Ordering number : ENA1617A

SANYO Semiconductors
DATA SHEET

An ON Semiconductor Company

N-channel Silicon Juncton FET

TF256TH — Electret Condenser Microphone Applications

Features

- High gain : G_V=2.7dB typ (V_{CC}=2V, R_L=2.2kΩ, Cin=5pF, V_{IN}=10mV, f=1kHz)
- Ultrasmall package facilitates miniaturization in end products
- Best suited for use in electret condenser microphone for audio equipments and telephones
- Excellent transient characteristics
- Adoption of FBET process
- Halogen free compliance

Specifications

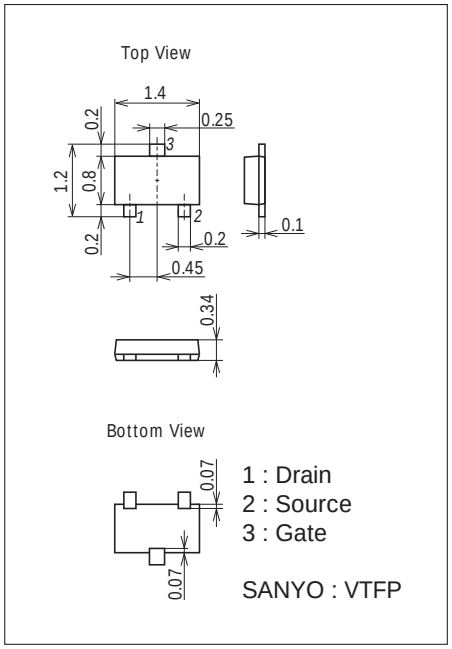
Absolute Maximum Ratings at Ta=25°C

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

Package Dimensions

unit : mm (typ)

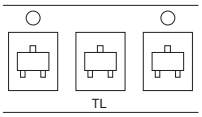
7031-001



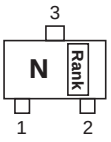
Product & Package Information

- Package : VTFP
- JEITA, JEDEC : SC-106A
- Minimum Packing Quantity : 8,000 pcs./real

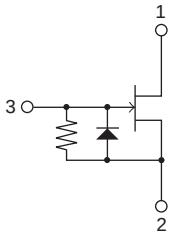
Packing Type: TL



Marking



Electrical Connection



Electrical Characteristics at Ta=25°C

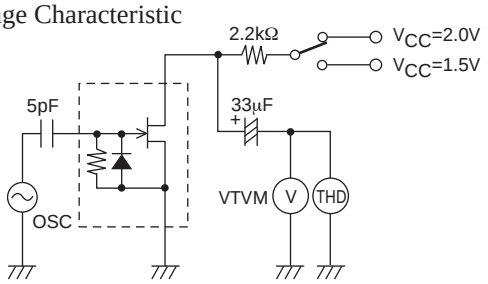
Parameter	Symbol	Conditions	Ratings				Unit
			Rank	min	typ	max	
Gate-to-Drain Breakdown Voltage	$V_{(BR)GDO}$	I_G=−100μA		−20			V
Cutoff Voltage	$V_{GS}(off)$	V_{DS}=2V, I_D=1μA		−0.1	−0.35	−1.0	V
Drain Current	I_{DSS}*	V_{DS}=2V, V_{GS}=0V	3	100		180	μA
			4	140		280	
			5	240		450	
Forward Transfer Admittance	| yfs |	V_{DS}=2V, V_{GS}=0V, f=1kHz		0.75	1.7		mS
Input Capacitance	Ciss	V_{DS}=2V, V_{GS}=0V, f=1MHz			3.1		pF
Reverse Transfer Capacitance	Crss	V_{DS}=2V, V_{GS}=0V, f=1MHz			1.0		pF
[Ta=25°C, V_{CC}=2.0V, R_L=2.2kΩ, Cin=5pF, See specified Test Circuit.]							
Voltage Gain	G_V	V_{IN}=10mV, f=1kHz	3		1.0		dB
			4		2.0		
			5		3.0		
Reduced Voltage Characteristic	ΔG_{VV}	V_{IN}=10mV, f=1kHz, V_{CC}=2.0V → 1.5V	3		−0.5	−1.0	dB
			4		−0.6	−1.3	
			5		−0.9	−2.0	
Frequency Characteristic	ΔGvf	f=1kHz to 110Hz				−1.0	dB
Total Harmonic Distortion	THD	V_{IN}=30mV, f=1kHz	3		1.4		%
			4		0.9		
			5		0.35		
Output Noise Voltage	V_{NO}	V_{IN}=0V, A curve			−105	−100	dB

