

# DATA SHEET

# NEC

## SILICON POWER MOS FET NE5500434

### N-CHANNEL SILICON POWER MOS FET POWER AMPLIFIER FOR GSM CLASS 4 HANDSETS

#### DESCRIPTION

The NE5500434 is an N-channel silicon power MOS FET specially designed as the transmission power amplifier for GSM class 4 handsets. Dies are manufactured using our NEWMOS technology (our 0.6  $\mu$ m WSi gate lateral MOS FET), housed in a surface mount 3-pin power minimold (34 PKG) (SOT-89 type) package. The device can deliver 35 dBm output power with 63% power added efficiency at 900 MHz under the 4.8 V supply voltage.

The NE5500434 also can deliver 31.5 dBm output power with 60% power added efficiency at 3.6 V.

#### FEATURES

- High output power :  $P_{out} = 35$  dBm TYP. ( $V_{DS} = 4.8$  V,  $f = 900$  MHz,  $P_{in} = 25$  dBm)  
:  $P_{out} = 31.5$  dBm TYP. ( $V_{DS} = 3.6$  V,  $f = 900$  MHz,  $P_{in} = 20$  dBm)
- High power added efficiency :  $\eta_{add} = 60\%$  TYP. ( $V_{DS} = 4.8$  V,  $f = 900$  MHz)
- High linear gain :  $G_L = 14.0$  dB TYP. ( $V_{DS} = 4.8$  V,  $f = 900$  MHz)
- Surface mount package : 3-pin power minimold (34 PKG) (SOT-89 type)
- Single supply :  $V_{DS} = 4.8$  V for GSM class 4 handsets

#### APPLICATIONS

- Digital cellular phones : GSM class 4 handsets
- <R> • Handheld transceiver : FRS (Family Radio Service), GMRS (General Mobile Radio Service)
- Others : General purpose amplifiers for 800 to 1 000 MHz TDMA applications

#### <R> ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
NE5500434	NE5500434-AZ	3-pin power minimold (SOT-89, Our code: 34) (Pb-Free : External solder plating)	V4	<ul style="list-style-type: none"> <li>• Magazine case</li> <li>• Qty 25 pcs/case</li> </ul>
NE5500434-T1	NE5500434-T1-AZ	3-pin power minimold (SOT-89, Our code: 34) (Pb-Free : External solder plating)		<ul style="list-style-type: none"> <li>• 12 mm wide embossed taping</li> <li>• Source pin face the perforation side of the tape</li> <li>• Qty 1 kpcs/reel</li> </ul>

**Remarks 1.** To order evaluation samples, contact your nearby sales office.

Part number for sample order: NE5500434

**2.** This product is containing Pb-material inside.

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

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Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.

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

Operation in excess of any one of these parameters may result in permanent damage.

Parameter	Symbol	Ratings	Unit
Drain to Source Voltage	V <sub>DS</sub>	20	V
Gate to Source Voltage	V <sub>GS</sub>	6.0	V
Drain Current	I <sub>D</sub>	2.0	A
Total Power Dissipation	P <sub>tot</sub>	10	W
Channel Temperature	T <sub>ch</sub>	125	°C
Storage Temperature	T <sub>stg</sub>	-65 to +125	°C

**RECOMMENDED OPERATING CONDITIONS**

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V <sub>DS</sub>		3.0	4.8	6.0	V
Gate to Source Voltage	V <sub>GS</sub>		0	2.0	3.5	V
Drain Current	I <sub>D</sub>	Duty Cycle ≤ 50%, T <sub>on</sub> ≤ 1 s	-	1.0	1.5	A
Input Power	P <sub>in</sub>	f = 900 MHz, V <sub>DS</sub> = 4.8 V	-	-	27	dBm

**ELECTRICAL CHARACTERISTICS**

(T<sub>A</sub> = +25°C, unless otherwise specified, using our standard test fixture.)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Gate to Source Leakage Current	I <sub>ISO</sub>	V <sub>GS</sub> = 6.0 V	-	-	100	nA
Drain to Source Leakage Current (Zero Gate Voltage Drain Current)	I <sub>DSS</sub>	V <sub>DS</sub> = 8.5 V	-	-	100	nA
Gate Threshold Voltage	V <sub>th</sub>	V <sub>DS</sub> = 4.8 V, I <sub>DS</sub> = 1 mA	1.0	1.35	2.0	V
Thermal Resistance	R <sub>th</sub>	Channel to Case	-	10	-	°C/W
Transconductance	g <sub>m</sub>	V <sub>DS</sub> = 4.8 V, I <sub>DS</sub> = 600 mA	-	1.43	-	S
Drain to Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>DSS</sub> = 10 μA	20	24	-	V
Output Power	P <sub>out</sub>	f = 900 MHz, V <sub>DS</sub> = 4.8 V,	34.0	35.0	-	dBm
Drain Current	I <sub>D</sub>	P <sub>in</sub> = 25 dBm, I <sub>Dset</sub> = 600 mA (RF OFF)	-	990	-	mA
Power Added Efficiency	η <sub>add</sub>		53	60	-	%
Linear Gain <sup>Note</sup>	G <sub>L</sub>		12.0	14.0	-	dB

