PF0231A

MOS FET Power Amplifier Module for ADC Handy Phone

HITACHI

ADE-208-378A (Z)
2nd. Edition
July 1996

Application

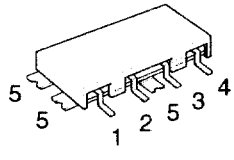
For ADC class3 824 to 849 MHz

Features

- Low voltage operation 4.8 V
- High efficiency: 42% Typ for CW
  34% Typ for π/4-DQPSK
- Simple Pout control: Controllable by VAPC
- Low power control current: 600 μA Typ.

Pin Arrangement

• RF-E



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

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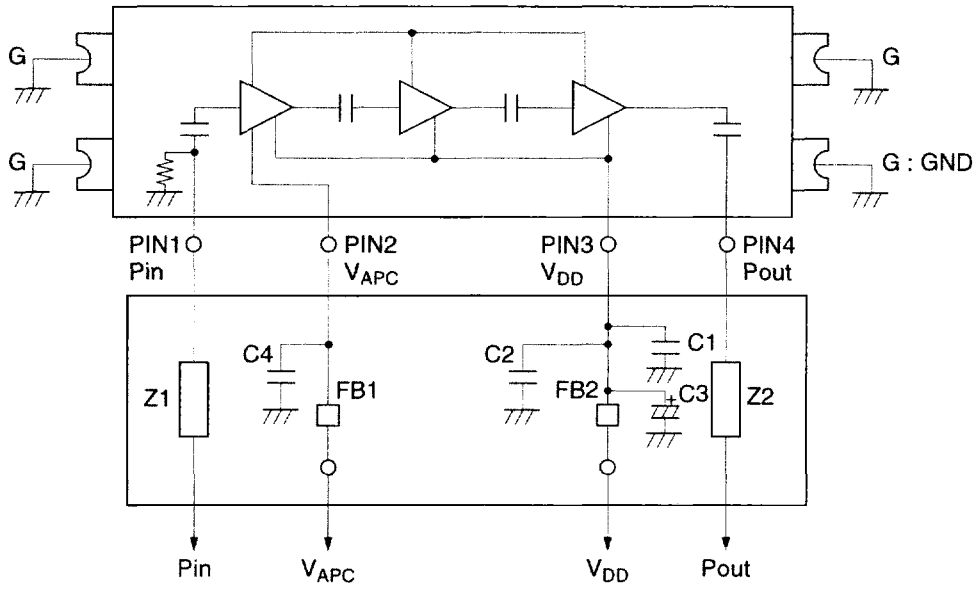
Internal Diagram and External Circuit



C1 = C4 = 0.01 µF (Ceramic chip)
C2 = 4.7 µF (Tantalum)
C3 = 220 µF (Aluminum electrolyte)
FB = Ferrite bead BL01RN1-A62-001 (Manufacturer: MURATA) or equivalent
Z1 = Z2 = 50 Ω (Micro strip line)

Absolute Maximum Ratings (Tc = 25°C)

Item	Symbol	Rating	Unit
Supply voltage	VDD	10	V
Supply current	IDD	1.5	A
VAPC voltage	VAPC	4.5	V
Input power	Pin	20	mW
Operating case temperature	Tc (op)	–30 to +100	°C
Storage temperature	Tstg	–30 to +100	°C

Electrical Characteristics (Tc = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Condition
Frequency range	f	824	—	849	MHz	—
Drain cutoff current	IDS	—	—	100	μA	VDD = 10 V, VAPC = 0 V
Total efficiency(1)	ηT (1)	37	42	—	%	Pin = 1 mW, VDD = 4.8 V,
2nd harmonic distortion	2nd H.D.	—	–35	–30	dBc	Pout = 1.2 W (at VAPC controlled),
3rd harmonic distortion	3rd H.D.	—	–40	–30	dBc	RL = Rg = 50 Ω
Input VSWR	VSWR (in)	—	1.5	3	—	
Output power	Pout	1.6	2.1	—	W	Pin = 1 mW, VDD = 4.8 V, VAPC = 4.0 V, RL = Rg = 50 Ω
Isolation	—	—	–40	–35	dBm	Pin = 1 mW, VDD = 4.8 V, VAPC = 0.5 V, RL = Rg = 50 Ω
Total efficiency(2)	ηT (2)	30	34	—	%	Pin = controlled (p/4-DQPSK, $\sqrt{\alpha}$ =
Adjacent channel	PADJ (30k)	—	–30	–27	dBc	0.35, 48.6kbps), BW = 24.3 kHz with
leakage power	PADJ (60k)	—	–55	–47	dBc	R-NYQT, Pout = 1.0 W ave., VDD = 4.8 V, VAPC = 2.5 V
Load VSWR tolerance	—	No degradation			—	Pin = 1 mW, VDD = 6 V, Pout ≤ 1.4 W, t = 10 sec., Output VSWR = 20:1 All phases
Stability	—	No parasitic oscillation			—	Pin = 1 mW, VDD = 4 to 6 V, Pout ≤ 1.4 W, Output VSWR = 3:1 All phases, Rg = 50 Ω

