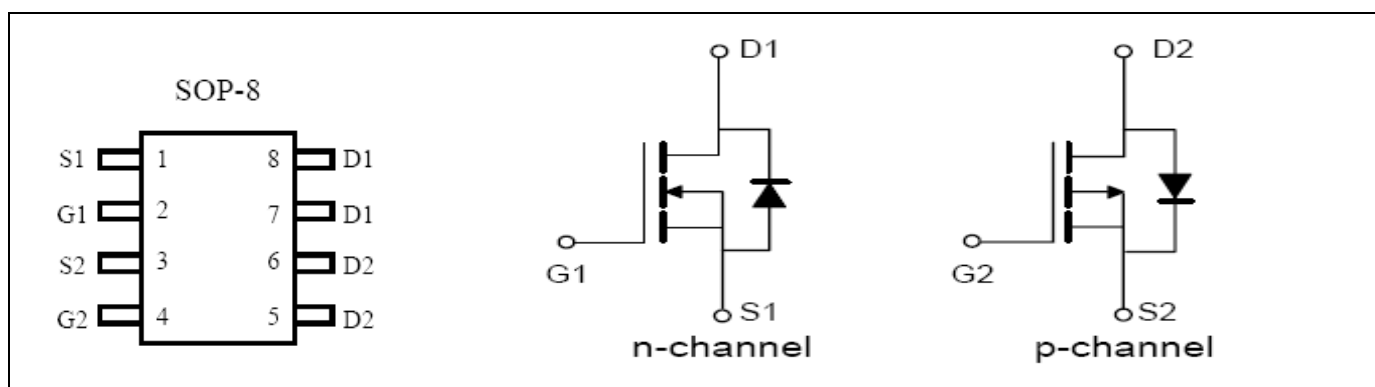


## Complementary High Density Trench MOSFET

PRODUCT SUMMARY (N-Channel)		
V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(on)</sub> (m-ohm) Max
30V	6.9A	28 @ V <sub>GS</sub> = 10 V, I <sub>D</sub> =6.9A
		42 @ V <sub>GS</sub> = 4.5V, I <sub>D</sub> =5.0A

PRODUCT SUMMARY (P-Channel)		
V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(on)</sub> (m-ohm) Max
-30V	-6.0 A	50 @ V <sub>GS</sub> = -10V, I <sub>D</sub> =-6.0A
		80@V <sub>GS</sub> = -4.5V, I <sub>D</sub> =-5.0A



### Absolute Maximum Ratings (T<sub>A</sub>=25°C, unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units
V <sub>DS</sub>	Drain-Source Voltage	30	-30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	±20	V
I <sub>D</sub>	Drain Current <sup>a</sup>	6.9	-6.0	A
I <sub>DM</sub>	Drain Current <sup>b</sup> (Pulsed) <sup>*1</sup>	28	-26	A
I <sub>S</sub>	Drain-Source Diode Forward Current <sup>a</sup>	2.5	-2.3	A
P <sub>D</sub>	Total Power Dissipation <sup>a</sup> @T <sub>A</sub> =25°C	2.0	2.0	W
	Total Power Dissipation <sup>a</sup> @T <sub>A</sub> =75°C	1.2	1.2	
T <sub>j</sub> , T <sub>stg</sub>	Operating Junction and Storage Temperature Range <sup>a</sup>	-55 to +150	-55 to +150	°C
R <sub>θJA</sub>	Thermal Resistance Junction to Ambient <sup>a</sup>	63.2	63.2	°C/W

a: Surface Mounted on FR4 Board, t ≤ 5sec.

b: Pulse width limited by maximum junction temperature.

