

EVVOSEMI[®]

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

Product Specification

▶ Domestic	Part Number	IRF9362
▶ Overseas	Part Number	IRF9362
▶ Equivalent	Part Number	IRF9362

EV is the abbreviation of name EVVO

-30V P+P-Channel Enhancement Mode MOSFET

General Description

The IRF9362 integrates two P-channel enhancement-mode power MOSFETs in a compact SOP-8 package. Its trench-gate design provides low on-resistance and low gate charge, making the device suitable for battery protection, load switching, and other low-voltage power-management applications. The product is RoHS compliant.

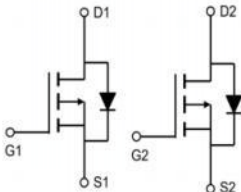
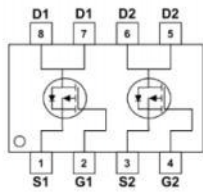
Application

- Battery protection
- Load switch
- Uninterruptible power supply

General Features

- $V_{DS} = -30V$ $I_D = -9.5A$
- $R_{DS(ON)} < -20m\Omega$ @ $V_{GS}=10V$
- $R_{DS(ON)} < -25m\Omega$ @ $V_{GS}=4.5V$

SOP-8L Pin Configuration



Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^{\circ}C$	Continuous Drain Current, V_{GS} @ -10V ¹	-9.5	A
$I_D@T_A=70^{\circ}C$	Continuous Drain Current, V_{GS} @ -10V ¹	-7.6	A
I_{DM}	Pulsed Drain Current ²	-50	A
EAS	Single Pulse Avalanche Energy ³	72.2	mJ
I_{AS}	Avalanche Current	-38	A
$P_D@T_A=25^{\circ}C$	Total Power Dissipation ⁴	3.1	W
$P_D@T_A=70^{\circ}C$	Total Power Dissipation ⁴	2	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	75	°C/W

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	Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	40	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	24	$^{\circ}C/W$

Electrical Characteristics ($T_J=25^{\circ}C$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30	---	---	V
$\frac{\partial BV_{DSS}}{\partial T_J}$	BV_{DSS} Temperature Coefficient	Reference to $25^{\circ}C, I_D=-1mA$	---	-0.022	---	$V/^{\circ}C$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-6A$	---	16	20	$m\Omega$
		$V_{GS}=-4.5V, I_D=-4A$	---	18	25	
$V_{GS(th)}$	Gate Threshold Voltage		-1.0	---	-2.5	V
$\frac{\partial V_{GS(th)}}{\partial T_J}$	$V_{GS(th)}$ Temperature Coefficient	$V_{GS}=V_{DS}, I_D=-250\mu A$	---	4.6	---	$mV/^{\circ}C$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-24V, V_{GS}=0V, T_J=25^{\circ}C$	---	---	-1	μA
		$V_{DS}=-24V, V_{GS}=0V, T_J=55^{\circ}C$	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-5V, I_D=-6A$	---	17	---	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	---	13	---	Ω
Q_g	Total Gate Charge (-4.5V)	$V_{DS}=-15V, V_{GS}=-4.5V, I_D=-6A$	---	12.6	---	nC
Q_{gs}	Gate-Source Charge		---	4.8	---	
Q_{gd}	Gate-Drain Charge		---	4.8	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-6A$	---	4.6	---	ns
T_r	Rise Time		---	14.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	41	---	
T_f	Fall Time		---	19.6	---	
C_{iss}	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	---	1345	---	pF
C_{oss}	Output Capacitance		---	194	---	
C_{rss}	Reverse Transfer Capacitance		---	158	---	
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V, \text{Force Current}$	---	---	-9.5	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	-50	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=-1A, T_J=25^{\circ}C$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-6A, dI/dt=100A/\mu s, T_J=25^{\circ}C$	---	16.3	---	nS
Q_{rr}	Reverse Recovery Charge	$T_J=25^{\circ}C$	---	5.9	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch ²FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-38A$
- 4.The power dissipation is limited by $150^{\circ}C$ junction temperature
- 5 .The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

