HSSX2901

N-Ch and P-Ch Fast Switching MOSFETs

Description

The HSSX2901 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 small power switching and load switch applications.

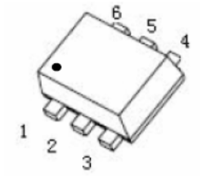
The HSSX2901 meet the RoHS and Green Product requirement with full function reliability approved.

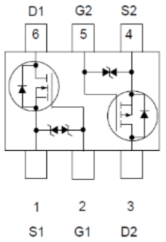
- Interfacing Switching
- Load/Power Switching
- Logic Level Shift
- ESD Protected Gate

Product Summary

BVDSS	RDSON	ID
20V	500mΩ	0.8A
-20V	600mΩ	-0.8A

SOT-563 Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
V_{DS}	Drain-Source Voltage	20	-20	V
V_{GS}	Gate-Source Voltage	±8	±8	V
I_D@T_A=25˚C	Continuous Drain Current, V_{GS} @ -4.5V[1]	0.8	-0.8	A
I_{DM}	Pulsed Drain Current[2]	3.1	-3.1	A
P_D@T_A=25˚C	Total Power Dissipation[3]	0.3	0.3	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	˚C
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	˚C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	420	˚C/W

N-Channel Electrical Characteristics (T_J=25 ˚C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	20	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=0.65A	---	300	500	mΩ
		V_{GS}=2.5V , I_D=0.45A	---	600	800	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.5	0.7	1.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=16V , V_{GS}=0V , T_J=25˚C	---	---	1	uA
		V_{DS}=16V , V_{GS}=0V , T_J=55˚C	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±8V , V_{DS}=0V	---	---	±10	uA
gfs	Forward Transconductance	V_{DS}=10V , I_D=300mA	---	3	---	S
Q_g	Total Gate Charge (4.5V)	V_{DS}=6V , V_{GS}=4.5V , I_D=0.3A	---	3.7	---	nC
Q_{gs}	Gate-Source Charge		---	2.4	---	
Q_{gd}	Gate-Drain Charge		---	1.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=6V , V_{GS}=4.5V , R_G=6Ω I_D=0.3A	---	5	---	ns
T_r	Rise Time		---	19	---	
$T_{d(off)}$	Turn-Off Delay Time		---	22	---	
T_f	Fall Time		---	7.6	---	
C_{iss}	Input Capacitance	V_{DS}=6V , V_{GS}=0V , f=1MHz	---	41	---	pF
C_{oss}	Output Capacitance		---	25	---	
C_{rss}	Reverse Transfer Capacitance		---	17	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	0.8	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=0.1A , T_J=25˚C	---	---	1.2	V

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The power dissipation is limited by 150˚C junction temperature
4.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

