UMW NTD20N03L27T4G

30V N-Channel MOSFET

1.Features

- $V_{DS\ (V)}$=30V
- $R_{DS(ON)}$<15mΩ(V_{GS}=5V)
- Power Supplies
- Inductive Loads
- PWM Motor Controls

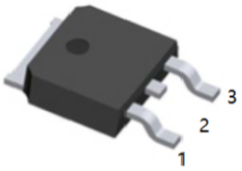
2.Applications

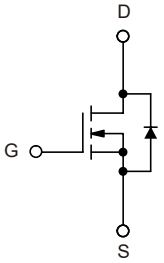
- SPICE Parameters Available
- Diode is Characterized for use in Bridge Circuits
- Ultra−Low $R_{DS(ON)}$, Single Base, Advanced Technology
- High Avalanche Energy Specified
- IDSS and $V_{(on)}$ Specified at Elevated Temperatures

3.Pinning information

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

TO-252(DPAK)
top view





4.Absolute Maximum Ratings T_C= 25°C

Parameter	Symbol	Rating	Units
Drain-to-Source Voltage	V_{DSS}	30	Vdc
Drain−to−Gate Voltage (R_{GS}=1MΩ)	V_{DGR}	30	Vdc
Gate−to−Source Voltage - Continuous	V_{GS}	±20	Vdc
- Non−Repetitive (tp≤10 ms)	V_{GS}	±24	Vdc
Drain Current - Continuous @ T_A=25°C	I_D	20	Adc
- Continuous @ T_A=100°C	I_D	16	Adc
- Single Pulse (t_p≤10 μs)	I_{DM}	60	Apk

Total Power Dissipation @ T_A=25°C	P_D	74	W
Derate above 25°C		0.6	W/°C
Total Power Dissipation @ T_C=25°C (Note 1)		1.75	W
Storage Temperature Range	T_J,T_{STG}	−55 to 150	°C
Single Pulse Drain-to-Source Avalanche Energy-Starting T_J= 25°C (V_{DD}=30Vdc, V_{GS}=5Vdc, $I_{L(pk)}$=24A,L=1mH, V_{DS}=34Vdc)	E_{AS}	288	mJ
Thermal Resistance-Junction-to-Case	$R_{\theta JC}$	1.67	°C/W
-Junction-to-Ambient	$R_{\theta JA}$	100	°C/W
-Junction-to-Ambient (Note 1)	$R_{\theta JA}$	71.4	°C/W
Maximum Lead Temperature for SolderingPurposes, 1/8 in. from case for 10 seconds	T_L	260	°C

Notes:

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. When surface mounted to an FR4 board using the minimum recommended pad size and repetitive rating; pulse width limited by maximum junction temperature.

5.Electrical Characteristics @ T_C = 25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0Vdc, I_D=250μAdc	30			Vdc
(Temperature Coefficient Positive) (Note 2)				43		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30Vdc, V_{GS}=0Vdc			10	μAdc
		V_{DS}=30Vdc,V_{GS}=0Vdc,T_J=150°C			100	μAdc
Gate−Body Leakage Current	I_{GSS}	V_{GS}=±20Vdc, V_{DS}=0Vdc			±100	nAdc
ON CHARACTERISTICS						
Gate Threshold Voltage (Note 2)	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μAdc	1	1.7	2.5	Vdc
Threshold Temperature Coefficient				5		mV/°C
Static Drain−to−Source	$R_{DS(ON)}$	V_{GS}=4Vdc, I_D=10Adc		8	12	mΩ
On−Voltage (Note 2)		V_{GS}=5Vdc,I_D=10Adc		10	15	mΩ
Static Drain−to−Source	$V_{DS(ON)}$	V_{GS}=5Vdc,I_D=20Adc		0.48	0.54	Vdc
On−Voltage (Note 2)		V_{DS}=5Vdc, I_D=10Adc,T_J=150°C		0.4		Vdc
Forward Transconductance (Note 2)	g_{FS}	V_{DS}=5Vdc, I_D=10Adc		21		Mhos
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	V_{DS}=25Vdc, V_{GS}=0Vdc f=1MHz		1005	1260	pF
Output Capacitance	C_{oss}			271	420	pF
Transfer Capacitance	C_{rss}			87	112	pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=20Vdc, I_D=20Adc V_{GS}=5Vdc, R_G=9.1Ω(Note 2)		17	25	ns
Rise Time	t_r			137	160	ns
Turn-Off Delay Time	$t_{D(off)}$			38	45	ns
Fall Time	t_f			31	40	ns
Gate Charge	Q_T	V_{DS}=48Vdc, I_D=15Adc V_{GS}=10Vdc (Note 2)		13.8	18.9	nC
	Q_1			2.8		nC
	Q_2			6.6		nC

