UMW 50N06

60V N-Channel MOSFET

1.Description

The 50N06 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.

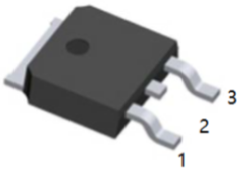
2.Features

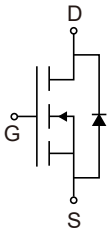
- $V_{DS\ (V)}$=60V
- I_D=50A
- $R_{DS(ON)}$=12mΩ(V_{GS}=10V)
- $R_{DS(ON)}$=16mΩ(V_{GS}=4.5V)

3.Pinning information

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

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	50	A
	T_C=100°C		33	
Drain Current-Pulsed[Note1]		I_{DM}	200	
Avalanche Energy[Note4]		E_{AS}	64	mJ
Maximum Power Dissipation	T_C=25°C	P_D	105	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		12	17	mΩ
		V_{GS}=4.5V, I_{DS}=20A		16	21	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

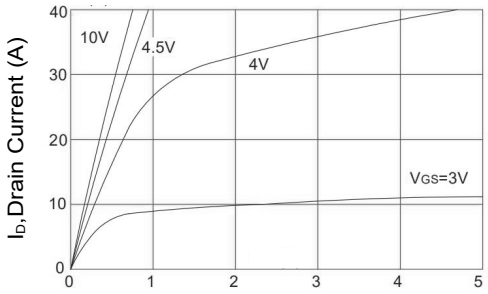


Figure 1: Output Characteristics

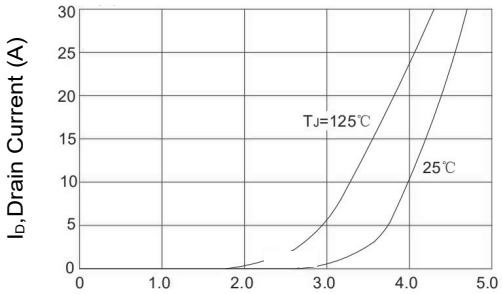


Figure 2: Transfer Characteristics

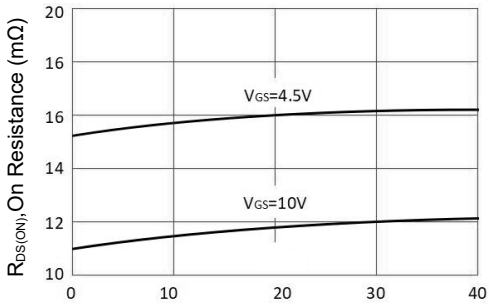


Figure 3: On-resistance vs. Drain Current

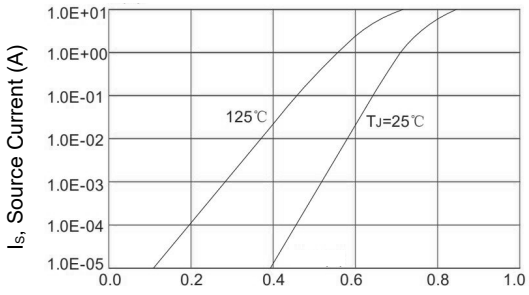


Figure 4: Body Diode Characteristics

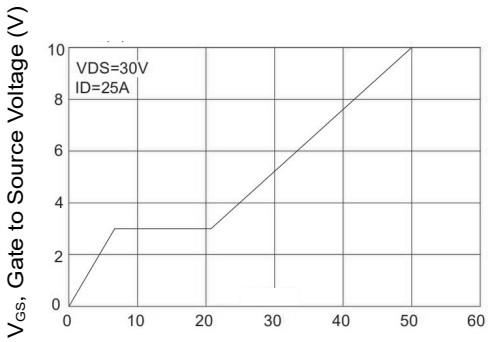


Figure 5: Gate Charge Characteristics

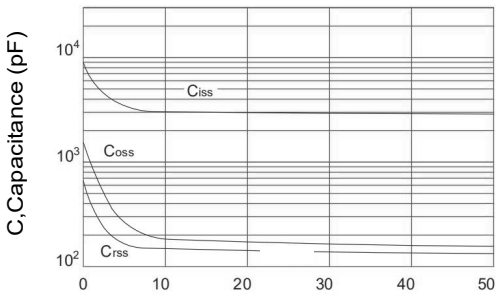
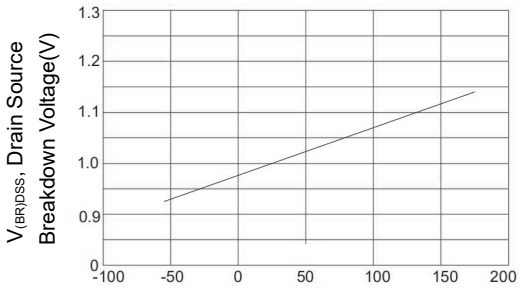


