EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

Product Specification

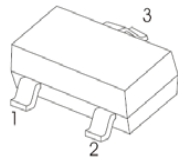
Domestic Part Number	IRLML2402
Overseas Part Number	IRLML2402
Equivalent Part Number	IRLML2402

N-Channel MOSFET

Product summary

V_{DS}	20	V
$R_{DS(on)\ max}$ (@V_{GS} = 4.5V)	250	mΩ
$Q_{g\ (typical)}$	2.6	nC
I_D (@T_A = 25°C)	1.2	A

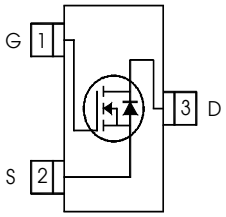
SOT-23



1. GATE
2. SOURCE
3. DRAIN

Features

- Industry-standard pinout SOT-23 Package
- Compatible with Existing Surface Mount Techniques
- RoHS Compliant, Halogen-Free
- MSL1, Industrial qualification



Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 4.5V	1.2	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 4.5V	0.95	
I_{DM}	Pulsed Drain Current ①	7.4	
P_D @T_A = 25°C	Power Dissipation	540	mW
	Linear Derating Factor	4.3	mW/°C
V_{GS}	Gate-to-Source Voltage	± 12	V
dv/dt	Peak Diode Recovery dv/dt ②	5.0	V/ns
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

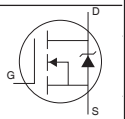
	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ④	—	230	°C/W

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	20	–––	–––	V	V_{GS} = 0V, I_D = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	–––	0.024	–––	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	–––	–––	250	mΩ	V_{GS} = 4.5V, I_D = 0.93A ③
		–––	–––	350		V_{GS} = 2.7V, I_D = 0.47A ③
$V_{GS(th)}$	Gate Threshold Voltage	0.70	–––	–––	V	V_{DS} = V_{GS}, I_D = 250μA
g_{fs}	Forward Transconductance	1.3	–––	–––	S	V_{DS} = 10V, I_D = 0.47A
I_{DSS}	Drain-to-Source Leakage Current	–––	–––	1.0	μA	V_{DS} = 16V, V_{GS} = 0V
		–––	–––	25		V_{DS} = 16V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	–––	–––	-100	nA	V_{GS} = -12V
	Gate-to-Source Reverse Leakage	–––	–––	100		V_{GS} = 12V
Q_g	Total Gate Charge	–––	2.6	3.9	nC	I_D = 0.93A
Q_{gs}	Gate-to-Source Charge	–––	0.41	0.62		V_{DS} = 16V
Q_{gd}	Gate-to-Drain ("Miller") Charge	–––	1.1	1.7		V_{GS} = 4.5V, See Fig. 6 and 9 ③
$t_{d(on)}$	Turn-On Delay Time	–––	2.5	–––	ns	V_{DD} = 10V
t_r	Rise Time	–––	9.5	–––		I_D = 0.93A
$t_{d(off)}$	Turn-Off Delay Time	–––	9.7	–––		R_G = 6.2Ω
t_f	Fall Time	–––	4.8	–––		R_D = 11Ω, See Fig. 10 ③
C_{iss}	Input Capacitance	–––	110	–––	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	–––	51	–––		V_{DS} = 15V
C_{rss}	Reverse Transfer Capacitance	–––	25	–––		f = 1.0MHz, See Fig. 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	–––	–––	0.54	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	–––	–––	7.4		
V_{SD}	Diode Forward Voltage	–––	–––	1.2	V	T_J = 25°C, I_S = 0.93A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	–––	25	38	ns	T_J = 25°C, I_F = 0.93A
Q_{rr}	Reverse RecoveryCharge	–––	16	24	nC	di/dt = 100A/μs ③



Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)

② I_{SD} ≤ 0.93A, di/dt ≤ 90A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C

③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

④ Surface mounted on FR-4 board, t ≤ 5sec.