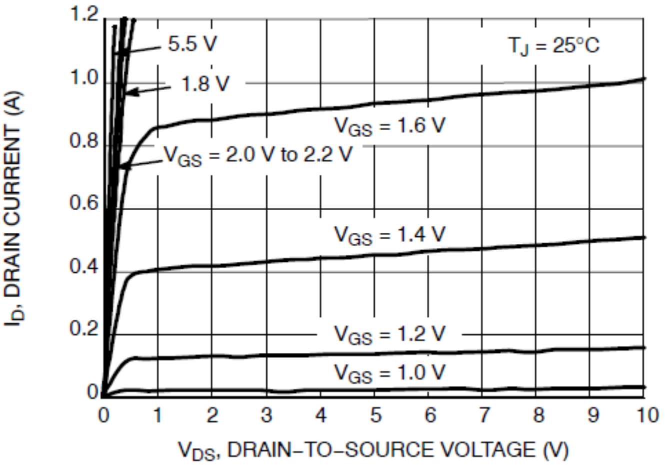


Figure 1. On–Region Characteristics

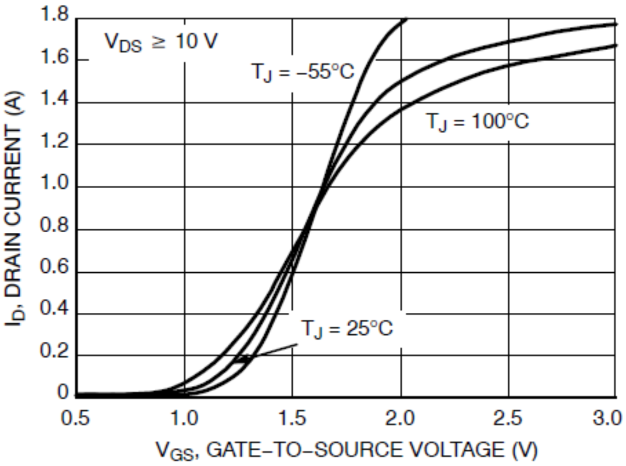


Figure 2. Transfer Characteristics

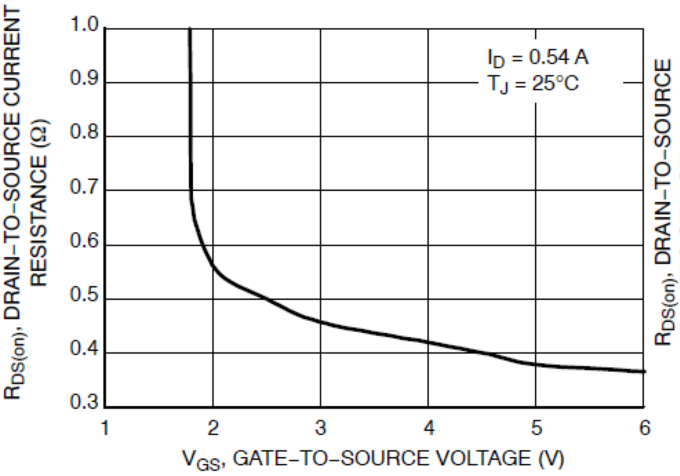


Figure 3. On–Resistance versus Gate–to–Source Voltage

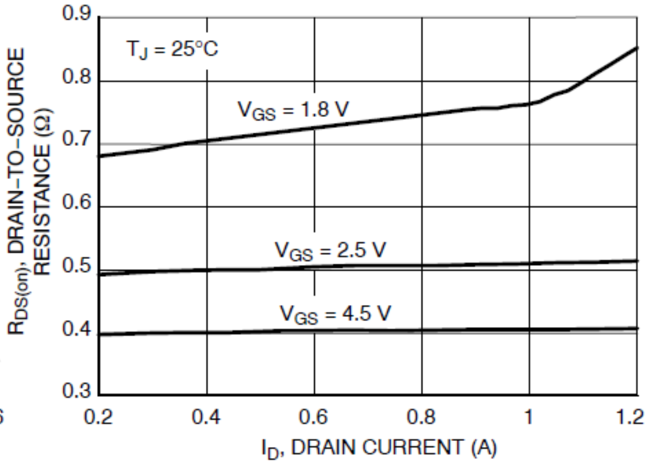


Figure 4. On–Resistance versus Drain Current and Gate Voltage

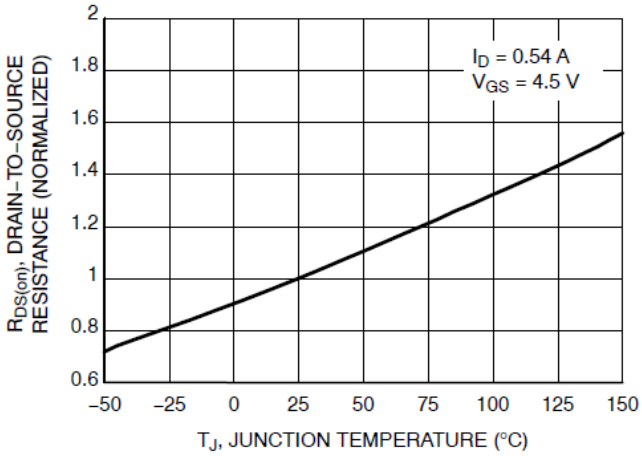


Figure 5. On–Resistance Variation with Temperature

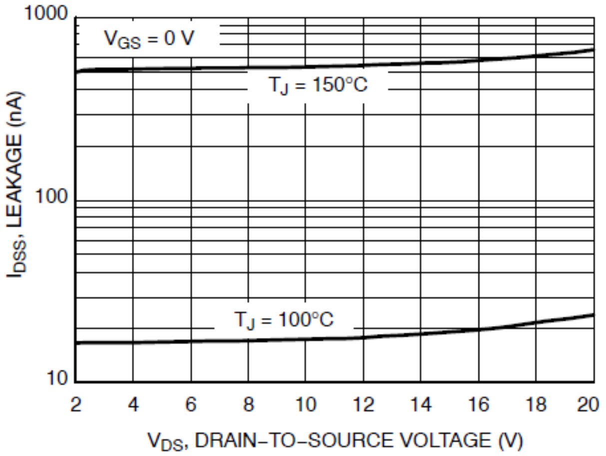


Figure 6. Drain–to–Source Leakage Current versus Voltage

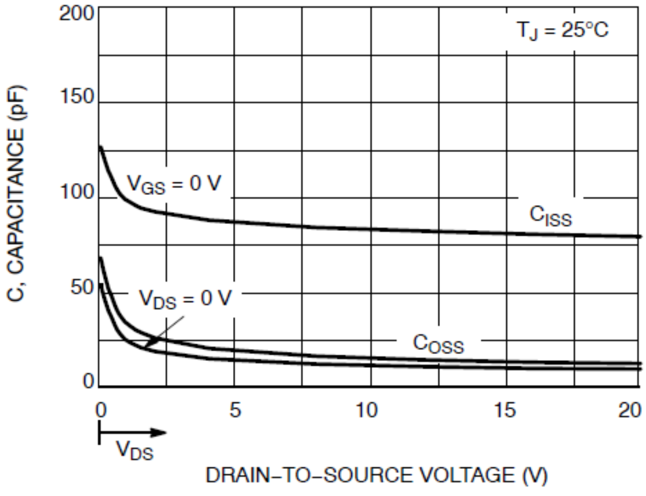


Figure 7. Capacitance Variation

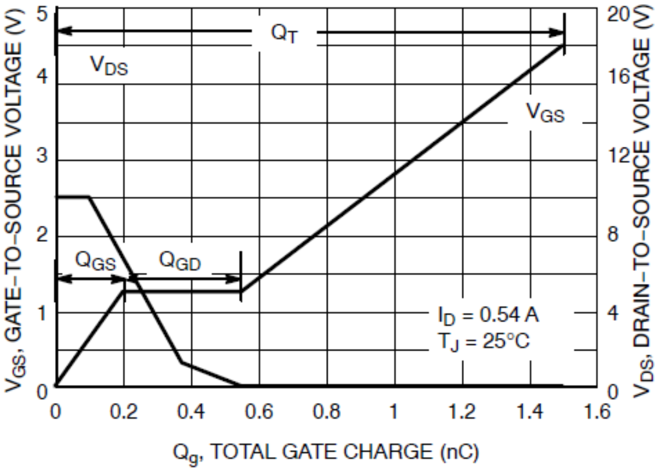


Figure 8. Gate–to–Source and Drain–to–Source Voltage versus Total Charge

