

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

NE5511279A

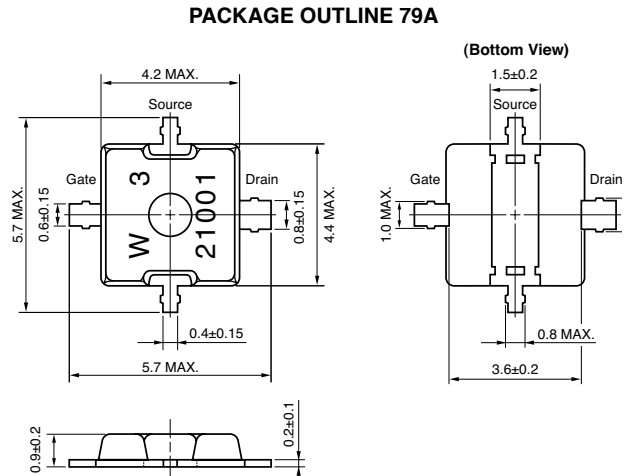
FEATURES

- **HIGH OUTPUT POWER:**
 $P_{out} = 40.0 \text{ dBm TYP.}, f = 900 \text{ MHz}, V_{DS} = 7.5 \text{ V},$
 $P_{out} = 40.5 \text{ dBm TYP.}, f = 460 \text{ MHz}, V_{DS} = 7.5 \text{ V},$
- **HIGH POWER ADDED EFFICIENCY:**
 $\eta_{add} = 48\% \text{ TYP.}, f = 900 \text{ MHz}, V_{DS} = 7.5 \text{ V},$
 $\eta_{add} = 50\% \text{ TYP.}, f = 460 \text{ MHz}, V_{DS} = 7.5 \text{ V},$
- **HIGH LINEAR GAIN:**
 $G_L = 15.0 \text{ dB TYP.}, f = 900 \text{ MHz}, V_{DS} = 7.5 \text{ V},$
 $G_L = 18.5 \text{ dB TYP.}, f = 460 \text{ MHz}, V_{DS} = 7.5 \text{ V},$
- **SURFACE MOUNT PACKAGE:**
 $5.7 \times 5.7 \times 1.1 \text{ mm MAX}$
- **SINGLE SUPPLY:**
 $V_{DS} = 2.8 \text{ to } 8.0 \text{ V}$

APPLICATIONS

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

OUTLINE DIMENSIONS (Units in mm)



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 (T_A = 25°C)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT	TEST CONDITIONS
P _{out}	Output Power	38.5	40.0	–	dBm	f = 900 MHz, V _{DS} = 7.5 V,
I _D	Drain Current	–	2.5	–	A	P _{in} = 27 dBm,
η _{add}	Power Added Efficiency	42	48	–	%	I _{DSQ} = 400 mA (RF OFF)
G _L	Linear Gain	–	15.0	–	dB	P _{in} = 5 dBm
P _{out}	Output Power	–	40.5	–	dBm	f = 460 MHz, V _{DS} = 7.5 V,
I _D	Drain Current	–	2.75	–	A	P _{in} = 25 dBm,
η _{add}	Power Added Efficiency	–	50	–	%	I _{DSQ} = 400 mA (RF OFF)
G _L	Linear Gain	–	18.5	–	dB	P _{in} = 5 dBm
I _{GSS}	Gate to Source Leak Current	–	–	100	nA	V _{GS} = 6.0 V
I _{DSS}	Drain to Source Leakage Current (Zero Gate Voltage Drain Current)	–	–	100	nA	V _{DS} = 8.5 V
V _{th}	Gate Threshold Voltage	1.0	1.5	2.0	V	V _{DS} = 4.8 V, I _{DS} = 1.5 mA
R _{th}	Thermal Resistance	–	5	–	°C/W	Channel to Case
g _m	Transconductance	–	2.3	–	S	V _{DS} = 3.5 V, I _{DS} = 900 mA
BV _{DSS}	Drain to Source Breakdown Voltage	20	24	–	V	I _{DSS} = 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.

