UMW SSM3J332R

-30V P-Channel MOSFET

1.Features

- $V_{DS(V)}$=-30V
- $R_{DS(ON)}$<50mΩ(V_{GS}=-10V)
- $R_{DS(ON)}$<63mΩ(V_{GS}=-4.5V)

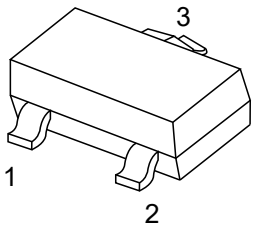
2.Applications

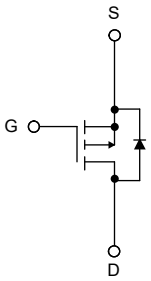
- For Mobile Computing
- Load Switch
- Notebook Adaptor Switch
- DC/DC Converter

3.Pinning information

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

SOT-23





4.Maximum ratings (T_A=25°C unless otherwise noted)

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous DrainCurrent (T_J = 150 °C)	T_C=25°C	I_D	-5.6	A
	T_C=70°C		-5.1	
	T_A=25°C		-5.4[b,c]	
	T_A=70°C		-4.3[b,c]	
Pulsed Drain Current (t =100μs)		I_{DM}	-18	
Continuous Source-Drain Diode Current	T_C=25°C	I_S	-2.1	
	T_A=25°C		-1[b,c]	

Maximum Power Dissipation	T_C=25°C	P_D	2.5	W
	T_C=70°C		1.6	
	T_A=25°C		1.25[b,c]	
	T_A=70°C		0.8[b,c]	
Junction and Storage Temperature Range		T_J,T_{STG}	-55 to 150	°C

5.Thermal resistance rating

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [b,d]	t ≤5s	R_{thJA}	75	100	°C/W
Maximum Junction-to-Foot (Drain)	Steady-State	R_{thJF}	40	50	°C/W

Notes:

a. Based on T_C=25 °C.

b. Surface Mounted on 1" x 1" FR4 board.

c. t = 5 s.

d. Maximum under Steady State conditions is 166 °C/W.

6.Specifications(T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{DS}=0V, I_D=-250μA	-30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D=-250μA		-19		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			4		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.5		-2	V
Gate-Source Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V, V_{GS}=0V			-1	μA
		V_{DS}=-30V, V_{GS}=0V,T_J=55°C			-5	
On-State Drain Current[a]	$I_{D(ON)}$	V_{DS}≤-5V, V_{GS}=-10V	-2.5			A
Drain-Source On-State Resistance[a]	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4.4A		46	50	mΩ
		V_{GS}=-4.5V, I_D=-3.6A		50	63	
Forward Transconductance[a]	g_{FS}	V_{DS}=-15V, I_D=-3.4A		18		S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, f=1MHz		1295		pF
Output Capacitanc	C_{oss}			150		
Reverse Transfer Capacitance	C_{rss}			130		
Total Gate Charge	Q_g	V_{DS}=-15V, V_{GS}=-10V		24	36	nC
		I_D=-5.4A		11.4	17	
Gate Source Charge	Q_{gs}	V_{DS}=-15V, V_{GS}=-4.5V		3.4		
Gate Drain Charge	Q_{gd}	I_D=-5.4A		3.8		
Gate Resistance	R_g	f=1MHz	1.5	7.7	15.4	Ω
Turn-On DelayTime	$t_{D(on)}$	V_{DD} =-15V, R_L=3.5Ω		13	20	ns
Rise Time	t_r	I_D≅-4.3A, V_{GEN}=-10V		4	8	
Turn-Off DelayTime	$t_{D(off)}$	R_g=1Ω		38	57	
Fall Time	t_f			6	12	