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Typical Characteristics

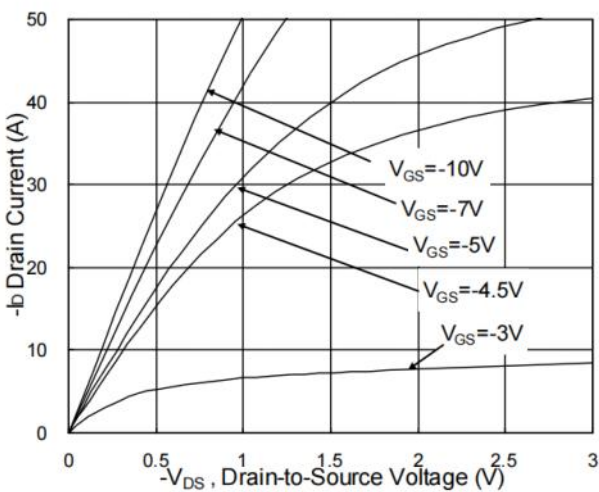


Fig.1 Typical Output Characteristics

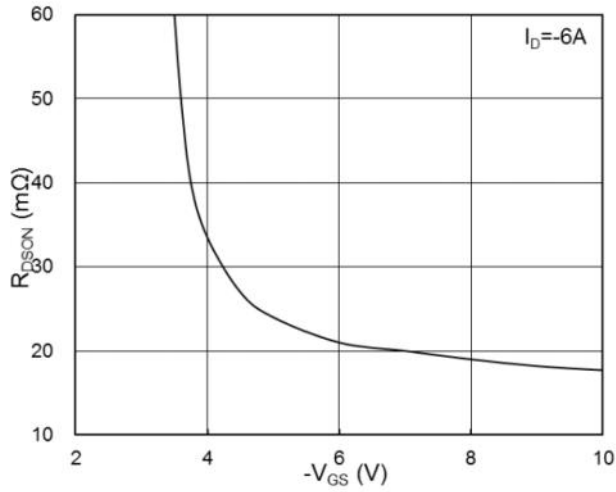


Fig.2 On-Resistance v.s Gate-Source

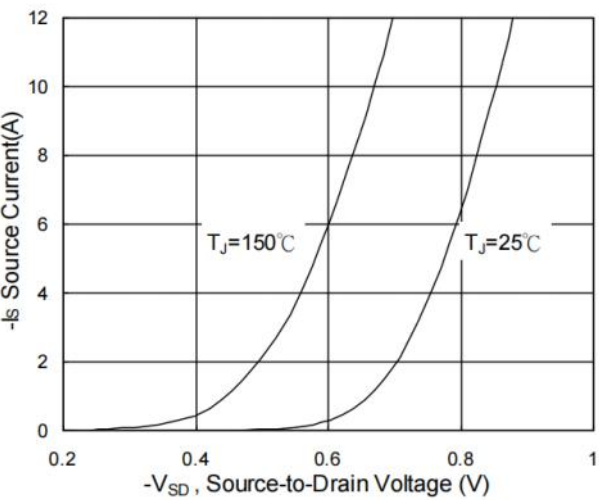


Fig.3 Forward Characteristics of Reverse

