# 30V N+P-Channel MOSFET

Features

● High Speed Power Switching

● Reliable and Rugged

● ROHS Compliant

●100% Avalanche Tested
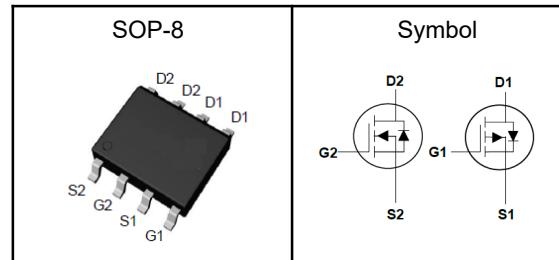
Applications

● Power Management in Desktop Computer

● DC/DC Converters

Pin Description

SOP-8	Symbol

	N-ch	P-ch	
V_{DSS}	30	-30	V
$R_{DS(ON)-Typ}$	18	35	mΩ
I_D	6.5	-7	A

Absolute Maximum Ratings(T$_A$=25℃, Unless Otherwise Noted)

Symbol	Parameter	N-Ch	P-Ch	Unit
V_{DSS}	Drain-Source Voltage	30	-30	V
V_{GSS}	Gate-Source Voltage	±20	±20	V
T_J	Maximum Junction Temperature	-55 to 150		℃
T_{STG}	Storage Temperature Range	-55 to 150		℃
I_{DM}[①]	Pulse Drain Current Tested	30	-30	A
I_D	Continuous Drain Current	6.5	-7	A
P_D	Maximum Power Dissipation	2	2	W
E_{AS}	Avalanche Energy, Single pulse	12	43	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{θJA}$	Thermal Resistance-Junction to Ambient	62.5	℃/W

Note ① : Max. current is limited by bonding wire.

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150℃.

Note ③ : Surface Mounted on 1in² FR-4 board with 1oz.

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N-ch Electrical Characteristics (T$_J$=25℃, Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V, I$_D$=250uA	30	---	---	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=30V, V$_{GS}$=0V	---	---	1	uA
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=250uA	1.0	---	3.0	V
I$_{GSS}$	Gate Leakage Current	V$_{GS}$=±20V, V$_{DS}$=0V	---	---	±100	nA
R$_{DS(ON)}$	Drain-Source On-state Resistance	V$_{GS}$=10V, I$_D$=6A	---	18	28	mΩ
		V$_{GS}$=4.5V, I$_D$=6A	---	26	37	mΩ
Dynamic Characteristics⑤						
R$_g$	Gate Resistance	V$_{DS}$=0V , V$_{GS}$=0V , f=1MHz	---	1.8	---	Ω
C$_{iss}$	Input Capacitance	V$_{DS}$=15V, V$_{GS}$=0V, Freq.=1MHz	---	530	---	pF
C$_{oss}$	Output Capacitance		---	67	---	
C$_{rss}$	Reverse Transfer Capacitance		---	61	---	
T$_{d(on)}$	Turn-on Delay Time	V$_{DD}$=15V,V$_{GS}$=10V, RL=2.5Ω,R$_G$=3Ω	---	4.5	---	nS
T$_r$	Turn-on Rise Time		---	2.5	---	
T$_{d(off)}$	Turn-off Delay Time		---	14.5	---	
T$_f$	Turn-off Fall Time		---	3.5	---	
Q$_g$	Total Gate Charge	V$_{DS}$=15V,V$_{GS}$=10V, I$_D$=6A	---	14.2	---	nC
Q$_{gs}$	Gate-Source Charge		---	1.8	---	
Q$_{gd}$	Gate-Drain Charge		---	3.3	---	
Source-Drain Characteristics						
V$_{SD}$	Diode Forward Voltage	I$_S$=6A, V$_{GS}$=0V	---	---	1.2	V
t$_{rr}$	Reverse Recovery Time	I$_F$=7.2A, dI$_F$/dt=100A/us	---	10.5	---	nS
Q$_{rr}$	Reverse Recovery Charge		---	4.5	---	nC

Note ④： Pulse test (pulse width≤300us, duty cycle≤2%).

Note ⑤ : Guaranteed by design, not subject to production testing.

