PF0030 Series

MOS FET Power Amplifier

HITACHI

ADE-208-460 (Z)
1st Edition
July 1996

Features

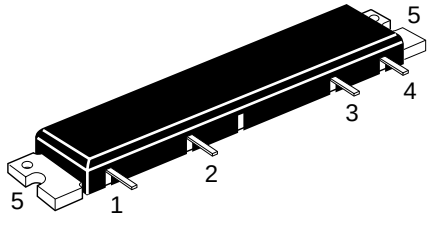
- High stability: Load VSWR = 20 : 1
- Low power control current: 400 μA
- Thin package: 5 mmt

Ordering Information

Type No	Operating Frequency	Application
PF0030	824 to 849 MHz	AMPS
PF0032	872 to 905 MHz	E-TACS

Pin Arrangement

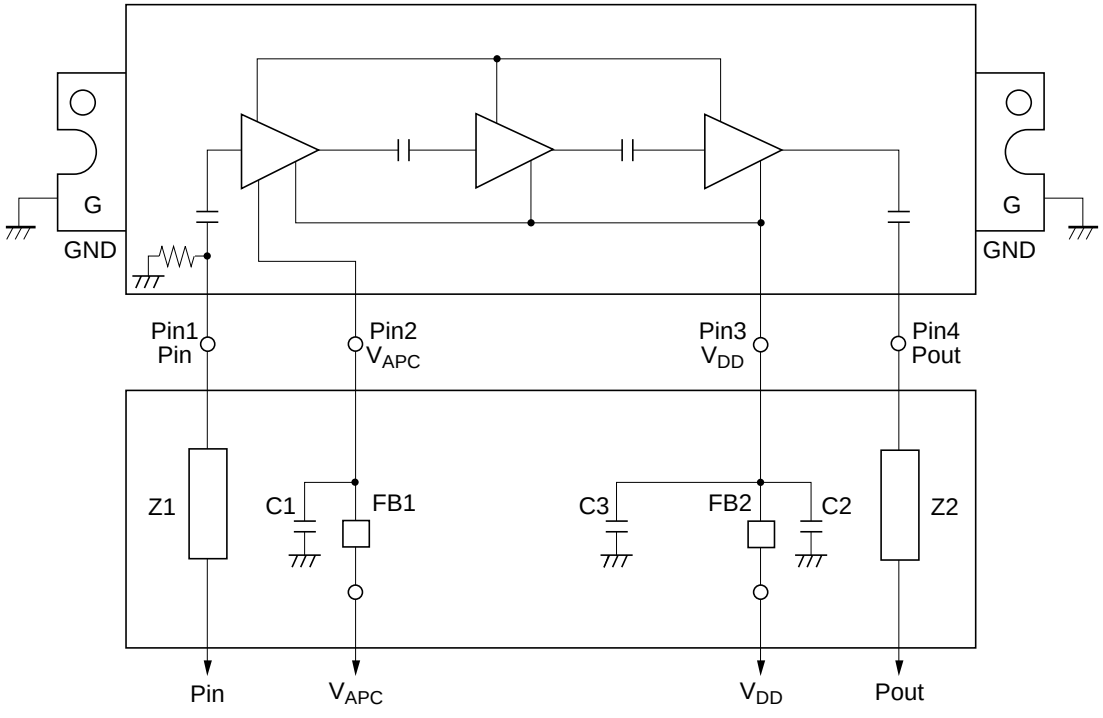
• RF-B2



1: Pin
2: V_{APC}
3: V_{DD}
4: Pout
5: GND

Hitachi semiconductor

Internal Diagram and External Circuit



C1 = C2 = 0.01 μF (Ceramic chip capacitor)
C3 = 10 μF (Aluminum Electrolyte Capacitor)
FB = Ferrite bead BL01RN1-A62-001 (Manufacture: MURATA) or equivalent
Z1 = Z2 = 50 Ω (Microstrip line)

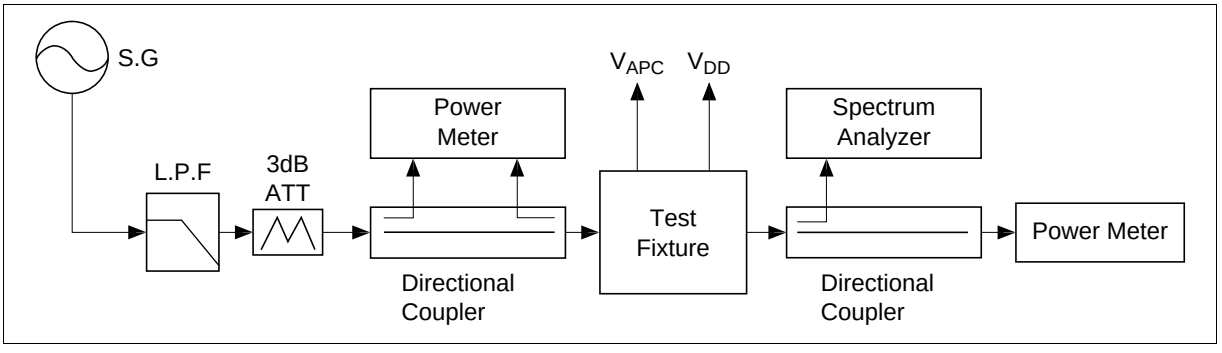
Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Rating	Unit
Supply voltage	V_{DD}	17	V
Supply current	I_{DD}	3	A
APC voltage	V_{APC}	±8	V
Input power	Pin	20	mW
Operating case temperature	Tc (op)	–30 to +110	°C
Storage temperature	Tstg	–40 to +110	°C

Electrical Characteristics (Ta = 25°C)