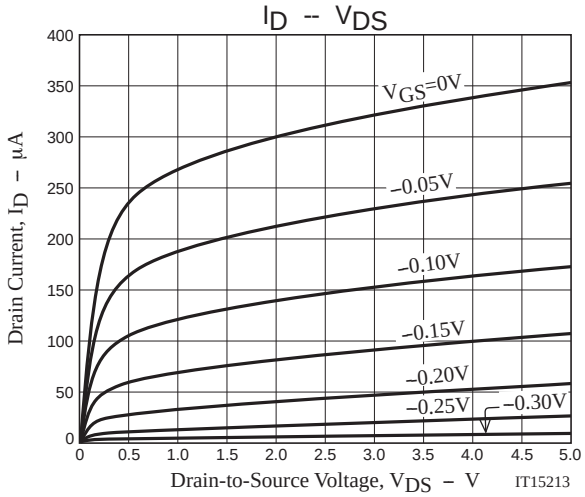
* : The TF256TH is classified by I_{DSS} as follows : (unit : μA)

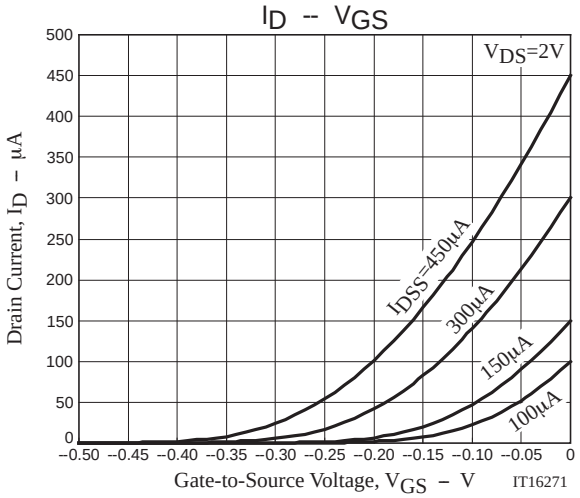
Marking	N3	N4	N5
Rank	3	4	5
I_{DSS}	100 to 180	140 to 280	240 to 450

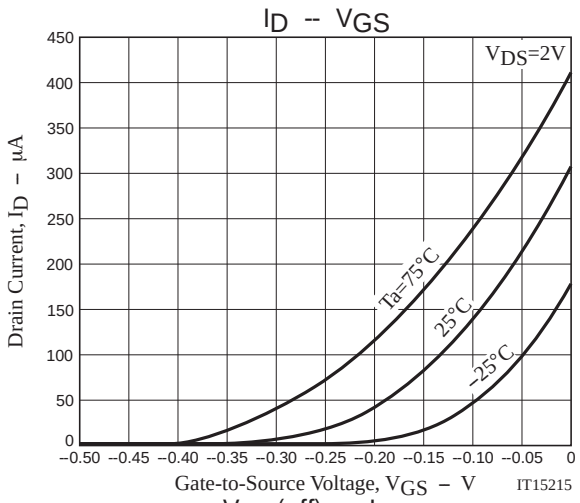
Test Circuit

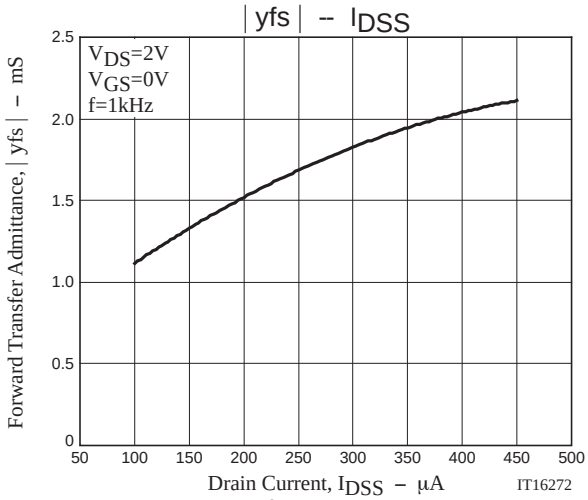
Voltage gain
Frequency Characteristic
Distortion
Reduced Voltage Characteristic

