



- ★ Super Low Gate Charge
- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

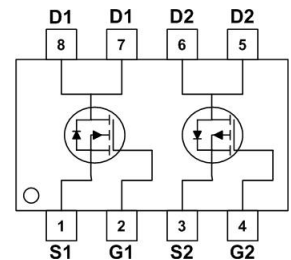
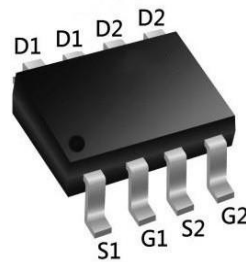
**Product Summary**

BVDSS	RDSON	ID
100V	70mΩ	10.0A
-100V	180mΩ	-5.0A

**Description**

The XXW10G10S is the high performance complementary N-ch and P-ch MOSFETs with high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The XXW10G10S meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

**SOP8 Pin Configuration**

**Absolute Maximum Ratings**

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
$V_{DS}$	Drain-Source Voltage	100	-100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	$\pm 20$	V
$I_D@T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	10.0	-5.0	A
$I_D@T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	6.0	-3.5	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	25	-9.5	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	22.5	35.3	mJ
$I_{AS}$	Avalanche Current	22.6	-26.6	A
$P_D@T_A=25^\circ C$	Total Power Dissipation <sup>4</sup>	2.5	2.5	W
$T_{STG}$	Storage Temperature Range	-55 to 150	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	-55 to 150	$^\circ C$

**Thermal Data**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	---	85	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	62.5	$^\circ C/W$

**N-Ch and P-Ch Fast Switching MOSFETs**
**Electrical Characteristics (T<sub>J</sub> = 25°C, unless otherwise noted)**

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
<b>Static Characteristics</b>							
Drain-Source Breakdown Voltage	<b>V<sub>(BR)DSS</sub></b>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	100	-	-	V	
Gate-body Leakage current	<b>I<sub>GSS</sub></b>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±100	nA	
Zero Gate Voltage Drain Current	<b>I<sub>DSS</sub></b>	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V	T <sub>J</sub> = 25°C	-	-	1	μA
			T <sub>J</sub> = 100°C	-	-	100	
Gate-Threshold Voltage	<b>V<sub>GS(th)</sub></b>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1.2	-	2.5	V	
Drain-Source on-Resistance <sup>4</sup>	<b>R<sub>DS(on)</sub></b>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 5A	-	70	90	mΩ	
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3A	-	75	105		
Forward Transconductance <sup>4</sup>	<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 5A	-	12	-	S	
<b>Dynamic Characteristics<sup>5</sup></b>							
Input Capacitance	<b>C<sub>iss</sub></b>	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1MHz	-	1220	-	pF	
Output Capacitance	<b>C<sub>oss</sub></b>		-	53	-		
Reverse Transfer Capacitance	<b>C<sub>rss</sub></b>		-	42	-		
Gate Resistance	<b>R<sub>g</sub></b>	f = 1MHz	-	1.3	-	Ω	
<b>Switching Characteristics<sup>5</sup></b>							
Total Gate Charge	<b>Q<sub>g</sub></b>	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 50V, I <sub>D</sub> = 5A	-	20.6	-	nC	
Gate-Source Charge	<b>Q<sub>gs</sub></b>		-	4	-		
Gate-Drain Charge	<b>Q<sub>gd</sub></b>		-	3.7	-		
Turn-On Delay Time	<b>t<sub>d(on)</sub></b>	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 50V, R <sub>G</sub> = 3Ω, I <sub>D</sub> = 5A	-	4.7	-	ns	
Rise Time	<b>t<sub>r</sub></b>		-	21	-		
Turn-Off Delay Time	<b>t<sub>d(off)</sub></b>		-	20	-		
Fall Time	<b>t<sub>f</sub></b>		-	16	-		
<b>Drain-Source Body Diode Characteristics</b>							
Diode Forward Voltage <sup>4</sup>	<b>V<sub>SD</sub></b>	I <sub>S</sub> = 1A, V <sub>GS</sub> = 0V	-	-	1.2	V	
Continuous Source Current	<b>I<sub>S</sub></b>	T <sub>C</sub> = 25°C	-	-	10	A	

