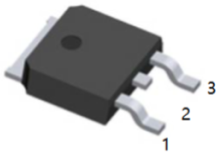
IRFR8314

30V N-Channel MOSFET

Application

- Optimized for UPS/Inverter Applications
- Low Voltage Power Tools

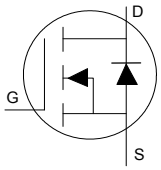


1.G 2.D 3.S

TO-252(DPAK) top view

Benefits

- Fully Characterized Avalanche Voltage and Current
- Lead-Free, RoHS Compliant
- V_{DS}(V) =30V
- I_D =90A (V_{GS}= 10V)
- $R_{DS(ON)}$ <2.2mΩ (V_{GS} =10V)
- $R_{DS(ON)}$ <3.1mΩ (V_{GS} =4.5V)



Absolute Maximum Rating

Symbol	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 20	
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V (Silicon Limited)	179①	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V (Silicon Limited)	127①	
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V (Package Limited)	90	
I_{DM}	Pulsed Drain Current ②	357	
P_D @T_C = 25°C	Maximum Power Dissipation	125	W
P_D @T_C = 100°C	Maximum Power Dissipation	63	W
	Linear Derating Factor	0.83	W/°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ⑤		1.2	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount) ⑦		50	
$R_{\theta JA}$	Junction-to-Ambient		110	

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	30			V	V_{GS} = 0V, I_D = 250μA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		18		mV/°C	Reference to 25°C, I_D = 1mA ②
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		1.6	2.2	mΩ	V_{GS} = 10V, I_D = 90A ④
			2.6	3.1		V_{GS} = 4.5V, I_D = 72A ④
$V_{GS(th)}$	Gate Threshold Voltage	1.2	1.7	2.2	V	V_{DS} = V_{GS}, I_D = 100μA
$\Delta V_{GS(th)}/\Delta T_J$	Gate Threshold Voltage Coefficient		-7.0		mV/°C	
I_{DSS}	Drain-to-Source Leakage Current			1.0	μA	V_{DS} =24 V, V_{GS} = 0V
				150		V_{DS} =24V,V_{GS} = 0V,T_J =125°C
I_{GSS}	Gate-to-Source Forward Leakage			100	nA	V_{GS} = 20V
	Gate-to-Source Reverse Leakage			-100		V_{GS} = -20V
gfs	Forward Transconductance	189			S	V_{DS} = 15V, I_D =72A
Q_g	Total Gate Charge		36	54	nC	V_{DS} = 15V V_{GS} = 4.5V I_D = 72A
Q_{gs1}	Pre-Vth Gate-to-Source Charge		10			
Q_{gs2}	Post-Vth Gate-to-Source Charge		7.7			
Q_{gd}	Gate-to-Drain Charge		10			
Q_{godr}	Gate Charge Overdrive		8.3			
Q_{sw}	Switch Charge (Qgs2 + Qgd)		20			
R_G	Gate Resistance		2.0		Ω	
$t_{d(on)}$	Turn-On Delay Time		19		ns	V_{DD} = 15V I_D = 72A R_G= 1.8Ω V_{GS} = 4.5V ④
t_r	Rise Time		98			
$t_{d(off)}$	Turn-Off Delay Time		28			
t_f	Fall Time		30			
C_{iss}	Input Capacitance		4945		pF	V_{GS} = 0V V_{DS} = 15V f = 1.0MHz
C_{oss}	Output Capacitance		908			
C_{rss}	Reverse Transfer Capacitance		493			
I_S	Continuous Source Current (Body Diode) ②			179①	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ②			357		
V_{SD}	Diode Forward Voltage			1.0	V	T_J = 25°C,I_S = 72A,V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time		31	47	ns	T_J = 25°C I_F = 72A ,V_{DD}=15V
Q_{rr}	Reverse Recovery Charge		87	130	nC	di/dt = 360A/μs ④
$E_{AS\ (Thermally\ limited)}$	Single Pulse Avalanche Energy ③					180 mJ
$E_{AS\ (tested)}$	Single Pulse Avalanche Energy Tested Value ⑥					279 mJ
I_A	Avalanche Current					72 A

