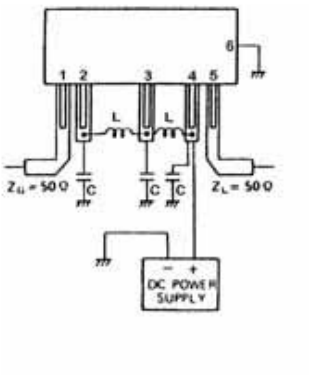
Endstufen für FT 736

Mitsubishi-1



Auf dieser und der folgenden Seiten finden Sie alle HF-Leistungsmodule, die Sie über uns beziehen können. Wir führen die Hersteller Mitsubishi (M .....), Toshiba (S-AV.., S-AU..), Hitachi (PF...), Motorola (CA....., MHW...), NEC (MC-....), Philips (BGY..)Die meisten Gehäuse, vor allem die von Mitsubishi und Toshiba, sehen wie die links abgebildeten aus, obwohl es von diesen Gehäusen mehrere verschiedene Größen gibt.**Auf dieser und der folgenden Seiten finden Sie alle HF-Leistungsmodule, die Sie über uns beziehen können. Wir führen die Hersteller Mitsubishi (M .....), Toshiba (S-AV.., S-AU..), Hitachi (PF...), Motorola (CA....., MHW...), NEC (MC-....), Philips (BGY..)Die meisten Gehäuse, vor allem die von Mitsubishi und Toshiba, sehen wie die links abgebildeten aus, obwohl es von diesen Gehäusen mehrere verschiedene Größen gibt.****Die hier angegebene Angaben dienen alle nur zur Orientierung! Ohne GewährBei den Mitsubishi-Typen mit dem Zusatz "R" ist die Reihenfolge der Pin´s um 180 gedreht, d.h. der HF-Eingang liegt auf der rechten Seite an Pin 4 bzw. 5.**

Sonderbeschaffung nur gegen Vorabrechnung lieferbarModule Lieferzeit ca.8Tage. Zur Zeit ca.40Typen von Mitsubishi ab Lager lieferbar.

M 57713

Frequenzbereich:144-148 MHzMax. BW: VCC: 12,5 VHF-out Min : 17WattHF in mW: 200Mode: SSBGehäuse: H3B (Siehe Abbildung)

inkl. MwSt **145,95 €**
122,65 €
1
Jetzt kaufen

M 57727

Frequenzbereich:144-148 MHzMax. BW: 140-150VCC: 12,5 VHF-out Min Ohm: 37HF in mW: 300Mode: SSBGehäuse: H3B (Siehe Abbildung)

inkl. MwSt **145,95 €**
122,65 €
1
Jetzt kaufen

http://www.amidon.de/contents/de/d144_01.html

M 57745

M57745

Frequenzbereich:430 - 450 MHzMax. BW: 425 - 450 MHzVCC: 12,5 VHF-out 30WattHF in mW: 300Mode: SSBGehäuse: H3C

inkl. MwSt **169,95 €**
142,82 €
1
Jetzt kaufen

M 57716

M 57716-ab Lager, equivalent SCxx16 (ICOM)

Frequenzbereich:430-450 MHzMax. BW: VCC: 12,5 VHF-out Min Ohm: 17HF in mW: 200Mode: SSBGehäuse: H3C (Siehe Abbildung)NUR PER VORKASSE !! Datenblatt wird mitgeliefert!!

inkl. MwSt **99,50 €**
83,61 €
1
Jetzt kaufen

M 57762

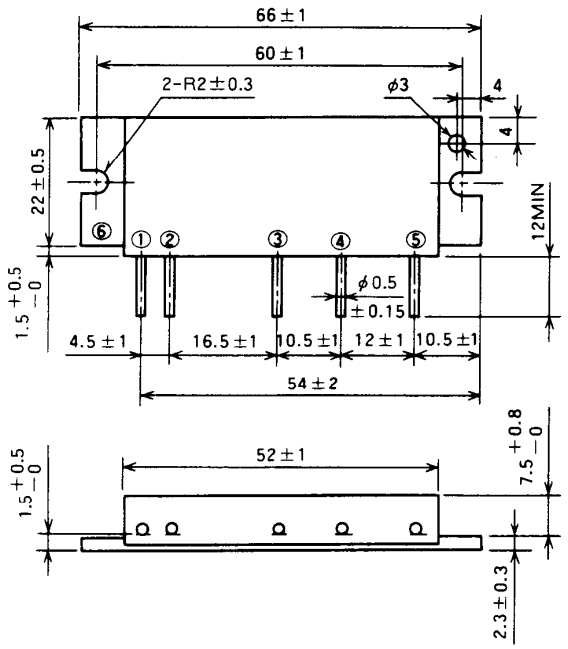
Frequenzbereich:1240-1300 MHzMax. BW: 1240-1300 MHzVCC: 12,5 VHF-out Min Ohm:18HF in mW: 1000Mode: SSBGehäuse: H3B

inkl. MwSt **189,00 €**
158,82 €
1
Jetzt kaufen

M57716

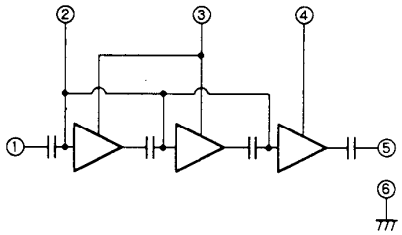
430-450MHz, 12.5V, 17W, SSB MOBILE RADIO

OUTLINE DRAWING Dimensions in mm



H3

BLOCK DIAGRAM



PIN :
①Pin : RF INPUT
②VBB : BASE BIAS SUPPLY
③VCC1 : 1st. DC SUPPLY
④VCC2 : 2nd. DC SUPPLY
⑤Po : RF OUTPUT
⑥GND : FIN

ABSOLUTE MAXIMUM RATINGS (Tc = 25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		17	V
V_{BB}	Base bias		10	V
I_{CC}	Total current		6	A
$P_{in(max)}$	Input power	$Z_G = Z_L = 50\ \Omega$	0.3	W
$P_{O(max)}$	Output power	$Z_G = Z_L = 50\ \Omega$	28	W
$T_{C(OP)}$	Operation case temperature		− 30 to 110	℃
T_{stg}	Storage temperature		− 40 to 110	℃

Note. Above parameters are guaranteed independently.

