UMW IRLZ44NSTRL

55V N-Channel MOSFET

1.Description

Fifth Generation from International Rectifier utilize advanced processing techniques to achieve the lowest possibleon-resistance persilicon area.

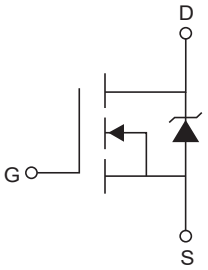
2.Features

- $V_{DS\ (V)}$=55V
- I_D=47A(V_{GS}=10V)
- $R_{DS(ON)}$<22mΩ(V_{GS}=10V)

3.Pinning information

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

TO-263



4.Absolute Maximum Ratings

Parameter		Symbol	Rating	Units
Continuous Drain Current, V_{GS}=10V ⑤	T_C=25°C	I_D	47	A
Continuous Drain Current, V_{GS}=10V ⑤	T_C=100°C		33	A
Pulsed Drain Current ①⑤		I_{DM}	160	A
Power Dissipation	T_A=25°C	P_D	3.8	W
Power Dissipation	T_C=25°C		110	W
Linear Derating Factor			0.71	W/°C
Gate-to-Source Voltage		V_{GS}	±16	V
Single Pulse Avalanche Energy ②⑤		E_{AS}	210	mJ
Avalanche Current ①		I_{AR}	25	A
Repetitive Avalanche Energy ①		E_{AR}	11	mJ
Peak Diode Recovery dv/dt ③⑤		dv/dt	5	V/ns
Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C
Soldering Temperature, for 10 seconds			300 (1.6mm from case)	°C

5.Thermal resistance rating

Parameter	Symbol	Typ	Max	Units
Junction-to-Case	$R_{\theta JC}$		1.4	°C/W
Junction-to-Ambient (PCB Mounted.steady-state) **	$R_{\theta JA}$		40	°C/W

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=250μA, V_{GS}=0V	55			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	I_D=1mA,Reference to 25°C		0.07		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=25A ④			22	mΩ
		V_{GS}=5V, I_D=25A ④			25	mΩ
		V_{GS}=4V, I_D=21A ④			35	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1		2	V
Forward Transconductance	g_{FS}	V_{DS}=25V, I_D=25A	21			S
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=55V, V_{GS}=0V			25	μA
		V_{DS}=44V,V_{GS}=0V,T_J=150°C			250	μA
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=16V			100	nA
Gate-to-Source Reverse Leakage		V_{GS}=-16V			-100	nA
Total Gate Charge	Q_g	I_D=25A			48	nC
Gate-to-Source Charge	Q_{gs}	V_{DS}=44V, V_{GS}=5V			8.6	nC
Gate-to-Drain ("Miller") Charge	Q_{gd}	See Fig.6 and 13 ④			25	nC
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=28V		11		ns
Rise Time	t_r	I_D=25A		84		ns
Turn-Off Delay Time	$t_{D(off)}$	R_G=3.4Ω,V_{GS}=5V		26		ns
Fall Time	t_f	R_D=1.1Ω, See Fig. 10 ④		15		ns
Internal Drain Inductance	L_D	Between lead, 6mm (0.25in.)		4.5		nH
Internal source Inductance	L_S	from package and center of die contact		7.5		nH
Input Capacitance	C_{iss}	V_{GS}=0V		1700		pF
Output Capacitance	C_{oss}	V_{DS}=25V		400		pF
Reverse Transfer Capacitance	C_{rss}	f=1.0MHz, See Fig. 5		150		pF

Diode Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			47	A
Pulsed Source Current (Body Diode) ①	I_{SM}				160	A
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=25A,V_{GS}=0V④			1.3	V
Reverse Recovery Time	t_{rr}	T_J=25°C,I_F=25A di/dt=100A/μs ④		80	120	ns
Reverse Recovery Charge	Q_{rr}			210	320	nC
Forward Turn-On Time	t_{on}	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, didt ≤270A/μs, V_{DD}≤ $V_{(BR)DSS}$,T_J≤ 175°C

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

⑤ Uses IRLZ44N data and test conditions.