DRAIN−SOURCE DIODE CHARACTERISTICS						
Forward On−Voltage	V_{SD}	I_S=20Adc, V_{GS}=0V(Note 2)		1	1.15	Vdc
		I_S=20Adc, V_{GS}=0V, T_J=125°C		0.9		Vdc
Reverse Recovery Time	t_{rr}	I_S=15A, dI_S/dt=100 A/μs(Note 2) V_{GS}=0Vdc		23		ns
	t_a			13		ns
	t_b			10		ns
Reverse Recovery Stored Charge	Q_{rr}			0.017		μC

Notes:

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.

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

3. Switching characteristics are independent of operating junction temperature.

6.1Typical Characterisitics

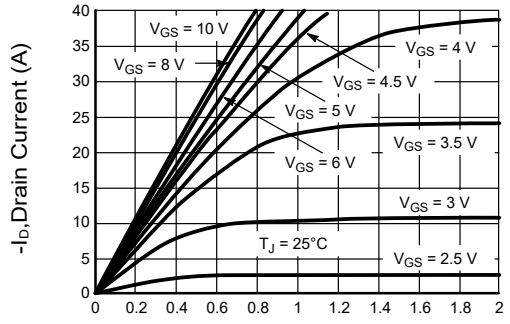


Figure 1: Output Characteristics

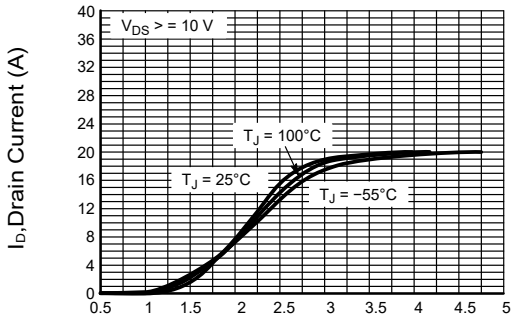


Figure 2: Transfer Characteristics

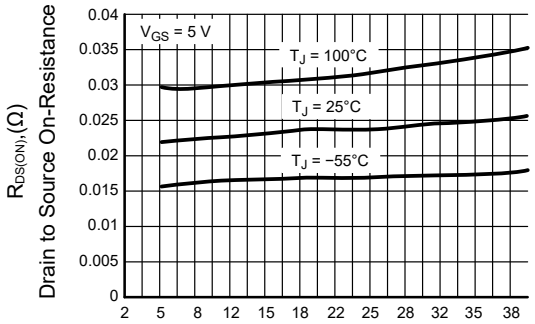


