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

BV_{DSS}	$R_{DS(ON)}$	I_D T_A = +25°C
100V	65mΩ @ V_{GS} = 10V	4A
	105mΩ @ V_{GS} = 4.5V	3A

Description

This N-channel MOSFET provides users with a competitive specification, offering efficient power-handling capability, high impedance, and is free from thermal runaway and thermally induced secondary breakdown.

Applications

- Load Switching
- Uninterrupted Power Supply

Features and Benefits

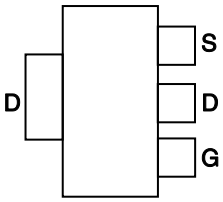
- Low Gate Drive
- Low Input Capacitance
- Fast Switching Speed

Mechanical Data

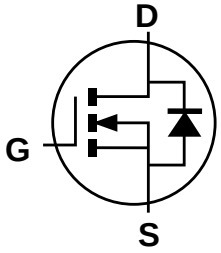
- Case: SOT223
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Lead-Frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223

Top View



Pin Out - Top View



Equivalent Circuit

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = 10V	T_A = +25°C	I_D	4	A
	T_A = +70°C	I_D	3	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%) (Note 5)		I_{DM}	28	A
Maximum Body Diode Continuous Current (Note 6)		I_S	12	A
Avalanche Energy (Note 7) L = 0.1mH		E_{AS}	6	mJ
Avalanche Current (Note 7) L = 0.1mH		I_{AS}	1.8	A

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_C = +25°C	P_D	2.4	W
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	51	°C/W
Thermal Resistance, Junction to Case	(Note 5)	$R_{\theta JC}$	9	°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}	100	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	V_{DS} = 80V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	—	3.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	43	65	mΩ	V_{GS} = 10V, I_D = 4A
		—	63	105	mΩ	V_{GS} = 4.5V, I_D = 4A
Diode Forward Voltage	V_{SD}	—	0.8	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	228	—	pF	V_{DS} = 50V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	89.3	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	2.5	—	pF	
Gate Resistance	R_g	—	8.2	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	2.5	—	nC	V_{DS} = 50V, I_D = 4.5A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	4.5	—	nC	
Gate-Source Charge	Q_{gs}	—	0.6	—	nC	
Gate-Drain Charge	Q_{gd}	—	1.3	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	3.0	—	ns	V_{DS} = 50V, R_L = 11Ω, V_{GS} = 10V, R_{GEN} = 3Ω
Turn-On Rise Time	t_R	—	3.1	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	12.3	—	ns	
Turn-Off Fall Time	t_F	—	4.3	—	ns	
Reverse Recovery Time	t_{RR}	—	22.9	—	ns	I_F = 4.5A, di/dt = 300A/μs
Reverse Recovery Charge	Q_{RR}	—	45.2	—	nC	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
6 .Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.

