



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



企业QQ二维码

Product Summary

Device	BV _{bss}	R _{DS(ON)} Max	I _D Max T _A = +25°C
Q1	60V	1.7Ω @ V _{GS} = 10V	480mA
		3Ω @ V _{GS} = 4.5V	360mA
Q2	-60V	4Ω @ V _{GS} = -10V	-320mA
		6Ω @ V _{GS} = -4.5V	-260mA

Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Ultra-Small Surface Mount Package

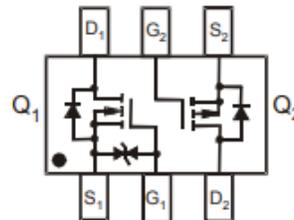
Description and Applications

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

- General-purpose interfacing switches
- Power management functions
- Analog switches

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
- Terminal Connections Indicator: See Diagram
- Terminals: Finish—Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.027 grams (Approximate)



Maximum Ratings N-CHANNEL – Q1 (@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 = +70°C	I _D	480 380	mA
Maximum Body Diode Forward Current (Note 5)			I _S	480	mA
Pulsed Drain Current (Note 5)			I _{DM}	1.3	A
Pulsed Source Current (Note 5)			I _{SM}	1.3	A

Maximum Ratings P-CHANNEL – Q2 (@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 = +70°C	I _D	-320 -250	mA
Maximum Body Diode Forward Current (Note 5)			I _S	-320	mA
Pulsed Drain Current (Note 5)			I _{DM}	-1	A
Pulsed Source Current (Note 5)			I _{SM}	-1	A

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

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 6)			P _D	0.5	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R _{θJA}	261	°C/W
Total Power Dissipation (Note 5)			P _D	0.8	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R _{θJA}	158	°C/W
Operating and Storage Temperature Range			T _J , T _{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Electrical Characteristics N-CHANNEL – Q1 (@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}	60	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1.0	μA	V _{DS} = 60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	μA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	1.0	—	2.5	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	1.0	1.7	Ω	V _{GS} = 10V, I _D = 200mA
		—	1.2	3		V _{GS} = 4.5V, I _D = 200mA
Diode Forward Voltage	V _{SD}	—	0.85	1.4	V	V _{GS} = 0V, I _S = 115mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	41	—	pF	V _{DS} = 30V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	4.5	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	2.7	—	pF	
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	0.51	—	nC	V _{DS} = 15V, I _D = 200mA
Total Gate Charge (V _{GS} = 10V)	Q _g	—	1.04	—	nC	
Gate-Source Charge	Q _{gs}	—	0.16	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.18	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	6.9	—	ns	V _{DD} = 30V, V _{GS} = 10V R _G = 150Ω, I _D = 200mA
Turn-On Rise Time	t _R	—	5.8	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	37.8	—	ns	
Turn-Off Fall Time	t _F	—	14.3	—	ns	
Reverse Recovery Time	t _{RR}	—	19	—	ns	
Reverse Recovery Charge	Q _{RR}	—	9	—	nC	I _F = 1A, dI/dt = 100A/μs

Electrical Characteristics P-CHANNEL – Q2 (@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}	-60	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1.0	μA	V _{DS} = -60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	-1	—	-3	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	1.8	4	Ω	V _{GS} = -10V, I _D = -200mA
		—	2.3	6		V _{GS} = -4.5V, I _D = -200mA
Diode Forward Voltage	V _{SD}	—	-0.8	-1.4	V	V _{GS} = 0V, I _S = -115mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	40	—	pF	V _{DS} = -25V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	5	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	3	—	pF	
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	0.5	—	nC	V _{DS} = -10V, I _D = -0.1A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	1.1	—	nC	
Gate-Source Charge	Q _{gs}	—	0.1	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.1	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	4	—	ns	V _{DD} = -30V, V _{GS} = -10V R _G = 50Ω, I _D = -270mA
Turn-On Rise Time	t _R	—	4	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	39.7	—	ns	
Turn-Off Fall Time	t _F	—	13.8	—	ns	
Body Diode Reverse Recovery Time	t _{RR}	—	26.6	—	ns	
Body Diode Reverse Recovery Charge	Q _{RR}	—	16.3	—	nC	I _F = -1A, dI/dt = 100A/μs

Notes: 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to product testing.

