

# NE5550279A

R09DS0033EJ0200

Rev.2.00

Jul 04, 2012

## Silicon Power LDMOS FET

### FEATURES

- High Output Power :  $P_{out} = 33.0$  dBm TYP. ( $V_{DS} = 7.5$  V,  $I_{Dset} = 40$  mA,  $f = 460$  MHz,  $P_{in} = 15$  dBm)
- High power added efficiency :  $\eta_{add} = 68\%$  TYP. ( $V_{DS} = 7.5$  V,  $I_{Dset} = 40$  mA,  $f = 460$  MHz,  $P_{in} = 15$  dBm)
- High Linear gain :  $G_L = 22.5$  dB TYP. ( $V_{DS} = 7.5$  V,  $I_{Dset} = 40$  mA,  $f = 460$  MHz,  $P_{in} = 0$  dBm)
- High ESD tolerance
- Suitable for VHF to UHF-BAND Class-AB power amplifier.

### APPLICATIONS

- 150 MHz Band Radio System
- 460 MHz Band Radio System
- 900 MHz Band Radio System

### ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
NE5550279A	NE5550279A-A	79A (Pb Free)	W7	<ul style="list-style-type: none"> <li>• 12 mm wide embossed taping</li> <li>• Gate pin faces the perforation side of the tape</li> </ul>
NE5550279A-T1	NE5550279A-T1-A			<ul style="list-style-type: none"> <li>• 12 mm wide embossed taping</li> <li>• Gate pin faces the perforation side of the tape</li> <li>• Qty 1 kpcs/reel</li> </ul>
NE5550279A-T1A	NE5550279A-T1A-A			<ul style="list-style-type: none"> <li>• 12 mm wide embossed taping</li> <li>• Gate pin faces the perforation side of the tape</li> <li>• Qty 5 kpcs/reel</li> </ul>

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

Part number for sample order: NE5550279A

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

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

Parameter	Symbol	Ratings	Unit
Drain to Source Voltage	$V_{DS}$	30	V
Gate to Source Voltage	$V_{GS}$	6.0	V
Drain Current	$I_{DS}$	0.6	A
Drain Current (50% Duty Pulsed)	$I_{DS-pulse}$	1.2	A
Total Power Dissipation <sup>Note</sup>	$P_{tot}$	6.25	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

Note: Value at  $T_C = 25^\circ\text{C}$

### 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.

**RECOMMENDED OPERATING RANGE ( $T_A = 25^\circ\text{C}$ )**

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	$V_{DS}$		–	7.5	9.0	V
Gate to Source Voltage	$V_{GS}$		1.65	2.20	2.85	V
Drain Current	$I_{DS}$		–	0.4	–	A
Input Power	$P_{in}$	$f = 460 \text{ MHz}, V_{DS} = 7.5 \text{ V}$	–	15	20	dBm

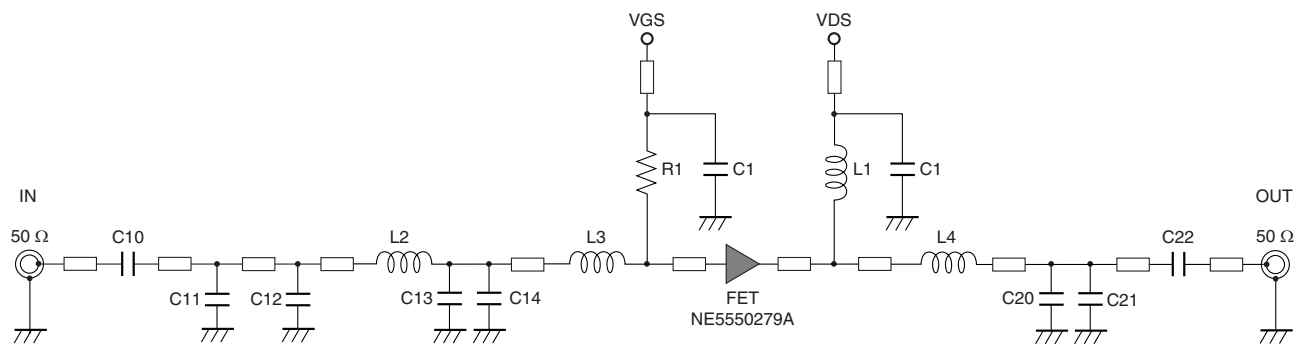
**ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)**

