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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Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max T_A = +25°C
30V	73mΩ @ V_{GS} = 10V	3.3A
	110mΩ @ V_{GS} = 4.5V	2.7A

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed

Description and Applications

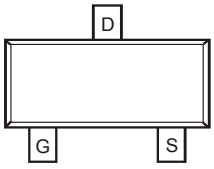
This MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- General Purpose Interfacing Switch
- Power Management Functions
- Boost Application
- Analog Switch

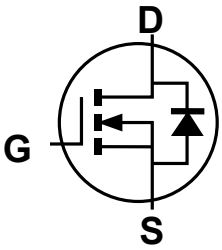
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish—Matte Tin Annealed Over Copper Lead-Frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.027 grams (approximate)

Top View



Pin Configuration



Internal Schematic

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	2.5 2.0	A
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	3.3 2.7	A
Continuous Drain Current (Note 6) V_{GS} = 10V	t≦10sec	T_A = +25°C T_A = +70°C	I_D	3.8 3.1	A
Continuous Drain Current (Note 6) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	2.7 2.1	A
Pulsed Drain Current (Note 7)			I_{DM}	25	A

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	0.74	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	173.4	°C/W
Total Power Dissipation (Note 6)	P_D	1.3	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	99.1	°C/W
Total Power Dissipation (Note 6) t≦10sec	P_D	1.8	W
Thermal Resistance, Junction to Ambient (Note 6) t≦10sec	$R_{\theta JA}$	72	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, on 1inch square copper plate
7. Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current @T_C = +25°C	I_{DSS}	-	-	1.0	μA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	-	3.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	54	73	mΩ	V_{GS} = 10V, I_D = 3.1A
		-	88	110		V_{GS} = 4.5V, I_D = 2A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	4.8	-	mS	V_{DS} = 10V, I_D = 3.1A
Diode Forward Voltage (Note 6)	V_{SD}	-	0.75	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	-	305.8	-	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	39.9	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	39.5	-	pF	
Gate Resistance	R_g	-	1.4	-	Ω	V_{DS} = 0V, V_{GS} = 0V,f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	-	4.1	-	nC	V_{GS} = 10V, V_{DS} = 10V, I_D = 3A
Total Gate Charge (V_{GS} = 10V)	Q_g	-	8.6	-	nC	
Gate-Source Charge	Q_{gs}	-	1.2	-	nC	
Gate-Drain Charge	Q_{gd}	-	1.5	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	2.6	-	ns	V_{DD} = 15V, V_{GS} = 10V, R_L = 47Ω, R_G = 3Ω,
Turn-On Rise Time	t_r	-	4.6	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	13.1	-	ns	
Turn-Off Fall Time	t_f	-	2.5	-	ns	