ELECTRICAL CHARACTERISTICS (Tc = 25℃ unless otherwise noted)

Symbol	Parameter	Test conditions	Limits		Unit
			Min	Max	
f	Frequency range	P_{in} = 0.2W V_{CC} = 12.5V V_{BB} = 9V $Z_G = Z_L = 50\ \Omega$	430	450	MHz
P_O	Output power		17		W
η_T	Total efficiency		35		%
2fo	2nd. harmonic			− 30	dBc
ρ_{in}	Input VSWR			2.5	−
−	Load VSWR tolerance	V_{CC} = 15.2V, V_{BB} = 9V P_O = 14W (P_{in} : controlled) Load VSWR=20:1(All phase), 2sec. Z_G = 50 Ω	No degradation or destroy		−

Note. Above parameters, ratings, limits and conditions are subject to change.

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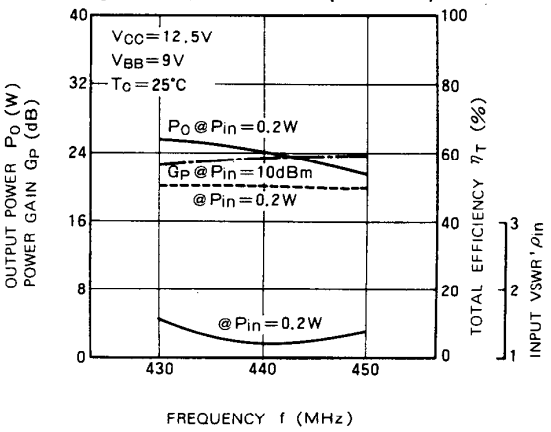
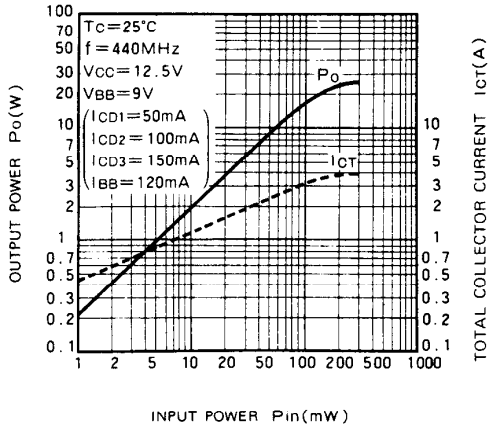
MITSUBISHI ELECTRIC

TYPICAL PERFORMANCE DATA

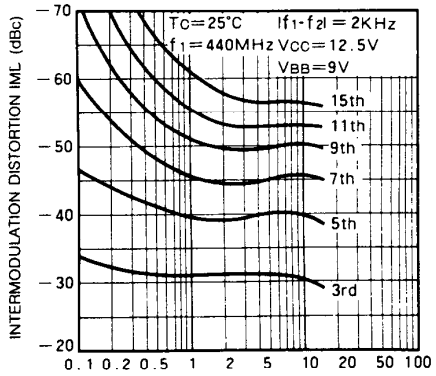
OUTPUT POWER, POWER GAIN, TOTAL EFFICIENCY, INPUT VSWR VS. FREQUENCY CHARACTERISTICS (M57716)



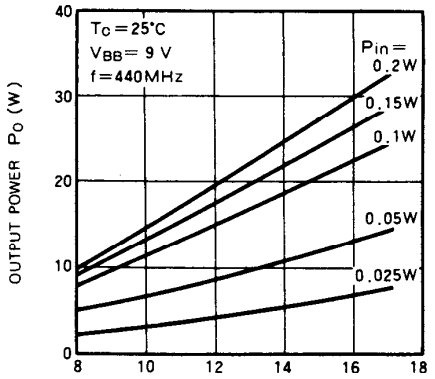
OUTPUT POWER, TOTAL COLLECTOR CURRENT VS. INPUT POWER



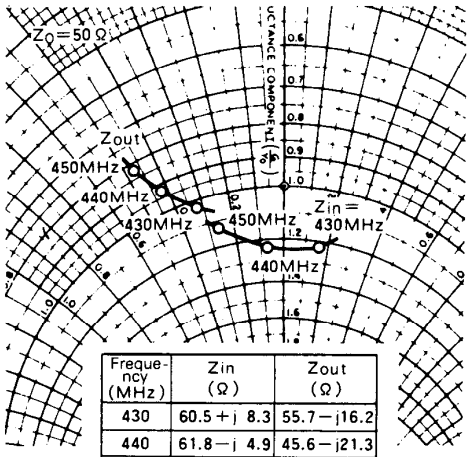
INTERMODULATION DISTORTION VS. OUTPUT POWER



OUTPUT POWER VS. DC SUPPLY VOLTAGE



INPUT IMPEDANCE, OUTPUT IMPEDANCE VS. FREQUENCY



Frequency (MHz)	Zin (Ω)	Zout (Ω)
430	60.5+j 8.3	55.7−j16.2
440	61.8−j 4.9	45.6−j21.3
450	58.3−j14.8	41.3−j23.4

Test condition : V_{CC}=12.5V, V_{BB}=9V
P_{in}=0.2W

DESIGN CONSIDERATION OF HEAT RADIATION.

Please refer to following consideration when designing heat shink.

1. Junction temperature of incorporated transistors at standard operation.

(1) Thermal resistance between junction and package of incorporated transistors.

a) First stage transistor

$R_{th(j-c)1}$ = 15°C/W (Typ.)

b) Second stage transistor

$R_{th(j-c)2}$ = 6°C/W (Typ.)

c) Final stage transistor

$R_{th(j-c)3}$ = 2°C/W (Typ.)

(2) Junction temperature of incorporated transistors at standard operation.

