



YOUSHANG SEMICONDUCTOR

**设计研发新型功率器件**

**各类小信号开关**

**中低压及高压大电流等场效应管**

0755-83047638

ysbdt@szyoushang.cn

www.szyoushang.cn



企业微信二维码



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## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$	Package	$I_D$ $T_A = +25^\circ C$
600V	160 $\Omega$ @ $V_{GS} = 10V$	SC59 SOT23	70mA

## Description

This new generation uses advanced planar technology MOSFET, provide excellent high voltage and fast switching, making it ideal for small-signal and level shift applications.

## Applications

- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

## Features

- Low Input Capacitance
- High  $BV_{DSS}$  Rating for Power Application
- Low Input/Output Leakage

## Mechanical Data

- Case: SC59 / SOT23
- Case Material: Molded Plastic "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.008 grams (Approximate)

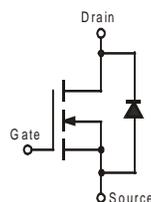


SOT23

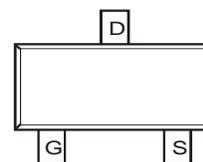
Top View



SC59



Equivalent Circuit



Top View

### Maximum Ratings (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	600	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	50	mA
		$T_A = +70^\circ\text{C}$		40	
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	70	mA
		$T_A = +70^\circ\text{C}$		55	
Continuous Drain Current (Note 5) $V_{GS} = 5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	45	mA
		$T_A = +70^\circ\text{C}$		35	
Continuous Drain Current (Note 6) $V_{GS} = 5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	65	mA
		$T_A = +70^\circ\text{C}$		50	
Pulsed Drain Current @ $T_{SP} = +25^\circ\text{C}$ (Note 7)			$I_{DM}$	0.16	A

### Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation, @ $T_A = +25^\circ\text{C}$ (Note 5)	$P_D$	0.61	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 5)	$R_{\theta JA}$	204	$^\circ\text{C/W}$
Power Dissipation, @ $T_A = +25^\circ\text{C}$ (Note 6)	$P_D$	1.25	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 6)	$R_{\theta JA}$	100	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
  6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2 oz. Copper, single sided.
  7. Repetitive rating, pulse width limited by junction temperature, 10 $\mu\text{s}$  pulse, duty cycle = 1%.

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	600	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	0.1	μA	V <sub>DS</sub> = 600V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	3	—	4.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	80	160	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 16mA
		—	95	190		V <sub>GS</sub> = 5.0V, I <sub>D</sub> = 16mA
Forward Transfer Admittance	Y <sub>fs</sub>	—	76	—	mS	V <sub>DS</sub> = 10V, I <sub>D</sub> = 16mA
Diode Forward Voltage	V <sub>SD</sub>	—	—	1.5	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 16mA
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	21.8	—	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	2.2	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	0.3	—		
Total Gate Charge	Q <sub>g</sub>	—	1.08	—	nC	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 300V, I <sub>D</sub> = 0.01A
Gate-Source Charge	Q <sub>gs</sub>	—	0.08	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	0.50	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	5.0	—	ns	V <sub>DD</sub> = 300V, V <sub>GS</sub> = 10V, R <sub>GEN</sub> = 6Ω, I <sub>D</sub> = 10mA
Turn-On Rise Time	t <sub>R</sub>	—	7.2	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	28.7	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	168	—	ns	
Reverse Recovery Time	t <sub>RR</sub>	—	131	—	ns	V <sub>R</sub> = 300V, I <sub>F</sub> = 0.016A, di/dt = 100A/μs
Reverse Recovery Charge	Q <sub>RR</sub>	—	32	—	nC	

Notes: 8. Short duration pulse test used to minimize self-heating effect.  
 9. Guaranteed by design. Not subject to production testing.

