UMW IRFR8314TR

30V N-Channel MOSFET

1.Features

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

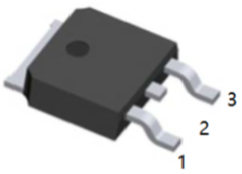
2.Application

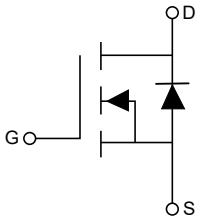
- Optimized for UPS/Inverter Applications
- Low Voltage Power Tools

3.Pinning information

Pin	Symbol	Description
1	G	GATE
3	S	SOURCE
2	D	DRAIN

TO-252(DPAK) top view





4.Absolute Maximum Ratings

Parameter		Symbol	Rating	Units
Drain- Source Voltage		V_{DS}	30	V
Gate-to-Source Voltage		V_{GS}	±20	V
Continuous Drain Current, V_{GS}=10V (Silicon Limited)	T_C=25°C	I_D	179 ①	A
Continuous Drain Current, V_{GS}=10V (Silicon Limited)	T_C=100°C		127 ①	A
Continuous Drain Current, V_{GS}=10V (Package Limited)	T_C=25°C		90	A
Pulsed Drain Current ②		I_{DM}	357	A
Maximum Power Dissipation	T_C=25°C	P_D	125	W
Maximum Power Dissipation	T_C=100°C		63	W
Linear Derating Factor			0.83	W/°C
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C
Soldering Temperature, for 10 seconds (1.6mm from case)			300	°C

5.Thermal resistance rating

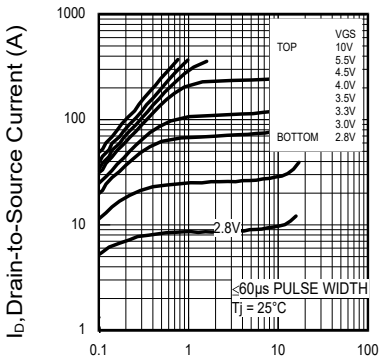
Parameter	Symbol	Typ	Max	Units
Junction-to-Case ⑤	$R_{\theta JC}$		1.2	°C/W
Junction-to-Ambient (PCB Mount) ⑦	$R_{\theta JA}$		50	°C/W
Junction-to-Ambient	$R_{\theta JA}$		110	°C/W

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	30			V
Breakdown Voltage Temp. Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C,I_D=1mA②		18		mV/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=90A ④		1.6	2.2	mΩ
		V_{GS}=4.5V, I_D=72A ④		2.6	3.1	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=100μA	1.2	1.7	2.2	V
Gate Threshold Voltage Coefficient	$\Delta V_{GS(th)}/\Delta T_J$			-7		mV/°C
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			1	μA
		V_{DS}=24V, V_{GS}=0V, T_J=125°C			150	μA
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=20V			100	nA
Gate-to-Source Reverse Leakage		V_{GS}=-20V			-100	nA
Forward Transconductance	g_{FS}	V_{DS}=15V, I_D=72A	189			S
Total Gate Charge	Q_g	V_{DS}=15V, V_{GS}=4.5V I_D=72A		36	54	nC
Pre-Vth Gate-to-Source Charge	Q_{gs1}			10		nC
Post-Vth Gate-to-Source Charge	Q_{gs2}			7.7		nC
Gate-to-Drain Charge	Q_{gd}			10		nC
Gate Charge Overdrive	Q_{gdor}			8.3		nC
Switch Charge (Q_{gs2} + Q_{gd})	Q_{sw}			20		nC
Gate Resistance	R_g			2		Ω
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=15V, V_{GS}=4.5V ④ I_D=72A, R_G=1.8Ω		19		ns
Rise Time	t_r			98		ns
Turn-Off Delay Time	$t_{D(off)}$			28		ns
Fall Time	t_f			30		ns
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V f = 1.0MHz		4945		pF
Output Capacitance	C_{oss}			908		pF
Reverse Transfer Capacitance	C_{rss}			493		pF

