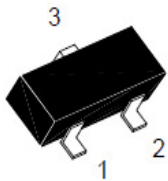## N-Channel High Density Trench MOSFET

◆ **Features**

1．Advanced Trench Process Technology.

2．High Density Cell Design for Ultra Low On-Resistance.
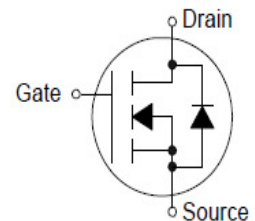
3．RoHS Compliant.

PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(on)}$ (m-ohm) Max
30V	4.0A	37 @ VGS = 10V, ID=4.0A
		49 @ VGS = 4.5V, ID=3.5A

SM2306 Pin Assignment & Symbol

3-Lead Plastic **SOT-23**
Pin 1: Gate 2: Source 3: Drain

◆ **Ordering Information**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
SM2306 SR L	SM2306 SR G	SOT-23	G	S	D	Tape Reel

SM2306X X X

(1) Package Type

(2) Packing Type

(3) Lead Free

(1) S：SOT-23；

(2) R：Tape Reel

(3) G：Halogen Free；L：Lead Free

◆ Absolute Maximum Ratings (T$_A$=25°C, unless otherwise noted)

Symbol	Parameter	Ratings	Units
V$_{DS}$	Drain-Source Voltage	30	V
V$_{GS}$	Gate-Source Voltage	±20	V
I$_D$	Drain Current (Continuous) [a]	4	A
I$_{DM}$	Drain Current (Pulsed) [b]	20	A
P$_D$	Total Power Dissipation @TA=25°C	0.9	W
T$_j$, T$_{stg}$	Operating Junction and Storage Temperature Range	-55 to +150	°C
R$_{\theta JA}$	Thermal Resistance Junction to Ambient (PCB mounted) [c]	100	°C/W

a:Fused current that based on wire numbers and diameter

b:Repetitive Rating: Pulse width limited by the maximum junction temperature
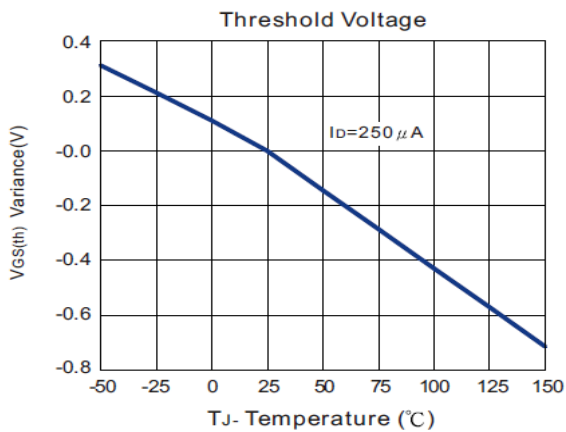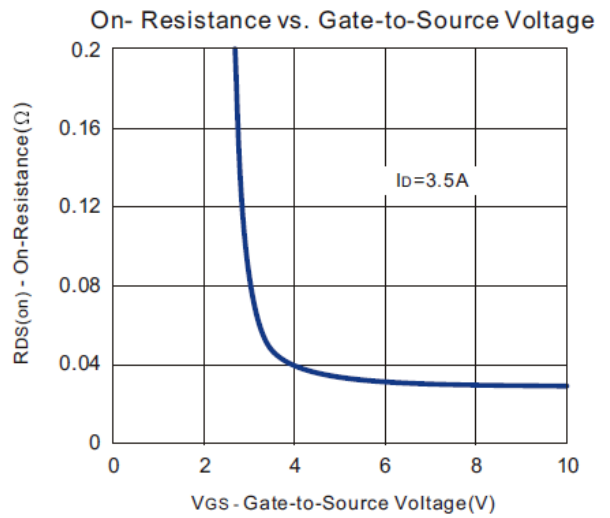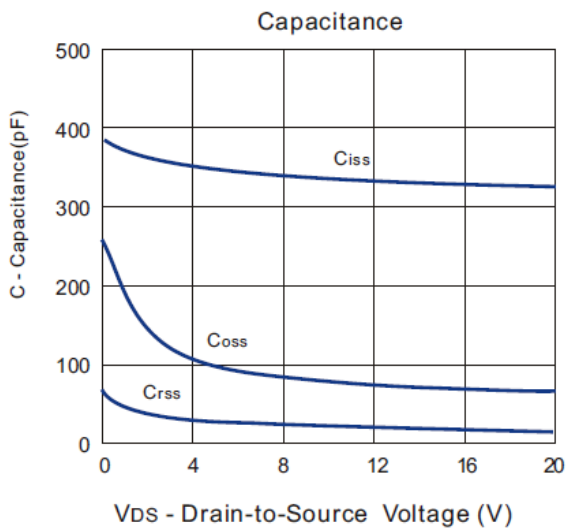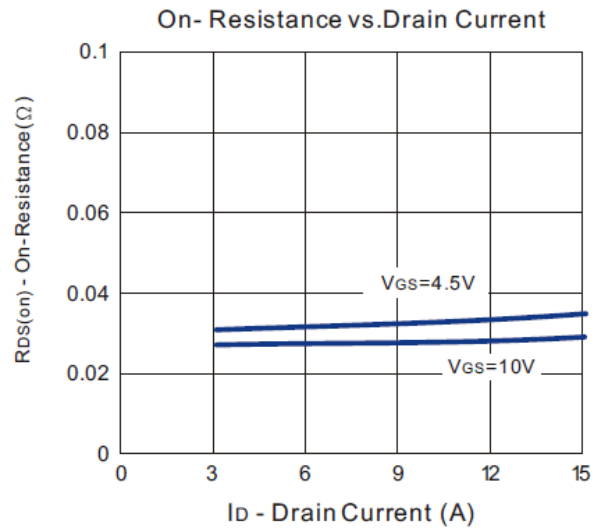
c:1-in^2 2oz Cu PCB board

