Shenzhen Tuofeng Semiconductor Technology co., LTD

4606

Complementary High Density Trench MOSFET

PRODUCT SUMMARY (N-Channel)		
V_{DSS}	I_D	$R_{DS(on)}$ (m-ohm) Max
30V	6.9A	28 @ VGS = 10 V, I_D=6.9A
		42 @ VGS = 4.5V, I_D=5.0A

PRODUCT SUMMARY (P-Channel)		
V_{DSS}	I_D	$R_{DS(on)}$ (m-ohm) Max
-30V	-6.0 A	50 @ VGS = -10V, I_D=-6.0A
		80@VGS = -4.5V, I_D=-5.0A
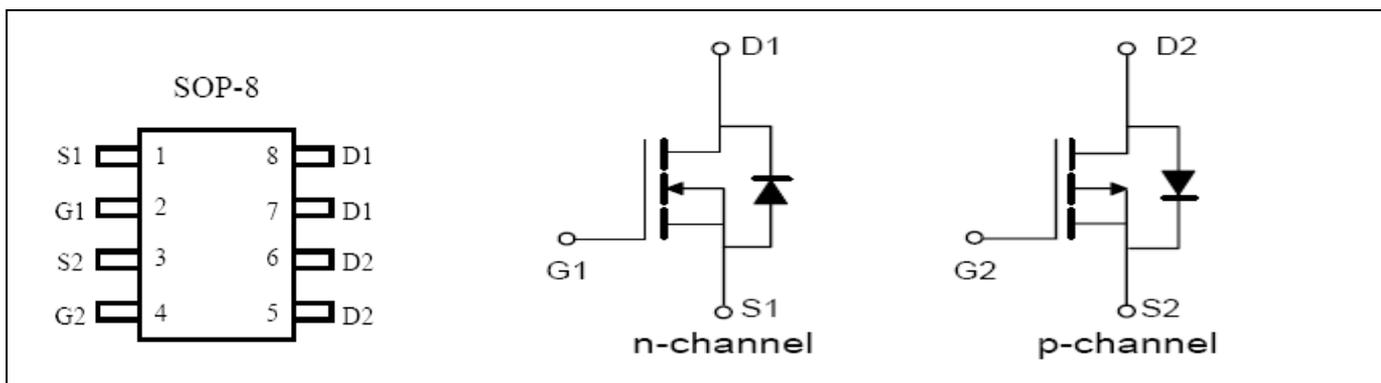
Absolute Maximum Ratings (T_A=25°C, unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Drain Current[a]	6.9	-6.0	A
I_{DM}	Drain Current[b] (Pulsed) [*1]	28	-26	A
Is	Drain-Source Diode Forward Current [a]	2.5	-2.3	A
P_D	Total Power Dissipation[a] @T_A=25°C	2.0	2.0	W
	Total Power Dissipation[a] @T_A=75°C	1.2	1.2	
T_j, T_{stg}	Operating Junction and Storage Temperature Range[a]	-55 to +150	-55 to +150	°C
$R_{\theta JA}$	Thermal Resistance Junction to Ambient[a]	63.2	63.2	°C/W

a: Surface Mounted on FR4 Board , t ≤ 5sec .
b: Pulse width limited by maximum junction temperature.

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N-Channel Electrical Characteristics(T$_A$=25°C, unless otherwise noted)

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

Note:

b: Pulse width limited by maximum junction temperature.

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

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## P-Channel Electrical Characteristics (T_A=25°C, unless otherwise noted)

