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3SK295 Silicon N-Channel Dual Gate MOS FET

REJ03G0814-0300 (Previous ADE-208-387A) Rev.3.00 Aug. 10, 2005

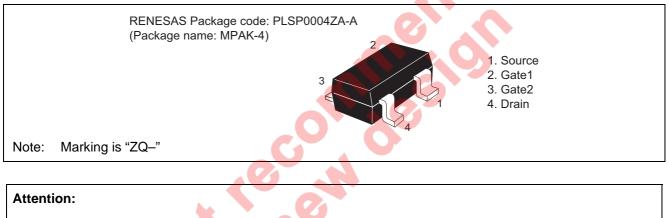
Application

• UHF RF amplifier

Features

- Low noise figure. NF = 2.0 dB typ. at f = 900 MHz
- Capable of low voltage operation

Outline



This device is very sensitive to electro static discharge.

It is recommended to adopt appropriate cautions when handling this transistor.



Absolute Maximum Ratings

(Ta = 2)	25°C)
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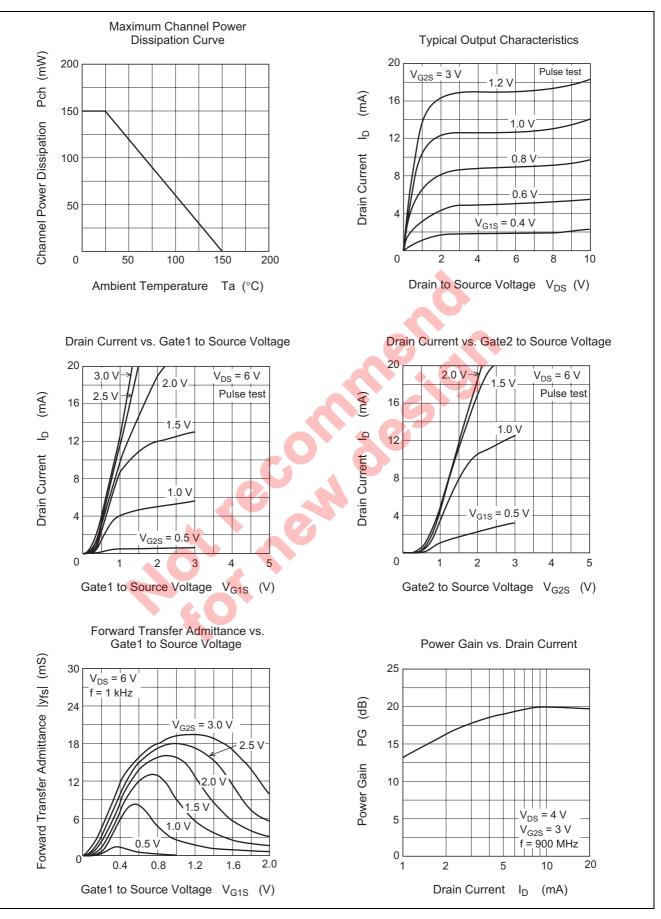
ltem	Symbol	Ratings	Unit
Drain to source voltage	V _{DS}	12	V
Gate 1 to source voltage	V _{G1S}	±8	V
Gate 2 to source voltage	V _{G2S}	±8	V
Drain current	ID	25	mA
Channel power dissipation	Pch	150	mW
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

