INSTRUCTION MANUAL

2M - 100W

SPECIALITIES

1. The 2M-100W is in a high efficiency and high output power at the time of transmitting and in with low noise at the time of receiving.

2. Complete automatic change-over system is applied in switching from transmit to receive and vice versa.

3. Supplied with Manual T/R Switching, which enables the easy operation of SSB or CW mode.

4. When the Power Switch is ON, the TX lamp is lit to indicate that the TX/RX circuit is in operation.

5. The 2M-100W is compact All Solid State design.

SPECIFICATION

Frequency	144MHz to 146 MHz
Mode	SSB, FM, CW, RTTY
In/Out impedance	50 Ohms
Output transistor	2SC2630 (E)
Voltage	DC13.8V (standard)
Current	about 8A to 10A
Driving power	10W to 15W
RF power	80W to 90W
RF preamplifier gain	about 13dB
Size	Approximately 146 x 200 x 58mm

NOTES FOR OPERATION

1. As the output power of the companion transceiver is to be used to drive this amplifier, it is important to ensure that the driving power should NOT exceed 15W. If the driving power is exceeded, the final transistor of the 2M-100W will be broken down.

2. The supply voltage should not exceed 13.8V. If the supply voltage is over 15V plus or minus 15%, the final transistor will be destroyed. If you use a stabilised power supply, ensure that it is capable of supplying 13A with low ripple voltage. If using a regualted power supply it may be found that the presence of VHF radio frequency energy will prevent normal operation. As a cure, connecting parallel between the plus and minus terminals of the DC output, a capacitor of 250MFD and a RF bypass of either 0.1MFD, 0.01MFD, 300PF or 100PF.

3. It is important that the SWR of the antenna be as low as possible. Under no circumstances use this amplifier with an antenna whose SWR is not below 1:1.3. Ensure that the antenna is capable of withstanding high power output.

4. Resist the temptations to open the bottom plate of the power amplifier and adjust the trimmers and coils inside.

5. Try to avoid transmitting when the ambient temperature is above 40°C.

6. When loaded in a car, try to avoid setting the amplifier in a heated place, just as an outlet of heated air or the engine room.

7. Be careful not to reverse the polarity when connecting power supplies to the amplifier.

8. The power supply cord should be directly connected to batteries. When the cord is not long enough, use one which is more than 2.0 square thick.

WHEN THE NG (NO GOOD) CIRCUIT WORKS

In case of the following troubles while using the 2M-100W, the NG circuit works and both the transmitting and the receiving amplifiers stop working to protect the main amplifier. (In this case the TX lamp will not light even when the companion transceiver is in the transmit mode. Or the receiving amplifier will not work when the power supply switch is in the RT position.)

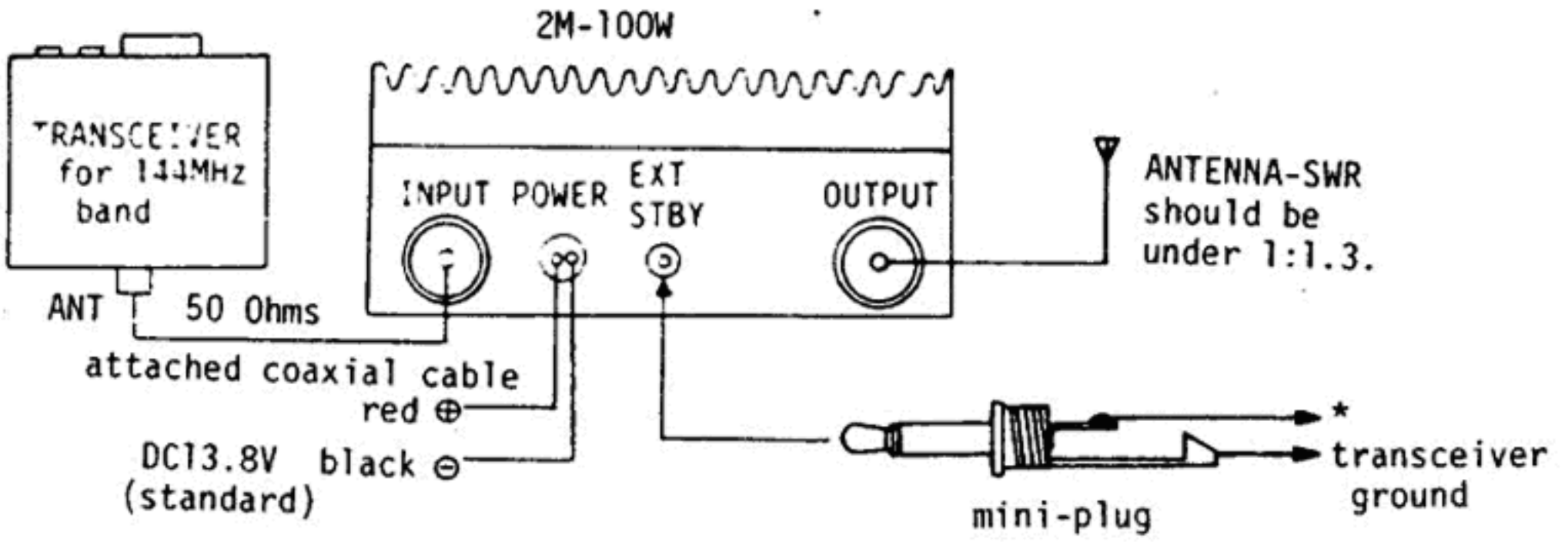
1. When the supply voltage is over 15V.
   (Even when the voltage temporally exceeds 15V, the NG circuit works.)

