

1.Features

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

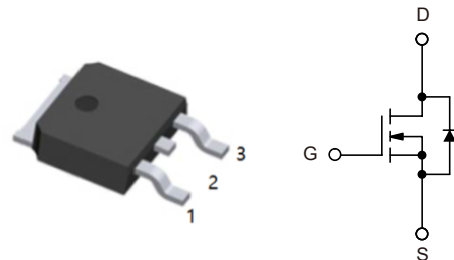
2.Applications

- 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 $T_c=25^{\circ}C$

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



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

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 @ $T_c = 25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage (Temperature Coefficient Positive) (Note 2)	V _{(BR)DSS}	V _{GS} =0Vdc, I _D =250μAdc	30			Vdc
				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 On-Voltage (Note 2)	R _{DS(ON)}	V _{GS} =4Vdc, I _D =10Adc		8	12	mΩ
		V _{GS} =5Vdc, I _D =10Adc		10	15	mΩ
Static Drain-to-Source On-Voltage (Note 2)	V _{DS(ON)}	V _{GS} =5Vdc, I _D =20Adc		0.48	0.54	Vdc
		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}	$I_S=20A_{dc}$, $V_{GS}=0V$ (Note 2)		1	1.15	Vdc
		$I_S=20A_{dc}$, $V_{GS}=0V$, $T_J=125^{\circ}C$		0.9		Vdc
Reverse Recovery Time	t_{rr}	$I_S=15A$, $dI_S/dt=100 A/\mu s$ (Note 2) $V_{GS}=0V_{dc}$		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 $\leq 300 \mu s$, Duty Cycle $\leq 2\%$.

