NE5820M53

P-channel MOS Field Effect Transistor for Impedance Converter of Microphone

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Rev.2.00
May 20, 2011

DESCRIPTION

The NE5820M53 is a P-channel silicon MOSFET designed for use as impedance converter for microphone.
The package is a 3-pin thin-type lead-less minimold, suitable for high-density surface mounting.

FEATURES

- Low noise : N_V = −114 dBV TYP. @V_{DD} = 2.0 V, C_{in} = 3 pF, R_L = 15 kΩ
- Low input capacitance : C_{iss} = 1.5 pF TYP. @V_{DD} = 2.0 V, R_L = 15 kΩ
- Low consumption current : I_{DD} = 85 μATYP. @V_{DD} = 2.0 V, R_L = 15 kΩ
- High-density surface mounting : 3-pin thin-type lead-less minimold (1.2 × 1.0 × 0.33 mm)
- Built-in the capacitor for RF noise immunity
- High ESD voltage

APPLICATIONS

- Microphone, Sensor etc.

ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Marking	Supplying Form
NE5820M53-T1	NE5820M53-T1-A	3-pin thin-type lead-less minimold (Pb-Free)	10 kpcs/reel	B8	• Embossed tape 8 mm wide • Pin 3 face the perforation side of the tape

Remark To order evaluation samples, please contact your nearby sales office.
Part number for sample order: NE5820M53

CAUTION

Observe precautions when handling because these devices are sensitive to electrostatic discharge.

The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Input Voltage (IN-GND)	V_{in}	–0.8 to +0.8	V
Input Current (IN-GND)	I_{in}	0.5	mA
Output Voltage (OUT-GND)	V_{out}	–0.5 to +6	V
Output Current (OUT-GND)	I_{out}	17	mA
Channel Temperature	T_{ch}	130	°C
<R> Operating Ambient Temperature	T_A	–40 to +95	°C
Storage Temperature	T_{stg}	–65 to +150	°C

RECOMMENDED OPERATING RANGE (T_A = +25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
<R> Supply Voltage Note	V_{DD}	1.0	2.0	10.0	V

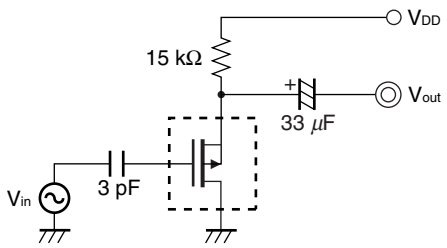
Note: R_L = 15 kΩ

ELECTRICAL CHARACTERISTICS (T_A = +25°C, R_L = 15 kΩ, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Consumption Current	I_{DD}	V_{DD} = 2 V, V_{in} = 0 V	60	85	105	μA
Input Capacitance	C_{iss}	V_{DD} = 2 V, f = 1 MHz	–	1.5	–	pF
Voltage Gain	G_V	V_{DD} = 2 V, V_{in} = 10 mVrms, C_{in} = 3 pF, f = 1 kHz, see TEST CIRCUIT	–4.5	–3.0	–	dB
Reduced Voltage Characteristics	ΔG_{VV}	V_{DD} = 2 → 1.5 V, V_{in} = 10 mVrms, C_{in} = 3 pF, f = 1 kHz, see TEST CIRCUIT	–	0.3	–	dB
Frequency Characteristics	ΔG_{Vf}	V_{DD} = 2 V, V_{in} = 10 mVrms, C_{in} = 3 pF, f = 1 kHz → 110 Hz, see TEST CIRCUIT	–	0.05	–	dB
Output Noise Voltage	N_V	V_{DD} = 2 V, V_{in} = 0 Vrms, C_{in} = 3 pF, A-Curve, see TEST CIRCUIT	–	–114	–	dBV
Total Harmonic Distortion	THD	V_{DD} = 2 V, V_{out} = 30 mVrms, C_{in} = 3 pF, f = 1 kHz, see TEST CIRCUIT	–	0.1	–	%