7.1Typical Characterisitics

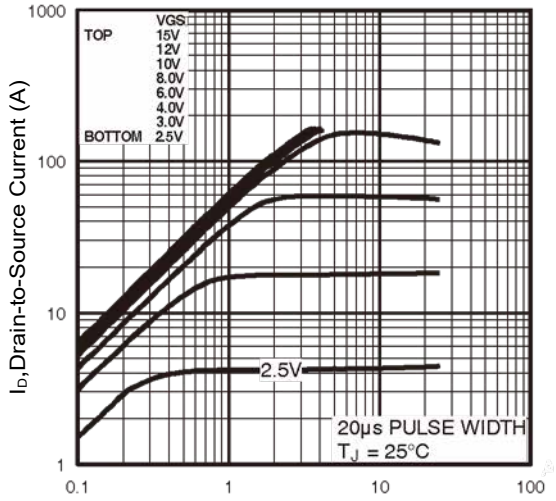


Figure 1: Typical Output Characteristics

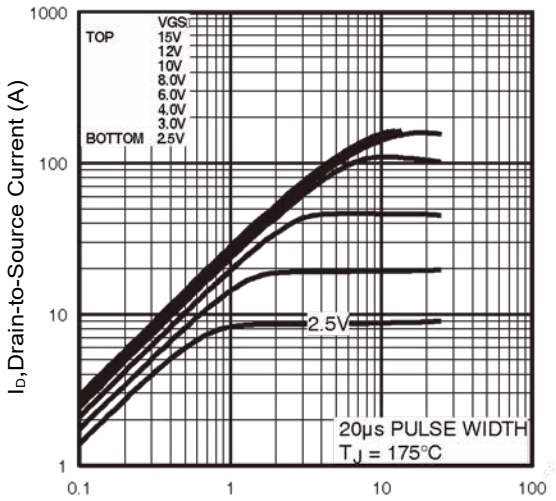


Figure 2: Typical Output Characteristics

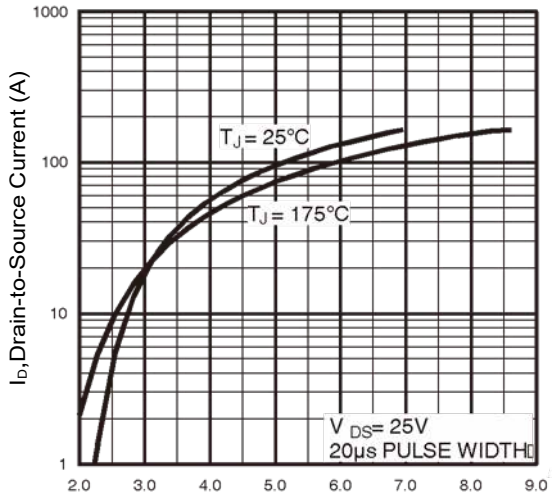


Figure 3: Typical Transfer Characteristics

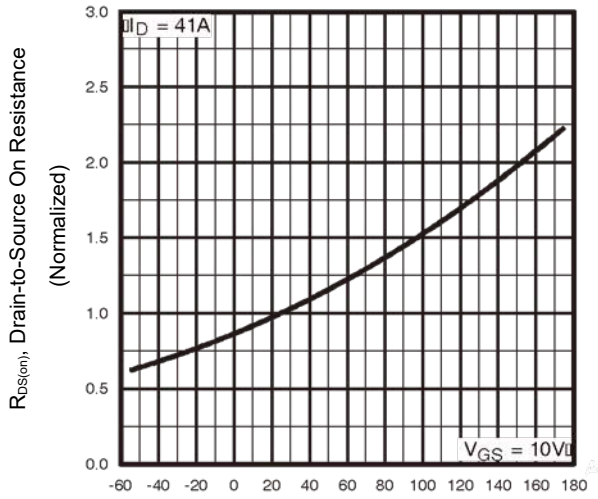
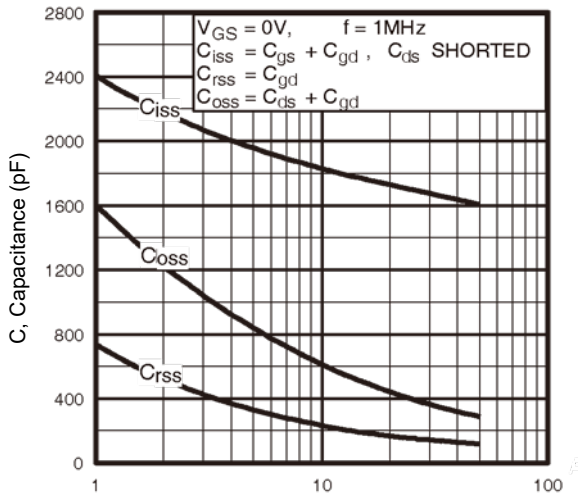


