

# NEC's 7.5 V UHF BAND NE5511279A RF POWER SILICON LD-MOS FET

# **FEATURES**

#### **HIGH OUTPUT POWER:**

Pout = 40.0 dBm TYP., f = 900 MHz, VDS = 7.5 V, Pout = 40.5 dBm TYP., f = 460 MHz, VDS = 7.5 V,

#### · HIGH POWER ADDED EFFICIENCY:

 $\eta$ add = 48% TYP., f = 900 MHz, VDS = 7.5 V,  $\eta$ add = 50% TYP., f = 460 MHz, VDS = 7.5 V,

#### · HIGH LINEAR GAIN:

GL = 15.0 dB TYP., f = 900 MHz, VDS = 7.5 V,GL = 18.5 dB TYP., f = 460 MHz, VDS = 7.5 V,

#### SURFACE MOUNT PACKAGE:

5.7 x 5.7 x 1.1 mm MAX

#### · SINGLE SUPPLY:

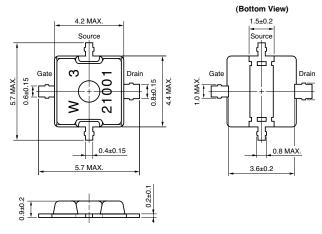
VDS = 2.8 to 8.0 V

### **APPLICATIONS**

- · UHF RADIO SYSTEMS
- CELLULAR REPEATERS
- **TWO-WAY RADIOS**
- · FRS/GMRS
- FIXED WIRELESS

### **OUTLINE DIMENSIONS** (Units in mm)

#### **PACKAGE OUTLINE 79A**



# **DESCRIPTION**

NEC's NE5511279A is an N-Channel silicon power laterally diffused MOSFET specially designed as the transmission power amplifier for 7.5 V radio systems. Die are manufactured using NEC's NEWMOS1 technology and housed in a surface mount package. This device can deliver 40.0 dBm output power with 48% power added efficiency at 900 MHz using a 7.5 V supply voltage.

# ELECTRICAL CHARACTERISTICS (TA = 25°C)

| SYMBOL          | PARAMETER   | MIN  | TYP  | MAX | UNIT | TEST CONDITIONS                                   |
|-----------------|---|------|------|-----|------|---|
| Pout            | Output Power  | 38.5 | 40.0 | -   | dBm  | f = 900 MHz, V <sub>DS</sub> = 7.5 V,             |
| ΙD              | Drain Current   | -    | 2.5  | ı   | Α    | P <sub>in</sub> = 27 dBm,                         |
| ηadd            | Power Added Efficiency  | 42   | 48   | ı   | %    | IDSQ = 400 mA (RF OFF)                            |
| GL              | Linear Gain   | -    | 15.0 | ı   | dB   | Pin = 5 dBm                                       |
| Pout            | Output Power  | -    | 40.5 | _   | dBm  | f = 460 MHz, V <sub>DS</sub> = 7.5 V,             |
| ΙD              | Drain Current   | -    | 2.75 | _   | Α    | P <sub>in</sub> = 25 dBm,                         |
| ηadd            | Power Added Efficiency  | -    | 50   | _   | %    | IDSQ = 400 mA (RF OFF)                            |
| GL              | Linear Gain   | -    | 18.5 | -   | dB   | Pin = 5 dBm                                       |
| Igss            | Gate to Source Leak Current                                       | -    | -    | 100 | nA   | V <sub>GS</sub> = 6.0 V                           |
| IDSS            | Drain to Source Leakage Current (Zero Gate Voltage Drain Current) | -    | -    | 100 | nA   | V <sub>DS</sub> = 8.5 V                           |
| V <sub>th</sub> | Gate Threshold Voltage  | 1.0  | 1.5  | 2.0 | V    | V <sub>DS</sub> = 4.8 V, I <sub>DS</sub> = 1.5 mA |
| Rth             | Thermal Resistance  | _    | 5    | ı   | °C/W | Channel to Case                                   |
| <b>g</b> m      | Transconductance  | -    | 2.3  | ı   | S    | V <sub>DS</sub> = 3.5 V, I <sub>DS</sub> = 900 mA |
| BVDSS           | Drain to Source Breakdown Voltage                                 | 20   | 24   | -   | V    | loss = 15 μA                                      |

#### Notes:

DC performance is 100% tested. RF performance is tested on several samples per wafer. Wafer rejection criteria for standard devices is 1 reject for several samples.

California Eastern Laboratories

# ABSOLUTE MAXIMUM RATINGS<sup>1</sup> (TA = 25 °C)

| SYMBOLS | PARAMETERS                        | UNITS | RATINGS     |
|---------|-----------------------------------|-------|-------------|
| VDS     | Drain Supply Voltage <sup>2</sup> | V     | 20.0        |
| Vgs     | Gate Supply Voltage               | V     | 6.0         |
| lD      | Drain Current                     | Α     | 3.0         |
| Ртот    | Total Power Dissipation           | W     | 20          |
| Тсн     | Channel Temperature               | °C    | 125         |
| Тѕтс    | Storage Temperature               | °C    | -55 to +125 |

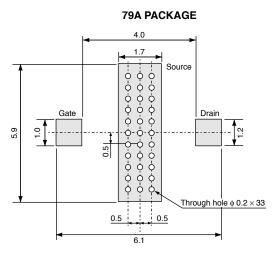
#### Note:

- Operation in excess of any one of these parameters may result in permanent damage.
- 2. Vps must be used under 12 V on RF operation.

