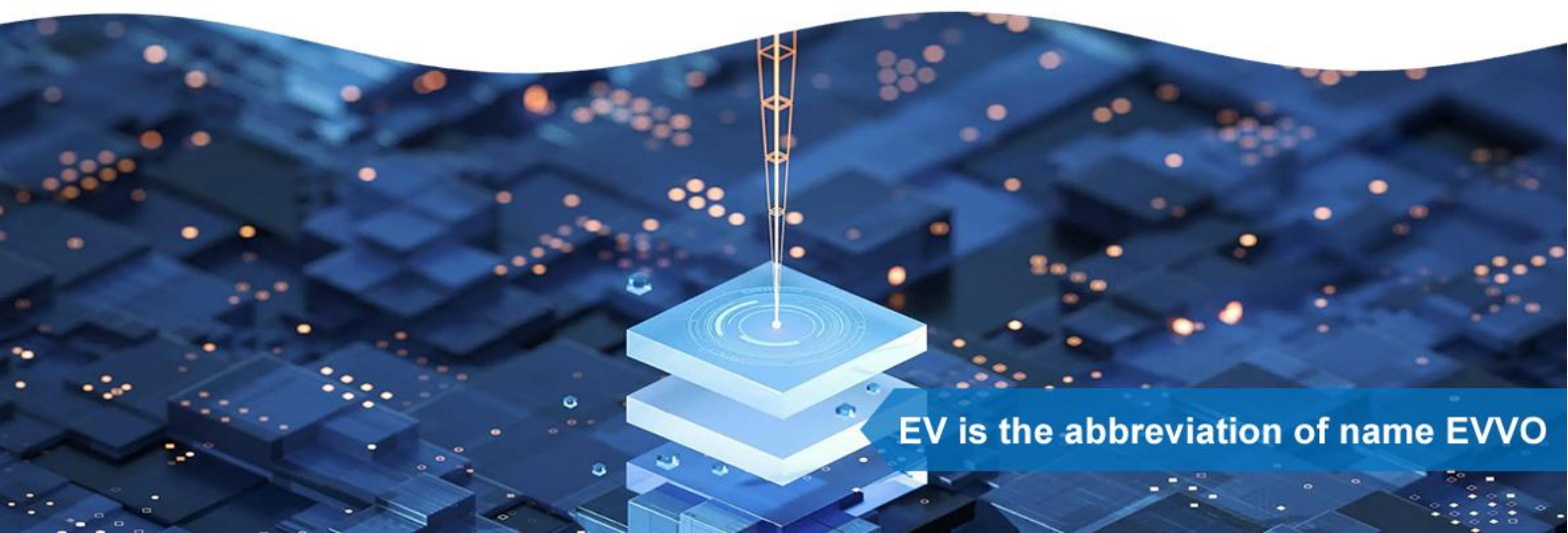
EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

Product Specification

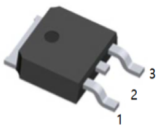
Domestic Part Number	EV-IRFR1205-T1
Overseas Part Number	IRFR1205
Equivalent Part Number	IRFR1205

"T1" means TO-252



Features

- $V_{DS\ (V)}$ = 55V
- I_D= 44A (V_{GS}=10V)
- $R_{DS(ON)}$ < 27mΩ (V_{GS} = 10V)

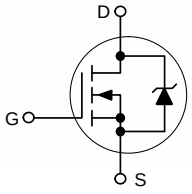


1.G 2.D 3.S
TO-252(DPAK) top view

Description

The EV-IRFR1205-T1 is designed for surface mounting using vapor phase infrared, or wave soldering technigues The straight lead version is for through- hole mounting applications. Power dissipation le-vels up to 1.5 watts are possible in typical surface mount applications.

