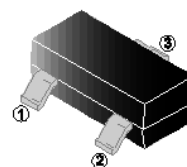


RoHS Compliant Product  
A suffix of "-C" specifies halogen & lead-free

### FEATURES

- High Density Cell Design for Low  $R_{DS(ON)}$
- Voltage Controlled Small Signal Switch
- Moisture Sensitivity Level 1
- ESD Protected

**SOT-23**



### APPLICATION

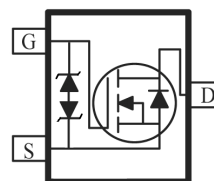
- Power Switching Application
- Uninterruptible Power Supply
- DC/DC Converter

### MARKING

**3099.**

### PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-23	3K	7 inch



### ORDER INFORMATION

Part Number	Type
SMS3099E-C	Lead (Pb)-free and Halogen-free

### ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current	$I_D$	$T_A=25^\circ\text{C}$	1.1
		$T_A=100^\circ\text{C}$	0.7
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	3.3	A
Total Power Dissipation <sup>2</sup>	$P_D$	$T_A=25^\circ\text{C}$	0.83
		$T_A=100^\circ\text{C}$	0.33
Thermal Resistance from Junction-Ambient <sup>3</sup>	$R_{\theta JA}$	150	$^\circ\text{C/W}$
Operating Junction & Storage Temperature Range	$T_J, T_{STG}$	-55~150	$^\circ\text{C}$

Notes:

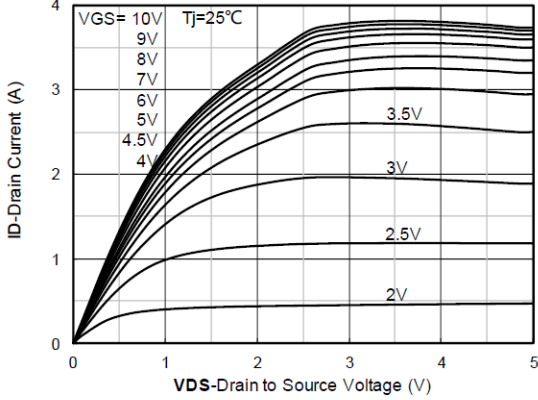
1. Repetitive rating; pulse width limited by max. Junction temperature.
2.  $P_D$  is based on max. Junction temperature, using junction-case thermal resistance.
3. The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in the still air environment with  $T_A=25^\circ\text{C}$ . The maximum allowed junction temperature of 150 $^\circ\text{C}$ . The value in any given application depends on the user's specific board design.

**ELECTRICAL CHARACTERISTICS** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

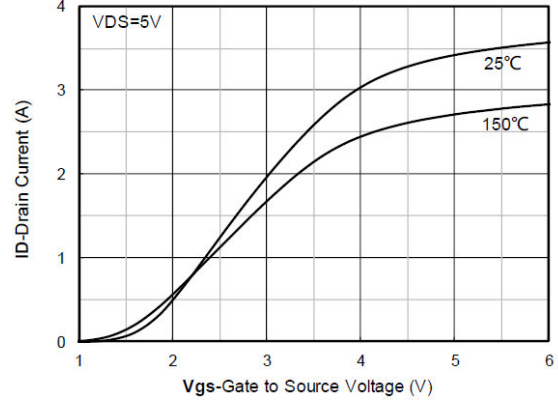
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	30	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$	
Gate Threshold Voltage	$V_{GS(th)}$	0.5	1	1.5	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	
Gate-Body Leakage Current	$I_{GSS}$	-	-	$\pm 10$	$\mu\text{A}$	$V_{GS}=\pm 12\text{V}, V_{DS}=0$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$T_J=25^\circ\text{C}$	-	-	1	$\mu\text{A}$	$V_{DS}=30\text{V}, V_{GS}=0$
		$T_J=150^\circ\text{C}$	-	-	100		
Drain-Source On-Resistance	$R_{DS(ON)}$		-	350	450	m $\Omega$	$V_{GS}=10\text{V}, I_D=0.5\text{A}$
			-	430	550		$V_{GS}=4.5\text{V}, I_D=0.3\text{A}$
			-	640	850		$V_{GS}=2.5\text{V}, I_D=0.2\text{A}$
Gate resistance	$R_G$	-	90	-	$\Omega$	$f=1\text{MHz}$	
Total Gate Charge	$Q_g$	-	1.85	-	nC	$V_{GS}=10\text{V}, V_{DS}=15\text{V}, I_D=1\text{A}$	
Gate-Source Charge	$Q_{gs}$	-	0.45	-			
Gate-Drain Charge	$Q_{gd}$	-	0.29	-			
Turn-on Delay Time	$t_{(on)}$	-	3	-	nS	$V_{GS}=10\text{V}, V_{DD}=15\text{V}, I_D=1\text{A}$ $R_G=3\Omega$	
Rise Time	$t_r$	-	19	-			
Turn-off Delay Time	$t_{(off)}$	-	17	-			
Fall Time	$t_f$	-	24	-			
Input Capacitance	$C_{iss}$	-	37	-	pF	$V_{DS}=15\text{V}$ $V_{GS}=0$ $f=1\text{MHz}$	
Output Capacitance	$C_{oss}$	-	10	-			
Reverse Transfer Capacitance	$C_{rss}$	-	5	-			
<b>Source-Drain Diode</b>							
Diode Forward Voltage	$V_{SD}$	-	0.9	1.2	V	$V_{GS}=0, I_S=0.5\text{A}$	
Maximum Body-Diode Continuous Current	$I_S$	-	-	1.1	A		
Reverse Recovery Time	$T_{rr}$	-	2	-	nS	$I_F=1\text{A}$	
Recovered Charge	$Q_r$	-	12	-	nC	$di/dt=100\text{A}/\mu\text{s}$	