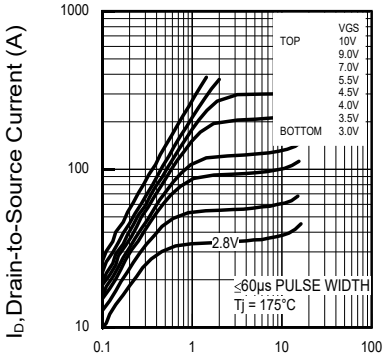
Diode Characteristics						
Continuous Source Current (Body Diode) ②	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			179①	A
Pulsed Source Current (Body Diode) ②	I_{SM}				357	A
Diode Forward Voltage	V_{SD}	T_J=25°C,I_F=72A,V_{GS}=0V ④			1	V
Reverse Recovery Time	t_{rr}	T_J=25°C,I_F=72A,V_{DD}=15V di/dt=360A/μs ④		31	47	ns
Reverse Recovery Charge	Q_{rr}			87	130	nC
Single Pulse Avalanche Energy ③	$E_{AS\ (Thermally\ limited)}$				180	mJ
Single Pulse Avalanche Energy Tested Value ⑥	$E_{AS\ (tested)}$				279	mJ
Avalanche Current	I_A				72	A

7.1Typical Characterisitics



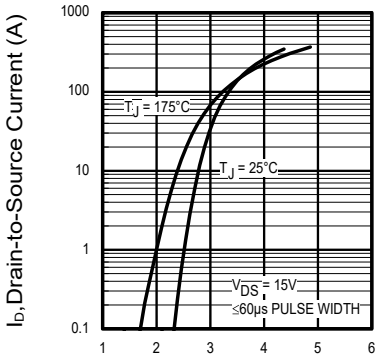
V_{DS},Drain-to-Source Voltage (V)

Figure 1: Typical Output Characteristics



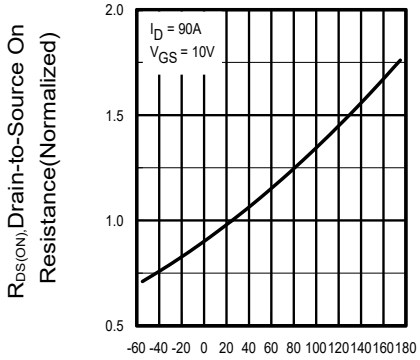
V_{DS},Drain-to-Source Voltage (V)

Figure 2: Typical Output Characteristics



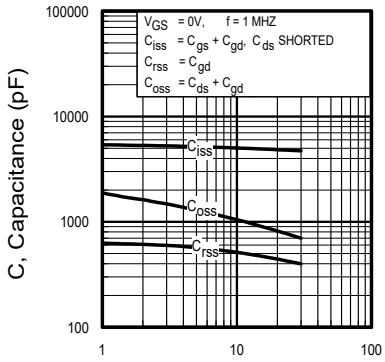
V_{GS},Gate-to-Source Voltage (V)

Figure 3: Typical Output Characteristics



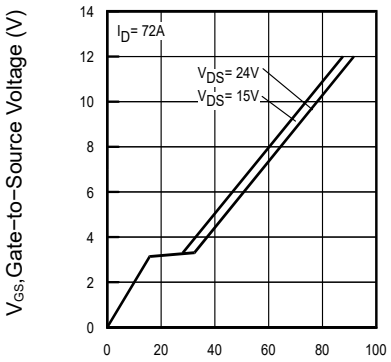
T_J,Junction Temperature (°C)

Figure 4: Normalized On-Resistance vs. Temperature



V_{DS},Drain-to-Source Voltage (V)

Figure 5: Typical Output Characteristics



Q_g, Total Gate Charge (nC)