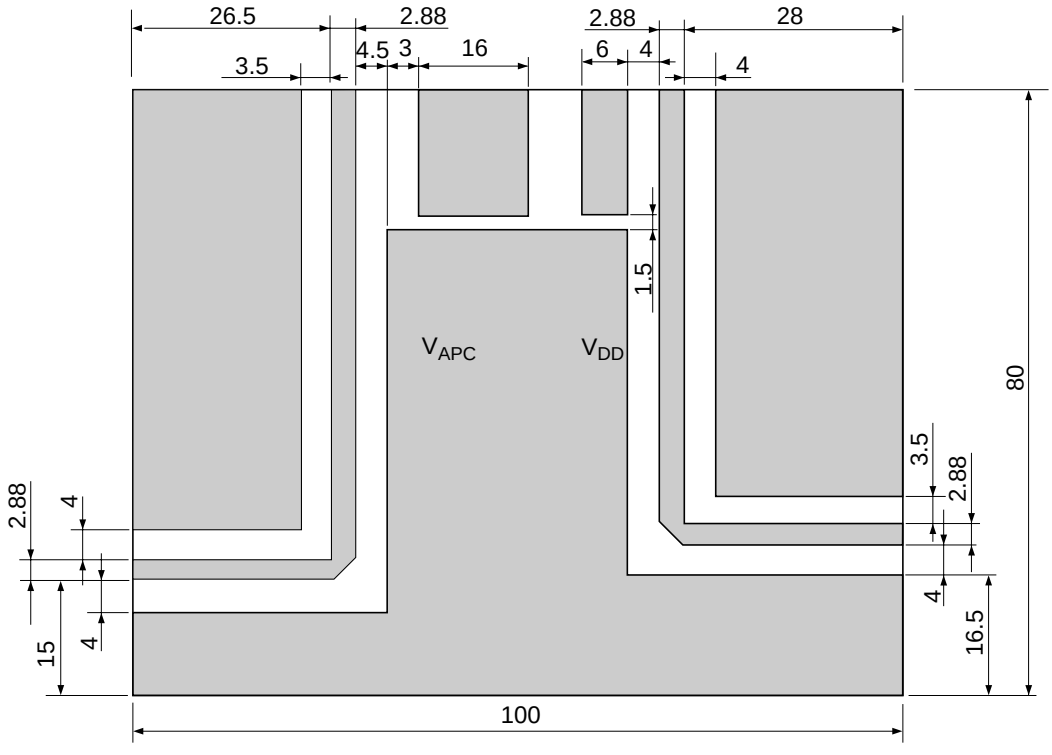
Item	Symbol	Min	Typ	Max	Unit	Test Condition
Drain cutoff current	I_{DS}	—	—	500	μA	V_{DD} = 17 V, V_{APC} = 0 V
Total efficiency	η_T	35	40	—	%	Pin = 2 mW,
2nd harmonic distortion	2nd H.D.	—	–50	–30	dB	V_{DD} = 12.5 V,
3rd harmonic distortion	3rd H.D.	—	–50	–30	dB	Pout = 6 W (at APC controlled)
Input VSWR	VSWR (in)	—	1.5	3	—	Zin = Zout = 50 Ω
Output VSWR	VSWR (out)	—	1.5	—	—	
Stability	—	No parasitic oscillation			—	Pin = 2 mW, V_{DD} = 12.5 V, Pout = 6 W (at APC controlled), Zin = 50 Ω, Output VSWR = 20:1 All phases, t = 20 sec

Test System Diagram



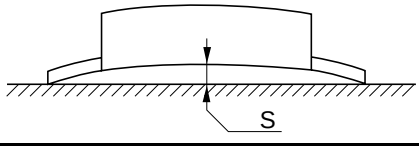
Test Fixture Pattern

Unit: mm



Grass Epoxy Double sided PCB
(t = 1.6 mm, εr = 4.8)

Mechanical Characteristics

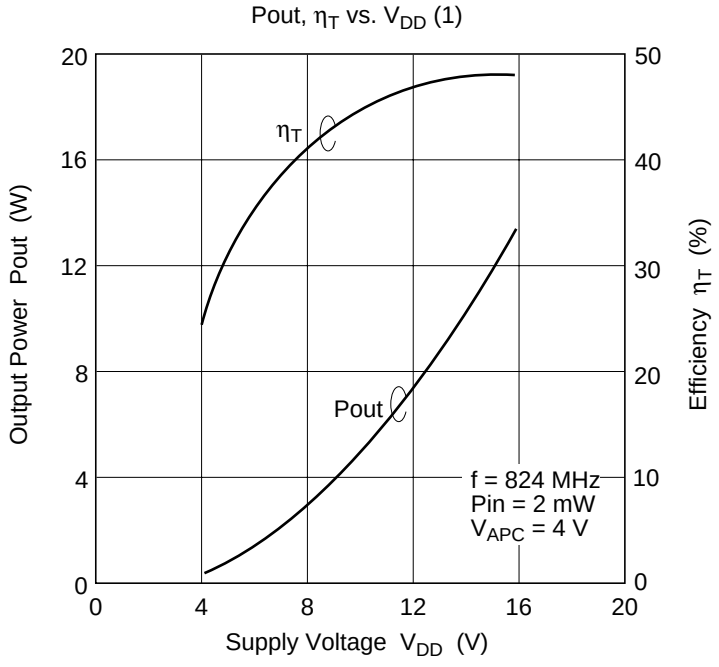
Item	Conditions	Spec
Torque for screw up the heatsink flange	M3 Screw Bolts	4 to 6 kg•cm
Warp size of the heatsink flange: S		S = 0 +0.3/–0 mm

