UMW SUD50P06-15

-60V P-Channel MOSFET

1.Features

- $V_{DS\ (V)}$=-60V
- $R_{DS(ON)}$<15mΩ(V_{GS}=-10V)
- $R_{DS(ON)}$<20mΩ(V_{GS}=-4.5V)

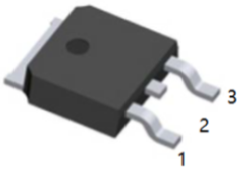
2.Applications

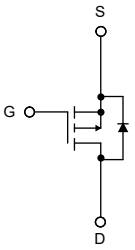
- Load Switch

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	Value	Units
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (T_J=150°C)	T_C=25°C	I_D	-50[d]	A
	T_C=125°C		-27.5	
Pulsed Drain Current		I_{DM}	-80	
Avalanche Current		I_{AS}	-50	
Single Pulse Avalanche Energy [a]	L=0.1mH	E_{AS}	125	mJ
Power Dissipation	T_C=25°C	P_D	113[c]	W
	T_A=25°C		2.5[b,c]	W
Junction and Storage Temperature Range		T_J,T_{STG}	-55 to 150	°C

5.Thermal resist ance rating

Parameter		Symbol	Typ	Max	Units
Junction-to-Ambient [b]	t ≤10s	R_{thJA}	15	18	°C/W
	Steady-State		40	50	°C/W
Junction-to-Case		R_{thJC}	0.82	1.1	°C/W

Notes:

a. Duty cycle ≤ 1 %.

b. When mounted on 1" square PCB (FR-4 material).

c. See SOA curve for voltage derating.

d. Package limited.

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS}=0V, I_D=-250μA	-60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.1	-1.8	-2.5	V
Gate-Body Leakage	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS}=-60V,V_{GS}=0V			-1	μA
		V_{DS}=-60V,V_{GS}=0V,T_J=125°C			-50	μA
		V_{DS}=-60V,V_{GS}=0V,T_J=150°C			-100	μA
On-State Drain Current [a]	$I_{D(ON)}$	V_{DS}=-5V, V_{GS}=-10V	-50			A
Drain-Source On-State Resistance [a]	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-17A		12	15	mΩ
		V_{GS}=-10V, I_D=-50A,T_J=125°C			25	mΩ
		V_{GS}=-10V, I_D=-50A,T_J=150°C			28	mΩ
		V_{GS}=-4.5V, I_D=-14A			20	mΩ
Forward Transconductance [a]	g_{FS}	V_{DS}=-15V, I_D=-17A		61		S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-25V, f=1MHz		4950		pF
Output Capacitance	C_{oss}			480		pF
Reverse Transfer Capacitance	C_{rss}			405		pF
Total Gate Charge [c]	Q_g	V_{DS}=-30V, V_{GS}=-10V, I_D=-50A		110	165	nC
Gate-Source Charge [c]	Q_{gs}			19		nC
Gate-Drain Charge [c]	Q_{gd}			28		nC
Turn-On Delay Time [c]	$t_{D(on)}$	V_{DD}=-30V, R_L=0.6Ω I_D≅-50A, V_{GEN}=-10V, R_G=6Ω		15	23	nS
Rise Time [c]	t_r			70	105	nS
Turn-Off Delay Time [c]	$t_{D(off)}$			175	260	nS
Fall Time [c]	t_f			175	260	nS

Source-Drain Diode Ratings and Characteristics T_C=25 °C [b]						
Continuous Current	I_S				-50	A
Pulsed Current	I_{SM}				-80	A
Forward Voltage [a]	V_{SD}	I_F=-50A, V_{GS}=0V		-1	-1.6	V
Reverse Recovery Time	t_{rr}	I_F=-50A, dI/dt=100A/μs		45	70	ns

Notes:

a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.

b. Guaranteed by design, not subject to production testing.

c. Independent of operating temperature.

