

EVVOSEMI[®]

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

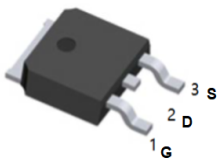
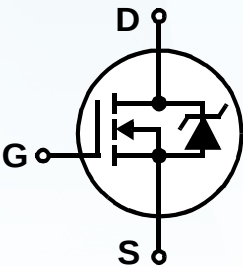
Product Specification

▶ Domestic	Part Number	IRFR3910
▶ Overseas	Part Number	IRFR3910
▶ Equivalent	Part Number	IRFR3910

EV is the abbreviation of name EVVO

Description

The D-PAK is designed for surface mounting using vapor phase,infrared,or wave soldering techniques.Power dissipation levels up to 1.5 watts are possible in typical surface mount applications.



TO-252(DPAK) top view

Features

- V_{DS} (V) = 100V
- I_D = 16A (V_{GS} = 10V)
- $R_{DS(ON)}$ =115m Ω (V_{GS} = 10V)

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ $T_C = 25^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V	16	A
I_D @ $T_C = 100^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V	12	
I_{DM}	Pulsed Drain Current ①⑥	60	
P_D @ $T_C = 25^{\circ}C$	Power Dissipation	79	W
	Linear Derating Factor	0.53	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy②⑥	150	mJ
I_{AR}	Avalanche Current①⑥	9.0	A
E_{AR}	Repetitive Avalanche Energy①⑥	7.9	mJ
dv/dt	Peak Diode Recovery dv/dt ③	5.0	V/ns
T_J	Operating Junction and	-55 to + 175	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	1.9	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB mount) **	—	50	
$R_{\theta JA}$	Junction-to-Ambient	—	110	

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.12	—	$V/^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.115	—	$V_{GS} = 10V, I_D = 10A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance	6.4	—	—	S	$V_{DS} = 50V, I_D = 9.0A$ ⑥
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	$V_{DS} = 100V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 80V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$
Q_g	Total Gate Charge	—	—	44	nC	$I_D = 9.0A$
Q_{gs}	Gate-to-Source Charge	—	—	6.2		$V_{DS} = 80V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	21		$V_{GS} = 10V$, See Fig. 6 and 13 ④⑥
$t_{d(on)}$	Turn-On Delay Time	—	6.4	—	ns	$V_{DD} = 50V$
t_r	Rise Time	—	27	—		$I_D = 9.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	37	—		$R_G = 12\Omega$
t_f	Fall Time	—	25	—		$R_D = 5.5\Omega$, See Fig. 10 ④⑥
L_D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.)
L_S	Internal Source Inductance	—	7.5	—		from package and center of die contact ⑤
C_{ISS}	Input Capacitance	—	640	—	pF	$V_{GS} = 0V$
C_{OSS}	Output Capacitance	—	160	—		$V_{DS} = 25V$
C_{RSS}	Reverse Transfer Capacitance	—	88	—		$f = 1.0\text{MHz}$, See Fig. 5 ⑥

