

1.Features

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

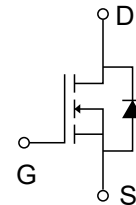
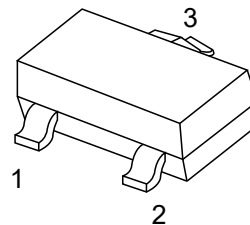
2.Applications

- 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 ($T_J=25^{\circ}C$ 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	$T_A=25^{\circ}C$	I_D	2	A
		$T_A=85^{\circ}C$		1.5	
	$t \leq 10s$	$T_A=25^{\circ}C$		2.5	
Power Dissipation (Note 1)	Steady State	$T_A=25^{\circ}C$	P_D	0.73	W
Continuous Drain Current (Note 2)	Steady State	$T_A=25^{\circ}C$	I_D	1.5	A
		$T_A=85^{\circ}C$		1.1	
Power Dissipation (Note 2)		$T_A=25^{\circ}C$	P_D	0.42	W
Pulsed Drain Current	$t_p=10\mu s$		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 $T_J=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	36		V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=24V$			1	μA
		$V_{GS}=0V, V_{DS}=24V, T_J=125^{\circ}\text{C}$			10	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.75	3	V
Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2.5A$		85	110	m Ω
		$V_{GS}=4.5V, I_D=2A$		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}	$f=1\text{MHz}$		52		
Reverse Transfer Capacitance	C_{rss}	$V_{DS}=15V$		15		
Input Capacitance	C_{iss}	$V_{GS}=0V$		130	250	pF
Output Capacitance	C_{oss}	$f=1\text{MHz}$		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	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=15V$ $I_D=1A, R_g=6\Omega$		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	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=24V$ $I_D=2.5A, R_g=2.5\Omega$		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}	$V_{GS}=0V, I_S=2A$ $d_{ISD}/d_t=100 A/\mu s$		9.2		ns
Reverse Recovery Charge	Q_{rr}			4		nC

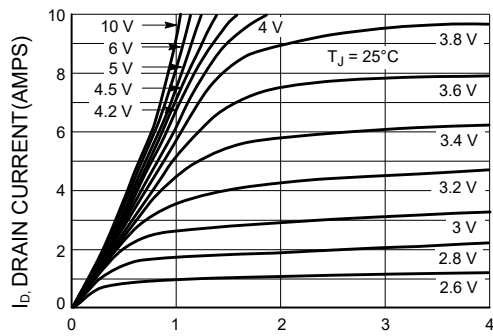
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

4. Switching characteristics are independent of operating junction temperatures.

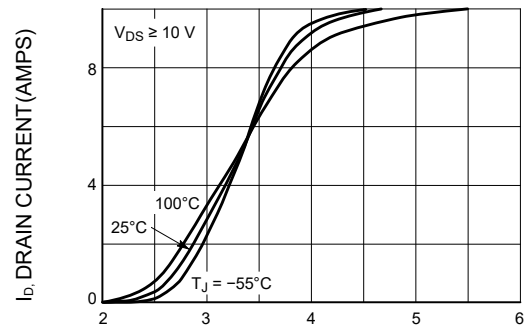


7.1 Typical Characteristics



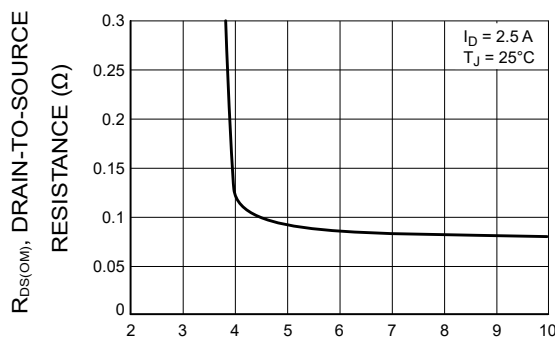
V_{DS}, DRAIN-TO-SOURCE VOLTAGE (V)

Fig 1: On-Region Characteristics



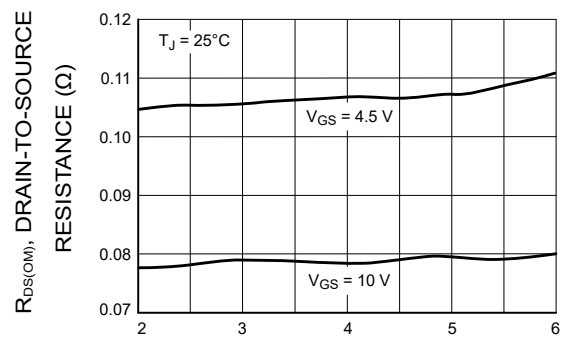
V_{GS}, GATE-TO-SOURCE VOLTAGE (V)

