

COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET
Product Summary

Device	$V_{(BR)DSS}$	$R_{DS(ON)} \text{ max}$	$I_D \text{ max}$ $T_A = 25^\circ\text{C}$
Q1	60V	$1.7\Omega @ V_{GS} = 10V$	500mA
		$3\Omega @ V_{GS} = 4.5V$	400mA
Q2	-60V	$4\Omega @ V_{GS} = -10V$	-360mA
		$6\Omega @ V_{GS} = -4.5V$	-310mA

Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Ultra-Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 standards for High Reliability**

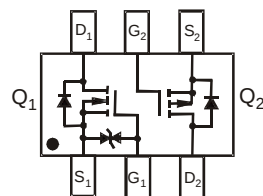
Description and Applications

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

- General Purpose Interfacing Switch
- Power Management Functions
- Analog Switch

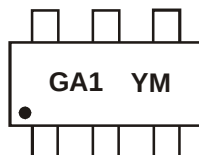
Mechanical Data

- Case: SOT563
- Case 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)


Ordering Information (Note 3)

Part Number	Case	Packaging
DMG1029SV-7	SOT563	3000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 3. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information


GA1 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: W = 2009)
 M = Month (ex: 9 = September)

Maximum Ratings N-CHANNEL – Q1 @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Units
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	500 400	mA
	t<10s	T _A = 25°C T _A = 70°C	I _D	620 480	mA
Pulsed Drain Current (Note 5)			I _{DM}	1000	mA

Maximum Ratings P-CHANNEL – Q2@T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Units
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	-360 -280	mA
	t<10s	T _A = 25°C T _A = 70°C	I _D	-410 -320	mA
Pulsed Drain Current (Note 5)			I _{DM}	-650	mA

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 4)	T _A = 25°C	P _D	0.45	W
	T _A = 70°C		0.28	
Thermal Resistance, Junction to Ambient (Note 4)	Steady state	R _{θJA}	281	°C/W
	t<10s		210	
Total Power Dissipation (Note 5)	T _A = 25°C	P _D	1	W
	T _A = 70°C		0.62	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R _{θJA}	129	°C/W
	t<10s		97	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

- Notes: 4. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
5. 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 6)						
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 6)						
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 7)						
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 6)						
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 6)						
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 7)						
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: 6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