N-CHANNEL – Q1

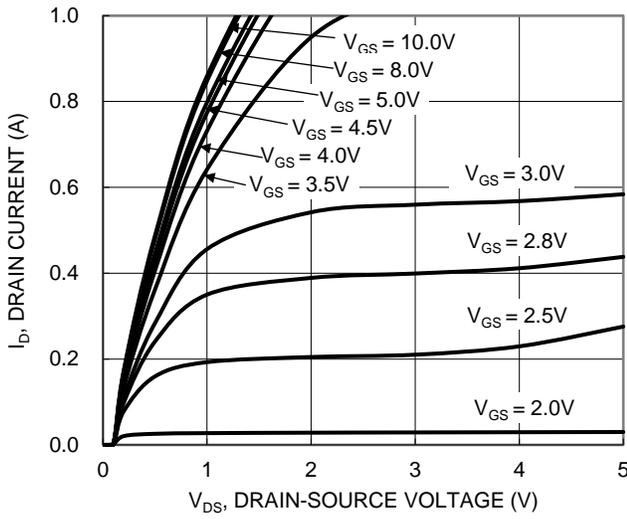


Figure 1. Typical Output Characteristic

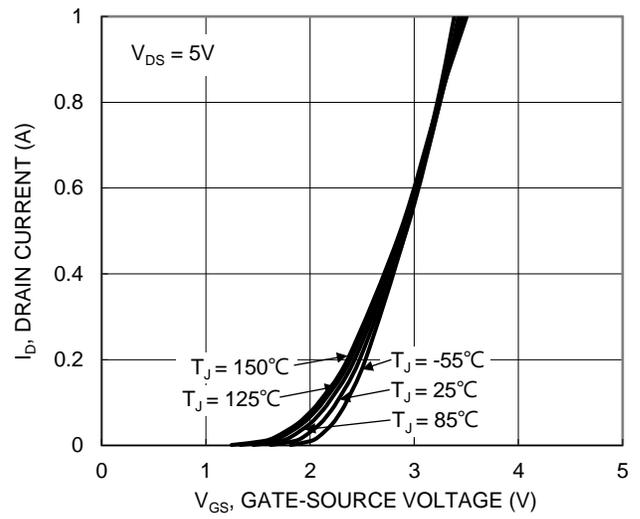


Figure 2. Typical Transfer Characteristic

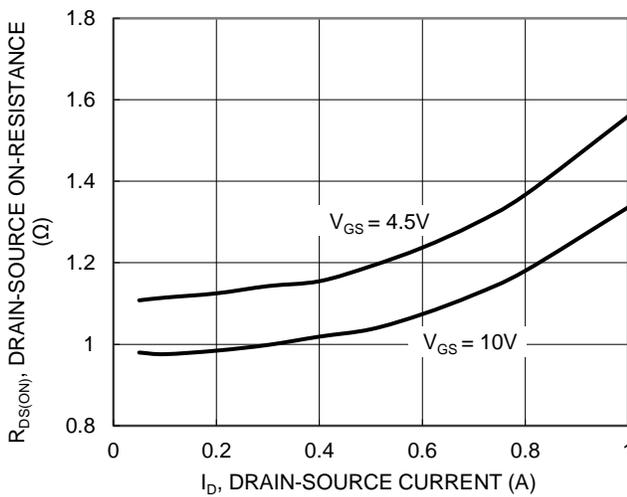


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

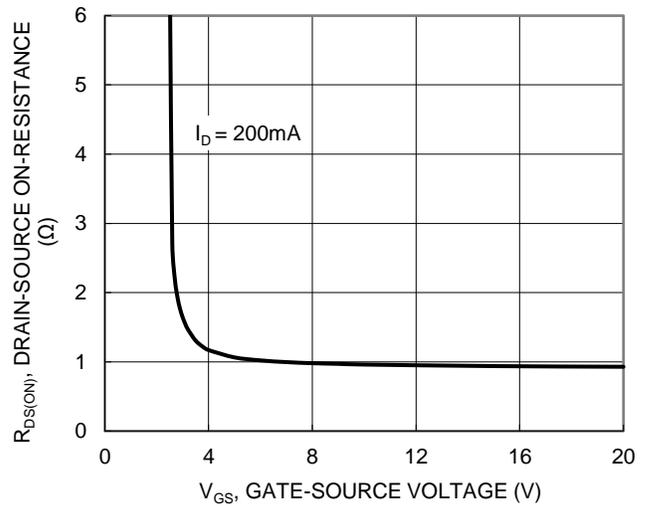


Figure 4. Typical Transfer Characteristic

