To all our customers

Regarding the change of names mentioned in the document, such as Hitachi Electric and Hitachi XX, to Renesas Technology Corp.

The semiconductor operations of Mitsubishi Electric and Hitachi were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.) Accordingly, although Hitachi, Hitachi, Ltd., Hitachi Semiconductors, and other Hitachi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Renesas Technology Home Page: http://www.renesas.com

Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

Cautions

Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.
   Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

Notes regarding these materials

1. These materials are intended as a reference to assist our customers in the selection of the Renesas Technology Corporation product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Renesas Technology Corporation or a third party.
2. Renesas Technology Corporation assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
3. All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Renesas Technology Corporation without notice due to product improvements or other reasons. It is therefore recommended that customers contact Renesas Technology Corporation or an authorized Renesas Technology Corporation product distributor for the latest product information before purchasing a product listed herein.
   The information described here may contain technical inaccuracies or typographical errors.
   Renesas Technology Corporation assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors.
   Please also pay attention to information published by Renesas Technology Corporation by various means, including the Renesas Technology Corporation Semiconductor home page (http://www.renesas.com).
4. When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Renesas Technology Corporation assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
5. Renesas Technology Corporation semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Renesas Technology Corporation or an authorized Renesas Technology Corporation product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
6. The prior written approval of Renesas Technology Corporation is necessary to reprint or reproduce in whole or in part these materials.
7. If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination.
   Any diversion or reexport contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
8. Please contact Renesas Technology Corporation for further details on these materials or the products contained therein.

2SK360 Series

Silicon N-Channel MOS FET

Application

VHF amplifier

Features

- Capable of high density mount
- High gain, low noise
- Capable of IF amplifier

Table 1 Ordering Information

Tyoe No.	Package
2SK359	TO-92
2SK360	MPAK
2SK439	SPAK

Table 2 Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	Ratings	Unit
Drain to source voltage		V_{DSX}*	20	V
Gate to source voltage		V_{GSS}	±5	V
Drain current		I_D	30	mA
Gate current		I_G	±1	mA
Channel dissipation	2SK359	Pch	400	mW
	2SK360		150	
	2SK439		300	
Channel temperature		Tch	150	°C
Storage temperature		Tstg	–55 to +150	°C

*: V_{GS} = –4 V

Table 3 Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSX}$	20	—	—	V	I_D = 100 µA, V_{GS} = –4 V
Gate leakage current	I_{GSS}	—	—	±20	nA	V_{GS} = ±5 V, V_{DS} = 0
Drain current	I_{DSS}	4	—	12	mA	V_{DS} = 10 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	0	—	–2.0	V	V_{DS} = 10 V, I_D = 10 µA
Forward transfer admittance	$\|y_{fs}\|$	8	14	—	mS	V_{DS} = 10 V, V_{GS} = 0, f = 1 kHz

Electrical Characteristics (Ta = 25°C) (cont)

Item		Symbol	Min	Typ	Max	Unit	Test conditions
Input capacitance		Ciss	—	2.5	—	pF	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz
Output capacitance	2SK359	Coss	—	1.6	—	pF	V_{DS} = 10 V, V_{GS} = 0,
	2SK360						f = 1 MHz
	2SK439			1.8			V_{DS} = 5 V, V_{GS} = 0, f = 1 MHz
Reverse transfer capacitance		Crss	—	0.03	—	pF	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz
Power gain		PG	—	30	—	dB	V_{DS} = 10 V, V_{GS} = 0,
Noise figure		NF	—	2.0	—	dB	f = 100 MHz

2SK360 representing the characteristics curves hereafter.

For the detail of characteristics of other parts, please consult our sales office near you.

