UMW MGSF1N03L

30V N-Channel MOSFET

1.Description

These miniature surface mount MOSFETs low $R_{DS(ON)}$ assure minimal power loss and conserve energy, making these devices ideal for use in space sensitive power management circuitry.

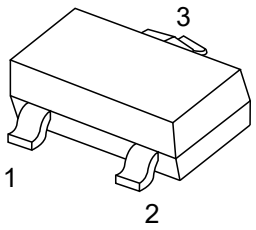
2.1Features

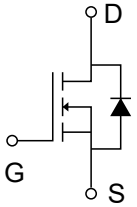
- $V_{DS\ (V)}$=30V
- I_D=2.1A
- $R_{DS(ON)}$<0.08Ω(V_{GS}=10V)
- $R_{DS(ON)}$<0.125Ω(V_{GS}=4.5V)

3.Pinning information

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

SOT-23





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

Parameter			Symbol	Value	Units
Drain − to − Source Voltage			V_{DS}	30	V
Gate − to − Source Voltage			V_{GS}	±20	
Continuous Drain Current $R_{\theta JL}$	Steady State	T_A=25°C	I_D	2.1	A
		T_A=85°C		1.5	
Power Dissipation $R_{\theta JL}$	Steady State	T_A=25°C	P_D	0.69	W
Continuous Drain Current (Note 1)	Steady State	T_A=25°C	I_D	1.6	A
		T_A=85°C		1.2	
Power Dissipation (Note 1)		T_A=25°C	P_D	0.42	W
Pulsed Drain Current	t_p=10μs		I_{DM}	6	A
ESD Capability (Note 3)	C=100pF, R_S=1500Ω		ESD	125	V
Operating Junction and Storage Temperature			T_J,T_{STG}	-55 to 150	°C
Source Current (Body Diode)			I_S	2.1	A
Lead Temperature for Soldering Purposes (1/8” from case for 10 sec)			T_L	260	°C

5.Thermal Resistance Rating

Junction− to −Foot − Steady State	$R_{\theta JL}$	180	°C/W
Junction− to −Ambient − Steady State (Note 1)	$R_{\theta JA}$	300	°C/W
Junction− to −Ambient − t<10s (Note 1)	$R_{\theta JA}$	250	°C/W
Junction− to −Ambient − Steady State (Note 2)	$R_{\theta JA}$	400	°C/W

1. Surface−mounted on FR4 board using 650 mm ^{2}, 1 oz. Cu pad size.
2. Surface−mounted on FR4 board using 50 mm ^{2}, 1 oz. Cu pad size.
3. ESD Rating Information: HBM Class 0.

6.Electrical Characteristics T_A=25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=10μA, V_{GS}=0V	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
		V_{DS}=30V, V_{GS}=0V,T_J=125°C			10	
Gate−Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1	1.7	2.4	V
Static Drain−to−Source On−Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=1.2A		0.08	0.1	Ω
		V_{GS}=4.5V, I_D=1A		0.125	0.145	
Input Capacitance	C_{iss}	V_{DS}=5V		140		pF
Output Capacitance	C_{oss}			100		
Transfer Capacitance	C_{rss}			40		
Turn−On Delay Time	$t_{D(on)}$	I_D=1A		2.5		ns
Rise Time	t_r	R_L=50Ω		1		
Turn−Off Delay Time	$t_{D(off)}$	V_{DD}=15V		16		
Fall Time	t_f			8		
Gate Charge (See Figure 6)	Q_T			6000		pC
Continuous Current	I_S				0.6	A
Pulsed Current	I_{SM}				0.75	A
Forward Voltage (Note 5)	V_{SD}			0.8		V

4. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

5. Switching characteristics are independent of operating junction temperature.

7.1Typical Characterisitics

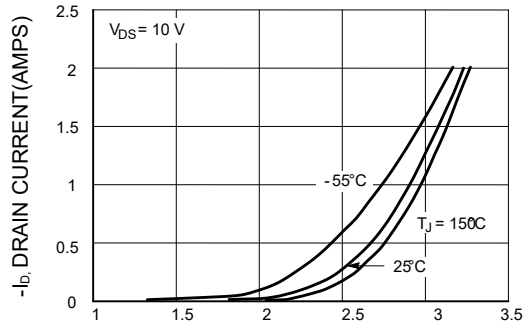


Figure 1: On-Region Characteristics.