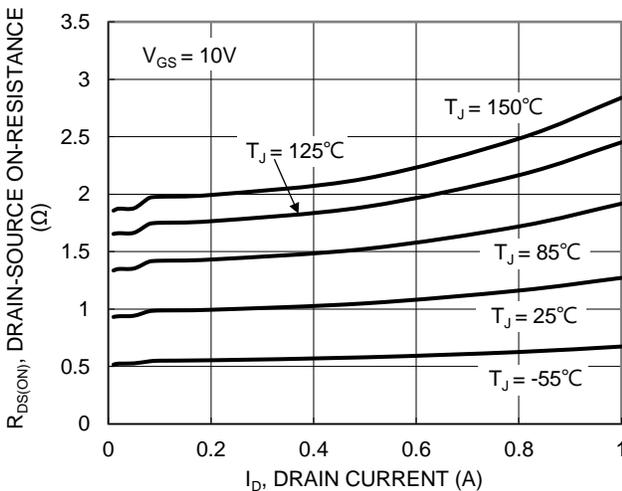


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

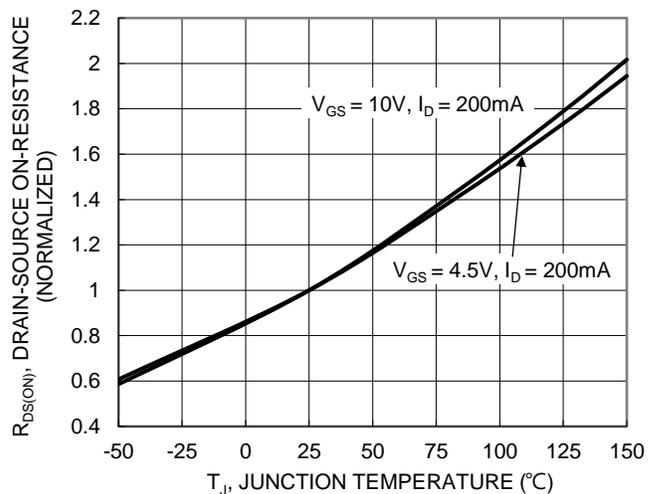


Figure 6. On-Resistance Variation with Junction Temperature

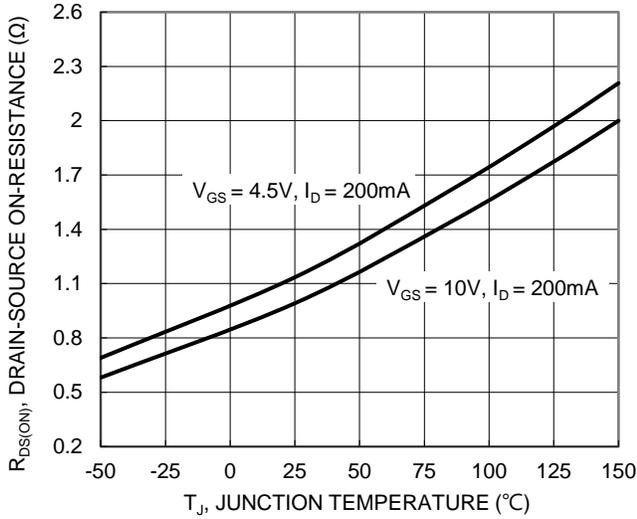


Figure 7. On-Resistance Variation with Junction Temperature

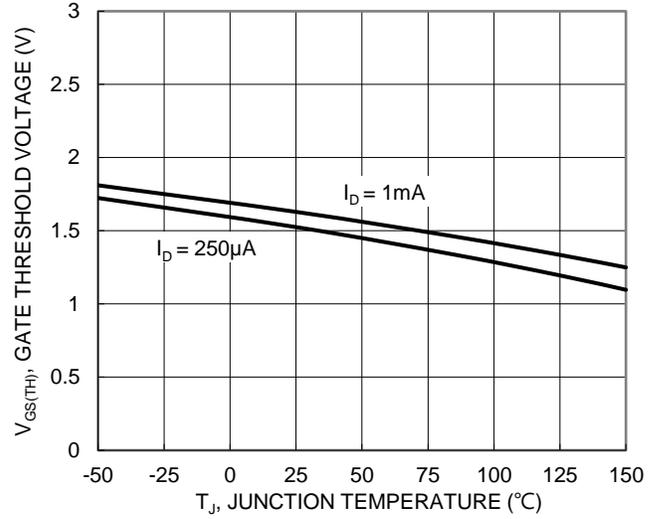


