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}	Max $R_{DS(ON)}$	Max I_D T_A = +25°C
-60V	400mΩ @ V_{GS} = -10V	-1.1A
	600mΩ @ V_{GS} = -4.5V	-0.9A

Features

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

Description and Applications

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

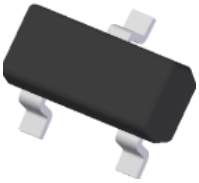
- DC - DC converters
- Power management functions
- Relay and solenoid driving
- Motor control

Mechanical Data

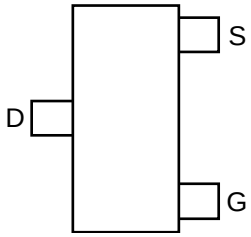
- Case: SOT23
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208
- Weight: 0.009 grams (Approximate)

e3

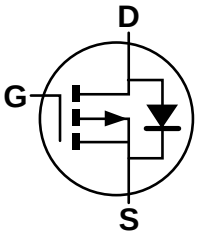
SOT23 (Type DN)



Top View



Top View
Pin Out



Equivalent Circuit

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

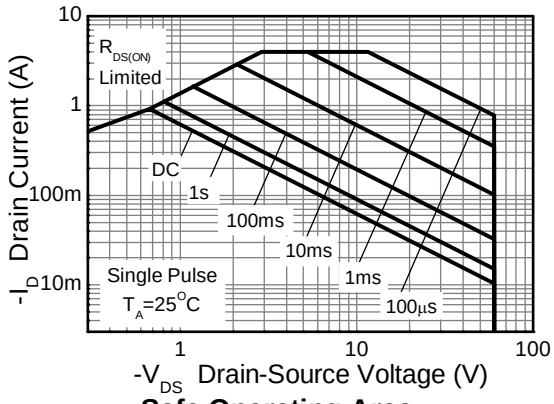
Characteristic				Symbol	Value	Unit
Drain-Source Voltage				V_{DSS}	-60	V
Gate-Source Voltage				V_{GS}	±20	V
Continuous Drain Current	V_{GS} = -10V	T_A = +70°C	(Note 8) (Note 7) (Note 6)	I_D	-1.1 -0.8 -0.9	A
Pulsed Drain Current (Note 8)				I_{DM}	-4.0	A
Continuous Source Current (Body Diode) (Note 7)				I_S	-1.2	A
Pulsed Source Current (Body Diode) (Note 8)				I_{SM}	-4.0	A

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

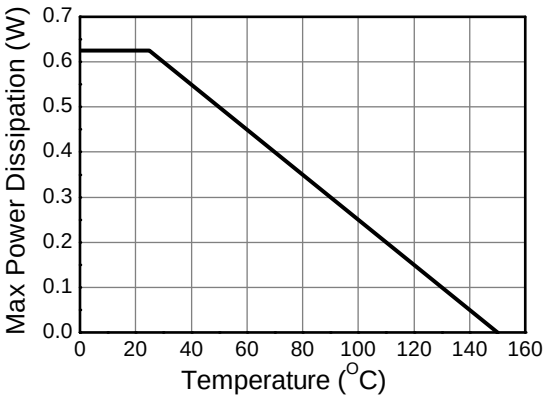
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6) Linear Derating Factor	P_D	625 5	mW mW/°C
Power Dissipation (Note 7) Linear Derating Factor	P_D	806 6.5	mW mW/°C
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	155	°C/W
Thermal Resistance, Junction to Leads (Note 9)	$R_{\theta JL}$	194	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 6. For a device surface mounted on 25mm x 25mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions.
7. For a device surface mounted on FR-4 PCB measured at t ≤ 5s.
8. Repetitive rating 25mm x 25mm FR-4 PCB, D = 0.05 pulse width = 10μs - pulse current limited by maximum junction temperature.
9. Thermal resistance from junction to solder-point (at the end of the collector lead).

