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SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

N-channel Silicon Juncton FET

TF202THC — Electret Condenser Microphone Applications

Features

- Ultrasmall package facilitates miniaturization in end products.
- Especially suited for use in electret condenser microphone for audio equipments and telephones.
- Excellent voltage characteristics.
- Excellent transient characteristics.
- Adoption of FBET process.
- Halogen free compliance.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Gate-to-Drain Voltage	V_{GDO}		−20	V
Gate Current	I_G		10	mA
Drain Current	I_D		1	mA
Allowable Power Dissipation	P_D		100	mW
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Gate-to-Drain Breakdown Voltage	$V_{(BR)GDO}$	I_G=−100μA	−20			V
Cutoff Voltage	$V_{GS(off)}$	V_{DS}=5V, I_D=1μA	−0.2	−0.6	−1.0	V

Continued on next page.

Continued from preceding page.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain Current	I_{DSS}	V_{DS}=5V, V_{GS}=0V	140*		350*	μA
Forward Transfer Admittance	| yfs |	V_{DS}=5V, V_{GS}=0V, f=1kHz	0.5	1.0		mS
Input Capacitance	Ciss	V_{DS}=5V, V_{GS}=0V, f=1MHz		3.5		pF
Reverse Transfer Capacitance	Crss	V_{DS}=5V, V_{GS}=0V, f=1MHz		0.65		pF
[Ta=25°C, V_{CC}=4.5V, R_L=1kΩ, Cin=15pF, See specified Test Circuit.]						
Voltage Gain	GV	V_{IN}=10mV, f=1kHz		−3.0		dB
Reduced Voltage Characteristic	ΔGVV	V_{IN}=10mV, f=1kHz, V_{CC}=4.5V → 1.5V		−1.2	−3.5	dB
Frequency Characteristic	ΔGvf	f=1kHz to 110Hz			−1.0	dB
Input Impedance	Z_{IN}	f=1kHz	25			MΩ
Output Impedance	Z_O	f=1kHz		1000		Ω
Total Harmonic Distortion	THD	V_{IN}=30mV, f=1kHz		1.2		%
Output Noise Voltage	V_{NO}	V_{IN}=0V, A Curve			−110	dB

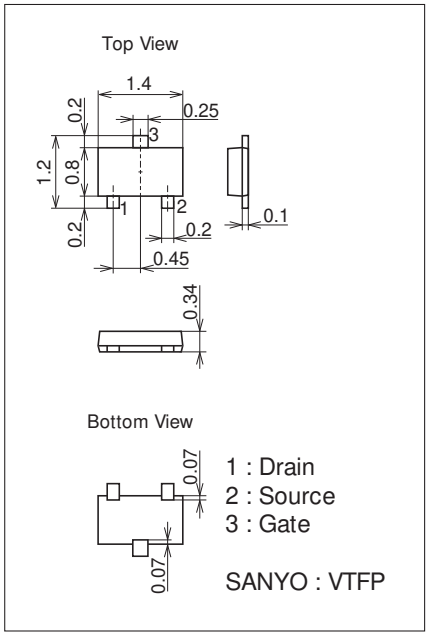
* : The TF202THC is classified by I_{DSS} as follows : (unit : μA)

Marking	E4	E5
Rank	4	5
I_{DSS}	140 to 240	210 to 350

Package Dimensions

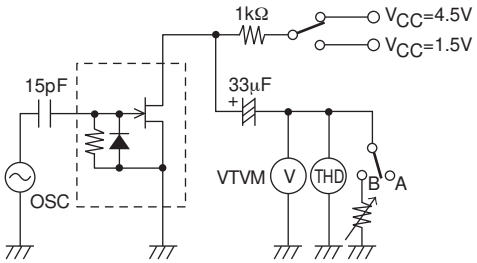
unit : mm (typ)