Figure 8. Gate Threshold Variation vs. Junction Temperature

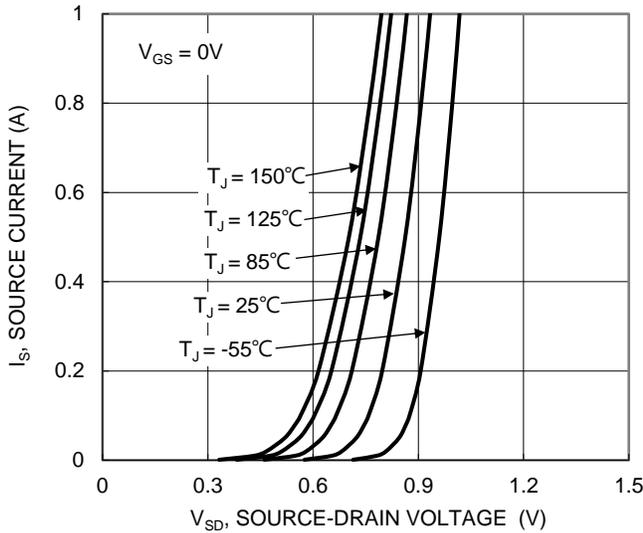


Figure 9. Diode Forward Voltage vs. Current

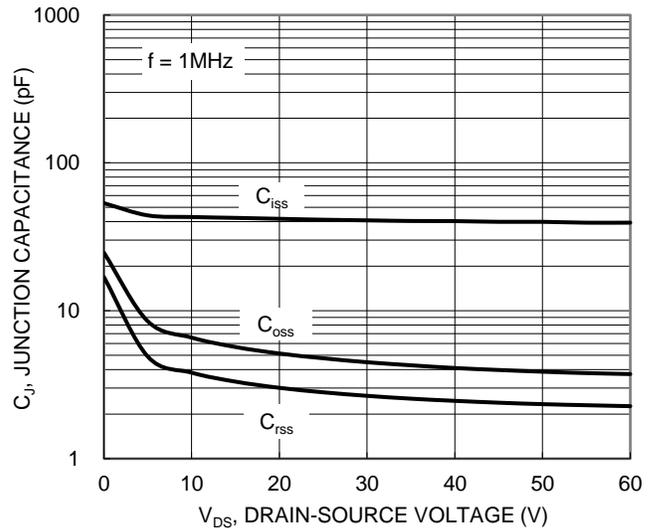


Figure 10. Typical Junction Capacitance

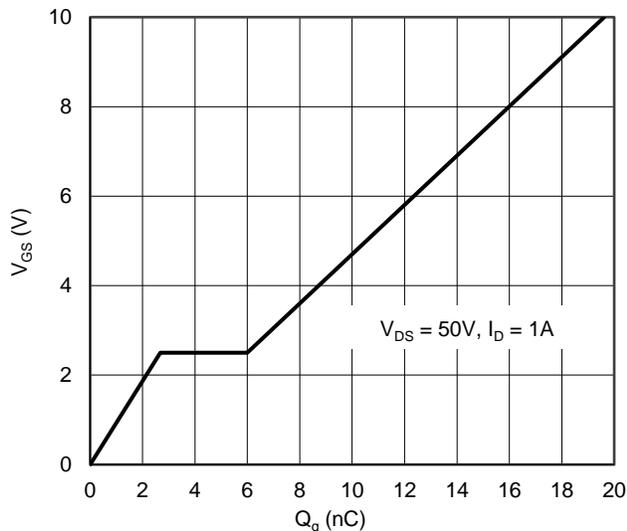


Figure 11. Gate Charge

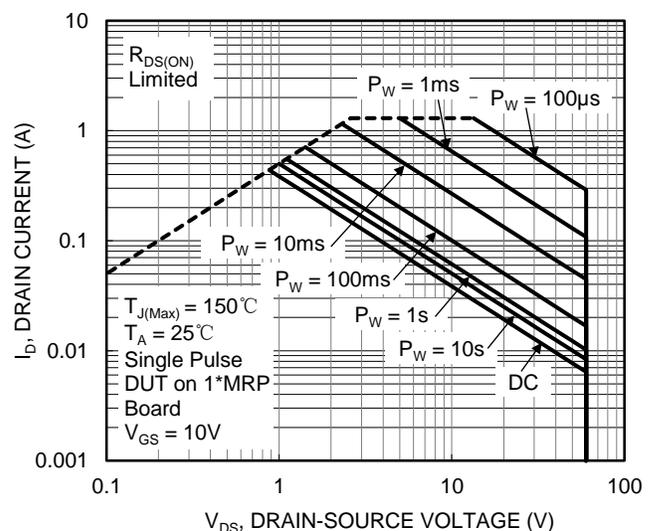