- Ultra LowOn-Resistance
- Fast Switching
- Fully Avalanche Rated
- Lead-Free



N–Channel

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	44⑤	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	31⑤	
I_{DM}	Pulsed Drain Current ①⑦	160	
P_D @T_C = 25°C	Power Dissipation	107	W
	Linear Derating Factor	0.71	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy②⑦	210	mJ
I_{AR}	Avalanche Current①⑦	25	A
E_{AR}	Repetitive Avalanche Energy①⑦	11	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		1.4	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB mount)		50	
$R_{\theta JA}$	Junction-to-Ambient		110	

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	55			V	V_{GS} = 0V, I_D = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.055		V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance			27	mΩ	V_{GS} = 10V, I_D = 26A ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0		4.0	V	V_{DS} = V_{GS}, I_D = 250μA
g_{fs}	Forward Transconductance	17			S	V_{DS} = 25V, I_D = 25A⑦
I_{DSS}	Drain-to-Source Leakage Current			25	μA	V_{DS} = 55V, V_{GS} = 0V
				250		V_{DS} = 44V, V_{GS} = 0V, T_J = 150°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			65	nC	I_D = 25A
Q_{gs}	Gate-to-Source Charge			12		V_{DS} = 44V
Q_{gd}	Gate-to-Drain ("Miller") Charge			27		V_{GS} = 10V, See Fig. 6 and 13 ④⑦
$t_{d(on)}$	Turn-On Delay Time		7.3		ns	V_{DD} = 28V
t_r	Rise Time		69			I_D = 25A
$t_{d(off)}$	Turn-Off Delay Time		47			R_G = 12Ω
t_f	Fall Time		60			R_D = 1.1Ω, See Fig. 10 ④⑦
L_D	Internal Drain Inductance		4.5		nH	Between lead, 6mm (0.25in.) from package and center of die contact⑥
L_S	Internal Source Inductance		7.5			
C_{iss}	Input Capacitance		1300		pF	V_{GS} = 0V
C_{oss}	Output Capacitance		410			V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance		150			f = 1.0MHz, See Fig. 5⑦

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)			44⑤	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①⑦			160		
V_{SD}	Diode Forward Voltage			1.3	V	T_J = 25°C, I_S = 22A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time		65	98	ns	T_J = 25°C, I_F =25A
Q_{rr}	Reverse RecoveryCharge		160	240	nC	di/dt = 100A/μs ④⑦
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°C, L = 470μH R_G = 25Ω, I_{AS} = 25A. (See Figure 12)

③ I_{SD} ≤ 25A, di/dt ≤ 320A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 175°C

④ Pulse width ≤ 300μs; duty cycle ≤ 2%.

⑤ Calculated continuous current based on maximum allowable junction temperature; Package limitation current = 20A

⑥ This is applied for I-PAK, Ls of D-PAK is measured between lead and center of die contact

