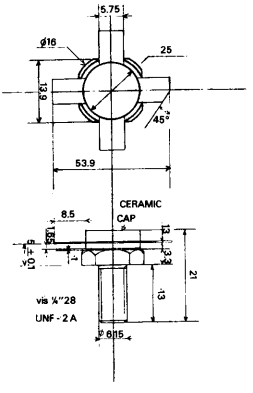
TP 9381

500 SOE F



TP 9381 A

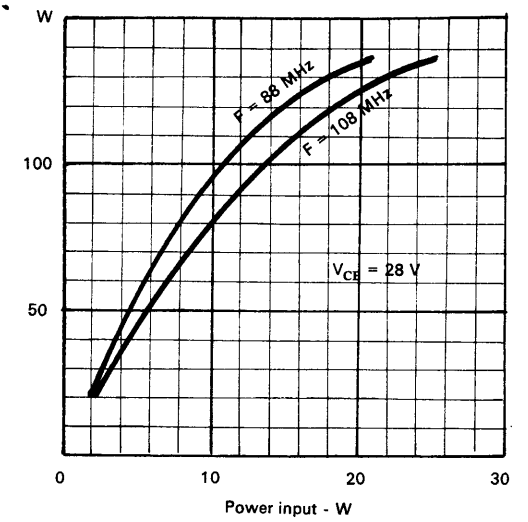
500 SOE I/4 STUD



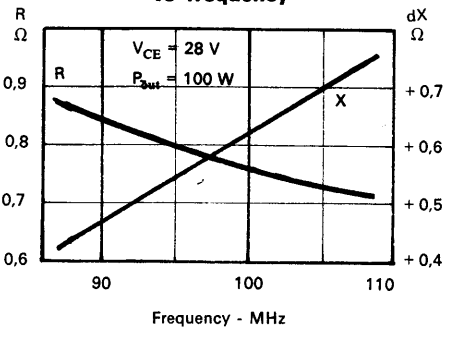
Stud torque :
min 21 kg.cm
max 25 kg.cm

Use ultra flat heat sink. Make stud hole as small as possible. Use a few of silicon grease.

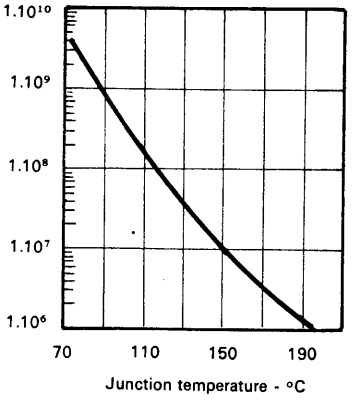
Power Output vs Power Input



Series Input Impedance vs frequency

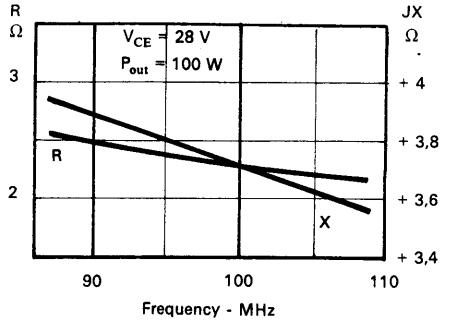


MTTF Factor vsTj

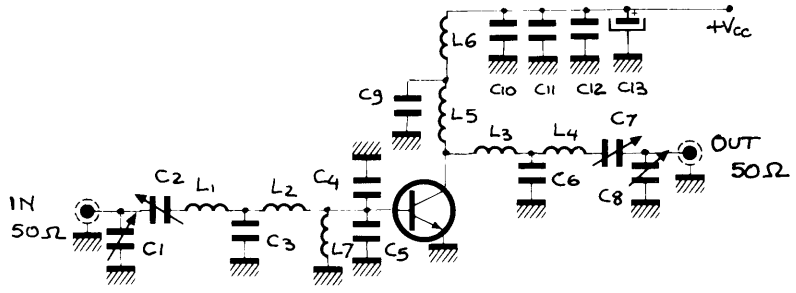


Divide by Ic^2 to obtain metal lifetime in hours

Series load Impedance vs frequency



Test Circuit 88-108 MHz
Narrow band



C_1 ARCO 425 Variable capacitor 24-200 pF
C_2 ARCO 425
C_3 150 pF UNELCO
C_4 470 pF Chip capacitor (very close to the transistor) ATC
C_5 470 pF Chip capacitor (very close to the transistor) ATC
C_6 300 pF UNELCO
C_7 ARCO 425
C_8 ARCO 425
C_9 1000 pF UNELCO
C_{10} 1000 pF UNELCO
C_{11} 10000 pF
C_{12} 0.1 μF
C_{13} 100 μF/40 V electrolytic

