DATA SHEET

CEL

SILICON POWER MOS FET
NE552R479A

3.0 V OPERATION SILICON RF POWER LDMOS FET FOR 2.45 GHz 0.4 W TRANSMISSION AMPLIFIERS

DESCRIPTION

The NE552R479A is an N-channel silicon power laterally diffused MOS FET specially designed as the transmission power amplifier for 3.0 V WLL products. Dies are manufactured using our NEWMOS2 technology (our WSi gate laterally diffused MOS FET) and housed in a surface mount package. This device can deliver 26.0 dBm output power with 45% power added efficiency at 2.45 GHz under the 3.0 V supply voltage.

FEATURES

- High output power : P_{out} = 26.0 dBm TYP. (V_{DS} = 3.0 V, I_{Dset} = 200 mA, f = 2.45 GHz, P_{in} = 19 dBm)
- High power added efficiency : η_{add} = 45% TYP. (V_{DS} = 3.0 V, I_{Dset} = 200 mA, f = 2.45 GHz, P_{in} = 19 dBm)
- High linear gain : G_L = 11 dB TYP. (V_{DS} = 3.0 V, I_{Dset} = 200 mA, f = 2.45 GHz, P_{in} = 10 dBm)
- Surface mount package : 5.7 × 5.7 × 1.1 mm MAX.
- ★ Single supply : V_{DS} = 2.8 to 6.0 V

APPLICATIONS

- Digital cellular phones : 3.0 V GSM1900 Pre Driver
- Analog cellular phones : 2.8 V AMPS Handsets
- Bluetooth™ applications : 3.0 V Class 1 Devices
- Others : 3.0 V Two-Way Pagers

ORDERING INFORMATION

Part Number	Package	Marking	Supplying Form
NE552R479A-T1	79A	AW	• 12 mm wide embossed taping • Gate pin face the perforation side of the tape • Qty 1 kpcs/reel
NE552R479A-T1A			• 12 mm wide embossed taping • Gate pin face the perforation side of the tape • Qty 5 kpcs/reel

Remark To order evaluation samples, contact your nearby sales office.
Part number for sample order: NE552R479A-A

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

Document No. PU10124EJ03V0DS (3rd edition)
Date Published July 2003 CP(K)

The mark ★ shows major revised points.

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Drain to Source Voltage	V_{DS}	15.0	V
Gate to Source Voltage	V_{GS}	5.0	V
Drain Current	I_D	300	mA
Drain Current (Pulse Test)	I_D Note	600	mA
Total Power Dissipation	P_{tot}	10	W
Channel Temperature	T_{ch}	125	°C
Storage Temperature	T_{stg}	–55 to +125	°C

Note Duty Cycle 50%, $T_{on} \leq 1$ s

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V_{DS}		2.8	3.0	6.0	V
Gate to Source Voltage	V_{GS}		0	2.0	3.0	V
Drain Current	I_D	Duty Cycle 50%, $T_{on} \leq 1$ s	–	200	500	mA
Input Power	P_{in}	f = 2.45 GHz, V_{DS} = 3.0 V	18	19	25	dBm

ELECTRICAL CHARACTERISTICS
(T_A = +25°C, unless otherwise specified, using NEC standard test fixture)

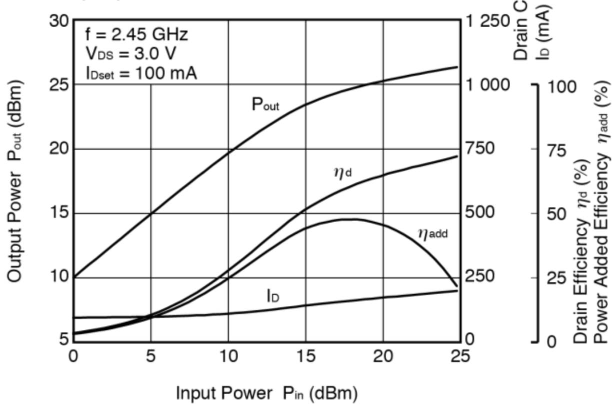
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Gate to Source Leak Current	I_{GSS}	V_{GS} = 5.0 V	–	–	100	nA
Drain to Source Leakage Current (Zero Gate Voltage Drain Current)	I_{DSS}	V_{DS} = 6.0 V	–	–	100	nA
Gate Threshold Voltage	V_{th}	V_{DS} = 3.5 V, I_D = 1 mA	1.0	1.4	1.9	V
Thermal Resistance	R_{th}	Channel to Case	–	–	10	°C/W
Transconductance	G_m	V_{DS} = 3.5 V, I_D = 100 mA	–	0.4	–	S
Drain to Source Breakdown Voltage	BV_{DSS}	I_{DSS} = 10 μA	15	18	–	V
Output Power	P_{out}	f = 2.45 GHz, V_{DS} = 3.0 V,	24.0	26.0	–	dBm
Drain Current	I_D	P_{in} = 19 dBm,	–	230	–	mA
Power Added Efficiency	η_{add}	I_{Dset} = 200 mA (RF OFF), **Note1**	35	45	–	%
Linear Gain Note2	G_L		–	11	–	dB

Notes **1.** 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.