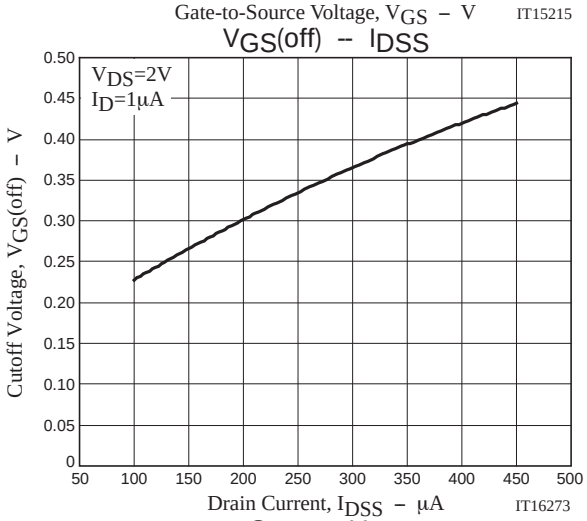


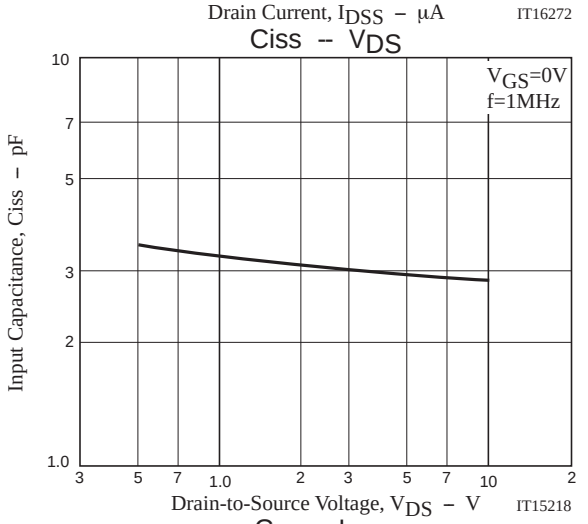


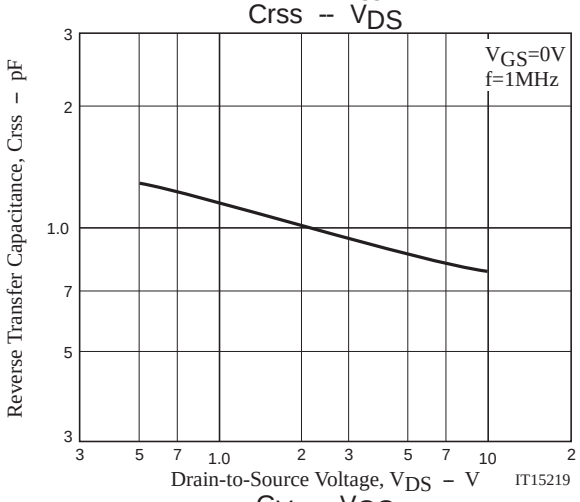


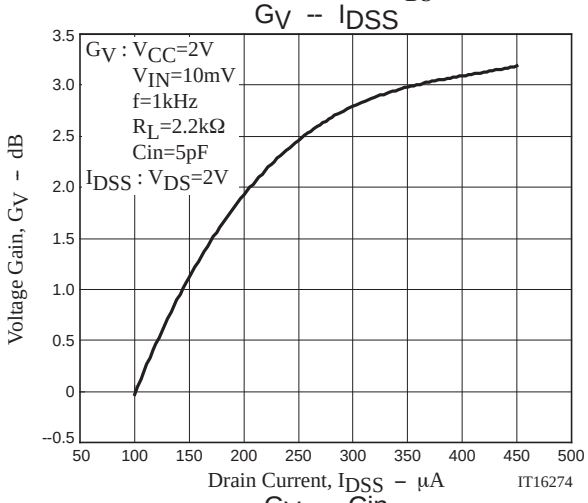

ID -- VGS
VDS=2V
Ta=75°C
25°C
–25°C
Drain Current, ID – μA
Gate-to-Source Voltage, VGS – V
IT15215

