



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**

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企业微信二维码



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## Product Summary

$V_{(BR)DSS}$	$R_{DS(on) \max}$	$I_D$ $T_A = +25^\circ\text{C}$
-30V	50m $\Omega$ @ $V_{GS} = -10\text{V}$	-3.7A
	60m $\Omega$ @ $V_{GS} = -4.5\text{V}$	-3.3A
	85m $\Omega$ @ $V_{GS} = -2.5\text{V}$	-2.7A

## Features

- Low Input Capacitance
- Low On-Resistance
- Low Input/Output Leakage

## Description and Applications

This new generation Small-Signal enhancement mode MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

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

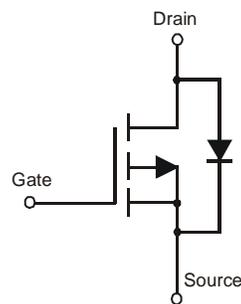
## Mechanical Data

- Case: SC-59
- Case Material - Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Finish - Matte Tin Annealed over Copper Leadframe;
- Solderable per MIL-STD-202, Method 208③
- Weight: 0.014 grams (Approximate)

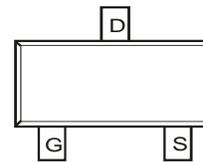


SC59

Top View



Equivalent Circuit



Top View

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	-30	V
Gate-Source Voltage			$V_{GSS}$	$\pm 12$	V
Continuous Drain Current (Note 6) $V_{GS} = -10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	-3.0	A
		$T_A = +70^\circ\text{C}$		-2.3	
Continuous Drain Current (Note 7) $V_{GS} = -10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	-3.7	A
		$T_A = +70^\circ\text{C}$		-2.9	
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)			$I_{DM}$	-30	A
Maximum Body Diode Continuous Current (Note 7)			$I_S$	-1.5	A

**Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation	(Note 6)	$P_D$	0.8	W
	(Note 7)		1.2	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	159	$^\circ\text{C/W}$
	(Note 7)		105	
Thermal Resistance, Junction to Case	(Note 7)	$R_{\theta JC}$	36	$^\circ\text{C/W}$
Operating and Storage Temperature Range		$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	-30	-	-	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	$I_{DSS}$	-	-	-1.0	$\mu\text{A}$	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS} = \pm 12\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	-1.0	-1.3	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	41	50	m $\Omega$	$V_{GS} = -10\text{V}, I_D = -4\text{A}$
		-	47	60		$V_{GS} = -4.5\text{V}, I_D = -3.5\text{A}$
		-	60	85		$V_{GS} = -2.5\text{V}, I_D = -2.5\text{A}$
		-	-	-		-
Forward Transfer Admittance	$ Y_{fs} $	-	12	-	S	$V_{DS} = -5\text{V}, I_D = -4\text{A}$
Diode Forward Voltage	$V_{SD}$	-	-0.8	-1.0	V	$V_{GS} = 0\text{V}, I_S = -1\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	-	1,326	-	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	-	103	-		
Reverse Transfer Capacitance	$C_{rss}$	-	71	-		
Gate Resistance	$R_g$	-	7.3	-	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ( $V_{GS} = -4.5\text{V}$ )	$Q_g$	-	11.6	-	nC	$V_{DD} = -15\text{V}, I_D = -4\text{A}$
Total Gate Charge ( $V_{GS} = -10\text{V}$ )	$Q_g$	-	25.1	-		
Gate-Source Charge	$Q_{gs}$	-	2	-		
Gate-Drain Charge	$Q_{gd}$	-	1.7	-		
Turn-On Delay Time	$t_{D(on)}$	-	8	-	nS	$V_{DS} = -15\text{V}, V_{GS} = -10\text{V}, R_{GEN} = 6\Omega, R_L = 3.75\Omega$
Turn-On Rise Time	$t_r$	-	13	-		
Turn-Off Delay Time	$t_{D(off)}$	-	71	-		
Turn-Off Fall Time	$t_f$	-	38	-		

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper pad layout
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

