



Yixin Advanced Power MOSFET **SSR/U1N50A**

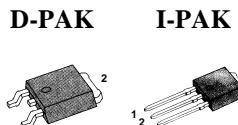
FEATURES

- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
- Extended Safe Operating Area
- Lower Leakage Current : 10 μA (Max.) @ $V_{DS} = 500\text{V}$
- Lower $R_{DS(\text{ON})}$: 4.046 Ω (Typ.)

$BV_{DSS} = 500 \text{ V}$

$R_{DS(\text{on})} = 5.5 \Omega$

$I_D = 1.3 \text{ A}$



1. Gate 2. Drain 3. Source

Absolute Maximum Ratings

Symbol	Characteristic	Value	Units
V_{DSS}	Drain-to-Source Voltage	500	V
I_D	Continuous Drain Current ($T_C=25^\circ\text{C}$)	1.3	A
	Continuous Drain Current ($T_C=100^\circ\text{C}$)	0.82	
I_{DM}	Drain Current-Pulsed ①	5	A
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy ②	113	mJ
I_{AR}	Avalanche Current ①	1.3	A
E_{AR}	Repetitive Avalanche Energy ①	2.6	mJ
dv/dt	Peak Diode Recovery dv/dt ③	3.5	V/ns
P_D	Total Power Dissipation ($T_A=25^\circ\text{C}$) *	2.5	W
	Total Power Dissipation ($T_C=25^\circ\text{C}$)	26	W
	Linear Derating Factor	0.21	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating Junction and Storage Temperature Range	- 55 to +150	$^\circ\text{C}$
T_L	Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5-seconds	300	

Thermal Resistance

Symbol	Characteristic	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	4.76	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-Ambient *	--	50	
$R_{\theta JA}$	Junction-to-Ambient	--	110	

* When mounted on the minimum pad size recommended (PCB Mount).

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Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
BV_{DSS}	Drain-Source Breakdown Voltage	500	--	--	V	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_D=250\mu\text{A}$
$\Delta \text{BV}/\Delta T_J$	Breakdown Voltage Temp. Coeff.	--	0.63	--	V°C	$\text{I}_D=250\mu\text{A}$ See Fig 7
$\text{V}_{\text{GS(th)}}$	Gate Threshold Voltage	2.0	--	4.0	V	$\text{V}_{\text{DS}}=5\text{V}, \text{I}_D=250\mu\text{A}$
I_{GSS}	Gate-Source Leakage , Forward	--	--	100	nA	$\text{V}_{\text{GS}}=30\text{V}$
	Gate-Source Leakage , Reverse	--	--	-100		$\text{V}_{\text{GS}}=-30\text{V}$
I_{DSS}	Drain-to-Source Leakage Current	--	--	10	μA	$\text{V}_{\text{DS}}=500\text{V}$
		--	--	100		$\text{V}_{\text{DS}}=400\text{V}, T_C=125^\circ\text{C}$
$\text{R}_{\text{DS(on)}}$	Static Drain-Source On-State Resistance	--	--	5.5	Ω	$\text{V}_{\text{GS}}=10\text{V}, \text{I}_D=0.65\text{A}$ ④
g_{fs}	Forward Transconductance	--	1.04	--	Ω	$\text{V}_{\text{DS}}=50\text{V}, \text{I}_D=0.65\text{A}$ ④
C_{iss}	Input Capacitance	--	220	290	pF	$\text{V}_{\text{GS}}=0\text{V}, \text{V}_{\text{DS}}=25\text{V}, f=1\text{MHz}$ See Fig 5
C_{oss}	Output Capacitance	--	30	35		
C_{rss}	Reverse Transfer Capacitance	--	11	13		
$t_{\text{d(on)}}$	Turn-On Delay Time	--	12	35	ns	$\text{V}_{\text{DD}}=250\text{V}, \text{I}_D=1.5\text{A}, \text{R}_G=24\Omega$ See Fig 13 ④⑤
t_r	Rise Time	--	13	35		
$t_{\text{d(off)}}$	Turn-Off Delay Time	--	42	90		
t_f	Fall Time	--	15	40		
Q_g	Total Gate Charge	--	11	16	nC	$\text{V}_{\text{DS}}=400\text{V}, \text{V}_{\text{GS}}=10\text{V}, \text{I}_D=1.5\text{A}$ See Fig 6 & Fig 12 ④⑤
Q_{gs}	Gate-Source Charge	--	1.6	--		
Q_{gd}	Gate-Drain("Miller") Charge	--	5.5	--		

Source-Drain Diode Ratings and Characteristics

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
I_S	Continuous Source Current	--	--	1.3	A	Integral reverse pn-diode in the MOSFET
I_{SM}	Pulsed-Source Current ①	--	--	5		
V_{SD}	Diode Forward Voltage ④	--	--	1.15	V	$T_J=25^\circ\text{C}, \text{I}_S=1.3\text{A}, \text{V}_{\text{GS}}=0\text{V}$
t_{rr}	Reverse Recovery Time	--	162	--	ns	$T_J=25^\circ\text{C}, \text{I}_F=1.5\text{A}$ $d\text{I}/dt=100\text{A}/\mu\text{s}$ ④
Q_{rr}	Reverse Recovery Charge	--	0.54	--		