Figure 12. SOA, Safe Operation Area

P-CHANNEL – Q2

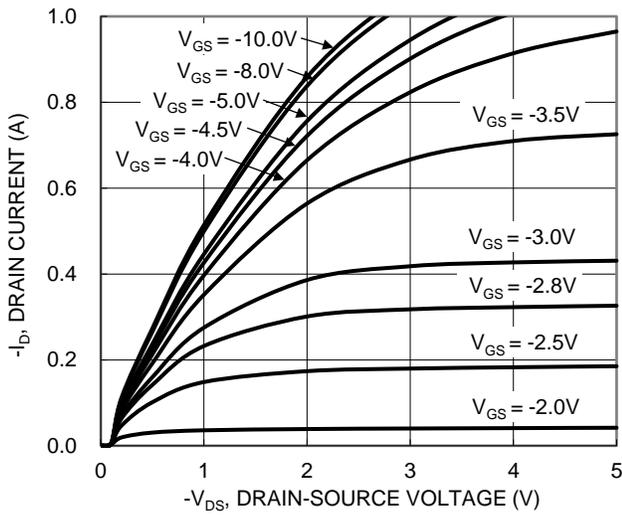


Figure 13. Typical Output Characteristic

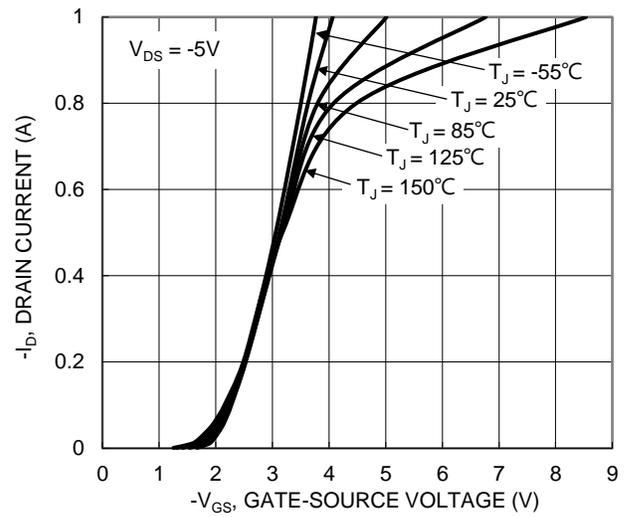


Figure 14. Typical Transfer Characteristic

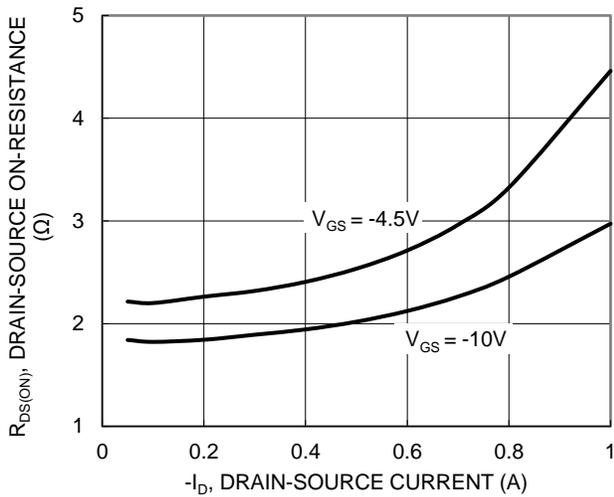


Figure 15. Typical On-Resistance vs. Drain Current and Gate Voltage

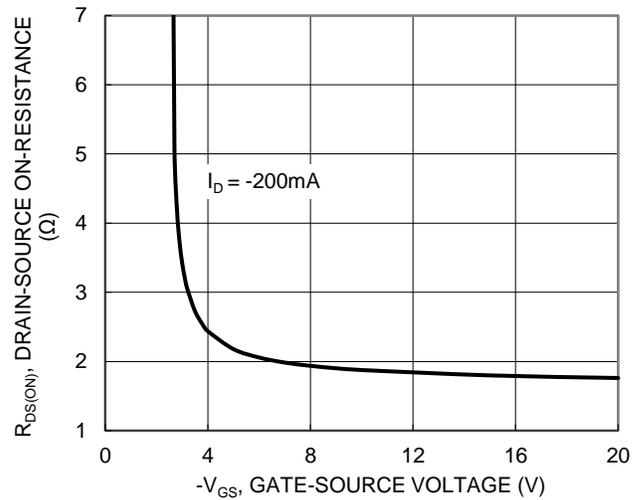


