

EVVOSEMI[®]

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

Product Specification

▶ Domestic	Part Number	IRFR1205
▶ Overseas	Part Number	IRFR1205
▶ Equivalent	Part Number	IRFR1205

EV is the abbreviation of name EVVO

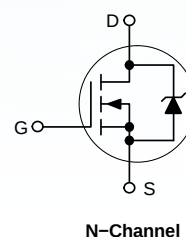
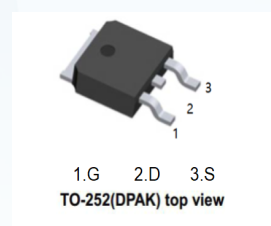
Features

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

Description

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

- Ultra Low On-Resistance
- Fast Switching
- Fully Avalanche Rated
- Lead-Free



Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	44⑤	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	31⑤	
I_{DM}	Pulsed Drain Current ①⑦	160	
$P_D @ T_C = 25^\circ C$	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		

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	55			V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.055		V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance			27	m Ω	$V_{GS} = 10V, I_D = 26A$ 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	17			S	$V_{DS} = 25V, I_D = 25A$ ⑦
I_{DSS}	Drain-to-Source Leakage Current			25	μA	$V_{DS} = 55V, V_{GS} = 0V$
				250		$V_{DS} = 44V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
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			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 ④ ⑦
$t_{d(on)}$	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			$R_G = 12\Omega$
t_f	Fall Time		60			$R_D = 1.1\Omega$, See Fig. 10 ④ ⑦
L_D	Internal Drain Inductance		4.5		nH	Between lead, 6mm (0.25in.) from package and center of die contact ⑥
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			$f = 1.0\text{MHz}$, See Fig. 5 ⑦

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)			44 ⑤	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ① ②			160		
V_{SD}	Diode Forward Voltage			1.3	V	$T_J = 25^\circ\text{C}, I_S = 22A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time		65	98	ns	$T_J = 25^\circ\text{C}, I_F = 25A$
Q_{rr}	Reverse Recovery Charge		160	240	nC	$di/dt = 100A/\mu s$ ④ ⑦
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 $T_J = 25^\circ\text{C}$, $L = 470\mu H$, $R_G = 25\Omega$, $I_{AS} = 25A$. (See Figure 12)
- ③ $I_{SD} \leq 25A$, $di/dt \leq 320A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 175^\circ\text{C}$
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- ⑤ Calculated continuous current based on maximum allowable junction temperature; Package limitation current = 20A
- ⑥ This is applied for I-PAK, L_S 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)