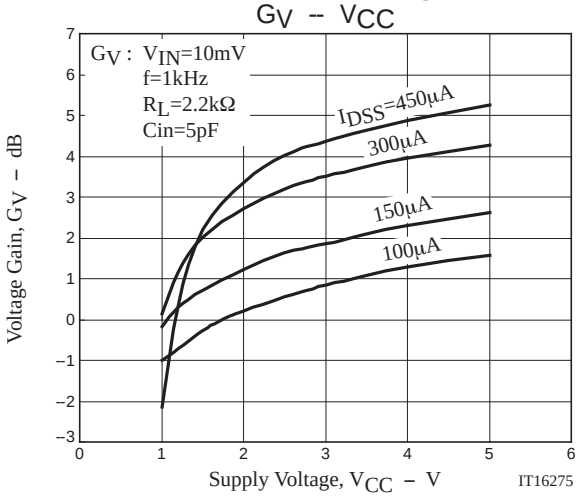

| yfs | -- IDSS
VDS=2V
VGS=0V
f=1kHz
Forward Transfer Admittance, | yfs | – mS
Drain Current, IDSS – μA
IT16272

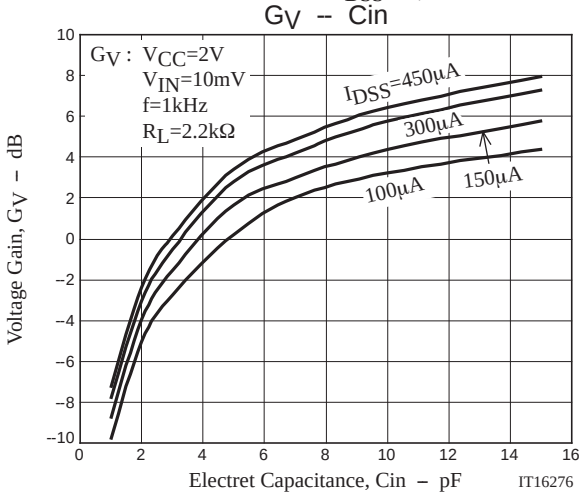

VGS(off) -- IDSS
VDS=2V
ID=1μA
Cutoff Voltage, VGS(off) – V
Drain Current, IDSS – μA
IT16273

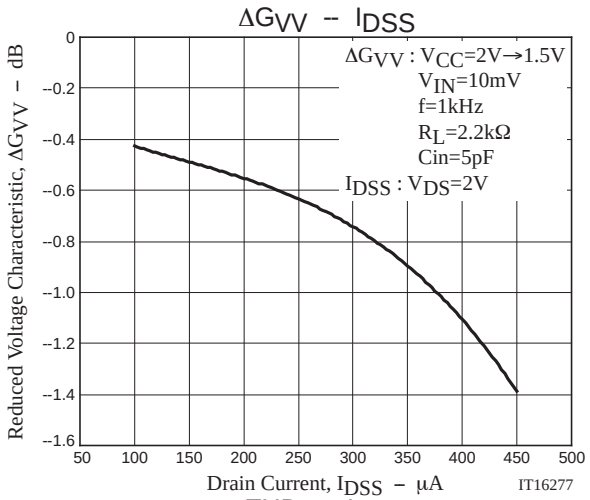

Ciss -- VDS
VGS=0V
f=1MHz
Input Capacitance, Ciss – pF
Drain-to-Source Voltage, VDS – V
IT15218

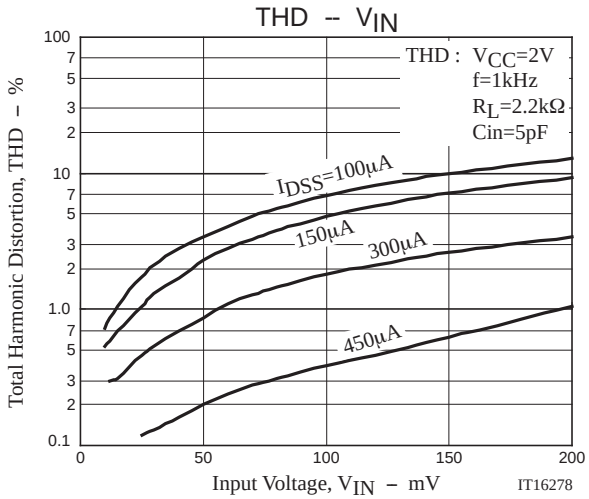

Crss -- VDS
VGS=0V
f=1MHz
Reverse Transfer Capacitance, Crss – pF
Drain-to-Source Voltage, VDS – V
IT15219

