优尚

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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Features

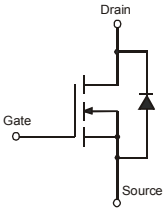
- Low On-Resistance:
  - $R_{DS(ON)}$ < 54mΩ @ V_{GS} = 10V
  - $R_{DS(ON)}$ < 72mΩ @ V_{GS} = 4.5V
  - $R_{DS(ON)}$ < 115mΩ @ V_{GS} = 2.5V
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage

Mechanical Data

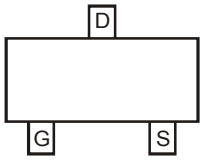
- Case: SOT-23
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.008 grams (approximate)

SOT-23

TOP VIEW



EQUIVALENT CIRCUIT



Pin Configuration

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±12	V
Drain Current (Note 5)	T_A = +25°C T_A = +70°C	I_D	3.8 3.1	A
Drain Current (Note 5)	Pulsed	I_{DM}	15	A
Body-Diode Continuous Current (Note 5)		I_S	2.0	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	1.4	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	90	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	800	nA	V_{DS} = 28V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	—	±80 ±800	nA	V_{GS} = ±12V, V_{DS} = 0V V_{GS} = ±19V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	0.62	0.92	1.4	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	— — 	39 52 90	54 72 115	mΩ	V_{GS} = 10V, I_D = 3.8A V_{GS} = 4.5V, I_D = 3.6A V_{GS} = 2.5V, I_D = 3.1A
Forward Transconductance	$\|Y_{fs}\|$	—	3	—	S	V_{DS} = 5V, I_D = 3.1A
Source-Drain Diode Forward Voltage	V_{SD}	—	—	1.16	V	V_{GS} = 0V, I_S = 2.0A
DYNAMIC CHARACTERISTICS (Note 7)						
Gate Resistance	R_g	-	4.17	-	Ω	V_{DS} =0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (10V)	Q_g	-	8.2	-	nC	V_{GS} = 10 V, V_{DS} = 10V, I_D = 3.8 A
Total Gate Charge (4.5V)	Q_g	-	3.7	-	nC	V_{GS} =4.5 V, V_{DS} = 10V, I_D = 3.8 A
Gate-Source Charge	Q_{gs}	-	0.7	-	nC	
Gate-Drain Charge	Q_{gd}	-	1.1	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	1.14	-	ns	V_{DD} = 15V, V_{GEN} = 10V, R_{GEN} = 6Ω, R_L = 3.9Ω
Turn-On Rise Time	t_r	-	3.49	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	15.02	-	ns	
Turn-Off Fall Time	t_f	-	3.26	-	ns	
Input Capacitance	C_{iss}	—	305	—	pF	V_{DS} = 5V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	74	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	48	—	pF	

Notes: 5. Device mounted on FR-4 PCB. t ≤5 sec.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.