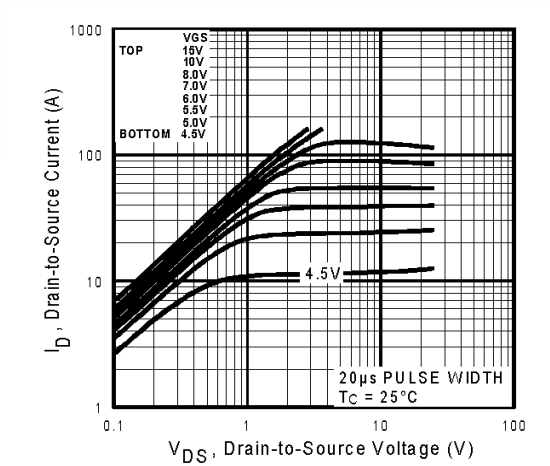


Fig 1. Typical Output Characteristics

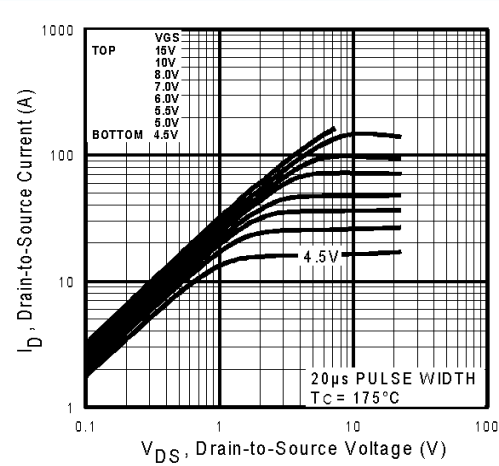


Fig 2. Typical Output Characteristics

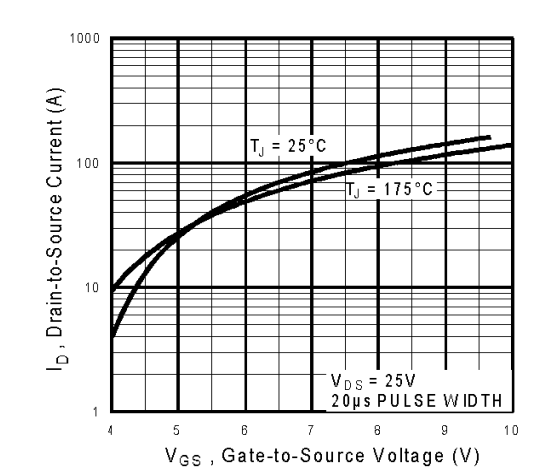


Fig 3. Typical Transfer Characteristics

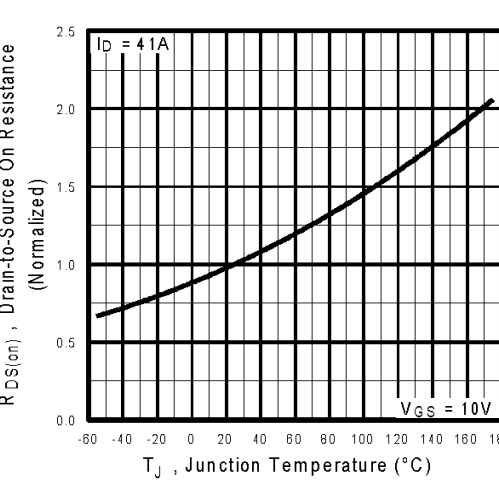


Fig 4. Normalized On-Resistance Vs. Temperature

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

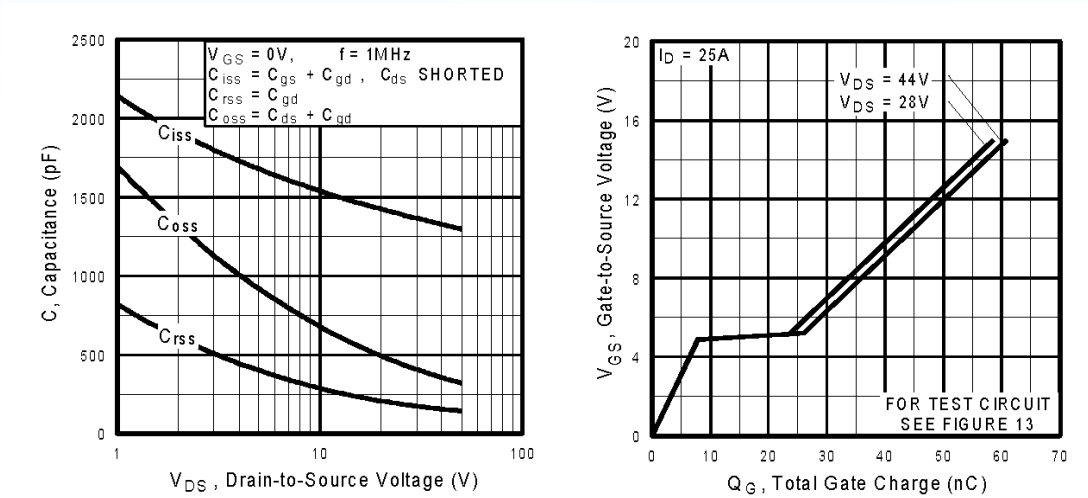


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

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

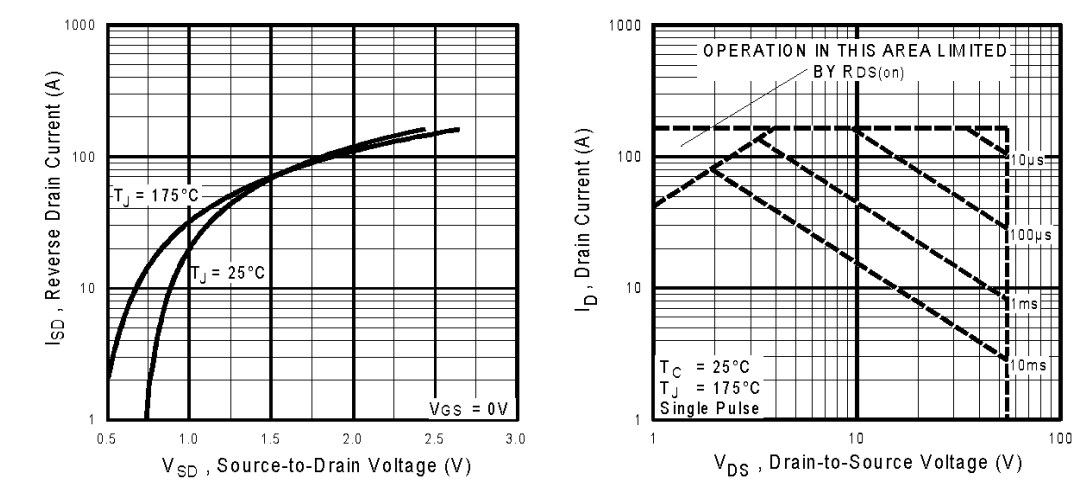


Fig 7. Typical Source-Drain Diode Forward Voltage

Fig 8. Maximum Safe Operating Area

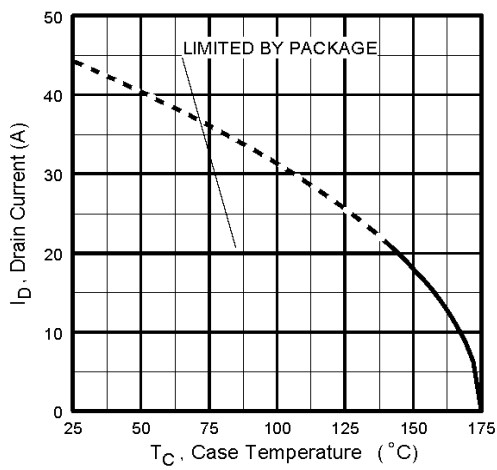


Fig 9. Maximum Drain Current Vs. Case Temperature

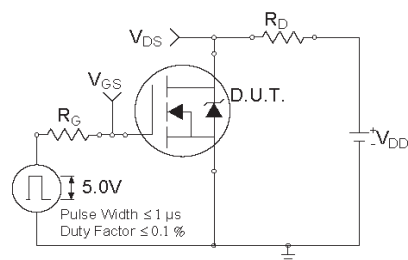


Fig 10a. Switching Time Test Circuit

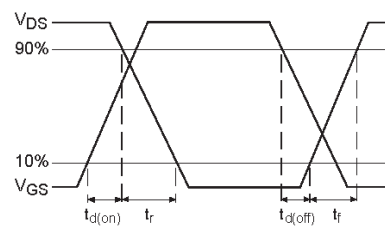


