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

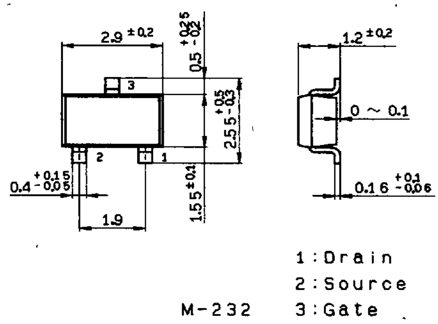
- High figure of merit
  (V_{DS} = 5 V, I_D = 10 mA) $|Y_{fs}|$/Ciss 4.5
- High forward transfer admittance
  (V_{DS} = 5 V, V_{GS} = 0 V) $|Y_{fs}|$ 30 mS (Typ.)
- Low input capacitance
  Ciss 6.6 pF (Typ.)

Structure

- Silicon N-Channel junction FET

Package Outline

Unit: mm



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	Tj	150	°C
● Storage temperature	Tstg	−55 to +150	°C

60199A-HP

Electrical Characteristics

Unless otherwise specified (Ta = 25°C)

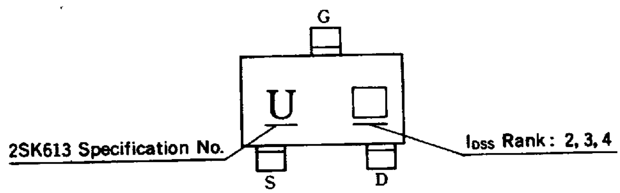
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain to Gate Voltage	V_{DGO}	$I_G = 10\,\mu A$	15			V
Source to Gate Voltage	V_{SGO}	$I_G = 10\,\mu A$	15			V
Drain to Source Voltage	V_{DSX}	$I_D = 10\,\mu A$, $V_{GS} = -3\,V$	15			V
Gate Cutoff Current	I_{GSS}	$V_{GS} = -7\,V$, $V_{DS} = 0\,V$			−2	nA
Drain Current	I_{DSS} *	$V_{GS} = 5\,V$, $V_{GS} = 0\,V$	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	$\lvert Y_{fs} \rvert$ *	$V_{DS} = 5\,V$, $V_{GS} = 0\,V$, $f = 1\,kHz$	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	$\bar{e}_n$	$V_{DS} = 5\,V$, $I_D = 10\,mA$, $Rg = 0\,\Omega$, $f = 1\,kHz$		4.0	7.0	$nV/\sqrt{Hz}$

(*Drain current detail specification as follows.)

Classification

	I_{DSS}(mA) ($V_{DS} = 5\,V$, $V_{GS} = 0\,V$)	$V_{GS(OFF)}$ (V) ($V_{DS} = 5\,V$, $I_D = 100\,\mu A$)	$\lvert Y_{fs} \rvert$ (mS) ($V_{DS} = 5\,V$, $V_{GS} = 0\,V$, $f = 1\,kHz$)	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

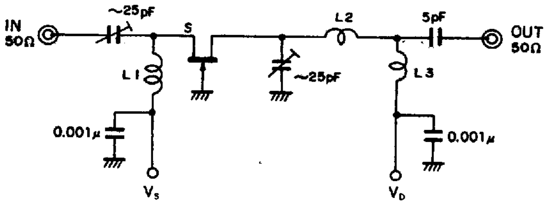


T-29-25

Standard Circuit Design Data

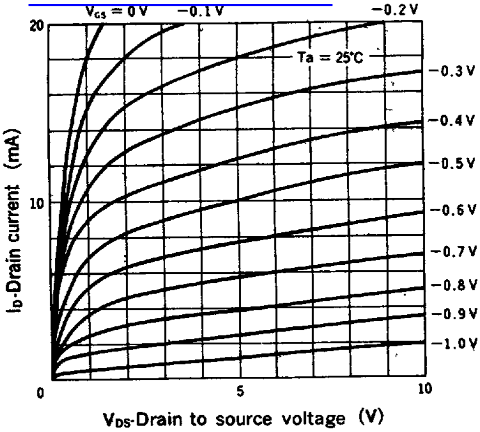
Item	Symbol	Condition	Typ.	Unit
Forward Transfer Admittance	$\mid Y_{fs} \mid$	V_{DS} = 5 V, I_D = 10 mA, f = 1 kHz	25	mS
Input Capacitance	C_{iss}	V_{DS} = 5 V, I_D = 10 mA, f = 1 MHz	5.5	pF
Gate Cutoff Current	I_G	V_{DG} = 5 V, I_D ≒ 10 mA	10	pA
Input Resistance	r_{is}	V_{DS} = 5 V, I_D = 10 mA, f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

