

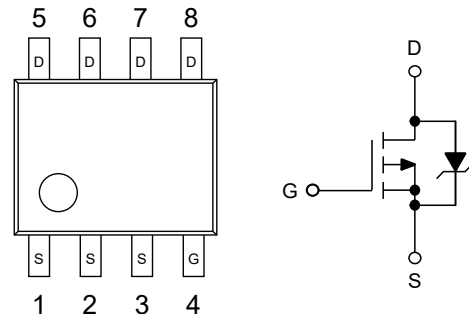
1.Features

- $V_{DS(V)} = -30V$
- $I_D = -11.4A$
- $R_{DS(ON)} < 12m\Omega (V_{GS} = -10V)$
- $R_{DS(ON)} < 19m\Omega (V_{GS} = -4.5V)$
- Low $R_{DS(ON)}$ to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Optimized Gate Charge to Minimize Switching Losses
- SOP-8 Surface Mount Package Saves Board Space

2.Pinning information

Pin	Symbol	Description
4	G	GATE
1,2,3	S	SOURCE
5,6,7,8	D	DRAIN

SOP-8



3.Absolute Maximum Ratings $T_J = 25^\circ C$ unless otherwise noted

Parameter			Symbol	Maximum	Units
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	± 20	
Continuous Drain Current $R_{\theta JA}$ (Note 1)	Steady State	$T_A = 25^\circ C$	I_D	-8.9	A
		$T_A = 70^\circ C$		-7.1	
Power Dissipation $R_{\theta JA}$ (Note 1)	Steady State	$T_A = 25^\circ C$	P_D	1.52	W
Continuous Drain Current $R_{\theta JA}$ (Note 2)	Steady State	$T_A = 25^\circ C$	I_D	-6.6	A
		$T_A = 70^\circ C$		-5.3	
Power Dissipation $R_{\theta JA}$ (Note 2)	Steady State	$T_A = 25^\circ C$	P_D	0.84	W
Continuous Drain Current $R_{\theta JA}$ $t \leq 10$ s (Note 1)	Steady State	$T_A = 25^\circ C$	I_D	-11.4	A
		$T_A = 70^\circ C$		-9.3	
Power Dissipation $R_{\theta JA}$, $t \leq 10$ s (Note 1)	Steady State	$T_A = 25^\circ C$	P_D	2.5	W
Pulsed Drain Current	Steady State	$T_A = 25^\circ C, T_P = 10\mu s$	I_{DM}	-46	A



Operating Junction and Storage Temperature	T_J, T_{STG}	-55 to 150	°C
Source Current (Body Diode)	I_S	-2.1	A
Single Pulse Drain-to-Source Avalanche Energy ($T_J=25^\circ\text{C}$, $V_{DD}=30\text{V}$, $V_{GS}=10\text{V}$, $I_L=20\text{A}$, $L=1\text{mH}$, $R_G=25\ \Omega$)	E_{AS}	200	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	T_L	260	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Surface-mounted on FR4 board using 1 inch sq pad size, 1 oz Cu.
2. Surface-mounted on FR4 board using the minimum recommended pad size.

4. Thermal resistance rating

Parameter	Symbol	Value	Units
Junction-to-Ambient – Steady State (Note 3)	R_{thJA}	82	°C/W
Junction-to-Ambient – $t \leq 10\text{s}$ (Note 3)		50	°C/W
Junction-to-Foot (Drain)	R_{thJF}	20	°C/W
Junction-to-Ambient – Steady State (Note 4)	R_{thJA}	148	°C/W

3. Surface-mounted on FR4 board using 1 inch sq pad size, 1 oz Cu.
4. Surface-mounted on FR4 board using the minimum recommended pad size.