**TYPICAL CHARACTERISTICS**

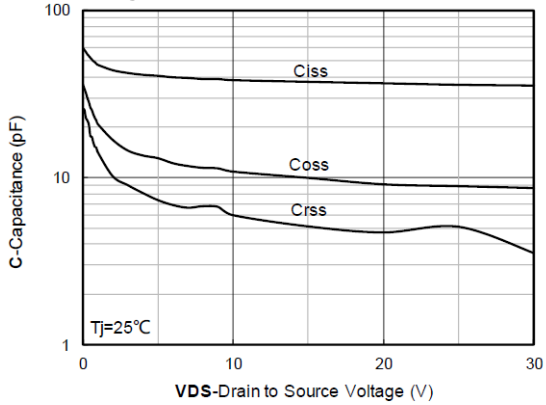
**Figure 1. Output Characteristics**



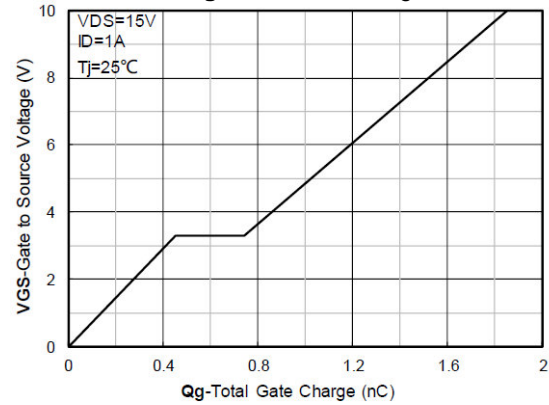
**Figure 2. Transfer Characteristics**



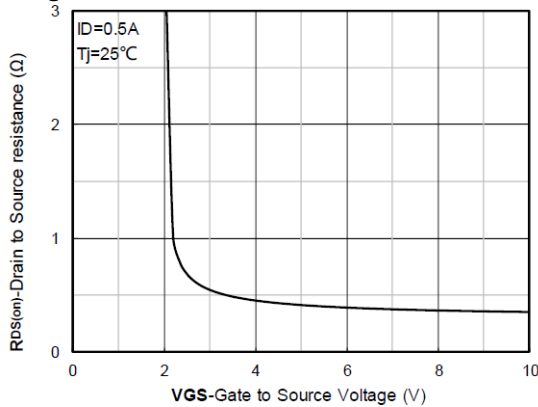
**Figure 3. Capacitance Characteristics**