◆ Electrical Characteristics (T$_A$=25°C, unless otherwise noted)

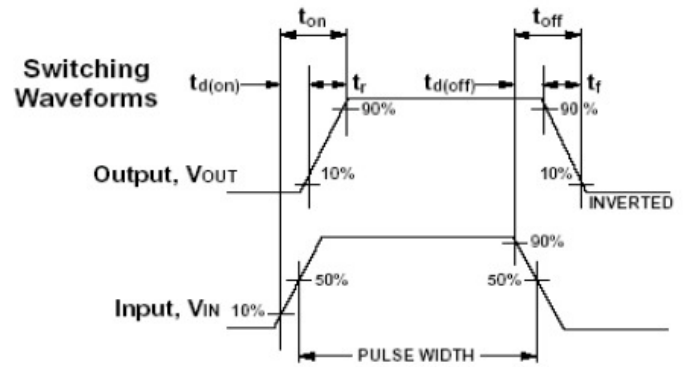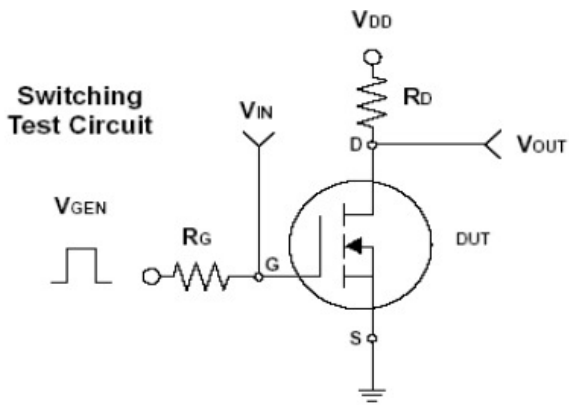| Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
● Off Characteristics						
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V, I$_D$=250uA	30	-	-	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=30V, V$_{GS}$=0V	-	-	1	uA
I$_{GSS}$	Gate-Body Leakage Current	V$_{GS}$=±20V, V$_{DS}$=0V	-	-	±100	nA
● On Characteristics						
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=250uA	1	-	3	V
R$_{DS(on)}$	Drain-Source On-State Resistance	V$_{GS}$=10V, I$_D$=4.0A	-	27	37	mΩ
		V$_{GS}$=4.5V, I$_D$=3.5A	-	35	49	
● Dynamic Characteristics[d]						
C$_{iss}$	Input Capacitance	V$_{DS}$=15V, V$_{GS}$=0V, f=1MHz	-	240	-	pF
C$_{oss}$	Output Capacitance		-	110	-	
C$_{rss}$	Reverse Transfer Capacitance		-	17	-	
● Switching Characteristics[d]						
Q$_g$	Total Gate Charge	V$_{DS}$=15V,I$_D$=5.8,V$_{GS}$=10V	-	4.5	-	nC
Q$_{gs}$	Gate-Source Charge		-	1.2	-	
Q$_{gd}$	Gate-Drain Charge		-	1.7	-	
t$_{d(on)}$	Turn-on Delay Time	V$_{DD}$=15V, R$_G$=6Ω, I$_D$=1A V$_{GEN}$=10V,R$_L$=15Ω	-	8	-	nS
t$_r$	Turn-on Rise Time		-	12	-	
t$_{d(off)}$	Turn-off Delay Time		-	17	-	
t$_f$	Turn-off Fall Time		-	8	-	
● Drain-Source Diode Characteristics						
I$_S$	Maximum Diode Forward Current		-	-	2.5	A
V$_{SD}$	Drain-Source Diode Forward Voltage	V$_{GS}$=0V, I$_S$=1A	-	0.76	1	V

Note: Pulse Test: Pulse Width ≤300us, Duty Cycle≤2%

d: Guaranteed by design: not subject to production testing

◆ Characteristics Curve

Transfer Characteristics

On- Resistance vs.Drain Current

Capacitance

On- Resistance vs. Gate-to-Source Voltage

Threshold Voltage

◆ **Characteristics Curve**

Switching
Test Circuit

V$_{DD}$

V$_{IN}$

R$_D$

D

V$_{OUT}$

V$_{GEN}$

R$_G$

G

DUT

S

Switching
Waveforms

t$_{on}$

t$_{off}$

t$_{d(on)}$

t$_r$

t$_{d(off)}$

t$_f$

Output, V$_{OUT}$

90%

10%

90%

10%

INVERTED

Input, V$_{IN}$

90%

50%

50%

10%

PULSE WIDTH

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