7031-001

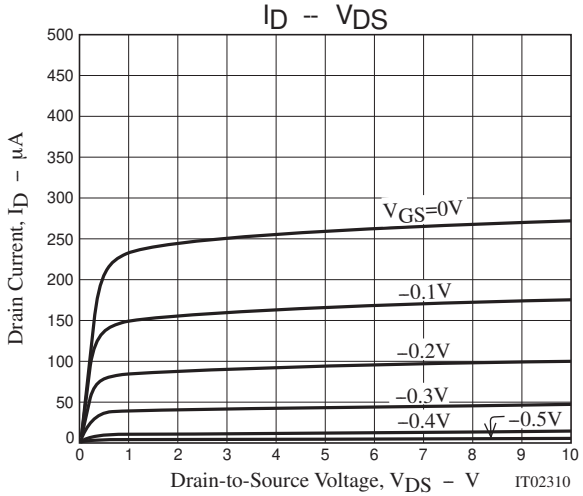


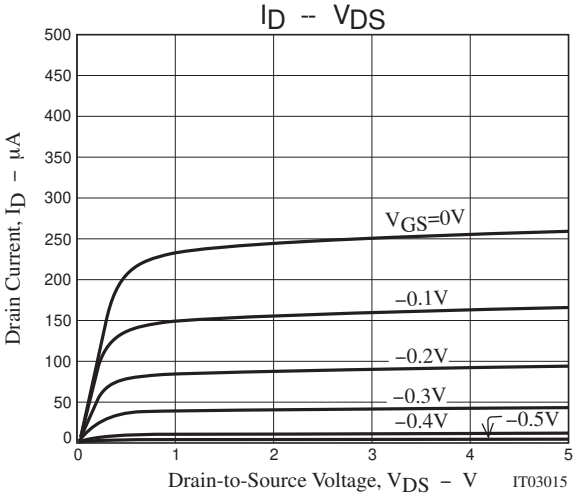
Test Circuit

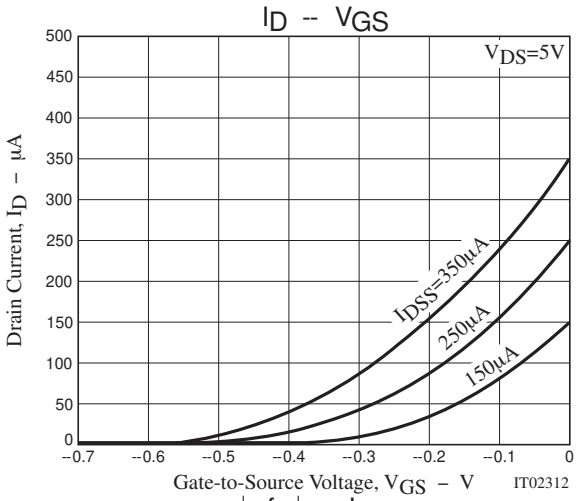
Voltage gain
Frequency Characteristic
Distortion
Reduced Voltage Characteristic