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

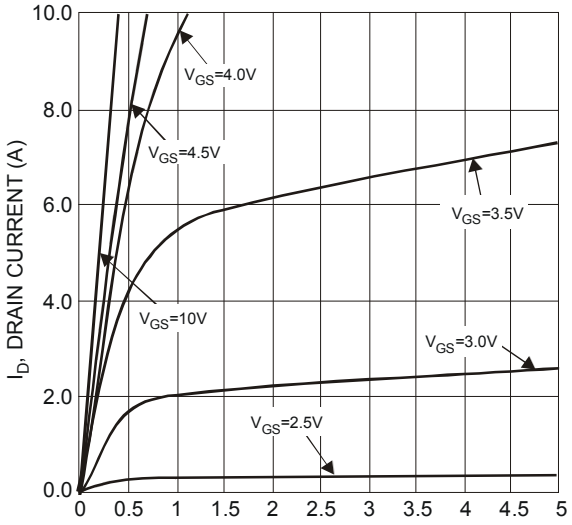


Fig. 1 Typical Output Characteristics

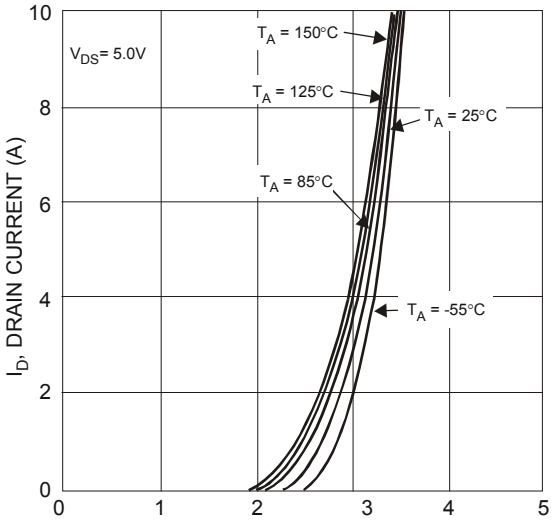


Fig. 2 Typical Transfer Characteristics

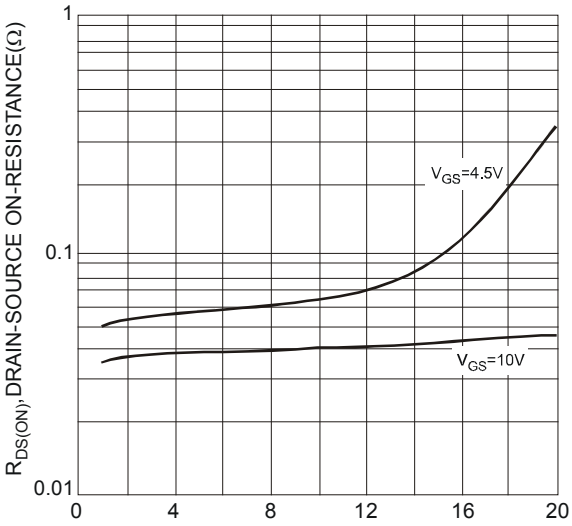


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

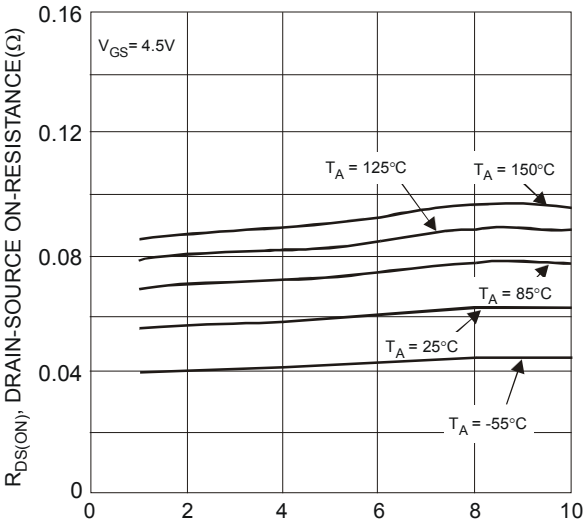


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

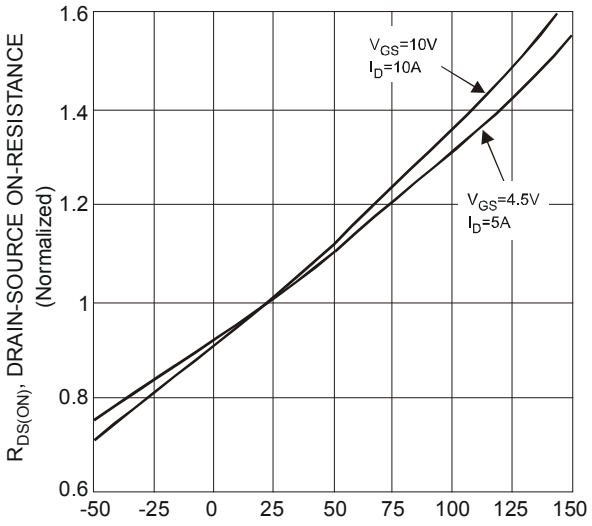