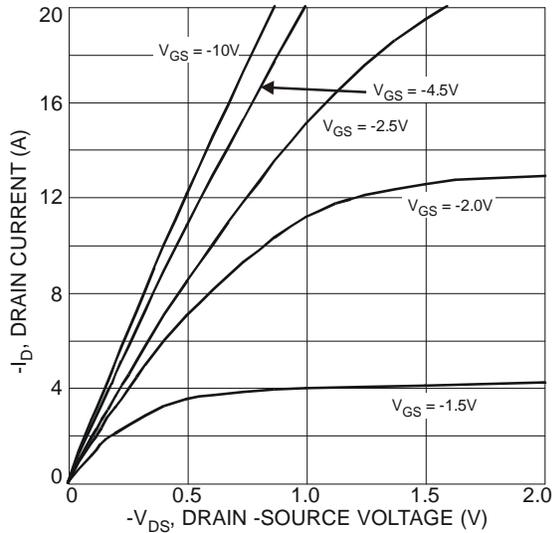


Figure 1 Typical Output Characteristics

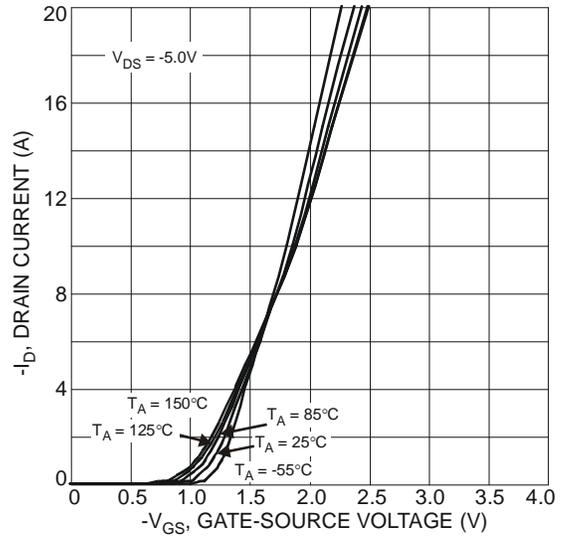


Figure 2 Typical Transfer Characteristics

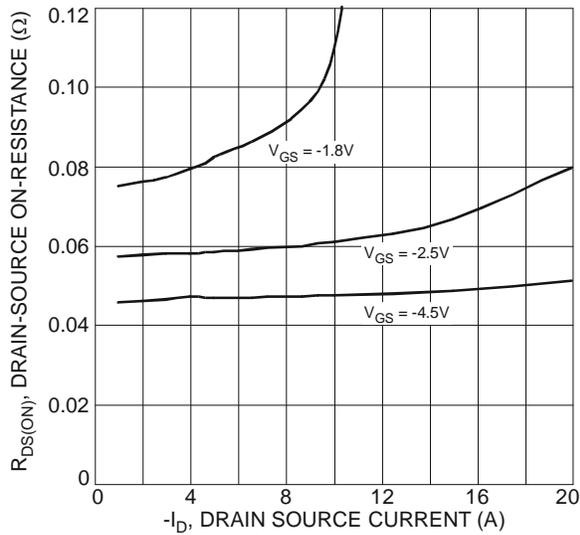


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

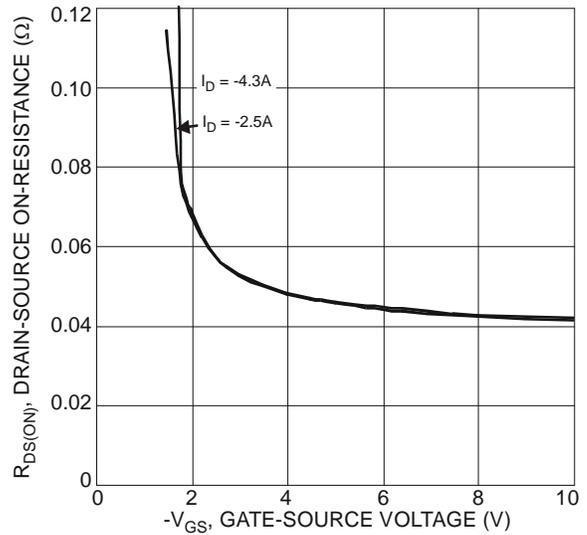


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

