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}	$R_{DS(ON)}$	I_D T_A = +25°C
60V	1.8Ω @ V_{GS} = 10V	440mA
	2.1Ω @ V_{GS} = 4.5V	410mA

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected

Description and Applications

This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- Battery operated systems and solid-state relays
- Drivers: relays, solenoids, lamps, hammers, displays, memories, transistors, etc.
- DC-DC converters
- Power-management functions

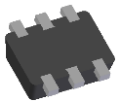
Mechanical Data

- Package: SOT563
- 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
- Weight: 0.003 grams (Approximate)

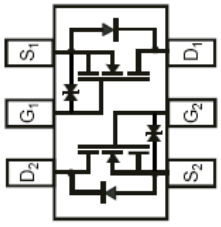
ESD PROTECTED TO 2kV

SOT563

Top View



Bottom View



Top View
Pin Definition/Schematic

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +85°C	I_D	410 300	mA
Continuous Drain Current (Note 6) V_{GS} = 10V	t ≤ 10s	T_A = +25°C T_A = +85°C	I_D	440 320	mA
Continuous Drain Current (Note 5) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +85°C	I_D	380 270	mA
Continuous Drain Current (Note 6) V_{GS} = 4.5V	t ≤ 10s	T_A = +25°C T_A = +85°C	I_D	410 295	mA
Pulsed Drain Current (Note 7)			I_{DM}	1.0	A

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5)	P_D	0.58	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	213	°C/W
Power Dissipation (Note 6) t ≤ 10s	P_D	0.65	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 6) t ≤ 10s	$R_{\theta JA}$	192	°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 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1.0	μA	V_{DS} = 50V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±50	nA	V_{GS} = ±5V, V_{DS} = 0V
		—	—	±150	nA	V_{GS} = ±10V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.5	—	1.8	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	1.2	1.8	Ω	V_{GS} = 10V, I_D = 500mA
		—	1.4	2.1		V_{GS} = 4.5V, I_D = 200mA
Forward Transfer Admittance	$\|Y_{fs}\|$	80	580	—	mS	V_{DS} = 10V, I_D = 200mA
Continuous Source Current (Note 8)	I_S	—	—	200	mA	—
Diode Forward Voltage	V_{SD}	—	0.8	1.3	V	V_{GS} = 0V, I_S = 200mA
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	32	—	pF	V_{DS} = 25V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	4.4	—		
Reverse Transfer Capacitance	C_{rss}	—	2.9	—		
Gate Resistance	R_g	—	126	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	—	0.45	—	pC	V_{GS} = 4.5V, V_{DS} = 10V I_D = 250mA
Gate-Source Charge	Q_{gs}	—	0.08	—		
Gate-Drain Charge	Q_{gd}	—	0.08	—		
Turn-On Delay Time	$t_{D(ON)}$	—	3.4	—	ns	V_{GS} = 10V, V_{DS} = 30V R_L = 150Ω, R_g = 25Ω I_D = 200mA
Turn-On Rise Time	t_R	—	3.4	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	26.4	—	ns	
Turn-Off Fall Time	t_F	—	16.3	—	ns	

Notes:
5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 PCB with minimum recommended pad layout, measured in t ≤ 10s.
7. Repetitive rating, pulse width limited by junction temperature, 10μs pulse, duty cycle = 1%.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