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## P-ch Electrical Characteristics (T$_J$=25℃, Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V, I$_D$=-250uA	-30	---	---	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=-30V, V$_{GS}$=0V	---	---	-1	uA
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=-250uA	-1.0	---	-2.0	V
I$_{GSS}$	Gate Leakage Current	V$_{GS}$=±20V, V$_{DS}$=0V	---	---	±100	nA
R$_{DS(ON)}$	Drain-Source On-state Resistance	V$_{GS}$=-10V, I$_D$=-6.5A	---	35	45	mΩ
		V$_{GS}$=-4.5V, I$_D$=-5A	---	45	65	mΩ
Dynamic Characteristics[⑤]						
R$_g$	Gate Resistance	V$_{DS}$=0V , V$_{GS}$=0V , f=1MHz	---	3.2	---	Ω
C$_{iss}$	Input Capacitance	V$_{DS}$=-15V, V$_{GS}$=0V, Freq.=1MHz	---	956	---	pF
C$_{oss}$	Output Capacitance		---	122	---	
C$_{rss}$	Reverse Transfer Capacitance		---	116	---	
T$_{d(on)}$	Turn-on Delay Time	V$_{DD}$=-15V,V$_{GS}$=-10V, R$_G$=6Ω	---	8	---	nS
T$_r$	Turn-on Rise Time		---	6	---	
T$_{d(off)}$	Turn-off Delay Time		---	20	---	
T$_f$	Turn-off Fall Time		---	7.5	---	
Q$_g$	Total Gate Charge	V$_{DS}$=-15V,V$_{GS}$=-10V, I$_D$=-6.5A	---	21	---	nC
Q$_{gs}$	Gate-Source Charge		---	2.2	---	
Q$_{gd}$	Gate-Drain Charge		---	4.5	---	
Source-Drain Characteristics						
V$_{SD}$	Diode Forward Voltage	I$_S$=-6.5A, V$_{GS}$=0V	---	---	-1.2	V
t$_{rr}$	Reverse Recovery Time	I$_F$=-5.3A,dI$_F$/dt=100A/us	---	15	---	nS
Q$_{rr}$	Reverse Recovery Charge		---	9.7	---	nC

Note ④： Pulse test (pulse width≤300us, duty cycle≤2%).

Note ⑤ : Guaranteed by design, not subject to production testing.

