

SONY**2SK613**

Silicon N-Channel Junction FET

*T-29-25***Description**

Making the best of Epitaxy and Pattern latest technology, 2SK613 accomplishes so far unattainable levels of performance.

Usage with head amplifiers for video cameras and the like, ensures the highest efficiency.

Features

● High figure of merit

$$\left(\begin{array}{l} V_{DS} = 5V \\ I_D = 10mA \end{array} \right) |Y_{fs}| / C_{iss} 4.5$$

● High forward transfer admittance

$$\left(\begin{array}{l} V_{DS} = 5V \\ V_{GS} = 0V \end{array} \right) |Y_{fs}| \quad 30 \text{ mS(Typ.)}$$

● Low input capacitance

$$C_{iss} \quad 6.6 \text{ pF(Typ.)}$$

Structure

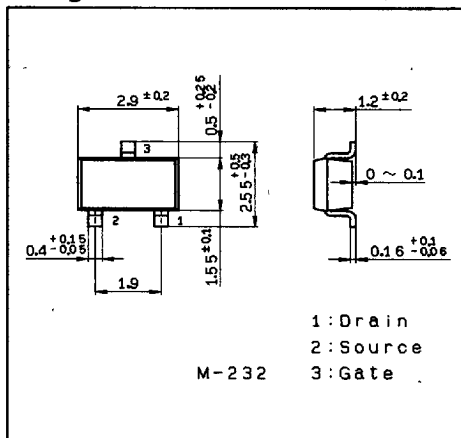
● Silicon N-Channel junction FET

Absolute Maximum Ratings (Ta=25°C)

● Drain to gate voltage	V_{DGO}	15	V
● Source to gate voltage	V_{SGO}	15	V
● Drain current	I_D	50	mA
● Gate current	I_G	5	mA
● Allowable power dissipation	P_D	150	mW
● Junction temperature	T_j	150	°C
● Storage temperature	T_{stg}	-55 to +150	°C

Package Outline

Unit: mm



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T-29-25**Electrical Characteristics**

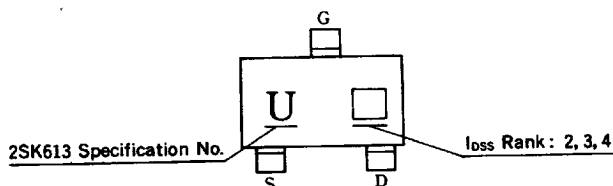
Unless otherwise specified (Ta = 25°C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain to Gate Voltage	V_{DGS}	$I_G = 10 \mu A$	15			V
Source to Gate Voltage	V_{SGS}	$I_G = 10 \mu A$	15			V
Drain to Source Voltage	V_{DSX}	$I_D = 10 \mu A, V_{GS} = -3 V$	15			V
Gate Cutoff Current	I_{GSS}	$V_{GS} = -7 V, V_{DS} = 0 V$			-2	nA
Drain Current	$I_{DSS} *$	$V_{GS} = 5 V, V_{DS} = 0 V$	13.4		42.0	mA
Gate to Source Cutoff Voltage	$V_{GS(OFF)} *$	$V_{DS} = 5 V, I_D = 100 \mu A,$	-0.65		-2.0	V
Forward Transfer Admittance	$ Y_{fs} *$	$V_{DS} = 5 V, V_{GS} = 0 V, f = 1 kHz$	23	30		mS
Input Capacitance	C_{iss}	$V_{DS} = 5 V, V_{GS} = 0 V, f = 1 MHz$		6.6	7.5	pF
Equivalent Input Noise Voltage	$\bar{e}_n$	$V_{DS} = 5 V, I_D = 10 mA, R_g = 0 \Omega, f = 1 kHz$		4.0	7.0	nV/ $\sqrt{Hz}$

(* Drain current detail specification as follows.)

Classification

	$I_{DSS} (mA) \left(\begin{matrix} V_{DS} = 5 V \\ V_{GS} = 0 V \end{matrix} \right)$	$V_{GS(OFF)} (V) \left(\begin{matrix} V_{DS} = 5 V \\ I_D = 100 \mu A \end{matrix} \right)$	$ Y_{fs} (mS) \left(\begin{matrix} V_{DS} = 5 V \\ V_{GS} = 0 V \\ f = 1 kHz \end{matrix} \right)$	Mark
2SK613-2	13.4 to 21.0	-0.65 to -1.26	23	2
2SK613-3	19.0 to 30.2	-0.85 to -1.6	25	3
2SK613-4	27.4 to 42.0	-1.05 to -2.0	29	4

Mark

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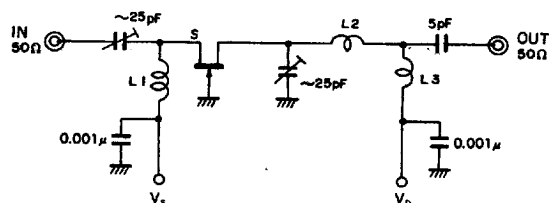
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Standard Circuit Design Data

