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

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D T_A = 25°C
60V	7.5Ω @ V_{GS} = 5V	115mA

Description and Applications

This new generation 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.

- DC-DC Converters
- Power management functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc

Features

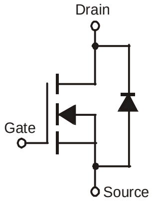
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- **Totally Lead Free, Full RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Notes 2 and 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

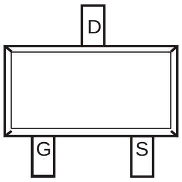
- Case: SOT523
- Case Material: Molded Plastic. “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.002 grams (approximate)

SOT523

Top View



Equivalent Circuit



Top View

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	60	V
Drain-Gate Voltage $R_{GS} \leq 1.0M\Omega$		V_{DGR}	60	V
Gate-Source Voltage	Continuous Pulsed	V_{GSS}	±20 ±40	V
Drain Current (Note 5)	Continuous Continuous @ 100°C Pulsed	I_D	115 73 800	mA

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_d	150	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	833	°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}	60	—	—	V	V_{GS} = 0V, I_D = 10μA
Zero Gate Voltage Drain Current	@ T_C = 25°C @ T_C = 125°C	I_{DSS}	—	—	1.0 500	μA	V_{DS} = 60V, V_{GS} = 0V
Gate-Body Leakage		I_{GSS}	—	—	±10	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)							
Gate Threshold Voltage		$V_{GS(th)}$	1.0	—	2.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	@ T_j = 25°C @ T_j = 125°C	$R_{DS\ (ON)}$	—	2.0 4.4	7.5 13.5	Ω	V_{GS} = 5.0V, I_D = 0.05A V_{GS} = 10V, I_D = 0.5A
On-State Drain Current		$I_{D(ON)}$	0.5	1.0	—	A	V_{GS} = 10V, V_{DS} = 7.5V
Forward Transconductance		g_{FS}	80	—	—	mS	V_{DS} =10V, I_D = 0.2A
DYNAMIC CHARACTERISTICS (Note 7)							
Input Capacitance		C_{iss}	—	22	50	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance		C_{oss}	—	11	25	pF	
Reverse Transfer Capacitance		C_{rss}	—	2.0	5.0	pF	
SWITCHING CHARACTERISTICS (Note 7)							
Turn-On Delay Time		$t_{D(ON)}$	—	7.0	20	ns	V_{DD} = 30V, I_D = 0.2A,
Turn-Off Delay Time		$t_{D(OFF)}$	—	11	20	ns	R_L = 150Ω, V_{GEN} = 10V, R_{GEN} = 25Ω

Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6 .Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.

