UMW SI2333CDS

-12V P-Channel MOSFET

1.Features

- $V_{DS(V)}$=-12V
- Q_g=9nC
- $R_{DS(ON)}$<35mΩ(V_{GS}=-4.5V), I_D=-5.1A
- $R_{DS(ON)}$<45mΩ(V_{GS}=-2.5V), I_D=-4.5A
- $R_{DS(ON)}$<59mΩ(V_{GS}=-1.8V), I_D=-3.9A

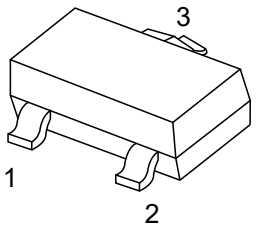
2.Applications

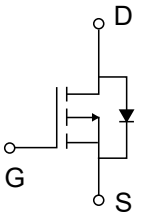
- Load Switch
- PA Switch

3.Pinning information

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

SOT-23





4.Absolute Maximum Ratings T_A= 25°C

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-12	V
Gate-Source Voltage		V_{GS}	±8	
Continuous Drain Current (T_J = 150 °C)	T_C=25°C	I_D	-7.1	A
	T_C=70°C		-5.7	
	T_A=25°C		-5.1[bc]	
	T_A=70°C		-4[bc]	
Pulsed Drain Current		I_{DM}	-20	
Continuous Source-Drain Diode Current	T_C=25°C	I_S	-1	
	T_A=25°C		-0.63[bc]	

Maximum Power Dissipation	T_C=25°C	P_D	2.5	W
	T_C=70°C		1.6	
	T_A=25°C		1.25[b,c]	
	T_A=70°C		0.8[b,c]	
Junction and Storage Temperature Range		T_J,T_{STG}	-55 to 150	°C

5.Thermal resist ance rating

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [b,d]	t ≤5s	R_{thJA}	75	100	°C/W
Maximum Junction-to-Foot (Drain)	Steady-State	R_{thJF}	40	50	°C/W

Notes:

a. Based on T_C=25 °C.

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

c. t=5s.

d. Maximum under Steady State conditions is 166 °C/W.

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	-12			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D=-250μA		-13		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			2.6		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.4		-1	V
Gate-Source Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±8V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-12V, V_{GS}=0V			-1	μA
		V_{DS}=-12V, V_{GS}=0V, T_J=55°C			-10	
On-State Drain Current[a]	$I_{D(ON)}$	V_{DS}≤-5V, V_{GS}=-4.5V	-20			A
Drain-Source On-State Resistance[a]	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-5.1A		28.5	35	mΩ
		V_{GS}=-2.5V, I_D=-4.5A		36	45	
		V_{DS}=-1.8V, I_D=-2A		46	59	
Forward Transconductance[a]	g_{FS}	V_{DS}=-5V, I_D=-5.3A		18.5		S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{DS}=-6V, V_{GS}=0V, f=1MHz		1225		pF
Output Capacitanc	C_{oss}			315		
Reverse Transfer Capacitance	C_{rss}			260		
Total Gate Charge	Q_g	V_{DS}=-6V, V_{GS}=-4.5V, I_D=-5.1A		15	25	nC
		V_{DS}=-6V, V_{GS}=-2.5V, I_D=-5.1A		9	15	
Gate Source Charge	Q_{gs}			1.9		
Gate Drain Charge	Q_{gd}			3.8		
Gate Resistance	R_g	f=1MHz		4		Ω
Turn-On DelayTime	$t_{D(on)}$	V_{DD} =-6V, R_L=6Ω, I_D=-1A, V_{GEN}=-4.5V, R_g=1Ω		13	20	ns
Rise Time	t_r			35	60	
Turn-Off DelayTime	$t_{D(off)}$			45	70	
Fall Time	t_f			12	20	