- Conditions for standard operation.
  P_O = 14W, V_{CC} = 12.5V, P_{in} = 80mW, η_T = 35% (minimum rating), P_{O1} (Note 1) = 1W, P_{O2} (2) = 4.5W, I_T = 3.2A (I_{T1} (3) = 0.15A, I_{T2} (4) = 0.55A, I_{T3} (5) = 2.5A)
  Note 1: Output power of the first stage transistor
  Note 2: Output power of the second stage transistor
  Note 3: Circuit current of the first stage transistor
  Note 4: Circuit current of the second stage transistor
  Note 5: Circuit current of the final stage transistor
- Junction temperature of the first stage transistor
  $T_{j1} = (V_{CC} \times I_{T1} - P_{O1} + P_{in}) \times R_{th(j-c)1} + T_c$ (6)
  $= (12.5 \times 0.15 - 1 + 0.08) \times 15 + T_c$
  $= 14.4 + T_c$ (°C)
  Note 6: Package temperature of device
- Junction temperature of the second stage transistor
  $T_{j2} = (V_{CC} \times I_{T2} - P_{O2} + P_{O1}1) \times R_{th(j-c)2} + T_c$
  $= (12.5 \times 0.55 - 4.5 + 1) \times 6 + T_c$
  $= 20.3 + T_c$ (°C)
- Junction temperature of the final stage transistor
  $T_{j3} = (V_{CC} \times I_{T3} - P_O + P_{O2}) \times R_{th(j-c)3} + T_c$
  $= (12.5 \times 2.5 - 14 + 4.5) \times 2 + T_c$
  $= 43.5 + T_c$ (°C

2. Heat sink design

In thermal design of heat sink, try to keep the package temperature at the upper limit of the operating ambient temperature (normally T_a = 60°C) and at the output power of 14W below 90°C.

The thermal resistance $R_{th(c-a)}$ (7) of the heat sink to realize this:

$$\text{Note 7: } R_{th(c-a)} = \frac{T_c - T_a}{(P_O/\eta_T) - P_O + P_{in}} = \frac{90 - 60}{(14/0.35) - 14 + 0.08}$$

$$= 1.15 \text{ (°C/W)}$$

Note 7: Inclusive of the contact thermal resistance between device and heat sink.

Mounting the heat sink of the above thermal resistance on the device,

T_{j1} = 104.4°C, T_{j2} = 110.3°C, T_{j3} = 133.5°C at T_a = 60°C, T_c = 90°C.

In the annual average of ambient temperature is 30°C,

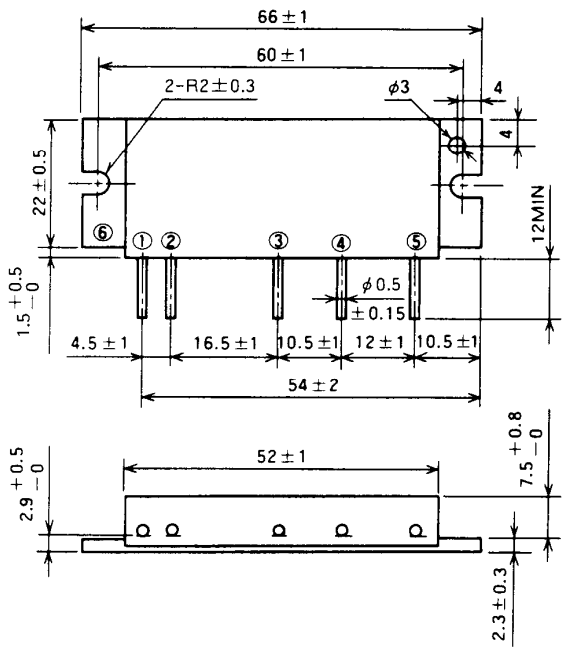
T_{j1} = 74.4°C, T_{j2} = 80.3°C, T_{j3} = 103.5°C.

As the maximum junction temperature of these incorporated transistors T_{jmax} are 175°C, application under fully derated condition is ensured.

M57727

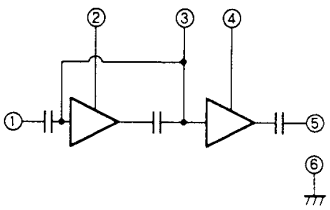
144-148MHz, 12.5V, 37W, SSB MOBILE RADIO

OUTLINE DRAWING Dimensions in mm



H3

BLOCK DIAGRAM



PIN :
①Pin : RF INPUT
②Vcc1 : 1st. DC SUPPLY
③VBB : BASE BIAS SUPPLY
④Vcc2 : 2nd. DC SUPPLY
⑤Po : RF OUTPUT
⑥GND : FIN

ABSOLUTE MAXIMUM RATINGS (Tc = 25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		17	V
V_{BB}	Base bias		10	V
I_{CC}	Total current		10	A
$P_{in(max)}$	Input power	$Z_G = Z_L = 50\,\Omega$	0.5	W
$P_{O(max)}$	Output power	$Z_G = Z_L = 50\,\Omega$	40	W
$T_{C(OP)}$	Operation case temperature		− 30 to 110	℃
T_{stg}	Storage temperature		− 40 to 110	℃

Note. Above parameters are guaranteed independently.

ELECTRICAL CHARACTERISTICS (Tc = 25℃ unless otherwise noted)

Symbol	Parameter	Test conditions	Limits		Unit
			Min	Max	
f	Frequency range	P_{in} = 0.3W V_{CC} = 12.5V V_{BB} = 9V $Z_G = Z_L = 50\,\Omega$	144	148	MHz
P_O	Output power		37		W
η_T	Total efficiency		50		%
2fo	2nd. harmonic			− 25	dBc
3fo	3rd. harmonic			− 30	dBc
ρ_{in}	Input VSWR			2.2	−
−	Load VSWR tolerance	V_{CC} = 15.2V, V_{BB} = 9V P_O = 30W (P_{in} : controlled) Load VSWR≧20:1 (All phase), 5sec. $Z_G = 50\,\Omega$	No degradation or destroy		−

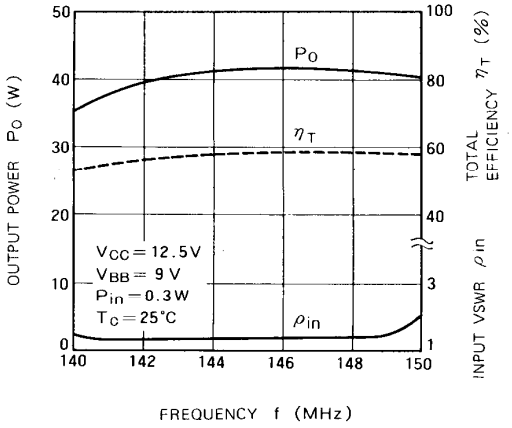
Note. Above parameters, ratings, limits and conditions are subject to change.

