

N-Channel 20V(D-S) MOSFET

Product summary		
V_{DS}	20	V
$R_{DS(ON)}$ (at $V_{GS}=4.5V$) Typ.	21	m Ω
$R_{DS(ON)}$ (at $V_{GS}=2.5V$) Typ.	28	m Ω
I_D ($T_A=25^\circ C$)	4.2	A

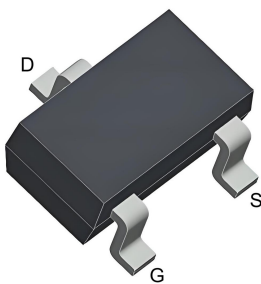
Features

- High Power and current handing capability
- Trench Power LV MOSFET technology
- RoHS Compliant

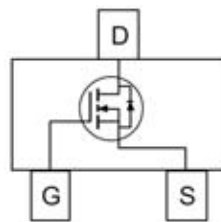
Applications

- Load Switch
- PWM application

Pin Configuration



SOT-23



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECG2302A	SOT-23	7"	3000pcs

Absolute Maximum Ratings (at $T_A=25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 10	V
I_D	Continuous Drain Current ^A	$T_A=25^\circ C$	4.2
		$T_A=70^\circ C$	3.1
I_{DM}	Pulse Drain Current Tested ^B	16	A
P_D	Power Dissipation ^A	$T_A=25^\circ C$	1.2
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JA}$	Thermal Resistance-Junction to ambient ^A	104	$^\circ C/W$

Electrical Characteristics (at $T_J = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V$	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 10V$	--	--	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.55	0.8	1.2	V
$R_{DS(ON)}$	Drain-Source On-State Resistance ^B	$V_{GS}=4.5V, I_D=4A$	--	21	27	m Ω
		$V_{GS}=2.5V, I_D=3A$	--	28	38	m Ω
V_{SD}	Diode Forward Voltage	$I_S=4A, V_{GS}=0V$	--	--	1.2	V
Dynamic and Switching Parameters ^C						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=20V$ $f=1\text{MHz}$	--	602	--	pF
C_{oss}	Output Capacitance		--	79	--	pF
C_{riss}	Reverse Transfer Capacitance		--	62	--	pF
Q_g	Total Gate Charge	$V_{DS}=10V, I_D=4.2A$ $V_{GS}=4.5V$	--	6.5	--	nC
Q_{gs}	Gate-Source Charge		--	1.6	--	nC
Q_{gd}	Gate-Drain Charge		--	1.5	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DS}=10V$ $I_D=4.2A, R_{GEN}=3\Omega,$ $V_{GS}=4.5V$	--	8	--	ns
t_r	Turn-on Rise Time		--	58	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	20	--	ns
t_f	Turn-off Fall Time		--	68	--	ns