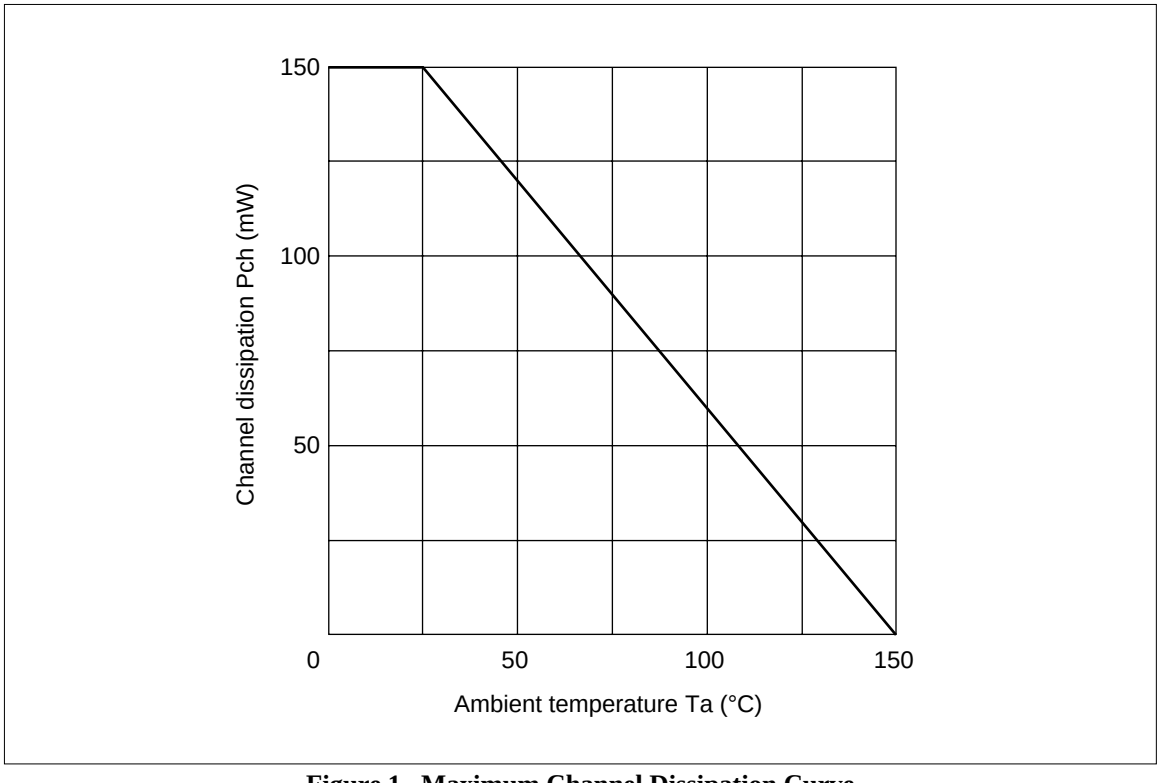

Figure 1 Maximum Channel Dissipation Curve

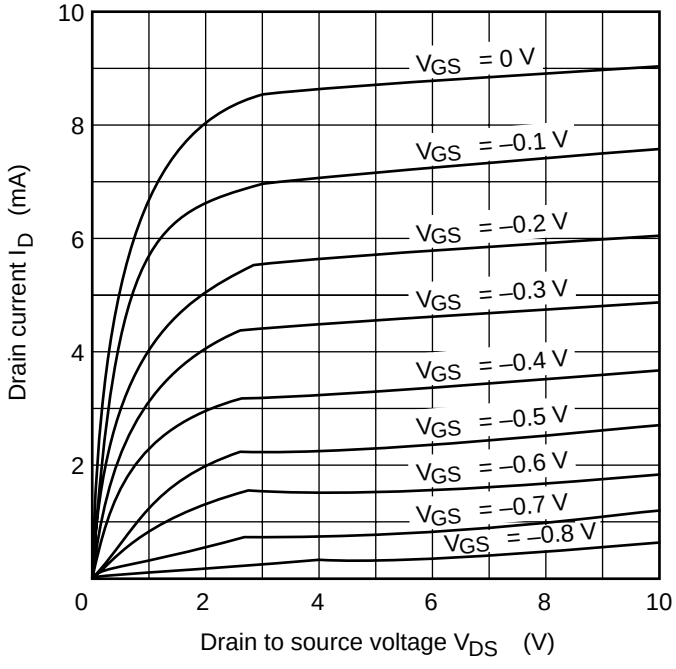

Figure 2 Typical Output Characteristics

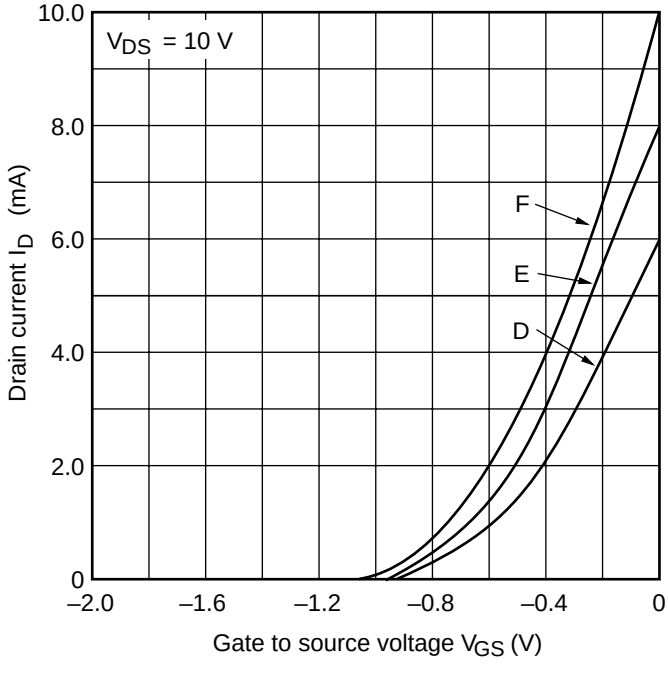

