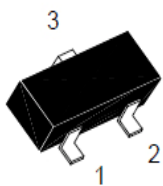


## P-Channel Enhancement-Mode MOSFET

### ◆ Features

1. Advanced Trench Process Technology.
2. High Density Cell Design for Ultra Low On-Resistance.
3. Improved Shoot-Through FOM
4. RoHS Compliant

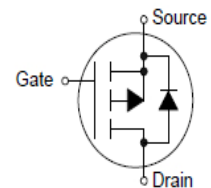
PRODUCT SUMMARY		
V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(on)</sub> (m-ohm) Max
-20V	-2.8A	100 @ V <sub>GS</sub> = -4.5V, I <sub>D</sub> =-2.8A
		150 @ V <sub>GS</sub> = -2.5V, I <sub>D</sub> =-2.0A
		170 @ V <sub>GS</sub> = -1.8V, I <sub>D</sub> =-2.0A



### SM2301 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	
SM2301 SRL	SM2301 SRG	SOT-23	G	S	D	Tape Reel
SM2301 LR L	SM2301 LR G	SOT-23-3L	G	S	D	Tape Reel

SM2301X 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 ( $T_A=25^\circ\text{C}$ , unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current (Continuous) <sup>a</sup>	-2.8	A
$I_{DM}$	Drain Current (Pulsed) <sup>b</sup>	-8	A
$P_D$	Total Power Dissipation @ $T_A=25^\circ\text{C}$	0.9	W
$T_j, T_{stg}$	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient (PCB mounted) <sup>c</sup>	140	$^\circ\text{C/W}$