⑦ Uses IRFZ44N data and test conditions

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

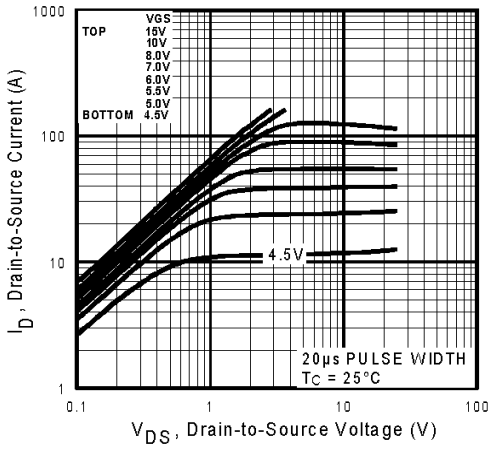


Fig 1. Typical Output Characteristics

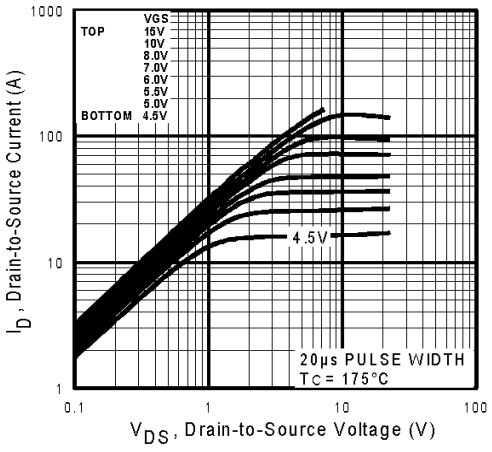


Fig 2. Typical Output Characteristics

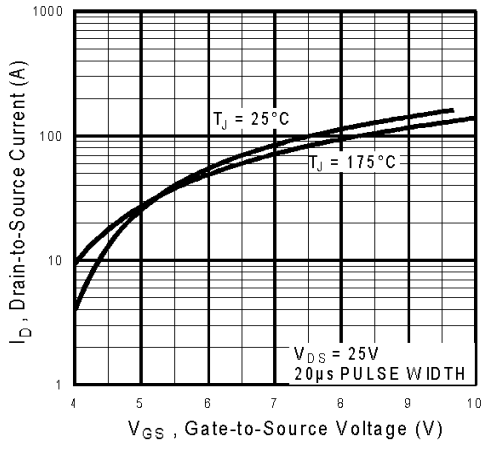


Fig 3. Typical Transfer Characteristics

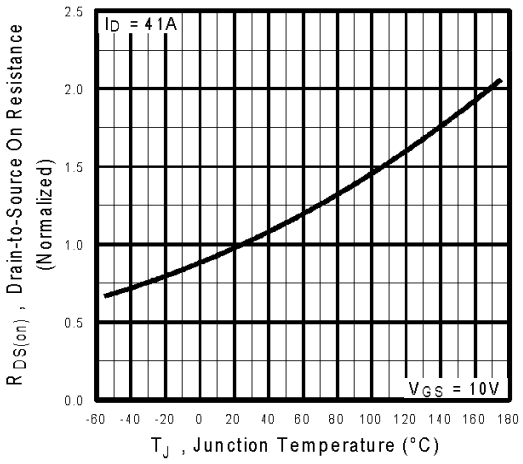


Fig 4. Normalized On-Resistance Vs. Temperature

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

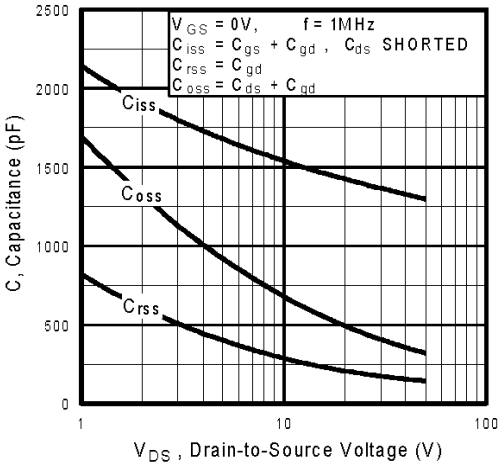


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

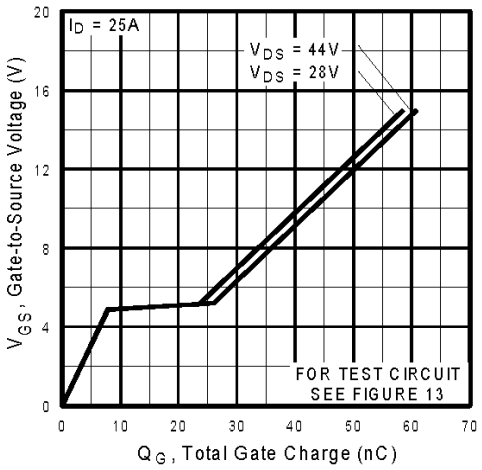