Figure 6: Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

7.2Typical Characterisitics

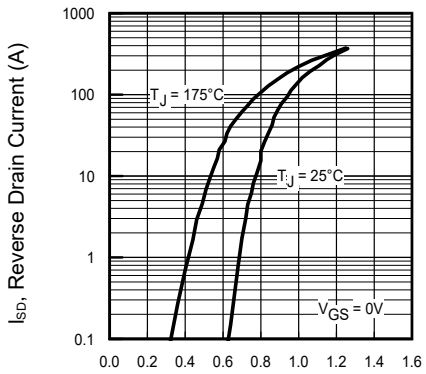


Figure 7: Typical Source-Drain Diode Forward Voltage

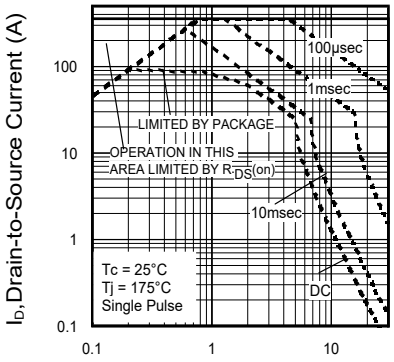


Figure 8: Maximum Safe Operating Area

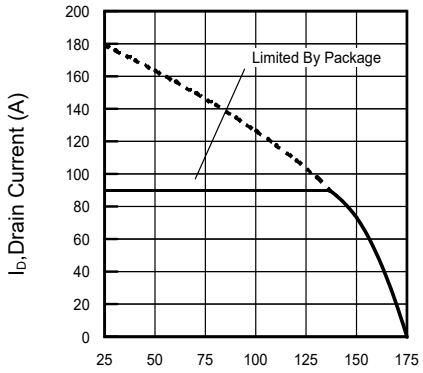


Figure 9: Maximum Drain Current vs. Case Temperature

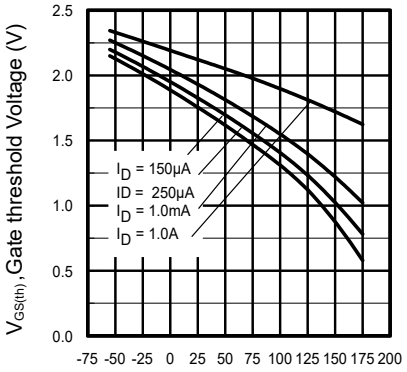


Figure 10: Threshold Voltage vs. Temperature

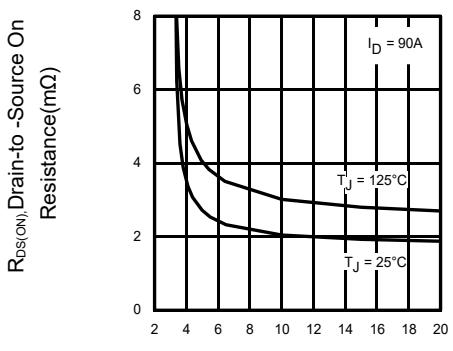


Figure 11: On-Resistance Vs. Gate Voltage