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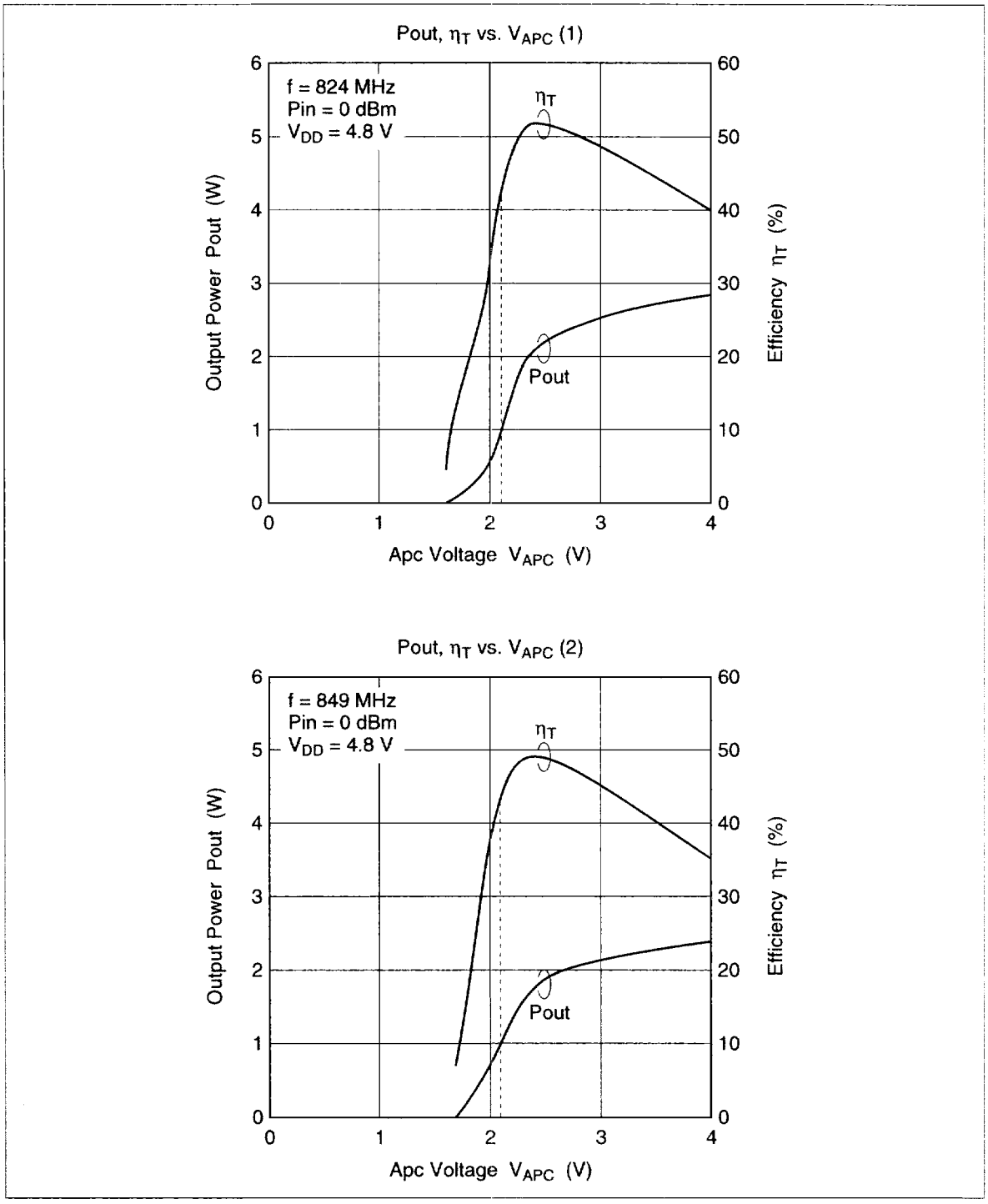