A. The data tested by surface mounted on a 1 inch x 1 inch FR-4 board with 20Z copper.

B. Pulse Test: Pulse Width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

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

Typical Characteristics

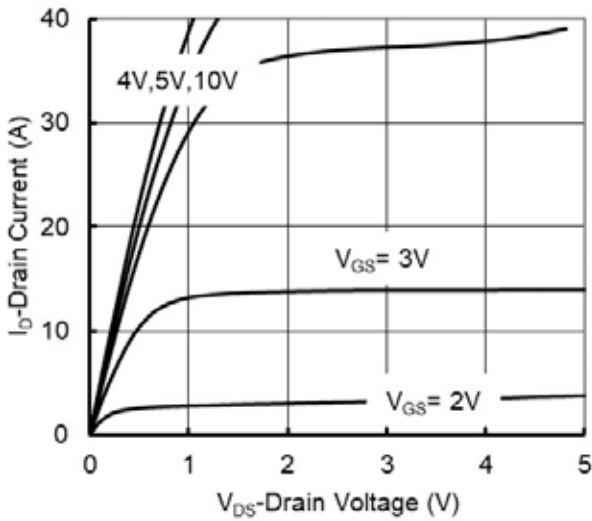


Figure1. Output Characteristics

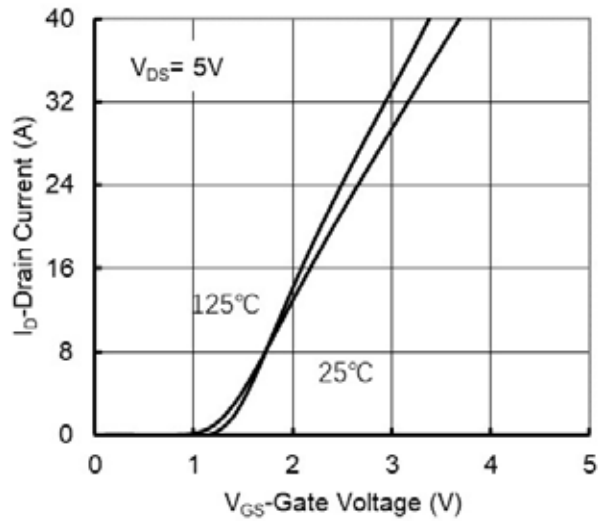


Figure2. Transfer Characteristics

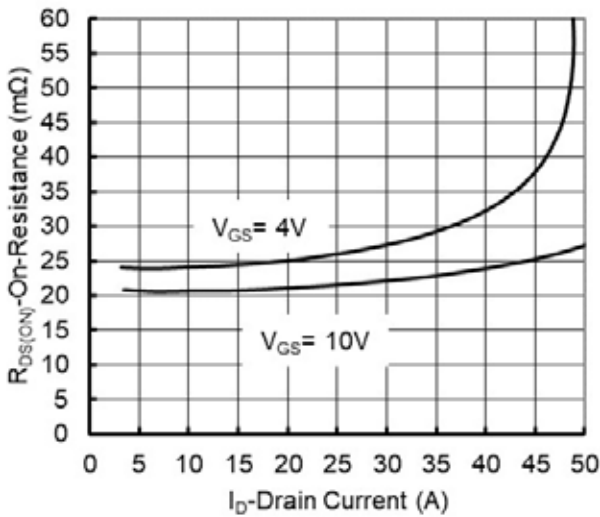


