



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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企业微信二维码



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Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = +25^\circ\text{C}$
250V	$8.5\Omega @ V_{GS} = 10V$	240mA

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

- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc

Features

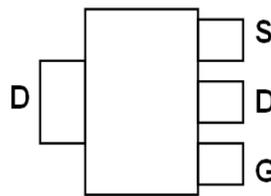
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed

Mechanical Data

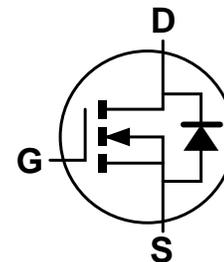
- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Finish Annealed over Copper Lead frame. Solderable per MIL-STD-202, Method 208 (G3)
- Weight: 0.052 grams (Approximate)



Top View



Pin-out
Top View



Equivalent Circuit

Maximum Ratings (@ $T^A = +25^{\circ}\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	250	V
Gate-Source Voltage	V_{GSS}	± 40	V
Continuous Drain Current, $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^{\circ}\text{C}$ (Note 5)	240
		$T_A = +70^{\circ}\text{C}$ (Note 5)	192
Maximum Body Diode Forward Current	I_S	1.1	A
Pulsed Drain Current (Note 7)	I_{DM}	1.44	A
Pulsed Source Current (Note 7)	I_{SM}	1.44	A