Figure 3: On−Resistance vs. Drain Current and Temperature

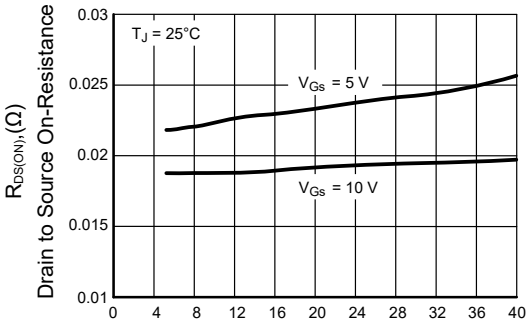


Figure 4: On−Resistance vs. Drain Current and Gate Voltage

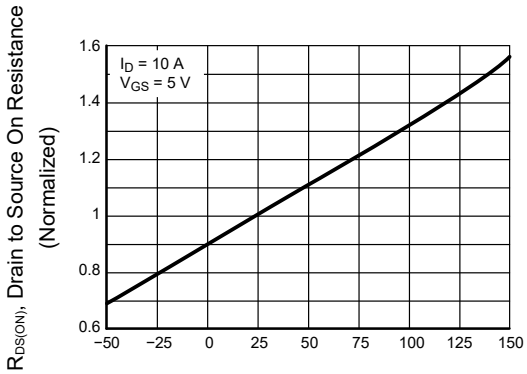


Figure 5: On−Resistance Variation with Temperature

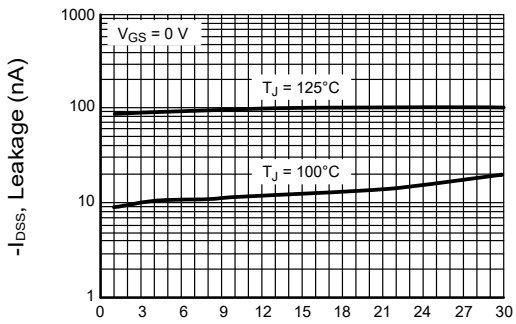
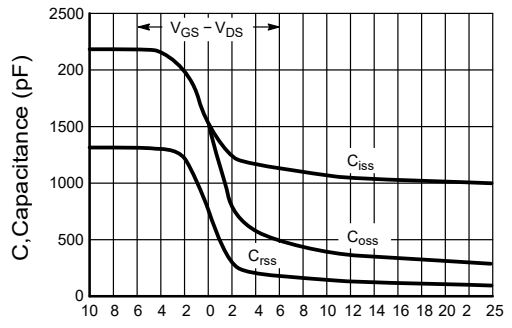


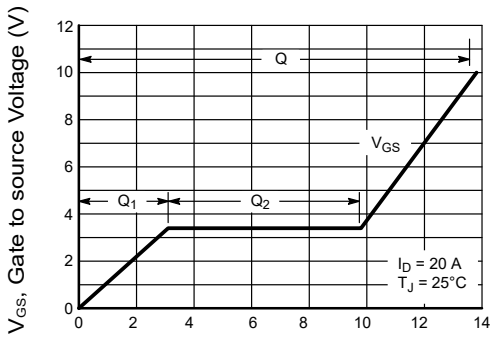
Figure 6: Drain−to−Source Leakage Current vs. Voltage

6.2Typical Characterisitics



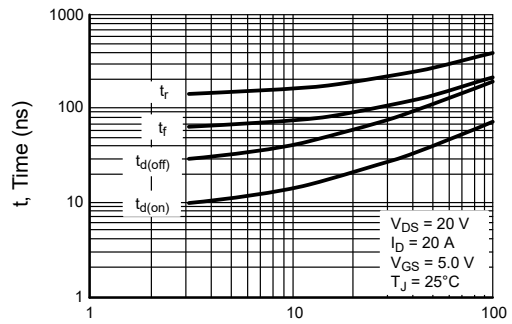
Gate−to−source Or Drain−to−source Voltage (V)

Figure 7: Capacitance Variation



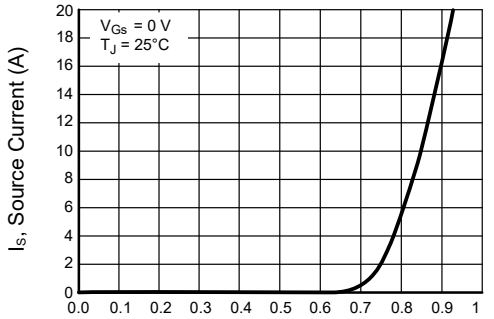
Q_G, Total Gate Charge (nC)

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



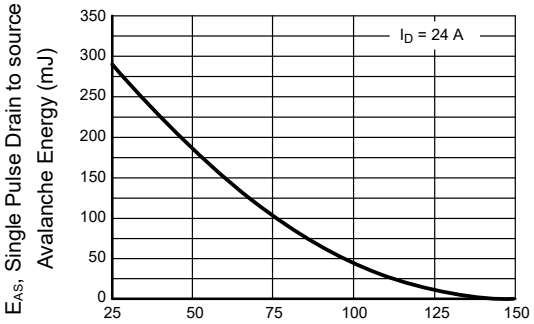
R_G, Gate Resistance (Ω)