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

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• Off Characteristics						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V	-	-	50	nA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
• On Characteristics <sup>c</sup>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.0	1.4	3.0	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> = 6.9A	-	25	28	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> = 5.0A	-	38	42	
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> = 5.0A	-	6.0	-	S
• Dynamic Characteristics <sup>d</sup>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	-	398	-	pF
C <sub>oss</sub>	Output Capacitance		-	67	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	61	-	
• Switching Characteristics <sup>d</sup>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, I <sub>D</sub> =1A, V <sub>GS</sub> =10V	-	7.4	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	1.7	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	1.3	-	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> = 15V, R <sub>L</sub> =15Ω, I <sub>D</sub> =1A, V <sub>GEN</sub> =10V, R <sub>G</sub> =6Ω	-	8.0	-	nS
t <sub>r</sub>	Turn-on Rise Time		-	11.2	-	
t <sub>d(off)</sub>	Turn-off Delay Time		-	17.2	-	
t <sub>f</sub>	Turn-off Fall Time		-	7.54	-	
• Drain-Source Diode Characteristics						
V <sub>SD</sub>	Drain-Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =2.0A	-	-	1.0	V

Note:

b: Pulse width limited by maximum junction temperature.

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

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

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• Off Characteristics						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-30	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V	-	-	-50	nA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
• On Characteristics <sup>c</sup>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-1.0	-1.3	-2.0	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-6.0A	-	40	50	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5.0A	-	70	80	
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-6.0A	-	12.7	-	S
• Dynamic Characteristics <sup>d</sup>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz	-	930	-	pF
C <sub>oss</sub>	Output Capacitance		-	121	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	102	-	
• Switching Characteristics <sup>d</sup>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-15V, I <sub>D</sub> =-3A, V <sub>GS</sub> =-10V	-	20	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	4.1	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	2.6	-	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =-15V, R <sub>L</sub> =5Ω, I <sub>D</sub> =-3A, V <sub>GEN</sub> =-10V, R <sub>G</sub> =6Ω	-	9.5	-	nS
t <sub>r</sub>	Turn-on Rise Time		-	5.4	-	
t <sub>d(off)</sub>	Turn-off Delay Time		-	42.5	-	
t <sub>f</sub>	Turn-off Fall Time		-	13.6	-	
• Drain-Source Diode Characteristics						
V <sub>SD</sub>	Drain-Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =-2.0A	-	-	-1.0	V

Note:

b: Pulse width limited by maximum junction temperature.