30V N+P-Channel MOSFET

N-ch Typical Characteristics
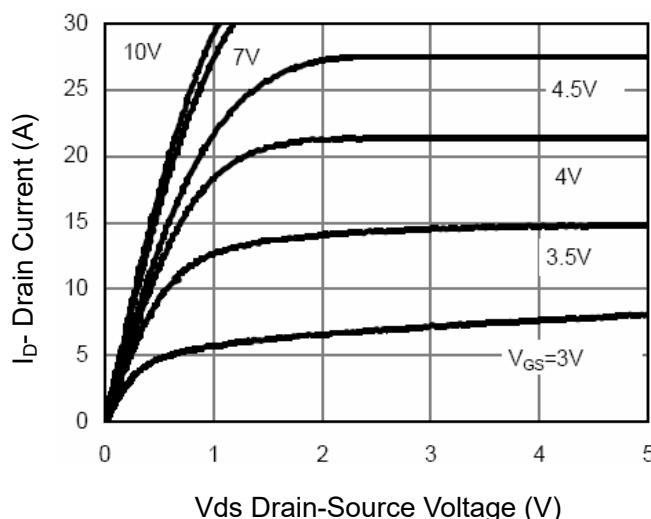
Figure 1 Output Characteristics
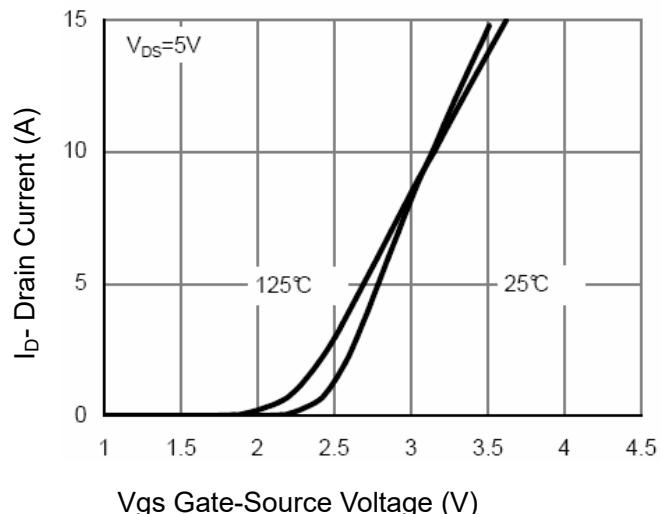
Figure 2 Transfer Characteristics
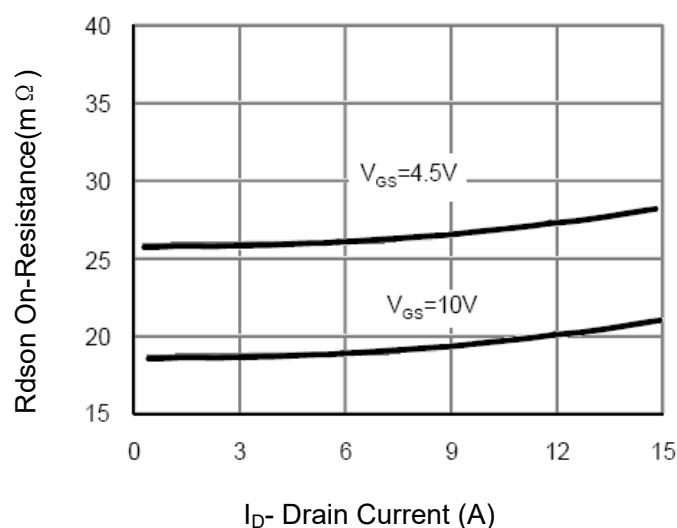
Figure 3 Drain-Source On-Resistance
