UMW 40N06

60V N-Channel MOSFET

1.Description

The 40N06 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

2.1Features

- $V_{DS\ (V)}$=60V
- I_D=40A
- $R_{DS(ON)}$<14mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<16mΩ(V_{GS}=4.5V)

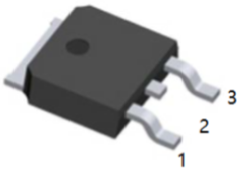
2.2Features

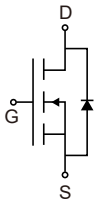
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

3.Pinning information

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

TO-252(DPAK)
top view





4.Absolute Maximum Ratings T_A= 25°C

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	
Drain Current-Continuous[Note3]	T_C=25°C	I_D	40	A
	T_C=100°C		29	
Drain Current-Pulsed[Note1]		I_{DM}	160	
Avalanche Energy[Note4]		E_{AS}	64	mJ
Maximum Power Dissipation	T_C=25°C	P_D	75	W
Storage Temperature Range		T_{STG}	-55 to 150	°C
Operating Junction Temperature Range		T_J	-55 to 150	°C

5.Thermal resistance rating

Parameter	Symbol	Typ	Max	Units
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$		1.4	°C/W

6.SPECIFICATIONS (T_J= 25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_{DS}=250μA	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate-Body Leakage	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
ON CHARACTERISTIC						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=250μA	1	1.6	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_{DS}=30A		14	18	mΩ
		V_{GS}=4.5V, I_{DS}=20A		16	22	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1MHz		2928		pF
Output Capacitance	C_{oss}			141		pF
Reverse Transfer Capacitance	C_{rss}			120		pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(on)}$	V_{GS}=10V, V_{DS}=30V R_{GEN}=1.8Ω, I_D=25A		7.5		ns
Rise Time	t_r			6		ns
Turn-Off Delay Time	$t_{D(off)}$			28.4		ns
Fall Time	t_f			5.5		ns
Total Gate Charge at 10V	Q_g	V_{DS}=30V, I_{DS}=25A, V_{GS}=10V		50		nC
Gate to Source Gate Charge	Q_{gs}			6		nC
Gate to Drain“Miller”Charge	Q_{gd}			15		nC

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{DS}=30A			1.2	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=25A		29		nS
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs		42		uC

Notes:

1: Repetitive rating, pulse width limited by maximum junction temperature.

2: Surface mounted on FR4 Board, t≤10sec.

3: Pulse width ≤ 300μs, duty cycle ≤ 2%.

4: E_{AS} condition: L=0.5mH,V_{DD}=10V, V_G=10V, V_{GATE}=20V,Start T_J=25°C.