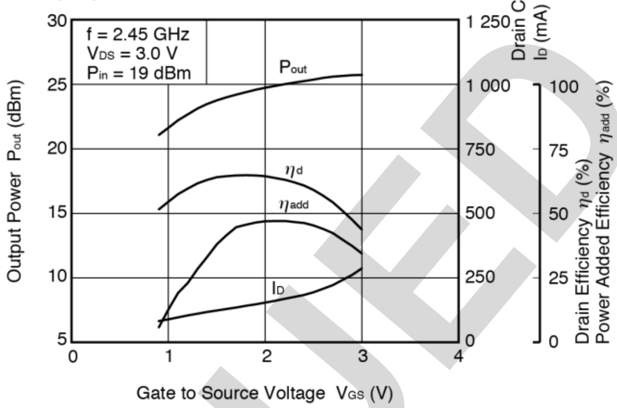
2. P_{in} = 10 dBm

TYPICAL CHARACTERISTICS (T_A = +25°C)

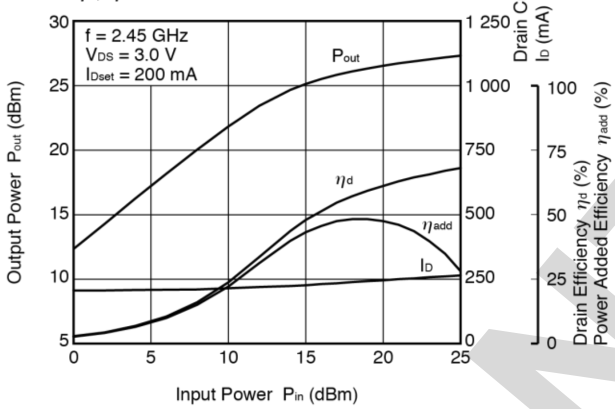
OUTPUT POWER, DRAIN CURRENT
η_d, η_{add} vs. INPUT POWER



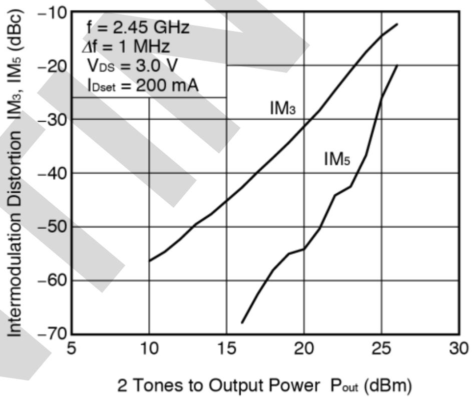
OUTPUT POWER, DRAIN CURRENT
η_d, η_{add} vs. GATE TO SOURCE VOLTAGE



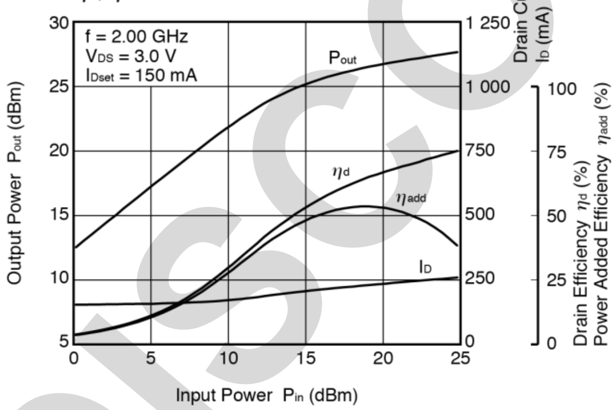
OUTPUT POWER, DRAIN CURRENT
η_d, η_{add} vs. INPUT POWER