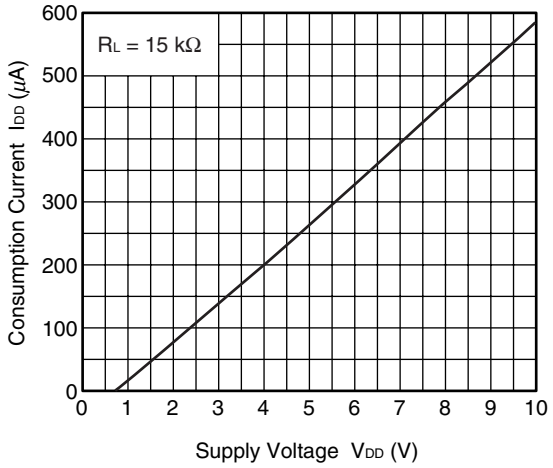
TEST CIRCUIT

Voltage Gain, Frequency Characteristics, Output Noise Voltage, Total Harmonic Distortion

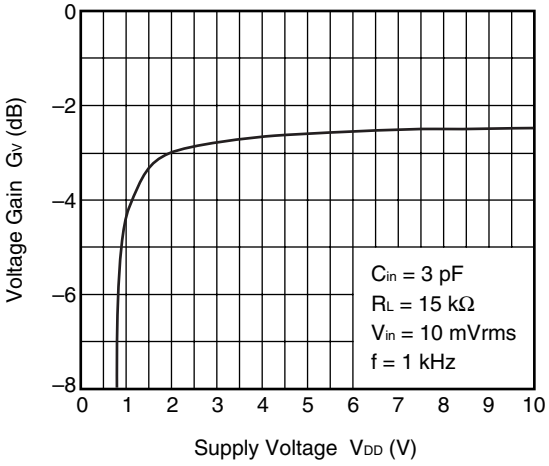


<R> TYPICAL CHARACTERISTICS (T_A = +25°C, unless otherwise specified)