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

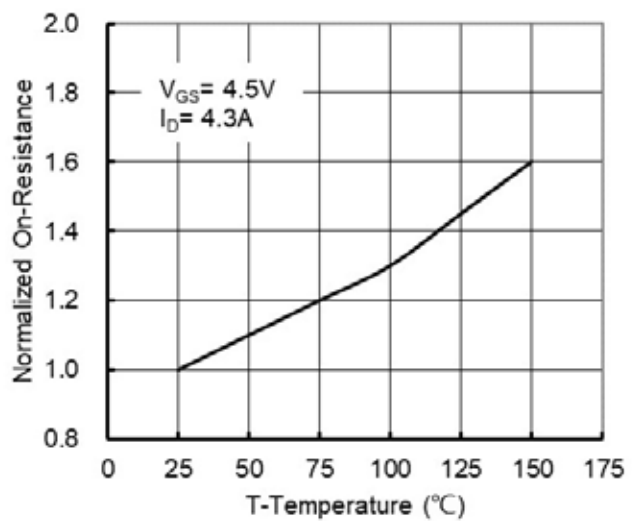


Figure 4: On-Resistance vs. Junction Temperature

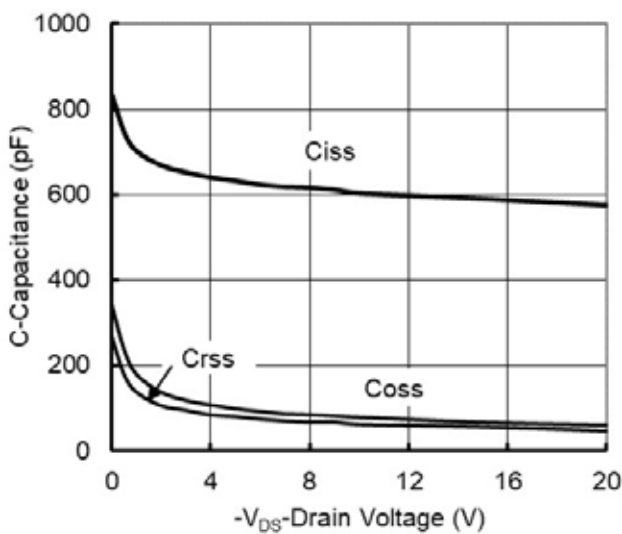


Figure5. Capacitance Characteristics

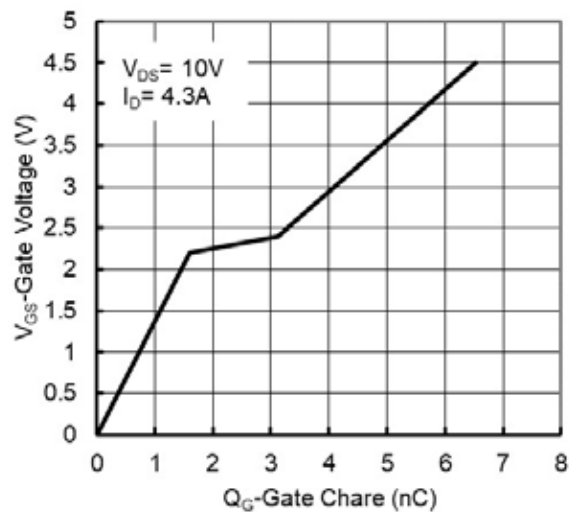


Figure6. Gate Charge

Typical Characteristics

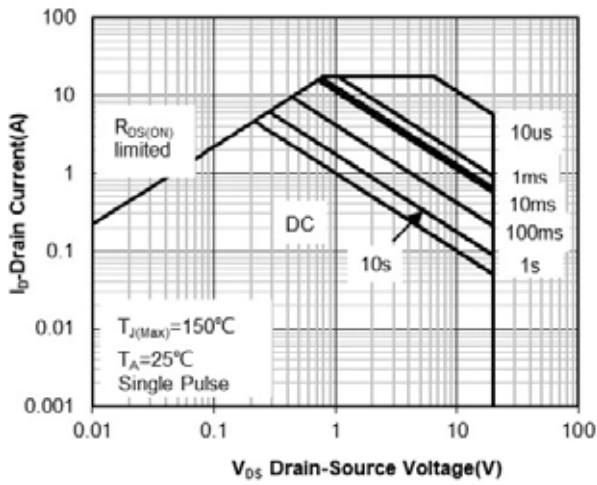


Figure 7. Safe Operation Area

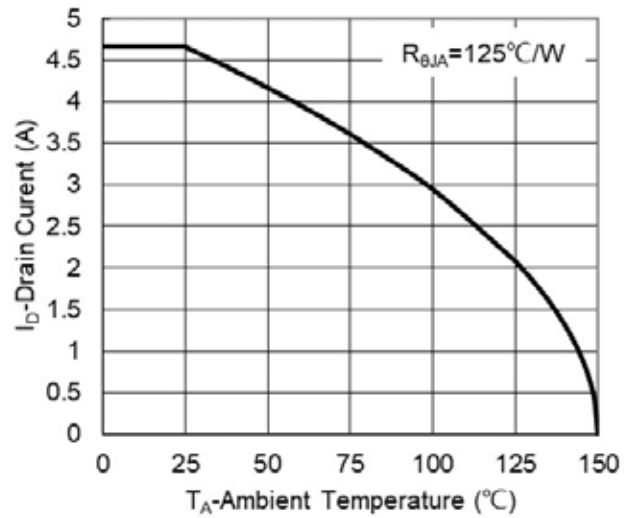


