2SK410

Silicon N-Channel MOS FET

HITACHI

Application

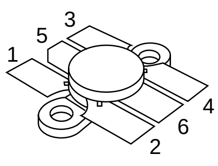
HF/VHF power amplifier

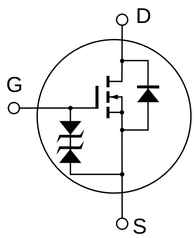
Features

- High breakdown voltage
- You can decrease handling current.
- Included gate protection diode
- No secondary–breakdown
- Wide area of safe operation
- Simple bias circuitry
- No thermal runaway

Outline

RFPAK-A





1. Source
2. Source
3. Source
4. Source
5. Drain
6. Gate

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	180	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	8	A
Channel dissipation	Pch*[1]	120	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Note: 1. Value at T_C = 25°C

Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Power output	P_O	140	180	—	W	V_{DD} = 80 V, f = 28 MHz,
Drain efficiency	η	—	80	—	%	I_{DQ} = 0.1 A, Pin = 5 W
Drain to source breakdown voltage	$V_{(BR)DSS}$	180	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	I_G = ±100 µA, V_{DS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	0.5	—	3.0	V	I_D = 1 mA, V_{DS} = 10 V*[1]
Drain current	I_{DSS}	—	—	1.0	mA	V_{DS} = 140 V, V_{GS} = 0
Drain to source saturation voltage	$V_{DS(on)}$	—	3.8	6.0	V	I_D = 4 A, V_{GS} = 10 V*[1]
Forward transfer admittance	$\|y_{fs}\|$	0.9	1.25	—	S	I_D = 3 A, V_{DS} = 20 V*[1]
Input capacitance	Ciss	—	440	—	pF	V_{GS} = 5 V, V_{DS} = 0, f = 1 MHz
Output capacitance	Coss	—	75	—	pF	V_{GS} = –5 V, V_{DS} = 50 V, f = 1 MHz
Reverse transfer capacitance	Crss	—	0.5	—	pF	V_{GD} = –50 V, f = 1 MHz
Power output	P_O	—	100	—	W_{PEP}	V_{DD} = 80 V, f = 28 MHz,
Power gain	PG	—	17	—	dB	f = 20 kHz, IMD –30 dB

Note: 1. Pulse Test

CAUTION: OPERATING HAZARDS
Beryllium Oxide Ceramics have been employed in these products.
Since dust or fume of the material is highly poison to the human body, please do not treat them mechanically or chemically in the manner which might expose them to the air. And it should never be thrown out with general industrial or domestic waste.

