



### General Features

- High power and current handling capability
- Lead free product is acquired
- Surface mount package

### Application

- PWM applications
- Load switch
- Power management

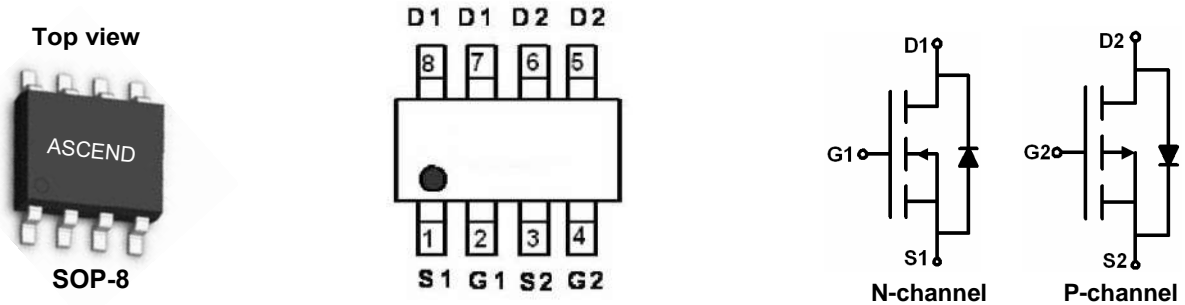
### Product Summary

#### ● N-Channel

$V_{DS}$		30	V
$R_{DS(on),Typ}$	$V_{GS}=10V$	22	$m\Omega$
$R_{DS(on),Typ}$	$V_{GS}=4.5V$	30	$m\Omega$
$I_D$		8	A

#### ● P-Channel

$V_{DS}$		-30	V
$R_{DS(on),Typ}$	$V_{GS}=-10V$	43	$m\Omega$
$R_{DS(on),Typ}$	$V_{GS}=-4.5V$	56	$m\Omega$
$I_D$		-6	A



### Absolute Maximum Ratings ( $T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	$V_{DS}$	30	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	V
Continuous Drain Current	$I_D$	8	-6	A
Pulsed Drain Current (Note 1)	$I_{DM}$	25	-20	A
Maximum Power Dissipation	$P_D$	2.5	2.5	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	-55 To 150	$^\circ C$

### Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note2)	$R_{\theta JA}$	N-Ch	89	$^\circ C/W$
		P-Ch	90	

**N-CH Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.5	2.5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =6A	-	22	29	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A	-	30	43	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =5A	-	15	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, F=1.0MHz	-	480	-	PF
Output Capacitance	C <sub>oss</sub>		-	80	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	60	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, R <sub>L</sub> =3Ω V <sub>GS</sub> =10V, R <sub>GEN</sub> =3Ω	-	4.5	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	2.5	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	14.5	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	3.5	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =5A, V <sub>GS</sub> =10V	-	5.2	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	0.85	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	1.3	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =3A	-	-	1.3	V
Diode Forward Current (Note 2)	I <sub>S</sub>		-	-	4	A

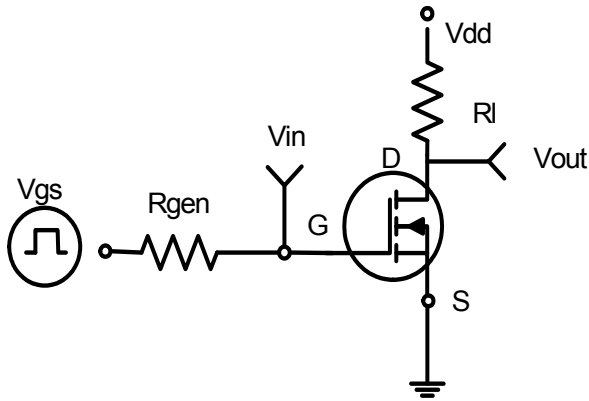
**P-CH Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =-250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V	-	-	-1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1	-1.5	-2.5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-5A	-	43	52	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A	-	56	77	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-4.1A	5.5	-	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, F=1.0MHz	-	648	-	PF
Output Capacitance	C <sub>oss</sub>		-	108	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	68	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-15V, R <sub>L</sub> =3.6Ω V <sub>GS</sub> =-10V, R <sub>GEN</sub> =3Ω	-	9	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	5	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	28	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	13.5	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-4A, V <sub>GS</sub> =-10V	-	14	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	3.1	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	3.	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A	-	-	-1.3	V

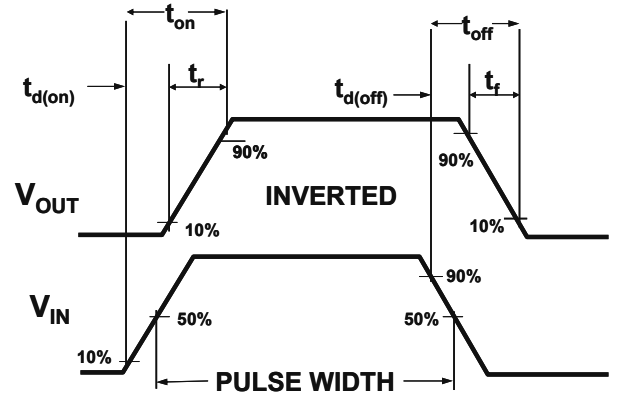
**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