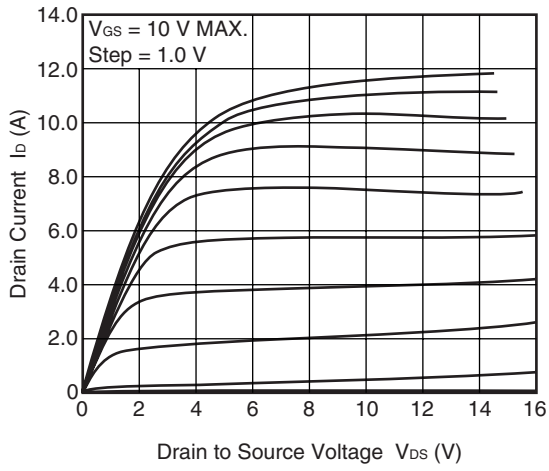
**Note** P<sub>in</sub> = 10 dBm

DC performance is 100% testing. RF performance is testing several samples per wafer.

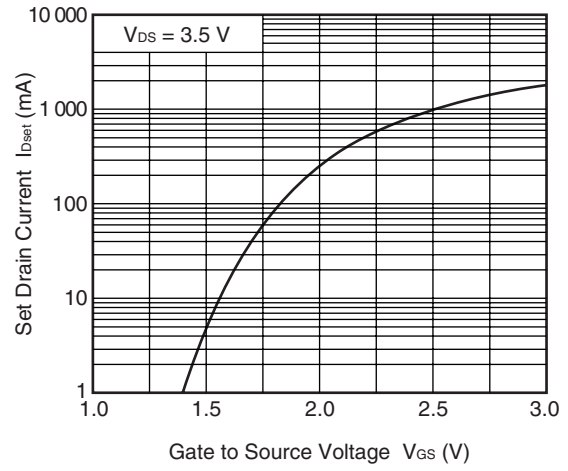
Wafer rejection criteria for standard devices is 1 reject for several samples.

<R> TYPICAL CHARACTERISTICS (T<sub>A</sub> = +25°C)

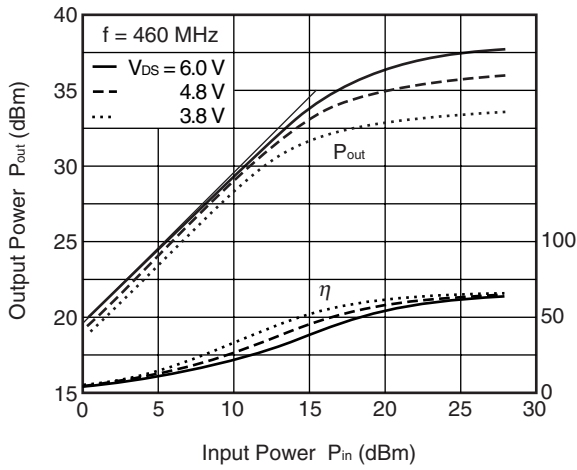
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



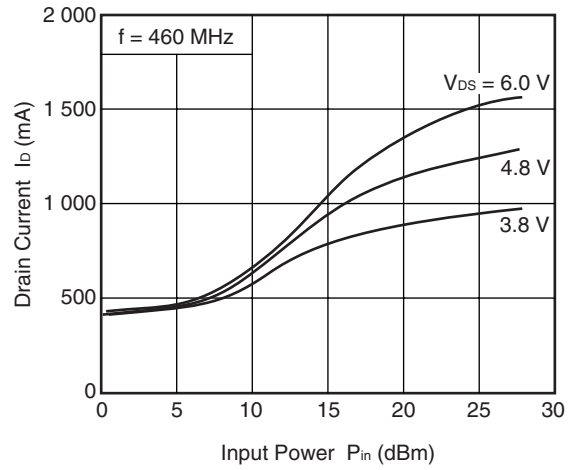
SET DRAIN CURRENT vs. GATE TO SOURCE VOLTAGE