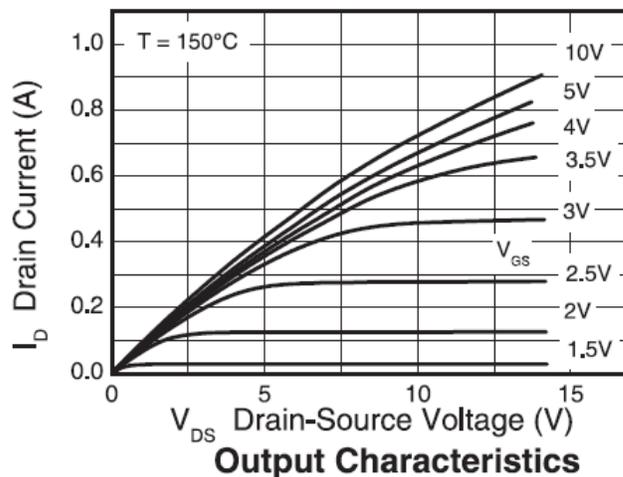
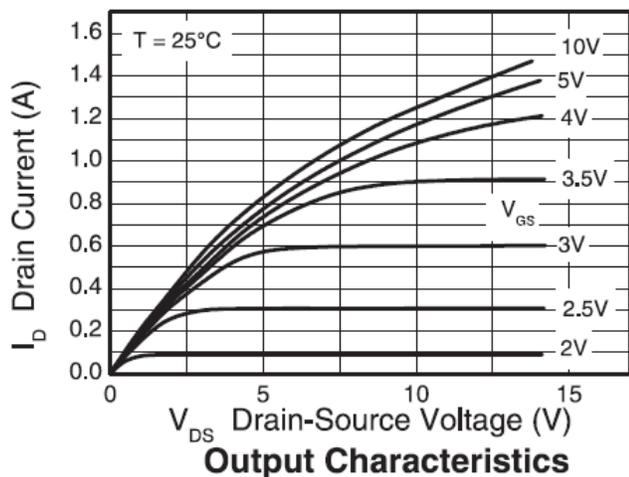
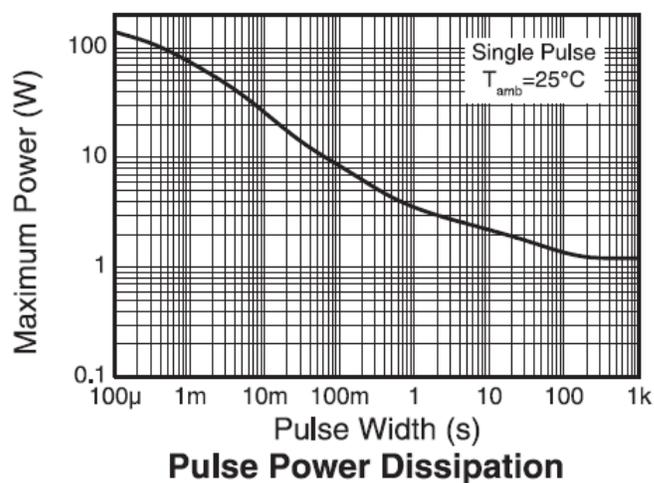
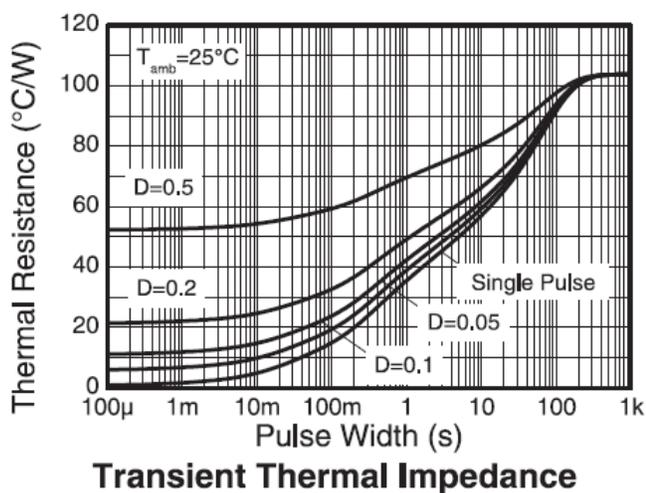
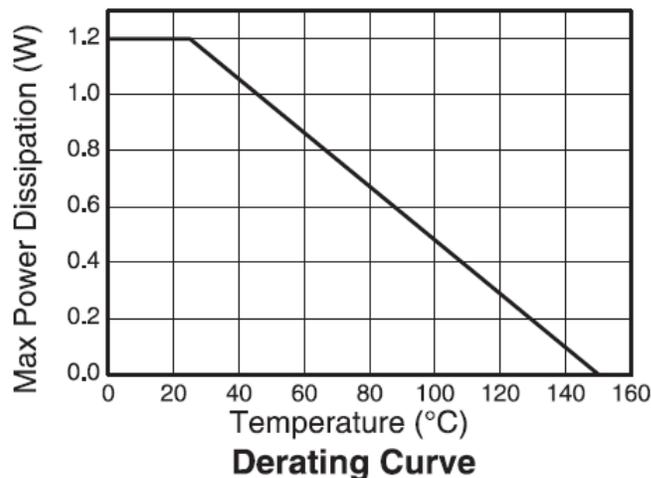
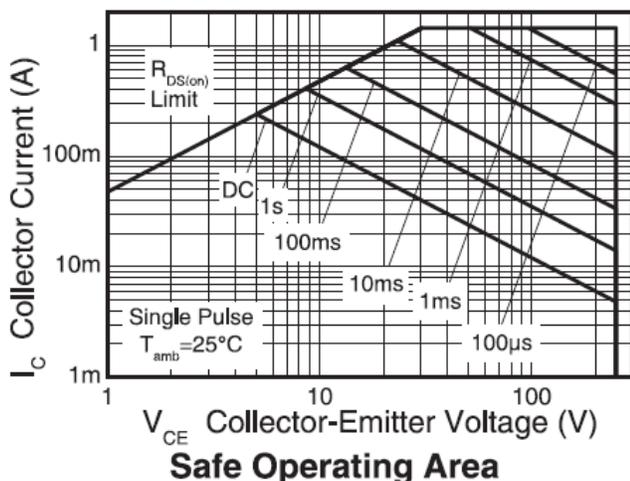
Thermal Characteristics

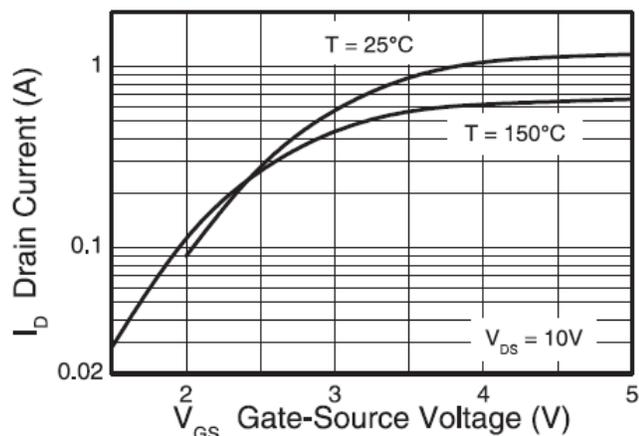
Characteristic	Symbol	Value	Unit
Total Power Dissipation	P_D	1.2	W
Linear Derating Factor		9.6	mW/ $^{\circ}\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	Steady State (Note 5)	103
		Steady State (Note 6)	50
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics (@ $T_A = +25^{\circ}\text{C}$, unless otherwise specified.)