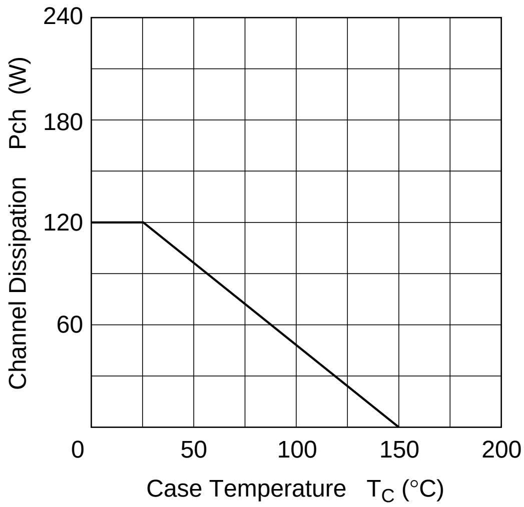


Figure 1 Power vs. Temperature Derating

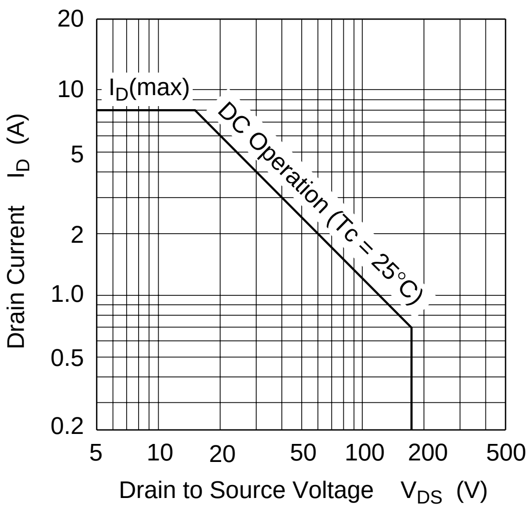


Figure 2 Maximum Safe Operation Area

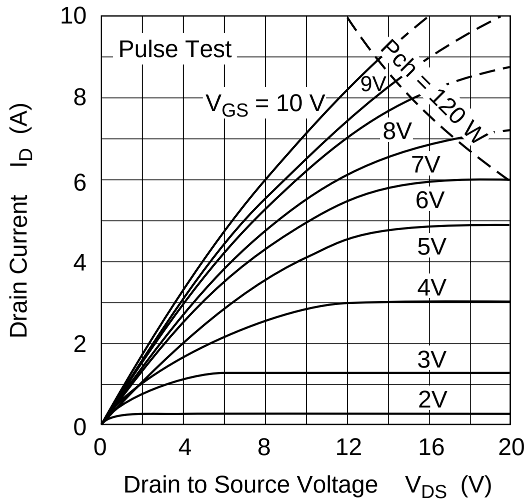


Figure 3 Typical Output Characteristics

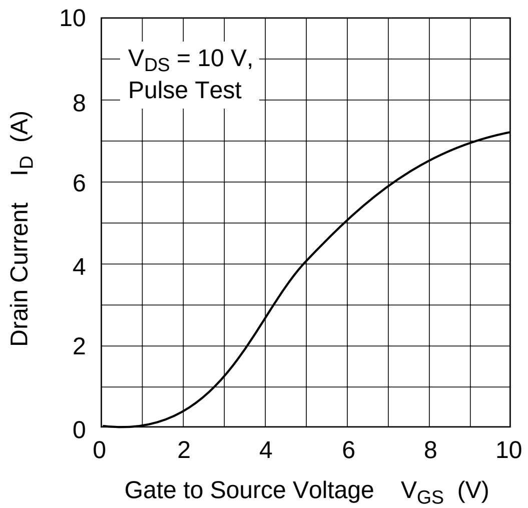


Figure 4 Typical Transfer Characteristics

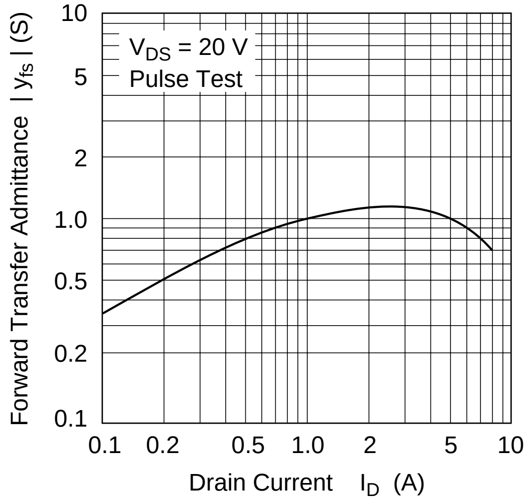


Figure 5 Forward Transfer Admittance vs. Drain Current

