

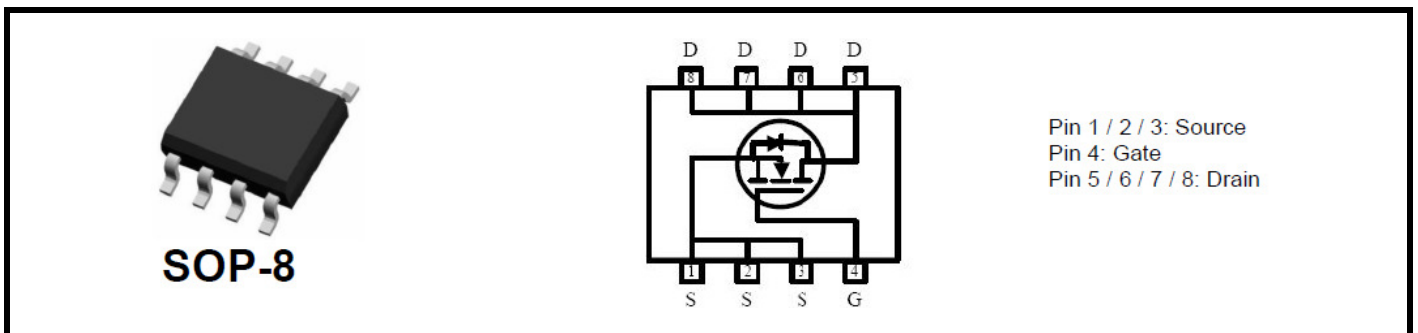
## N-Channel Enhancement-Mode MOSFET (30V,10A)

### PRODUCT SUMMARY




V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(on)</sub> (m-ohm) Max
30V	10A	15 @ V <sub>GS</sub> = 10V, I <sub>D</sub> =10A
		24 @ V <sub>GS</sub> = 4.5V, I <sub>D</sub> =5A

### ◆ Features

- 1、 Advanced Trench Process Technology.
- 2、 High Density Cell Design for Ultra Low On-Resistance.
- 3、 Lead free product is acquired.
- 4、 Surface mount Package
- 5、 RoHS Compliant.



### ◆ Ordering Information

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		4	1/2/3	5/6/7/8	
SM4410PRL	SM4410PRG	SOP-8	G	S	D	Tape Reel
<p style="text-align: center;">SM4410X X X</p> <p>(1) Package Type    </p> <p>(2) Packing Type    </p> <p>(3) Lead Free        </p>		<p>(1) P: SOP-8</p> <p>(2) R: Tape Reel</p> <p>(3) G: Halogen Free; L: Lead Free</p>				



## ◆ Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ , unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Continuous Drain Current	11	A
$I_{DM}$	Drain Current (Pulsed) <sup>†</sup>	50	A
$I_S$	Drain-Source Diode Forward Current <sup>a</sup>	2.6	A
$P_D$	Total Power Dissipation @ $T_A=25^\circ\text{C}$	3	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	100	$^\circ\text{C/W}$

Note

a: Repetitive Rating: Pulse width limited by the maximum junction temperature .

b: 1 Pulse Test: Pulse width  $\leq 300\mu\text{s}$  , Duty Cycle  $\leq 2\%$  .