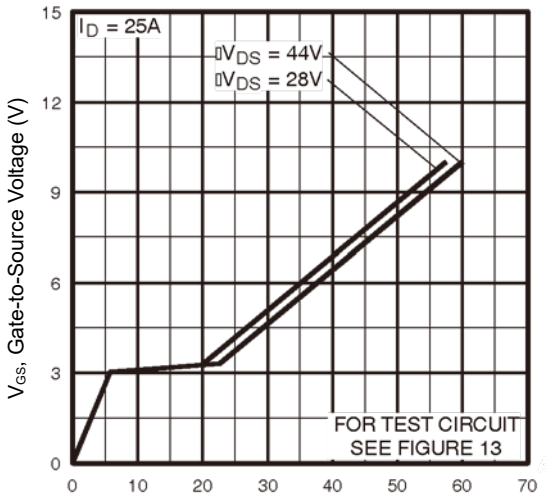
Figure 4: Nomalized On-ResistanceVs. Temperature

7.2Typical Characterisitics



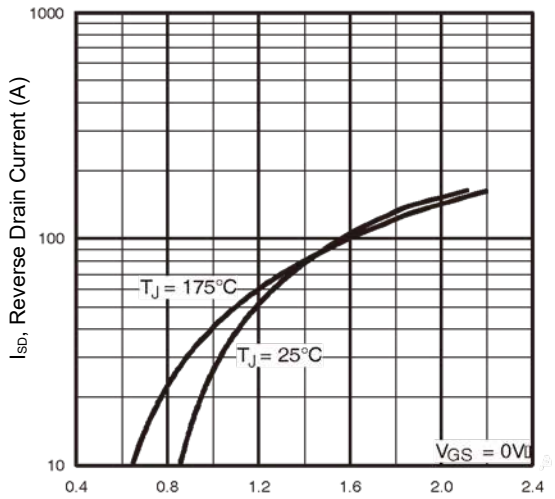
V_{DS} ,Drain-to-Source Voltage (V)

Figure 5: Typical Capacitance Vs. Drain-to-Source Voltage



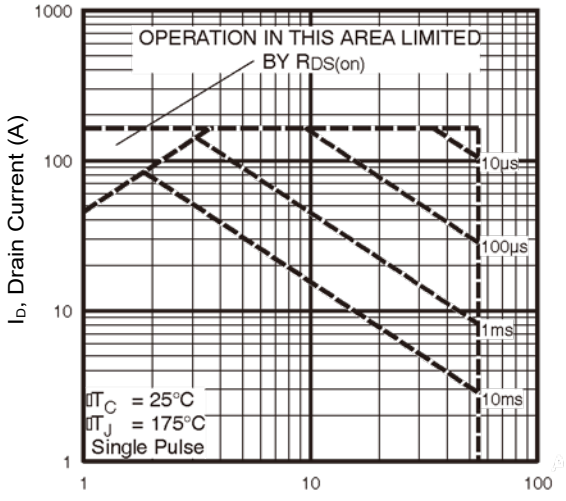
Q_G, Total Gate Charge (nC)