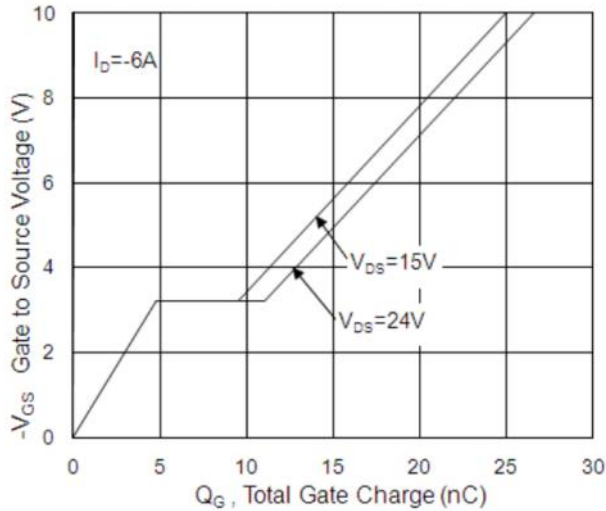


Fig.4 Gate-Charge Characteristics

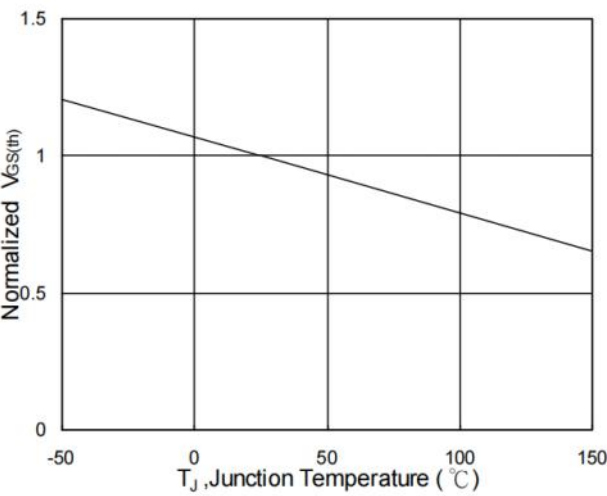


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

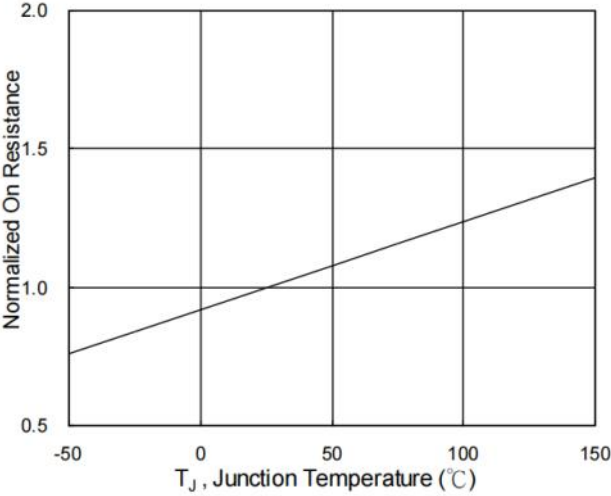


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

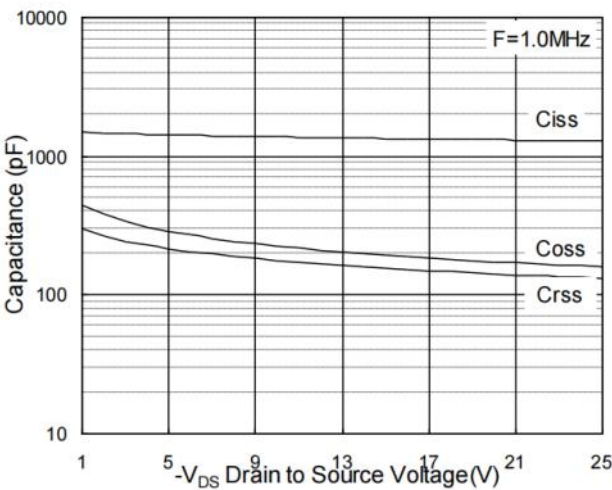


Fig.7 Capacitance

