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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企业微信二维码

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Product Summary

Device	BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max $T_A = +25°C$
Q1	60V	1.7Ω @ V_{GS} = 10V	500mA
		3Ω @ V_{GS} = 4.5V	400mA
Q2	-60V	4Ω @ V_{GS} = -10V	-360mA
		6Ω @ V_{GS} = -4.5V	-310mA

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 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:

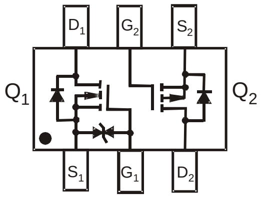
- General-purpose interfacing switches
- Power-management functions
- Analog switches

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 e3
- Weight: 0.027 grams (Approximate)

SOT563

Top View Bottom View



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 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	500 400	mA
	t < 10s	T_A = +25°C T_A = +70°C	I_D	620 480	mA
Maximum Body Diode Forward Current (Note 6)			I_S	500	mA
Pulsed Drain Current (Note 6)			I_{DM}	1000	mA
Pulsed Source Current (Note 6)			I_{SM}	1000	mA

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 6) V_{GS} = -10V	Steady State	T_A = +25°C T_A = +70°C	I_D	-360 -280	mA
	t < 10s	T_A = +25°C T_A = +70°C	I_D	-410 -320	mA
Maximum Body Diode Forward Current (Note 6)			I_S	-360	mA
Pulsed Drain Current (Note 6)			I_{DM}	-650	mA
Pulsed Source Current (Note 6)			I_{SM}	-650	mA

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	0.45	W
	T_A = +70°C		0.28	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	281	°C/W
	t < 10s		210	
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	1	W
	T_A = +70°C		0.62	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	129	°C/W
	t < 10s		97	
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 minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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 @T_C = +25°C	I_{DSS}	—	—	10	nA	V_{DS} =50V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±50	nA	V_{GS} = ±5V, 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	$R_{DS(ON)}$	—	1.3	1.7	Ω	V_{GS} = 10V, I_D = 500mA
		—	1.5	3		V_{GS} = 4.5V, I_D = 200mA
Forward Transfer Admittance	$\|Y_{FS}\|$	80	—	—	mS	V_{DS} = 10V, I_D = 200mA
Diode Forward Voltage	V_{SD}	—	—	1.4	V	V_{GS} = 0V, I_S = 115mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	30	—	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	4.2	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	2.9	—	pF	
Total Gate Charge	Q_g	—	0.3	—	nC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 250mA
Gate-Source Charge	Q_{gs}	—	0.2	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.08	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	3.9	—	ns	V_{DD} = 30V, V_{GS} = 10V, R_G = 25Ω, I_D = 200mA
Turn-On Rise Time	t_R	—	3.4	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	15.7	—	ns	
Turn-Off Fall Time	t_F	—	9.9	—	ns	

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 @T_C = +25°C	I_{DSS}	—	—	-25	nA	V_{DS} = -50V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±5V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1	—	-3.0	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	2.7	4	Ω	V_{GS} = -10V, I_D = -500mA
		—	3.2	6		V_{GS} = -4.5V, I_D = -200mA
Forward Transfer Admittance	$\|Y_{FS}\|$	50	—	—	mS	V_{DS} = -25V, I_D = -100mA
Diode Forward Voltage	V_{SD}	—	—	-1.4	V	V_{GS} = 0V, I_S = -115mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	25	—	pF	V_{DS} = -25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	4.7	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	2.7	—	pF	
Total Gate Charge	Q_g	—	0.28	—	nC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -500mA
Gate-Source Charge	Q_{gs}	—	0.14	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.08	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	5.5	—	ns	V_{DD} = -30V, V_{GS} = -10V, R_G = 50Ω, I_D = -270mA
Turn-On Rise Time	t_R	—	7.9	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	10.6	—	ns	
Turn-Off Fall Time	t_F	—	11.6	—	ns	