Figure 6: Typical Gate Charge Vs. Gate-to-Source Voltage



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

Figure 7: Typical Source-Drain Diode Forward Voltage



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

Figure 8: Maximum Safe Operating Area

7.3Typical Characterisitics

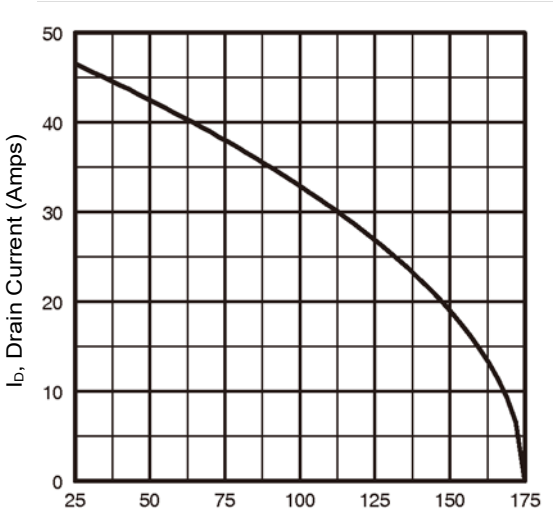


Figure 9: Maximum Drain Current Vs. Case Temperature

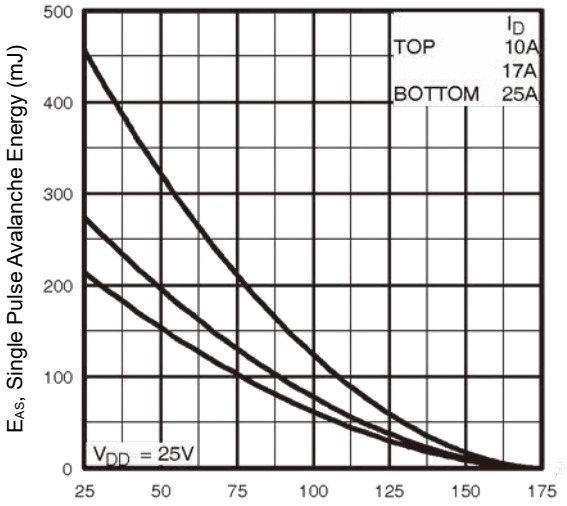


Figure 10: Maximum Avalanche Energy Vs. Drain Current

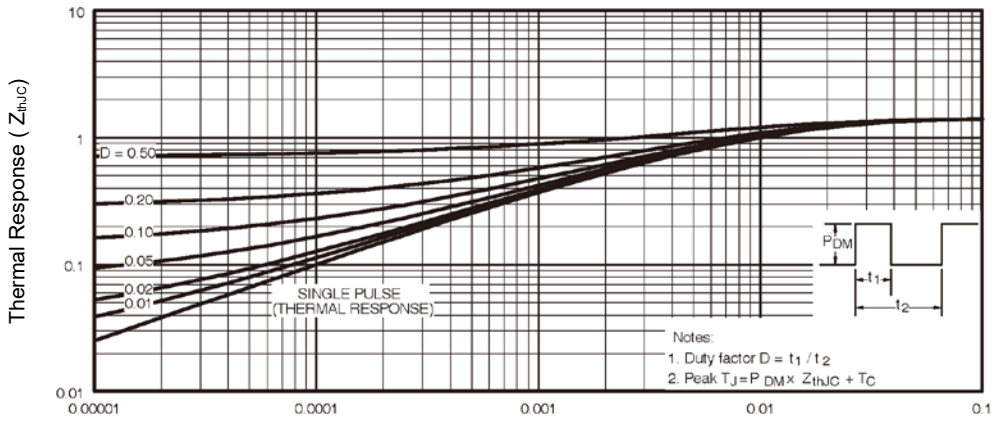


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

7.4Typical Characterisitics

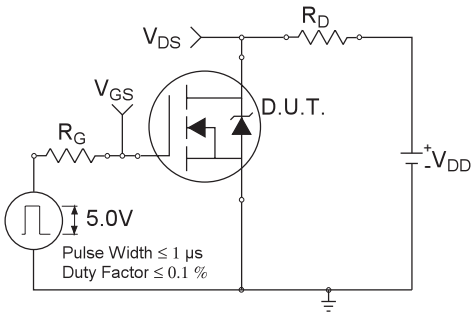


Figure 12a: Switching Time Test Circuit

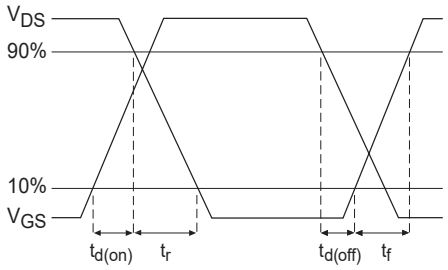


Figure 12b: Switching Time waveforms

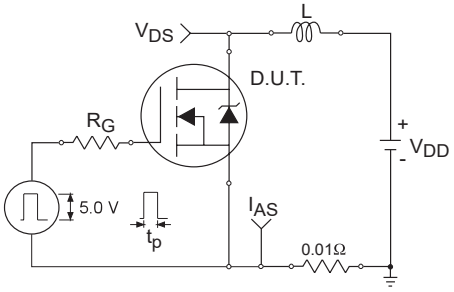