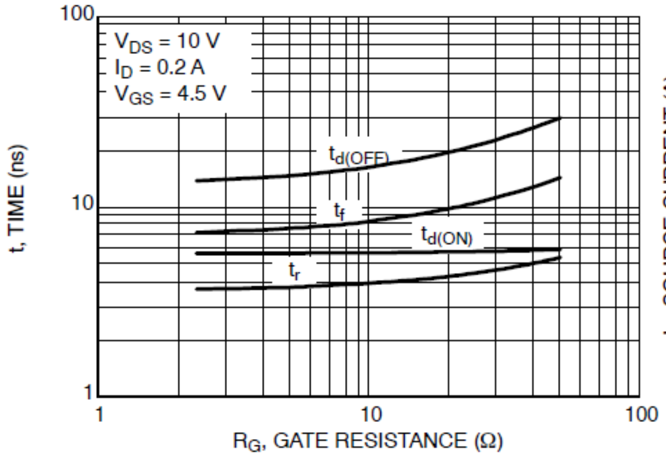


Figure 9. Resistive Switching Time Variation versus Gate Resistance

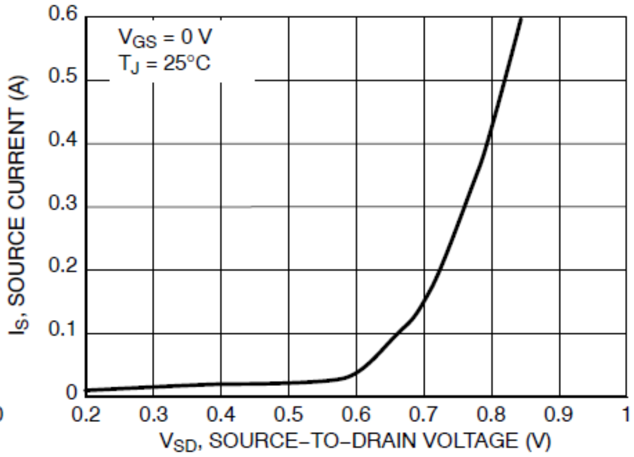


Figure 10. Diode Forward Voltage versus Current

P-Channel Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-20	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-4.5V , I_D=-700mA	---	600	800	mΩ
		V_{GS}=-2.5V , I_D=-300mA	---	800	1000	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.5	0.7	-1.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-16V , V_{GS}=0V , T_J=25°C	---	---	-1	uA
		V_{DS}=-16V , V_{GS}=0V , T_J=55°C	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±8V , V_{DS}=0V	---	---	±10	uA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-0.45A	---	10	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-6V , V_{GS}=-4.5V , I_D=-0.3A	---	19	---	nC
Q_{gs}	Gate-Source Charge		---	4.2	---	
Q_{gd}	Gate-Drain Charge		---	2.3	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-6V , V_{GS}=-4.5V , R_G=6Ω I_D=-0.3A	---	6	---	ns
T_r	Rise Time		---	14	---	
$T_{d(off)}$	Turn-Off Delay Time		---	27	---	
T_f	Fall Time		---	7	---	
C_{iss}	Input Capacitance	V_{DS}=-6V , V_{GS}=0V , f=1MHz	---	57	---	pF
C_{oss}	Output Capacitance		---	19	---	
C_{rss}	Reverse Transfer Capacitance		---	7	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	-0.8	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-0.1A , T_J=25°C	---	-0.66	-1.2	V

Note :

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The power dissipation is limited by 150°C junction temperature