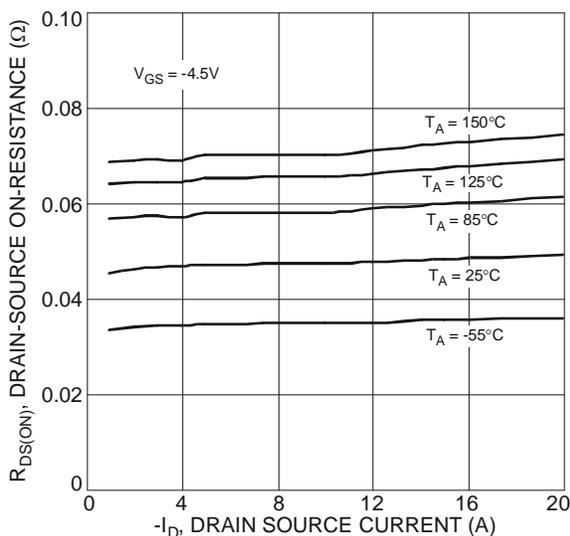


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

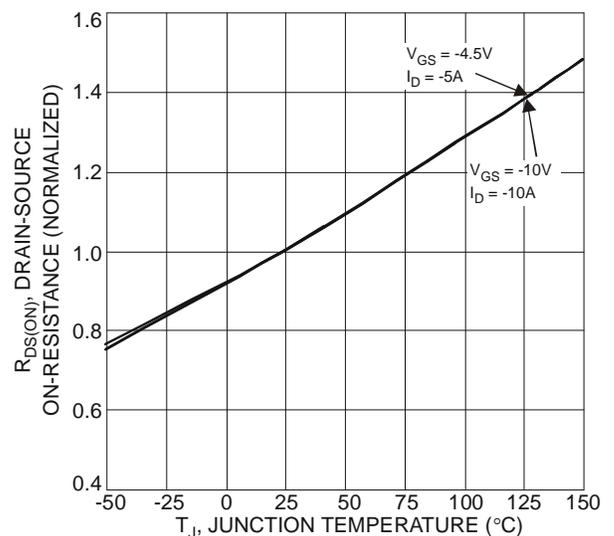


Figure 6 On-Resistance Variation with Temperature

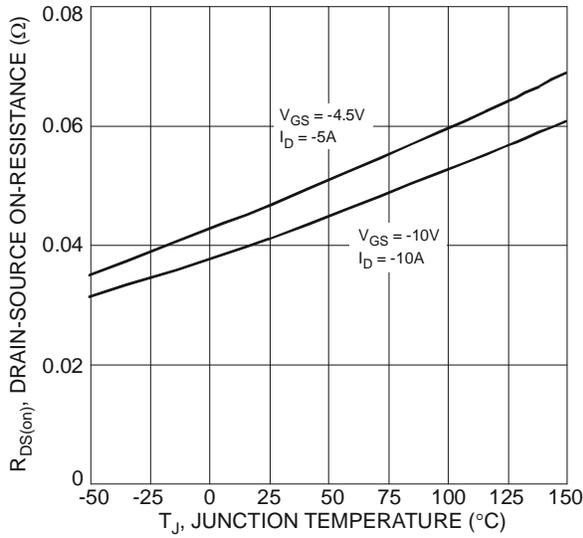


Figure 7 On-Resistance Variation with Temperature

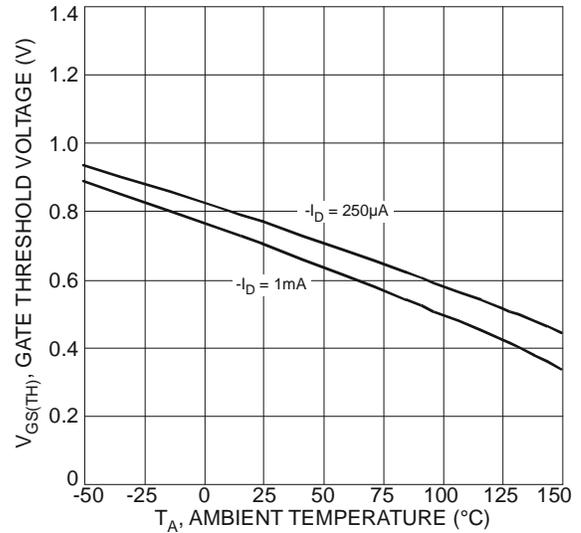


