

N-Channel Enhancement-Mode MOSFET(20V, 2.8A)



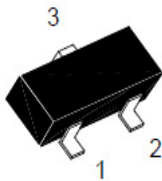
PRODUCT SUMMARY

V _{DSS}	I _D	R _{DS(on)} (m-ohm) Max
20V	2.8A	60 @ V _{GS} = 4.5V, I _D =2.8A
		115 @ V _{GS} = 2.5V, I _D =2.0A
		130 @ V _{GS} = 1.8V, I _D =2.0A

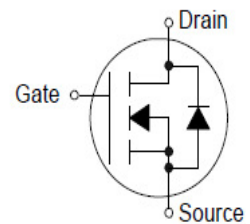
◆ Features

1. Advanced Trench Process Technology.
2. High Density Cell Design for Ultra Low On-Resistance.
3. Fully Characterized Avalanche Voltage and Current.
4. Improved Shoot-Through FOM.
5. RoHS Compliant.

SM2302 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	
SM2302SRL	SM2302SRG	SOT-23	G	S	D	Tape Reel
SM2302LR L	SM2302LRG	SOT-23-3L	G	S	D	Tape Reel

	SM2302X X X		
(1)Package Type	—	↑	↑
(2)Packing Type	—	—	↑
(3)Lead Free	—	—	—

(1) S:	SOT-23; L: SOT-23-3L
(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	20	V
V _{GS}	Gate-Source Voltage	±8	V
I _D	Drain Current (Continuous) ^a	2.8	A
I _{DM}	Drain Current (Pulsed) ^b	8	A
P _D	Total Power Dissipation @T _A =25°C	0.9	W
T _j , T _{stg}	Operating Junction and Storage Temperature Range	-55 to +150	°C
R _{θJA}	Thermal Resistance Junction to Ambient (PCB mounted) ^c	140	°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-in² 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	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V	-	-	1	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±8V, V _{DS} =0V	-	-	±100	nA
• On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	0.6	0.8	1.2	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =2.8A	-	40	60	mΩ
		V _{GS} =2.5V, I _D =2A	-	50	115	
		V _{GS} =1.8V, I _D =2A	-	80	130	
• Dynamic Characteristics^d						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHz	-	456.41	-	pF
C _{oss}	Output Capacitance		-	86.81	-	
C _{rss}	Reverse Transfer Capacitance		-	58.89	-	
• Switching Characteristics^d						
Q _g	Total Gate Charge	V _{DS} =10V, I _D =3.6A, V _{GS} =4.5V	-	4.5	-	nC
Q _{gs}	Gate-Source Charge		-	0.83	-	
Q _{gd}	Gate-Drain Charge		-	1.18	-	
t _{d(on)}	Turn-on Delay Time	V _{DD} =15V, R _L =5.5Ω, I _D =1A, V _{GEN} =4.5V, R _G =6Ω	-	11.24	-	nS
t _r	Turn-on Rise Time		-	3.48	-	
t _{d(off)}	Turn-off Delay Time		-	19.64	-	
t _f	Turn-off Fall Time		-	4.4	-	
• Drain-Source Diode Characteristics						
I _S	Maximum Diode Forward Current		-	-	1.6	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =1.6A	-	-	1.2	V