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Item	Symbol	Condition	Typ.	Unit
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = 5\text{ V}, I_D = 10\text{ mA}, f = 1\text{ kHz}$	.25	mS
Input Capacitance	C_{iss}	$V_{DS} = 5\text{ V}, I_D = 10\text{ mA}, f = 1\text{ MHz}$	5.5	pF
Gate Cutoff Current	I_g	$V_{GS} = 5\text{ V}, I_D = 10\text{ mA}$	10	pA
Input Resistance	r_{is}	$V_{DS} = 5\text{ V}, I_D = 10\text{ mA}, f = 100\text{ MHz}$	3.5	k Ω
Input Capacitance	C_{is}		5.5	pF
Output Resistance	r_{os}		2.0	k Ω
Output Capacitance	C_{os}		1.5	pF
Power Gain	PG	$V_{DS} = 5\text{ V}, I_D = 10\text{ mA}, f = 100\text{ MHz}$	14	dB
Noise Figure	NF		1.8	dB
Equivalent Input Noise Voltage	$\bar{e}_n$	$V_{DS} = 5\text{ V}, I_D = 10\text{ mA}, f = 1\text{ kHz}, R_g = 0\text{ }\Omega$	4.0	nV/ $\sqrt{\text{Hz}}$
Reverse Transfer	C_{rss}	$V_{DS} = 5\text{ V}, V_s = 0\text{ V}, f = 1\text{ MHz}$	1.6	pF

100 MHz PG, NF Test Circuit



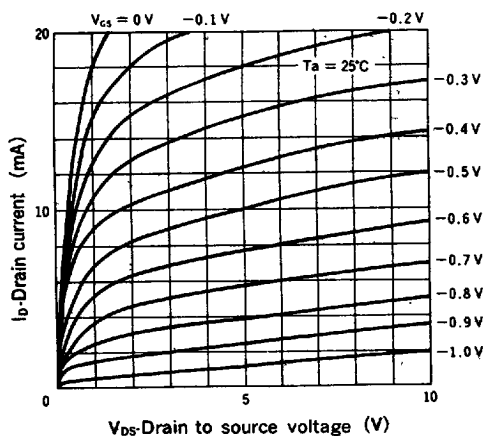
- L1: ϕ 0.45 mm Polyurethan wire ϕ 3 mm 10.5 t
 L2: ϕ 0.45 mm Polyurethan wire ϕ 3 mm 5.5 t
 L3: ϕ 0.45 mm Polyurethan wire ϕ 3 mm 5.5 t

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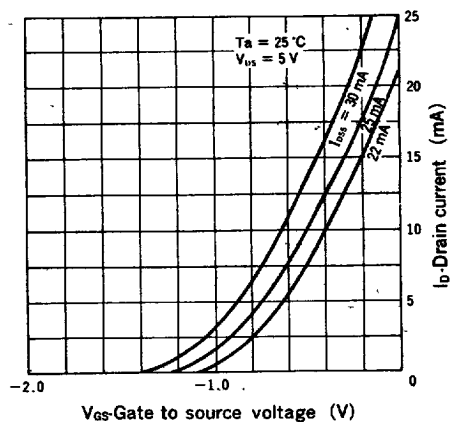
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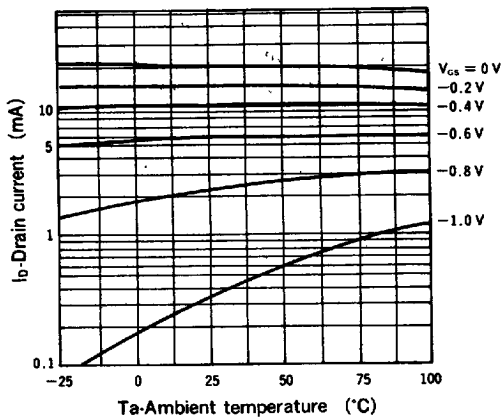
Drain current vs. Gate to source voltage



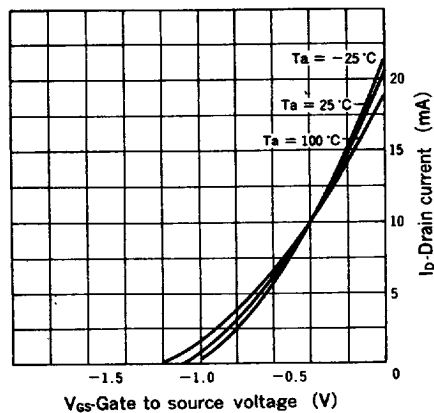
Drain current vs. Gate to source voltage