Figure 16. Typical Transfer Characteristic

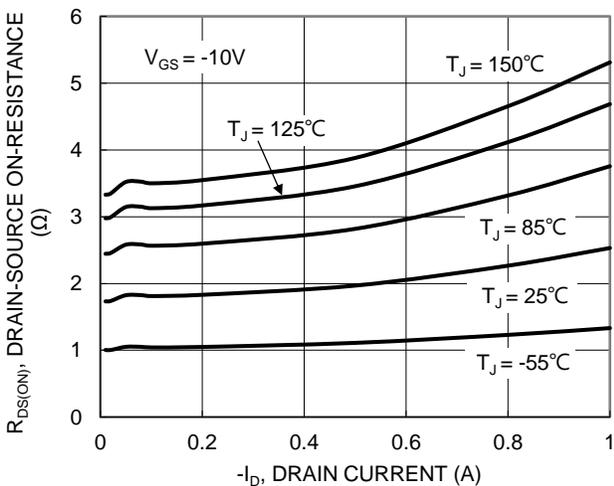


Figure 17. Typical On-Resistance vs. Drain Current and Junction Temperature

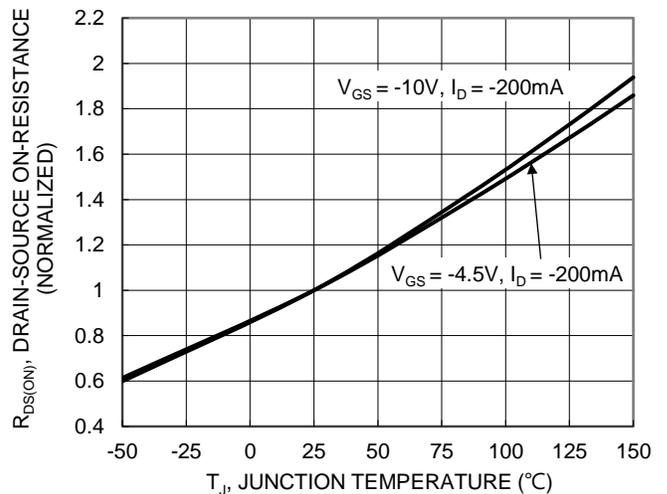


Figure 18. On-Resistance Variation with Junction Temperature

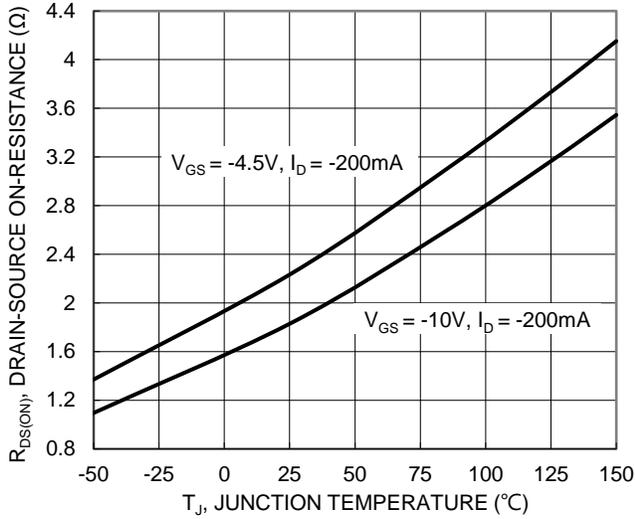