5. Electrical Characteristics $T_J=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			29		mV/ $^{\circ}\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0\text{V}$, $T_J=25^{\circ}\text{C}$			-1	μA
		$V_{DS}=-24\text{V}$, $T_J=85^{\circ}\text{C}$			-5	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 100	nA
ON CHARACTERISTICS (Note 5)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}$, $I_D=-250\mu\text{A}$	-1.5		-2.5	V
Negative Threshold Temperature Coefficient	$V_{GS(th)}/T_J$			6		mV/ $^{\circ}\text{C}$
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS}=-10\text{V}$, $I_D=-11.4\text{A}$		10	12	m Ω
		$V_{GS}=-4.5\text{V}$, $I_D=-9.1\text{A}$		15	19	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-1.5\text{V}$, $I_D=-11.4\text{A}$		30		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{iss}	$V_{DS}=-24\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$		3100		pF
Output Capacitance	C_{oss}			550		pF
Reverse Transfer Capacitance	C_{rss}			370		pF
Total Gate Charge	$Q_{g(TOT)}$	$V_{GS}=-4.5\text{V}$, $V_{DS}=-15\text{V}$ $I_D=-11.4\text{A}$		29		nC
Threshold Gate Charge	$Q_{g(TH)}$			3.3		nC
Gate-to-Source Charge	Q_{gs}			10		nC
Gate-to-Drain Charge	Q_{gd}			13		nC
Total Gate Charge	$Q_{g(TOT)}$	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $I_D=-11.4\text{A}$		55		nC
Gate Resistance	R_g			2	4	Ω



SWITCHING CHARACTERISTICS (Note 6)							
Turn-On Delay Time	t _{D(on)}	V _{GS} =-10V, V _{DS} =-15V I _D =-1A, R _g =6Ω			18		ns
Rise Time	t _r				13		ns
Turn-Off Delay Time	t _{D(off)}				64		ns
Fall Time	t _f				36		ns
DRAIN-SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V _{SD}	V _{GS} =0V	T _J =25°C		-0.73	-1	V
		I _S =-2.1A	T _J =125°C		0.54		ns
Reverse Recovery Time	t _{rr}	V _{GS} =0V, d _{IS} /d _t =100A/μs I _S =-2.1A			34		ns
Charge Time	t _a				18		ns
Discharge Time	t _b				16		ns
Reverse Recovery Charge	Q _{rr}				30		nC