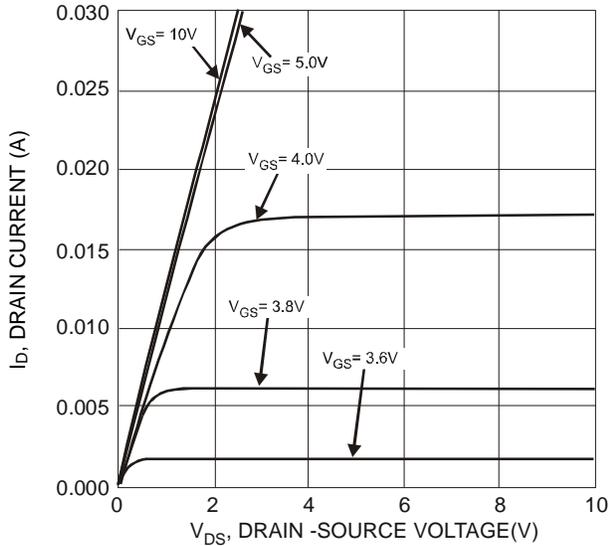


Figure 1 Typical Output Characteristics

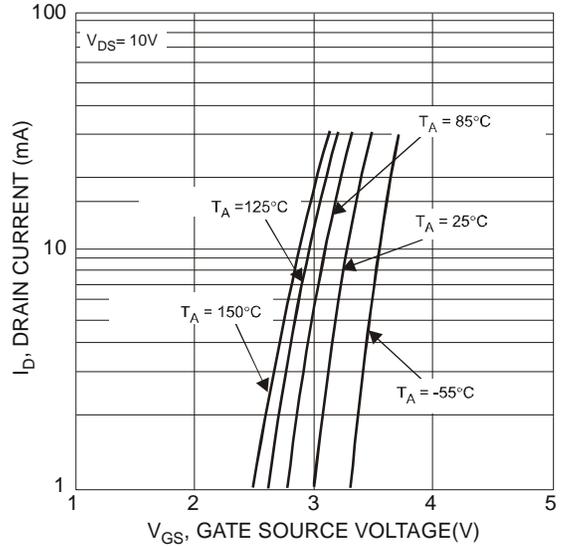


Figure 2 Typical Transfer Characteristics

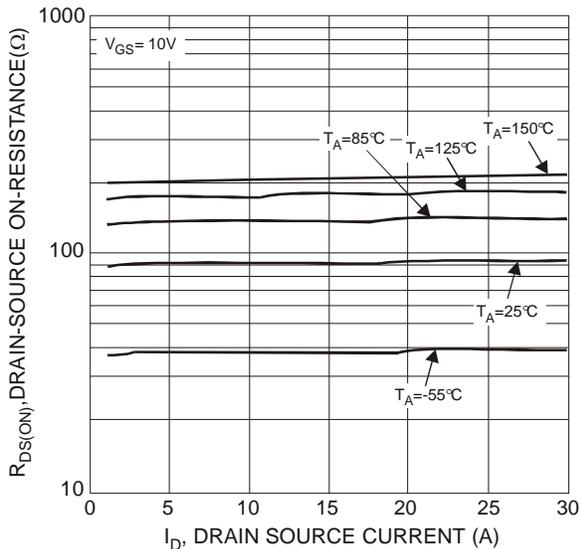


Figure 3 Typical On-Resistance vs. Drain Current and Temperature

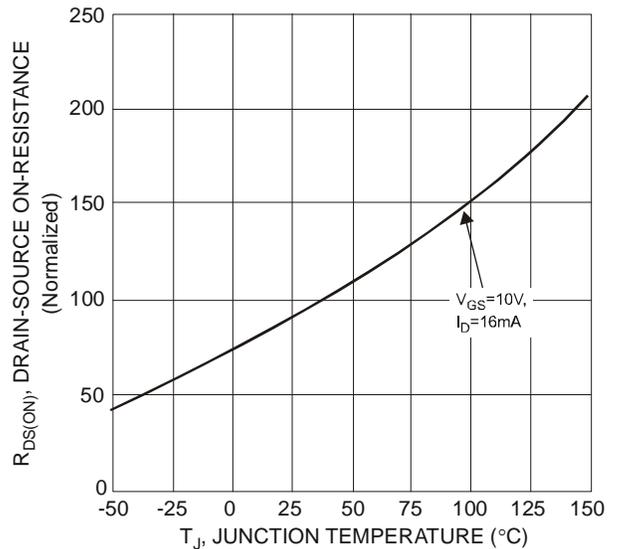


Figure 4 On-Resistance Variation with Temperature

