DATA SHEET

NEC

JUNCTION FIELD EFFECT TRANSISTOR
2SK4028

N-CHANNEL SILICON JUNCTION FIELD EFFECT TRANSISTOR FOR IMPEDANCE CONVERTER OF ECM

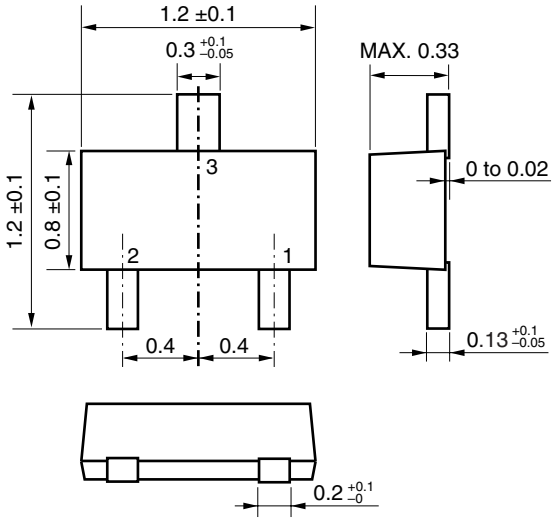
DESCRIPTION

The 2SK4028 is suitable for converter of ECM.

FEATURES

- High gain
  –1.0 dB (V_{DD} = 2.0 V, C = 5 pF, R_L = 2.2 kΩ)
- Low noise
  –115 dB (V_{DD} = 2.0 V, C = 5 pF, R_L = 2.2 kΩ)
- Ultra thin thickness package
  t = 0.3 mm TYP.

PACKAGE DRAWING (Unit: mm)



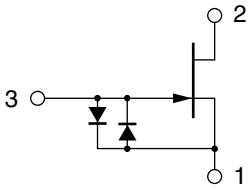
ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK4028	3pXSOF03 (0812)

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = –1.0 V)	V_{DSX}	20	V
Gate to Drain Voltage	V_{GDO}	–20	V
Drain Current	I_D	10	mA
Gate Current	I_G	10	mA
Total Power Dissipation	P_T	100	mW
Junction Temperature	T_j	125	°C
Storage Temperature	T_{stg}	–55 to +125	°C

EQUIVALENT CIRCUIT



1: Source
2: Drain
3: Gate

Caution Please take care of ESD (Electro Static Discharge) when you handle the device in this document.

Document No. D17529EJ1V0DS00 (1st edition)
Date Published April 2005 NS CP(K)
Printed in Japan

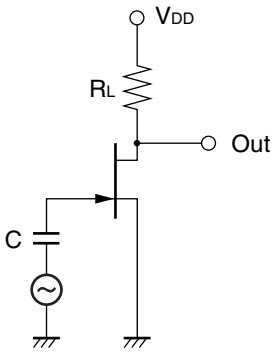
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Cut-off Current	I_{DSS}	V_{DS} = 2.0 V, V_{GS} = 0 V	90	250	430	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 2.0 V, I_D = 1.0 μA		−0.37	−1.0	V
Forward Transfer Admittance	$\lvert y_{fs1} \rvert$	V_{DS} = 2.0 V, I_D = 30 μA, f = 1.0 kHz	320	470		μS
	$\lvert y_{fs2} \rvert$	V_{DS} = 2.0 V, V_{GS} = 0 V, f = 1.0 kHz	800	1600		μS
Input Capacitance	C_{iss}	V_{DS} = 2.0 V, V_{GS} = 0 V, f = 1.0 MHz		4.0		pF
Voltage Gain	G_V	V_{DD} = 2.0 V, C = 5 pF, R_L = 2.2 kΩ, V_{IN} = 10 mV, f = 1 kHz		−1.0		dB
Noise Voltage	NV	V_{DD} = 2.0 V, C = 5 pF, R_L = 2.2 kΩ, A-curve		−115		dB