NOV. '97

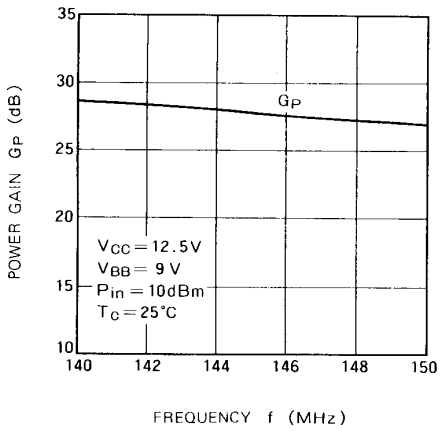
MITSUBISHI ELECTRIC

TYPICAL PERFORMANCE DATA

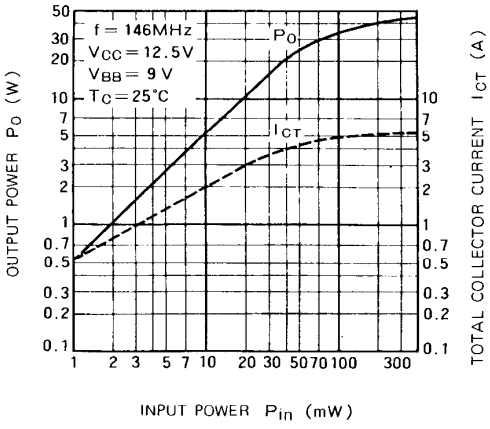
OUTPUT POWER, TOTAL EFFICIENCY, INPUT VSWR VS. FREQUENCY



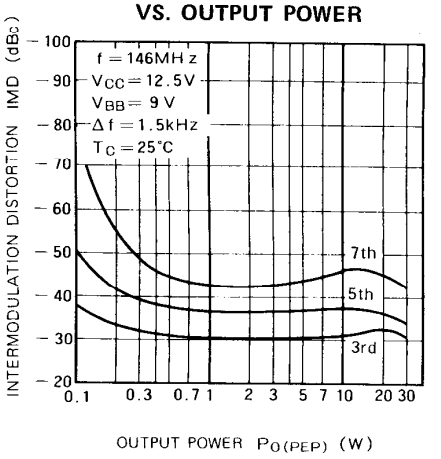
POWER GAIN VS. FREQUENCY



OUTPUT POWER, TOTAL COLLECTOR CURRENT VS. INPUT POWER



INTERMODULATION DISTORTION VS. OUTPUT POWER



DESIGN CONSIDERATION OF HEAT RADIATION.

Please refer to following consideration when designing heat sink.

1. Junction temperature of incorporated transistors at standard operation.

(1) Thermal resistance between junction and package of incorporated transistors.

a) First stage transistor

$R_{th(j-c)1} = 3°C/W$ (Typ.)

b) Final stage transistor

$R_{th(j-c)2} = 1.5°C/W$ (Typ.)

(2) Junction temperature of incorporated transistors at standard operation.

- Conditions for standard operation.

  P_O = 30W, V_{CC} = 12.5V, P_{in} = 0.1W, η_T = 50% (minimum rating), P_{O1} (Note 1) = 2W, I_T = 4.8A (I_{T1} (2) = 0.4A, I_{T2} (3) = 4.4A)

  Note 1: Output power of the first stage transistor

  Note 2: Circuit current of the first stage transistor

  Note 3: Circuit current of the final stage transistor

- Junction temperature of the first stage transistor

  $T_{j1} = (V_{CC} \times I_{T1} - P_{O1} + P_{in}) \times R_{th(j-c)2} + T_C$ (4)

  $= (12.5 \times 0.4 - 2 + 0.1) \times 3 + T_C$

  $= 9.3 + T_C$ (°C)

  Note 4: Package temperature of device

- Junction temperature of the final stage transistor

  $T_{j2} = (V_{CC} \times I_{T2} - P_O + P_{O1}) \times R_{th(j-c)2} + T_C$

  $= (12.5 \times 4.4 - 30 + 2) \times 1.5 + T_C$

  $= 40.5 + T_C$ (°C)

2. Heat sink design

In thermal design of heat sink, try to keep the package temperature at the upper limit of the operating ambinet temperature (normally T_a = 60°C) and at the output power of 30W below 90°C.

The thermal resistance $R_{th(c-a)}$ (5) of the heat sink to realize this:

$$R_{th(c-a)} = \frac{T_C - T_a}{(P_O/\eta_T) - P_O + P_{in}} = \frac{90 - 60}{(30/0.5) - 30 + 0.1}$$

$= 1.00$ (°C/W)

Note 5: Inclusive of the contact thermal resistance between device and heat sink

Mounting the heat sink of the above thermal resistance on the device,

T_{j1} = 110°C, T_{j2} = 131°C at T_a = 60°C, T_C = 90°C.

In the annual average of ambient temperature is 30°C,

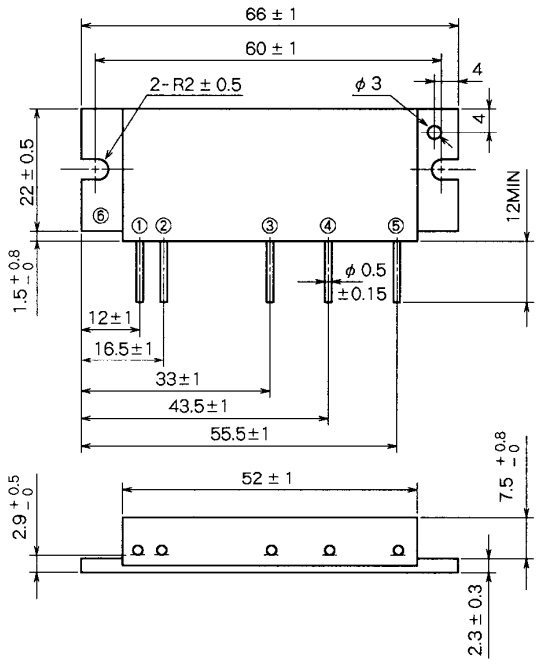
T_{j1} = 70°C, T_{j2} = 101°C

As the maximum junction temperature of these incorporated transistors T_{jmax} are 175°C, application under fully derated condition is ensured.