L_1 3 turns 6 mm ID 1.2 mm wire
L_2 2 cm wire 1.2 mm Ω (hair pin)
L_3 1.2 cm wire 1.2 mm Ω (hair pin)
L_4 3 turns 6 mm ID 1.2 mm wire
L_5 6 turns 8 mm ID 1.5 mm wire
L_6 6 turns 1.5 mm wire on ferrite core
L_7 10 μH chocke

TRW® SEMICONDUCTORS

TP 9382

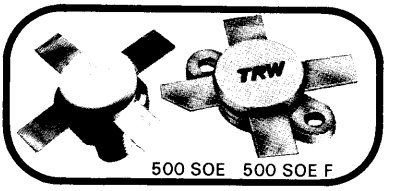
FM Power Transistor

PRELIMINARY DATA SHEET

175 W
108 MHz 28 V
HIGH POWER RF
TRANSISTOR
NPN SILICON

The TP 9382 is designed for use in new generation of VHF-FM broadcast transmitters operating from a 28 V supply in class A, B, or C.

Its construction, which incorporates the now standard TRW process of gold metallization and diffused ballast resistors, ensures a long operational life even when run at its maximum ratings.



500 SOE 500 SOE F

Electrical Characteristics (T_{case} = 25 °C)

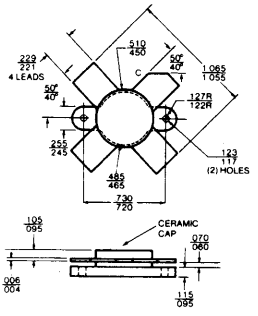
	SYMBOL	CHARACTERISTICS	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
DC TEST	BV_{EBO}	Emitter Base Breakdown Voltage	I_E = 10 mA	4			V
	BV_{CEO}	Collector Emitter Breakdown Voltage	I_C = 100 mA	35			V
	BV_{CES}	Collector Emitter Breakdown Voltage	I_C = 200 mA Emitter Base Short circuited	60			V
	I_{CES}	Collector cutoff current	V_{CE} = 25 V			20	mA
	h_{FE}	DC current gain	V_{CE} = 10 V I_C = 1 A	20		150	—
RF TEST	P_{out}	Commun Emitter Amplifier Output power	V_{CE} = 28 V P_{in} = 40 W F = 108 MHz	175			W
	η_C	Collector Efficiency	V_{CE} = 28 V P_{out} = 175 W F = 108 MHz	75			%
	C_{ob}	Output Capacitance	V_{CB} = 28 V F = 1 MHz			380	pF
	VSWR	Voltage Standing Wave Ratio	V_{CE} = 28 V P_{out} = 175 W F = 108 MHz				—
THERMAL	$Rth_{J.C}$	Thermal Resistance Junction - Case	Pd = 100 W t = 25 °C t = 70 °C		0,5 0,6	0,7	°C/W
	$Rth_{C.H}$	Thermal Resistance Case - Heatsink			0,15		°C/W

Absolute Maximum Ratings

Emitter Base Voltage	V_{EB}	4 V
Collector Emitter Voltage	V_{CE}	35 V
Collector Base Voltage	V_{CB}	60 V
Collector Current	I_C	24 A
Total device Power dissipation (t_{case} = 25 °C)	P_d	250 W
Storage and Junction temperature	$T°_S$	— 65 to 200 °C