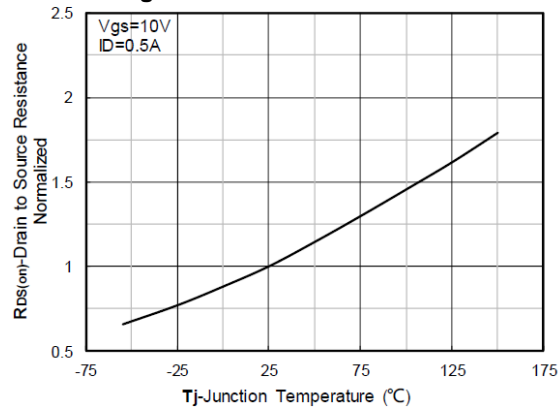
**Figure 4. Gate Charge**



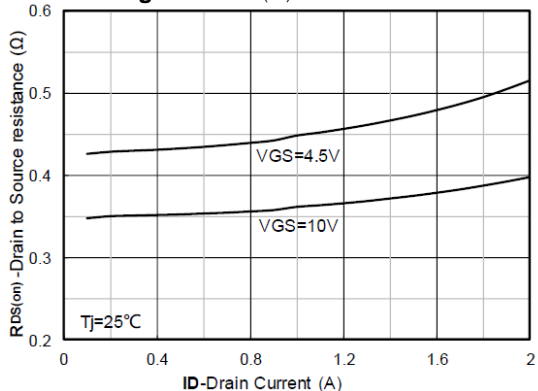
**Figure 5. On-Resistance vs Gate to Source Voltage**



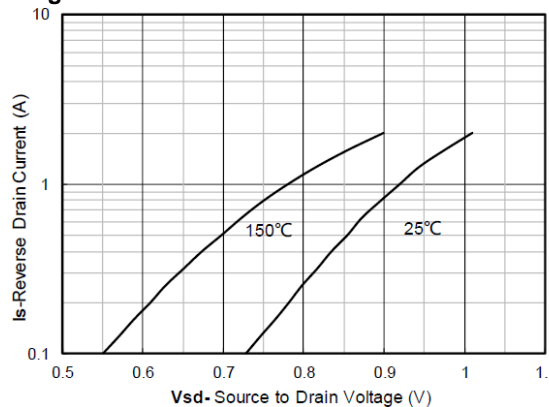
**Figure 6. Normalized On-Resistance**



**Figure 7.  $R_{DS(on)}$  VS Drain Current**

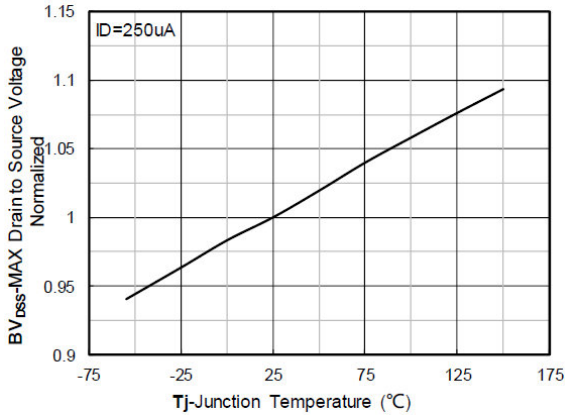


**Figure 8. Forward Characteristics of Reverse Diode**

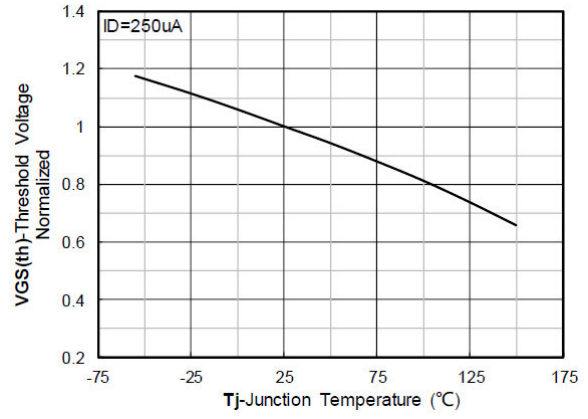


**TYPICAL CHARACTERISTICS**

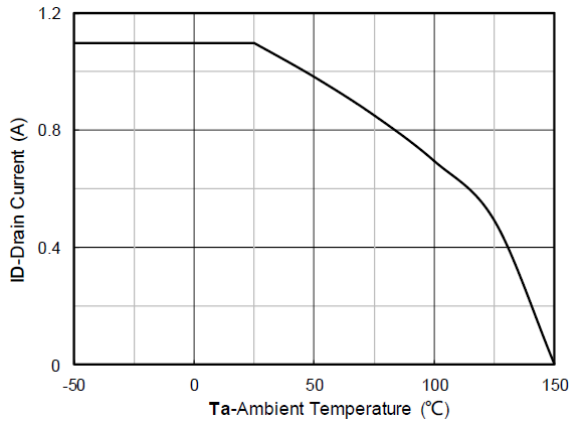
**Figure 9. Normalized Breakdown Voltage**



