

## N-Channel 20V(D-S) MOSFET

Product summary		
$V_{DS}$	20	V
$R_{DS(ON)}$ (at $V_{GS}=4.5V$ ) Typ.	35	m $\Omega$
$R_{DS(ON)}$ (at $V_{GS}=2.5V$ ) Typ.	47	m $\Omega$
$I_D$ ( $T_A=25^\circ C$ )	3.2	A

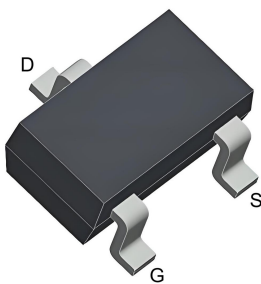
### Features

- Trench Power LV MOSFET technology
- RoHS Compliant

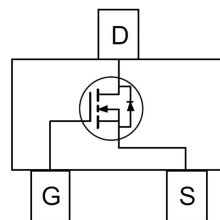
### Applications

- Load Switch
- PWM application
- Power Management

### Pin Configuration



SOT-23



### Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECG2302BL	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	$\pm 10$	V	
$I_D$	Continuous Drain Current <sup>A</sup>	$T_A=25^\circ C$	3.2	A
		$T_A=70^\circ C$	2.5	A
$I_{DM}$	Pulse Drain Current Tested <sup>B</sup>	10	A	
$P_D$	Power Dissipation <sup>A</sup>	$T_A=25^\circ C$	0.7	W
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to +150	$^\circ C$	

### Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JA}$	Thermal Resistance-Junction to ambient <sup>A</sup>	178	$^\circ C/W$

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

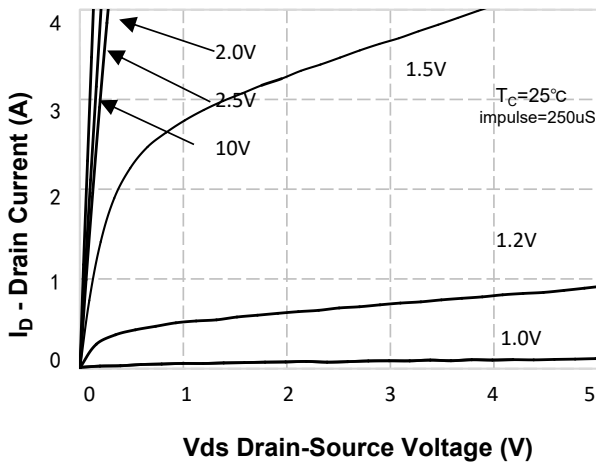
Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
<b>Static Parameters</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	--	--	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V$	--	--	1	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 10V$	--	--	$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.45	--	1.1	V
$R_{DS(on)}$	Drain-Source On-State Resistance <sup>B</sup>	$V_{GS}=4.5V, I_D=3A$	--	35	46	m $\Omega$
		$V_{GS}=2.5V, I_D=2A$	--	47	59	m $\Omega$
$V_{SD}$	Diode Forward Voltage	$I_S=3A, V_{GS}=0V$	--	--	1.2	V
$I_S$	Maximum Body-Diode Continuous Current		--	--	3.2	A
<b>Dynamic and Switching Parameters <sup>C</sup></b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=10V$ $f=1\text{MHz}$	--	185	--	pF
$C_{oss}$	Output Capacitance		--	37	--	pF
$C_{rss}$	Reverse Transfer Capacitance		--	34	--	pF
$Q_g$	Total Gate Charge	$V_{DS}=10V, I_D=3A$ $V_{GS}=5V$	--	6.3	--	nC
$Q_{gs}$	Gate-Source Charge		--	6	--	nC
$Q_{gd}$	Gate-Drain Charge		--	0.5	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=10V$ $R_L=2.7\Omega, R_G=6\Omega,$ $V_{GS}=5V$	--	4.5	--	ns
$t_r$	Turn-on Rise Time		--	31	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	12	--	ns
$t_f$	Turn-off Fall Time		--	4	--	ns

A. The data tested by surface mounted on a 1 inch x 1 inch FR-4 board with 2OZ copper.

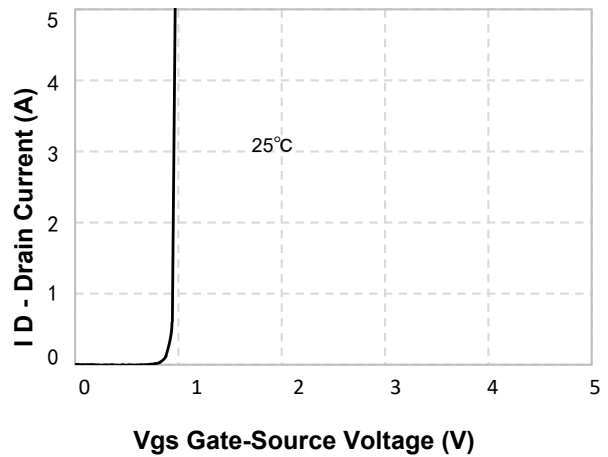
B. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .