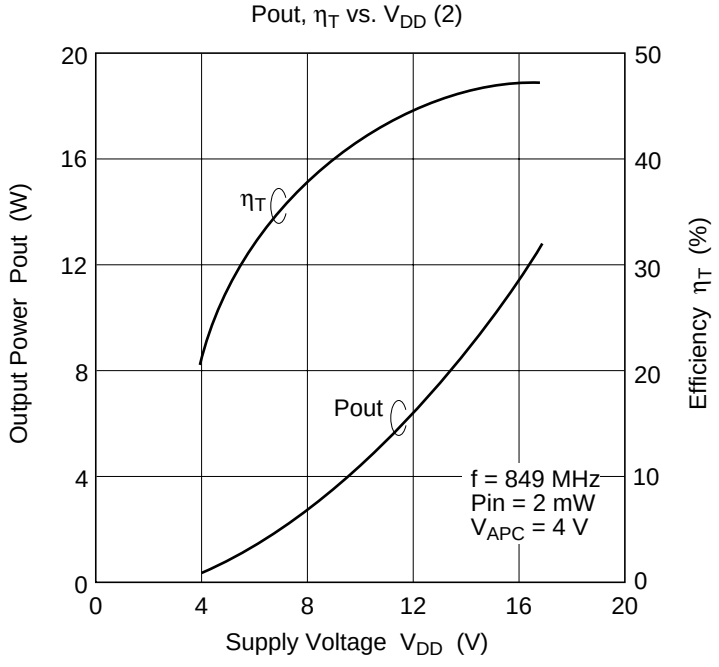
Note for Use

- Unevenness and distortion at the surface of the heatsink attached module should be less than 0.05 mm.
- It should not be existed any dust between module and heatsink.
- MODULE should be separated from PCB less than 1.5 mm.
- Soldering temperature and soldering time should be less than 230°C, 10 sec.
  (Soldering position spaced from the root point of the lead frame: 2 mm)
- Recommendation of thermal joint compounds is TYPE G746.
  (Manufacturer: Shin-Etsu Chemical, Co., Ltd.)
- To protect devices from electro-static damage, soldering iron, measuring-equipment and human body etc. should be grounded.
- Torque for screw up the heatsink flange should be 4 to 6 kg · cm with M3 screw bolts.
- Don't solder the flange directly.
- It should make the lead frame as straight as possible.
- The module should be screwed up before lead soldering.
- It should not be given mechanical and thermal stress to lead and flange of the module.
- When the external parts (Isolator, Duplexer, etc.) of the module are changed, the electrical characteristics should be evaluated enough.
- Don't washing the module except lead pins.
- To get good stability, ground impedance between the module GND flange and PCB GND pattern should be designed as low as possible.

Characteristics Curve

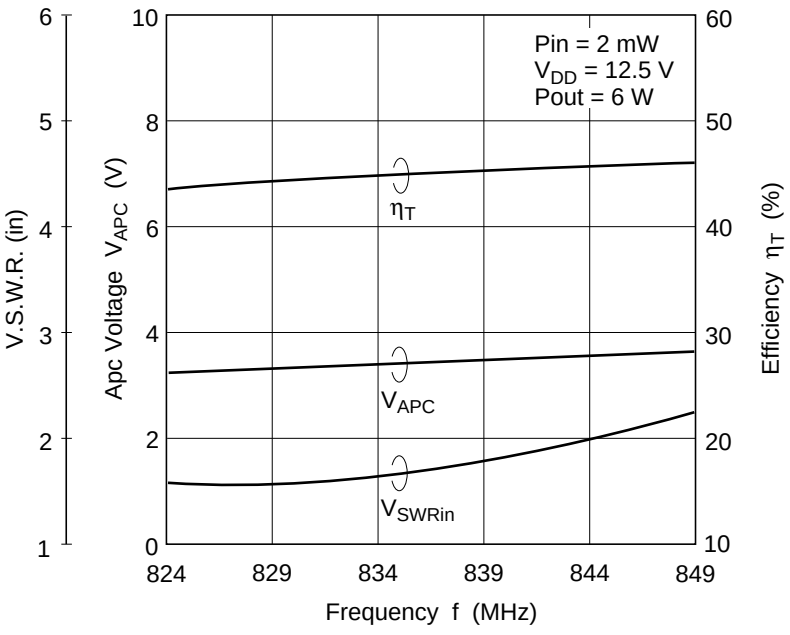
PF0030



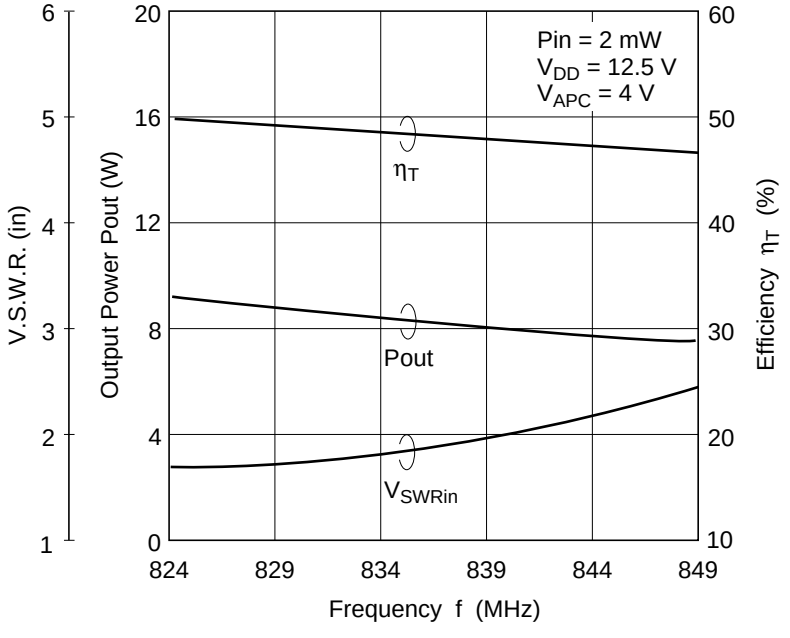


PF0030 (cont)

