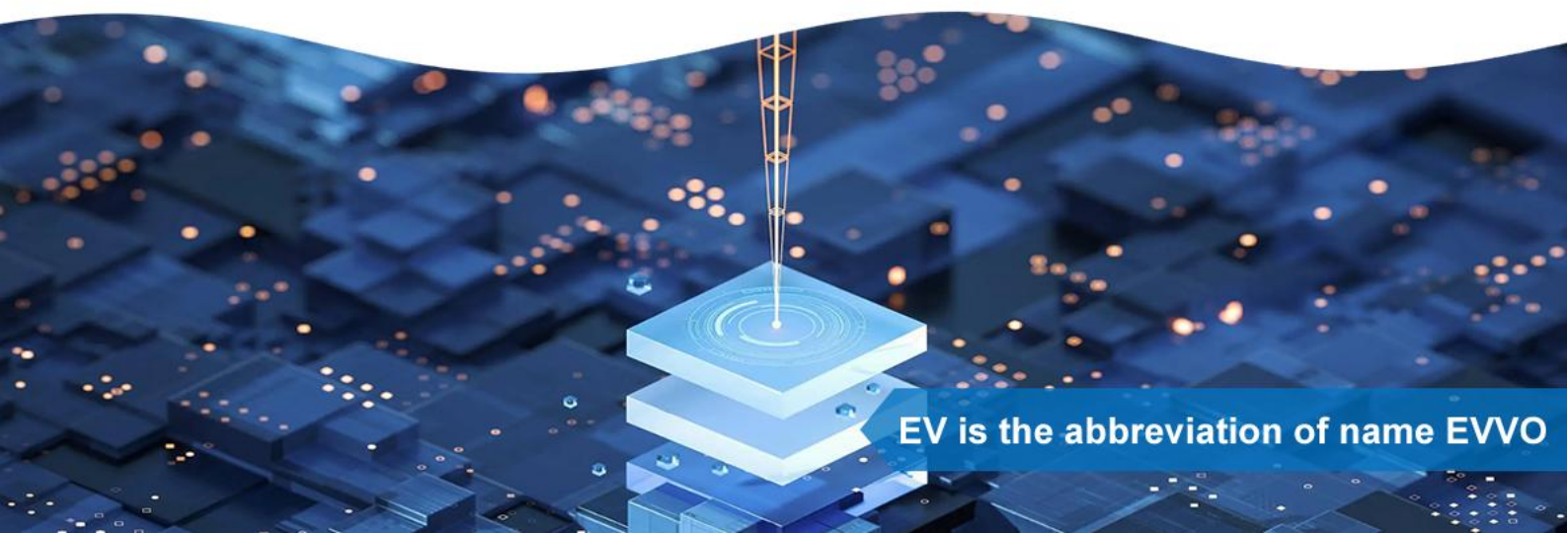
EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

Product Specification

Domestic Part Number	IRFL024Z
Overseas Part Number	IRFL024Z
Equivalent Part Number	IRFL024Z



60V N-Channel Enhancement Mode MOSFET

Description

The IRFL024Z 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 = 50 A

$R_{DS(ON)}$ < 17mΩ @ V_{GS}=10V

$R_{DS(ON)}$ < 23mΩ @ V_{GS}=4.5V

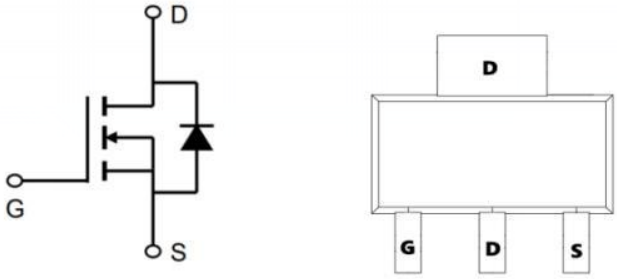
Application

Battery protection

Load switch

Uninterruptible power supply

SOT223-3L Pin Configuration



Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ 10V[1]	50	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V[1]	10	A
I_{DM}	Pulsed Drain Current[2]	120	A
EAS	Single Pulse Avalanche Energy[3]	80	mJ
I_{AS}	Avalanche Current	40	A
P_D@T_C=25°C	Total Power Dissipation[4]	41	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](t≤10S)	35	°C/W
	Thermal Resistance Junction-ambient [1](Steady State)	55	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-case [1]	3	°C/W

