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}	$R_{DS(ON)\ MAX}$	$I_{D\ MAX}$ T_A = +25°C
30V	52mΩ @ V_{GS} = 10V	4A
	65mΩ @ V_{GS} = 4.5V	3A
	85mΩ @ V_{GS} = 2.5V	2A

Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage

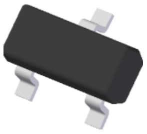
Mechanical Data

- Case: SOT23
- 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 annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminal Connections: See Diagram
- Weight: 0.008 grams (Approximate)

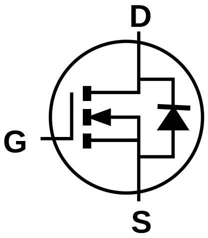
Applications

- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays

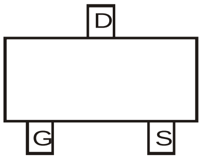
SOT23



Top View



Equivalent Circuit



Pin Configuration

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

Characteristic	Symbol	Value	Unit
Drain Source Voltage	V_{DSS}	30	V
Gate-Source Voltage	V_{GSS}	±12	V
Drain Current (Note 6)	I_D	4.0	A
Body-Diode Continuous Current (Note 6)	I_S	1.5	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P_D	1.4	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 6)	$R_{\theta JA}$	90	°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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	V_{DS} = 30V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.6	—	1.4	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	— —	— — —	52 65 85	mΩ	V_{GS} = 10V, I_D = 4A V_{GS} = 4.5V, I_D = 3A V_{GS} = 2.5V, I_D = 2A
Forward Transconductance	$\lvert Y_{fs} \rvert$	—	6.6	—	s	V_{DS} = 5V, I_D = 3.1A
Source-Drain Diode Forward Voltage	V_{SD}	—	—	1.16	V	V_{GS} = 0V, I_S = 2.0A
DYNAMIC CHARACTERISTICS(Note 8)						
Gate Resistance	R_g	—	2.2	—	Ω	V_{DS} =0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (10V)	Q_g	—	11.7	—	nC	V_{GS} = 10 V, V_{DS} = 15V, I_D = 4 A
Total Gate Charge (4.5V)	Q_g	—	5.5	—	nC	V_{GS} =10 V, V_{DS} = 15V, I_D = 4 A
Gate-Source Charge	Q_{gs}	—	1.1	—	nC	
Gate-Drain Charge	Q_{gd}	—	1.8	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	1.9	—	ns	V_{DD} = 15V, V_{GEN} = 10V, R_{GEN} =3Ω, R_L = 3.75Ω
Turn-On Rise Time	t_R	—	1.6	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	10.3	—	ns	
Turn-Off Fall Time	t_F	—	2.0	—	ns	
Input Capacitance	C_{iss}	—	464	—	pF	V_{DS} = 15V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	49.5	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	43.8	—	pF	

Notes:
6. Device mounted on FR-4 PCB. $t \leq 5$ sec.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