**Notes:**

1. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub> = 150°C.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
3. The EAS data shows Max. rating. The test condition is V<sub>DD</sub> = 25V, V<sub>GS</sub> = 10V, L = 0.1mH, I<sub>AS</sub> = 8A
4. The power dissipation is limited by 150°C junction temperature
5. The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

**P-Channel Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=-10V, I_D=-3A$	---	180	220	m $\Omega$
		$V_{GS}=-4.5V, I_D=-2A$	---	210	255	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.2	---	-2.5	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=-80V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	$\mu A$
		$V_{DS}=-80V, V_{GS}=0V, T_J=85^\circ\text{C}$	---	---	-30	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_g$	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	13	---	$\Omega$
$Q_g$	Total Gate Charge (-10V)	$V_{DS}=-50V, V_{GS}=-10V, I_D=-2A$	---	19	---	nC
$Q_{gs}$	Gate-Source Charge		---	3.4	---	
$Q_{gd}$	Gate-Drain Charge		---	2.9	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-30V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-1A$	---	9	---	ns
$T_r$	Rise Time		---	6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	39	---	
$T_f$	Fall Time		---	33	---	
$C_{iss}$	Input Capacitance	$V_{DS}=-30V, V_{GS}=0V, f=1\text{MHz}$	---	1228	---	pF
$C_{oss}$	Output Capacitance		---	41	---	
$C_{rss}$	Reverse Transfer Capacitance		---	29	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V$ , Force Current	---	---	-5.0	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup>FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=-25V, V_{GS}=-10V, L=0.5\text{mH}, I_{AS}=-14A$
- 4.The power dissipation is limited by  $150^\circ\text{C}$  junction temperature
- 5.The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.