100 MHz PG, NF Test Circuit

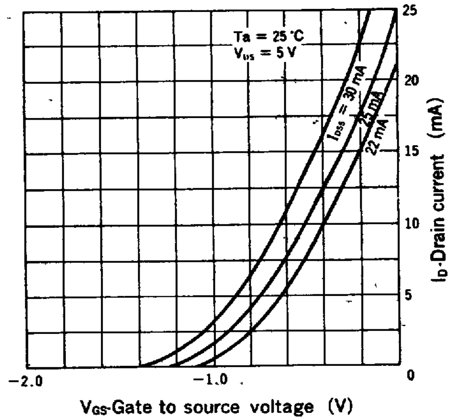


L1: φ 0.45 mm Polyurethan wire φ 3 mm 10.5 t
L2: φ 0.45 mm Polyurethan wire φ 3 mm 5.5 t
L3: φ 0.45 mm Polyurethan wire φ 3 mm 5.5 t

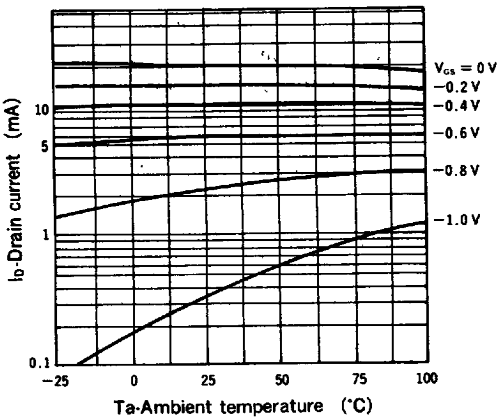
Drain current vs. Gate to source voltage



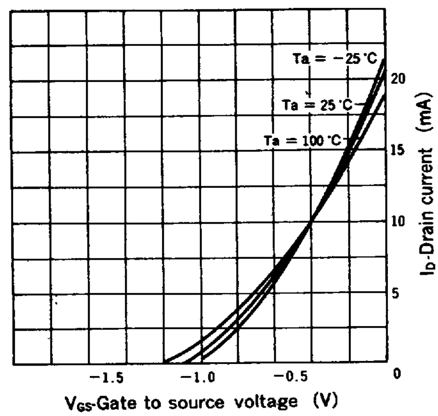
Drain current vs. Gate to source voltage



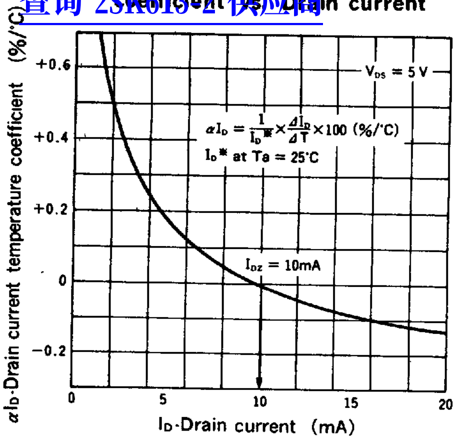
Drain current vs. Ambient temperature



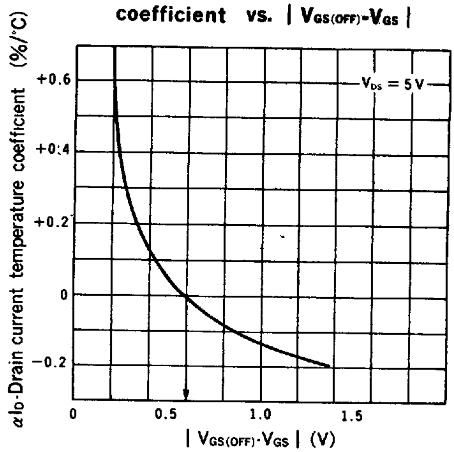
Drain current vs. Gate to source voltage