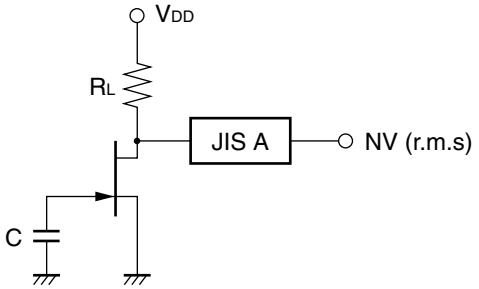
I_{DSS} CLASSIFICATION

MARKING	DE	DF	DH	DJ
I_{DSS} (μA)	90 to 180	150 to 240	210 to 350	320 to 430

GAIN TEST CIRCUIT

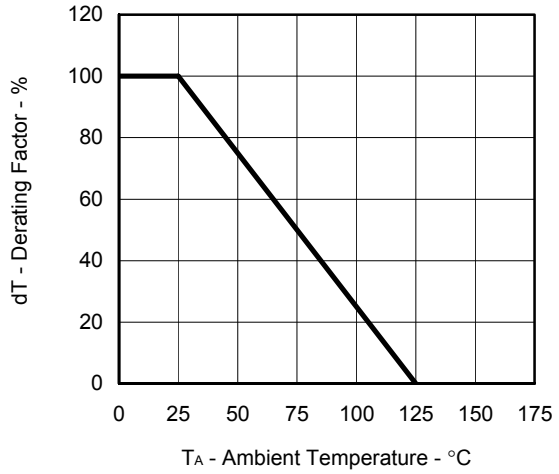


NOISE VOLTAGE TEST CIRCUIT

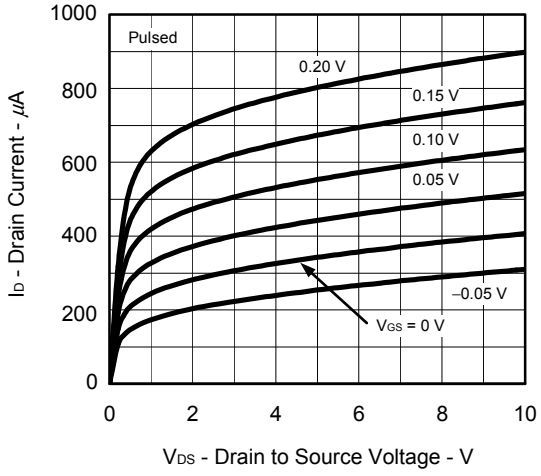


TYPICAL CHARACTERISTICS (T_A = 25°C)

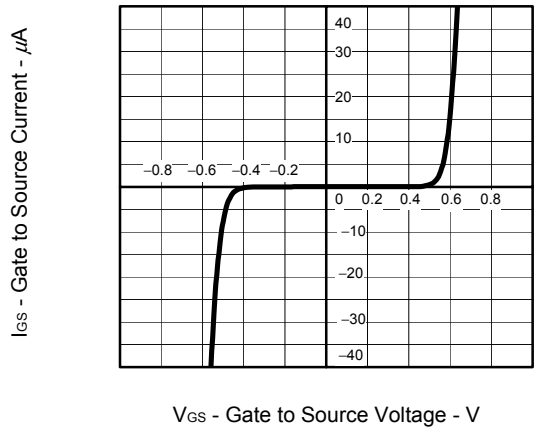
DERATING FACTOR OF POWER DISSIPATION



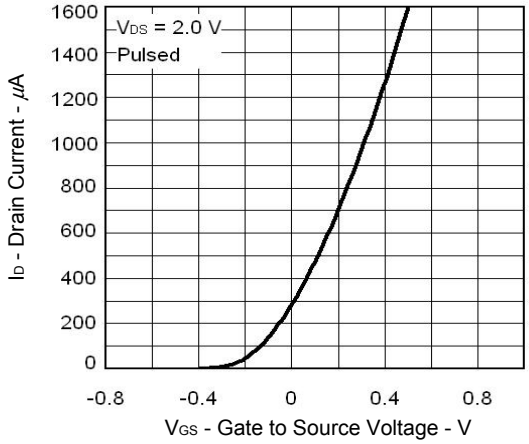
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



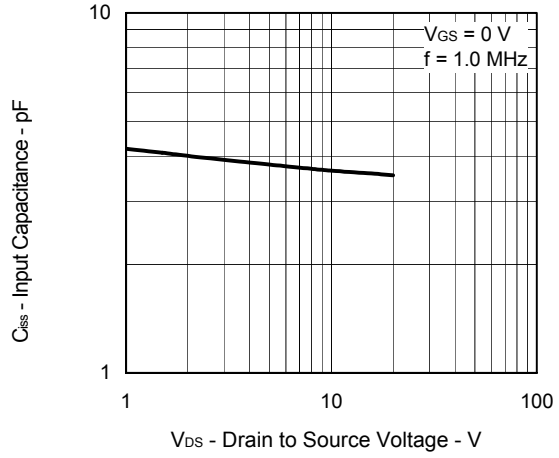
GATE TO SOURCE CURRENT vs.
GATE TO SOURCE VOLTAGE