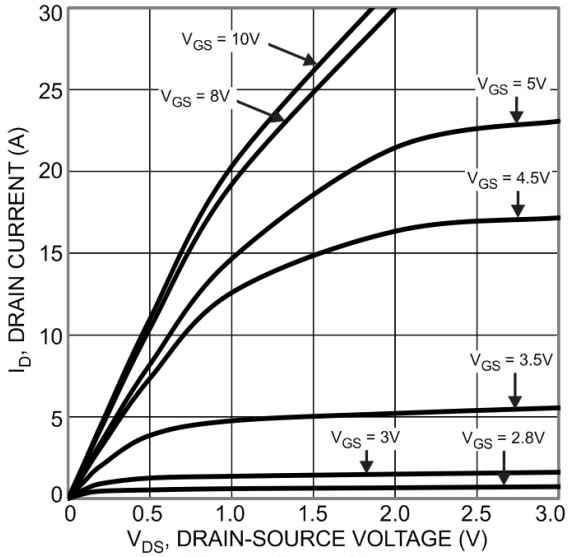


Fig. 1 Typical Output Characteristic

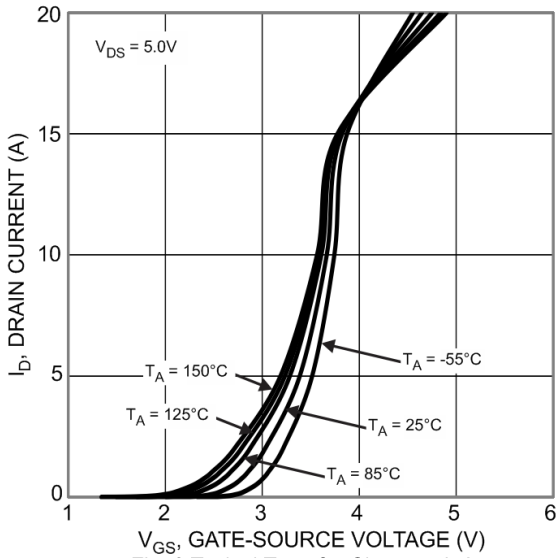


Fig. 2 Typical Transfer Characteristics

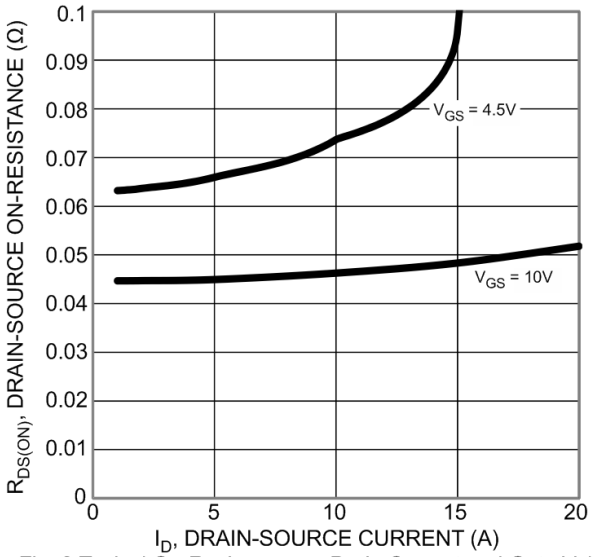


Fig. 3 Typical On-Resistance vs Drain Current and Gate Voltage

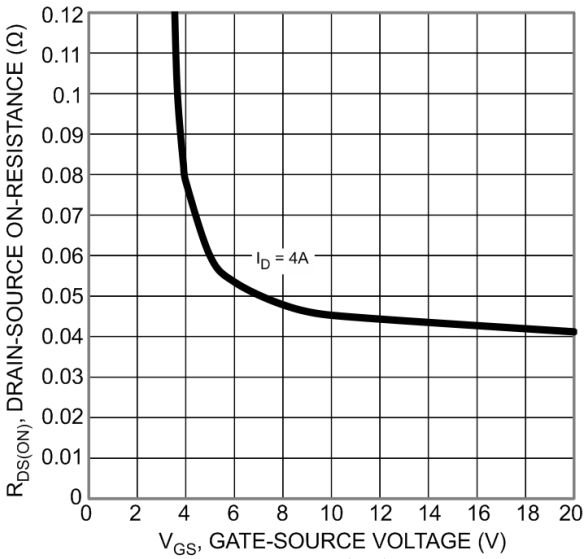


Fig. 4 Typical Transfer Characteristic