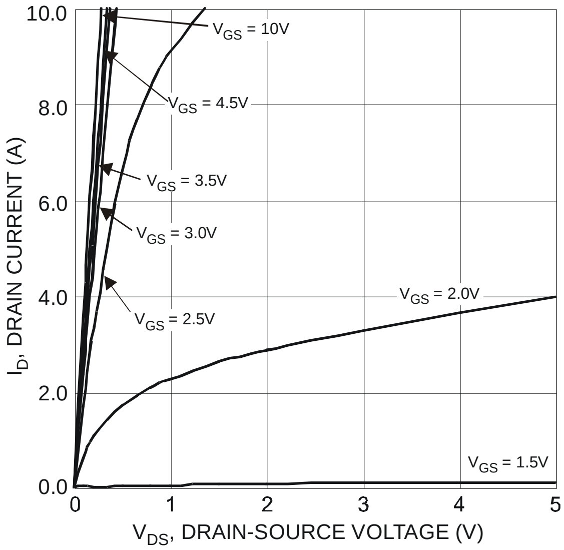


Figure 1 Typical Output Characteristics

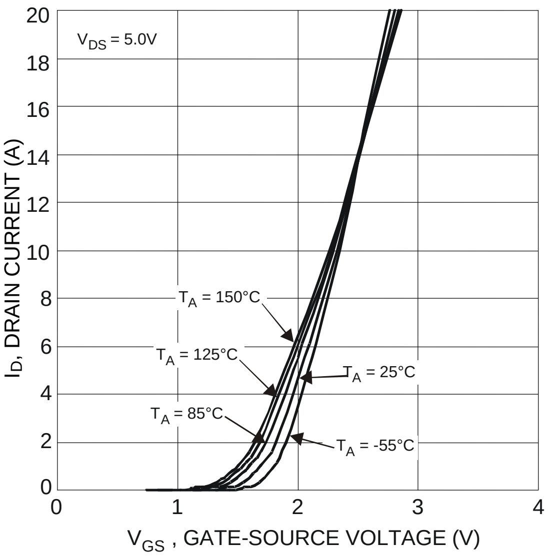


Figure 2 Typical Transfer Characteristics

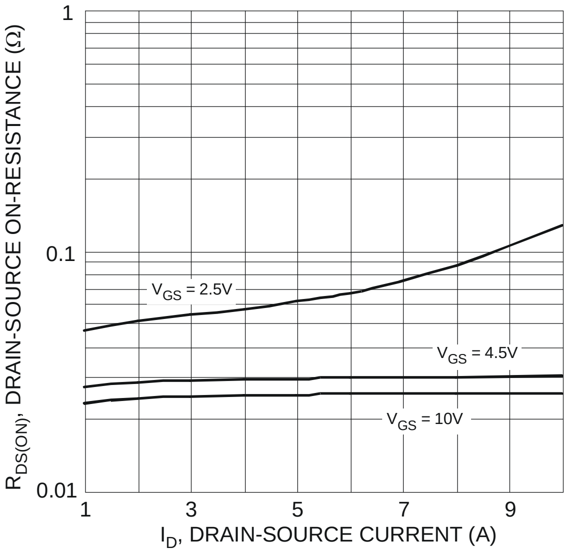


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

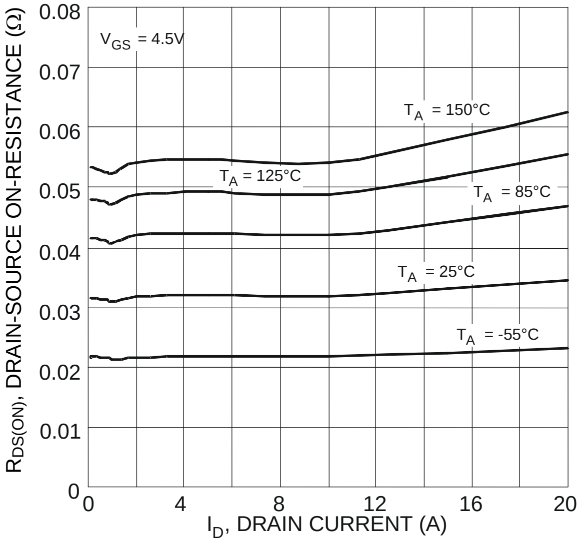