2. If the SWR of the antenna is greater than 1:1.3.

Once the NG circuit works, it can only be released and reset by switching off the power switch and setting it ON after a few seconds.

INTER CONNECTING DIAGRAM

1. The complete automatic changing circuit is built in. It works in a high efficiency just by connecting the antenna co-axial cable , the input co-axial cable and the power supplying cord. (Mode : FM, RTTY)



* is to be connected to the transceiver that supplies +5V to +13.8V in the transmit mode, and 0V in the receive mode. Some types of transceiver incorporate the terminal for this use.

2. In SSB or CW mode connect the cables as the diagram above and put the mini-plug into the EXT STBY terminal. The switching from the transmit to receive and vice versa is to be done with the ⊕ voltage of the transceiver.

FRONT PANEL

1. Power Supply Switch
   With the power switch in the OFF position, the transceiver operates on a straight through basis and bypasses the power amplifier. With the switch ON, only the transmitting amplifier is in operation. With the switch in RT, both the transmitting and receiving amplifiers are in operation.

2. Mode Switch
   Put the Mode Switch to the appropriate position as follows:
   FM - for FM, CW, RTTY mode SSB - for SSB mode

3. Power Lamp
   The lamp lights when the power siwtch is switched to ON.

4. RX Lamp
   Lights when the receiving amplifier is in operation. (It does not light in the transmit mode or when the NG circuit is in operation.)

5. TX Lamp
   Lights when the amplifier is used in transmit. (It does not light in the receive mode or when the NG circuit is in operation.)