Figure 8 Gate Threshold Variation vs. Ambient Temperature

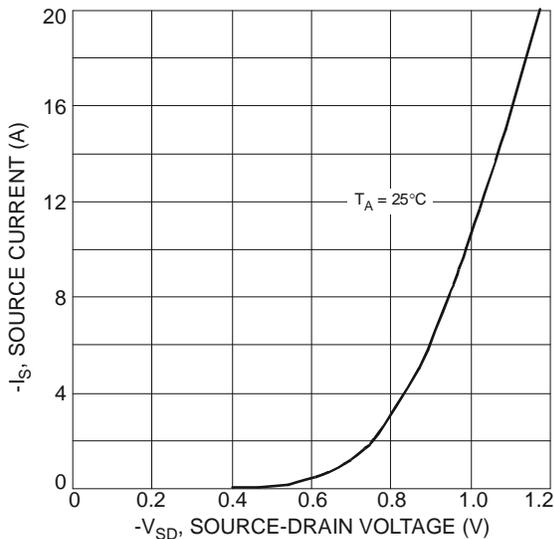


Figure 9 Diode Forward Voltage vs. Current

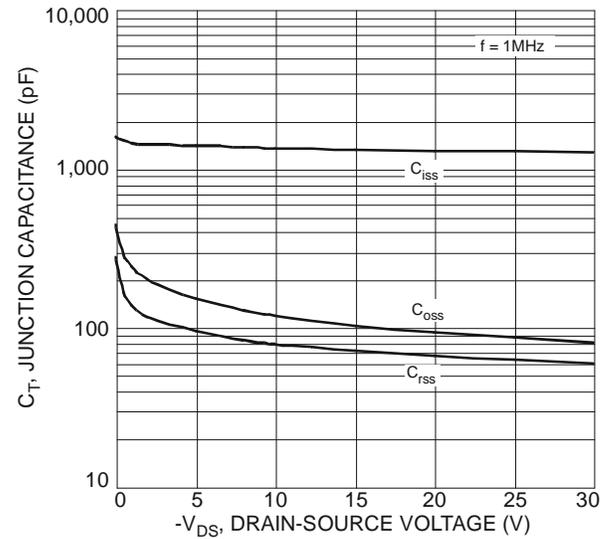


Figure 10 Typical Junction Capacitance

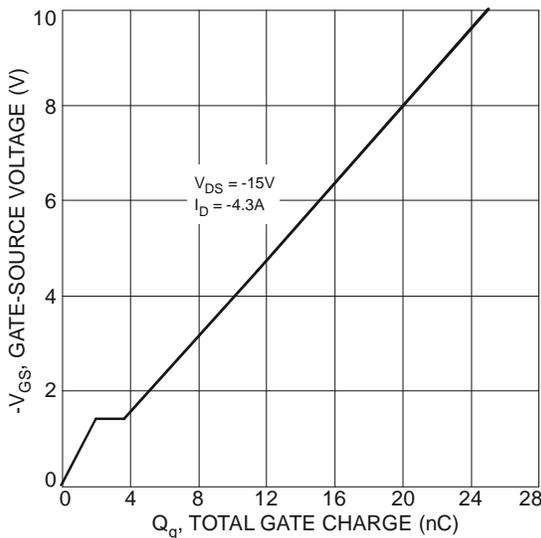


Figure 11 Gate-Charge Characteristics

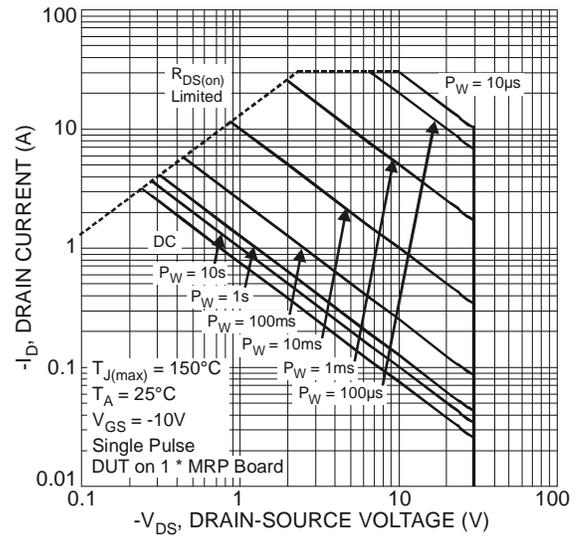