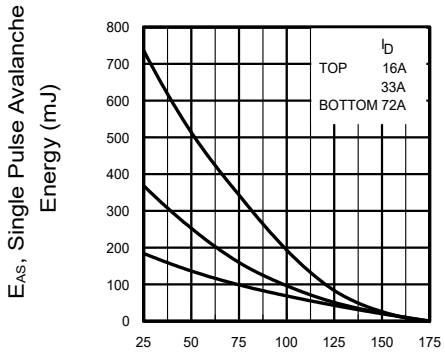


Figure 12: Maximum Avalanche Energy Vs. Drain Current

7.3Typical Characterisitics

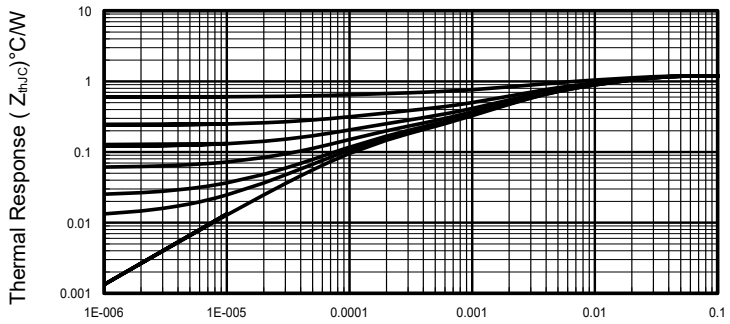
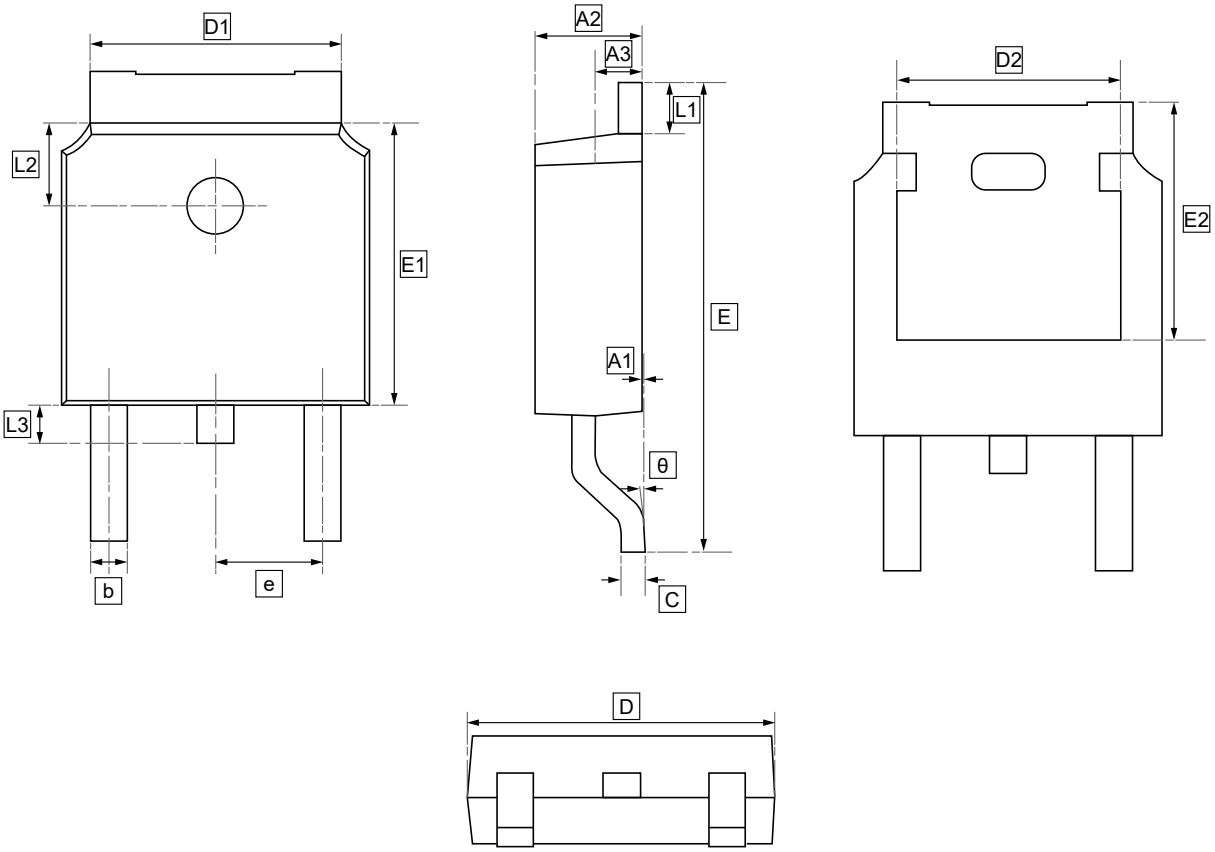


Fig 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case

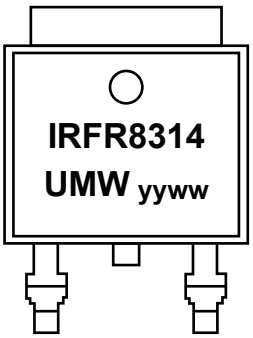
8.TO-252 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38	BSC	1.27	1.90	1.00	8.00

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRFR8314TR	TO-252	2500	Tape and reel

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