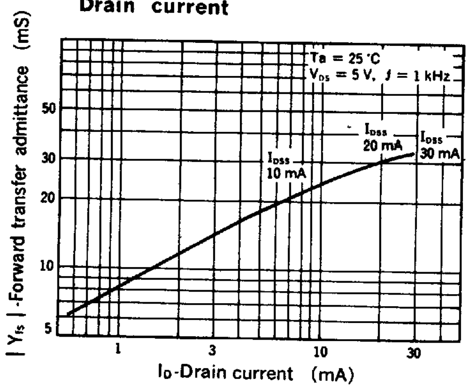
Drain current temperature coefficient vs. Drain current



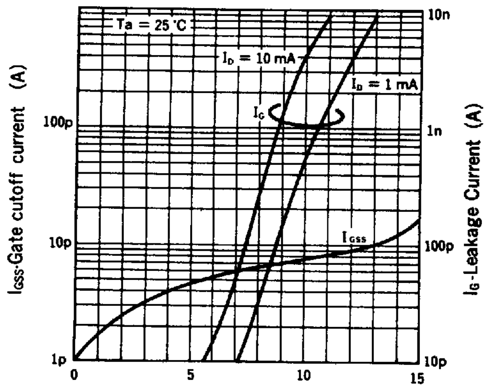
Drain current temperature coefficient vs. | VGS(OFF)-VGS |

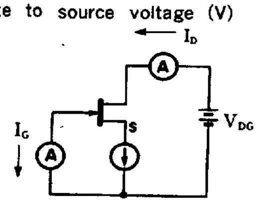


Forward transfer admittance vs. Drain current

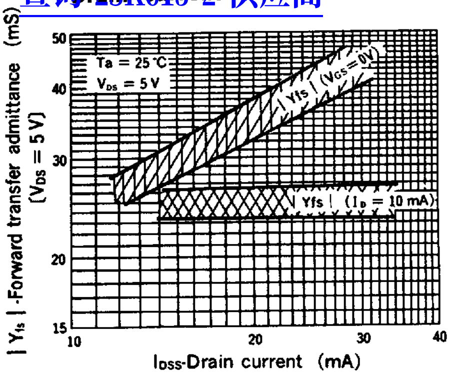


Gate cutoff current vs. Voltage

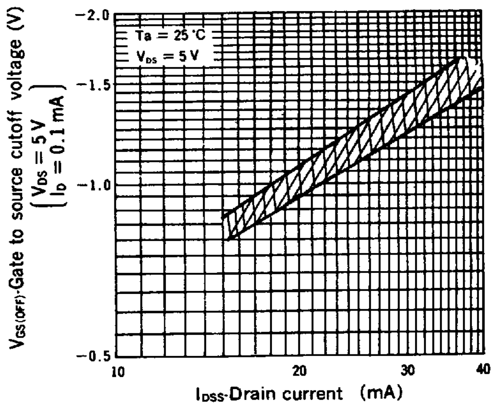




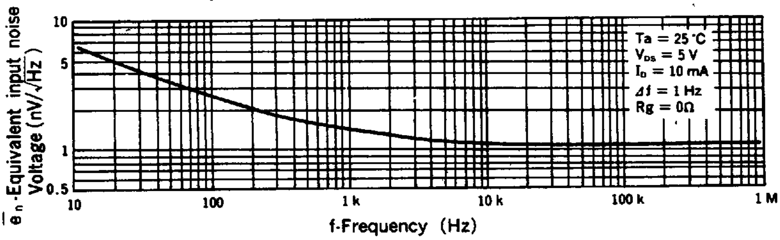
Forward transfer admittance vs. Drain current