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

d: Guaranteed by design: not subject to production testing

◆ Characteristics Curve

Fig.1 Output Characteristic

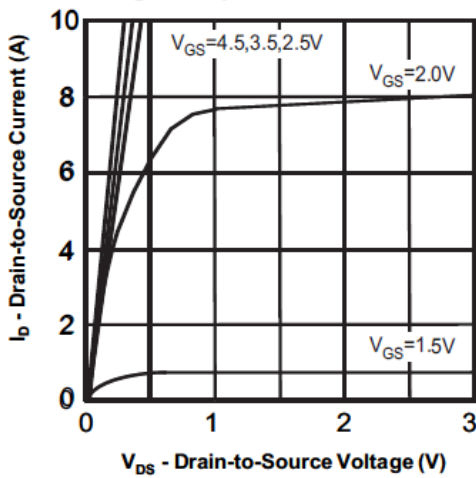


Fig.2 Transfer Characteristics

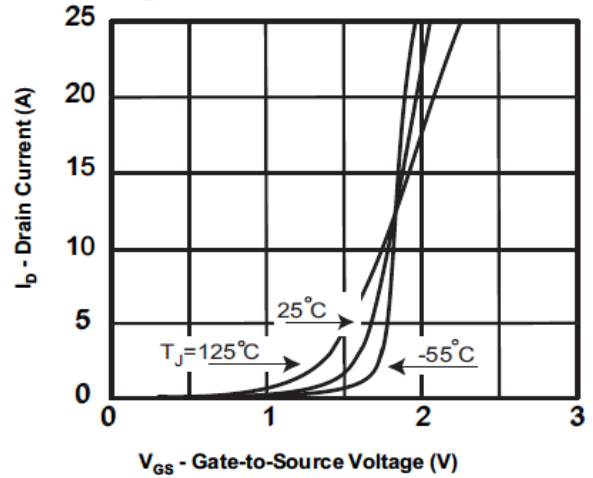


Fig.3 On-Resistance Variation with Temperature

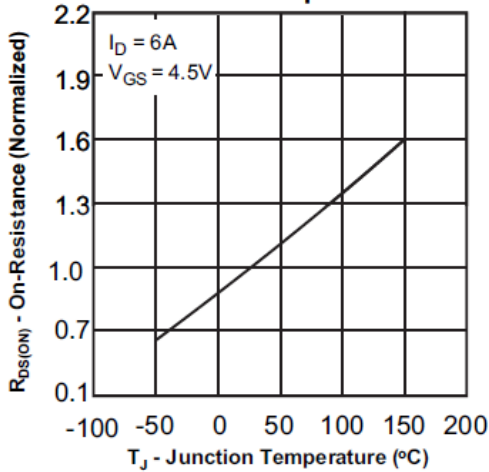


Fig.4 Body Diode Forward Voltage Variation with Source Current

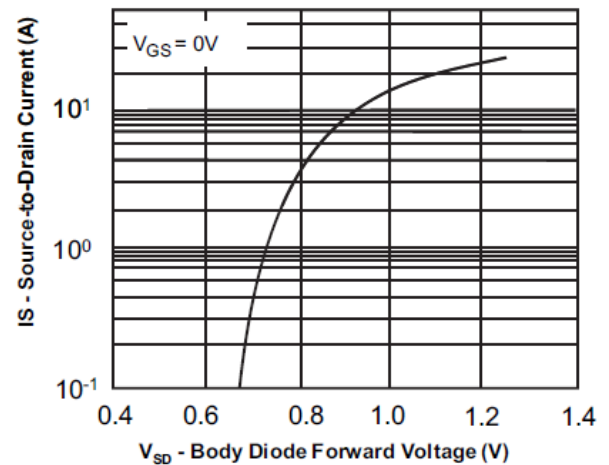


Fig.5 Gate Threshold Variation with Temperature

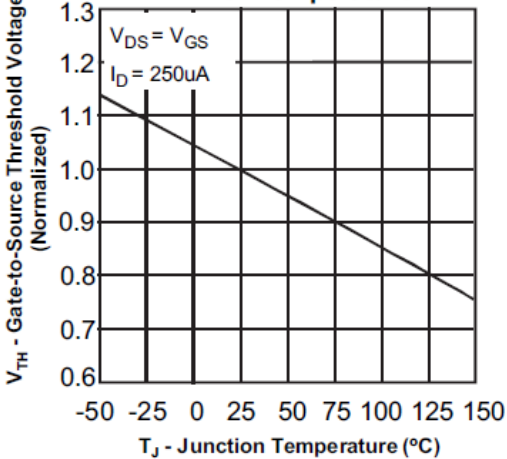
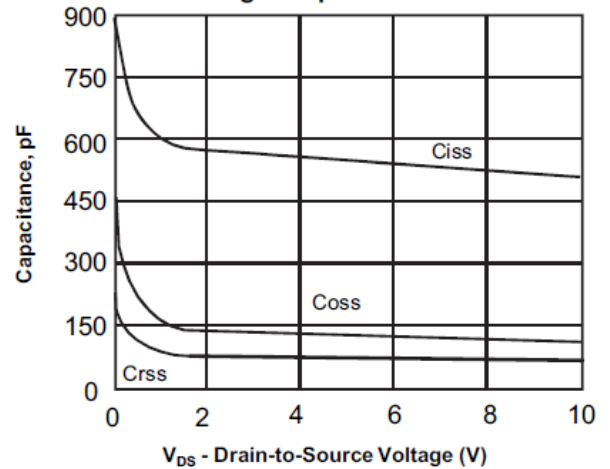