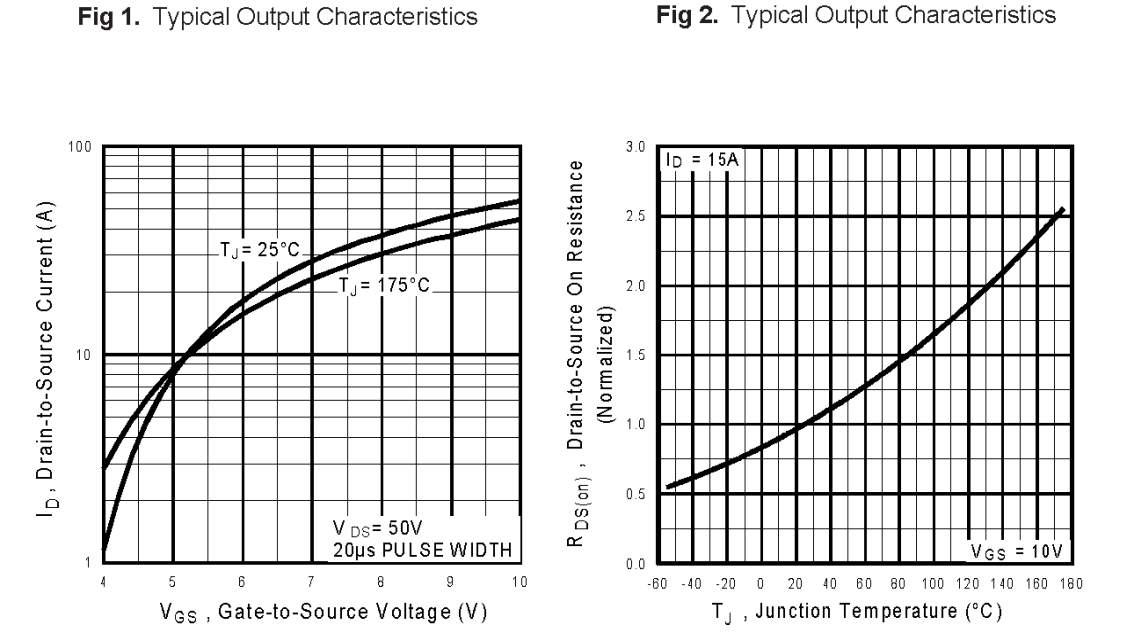
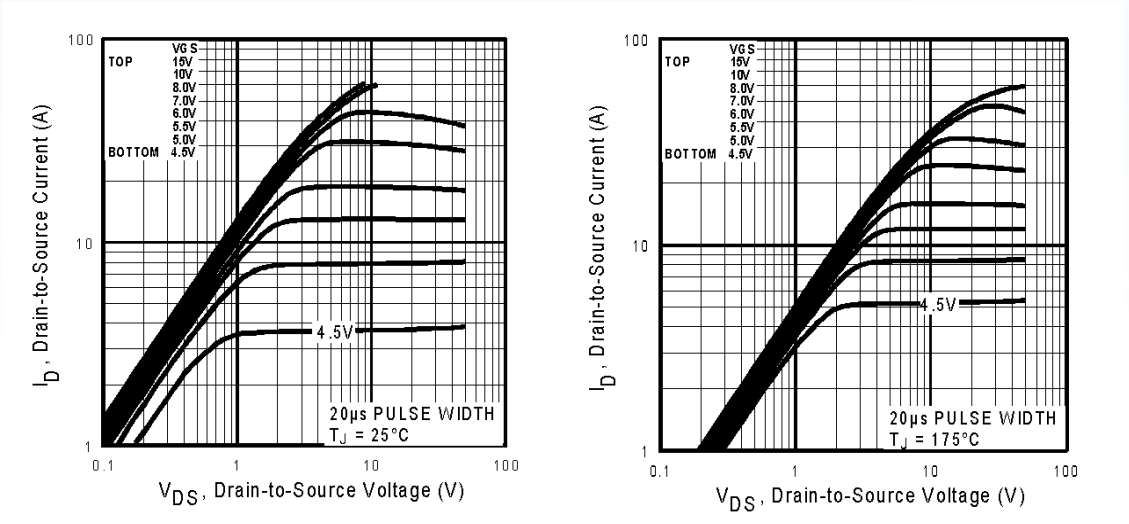
Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	16	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①⑥	—	—	60		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 9.0A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	130	190	ns	$T_J = 25^\circ\text{C}, I_F = 9.0A$
Q_{rr}	Reverse Recovery Charge	—	650	970	nC	$di/dt = 100A/\mu s$ ④⑥
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$)				

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② $V_{DD} = 25V$, starting $T_J = 25^\circ\text{C}$, $L = 3.1\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 9.0A$. (See Figure 12)
- ③ $I_{SD} \leq 9.0A$, $di/dt \leq 520A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 175^\circ\text{C}$
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$
- ⑤ This is applied for I-PAK, L_S of D-PAK is measured between lead and center of die contact
- ⑥ Uses IRF530N data and test conditions

