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 T_A = +25°C
-30V	80mΩ@ V_{GS} = -10V	-4.0A
	140mΩ@ V_{GS} =-4.5V	—

Description

This new generation Trench MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance.

Applications

- Power management functions
- Portable Equipment
- Battery Charging

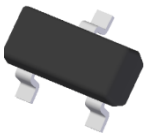
Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- 4.5V Gate Drive Capability
- Thermally Enhanced SOT23 package

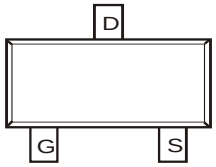
Mechanical Data

- Package: SOT23
- Package 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 e3
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)

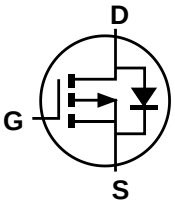
SOT23



Top View



Pin Configuration



Equivalent Circuit

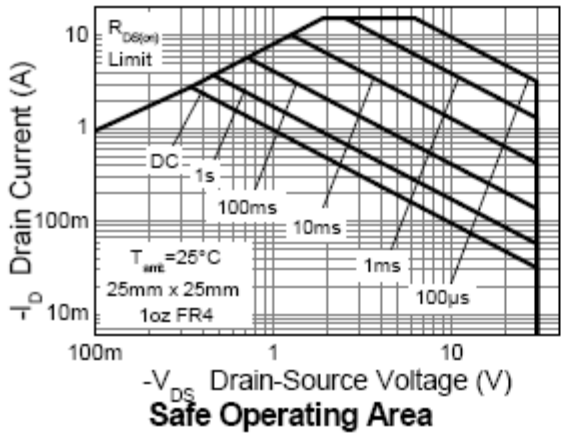
Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	-30	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current, V_{GS} = -10V	T_A = +25°C (Note 6)	I_D	-3.4	A
	T_A = +70°C (Note 6)		-2.7	
	T_A = +25°C (Note 5)		-2.8	
	T_L = +25°C (Note 8)		-4.0	
Pulsed Drain Current (Note 7)		I_{DM}	-15.3	A
Continuous Source Current (Body Diode) (Note 6)		I_S	-2	A
Pulsed Source Current (Body Diode) (Note 7)		I_{SM}	-15.3	A

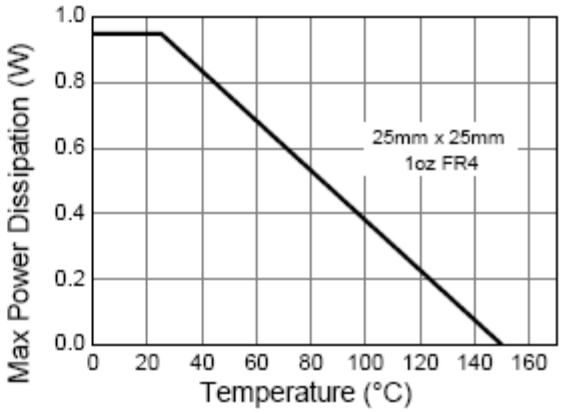
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5) Linear Derating Factor	T_A = +25°C (Note 5)	P_D	0.95	W
			7.6	mW/°C
	T_A = +25°C (Note 6)		1.4	W
			11.2	mW/°C
	T_L = +25°C (Note 8)		1.96	W
			15.7	mW/°C
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	131	°C/W
	(Note 6)		89	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

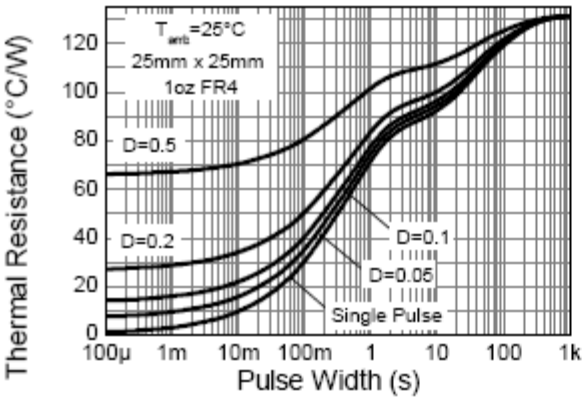
Notes:
5. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
6. Mounted on FR4 PCB measured at t ≤10 sec.
7. Repetitive rating on 25mm x 25mm FR4 PCB, D=0.02, pulse width 300μs – pulse width limited by maximum junction temperature.
8. Thermal resistance from junction to solder-point (at the end of the drain lead).