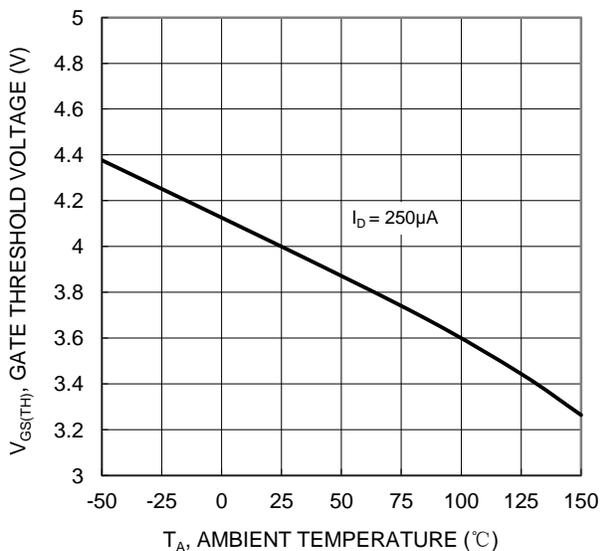


Figure 5. Gate Threshold Variation vs. Ambient Temperature

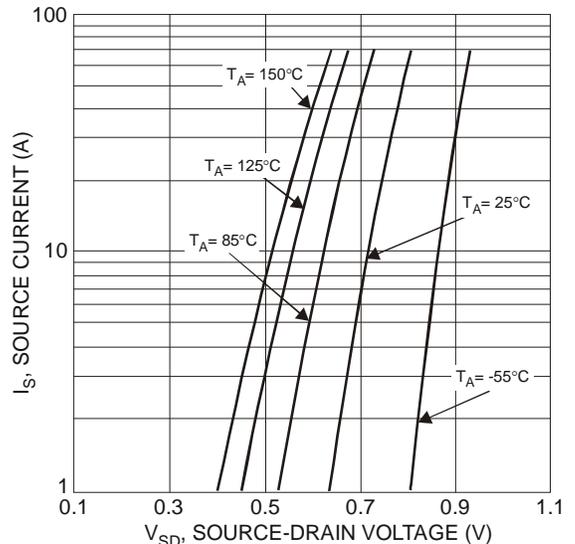


Figure 6 Diode Forward Voltage vs. Current

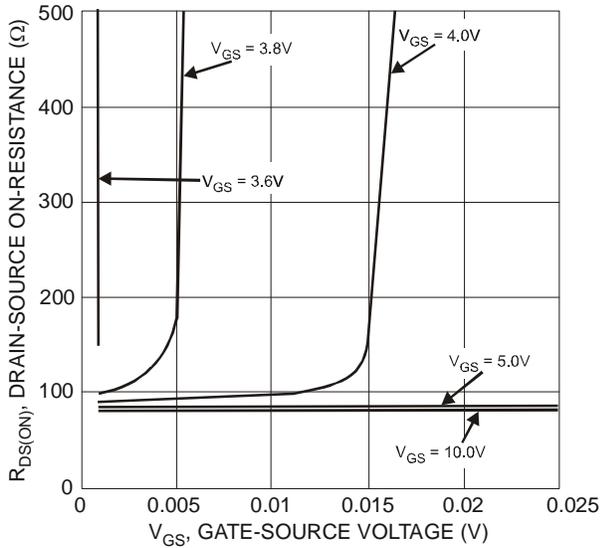


Figure 7 Typical On-Resistance vs. Drain Current and Gate Voltage

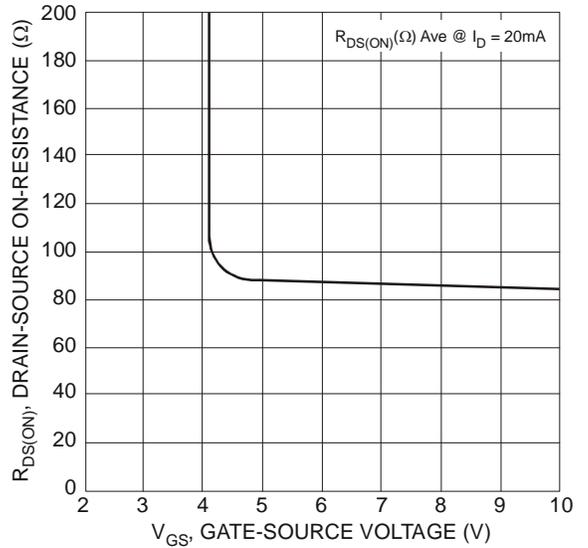


Figure 8 Typical Transfer Characteristic

