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 =
20V	0.12Ω @ V_{GS} = 10V	2.2A

Description

This new generation MOSFET is 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.

Applications

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

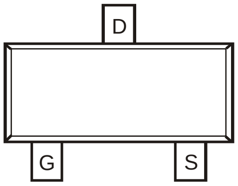
Features

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Small Surface Mount Package

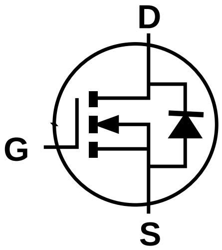
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Solderable per MIL-STD-202, Method 208 e3
- Lead-free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)

Top View



Top View
Pin Configuration



Equivalent Circuit

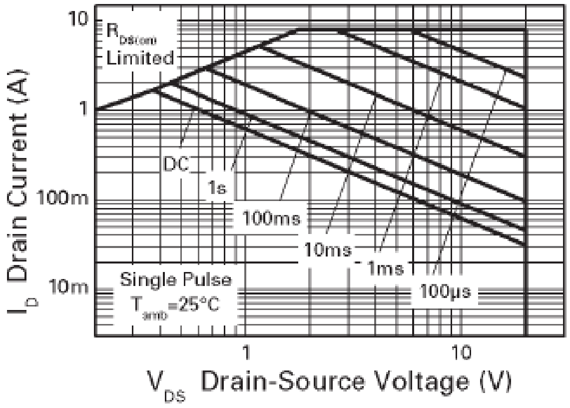
Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current, V_{GS} = 10V	(Note 6) (Note 6) (Note 5)	T_A = +25°C T_A = +70°C T_A = +25°C	I_D	2.2 1.7 1.9	A
Pulsed Drain Current (Note 7)			I_{DM}	8	A
Maximum Body Diode Continuous Current (Note 6)			I_S	1.29	A
Maximum Body Diode Continuous Current (Note 7)			I_{SM}	8	A

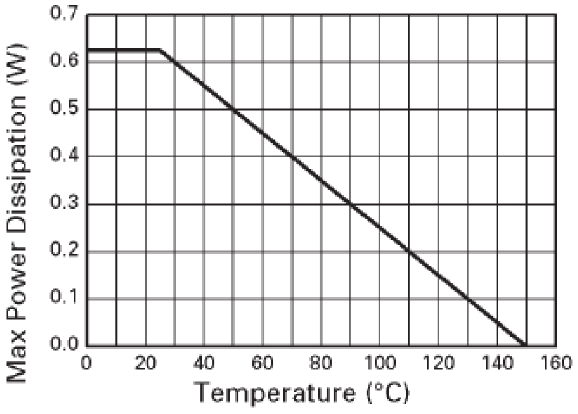
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation	(Note 5)	P_D	625	mW
Linear Derating Factor			5	mW/°C
Total Power Dissipation	(Note 6)	P_D	806	mW
Linear Derating Factor			6.4	mW/°C
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	200	°C/W
	(Note 6)		155	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

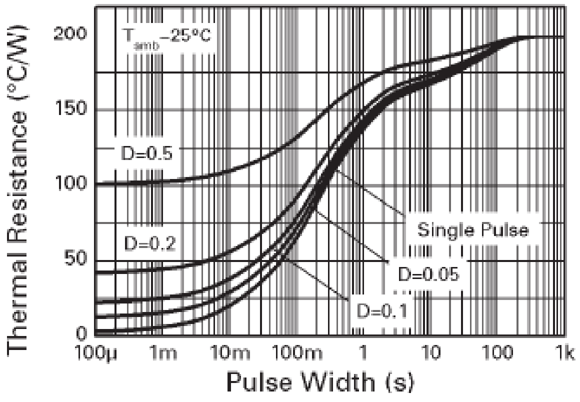
Notes: 5. For a device surface mounted on 25mm x 25mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions.
6. For a device surface mounted on FR-4 PCB measured at t≦5 secs.
7. Repetitive rating 25mm x 25mm FR4 PCB, D = 0.05, pulse width 10µs - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.



