UMW 20N06

60V N-Channel MOSFET

1.Description

The 20N06 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate cha rge. It can be used in a wide variety of applications.

2.1Features

- $V_{DS\ (V)}$=60V
- I_D=20A(V_{GS}=10V)
- $R_{DS(ON)}$<23mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<29mΩ(V_{GS}=4.5V)

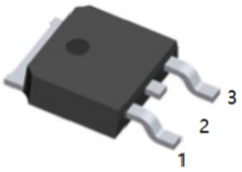
2.2Features

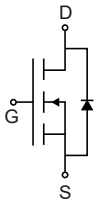
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

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	20	A
	T_C=100°C		14	
Drain Current-Pulsed[Note1]		I_{DM}	120	
Avalanche Energy[Note4]		E_{AS}	72	mJ
Maximum Power Dissipation	T_C=25°C	P_D	55	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	$R_{\theta JC}$		2.7	°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}=15A		23	35	mΩ
		V_{GS}=4.5V, I_{DS}=10A		29	40	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1MHz		1562		pF
Output Capacitance	C_{oss}			75.4		pF
Reverse Transfer Capacitance	C_{rss}			66.8		pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(on)}$	V_{GS}=10V, V_{DS}=30V R_{GEN}=1.8Ω, I_D=15A		7.5		ns
Rise Time	t_r			21		ns
Turn-Off Delay Time	$t_{D(off)}$			16		ns
Fall Time	t_f			23.5		ns
Total Gate Charge at 10V	Q_g	V_{DS}=30V, I_{DS}=15A, V_{GS}=10V		25		nC
Gate to Source Gate Charge	Q_{gs}			4.5		nC
Gate to Drain“Miller”Charge	Q_{gd}			6.5		nC

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{DS}=15A			1.2	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=15A		29		nS
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs		45		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}=30V, V_G=10V, V_{GATE}=60V,Start T_J=25°C.

7.1Typical Characterisitics

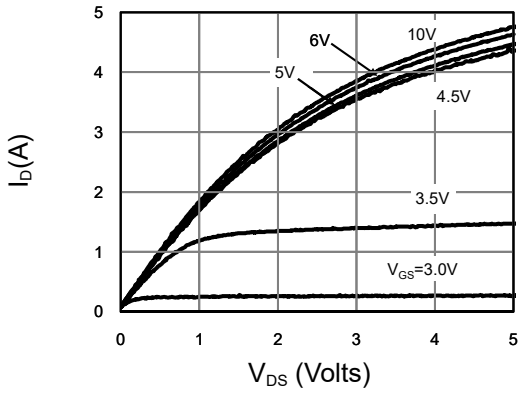


Fig 1: On-Region Characteristics (Note E)

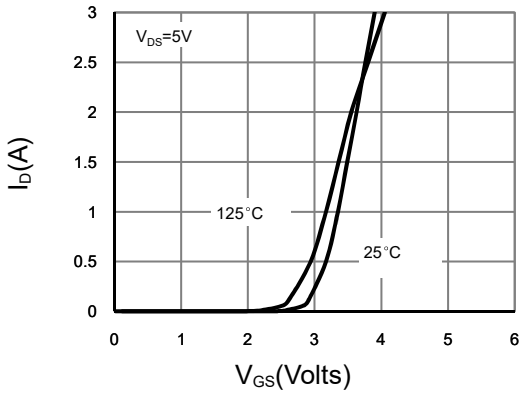


Figure 2: Transfer Characteristics (Note E)

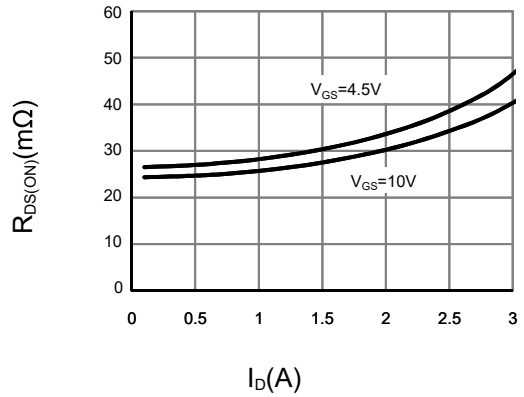


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

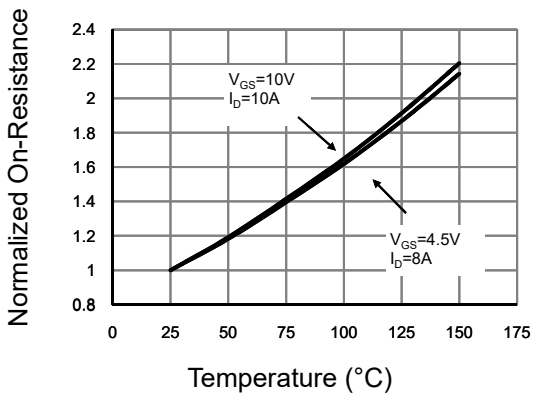


Figure 4: On-Resistance vs. Junction Temperature (Note E)