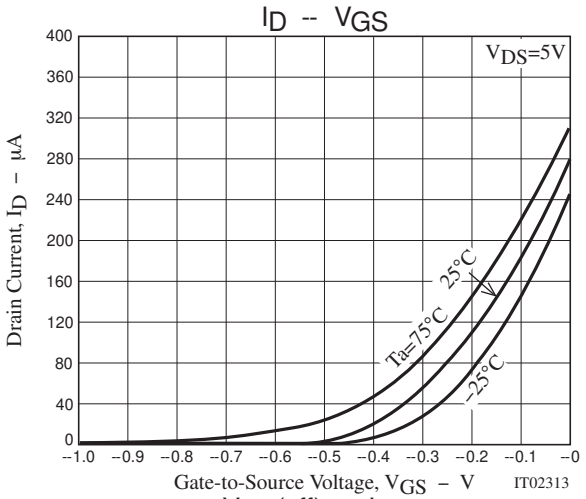


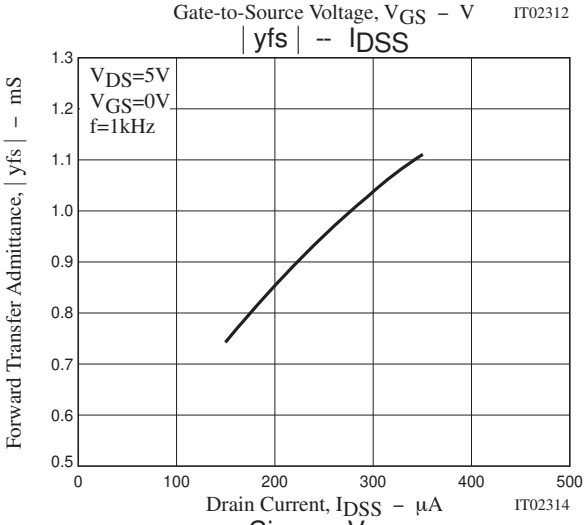
Output Impedance

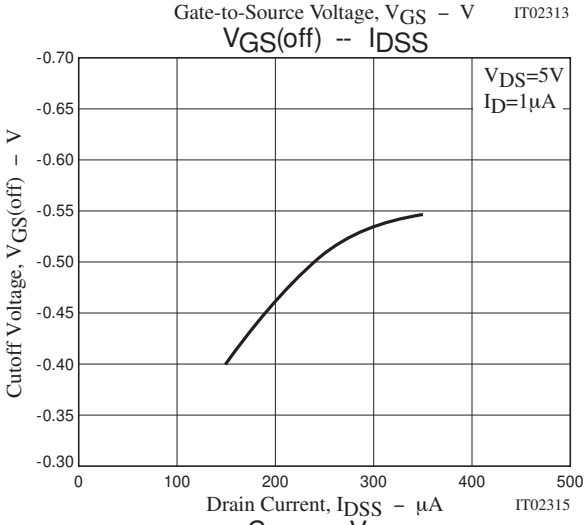


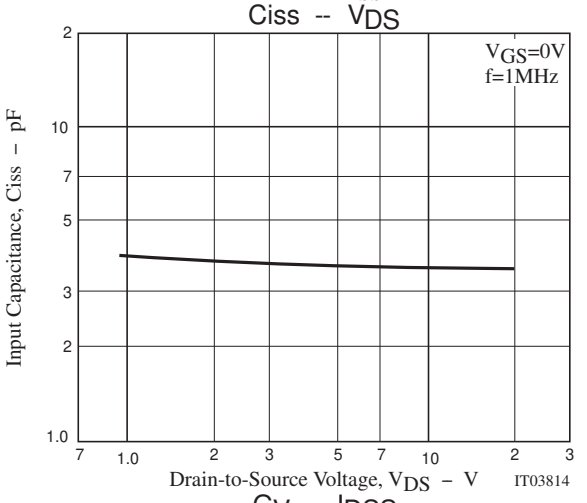


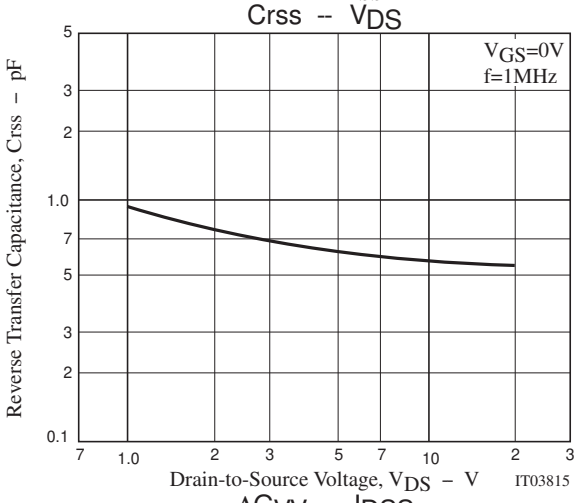

ID -- VGS
VDS=5V
IDSS=350μA
250μA
150μA
Drain Current, ID – μA
Gate-to-Source Voltage, VGS – V
IT02312