Figure 4 Typical On-Resistance vs.
Drain Current and Temperature

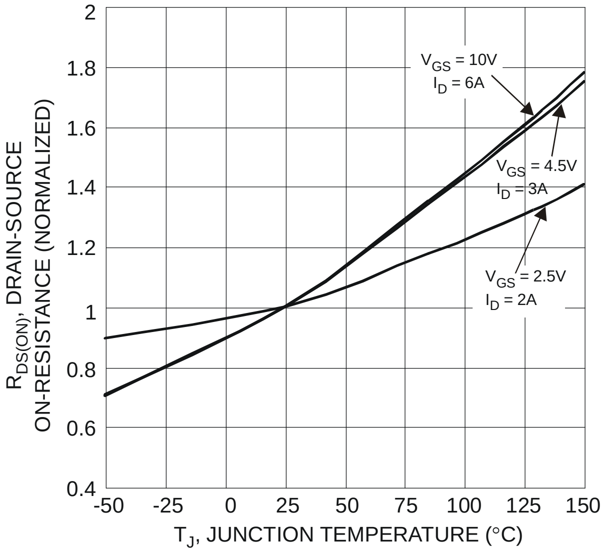


Figure 5 On-Resistance Variation with Temperature

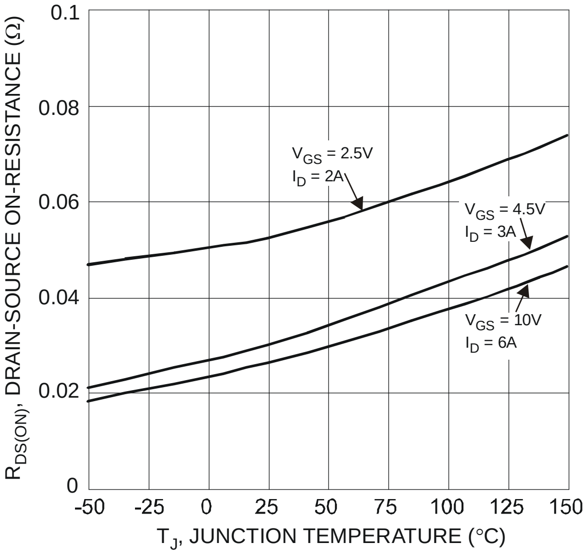


Figure 6 On-Resistance Variation with Temperature

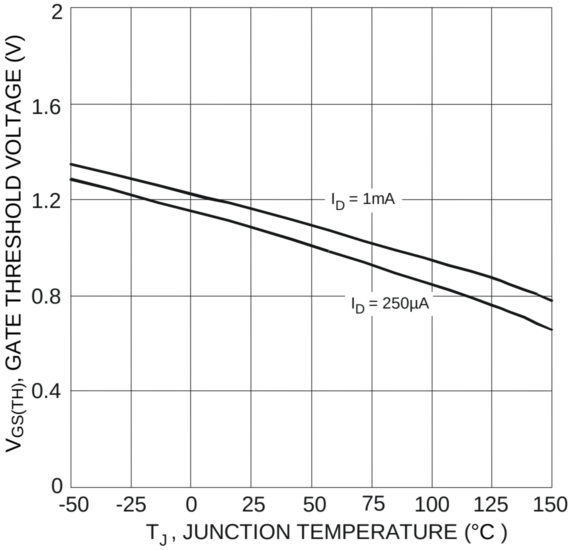