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS} = 6.0 \text{ V}$	–	–	100	nA
Drain to Source Leakage Current (Zero Gate Voltage Drain Current)	$I_{DSS}$	$V_{DS} = 25 \text{ V}$	–	–	10	$\mu\text{A}$
Gate Threshold Voltage	$V_{th}$	$V_{DS} = 7.5 \text{ V}, I_{DS} = 1.0 \text{ mA}$	1.15	1.65	2.25	V
Drain to Source Breakdown Voltage	$BV_{DSS}$	$I_{DS} = 10 \mu\text{A}$	25	38	–	V
Transconductance	$G_m$	$V_{DS} = 7.5 \text{ V}, I_{DS} = 140 \pm 20 \text{ mA}$	0.36	0.44	0.58	S
Thermal Resistance	$R_{th}$	Channel to Case	–	20.0	–	$^\circ\text{C/W}$
RF Characteristics						
Output Power	$P_{out}$	$f = 460 \text{ MHz}, V_{DS} = 7.5 \text{ V},$	31.5	33.0	–	dBm
Drain Current	$I_{DS}$	$P_{in} = 15 \text{ dBm},$	–	0.38	–	A
Power Drain Efficiency	$\eta_d$	$I_{Dset} = 40 \text{ mA (RF OFF)}$	–	70	–	%
Power Added Efficiency	$\eta_{add}$		–	68	–	%
Linear Gain	$G_L$ <sup>Note</sup>		–	22.5	–	dB

Note:  $P_{in} = 0 \text{ dBm}$

**Remark** 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.

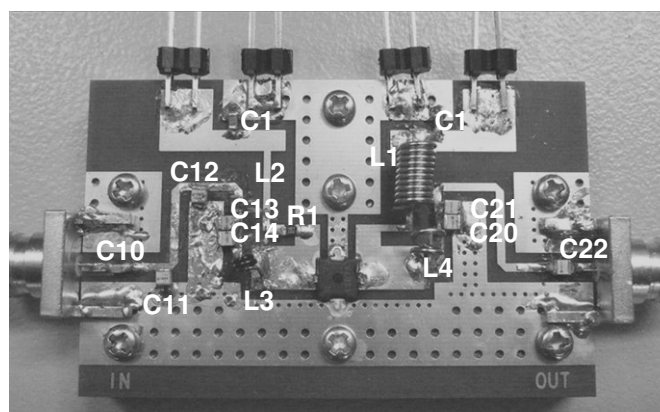
## TEST CIRCUIT SCHEMATIC FOR 460 MHz



## COMPONENTS OF TEST CIRCUIT FOR MEASURING ELECTRICAL CHARACTERISTICS

Symbol	Value	Type	Maker
C1	1 $\mu$ F	GRM188B31C105KA92	Murata
C10	22 pF	GRM1882C1H220JA01	Murata
C11	1.2 pF	ATC100A1R2JW	American Technical Ceramics
C12	4.7 pF	ATC100A4R7BW	American Technical Ceramics
C13	15 pF	ATC100A150BW	American Technical Ceramics
C14	12 pF	ATC100A120BW	American Technical Ceramics
C20	10 pF	ATC100A100JW	American Technical Ceramics
C21	3.9 pF	ATC100A3R9BW	American Technical Ceramics
C22	100 pF	ATC100A101JW	American Technical Ceramics
R1	2 k $\Omega$	1/10 W Chip Resistor RK73B1JTDD202J	KOA
L1	123 nH	$\phi$ 0.5 mm, $\phi$ D = 3 mm, 10 Turns	Ohesangyou
L2	10 nH	LQW18AN10NG00	Murata
L3	9.8 nH	$\phi$ 0.4 mm, $\phi$ D = 1.6 mm, 3 Turns	Ohesangyou
L4	20 nH	$\phi$ 0.5 mm, $\phi$ D = 3 mm, 2 Turns	Ohesangyou
PCB	-	R4775, t = 0.4 mm, $\epsilon$ r = 4.5, size = 30 $\times$ 48 mm	Panasonic
SMA Connector	-	WAKA 01K0790-20	WAKA