Figure 2: Transfer Characteristics



V_{GS}, GATE VOLTAGE (V)

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



I_D, DRAIN CURRENT (A)

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

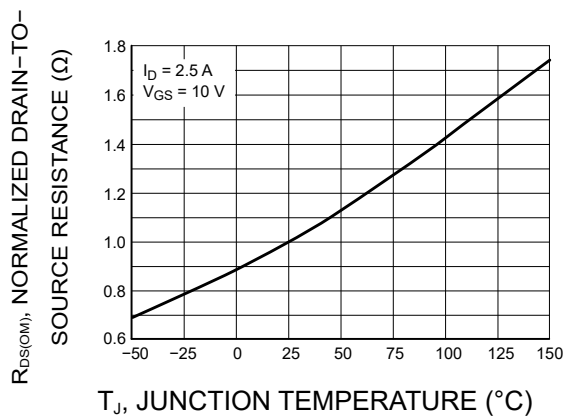
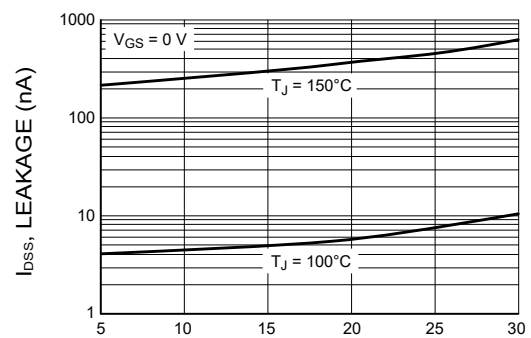


