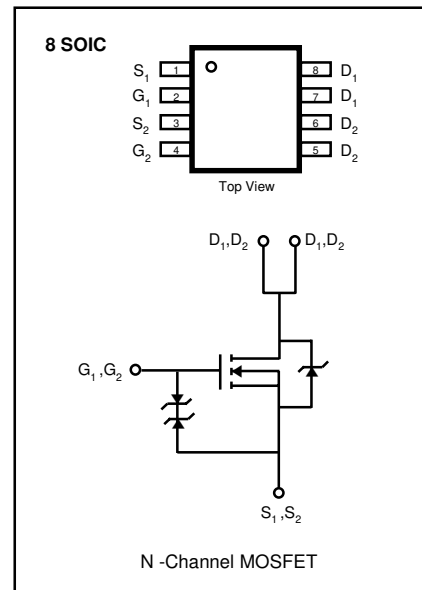


## FEATURES

- ❑ Lower  $R_{DS(ON)}$
- ❑ Improved Inductive Ruggedness
- ❑ Fast Switching Times
- ❑ Low Input Capacitance
- ❑ Extended Safe Operating Area
- ❑ Improved High Temperature Reliability

## Product Summary

Part Number	$BV_{DSS}$	$R_{DS(on)}$	$I_D$
SSD2009	50V	0.13 $\Omega$	3.0A



## Absolute Maximum Ratings

Symbol	Characteristic	Value	Units
$V_{DSS}$	Drain-to-Source Voltage	50	V
$I_D$	Continuous Drain Current $T_A=25^\circ\text{C}$	3.0	A
	Continuous Drain Current $T_A=70^\circ\text{C}$	2.3	
$I_{DM}$	Drain Current-Pulsed <sup>①</sup>	10.0	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$P_D$	Total Power Dissipation ( $T_A=25^\circ\text{C}$ )	2.0	W
	( $T_A=70^\circ\text{C}$ )	1.3	
$T_J, T_{STG}$	Operating and Junction Storage Temperature Range	- 55 to +150	$^\circ\text{C}$


## Thermal Resistance

Symbol	Characteristic	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient	--	62.5	$^\circ\text{C}/\text{W}$

### Electrical Characteristics ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
$BV_{DSS}$	Drain-Source Breakdown Voltage	50	--	--	V	$V_{GS}=0V, I_D=250\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	1.0	--	3.0	V	$V_{DS}=5V, I_D=250\mu A$
$I_{GSS}$	Gate-Source Leakage, Forward	--	--	100	nA	$V_{GS}=20V$
	Gate-Source Leakage, Reverse	--	--	-100	nA	$V_{GS}=-20V$
$I_{DSS}$	Drain-to-Source Leakage Current	--	--	2.0	$\mu A$	$V_{DS}=40V$
		--	--	25		$V_{DS}=40V, T_C=55^\circ\text{C}$
$I_{DON}$	On-State Drain-Source Current	10	--	--	A	$V_{DS}=5V, V_{GS}=10V$
$R_{DS(on)}$	Static Drain-Source	--	0.065	0.13	$\Omega$	$V_{GS}=10V, I_D=3.0A$
	On-State Resistance ②	--	0.084	0.2		$V_{GS}=4.5V, I_D=1.5A$
$g_{fs}$	Forward Transconductance ②	--	7.0	--	S	$V_{DS}=15V, I_D=3.0A$
$t_{d(on)}$	Turn-On Delay Time	--	16	20	ns	$V_{DD}=25V, I_D=1.0A,$ $R_\theta=6.0\Omega,$
$t_r$	Rise Time	--	16	20		
$t_{d(off)}$	Turn-Off Delay Time	--	40	70		
$t_f$	Fall Time	--	23	50		
$Q_g$	Total Gate Charge	--	17	25	nC	$V_{DS}=25V, V_{GS}=10V,$ $I_D=2.0A$
$Q_{gs}$	Gate-Source Charge	--	1.8	--		
$Q_{gd}$	Gate-Drain ("Miller") Charge	--	3.9	--		