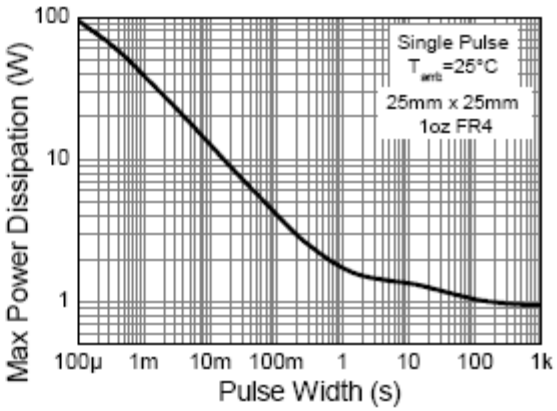
Safe Operating Area



Derating Curve



Transient Thermal Impedance



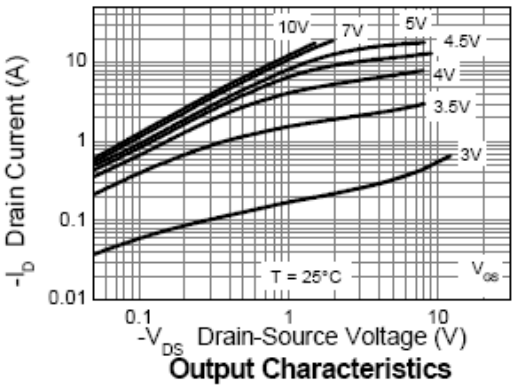
Pulse Power Dissipation

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

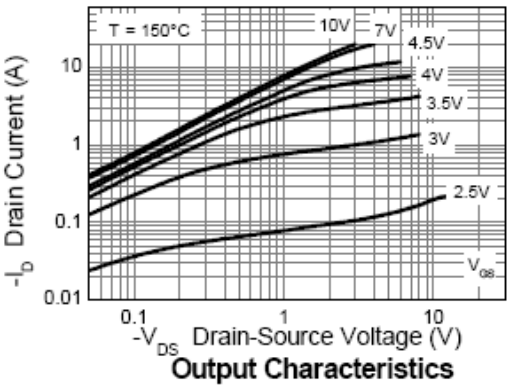
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	—	—	V	V_{GS} = 0V, I_D = -250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	uA	V_{DS} = -30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	-1	—	-3	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance (Note 9)	$R_{DS\ (ON)}$	—	—	80 140	mΩ	V_{GS} = -10V, I_D = -2.5A V_{GS} = -4.5V, I_D = -1.9A
Forward Transconductance (Note 9 & 10)	g_{fs}	—	5	—	S	V_{DS} = -15V, I_D = -3A
Diode Forward Voltage (Note 9)	V_{SD}	—	-0.8	-1.2	V	V_{GS} = 0V, I_S = -1.7A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	370	—	pF	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	72	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	38	—	pF	
GATE CHARACTERISTICS						
Total Gate Charge	Qg	—	7	—	nC	V_{DS} = -15V, V_{GS} = -10V, I_D = -3A
Gate-Source Charge	Q_{gs}	—	1.2	—		
Gate-Drain Charge	Q_{gd}	—	1.3	—		
SWITCHING CHARACTERISTICS (Note 10 & 11)						
Turn-On Delay Time	$t_{d(on)}$	—	1.3	—	ns	V_{DS} = -15V, V_{GS} = -10V, I_D = -1A, R_G = 6.0Ω
Rise Time	t_r	—	2.6	—		
Turn-On Delay Time	$t_{d(off)}$	—	49	—		
Rise Time	t_f	—	22	—		
SOURCE-DRAIN DIODE CHARACTERISTICS (Note 11)						
Reverse Recovery Time	t_{rr}	—	14.6	—	ns	IS= -1.5A,di/dt=100A/μs
Reverse Recovery Charge	Q_{rr}	—	9.5	—	nC	

Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
10. Switching characteristics are independent of operating junction temperature.
11. For design aid only, not subject to production testing.