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

N-CHANNEL – Q1

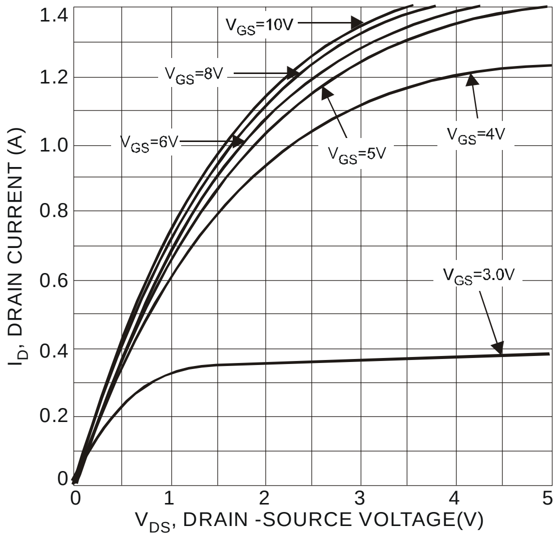


Fig. 1 Typical Output Characteristics

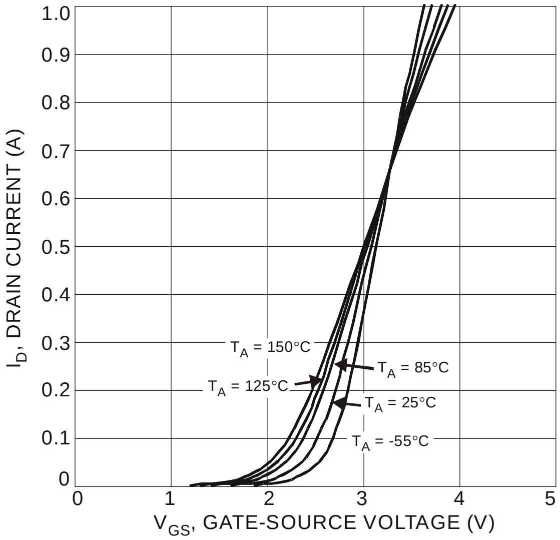


Fig. 2 Typical Transfer Characteristics

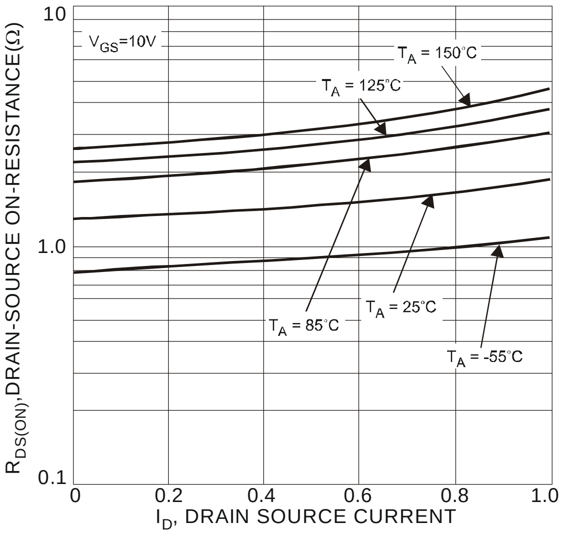


Fig. 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

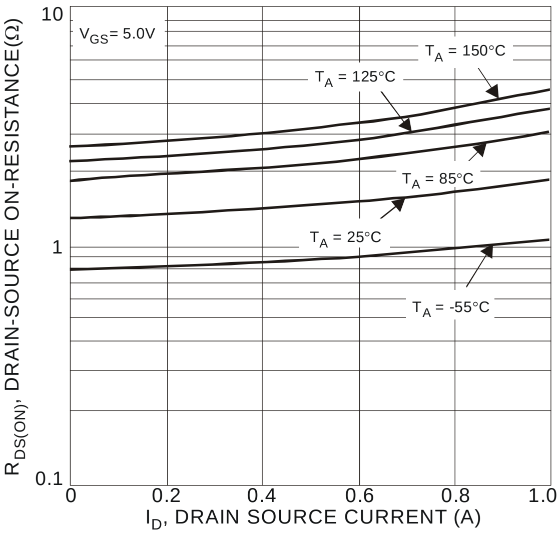


Fig. 4 Typical On-Resistance vs.
Drain Current and Temperature

N-CHANNEL – Q1 (continued)