3. Switching characteristics are independent of operating junction temperature.



6.1 Typical Characteristics

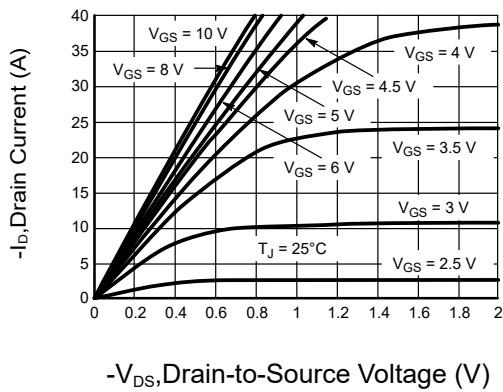


Figure 1: Output Characteristics

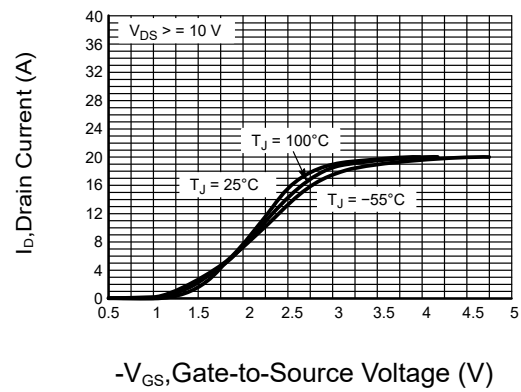


Figure 2: Transfer Characteristics

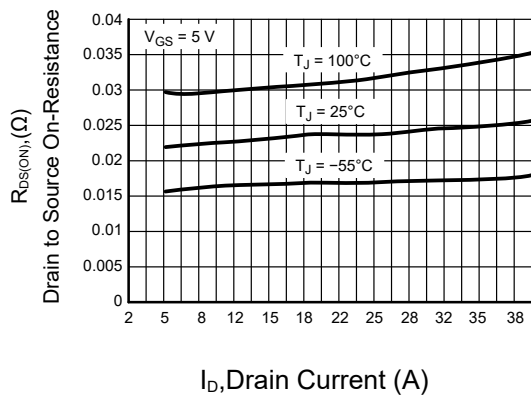


Figure 3: On-Resistance vs. Drain Current and Temperature

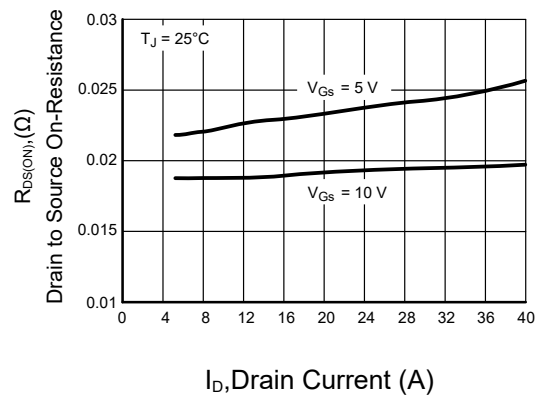


Figure 4: On-Resistance vs. Drain Current and Gate Voltage

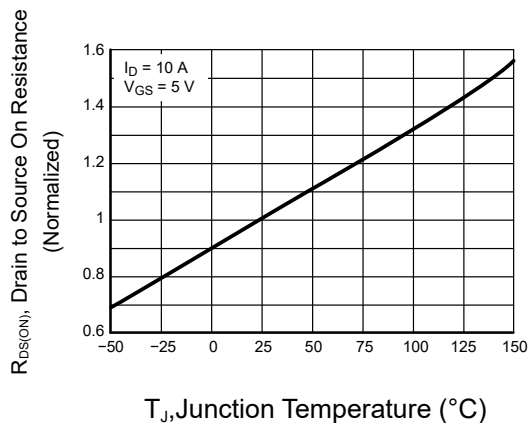


Figure 5: On-Resistance Variation with Temperature

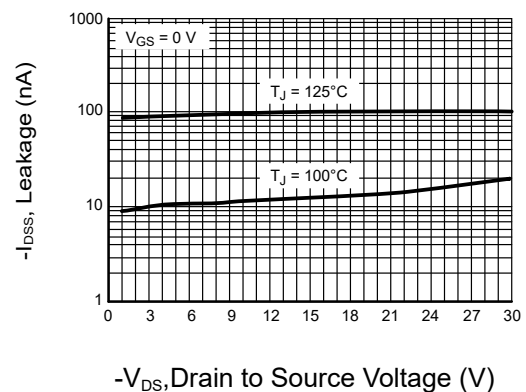
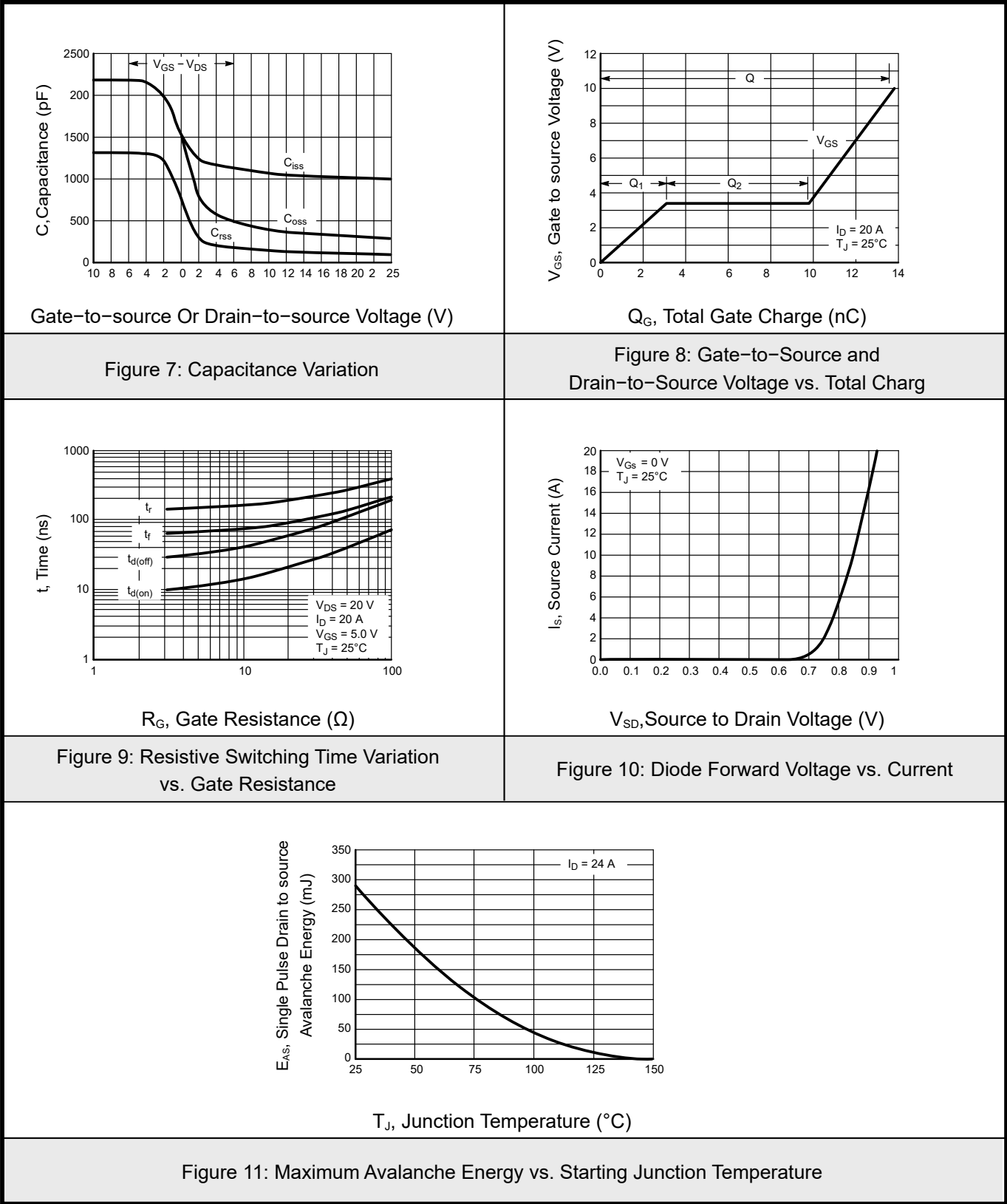