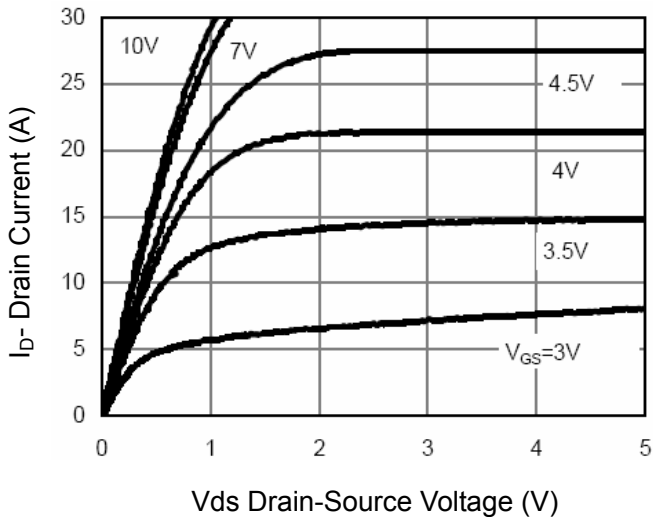
**N- Channel Typical Electrical and Thermal Characteristics (Curves)**



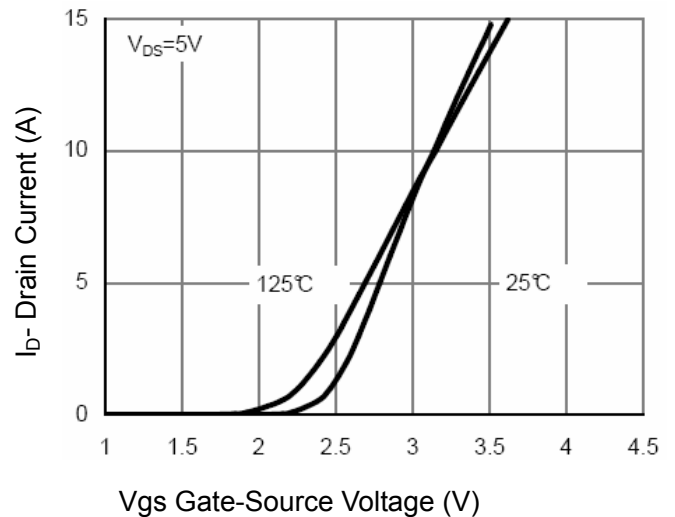
**Figure 1: Switching Test Circuit**



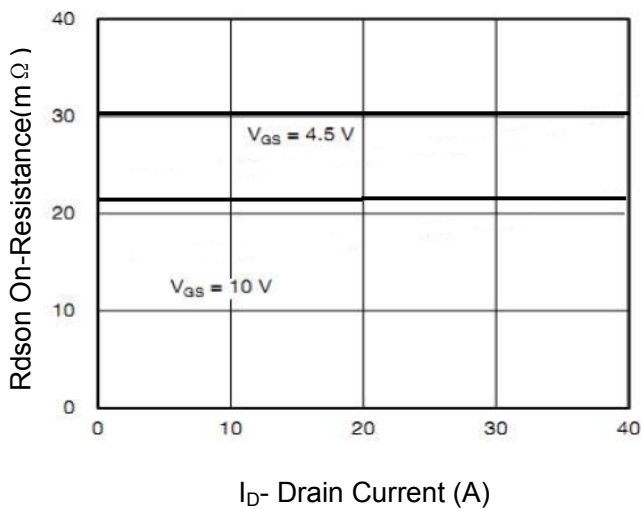
**Figure 2: Switching Waveforms**



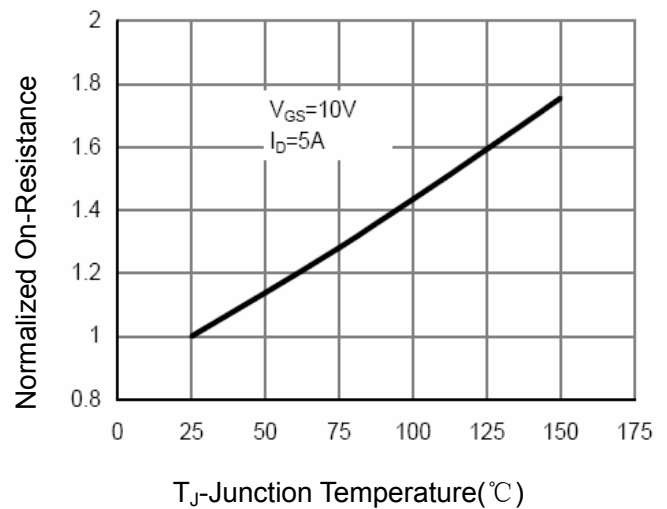
**Figure 3 Output Characteristics**



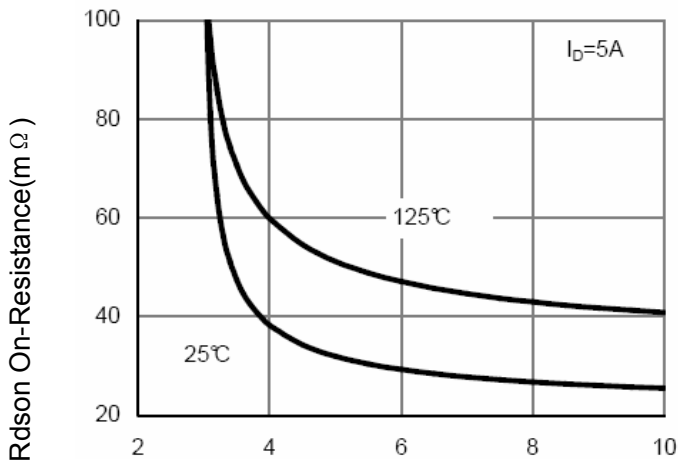