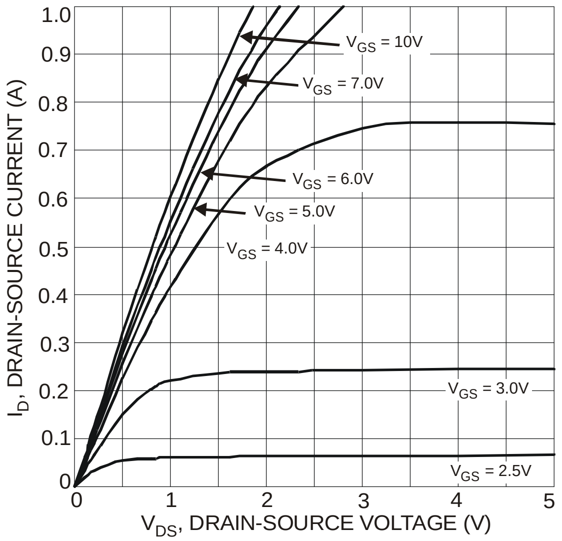


Fig. 1 On-Region Characteristics

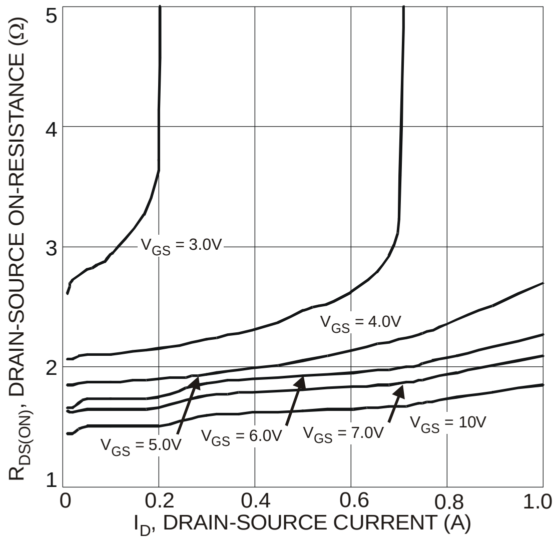


Fig. 2 On-Resistance Variation with Gate Voltage and Drain-Source Current

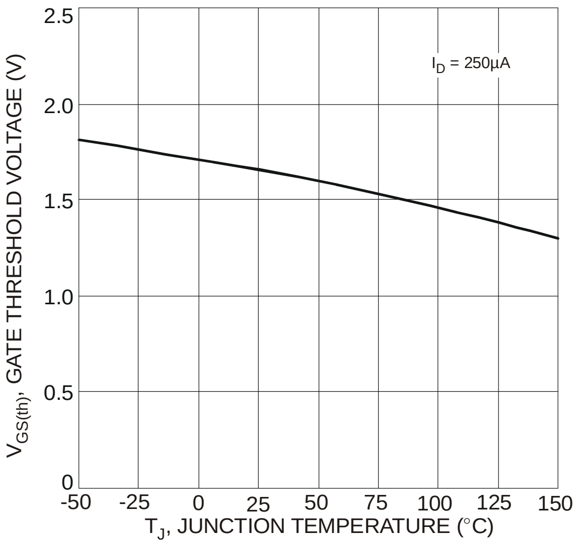


Fig. 3 Gate Threshold Variation with Temperature

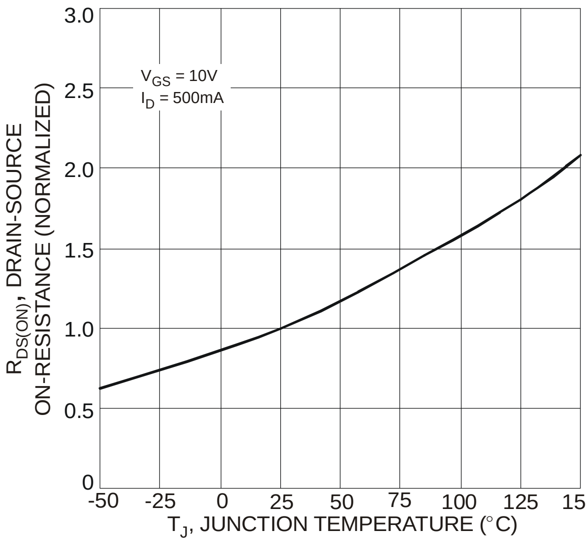


Fig. 4 On-Resistance Variation with Temperature

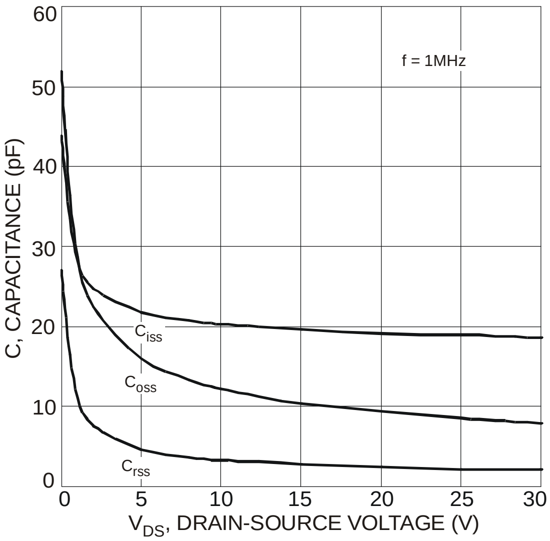


Fig. 5 Typical Capacitance

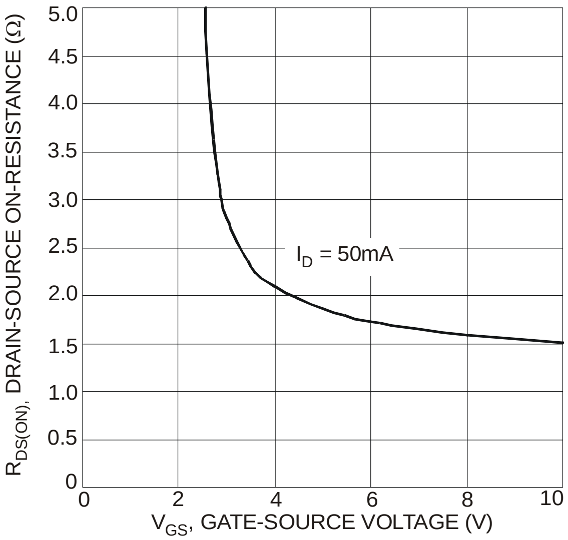
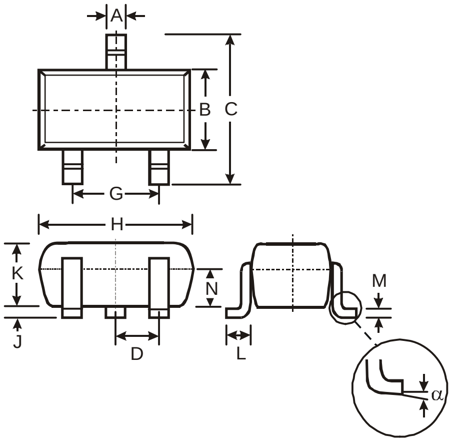


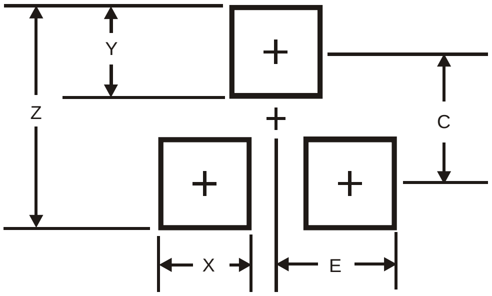
Fig. 6 On-Resistance vs. Gate-Source Voltage

Package Outline Dimensions



SOT523			
Dim	**Min**	**Max**	**Typ**
A	0.15	0.30	0.22
B	0.75	0.85	0.80
C	1.45	1.75	1.60
D	—	—	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
J	0.00	0.10	0.05
K	0.60	0.80	0.75
L	0.10	0.30	0.22
M	0.10	0.20	0.12
N	0.45	0.65	0.50
α	0°	8°	—
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	1.8
X	0.4
Y	0.51
C	1.3
E	0.7