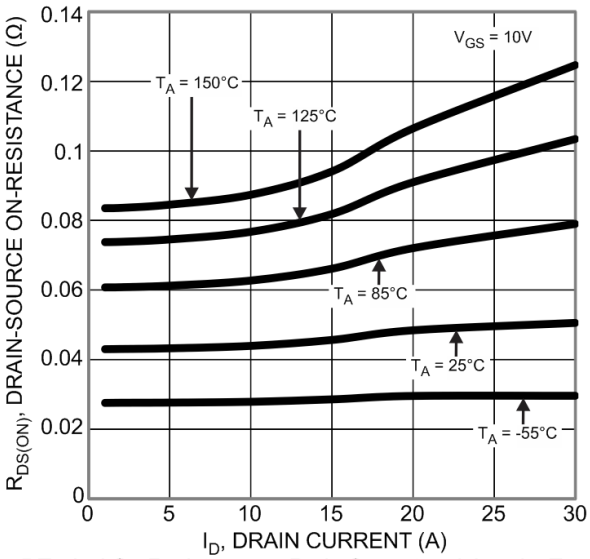


Fig. 5 Typical On-Resistance vs Drain Current and JunctionTemperature

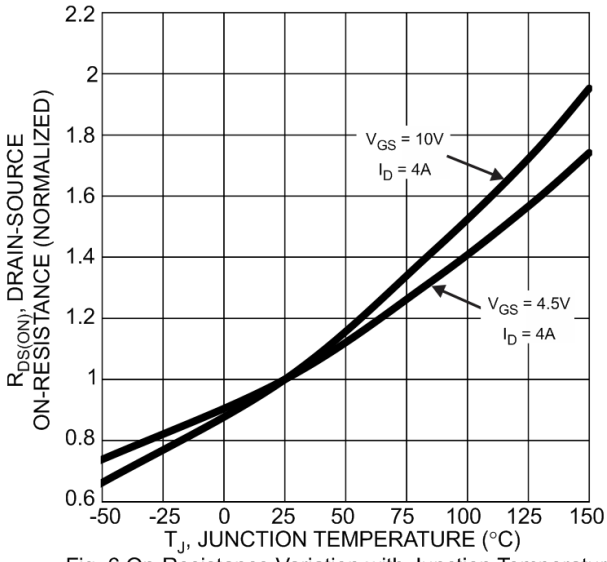


Fig. 6 On-Resistance Variation with Junction Temperature

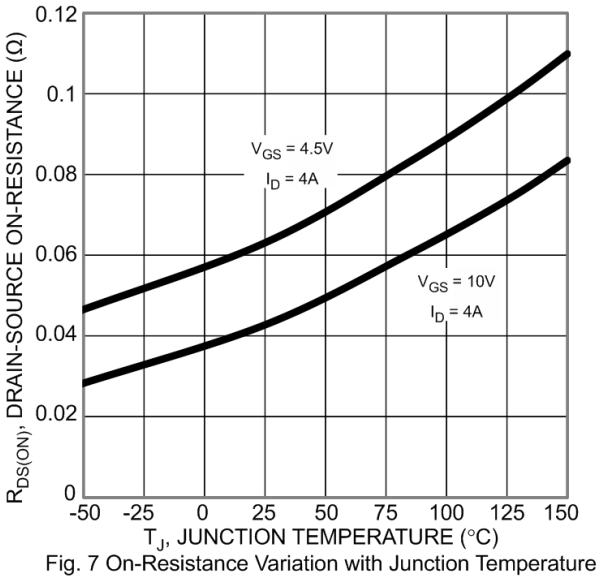


Fig. 7 On-Resistance Variation with Junction Temperature

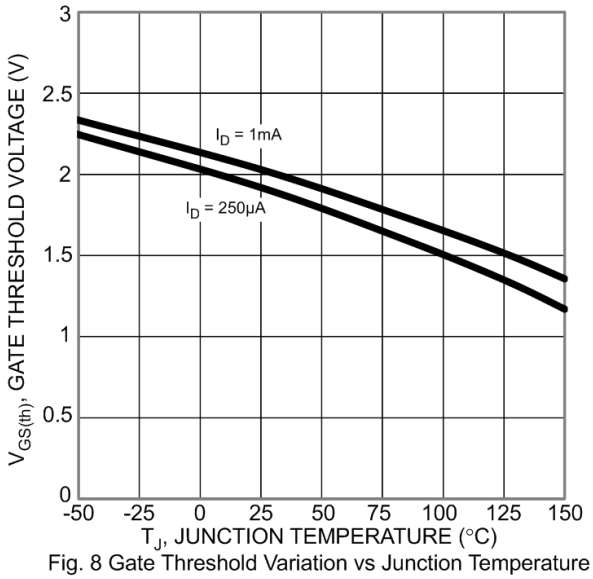