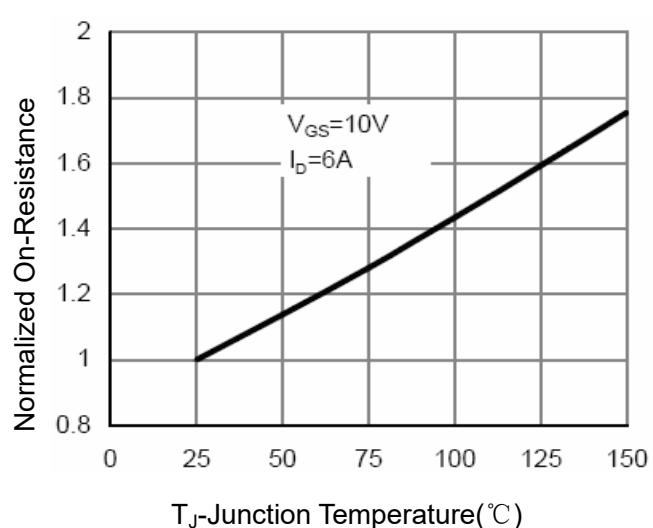
Figure 4 Drain-Source On-Resistance
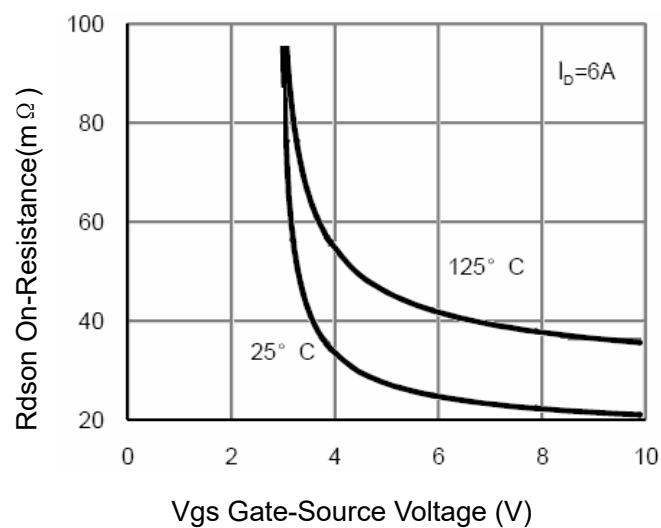
Figure 5 Rdson vs Vgs
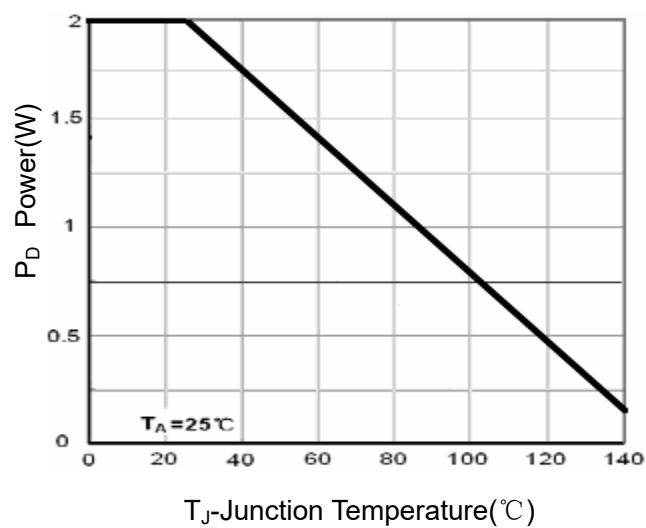
Figure 6 Power Dissipation
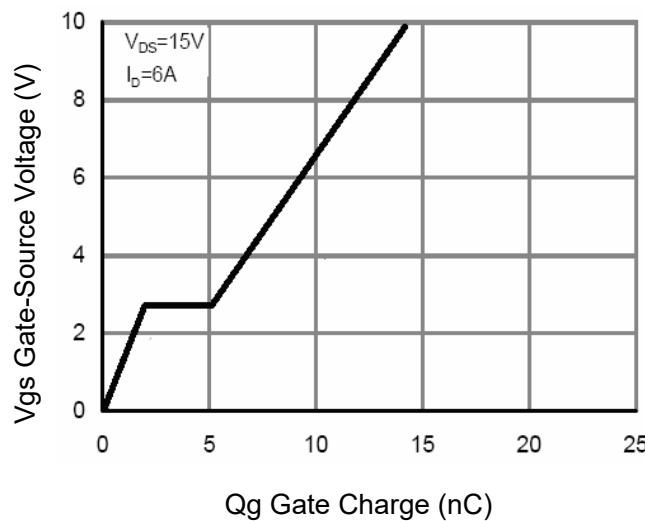
Figure 7 Gate Charge
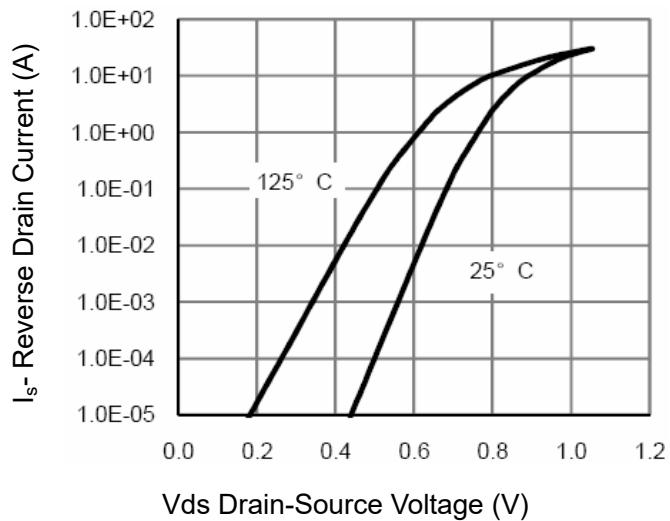