### RECOMMENDED OPERATING LIMITS

| SYMBOLS | PARAMETERS                              | UNITS | TYP | MAX |
|---------|---|-------|-----|-----|
| VDS     | Drain to Source Voltage                 | V     | 7.5 | 8.0 |
| Vgs     | Gate Supply Voltage                     | V     | 2.0 | 3.0 |
| IDS     | Drain Current <sup>1</sup>              | Α     | 2.5 | 3.0 |
| Pin     | Input Power<br>f = 900 MHz, VDS = 7.5 V | dBm   | 27  | 30  |

# P.C.B. LAYOUT (Units in mm)



#### Note:

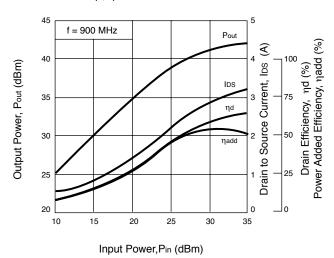
Use rosin or other material to prevent solder from penetrating through-holes.

# **ORDERING INFORMATION**

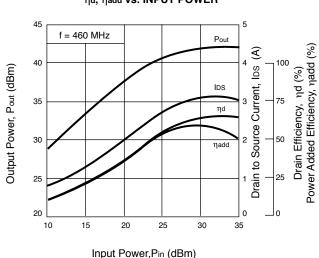
| PART NUMBER      | QTY  |
|------------------|--|
| NE5511279A-T1-A  | <ul> <li>12 mm wide embossed taping.</li> <li>Gate pin faces the perforation side of<br/>the tape.</li> <li>1 Kpcs/Reel</li> </ul> |
| NE5511279A-T1A-A |  |

# **TYPICAL PERFORMANCE CURVES** (TA = 25°C)

# OUTPUT POWER, DRAIN CURRENT, $\eta$ d, $\eta$ add vs. INPUT POWER



# OUTPUT POWER, DRAIN CURRENT, ηd, ηadd vs. INPUT POWER



# 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) Time at peak temperature Time at temperature of 220°C or higher Preheating time at 120 to 180°C Maximum number of reflow processes Maximum chlorine content of rosin flux (% mass) | : 260°C or below<br>: 10 seconds or less<br>: 60 seconds or less<br>: 120±30 seconds<br>: 3 times<br>: 0.2%(Wt.) or below | IR260    |
| VPS              | Peak temperature (package surface temperature) Time at temperature of 200°C or higher Preheating time at 120 to 150°C Maximum number of reflow processes Maximum chlorine content of rosin flux (% mass)                          | : 215°C or below<br>: 25 to 40 seconds<br>: 30 to 60 seconds<br>: 3 times<br>: 0.2%(Wt.) or below                         | VP215    |
| Wave Soldering   | Peak temperature (molten solder temperature) Time at peak temperature Preheating temperature (package surface temperature) Maximum number of flow processes Maximum chlorine content of rosin flux (% mass)                       | : 260°C or below<br>: 10 seconds or less<br>: 120°C or below<br>: 1 time<br>: 0.2%(Wt.) or below                          | WS260    |
| Partial Heating  | Peak temperature (pin temperature) Soldering time (per pin of device) Maximum chlorine content of rosin flux (% mass)   | : 350°C or below<br>: 3 seconds or less<br>: 0.2%(Wt.) or below   | HS350-P3 |

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

Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

California Eastern Laboratories, Your source for NEC RF, Microwave, Optoelectronic, and Fiber Optic Semiconductor Devices.
4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • FAX (408) 988-0279 • www.cel.com

DATA SUBJECT TO CHANGE WITHOUT NOTICE

08/26/2003





4590 Patrick Henry Drive Santa Clara, CA 95054-1817 Telephone: (408) 919-2500

Facsimile: (408) 988-0279

Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (\*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL's understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

| Restricted Substance per RoHS | Concentration Limit per RoHS (values are not yet fixed) | Concentration in CEL |            |
|-------------------------------|---|----------------------|------------|
| Lead (Pb)                     | < 1000 PPM  | -A<br>Not Detected   | -AZ<br>(*) |
| Mercury                       | < 1000 PPM  | Not Detected         |            |
| Cadmium                       | < 100 PPM   | Not Detected         |            |
| Hexavalent Chromium           | < 1000 PPM  | Not Detected         |            |
| PBB                           | < 1000 PPM  | Not Detected         |            |
| PBDE                          | < 1000 PPM  | Not Detected         |            |

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

Important Information and Disclaimer: Information provided by CEL on its website or in other communications concerting the substance content of its products represents knowledge and belief as of the date that it is provided. CEL bases its knowledge and belief on information provided by third parties and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. CEL has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. CEL and CEL suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall CEL's liability arising out of such information exceed the total purchase price of the CEL part(s) at issue sold by CEL to customer on an annual basis.

See CEL Terms and Conditions for additional clarification of warranties and liability.