**Figure 4 Transfer Characteristics**



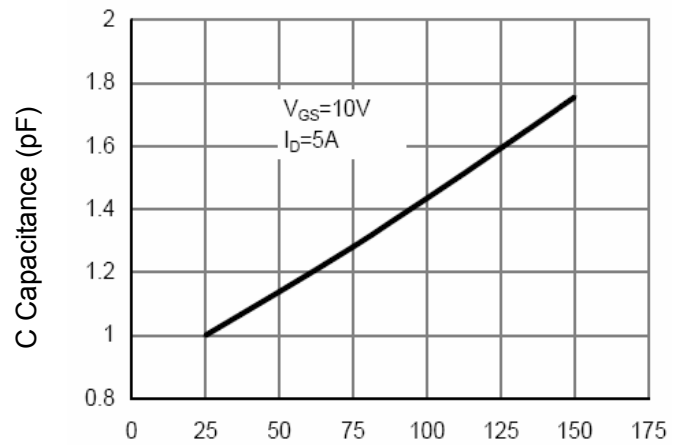
**Figure 5 Drain-Source On-Resistance**



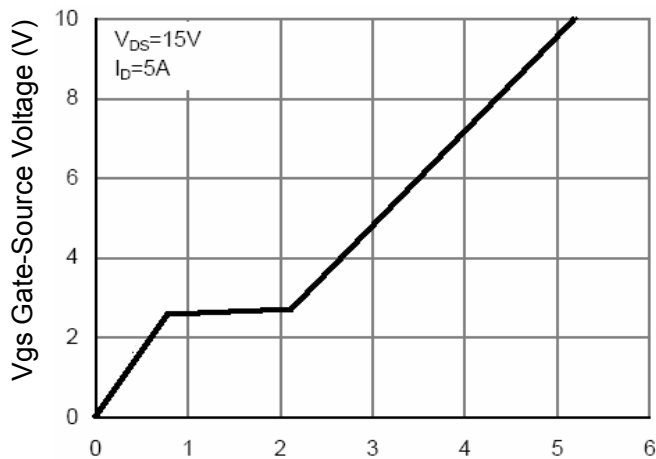
**Figure 6 Drain-Source On-Resistance**



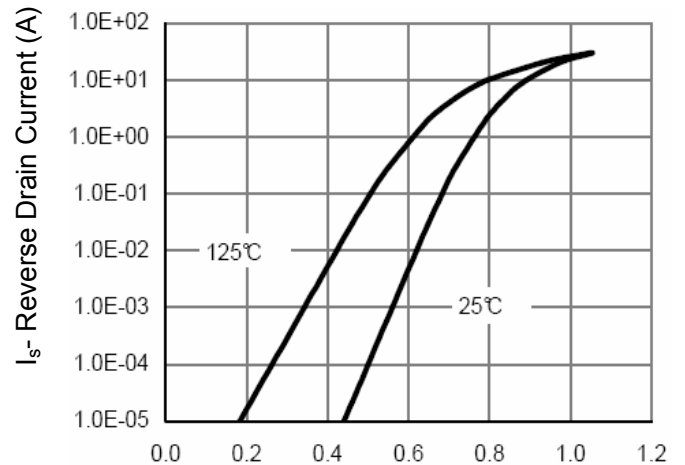
**Figure 7 Rdson vs Vgs**



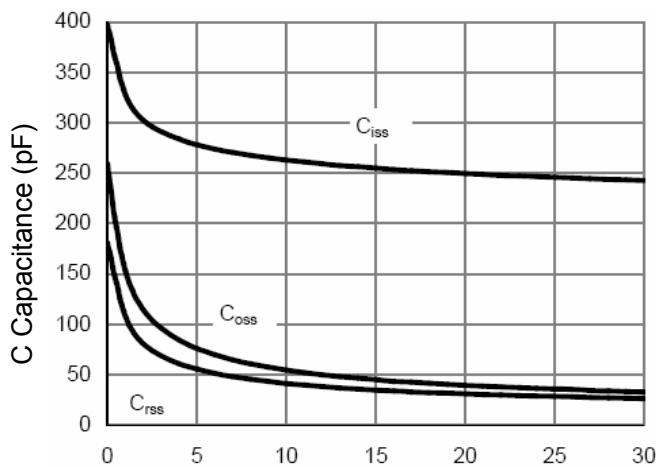
**Figure 8 Drain-Source On-Resistance**



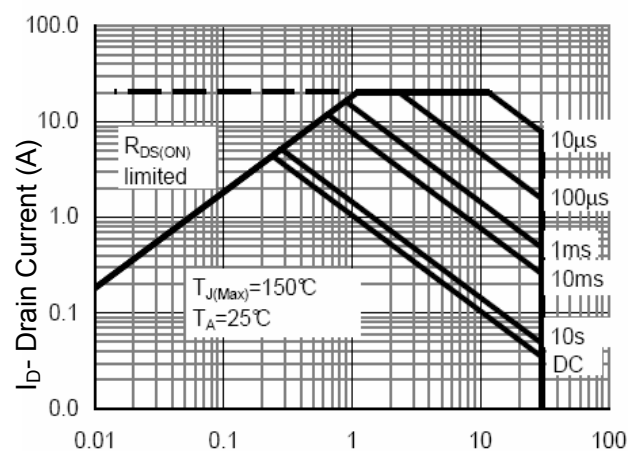
**Figure 9 Gate Charge**



**Figure 10 Source- Drain Diode Forward**