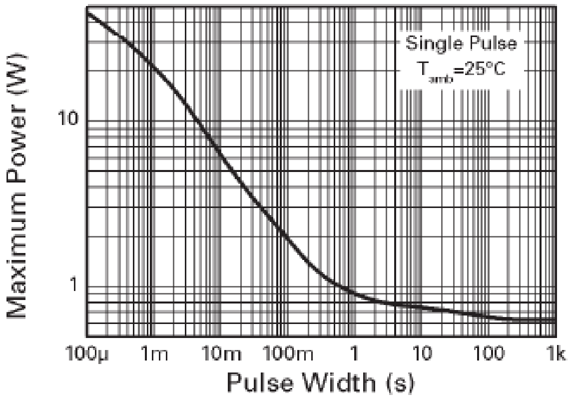
Safe Operating Area



Derating Curve



Transient Thermal Impedance

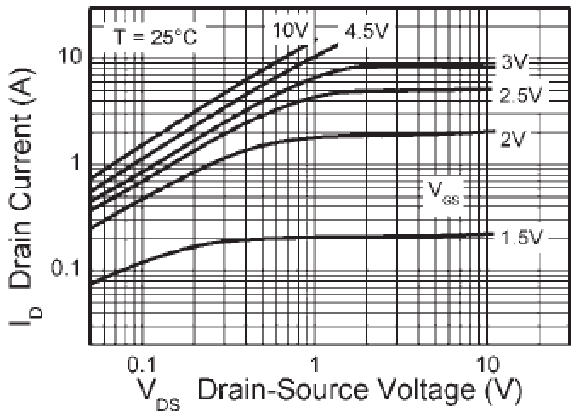


Pulse Power Dissipation

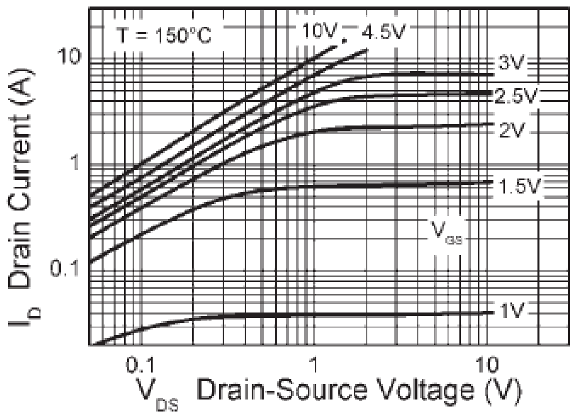
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 20V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	—	100	nA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	0.7	—	—	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance (Note 8)	$R_{DS(ON)}$	—	—	0.12	Ω	V_{GS} = 4.5V, I_D = 4A
		—	—	0.225	Ω	V_{GS} = 2.5V, I_D = 1.5A
Forward Transconductance	g_{FS}	—	6.1	—	S	V_{DS} = 10V, I_D = 4A
Diode Forward Voltage (Note 8 & 10)	V_{SD}	—	0.85	0.95	V	V_{GS} = 0V, I_S = 3.2A, T_J = +25°C
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	303	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	59	—		
Reverse Transfer Capacitance	C_{rss}	—	30	—		
Total Gate Charge (Note 9)	Q_g	—	3.0	—	nC	V_{DS} = 10V, V_{GS} = 10V, I_D = 4A
Gate-Source Charge (Note 9)	Q_{gs}	—	0.8	—		
Gate-Drain Charge (Note 9)	Q_{gd}	—	1.0	—		
Turn-On Delay Time (Note 9)	$t_{D(on)}$	—	2.49	—	ns	V_{DD} = 10V , I_D =4A, R_G = 6Ω, V_{GS} = 5V
Turn-On Rise Time (Note 9)	t_r	—	5.21	—		
Turn-Off Delay Time (Note 9)	$t_{D(off)}$	—	7.47	—		
Turn-Off Fall Time (Note 9)	t_f	—	4.62	—		
Reverse Recovery Time	t_{rr}	—	23	—	ns	T_J = +25°C, I_F = 4A, di/dt= 100A/µs
Reverse Recovery Charge	Qrr	—	5.65	—	nC	

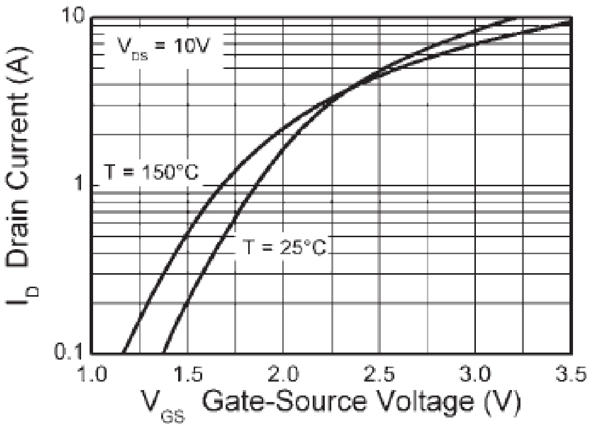
Notes: 8. Measured under pulsed conditions. Width=300µs. Duty cycle ≦ 2%.
9. Switching characteristics are independent of operating junction temperature.
10. Guaranteed by design. Not subject to production testing.