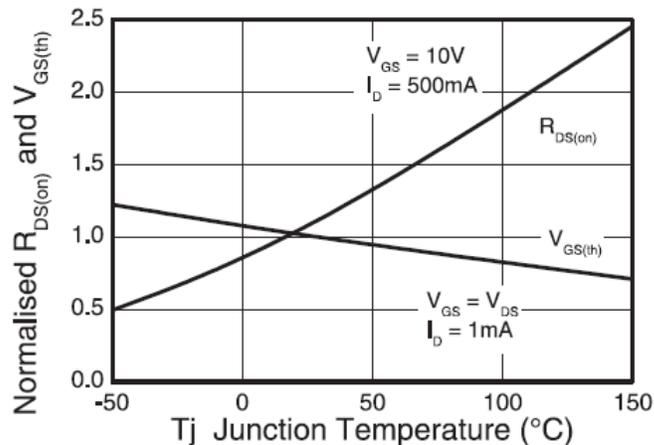
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	250	285	—	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	I_{DSS}	—	35	500	nA	$V_{DS} = 250\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	± 1	± 100	nA	$V_{GS} = \pm 40\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.8	1.4	1.8	V	$V_{DS} = V_{GS}, I_D = 1\text{mA}$
Static Drain-Source On-Resistance (Note 8)	$R_{DS(ON)}$	—	5.6	8.5	Ω	$V_{GS} = 10\text{V}, I_D = 500\text{mA}$
		—	5.9	9.0		$V_{GS} = 4.5\text{V}, I_D = 360\text{mA}$
		—	6.4	9.5		$V_{GS} = 2.4\text{V}, I_D = 20\text{mA}$
Diode Forward Voltage (Note 8)	V_{SD}	—	—	0.97	V	$V_{GS} = 0\text{V}, I_S = 360\text{mA}$
Forward Transconductance (Note 10)	g_{fs}	0.3	475	—	S	$V_{DS} = 10\text{V}, I_D = 0.3\text{A}$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	72	—	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	11	—		
Reverse Transfer Capacitance	C_{rss}	—	3.6	—		
Total Gate Charge	Q_g	—	2.6	3.65	nC	$V_{DS} = 25\text{V}, I_D = 360\text{mA}, V_{GS} = 10\text{V}$
Gate-Source Charge	Q_{gs}	—	0.2	0.28		
Gate-Drain Charge	Q_{gd}	—	0.5	0.70		
Turn-On Delay Time	$t_{D(ON)}$	—	1.25	—	ns	$V_{DD} = 50\text{V}, R_G = 6.0\Omega,$ $I_D = 200\text{mA}, R_D = 4.4\Omega$
Turn-On Rise Time	t_R	—	1.70	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	11.40	—		
Turn-Off Fall Time	t_F	—	3.50	—		
Body Diode Reverse Recovery Time	t_{RR}	—	186	260	ns	$I_F = 360\text{mA}, dI/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{RR}	—	34	48	nC	

- 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 condition.
 6. For a device surface mounted on FR4 PCB measured at $t \leq 5$ secs.
 7. Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal.
 8. Measured under pulsed conditions. Width=300 μs . Duty cycle $\leq 2\%$.
 9. Short duration pulse test used to minimize self-heating effect.
 10. Guaranteed by design. Not subject to product testing.