5. Pulse Test: pulse width $\leq 300 \mu s$, duty cycle $\leq 2\%$.

6. Switching characteristics are independent of operating junction temperatures.



6.1 Typical Characteristics

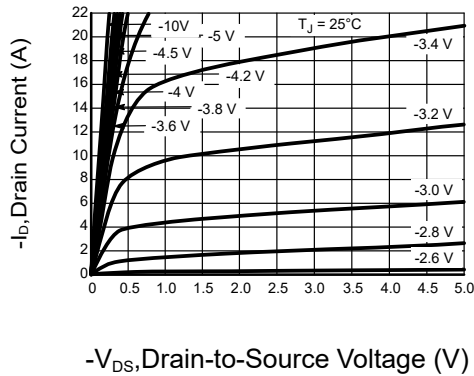


Figure 1: Output Characteristics

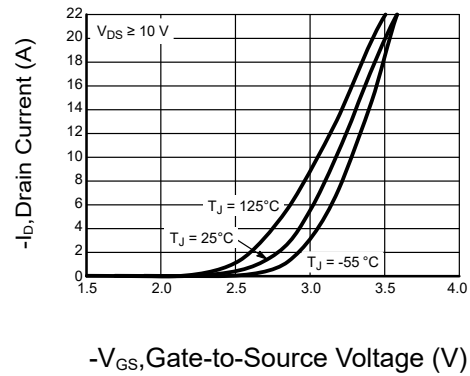


Figure 2: Transfer Characteristics

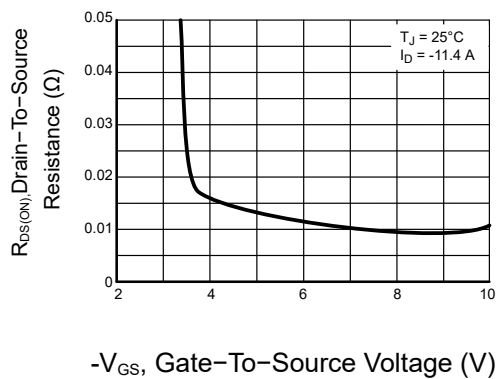


Figure 3: On-Resistance vs. Gate-to-Source Voltage

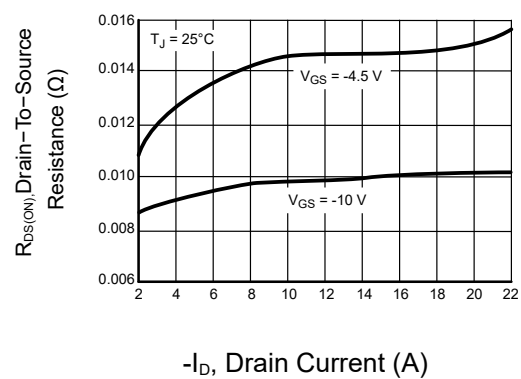


Figure 4: On-Resistance vs. Drain Current and Gate Voltage

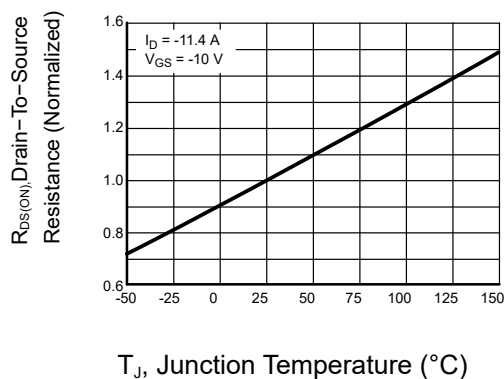


Figure 5: On-Resistance Variation with Temperature

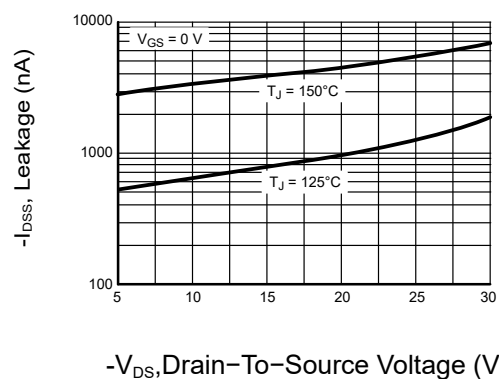
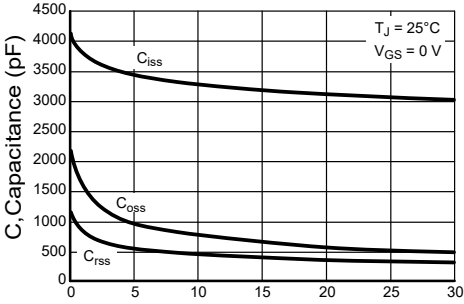
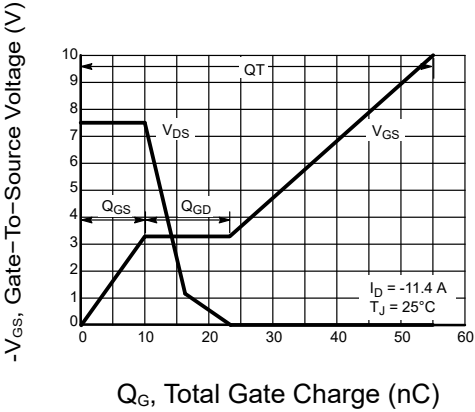
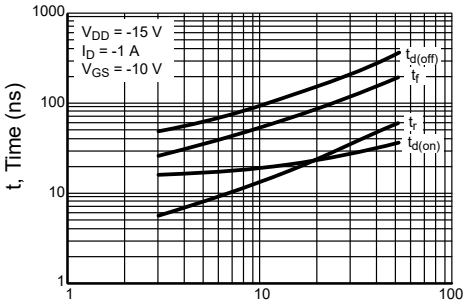
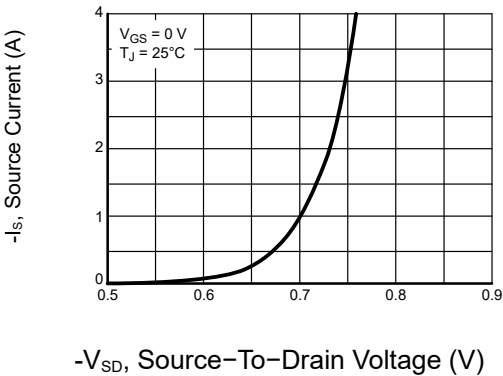
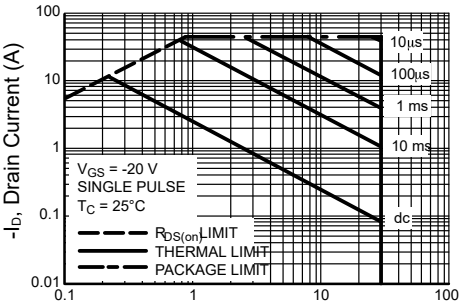
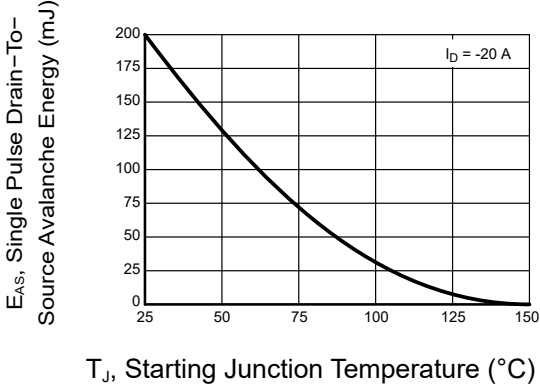