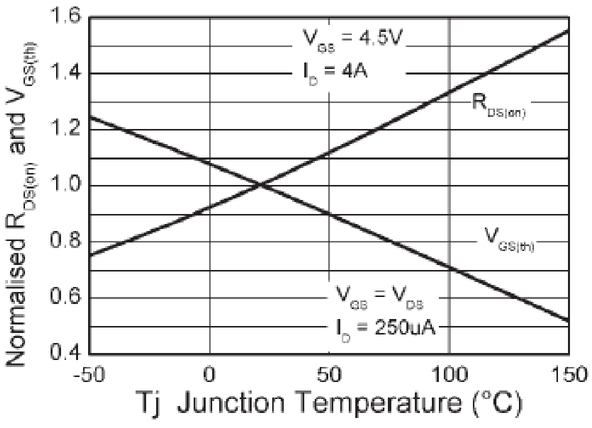
Output Characteristics



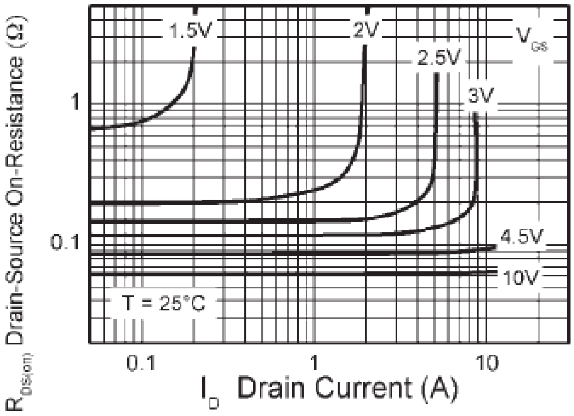
Output Characteristics



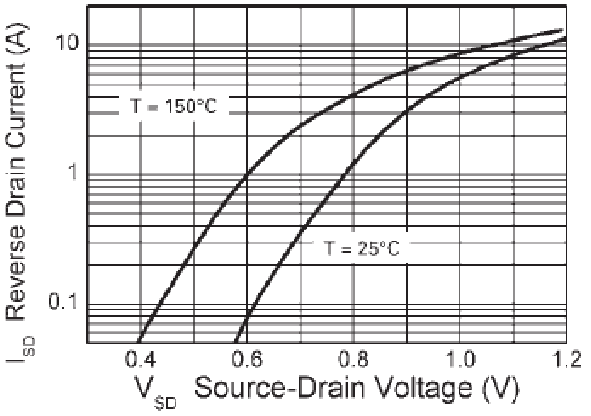
Typical Transfer Characteristics



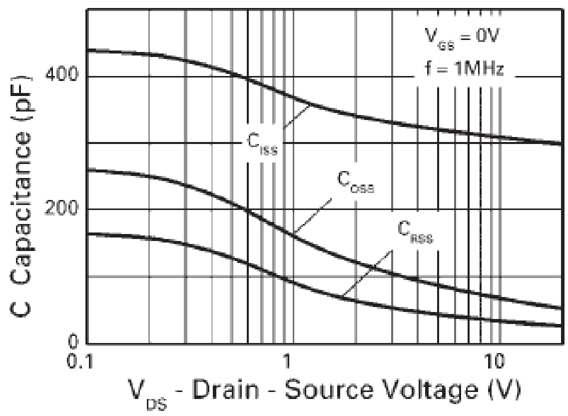
Normalised Curves v Temperature



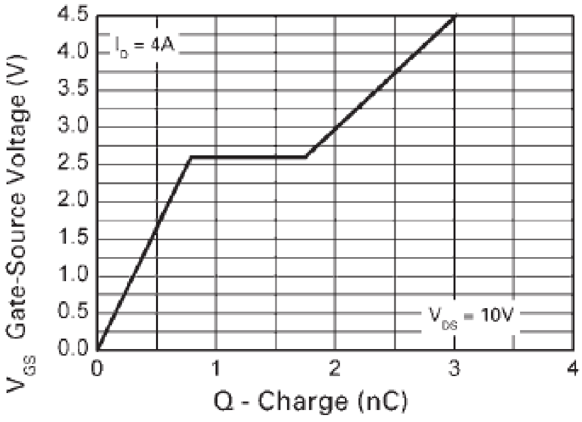
On-Resistance v Drain Current



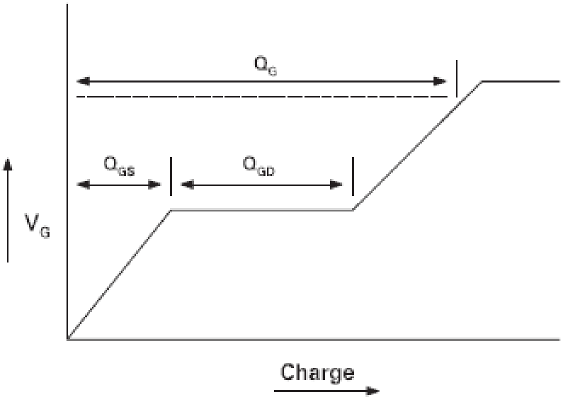
Source-Drain Diode Forward Voltage



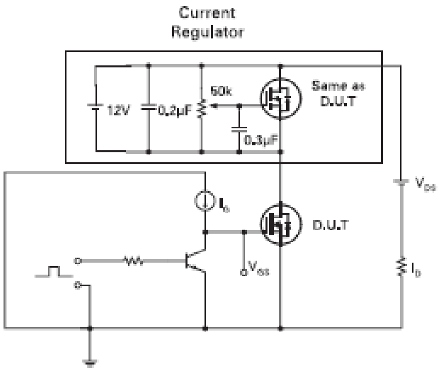