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

## Characteristics Curve(N-Channel)

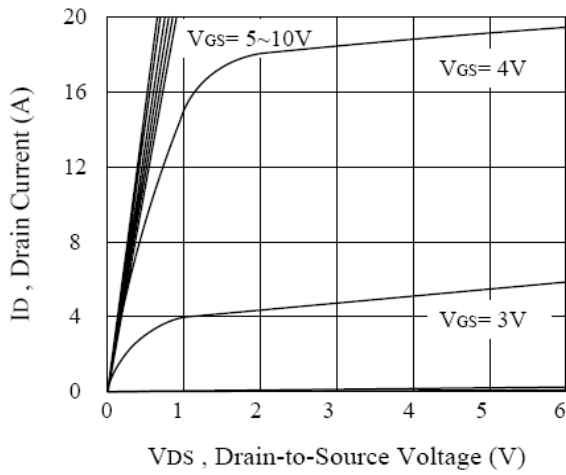


Figure 1. Output Characteristics

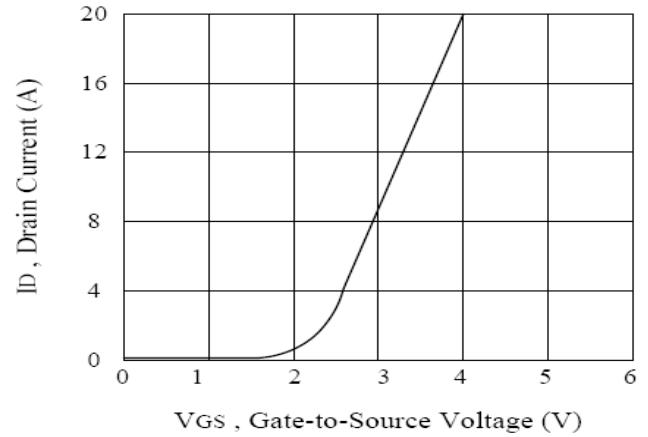


Figure 2. Transfer Characteristics

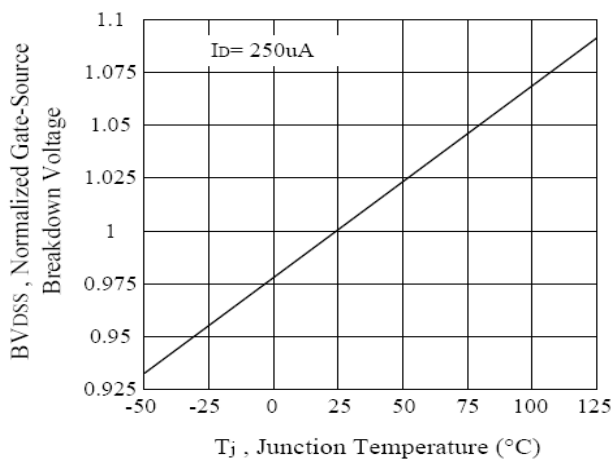


Figure 3. Breakdown Voltage Variation with Temperature

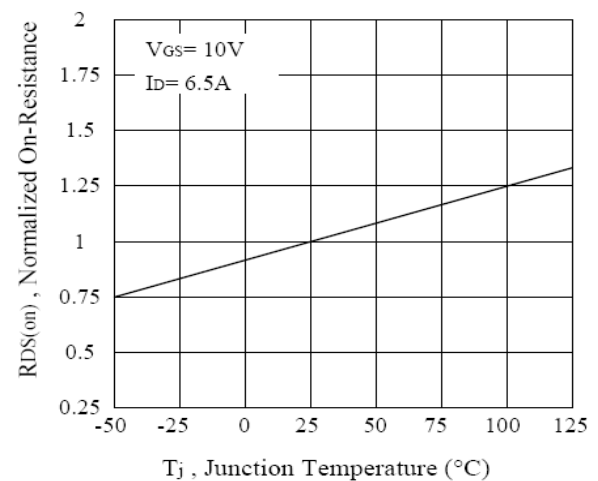


Figure 4. On-Resistance Variation with Temperature

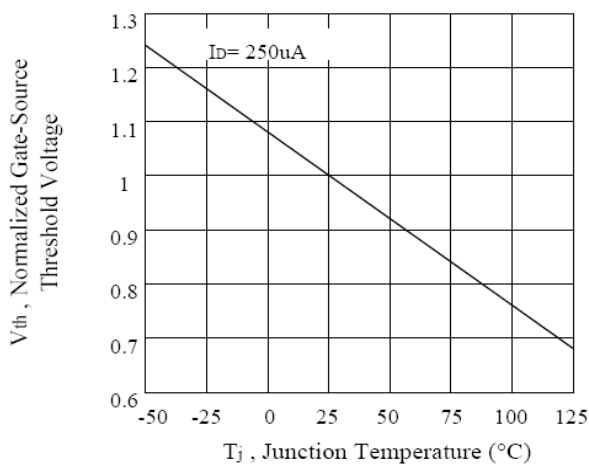
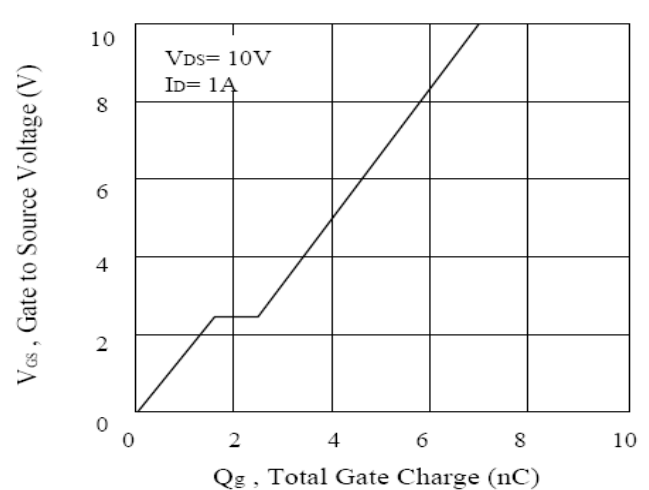