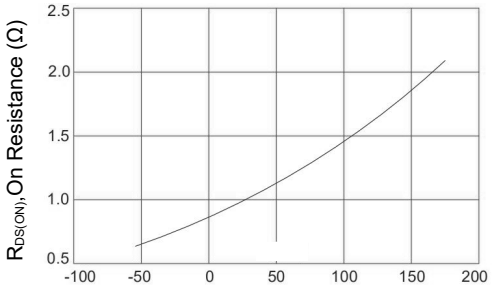
Figure 6: Capacitance Characteristics

7.2Typical Characterisitics



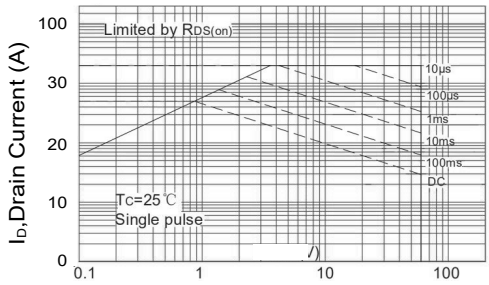
T_J, Junction Temperature (°C)

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature



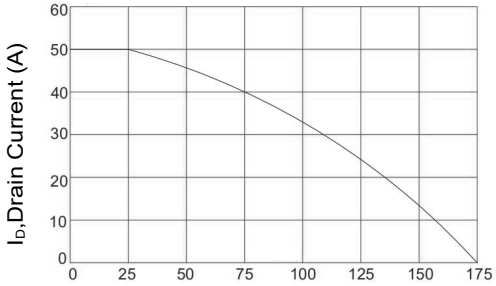
T_J,Junction Temperature (°C)

Figure 8: Normalized on Resistance vs. Junction Temperature



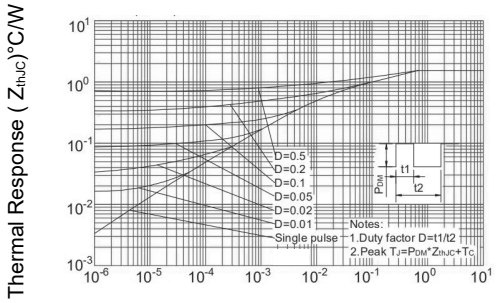
V_{DS},Drain Source Voltage (V)

Figure 9: Maximum Safe Operating Area



T_C,Case Temperature (°C)

Figure 10: Safe Operating Area



T_P(s)

