UMW SI4425DY

-30V P-Channel MOSFET

1.Features

- $V_{DS(V)}$=-30V, Q_g=22nC
- $R_{DS(ON)}$<12.5mΩ(V_{GS}=-10V), I_D=-10A
- $R_{DS(ON)}$<18mΩ(V_{GS}=-4.5V), I_D=-7A

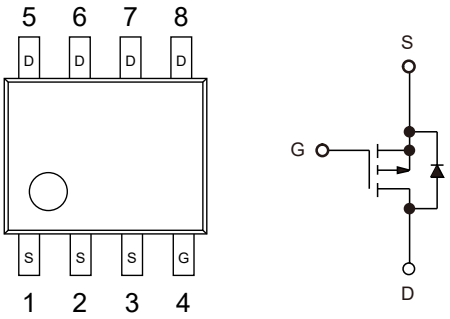
2.Applications

- Load Switches
- Notebook PCs
- Desktop PCs

3.Pinning information

Pin	Symbol	Description
4	G	GATE
1,2,3	S	SOURCE
5,6,7,8	D	DRAIN

SOP-8



4.Absolute Maximum Ratings T_A= 25°C

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current (T_J = 150 °C)	T_C=25°C	I_D	-11.6	A
	T_C=70°C		-10.5	
	T_A=25°C		-8.7[a,b]	
	T_A=70°C		-7.7[a,b]	
Pulsed Drain Current		I_{DM}	-40	
Continuous Source-Drain Diode Current	T_C=25°C	I_S	-4.6	
	T_A=25°C		2[a,b]	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	-20	
Single Pulse Avalanche Energy		E_{AS}	20	mJ
Maximum Power Dissipation	T_C=25°C	P_D	5.6	W
	T_C=70°C		3.6	W
	T_A=25°C		2.5[a,b]	W
	T_A=70°C		1.6[a,b]	W
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 to 150	°C

5.Thermal Resistance Rating

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [a,c]	t ≤10s	R_{thJA}	39	50	°C/W
Maximum Junction-to-Foot	Steady-State	R_{thJF}	18	22	°C/W

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

b. t=10s.

c. Maximum under Steady State conditions is 85 °C/W.

d. Based on T_C=25 °C.

6.T_J=25°C unless otherwise noted

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{DS}=0V, I_D=-250μA	-30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D=-250μA		-31		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			5.5		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1		-3	V
Gate-Source Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±25V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V, V_{GS}=0V			-1	μA
		V_{DS}=-30V, V_{GS}=0V, T_J=55°C			-5	
On-State Drain Current[a]	$I_{D(ON)}$	V_{DS}≥-10V, V_{GS}=-10V	-30			A
Drain-Source On-State Resistance[a]	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-10A		11	12.5	mΩ
		V_{GS}=-4.5V, I_D=-7A		12	18	
Forward Transconductance[a]	g_{FS}	V_{DS}=-10V, I_D=-10A		23		S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, f=1MHz		1960		pF
Output Capacitanc	C_{oss}			380		
Reverse Transfer Capacitance	C_{rss}			325		
Total Gate Charge	Q_g	V_{DS}=-15V, V_{GS}=-10V, I_D=-10A		43	65	nC
		V_{DS}=-15V, V_{GS}=-4.5V I_D=-10A		22	33	
Gate Source Charge	Q_{gs}			6		
Gate Drain Charge	Q_{gd}			11		
Gate Resistance	R_g	f=1MHz	0.3	1.3	2.5	Ω
Turn-On DelayTime	$t_{D(on)}$	V_{DD} =-15V, R_L=3Ω I_D≌-5A, V_{GEN}=-10V R_g=1Ω		11	22	ns
Rise Time	t_r			13	25	
Turn-Off DelayTime	$t_{D(off)}$			32	50	
Fall Time	t_f			9	18	

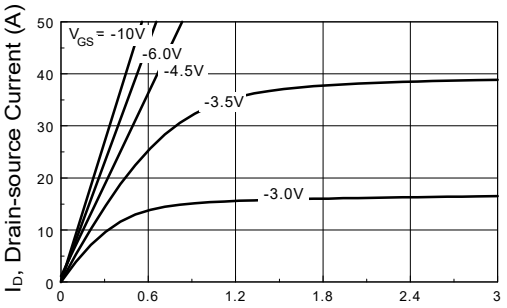
Turn-On DelayTime	$t_{D(on)}$	V_{DD} =-15V, R_L=3Ω I_D≌-5A, V_{GEN}=-4.5V R_g=1Ω		44	70	ns
Rise Time	t_r			100	160	ns
Turn-Off DelayTime	$t_{D(off)}$			28	50	ns
Fall Time	t_f			15	30	ns
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C=25°C			-4.6	A
Pulse Diode Forward Current	I_{SM}				-50	A
Body Diode Voltage	V_{SD}	I_S=-2A, V_{GS}=0V		-0.75	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=-2A, dI/dt=100A/μs T_J=25°C		28	45	ns
Body Diode Reverse Recovery Charge	Q_{rr}			20	40	nC
Reverse Recovery Fall Time	t_a			13		ns
Reverse Recovery Rise Time	t_b			15		ns

Notes:

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

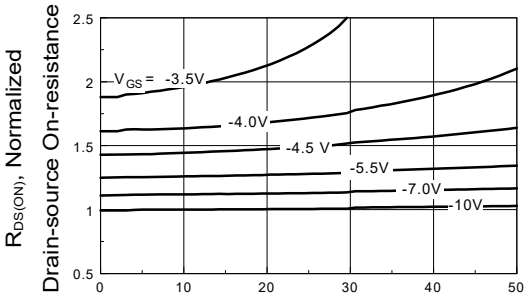
b. Guaranteed by design, not subject to production testing.