V_{APC}, η_T, VSWR (in) vs. Frequency

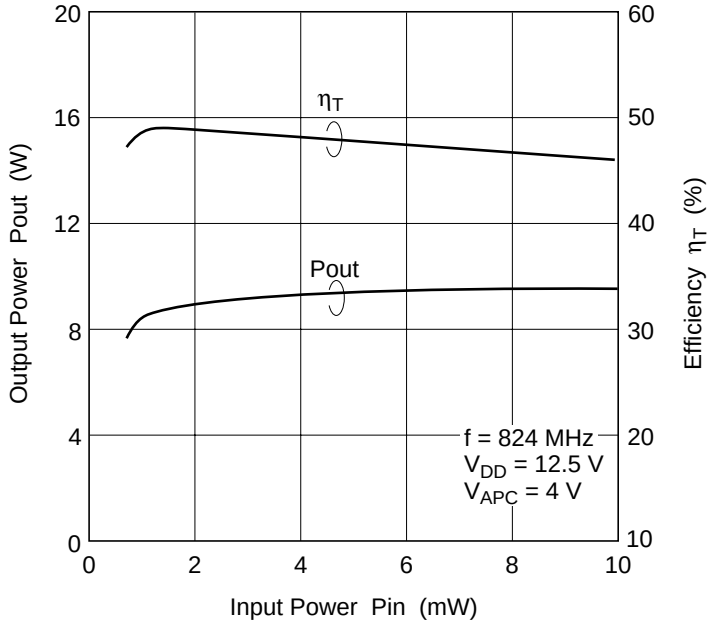


Pout, η_T, VSWR (in) vs. Frequency

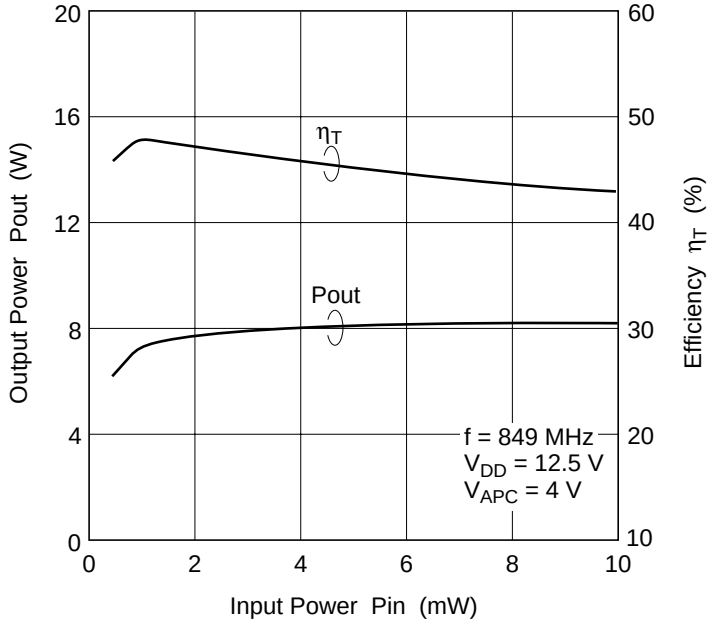


PF0030 (cont)

Pout, η_T vs. Pin (1)

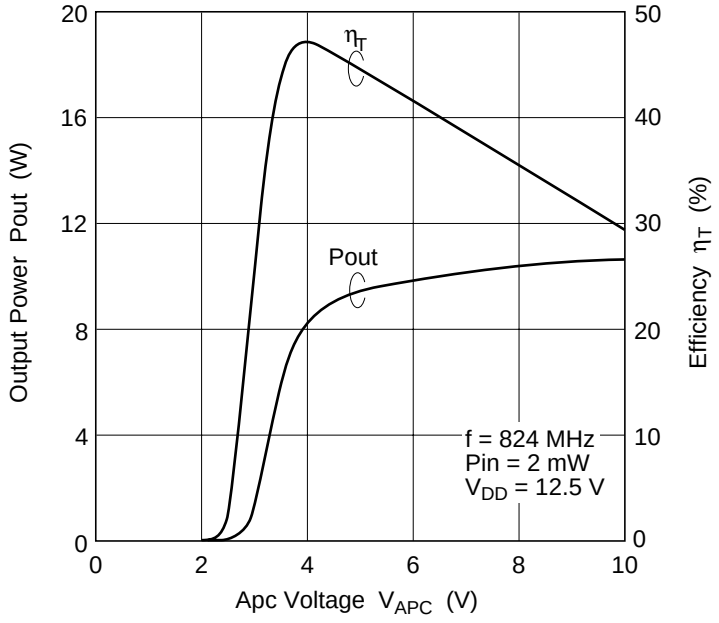


Pout, η_T vs. Pin (2)

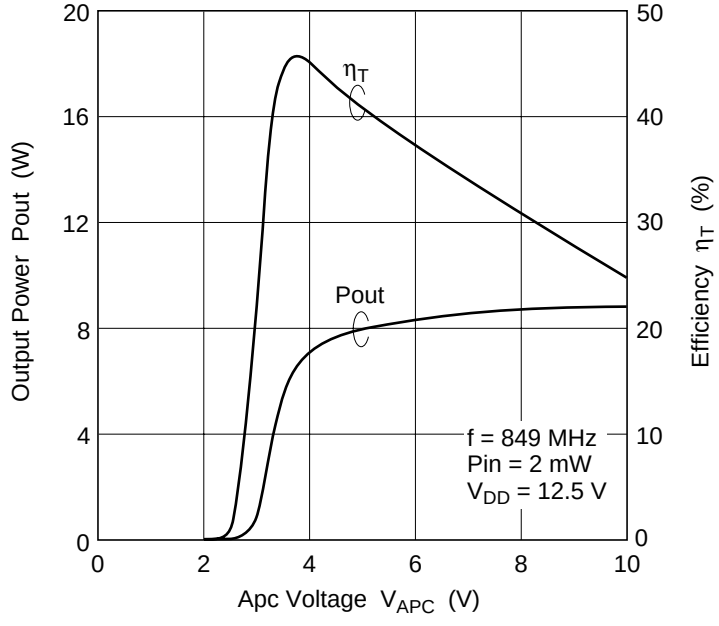


PF0030 (cont)

Pout, η_T vs. V_{APC} (1)