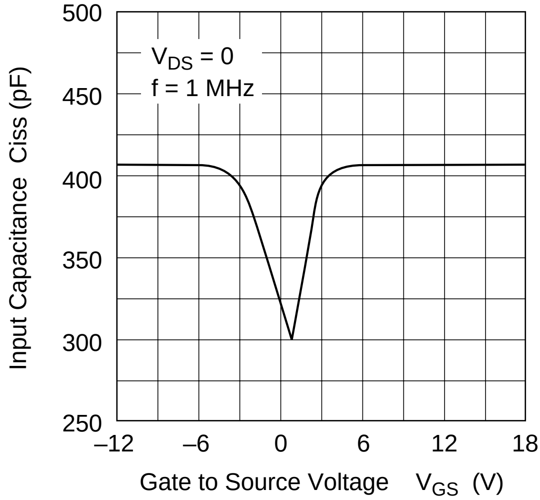


Figure 6 Input Capacitance vs. Gate to Source Voltage

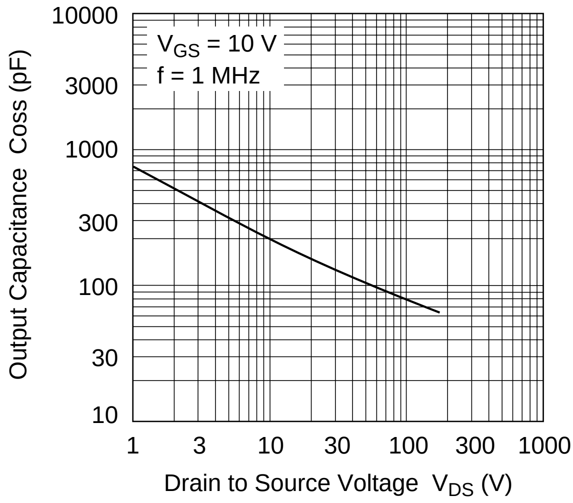


Figure 7 Output Capacitance vs. Drain to Source Voltage

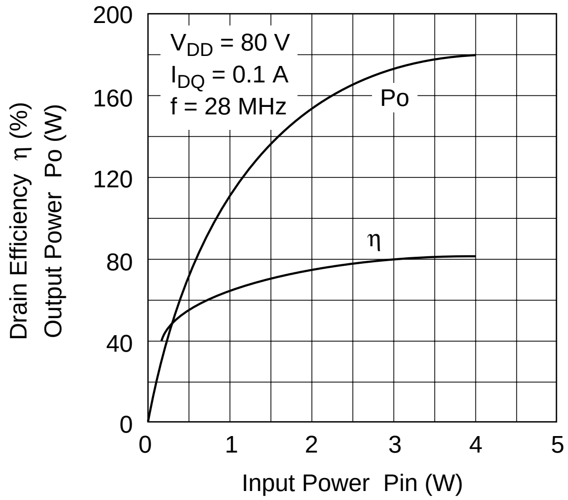


Figure 8 Output Power, Drain Efficiency vs. Input Power

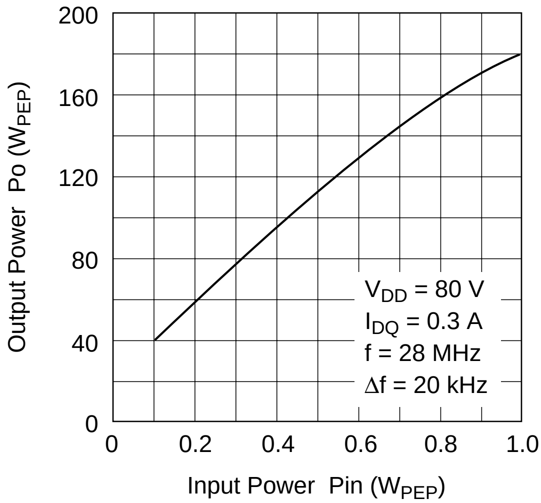


Figure 9 Output Power vs. Input Power (2 Tones)

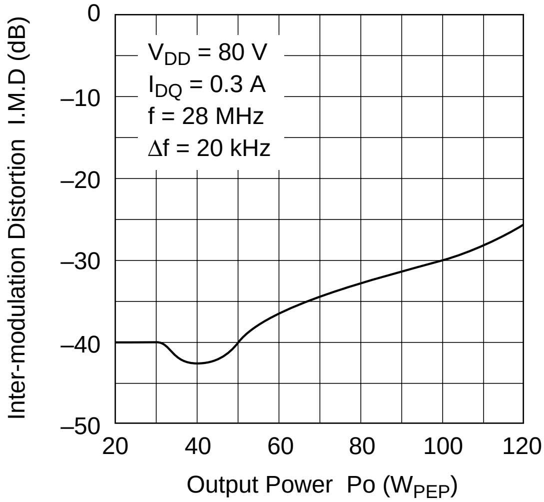
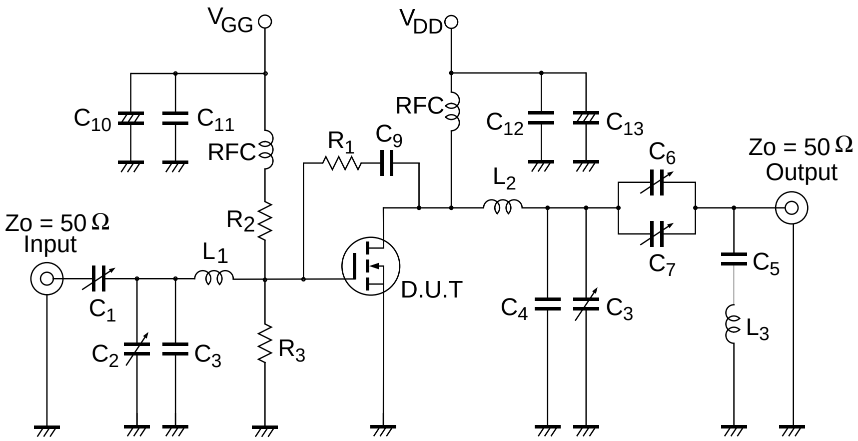