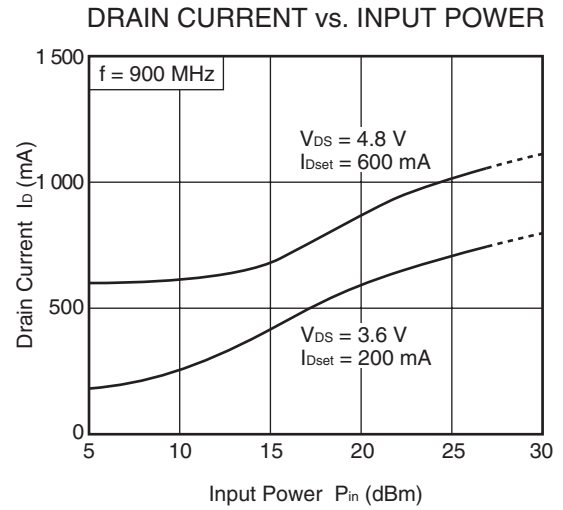
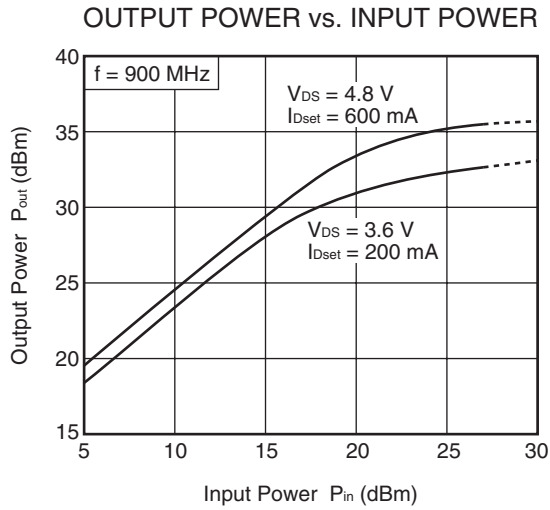
OUTPUT POWER, EFFICIENCY vs. INPUT POWER



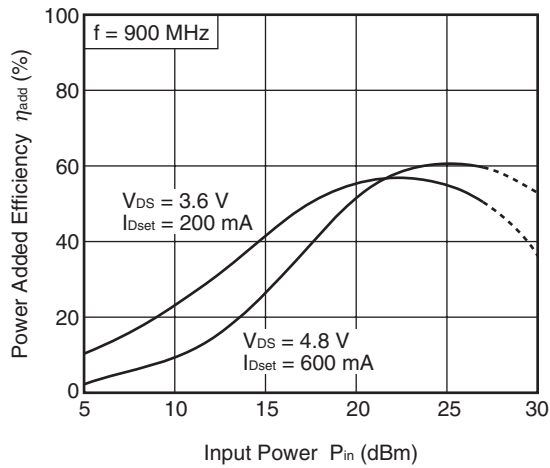
DRAIN CURRENT vs. INPUT POWER



**Remark** The graphs indicate nominal characteristics.



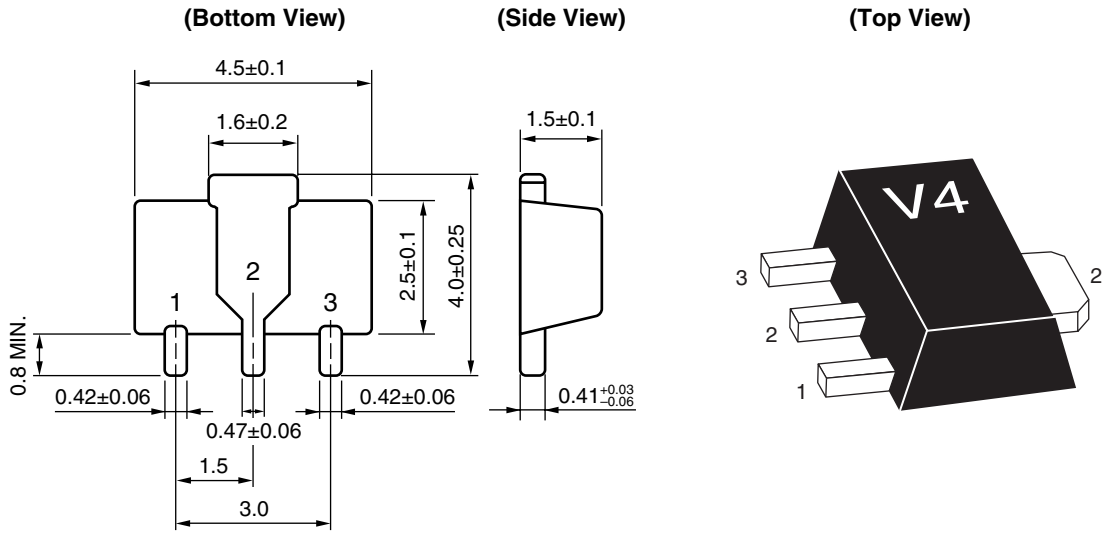
### POWER ADDED EFFICIENCY vs. INPUT POWER



**Remark** The graphs indicate nominal characteristics.

PACKAGE DIMENSIONS

3-PIN POWER MINIMOLD (34 PKG) (UNIT: mm)



PIN CONNECTIONS

- 1. Drain
- 2. Source
- 3. Gate

<R> **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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