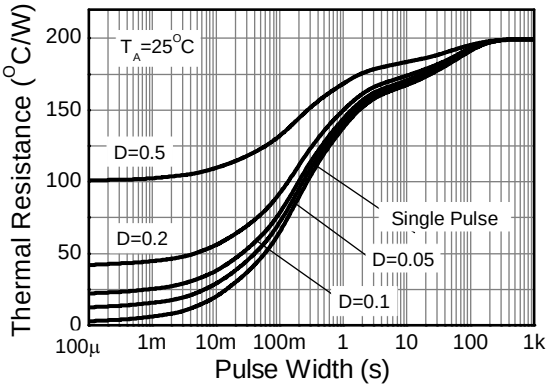
Thermal Characteristics



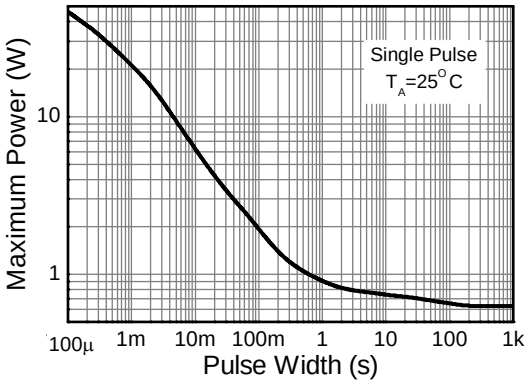
Safe Operating Area



Derating Curve



Transient Thermal Impedance



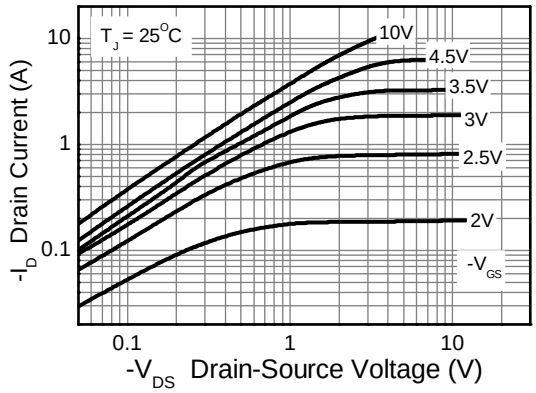
Pulse Power Dissipation

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

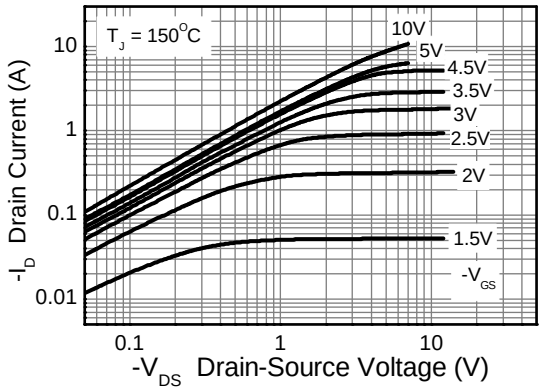
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-60	—	—	V	I_D = -250μA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-0.5	μA	V_{DS} = -60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.0	—	-3.0	V	I_D = -250μA, V_{DS} = V_{GS}
Static Drain-Source On-Resistance (Note 10)	$R_{DS(ON)}$	—	—	0.4	Ω	V_{GS} = -10V, I_D = -0.9A
				0.6		V_{GS} = -4.5V, I_D = -0.8A
Forward Transconductance (Notes 10 and 12)	g_{fs}	—	1.8	—	S	V_{DS} = -15V, I_D = -0.9A
Diode Forward Voltage (Note 10)	V_{SD}	—	-0.85	-0.95	V	T_J = +25°C, I_S = -0.8A, V_{GS} = 0V
Reverse Recovery Time (Note 12)	t_{RR}	—	21.1	—	ns	T_J = +25°C, I_F = -0.9A, di/dt = 100A/μs
Reverse Recovery Charge (Note 12)	Q_{RR}	—	19.3	—	nC	
DYNAMIC CHARACTERISTICS (Note 12)						
Input Capacitance	C_{iss}	—	219	—	pF	V_{DS} = -30V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	25.7	—		
Reverse Transfer Capacitance	C_{rss}	—	20.5	—		
Turn-On Delay Time (Note 11)	$t_{D(ON)}$	—	1.6	—	ns	V_{DD} = -30V, I_D = -1A, $R_g \cong$ 6.0Ω, V_{GS} = -10V
Turn-On Rise Time (Note 11)	t_R	—	2.2	—		
Turn-Off Delay Time (Note 11)	$t_{D(OFF)}$	—	11.2	—		
Turn-Off Fall Time (Note 11)	t_F	—	5.7	—		
Total Gate Charge (Note 11)	Q_g	—	2.9	—	nC	V_{DS} = -30V, V_{GS} = -4.5V, I_D = -0.9A
Total Gate Charge (Note 11)	Q_g	—	5.9	—	nC	V_{DS} = -30V, V_{GS} = -10V, I_D = -0.9A
Gate-Source Charge (Note 11)	Q_{gs}	—	0.74	—		
Gate-Drain Charge (Note 11)	Q_{gd}	—	1.5	—		