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• **Off Characteristics**						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V, V_{GS}=0V	-	-	-50	nA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
• **On Characteristics**[c]						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-1.0	-1.3	-2.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-6.0A	-	40	50	mΩ
		V_{GS}=-4.5V, I_D=-5.0A	-	70	80	
gfs	Forward Transconductance	V_{DS}=-10V, I_D=-6.0A	-	12.7	-	S
• **Dynamic Characteristics** [d]						
C_{iss}	Input Capacitance		-	930	-	pF
C_{oss}	Output Capacitance	V_{DS}=-15V, V_{GS}=0V, f=1MHz	-	121	-	
C_{rss}	Reverse Transfer Capacitance		-	102	-	
• **Switching Characteristics**[d]						
Q_g	Total Gate Charge		-	20	-	nC
Q_{gs}	Gate-Source Charge	V_{DS}=-15V, I_D=-3A, V_{GS}=-10V	-	4.1	-	
Q_{gd}	Gate-Drain Charge		-	2.6	-	
$t_{d(on)}$	Turn-on Delay Time		-	9.5	-	nS
t_r	Turn-on Rise Time	V_{DD}=-15V, R_L=5Ω, I_D=-3A,	-	5.4	-	
$t_{d(off)}$	Turn-off Delay Time	V_{GEN}=-10V, R_G=6Ω	-	42.5	-	
t_f	Turn-off Fall Time		-	13.6	-	
• **Drain-Source Diode Characteristics**						
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V, I_S=-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 7. Maximum Safe Operating Area