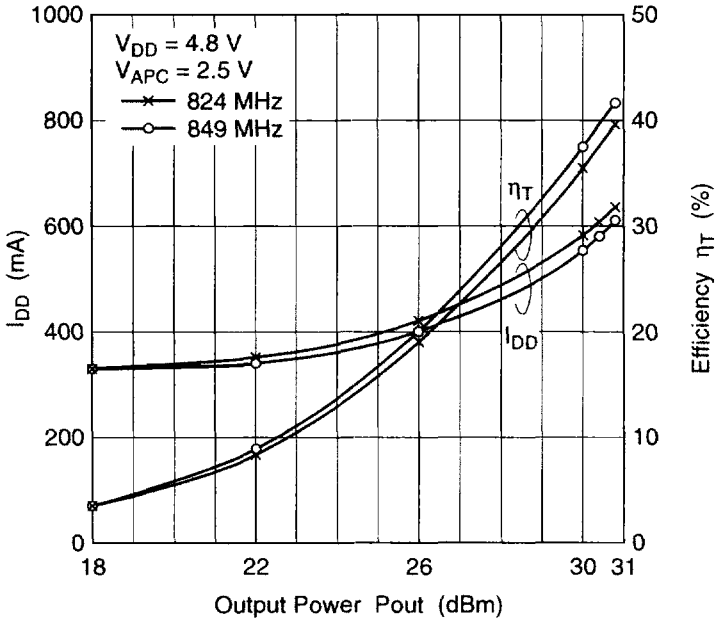
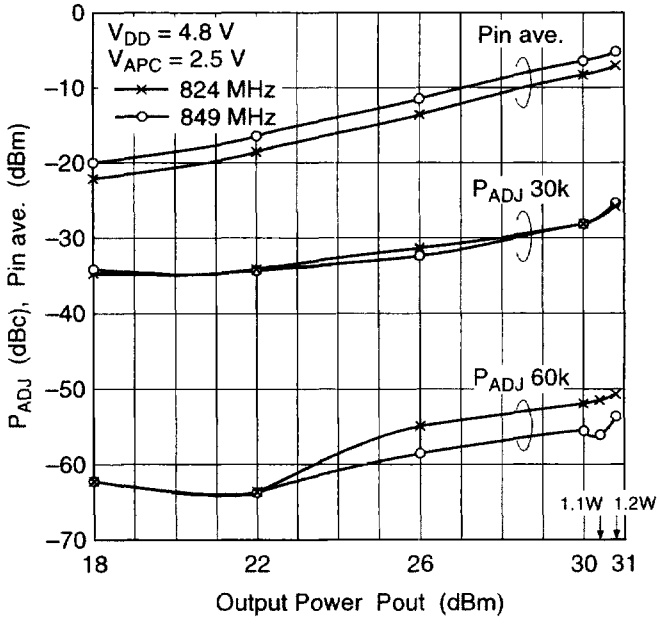
Characteristics Curve