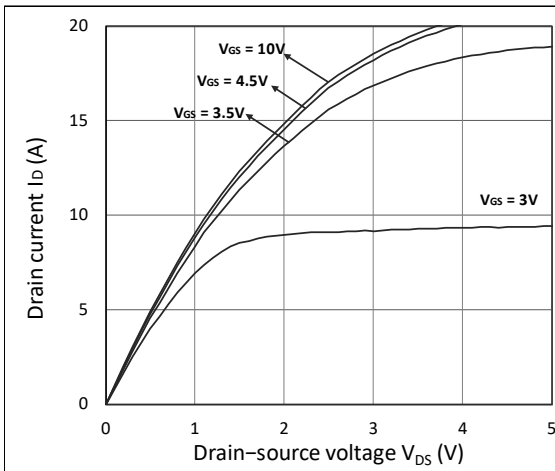
**N-Channel Typical Characteristics**


Figure 1. Output Characteristics

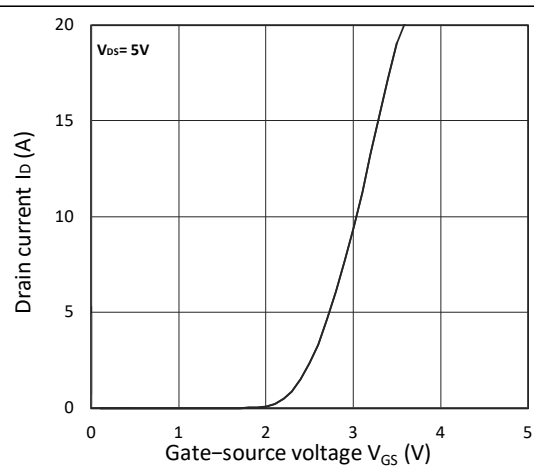


Figure 2. Transfer Characteristics

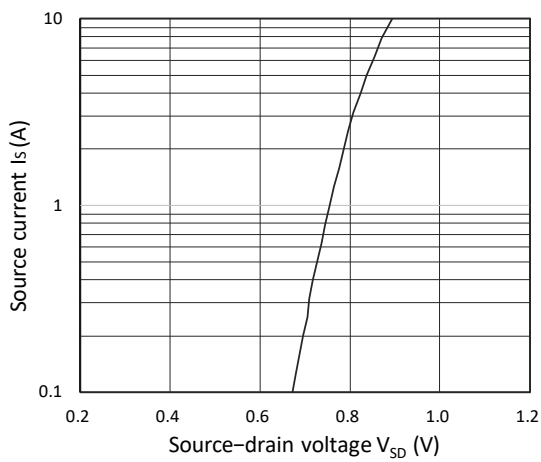
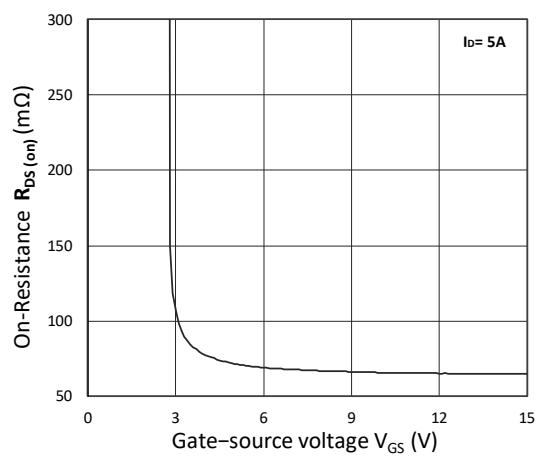
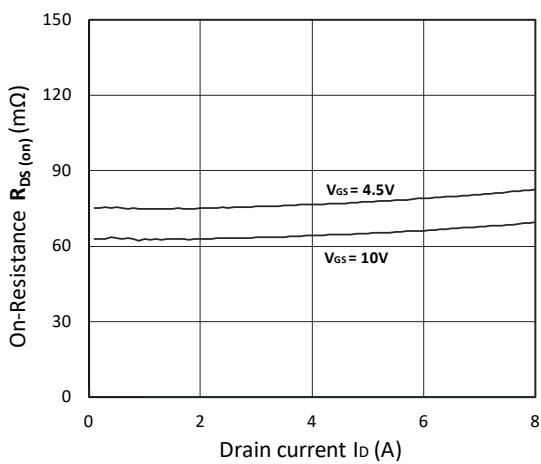
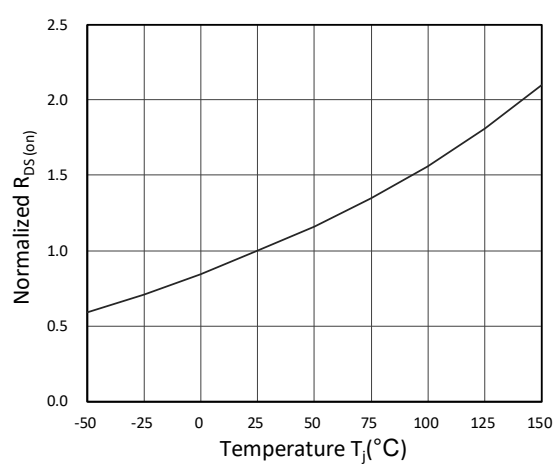


Figure 3. Forward Characteristics of Reverse


 Figure 4.  $R_{DS(on)}$  vs.  $V_{GS}$ 

 Figure 5.  $R_{DS(on)}$  vs.  $I_D$ 

 Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature

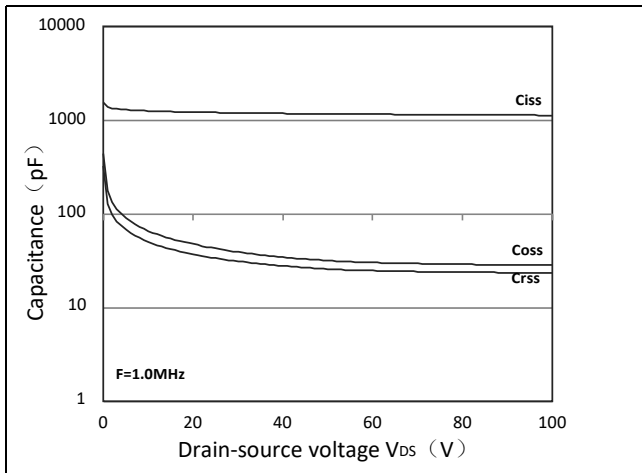
**N-Ch and P-Ch Fast Switching MOSFETs**