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Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	60	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	13.5	17	mΩ
		V_{GS}=4.5V , I_D=15A	---	18	23	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.8	2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=48V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=48V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Rg	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.2	----	Ω
Q_g	Total Gate Charge (10V)	V_{DS}=30V , V_{GS}=10V , I_D=18A	---	57	---	nC
Q_{gs}	Gate-Source Charge		---	8.7	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=30V , V_{GS}=10V , R_G=3.3 , I_D=20A	---	16.2	---	ns
T_r	Rise Time		---	41.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	56.4	---	
T_f	Fall Time		---	16.2	---	
C_{iss}	Input Capacitance	V_{DS}=30V , V_{GS}=0V , f=1MHz	---	1260	---	pF
C_{oss}	Output Capacitance		---	139	---	
C_{rss}	Reverse Transfer Capacitance		---	87	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	50	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=20A , dI/dt=100A/μs , T_J=25℃	---	22	---	nS
Q_{rr}	Reverse Recovery Charge		---	72	---	nC

Note :
1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=50V,V_{GS}=10V,L=0.1mH,I_{AS}=40A
4.The power dissipation is limited by 150℃ 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.

Typical Characteristics

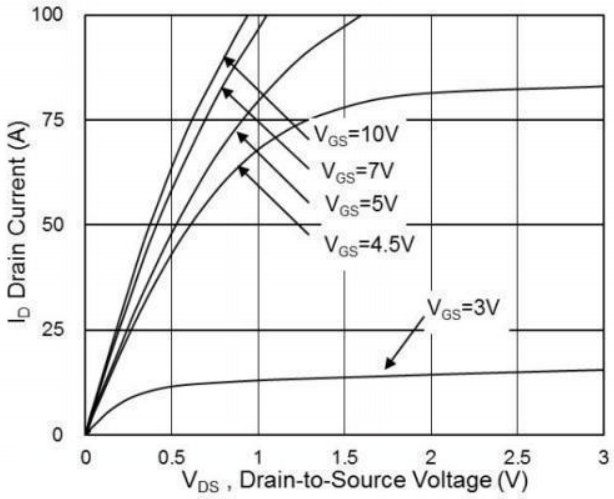

Fig.1 Typical Output Characteristics

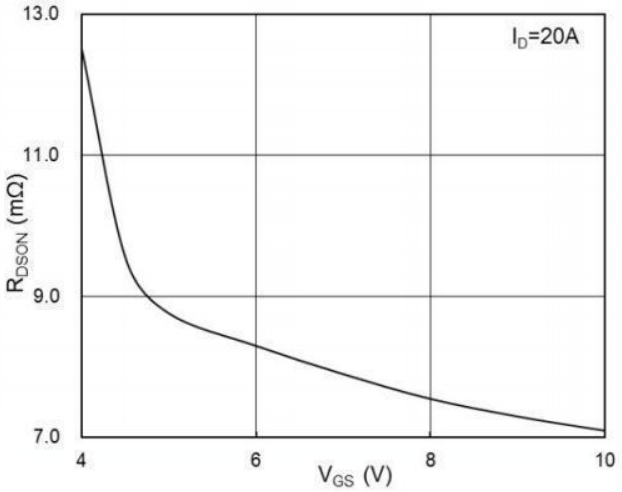

Fig.2 On-Resistance v.s Gate-Source

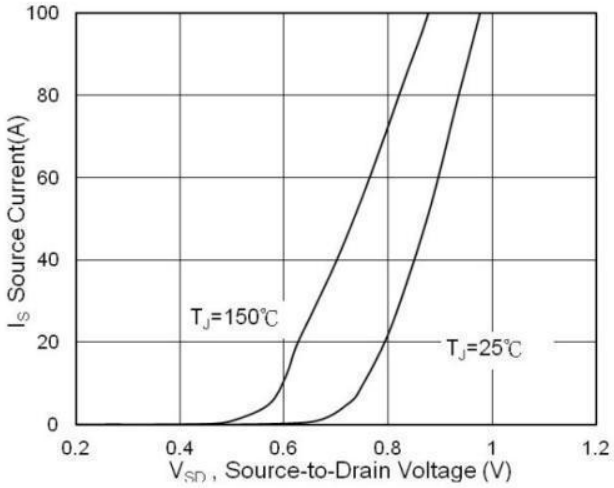

Fig.3 Forward Characteristics of Reverse

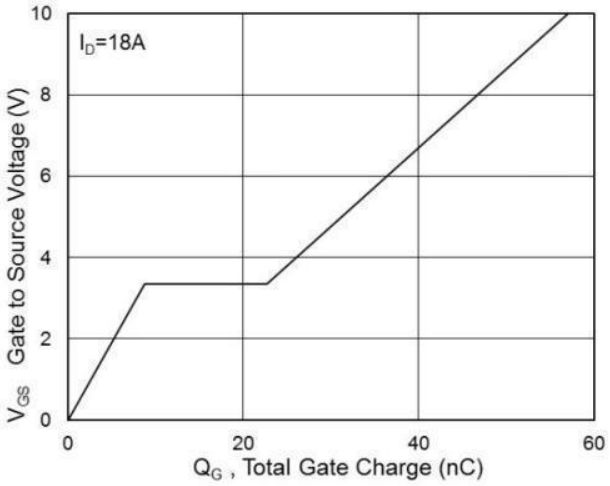

Fig.4 Gate-Charge Characteristics

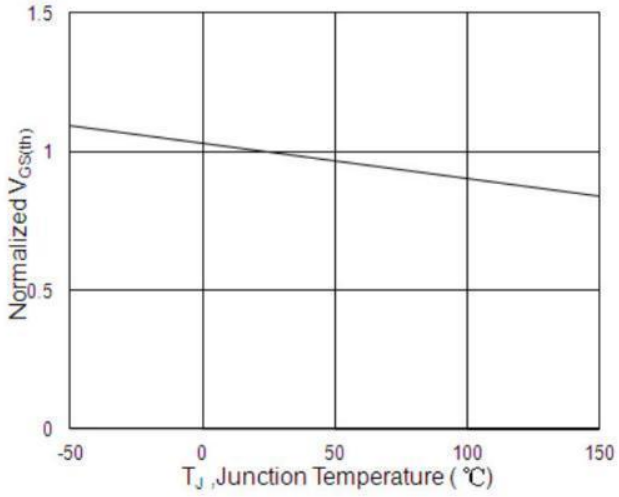

Fig.5 Normalized $V_{GS(th)}$ vs. T_J

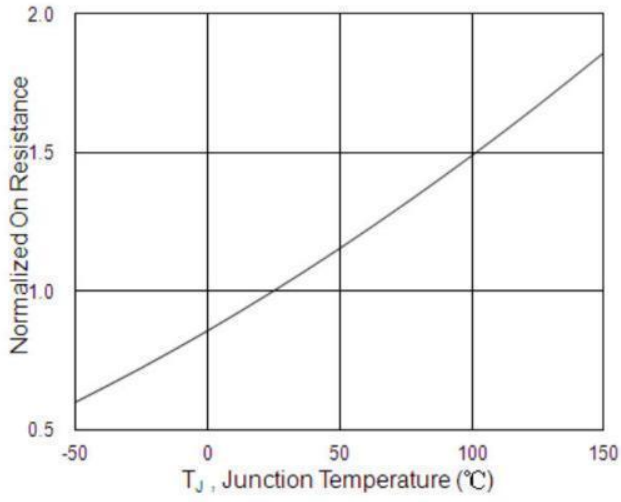

Fig.6 Normalized R_{DSON} vs. T_J

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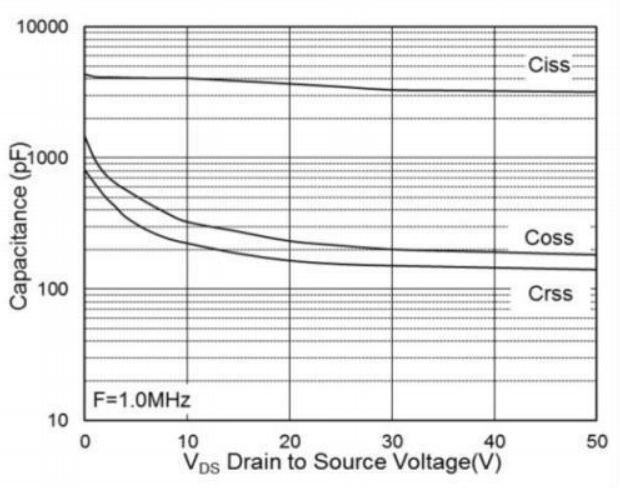

