

1.Features

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

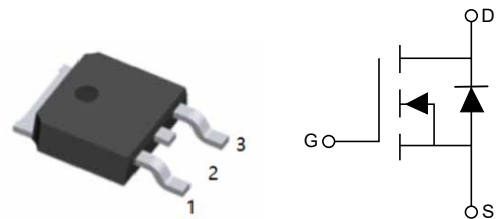
2.Application

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



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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
Breakdown Voltage Temp. Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1\text{mA}$ ②		18		mV/ $^\circ\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=90\text{A}$ ④		1.6	2.2	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=72\text{A}$ ④		2.6	3.1	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=100\mu\text{A}$	1.2	1.7	2.2	V
Gate Threshold Voltage Coefficient	$\Delta V_{GS(th)}/\Delta T_J$			-7		mV/ $^\circ\text{C}$
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^\circ\text{C}$			150	μA
Gate-to-Source Forward Leakage	I_{GSS}	$V_{GS}=20\text{V}$			100	nA
Gate-to-Source Reverse Leakage		$V_{GS}=-20\text{V}$			-100	nA
Forward Transconductance	g_{FS}	$V_{DS}=15\text{V}$, $I_D=72\text{A}$	189			S
Total Gate Charge	Q_g	$V_{DS}=15\text{V}$, $V_{GS}=4.5\text{V}$ $I_D=72\text{A}$		36	54	nC
Pre-V _{th} Gate-to-Source Charge	Q_{gs1}			10		nC
Post-V _{th} 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	$t_{D(on)}$	$V_{DD}=15\text{V}$, $V_{GS}=4.5\text{V}$ ④ $I_D=72\text{A}$, $R_G=1.8\Omega$		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}	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$ $f = 1.0\text{MHz}$		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}	$T_J=25^{\circ}\text{C}, I_F=72\text{A}, V_{GS}=0\text{V}$ ④			1	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}\text{C}, I_F=72\text{A}, V_{DD}=15\text{V}$ $di/dt=360\text{A}/\mu\text{s}$ 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