Electrical Characteristics

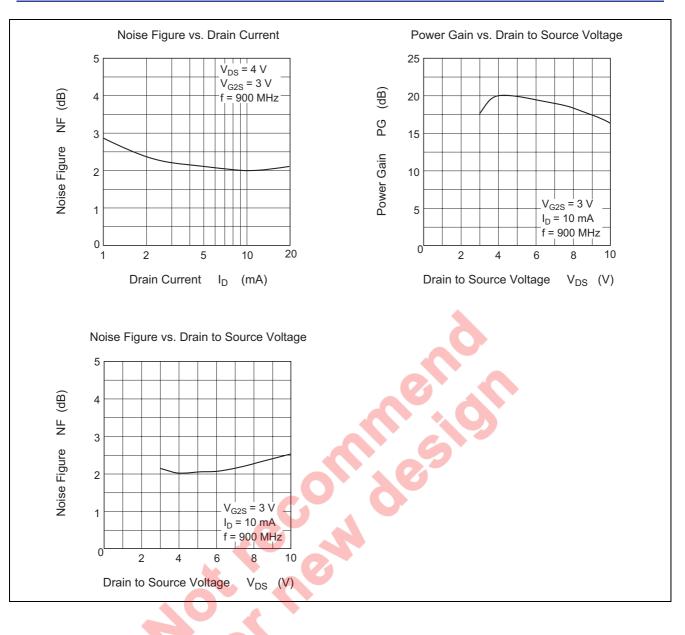
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Item	Symbol	Min	Тур	Max	Unit	Test conditions
Gate 1 to source breakdown voltage $V_{(BR)G1SS}$ ± 8 - - V $I_{G1} = \pm 10 \ \mu\text{A}, V_{G2S} = V_{DS} = 0$ Gate 2 to source breakdown voltage $V_{(BR)G2SS}$ ± 8 - - V $I_{G2} = \pm 10 \ \mu\text{A}, V_{G1S} = V_{DS} = 0$ Gate 1 cutoff current I_{G1SS} - - V $I_{G2} = \pm 10 \ \mu\text{A}, V_{G1S} = V_{DS} = 0$ Gate 1 cutoff current I_{G1SS} - - ± 100 nA $V_{G1S} = \pm 6 \ V, V_{G2S} = V_{DS} = 0$ Gate 2 cutoff current I_{G2SS} - - ± 100 nA $V_{G2S} = \pm 6 \ V, V_{G1S} = V_{DS} = 0$ On A $V_{G2S} = \pm 6 \ V, V_{G1S} = 0.5 \ V, V_{G2S} = \pm 0 \ V_{G2S} = 10 \ V, V_{G1S} = 0.5 \ V, V_{G2S} = 3 \ V$ Gate 1 to source cutoff voltage $V_{G1S(off)}$ -0.5 - 10 mA $V_{DS} = 6 \ V, V_{G1S} = 3 \ V, V_{DS} = 10 \ V, V_{G2S} = 3 \ V, V_{DS} = 100 \ \mu A$ Gate 2 to source cutoff voltage $V_{G2S(off)}$ 0 - $+1.0$ V $V_{DS} = 10 \ V, V_{G1S} = 3 \ V, V_{DS} = 100 \ \mu A$ $I_D = 100 \ \mu A$ Forward transfer admittance $ y_{fs} $ 16 20.8 \ - mS $V_{DS} = 6 \ V, V_{G2S} = 3 \ V, V_{DS} = 10 \ M, f = 1 \ HHz$ $I_D = 10 \ mA, f = 1 \ HHz$	Drain to source breakdown voltage	V _{(BR)DSX}	12	_	_	V	$I_D = 200 \ \mu A$, $V_{G1S} = -3 \ V$,
Gate 2 to source breakdown voltage $V_{(BR) G2SS}$ ± 8 $ V$ $I_{G2} = \pm 10 \ \mu A, \ V_{G1S} = V_{DS} = 0$ Gate 1 cutoff current I_{G1SS} $ \pm 100$ nA $V_{G1S} = \pm 6 \ V, \ V_{G2S} = V_{DS} = 0$ Gate 2 cutoff current I_{G2SS} $ \pm 100$ nA $V_{G2S} = \pm 6 \ V, \ V_{G1S} = V_{DS} = 0$ Drain current $I_{DS(on)}$ 0.5 $ 10$ mA $V_{G2S} = \pm 6 \ V, \ V_{G1S} = 0.5 \ V, \ V_{G2S} = 3 \ V$ Gate 1 to source cutoff voltage $V_{G1S(off)}$ -0.5 $ +0.5$ V $V_{DS} = 10 \ V, \ V_{G2S} = 3 \ V, \ I_D = 100 \ \mu A$ Gate 2 to source cutoff voltage $V_{G2S(off)}$ 0 $ +1.0$ V $V_{DS} = 10 \ V, \ V_{G1S} = 3 \ V, \ I_D = 100 \ \mu A$ Forward transfer admittance $ y_{fs} $ 16 20.8 $-$ mS $V_{DS} = 6 \ V, \ V_{G2S} = 3 \ V, \ I_D = 10 \ \mu A$ Input capacitance Ciss 1.2 1.5 2.2 pF $V_{DS} = 6 \ V, \ V_{G2S} = 3 \ V, \ I_D = 10 \ mA, \ f = 1 \ MHz$ Reverse transfer capacitance Crss $-$ <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>$V_{G2S} = -3 V$</td>							$V_{G2S} = -3 V$