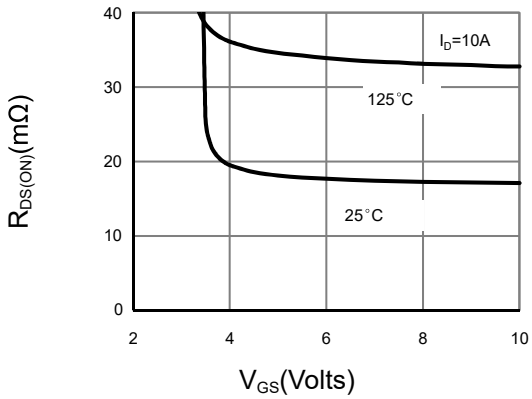


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

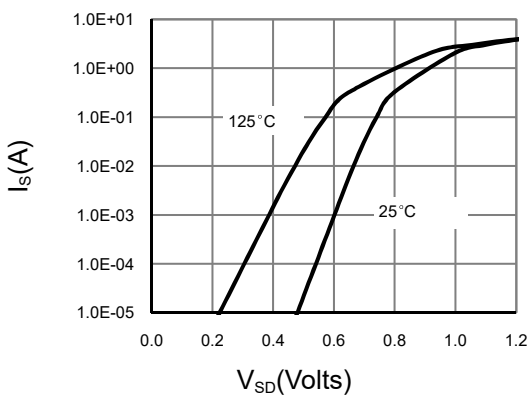


Figure 6: Body-Diode Characteristics(Note E)

7.2Typical Characterisitics

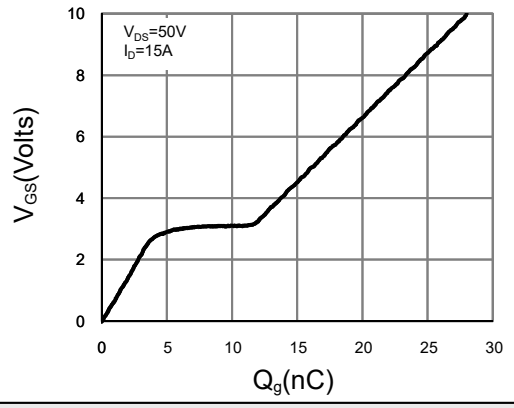


Figure 7: Gate-Charge Characteristics

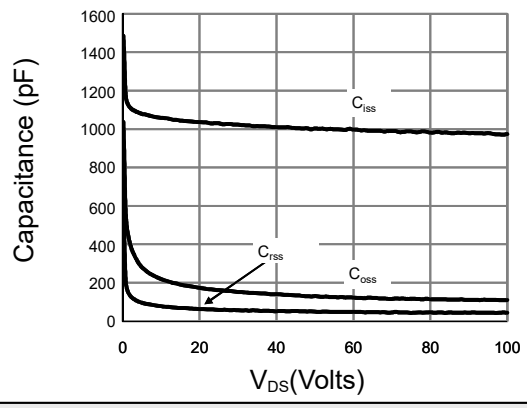


Figure 8: Capacitance Characteristics

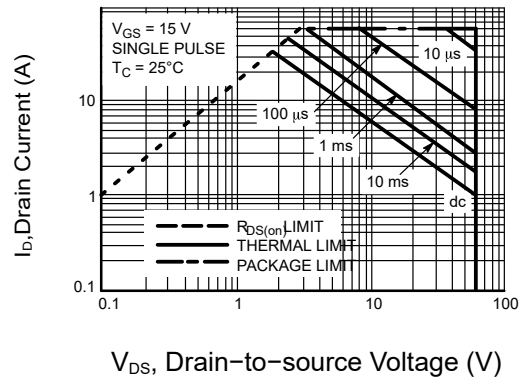


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

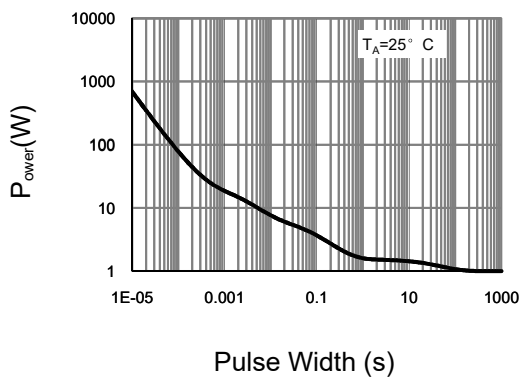


Figure 10: Single Pulse Power Rating Junction-to -Ambient (Note F)