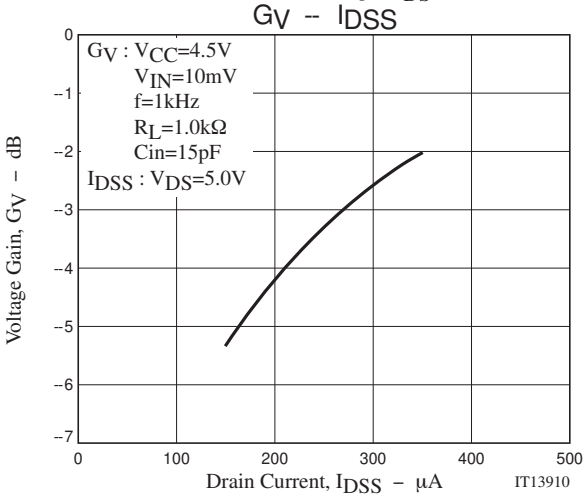

ID -- VGS
VDS=5V
25°C
Ta=75°C
–25°C
Drain Current, ID – μA
Gate-to-Source Voltage, VGS – V
IT02313

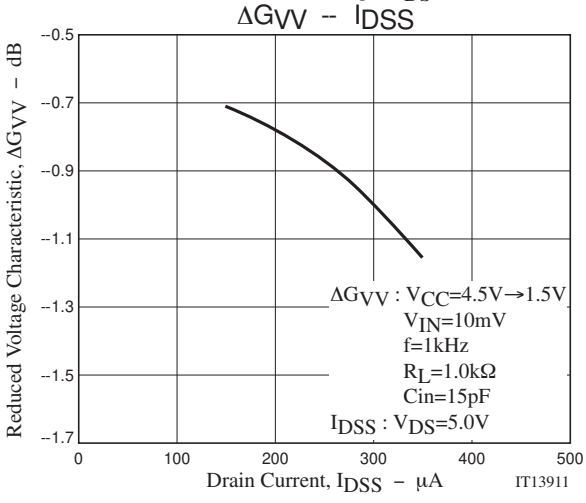

| yfs | -- IDSS
VDS=5V
VGS=0V
f=1kHz
Forward Transfer Admittance, | yfs | – mS
Drain Current, IDSS – μA
IT02314


VGS(off) -- IDSS
VDS=5V
ID=1μA
Cutoff Voltage, VGS(off) – V
Drain Current, IDSS – μA
IT02315

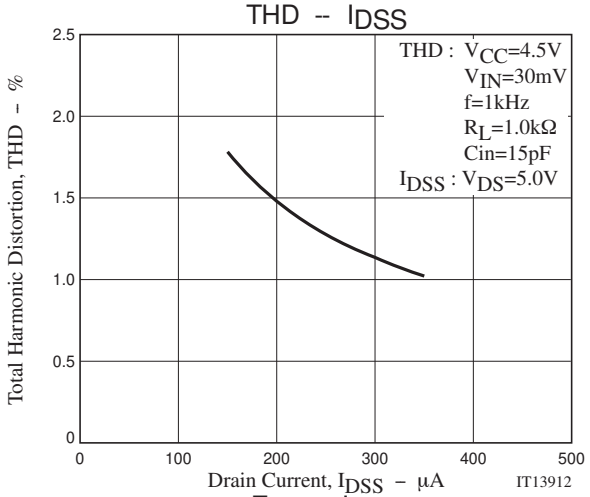

Ciss -- VDS
VGS=0V
f=1MHz
Input Capacitance, Ciss – pF
Drain-to-Source Voltage, VDS – V
IT03814


Crss -- VDS
VGS=0V
f=1MHz
Reverse Transfer Capacitance, Crss – pF
Drain-to-Source Voltage, VDS – V
IT03815

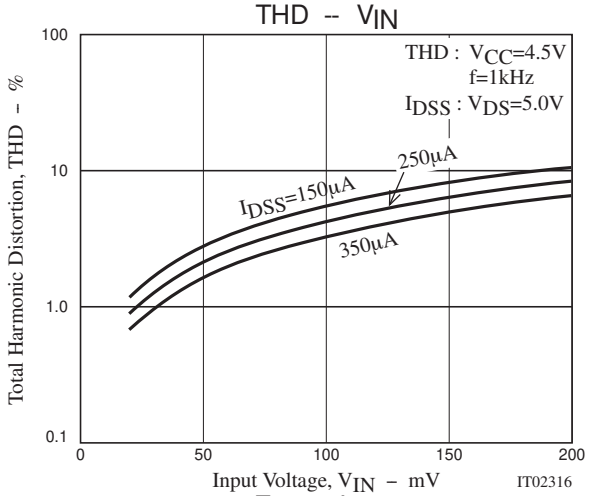

GV -- IDSS
GV : VCC=4.5V
VIN=10mV
f=1kHz
RL=1.0kΩ
Cin=15pF
IDSS : VDS=5.0V
Voltage Gain, GV – dB
Drain Current, IDSS – μA
IT13910