Figure 8. Body Diode Forward Voltage Variation with Source Current
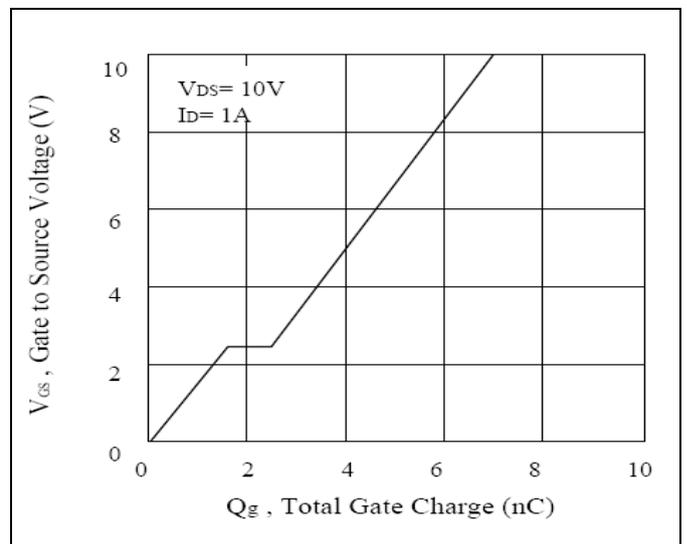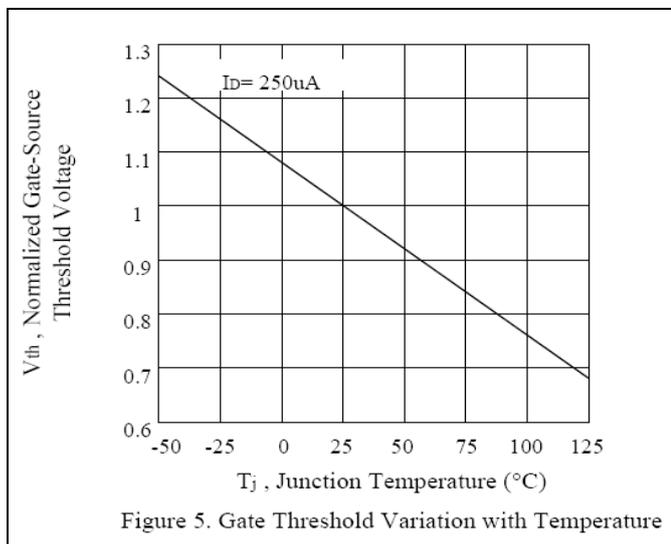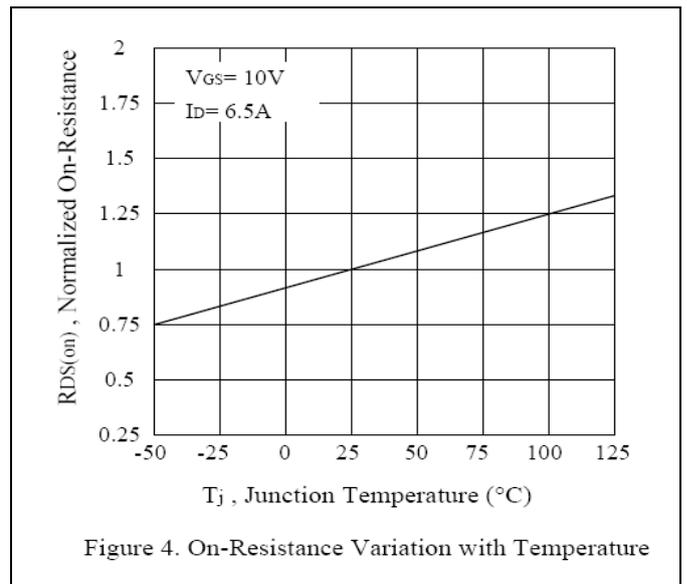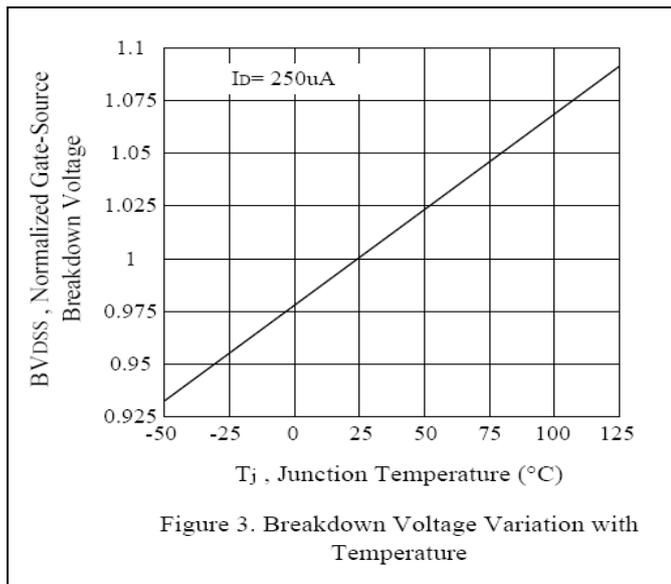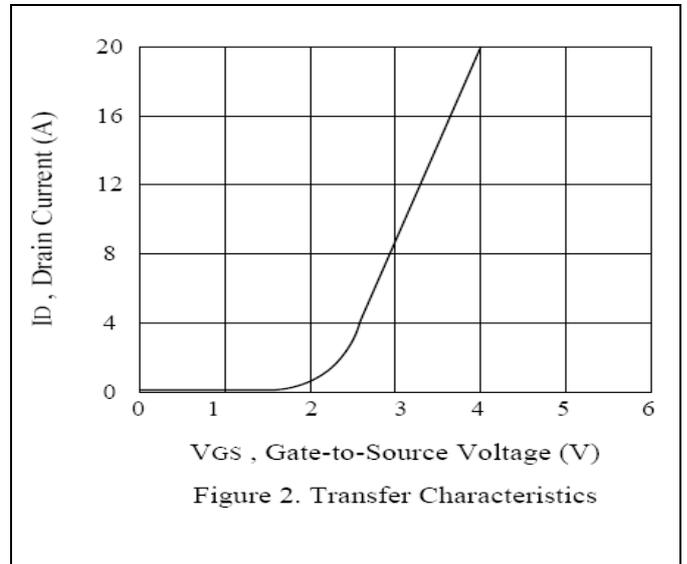