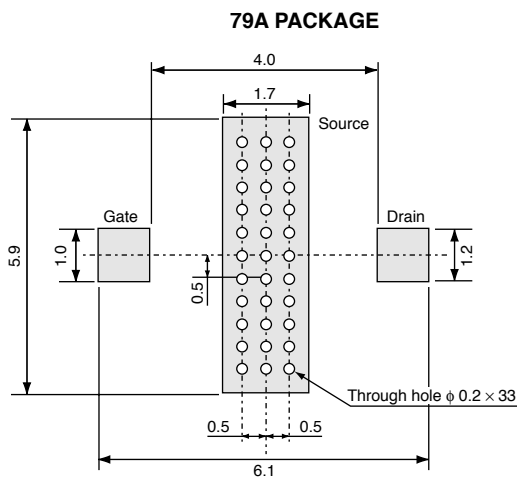
ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25 °C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{DS}	Drain Supply Voltage ²	V	20.0
V _{GS}	Gate Supply Voltage	V	6.0
I _D	Drain Current	A	3.0
P _{TOT}	Total Power Dissipation	W	20
T _{CH}	Channel Temperature	°C	125
T _{STG}	Storage Temperature	°C	-55 to +125

Note:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. V_{DS} must be used under 12 V on RF operation.

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



Note:

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

RECOMMENDED OPERATING LIMITS

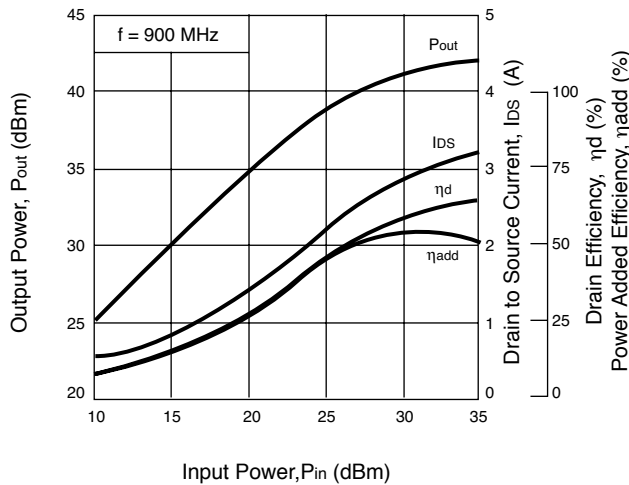
SYMBOLS	PARAMETERS	UNITS	TYP	MAX
V _{DS}	Drain to Source Voltage	V	7.5	8.0
V _{GS}	Gate Supply Voltage	V	2.0	3.0
I _{DS}	Drain Current ¹	A	2.5	3.0
P _{IN}	Input Power f = 900 MHz, V _{DS} = 7.5 V	dBm	27	30

ORDERING INFORMATION

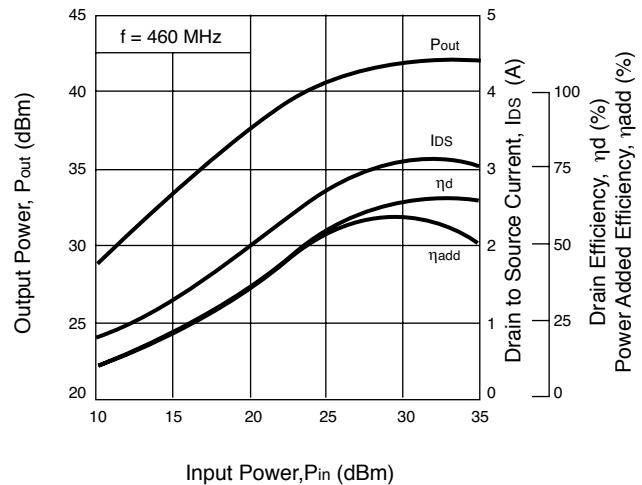
PART NUMBER	QTY
NE5511279A-T1-A	<ul style="list-style-type: none"> • 12 mm wide embossed taping. • Gate pin faces the perforation side of the tape. • 1 Kpcs/Reel
NE5511279A-T1A-A	

TYPICAL PERFORMANCE CURVES (T_A = 25°C)

OUTPUT POWER, DRAIN CURRENT, η_d, η_{add} vs. INPUT POWER



OUTPUT POWER, DRAIN CURRENT, η_d, η_{add} 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) : 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
VPS	Peak temperature (package surface temperature) : 215°C or below Time at temperature of 200°C or higher : 25 to 40 seconds Preheating time at 120 to 150°C : 30 to 60 seconds Maximum number of reflow processes : 3 times Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	VP215
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 (pin temperature) : 350°C or below Soldering time (per pin of device) : 3 seconds or less Maximum chlorine content of rosin flux (% mass) : 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.

CEL California Eastern Laboratories, Your source for NEC RF, Microwave, Optoelectronic, and Fiber Optic Semiconductor Devices.

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08/26/2003

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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 contained in CEL devices	
		-A	-AZ
Lead (Pb)	< 1000 PPM	Not Detected	(*)
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	

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