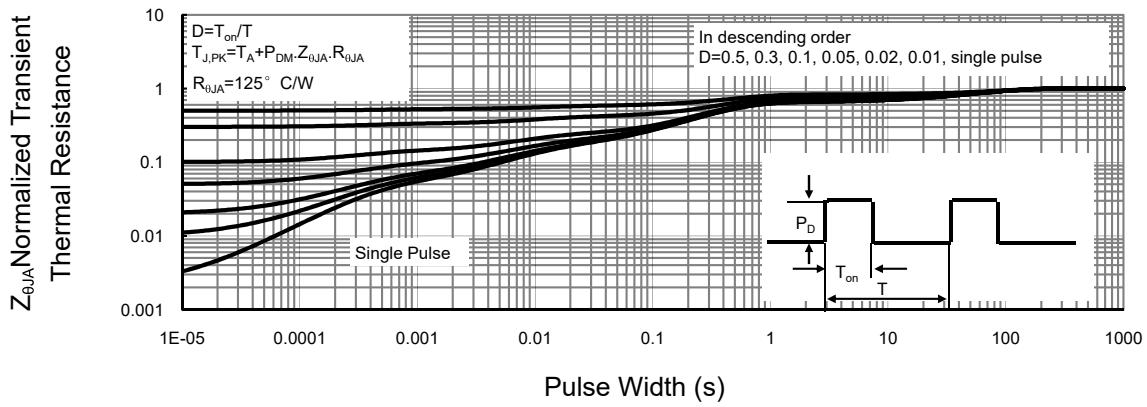


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

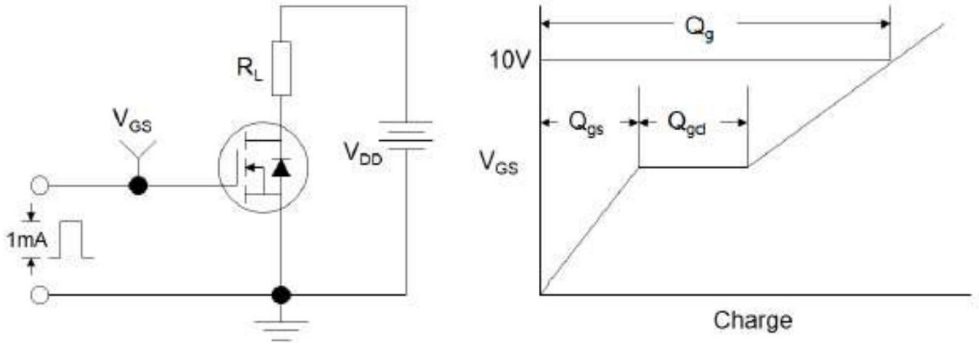


Figure1:Gate Charge Test Circuit & Waveform

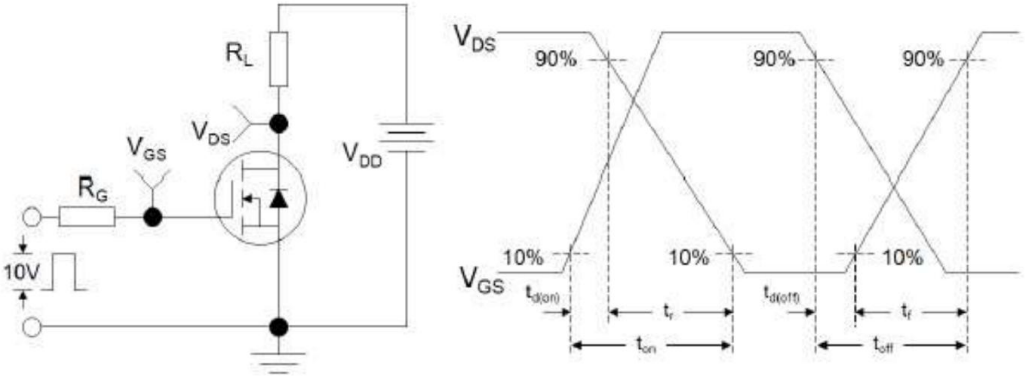


Figure 2: Resistive Switching Test Circuit & Waveforms

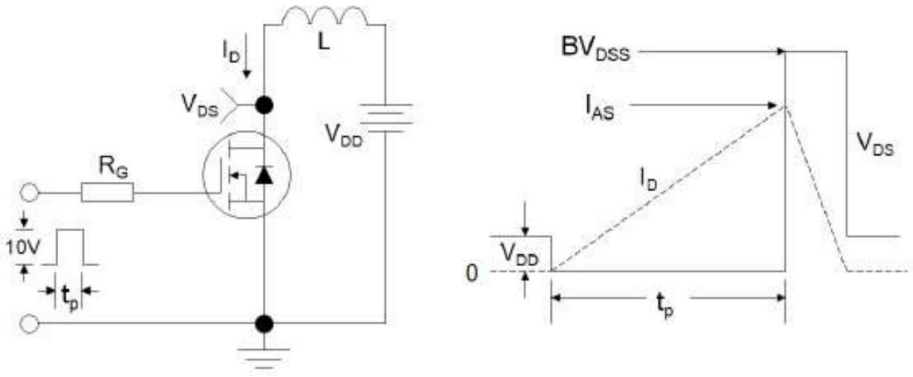