## COMPONENT LAYOUT OF TEST CIRCUIT FOR 460 MHz

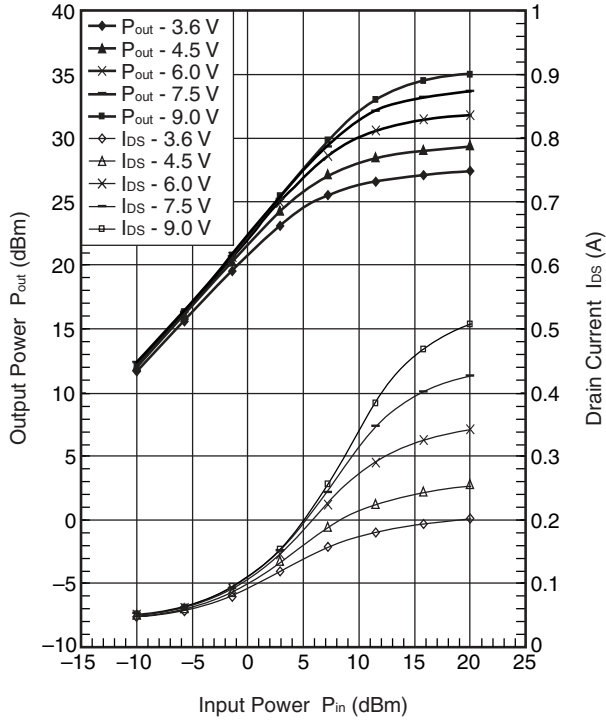


**TYPICAL CHARACTERISTICS 1 (T<sub>A</sub> = 25°C)**

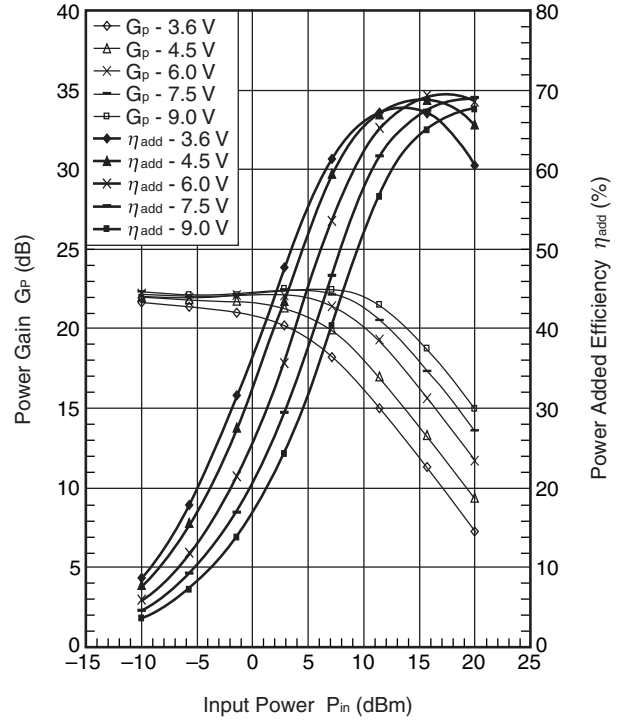
**R:** f = 460 MHz, V<sub>DS</sub> = 3.6/4.5/6/7.5/9 V, I<sub>Dset</sub> = 40 mA, P<sub>in</sub> = -10 to 20 dBm

**IM:** f1 = 460 MHz, f2 = 461 MHz, V<sub>DS</sub> = 3.6/4.5/6/7.5/9 V, I<sub>Dset</sub> = 40 mA, P<sub>out</sub> (2 tone) = 8 to 32 dBm