Figure 7 Gate Threshold Variation vs. Junction Temperature

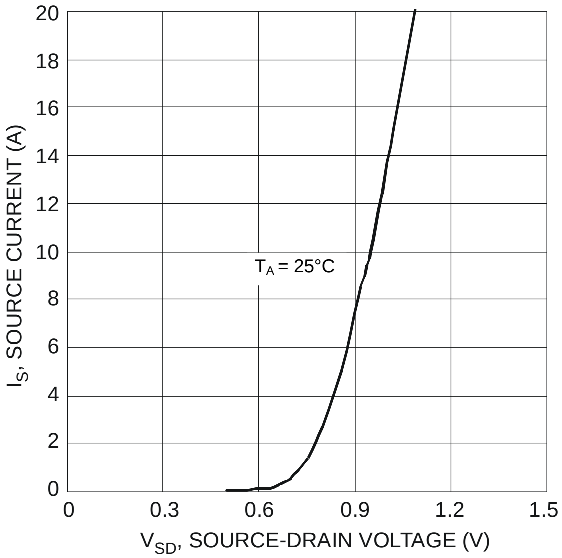


Figure 8 Diode Forward Voltage vs. Current

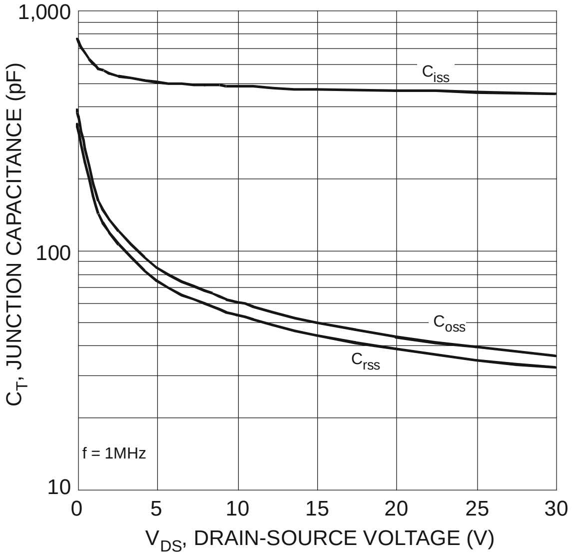


Figure 9 Typical Junction Capacitance

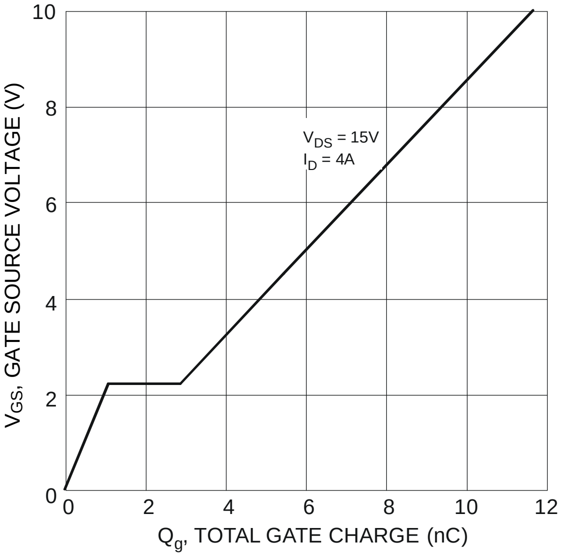


Figure 10 Gate Charge

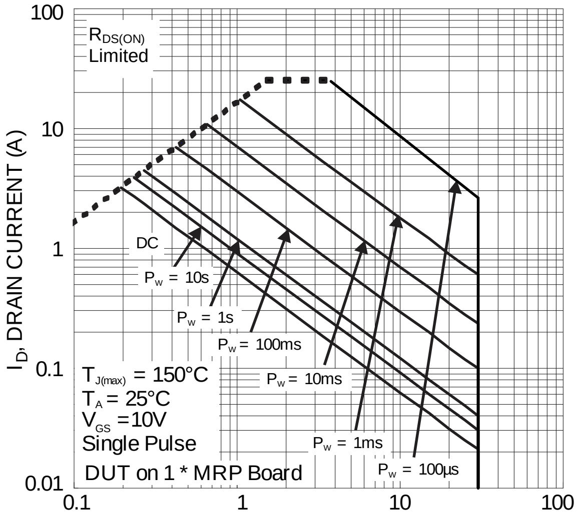