Figure 5. Gate Threshold Variation with Temperature



## Characteristics Curve(N-Channel)

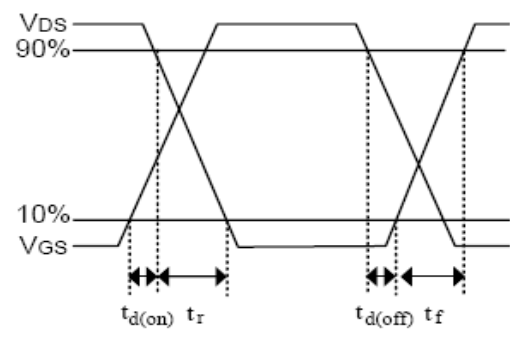
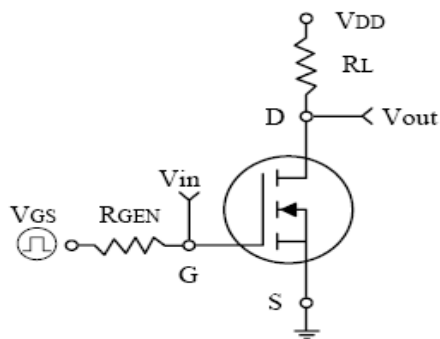
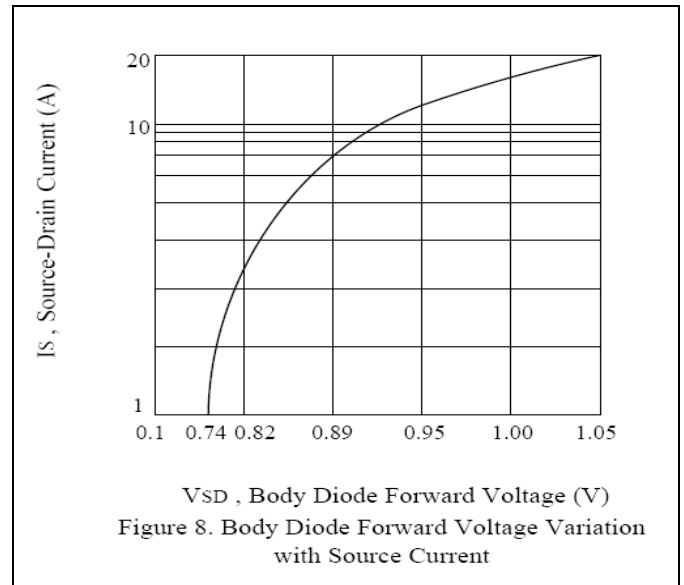
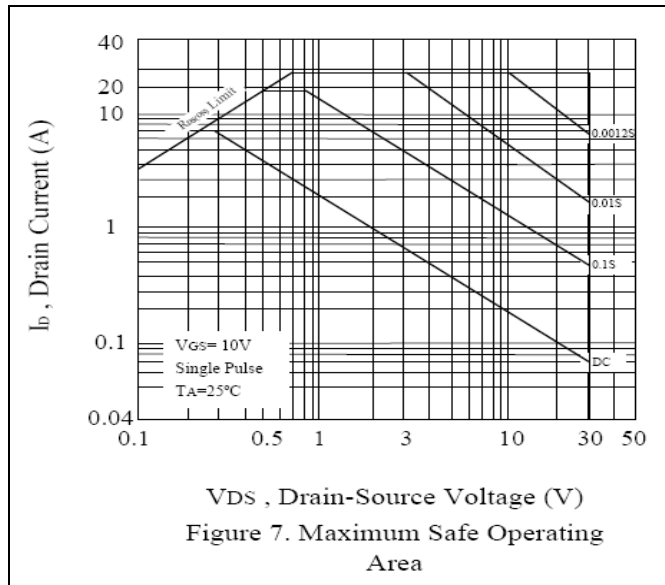