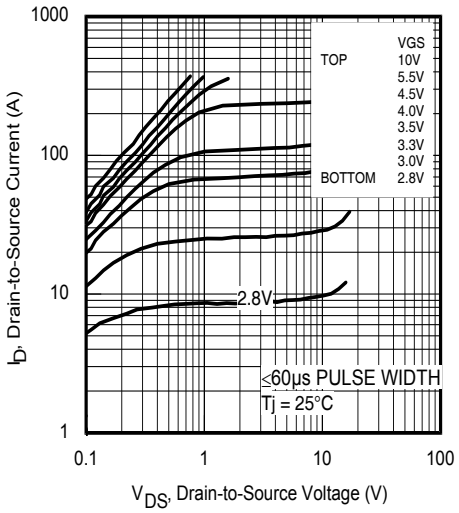


Fig 1. Typical Output Characteristics

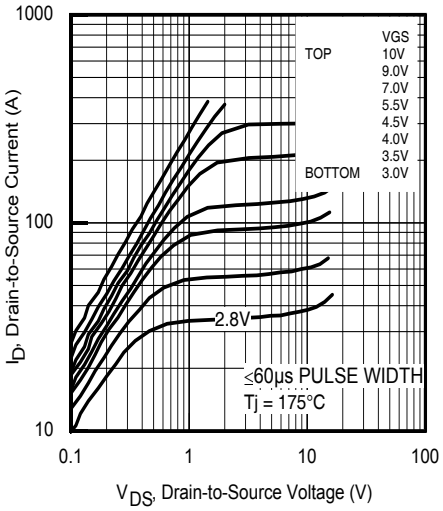


Fig 2. Typical Output Characteristics

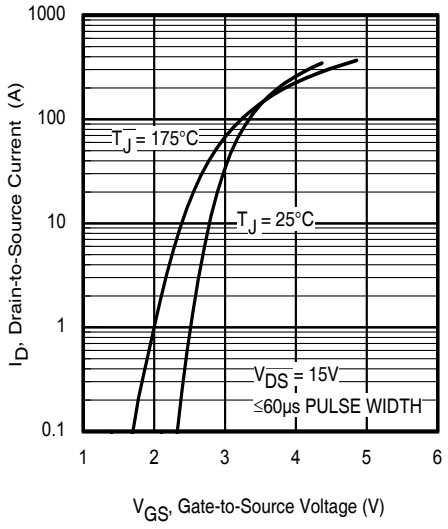


Fig 3. Typical Transfer Characteristics

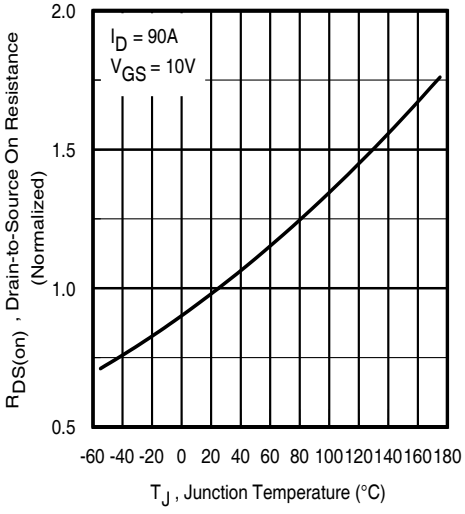


Fig 4. Normalized On-Resistance vs. Temperature

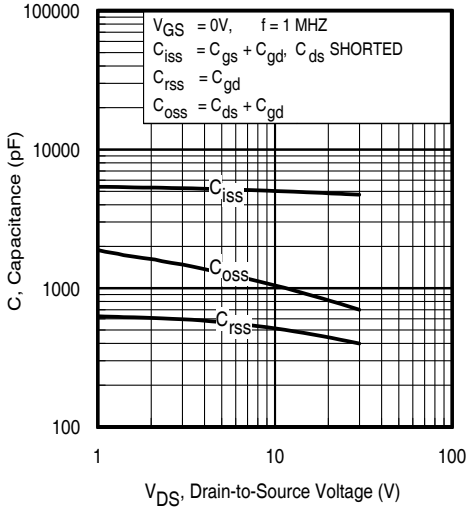


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

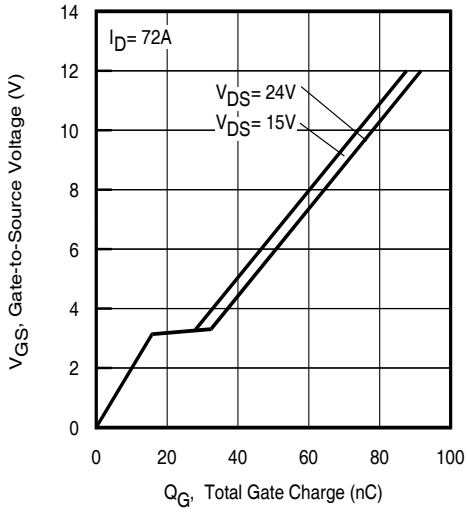