a:Fused current that based on wire numbers and diameter

b:Repetitive Rating: Pulse width limited by the maximum junction temperature

c:1-in<sup>2</sup> 2oz Cu PCB board

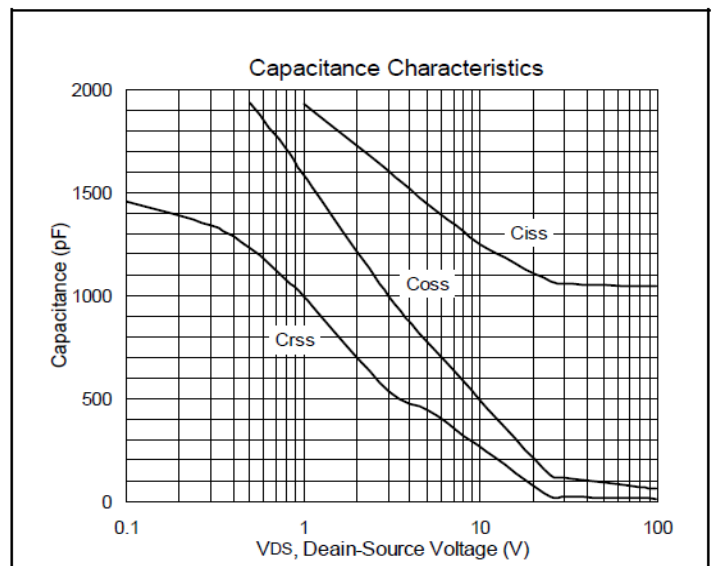
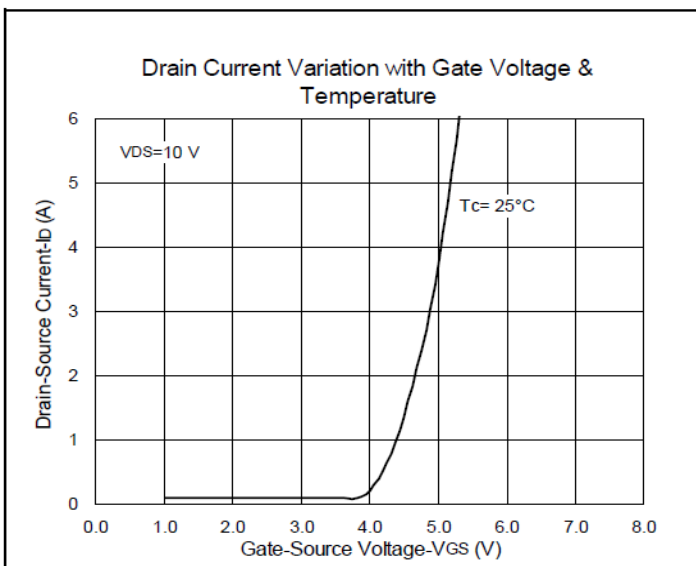
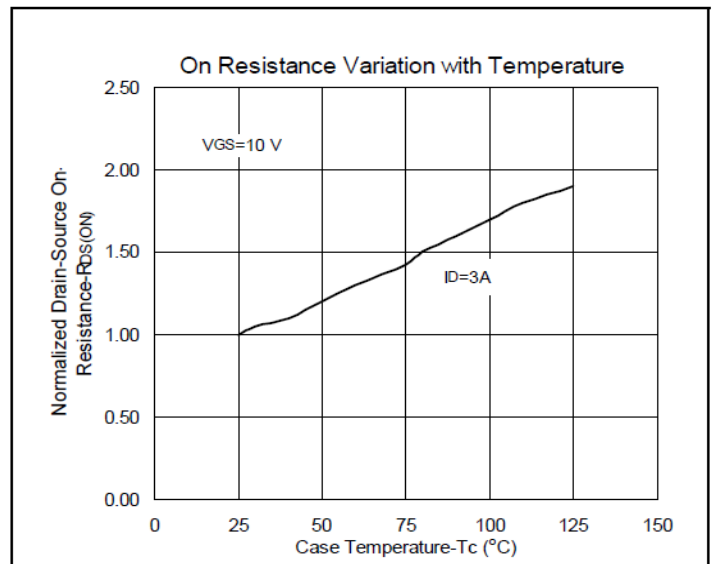
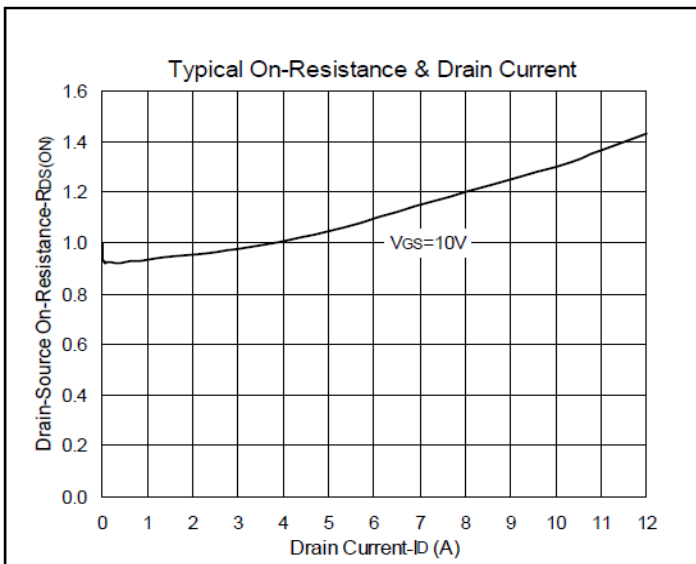
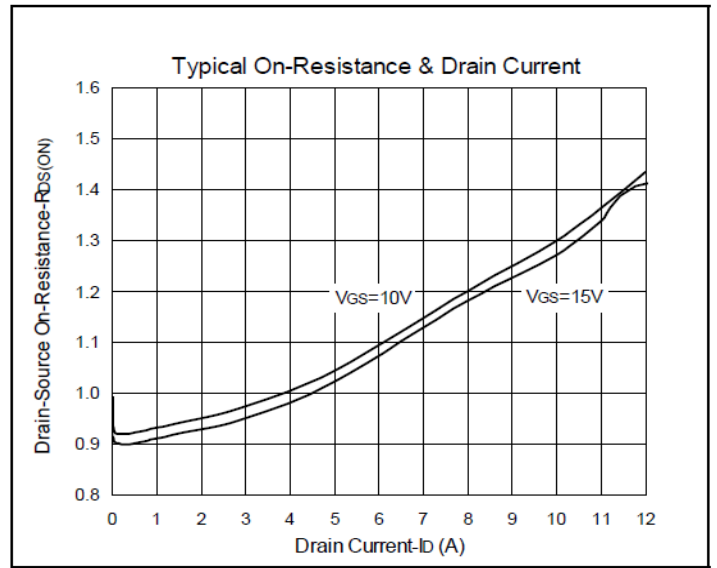
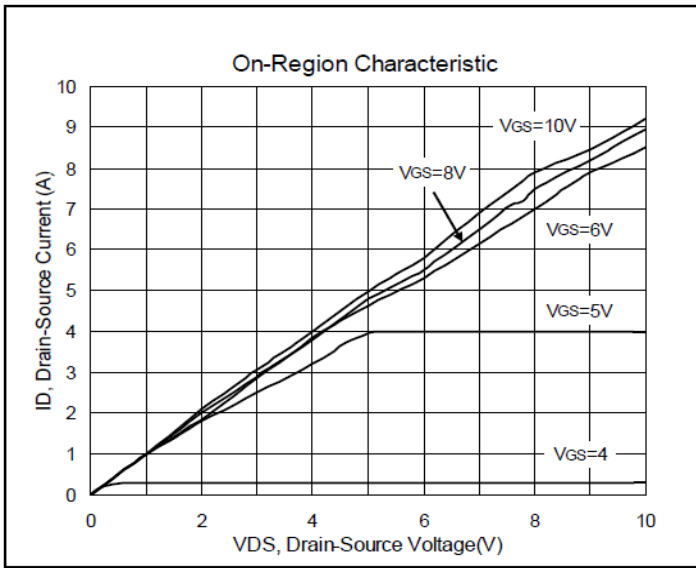
## ◆ Electrical Characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
<b>• Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu\text{A}$	-20	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-20V, V_{GS}=0V$	-	-	-1	$\mu\text{A}$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>• On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-0.45	-0.61	-0.9	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=-4.5V, I_D=-2.8A$	-	70	100	m $\Omega$
		$V_{GS}=-2.5V, I_D=-2A$	-	85	150	
		$V_{GS}=-1.8V, I_D=-2A$	-	120	170	
<b>• Dynamic Characteristics<sup>d</sup></b>						