Typical Characteristics

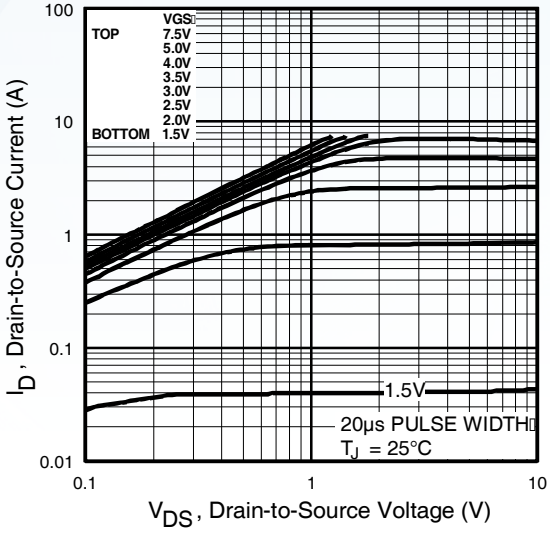


Fig 1. Typical Output Characteristics

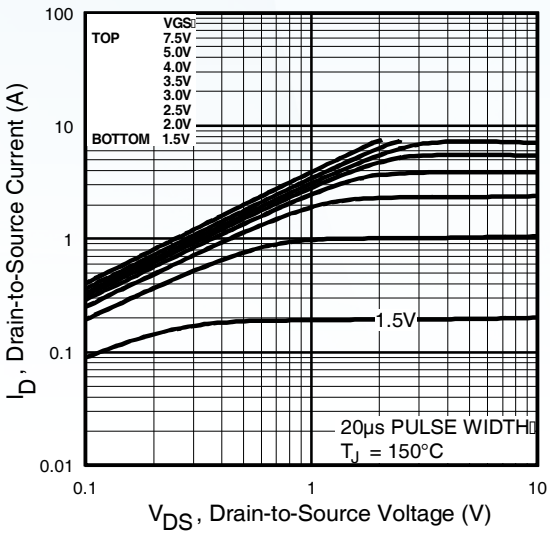


Fig 2. Typical Output Characteristics

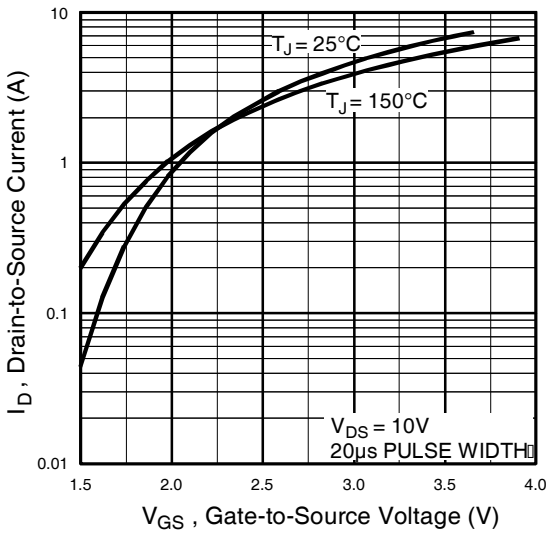


Fig 3. Typical Transfer Characteristics

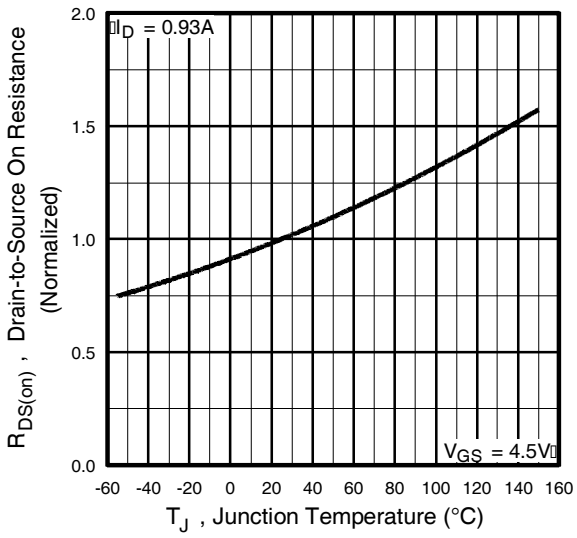


Fig 4. Normalized On-Resistance Vs. Temperature

Typical Characteristics