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

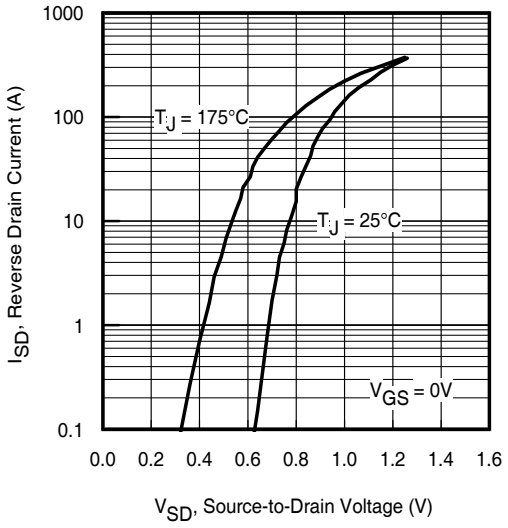


Fig 7. Typical Source-Drain Diode Forward Voltage

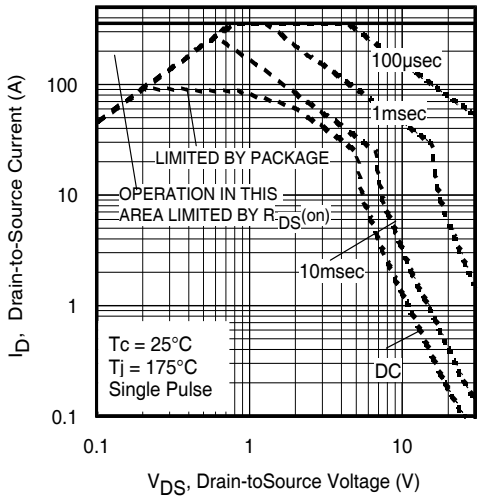


Fig 8. Maximum Safe Operating Area

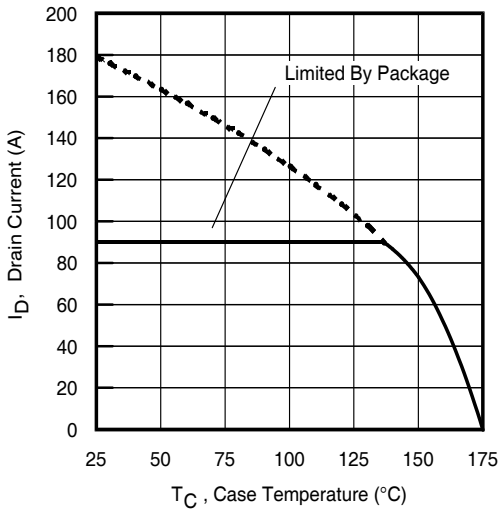


Fig 9. Maximum Drain Current vs. Case Temperature

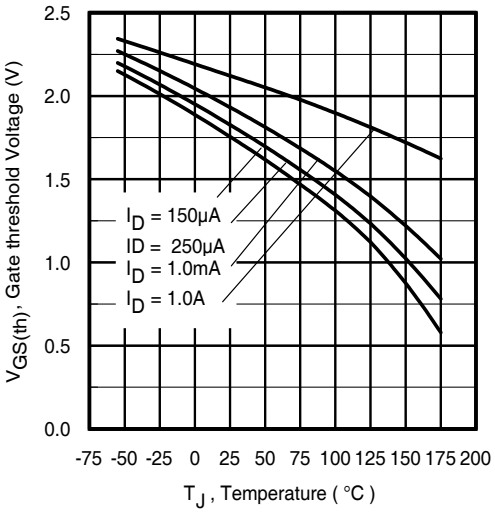


Fig 10. Threshold Voltage vs. Temperature

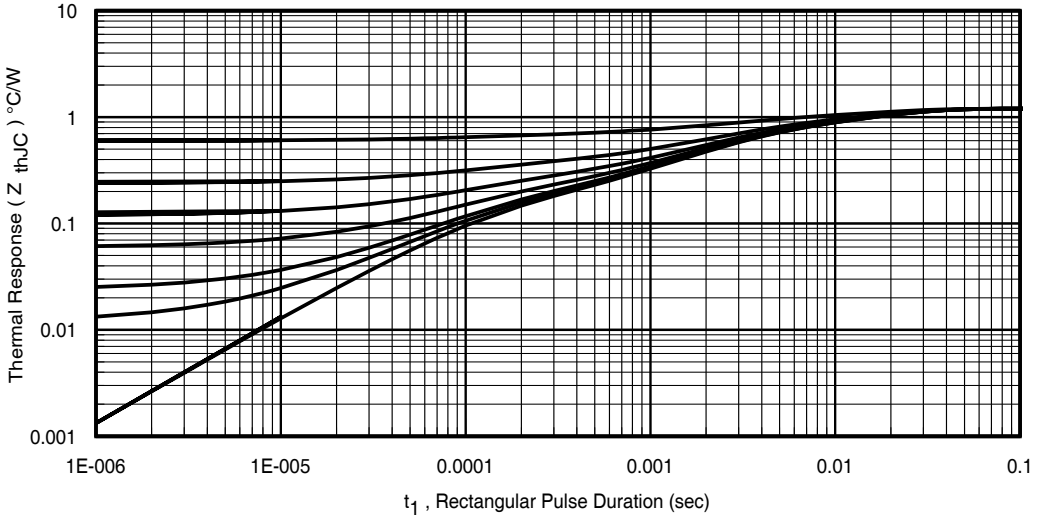