7.1 Typical Characteristics

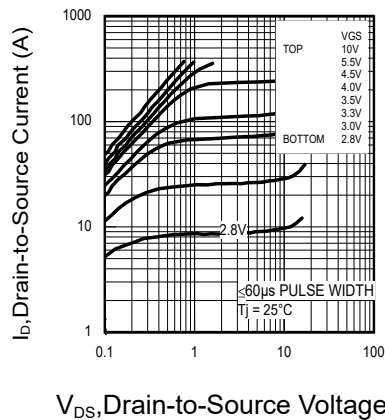


Figure 1: Typical Output Characteristics

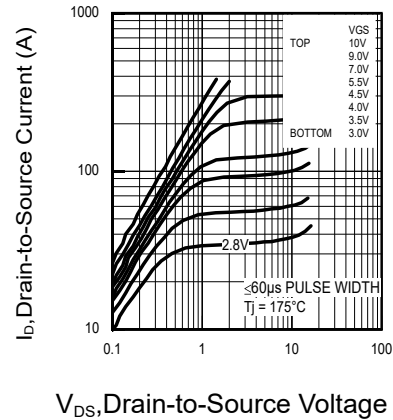


Figure 2: Typical Output Characteristics

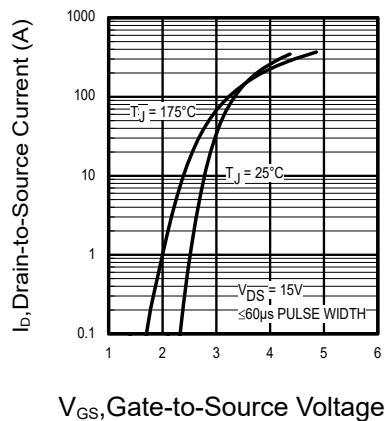


Figure 3: Typical Output Characteristics

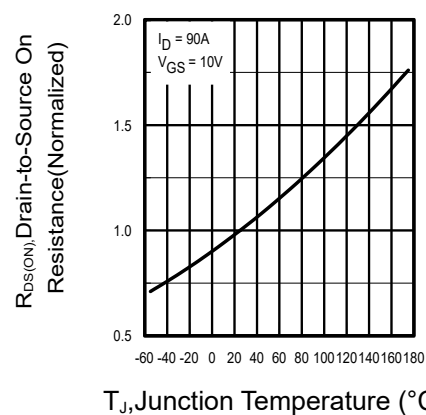


Figure 4: Normalized On-Resistance vs. Temperature

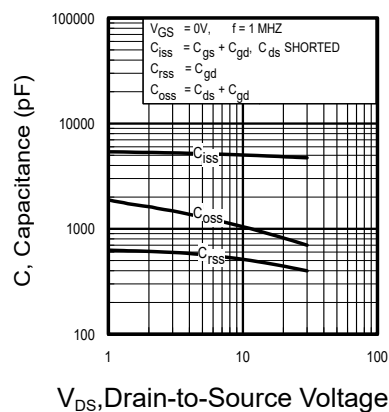


Figure 5: Typical Output Characteristics

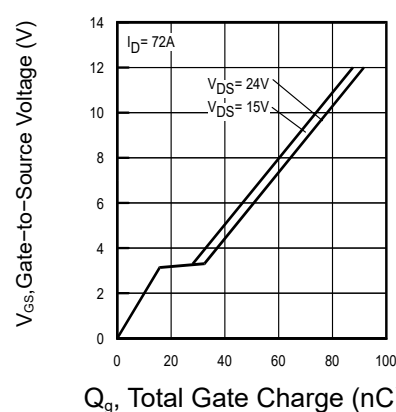


Figure 6: Gate-to-Source and Drain-to-Source Voltage vs. Total Charge



7.2 Typical Characteristics

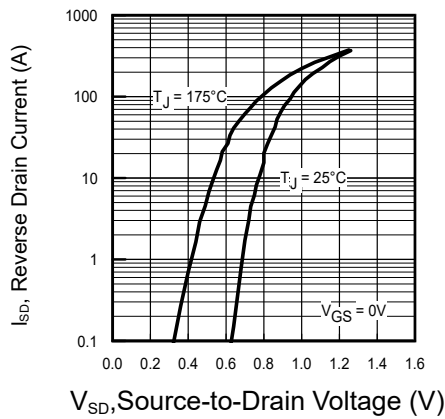


Figure 7: Typical Source-Drain Diode Forward Voltage

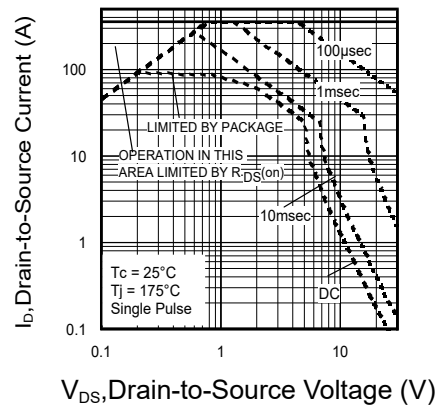


Figure 8: Maximum Safe Operating Area

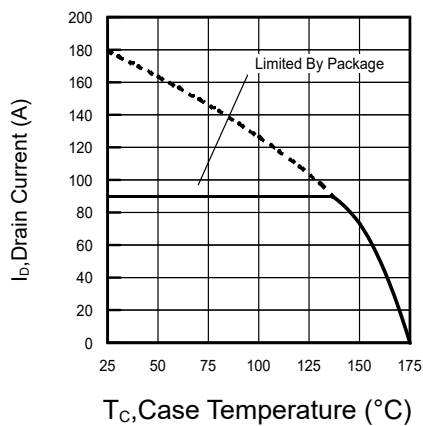


Figure 9: Maximum Drain Current vs. Case Temperature