** When mounted on 1" square PCB (FR-4 or G-10 Material) .
 For recommended footprint and soldering techniques refer to application note #AN-994



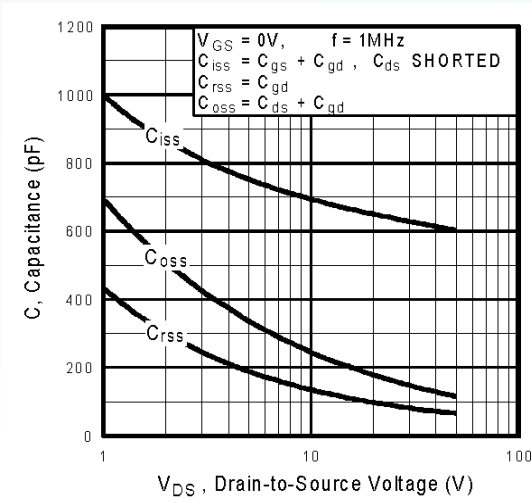


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

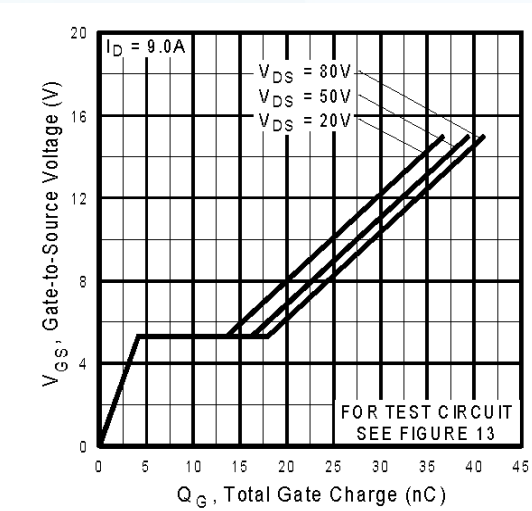


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

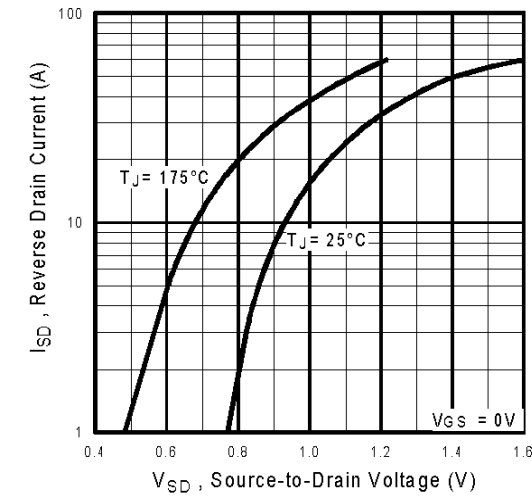


Fig 7. Typical Source-Drain Diode Forward Voltage

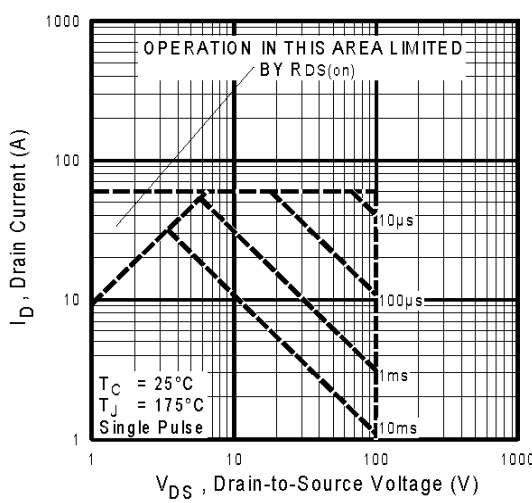


Fig 8. Maximum Safe Operating Area