**Figure 11 Capacitance vs Vds**



**Figure 12 Safe Operation Area**

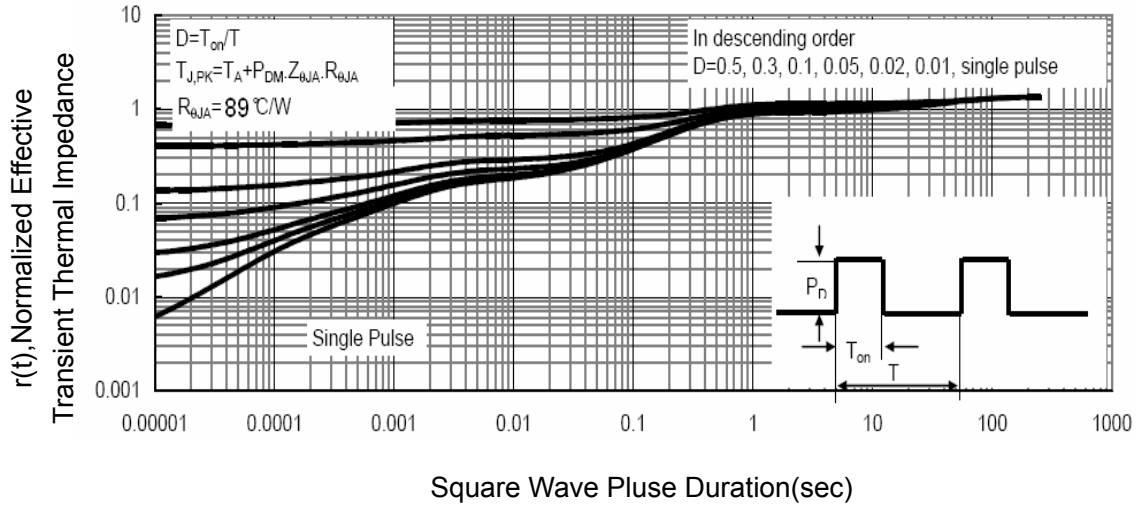


Figure 13 Normalized Maximum Transient Thermal Impedance

P-Channel Typical Electrical and Thermal Characteristics

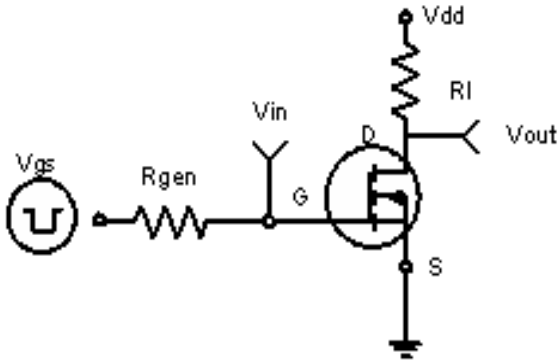


Figure 1: Switching Test Circuit

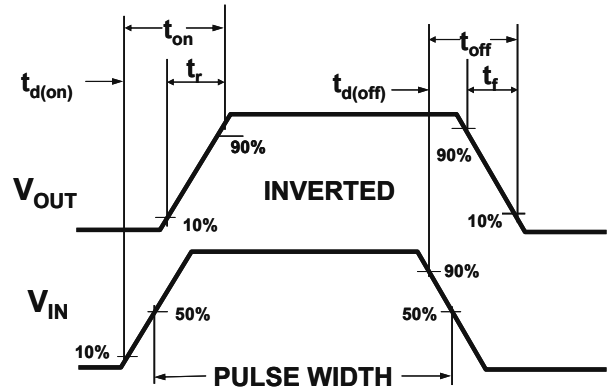
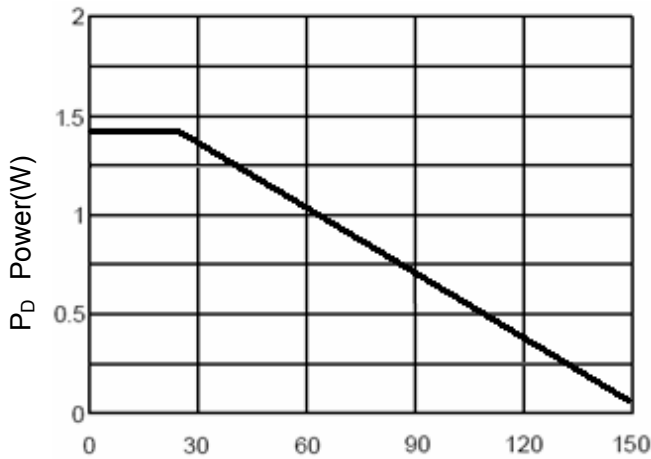
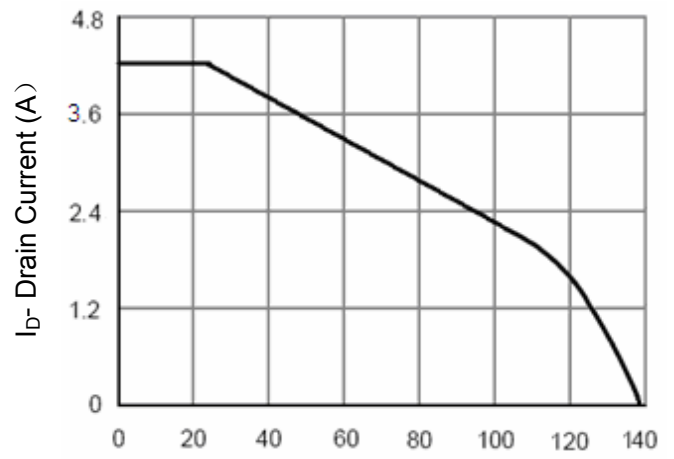