$C_{iss}$	Input Capacitance	$V_{DS}=-1V, V_{GS}=0V, f=1\text{MHz}$	-	660.8	-	pF
$C_{oss}$	Output Capacitance		-	110.4	-	
$C_{riss}$	Reverse Transfer Capacitance		-	37.6	-	
<b>• Switching Characteristics<sup>d</sup></b>						
$Q_g$	Total Gate Charge	$V_{DS}=-6V, I_D=-2.8A, V_{GS}=-4.5V$	-	6.396	-	nC
$Q_{gs}$	Gate-Source Charge		-	2.24	-	
$Q_{gd}$	Gate-Drain Charge		-	1.05	-	
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=-6V, R_L=6\Omega, I_D=-1A, V_{GEN}=-4.5V, R_G=5.6\Omega$	-	7.05	-	nS
$t_r$	Turn-on Rise Time		-	9.836	-	
$t_{d(off)}$	Turn-off Delay Time		-	23.396	-	
$t_f$	Turn-off Fall Time		-	7.692	-	
<b>• Drain-Source Diode Characteristics</b>						
$I_S$	Maximum Diode Forward Current		-	-	-1.6	A
$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=-1.6A$	-	-0.75	-	V

Note: Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

d: Guaranteed by design: not subject to production testing

## ◆ Characteristics Curve



## ◆ Characteristics Curve

