EVVOSEMI®

THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

Product Specification

Domestic Part Number	IRF9Z24N
Overseas Part Number	IRF9Z24N
Equivalent Part Number	IRF9Z24N

-60V P-Channel Enhancement Mode MOSFET

Description

The IRF9Z24N uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = −60V I_D =−20A

$R_{DS(ON)}$ < −110mΩ @ V_{GS}=−10V

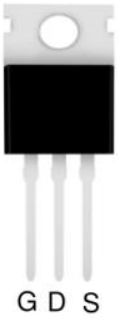
Application

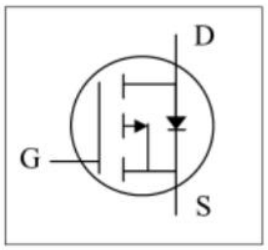
Battery protection

Load switch

Uninterruptible power supply

TO-220-3L Pin Configuration





Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	-20	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	-16	A
Pulsed Drain Current	I_{DM}	-260	A
Maximum Power Dissipation	P_D	1.92	W
Derating factor		0.87	W/℃
Single pulse avalanche energy (Note 5)	E_{AS}	50	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃
Thermal Resistance, Junction-to-Case(Note 2)	$R_{\theta JC}$	65	℃/W

Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-60V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-1.0	-1.63	-3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-20A	-	90	110	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-20A	-	25	-	S
Input Capacitance	C_{lss}	V_{DS}=-25V,V_{GS}=0V, F=1.0MHz	-	1800	-	PF
Output Capacitance	C_{oss}		-	420	-	PF
Reverse Transfer Capacitance	C_{rss}		-	145	-	PF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-30V, R_L=1.5Ω, V_{GS}=-10V,R_G=3Ω	-	53	-	nS
Turn-on Rise Time	t_r		-	19	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	221	-	nS
Turn-Off Fall Time	t_f		-	61	-	nS
Total Gate Charge	Q_g	V_{DS}=-30,I_D=-20A, V_{GS}=-10V	-	46		nC
Gate-Source Charge	Q_{gs}		-	16		nC
Gate-Drain Charge	Q_{gd}		-	24		nC
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-20A	-		-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-65	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, I_F =-20A di/dt = -100A/μs(Note3)	-	49		nS
Reverse Recovery Charge	Qrr		-	71		nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. Surface Mounted on FR4 Board, t ≤ 10 sec.