Figure 2: Switching Waveforms



T<sub>J</sub>-Junction Temperature(°C)  
Figure 3 Power Dissipation



T<sub>J</sub>-Junction Temperature(°C)  
Figure 4 Drain Current

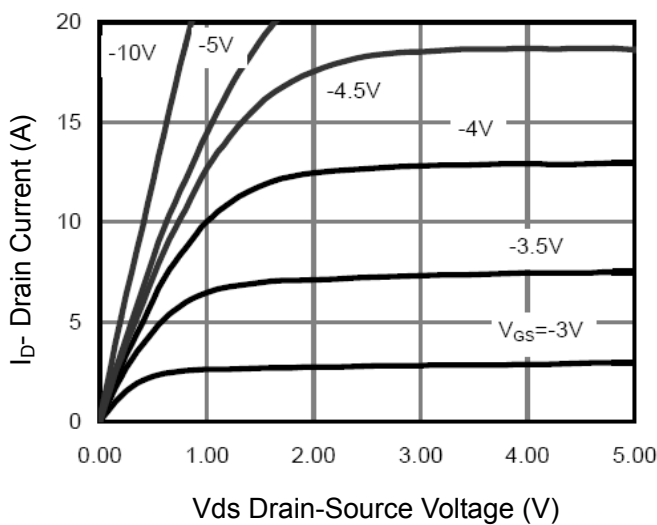


Figure 5 Output CHARACTERISTICS

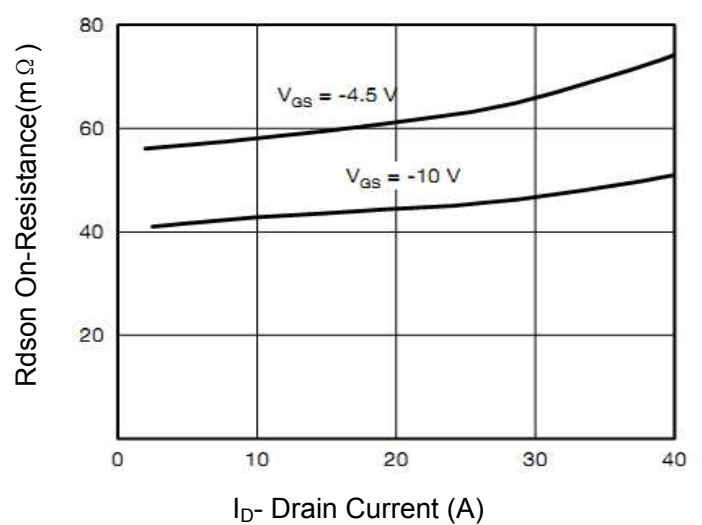