Figure 9: Resistive Switching Time Variation vs. Gate Resistance



V_{SD},Source to Drain Voltage (V)

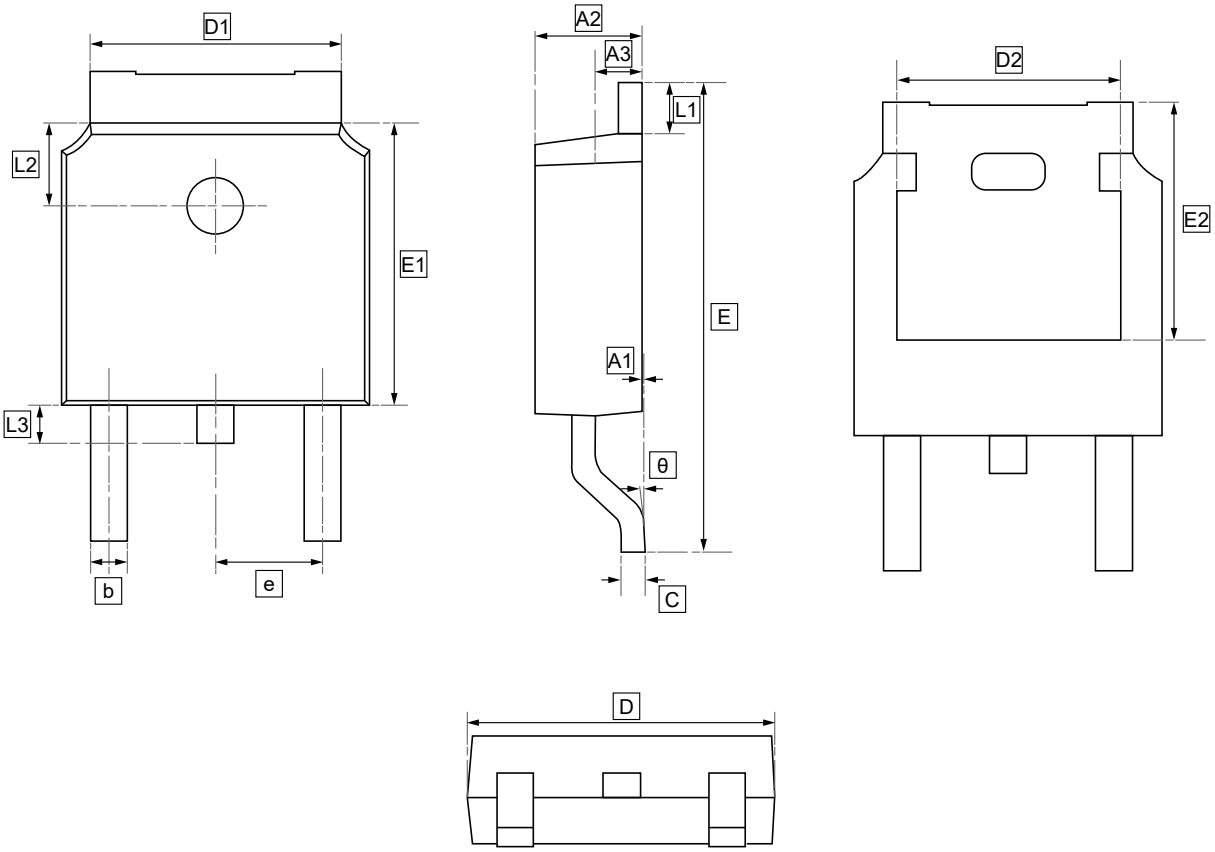
Figure 10: Diode Forward Voltage vs. Current



T_J, Junction Temperature (°C)

Figure 11: Maximum Avalanche Energy vs. Starting Junction Temperature

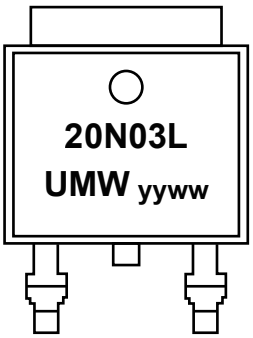
7.TO-252 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38	BSC	1.27	1.90	1.00	8.00

8.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW NTD20N03L27T4G	TO-252	2500	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.

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