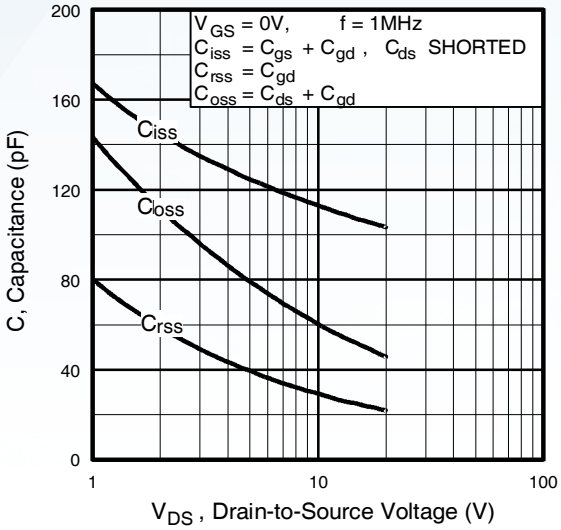


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

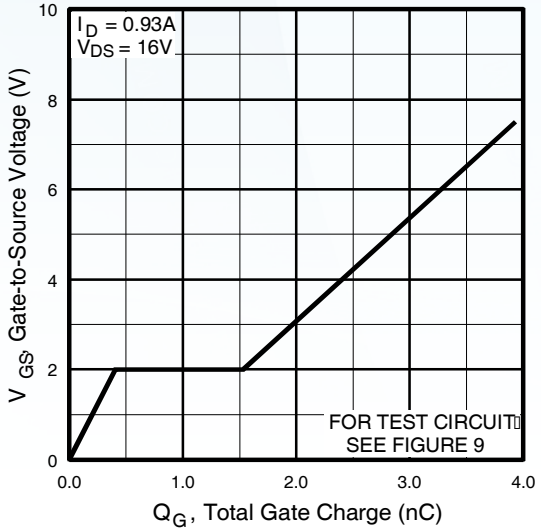


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

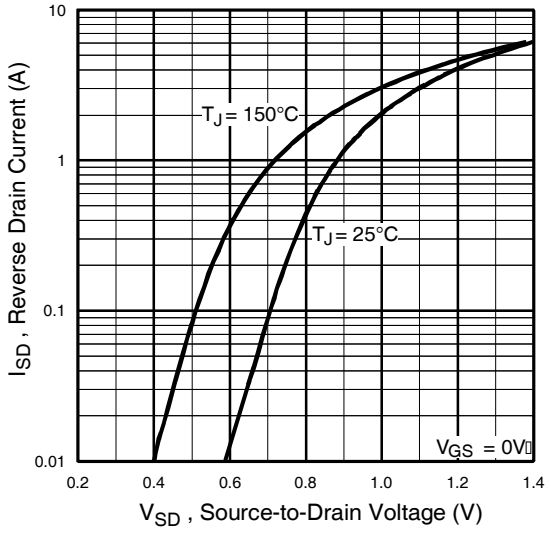


Fig 7. Typical Source-Drain Diode Forward Voltage

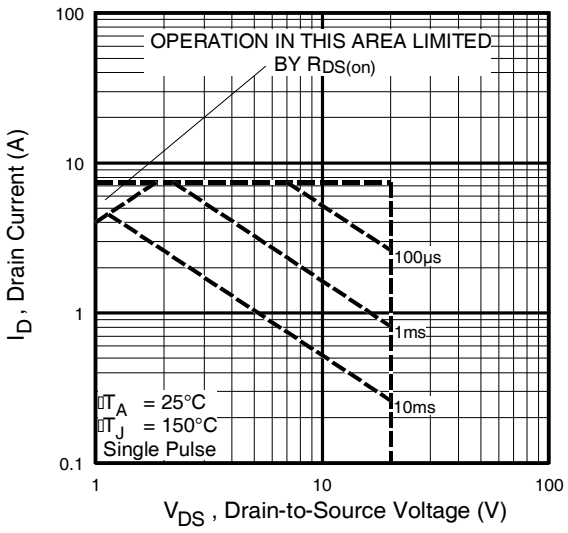


Fig 8. Maximum Safe Operating Area

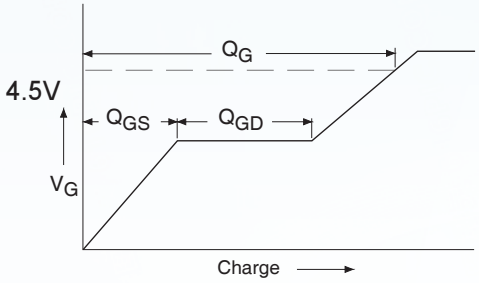


