## DATA SHEET



# MOS FIELD EFFECT TRANSISTOR **3SK135A**

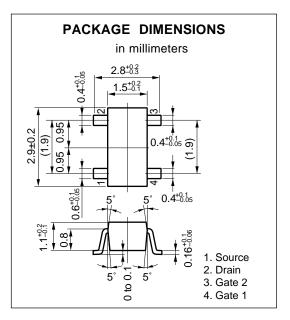
## RF AMP. FOR UHF TV TUNER N-CHANNEL SILICON DUAL-GATE MOS FIELD-EFFECT TRANSISTOR 4PIN MINI MOLD

#### FEATURES

- Suitable for use as RF amplifier in UHF TV tuner.
- Low C<sub>rss</sub> : 0.02 pF TYP.
- High G<sub>ps</sub> : 18 dB TYP.
- Low NF : 2.7 dB TYP.

#### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$ °C)

Drain to Source Voltage	VDSX	20	V
Gate1 to Source Voltage	Vg1s*	±10	V
Gate2 to Source Voltage	Vg2s*	±10	V
Drain Current	lD	25	mA
Total Power Dissipation	Р⊤	200	mW
Channel Temperature	Tch	150	C
Storage Temperature	Tstg	-65 to +150	С
		*R∟ ≥ 10 kΩ	



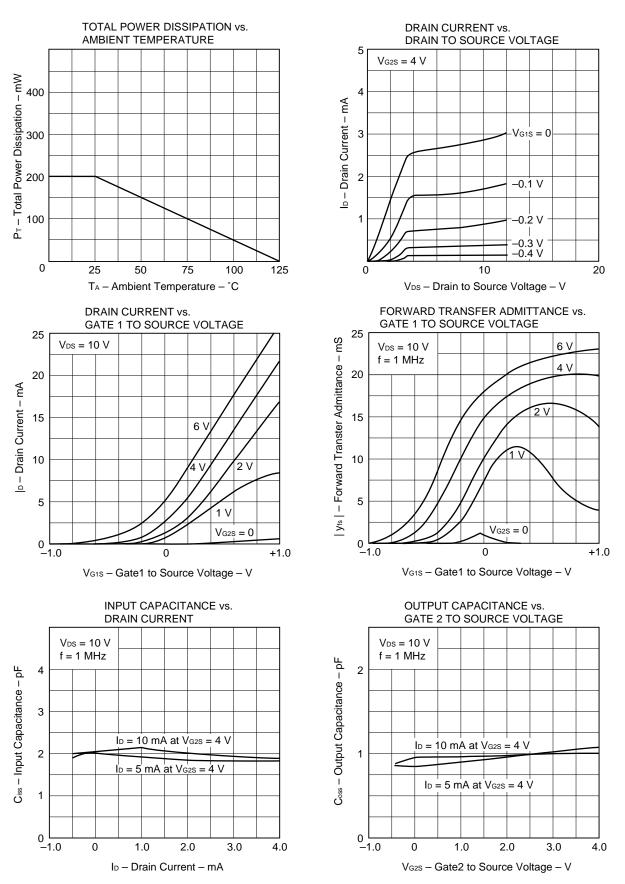
#### ELECTRICAL CHARACTERISTICS (TA = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS	
Drain to Source Breakdown Voltage	BVDSX	20			V	$V_{G1S} = V_{G2S} = -2 V$ , $I_D = 10 \mu A$	
Drain Current	IDSS	0.01		6	mA	$V_{DS} = 5 V, V_{G2S} = 4 V, V_{G1S} = 0$	
Gate1 to Source Cutoff Voltage	VG1S(off)			-2.0	V	$V_{DS} = 10 V, V_{G2S} = 4 V, I_{D} = 10 \mu A$	
Gate2 to Source Cutoff Voltage	VG2S(off)			-0.7	V	$V_{DS} = 10 V, V_{G1S} = 4 V, I_{D} = 10 \mu A$	
Gate1 Reverse Current	I <sub>G1SS</sub>			±20	nA	$V_{DS} = 0, V_{G1S} = \pm 8 V, V_{G2S} = 0$	
Gate2 Reverse Current	Ig2ss			±20	nA	$V_{DS} = 0, V_{G2S} = \pm 8 V, V_{G1S} = 0$	
Forward Transter Admittance	y <sub>fs</sub>	14	18		ms	$V_{DS} = 5 V$ , $V_{G2S} = 4 V$ , $I_D = 10 mA$ , f = 1 kHz	
Input Capacitance	Ciss	1.5		2.5	pF	Vds = 10 V, Vg2s = 4 V,	
Output capacitance	Coss	0.5	1.0	1.5	pF	l⊳ = 10 mA, f = 1 MHz	
Reverse Transfer Capacitance	Crss		0.02	0.03	pF		
Power Gain	G <sub>ps</sub> *	16	18		dB	$V_{DS} = 10 V, V_{G2S} = 4 V, I_D = 10 mA,$	
Noise Figure	NF*		2.7	4.5	dB	f = 900 MHz	