7.1Typical Characterisitics

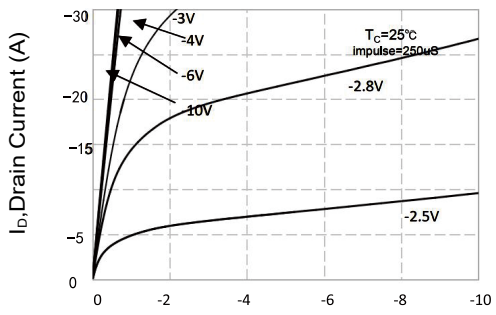


Figure 1: On-Region Characteristics

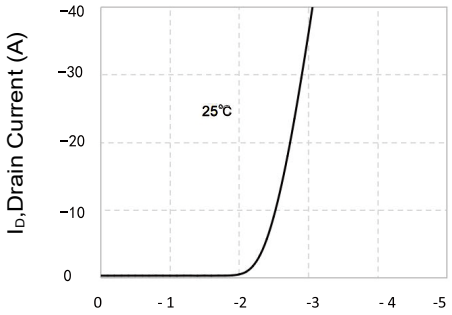


Figure 2: Transfer Characteristics

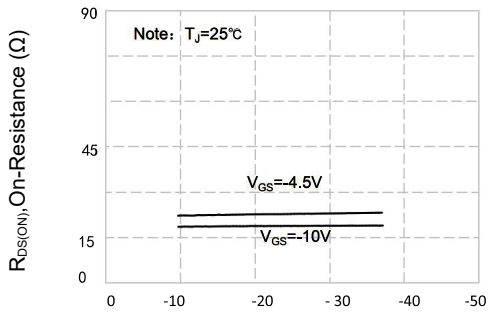


Figure 3: On-Resistance Variation vs Drain Current and Gate Voltage

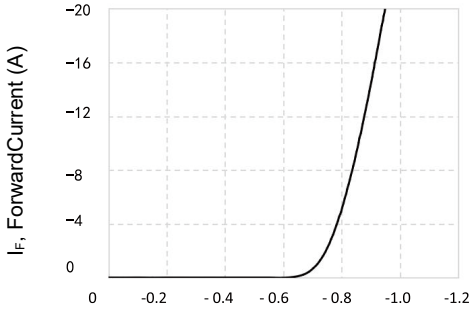


Figure 4: Body Diode Forward Voltage Variation with Source Current and temperature