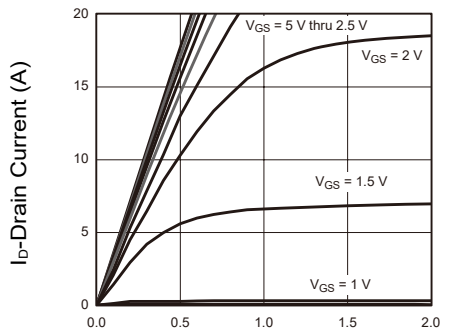
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C=25°C			-1	A
Pulse Diode Forward Current [a]	I_{SM}				-20	A
Body Diode Voltage	V_{SD}	I_S=-1A		-0.7	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=-1A, dI/dt=100A/μs T_J=25°C		32	50	ns
Body Diode Reverse Recovery Charge	Q_{rr}			20	40	nC
Reverse Recovery Fall Time	t_a			16		ns
Reverse Recovery Rise Time	t_b			16		ns

Notes:

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

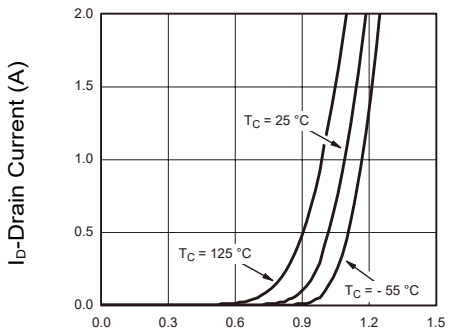
b. Guaranteed by design, not subject to production testing.

7.1Typical Characterisitics



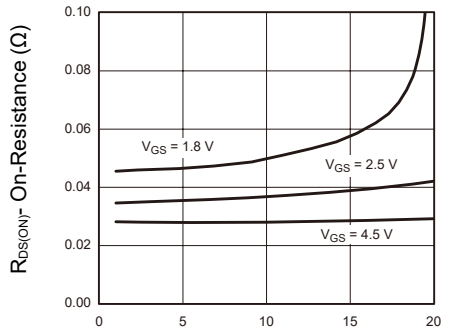
V_{DS} - Drain-to-Source Voltage (V)

Output Characteristics



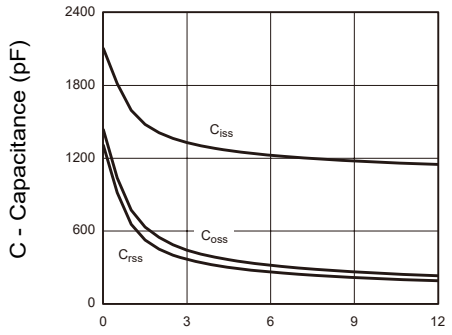
V_{GS} - Gate-to-Source Voltage (V)

Transfer Characteristics



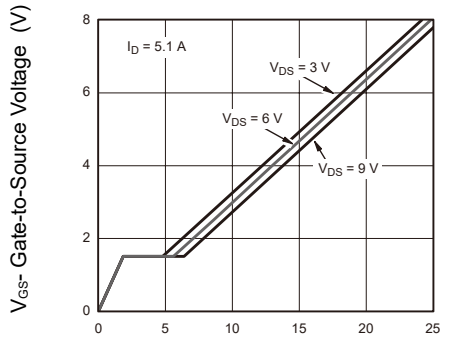
I_D-Drain Current (A)

On-Resistance vs. Drain Current and Gate Voltage



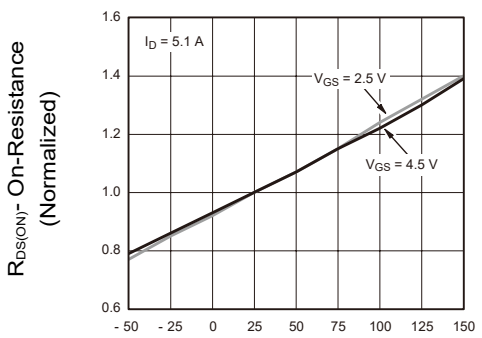
V_{DS} - Drain-to-Source Voltage (V)

Capacitance



Q_g - Total Gate Charge (nC)