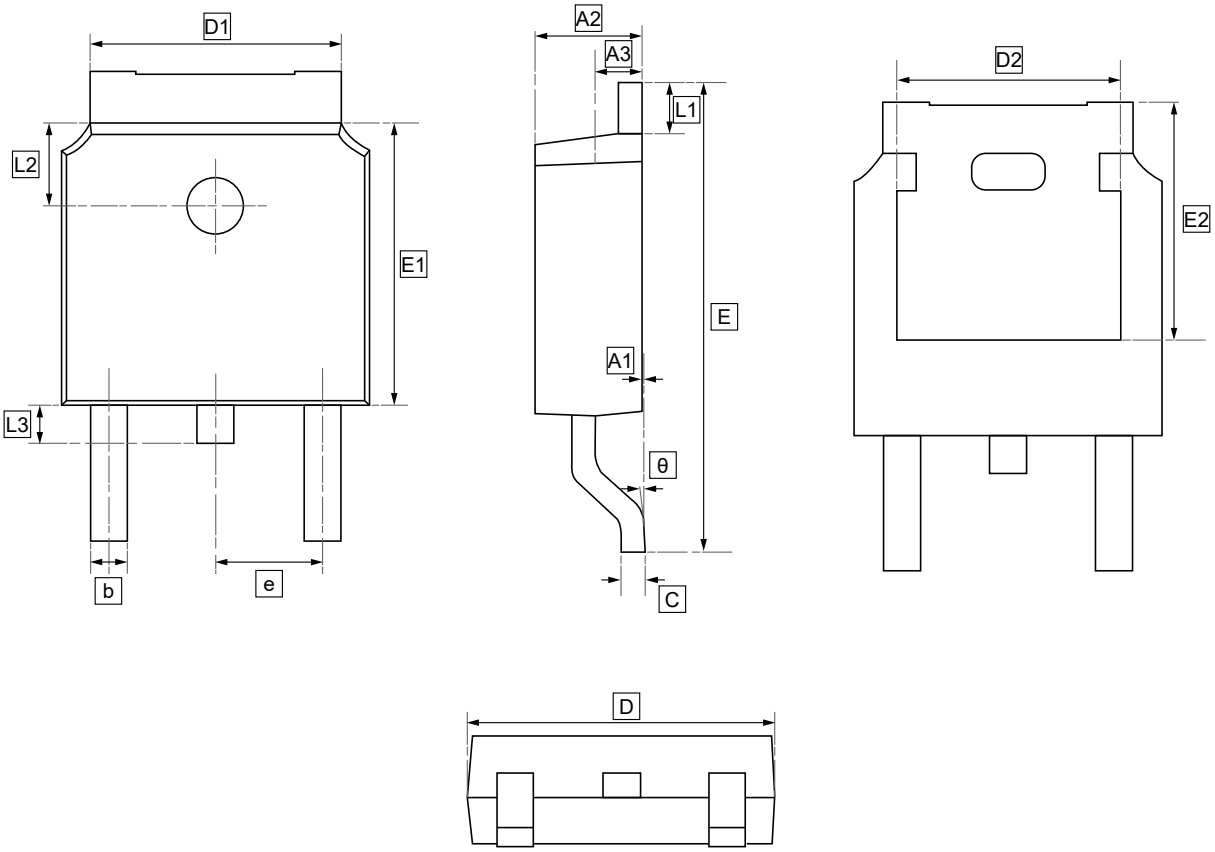


Figure 3:Unclamped inductive Switching Test Circuit & Waveforms

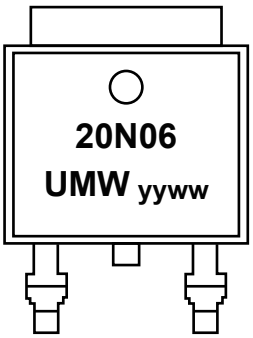
8.TO-252 Package Outline Dimensions



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 20N06	TO-252	2500	Tape and reel

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