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

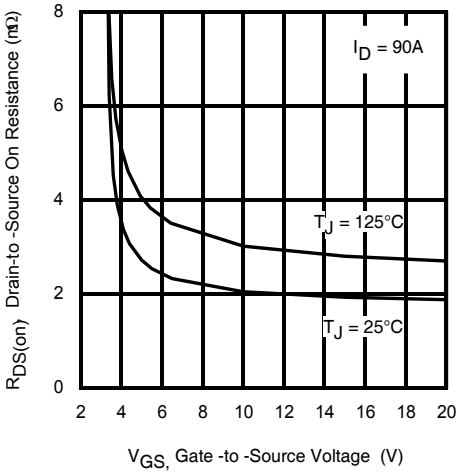


Fig 12. Typical On-Resistance vs. Gate Voltage

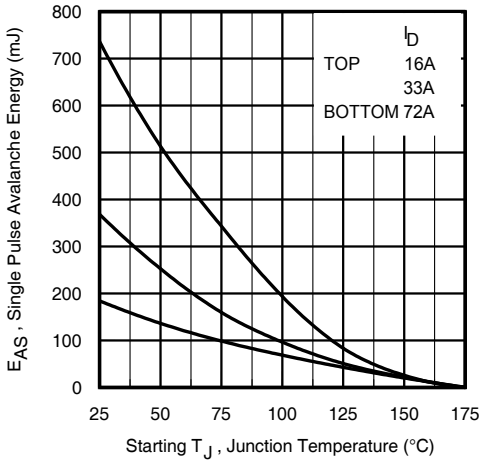
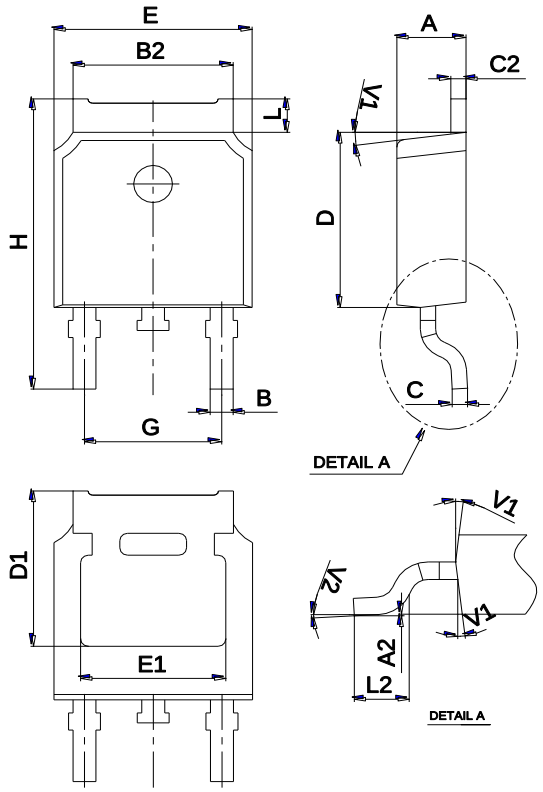


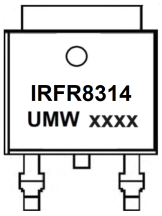
Fig 13. Maximum Avalanche Energy vs. Drain Current

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
UMW IRFR8314TR	TO-252	2500	Tape and reel

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