UMW IRLL110TR

100V N-Channel MOSFET

1.Description

The SOT-223 package is designed for surface-mounting using vapor phase, infrared, or wave soldering techniques.Its unique package design allows for easy automatic pick-and-place as with other SOT or SOIC packages but has the added advantage of improved thermal performance due to an enlarged tab for heatsinking.

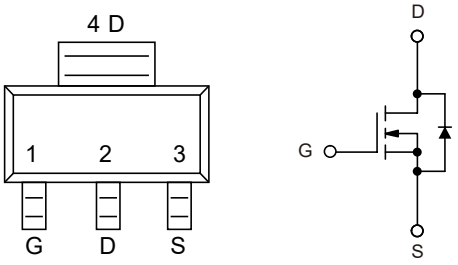
2.Features

- $V_{DS\ (V)}$=100V
- $R_{DS(ON)}$<54mΩ(V_{GS}=5V)
- $R_{DS(ON)}$<76mΩ(V_{GS}=4V)

3.Pinning information

Pin	Symbol	Description
1	G	GATE
2,4	D	DRAIN
3	S	SOURCE

SOT-223 top view



4.Absolute Maximum Ratings T_C=25°C unless otherwise noted

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±10	V
Continuous Drain Current(V_{GS} at 5V)	T_C=25°C	I_D	1.5	A
	T_C=100°C		0.93	A
Pulsed Drain Current [a]		I_{DM}	12	A
Linear Derating Factor			0.025	W/°C
Linear Derating Factor (PCB Mount) [e]			0.017	W/°C
Single Pulse Avalanche Energy [b]		E_{AS}	50	mJ
Repetitive Avalanche Current [a]		I_{AR}	1.5	A
Repetitive Avalanche Energy [a]		E_{AR}	0.31	mJ
Maximum Power Dissipation	T_C=25°C	P_D	3.1	W
Maximum Power Dissipation (PCB Mount) [e]	T_A=25°C		2	W

Peak Diode Recovery dV/dt [c]		dv/dt	5.5	V/ns
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C
Soldering Recommendations (Peak Temperature) [d]	for 10 s		300	°C

Notes:

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. V_{DD}=25 V, starting T_J=25°C, L=25mH, R_g=25Ω, I_{AS}=1.5A (see fig. 12).

c. I_{SD} ≤5.6A, dI/dt ≤75A/μs, V_{DD} ≤ V_{DS}, T_J≤ 150 °C.

d. 1.6 mm from case.

e. When mounted on 1" square PCB (FR-4 or G-10 material).

5.Thermal resistance rating

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient (PCB Mount) [a]	R_{thJA}		60	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}		40	°C/W

Notes:

a. When mounted on 1" square PCB (FR-4 or G-10 material).

6.Electrical Characteristics T_J=25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{DS}	I_D=250μA, V_{GS}=0V	100			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D=1mA,Reference to 25°C		0.12		V/°C
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1		2	V
Gate-Source Leakage	I_{GSS}	V_{GS}=±10V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V			25	μA
		V_{DS}=80V,V_{GS}=0V,T_J=125°C			250	μA
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=5V, I_D=0.9A [b]			54	mΩ
		V_{GS}=4V, I_D=0.75A [b]			76	mΩ
Forward Transconductance	g_{FS}	V_{DS}=25V, I_D=0.9A	0.57			S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V f=1MHz, see fig. 5		250		pF
Output Capacitance	C_{oss}			80		pF
Reverse Transfer Capacitance	C_{rss}			15		pF
Total Gate Charge	Q_g	V_{GS}=5V, I_D=5.6A V_{DS}=80V see fig. 6 and 13 [b]			6.1	nC
Gate-Source Charge	Q_{gs}				2.6	nC
Gate-Drain Charge	Q_{gd}				3.3	nC
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=50V, I_D=5.6A R_G=12Ω, R_D=8.4Ω		9.3		ns
Rise Time	t_r			47		ns
Turn-Off Delay Time	$t_{D(off)}$			16		ns
Fall Time	t_f			18		ns
Internal Drain inductance	L_D	Between lead,6mm (0.25in.) from package and centerof die contact		4		nH
Internal Source inductance	L_S			6		nH

Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			1.5	A
Pulsed Source Current (Body Diode) [a]	I_{SM}				12	A
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=1.5A,V_{GS}=0V [b]			2.5	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=5.6A		110	130	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs [b]		0.5	0.65	μC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

a. Repetitive rating; pulse width limited by maximum junction temperature

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

7.1Typical Characterisitics

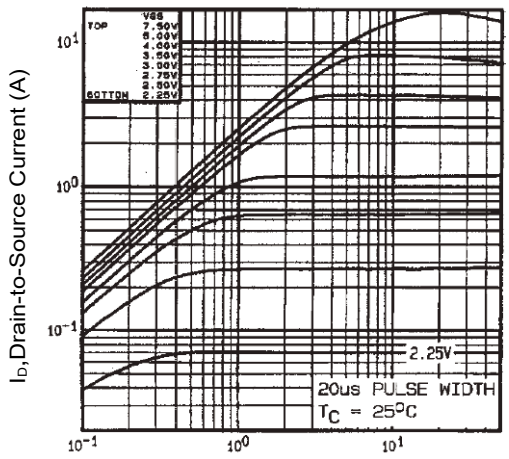


Fig 1. Typical Output Characteristics

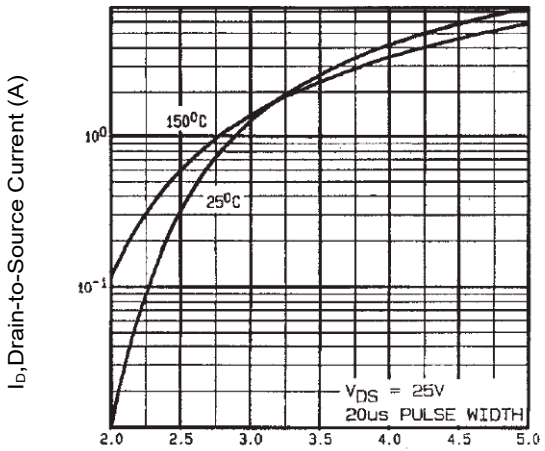


Fig 2. Typical Output Characteristics

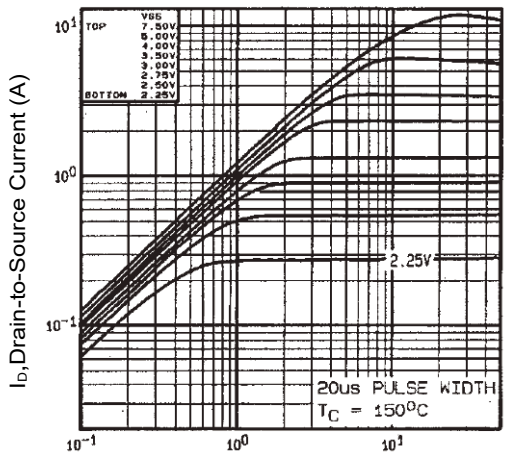


Fig 3. Typical Transfer Characteristics

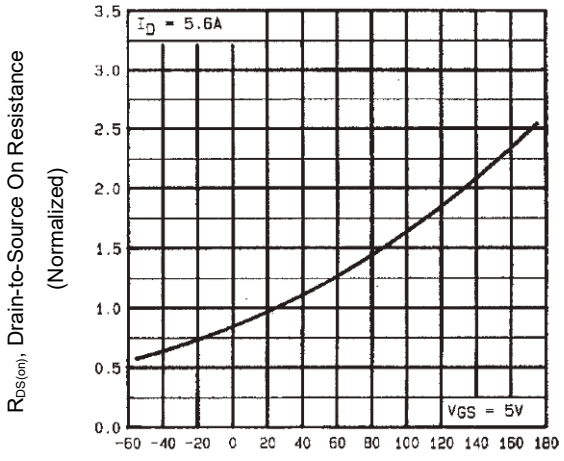
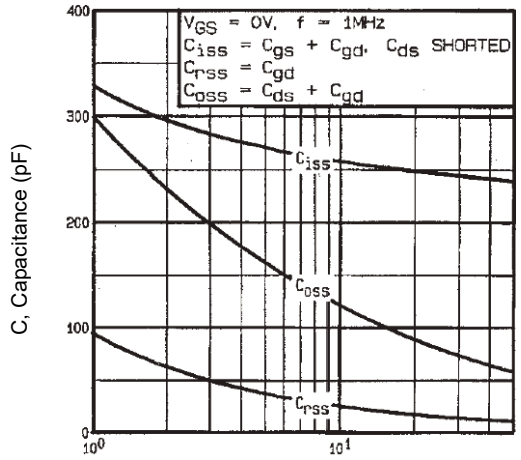