Gate 1 cutoff current Igss - - ± 100 nA VG1s = ± 6 V, VG2s = VDs = 0 Gate 2 cutoff current Igss - - ± 100 nA VG1s = ± 6 V, VG2s = VDs = 0 Gate 2 cutoff current Igss - - ± 100 nA VG1s = ± 6 V, VG2s = VDs = 0 Drain current Igss - - ± 100 nA VG2s = ± 6 V, VG1s = VDs = 0 Drain current Igs(on) 0.5 - 10 mA VG2s = ± 6 V, VG1s = 0.5 V, VG2s = 3 V, VG1s = 0.5 V, VG2s = 3 V Gate 1 to source cutoff voltage VG1s(off) -0.5 - +0.5 V VDs = 10 V, VG2s = 3 V, VG1s = 0.5 V, VG2s = 3 V, VG1s = 0.6 V, VG2s = 3 V, VG1s =	Gate 1 to source breakdown voltage	V _{(BR)G1SS}	±8		_	V	$I_{G1} = \pm 10 \ \mu A, \ V_{G2S} = V_{DS} = 0$
Gate 2 cutoff current I _{G2SS} ± 100 nA $V_{G2S} \pm 6$ V, $V_{G1S} = V_{DS} = 0$ Drain current I _{DS(on)} 0.5 10 mA $V_{DS} = 6$ V, $V_{G1S} = 0.5$ V, $V_{G2S} = 3$ V Gate 1 to source cutoff voltage $V_{G1S(off)}$ -0.5 +0.5 V $V_{DS} = 10$ V, $V_{G2S} = 3$ V, $I_D = 100$ µA Gate 2 to source cutoff voltage $V_{G2S(off)}$ 0 +1.0 V $V_{DS} = 10$ V, $V_{G1S} = 3$ V, $I_D = 100$ µA Forward transfer admittance $ y_{fs} $ 16 20.8 mS $V_{DS} = 6$ V, $V_{G2S} = 3$ V, $I_D = 100$ µA Input capacitance Ciss 1.2 1.5 2.2 pF $V_{DS} = 6$ V, $V_{G2S} = 3$ V, $I_D = 10$ mA, f = 1 kHz Output capacitance Coss 0.6 0.9 1.2 pF $I_D = 10$ mA, f = 1 MHz Reverse transfer capacitance Crss 0.01 0.03 pF Power gain PG 16 19.5 dB $V_{DS} = 4$ V, $V_{G2S} = 3$ V,	Gate 2 to source breakdown voltage	$V_{(BR)G2SS}$	±8		—	V	$I_{G2} = \pm 10 \ \mu A, \ V_{G1S} = V_{DS} = 0$
Drain current IDS(on) 0.5 - 10 mA $V_{DS} = 6 V, V_{G1S} = 0.5 V, V_{G2S} = 3 V$ Gate 1 to source cutoff voltage $V_{G1S(off)}$ -0.5 - +0.5 V $V_{DS} = 10 V, V_{G2S} = 3 V, V_{DS} = 10 V, V_{G2S} = 3 V, V_{DS} = 10 V, V_{G2S} = 3 V, V_{DS} = 10 V, V_{G1S} = 3 V, V_{DS} = 100 \mu A$ Gate 2 to source cutoff voltage $V_{G2S(off)}$ 0 - +1.0 V $V_{DS} = 10 V, V_{G1S} = 3 V, V_{DS} = 10 V, V_{G1S} = 3 V, V_{DS} = 10 V, V_{G1S} = 3 V, V_{DS} = 100 \mu A$ Forward transfer admittance $ y_{1s} $ 16 20.8 - mS $V_{DS} = 6 V, V_{G2S} = 3 V, V_{DS} = 10 M, F = 1 KHz$ Input capacitance Ciss 1.2 1.5 2.2 pF $V_{DS} = 6 V, V_{G2S} = 3 V, V_{DS} = 10 MA, f = 1 KHz$ Output capacitance Coss 0.6 0.9 1.2 pF $V_{DS} = 6 V, V_{G2S} = 3 V, V_{DS} = 10 MA, f = 1 MHz$ Reverse transfer capacitance Crss - 0.01 0.03 pF Power gain PG 16 19.5 - dB $V_{DS} = 4 V, V_{G2S} = 3 V, V_{S}$	Gate 1 cutoff current	I _{G1SS}	—	_	±100	nA	$V_{G1S} = \pm 6 V, V_{G2S} = V_{DS} = 0$