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

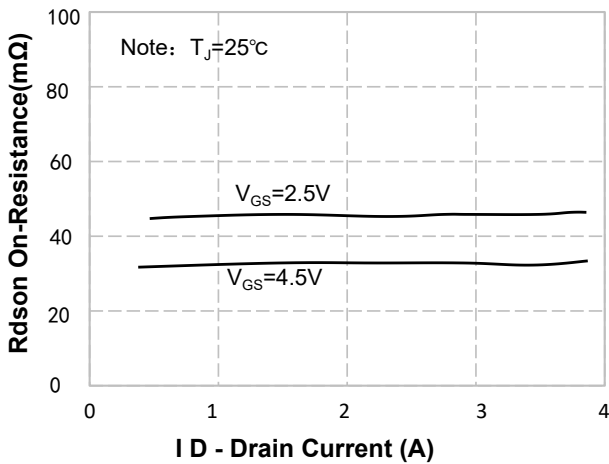
Typical Characteristics



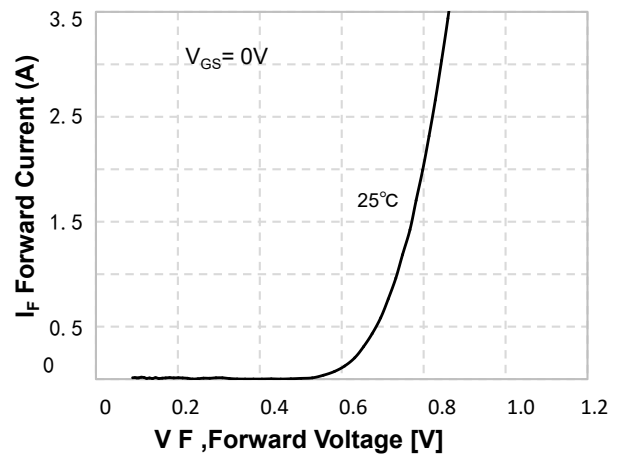
**Figure 1. On-Region Characteristics**



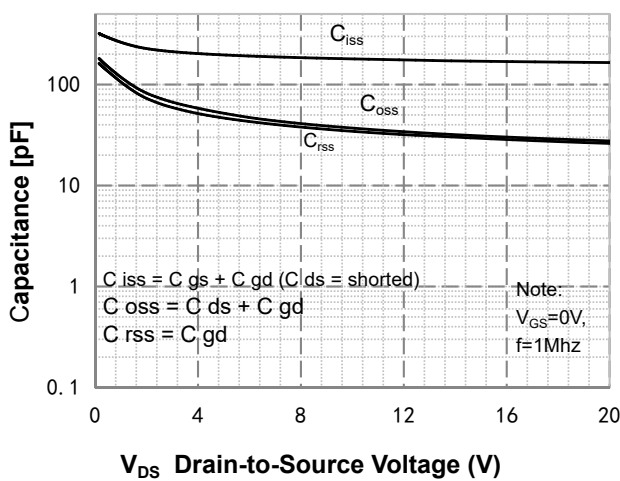
**Figure 2. Transfer Characteristics**



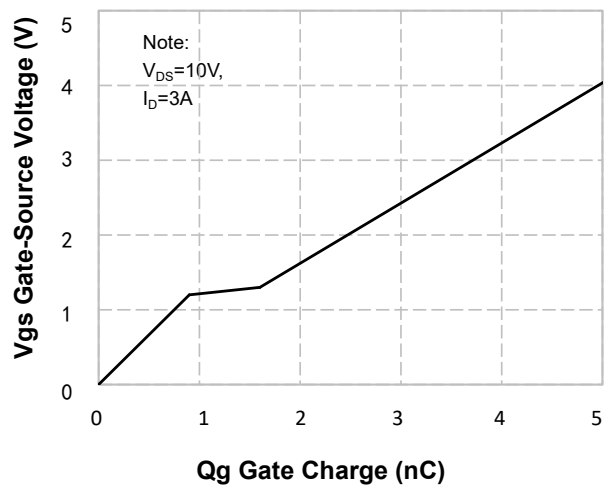
**Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage**