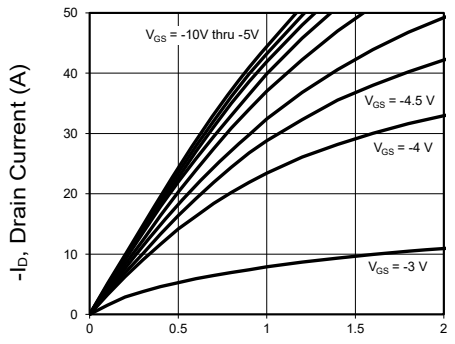
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=-15V, R_L=3.5Ω I_D≌-4.3V,V_{GEN}=-4.5V R_g=1Ω		28	42	ns
Rise Time	t_r			16	24	ns
Turn-Off Delay Time	$t_{D(off)}$			30	45	ns
Fall Time	t_f			10	20	ns
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C=25°C			-2.1	A
Pulse Diode Forward Current [a]	I_{SM}				-80	A
Body Diode Voltage	V_{SD}	I_S=-4.3A, V_{GS}=0V		-0.8	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=-4.3A, dI/dt=100A/μs T_J=25°C		15	23	ns
Body Diode Reverse Recovery Charge	Q_{rr}			7	14	nC
Reverse Recovery Fall Time	t_a			8		ns
Reverse Recovery Rise Time	t_b			7		ns

Notes:

a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.

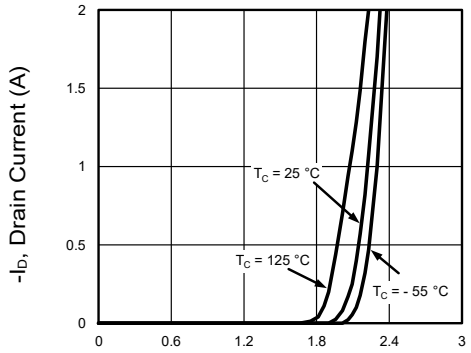
b. Guaranteed by design, not subject to production testing.

7.1Typical Characterisitics



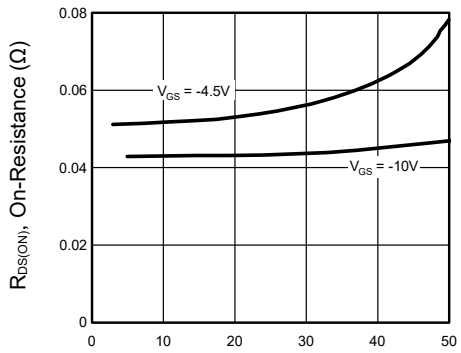
-V_{DS}, Drain-to-Source Voltage (V)

Figure 1: Output Characteristics



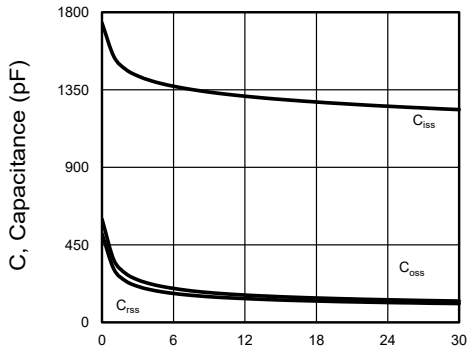
-V_{GS}, Gate-to-Source Voltage (V)

Figure 2: Transfer Characteristics



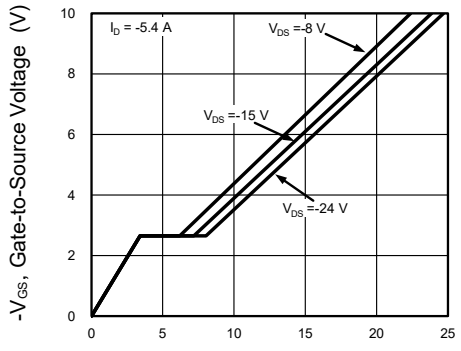
-I_D, Drain Current (A)

Figure 3: On-Resistance vs. Drain Current and Gate Voltage



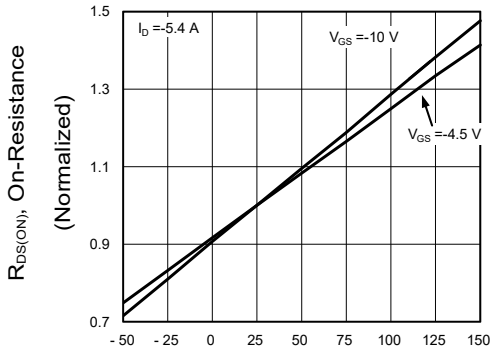
-V_{DS}, Drain-to-Source Voltage (V)

Figure 4: Capacitance



Q_g, Total Gate Charge (nC)