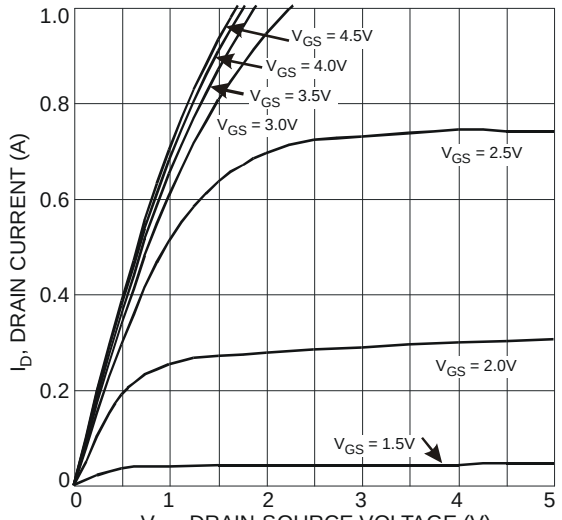


Figure 1 Typical Output Characteristic

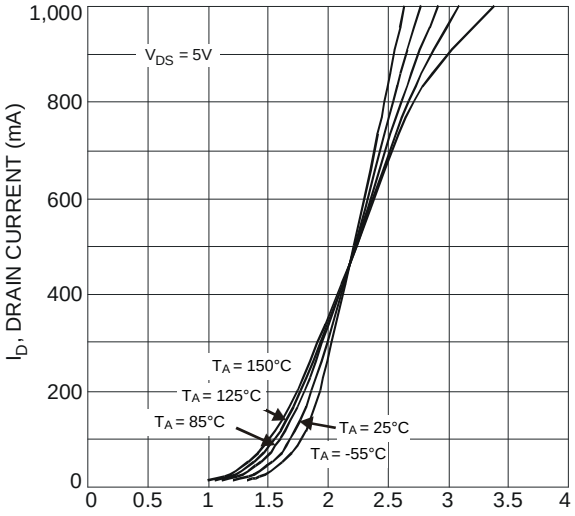


Figure 2 Typical Transfer Characteristic

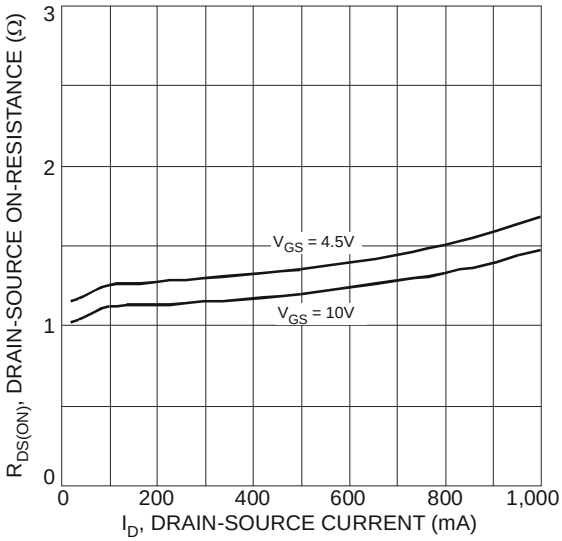


Figure 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

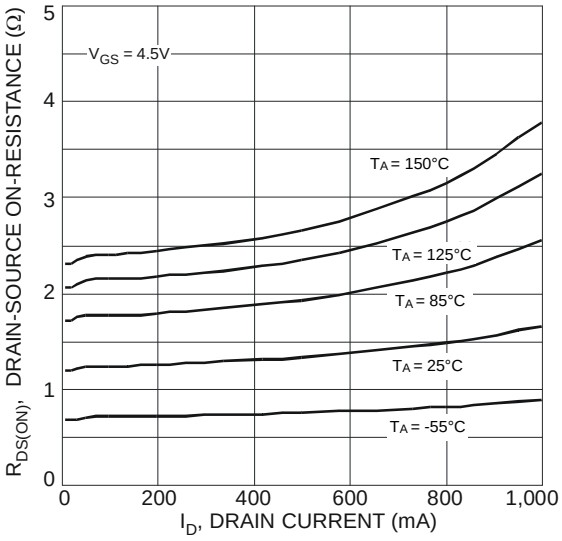


Figure 4 Typical On-Resistance
vs. Drain Current and Temperature

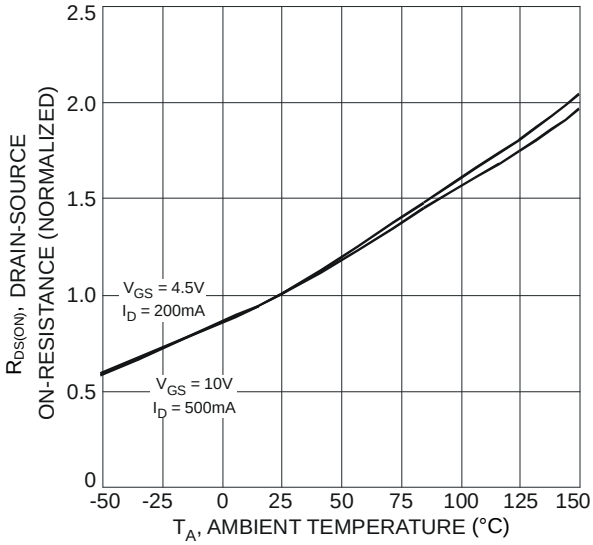