3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

4. Guaranteed by design, not subject to production

5. E_{AS} condition: Tj=25℃,V_{DD}=-30V,V_G=-10V,L=0.5mH,Rg=25ΩTypical Electrical and Thermal Characteristics (Curves)

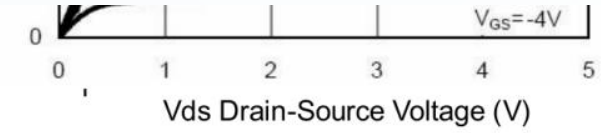


Figure 1 Output Characteristics

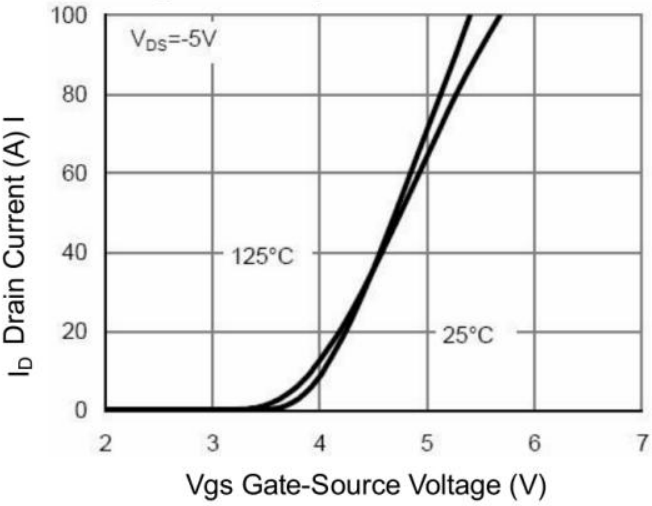


Figure 2 Transfer Characteristics

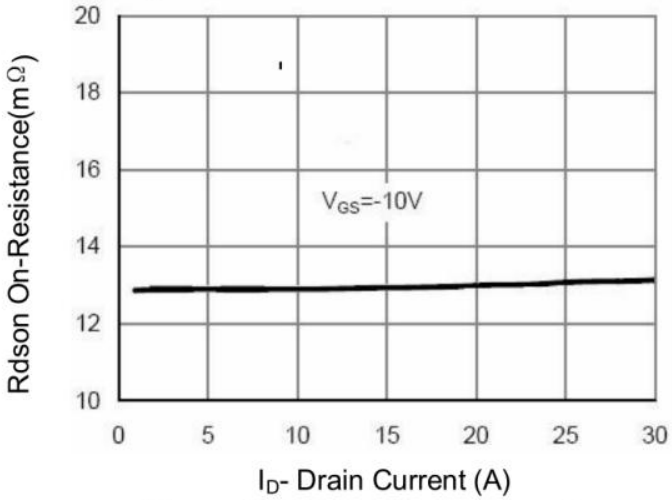


Figure 3 Rdson- Drain Current

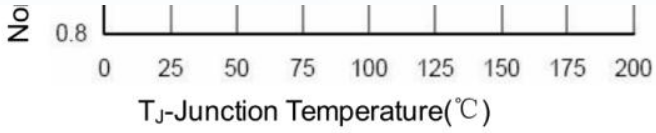


Figure 4 Rdson-Junction Temperature

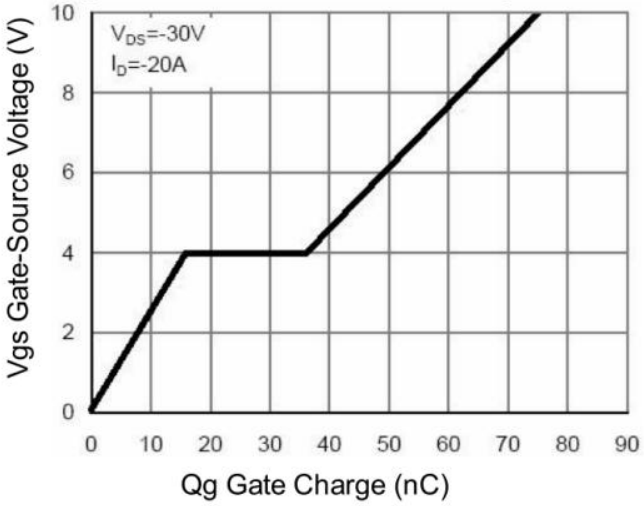


Figure 5 Gate Charge

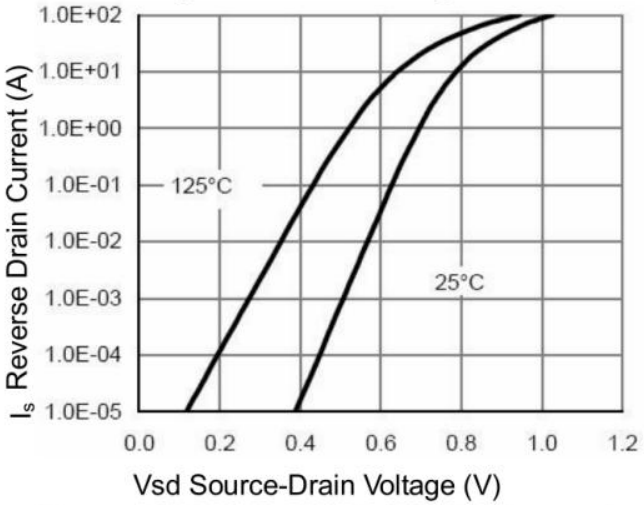


Figure 6 Source- Drain Diode Forward

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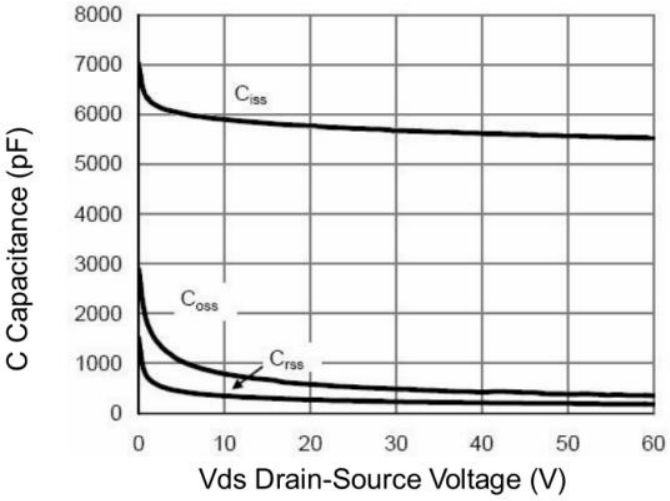