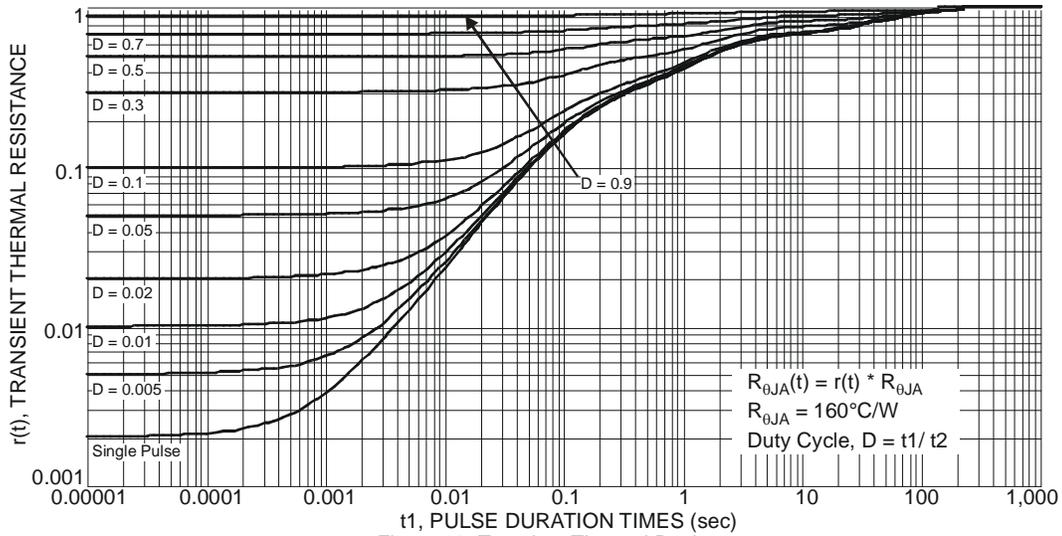
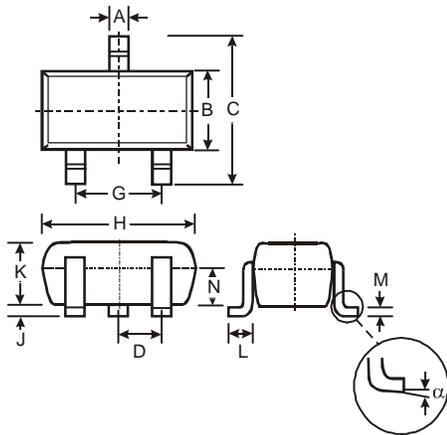


Figure 12 SOA, Safe Operation Area



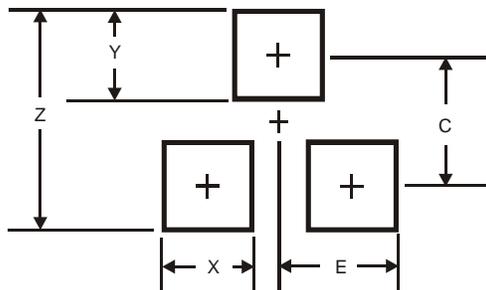
### Package Outline Dimensions



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

### Suggested Pad Layout



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