◈付 属 品

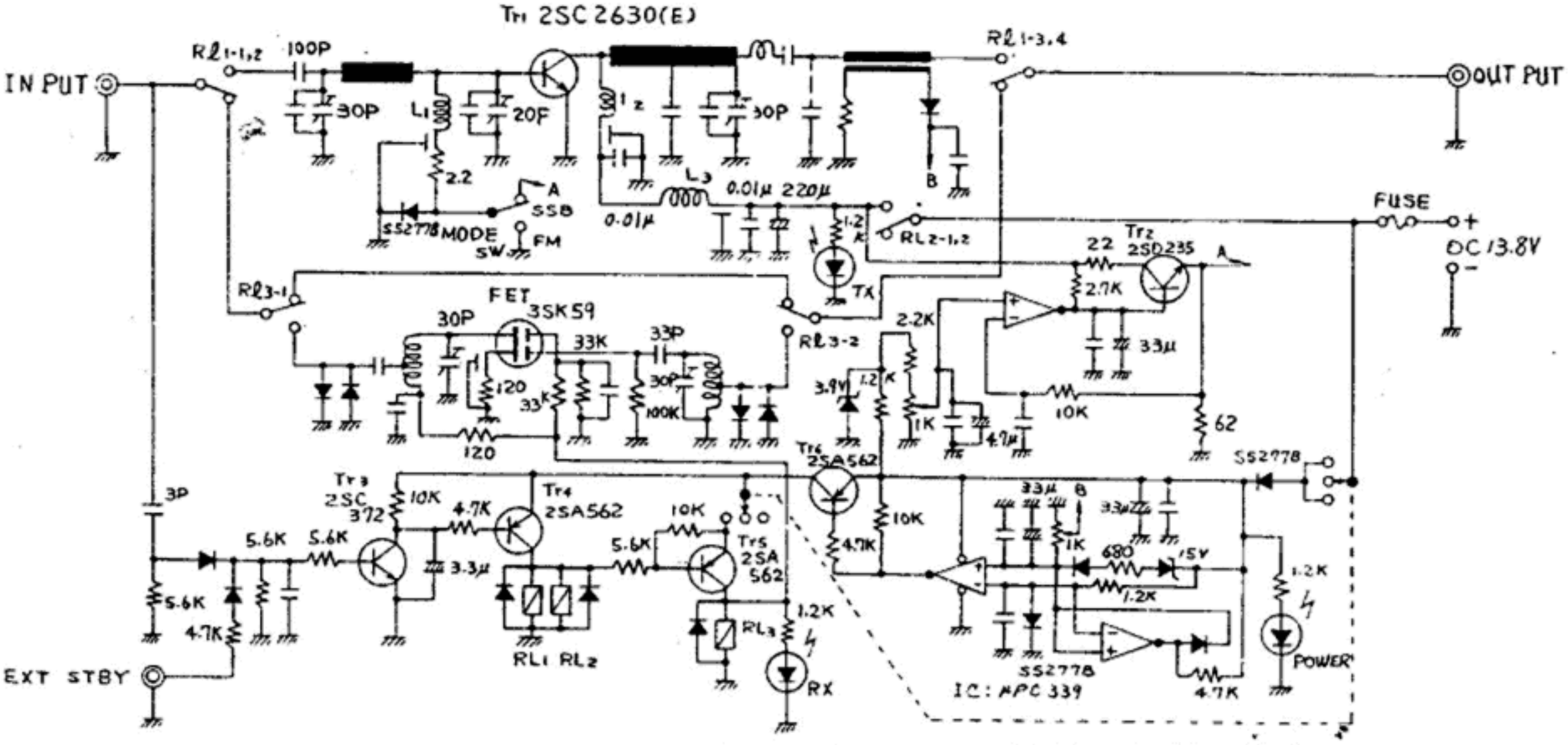
本製品には下記の様な付属品が付いています。

取扱説明書……1　　保証書……1　　ミニプラグ……1

取付アングル……1　　4㎜ネジ……4

※なお本製品には接続用同軸ケーブルの付属を廃止いたしました。取付場所に合わせて1.2m以上の良質のケーブルを御使用下さい。

◈回 路 図 (2M-100W)



* 記入なきダイオードは全て1S88、コンデンサは0.01μFとする。(同調用コンデンサを除く。)
* 抵抗コンデンサ単位は0.01μFとする。
* 回路及び部品は特別断りなく変更することがあります。

MITSUBISHI RF POWER TRANSISTOR

2SC2630

NPN EPITAXIAL PLANAR TYPE

DESCRIPTION

2SC2630 is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers in VHF band mobile radio applications.

FEATURES

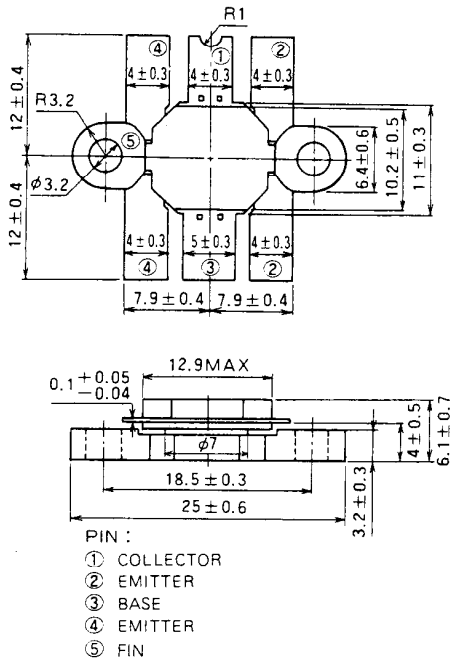
- High power gain: $G_{pe} \geqq 7dB$
  @V_{CC} = 12.5V, P_O = 50W, f = 175MHz
- Emitter ballasted construction and gold metallization for high reliability and good performances.
- Low thermal resistance ceramic package with flange.
- Ability of withstanding more than 20:1 load VSWR when operated at V_{CC} = 15.2V, P_O = 50W, f = 175MHz, T_C = 25°C.
- Equivalent input/output series impedance:
  Z_{in} = 0.8 + j1.2Ω @P_O = 60W, V_{CC} = 12.5V, f = 175MHz
  Z_{out} = 1.5 – j0.6Ω

APPLICATION

40 to 60 watts output power amplifiers in VHF band mobile radio applications.