7.1Typical Characterisitics



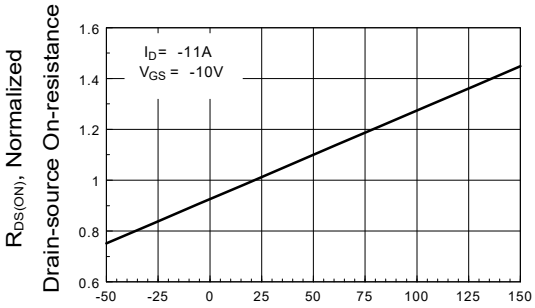
V_{DS}, Drain Source Voltage (V)

On-Region Characteristics



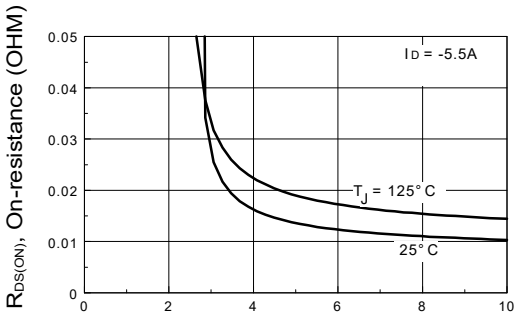
$-I_D$, Drain Current (A)

On-Resistance Variation with Dain Current and Gate Voltage



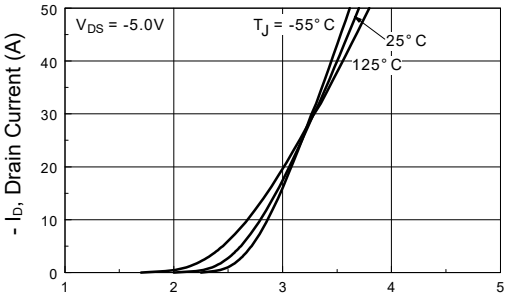
T_J, Junction Temperature (°C)

On-Resistance Variation with Temperature



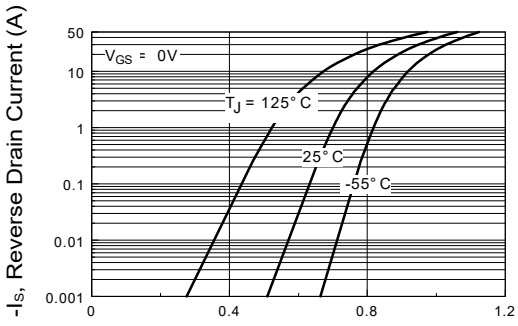
$-V_{GS}$, Gate To Source Voltage (V)

On-Resistance Variation with Gate-to-Source Voltage



$-V_{GS}$, Gate To Source Voltage (V)

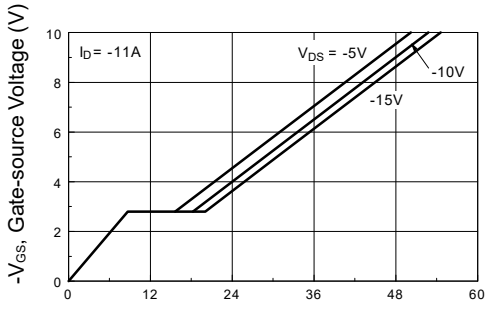
Transfer Characteristics



$-V_{SD}$, Body Diode Forward Voltage (V)

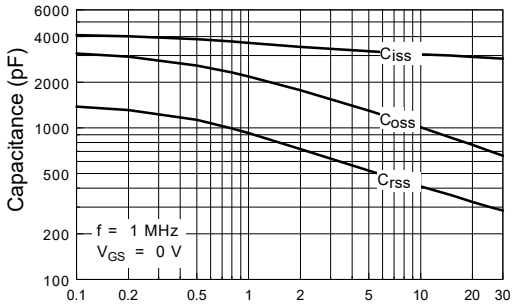
Body Diode Forward Voltage Variation with Source Current and Temperature

7.2Typical Characterisitics



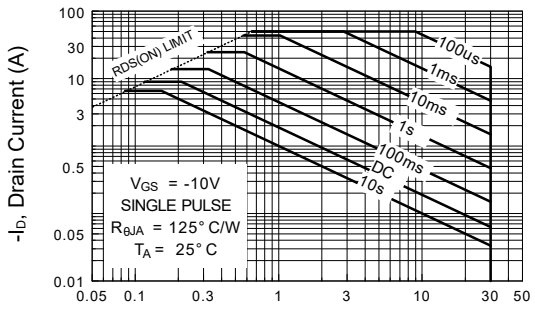
Q_g, Gate Charge (nC)