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

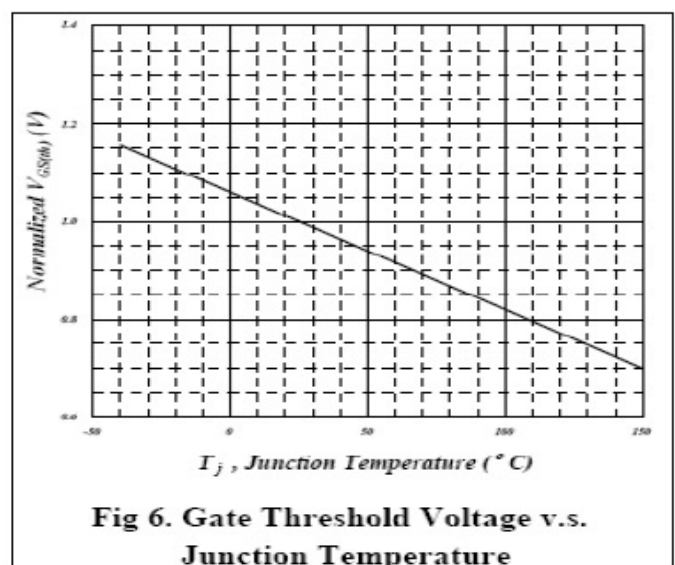
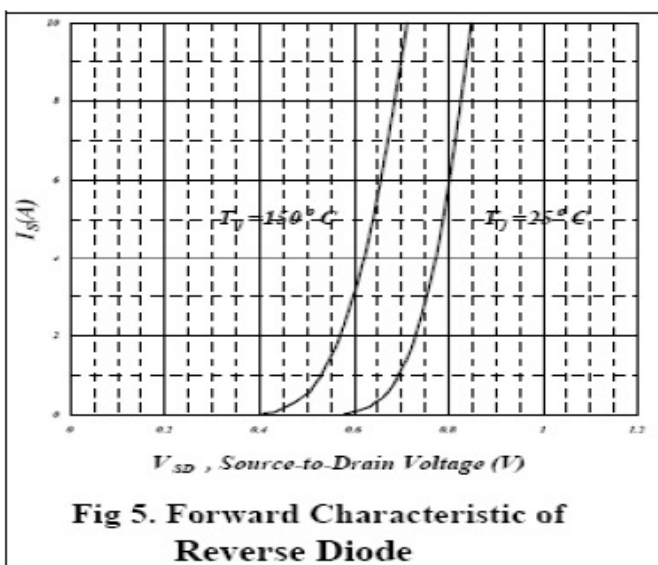
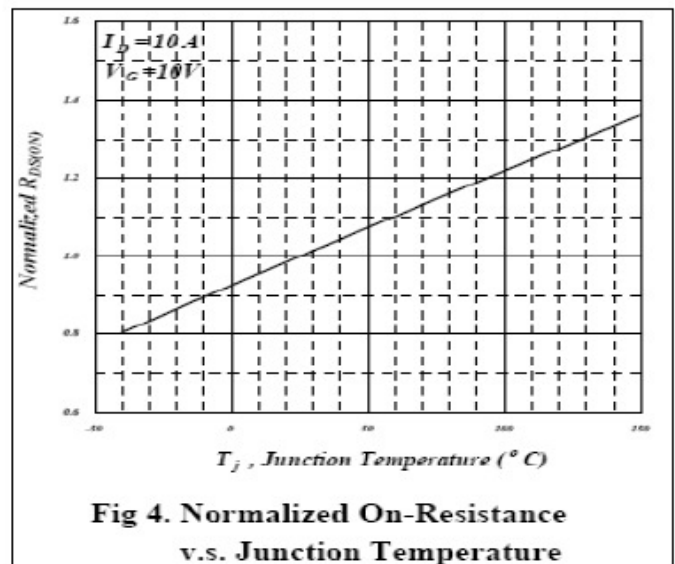
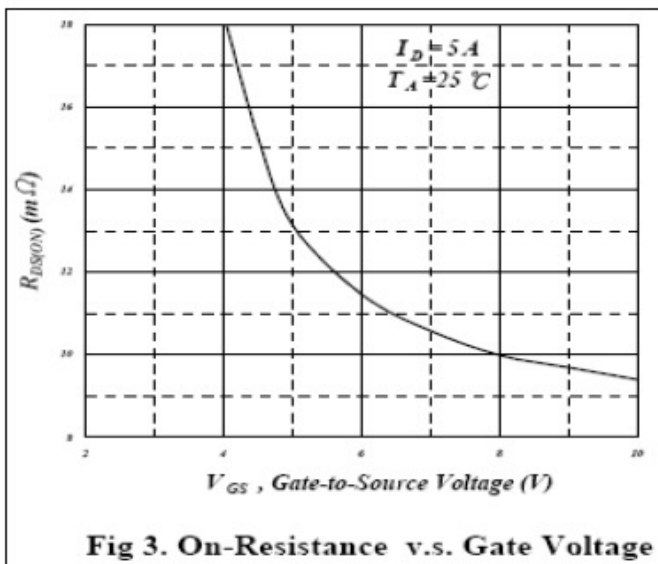
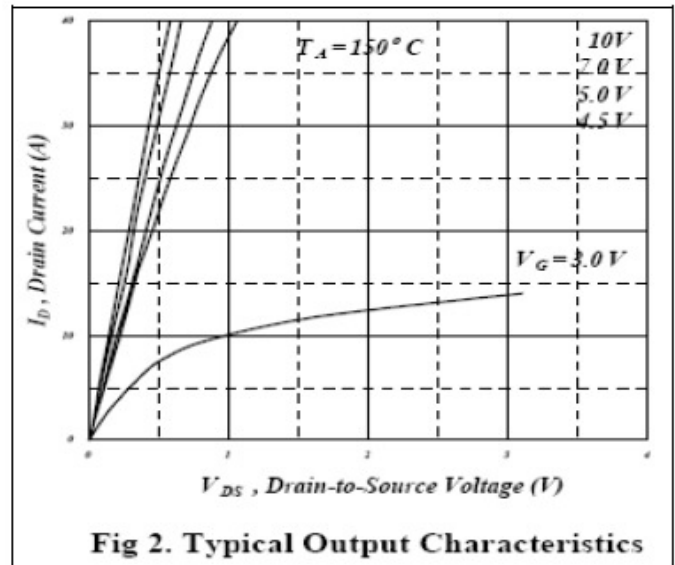
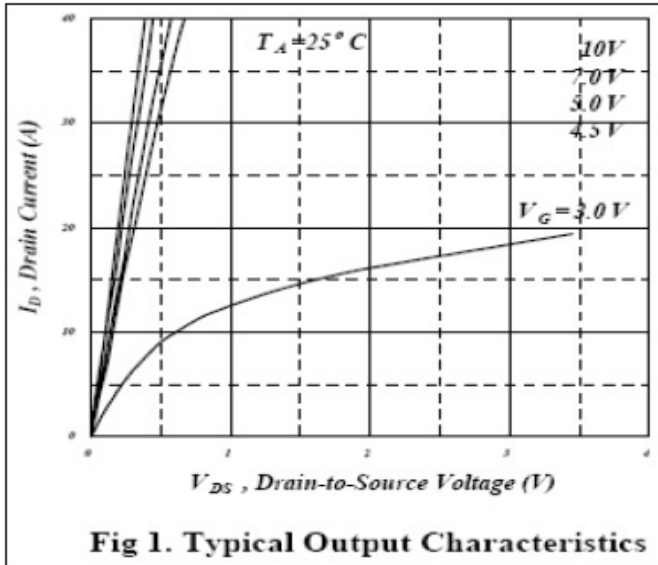
Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
<b>· Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	30	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$	-	-	1	$\mu\text{A}$
		$V_{DS}=24\text{V}, V_{GS}=0\text{V}, T_J=70^\circ\text{C}$	-	-	25	
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$	-	-	$\pm 100$	nA
<b>· On Characteristics<sup>c</sup></b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1	-	3	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=10\text{V}, I_D=10\text{A}$	-	-	15	m $\Omega$
		$V_{GS}=4.5\text{V}, I_D=5\text{A}$	-	-	24	
$g_{FS}$	Forward Transconductance	$V_{DS}=10\text{V}, I_D=9\text{A}$	-	9	-	S
<b>· Dynamic Characteristics<sup>d</sup></b>						
$C_{iss}$	Input Capacitance	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{ MHz}$	-	890	-	$\mu\text{F}$
