UMW SI9948AEY

Dual P-Channel MOSFET

1.Features

- $V_{DS(V)}$=-60V
- I_D=-5.3A
- $R_{DS(ON)}$<54mΩ(V_{GS}=-10V)
- $R_{DS(ON)}$<59mΩ(V_{GS}=-4.5V)

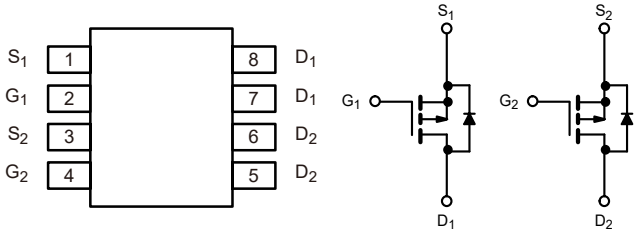
2.Applications

- Load Switches

3.Pinning information

Pin	Symbol	Description
2,4	G1,G2	GATE
1,3	S1,S2	SOURCE
5,6,7,8	D1,D2	DRAIN

SOP-8



4.Thermal Resistance Rating

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [a,c]	t ≤10s	R_{thJA}	38	50	°C/W
Maximum Junction-to-Foot	Steady-State	R_{thJF}	20	25	°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.

e. Limited by package.

5.Absolute Maximum Ratings T_A= 25°C

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current (T_J = 150 °C)	T_C=25°C	I_D	-5.3 [e]	A
	T_C=70°C		-5 [e]	
	T_A=25°C		-5.3 [a,b]	
	T_A=70°C		-5 [a,b]	
Pulsed Drain Current		I_{DM}	-32 [e]	
Continuous Source-Drain Diode Current	T_C=25°C	I_S	-4.1	
	T_A=25°C		-2 [a,b]	
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	4	W
	T_C=70°C		2.5	W
	T_A=25°C		2 [a,b]	W
	T_A=70°C		1.4 [a,b]	W
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 to 150	°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	-60			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D=-250μA		-3.1		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			4.5		
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}=±20V			±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=-5A		54		mΩ
		V_{GS}=-4.5V, I_D=-4.5A		59		
Forward Transconductance[a]	g_{FS}	V_{DS}=-10V, I_D=-5A		23		S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, f=1MHz		1345		pF
Output Capacitanc	C_{oss}			210		
Reverse Transfer Capacitance	C_{rss}			180		
Total Gate Charge	Q_g	V_{DS}=-15V, V_{GS}=-10V, I_D=-5A		32	50	nC
		V_{DS}=-15V, V_{GS}=-4.5V, I_D=-5A		15	25	
Gate Source Charge	Q_{gs}			4		
Gate Drain Charge	Q_{gd}			7.5		
Gate Resistance	R_g	f=1MHz		5.8		Ω
Turn-On DelayTime	$t_{D(on)}$	V_{DD} =-15V, R_L=15Ω, I_D≅-1A, V_{GEN}=-10V, R_g=1Ω		10	15	ns
Rise Time	t_r			8	15	
Turn-Off DelayTime	$t_{D(off)}$			45	70	
Fall Time	t_f			12	25	

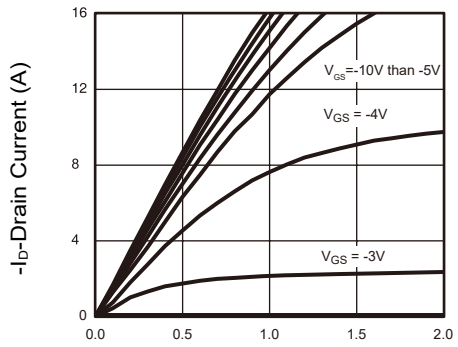
Turn-On DelayTime	$t_{D(on)}$	V_{DD} =-15V, R_L=15Ω I_D≅-1A, V_{GEN}=-4.5V R_g=1Ω		42	70	ns
Rise Time	t_r			35	60	ns
Turn-Off DelayTime	$t_{D(off)}$			40	70	ns
Fall Time	t_f			16	30	ns
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C=25°C			-4.1	A
Pulse Diode Forward Current [a]	I_{SM}				-32	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		34	60	ns
Body Diode Reverse Recovery Charge	Q_{rr}			22	40	nC
Reverse Recovery Fall Time	t_a			11		ns
Reverse Recovery Rise Time	t_b			23		ns

Notes:

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

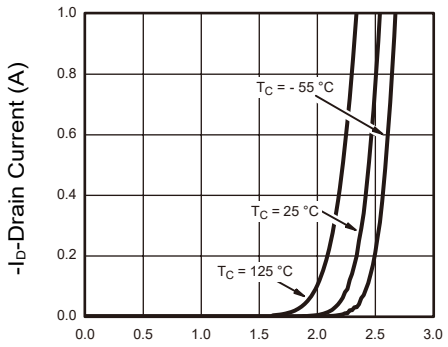
b. Guaranteed by design, not subject to production testing.