Fig 10b. Switching Time Waveforms

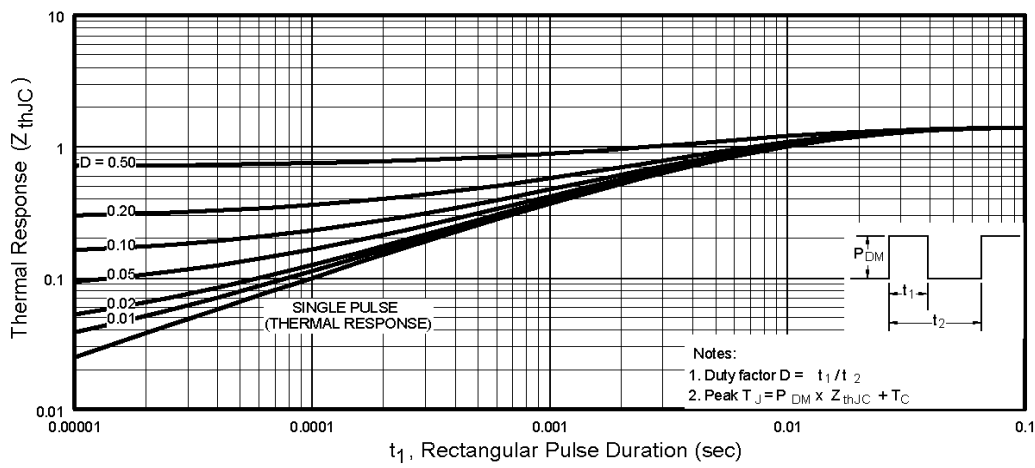
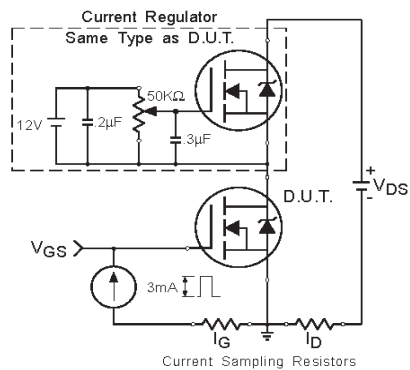
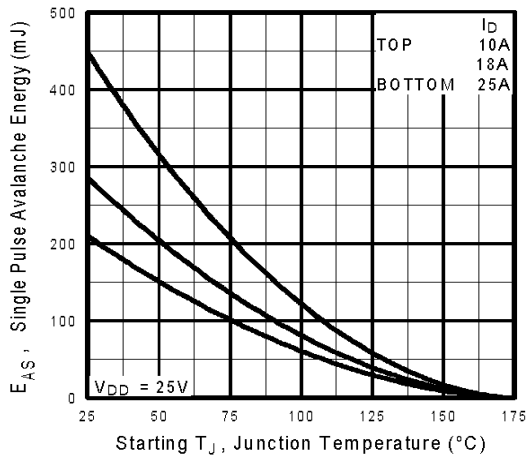
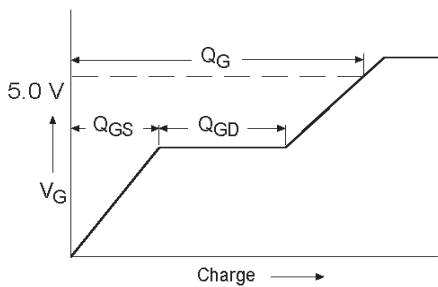
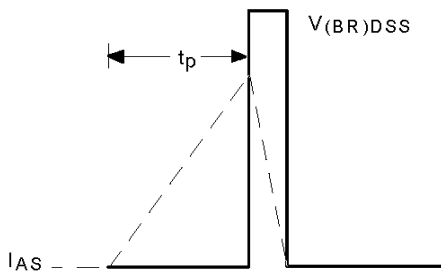
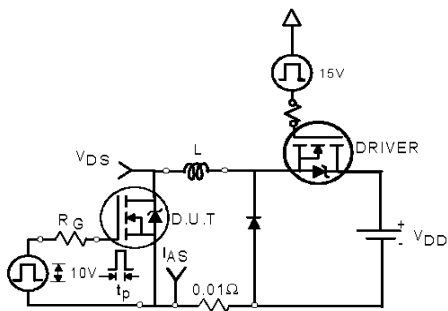
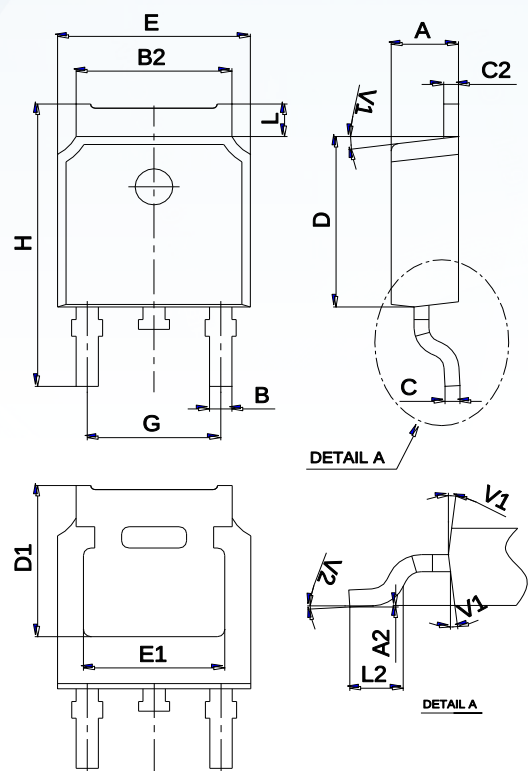


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

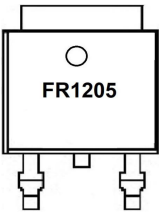


Package Mechanical Data TO-252



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
IRFR1205	TO-252	2500	Tape and reel

Disclaimer

EVVOSEMI ("EVVO") reserves the right to make corrections, enhancements, improvements, and other changes to its products and services at any time, and to discontinue any product or service without notice.

EVVO warrants the performance of its hardware products to the specifications applicable at the time of sale in accordance with its standard warranty. Testing and other quality control techniques are used as deemed necessary by EVVO to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

Customers should obtain and confirm the latest product information and specifications before final design, purchase, or use. EVVO makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does EVVO assume any liability for application assistance or customer product design. EVVO does not warrant or accept any liability for products that are purchased or used for any unintended or unauthorized application.

EVVO products are not authorized for use as critical components in life support devices or systems without the express written approval of EVVOSEMI.

The EVVO logo and EVVOSEMI are trademarks of EVVOSEMI or its subsidiaries in relevant jurisdictions. EVVO reserves the right to make changes without further notice to any products herein.