Gate 1 to source cutoff voltage $V_{G1S(off)}$ -0.5 -0.5 $+0.5$ V $V_{DS} = 10 \text{ V}, V_{G2S} = 3 \text{ V},$ Gate 2 to source cutoff voltage $V_{G2S(off)}$ 0 $$ $+1.0$ V $V_{DS} = 10 \text{ V}, V_{G1S} = 3 \text{ V},$ Gate 2 to source cutoff voltage $V_{G2S(off)}$ 0 $$ $+1.0$ V $V_{DS} = 10 \text{ V}, V_{G1S} = 3 \text{ V},$ Forward transfer admittance $ y_{fs} $ 16 20.8 $$ mS $V_{DS} = 6 \text{ V}, V_{G2S} = 3 \text{ V},$ Input capacitance Ciss 1.2 1.5 2.2 pF $V_{DS} = 6 \text{ V}, V_{G2S} = 3 \text{ V},$ Output capacitance Coss 0.6 0.9 1.2 pF $V_{DS} = 6 \text{ V}, V_{G2S} = 3 \text{ V},$ Reverse transfer capacitance Crss $ 0.01$ 0.03 pF Power gain PG 16 19.5 $-$ dB $V_{DS} = 4 \text{ V}, V_{G2S} = 3 \text{ V},$	Gate 2 cutoff current	I _{G2SS}	_	—	±100	nA	$V_{G2S} = \pm 6 V, V_{G1S} = V_{DS} = 0$
Gate 1 to source cutoff voltage $V_{G1S(off)}$ -0.5 $+0.5$ V $V_{DS} = 10 \text{ V}, \text{ V}_{G2S} = 3 \text{ V}, \text{ I}_D = 100 \mu\text{A}$ Gate 2 to source cutoff voltage $V_{G2S(off)}$ 0 $ +1.0$ V $V_{DS} = 10 \text{ V}, \text{ V}_{G1S} = 3 \text{ V}, \text{ I}_D = 100 \mu\text{A}$ Forward transfer admittance $ y_{ts} $ 16 20.8 $-$ mS $V_{DS} = 6 \text{ V}, \text{ V}_{G2S} = 3 \text{ V}, \text{ I}_D = 100 \mu\text{A}$ Input capacitance Ciss 1.2 1.5 2.2 pF $V_{DS} = 6 \text{ V}, \text{ V}_{G2S} = 3 \text{ V}, \text{ I}_D = 10 \text{ mA}, \text{ f} = 1 \text{ kHz}$ Output capacitance Coss 0.6 0.9 1.2 pF $I_D = 10 \text{ mA}, \text{ f} = 1 \text{ MHz}$ Reverse transfer capacitance Crss $ 0.01$ 0.03 pF Power gain PG 16 19.5 $-$ dB $V_{DS} = 4 \text{ V}, \text{ V}_{G2S} = 3 \text{ V},$	Drain current	I _{DS(on)}	0.5	—	10	mA	$V_{DS} = 6 \text{ V}, \text{ V}_{G1S} = 0.5 \text{ V},$
Gate 1 to obtrice output voltageVGIS(off)O-+1.0VVDS = 10 V, VG2S = 0 V, VG2S =							$V_{G2S} = 3 V$
Gate 2 to source cutoff voltage $V_{G2S(off)}$ 0 - +1.0 V $V_{DS} = 10 \text{ V}, \text{ V}_{G1S} = 3 \text{ V}, \text{ I}_{D} = 100 \mu\text{A}$ Forward transfer admittance $ y_{fs} $ 16 20.8 - mS $V_{DS} = 6 \text{ V}, \text{ V}_{G2S} = 3 \text{ V}, \text{ I}_{D} = 10 \text{ mA}, \text{ f} = 1 \text{ kHz}$ Input capacitance Ciss 1.2 1.5 2.2 pF $V_{DS} = 6 \text{ V}, \text{ V}_{G2S} = 3 \text{ V}, \text{ I}_{D} = 10 \text{ mA}, \text{ f} = 1 \text{ kHz}$ Output capacitance Coss 0.6 0.9 1.2 pF $I_D = 10 \text{ mA}, \text{ f} = 1 \text{ MHz}$ Reverse transfer capacitance Crss - 0.01 0.03 pF Power gain PG 16 19.5 - dB $V_{DS} = 4 \text{ V}, \text{ V}_{G2S} = 3 \text{ V}, \text{ I}_{DS} = 4 \text{ V}, \text{ V}_{G2S} = 3 \text{ V}, \text{ I}_{DS} = 4 \text{ V}, \text{ V}_{G2S} = 3 \text{ V}, \text{ I}_{DS} = 