7.1Typical Characterisitics

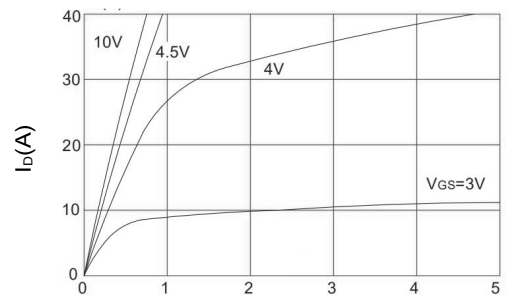


Figure 1: Output Characteristics

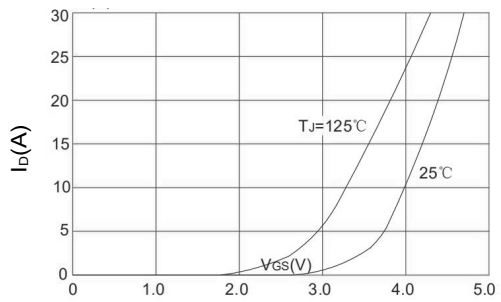


Figure 2: Typical Transfer Characteristics

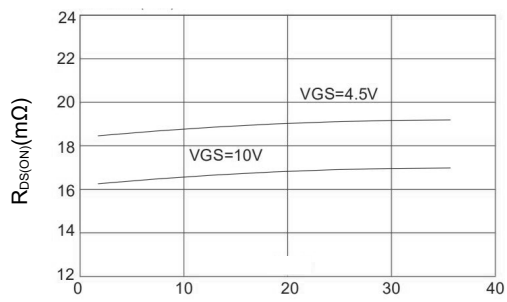


Figure 3: On-resistance vs. Drain Current

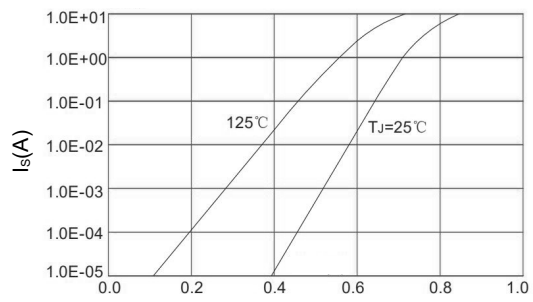


Figure 4: Body Diode Characteristics

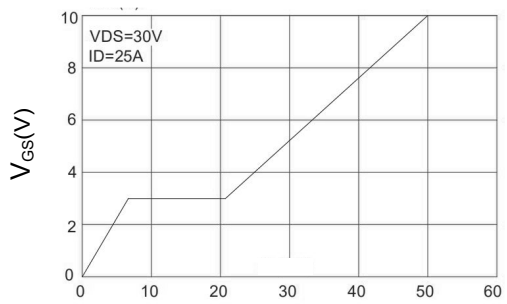


Figure 5: Gate Charge Characteristics

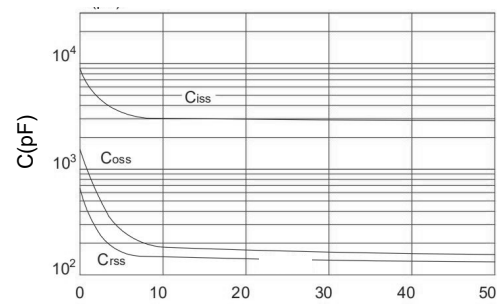


Figure 6: Capacitance Characteristics

7.2Typical Characterisitics