Figure 7 Capacitance vs Vds

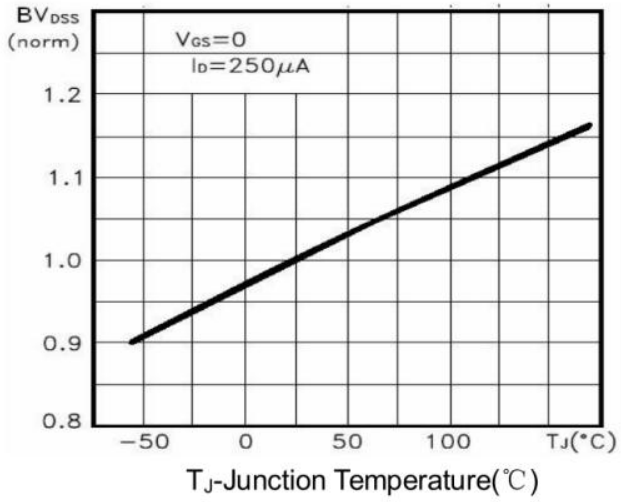


Figure 9 BV_{DSS} vs Junction Temperature

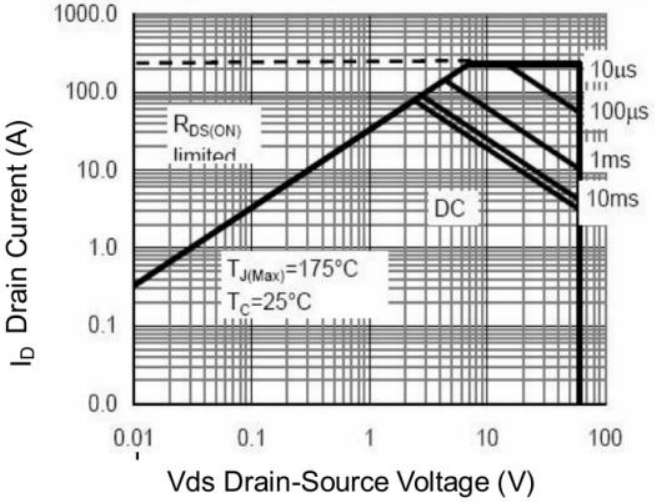


Figure 8 Safe Operation Area

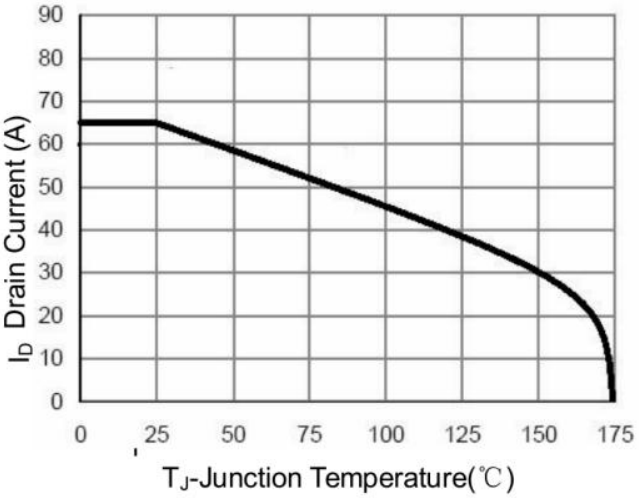


Figure 10 ID Current Derating vs Junction Temperature

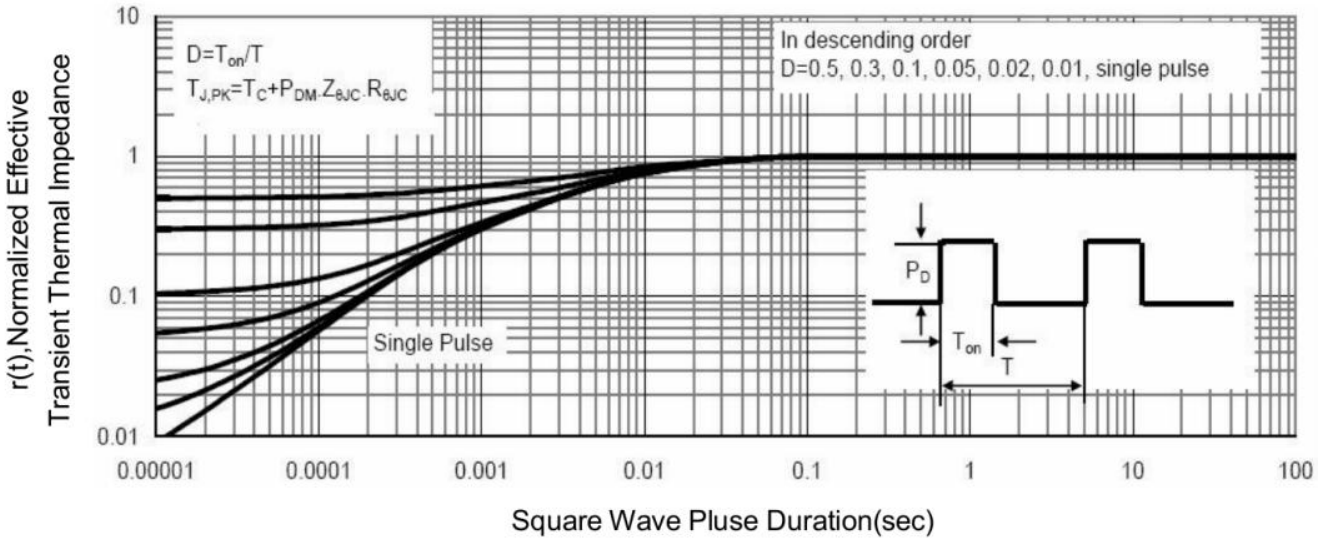