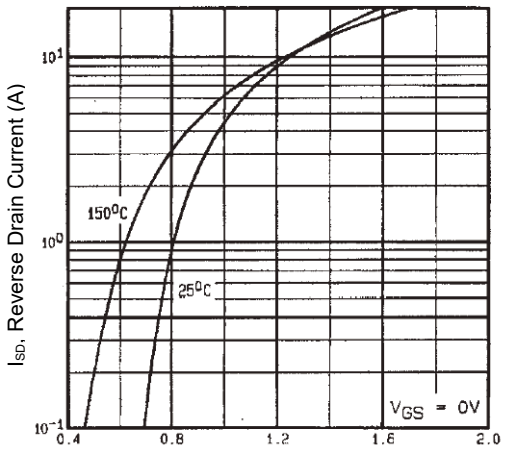
Fig 4. Nomalized On-ResistanceVs. Temperature

7.2Typical Characterisitics



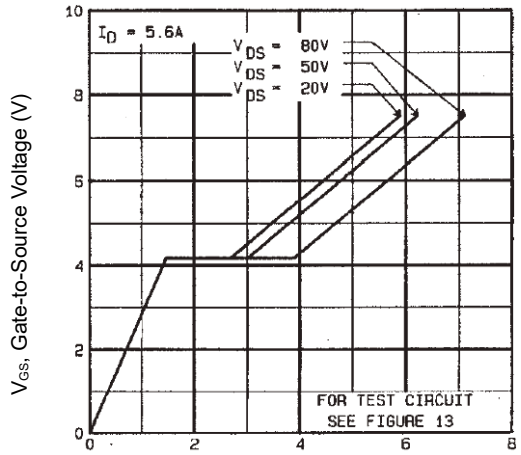
V_{DS}, Drain to Source Voltage (V)

Fig 5. Capacitance vs V_{DS}



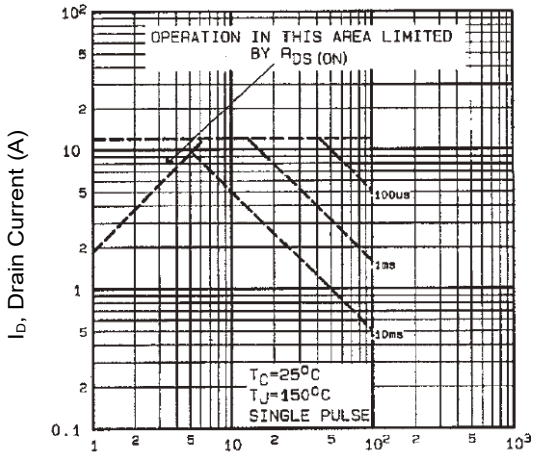
V_{SD}, Source-to-Drain Voltage (V)

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



Q_G, Total Gate Charge (nC)