7.1Typical Characterisitics



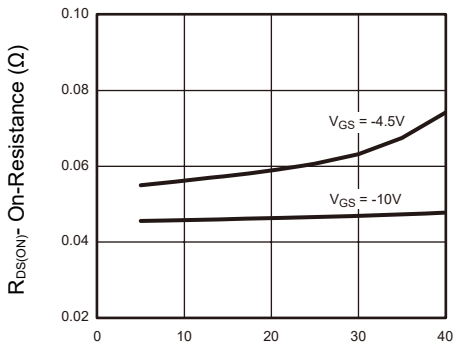
-V_{DS} - Drain-to-Source Voltage (V)

Output Characteristics



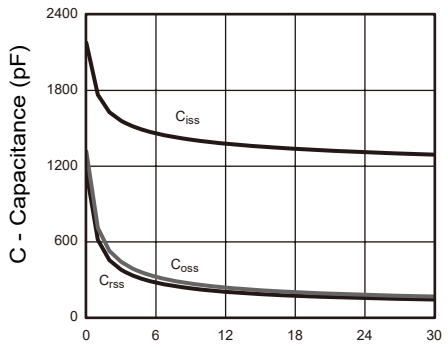
-V_{GS} - Gate-to-Source Voltage (V)

Transfer Characteristics



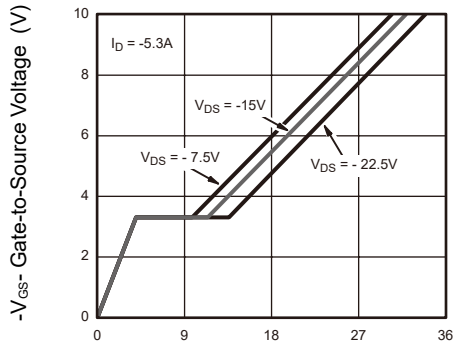
-I_D-Drain Current (A)

On-Resistance vs. Drain Current and Gate Voltage



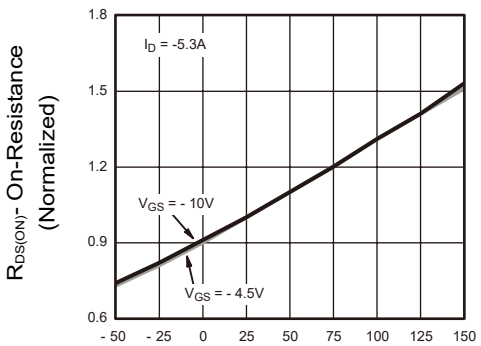
-V_{DS} - Drain-to-Source Voltage (V)

Capacitance



Q_g - Total Gate Charge (nC)

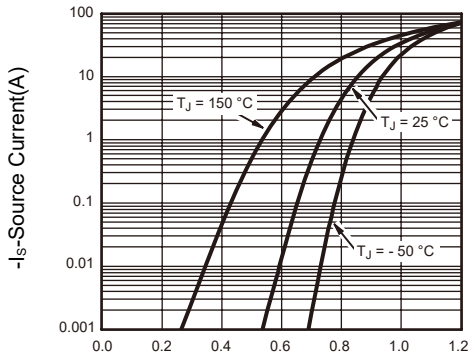
Gate Charge



T_J - Junction Temperature (°C)

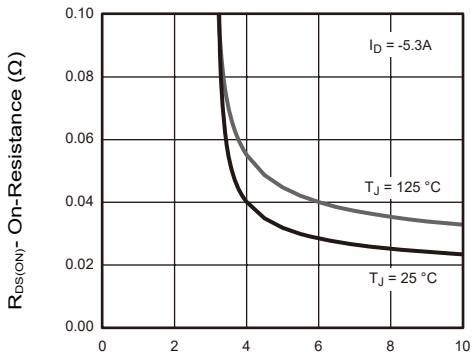
On-Resistance vs. Junction Temperature

7.2Typical Characterisitics



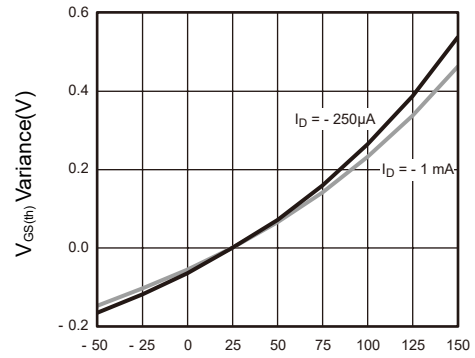
-V_{SD} - Source-to-Drain Voltage (V)