ΔGVV -- IDSS
ΔGVV : VCC=4.5V→1.5V
VIN=10mV
f=1kHz
RL=1.0kΩ
Cin=15pF
IDSS : VDS=5.0V
Reduced Voltage Characteristic, ΔGVV – dB
Drain Current, IDSS – μA
IT13911

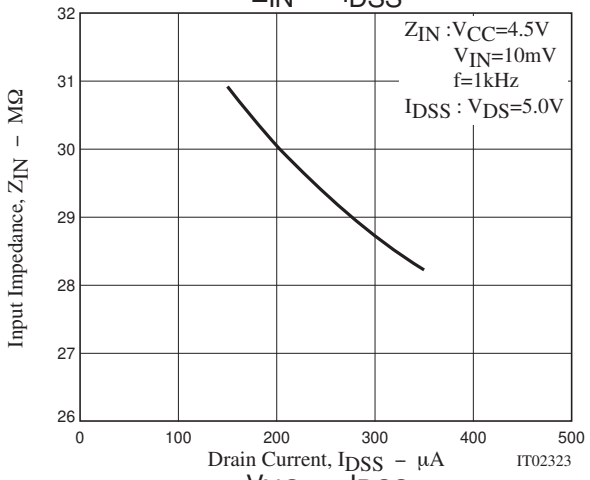
THD -- I_{DSS}



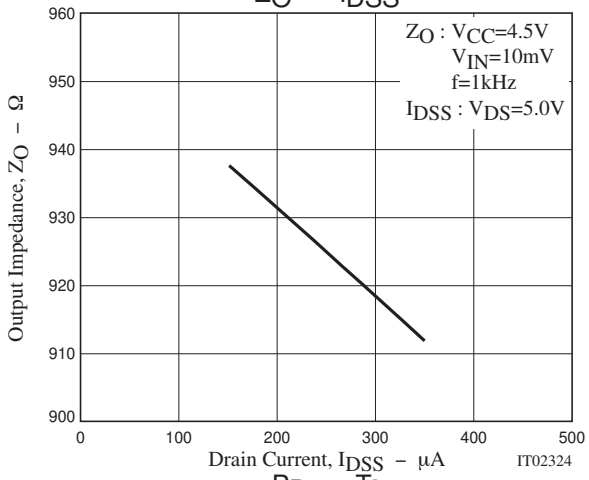
THD -- V_{IN}



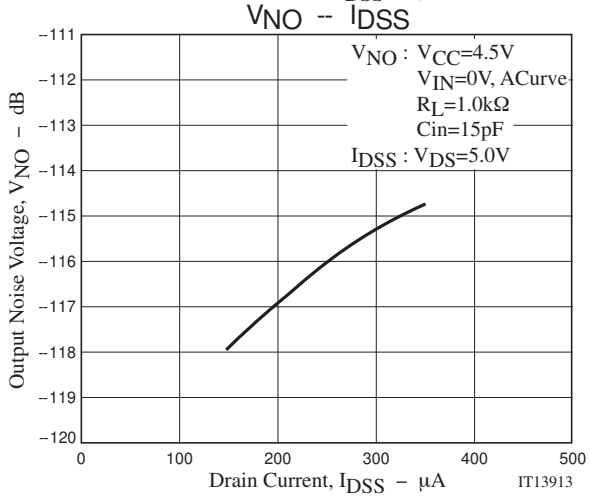
Z_{IN} -- I_{DSS}



Z_O -- I_{DSS}



V_{NO} -- I_{DSS}



P_D -- Ta