OUTLINE DRAWING

Dimensions in mm



PIN :
① COLLECTOR
② EMITTER
③ BASE
④ EMITTER
⑤ FIN

NOTE: ALL ELECTRODES ARE ISOLATED FROM FLANGE.

T-40

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CBO}	Collector to base voltage		35	V
V_{EBO}	Emitter to base voltage		4	V
V_{CEO}	Collector to emitter voltage	R_{BE} = ∞	17	V
I_C	Collector current		14	A
P_C	Collector dissipation	T_a = 25°C	5.5	W
		T_C = 25°C	100	
T_j	Junction temperature		175	°C
Tstg	Storage temperature		−55 to 175	°C
Rth-a	Thermal resistance	Junction to ambient	27.2	°C/W
Rth-c		Junction to case	1.5	°C/W

Note. Above parameters are guaranteed independently.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$V_{(BR)EBO}$	Emitter to base breakdown voltage	I_E = 10mA, I_C = 0	4			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	I_C = 10mA, I_E = 0	35			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	I_C = 0.1A, R_{BE} = ∞	17			V
I_{CBO}	Collector cutoff current	V_{CB} = 15V, I_E = 0			5	mA
I_{EBO}	Emitter cutoff current	V_{EB} = 3V, I_C = 0			5	mA
h_{FE}	DC forward current gain *	V_{CE} = 10V, I_C = 0.2A	10	40	180	—
P_O	Output power	V_{CC} = 12.5V, P_{in} = 10W, f = 175MHz	50	60		W
η_C	Collector efficiency		60	70		%

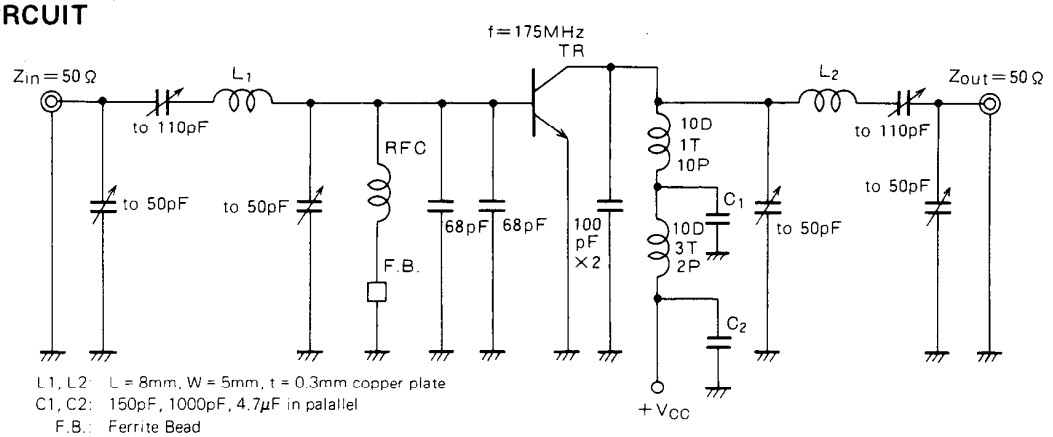
Note. * Pulse test, P_W = 150μs, duty = 5%.
Above parameters, ratings, limits and conditions are subject to change.