Fig.6 Capacitance



◆ Characteristics Curve

Fig. 7 Gate Charge Waveform

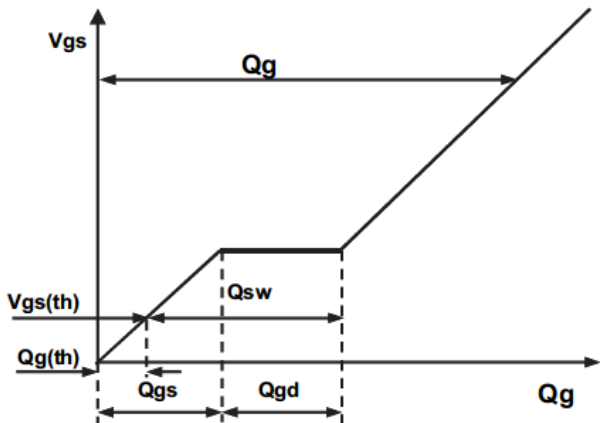


Fig. 8 Gate Charge

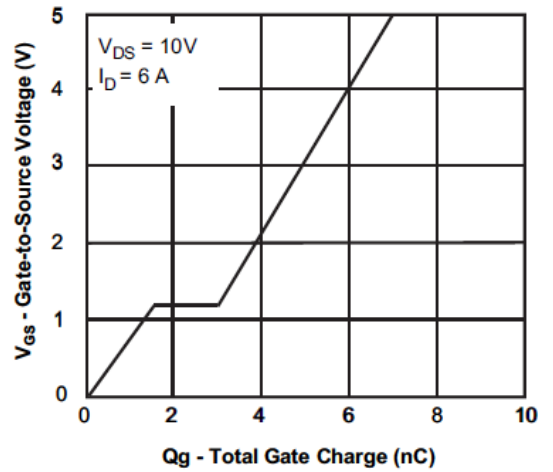


Fig. 9 Maximum Safe Operating Area

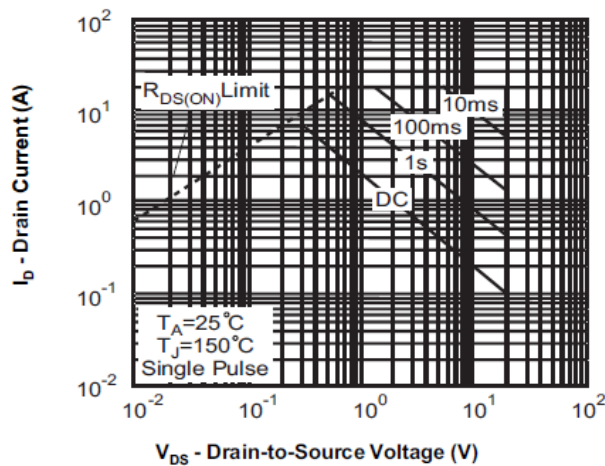