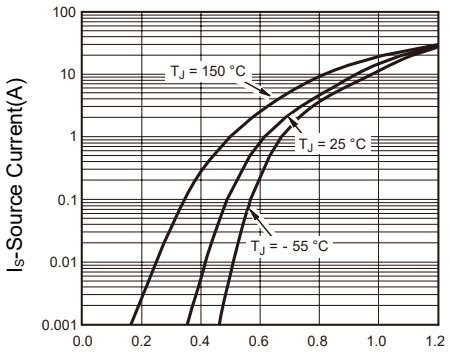
Gate Charge



T_J - Junction Temperature (°C)

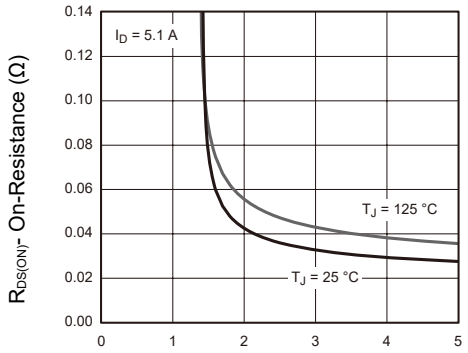
On-Resistance vs. Junction Temperature

7.2Typical Characterisitics



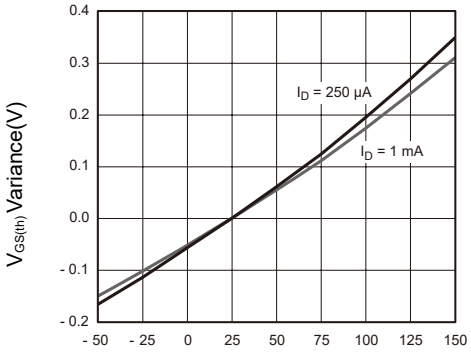
V_{SD} - Source-to-Drain Voltage (V)

Source-Drain Diode Forward Voltage



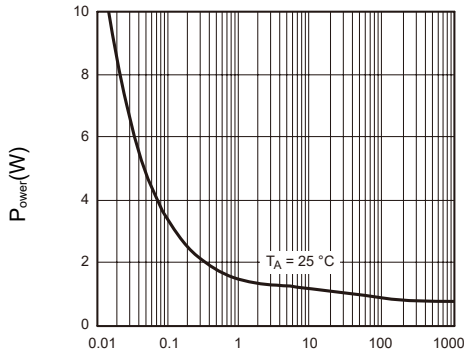
V_{GS} - Gate-to-Source Voltage (V)

On-Resistance vs. Gate-to-Source Voltage



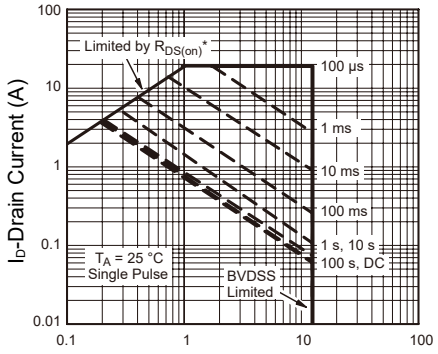
T_J - Temperature (°C)

Threshold Voltage



Time (s)