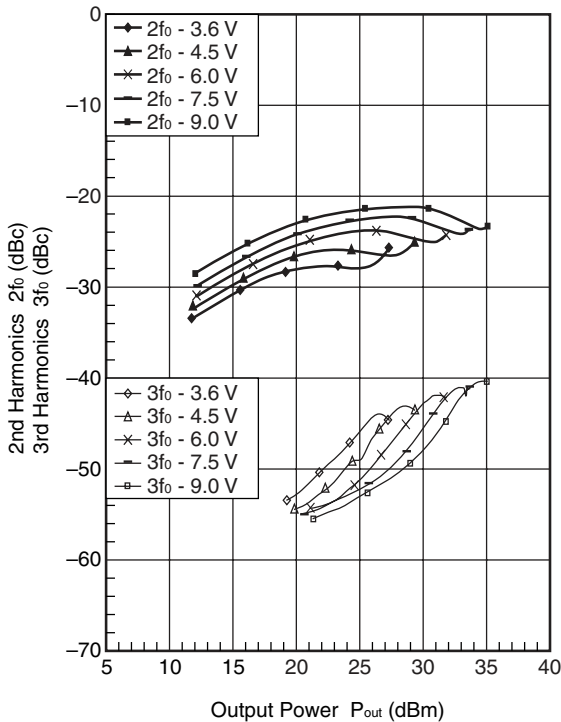
OUTPUT POWER, DRAIN CURRENT vs. INPUT POWER



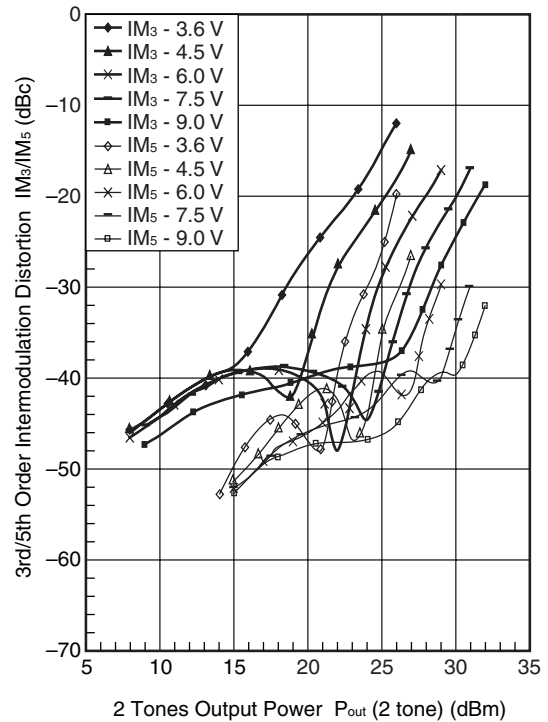
POWER GAIN, POWER ADDED EFFICIENCY vs. INPUT POWER



2f<sub>0</sub>, 3f<sub>0</sub> vs. OUTPUT POWER



IM<sub>3</sub>/IM<sub>5</sub> vs. 2 TONES OUTPUT POWER



**Remark** The graphs indicate nominal characteristics.

## S-PARAMETERS

S-parameters and noise parameters are provided on our web site in a form (S2P) that enables direct import of the parameters to microwave circuit simulators without the need for keyboard inputs.