N-CHANNEL – Q1

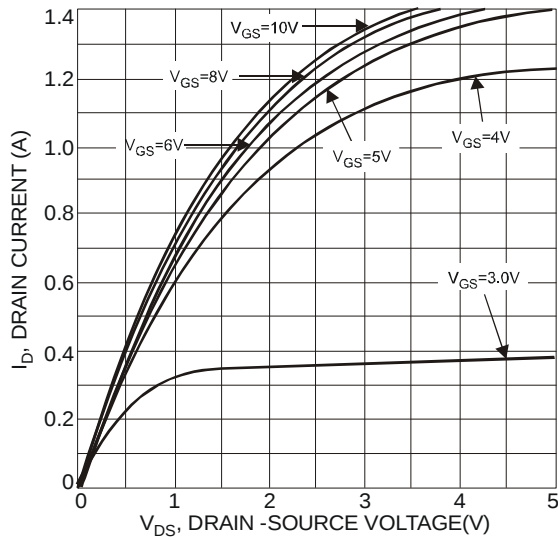


Fig. 1 Typical Output Characteristics

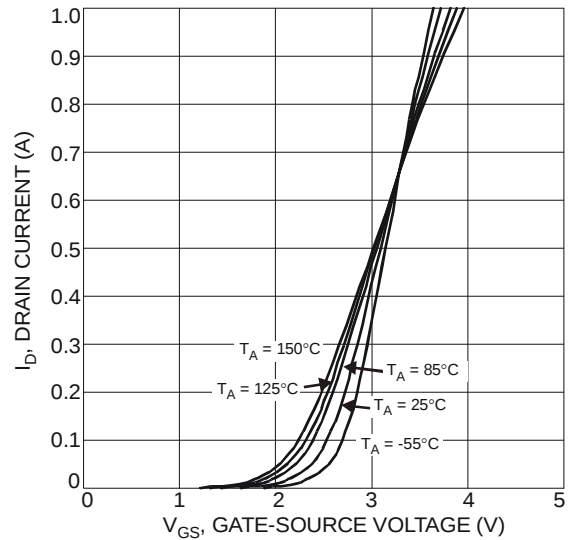


Fig. 2 Typical Transfer Characteristics

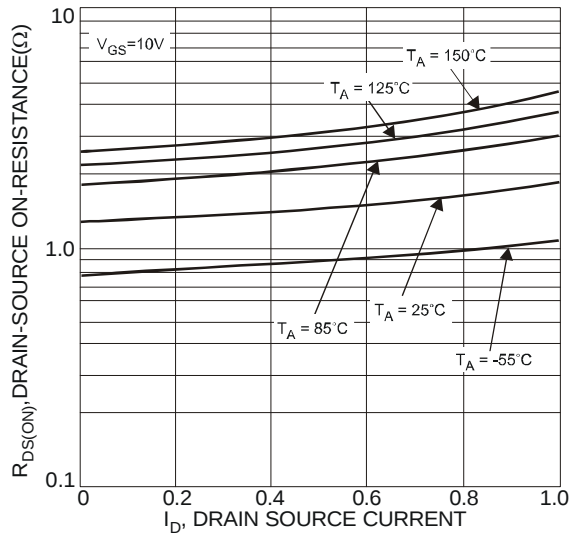


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

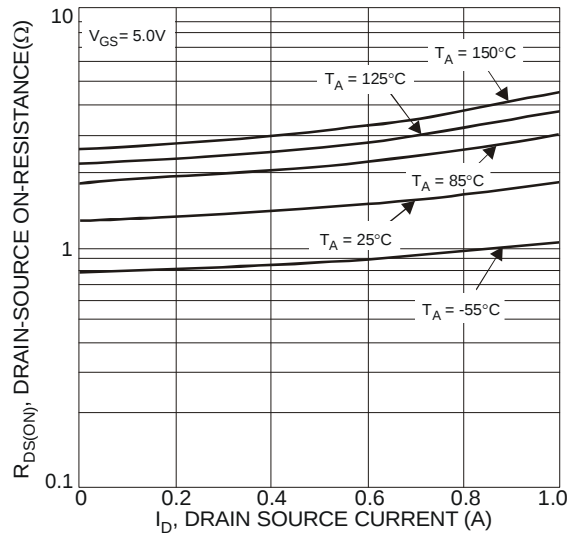


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