Figure 7. Capacitance Characteristics

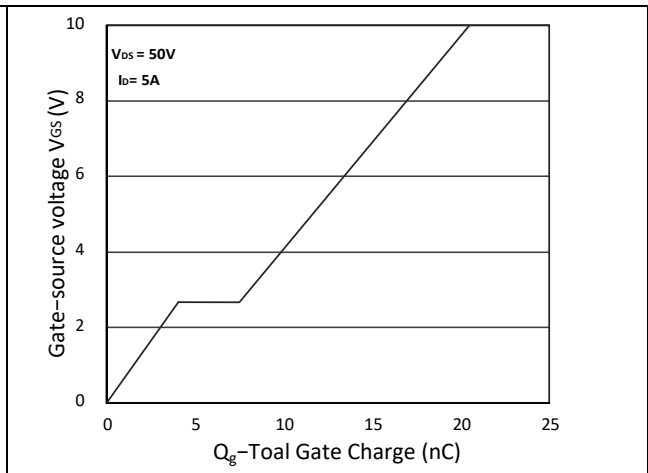


Figure 8. Gate Charge Characteristics

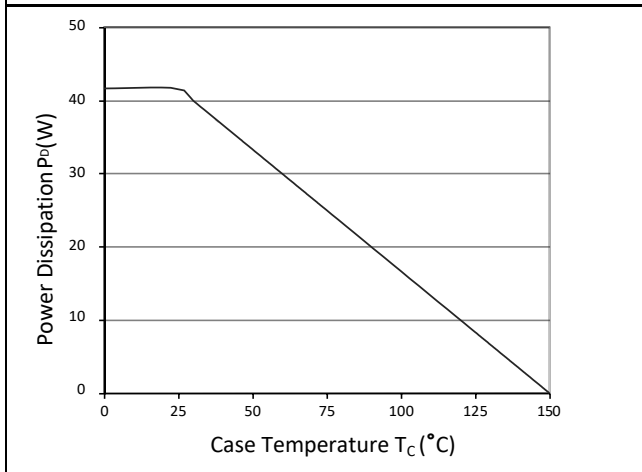


Figure 9. Power Dissipation