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

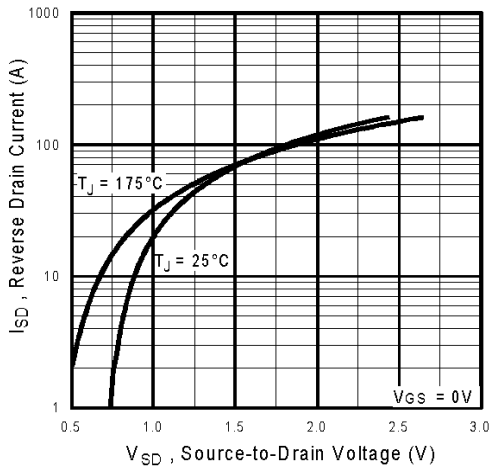


Fig 7. Typical Source-Drain Diode Forward Voltage

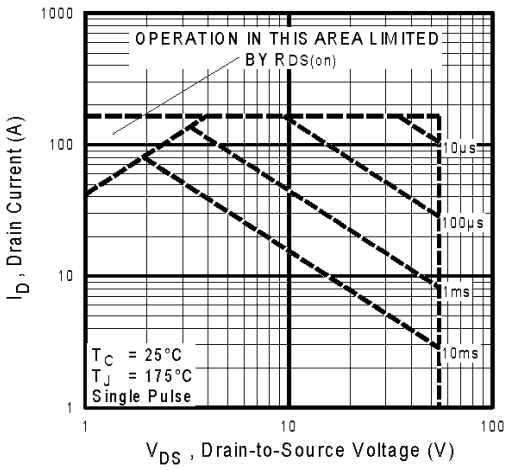


Fig 8. Maximum Safe Operating Area

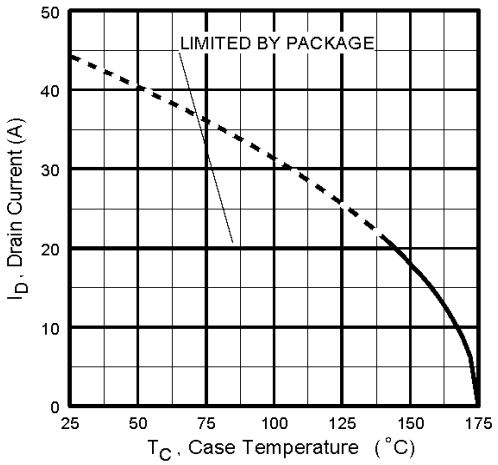


Fig 9. Maximum Drain Current Vs. Case Temperature

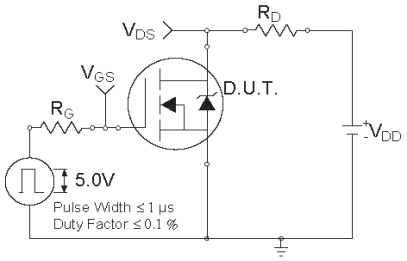


Fig 10a. Switching Time Test Circuit

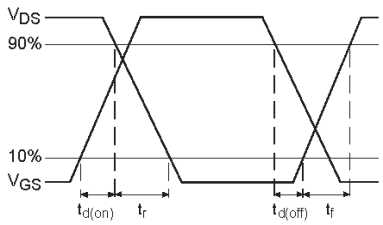


Fig 10b. Switching Time Waveforms

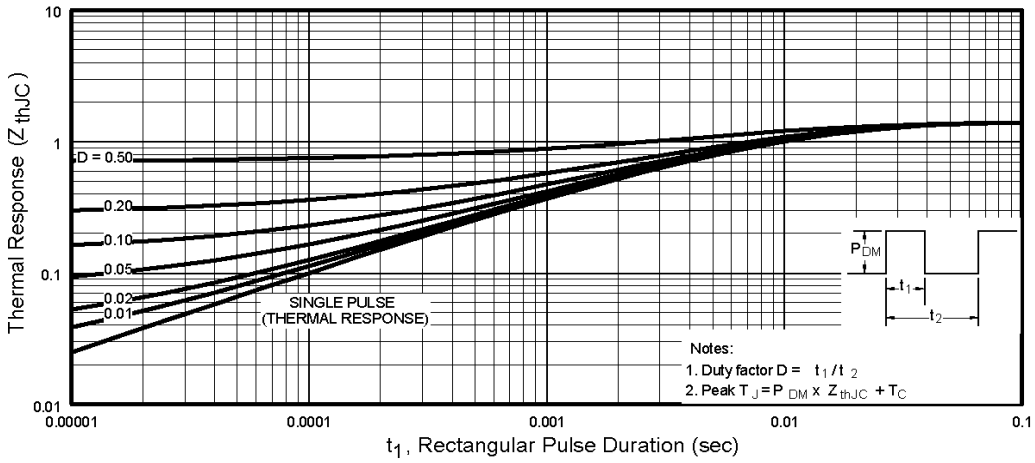


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

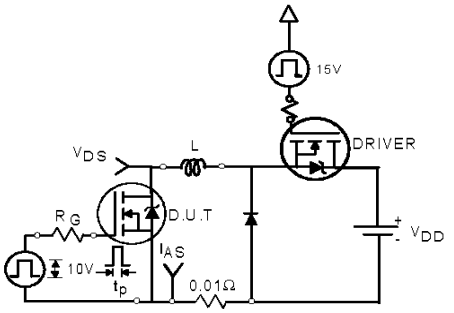