Gate Charge Characteristics



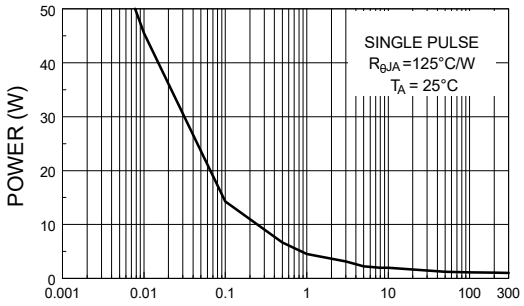
$-V_{DS}$, Drain to Source Voltage (V)

Capacitance Characteristics



$-V_{DS}$, Drain Source Voltage (V)

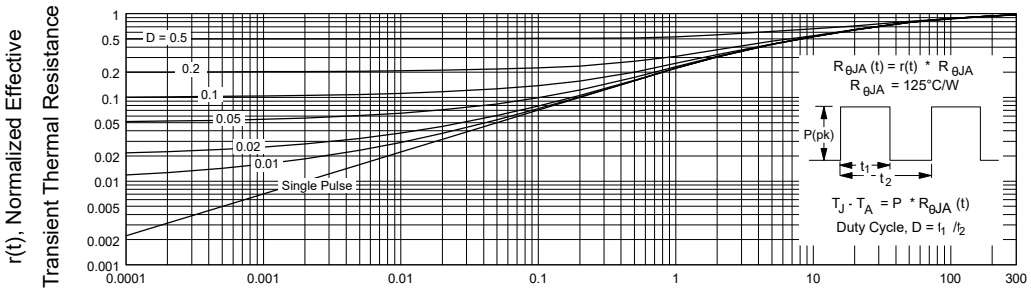
Maximum Safe Operating Area



Single Pulse Time (SEC)

Single Pulse Maximum Power Dissipation

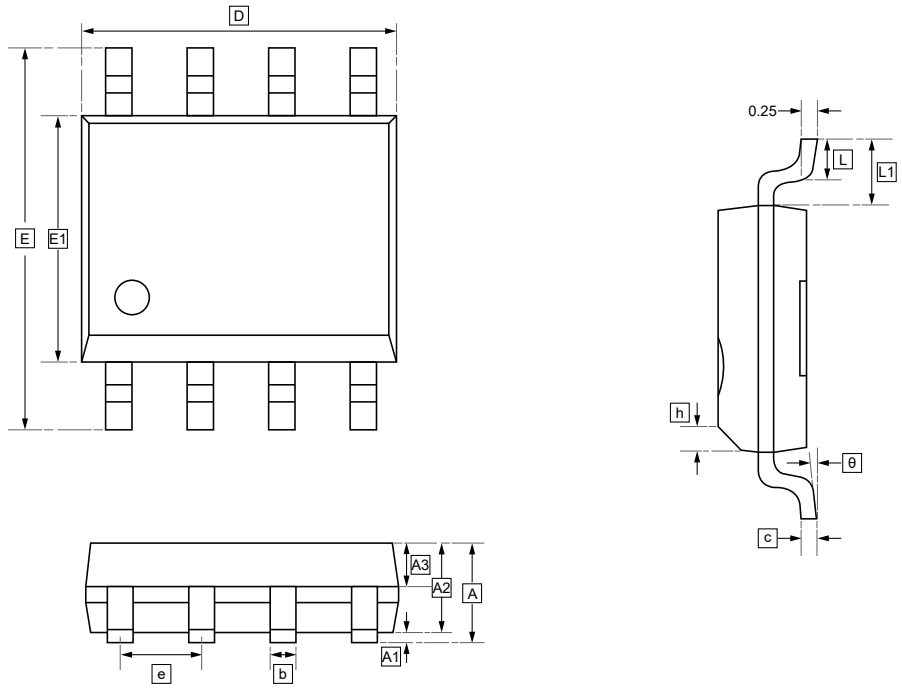
Thermal characterization performed using the conditions described in Note 1c.
Transient thermal response will change depending on the circuit board design.



t_1, TIME (sec)

Transient Thermal Response Curve

8.SOP-8 Package Outline Dimensions

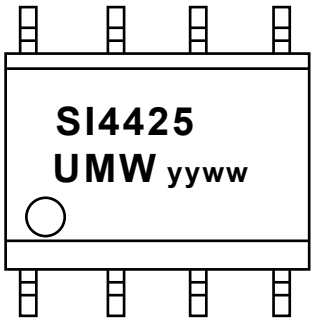


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.80	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.00	6.20	4.00	1.30	0.50	0.80

Symbol	L1	θ
Min	1.00	0°
Max	1.10	8°

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW SI4425DY	SOP-8	3000	Tape and reel

10.Disclaimer

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