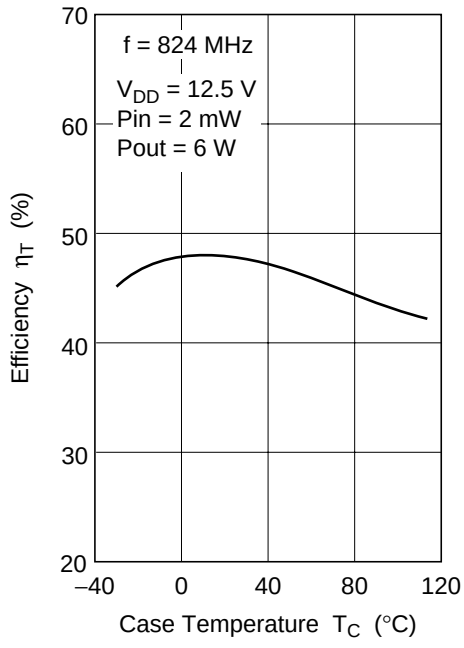


Pout, η_T vs. V_{APC} (2)

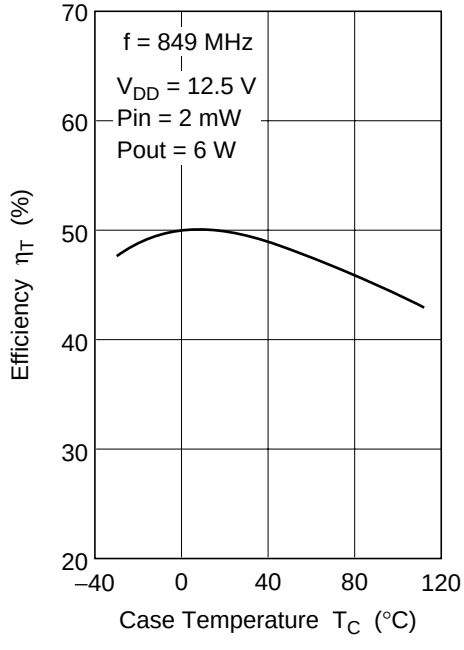


PF0030 (cont)

η_T vs. T_C (1)

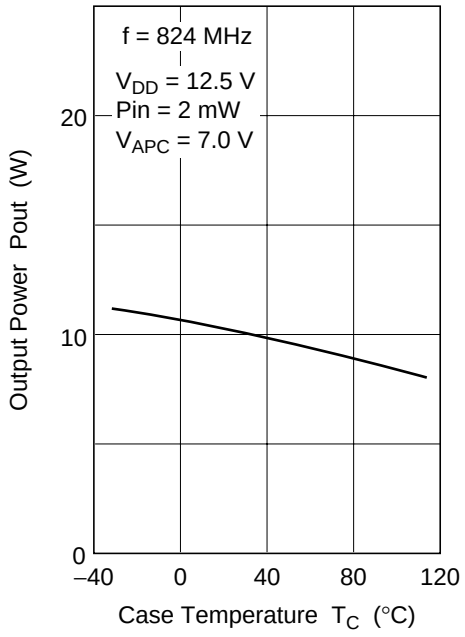


η_T vs. T_C (2)

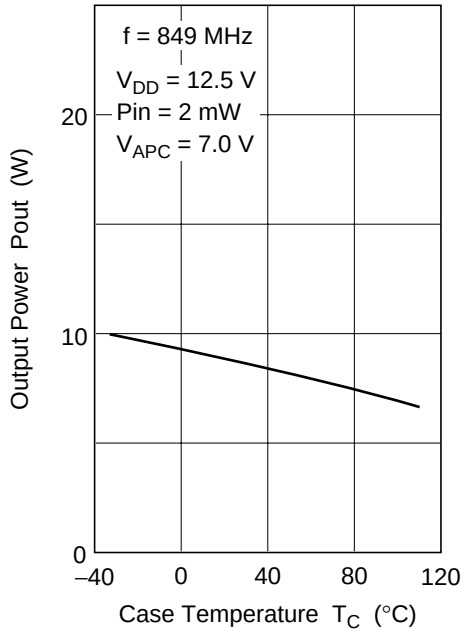


PF0030 (cont)

Pout vs. T_C (1)

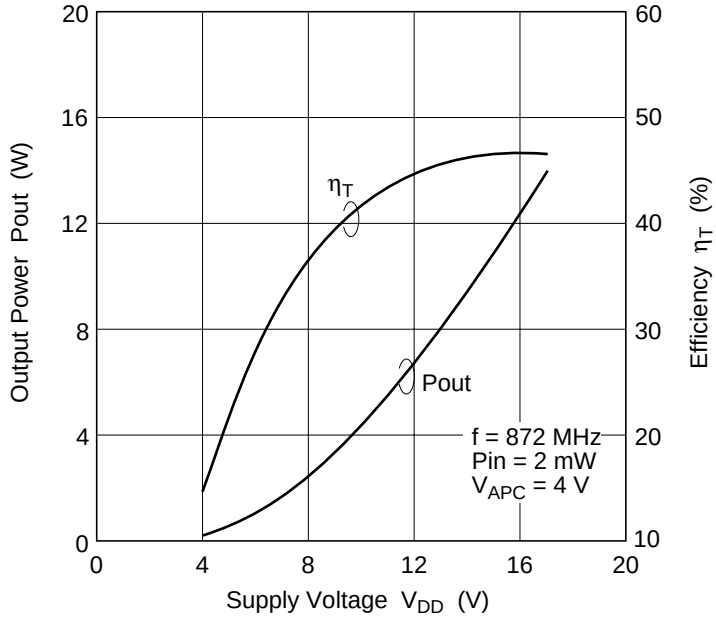


Pout vs. T_C (2)

