UMW NTR4503NT1G

30V N-Channel MOSFET

1.Features

- $V_{(BR)DSS}$=30V
- I_D=2.5A
- $R_{DS(ON)}$<85mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<105mΩ(V_{GS}=4.5V)

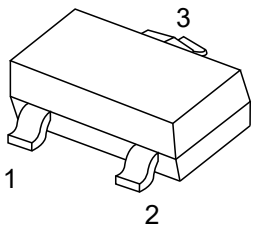
2.Applications

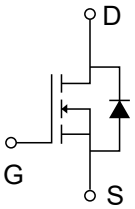
- DC-DC Conversion
- Load/Power Switch for Portables
- Load/Power Switch for Computing

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_{DSS}	30	V
Drain − to − Source Voltage			V_{GS}	±20	
Continuous Drain Current (Note 1)	Steady State	T_A=25°C	I_D	2	A
		T_A=85°C		1.5	
	t ≤10s	T_A=25°C		2.5	
Power Dissipation (Note 1)	Steady State	T_A=25°C	P_D	0.73	W
Continuous Drain Current (Note 2)	Steady State	T_A=25°C	I_D	1.5	A
		T_A=85°C		1.1	
Power Dissipation (Note 2)		T_A=25°C	P_D	0.42	W
Pulsed Drain Current	t_p=10μs		I_{DM}	10	A

Operating Junction and Storage Temperature	T_J, T_{STG}	-55 to 150	°C
Source Current (Body Diode)	I_S	2	A
Peak Source Current (Diode Forward)	I_{SM}	4	A
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	T_L	260	°C

5.Thermal Characteristics

Parameter	Symbol	Max	Units
Junction−to−Ambient − Steady State (Note 1)	$R_{\theta JA}$	170	°C/W
Junction−to−Ambient − t < 10 s (Note 1)	$R_{\theta JA}$	100	°C/W
Junction−to−Ambient − Steady State (Note 2)	$R_{\theta JA}$	300	°C/W

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Surface−mounted on FR4 board using 1 in sq pad size.
2. Surface−mounted on FR4 board using the minimum recommended pad size.

6.Electrical Characteristics T_J=25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	30	36		V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V,V_{DS}=24V			1	μA
		V_{GS}=0V,V_{DS}=24V,T_J=125°C			10	μA
Gate−to−Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1	1.75	3	V
Drain−to−Source On−Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2.5A		85	110	mΩ
		V_{GS}=4.5V, I_D=2A		105	140	
Forward Transconductance	g_{FS}	V_{DS}=4.5V, I_D=2.5A		5.3		S
CHARGES AND CAPACITANCES						
Input Capacitance	C_{iss}	V_{GS}=0V		135		pF
Output Capacitance	C_{oss}	f=1MHz		52		
Reverse Transfer Capacitance	C_{rss}	V_{DS}=15V		15		
Input Capacitance	C_{iss}	V_{GS}=0V		130	250	pF
Output Capacitance	C_{oss}	f=1MHz		42	75	
Reverse Transfer Capacitance	C_{rss}	V_{DS}=24V		13	25	
Total Gate Charge	$Q_{G(TOT)}$	V_{GS}=10V, V_{DS}=15V I_D=2.5A		3.6	7	nC
Threshold Gate Charge	$Q_{G(TH)}$			0.3		nC
Gate−to−Source Charge	Q_{gs}			0.6		nC
Gate−to−Drain Charge	Q_{gd}			0.7		nC
Total Gate Charge	$Q_{G(TOT)}$	V_{GS}=4.5V, V_{DS}=24V I_D=2.5A		1.9		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.3		nC
Gate−to−Source Charge	Q_{gs}			0.6		nC
Gate−to−Drain Charge	Q_{gd}			0.9		nC

SWITCHING CHARACTERISTICS, (Note 4)						
Turn-On Delay Time	$t_{D(on)}$	V_{GS}=10V, V_{DD}=15V I_D=1A,Rg=6Ω		5.8	12	ns
Rise Time	t_r			5.8	10	ns
Turn-Off Delay Time	$t_{D(off)}$			14	25	ns
Fall Time	t_f			1.6	5	ns
Turn−On Delay Time	$t_{D(on)}$	V_{GS}=10V, V_{DD}=24V I_D=2.5A,Rg=2.5Ω		4.8		ns
Rise Time	t_r			6.7		ns
Turn−Off Delay Time	$t_{D(off)}$			13.6		ns
Fall Time	t_f			1.8		ns
DRAIN−SOURCE DIODE CHARACTERISTICS						
Forward Diode Voltage	V_{SD}	V_{GS}=0V, I_S=2A		0.85	1.2	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V, I_S=2A d_{ISD}/d_t=100 A/μs		9.2		ns
Reverse Recovery Charge	Q_{rr}			4		nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