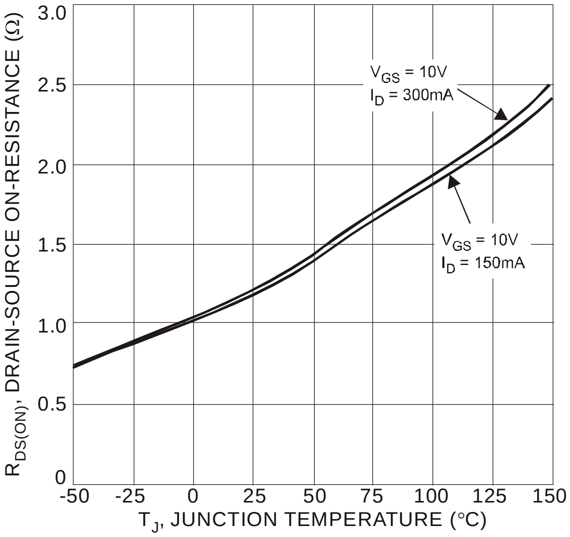


Fig. 5 On-Resistance Variation with Temperature

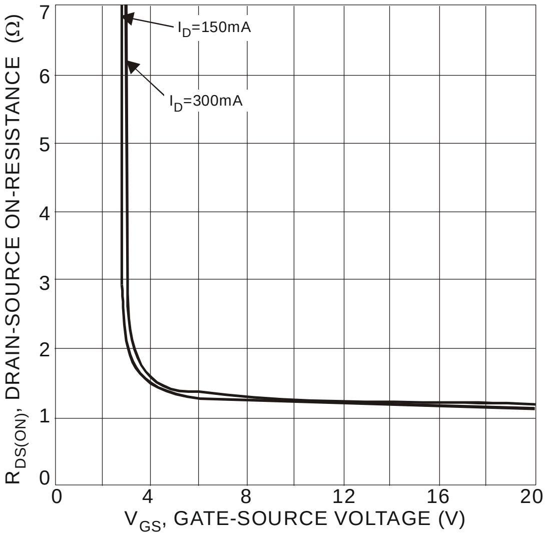


Fig. 6 Static Drain-Source On-Resistance vs. Gate-Source Voltage

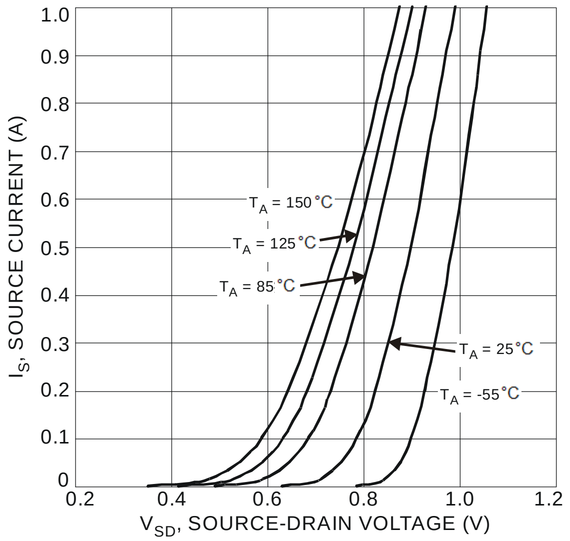


Fig. 7 Diode Forward Voltage vs. Current

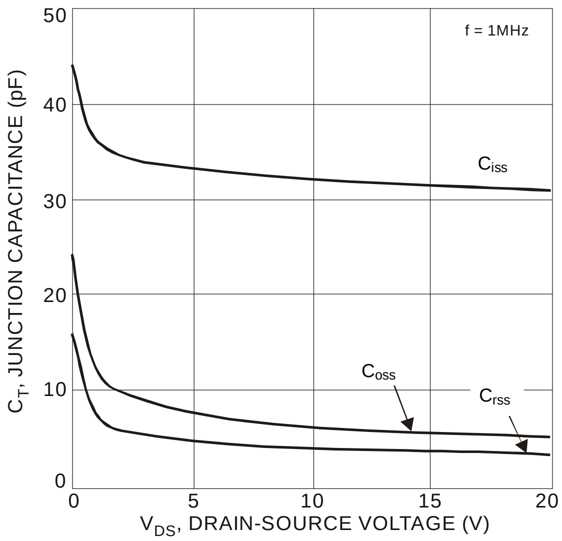


Fig. 8 Typical Junction Capacitance

P-CHANNEL – Q2

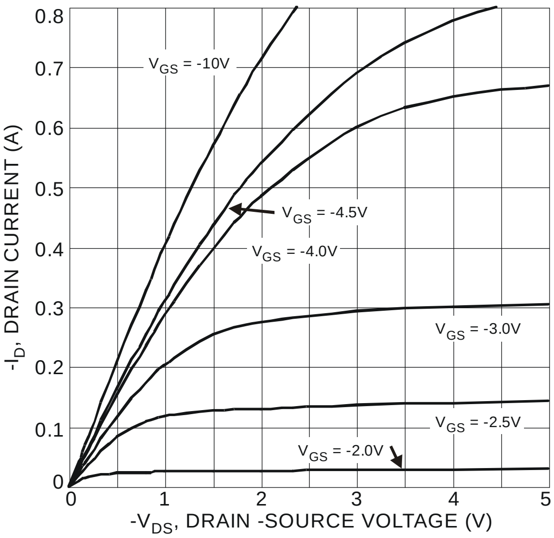


Fig. 9 Typical Output Characteristics

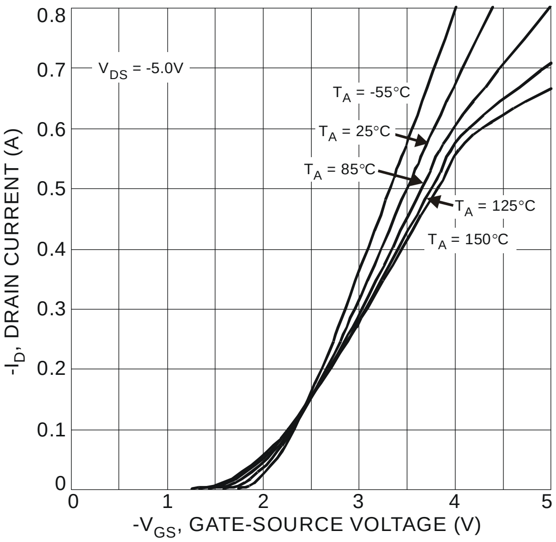