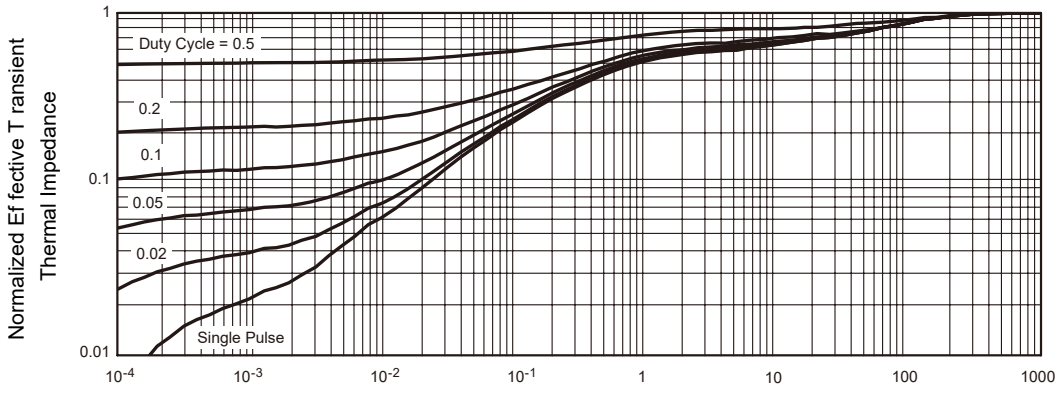
Single Pulse Power, Junction-to-Ambient



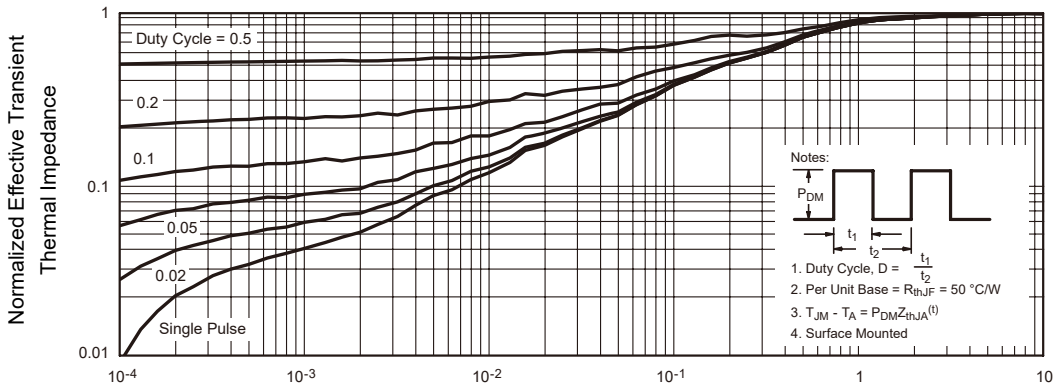
V_{DS} - Drain-to-Source Voltage (V)* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

7.3Typical Characterisitics

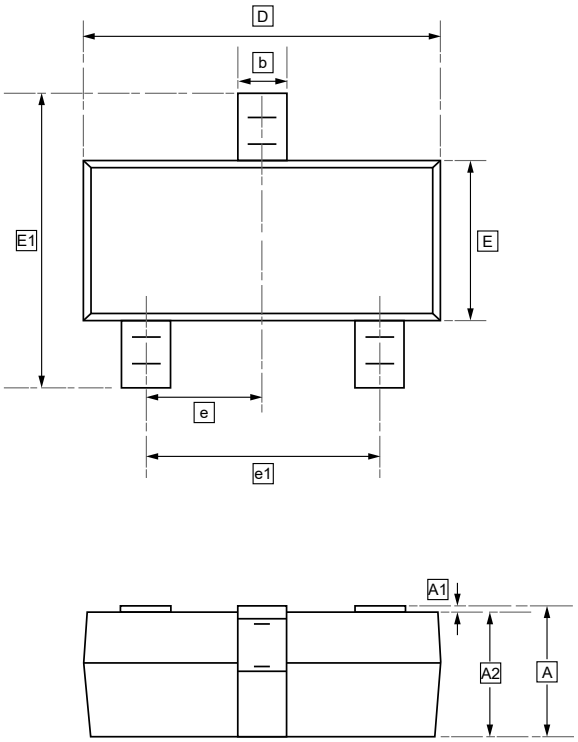


Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

8.SOT-23 Package Outline Dimensions

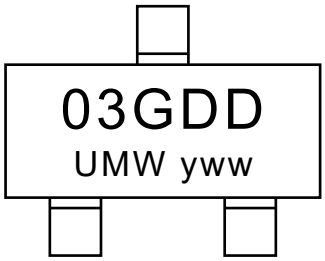


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	C	D	E	E1	e	e1	L	L1
Min	0.90	0.00	0.90	0.30	0.08	2.80	1.20	2.25	0.95	1.80	0.55	0.30
Max	1.15	0.10	1.05	0.50	0.15	3.00	1.40	2.55	TYP.	2.00	REF	0.50

Symbol	F	θ	θ1
Min	0.25	0°	2°
Max		8°	12°

9.Ordering information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW SI2333CDS	SOT-23	3000	Tape and reel

10.Disclaimer

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