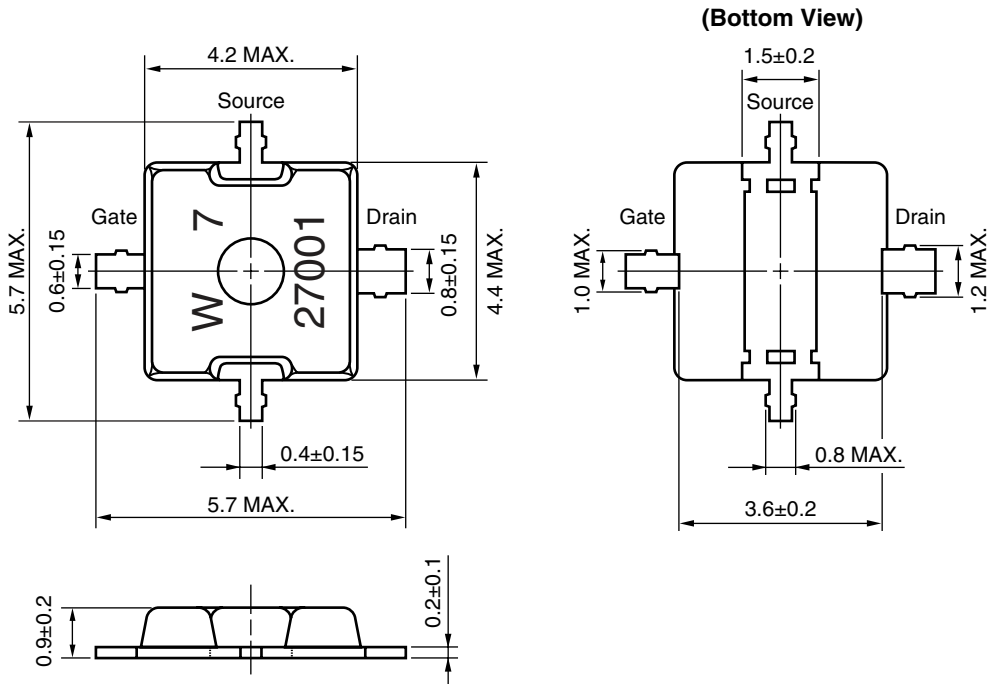
Click here to download S-parameters.

[Products] → [RF Devices] → [Device Parameters]

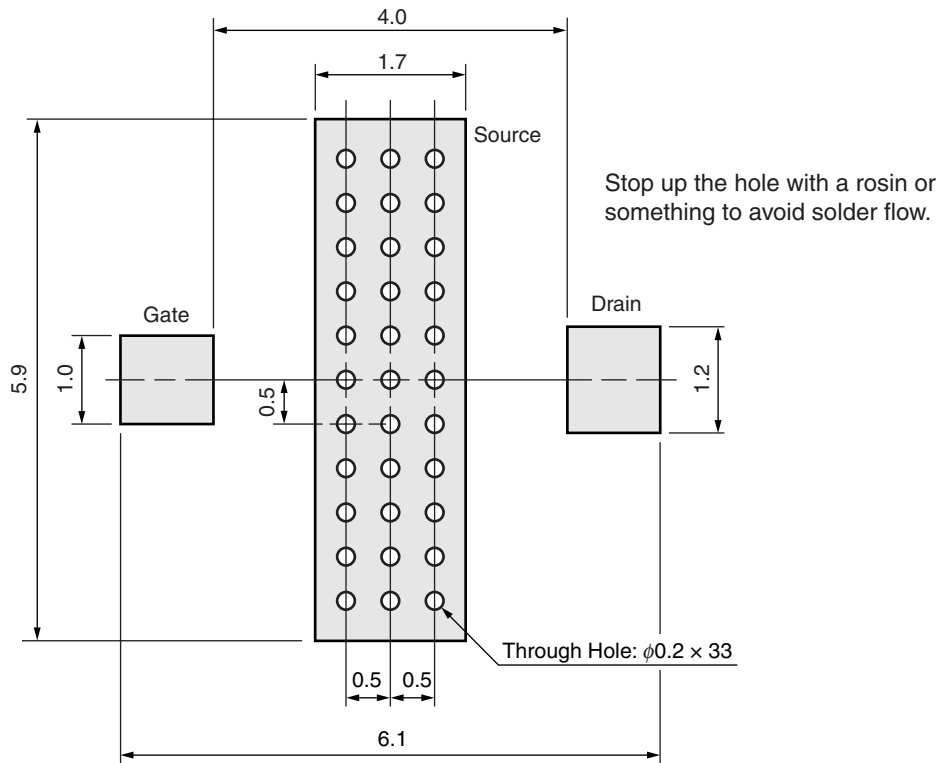
URL <http://www.renesas.com/products/microwave/>

**PACKAGE DIMENSIONS**

79A (UNIT: mm)



**79A PACKAGE RECOMMENDED P.C.B. LAYOUT (UNIT: mm)**



**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).

<b>Revision History</b>	<b>NE5550279A Data Sheet</b>
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Rev.	Date	Description	
		Page	Summary
1.00	Mar 28, 2012	-	First edition issued
2.00	Jul 04, 2012	p.2	Modification of ELECTRICAL CHARACTERISTICS

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