Fig 7. Typical Source-Drain Diode Forward Voltage



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

Fig 8. Maximum Safe Operating Area

7.3Typical Characterisitics

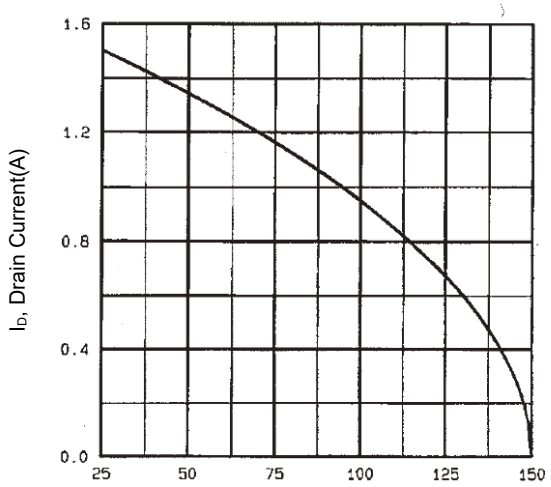


Fig 9. Maximum Drain Current vs. Ambient Temperature

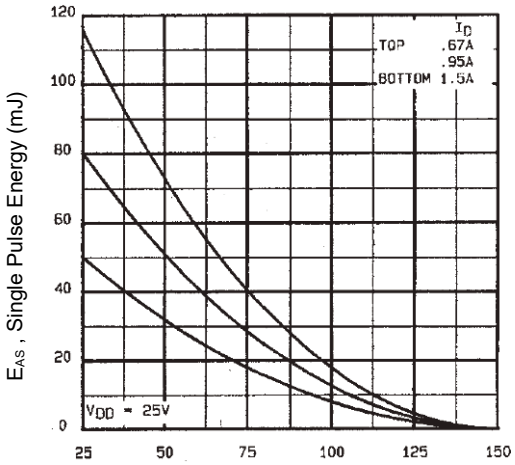


Fig 10. Maximum Avalanche Energy vs. Drain Current

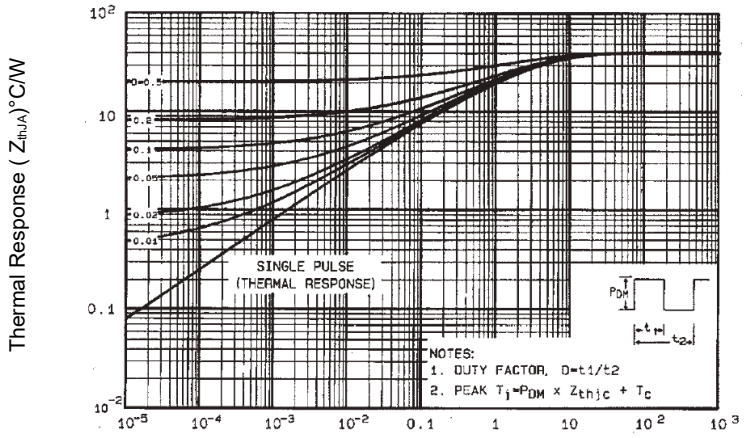


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

7.4Typical Characterisitics

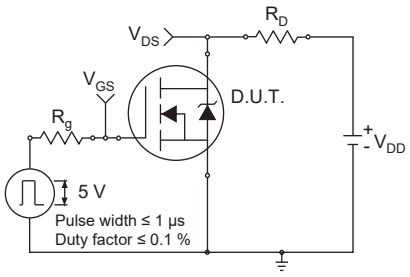


Figure 12a: Switching Time Test Circuit

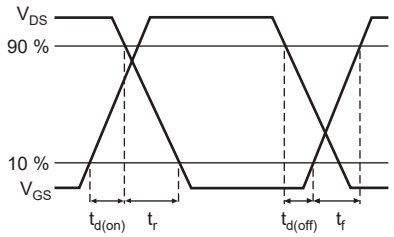


Figure 12b: Switching Time Waveforms

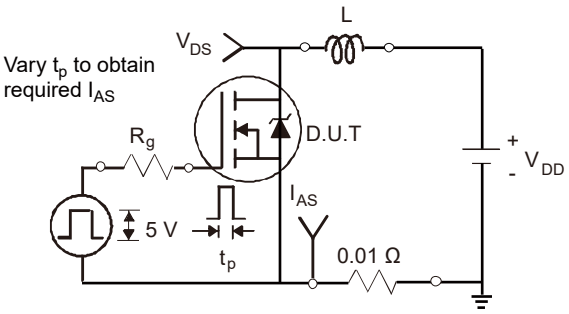


Figure 13a: Unclamped Inductive Test Circuit