Figure 13a: Unclamped Inductive Test Circuit

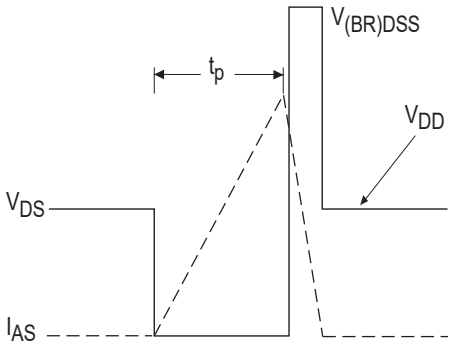


Figure 13b: Unclamped Inductive waveforms

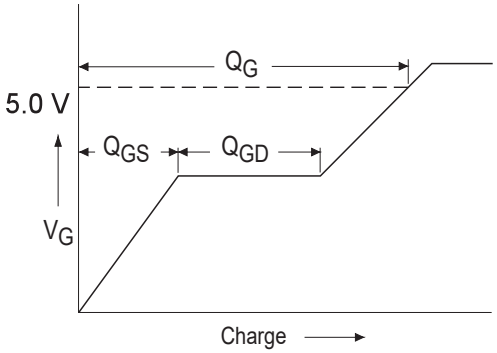


Figure 14a: Basic Gate Charge waveform

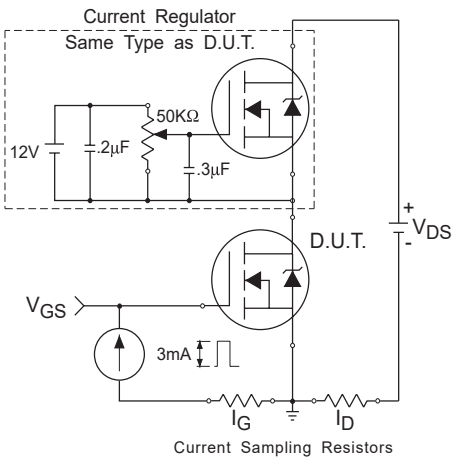
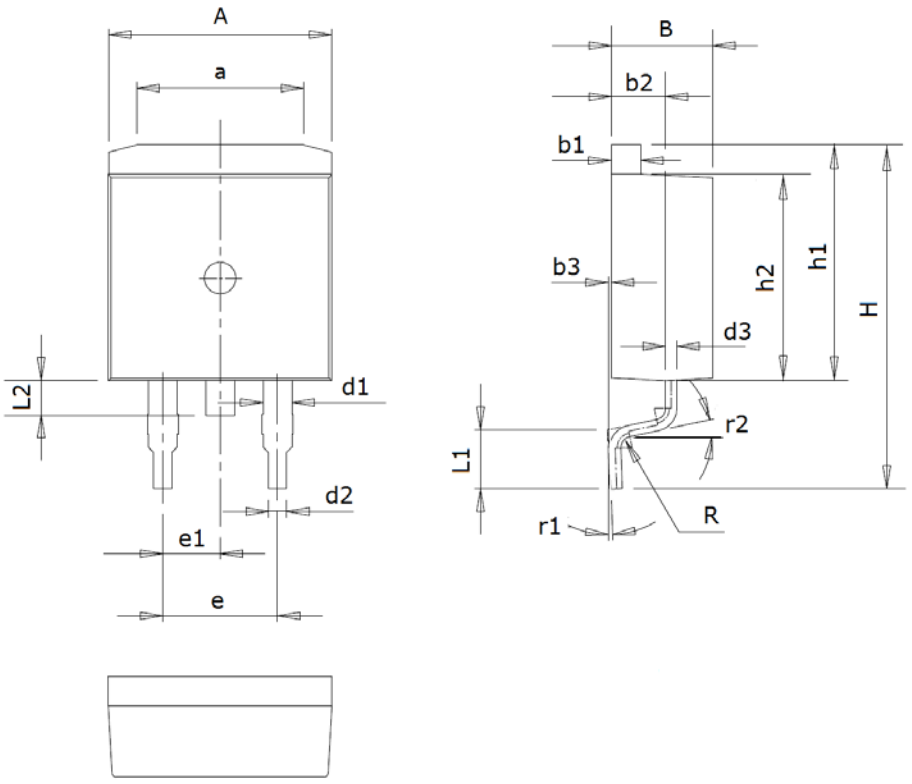


Figure 14b: Gate Charge Test Circuit

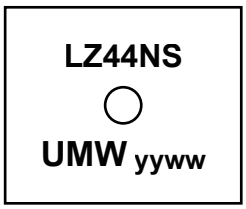
8.TO-263 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	Dimensions(mm)	Symbol	Dimensions(mm)	Symbol	Dimensions(mm)
A	9.7~10.3	d2	0.7~0.9	L1	2.4~2.9
a	7.0~7.8	d3	0.4~0.6	L2	1.3~1.8
B	4.3~4.7	e	5.08(typ)	R	0.5(typ)
b1	1.25~1.35	e1	2.54(typ)	r1	0~8°
b2	2.2~2.6	H	14.8~15.6	r2	12°(typ)
b3	0~0.2	h1	10.2~10.7		
d1	1.2~1.4	h2	8.9~9.4		

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRLZ44NSTRL	TO-263	800	Tape and reel

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