

# DATA SHEET

# NEC

## MOS FIELD EFFECT TRANSISTOR

# NE5814M14

### P-CHANNEL LOW NOISE MOS FIELD EFFECT TRANSISTOR FOR IMPEDANCE CONVERTER OF MICROPHONE 4-PIN LEAD-LESS MINIMOLD (M14, 1208 PKG)

#### DESCRIPTION

The NE5814M14 is a P-channel silicon MOS FET designed for use as impedance converter for microphone. The package is 4-pin lead-less minimold, suitable for surface mount.

#### FEATURES

- Low Noise :  $N_v = -114$  dB TYP. @  $V_{DD} = 2.0$  V,  $C_{in} = 3$  pF,  $R_L = 15$  k $\Omega$
- Low Input Capacitance :  $C_{iss} = 1.5$  pF TYP. @  $V_{DD} = 2.0$  V,  $V_{in} = 0$  V,  $R_L = 15$  k $\Omega$
- Low Consumption Current:  $I_{DD} = 80$   $\mu$ A TYP. @  $V_{DD} = 2.0$  V,  $R_L = 15$  k $\Omega$
- 4-pin lead-less minimold (1.2  $\times$  0.8  $\times$  0.5 mm)

#### APPLICATIONS

- Microphone, Sensor etc.

#### ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Marking	Supplying Form
NE5814M14	NE5814M14-A	4-pin lead-less minimold (M14, 1208 PKG) (Pb-Free)	50 pcs (Non reel)	zQ	• 8 mm wide embossed taping • Pin 1 (OUT), Pin 4 (IN) face the perforation side of the tape
NE5814M14-T3	NE5814M14-T3-A		10 kpcs/reel		

**Remark** To order evaluation samples, contact your nearby sales office.

Part number for sample order: NE5814M14

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

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**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = +25°C)**

Parameter	Symbol	Ratings	Unit
Input Voltage (IN-GND)	V <sub>in</sub>	-0.8 to +0.8	V
Input Current (IN-GND)	I <sub>in</sub>	0.5	mA
Output Voltage (OUT-GND)	V <sub>out</sub>	-0.5 to +6	V
Output Current (OUT-GND)	I <sub>out</sub>	5	mA
Total Power Dissipation	P <sub>tot</sub> <sup>Note</sup>	150	mW
Channel Temperature	T <sub>ch</sub>	130	°C
Operating Ambient Temperature	T <sub>A</sub>	-40 to +85	°C
Storage Temperature	T <sub>stg</sub>	-65 to +150	°C

**Note** Mounted on 1.08 cm<sup>2</sup> × 1.0 mm (t) glass epoxy PCB

**RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub> = +25°C)**

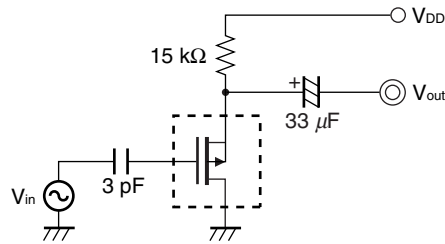
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage <sup>Note</sup>	V <sub>DD</sub>	1.5	2.0	5.0	V

**Note** R<sub>L</sub> = 15 kΩ

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = +25°C, unless otherwise specified)**