Figure 8. Maximum Continuous Drain Current vs Ambient Temperature

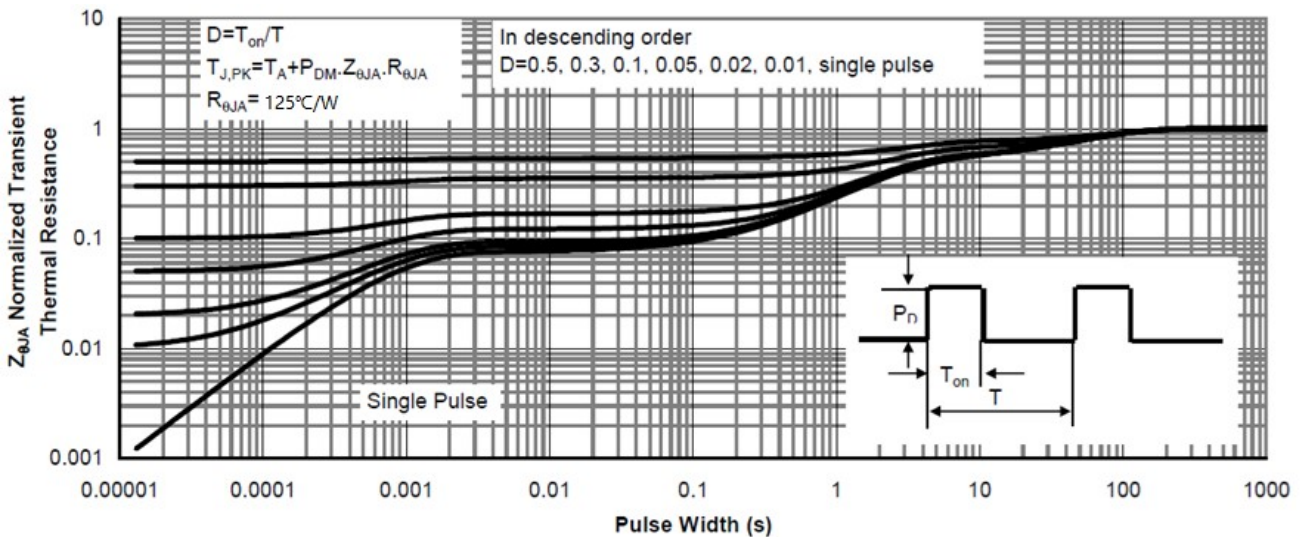
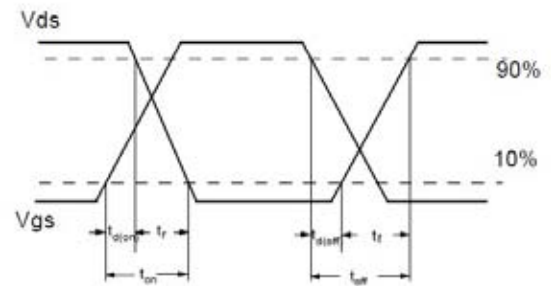
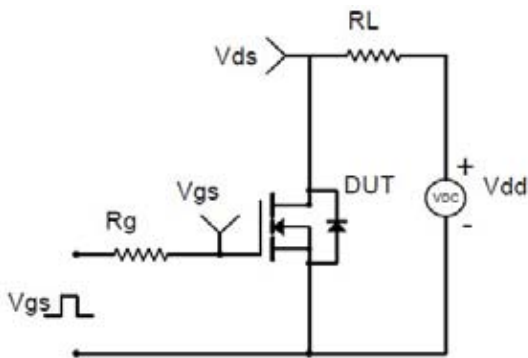
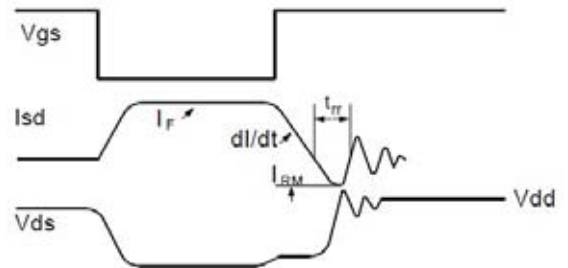
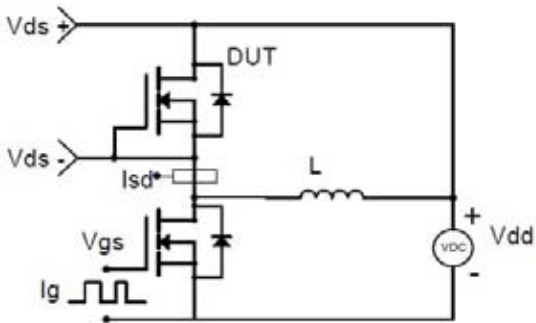


Figure 9. Normalized Maximum Transient Thermal Impedance

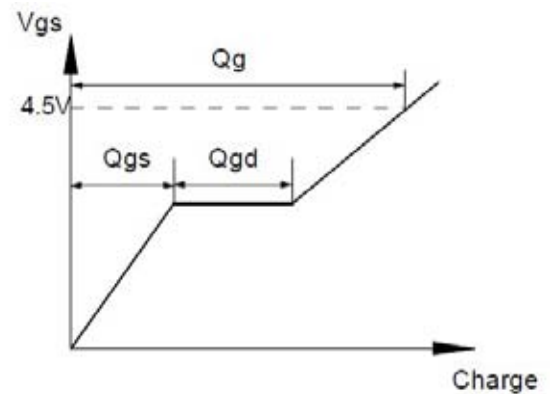
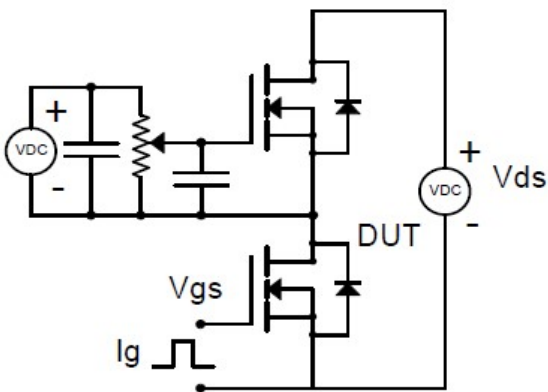
Typical Characteristics