Figure 5 On-Resistance Variation with Temperature

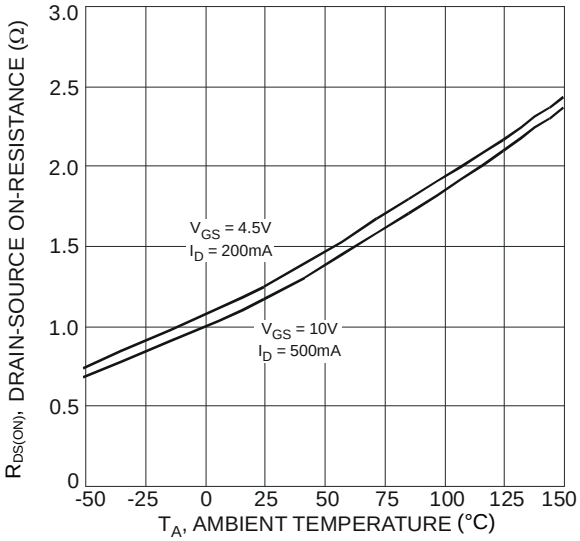


Figure 6 On-Resistance Variation with Temperature

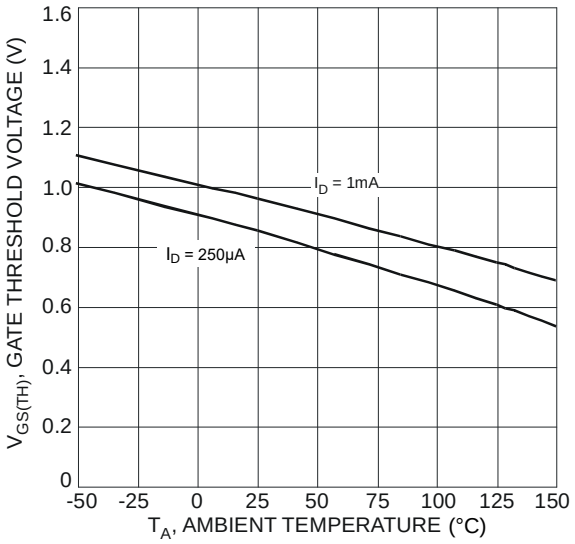


Figure 7 Gate Threshold Variation vs. Ambient Temperature

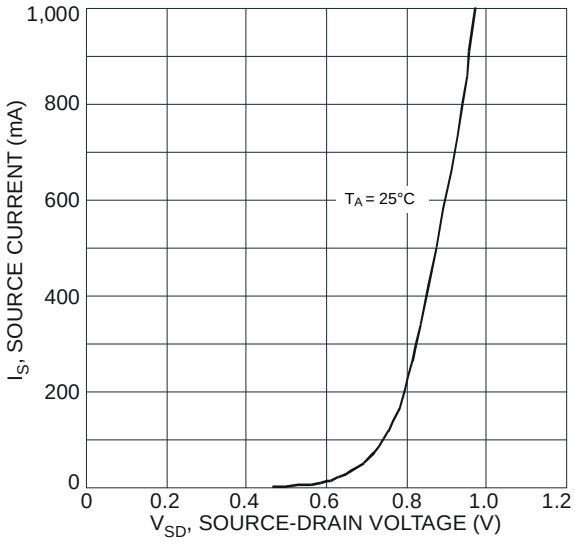


Figure 8 Diode Forward Voltage vs. Current

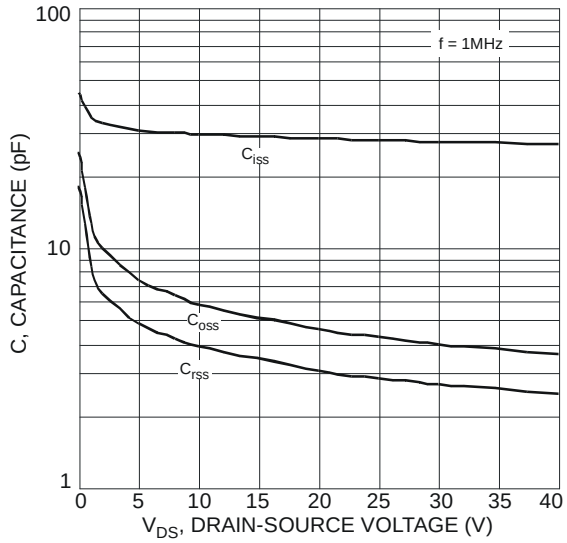