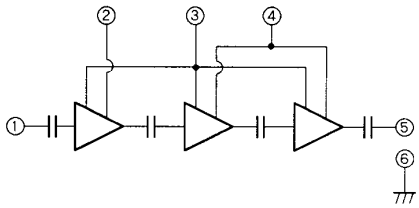
M57762

1240-1300MHz, 12.5V, 18W, SSB MOBILE RADIO

OUTLINE DRAWING Dimensions in mm



BLOCK DIAGRAM



PIN :
① Pin : RF INPUT
② VCC1 : 1st. DC SUPPLY
③ VBB : BASE BIAS SUPPLY
④ VCC2 : 2nd. DC SUPPLY
⑤ Po : RF OUTPUT
⑥ GND : FIN

ABSOLUTE MAXIMUM RATINGS (T_C = 25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		17	V
V_{BB}	Base bias		10	V
I_{CC}	Total current		8	A
$P_{in(max)}$	Input power	V_{CC1}=12.5V, V_{BB}=9V, Z_G=Z_L=50Ω	2	W
$P_{O(max)}$	Output power	Z_G = Z_L = 50 Ω	25	W
$T_{C(OP)}$	Operation case temperature		− 30 to 110	℃
T_{stg}	Storage temperature		− 40 to 110	℃

Note. Above parameters are guaranteed independently.

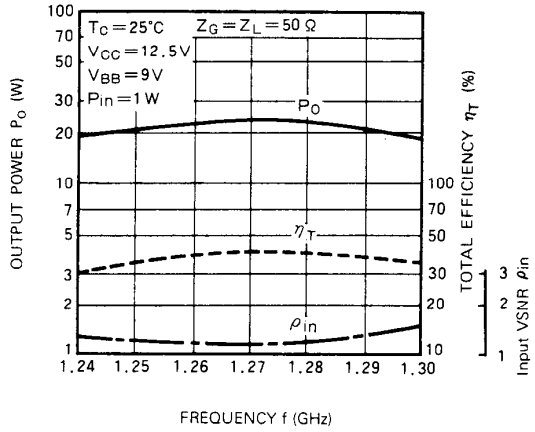
ELECTRICAL CHARACTERISTICS (T_C = 25℃ unless otherwise noted)

Symbol	Parameter	Test conditions	Limits		Unit
			Min	Max	
f	Frequency range	V_{CC1} = V_{CC2} = 12.5V V_{BB} = 9V P_{in} = 1W Z_G = Z_L = 50 Ω	1240	1300	MHz
P_O	Output power		18		W
η_T	Total efficiency		28		%
2fo	2nd. harmonic			− 45	dBc
ρ_{in}	Input VSWR			2.0	−
I_{BB}	Base bias current			500	mA
G_P	Linear power gain	V_{CC1} = V_{CC2} = 12.5V, V_{BB} = 9V, P_{in} = 10dBm, Z_G = Z_L = 50Ω	13		dB
IMD_3	3rd. intermodulation distortion	V_{CC1}=V_{CC2}=12.5V, V_{BB}=9V, Δf=10kHz, $P_{O(PEP)}$ ≦ 14W, Z_G=Z_L=50Ω		− 24	dBc
IMD_5	5th. intermodulation distortion			− 31	dBc
−	Load VSWR tolerance	V_{CC1} = V_{CC2} = 15.2V, V_{BB} = 9V, P_O = 18W(P_{in} : controlled), Z_G=50Ω Load VSWR − 16 : 1(All phase).	No degradation or destroy		−

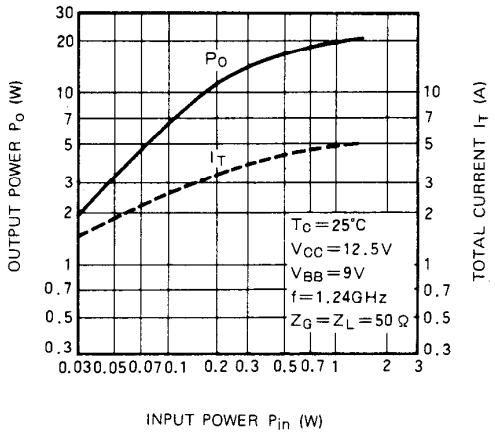
Note. Above parameters, ratings, limits and conditions are subject to change.

TYPICAL PERFORMANCE DATA

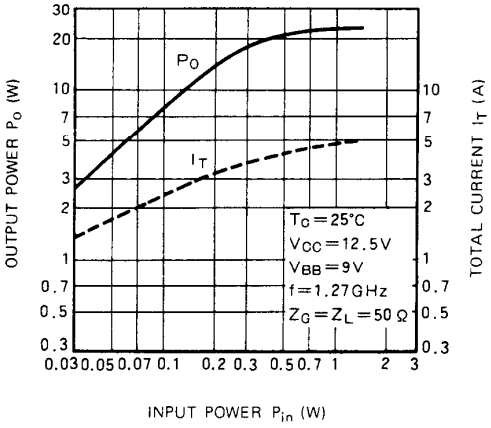
OUTPUT POWER, TOTAL EFFICIENCY, INPUT VSWR VS. FREQUENCY CHARACTERISTICS



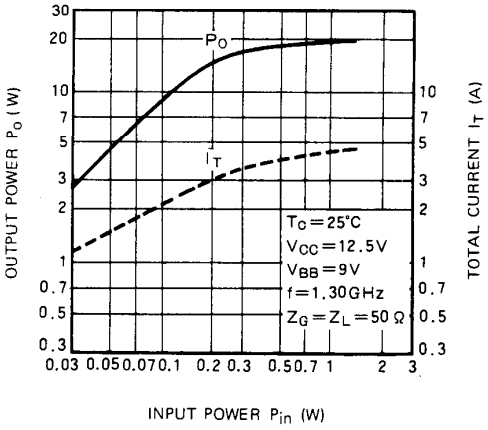
OUTPUT POWER, TOTAL CURRENT, VS. INPUT POWER CHARACTERISTICS