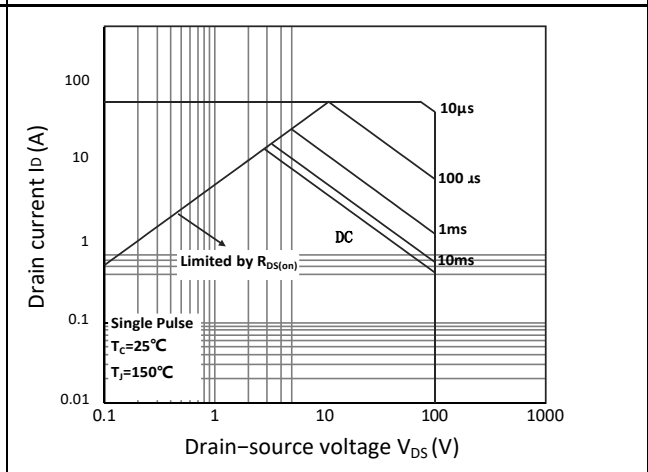


Figure 10. Safe Operating Area

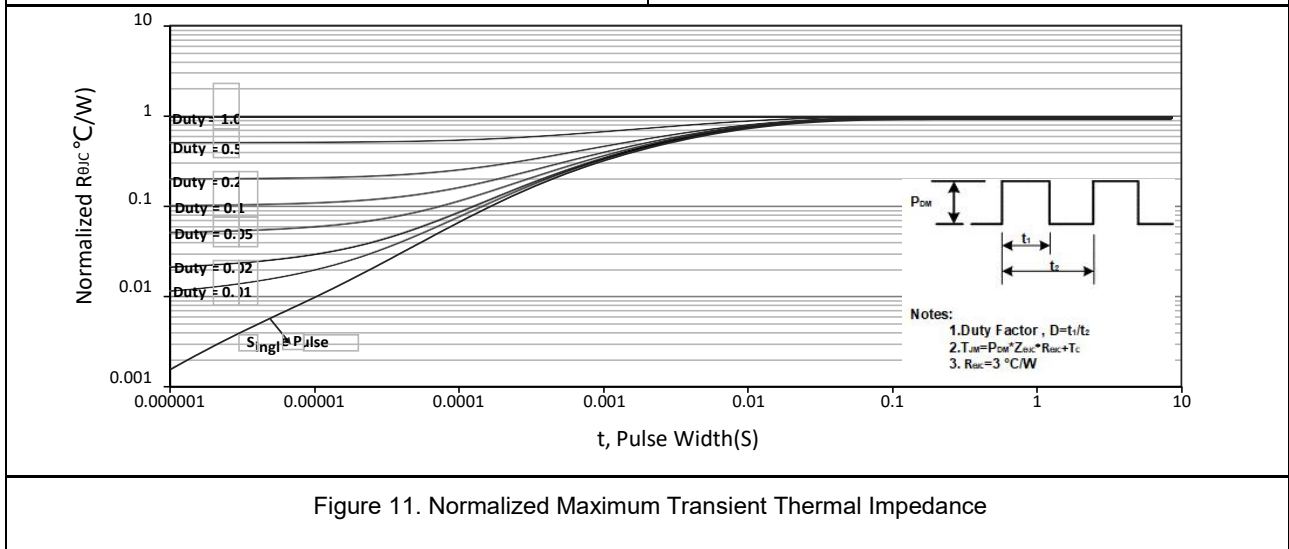
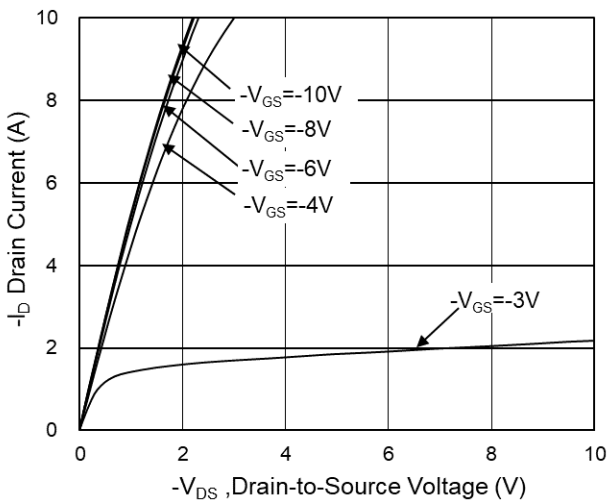
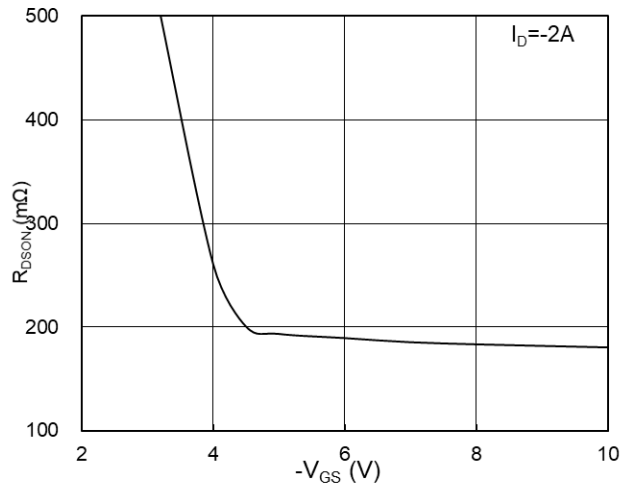