4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

P-Channel Typical Characteristics

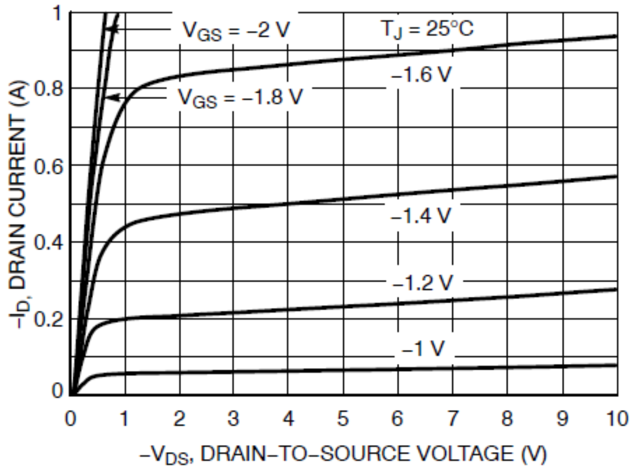


Figure 1. On−Region Characteristics

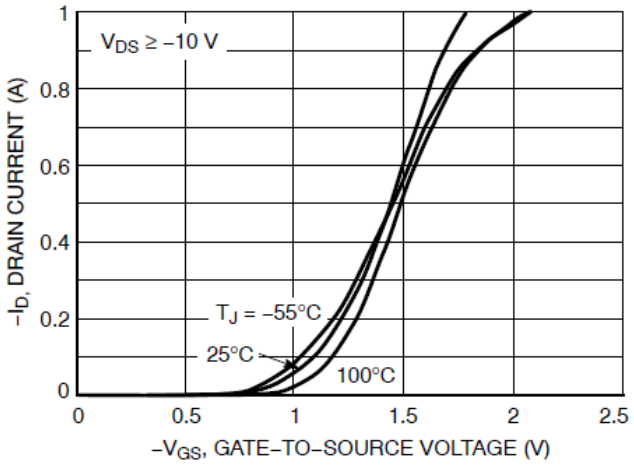


Figure 2. Transfer Characteristics

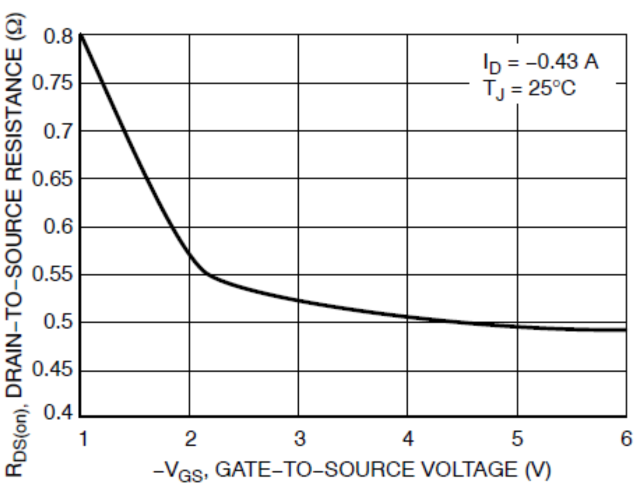


Figure 3. On−Resistance vs. Gate−to−Source Voltage

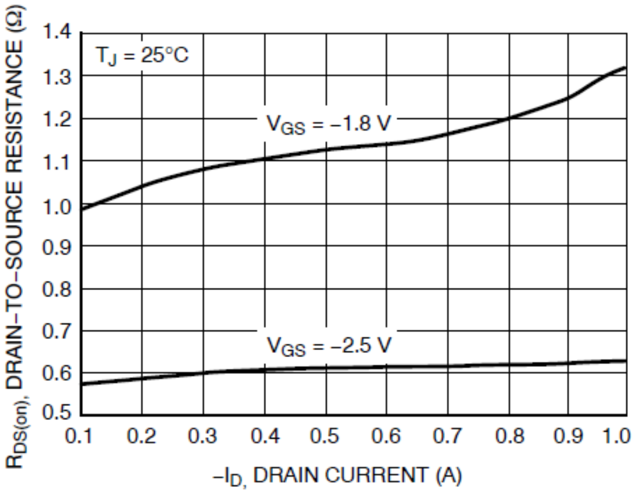


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

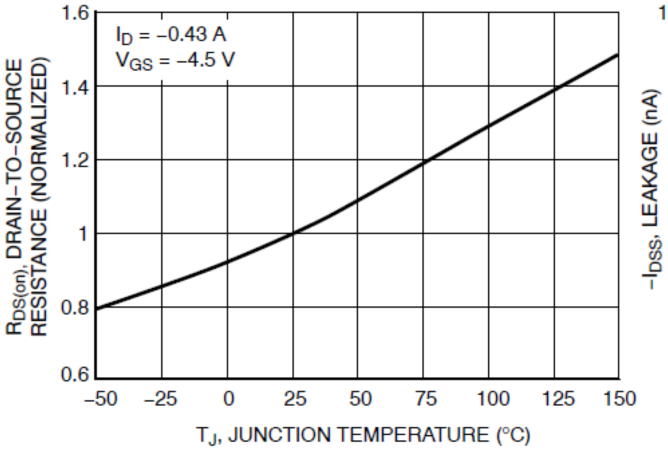