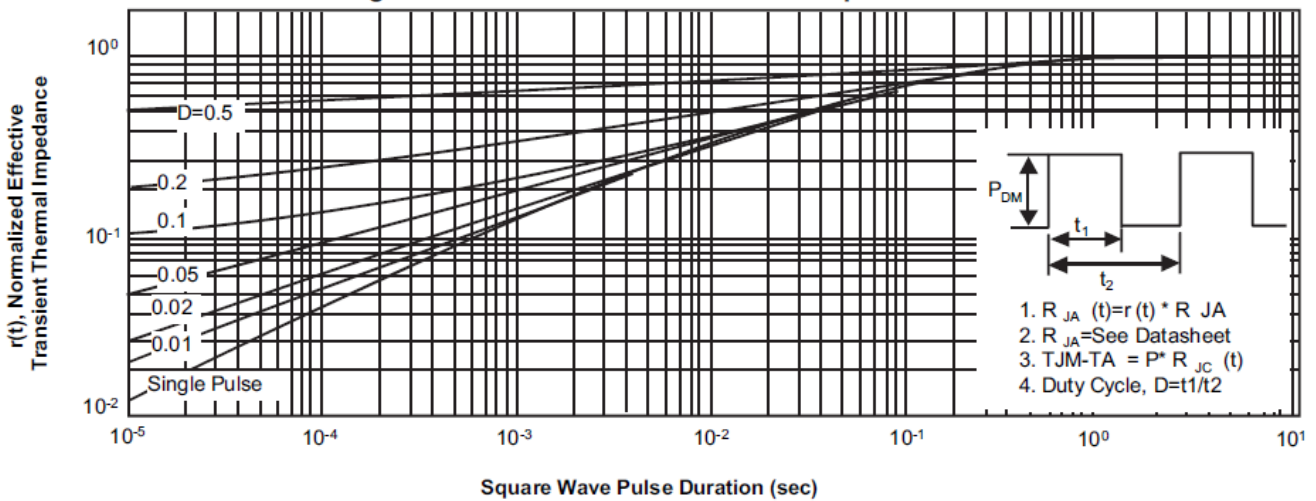
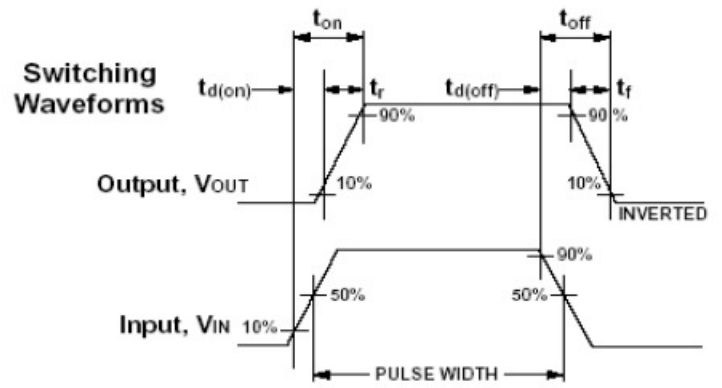
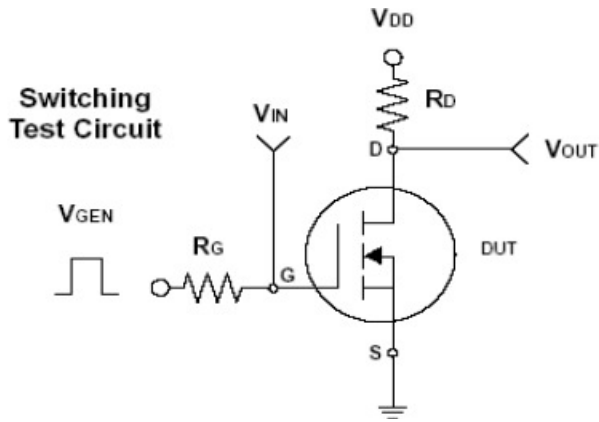


Fig. 10 Normalized Thermal Transient Impedance Curve



◆ Characteristics Curve



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