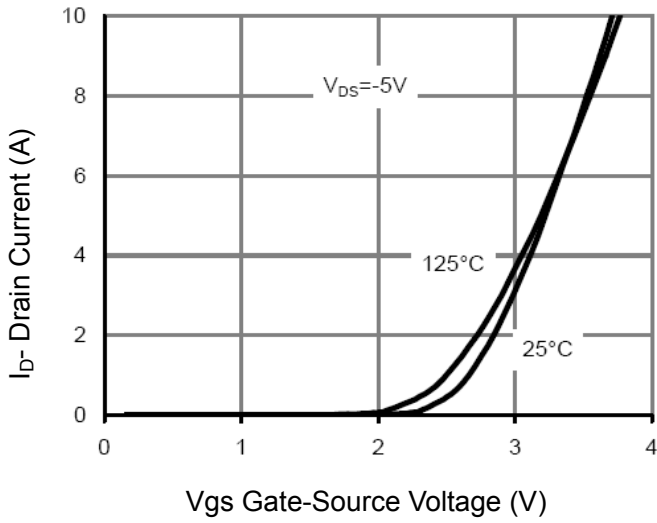
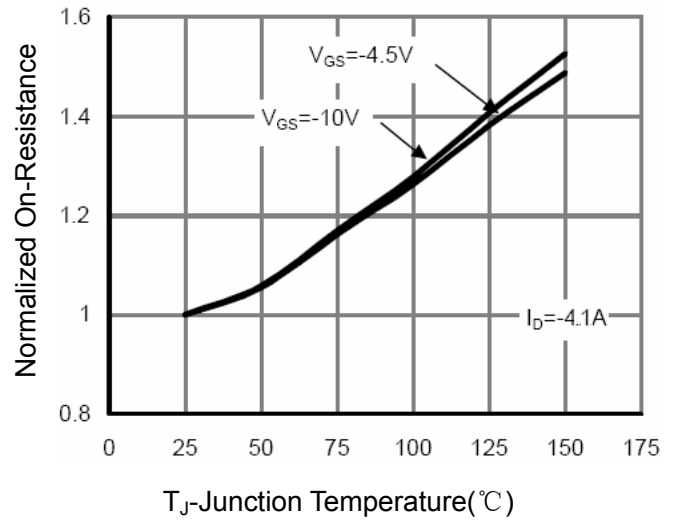


Figure 6 Drain-Source On-Resistance

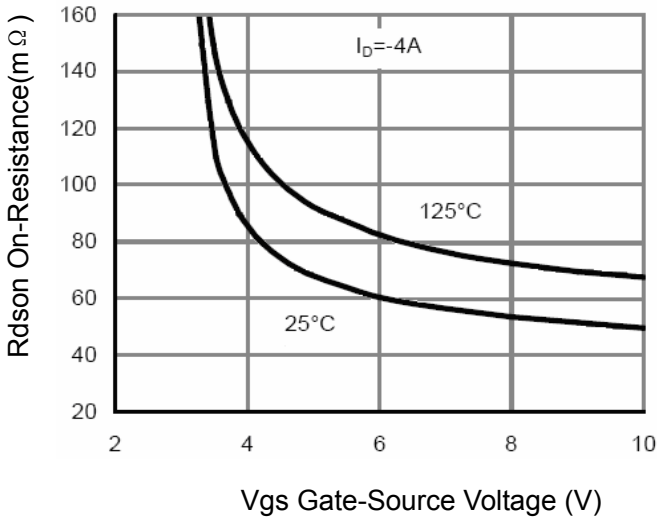




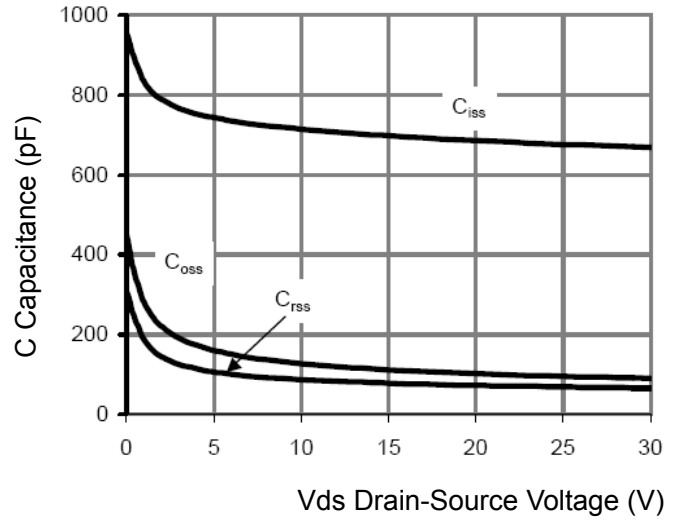
Vgs Gate-Source Voltage (V)  
**Figure 7 Transfer Characteristics**