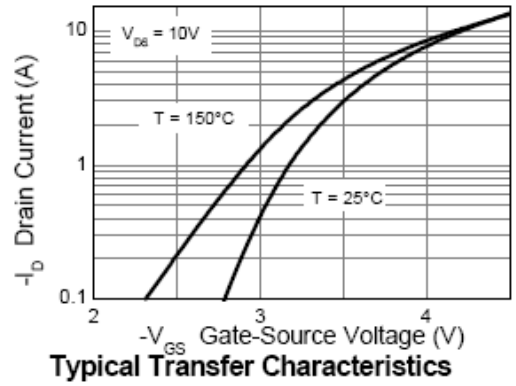
Typical Characteristics



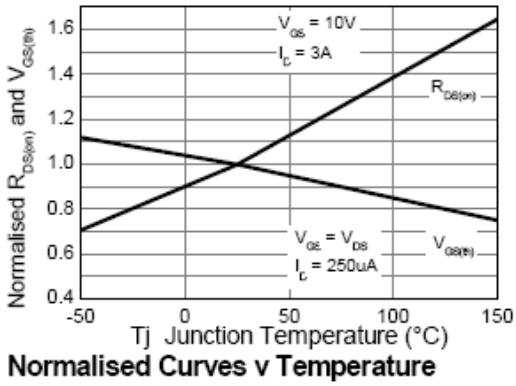
Output Characteristics



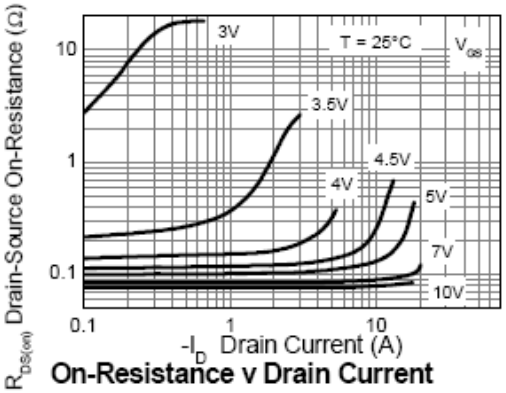
Output Characteristics



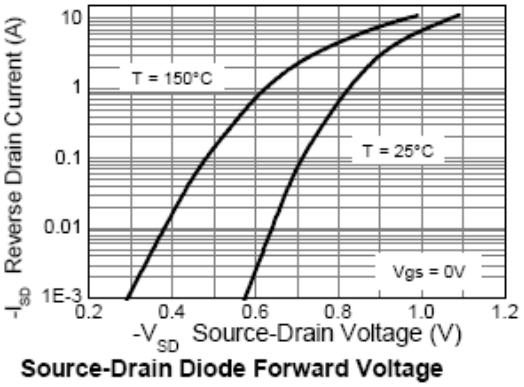
Typical Transfer Characteristics



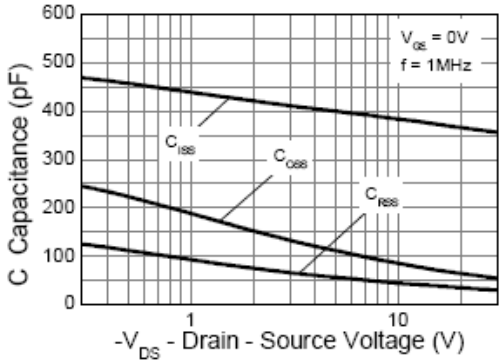
Normalised Curves v Temperature



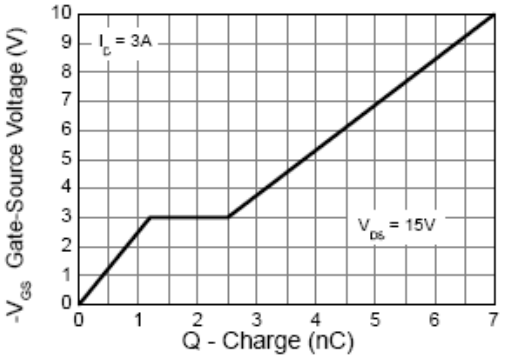
On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