4. Switching characteristics are independent of operating junction temperatures.

7.1Typical Characterisitics

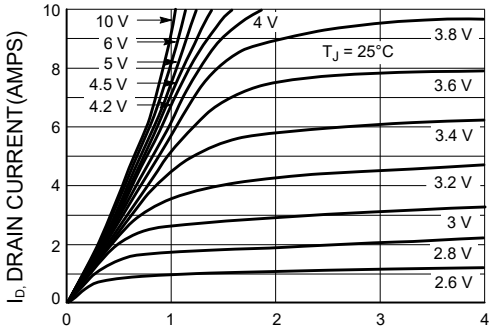


Fig 1: On-Region Characteristics

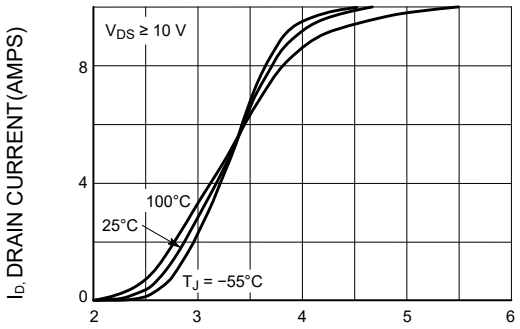


Figure 2: Transfer Characteristics

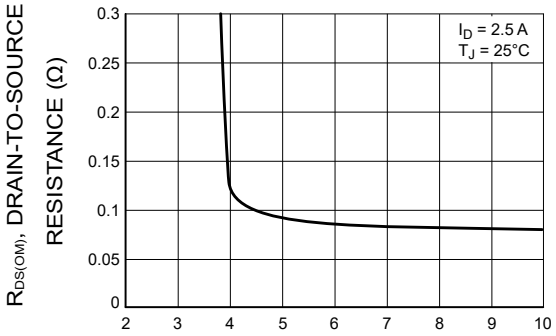


Figure 3: On-Resistance vs. Gate−to−SourceVoltage

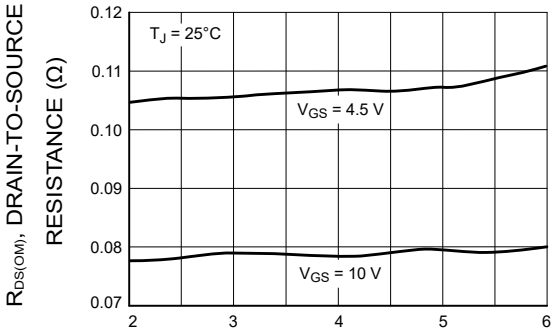


Figure 4: On−Resistance vs. Drain Current and Gate Voltage

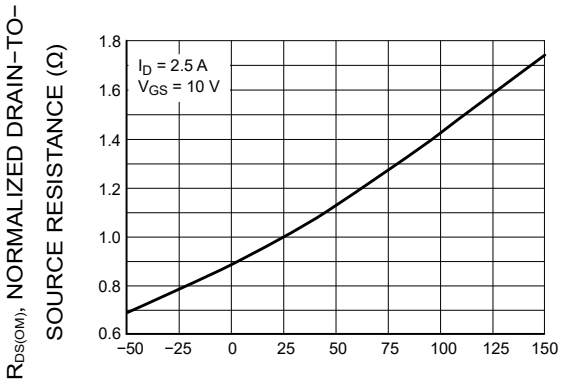


Figure 5: On-Resistance e Variation with Temperature

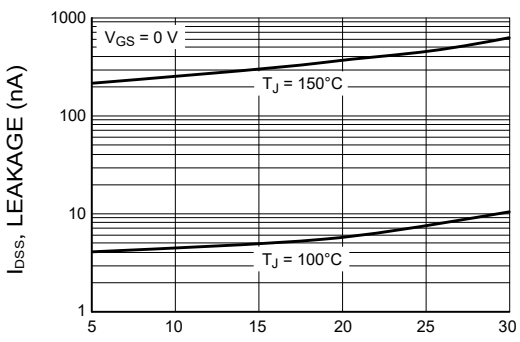


Figure 6: Drain−to−Source Leakage Current vs. Voltage

7.2Typical Characterisitics

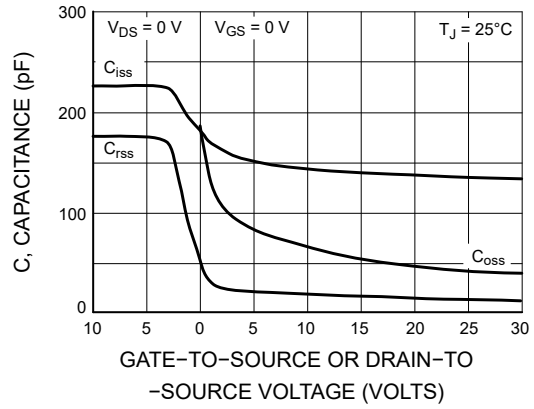


Fig 7: Capacitance Variation