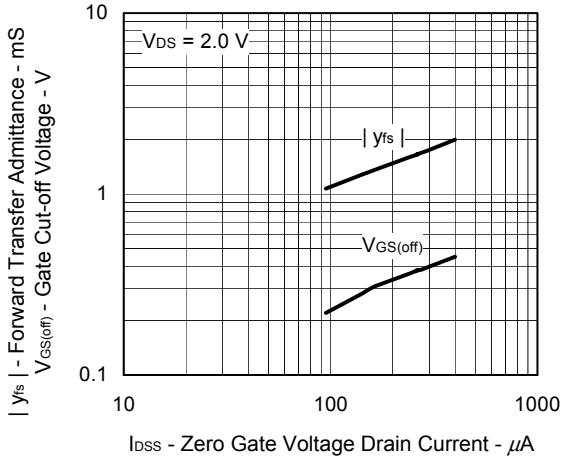
DRAIN CURRENT vs.
GATE TO SOURCE VOLTAGE



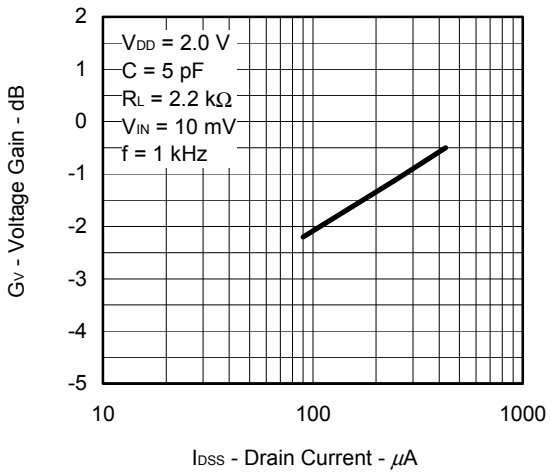
INPUT CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



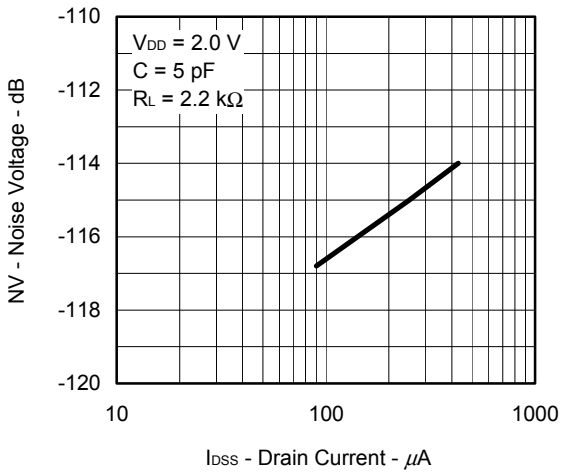
FORWARD TRANSFER ADMITTANCE AND GATE CUT-OFF VOLTAGE vs. ZERO GATE VOLTAGE DRAIN CURRENT



VOLTAGE GAIN vs. DRAIN CURRENT



NOISE VOLTAGE vs. DRAIN CURRENT



- **The information in this document is current as of April, 2005. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC Electronics data sheets or data books, etc., for the most up-to-date specifications of NEC Electronics products. Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.**
- No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Electronics. NEC Electronics assumes no responsibility for any errors that may appear in this document.
- NEC Electronics does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from the use of NEC Electronics products listed in this document or any other liability arising from the use of such products. No license, express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Electronics or others.
- Descriptions of circuits, software and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software and information in the design of a customer's equipment shall be done under the full responsibility of the customer. NEC Electronics assumes no responsibility for any losses incurred by customers or third parties arising from the use of these circuits, software and information.
- While NEC Electronics endeavors to enhance the quality, reliability and safety of NEC Electronics products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. To minimize risks of damage to property or injury (including death) to persons arising from defects in NEC Electronics products, customers must incorporate sufficient safety measures in their design, such as redundancy, fire-containment and anti-failure features.
- NEC Electronics products are classified into the following three quality grades: "Standard", "Special" and "Specific".

  The "Specific" quality grade applies only to NEC Electronics products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of an NEC Electronics product depend on its quality grade, as indicated below. Customers must check the quality grade of each NEC Electronics product before using it in a particular application.

  "Standard": Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots.

  "Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support).

  "Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.

The quality grade of NEC Electronics products is "Standard" unless otherwise expressly specified in NEC Electronics data sheets or data books, etc. If customers wish to use NEC Electronics products in applications not intended by NEC Electronics, they must contact an NEC Electronics sales representative in advance to determine NEC Electronics' willingness to support a given application.

(Note)

(1) "NEC Electronics" as used in this statement means NEC Electronics Corporation and also includes its majority-owned subsidiaries.

(2) "NEC Electronics products" means any product developed or manufactured by or for NEC Electronics (as defined above).