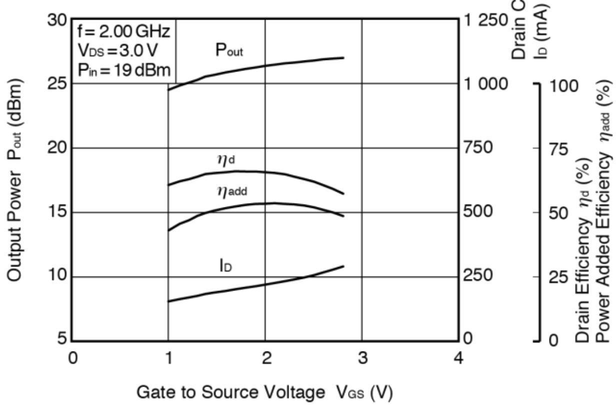
INTERMODULATION DISTORTION vs.
2 TONES TO OUTPUT POWER



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



OUTPUT POWER, DRAIN CURRENT
η_d, η_{add} vs. GATE TO SOURCE VOLTAGE



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

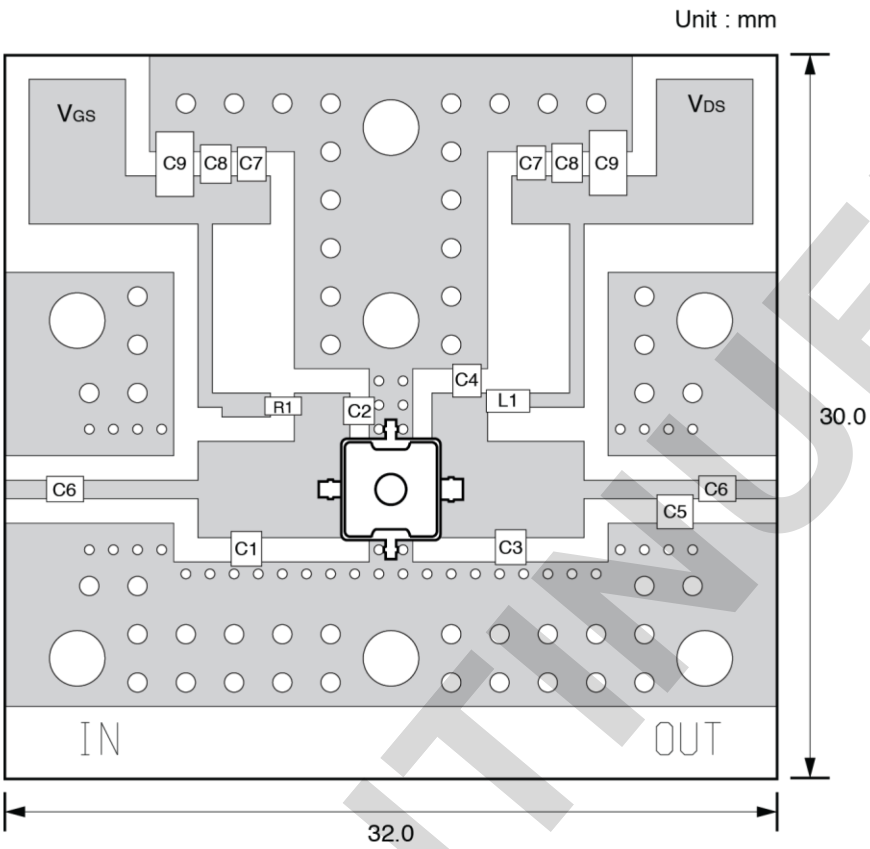
- S-parameters and noise parameters are provided on our Web site in a format (S2P) that enables the direct import of the parameters to microwave circuit simulators without the need for keyboard inputs.
- Click here to download S-parameters.
- [RF and Microwave] ® [Device Parameters]
- URL http://www.necel.com/microwave/en/

LARGE SIGNAL IMPEDANCE (V_{DS} = 3.0 V, I_D = 200 mA, f = 2.45 GHz, P_{out} = 400 mW)

f (GHz)	Z_{in} (Ω)	Z_{OL} (Ω) Note
2.45	2.96 –j7.78	3.36 –j8.42

Note Z_{OL} is the conjugate of optimum load impedance at given voltage, idling current, input power and frequency.