I_{DD}, η_T vs. Pout



P_{ADJ}, Pin ave. vs. Pout



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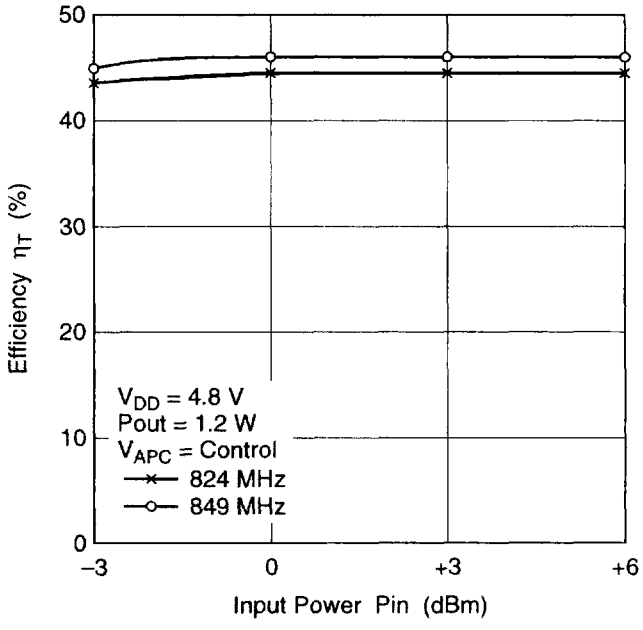
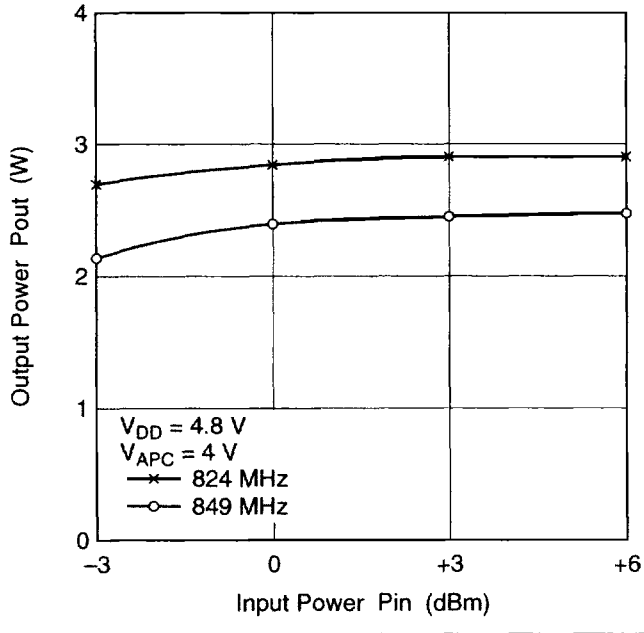
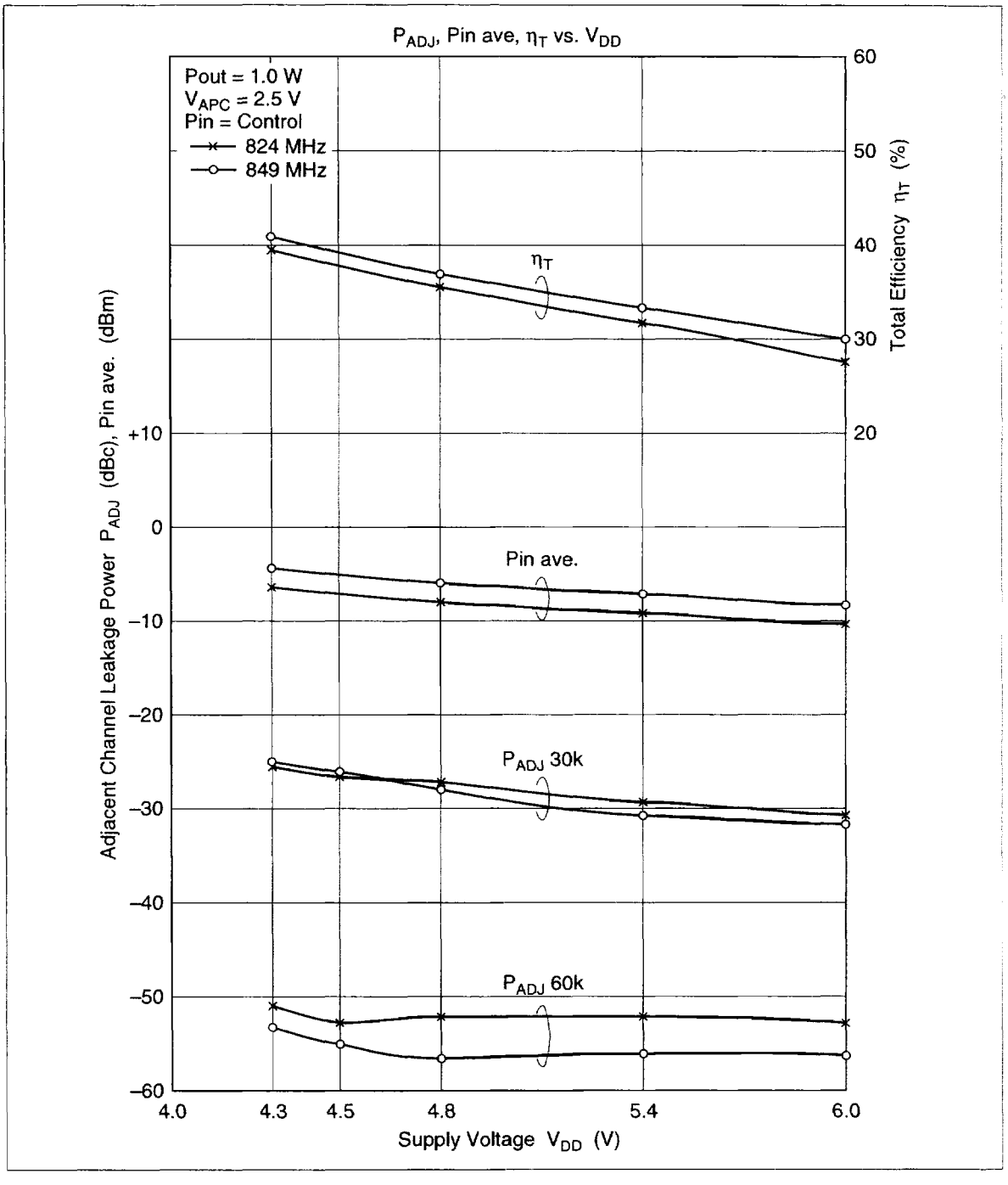
η_T vs. Pin