Figure 6: Drain-to-Source Leakage Current vs. Voltage

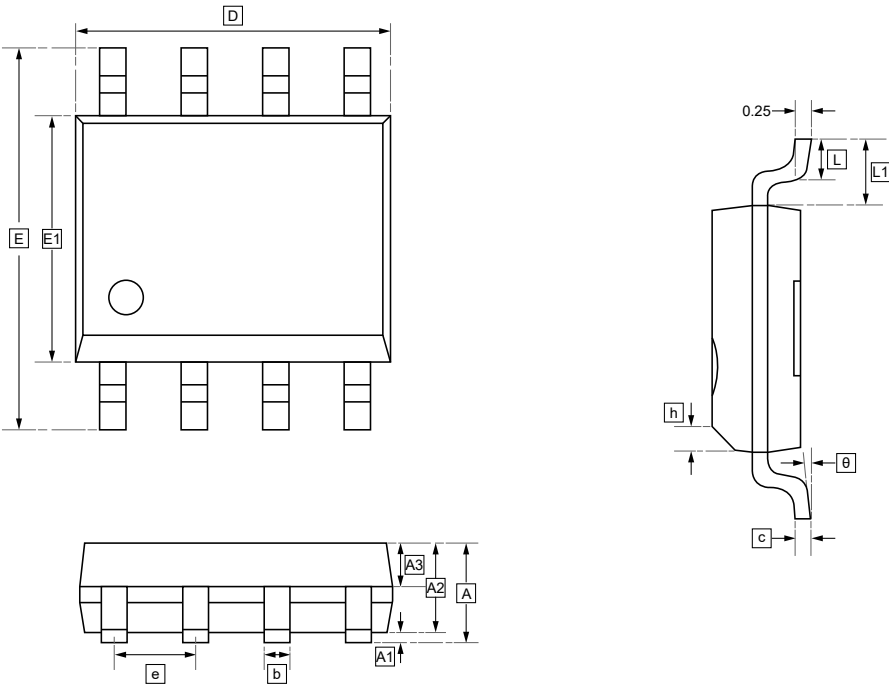


6.2Typical Characteristics

 C, Capacitance (pF) Drain-To-Source Voltage (V)	 -V_{GS}, Gate-To-Source Voltage (V) Q_G, Total Gate Charge (nC)
Figure 7: Capacitance Variation	Figure 8: Gate-To-Source and Drain-To-Source Voltage vs. Total Charge
 t, Time (ns) R_G, Gate Resistance (Ω)	 -I_S, Source Current (A) -V_{SD}, Source-To-Drain Voltage (V)
Figure 9: Resistive Switching Time Variation vs. Gate Resistance	Figure 10: Diode Forward Voltage vs. Current
 -I_D, Drain Current (A) -V_{DS}, Drain-To-Source Voltage (V)	 E_{AS}, Single Pulse Drain-To-Source Avalanche Energy (mJ) T_J, Starting Junction Temperature (°C)
Figure 11: Maximum Rated Forward Biased Safe Operating Area	Figure 12: Maximum Avalanche Energy vs. Starting Junction Temperature



7.SOP-8 Package Outline Dimensions



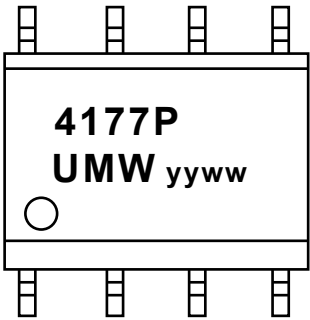
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.80	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.00	6.20	4.00	1.30	0.50	0.80

Symbol	L1	θ
Min	1.00	0°
Max	1.10	8°



8.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW NTMS4177PR	SOP-8	3000	Tape and reel



9.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.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.