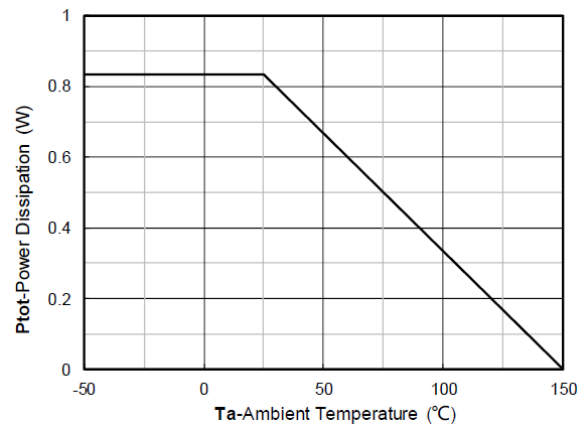
**Figure 10. Normalized Threshold Voltage**



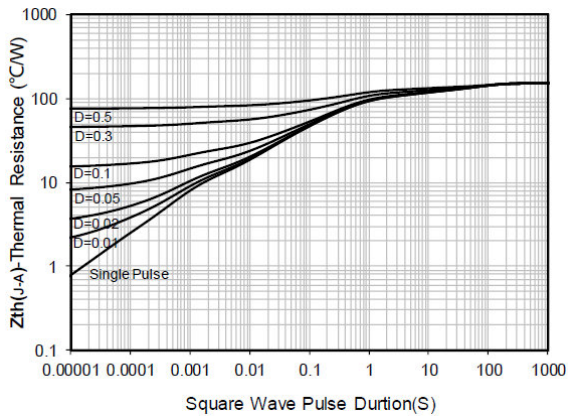
**Figure 11. Current Dissipation**



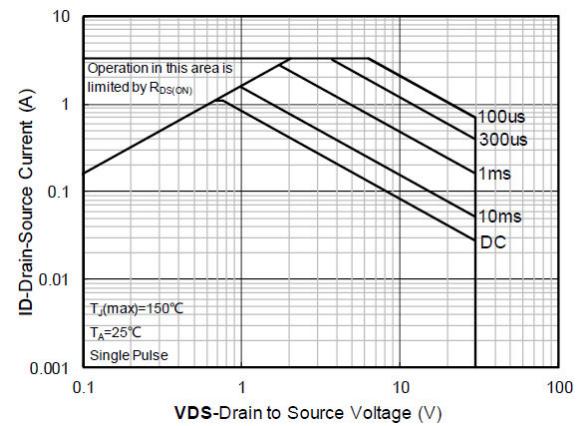
**Figure 12. Power Dissipation**



**Figure 13. Maximum Transient Thermal Impedance**

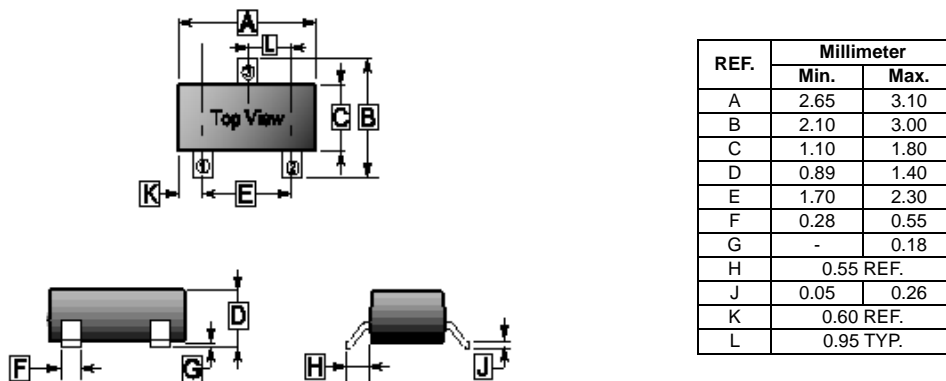


**Figure 14. Safe Operation Area**



**PACKAGE OUTLINE DIMENSIONS**

**SOT-23**



**MOUNTING PAD LAYOUT**

**SOT-23**