Figure 9. Switching Test Circuit and Switching Waveforms

## Characteristics Curve(P-Channel)

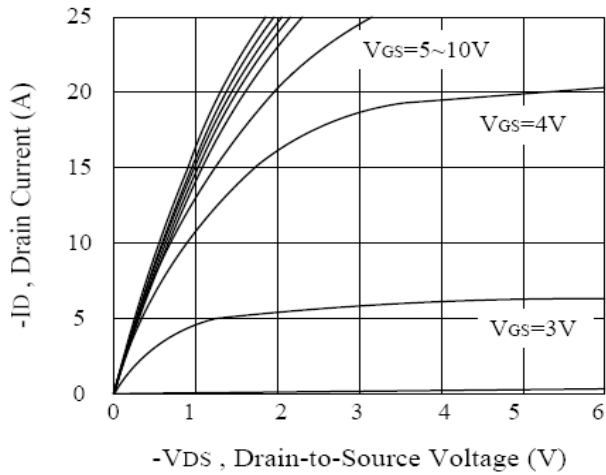


Figure 10 Output Characteristics

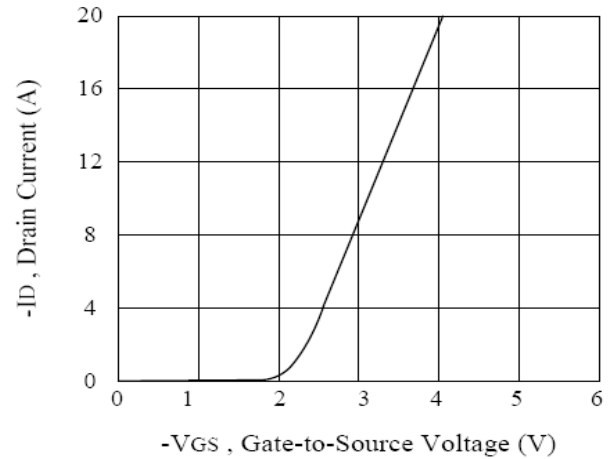


Figure 11 Transfer Characteristics

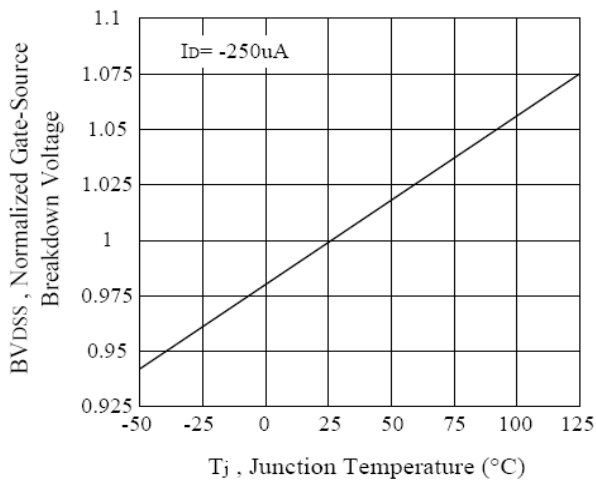


Figure 12 Breakdown Voltage Variation with

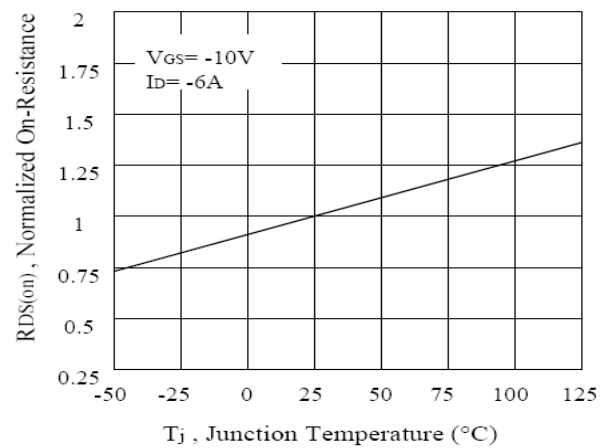