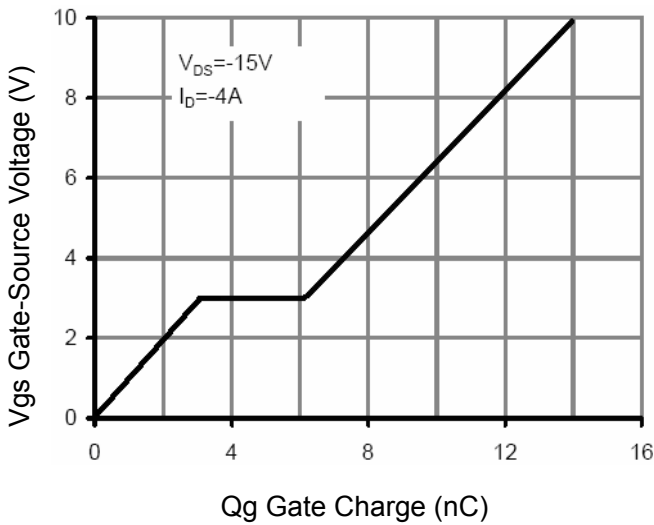
$T_J$ -Junction Temperature(°C)  
**Figure 8 Drain-Source On-Resistance**



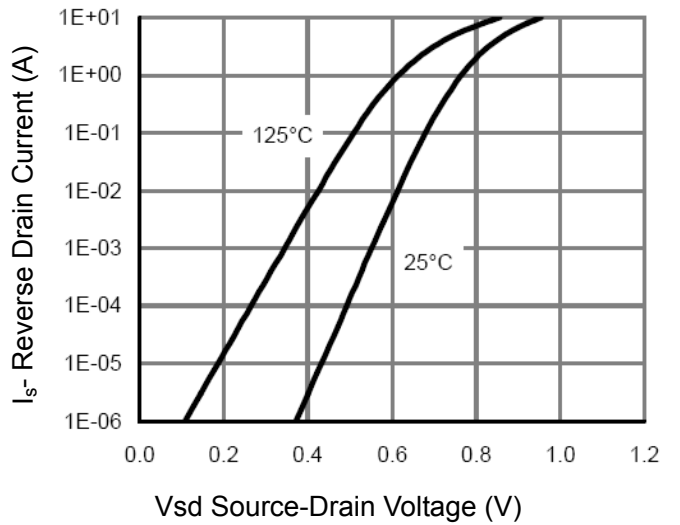
Vgs Gate-Source Voltage (V)  
**Figure 9 Rdson vs Vgs**



Vds Drain-Source Voltage (V)  
**Figure 10 Capacitance vs Vds**



Qg Gate Charge (nC)  
**Figure 11 Gate Charge**



Vsd Source-Drain Voltage (V)  
**Figure 12 Source- Drain Diode Forward**



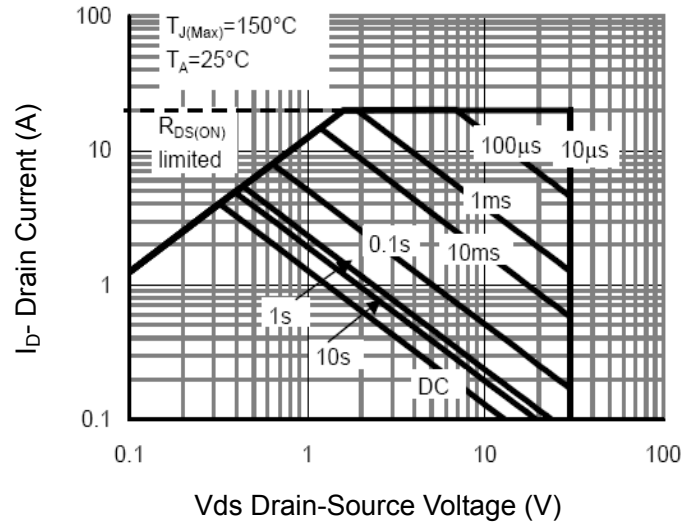


Figure 13 Safe Operation Area

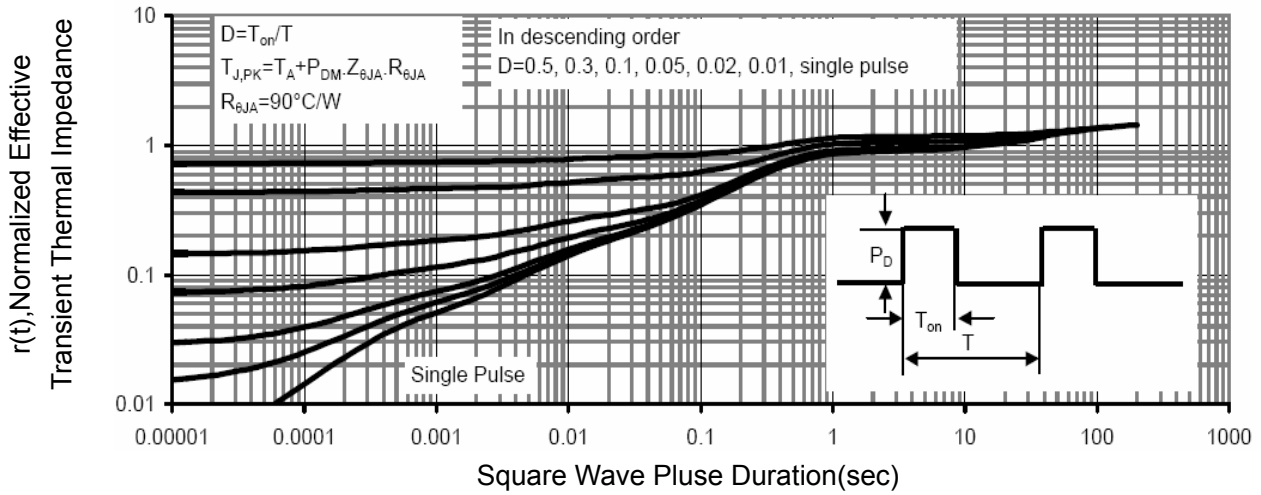
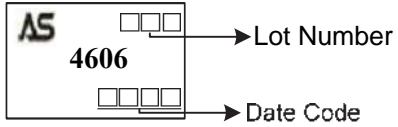