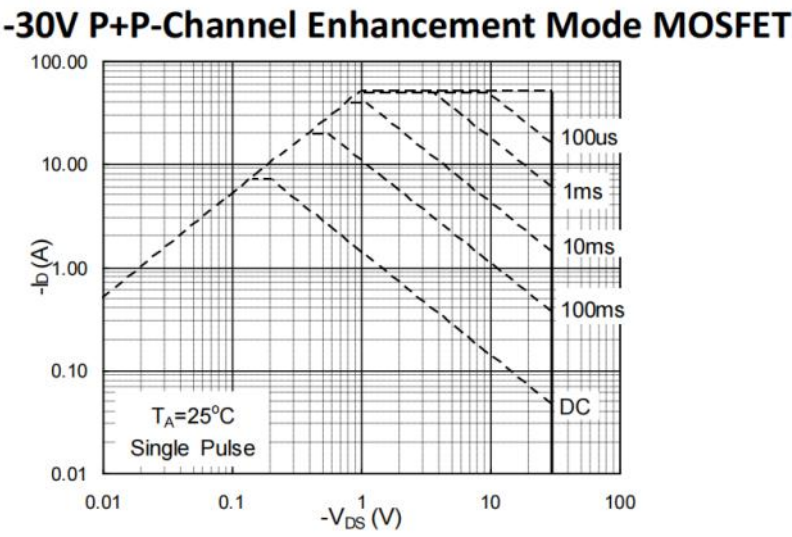


Fig.8 Safe Operating Area

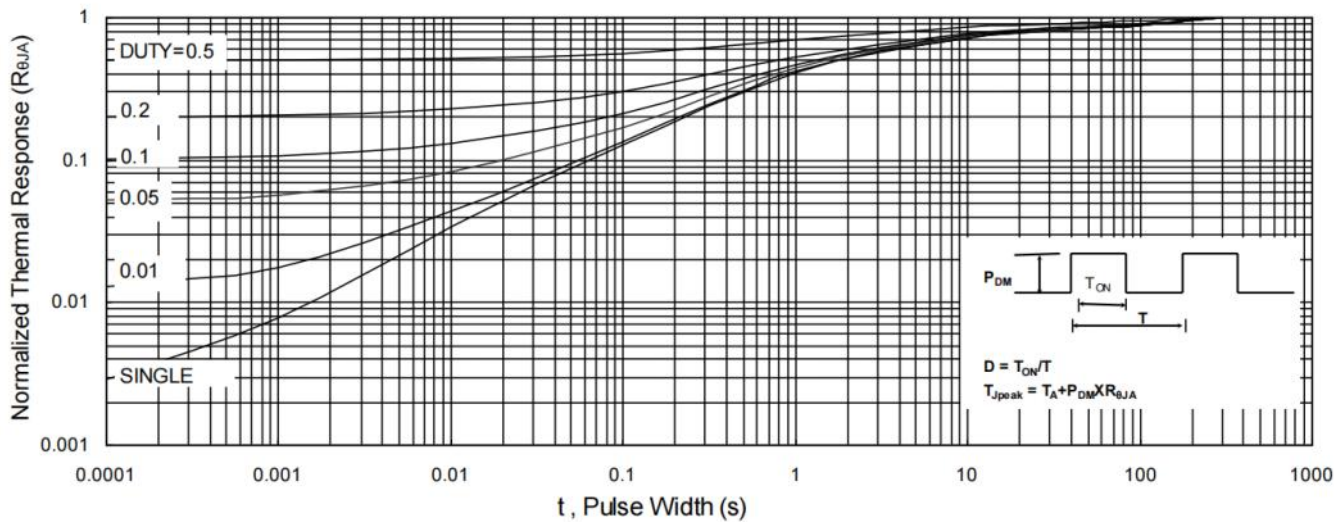


Fig.9 Normalized Maximum Transient Thermal Impedance

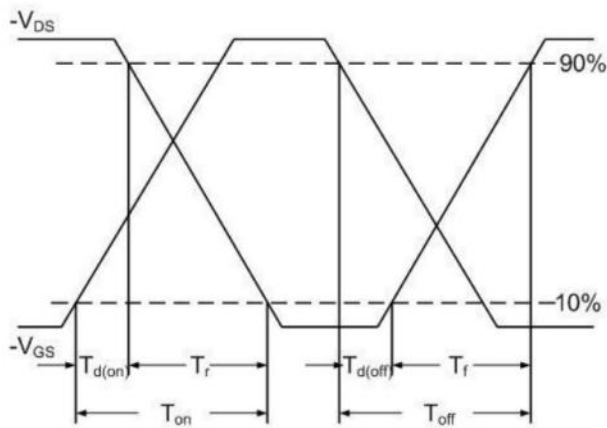


Fig.10 Switching Time Waveform

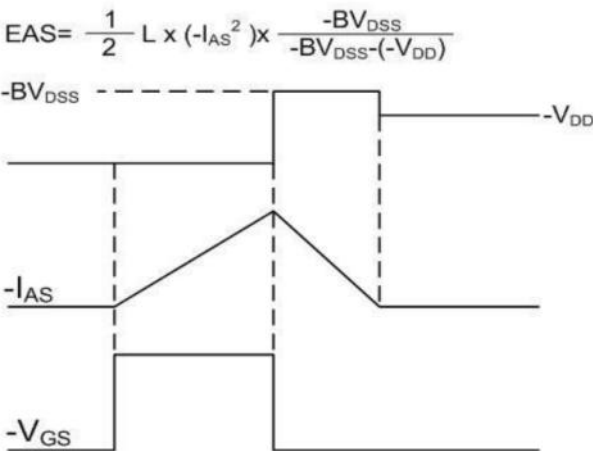
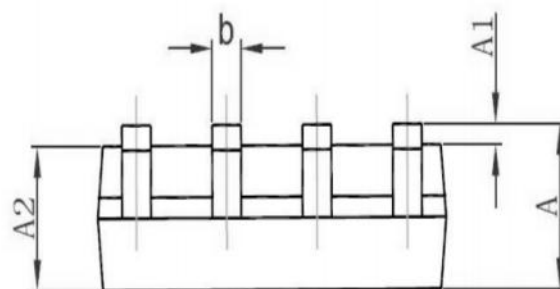
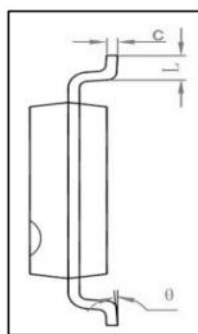