Figure 13. On-Resistance Variation with Temperature

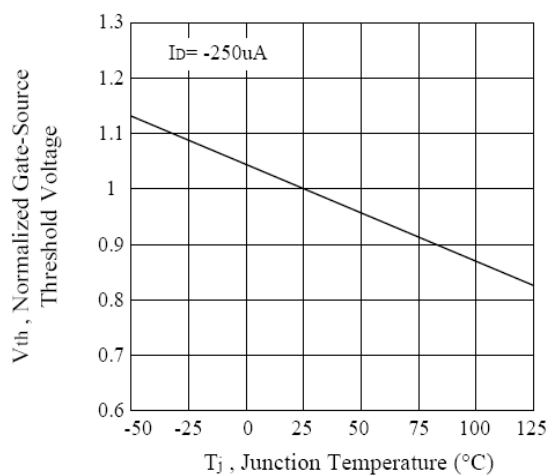


Figure 14 Gate Threshold Variation with Temperature

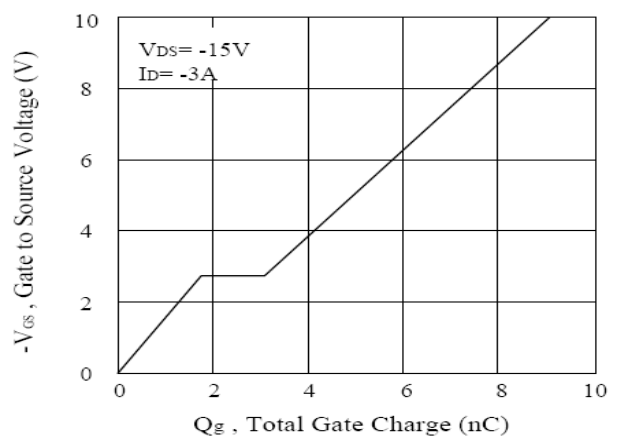


Figure 15. Gate Charge

## Characteristics Curve(P-Channel)

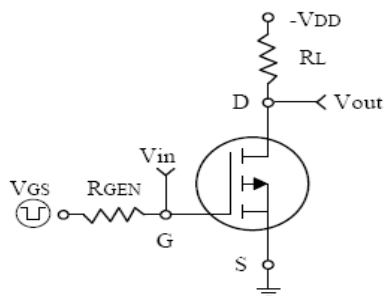
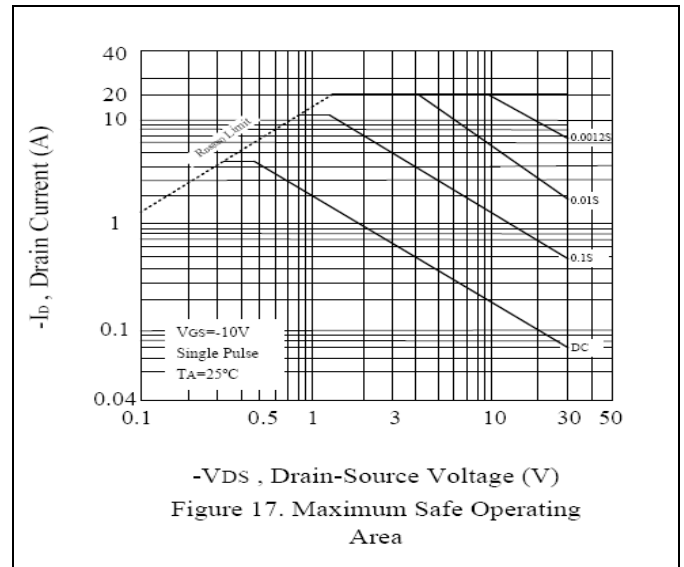
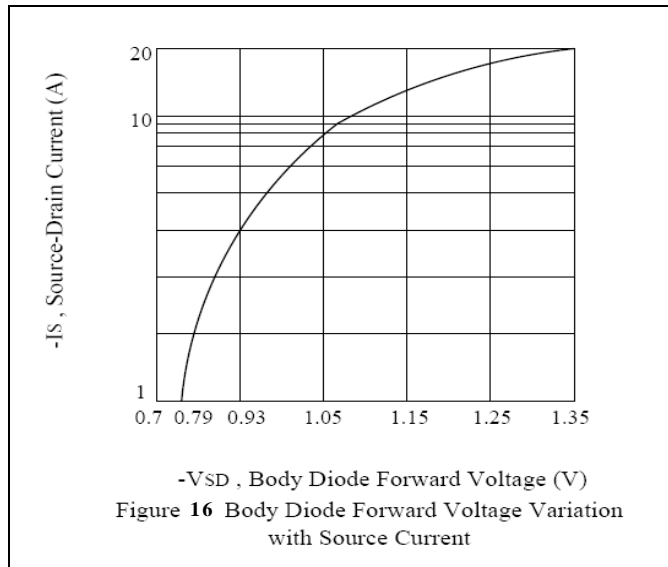


Figure 18 Switching Test Circuit and Switching Waveforms