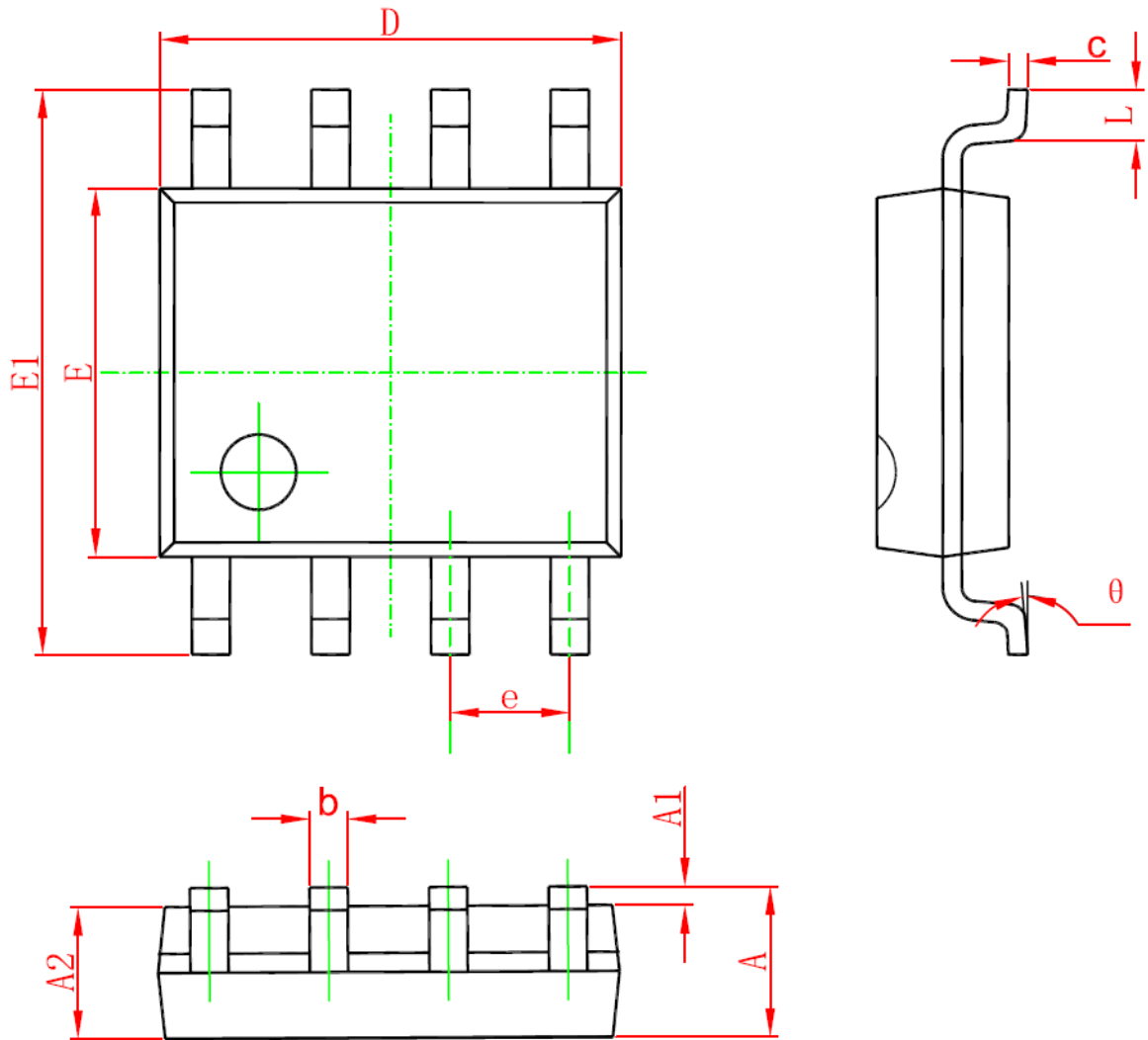
Figure 14 Normalized Maximum Transient Thermal Impedance

## Ordering and Marking Information

Ordering Device No.	Marking	Package	Packing	Quantity
ASDM4606S	4606	SOP-8	Tape&Reel	4000/Reel

PACKAGE	MARKING
SOP-8	 <p>AS      □□□□ → Lot Number 4606 □□□□ → Date Code</p>

## SOP-8 PACKAGE IN FORMATION



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
θ	0°	8°	0°	8°

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