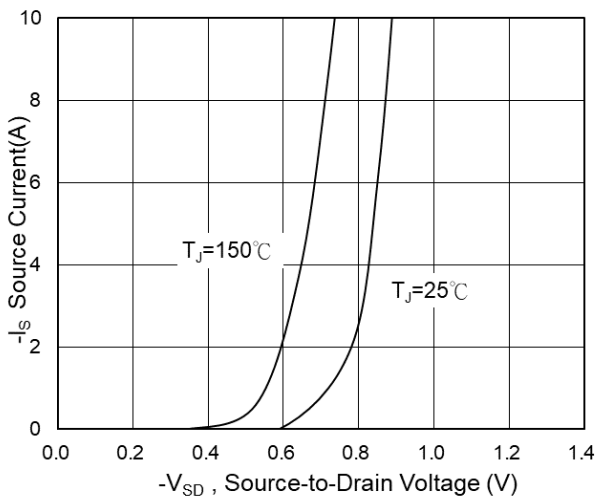
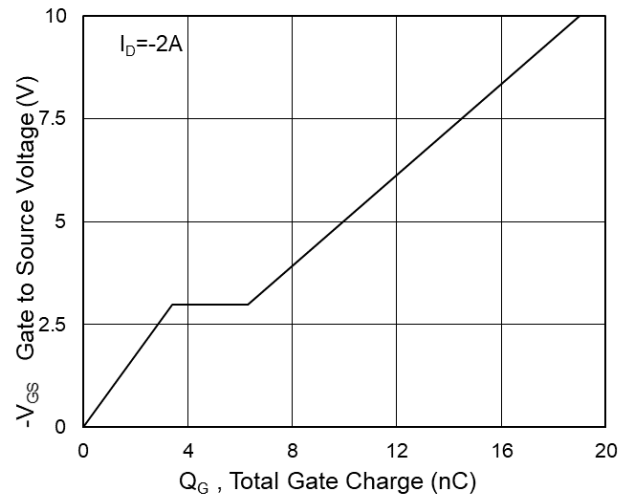
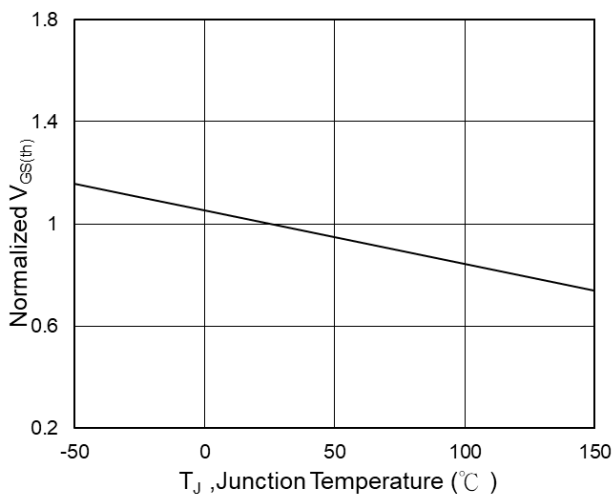
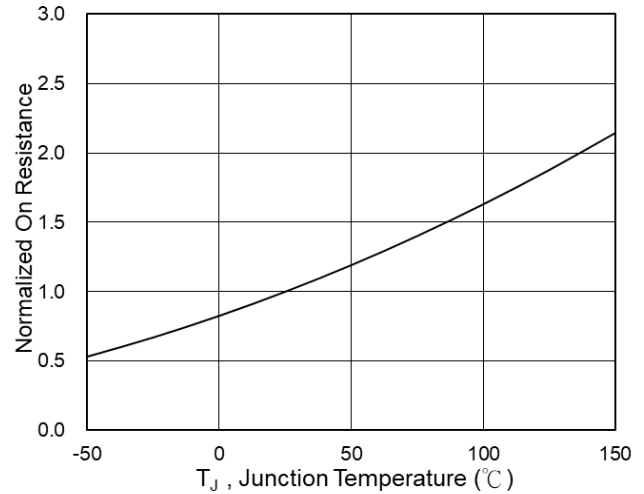
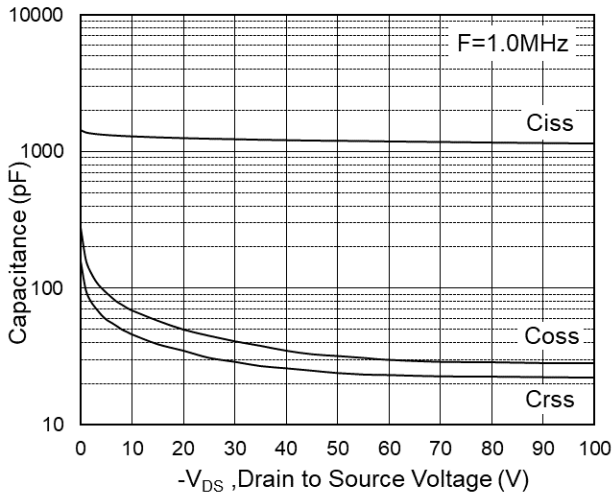


