



Yixin

Advanced Power MOSFET

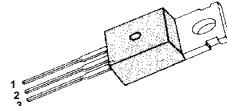
SFP9Z14

FEATURES

- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
- 175°C Opereting Temperature
- Extended Safe Operating Area
- Lower Leakage Current : -10 µA (Max.) @ V_{DS} = -60V
- Low R_{DS(ON)} : 0.362 Ω (Typ.)

BV_{DSS} = -60 VR_{DS(on)} = 0.5 ΩI_D = -6.7 A

TO-220



1.Gate 2. Drain 3. Source

Absolute Maximum Ratings

Symbol	Characteristic	Value	Units
V _{DSS}	Drain-to-Source Voltage	-60	V
I _D	Continuous Drain Current (T _C =25°C)	-6.7	A
	Continuous Drain Current (T _C =100°C)	-4.7	
I _{DM}	Drain Current-Pulsed ①	-27	A
V _{GS}	Gate-to-Source Voltage ②	±30	V
E _{AS}	Single Pulsed Avalanche Energy	115	mJ
I _{AR}	Avalanche Current ①	-6.7	A
E _{AR}	Repetitive Avalanche Energy ①	3.8	mJ
dv/dt	Peak Diode Recovery dv/dt ③	-5.5	V/ns
P _D	Total Power Dissipation (T _C =25°C)	38	W
	Linear Derating Factor	0.25	W/°C
T _J , T _{STG}	Operating Junction and Storage Temperature Range	- 55 to +175	°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 _{θJC}	Junction-to-Case	--	3.95	°C/W
R _{θCS}	Case-to-Sink	0.5	--	
R _{θJA}	Junction-to-Ambient	--	62.5	

SFP9Z14

P-CHANNEL
POWER MOSFET

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	-60	--	--	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.	--	-0.05	--	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	$\text{V}_{\text{GS}}=-20\text{V}$
	Gate-Source Leakage , Reverse	--	--	100		$\text{V}_{\text{GS}}=20\text{V}$
I_{DSs}	Drain-to-Source Leakage Current	--	--	-10	μA	$\text{V}_{\text{DS}}=-60\text{V}$
		--	--	-100		$\text{V}_{\text{DS}}=-48\text{V}, \text{T}_C=150^\circ\text{C}$
$\text{R}_{\text{DS(on)}}$	Static Drain-Source On-State Resistance	--	--	0.5	Ω	$\text{V}_{\text{GS}}=-10\text{V}, \text{I}_D=-3.4\text{A}$ ④
g_{fs}	Forward Transconductance	--	2.4	--	S	$\text{V}_{\text{DS}}=-30\text{V}, \text{I}_D=-3.4\text{A}$ ④
C_{iss}	Input Capacitance	--	270	350	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	--	90	135		
C_{rss}	Reverse Transfer Capacitance	--	25	35		
$t_{\text{d(on)}}$	Turn-On Delay Time	--	10	30	ns	$\text{V}_{\text{DD}}=-30\text{V}, \text{I}_D=-6.7\text{A}, \text{R}_G=24\Omega$ See Fig 13 ④⑤
t_r	Rise Time	--	19	50		
$t_{\text{d(off)}}$	Turn-Off Delay Time	--	21	50		
t_f	Fall Time	--	16	40		
Q_g	Total Gate Charge	--	9	11	nC	$\text{V}_{\text{DS}}=-48\text{V}, \text{V}_{\text{GS}}=-10\text{V}, \text{I}_D=-6.7\text{A}$ See Fig 6 & Fig 12 ④⑤
Q_{gs}	Gate-Source Charge	--	1.8	--		
Q_{gd}	Gate-Drain("Miller") Charge	--	4.2	--		

Source-Drain Diode Ratings and Characteristics

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
I_S	Continuous Source Current	--	--	-6.7	A	Integral reverse pn-diode in the MOSFET
I_{SM}	Pulsed-Source Current ①	--	--	-27		
V_{SD}	Diode Forward Voltage ④	--	--	-3.8	V	$\text{T}_J=25^\circ\text{C}, \text{I}_S=-6.7\text{A}, \text{V}_{\text{GS}}=0\text{V}$
t_{rr}	Reverse Recovery Time	--	75	--	ns	$\text{T}_J=25^\circ\text{C}, \text{I}_F=-6.7\text{A}$
Q_{rr}	Reverse Recovery Charge	--	0.17	--	μC	$d\text{i}_F/dt=100\text{A}/\mu\text{s}$ ④

Notes :