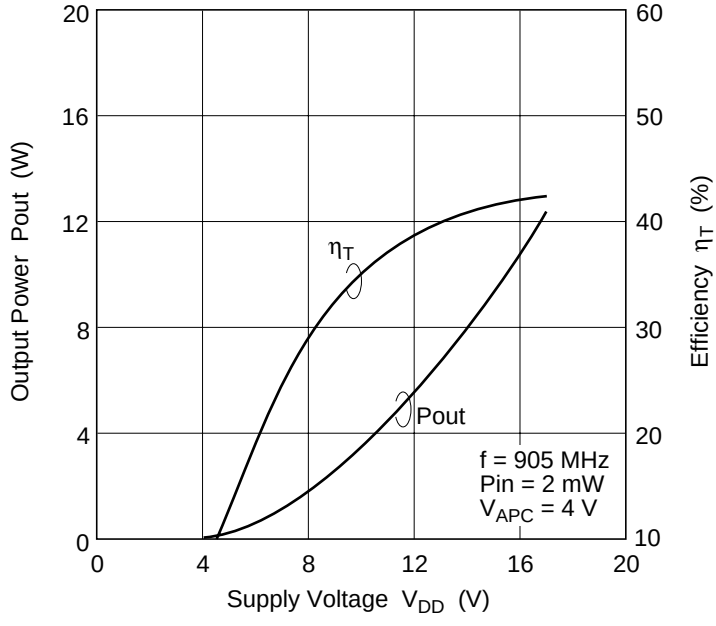


PF0032

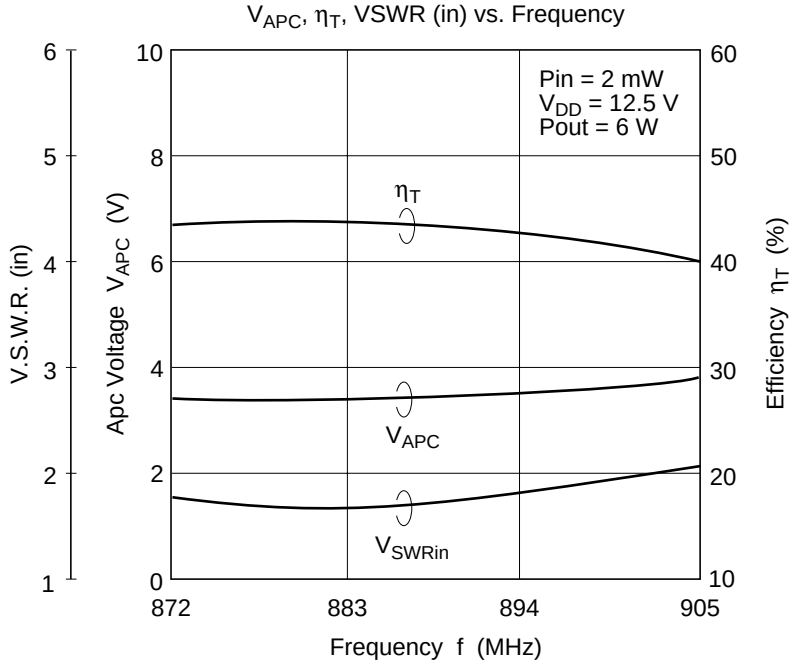
Pout, η_T vs. V_{DD} (1)

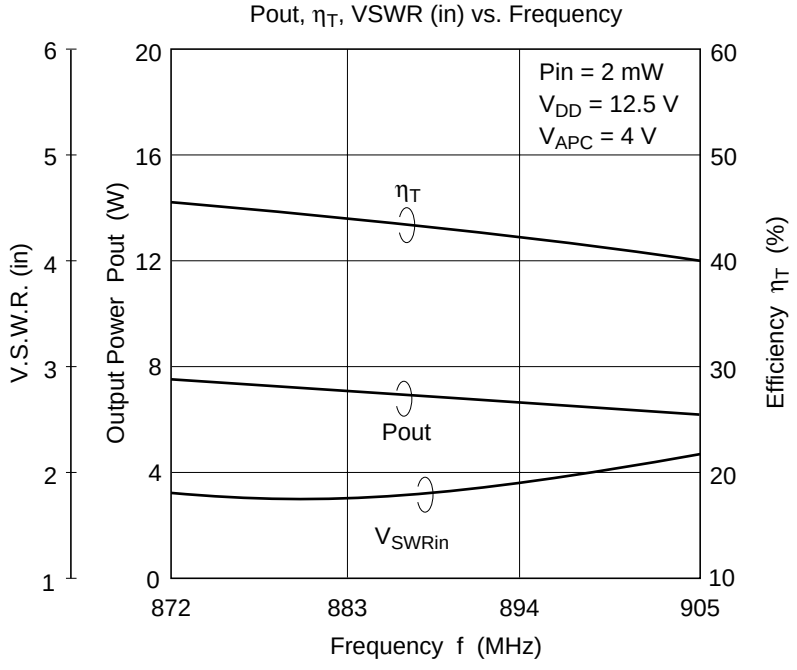


Pout, η_T vs. V_{DD} (2)



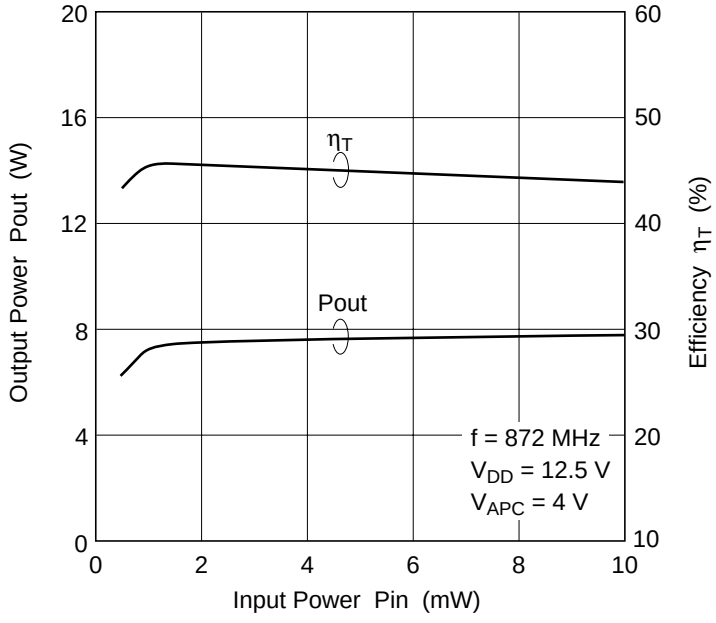
PF0032 (cont)