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

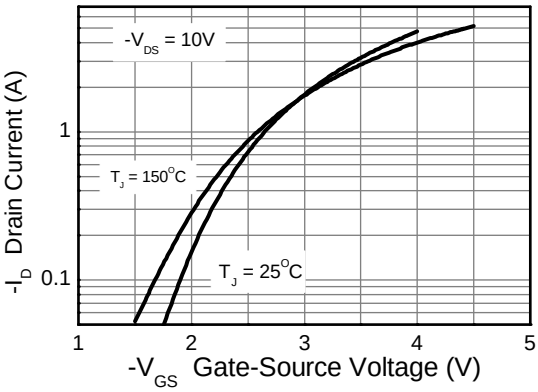
Typical Characteristics



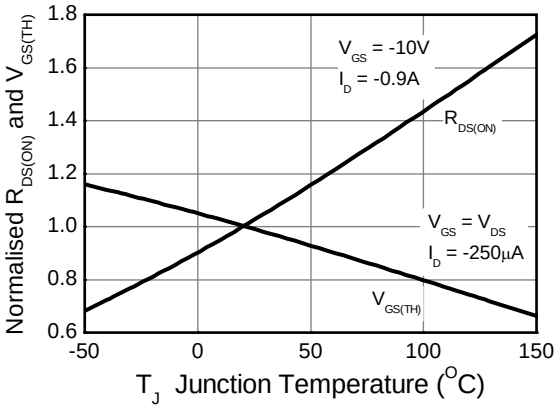
Output Characteristics



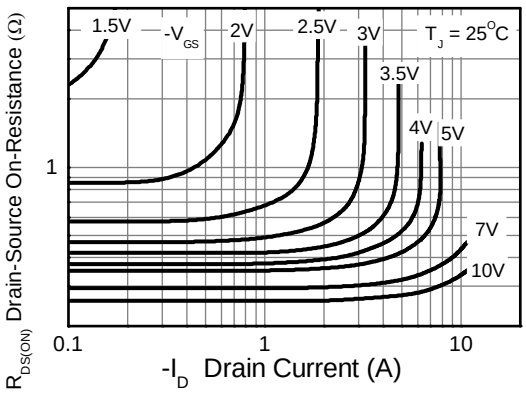
Output Characteristics



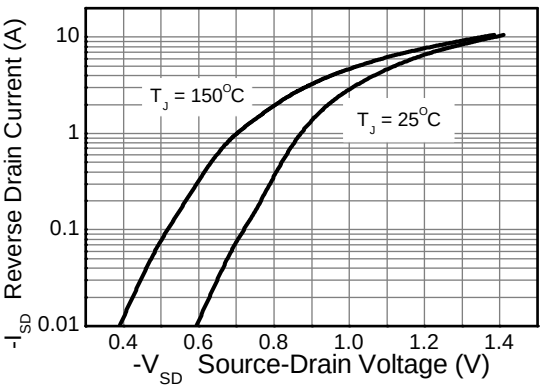
Typical Transfer Characteristics



Normalised Curves v Temperature

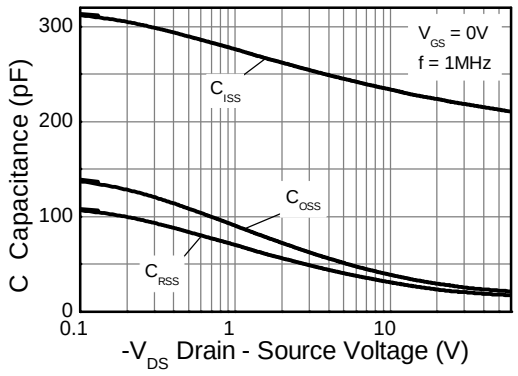


On-Resistance v Drain Current

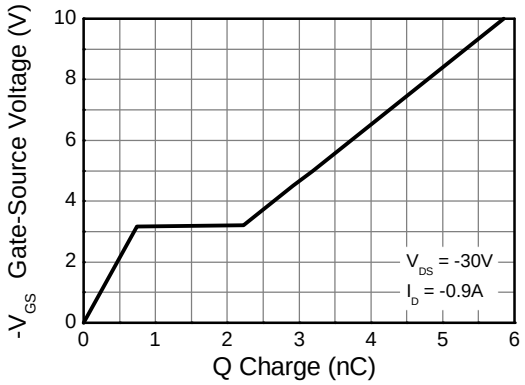


Source-Drain Diode Forward Voltage

Typical Characteristics (Cont.)