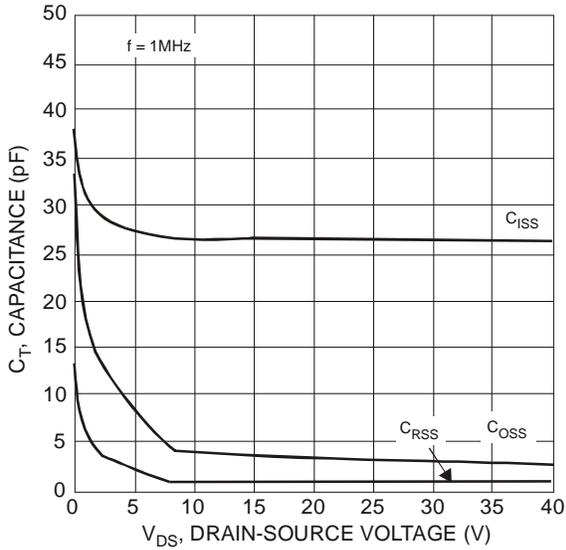


Figure 9 Typical Junction Capacitance

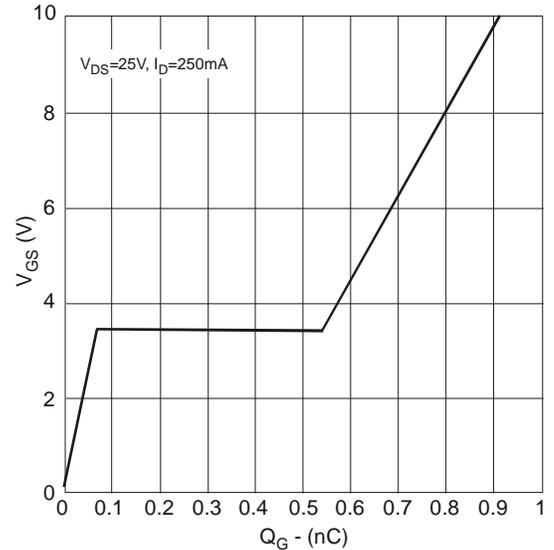


Figure 10 Gate Charge Characteristics

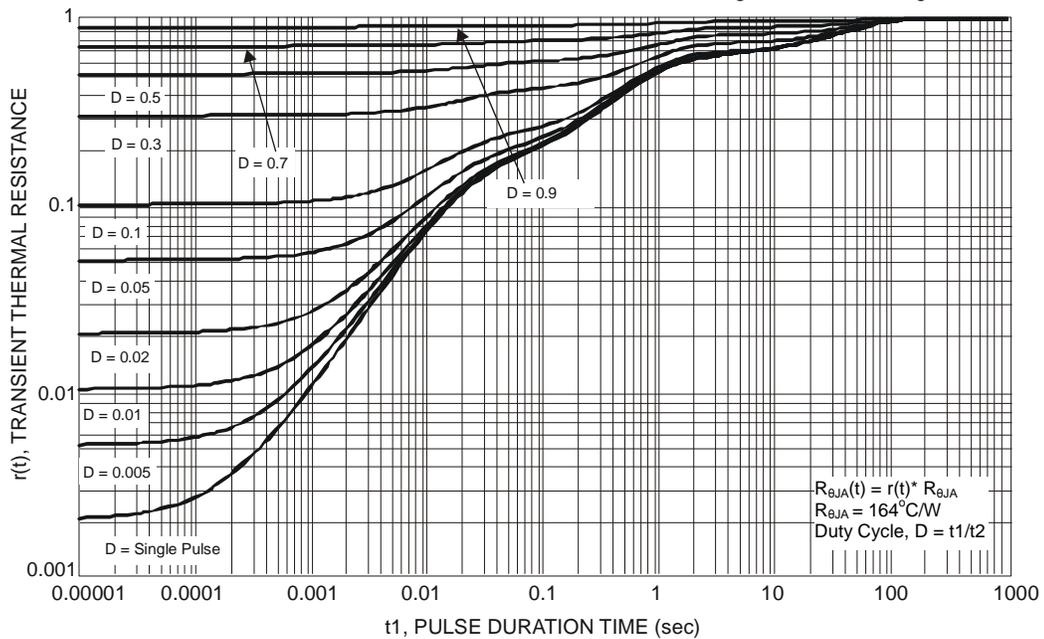
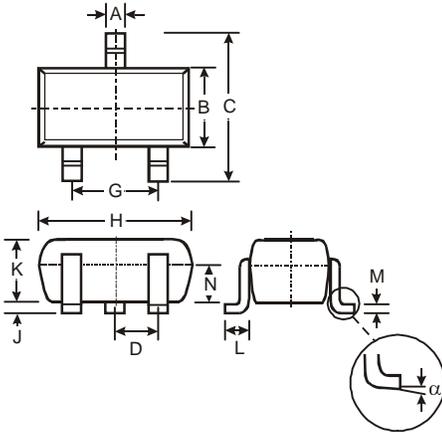


Figure 11 Transient Thermal Resistance

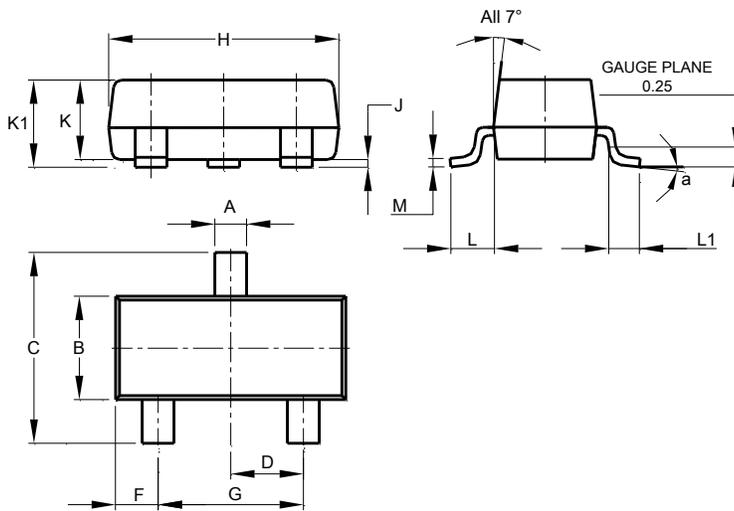
**Package Outline Dimensions**

**SC59**



SC59			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	-	-	0.95
G	-	-	1.90
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
$\alpha$	0°	8°	-
All Dimensions in mm			

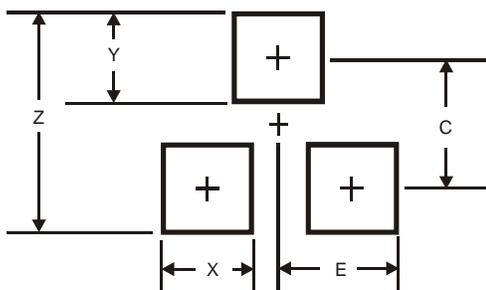
**SOT23**



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**Suggested Pad Layout**

**SC59**



Dimensions	Value (in mm)
Z	3.4
X	0.8
Y	1.0
C	2.4
E	1.35