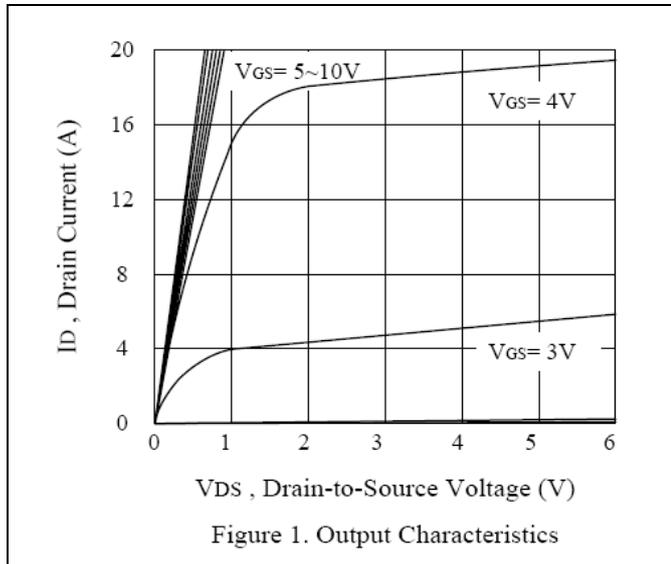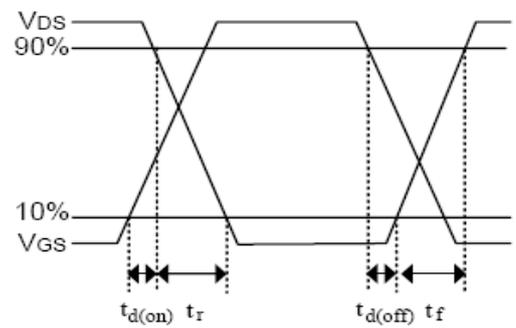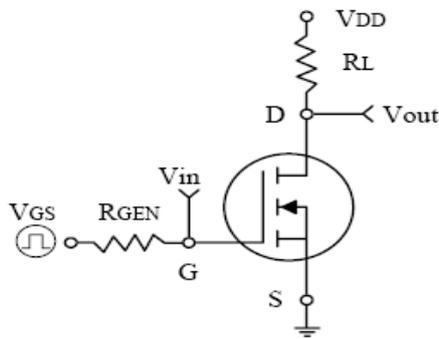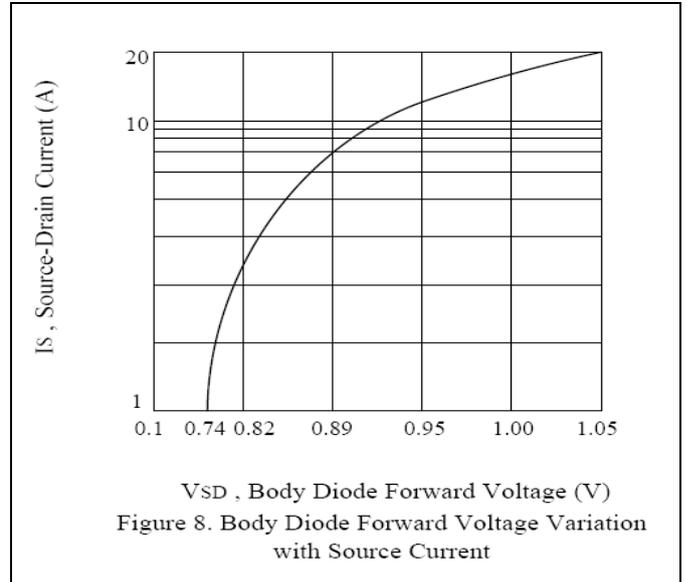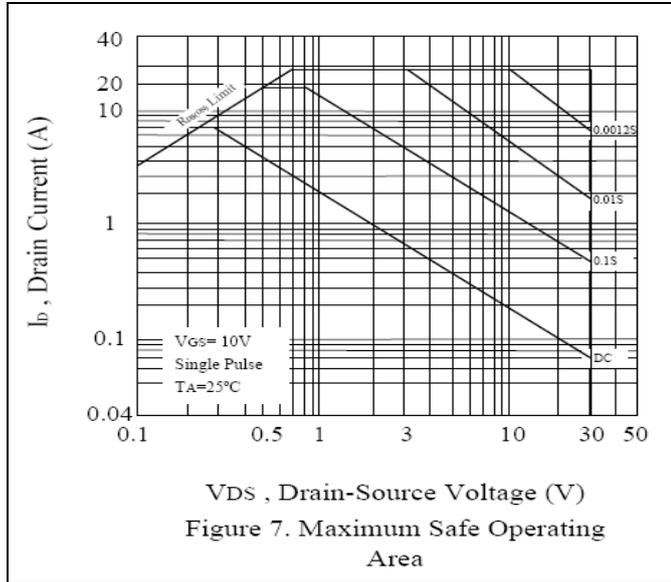
Figure 9. Switching Test Circuit and Switching Waveforms