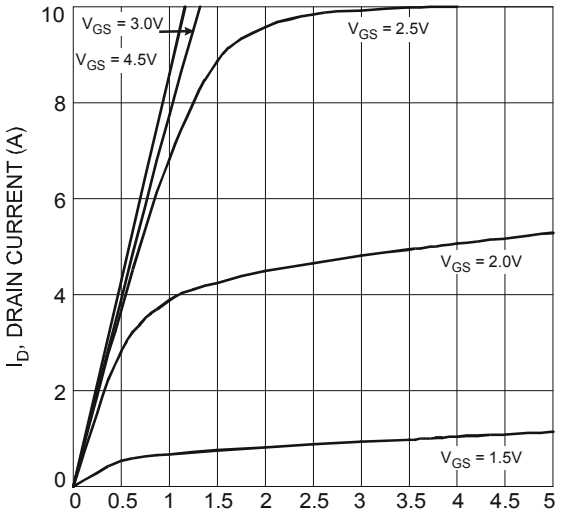


Fig. 1 Typical Output Characteristics

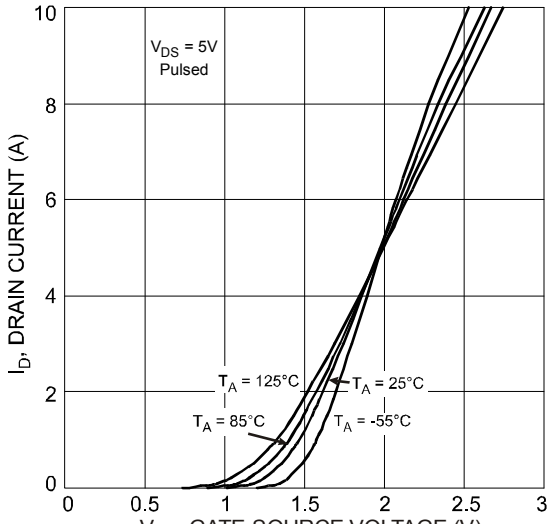


Fig. 2 Typical Transfer Characteristics

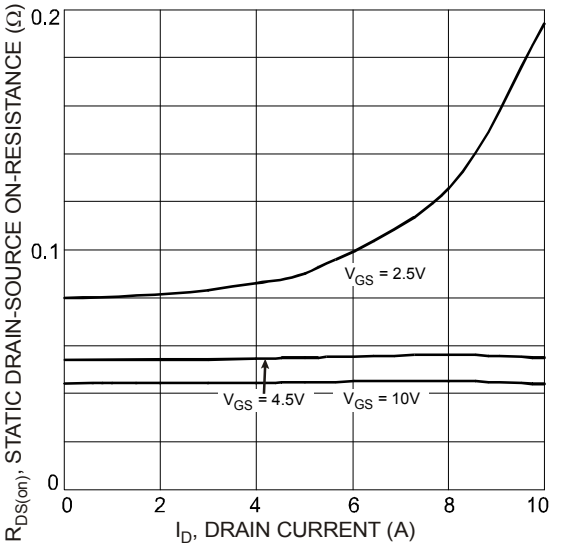


Fig. 3 On-Resistance vs. Drain Current and Gate Voltage

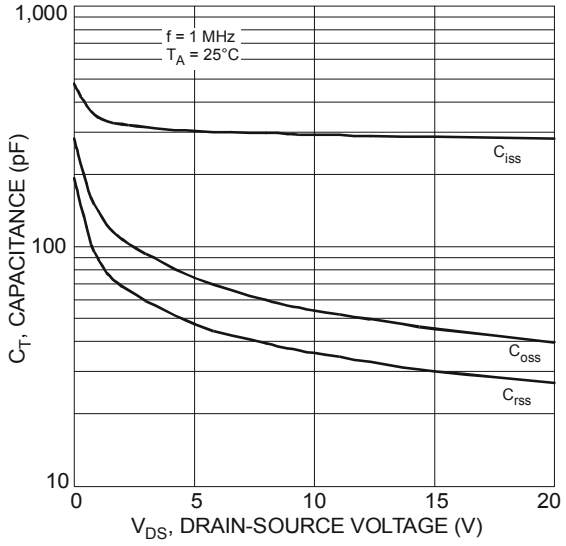


Fig. 4 Typical Total Capacitance

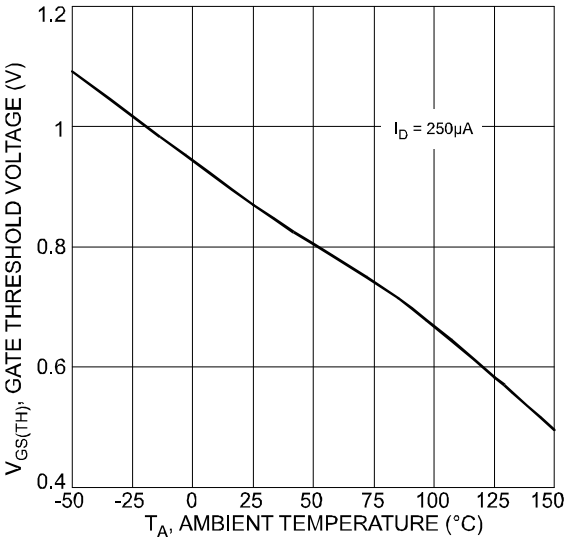


Fig. 5 Gate Threshold Voltage vs. Ambient Temperature

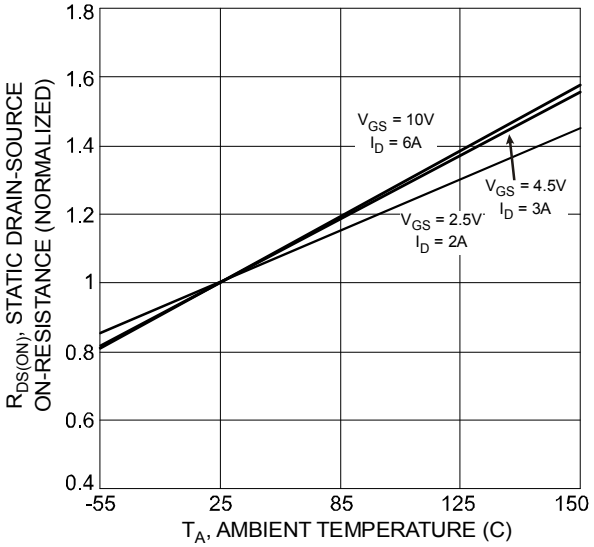