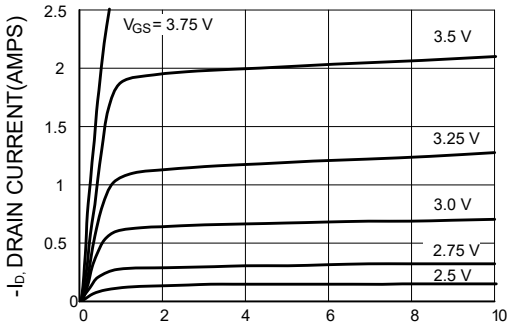


Figure 2: On−Region Characteristics

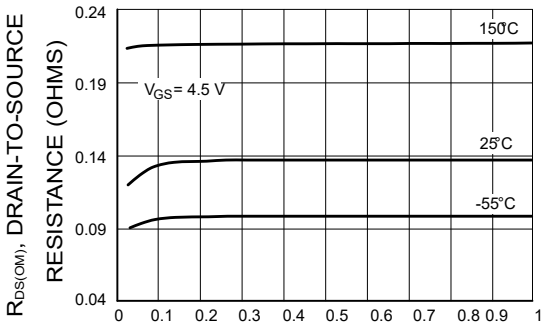


Figure 3: On−Resistance versus Drain Current

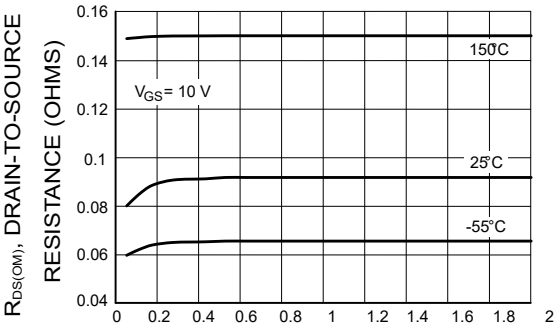


Figure 4: On−Resistance versus Drain Current



Figure 5: On−Resistance Variation with Temperature

7.2Typical Characterisitics

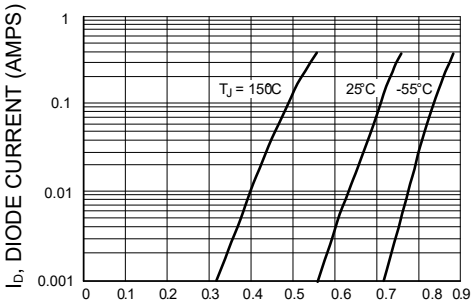


Figure 6: Body Diode Forward Voltage

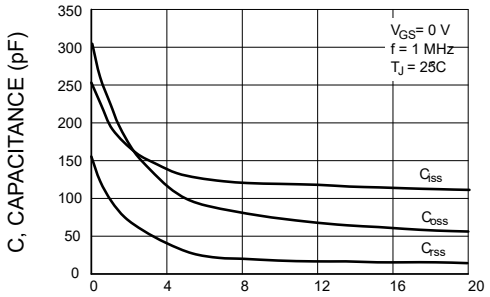


Figure 7: Capacitance

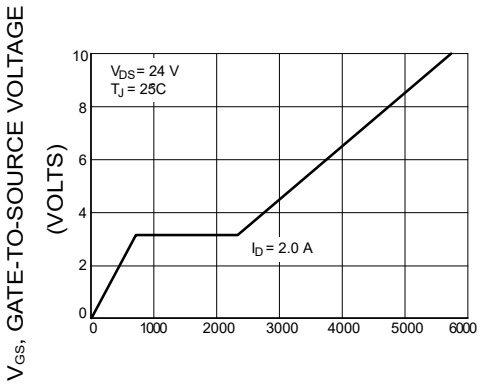


Figure 8: Gate Charge

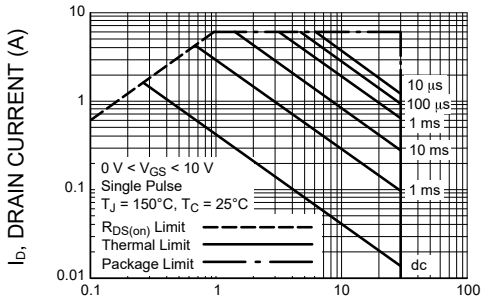


Figure 9: Maximum Rated Forward Biased Safe Operating Area