Fig. 8 Gate Threshold Variation vs Junction Temperature

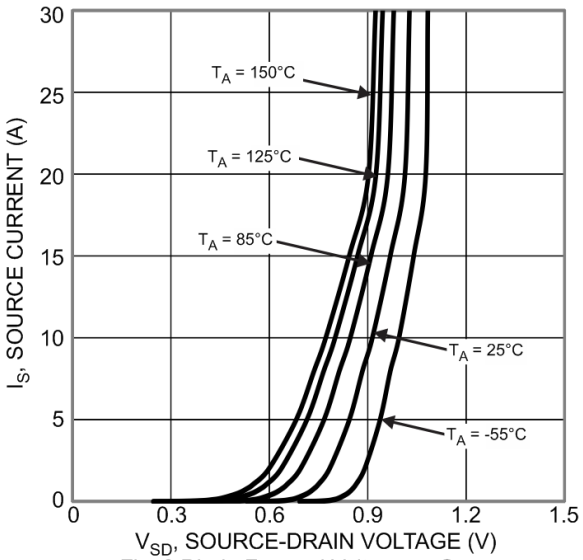


Fig. 9 Diode Forward Voltage vs Current

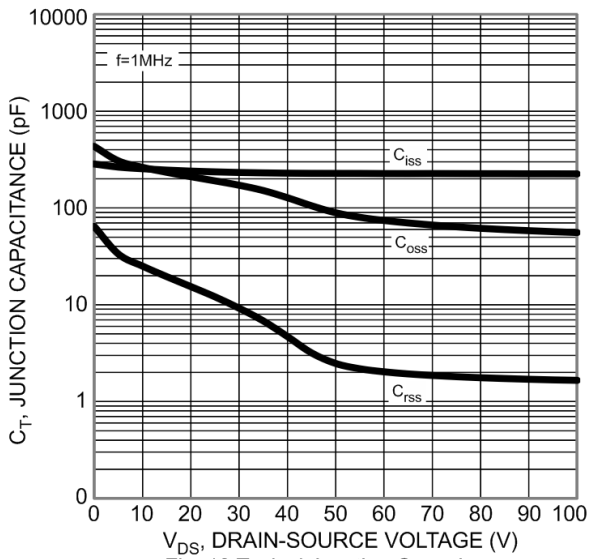


Fig. 10 Typical Junction Capacitance

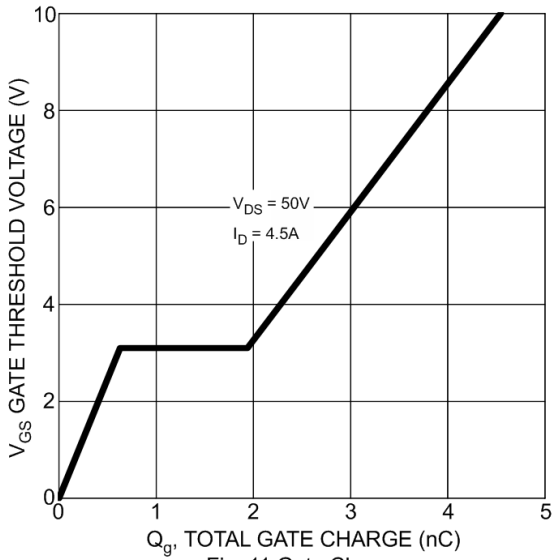


Fig. 11 Gate Charge

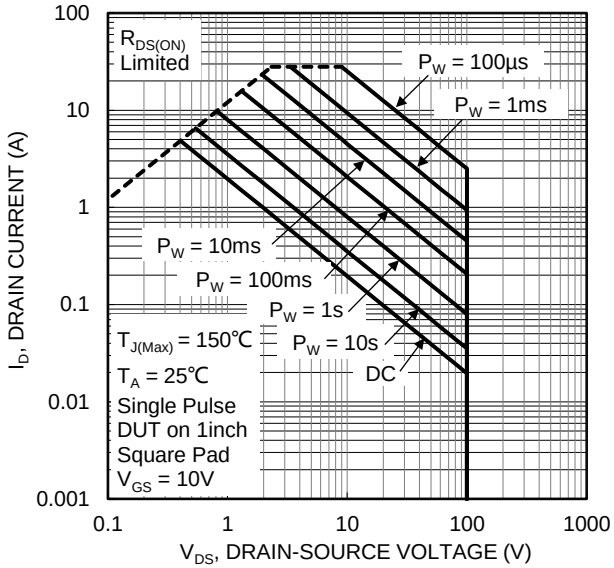