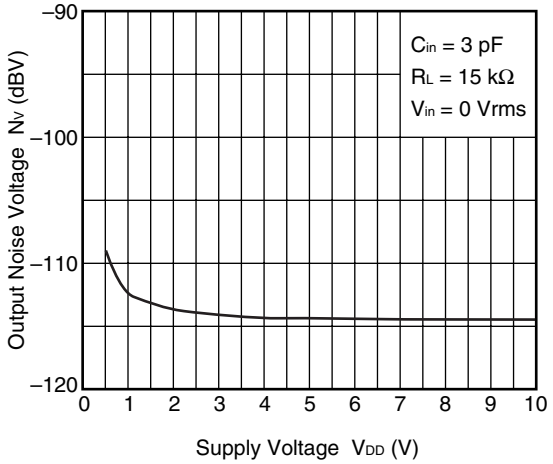
CONSUMPTION CURRENT vs. SUPPLY VOLTAGE



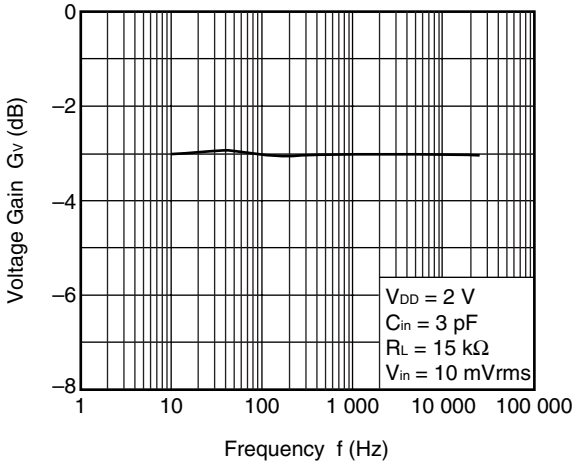
VOLTAGE GAIN vs. SUPPLY VOLTAGE



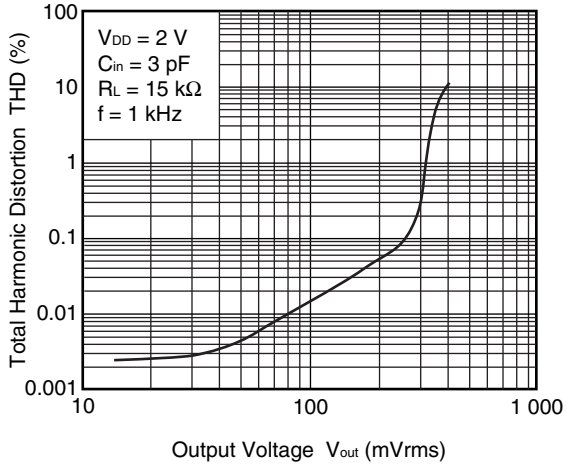
OUTPUT NOISE VOLTAGE vs. SUPPLY VOLTAGE



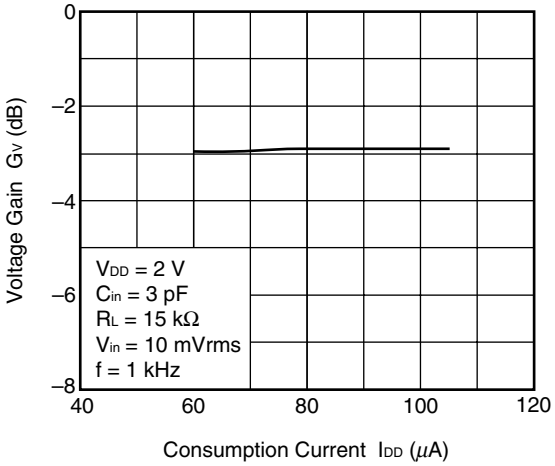
VOLTAGE GAIN vs. FREQUENCY



TOTAL HARMONIC DISTORTION vs. OUTPUT VOLTAGE

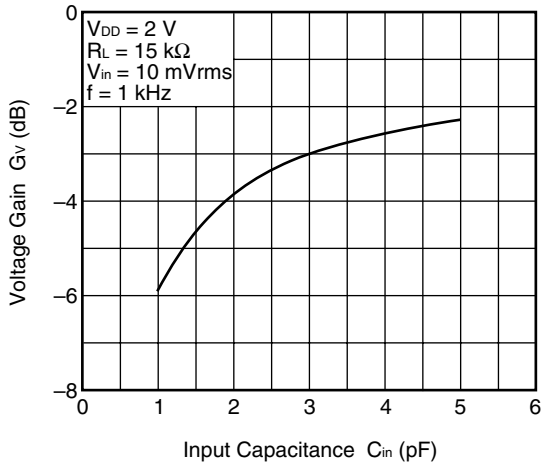


VOLTAGE GAIN vs. CONSUMPTION CURRENT

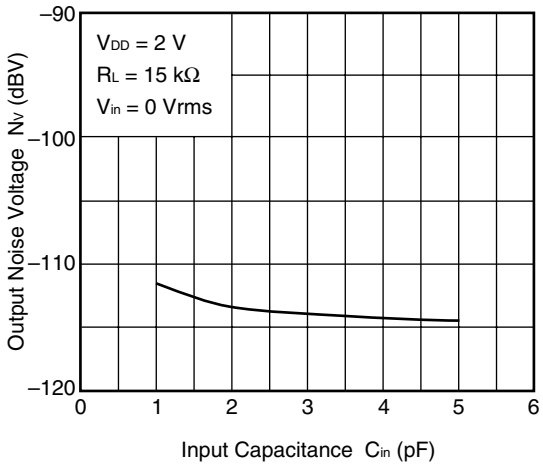


Remark The graphs indicate nominal characteristics.