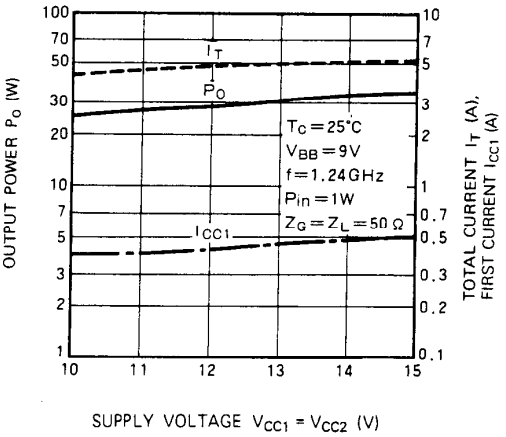
OUTPUT POWER, TOTAL CURRENT, VS. INPUT POWER CHARACTERISTICS



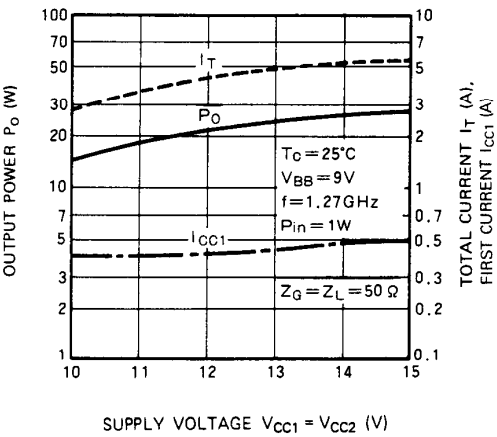
OUTPUT POWER, TOTAL CURRENT, VS. INPUT POWER CHARACTERISTICS