Drain current vs. Ambient temperature



Drain current vs. Gate to source voltage

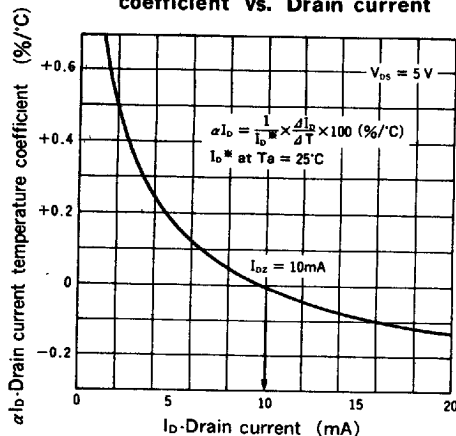


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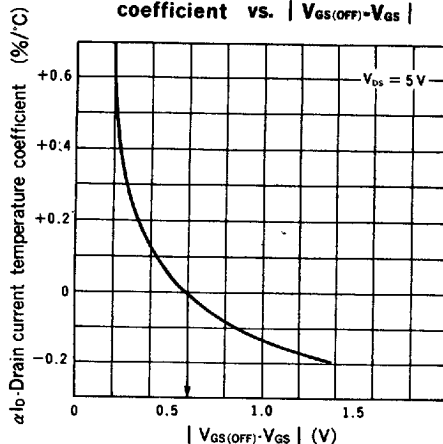
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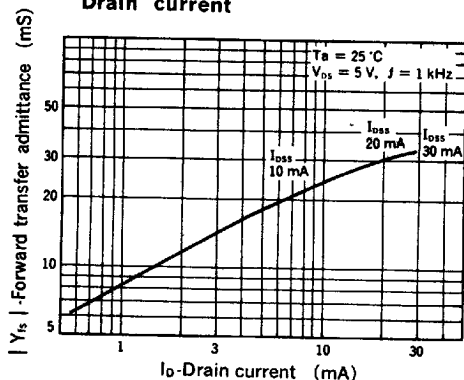
Drain current temperature coefficient vs. Drain current



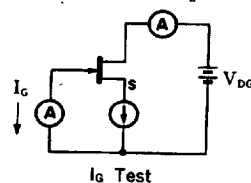
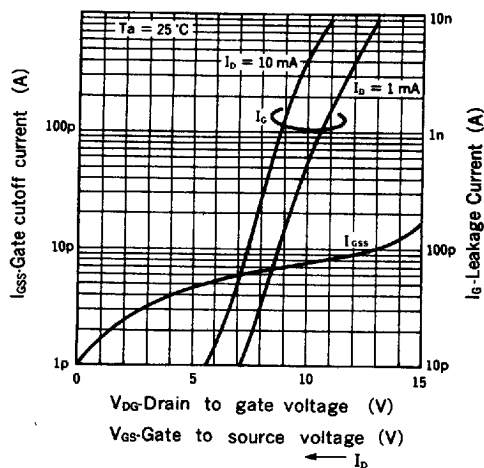
Drain current temperature coefficient vs. $|V_{GS(OFF)} - V_{GS}|$



Forward transfer admittance vs. Drain current



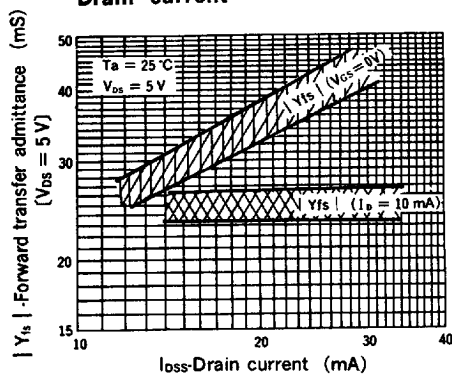
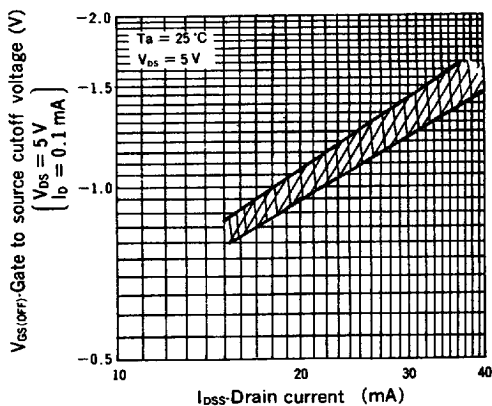
Gate cutoff current vs. Voltage