Figure 5: Gate Charge



T_J, Junction Temperature (°C)

Figure 6: On-Resistance vs. Junction Temperature

7.2Typical Characterisitics

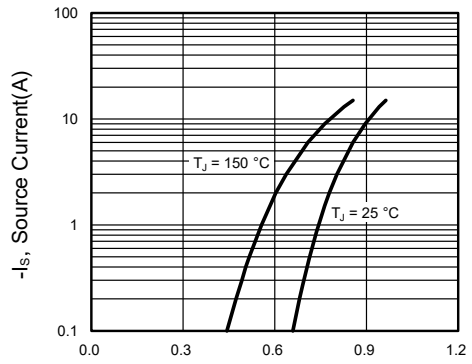


Figure 7: Source-Drain Diode Forward Voltage

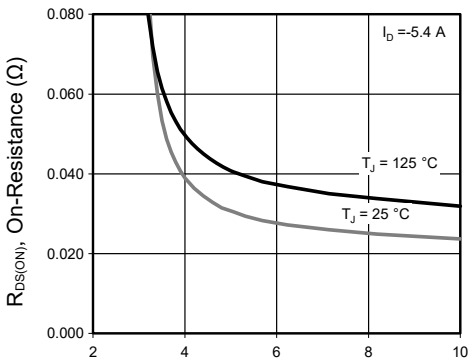


Figure 8: On-Resistance vs. Gate-to-Source Voltage

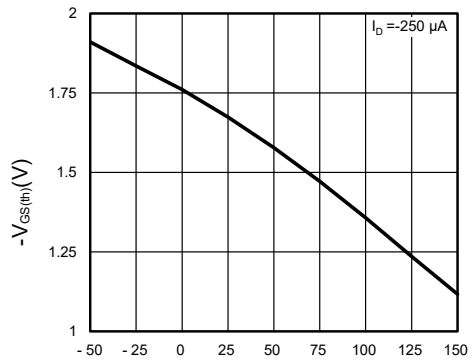


Figure 9: Threshold Voltage

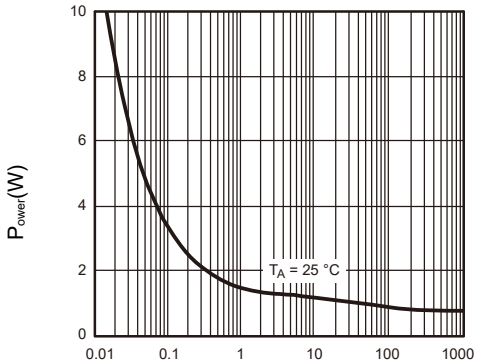


Figure 10: Single Pulse Power, Junction-to-Ambient

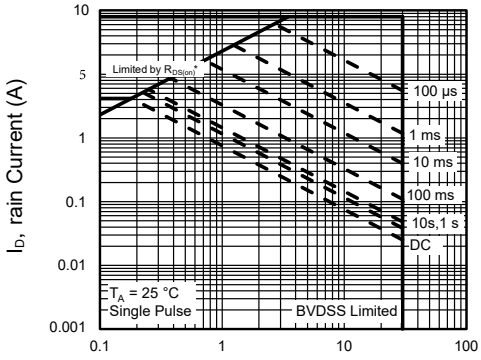


Figure 11: Safe Operating Area, Junction-to-Ambient

7.3Typical Characterisitics

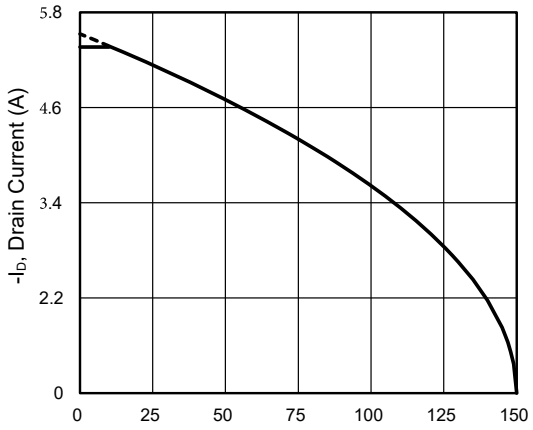


Figure 12: Current Derating*

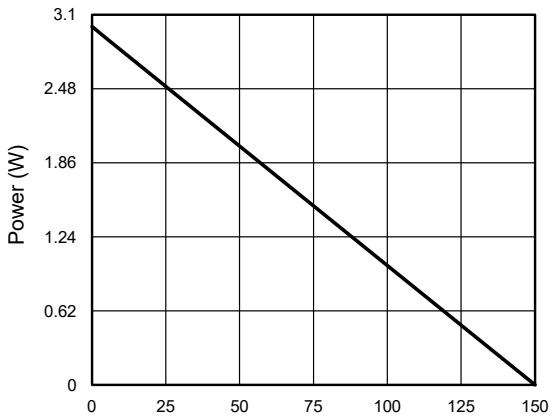


Figure 13: Power Derating, Junction-to-Case

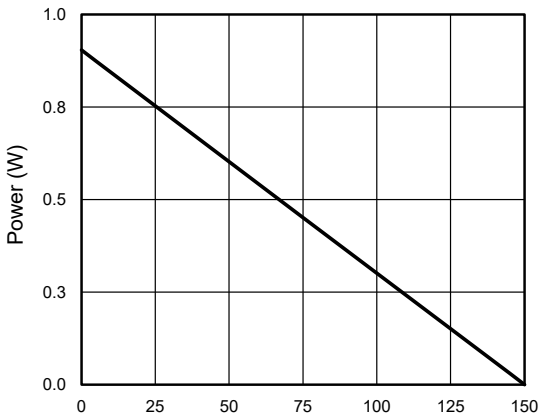


Figure 14: Power Derating, Junction-to-Ambient

* The power dissipation P_D is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upperdissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