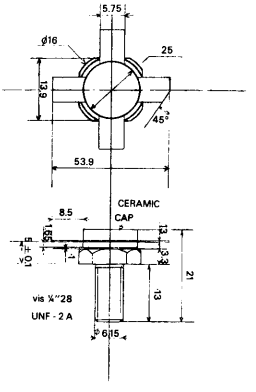
TP 9382

500 SOE F



TP 9382 A

500 SOE 1/4 STUD



TP 9382/A

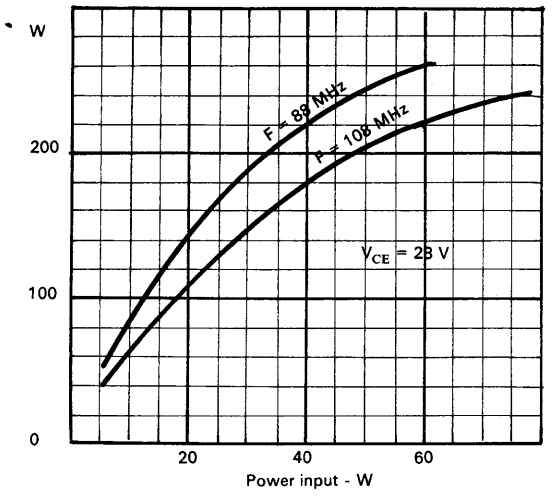
Stud torque :

min 21 kg.cm

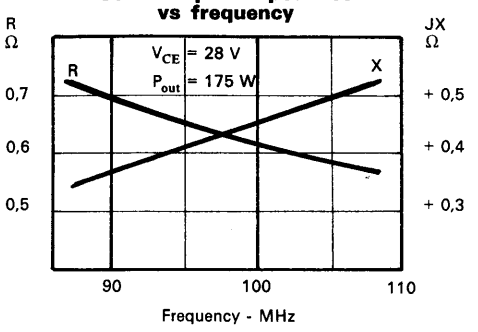
max 25 kg.cm

Use ultra flat heat sink. Make stud hole as small as possible. Use a few of silicon grease.

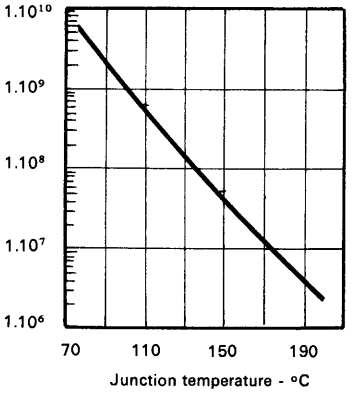
Power Output vs Power Input



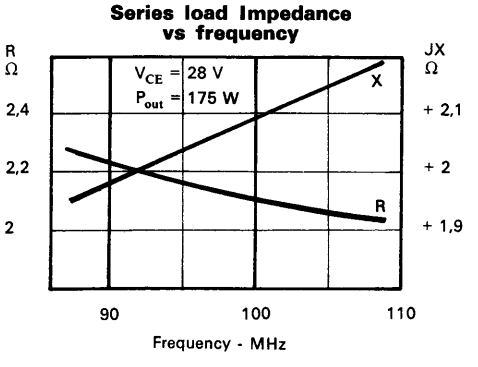
Series Input Impedance vs frequency



MTTF factor vs Tj

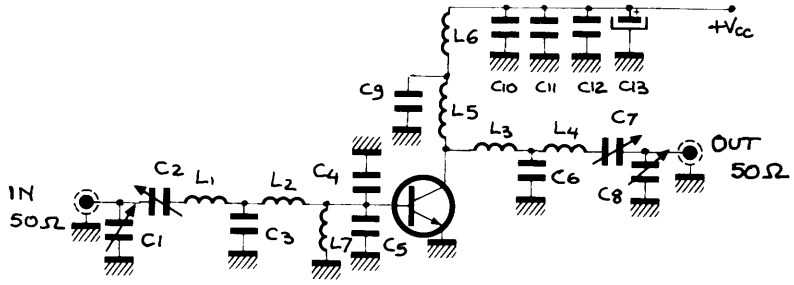


Series load Impedance vs frequency



Divide by I_C^2 to obtain metal lifetime in hours.

Test Circuit 88-108 MHz
Narrow band



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C_2 ARCO 425
C_3 150 pF UNELCO
C_4 470 pF Chip capacitor (very close to the transistor) ATC
C_5 470 pF Chip capacitor (very close to the transistor) ATC
C_6 300 pF UNELCO
C_7 ARCO 425
C_8 ARCO 425
C_9 1000 pF UNELCO
C_{10} 1000 pF UNELCO
C_{11} 10000 pF
C_{12} 0.1 μF
C_{13} 100 μF/40 V electrolytic

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L_2 2 cm wire 1.2 mm Ω (hair pin)
L_3 1.2 cm wire 1.2 mm Ω (hair pin)
L_4 3 turns 6 mm ID 1.2 mm wire
L_5 6 turns 8 mm ID 1.5 mm wire
L_6 6 turns 1.5 mm wire on ferrite core
L_7 10 μH chocke