Figure 12. SOA, Safe Operation Area

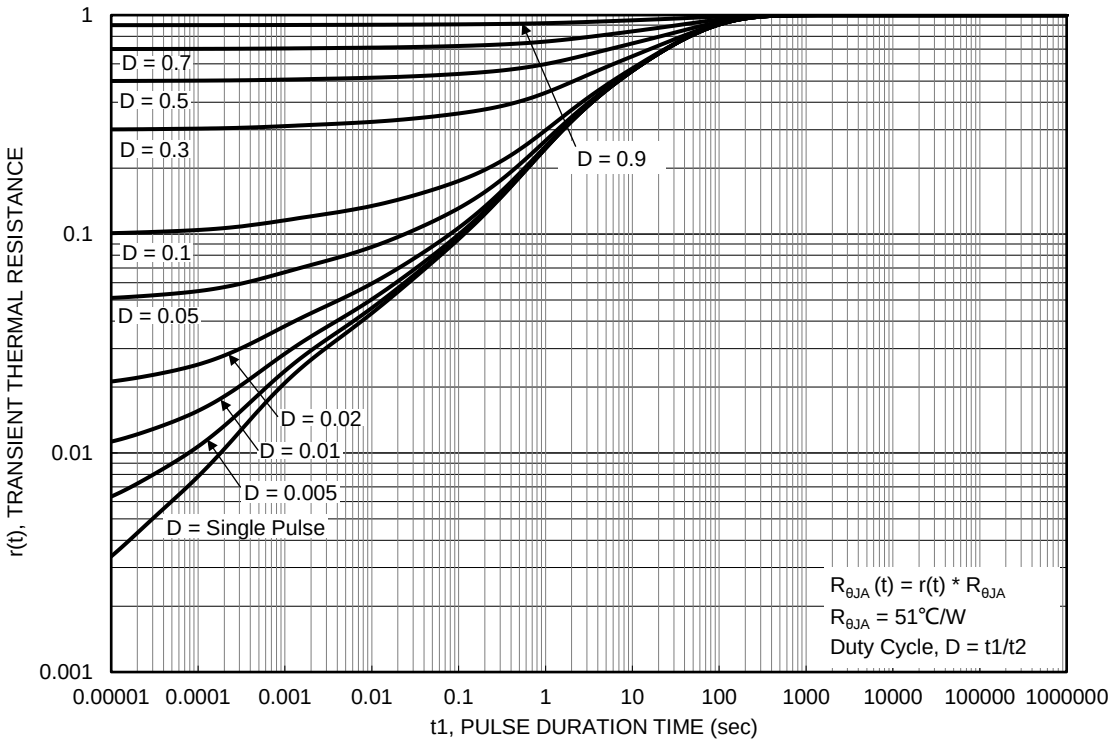
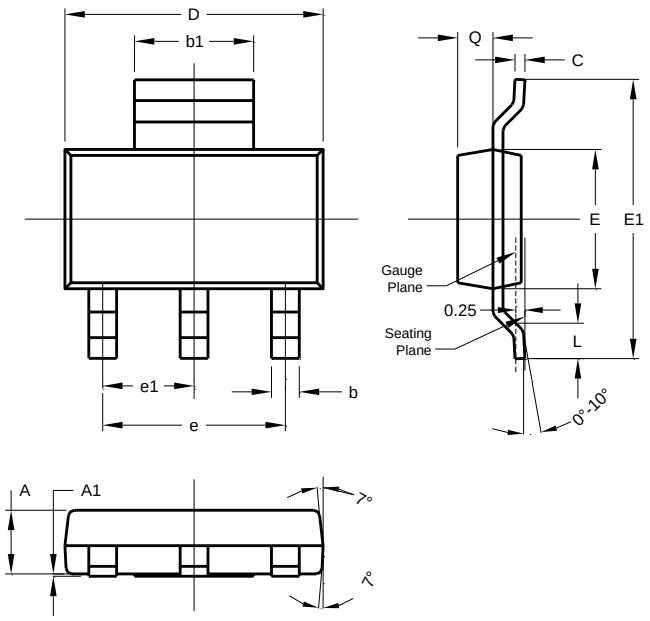


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

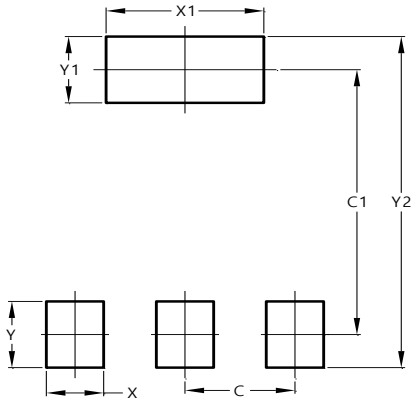
SOT223



SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

SOT223



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00