### Source-Drain Diode Ratings and Characteristics

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
$I_S$	Continuous Source Current (Body Diode)	--	--	2.0	A	Modified MOSFET Symbol Showing the Integral Reverse P-N Junction Rectifier 
$V_{SD}$	Diode Forward Voltage ②	--	--	1.2	V	$T_A=25^\circ\text{C}, I_S=1.5A, V_{GS}=0V$
$t_{rr}$	Reverse Recovery Time ②	--	100	--	ns	$T_A=25^\circ\text{C}, I_F=1.5A, di_F/dt=100A/\mu s$

#### Notes ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② Pulse Test : Pulse Width =  $250\mu s$ , Duty Cycle  $\leq 2\%$
- ③ Essentially Independent of Operating Temperature

Fig 1. Output Characteristics

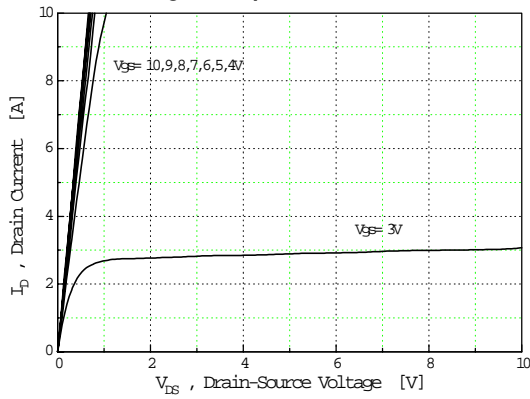


Fig 2. Transfer Characteristics

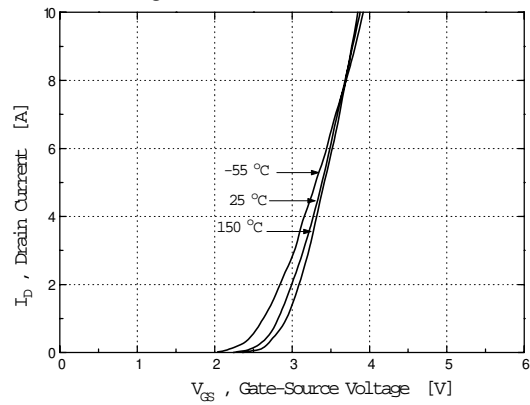


Fig 3. On-Resistance vs. Drain Current