Figure 19. On-Resistance Variation with Junction Temperature

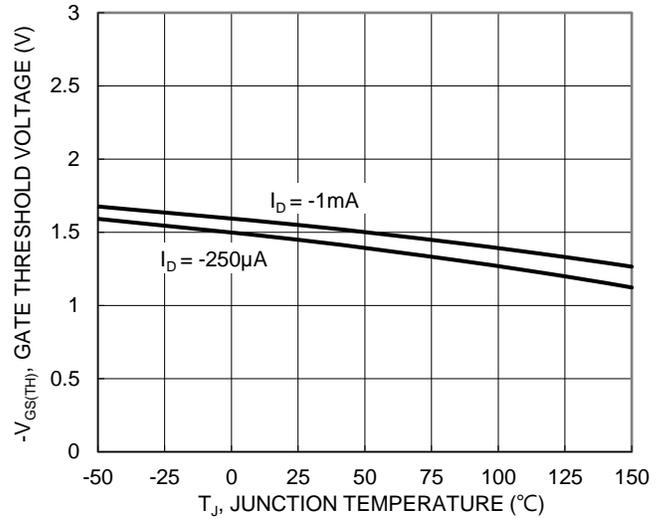


Figure 20. Gate Threshold Variation vs. Junction Temperature

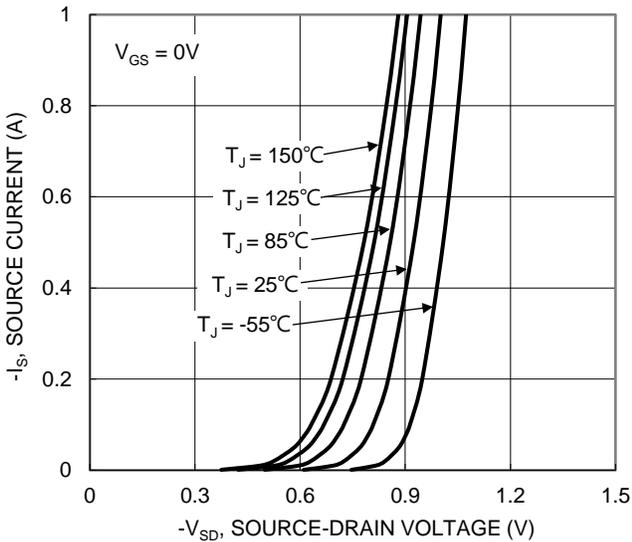


Figure 21. Diode Forward Voltage vs. Current

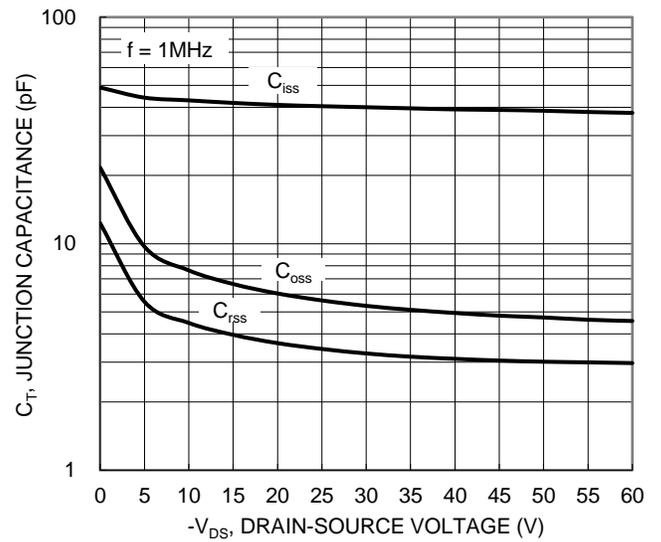


Figure 22. Typical Junction Capacitance

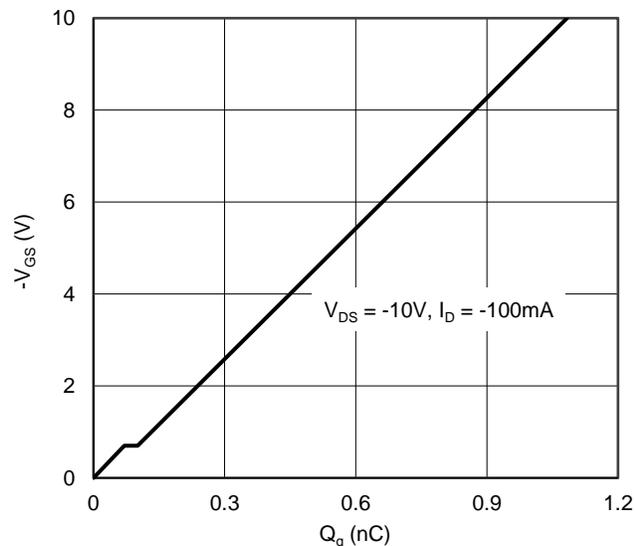