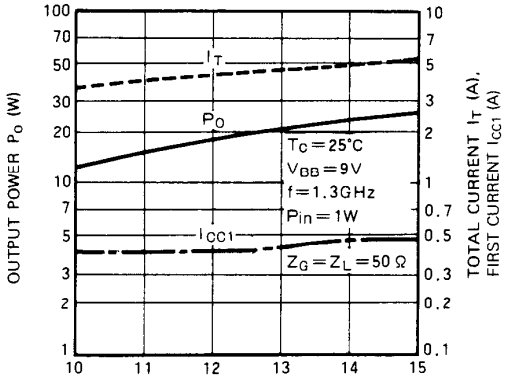
OUTPUT POWER, TOTAL CURRENT, FIRST CURRENT VS. SUPPLY VOLTAGE CHARACTERISTICS



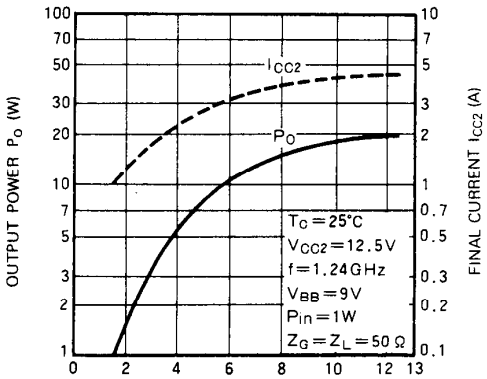
OUTPUT POWER, TOTAL CURRENT, FIRST CURRENT VS. SUPPLY VOLTAGE CHARACTERISTICS



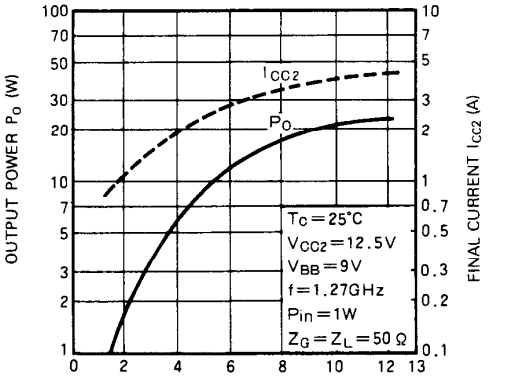
OUTPUT POWER, TOTAL CURRENT, FIRST CURRENT VS. SUPPLY VOLTAGE CHARACTERISTICS



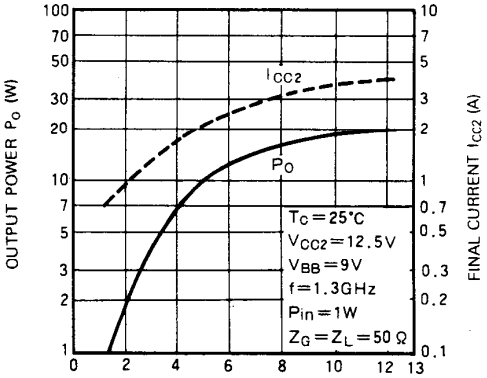
OUTPUT POWER, FINAL CURRENT VS. FIRST VOLTAGE CHARACTERISTICS



OUTPUT POWER, FINAL CURRENT VS. FIRST VOLTAGE CHARACTERISTICS



OUTPUT POWER, FINAL CURRENT VS. FIRST CURRENT CHARACTERISTICS

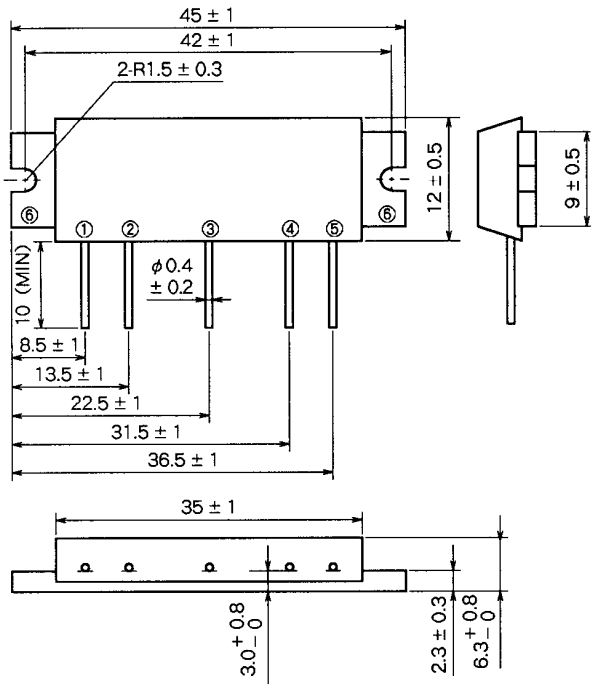


M67715

1240-1300MHz, 8V, 1.2W, SSB PORTABLE RADIO

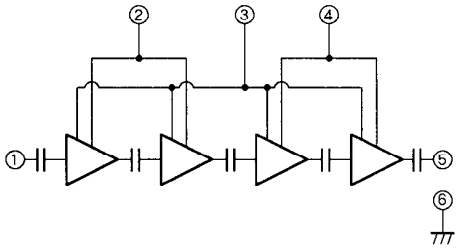
OUTLINE DRAWING

Dimensions in mm



H13

BLOCK DIAGRAM



PIN :
①Pin : RF INPUT
②V_{CC1} : 1st. DC SUPPLY
③V_{BB} : BASE BIAS SUPPLY
④V_{CC2} : 2nd. DC SUPPLY
⑤Po : RF OUTPUT
⑥GND : FIN

ABSOLUTE MAXIMUM RATINGS (T_C = 25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC1}	Supply voltage		9	V
V_{CC2}			16	V
V_{BB}	Base bias		9	V
I_{CC}	Total current		1.5	A
$P_{in(max)}$	Input power	Z_G = Z_L = 50 Ω	10	mW
$P_{O(max)}$	Output power	Z_G = Z_L = 50 Ω	4	W
$T_{C(OP)}$	Operation case temperature		− 20 to 100	℃
T_{stg}	Storage temperature		− 40 to 110	℃

Note. Above parameters are guaranteed independently.

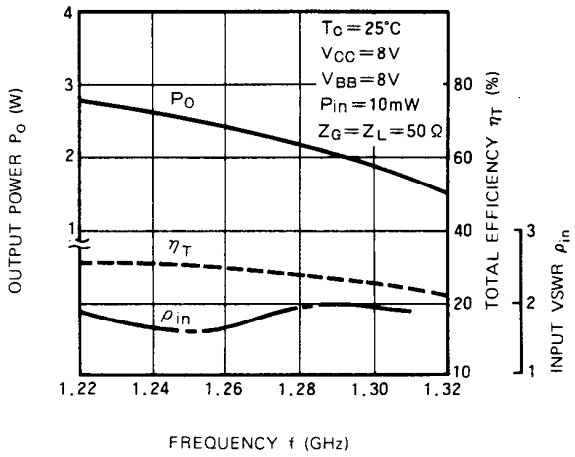
ELECTRICAL CHARACTERISTICS (T_C = 25℃ unless otherwise noted)

Symbol	Parameter	Test conditions	Limits		Unit
			Min	Max	
f	Frequency range	V_{CC1} = V_{CC2} = V_{BB} = 8V P_{in} = 10mW Z_G = Z_L = 50 Ω	1240	1300	MHz
P_O	Output power		1.2		W
η_T	Total efficiency		18		%
2fo	2nd. harmonic			− 30	dBc
3fo	3rd. harmonic			− 35	dBc
ρ_{in}	Input VSWR			2.5	−
−	Load VSWR tolerance	V_{CC1} = 9V, V_{CC2} = 15.2V, V_{BB} = 9V P_O = 1.5W(P_{in} : controlled), Z_G = 50Ω Load VSWR=10:1 (All phase), 5sec	No degradation or destroy		−
IMD_3	3rd. inter modulation distortion	V_{CC1}=V_{CC2}=V_{BB}=8V $P_{O(PEP)}$=1.26W, △f=20kHz, Z_G=Z_L=50Ω		− 23	dBc
IMD_5	5th. inter modulation distortion	V_{CC1}=V_{CC2}=V_{BB}=8V $P_{O(PEP)}$=1.26W, △f=20kHz, Z_G=Z_L=50Ω		− 30	dBc

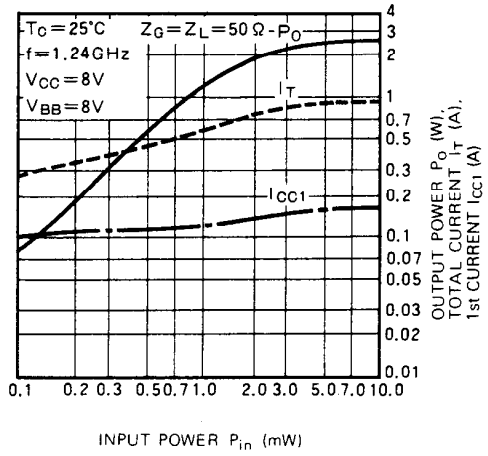
Note. Above parameters, ratings, limits and conditions are subject to change.

TYPICAL PERFORMANCE DATA

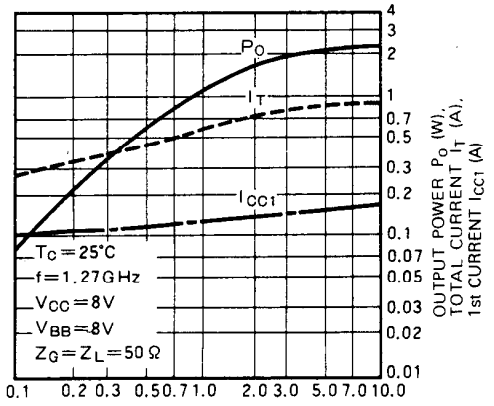
OUTPUT POWER, TOTAL EFFICIENCY, ρ_{in} VS. FREQUENCY CHARACTERISTICS