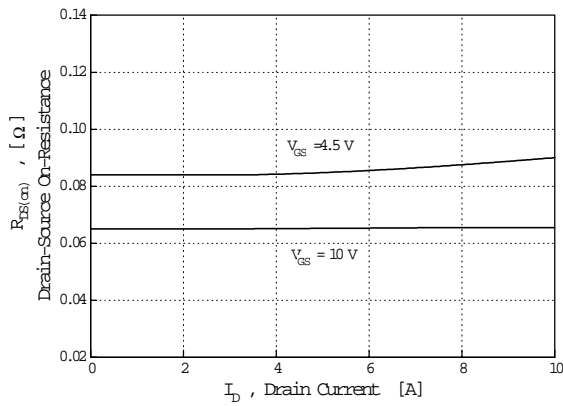


Fig 4. Source-Drain Forward Voltage

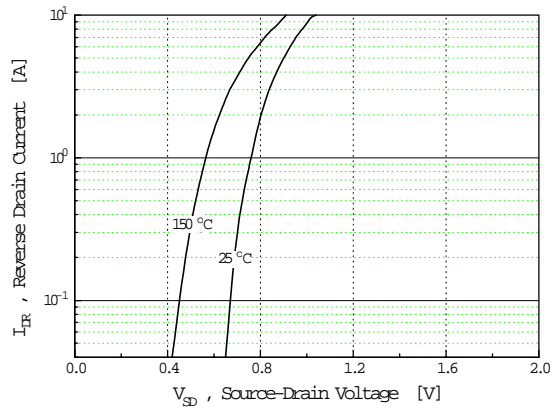


Fig 5. Capacitance vs. Drain-Source Voltage

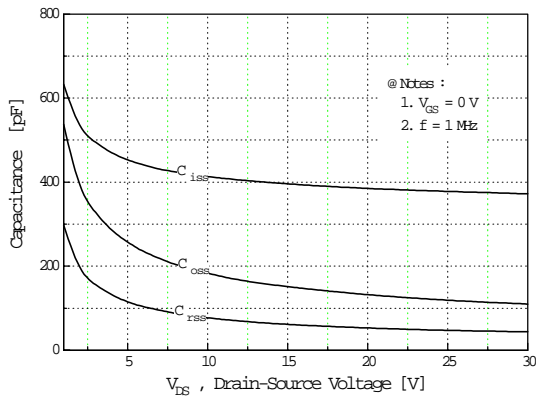
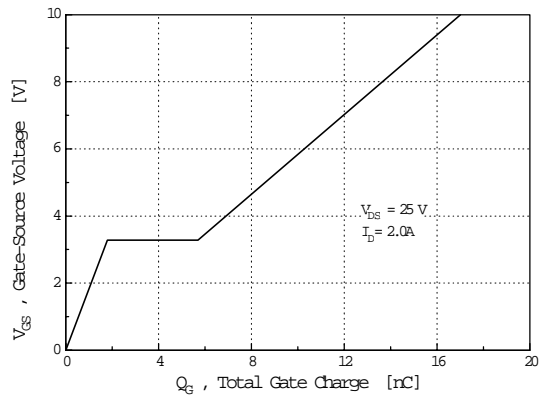
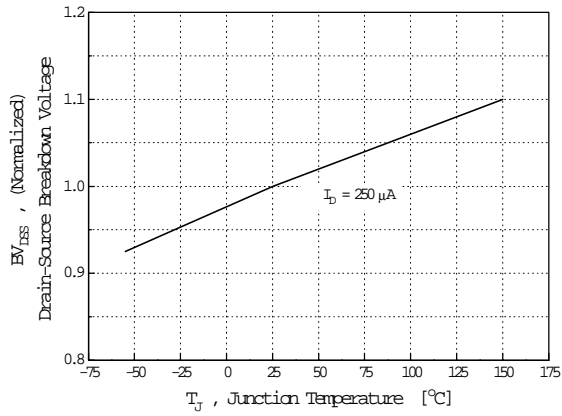


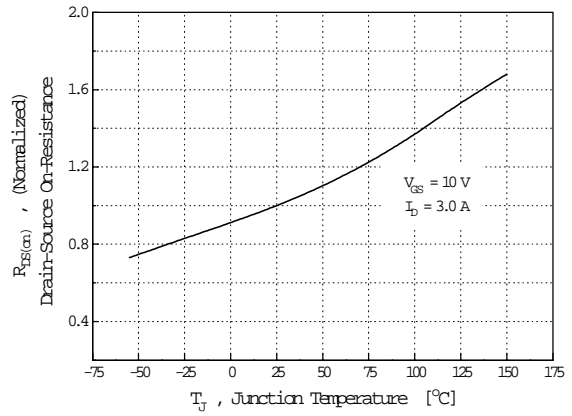
Fig 6. Gate Charge vs. Gate-Source Voltage



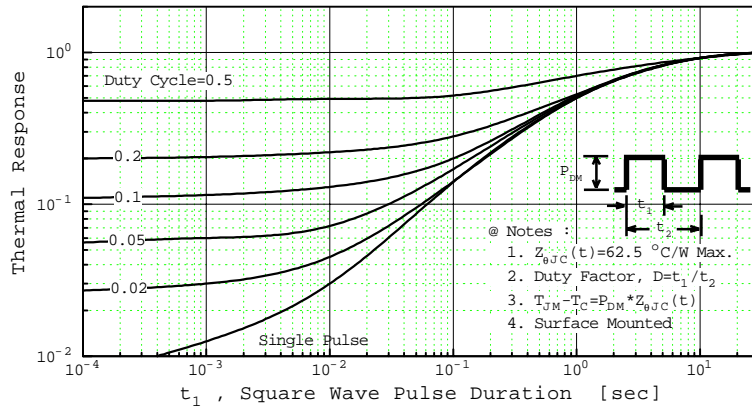
**Fig 7. Breakdown Voltage vs. Temperature**



**Fig 8. On-Resistance vs. Temperature**



**Fig 9. Normalized Effective Transient Thermal Impedance, Junction-to-Ambient**



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E <sup>2</sup> CMOS <sup>™</sup>	ISOPLANAR <sup>™</sup>	QFET <sup>™</sup>	SuperSOT <sup>™</sup> -8	
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