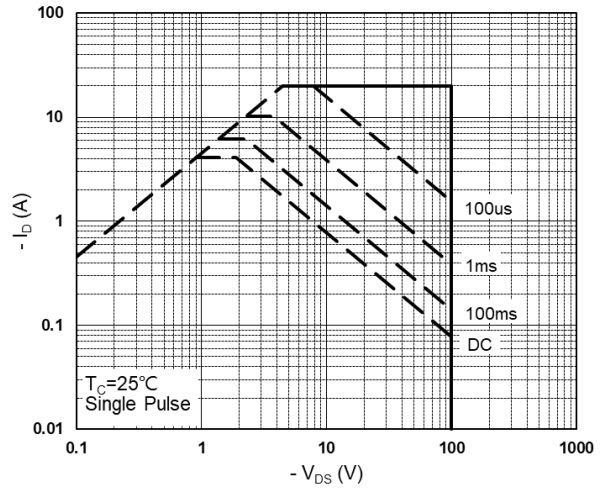
Figure 11. Normalized Maximum Transient Thermal Impedance

**P-Channel Typical Characteristics**

**Fig.1 Typical Output Characteristics**

**Fig.2 On-Resistance vs G-S Voltage**

**Fig.3 Source Drain Forward Characteristics**

**Fig.4 Gate-Charge Characteristics**

**Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$** 

**Fig.6 Normalized  $R_{DS(on)}$  vs  $T_J$**

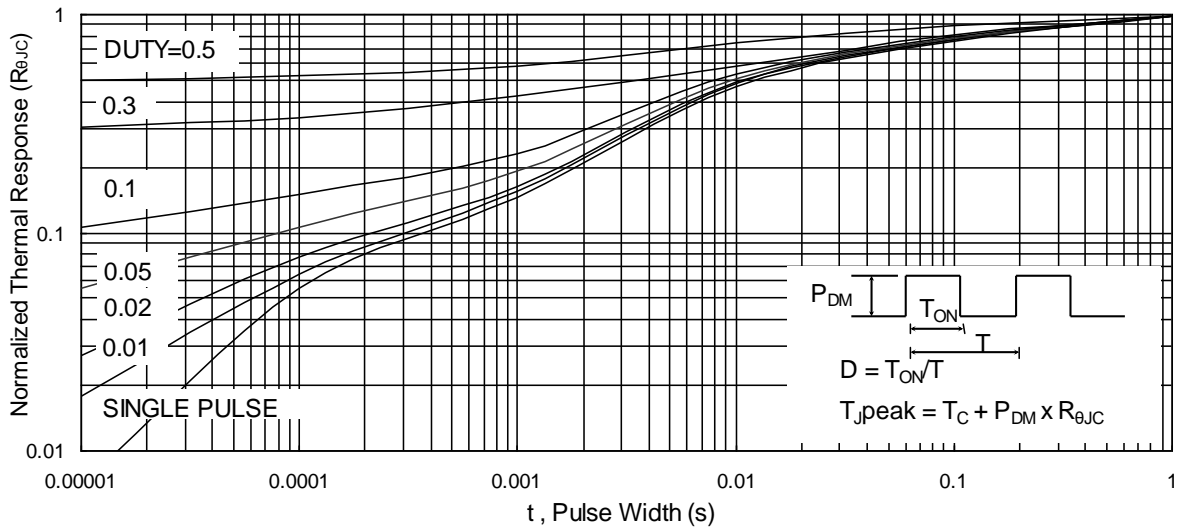
**N-Ch and P-Ch Fast Switching MOSFETs**