Figure 5. On−Resistance Variation with Temperature

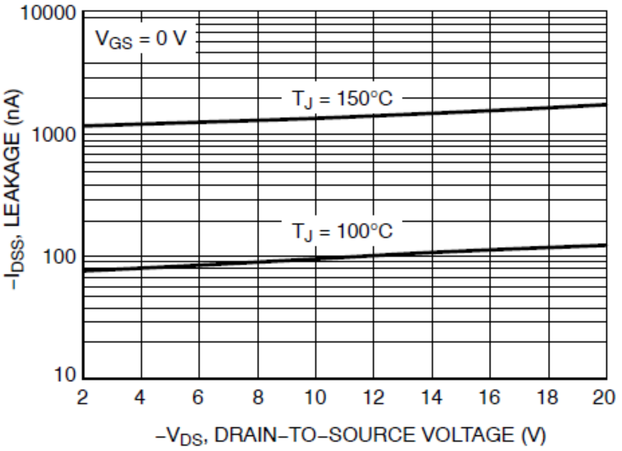


Figure 6. Drain−to−Source Leakage Current vs. Voltage

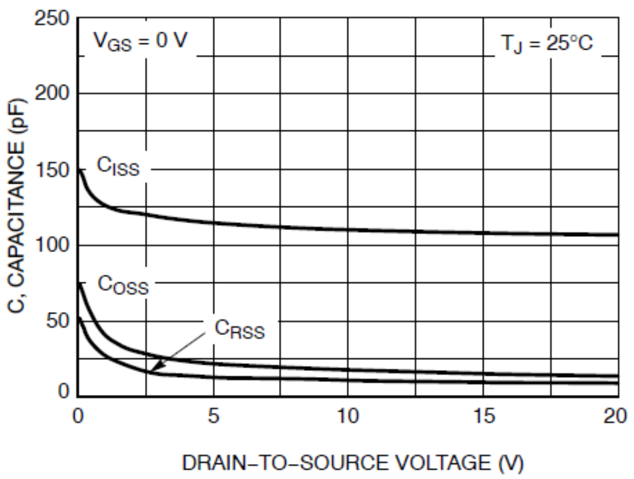


Figure 7. Capacitance Variation

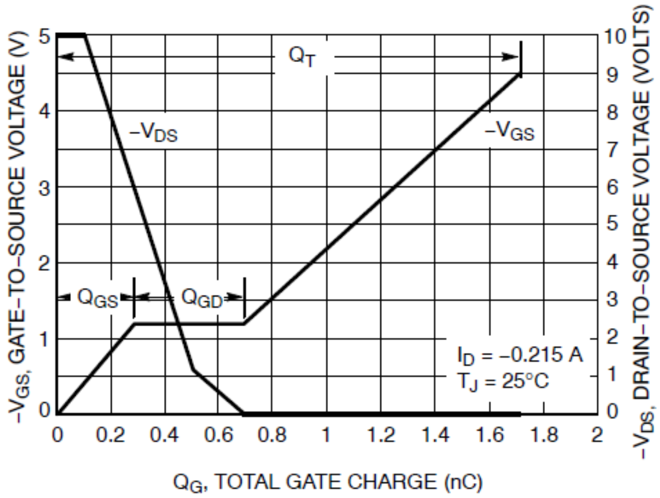


Figure 8. Gate–to–Source and Drain–to–Source Voltage vs. Total Charge

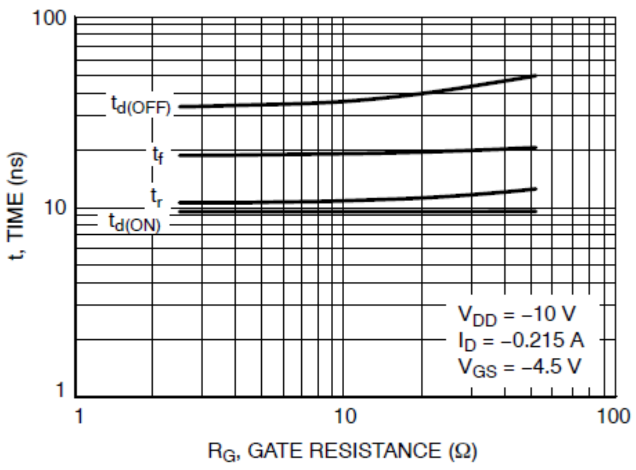


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

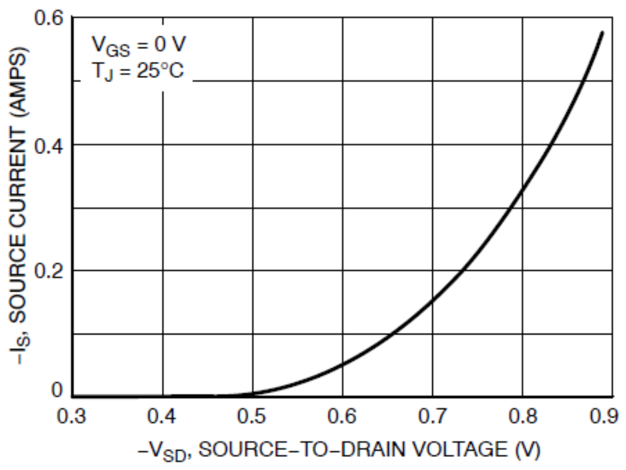
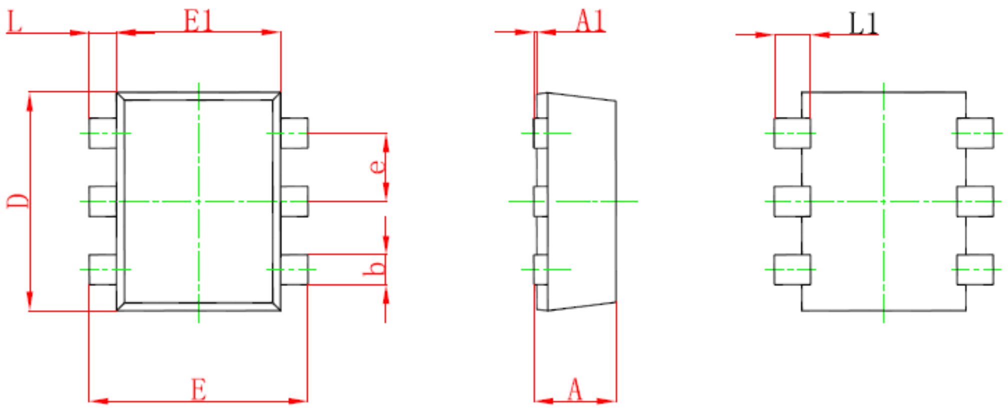
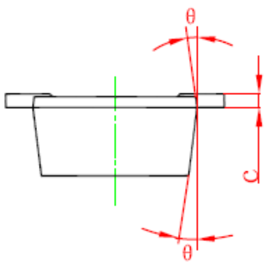


Figure 10. Diode Forward Voltage vs. Current

SOT-563 Package Outline Dimensions





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0. 525	0. 600	0. 021	0. 024
A1	0. 000	0. 050	0. 000	0. 002
e	0. 450	0. 550	0. 018	0. 022
c	0. 090	0. 160	0. 004	0. 006
D	1. 500	1. 700	0. 059	0. 067
b	0. 170	0. 270	0. 007	0. 011
E1	1. 100	1. 300	0. 043	0. 051
E	1. 500	1. 700	0. 059	0. 067
L	0. 100	0. 300	0. 004	0. 012
L1	0. 200	0. 400	0. 008	0. 016
θ	7 °REF.		7 °REF.	