V_{APC}, η_T, VSWR (in) vs. Frequency
Pin = 2 mW
V_{DD} = 12.5 V
Pout = 6 W
η_T
V_{APC}
V_{SWRin}
V.S.W.R. (in)
Apc Voltage V_{APC} (V)
Efficiency η_T (%)
Frequency f (MHz)
872
883
894
905

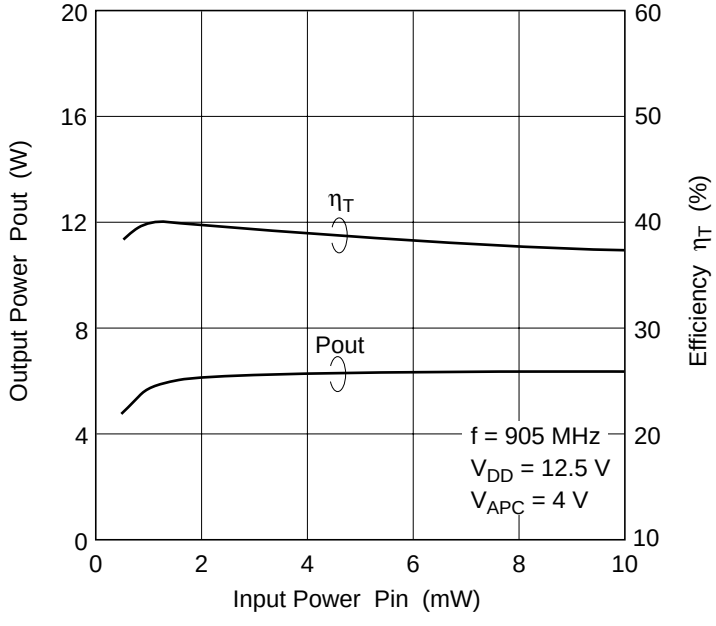

Pout, η_T, VSWR (in) vs. Frequency
Pin = 2 mW
V_{DD} = 12.5 V
V_{APC} = 4 V
η_T
Pout
V_{SWRin}
V.S.W.R. (in)
Output Power Pout (W)
Efficiency η_T (%)
Frequency f (MHz)
872
883
894
905

PF0032 (cont)

Pout, η_T vs. Pin (1)

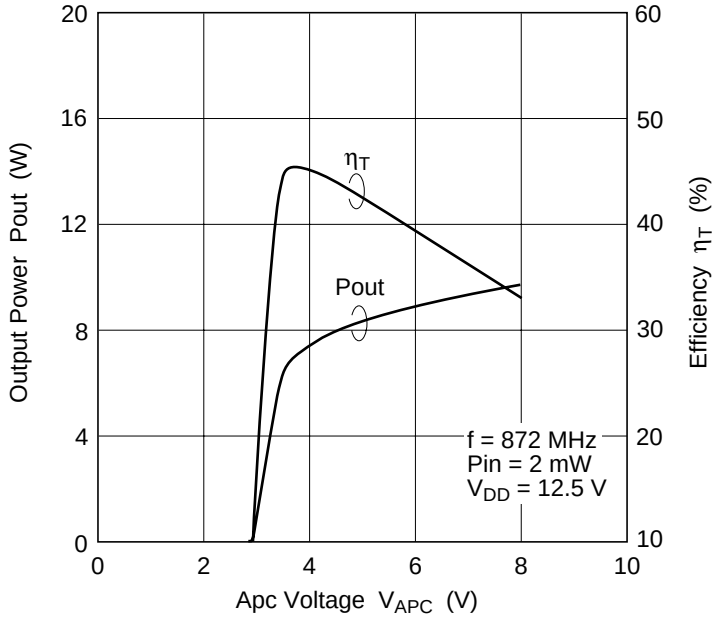


Pout, η_T vs. Pin (2)

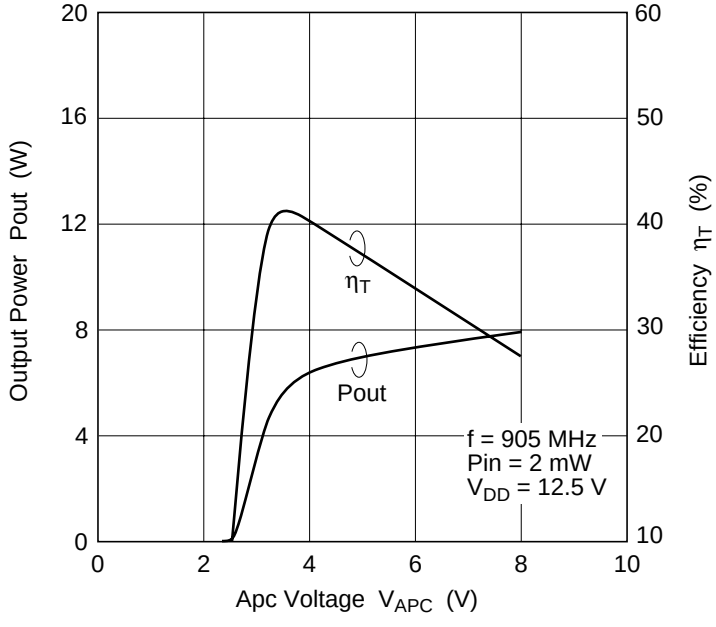


PF0032 (cont)

Pout, η_T vs. V_{APC} (1)

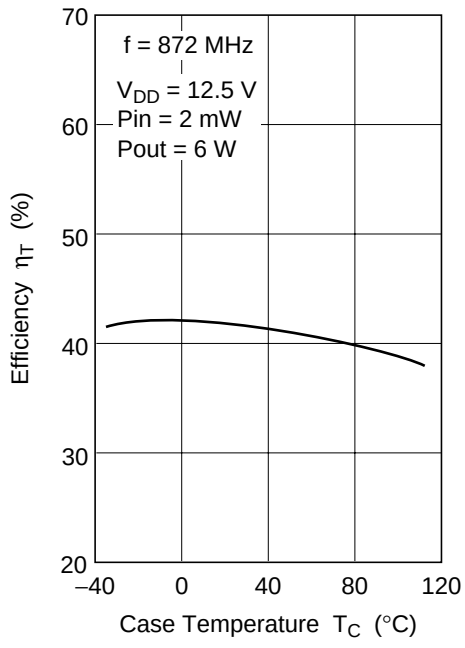


Pout, η_T vs. V_{APC} (2)