Figure 11: Maximum EffectiveTransient Thermal Impedance, Junction-to-Case

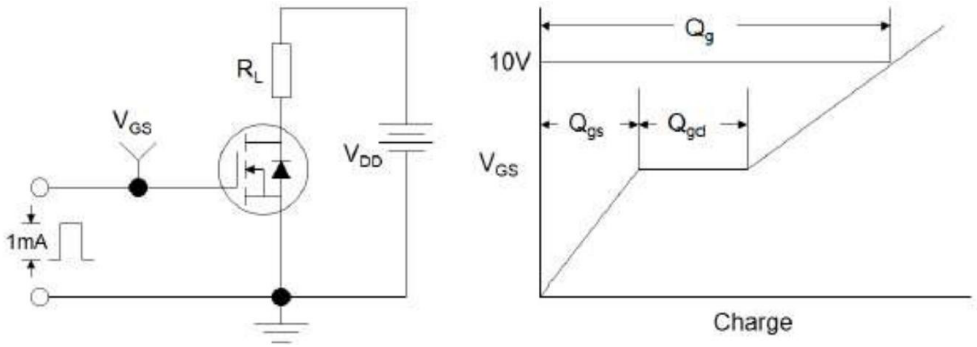


Figure1:Gate Charge Test Circuit & Waveform

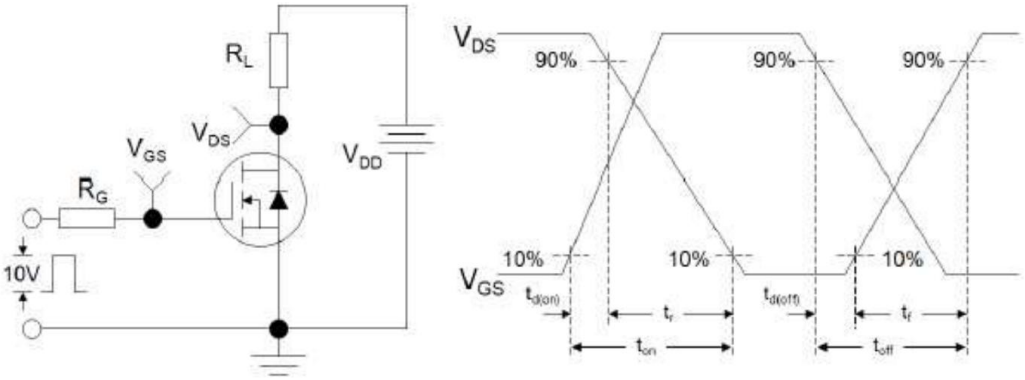


Figure 2: Resistive Switching Test Circuit & Waveforms

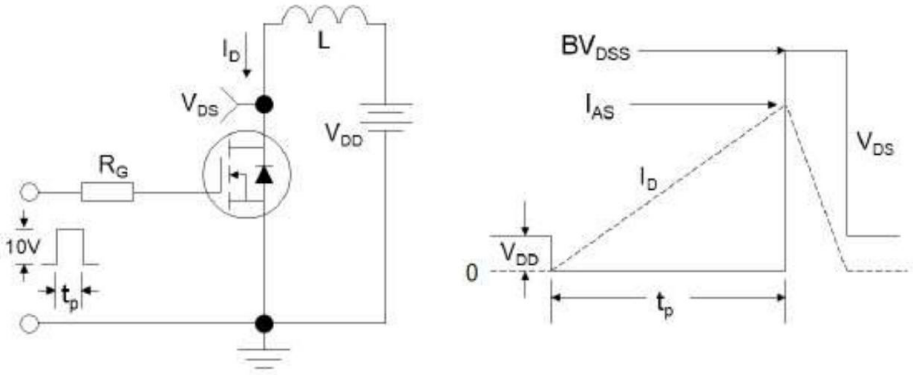
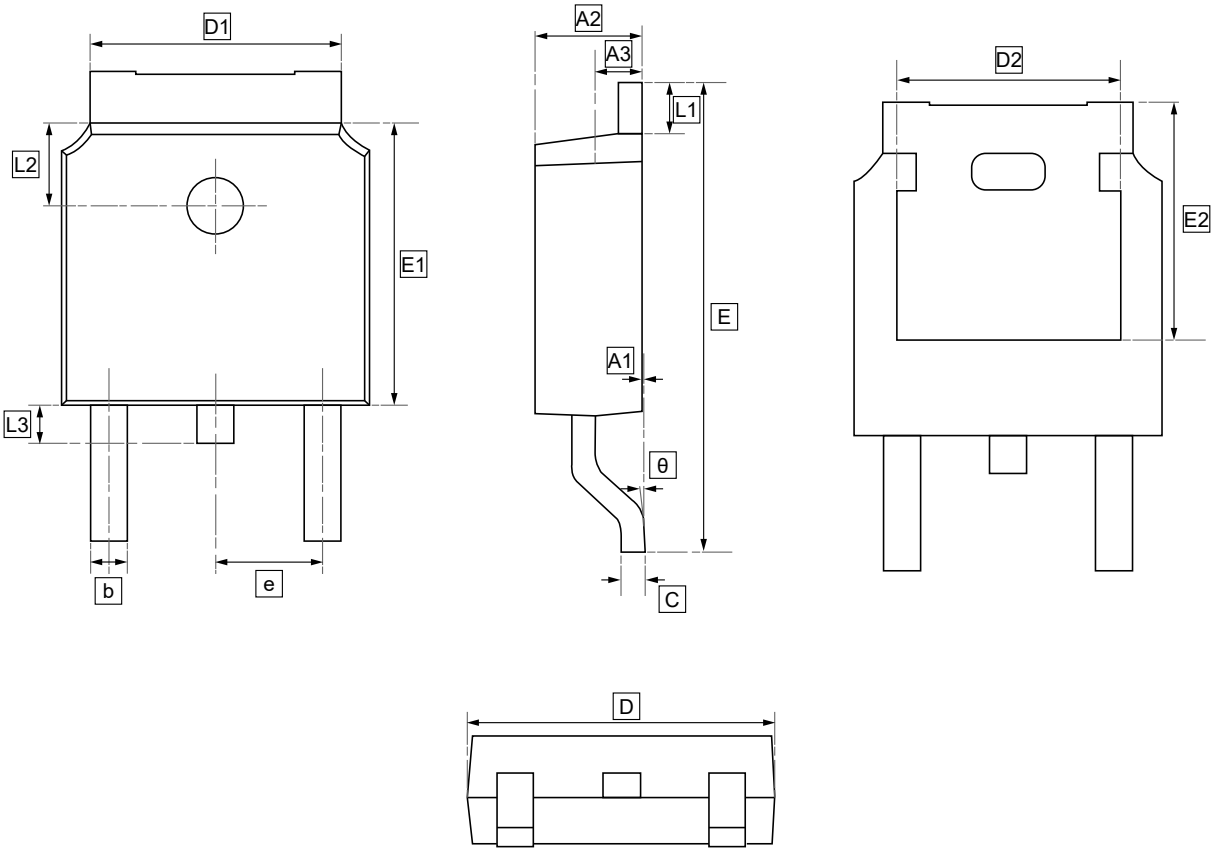


Figure 3:Unclamped inductive Switching Test Circuit & Waveforms

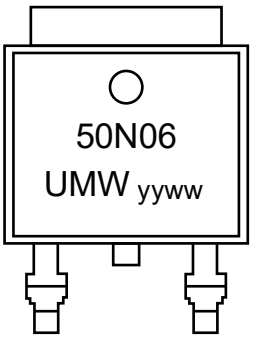
8.TO-252 Package Outline Dimensions



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 50N06	TO-252	2500	Tape and reel

10.Disclaimer

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