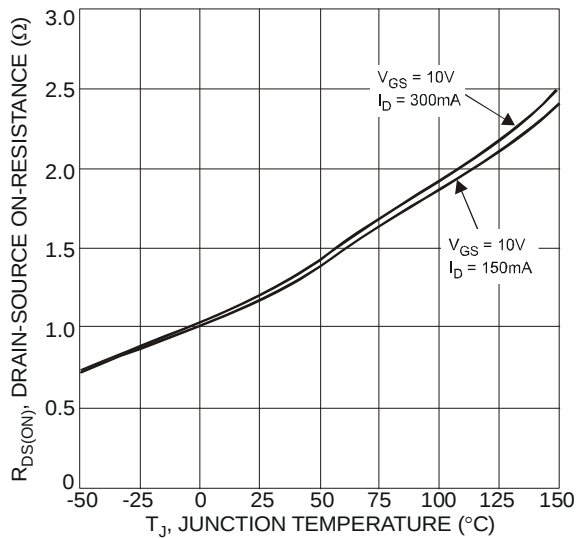


Fig. 5 On-Resistance Variation with Temperature

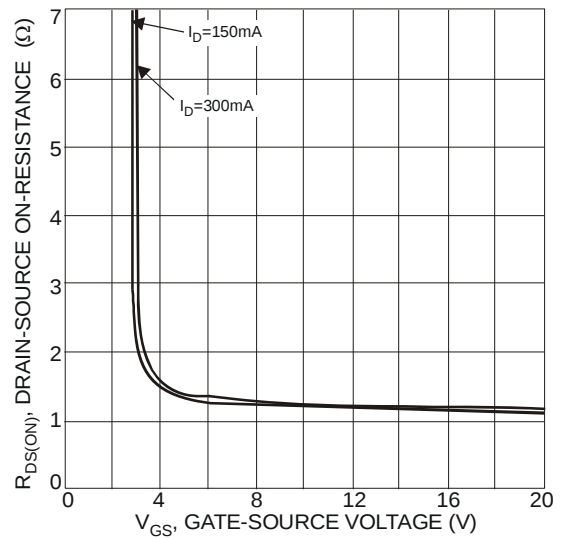


Fig. 6 Static Drain-Source On-Resistance vs. Gate-Source Voltage

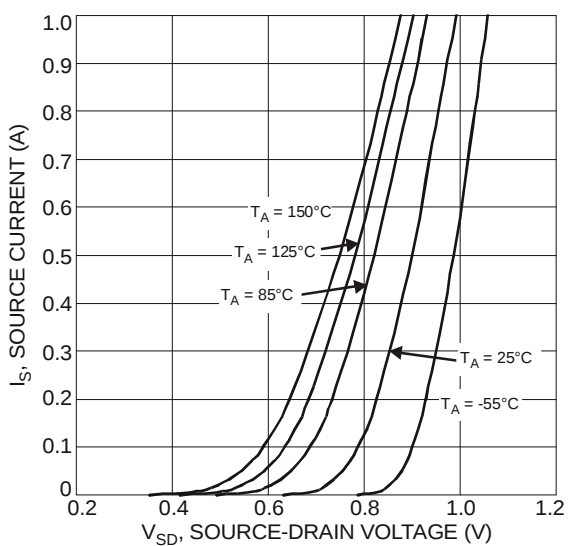


Fig. 7 Diode Forward Voltage vs. Current

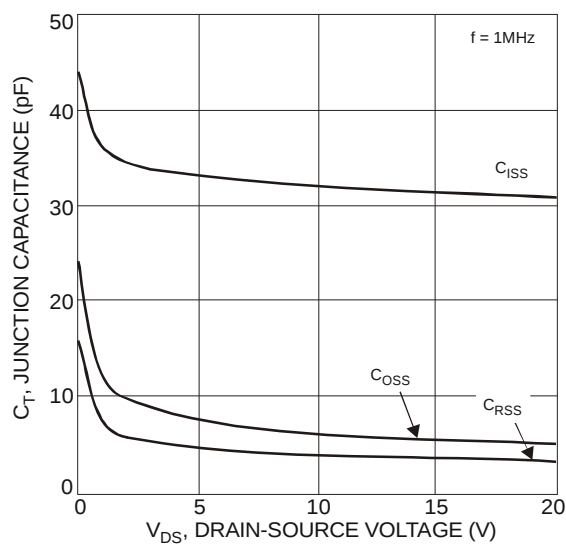


Fig. 8 Typical Junction Capacitance

P-CHANNEL – Q2