Fig 9a. Basic Gate Charge Waveform

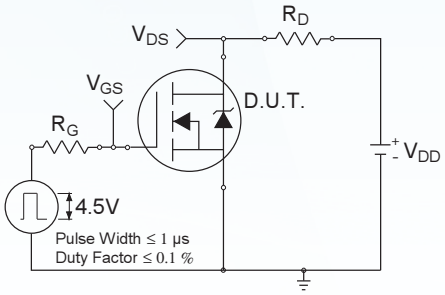


Fig 10a. Switching Time Test Circuit

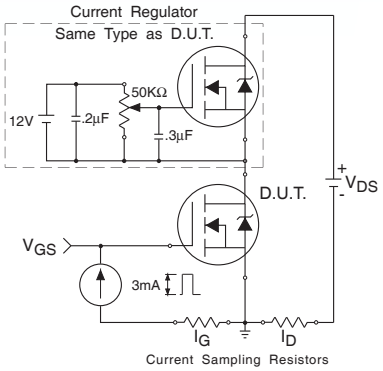


Fig 9b. Gate Charge Test Circuit

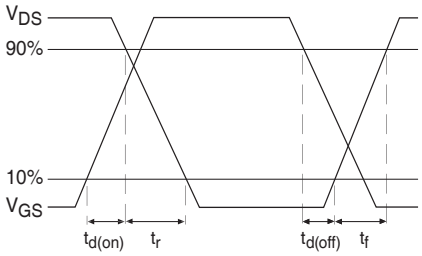


Fig 10b. Switching Time Waveforms

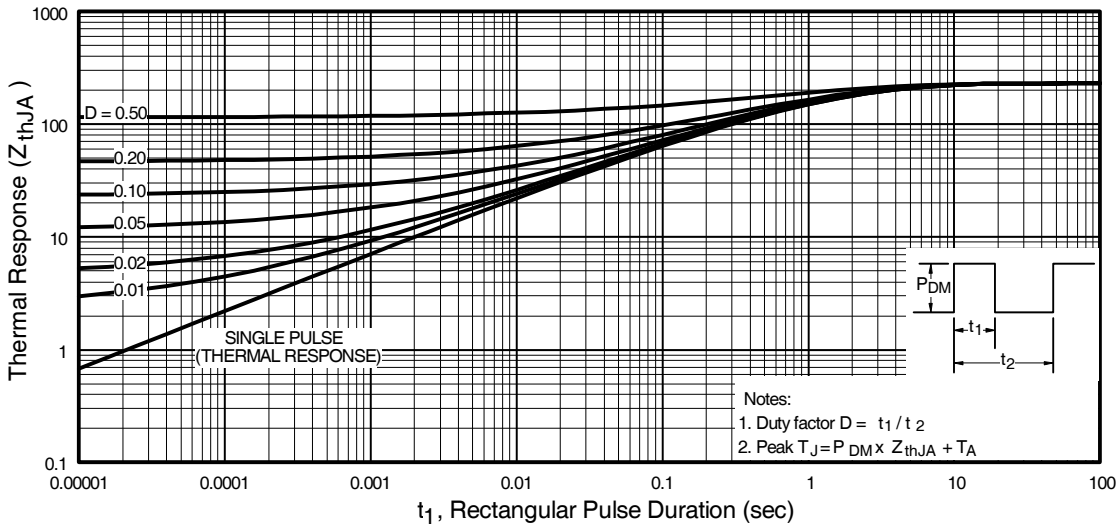
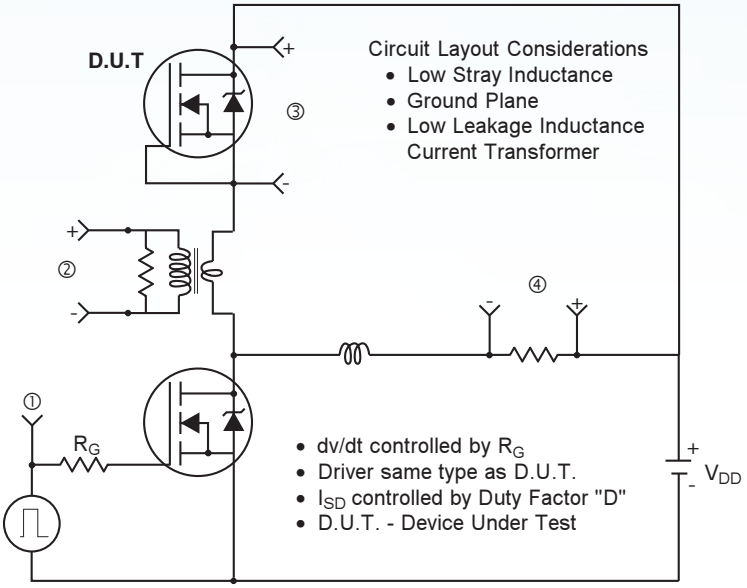
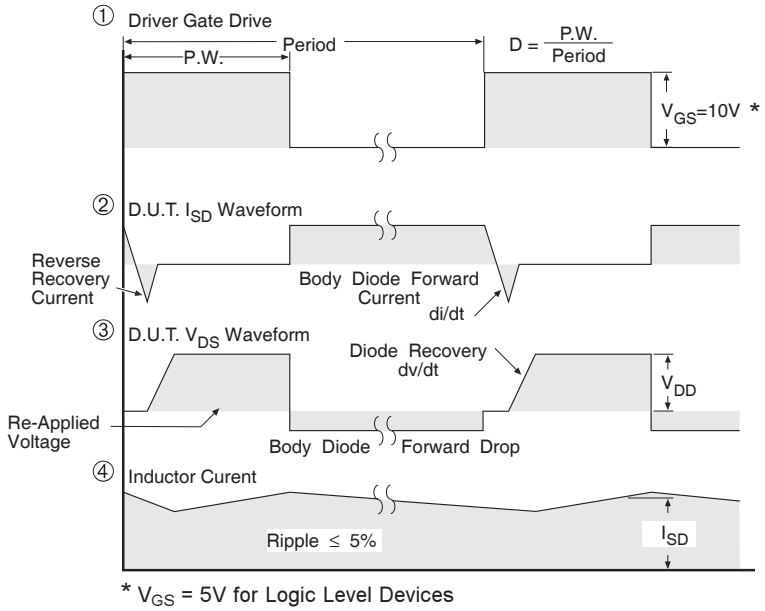