Figure 3 Typical Transfer Characteristics

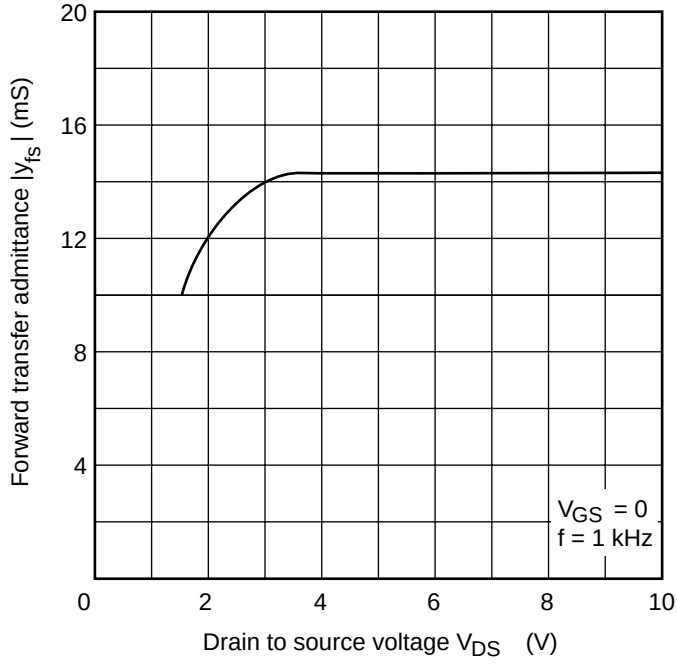

Figure 4 Forward Transfer Admittance vs. Drain to Source Voltage

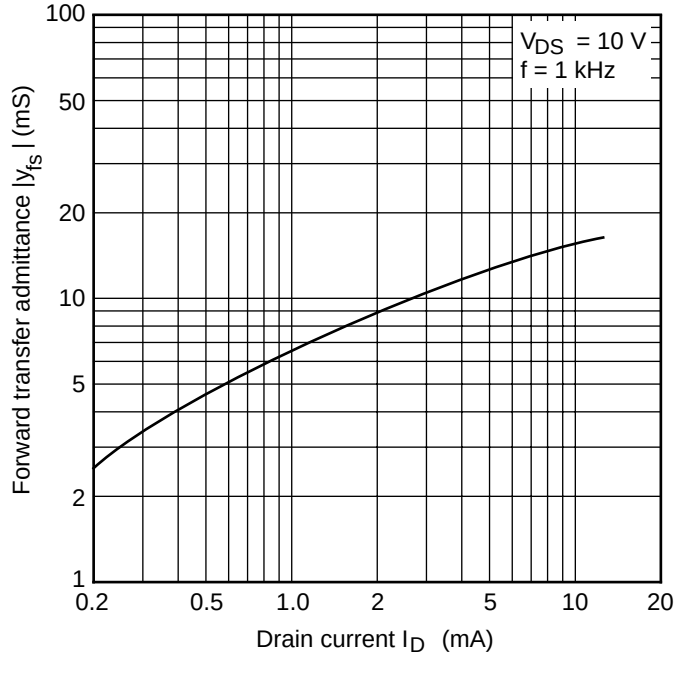

Figure 5 Forward Transfer Admittance vs. Drain Current