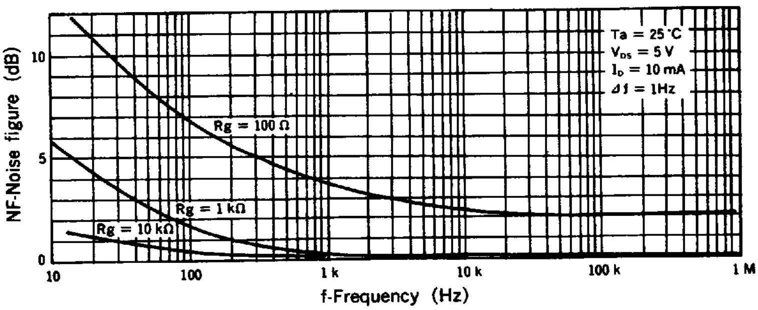
Gate to source cutoff voltage vs. Drain current



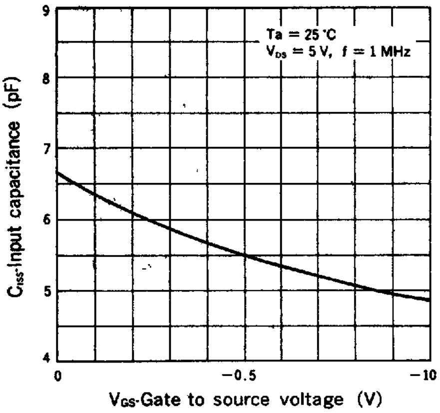
Equivalent input noise voltage vs. Frequency



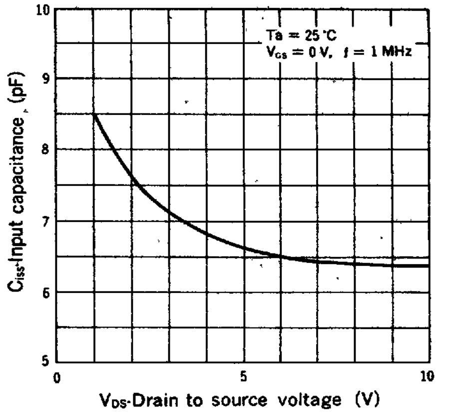
Noise figure vs. Frequency



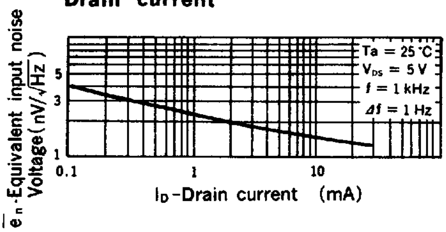
Input capacitance vs. Gate to source voltage



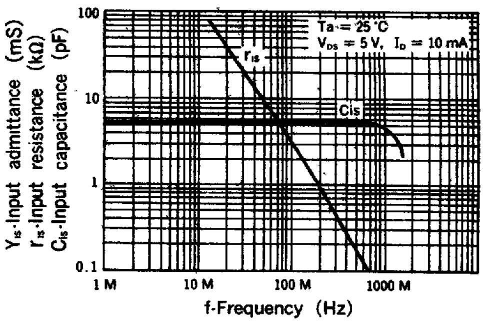
Input capacitance vs. Drain to source voltage



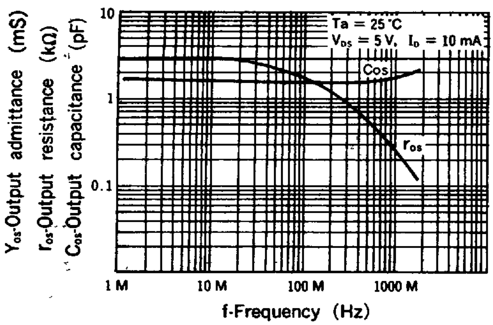
Equivalent input noise voltage vs. Drain current



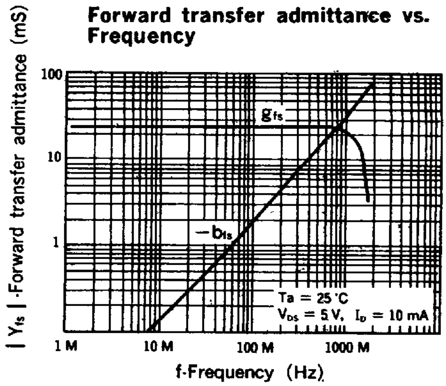
Input admittance vs. Frequency



Output admittance vs. Frequency



Forward transfer admittance vs. Frequency



Reverse transfer admittance vs. Frequency