7.4Typical Characterisitics

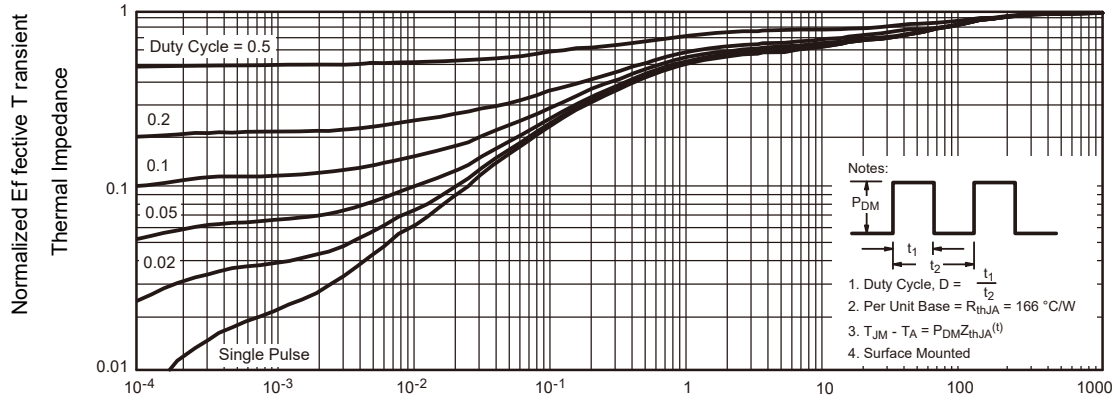


Figure 15: Normalized Thermal Transient Impedance, Junction-to-Ambient

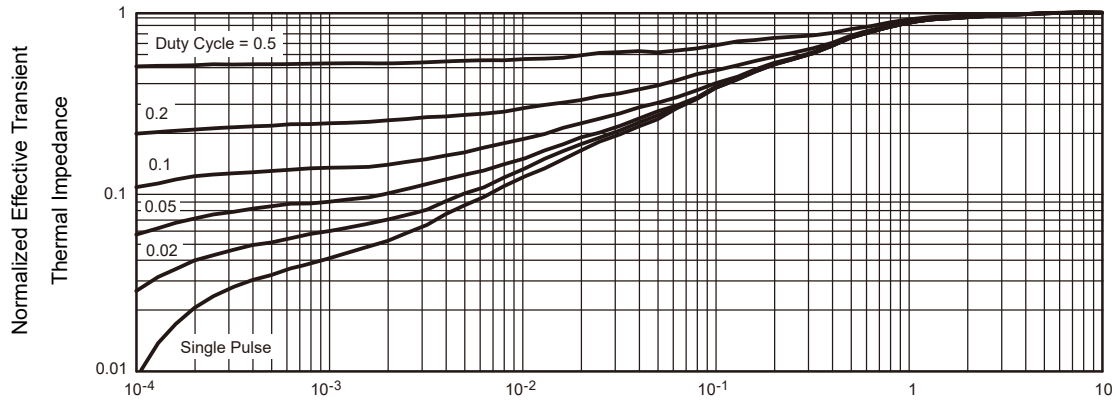
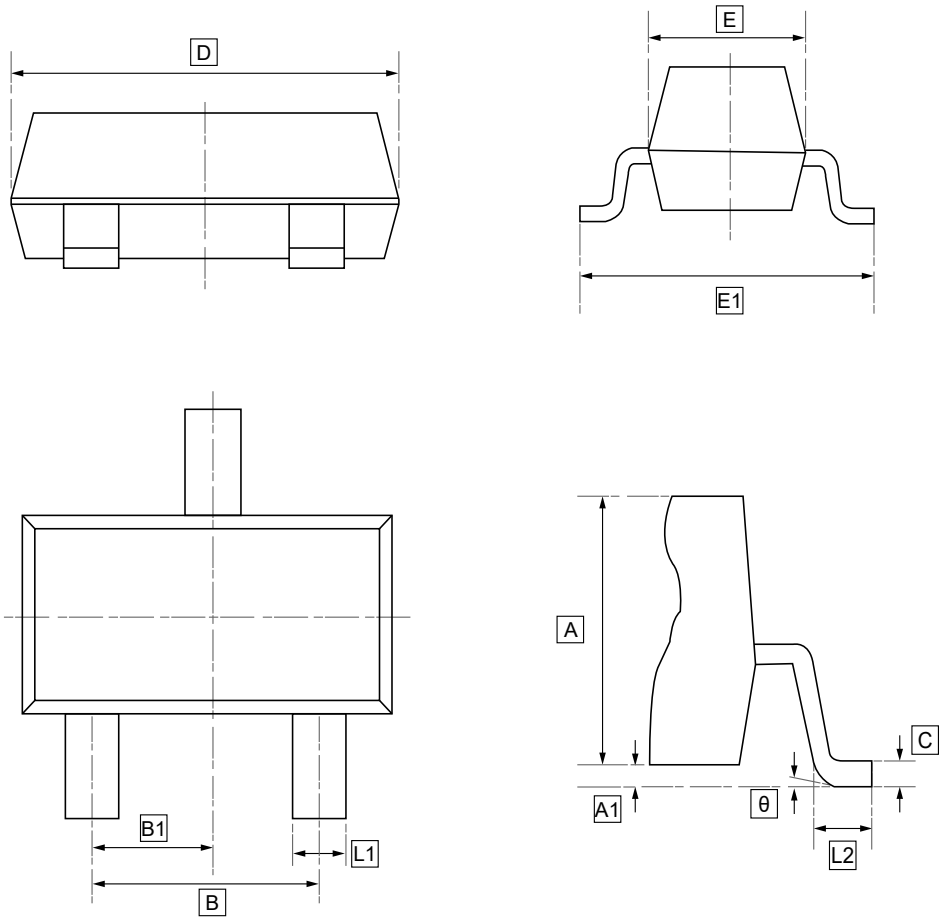


Figure 16: Normalized Thermal Transient Impedance, Junction-to-Foot

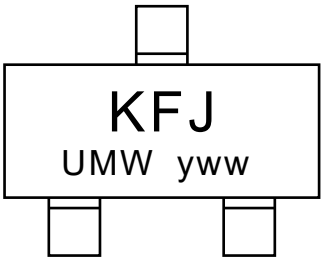
8.SOT-23 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	L1	L2	C	D	E	E1	B	B1	θ
Min	1.050	0.000	0.300	0.350	0.100	2.820	1.500	2.700	1.800	0.950	0°
Max	1.150	0.100	0.500	0.550	0.200	3.020	1.700	2.900	2.000	TYP	8°

9.Ordering information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW SSM3J332R	SOT-23	3000	Tape and reel

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