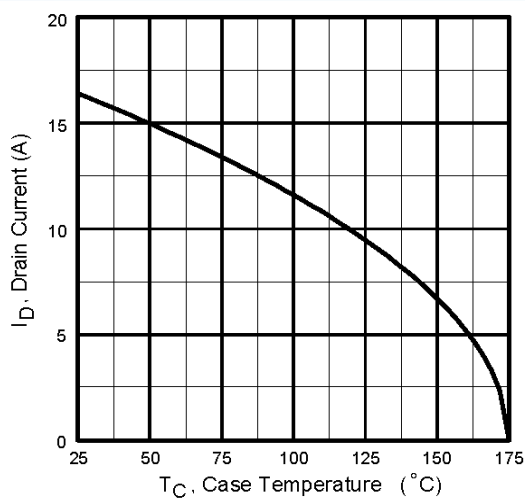


Fig 9. Maximum Drain Current Vs. Case Temperature

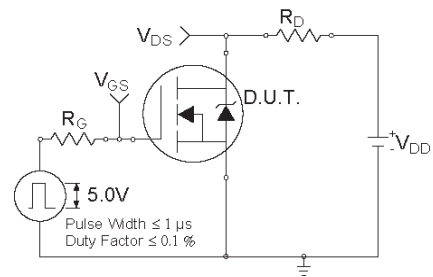


Fig 10a. Switching Time Test Circuit

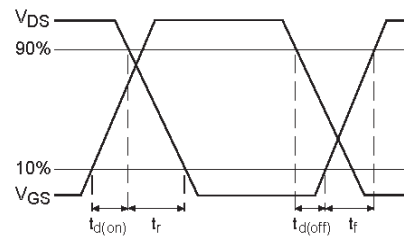


Fig 10b. Switching Time Waveforms

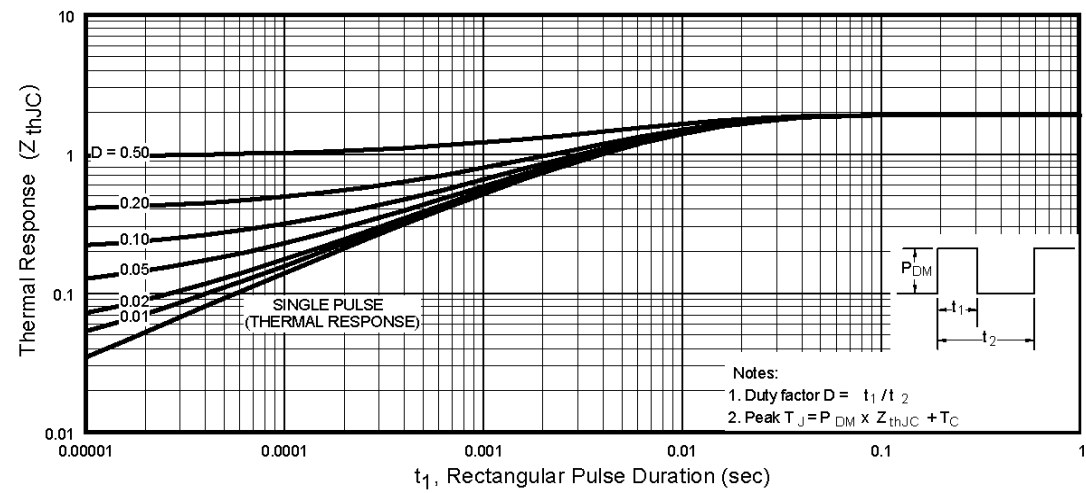


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

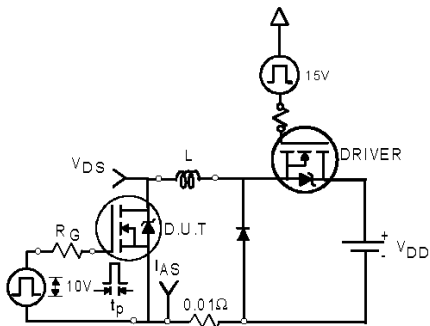


Fig 12a. Unclamped Inductive Test Circuit

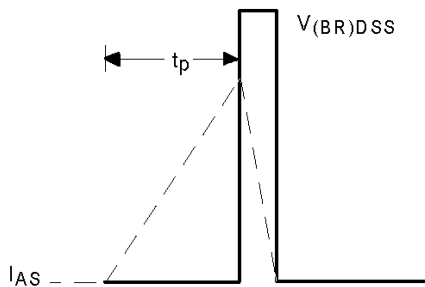


Fig 12b. Unclamped Inductive Waveforms