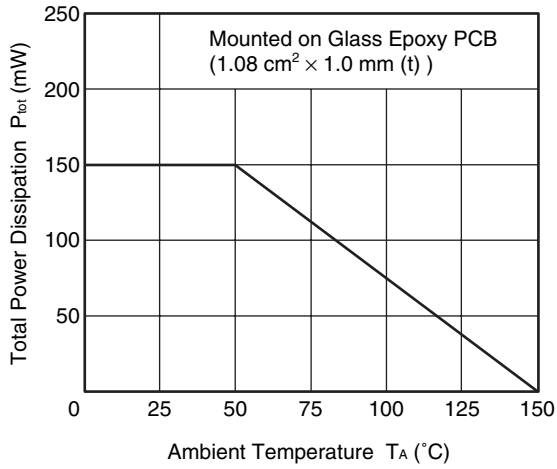
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Consumption Current	I <sub>DD</sub>	V <sub>DD</sub> = 2 V, V <sub>in</sub> = 0 V, R <sub>L</sub> = 15 kΩ	55	80	105	μA
Input Capacitance	C <sub>iss</sub>	V <sub>DD</sub> = 2 V, V <sub>in</sub> = 0 V, R <sub>L</sub> = 15 kΩ, f = 1 MHz	–	1.5	–	pF
Voltage Gain	G <sub>v</sub>	V <sub>DD</sub> = 2 V, V <sub>in</sub> = 10 mV, R <sub>L</sub> = 15 kΩ, C <sub>in</sub> = 3 pF, f = 1 kHz, see Test Circuit	–4.5	–3.0	–	dB
Reduced Voltage Characteristics	ΔG <sub>vV</sub>	V <sub>DD</sub> = 2 → 1.5 V, V <sub>in</sub> = 10 mV, R <sub>L</sub> = 15 kΩ, C <sub>in</sub> = 3 pF, f = 1 kHz, see Test Circuit	–	0.3	–	dB
Frequency Characteristics	ΔG <sub>v</sub> f	V <sub>DD</sub> = 2 V, V <sub>in</sub> = 10 mV, R <sub>L</sub> = 15 kΩ, C <sub>in</sub> = 3 pF, f = 1 kHz → 110 Hz, see Test Circuit	–	0.05	–	dB
Output Noise Voltage	N <sub>v</sub>	V <sub>DD</sub> = 2 V, V <sub>in</sub> = 0 V, R <sub>L</sub> = 15 kΩ, C <sub>in</sub> = 3 pF, f = 1 kHz, A-Curve, see Test Circuit	–	–114	–	dB
Total Harmonic Distortion	THD	V <sub>DD</sub> = 2 V, V <sub>in</sub> = 30 mV, R <sub>L</sub> = 15 kΩ, C <sub>in</sub> = 3 pF, f = 1 kHz, see Test Circuit	–	0.1	–	%

**TEST CIRCUIT (Voltage Gain, Frequency Characteristics, Output Noise Voltage, Total Harmonic Distortion)**

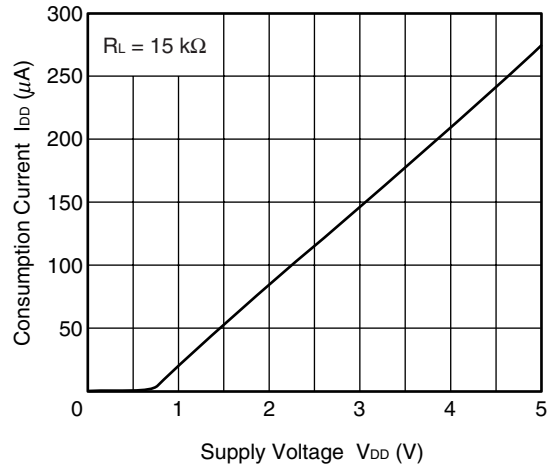


**TYPICAL CHARACTERISTICS (TA = +25°C, unless otherwise specified)**

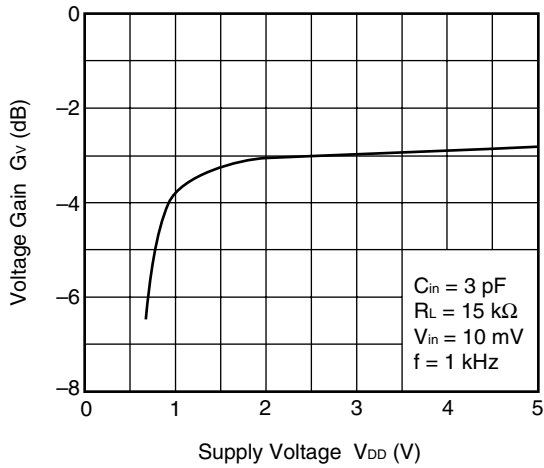
**TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE**