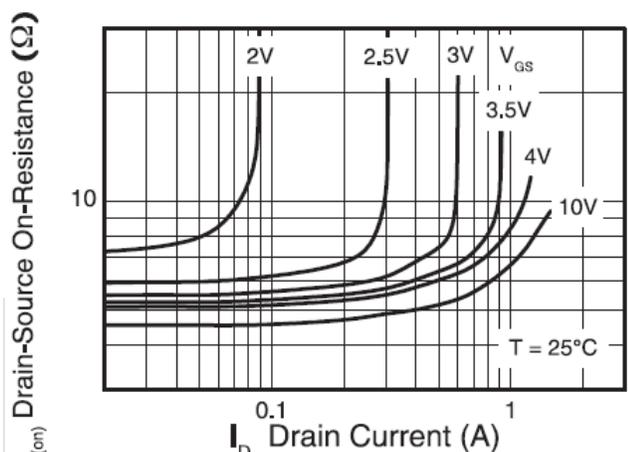




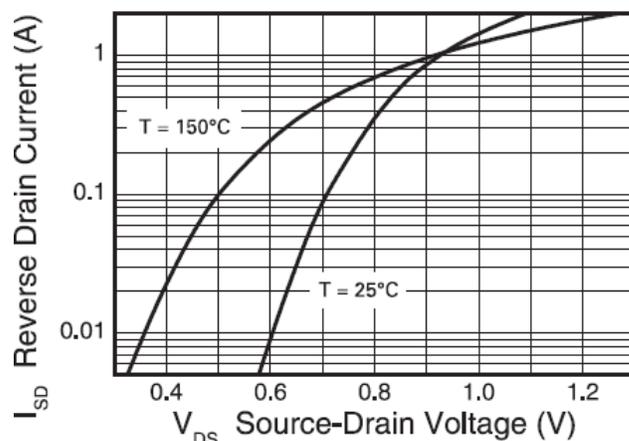
Typical Transfer Characteristics



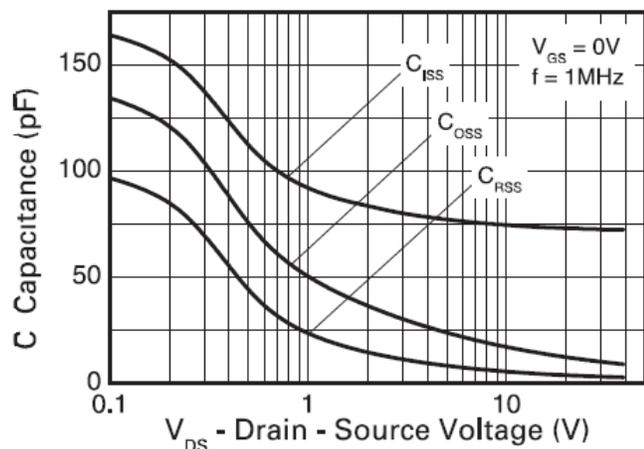
Normalised Curves v Temperature



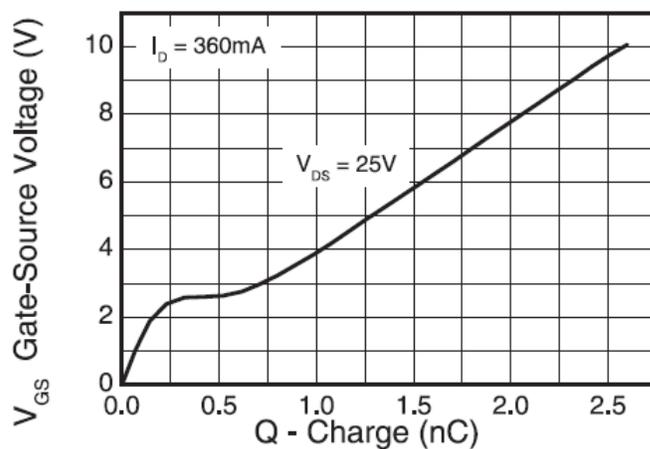
On-Resistance v Drain Current



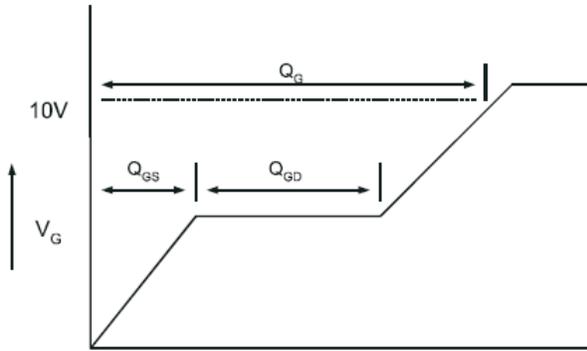
Source-Drain Diode Forward Voltage



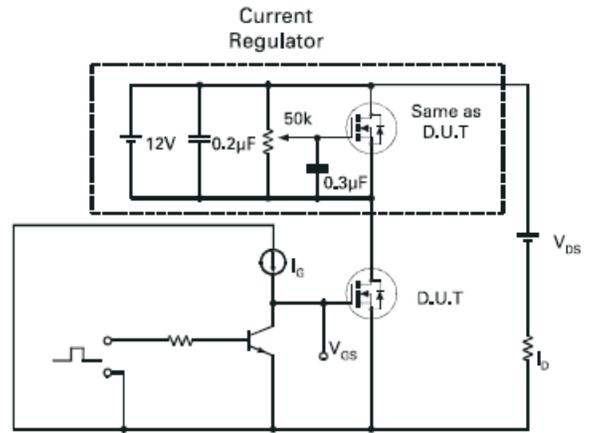
Capacitance v Drain-Source Voltage



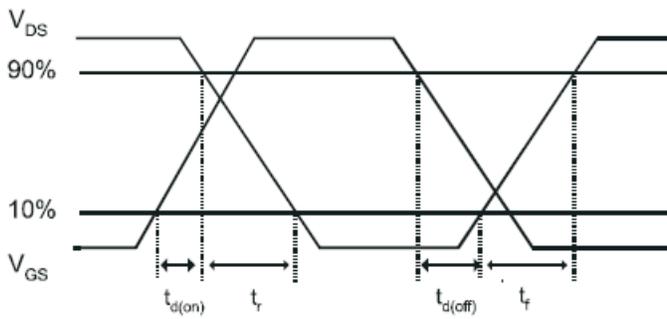