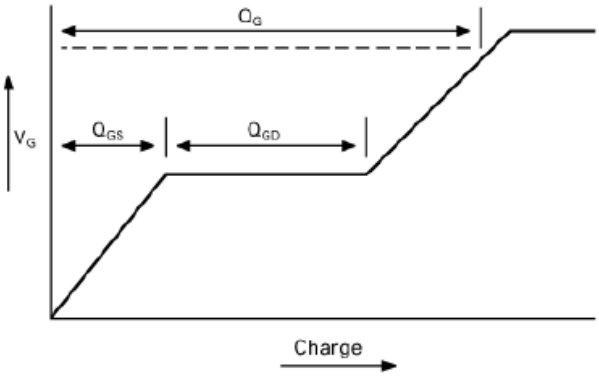


Capacitance v Drain-Source Voltage

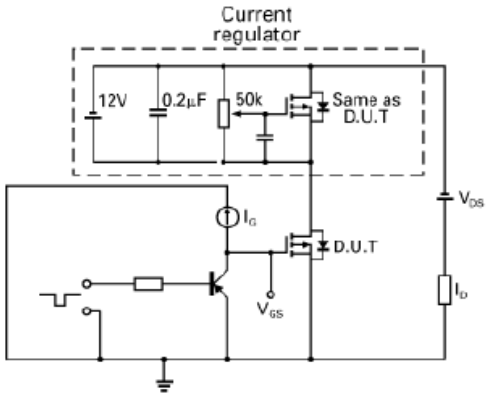


Gate-Source Voltage v Gate Charge

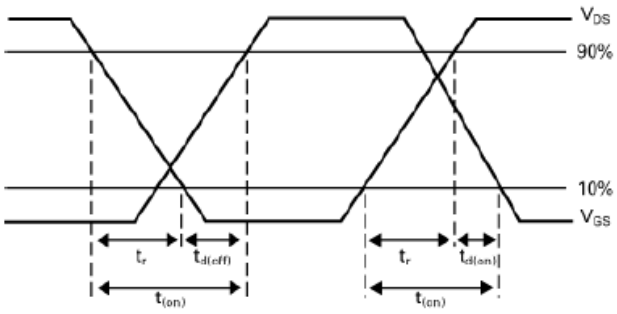
Test Circuits



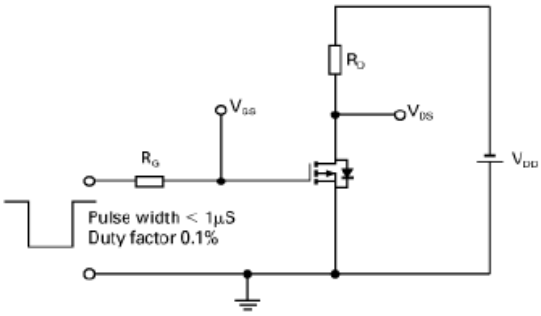
Basic gate charge waveform



Gate charge test circuit



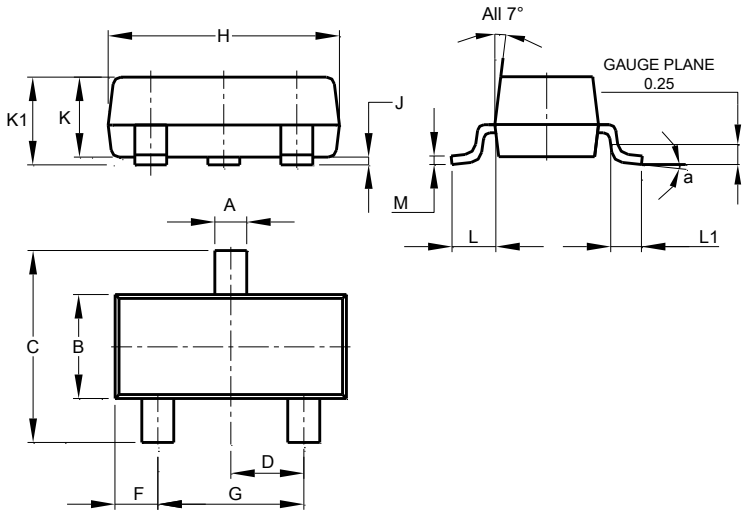
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

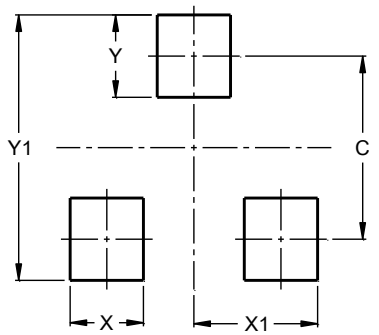
SOT23



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