Figure 8 Source- Drain Diode Forward
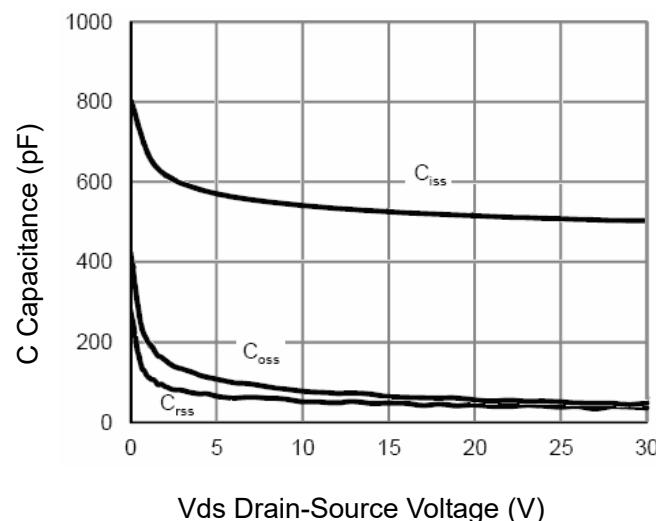
Figure 9 Capacitance vs Vds
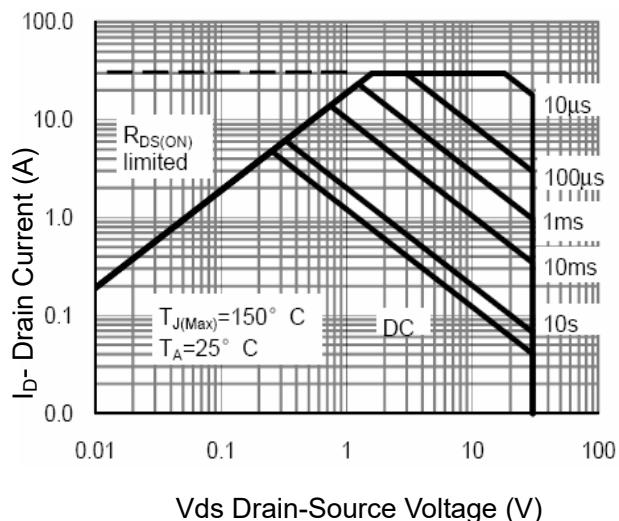
Figure 10 Safe Operation Area
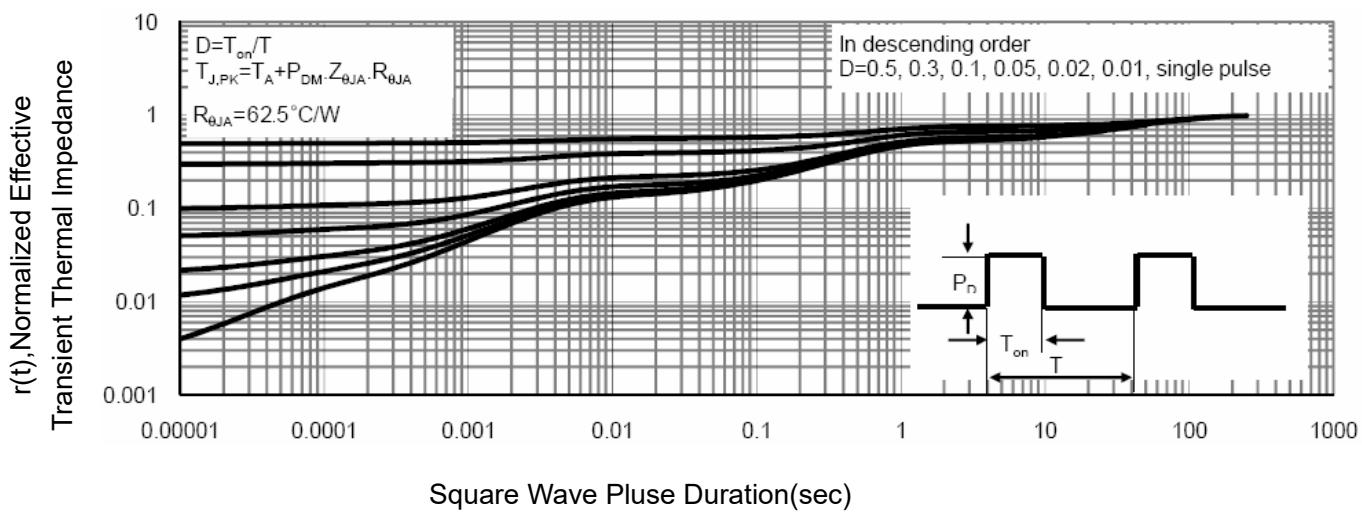
Figure 11 Normalized Maximum Transient Thermal Impedance