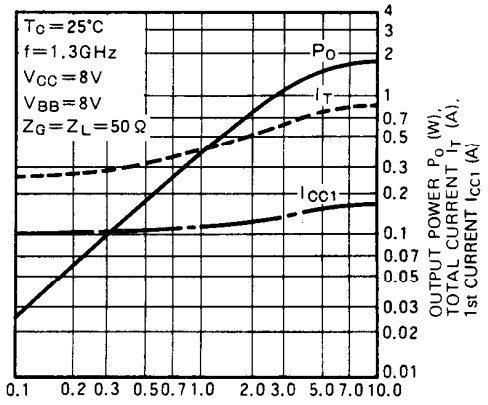
OUTPUT POWER, TOTAL CURRENT, 1st CURRENT VS. INPUT POWER CHARACTERISTICS



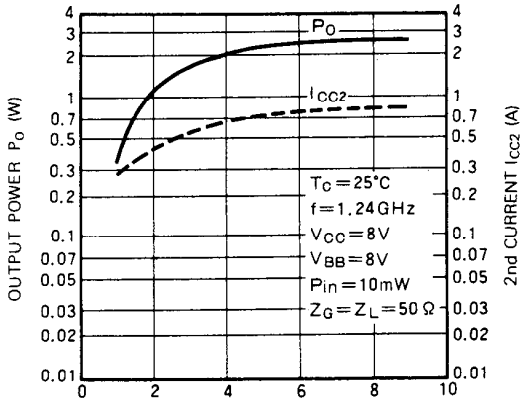
OUTPUT POWER, TOTAL CURRENT, 1st CURRENT VS. INPUT POWER CHARACTERISTICS



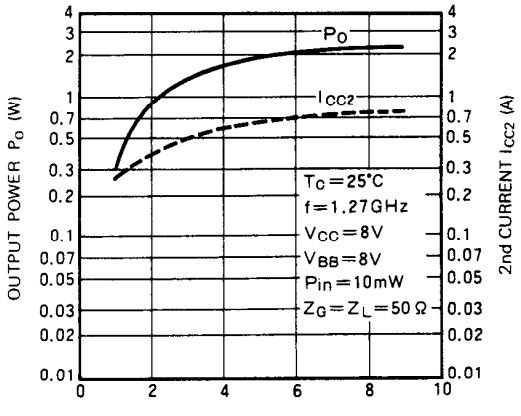
OUTPUT POWER, TOTAL CURRENT, 1st CURRENT VS. INPUT POWER CHARACTERISTICS



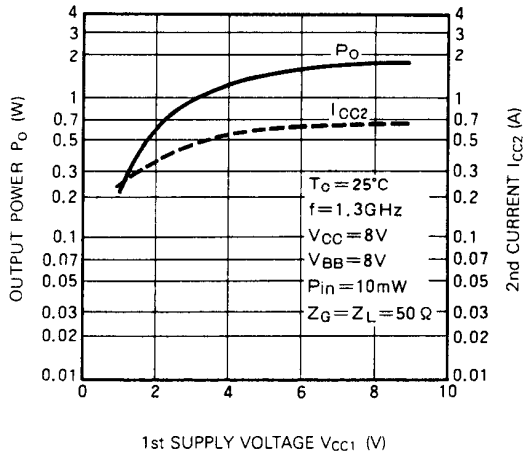
OUTPUT POWER, 2nd CURRENT VS. 1st SUPPLY VOLTAGE CHARACTERISTICS



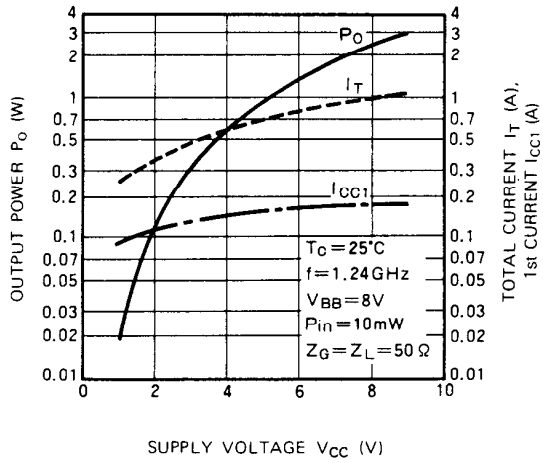
OUTPUT POWER, 2nd CURRENT VS. 1st SUPPLY VOLTAGE CHARACTERISTICS



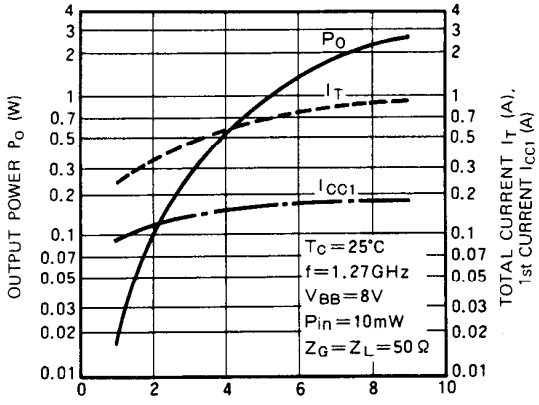
OUTPUT POWER, 2nd CURRENT VS. 1st SUPPLY VOLTAGE CHARACTERISTICS



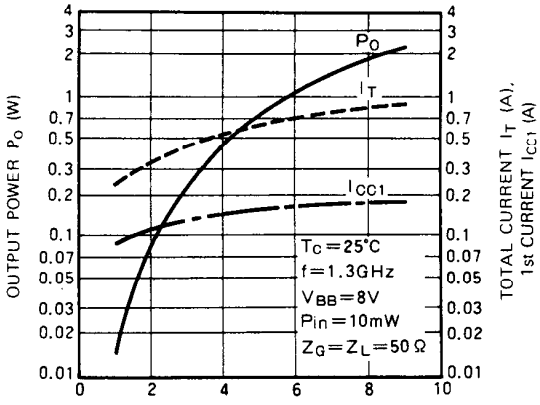
OUTPUT POWER, TOTAL CURRENT, 1st CURRENT VS. SUPPLY VOLTAGE CHARACTERISTICS



OUTPUT POWER, TOTAL CURRENT, 1st CURRENT VS. SUPPLY VOLTAGE CHARACTERISTICS



OUTPUT POWER, TOTAL CURRENT, 1st CURRENT VS. SUPPLY VOLTAGE CHARACTERISTICS



2nd, 3rd HARMONIC VS. FREQUENCY CHARACTERISTICS