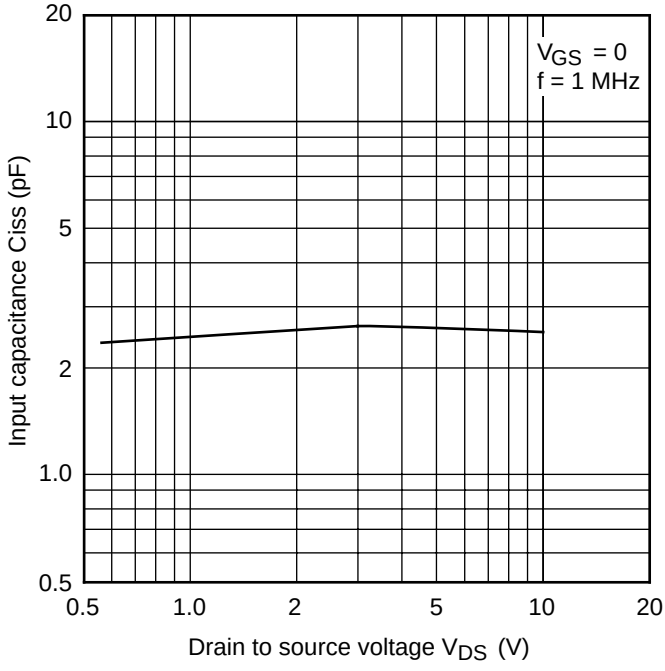

Figure 6 Input Capacitance vs. Drain to Source Voltage

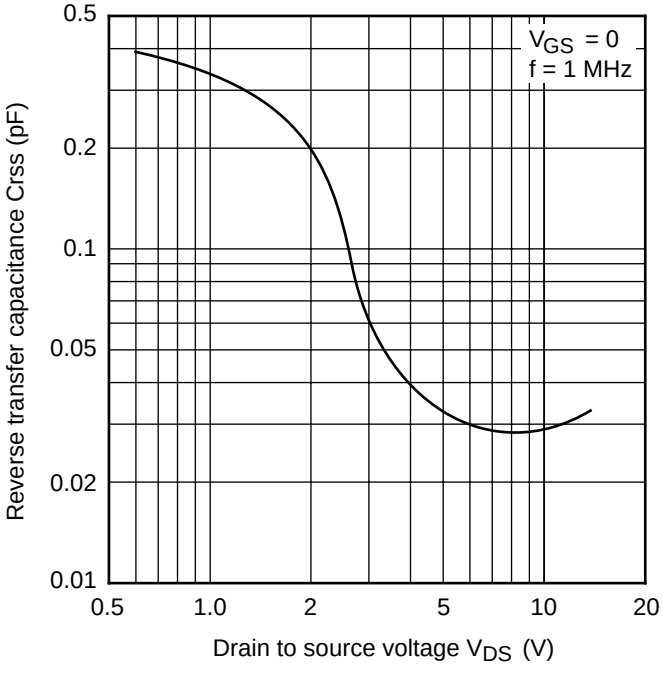

Figure 7 Reverse Transfer Capacitance vs. Drain to Source Voltage