**Figure 4. Body Diode Forward Voltage Variation with Source Current**

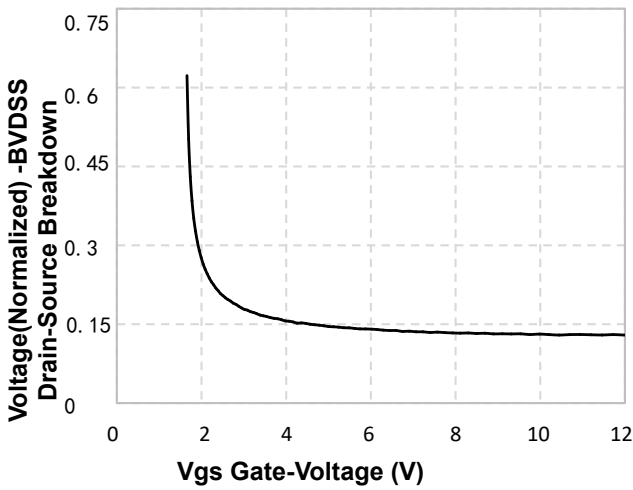


**Figure 5. Capacitance Characteristics**

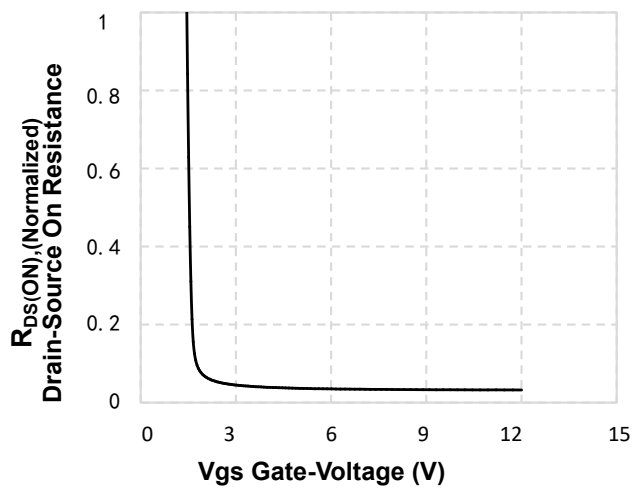


**Figure 6. Gate Charge Characteristics**

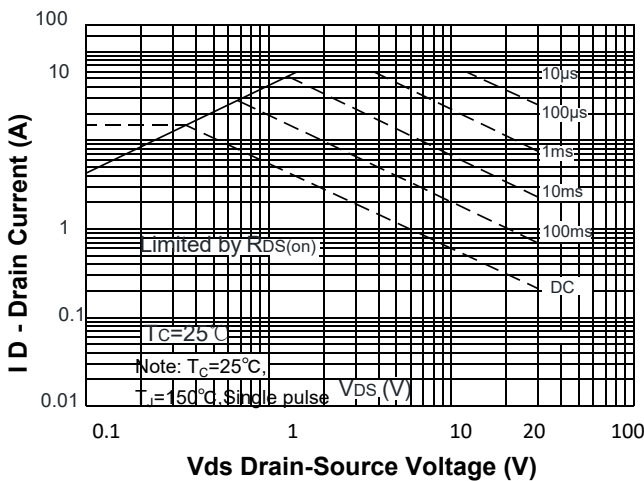
Typical Characteristics



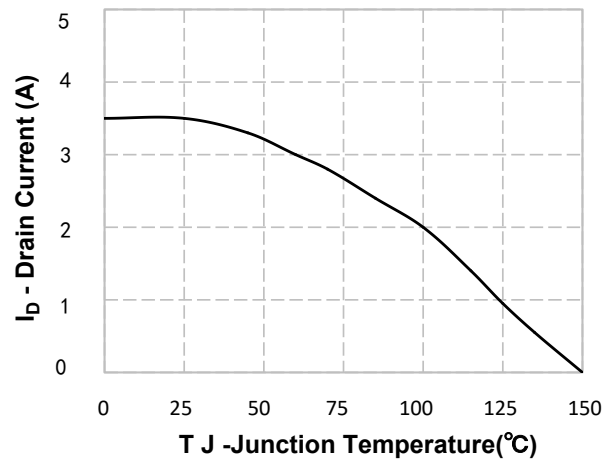
**Figure 7. Breakdown Voltage Variation vs Gate-Voltage**