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Peak Diode Recovery dv/dt Test Circuit



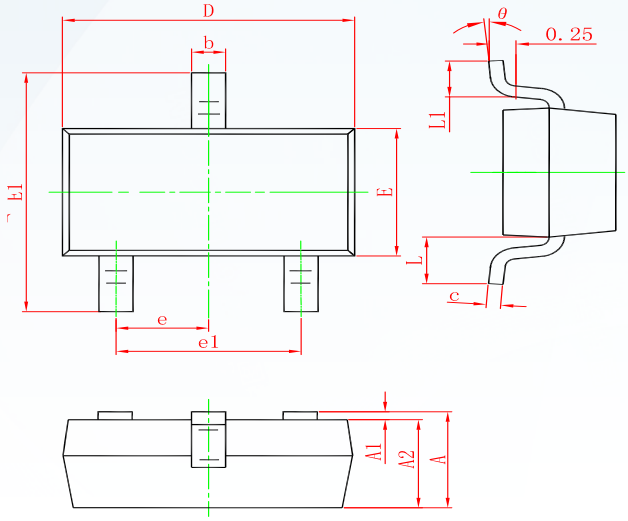


* V_{GS} = 5V for Logic Level Devices

Fig 12. For N-Channel HEXFETS

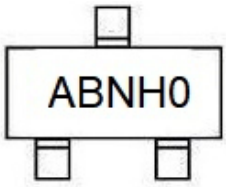
N-Channel MOSFET

SOT-23 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
IRLML2402	SOT-23	3000	Tape and reel

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