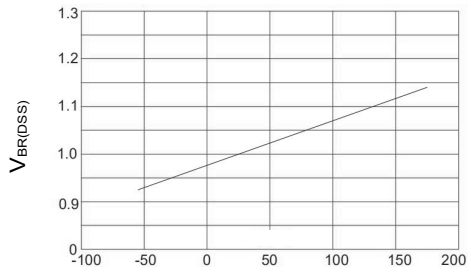


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

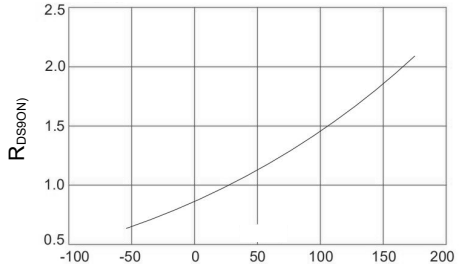


Figure 8: Normalized on Resistance vs Junction Temperature

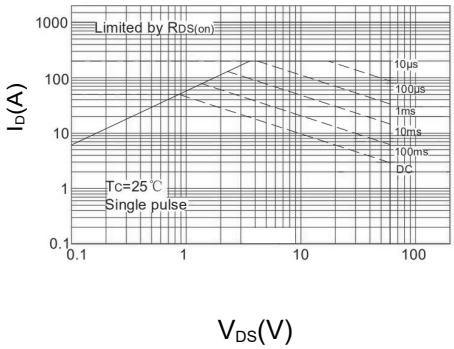


Figure 9: Maximum Safe Operating Area

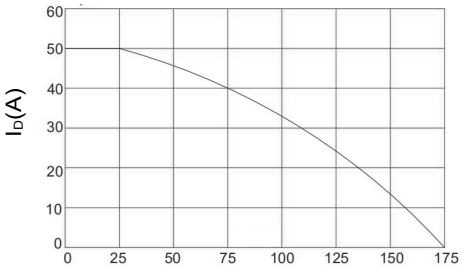


Figure 10: Maximum Continuous Drain Currentvs. Case Temperature

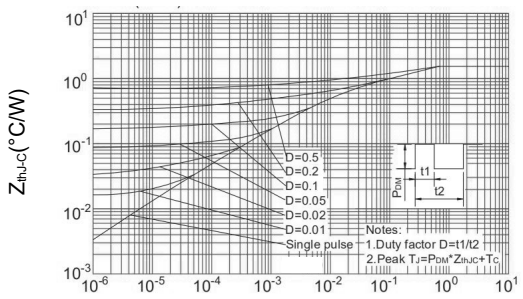


Figure 11: Maximum EffectiveTransient ThermalImpedance, Junction-to-Case

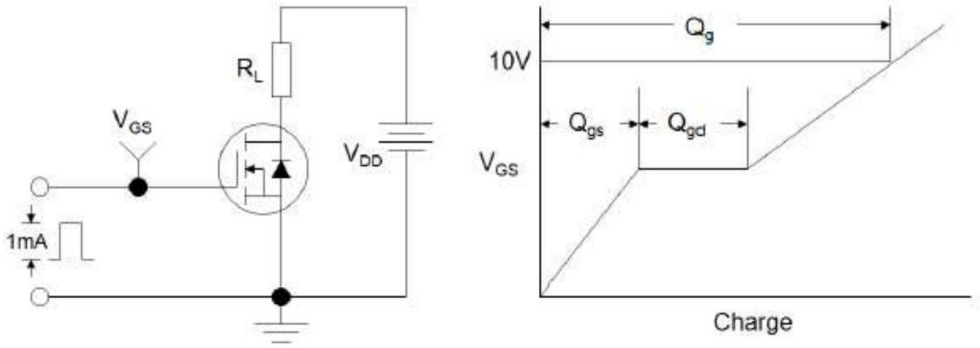