VOLTAGE GAIN vs. INPUT CAPACITANCE



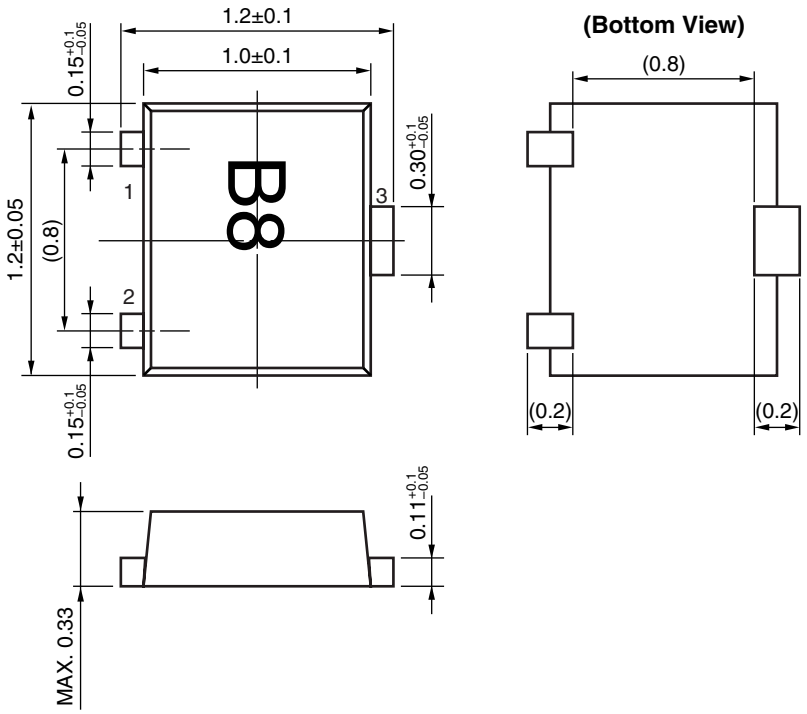
OUTPUT NOISE VOLTAGE
vs. INPUT CAPACITANCE



Remark The graphs indicate nominal characteristics.

PACKAGE DIMENSIONS

3-PIN THIN-TYPE LEAD-LESS MINIMOLD (UNIT: mm)



PIN CONNECTIONS

1. OUT
2. IN
3. GND

Remark ( ): Reference value

RECOMMENDED SOLDERING CONDITIONS

This product should be soldered and mounted under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your nearby sales office.

Soldering Method	Soldering Conditions	Condition Symbol
Infrared Reflow	Peak temperature (package surface temperature) : 260°C or below Time at peak temperature : 10 seconds or less Time at temperature of 220°C or higher : 60 seconds or less Preheating time at 120 to 180°C : 120±30 seconds Maximum number of reflow processes : 3 times Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	IR260
Wave Soldering	Peak temperature (molten solder temperature) : 260°C or below Time at peak temperature : 10 seconds or less Preheating temperature (package surface temperature) : 120°C or below Maximum number of flow processes : 1 time Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	WS260
Partial Heating	Peak temperature (terminal temperature) : 350°C or below Soldering time (per side of device) : 3 seconds or less Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	HS350

CAUTION

Do not use different soldering methods together (except for partial heating).

Revision History	NE5820M53 Data Sheet

Rev.	Date	Description	
		Page	Summary
1.00	Jul 9, 2010	–	First edition issued
2.00	May 20, 2011	p. 2	**ABSOLUTE MAXIMUM RATINGS**: Operating Ambient Temperature –40 to +85 → –40 to +95
		p. 2	**RECOMMENDED OPERATING RANGE**: Supply Voltage MIN. 1.5 → 1.0, MAX. 5.0 → 10.0
		p. 3	**TYPICAL CHARACTERISTICS**: Modification of CONSUMPTION CURRENT vs. SUPPLY VOLTAGE, VOLTAGE GAIN vs. SUPPLY VOLTAGE, OUTPUT NOISE VOLTAGE vs. SUPPLY VOLTAGE

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