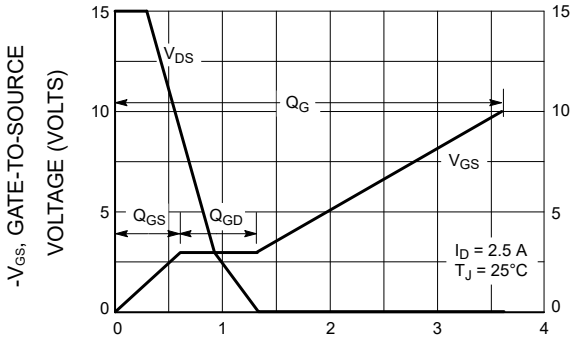


Figure 8: Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

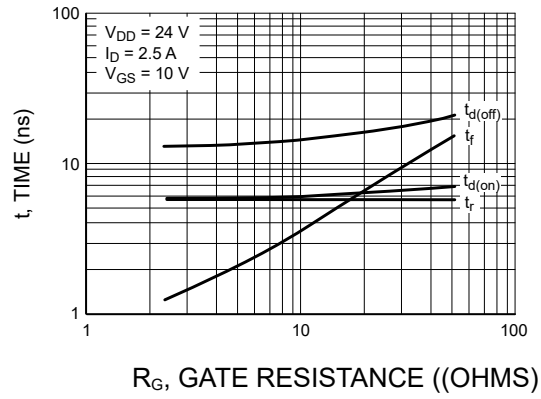


Figure 9: Resistive Switching Time Variation vs. Gate Resistance

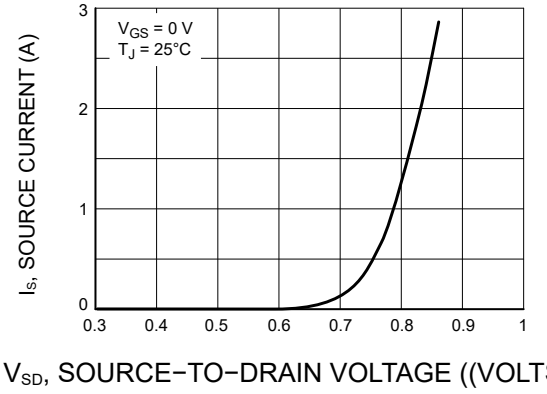
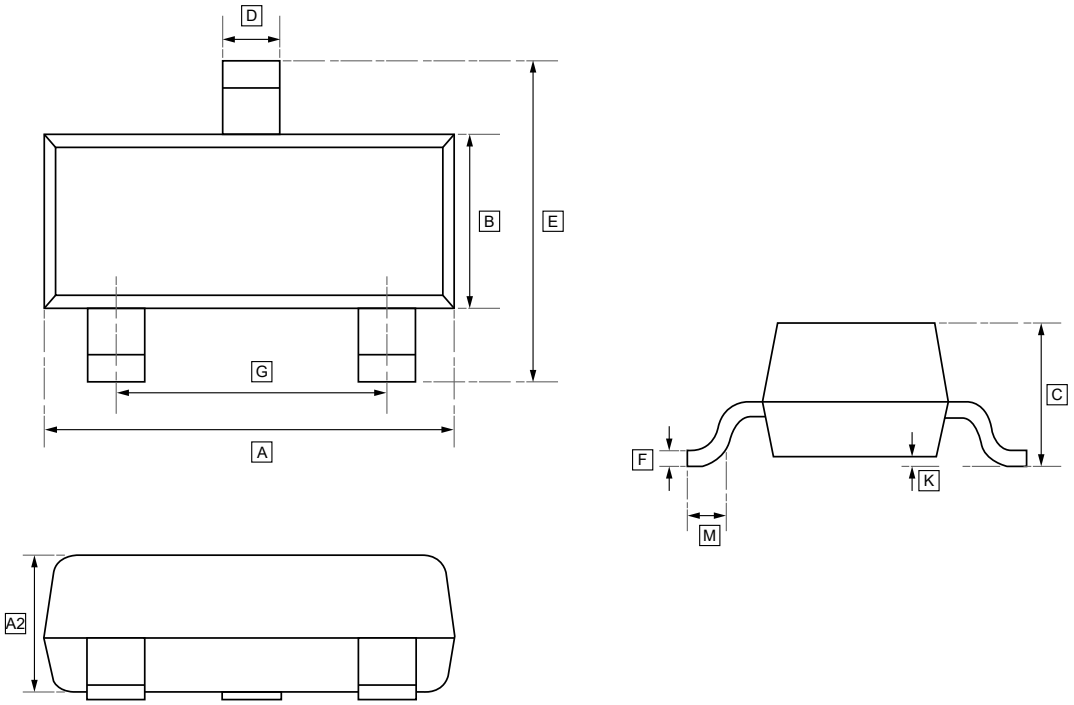


Figure 10: Diode Forward Voltage vs. Current

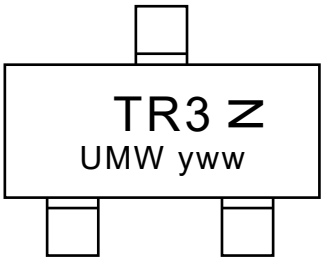
8.SOT-23 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	D	E	G	K	M	A2	F
Min	2.80	1.20	0.90	0.32	2.25	1.80	0.00	0.30	0.95	0.095
Max	3.04	1.40	1.10	0.55	2.55	2.00	0.10	-	1.05	0.115

9.Ordering Information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW NTR4503NT1G	SOT-23	3000	Tape and reel

10.Disclaimer

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