Fig. 10 Typical Transfer Characteristics

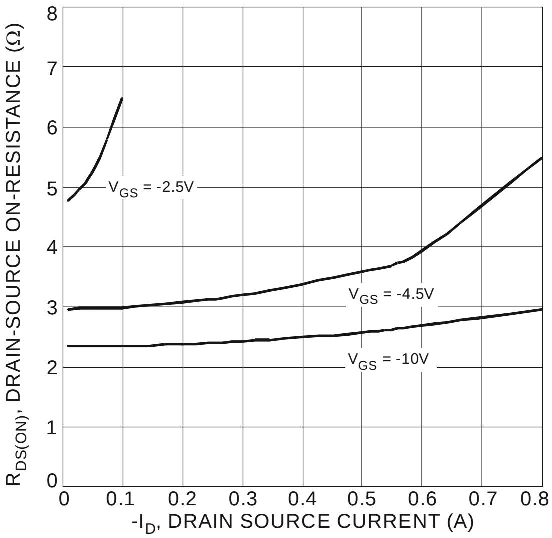


Fig. 11 Typical On-Resistance vs.
Drain Current and Gate Voltage

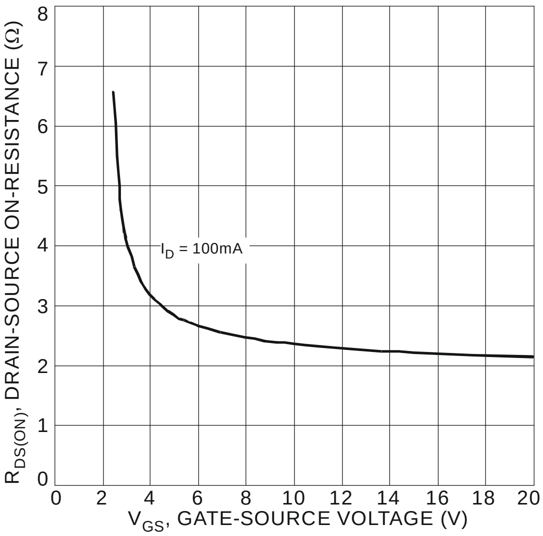


Fig. 12 Typical Drain-Source On-Resistance
vs. Gate-Source Voltage

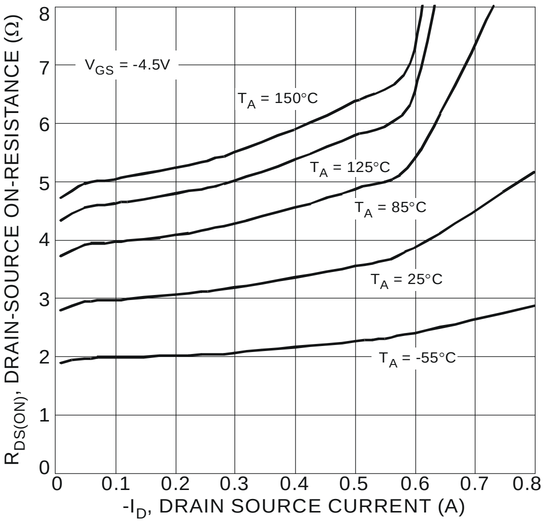


Fig. 13 Typical On-Resistance vs.
Drain Current and Temperature

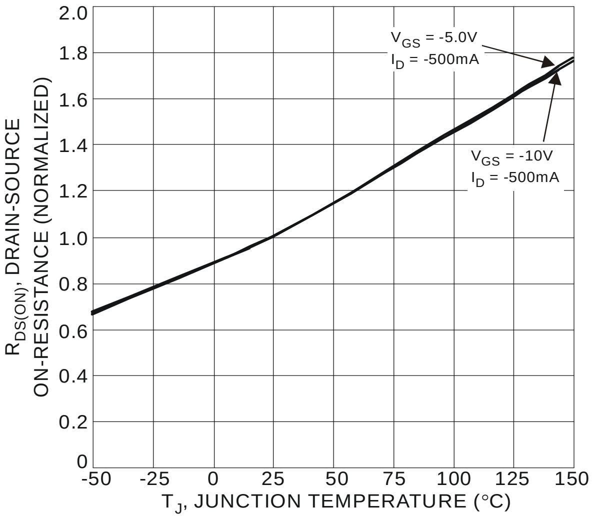


Fig. 14 On-Resistance Variation with Temperature

P-CHANNEL – Q2 (continued)