Figure 10 Inter-Modulation Distortion vs. Output Power



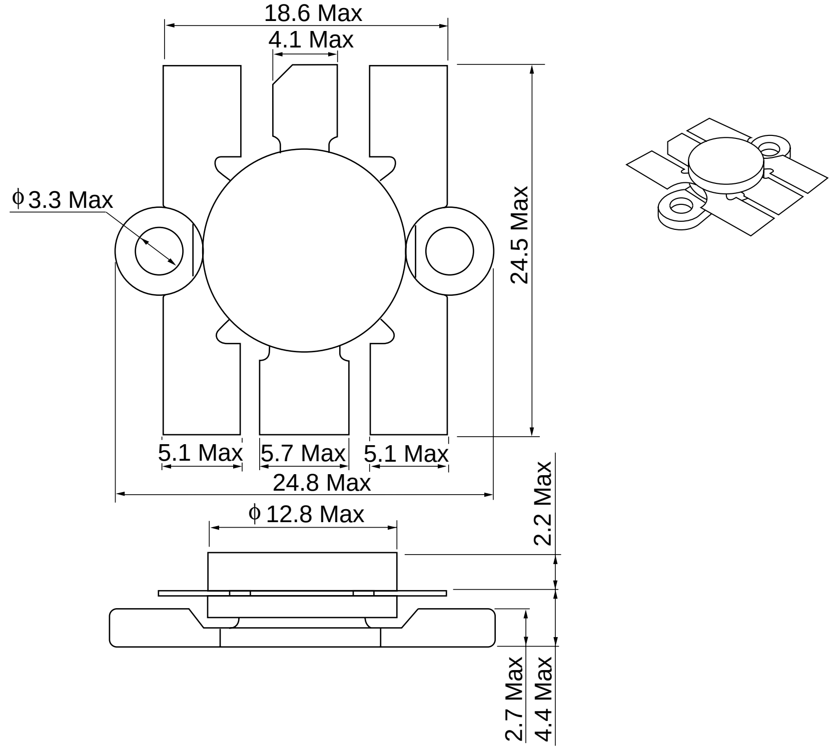
C_1, C_4 = to 50 pF
C_2, C_5 = to 20 pF
C_3, C_6 = 10 pF
C_7 = 32 pF
C8 = 15 pF
C_9, C_{11}, C_{12} = 0.1 µF
C_{10} = 4.7 µF
C_{13} = 22 µF

L_1: ID = 12 mm, d = 1.5 mm, T = 7 T
L_2: ID = 12 mm, d = 1.5 mm, T = 5 T
L_3: ID = 12 mm, d = 1.5 mm, T = 5 T
R_1 = 1 kΩ
R_2, R_3 = 100Ω
RFC_1 = FC 15 ø, d = 1 mm, T = 3 T
RFC_2 = FC 6 ø, d = 1 mm, T = 4 T

Figure 11 28 MHz Pout Test Circuit

Package Dimensions

Unit: mm



When using this document, keep the following in mind:

1. This document may, wholly or partially, be subject to change without notice.
2. All rights are reserved: No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without Hitachi's permission.
3. Hitachi will not be held responsible for any damage to the user that may result from accidents or any other reasons during operation of the user's unit according to this document.
4. Circuitry and other examples described herein are meant merely to indicate the characteristics and performance of Hitachi's semiconductor products. Hitachi assumes no responsibility for any intellectual property claims or other problems that may result from applications based on the examples described herein.
5. No license is granted by implication or otherwise under any patents or other rights of any third party or Hitachi, Ltd.
6. MEDICAL APPLICATIONS: Hitachi's products are not authorized for use in MEDICAL APPLICATIONS without the written consent of the appropriate officer of Hitachi's sales company. Such use includes, but is not limited to, use in life support systems. Buyers of Hitachi's products are requested to notify the relevant Hitachi sales offices when planning to use the products in MEDICAL APPLICATIONS.

HITACHI

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

For further information write to:

Hitachi America, Ltd.
Semiconductor & IC Div.
2000 Sierra Point Parkway
Brisbane, CA. 94005-1835
U S A
Tel: 415-589-8300
Fax: 415-583-4207

Hitachi Europe GmbH
Electronic Components Group
Continental Europe
Dornacher Straße 3
D-85622 Feldkirchen
München
Tel: 089-9 91 80-0
Fax: 089-9 29 30 00

Hitachi Europe Ltd.
Electronic Components Div.
Northern Europe Headquarters
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA
United Kingdom
Tel: 0628-585000
Fax: 0628-778322

Hitachi Asia Pte. Ltd.
16 Collyer Quay #20-00
Hitachi Tower
Singapore 0104
Tel: 535-2100
Fax: 535-1533

Hitachi Asia (Hong Kong) Ltd.
Unit 706, North Tower,
World Finance Centre,
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon
Hong Kong
Tel: 27359218
Fax: 27306071