NOV. '97

MITSUBISHI ELECTRIC

NPN EPITAXIAL PLANAR TYPE

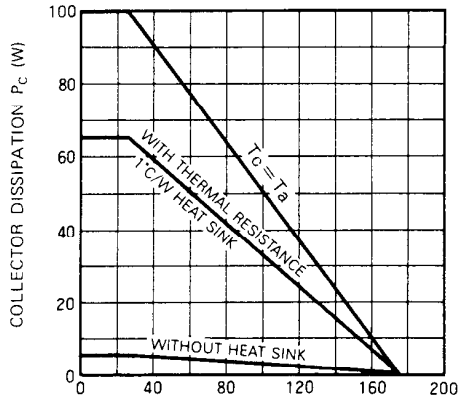
TEST CIRCUIT



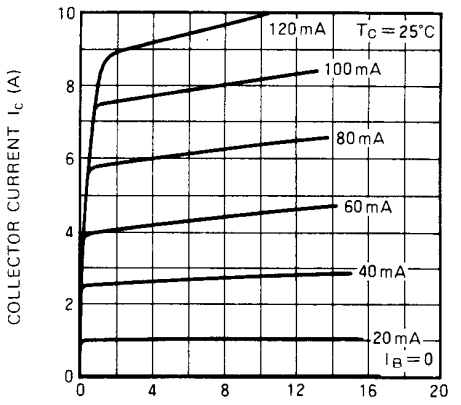
L1, L2: L = 8mm, W = 5mm, t = 0.3mm copper plate
C1, C2: 150pF, 1000pF, 4.7μF in palallel
F.B.: Ferrite Bead
NOTES: All coils are made from 1.5mmφ silver plated copper wire
D: Inner diameter of coil
T: Turn number of coil
P: Pitch of coil
Dimension in milli-meter

TYPICAL PERFORMANCE DATA

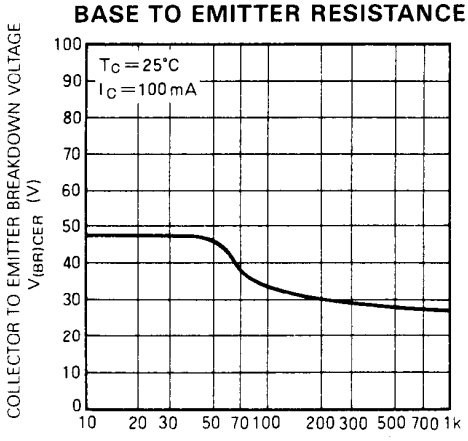
COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE



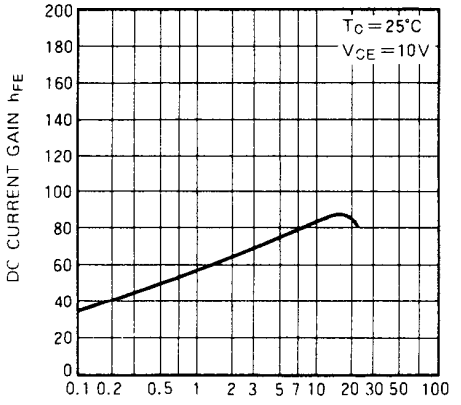
COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE



COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE

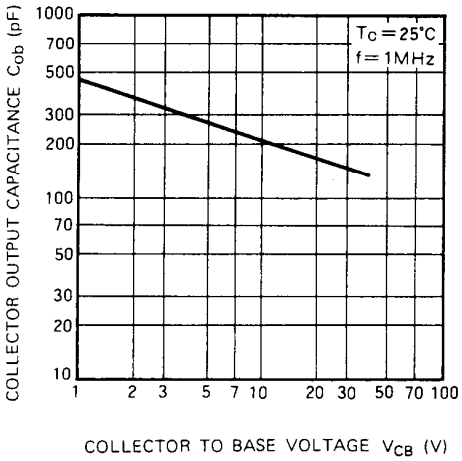


DC CURRENT GAIN VS. COLLECTOR CURRENT

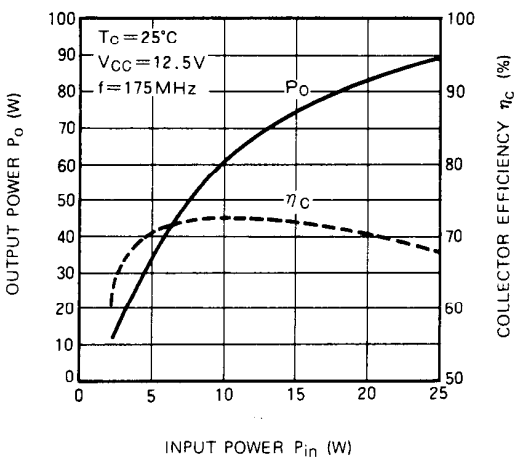


MITSUBISHI ELECTRIC

COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE



OUTPUT POWER, COLLECTOR EFFICIENCY VS. INPUT POWER



OUTPUT POWER VS. COLLECTOR SUPPLY VOLTAGE