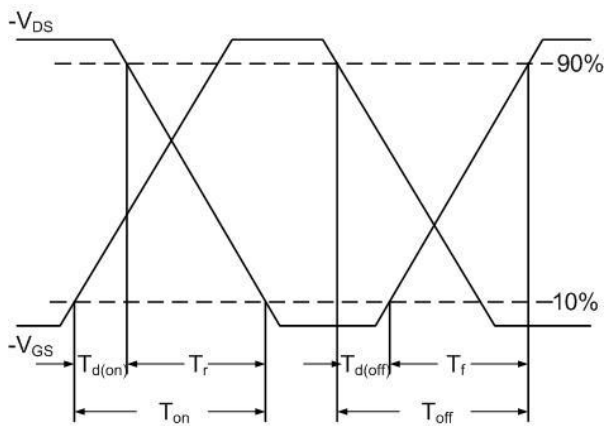
**Fig.7 Capacitance**



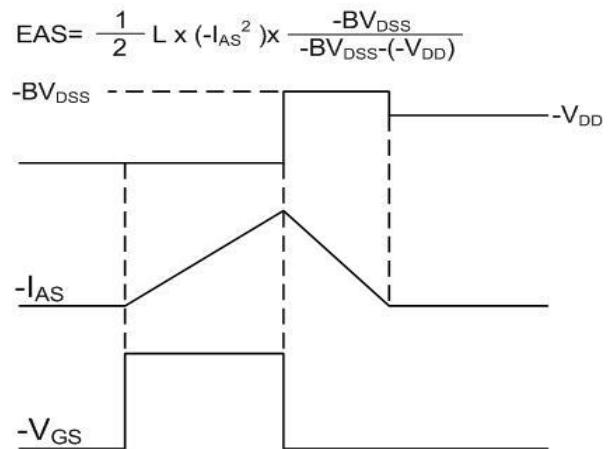
**Fig.8 Safe Operating Area**



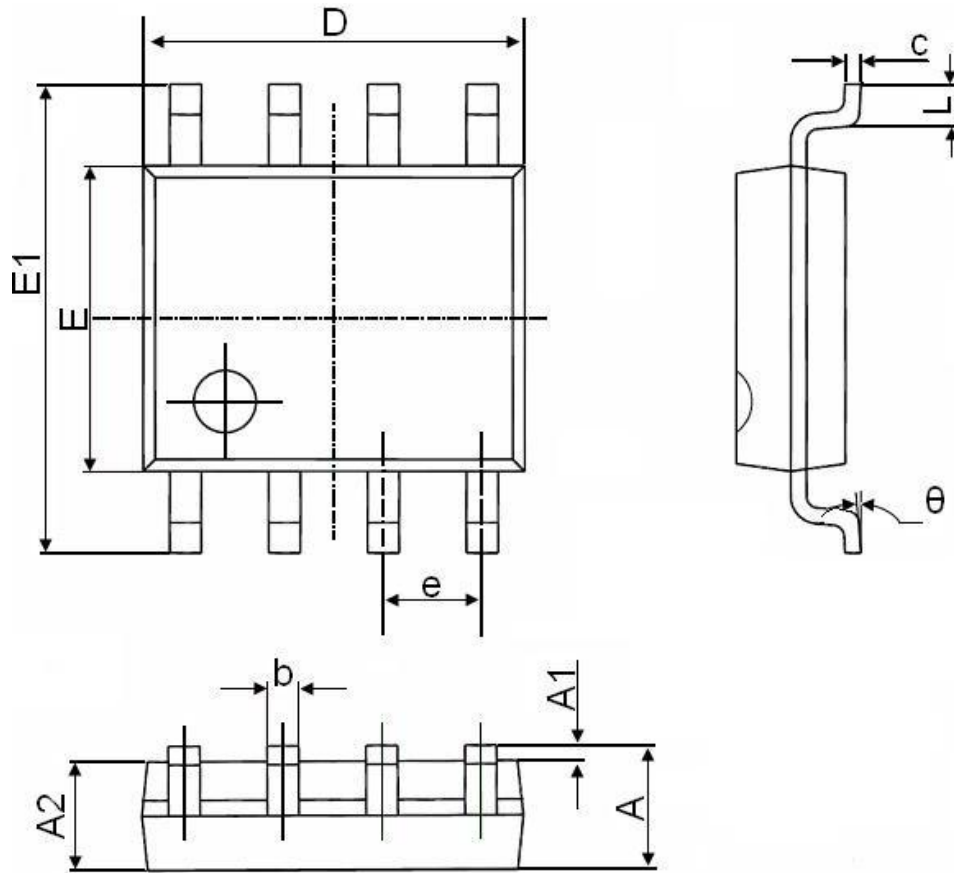
**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Waveform**

**SOP-8 Package Information**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
$\theta$	0°	8°	0°	8°