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② $L=3.0\text{mH}, \text{I}_{\text{AS}}=-6.7\text{A}, \text{V}_{\text{DD}}=-25\text{V}, \text{R}_G=27\Omega^*$, Starting $\text{T}_J=25^\circ\text{C}$
- ③ $\text{I}_{\text{SD}} \leq -6.7\text{A}, d\text{i}/dt \leq 200\text{A}/\mu\text{s}, \text{V}_{\text{DD}} \leq \text{BV}_{\text{DSS}}$, Starting $\text{T}_J=25^\circ\text{C}$
- ④ Pulse Test : Pulse Width = $250\mu\text{s}$, Duty Cycle $\leq 2\%$
- ⑤ Essentially Independent of Operating Temperature

Fig 1. Output Characteristics

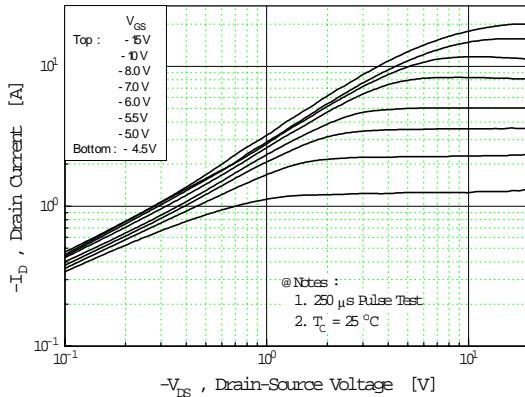


Fig 2. Transfer Characteristics

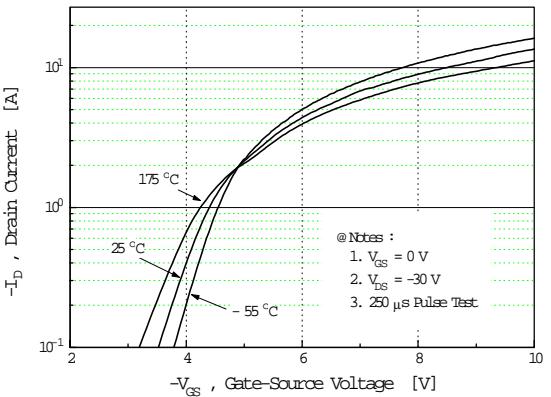


Fig 3. On-Resistance vs. Drain Current

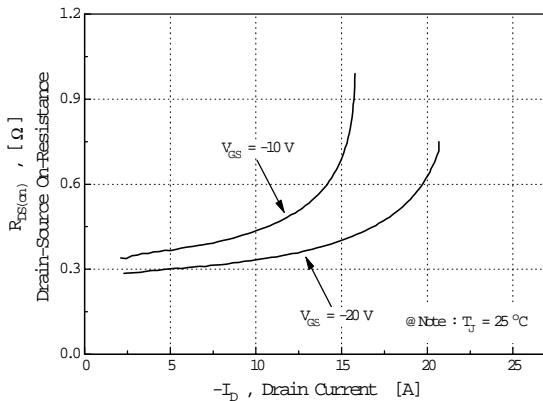


Fig 4. Source-Drain Diode Forward Voltage

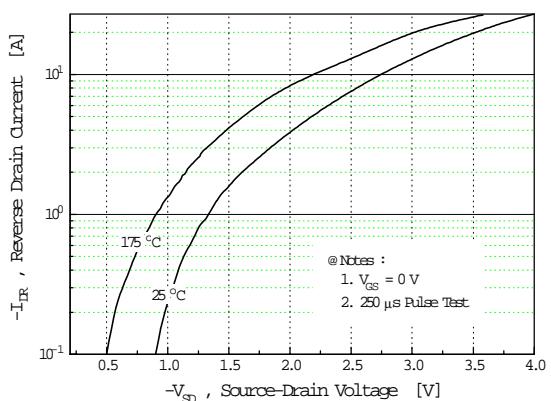


Fig 5. Capacitance vs. Drain-Source Voltage

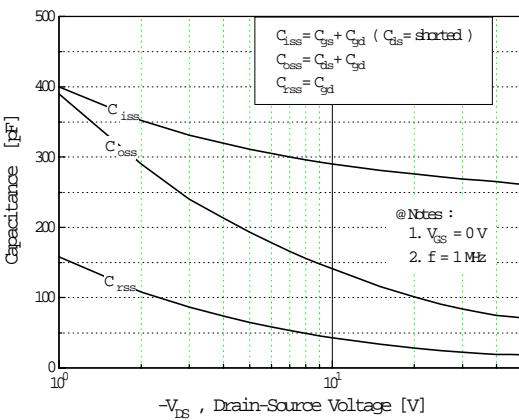


Fig 6. Gate Charge vs. Gate-Source Voltage