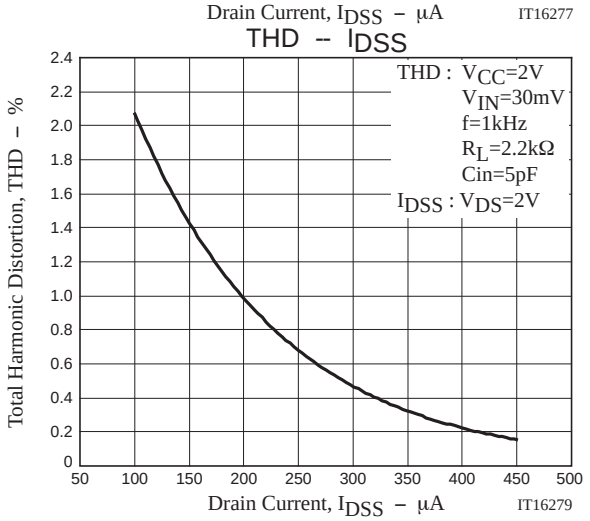

GV -- IDSS
GV : VCC=2V
VIN=10mV
f=1kHz
RL=2.2kΩ
Cin=5pF
IDSS : VDS=2V
Voltage Gain, GV – dB
Drain Current, IDSS – μA
IT16274

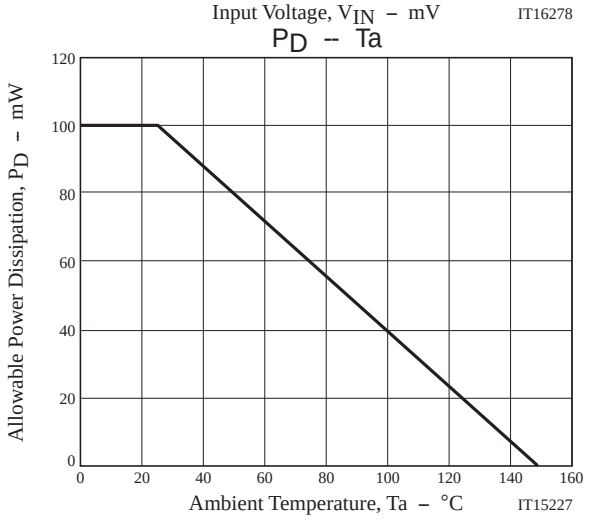

GV -- VCC
GV : VIN=10mV
f=1kHz
RL=2.2kΩ
Cin=5pF
IDSS=450μA
300μA
150μA
100μA
Voltage Gain, GV – dB
Supply Voltage, VCC – V
IT16275


GV -- Cin
GV : VCC=2V
VIN=10mV
f=1kHz
RL=2.2kΩ
IDSS=450μA
300μA
150μA
100μA
Voltage Gain, GV – dB
Electret Capacitance, Cin – pF
IT16276


ΔGVV -- IDSS
ΔGVV : VCC=2V→1.5V
VIN=10mV
f=1kHz
RL=2.2kΩ
Cin=5pF
IDSS : VDS=2V
Reduced Voltage Characteristic, ΔGVV – dB
Drain Current, IDSS – μA
IT16277


THD -- VIN
THD : VCC=2V
f=1kHz
RL=2.2kΩ
Cin=5pF
IDSS=100μA
150μA
300μA
450μA
Total Harmonic Distortion, THD – %
Input Voltage, VIN – mV
IT16278


THD -- IDSS
THD : VCC=2V
VIN=30mV
f=1kHz
RL=2.2kΩ
Cin=5pF
IDSS : VDS=2V
Total Harmonic Distortion, THD – %
Drain Current, IDSS – μA
IT16279


PD -- Ta
Allowable Power Dissipation, PD – mW
Ambient Temperature, Ta – °C
IT15227

This catalog provides information as of January, 2011. Specifications and information herein are subject to change without notice.