Source-Drain Diode Forward Voltage



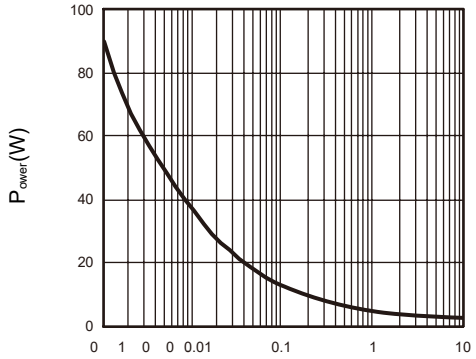
-V_{GS} - Gate-to-Source Voltage (V)

On-Resistance vs. Gate-to-Source Voltage



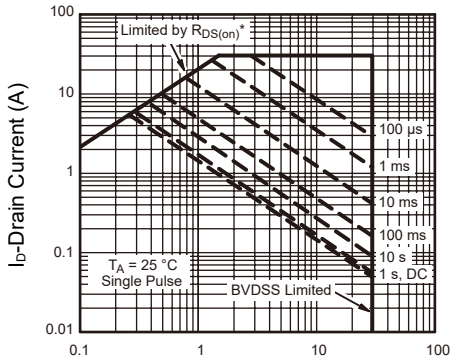
T_J - Temperature (°C)

Threshold Voltage



Time (s)

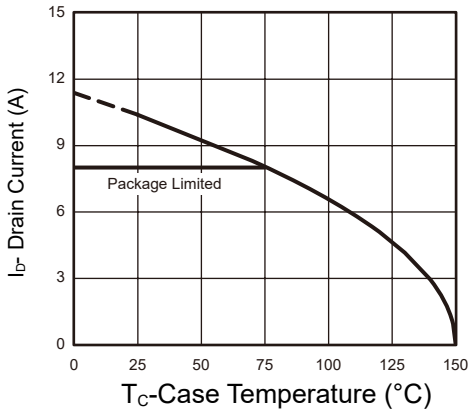
Single Pulse Power, Junction-to-Ambient



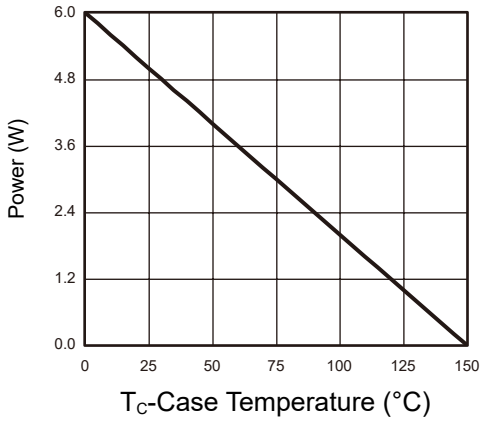
V_{DS} - Drain-to-Source Voltage (V)* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