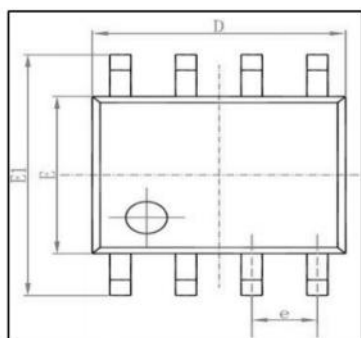


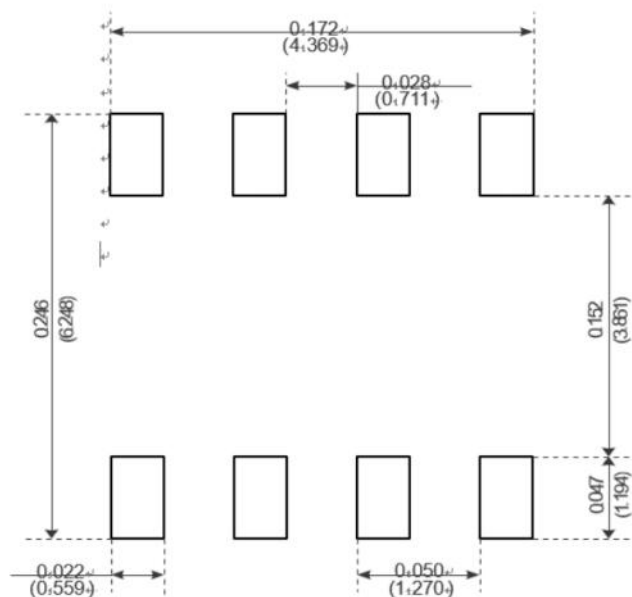
Fig.11 Unclamped Inductive Switching Waveform

-30V P+P-Channel Enhancement Mode MOSFET

Package Mechanical Data-SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Recommended Minimum Pads⁴⁾

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