Capacitance v Drain-Source Voltage



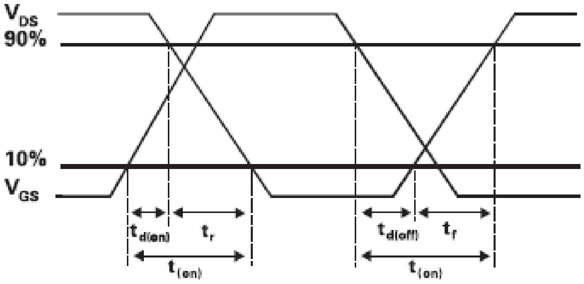
Gate-Source Voltage v Gate Charge



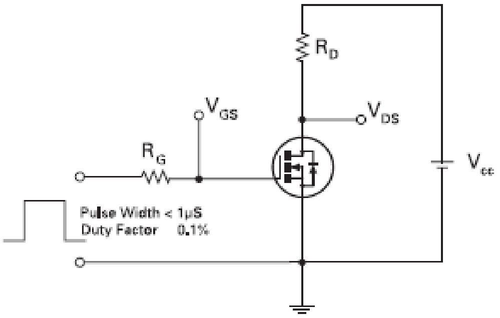
Basic Gate Charge Waveform



Gate Charge Test Circuit

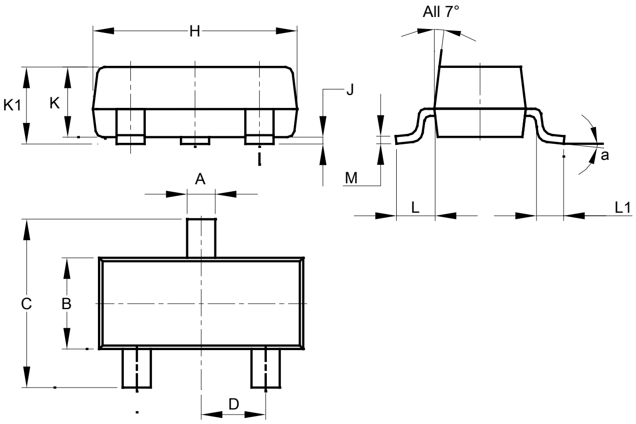


Switching Time Waveforms



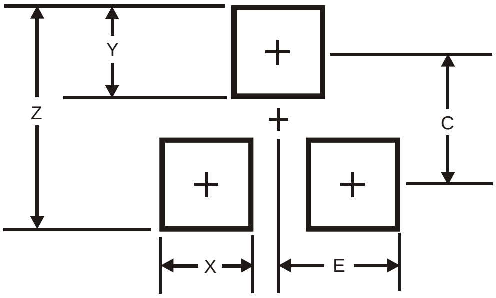
Switching Time Test Circuit

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
a	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