Figure 5: On-Resistance e Variation with Temperature

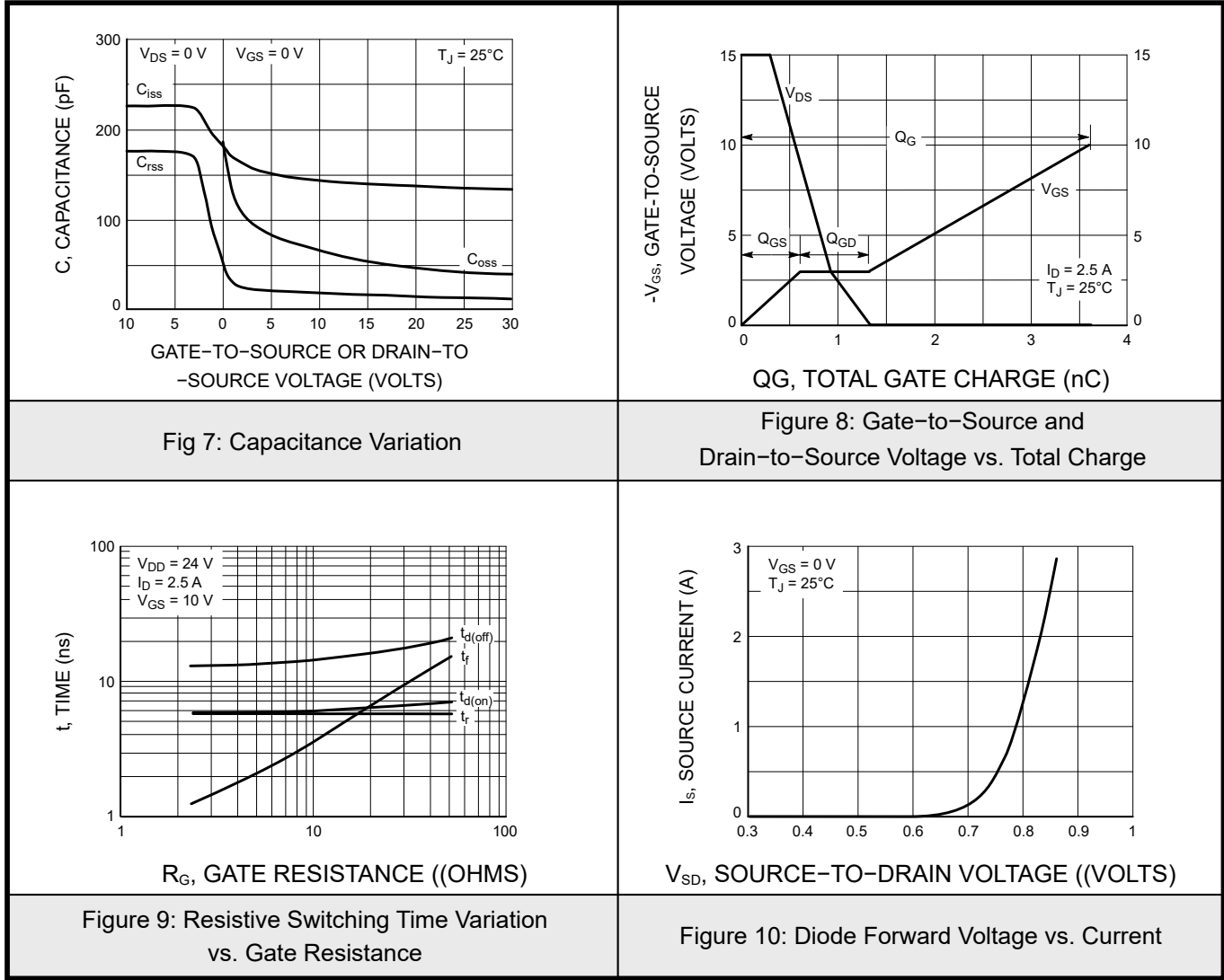


V_{DS}, DRAIN-TO-SOURCE VOLTAGE (V)

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

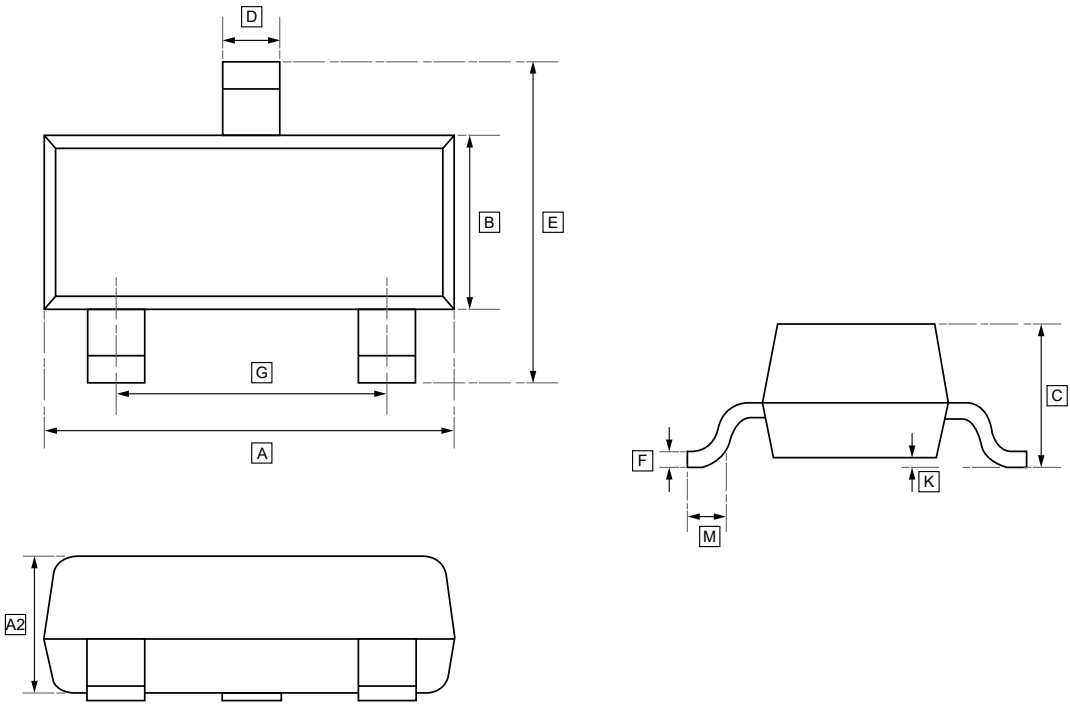


7.2Typical Characterisitics





8.SOT-23 Package Outline Dimensions

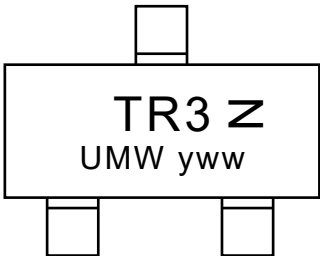


DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	D	E	G	K	M	A2	F
Min	2.85	1.20	0.90	0.40	2.25	1.80	0.00	0.30	0.95	0.095
Max	3.04	1.40	1.10	0.50	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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