4 \text{ V}, \text{ V}_{G2S} = 3 \text{ V}, \text{ I}_{DS} = 4 \text{ V}, \text{ V}_{G2S} = 3 \text{ V}, \text{ I}_{DS} = 4 \text{ V}, \text{ V}_{SS} = 4 \text{ V}, \text{ V}_{SS} = 3 \text{ V}, \text{ I}_{S} = 4 \text{ V}, \text{ V}_{SS} = 3 \text{ V}, \text{ I}_{S} = 4 \text{ V}, \text{ V}_{SS} = 3 \text{ V}, \text{ I}_{S} = 4 \text{ V}, \text{ V}_{S} = 3 \text{ V}, \text{ I}_{S} = 4 \text{ V}, \text{ V}_{S} = 3 \text{ V}, \text{ I}_{S} = 3 \text{ V}, \text{ I}_{S}$	Gate 1 to source cutoff voltage	V _{G1S(off)}	-0.5		+0.5	V	$V_{DS} = 10 V, V_{G2S} = 3 V,$
Forward transfer admittance $ y_{fs} $ 1620.8mS $V_{DS} = 6 \text{ V}, V_{G1S} = 3 \text{ V},$ $I_D = 100 \mu A$ Input capacitanceCiss1.21.52.2pF $V_{DS} = 6 \text{ V}, V_{G2S} = 3 \text{ V},$ $I_D = 10 \text{ mA}, f = 1 \text{ kHz}$ Output capacitanceCoss0.60.91.2pF $I_D = 10 \text{ mA}, f = 1 \text{ MHz}$ Reverse transfer capacitanceCrss0.010.03pFPower gainPG1619.5dB $V_{DS} = 4 \text{ V}, V_{G2S} = 3 \text{ V},$							I _D = 100 μA
Forward transfer admittance $ y_{fs} $ 16 20.8 mS $V_{DS} = 6 \text{ V}, V_{G2S} = 3 \text{ V},$ $I_D = 10 \text{ mA}, f = 1 \text{ kHz}$ Input capacitance Ciss 1.2 1.5 2.2 pF $V_{DS} = 6 \text{ V}, V_{G2S} = 3 \text{ V},$ Output capacitance Coss 0.6 0.9 1.2 pF $I_D = 10 \text{ mA}, f = 1 \text{ MHz}$ Reverse transfer capacitance Crss 0.01 0.03 pF Power gain PG 16 19.5 dB $V_{DS} = 4 \text{ V}, V_{G2S} = 3 \text{ V},$	Gate 2 to source cutoff voltage	V _{G2S(off)}	0	_	+1.0	V	$V_{DS} = 10 V, V_{G1S} = 3 V,$
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$							I _D = 100 μA
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Forward transfer admittance	y _{fs}	16	20.8	_	mS	$V_{DS} = 6 V, V_{G2S} = 3 V,$
Output capacitanceCoss0.60.91.2pF $I_D = 10 \text{ mA}, f = 1 \text{ MHz}$ Reverse transfer capacitanceCrss0.010.03pFPower gainPG1619.5-dB $V_{DS} = 4 \text{ V}, V_{G2S} = 3 \text{ V},$							$I_{D} = 10 \text{ mA}, \text{ f} = 1 \text{ kHz}$
Reverse transfer capacitanceCrss 0.01 0.03 pFPower gainPG16 19.5 $-$ dB $V_{DS} = 4$ V, $V_{G2S} = 3$ V,	Input capacitance	Ciss	1.2	1.5	2.2	pF	
Power gain PG 16 19.5 — dB V _{DS} = 4 V, V _{G2S} = 3 V,	Output capacitance	Coss	0.6	0.9	1.2	pF	I _D = 10 mA, f = 1 MHz
	Reverse transfer capacitance	Crss		0.01	0.03	pF	
Noise figure NF — 2.0 3 dB I_D = 10 mA, f = 900 MHz	Power gain	PG	16	19.5	—	dB	$V_{DS} = 4 V, V_{G2S} = 3 V,$
	Noise figure	NF	_	2.0	3	dB	I _D = 10 mA, f = 900 MHz