Gate-Source Voltage v Gate Charge



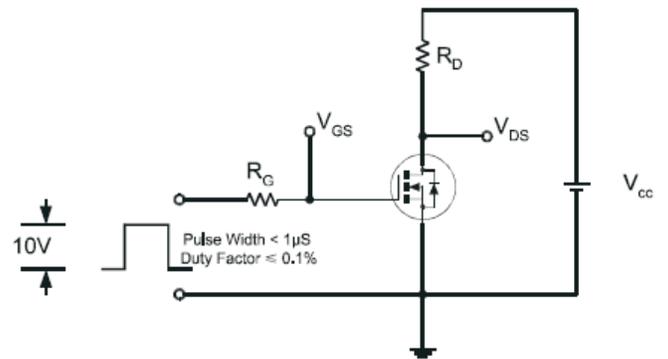
Basic Gate Charge Waveform



Gate Charge Test Circuit

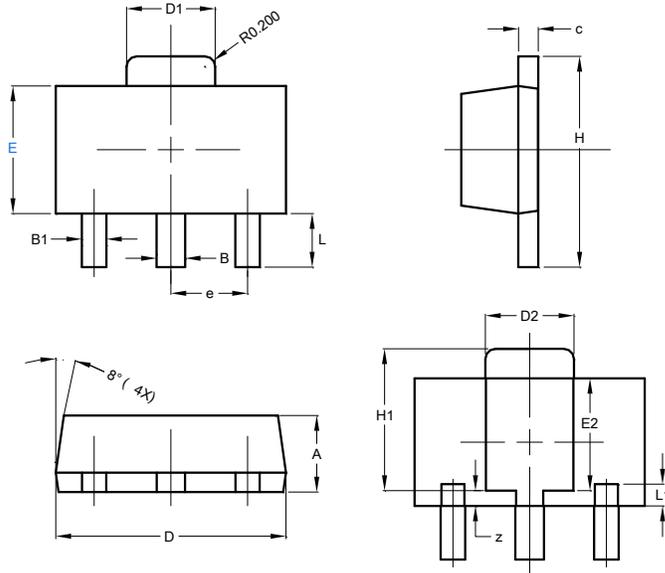


Switching Time Waveforms



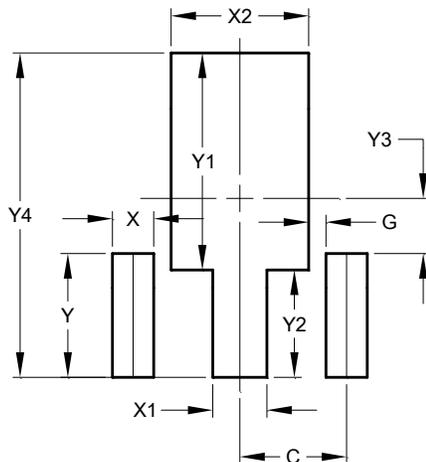
Switching Time Test Circuit

Package Outline Dimensions



SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.427 REF		
Z	0.30 REF		
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530