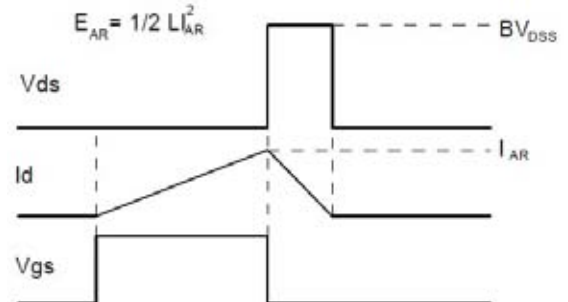
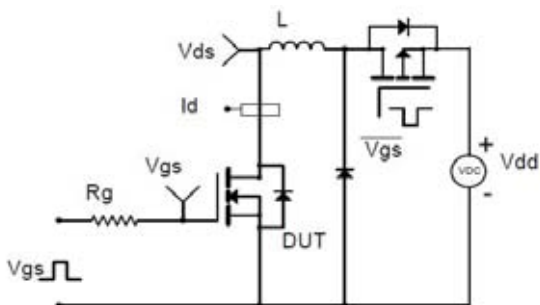
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

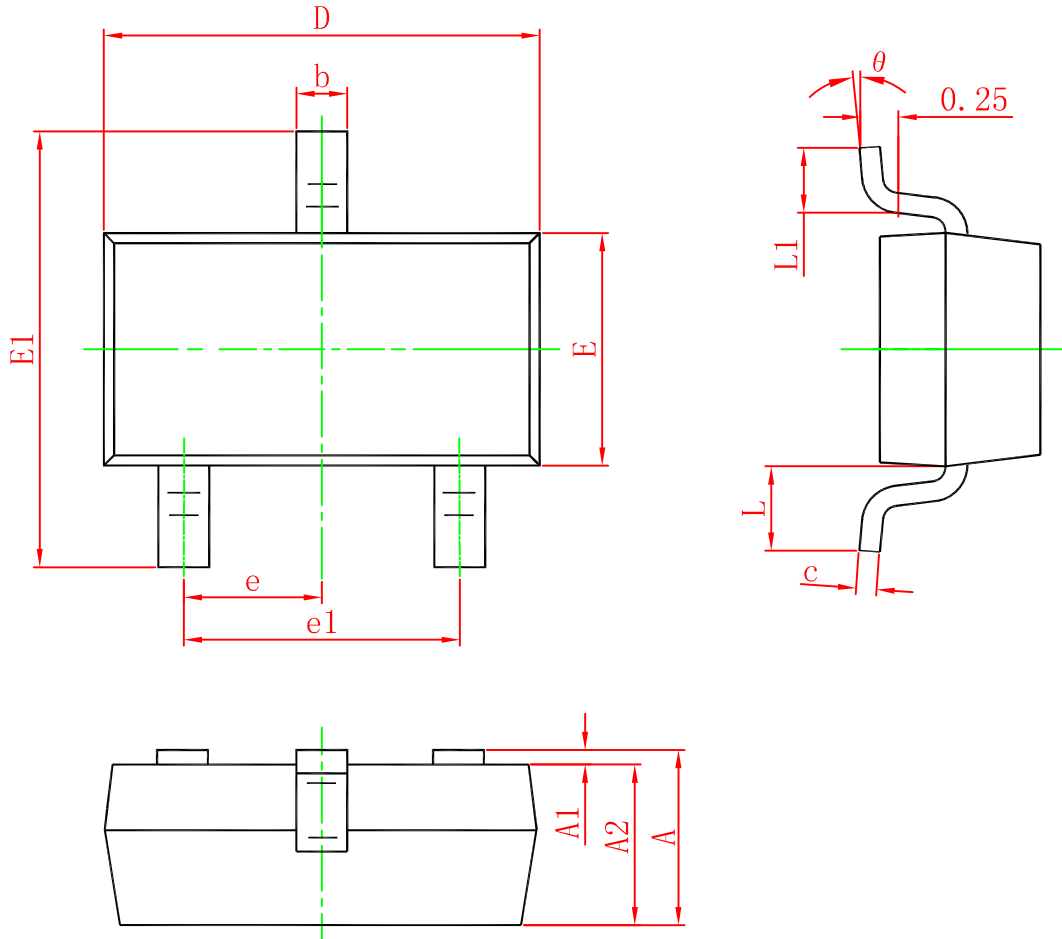


Gate Charge Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

SOT-23 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°