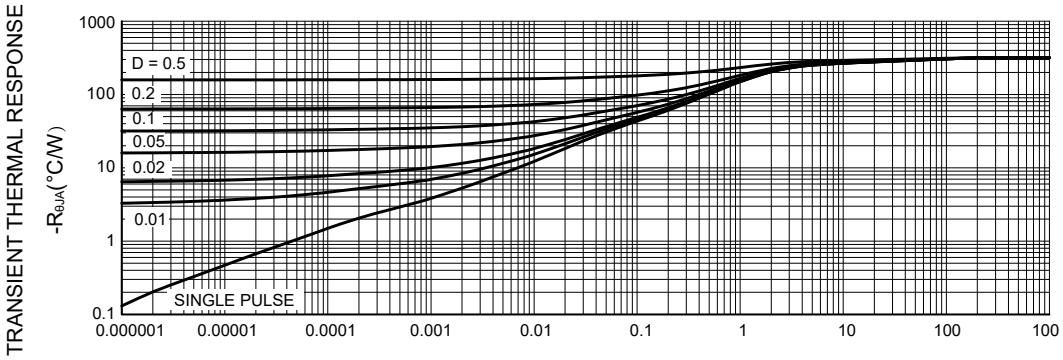
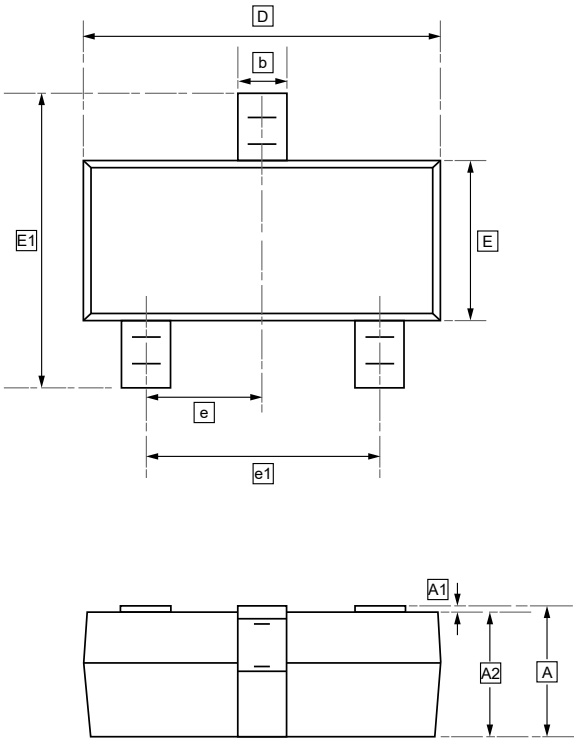


Figure 10. Thermal Response

8.SOT-23 Package Outline Dimensions

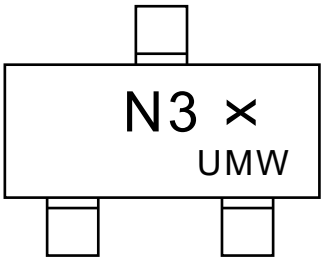


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	C	D	E	E1	e	e1	L	L1
Min	0.90	0.00	0.90	0.30	0.08	2.80	1.20	2.25	0.95	1.80	0.55	0.30
Max	1.15	0.10	1.05	0.50	0.15	3.00	1.40	2.55	TYP.	2.00	REF	0.50

Symbol	F	θ	θ1
Min	0.25	0°	2°
Max		8°	12°

9.Ordering information



x: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW MGSF1N03L	SOT-23	3000	Tape and reel

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