Figure 23. Gate Charge

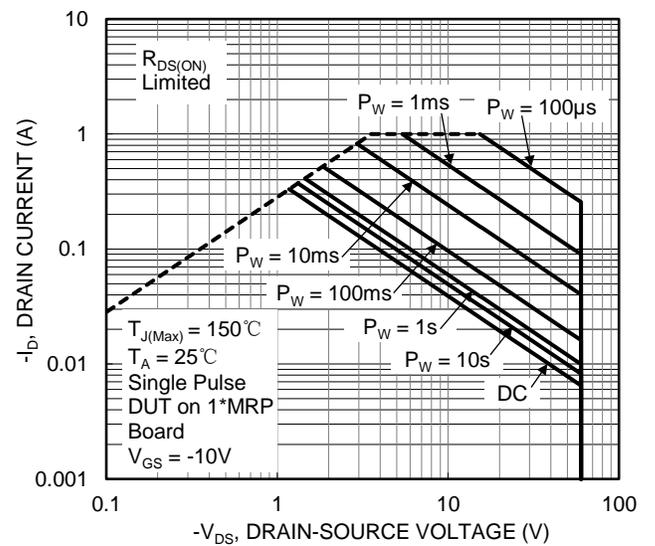


Figure 24. SOA, Safe Operation Area

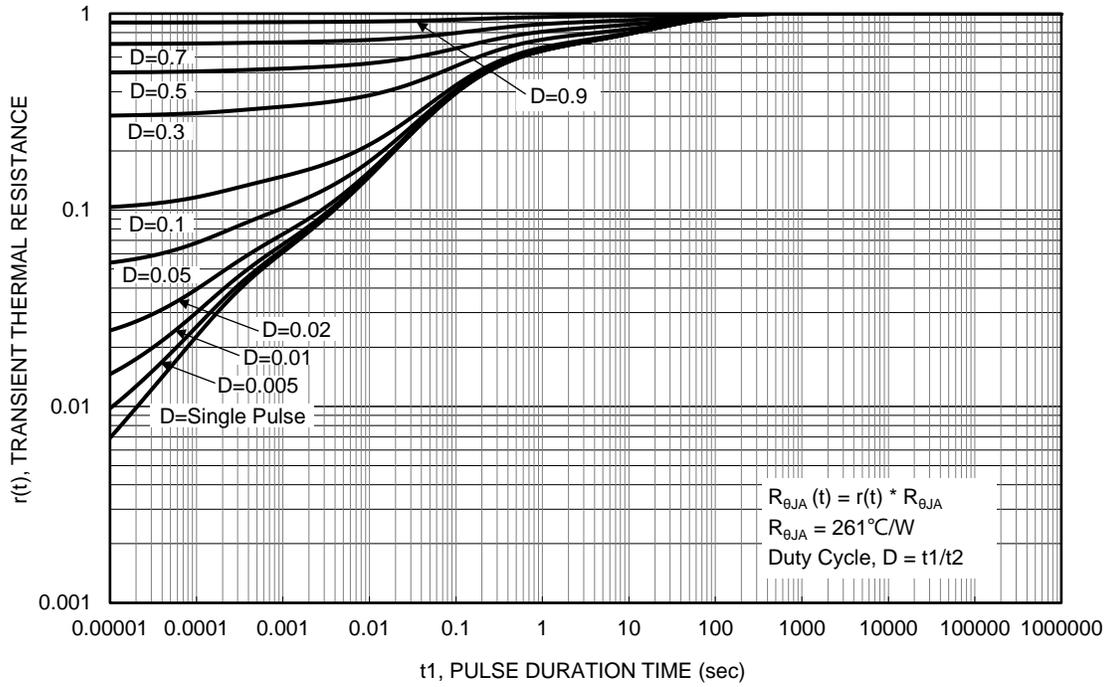
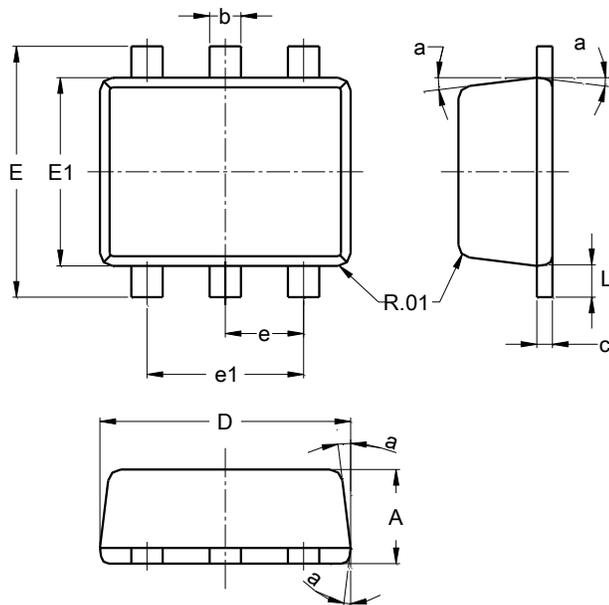


Figure 25. Transient Thermal Resistance

Package Outline Dimensions

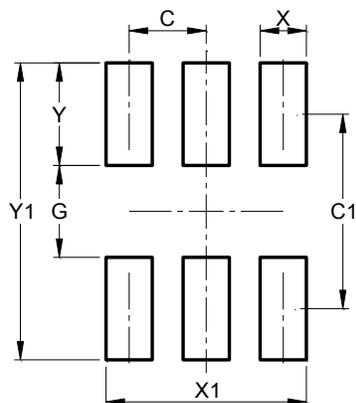
SOT563



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