Figure1:Gate Charge Test Circuit & Waveform

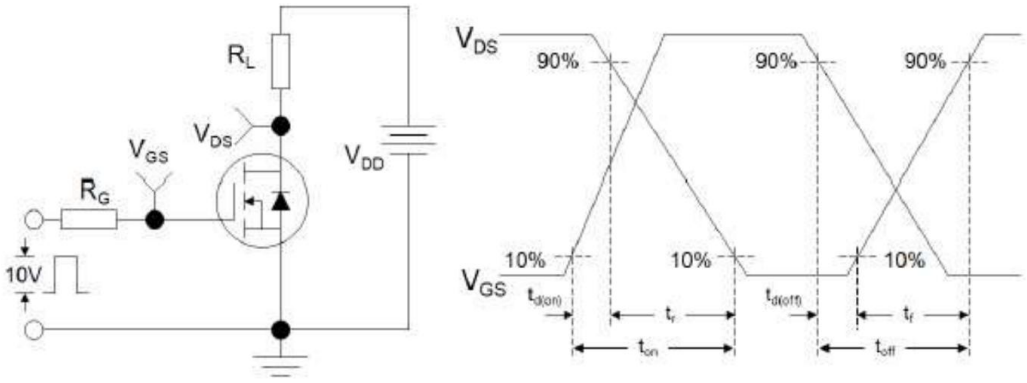


Figure 2: Resistive Switching Test Circuit & Waveforms

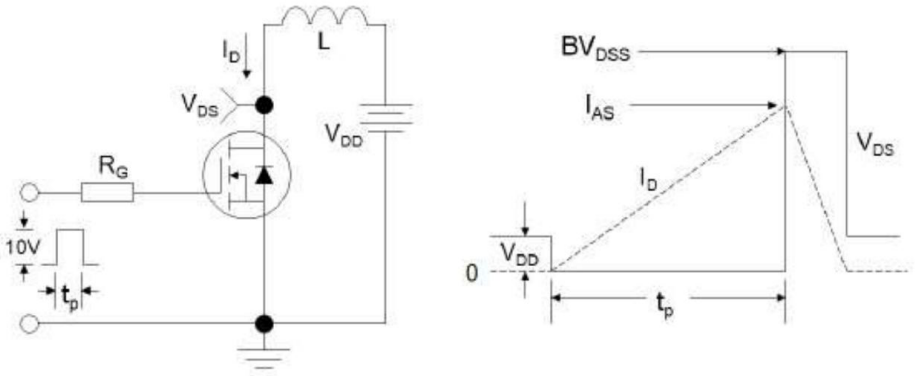
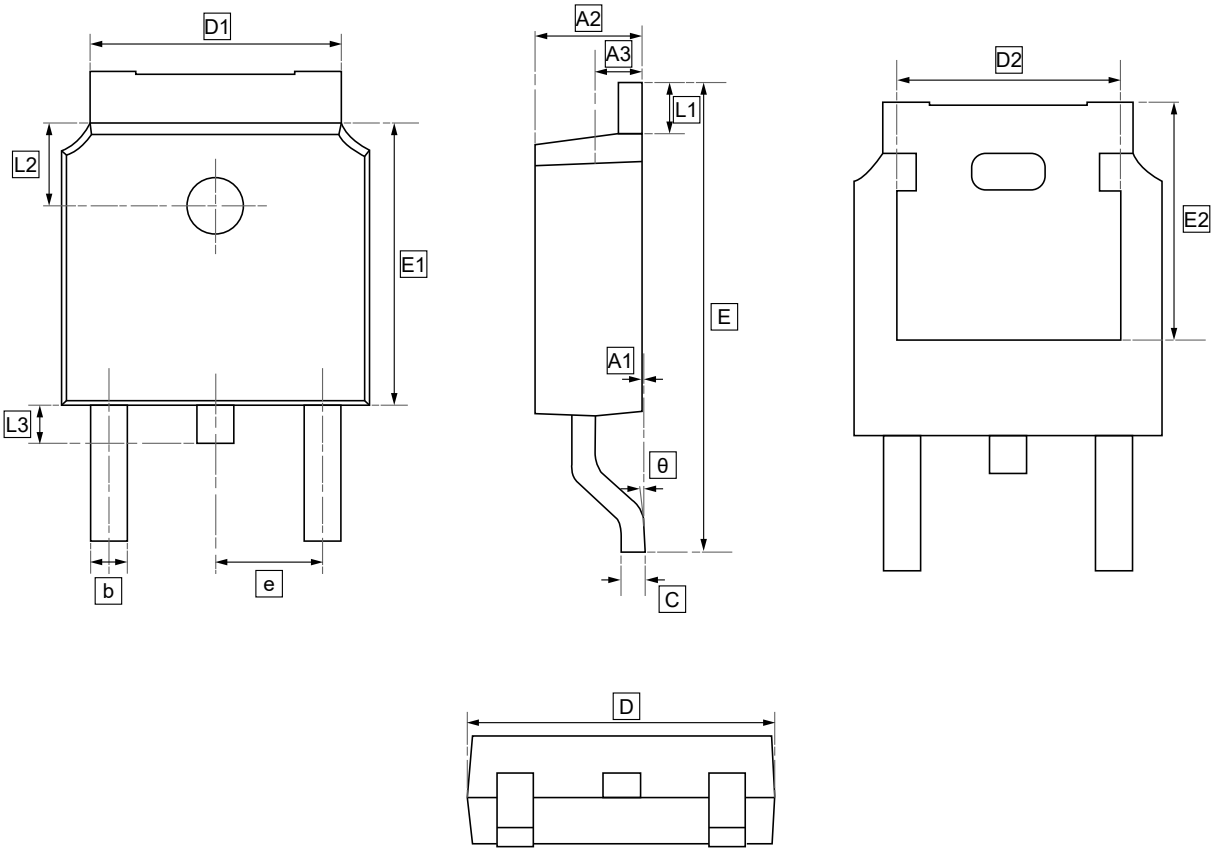


Figure 3:Unclamped inductive Switching Test Circuit & Waveforms

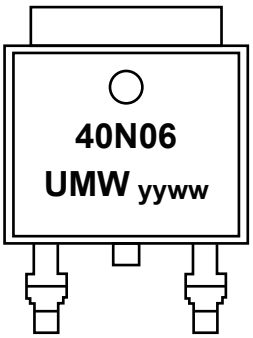
8.TO-252 Package Outline Dimensions



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

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW 40N06	TO-252	2500	Tape and reel

10.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.