Fig. 5 On-Resistance Variation with Temperature

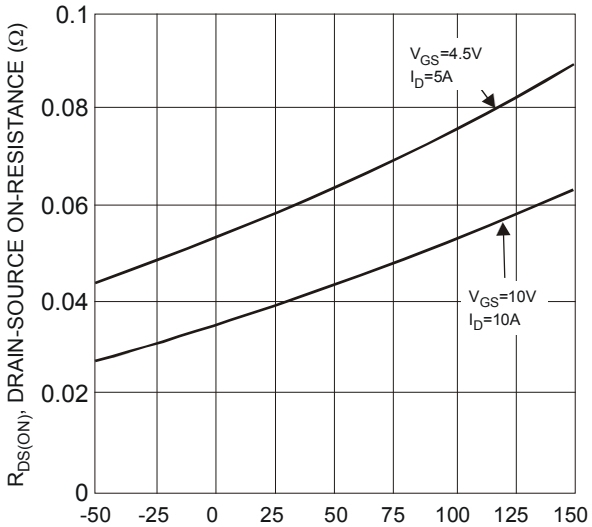


Fig. 6 On-Resistance Variation with Temperature

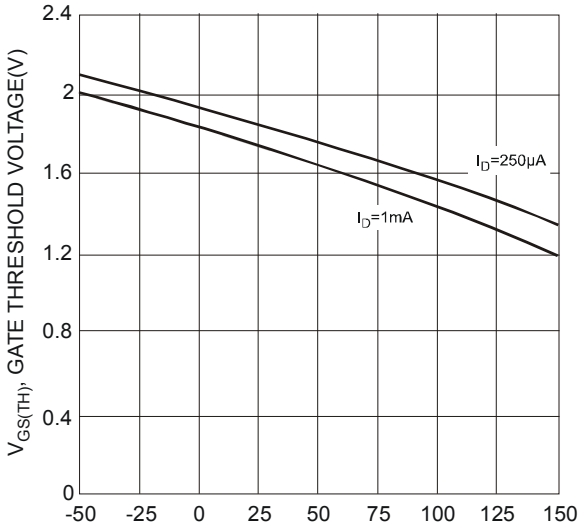


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

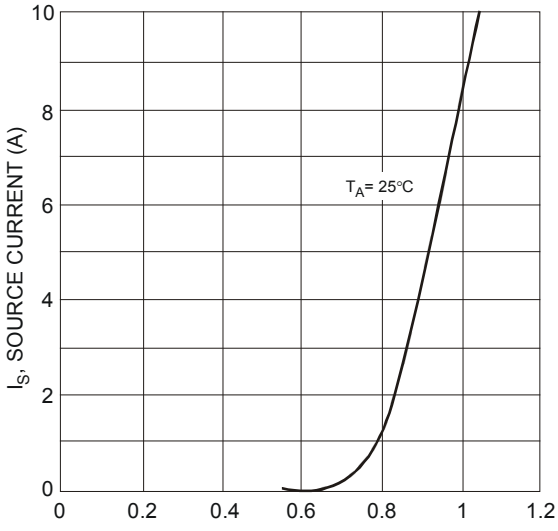


Fig. 8 Diode Forward Voltage vs. Current

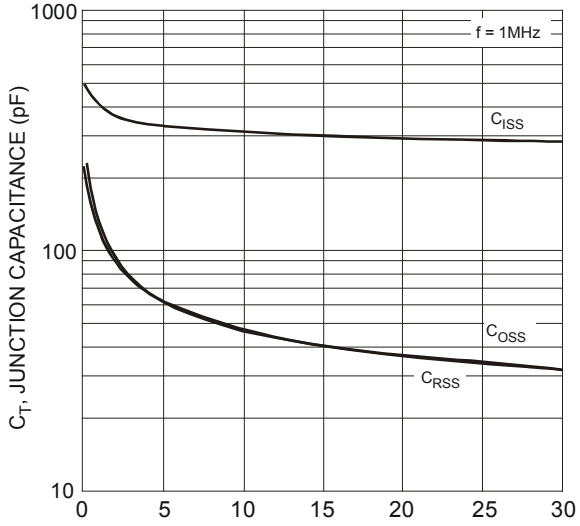


Fig. 9 Typical Junction Capacitance

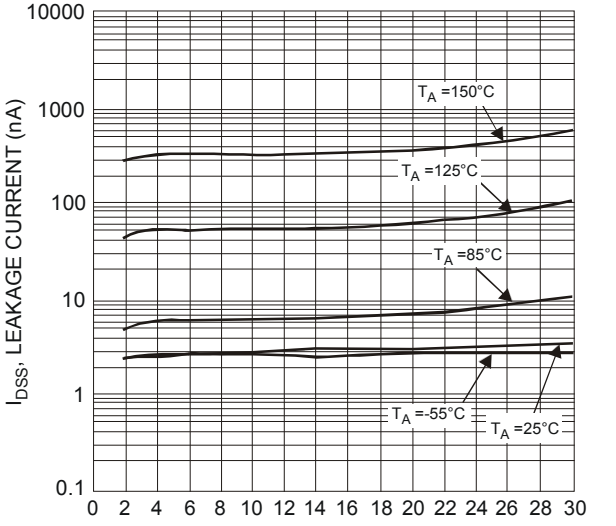