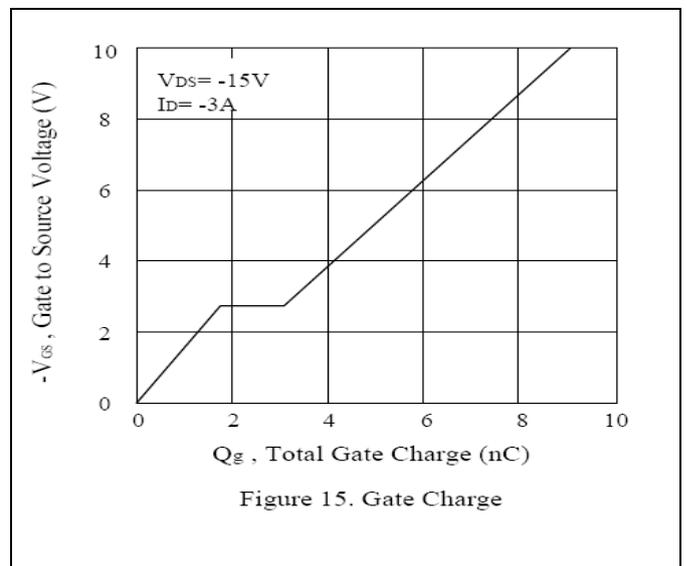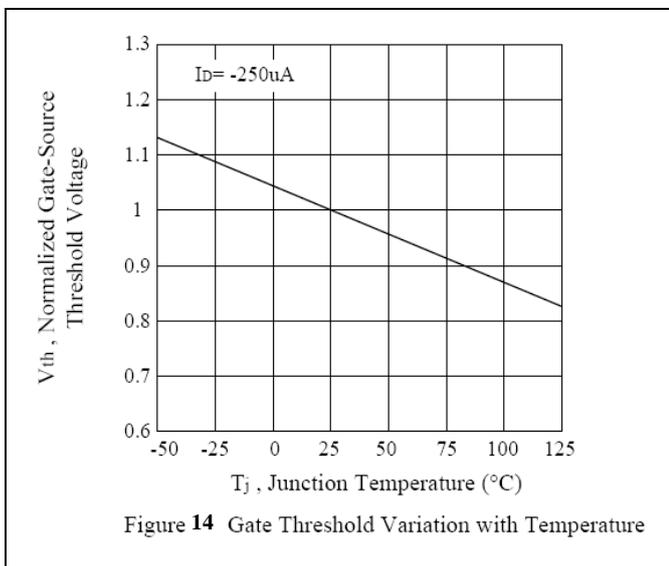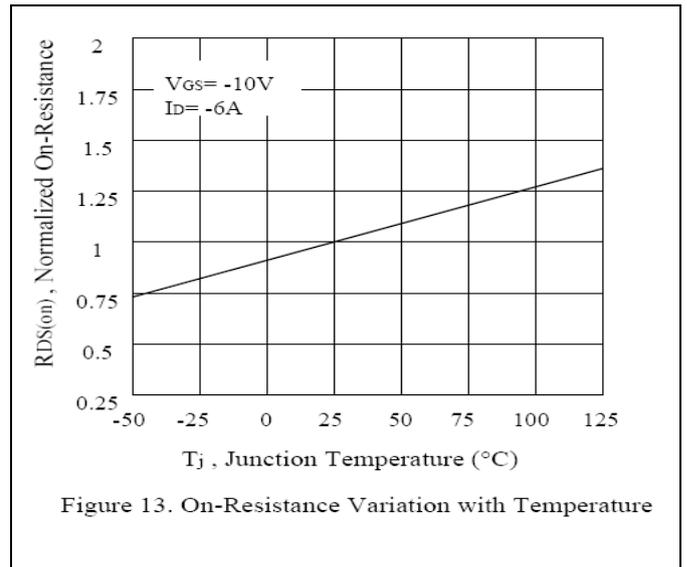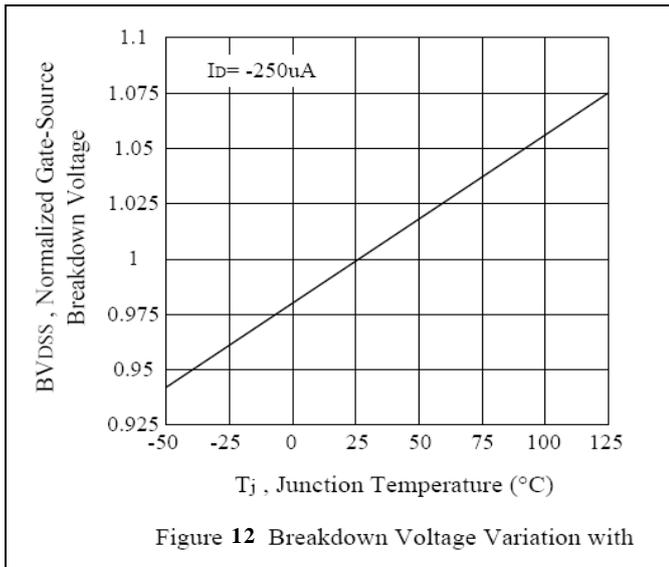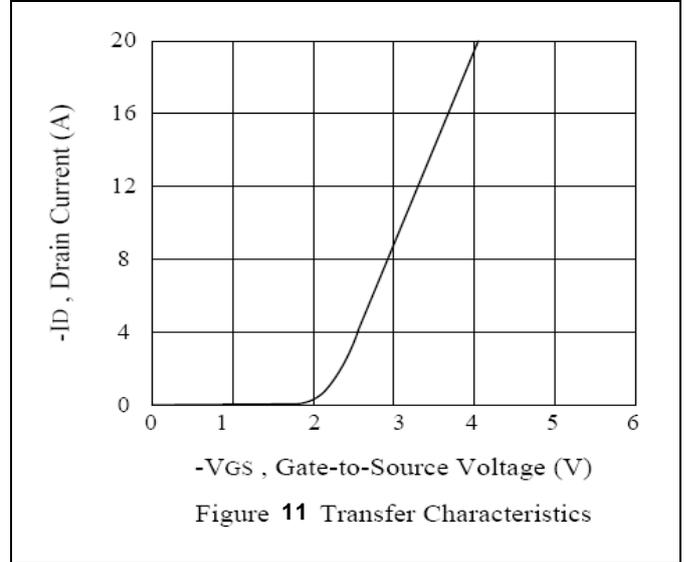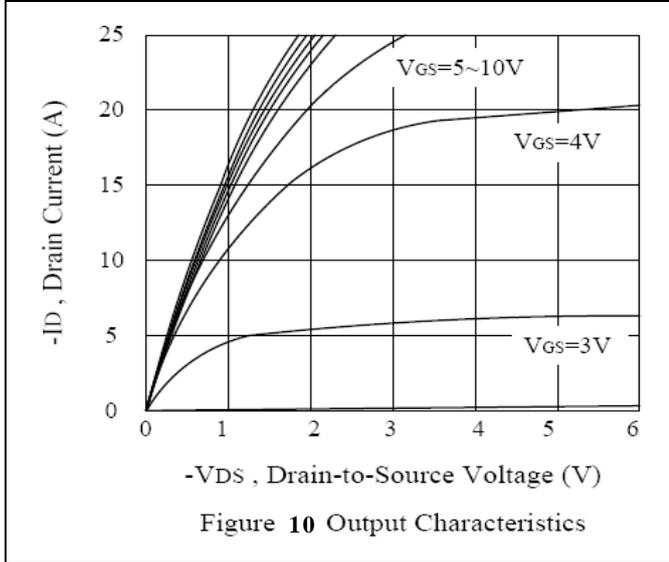
Characteristics Curve(P-Channel)

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)

-VSD , Body Diode Forward Voltage (V)
Figure 16 Body Diode Forward Voltage Variation
with Source Current

-VDS , Drain-Source Voltage (V)
Figure 17. Maximum Safe Operating
Area

Figure 18 Switching Test Circuit and Switching
Waveforms