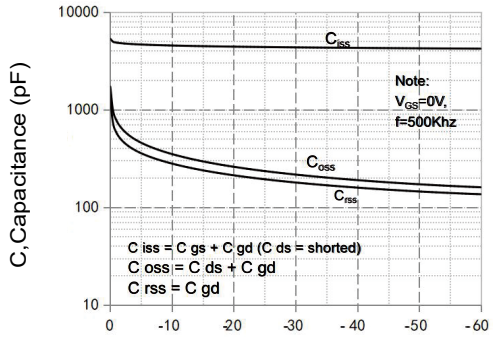


Figure 5: Capacitance Characteristics

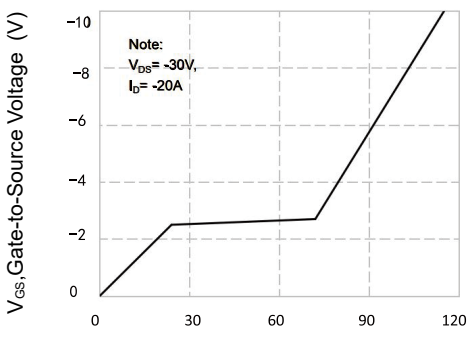


Figure 6: Gate Charge Characteristics

7.2Typical Characterisitics

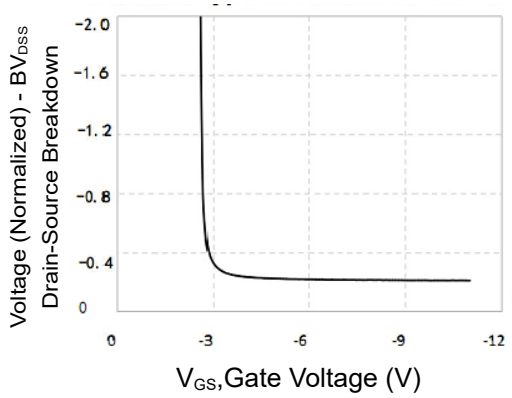


Figure 7: Breakdown Voltage Variation vs Gate-Voltage

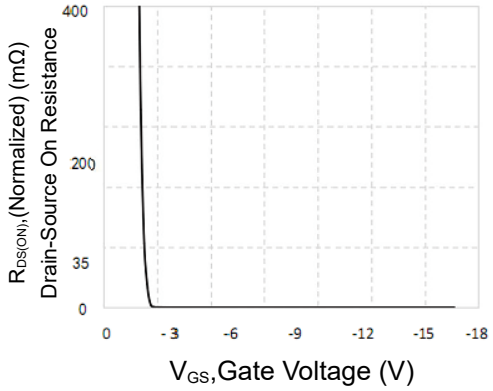


Figure 8: On-Resistance Variation vs Gate Voltage

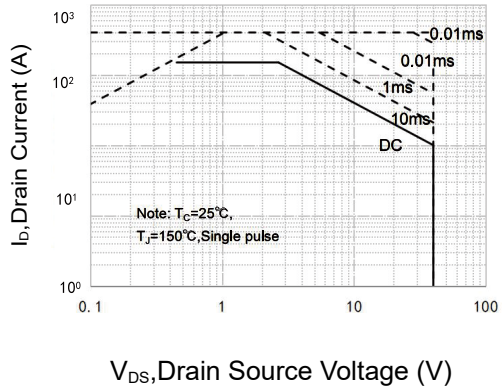


Figure 9: Maximum Safe Operating Area

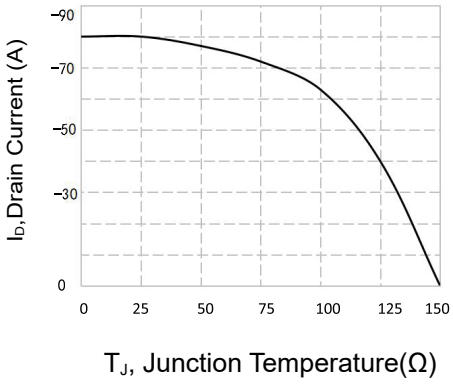


Figure 10: Maximum Continuous Drain Current vs Case Temperature

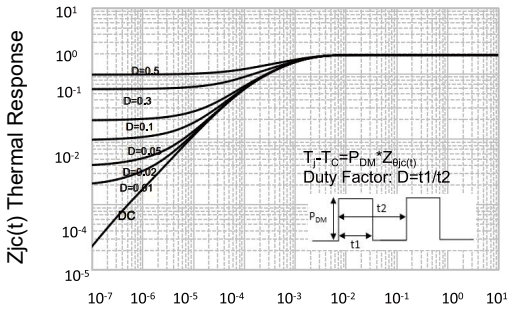
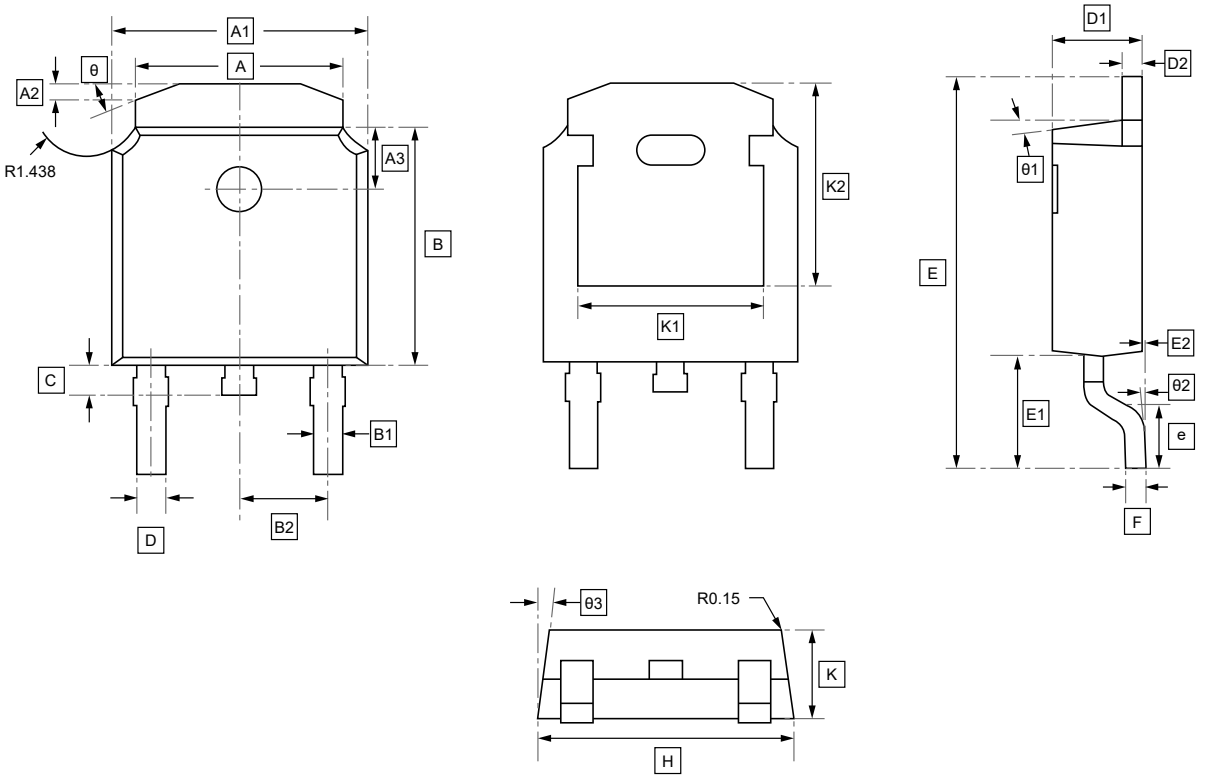


Figure 11: Transient Thermal Response Curve

8.TO-252 Package Outline Dimensions

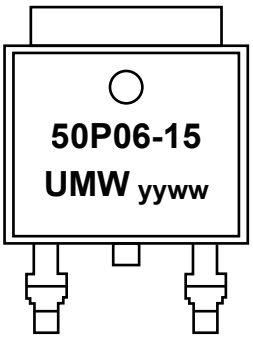


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	B	B1	B2	C	D	D1	D2	E
Min	5.20	6.50	0.40	1.40	6.00	0.740	2.286	0.60	0.74	2.15	0.50	9.80
Max	5.46	6.70	(typ)	1.80	6.20	0.940	(typ)	1.0	0.86	2.45	(typ)	10.40

Symbol	E1	E2	e	F	H	K	K1	K2	θ	θ1	θ2	θ3
Min	2.60	0.00	1.65	0.50	6.50	2.15	4.63	5.10	20°	7°	0°	7°
Max	3.20	0.127	(typ)	0.60	6.70	2.45	5.03	5.50	(typ)	(typ)	8°	(typ)

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW SUD50P06-15	TO-252	2500	Tape and reel

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