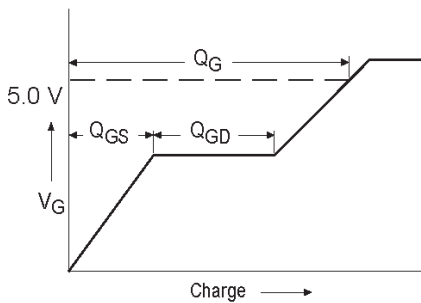


Fig 13a. Basic Gate Charge Waveform

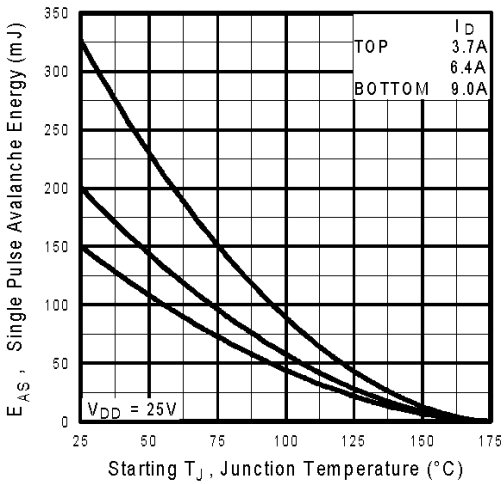


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

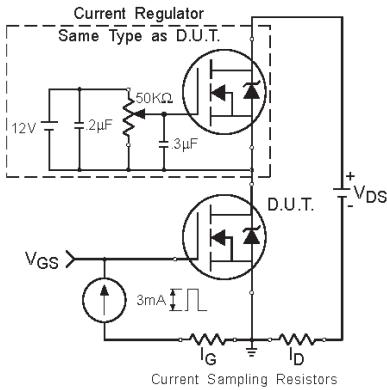
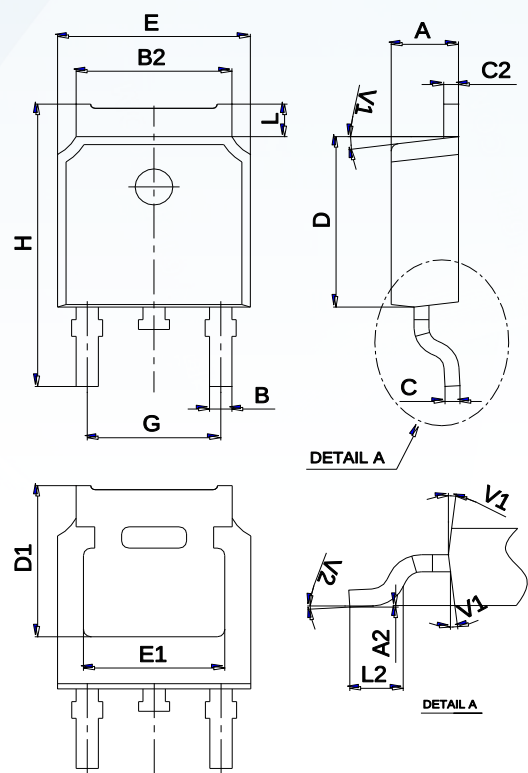


Fig 13b. Gate Charge Test Circuit

Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Ordering information

Order code	Package	Baseqty	Delivery mode
IRFR3910	TO-252	2500	Tape and reel

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