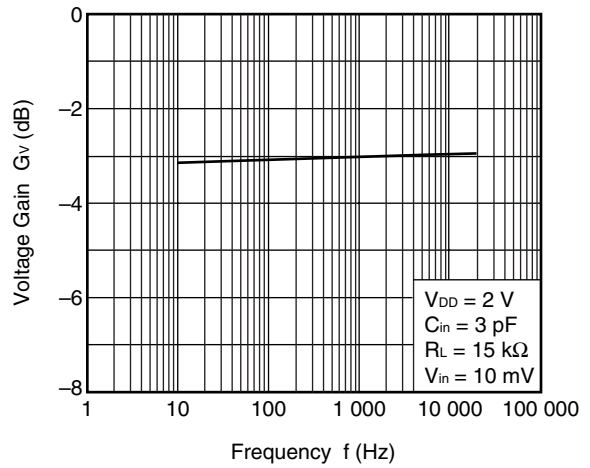
**CONSUMPTION CURRENT vs. SUPPLY VOLTAGE**



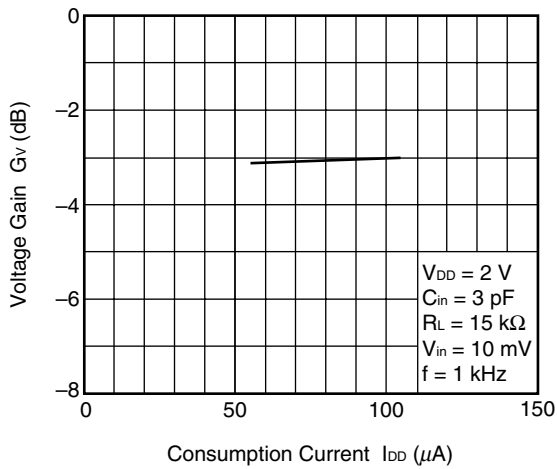
**VOLTAGE GAIN vs. SUPPLY VOLTAGE**



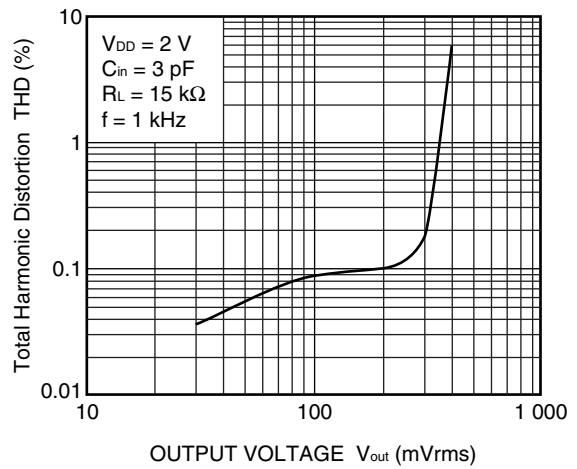
**VOLTAGE GAIN vs. FREQUENCY**



**VOLTAGE GAIN vs. CONSUMPTION CURRENT**



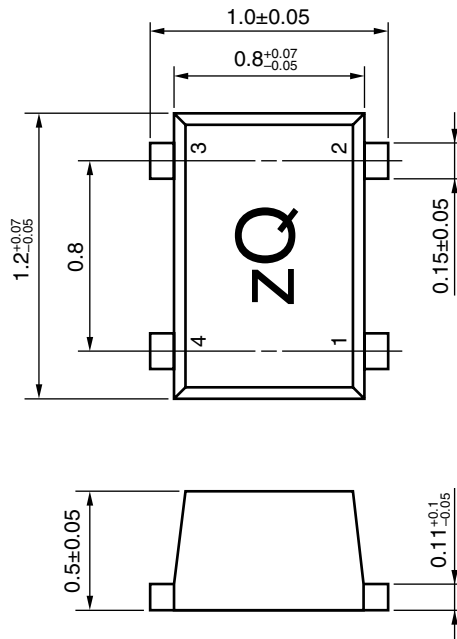
**TOTAL HARMONIC DISTORTION vs. OUTPUT VOLTAGE**



**Remark** The graphs indicate nominal characteristics.

PACKAGE DIMENSIONS

4-PIN LEAD-LESS MINIMOLD (M14, 1208 PKG) (UNIT: mm)



PIN CONNECTIONS

- 1. OUT
- 2. GND
- 3. NC
- 4. IN

**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).**

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