Figure 9 Typical Total Capacitance

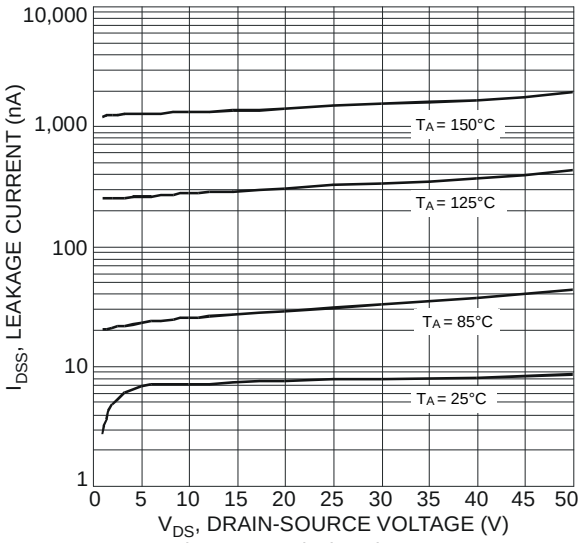


Figure 10 Typical Leakage Current vs. Drain-Source Voltage

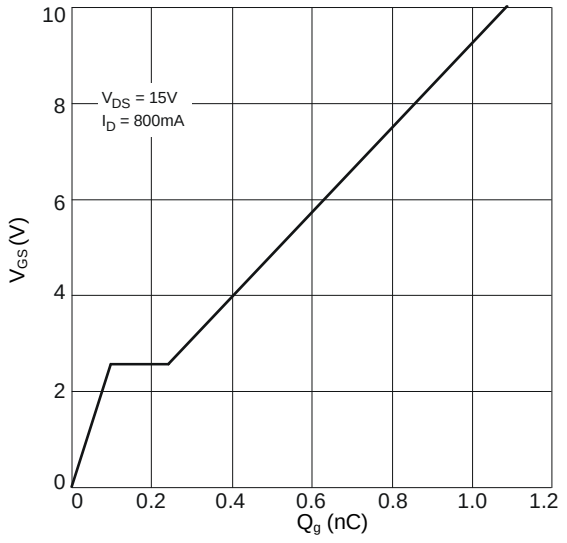


Figure 11 Gate Charge

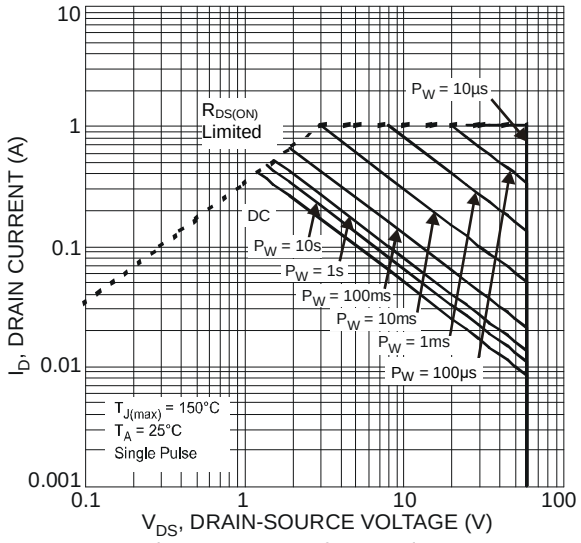


Figure 12 SOA, Safe Operation Area

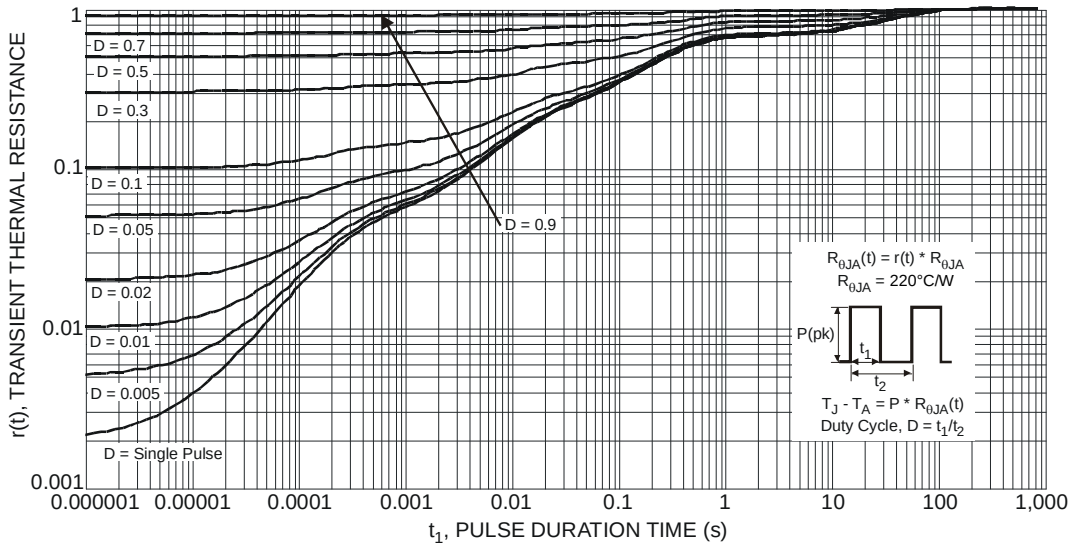
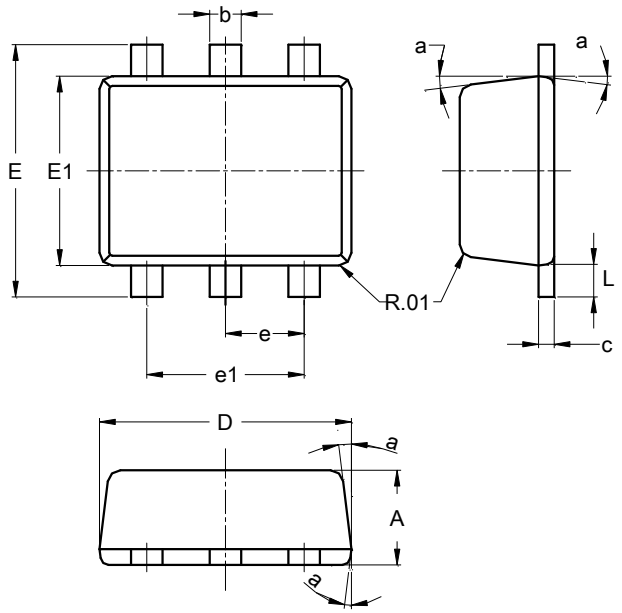


Figure 13 Transient Thermal Response

Package Outline Dimensions

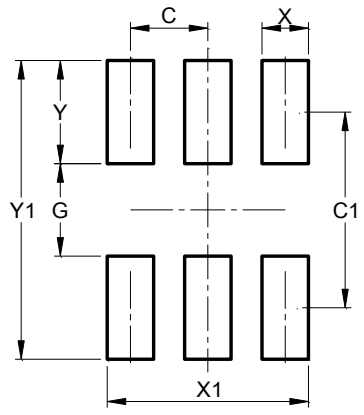
SOT563



SOT563			
Dim	**Min**	**Max**	**Typ**
A	0.55	0.60	--
b	0.15	0.30	0.20
c	0.10	0.18	0.11
D	1.50	1.70	1.60
E	1.55	1.70	1.60
E1	1.10	1.25	1.20
e	--	--	0.50
e1	0.90	1.10	1.00
L	0.10	0.30	0.20
a	8°	9°	7°
All Dimensions in mm			

Suggested Pad Layout

SOT563



Dimensions	Value (in mm)
C	0.500
C1	1.270
G	0.600
X	0.300
X1	1.300
Y	0.670
Y1	1.940