Fig.7 Capacitance

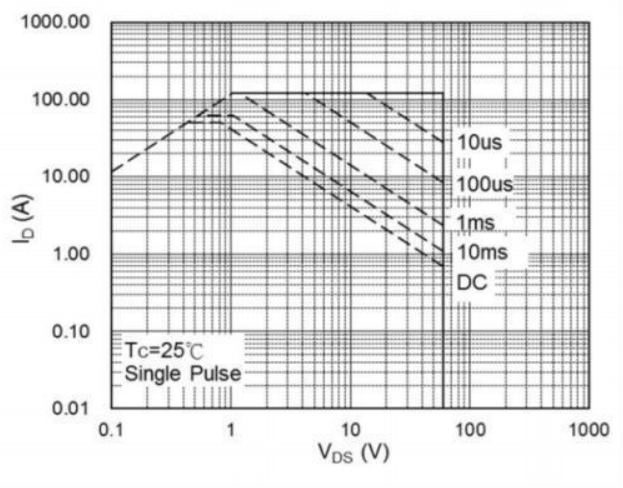

Fig.8 Safe Operating Area

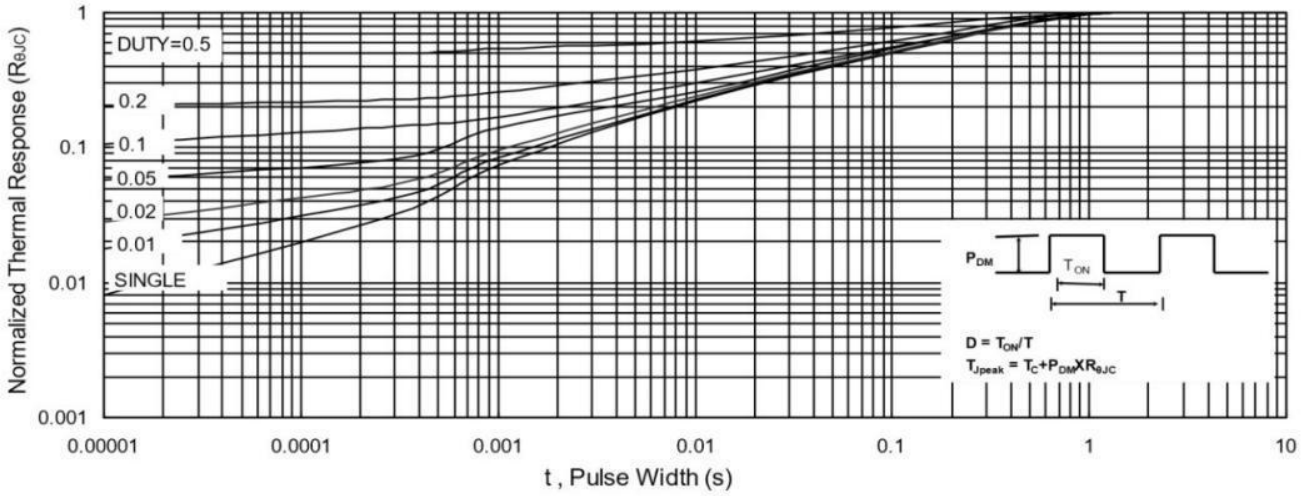

Fig.9 Normalized Maximum Transient Thermal Impedance

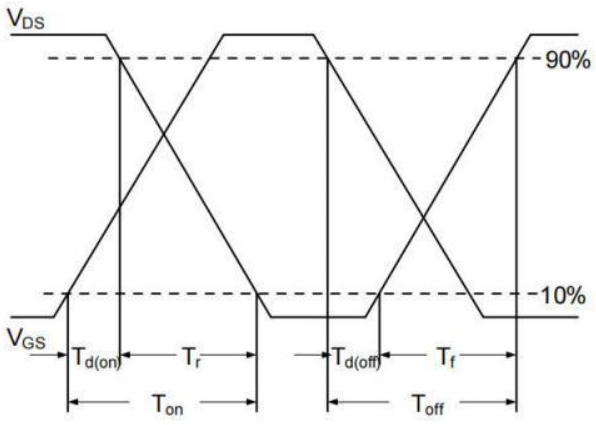

Fig.10 Switching Time Waveform

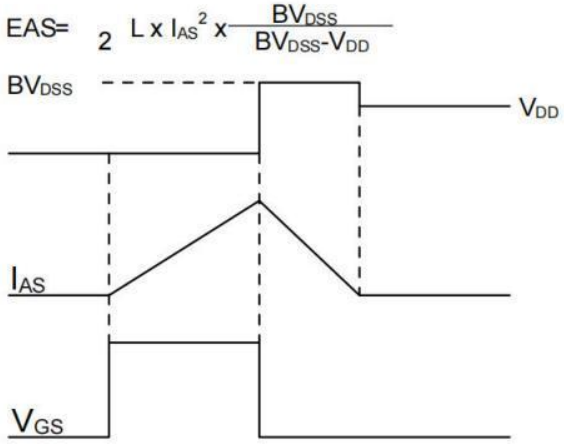

Fig.11 Unclamped Inductive Switching Waveform

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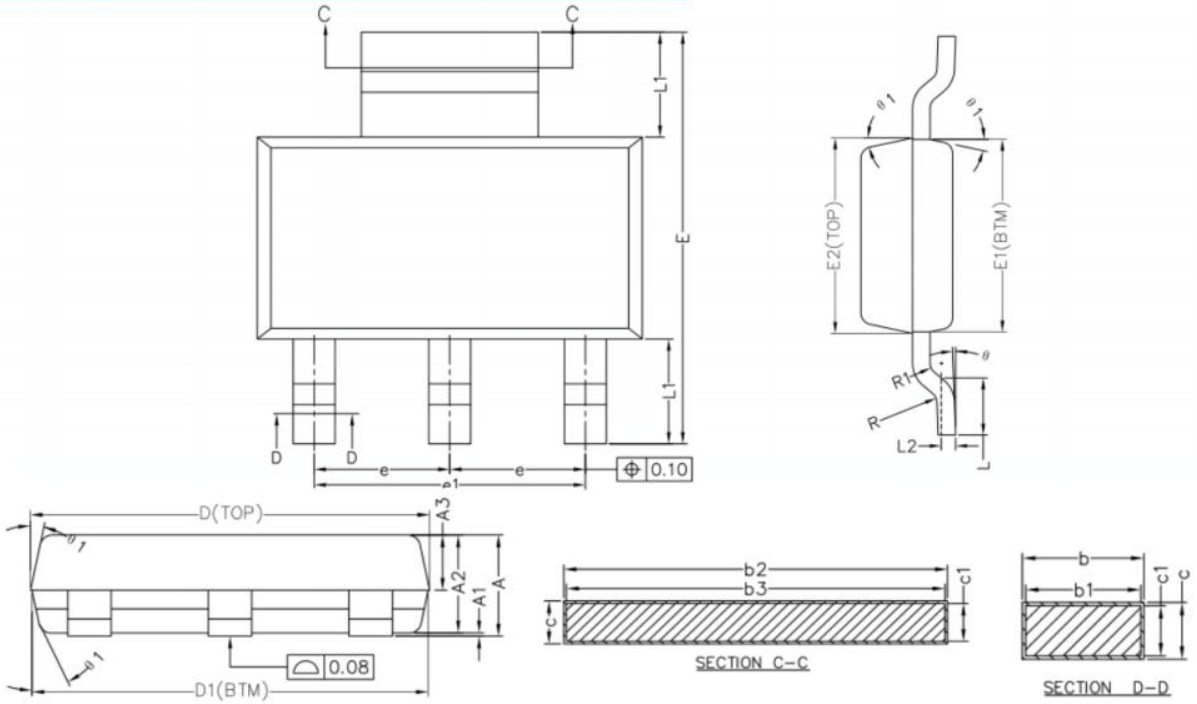
Package Mechanical Data-SOT-223



Symbol	Min	Nom	Max
A	--	--	1.80
A1	0.02	--	0.10
A2	1.50	1.60	1.70
A3	0.80	0.90	1.00
b	0.67	--	0.80
b1	0.66	0.71	0.76
b2	2.96	--	3.09
b3	2.95	3.00	3.05
C	0.30	--	0.35
C1	0.29	0.30	0.31
D	6.48	6.53	6.58
D1	6.55	6.60	6.65
E	6.80	--	7.20
E1	3.40	3.50	3.60
E2	3.33	3.43	3.53
e	2.30BSC		
e1	4.60BSC		
L	0.80	1.00	1.20
L1	1.75REF		
L2	0.25BSC		
R	0.10	--	--
R1	0.10	--	--
θ	0°	--	8°
θ1	10°	12°	14°

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