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

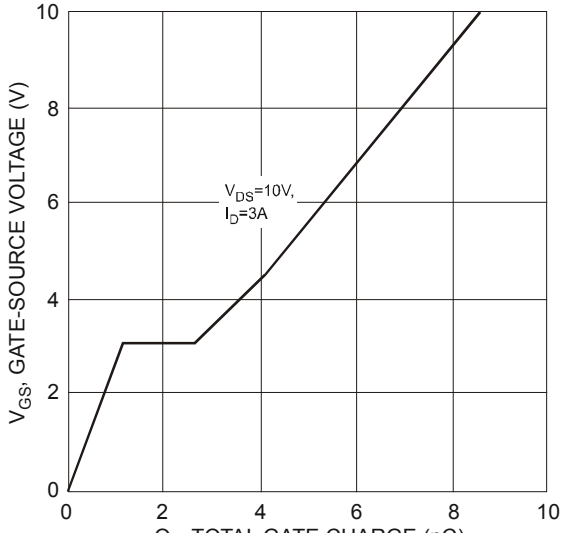


Fig. 11 Gate-Charge Characteristics

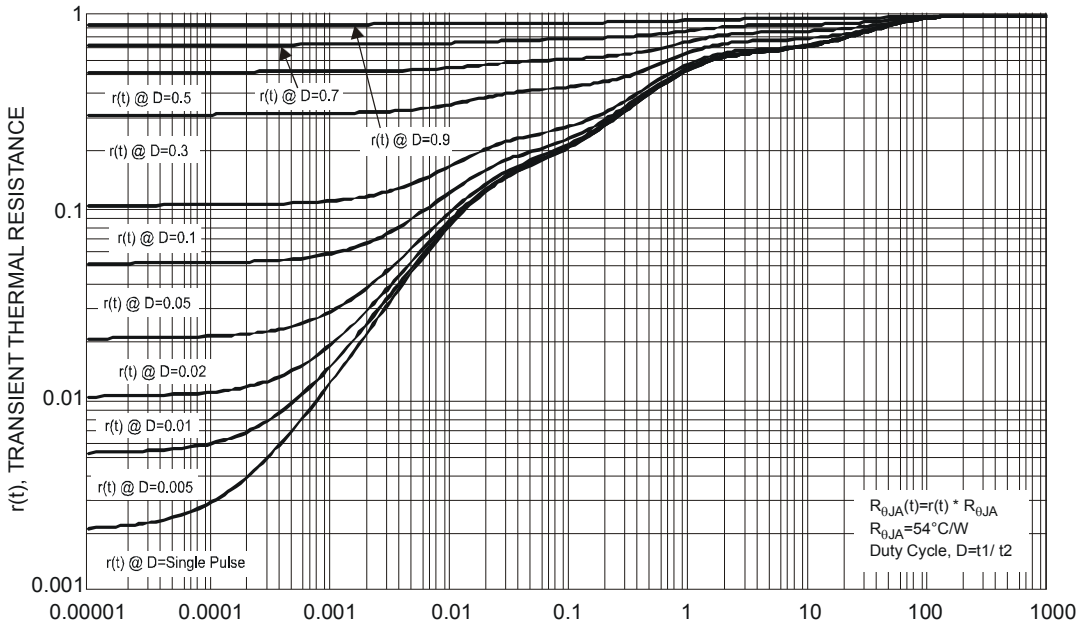
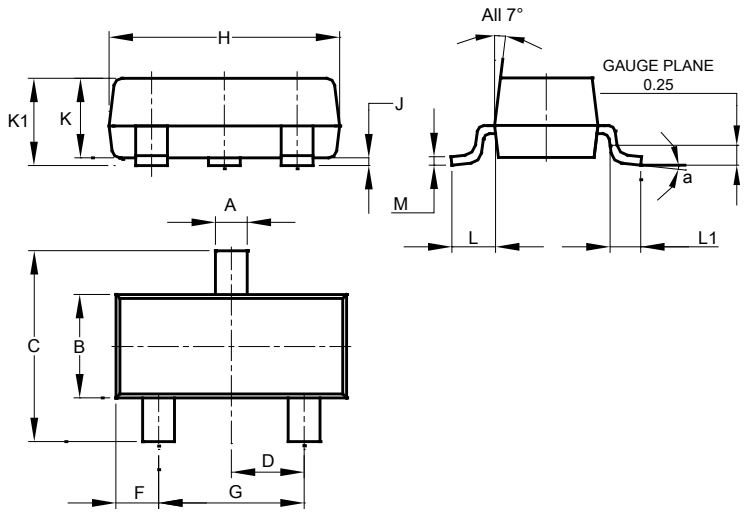


Fig. 12 Transient Thermal Resistance

Package Outline Dimensions

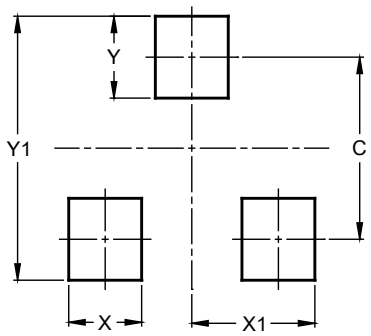
SOT23



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

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9