Figure 11 SOA, Safe Operation Area

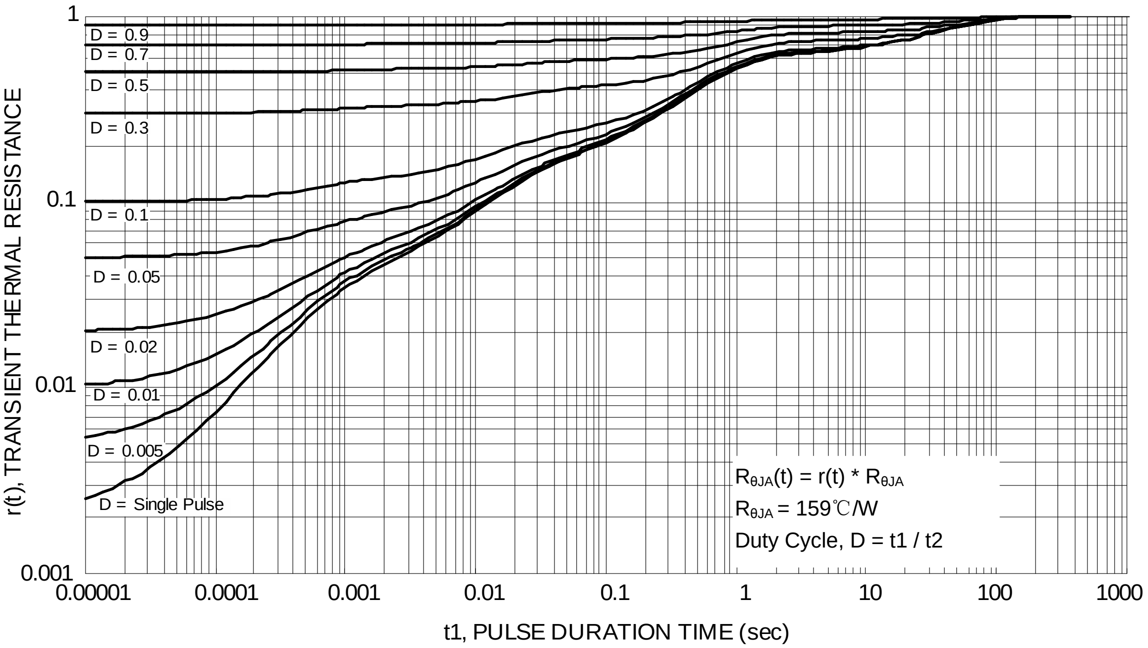
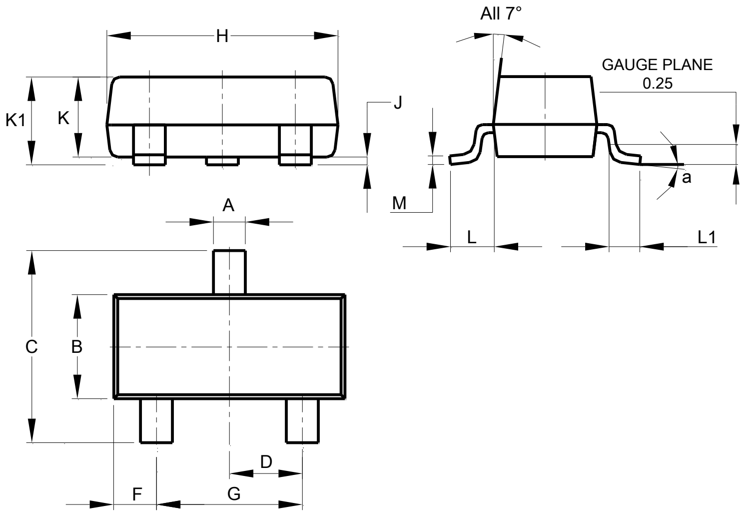


Figure 12 Transient Thermal Resistance

Package Outline Dimensions

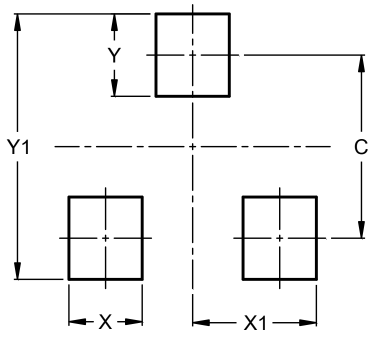
SOT23



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