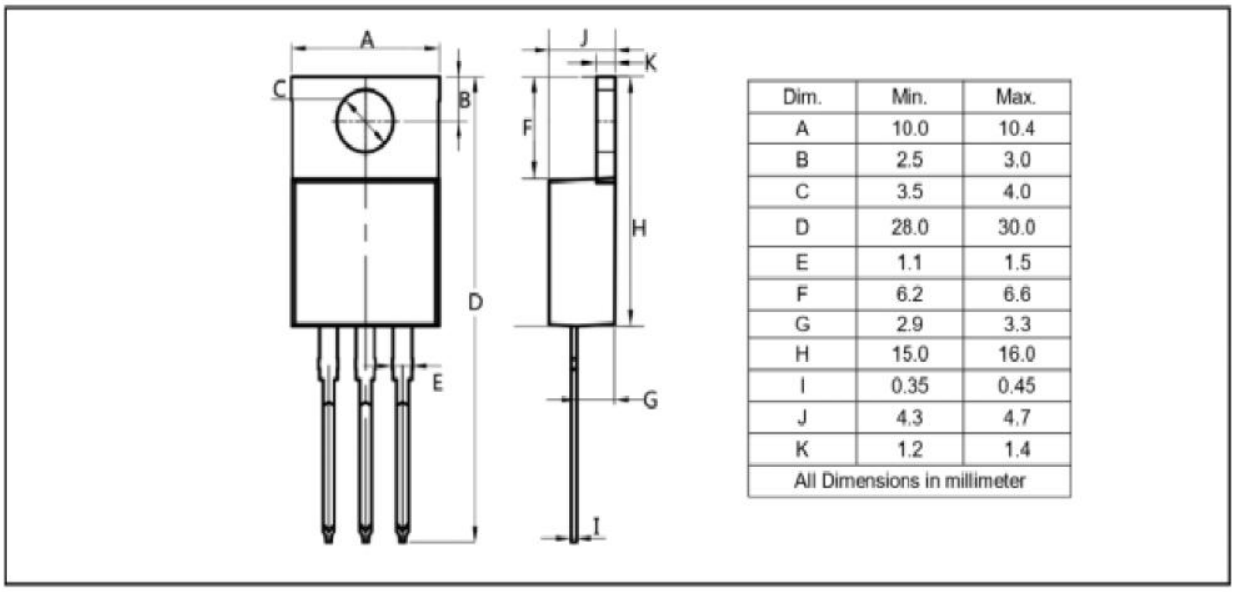


Figure 11 Normalized Maximum Transient Thermal Impedance

-60V P-Channel Enhancement Mode MOSFET

TO-220-3L



Dim.	Min.	Max.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4
All Dimensions in millimeter		

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