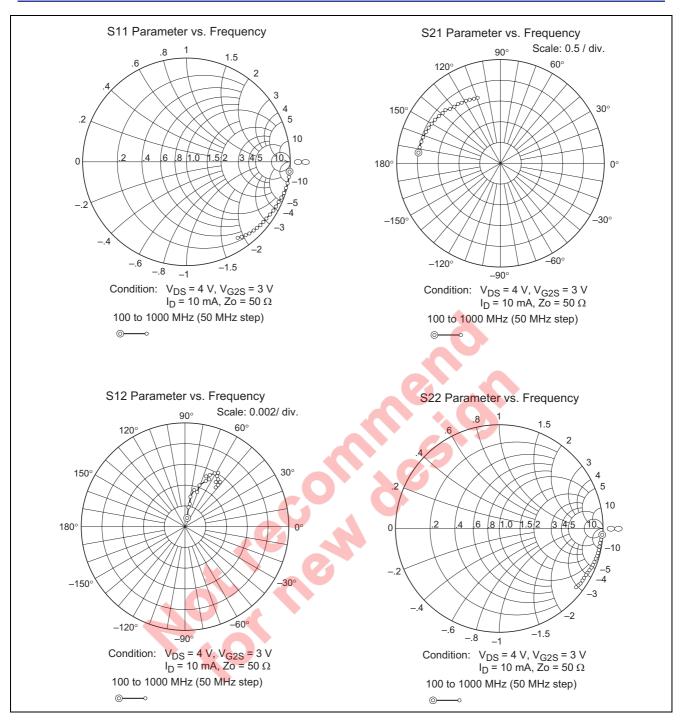
Main Characteristics





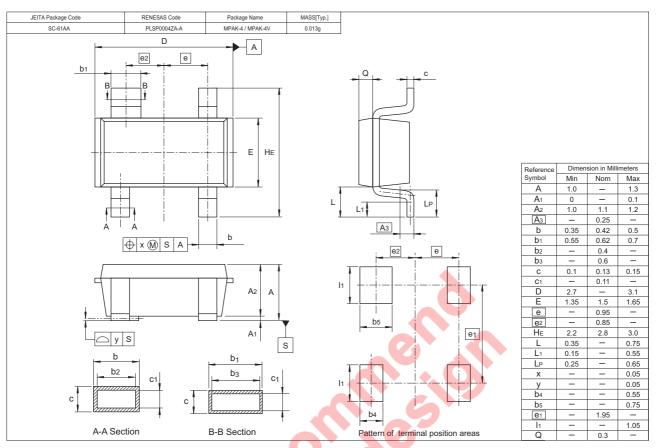








Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
3SK295ZQ-TL-E	3000	φ178 mm Reel, 8 mm Emboss Taping

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