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P-ch Typical Characteristics
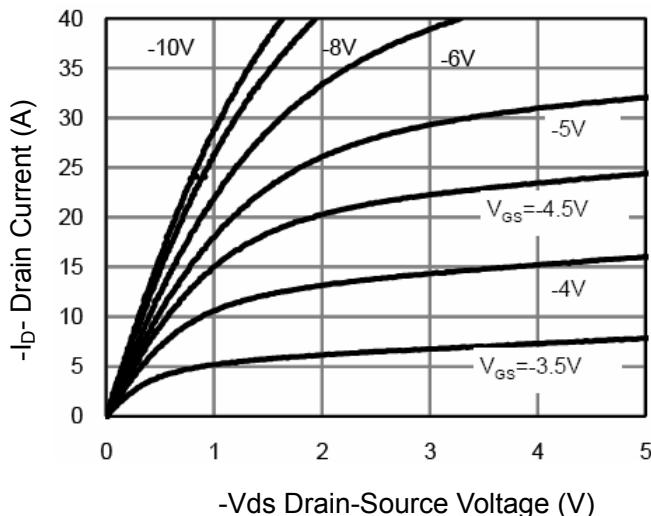
Figure 1 Output Characteristics
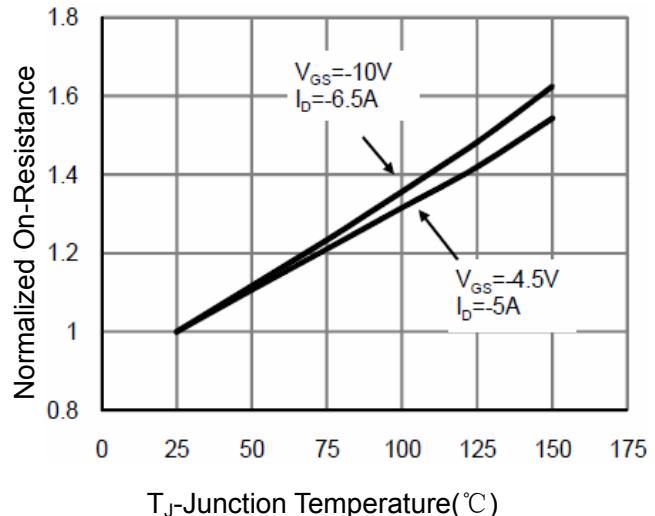
Figure 4 Rdson-Junction Temperature
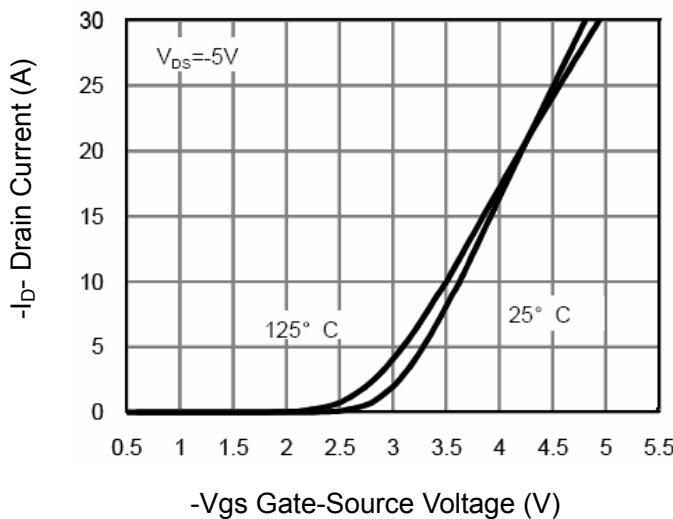
Figure 2 Transfer Characteristics
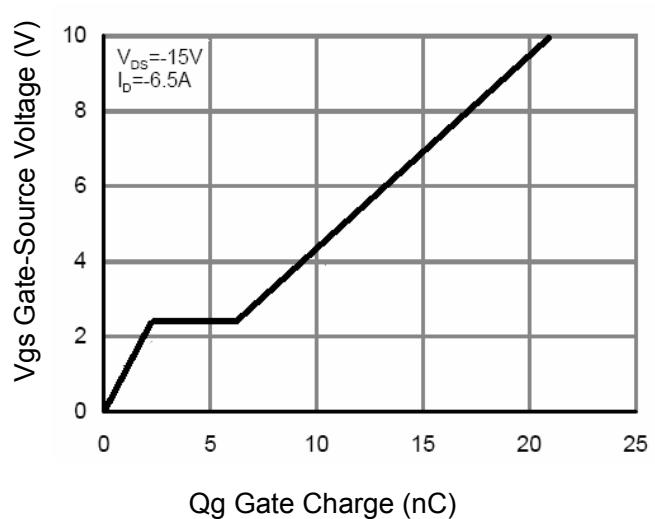
Figure 5 Gate Charge
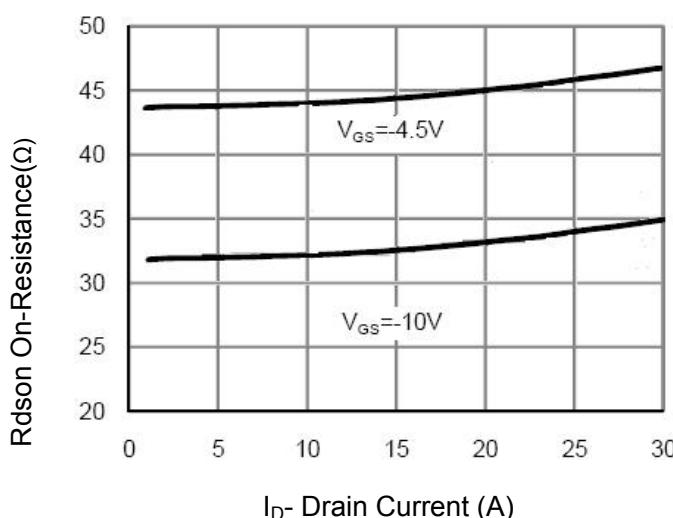
Figure 3 Rdson- Drain Current
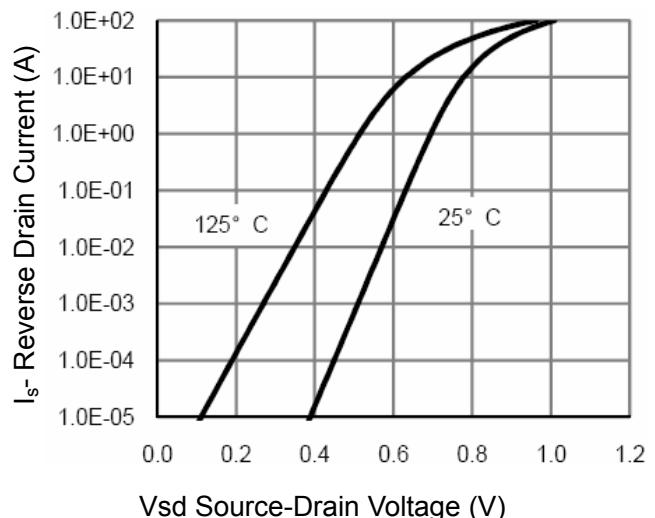
Figure 6 Source- Drain Diode Forward