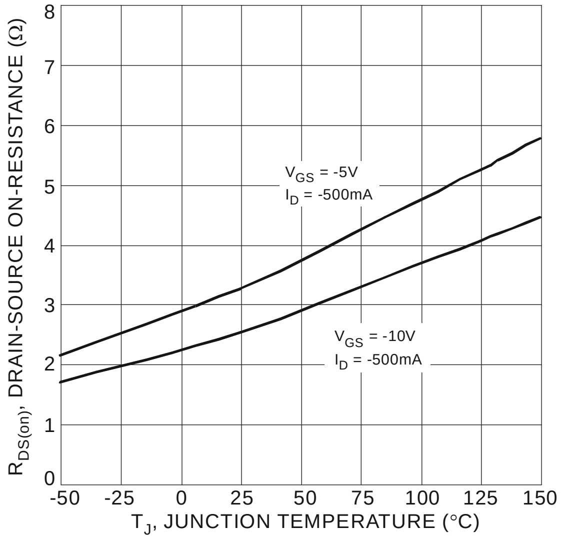


Fig. 15 On-Resistance Variation with Temperature

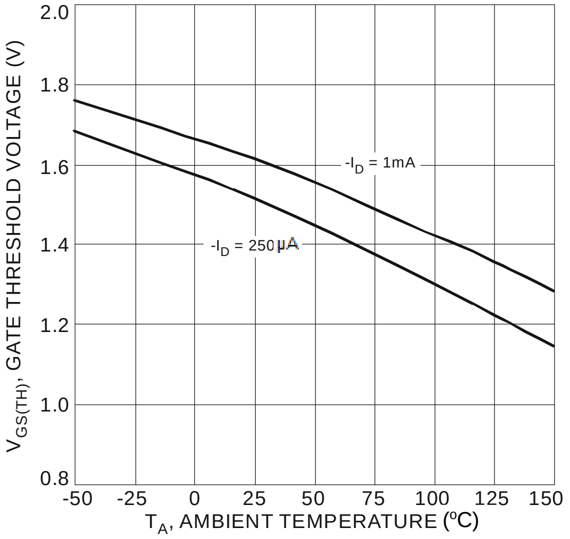


Fig. 16 Gate Threshold Variation vs. Ambient Temperature

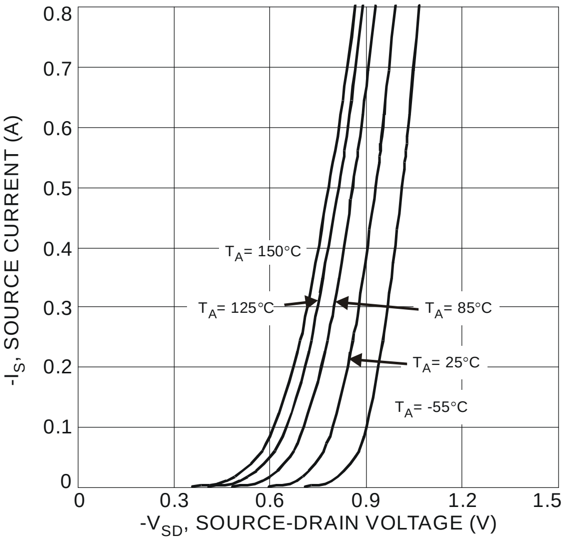


Fig. 17 Diode Forward Voltage vs. Current

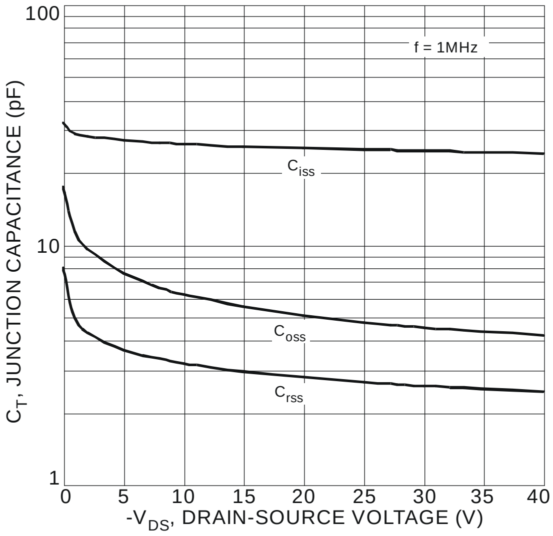