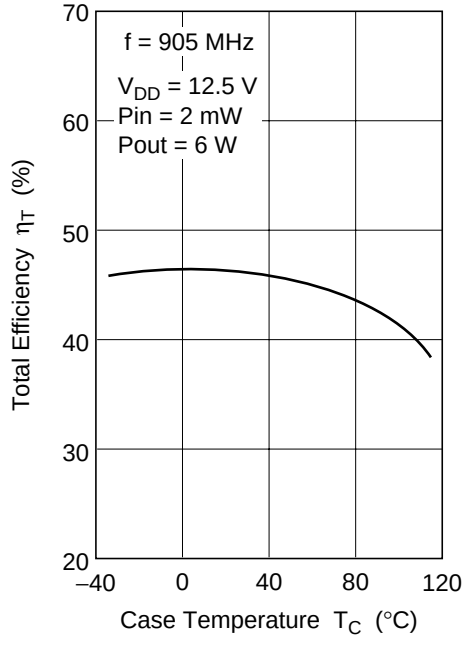


PF0032 (cont)

η_T vs. T_C (1)

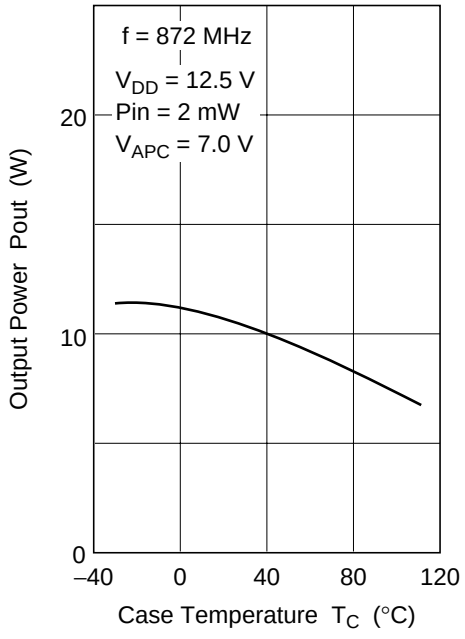


η_T vs. T_C (2)

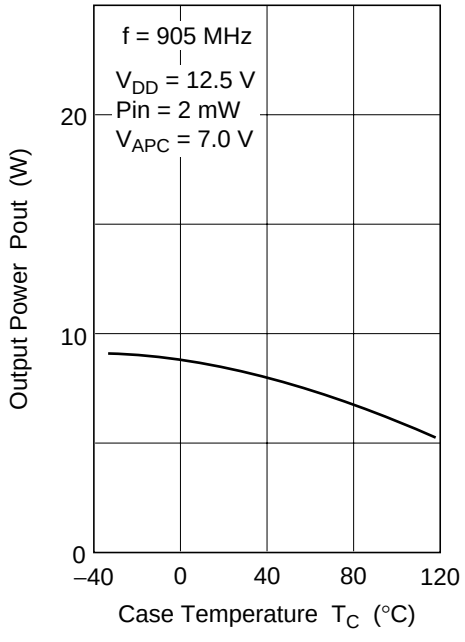


PF0032 (cont)

Pout vs. T_C (1)

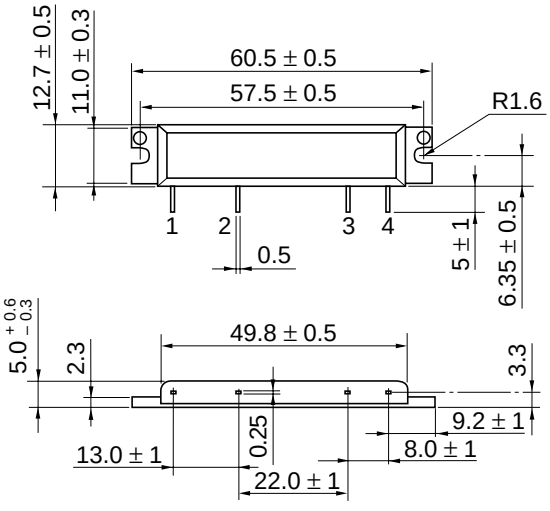


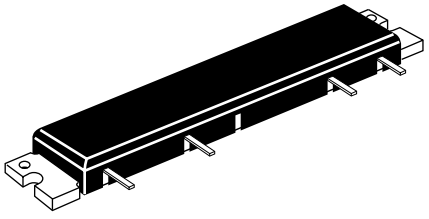
Pout vs. T_C (2)



Package Dimensions

Unit: mm





Hitachi Code	RF-B2
JEDEC	—
EIAJ	—
Weight (reference value)	16 g

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HITACHI

Hitachi, Ltd.
Semiconductor & Integrated Circuits.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

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For further information write to:

Hitachi Semiconductor
(America) Inc.
179 East Tasman Drive,
San Jose,CA 95134
Tel: <1> (408) 433-1990
Fax: <1>(408) 433-0223

Hitachi Europe GmbH
Electronic components Group
Dornacher Straße 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 778322

Hitachi Asia Pte. Ltd.
16 Collyer Quay #20-00
Hitachi Tower
Singapore 049318
Tel: 535-2100
Fax: 535-1533

Hitachi Asia Ltd.
Taipei Branch Office
3F, Hung Kuo Building. No.167,
Tun-Hwa North Road, Taipei (105)
Tel: <886> (2) 2718-3666
Fax: <886> (2) 2718-8180

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., North Tower, World Finance Centre,
Harbour City, Canton Road, Tsim Sha Tsui,
Kowloon, Hong Kong
Tel: <852> (2) 735 9218
Fax: <852> (2) 730 0281
Telex: 40815 HITEC HX