Pout vs. Pin




P_{ADJ}, Pin ave, η_T vs. V_{DD}
Pout = 1.0 W
V_{APC} = 2.5 V
Pin = Control
824 MHz
849 MHz
η_T
Pin ave.
P_{ADJ} 30k
P_{ADJ} 60k
Adjacent Channel Leakage Power P_{ADJ} (dBc), Pin ave. (dBm)
Total Efficiency η_T (%)
+10
0
−10
−20
−30
−40
−50
−60
60
50
40
30
20
4.0
4.3
4.5
4.8
5.4
6.0
Supply Voltage V_{DD} (V)

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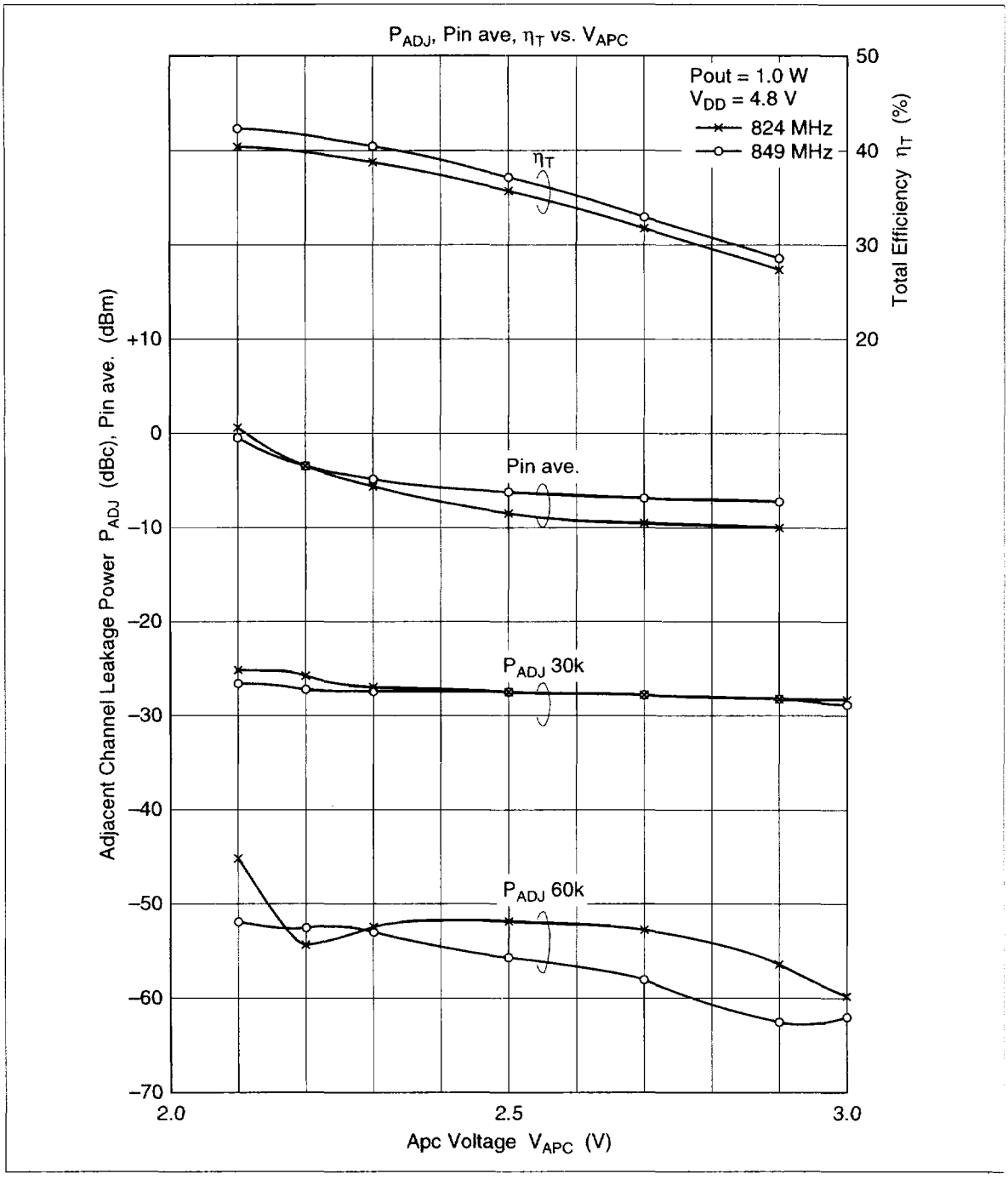