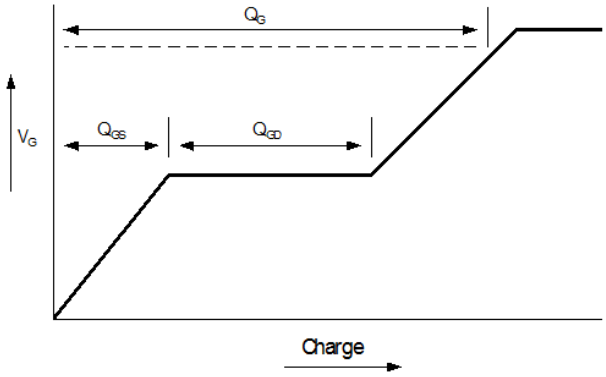


Capacitance v Drain-Source Voltage

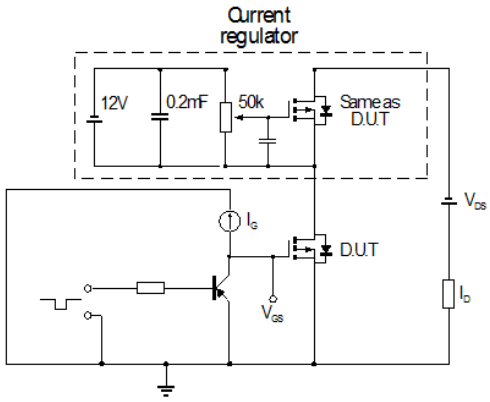


Gate-Source Voltage v Gate Charge

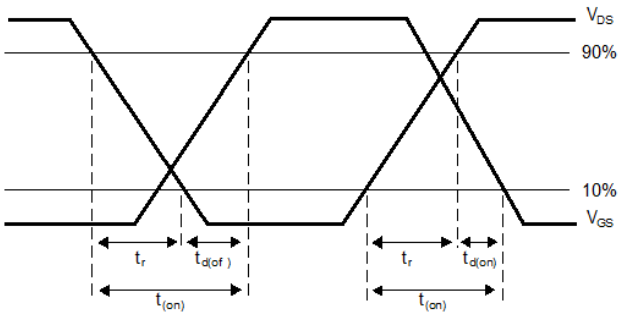
Test Circuits



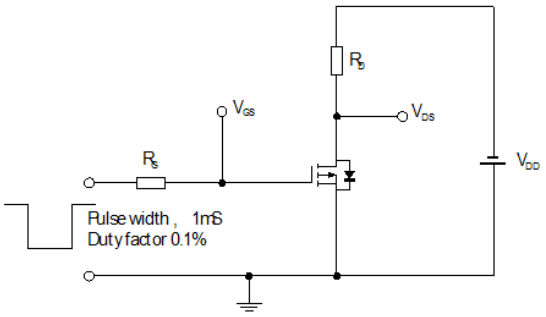
Basic gate charge waveform



Gate charge test circuit



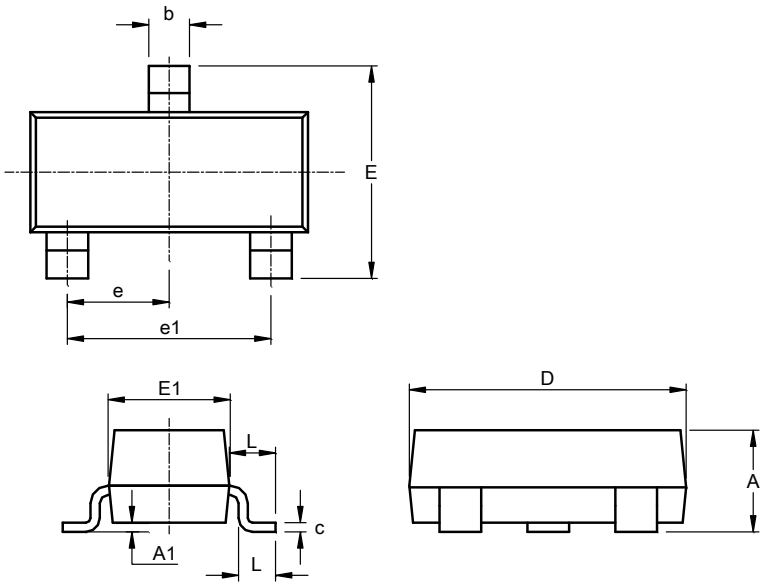
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

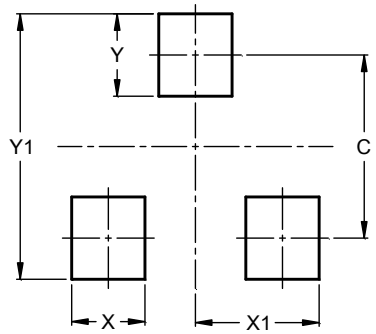
SOT23 (Type DN)



SOT23 (Type DN)			
Dim	**Min**	**Max**	**Typ**
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

Suggested Pad Layout

SOT23 (Type DN)



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9