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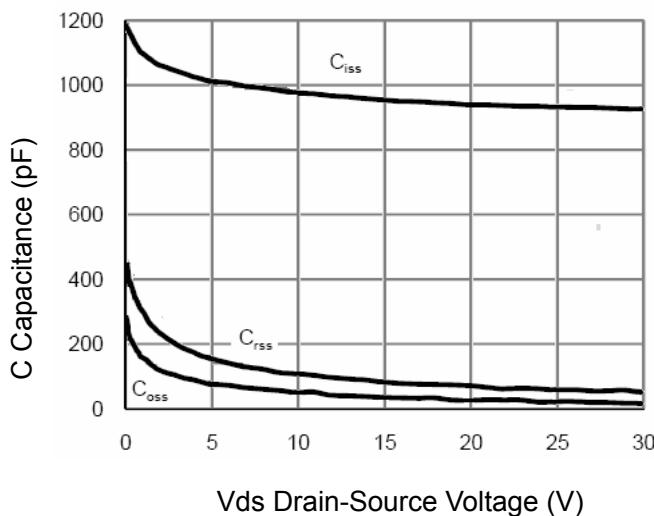
Figure 7 Capacitance vs Vds
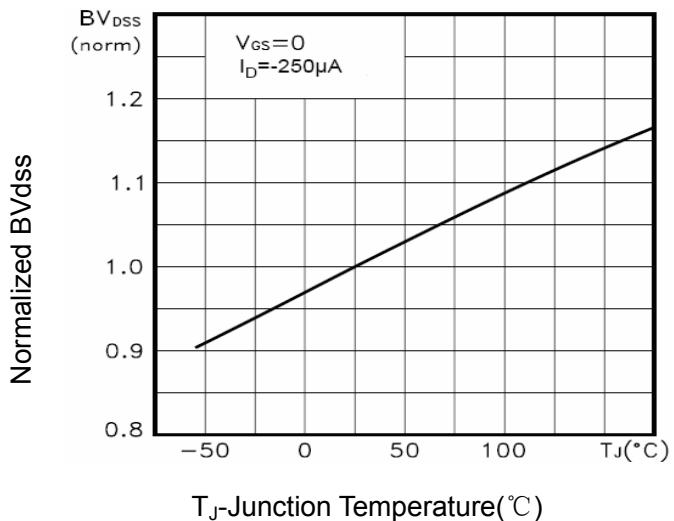
Figure 9 BV $_{DSS}$ vs Junction Temperature
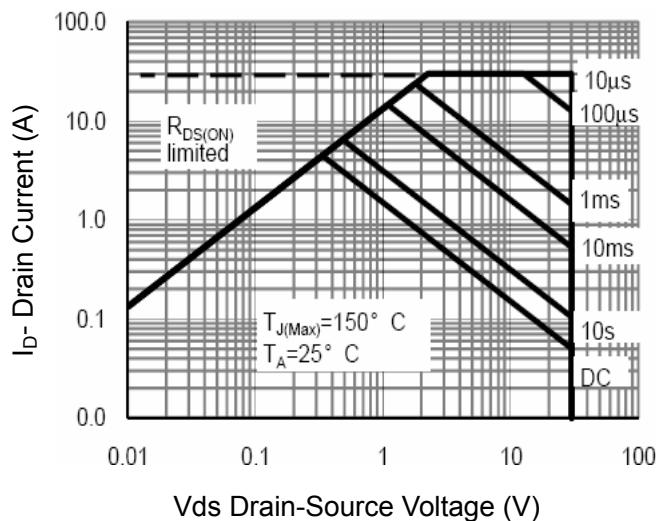
Figure 8 Safe Operation Area
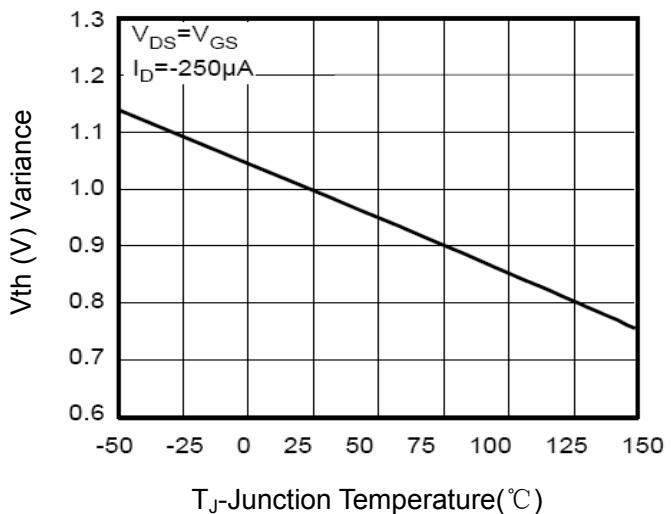
Figure 10 V $_{GS(th)}$ vs Junction Temperature

Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8　Package Outline Dimensions
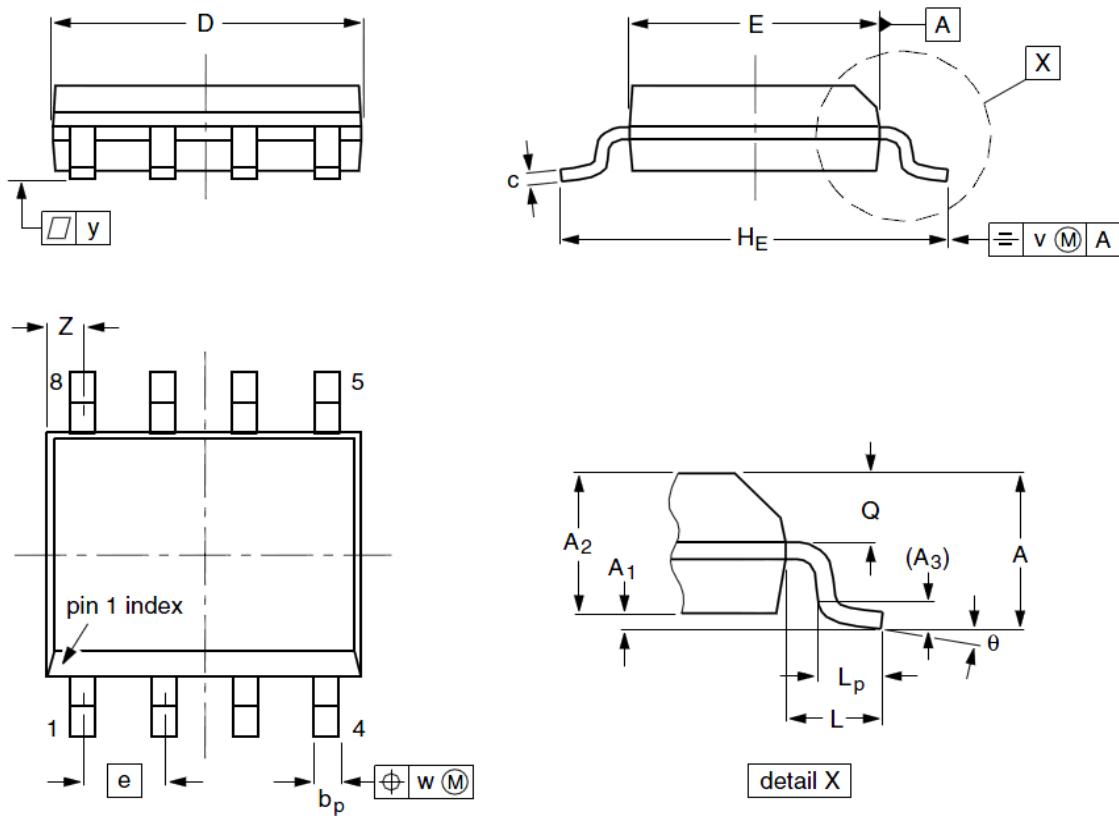
Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	1.35	1.55	1.75	A_1	0.10	0.18	0.25
A_2	1.25	1.45	1.65	A_3	--	0.25	--
b_p	0.36	0.42	0.51	c	0.19	0.22	0.25
D	4.70	4.92	5.10	E	3.80	3.90	4.00
e	--	1.27	--	H_E	5.80	6.00	6.20
L	--	1.05	--	L_P	0.40	0.68	1.00
Q	0.60	0.65	0.73	v	--	0.25	--
w	--	0.25	--	y	--	0.10	--
Z	0.30	0.50	0.70	θ	0°		8°