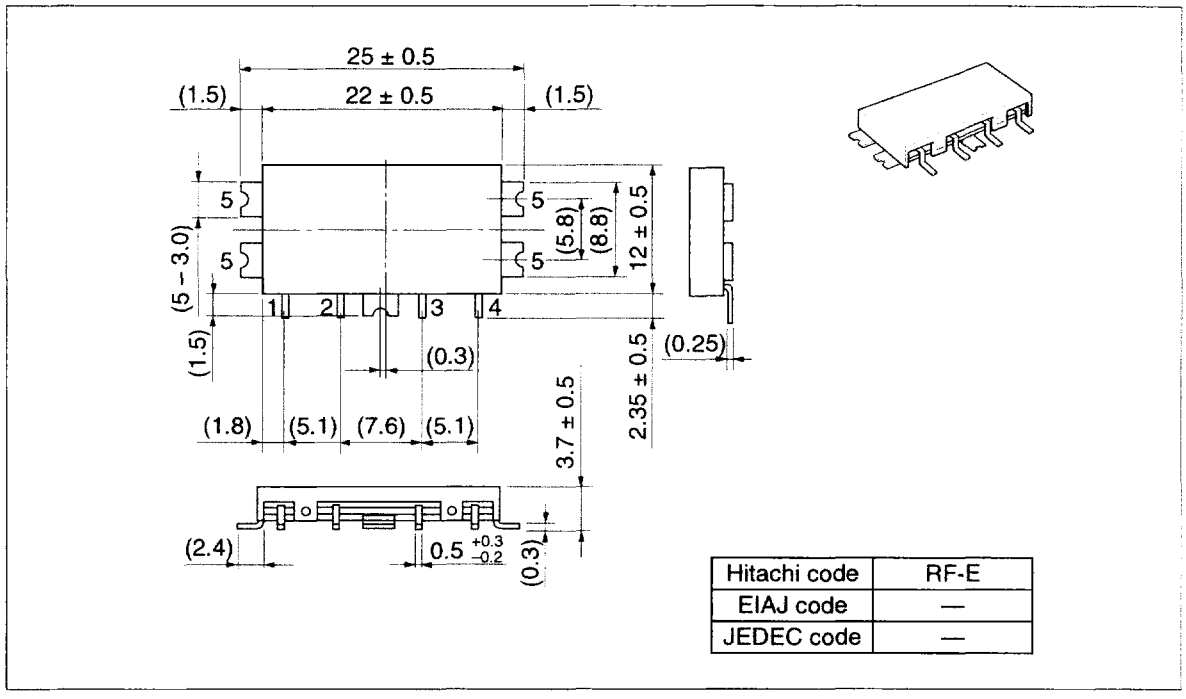

P_{ADJ}, Pin ave, η_T vs. V_{APC}
Pout = 1.0 W
V_{DD} = 4.8 V
824 MHz
849 MHz
η_T
Pin ave.
P_{ADJ} 30k
P_{ADJ} 60k
Adjacent Channel Leakage Power P_{ADJ} (dBc), Pin ave. (dBm)
Total Efficiency η_T (%)
+10
0
−10
−20
−30
−40
−50
−60
−70
50
40
30
20
2.0
2.5
3.0
Apc Voltage V_{APC} (V)

Package Dimensions

Unit: mm



Hitachi code	RF-E
EIAJ code	—
JEDEC code	—