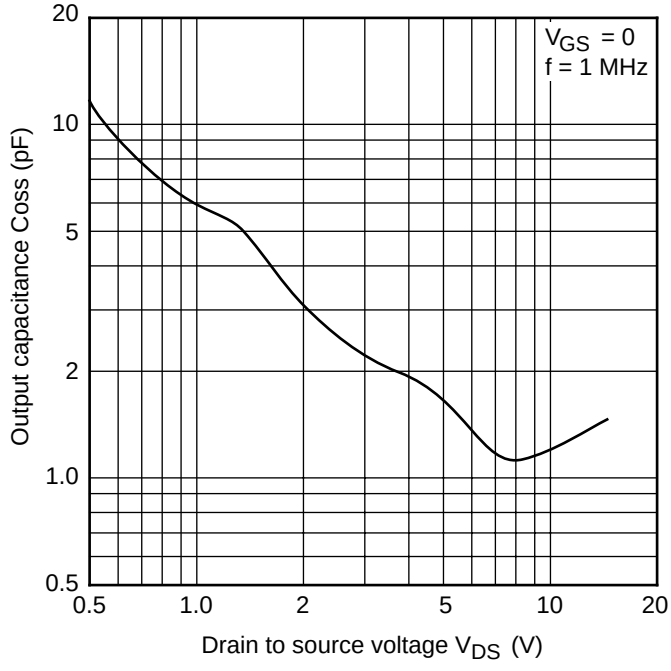

Figure 8 Output Capacitance vs. Drain to Source Voltage

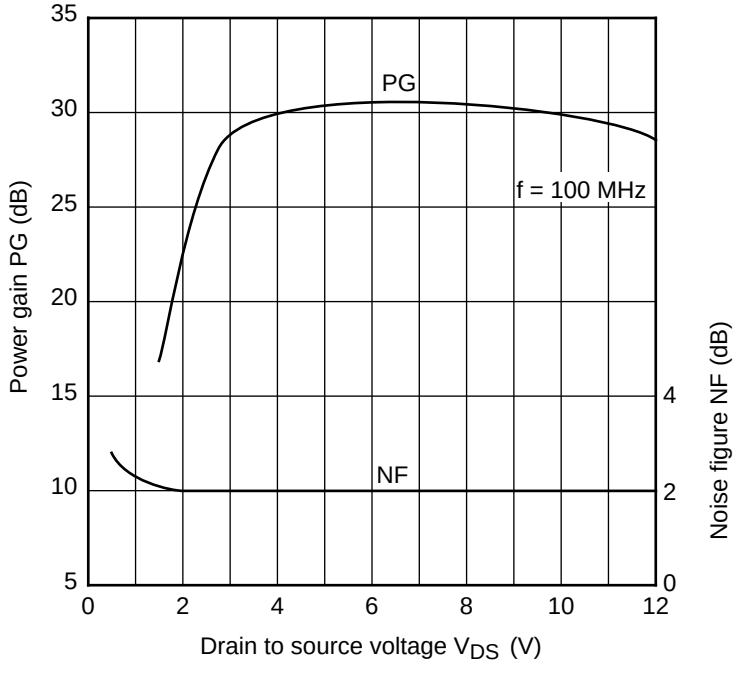

Figure 9 Power Gain, Noise Figure vs. Drain to Source Voltage