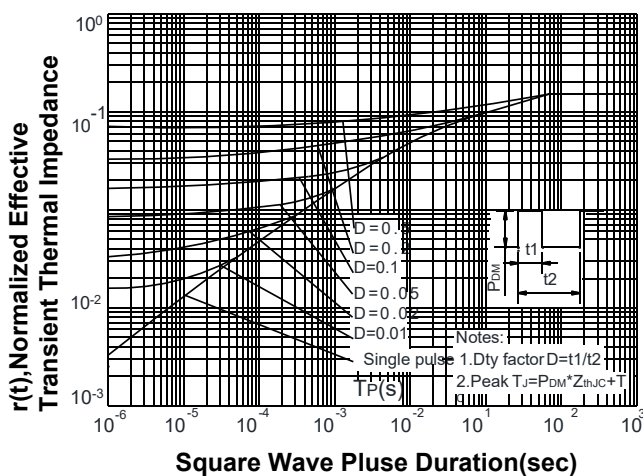
**Figure 8. On-Resistance Variation vs Gate Voltage**



**Figure 9. Maximum Safe Operating Area**

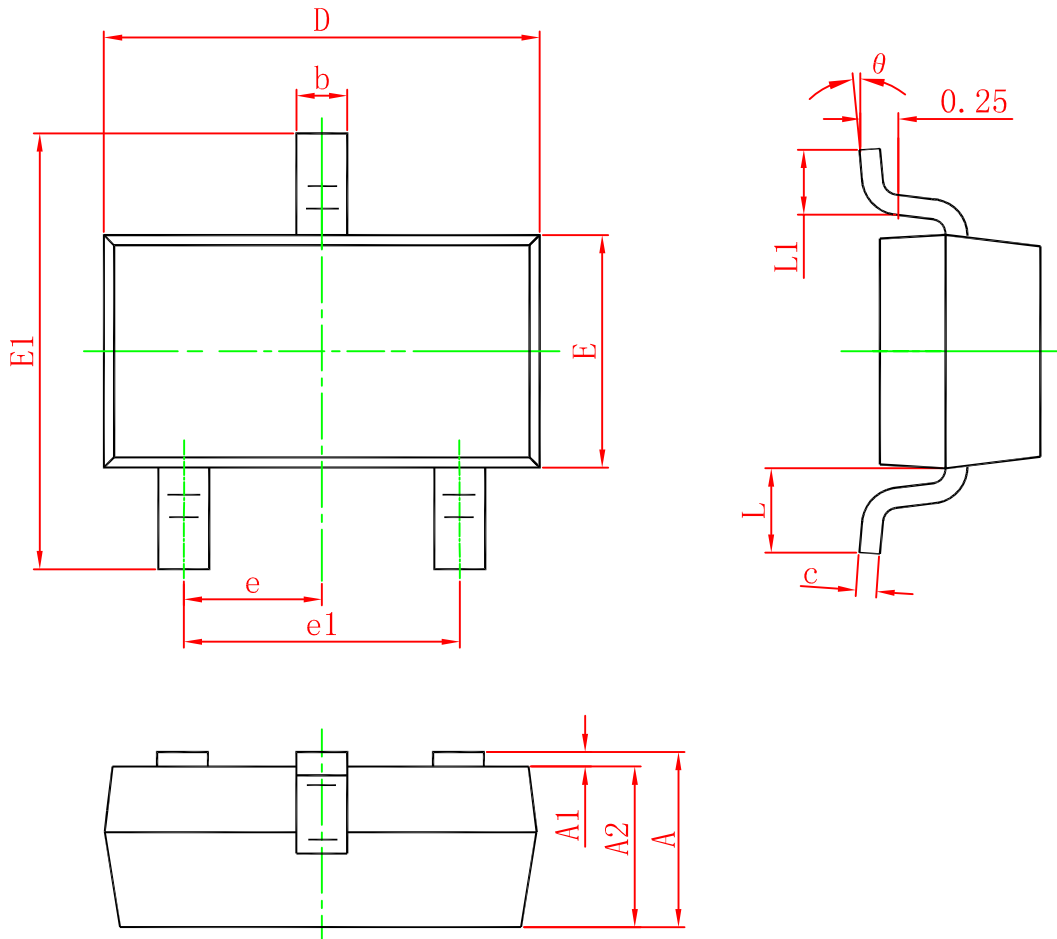


**Figure 10. Maximum Continuous Drain Current vs Temperature**



**Figure 11. Transient Thermal Response Curve**

## 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
$\theta$	0°	8°	0°	8°