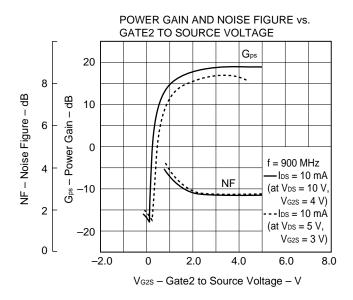
IDSS Classification

Class	L/LS*	K/KS*		
Marking	U65	U66		
IDSS	0.01 to 2	1 to 6		

Old specification/New specification



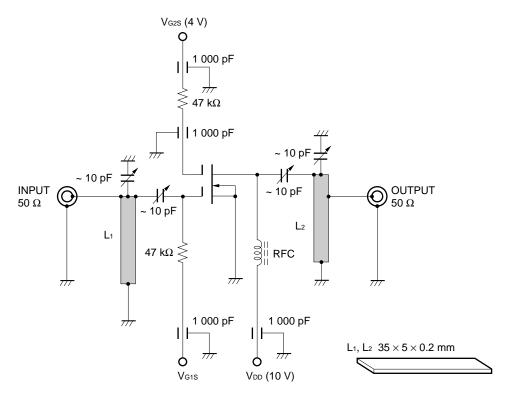
#### TYPICAL CHARACTERISTICS ( $T_A = 25$ °C)



### S-PARAMETER, Y-PARAMETER

S1, Y1 CONDITION	S1-MAG & Al FREQ.		11		21		12		22
$\begin{cases} V_{DS} = 10 \text{ V} \\ V_{G2S} = 4 \text{ V} \\ I_{DS} = 10 \text{ mA} \end{cases}$	50 100 200 300 400 500 600 700 800 900 1000	1.023 0.989 0.966 0.923 0.871 0.841 0.776 0.676 0.631 0.575 0.537	-2 -8 -11 -22 -23 -33 -34 -41 -43 -47 -49	1.758 1.778 1.758 1.758 1.718 1.738 1.718 1.698 1.660	173 165 153 139 128 113 101 88 76 64 48	0.002 0.003 0.003 0.008 0.017 0.034 0.058 0.089 0.130 0.172	86 102 56 167 -153 -160 -166 -178 173 160 142	1.023 0.977 0.966 0.933 0.912 0.902 0.891 0.881 0.881 0.891	0 4 7 -10 -11 -15 -15 -18 -21 -20 -34
	YI-MAG & AN FREQ.		11		21		12		22
	50 100 200 300 400 500 600 700 800 900 1000	0.405 1.382 1.937 3.962 4.327 6.197 6.589 8.151 8.287 8.404 8.085	125 85 80 77 69 71 62 53 47 44 46	17.940 18.399 19.044 20.003 20.688 21.986 23.697 24.190 23.916	6 9 18 26 36 45 58 69 81 94 103	0.020 0.024 0.027 0.033 0.086 0.205 0.434 0.803 1.269 1.878 2.492	-93 -72 -115 2 43 42 35 25 16 2 2 -9	0.234 0.715 1.226 1.773 2.069 2.801 2.754 2.973 2.985 2.079 4.327	-176 71 80 78 68 67 60 58 59 65 90
S2, Y2 CONDITION	S2-MAG & ANGL FREQ.		11		21		12		22
$\begin{cases} V_{DS} = 10 \text{ V} \\ V_{G2S} = 4 \text{ V} \\ I_{DS} = 5 \text{ mA} \end{cases}$	50 100 200 300 400 500 600 700 800 900 1000	$\begin{array}{c} 1.023\\ 0.989\\ 0.966\\ 0.933\\ 0.891\\ 0.851\\ 0.794\\ 0.684\\ 0.624\\ 0.556\\ 0.501\end{array}$	-2 -8 -11 -22 -23 -34 -35 -43 -43 -46 -51 -52	1.531 1.549 1.531 1.567 1.531 1.567 1.549 1.549 1.531	174 166 153 140 129 114 102 88 76 64 48	0.002 0.003 0.003 0.008 0.017 0.035 0.062 0.095 0.143 0.191	64 118 49 177 -148 -157 -161 -174 176 163 144	1.035 0.989 0.977 0.944 0.923 0.912 0.902 0.891 0.891 0.891	0 -4 -7 -10 -11 -15 -16 -19 -22 -22 -35
	Y2-MAG & ANGL FREQ.		11		21		12		22
	50 100 200 300 400 500 600 700 800 900	0.411 1.385 1.940 3.946 4.259 6.358 6.724 8.534 8.961 9.289	126 85 80 79 73 72 64 55 48 43	15.540 16.026 16.402 17.533 18.279 19.600 21.366 22.388	-5 -8 -18 -24 -35 -43 -56 -67 -79 -92	0.022 0.027 0.028 0.032 0.087 0.207 0.444 0.851 1.380 2.120	-115 -56 -122 13 48 46 41 31 21 7	0.354 0.690 1.229 1.759 2.034 2.770 2.914 3.157 3.168 2.336	-178 80 82 71 69 64 62 61 67

900 MHz Gps AND NF TEST CIRCUIT



 $V_{DS} = 10 V$ ,  $V_{G2S} = 4 V$ ,  $I_D = 10 mA$ 

No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.

NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.

While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customer must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.

NEC devices are classified into the following three quality grades:

"Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device 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: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC devices in "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact NEC Sales Representative in advance.

Anti-radioactive design is not implemented in this product.

M4 94.11