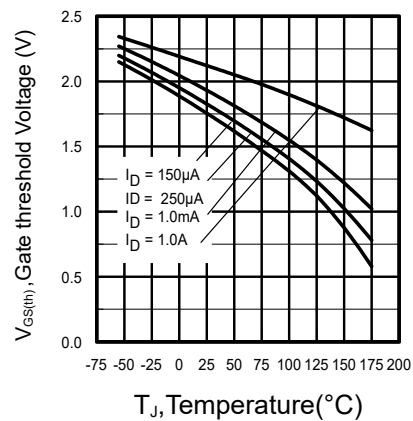


Figure 10: Threshold Voltage vs. Temperature

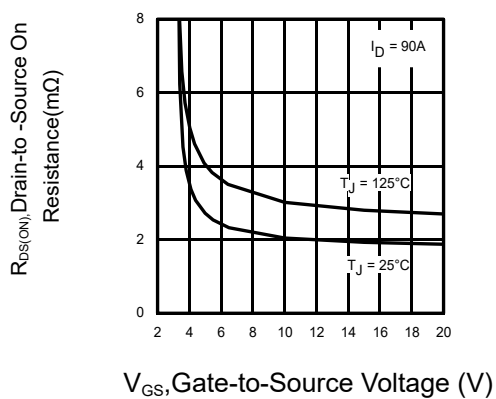


Figure 11: On-Resistance Vs. Gate Voltage

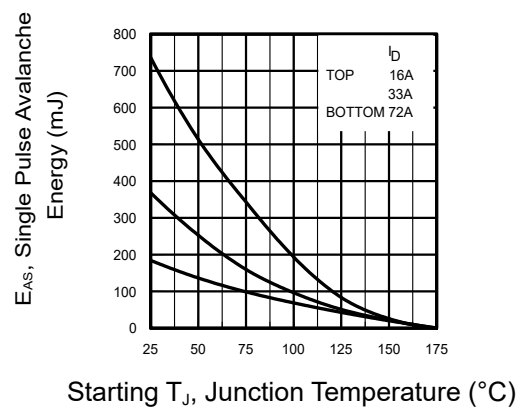


Figure 12: Maximum Avalanche Energy Vs. Drain Current



7.3 Typical Characteristics

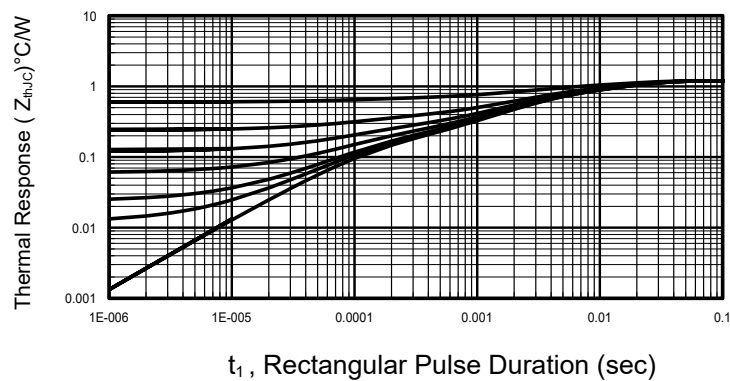
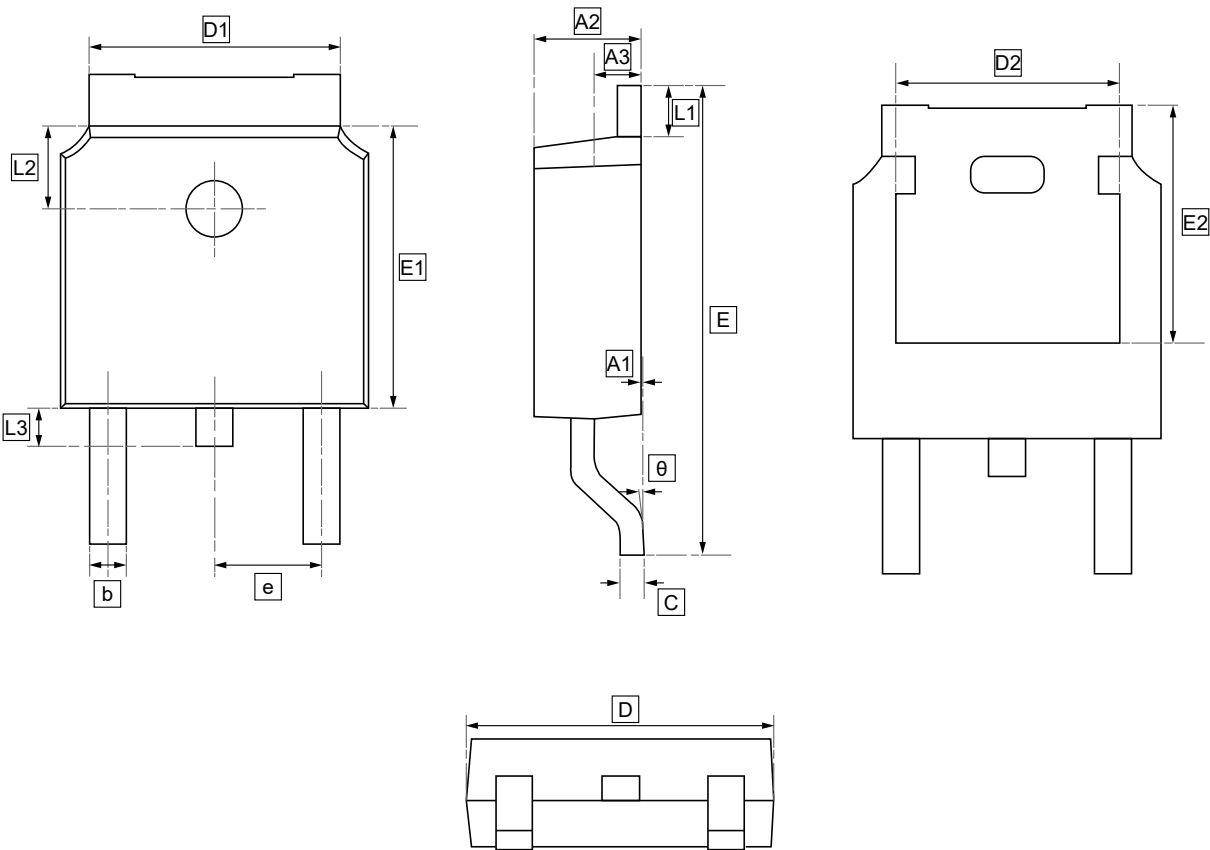


Fig 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case



8.TO-252 Package Outline Dimensions

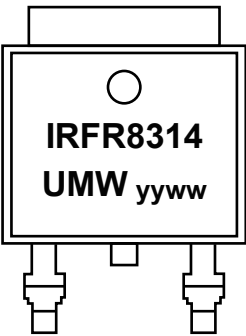


DIMENSIONS (mm are the original dimensions)

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 BSC	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		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



10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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