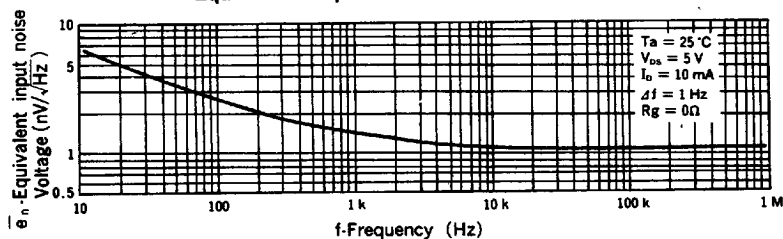
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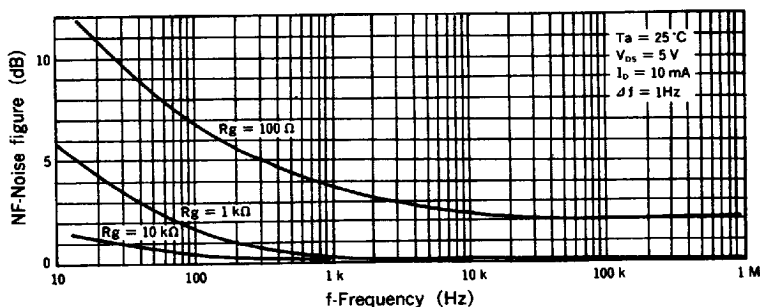
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Forward transfer admittance vs.
Drain currentGate to source cutoff voltage vs.
Drain current

Equivalent input noise voltage vs. Frequency



Noise figure vs. Frequency

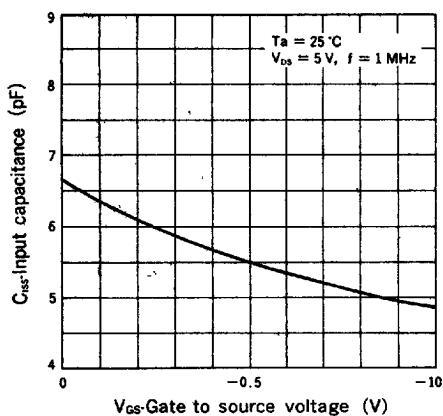


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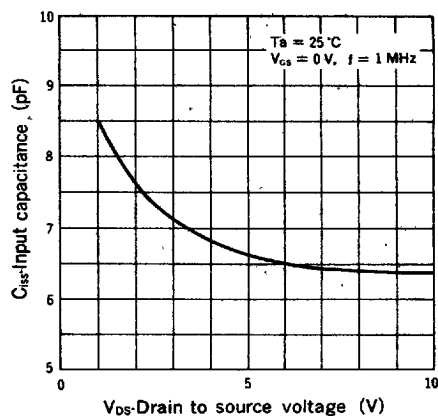
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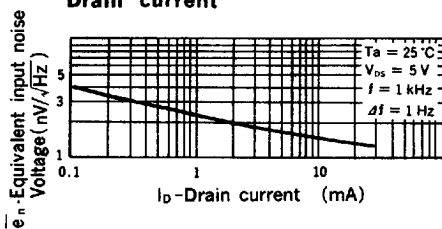
Input capacitance vs. Gate to source voltage



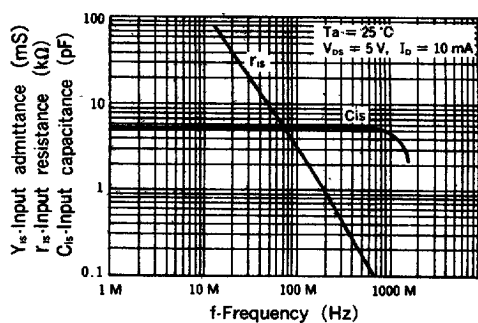
Input capacitance vs. Drain to source voltage



Equivalent input noise voltage vs. Drain current



Input admittance vs. Frequency

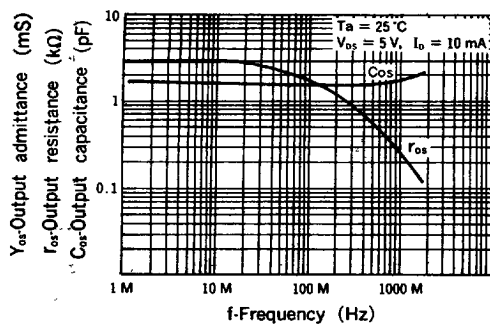


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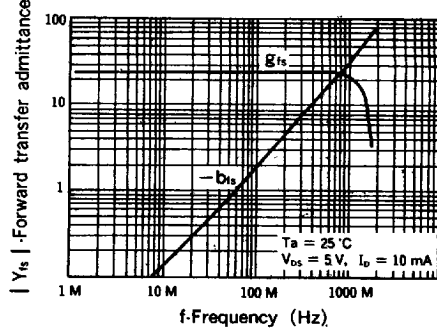
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Output admittance vs. Frequency



Forward transfer admittance vs. Frequency



Reverse transfer admittance vs. Frequency