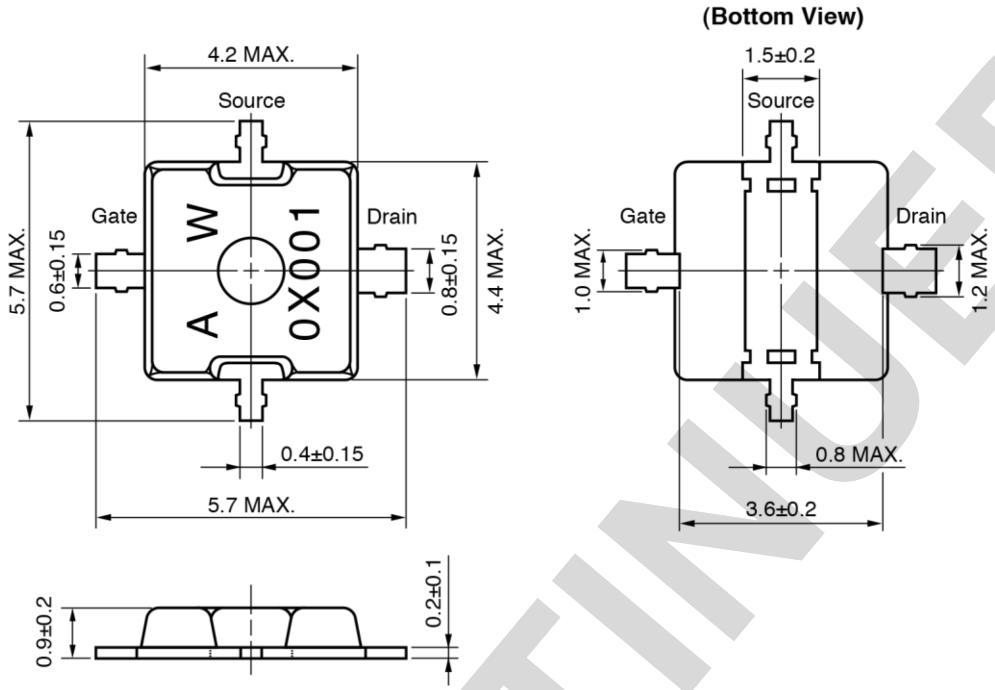
EVALUATION BOARD FOR 2.45 GHz



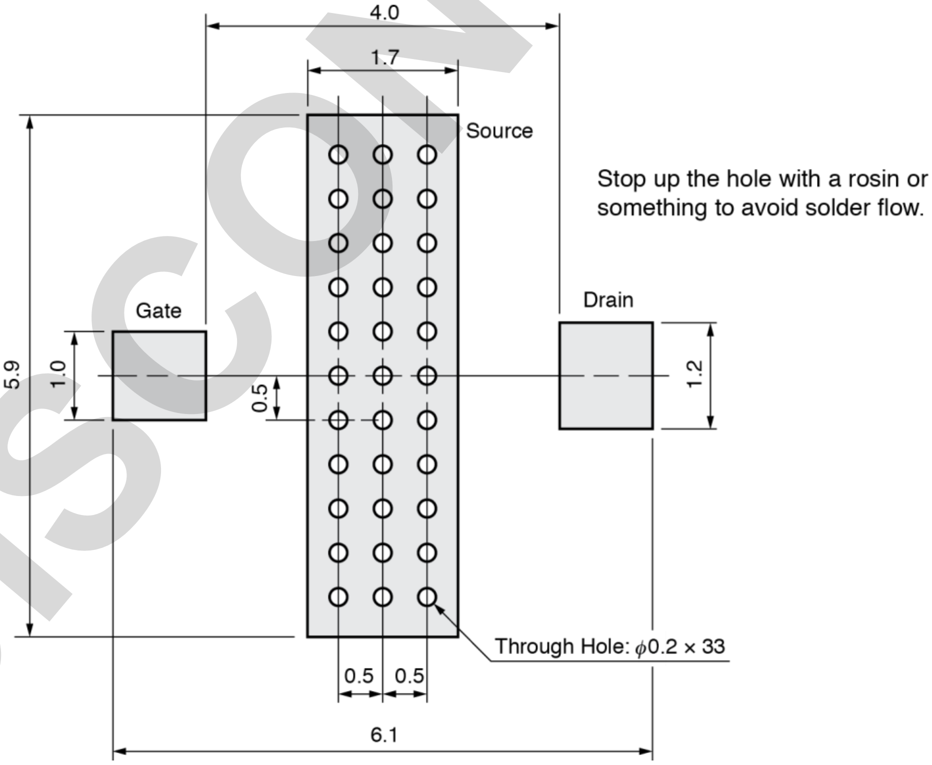
Symbol	Value	Comment
C1	2.0 pF	
C2	1.4 pF	
C3	2.2 pF	
C4	0.8 pF	
C5	0.5 pF	
C6	10 pF	
C7	1 000 pF	
C8	0.22 μF	
C9	3.3 μF - 16V	
R1	1 000 Ω	
L1	22 nH	
Circuit Board	t = 0.4 mm, ε r = 4.5	R4775

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) 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 : 10 seconds or less : 60 seconds or less : 120±30 seconds : 3 times : 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 : 25 to 40 seconds : 30 to 60 seconds : 3 times : 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 : 10 seconds or less : 120°C or below : 1 time : 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 : 3 seconds or less : 0.2%(Wt.) or below	HS350-P3

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