$C_{oss}$	Output Capacitance		-	159.6	-	
$C_{rss}$	Reverse Transfer Capacitance		-	83.2	-	
$R_g$	Gate resistance	$V_{DS}=0\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$	-	2	3	$\Omega$
<b>· Switching Characteristics<sup>d</sup></b>						
$Q_g$	Total Gate Charge	$V_{DS} = 15\text{V}, I_D = 10\text{A}$ $V_{GS} = 5\text{V}$	-	7.7	10.01	nC
$Q_{gs}$	Gate-Source Charge		-	1.6	2.08	
$Q_{gd}$	Gate-Drain Charge		-	3.1	4.03	
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 15\text{V}, I_D = 10\text{A}$ $V_{GEN} = 10\text{V}, R_G = 0.3\Omega$	-	11.1	22.2	nS
$t_r$	Turn-on Rise Time		-	8.4	16.8	
$t_{d(off)}$	Turn-off Delay Time		-	25.3	50.6	
$t_f$	Turn-off Fall Time		-	2.8	5.6	
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=9\text{A}, dI/dt=100\text{A}/\mu\text{S}$	-	24	-	nS
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=9\text{A}, dI/dt=100\text{A}/\mu\text{S}$	-	14	-	nC
<b>· Drain-Source Diode Characteristics</b>						
$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS}=0\text{V}, I_S=2.6\text{A}$	-	0.76	1.2	V