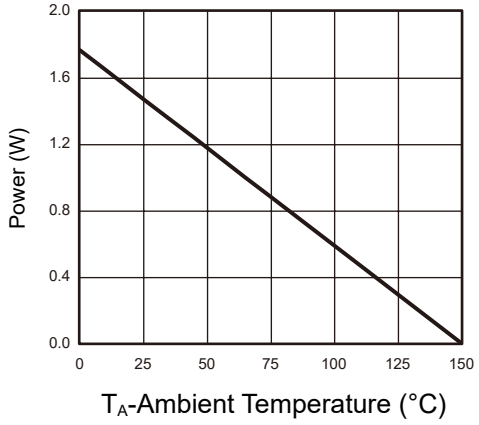
7.3Typical Characterisitics



Current Derating*



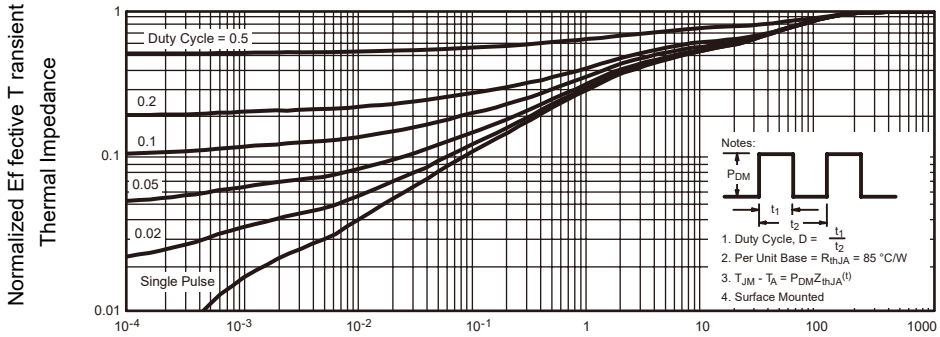
Power, Junction-to-Foot



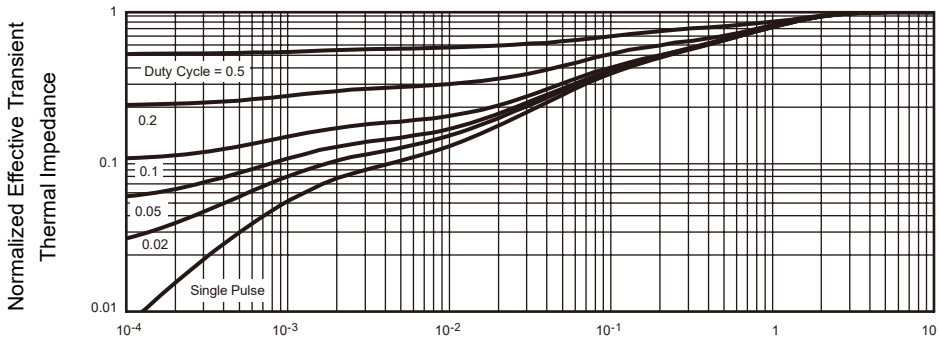
Power, Junction-to-Ambient

* The power dissipation P_D is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

7.4Typical Characterisitics

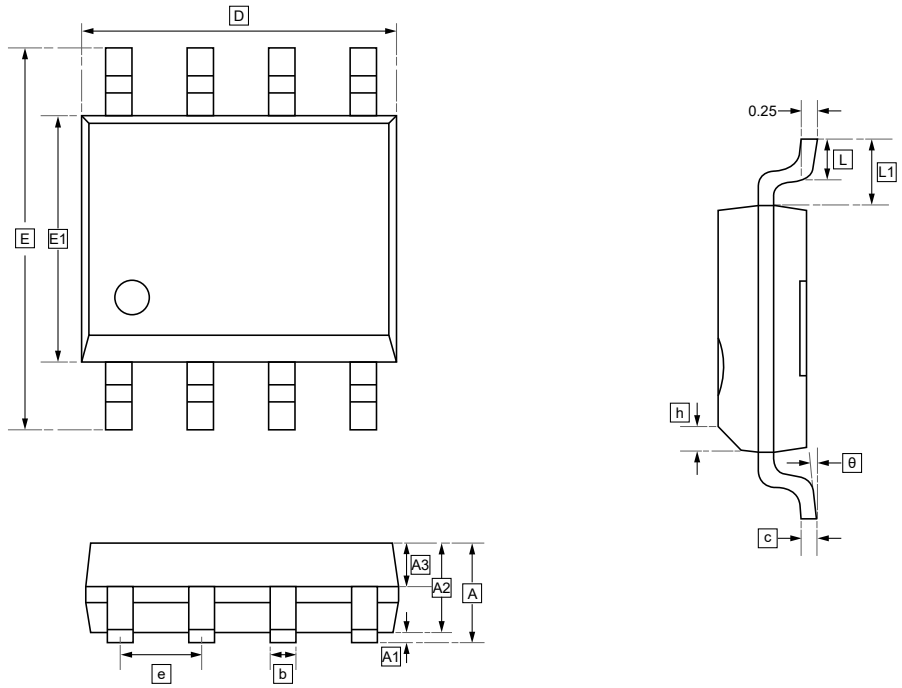


Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

8.SOP-8 Package Outline Dimensions

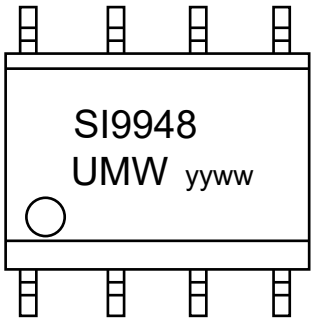


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.70	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.10	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 SI9948AEY	SOP-8	3000	Tape and reel

10.Disclaimer

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