Figure 6: Drain-to-Source Leakage Current vs. Voltage

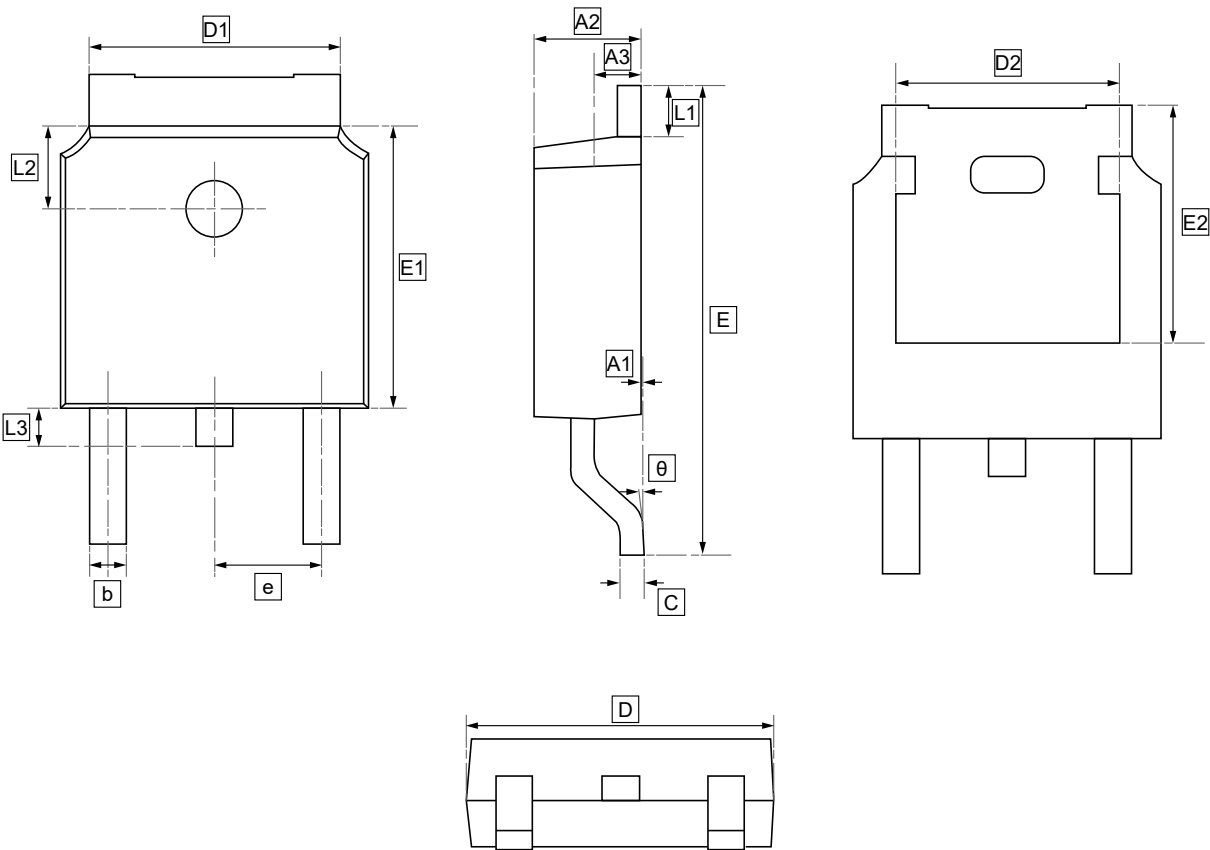


6.2Typical Characteristics





7.TO-252 Package Outline Dimensions

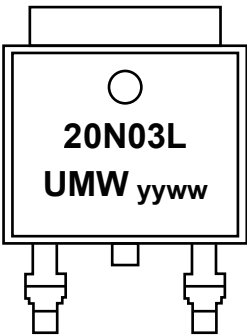


DIMENSIONS (mm are the original dimensions)

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.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.

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.