Fig 12a. Unclamped Inductive Test Circuit

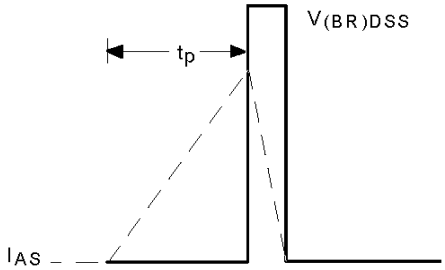


Fig 12b. Unclamped Inductive Waveforms

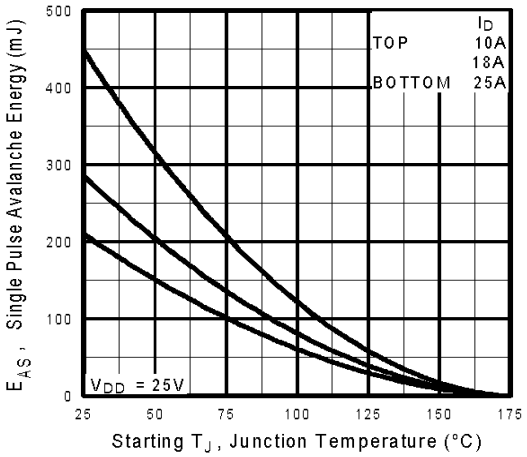


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

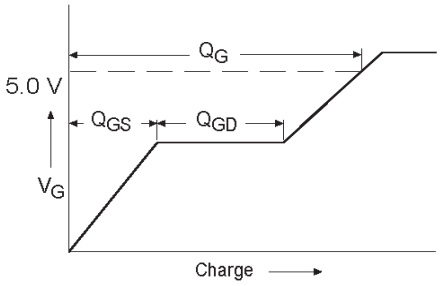


Fig 13a. Basic Gate Charge Waveform

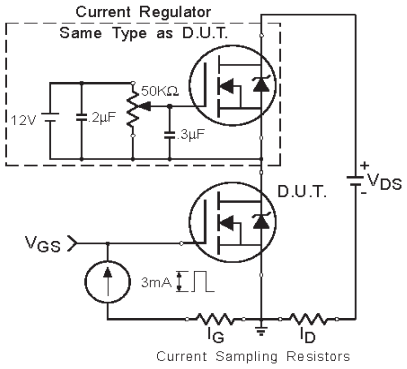
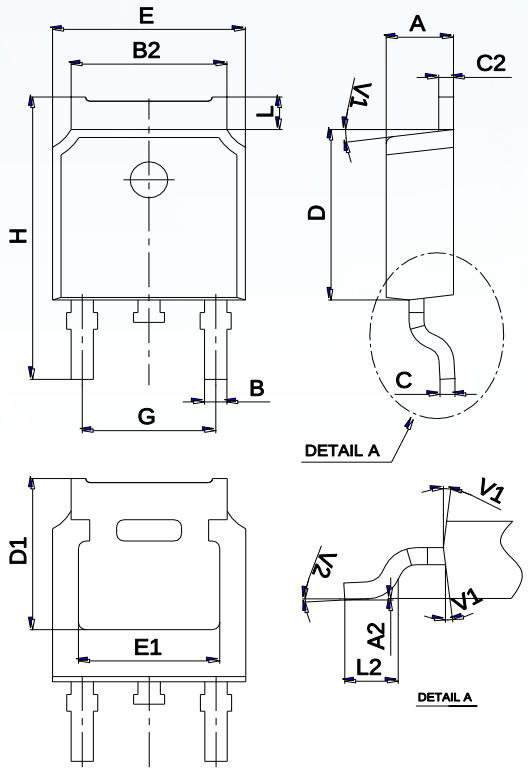


Fig 13b. Gate Charge Test Circuit

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°

Marking

Ordering information

Order code	Package	Baseqty	Deliverymode
EV-IRFR1205-T1	TO-252	2500	Tape and reel

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