Notes :

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② $L=120\text{mH}, \text{I}_{AS}=1.3\text{A}, \text{V}_{DD}=50\text{V}, \text{R}_G=27\Omega$, Starting $T_J=25^\circ\text{C}$
- ③ $\text{I}_{SD} \leq 1.5\text{A}, d\text{I}/dt \leq 70\text{A}/\mu\text{s}, \text{V}_{DD} \leq \text{BV}_{\text{DSS}}$, Starting $T_J=25^\circ\text{C}$
- ④ Pulse Test : Pulse Width = $250\ \mu\text{s}$, Duty Cycle $\leq 2\%$
- ⑤ Essentially Independent of Operating Temperature

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Fig 1. Output Characteristics

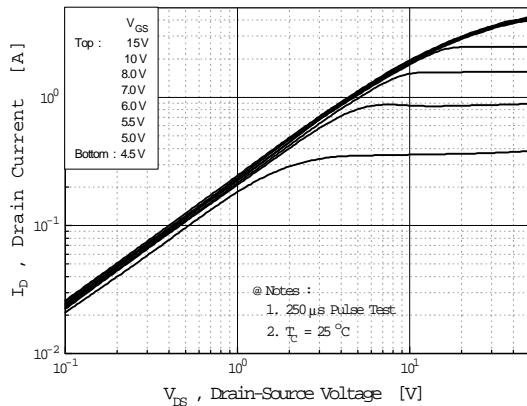


Fig 2. Transfer Characteristics

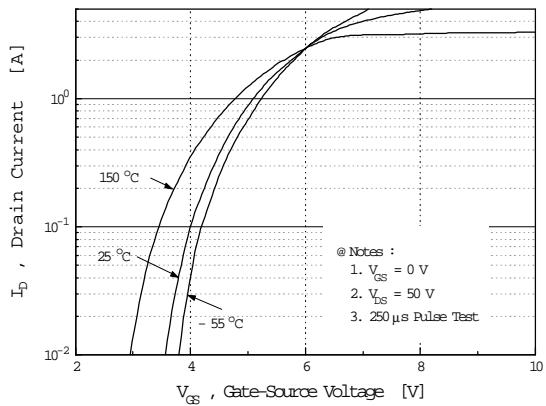


Fig 3. On-Resistance vs. Drain Current

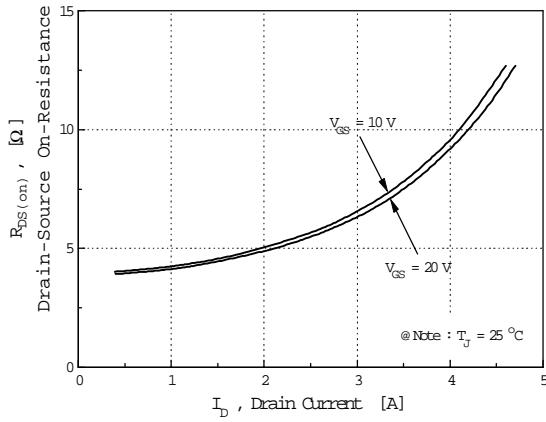


Fig 4. Source-Drain Diode Forward Voltage

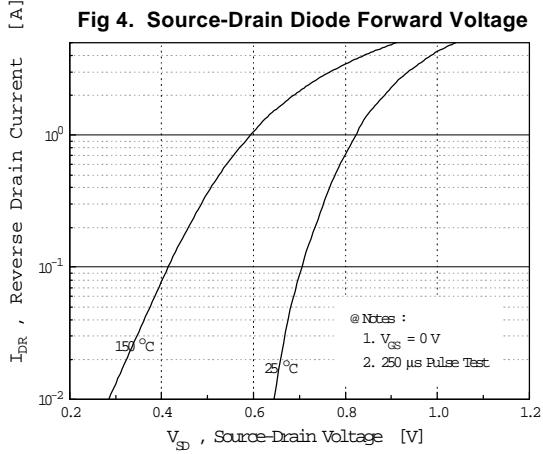


Fig 5. Capacitance vs. Drain-Source Voltage

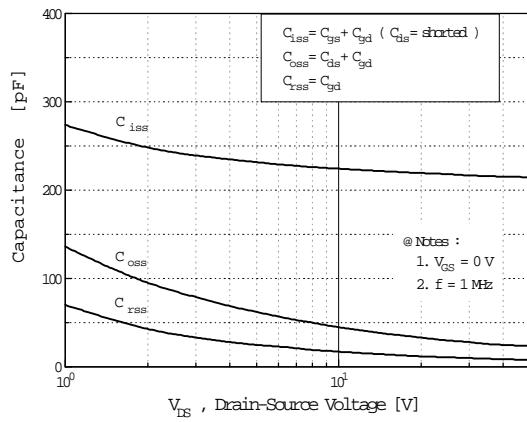


Fig 6. Gate Charge vs. Gate-Source Voltage