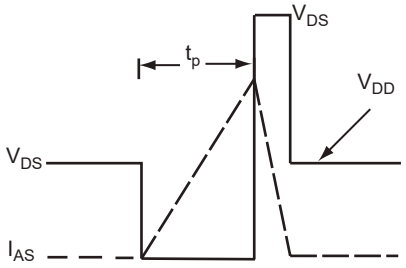


Figure 13b: Unclamped Inductive Waveforms

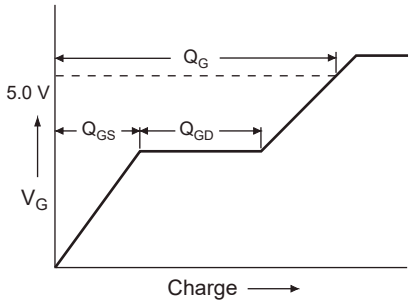


Figure 14a: Basic Gate Charge Waveform

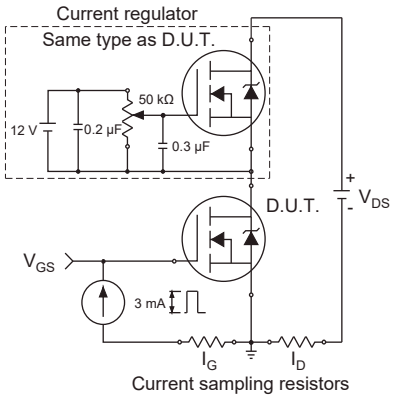
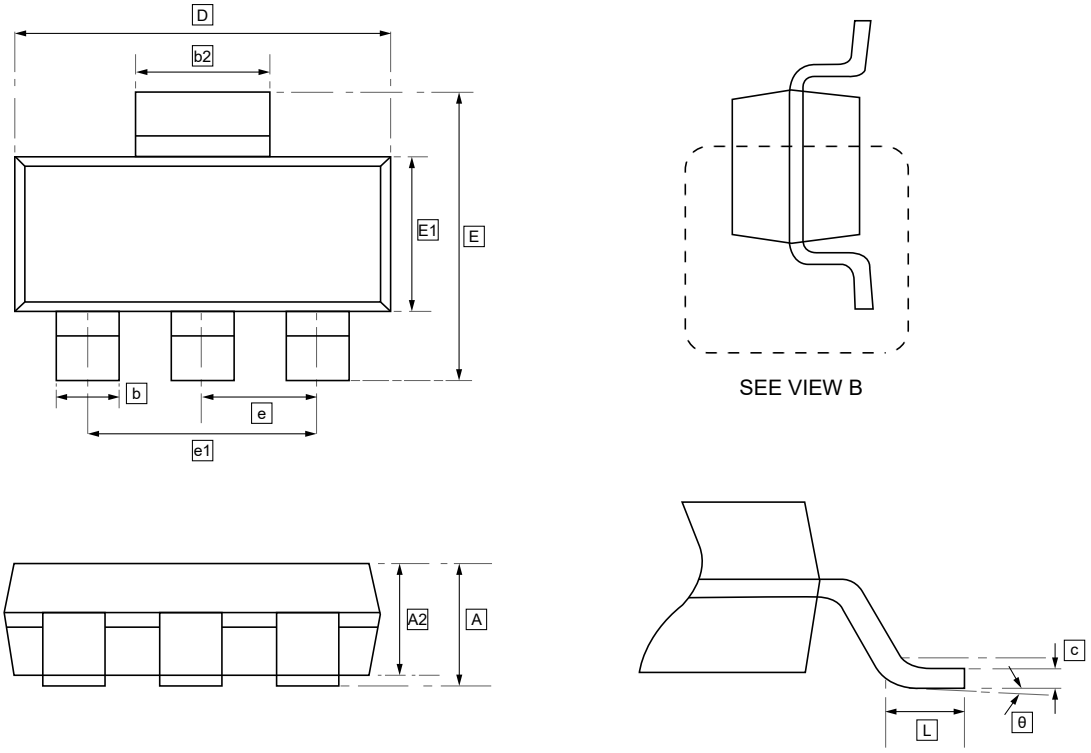


Figure 14b: Gate Charge Test Circuit

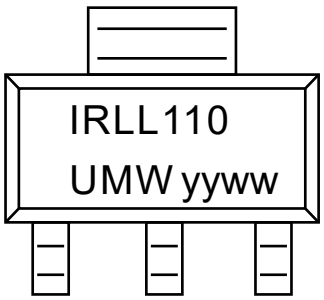
8.SOT-223 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	b2	c	D	E	E1	e	e1	L	θ
Min	1.50	0.02	1.50	0.66	2.90	0.23	6.30	6.70	3.30	2.30	4.60	0.90	0°
Max	1.80	0.10	1.70	0.84	3.10	0.33	6.70	7.30	3.70	BSC	BSC	1.10	8°

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRLL110TR	SOT-223	2500	Tape and reel

10.Disclaimer

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