Fig. 18 Typical Junction Capacitance

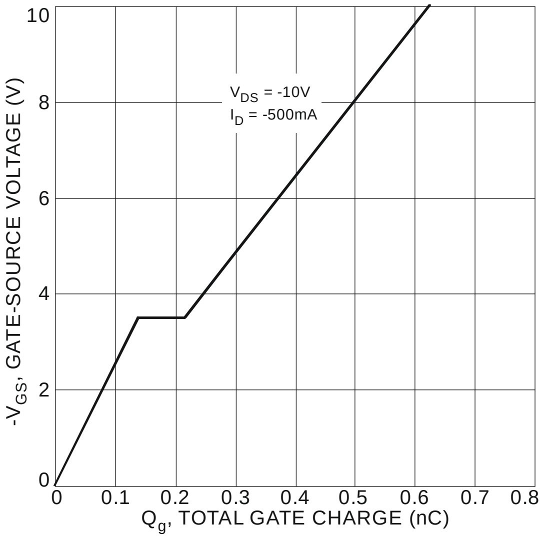


Fig. 19 Gate-Charge Characteristics

Package Outline Dimensions

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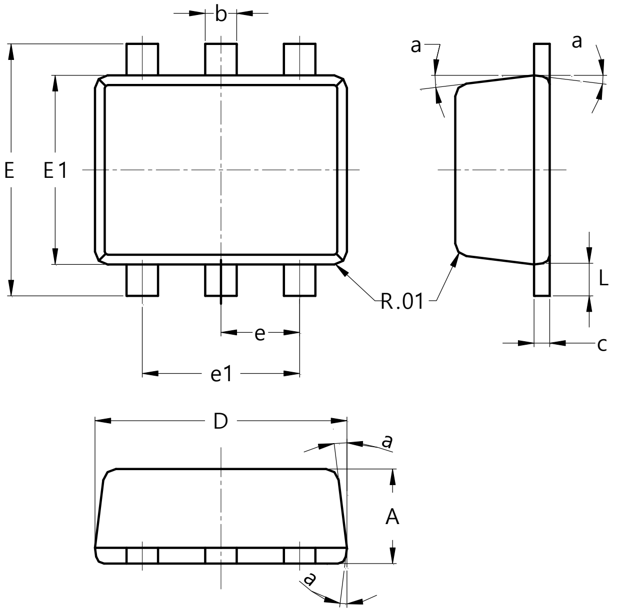
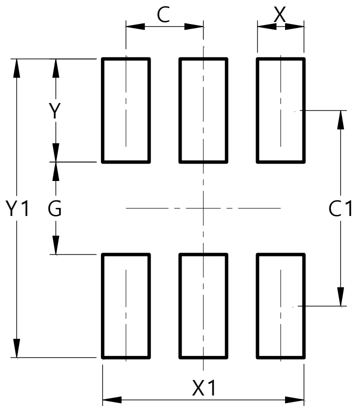
SOT563



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