Fig. 6 Normalized Static Drain-Source On-Resistance vs. Ambient Temperature

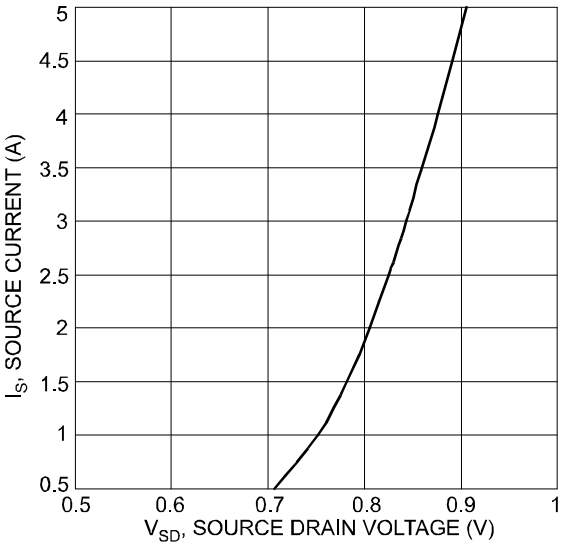


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

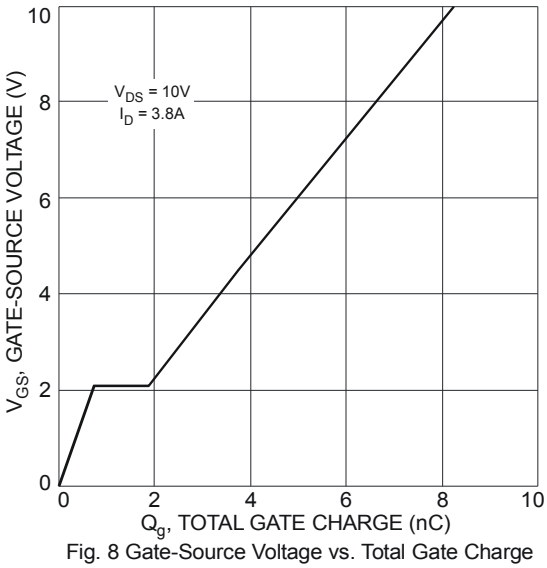
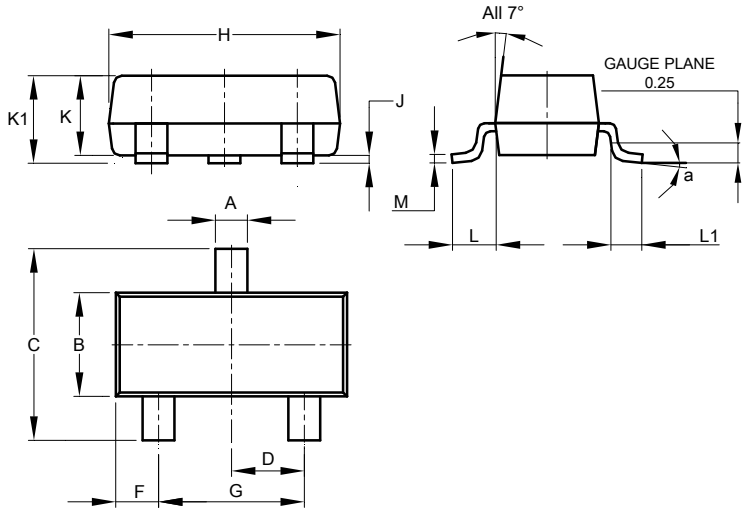


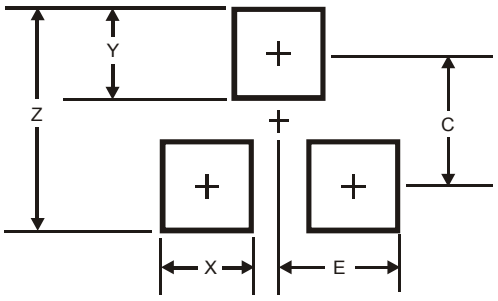
Fig. 8 Gate-Source Voltage vs. Total Gate Charge

Package Outline Dimensions



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
α	8°		
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35