Note:

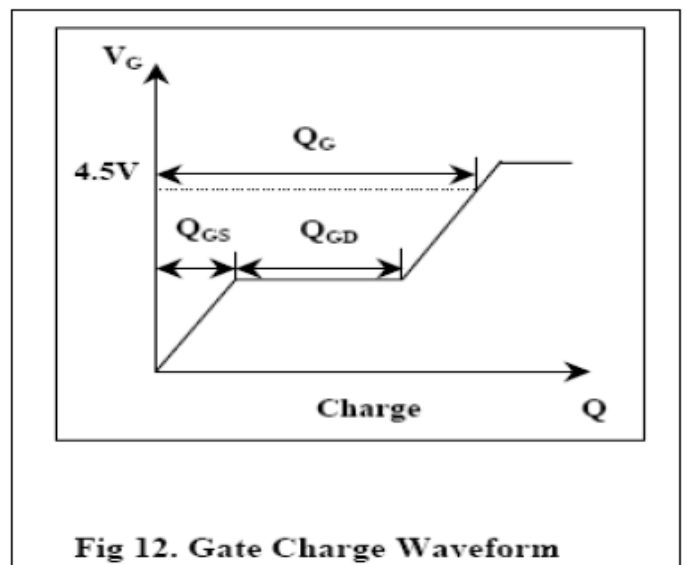
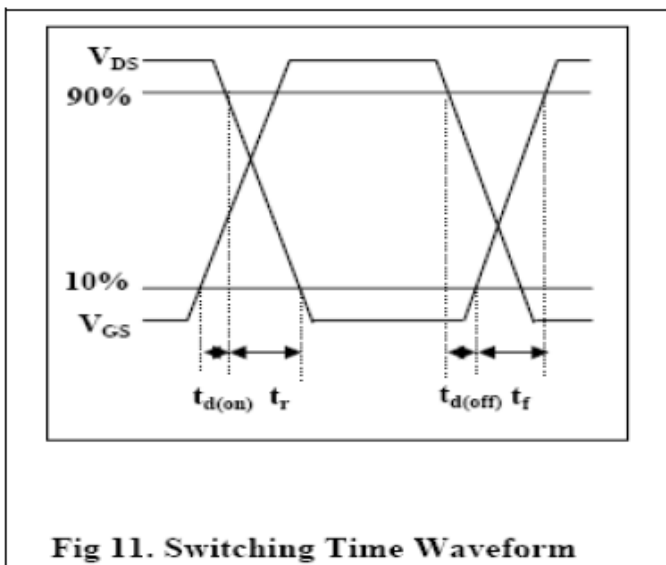
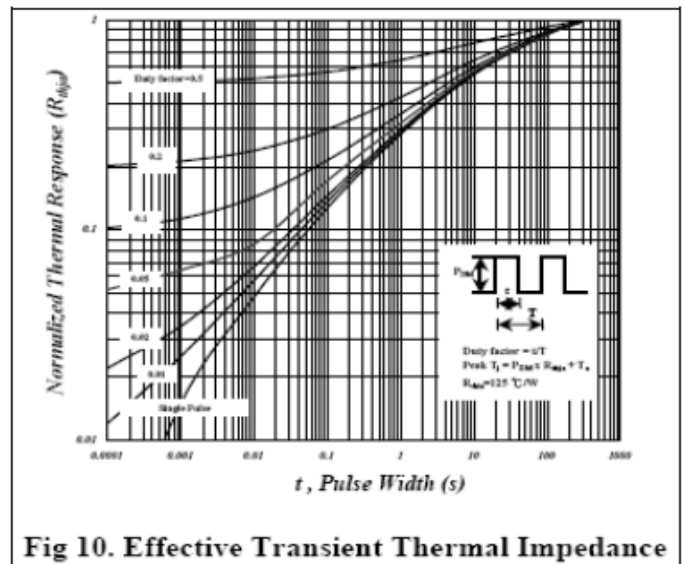
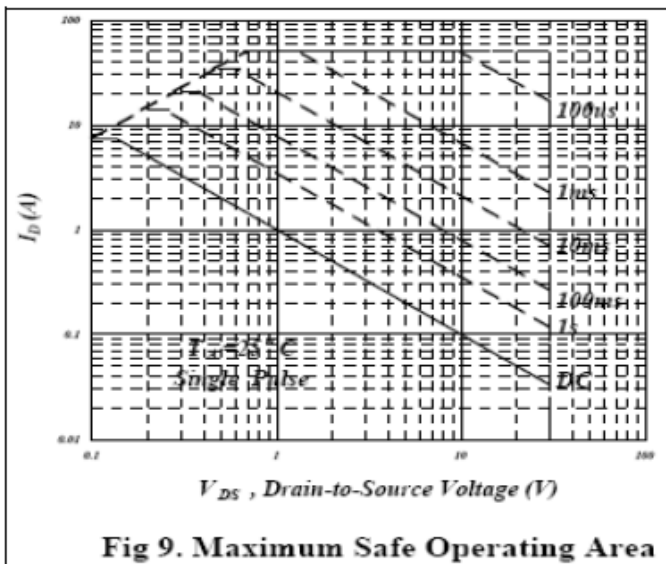
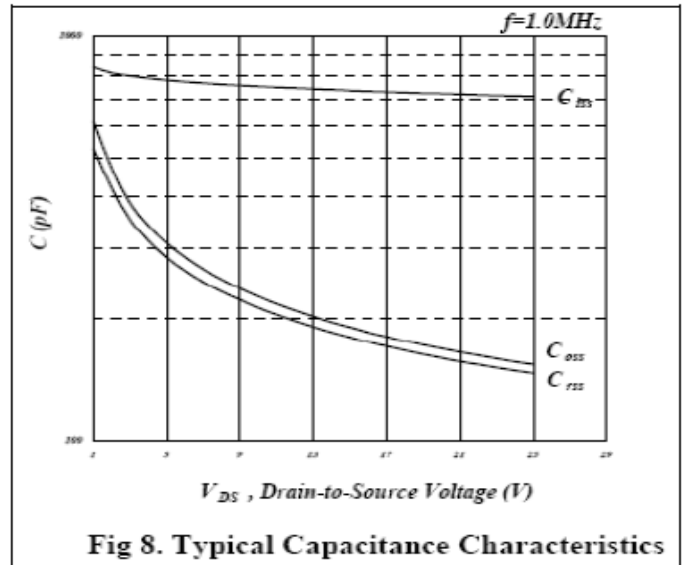
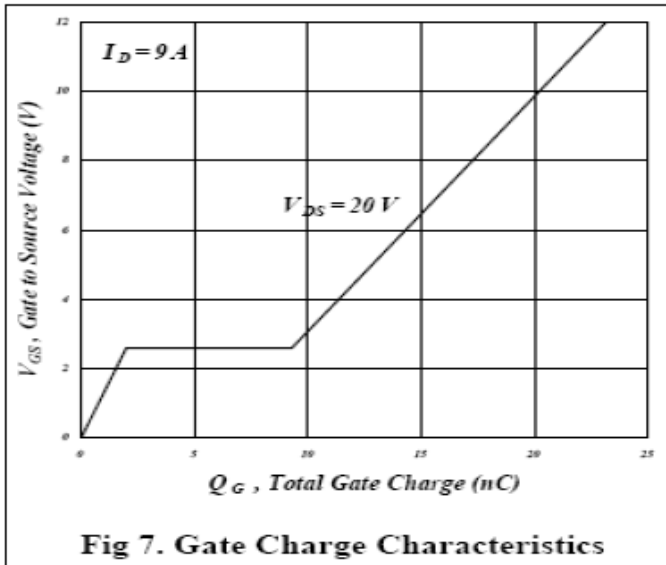
c : Pulse Test : Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2%.

d: Guaranteed by design, not subject to production testing.

## ◆ Characteristics Curve



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