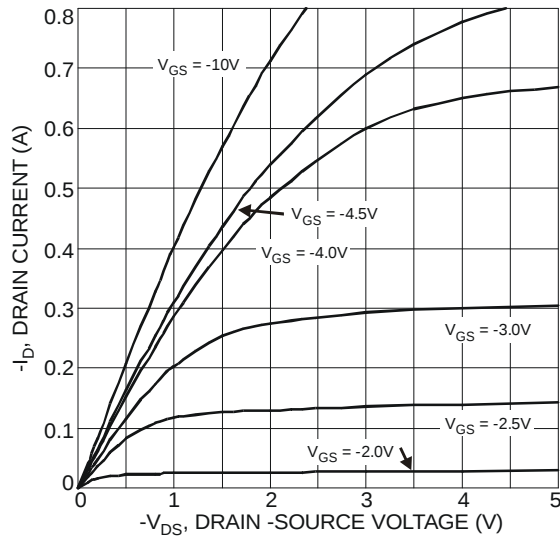


Fig. 9 Typical Output Characteristics

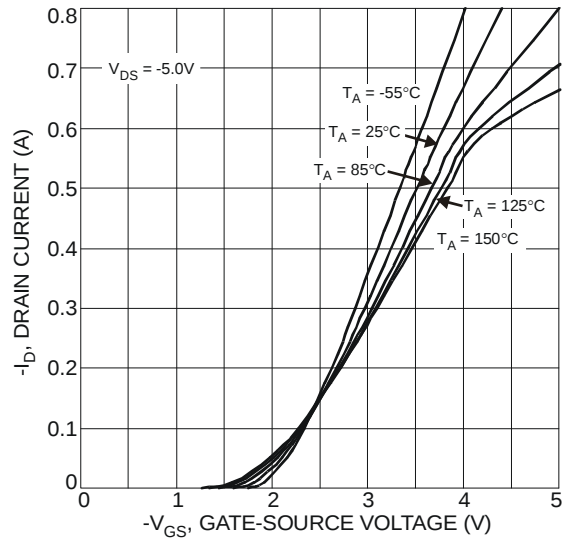


Fig. 10 Typical Transfer Characteristics

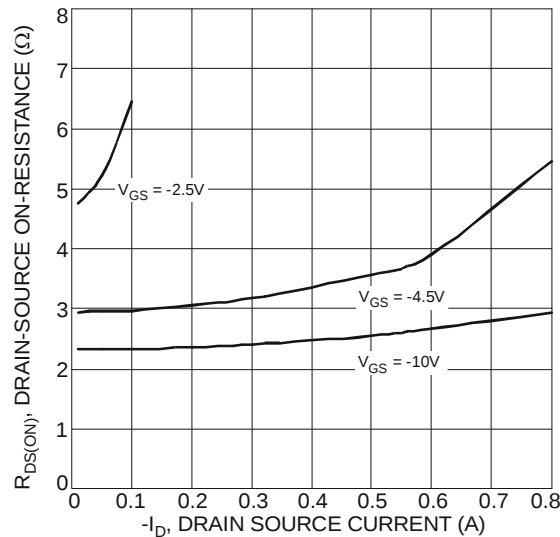


Fig. 11 Typical On-Resistance vs. Drain Current and Gate Voltage

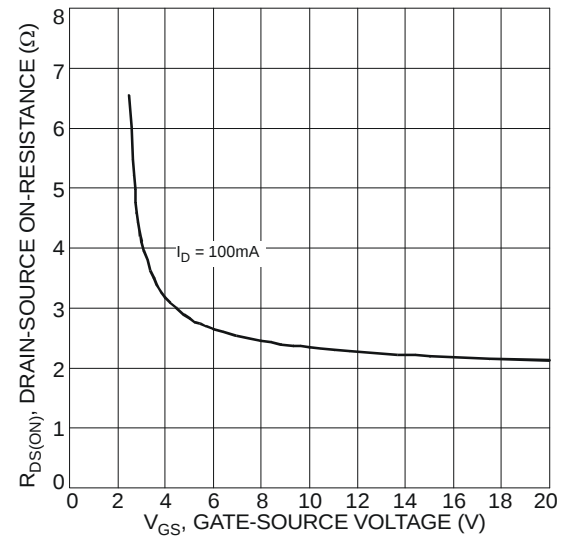


Fig. 12 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

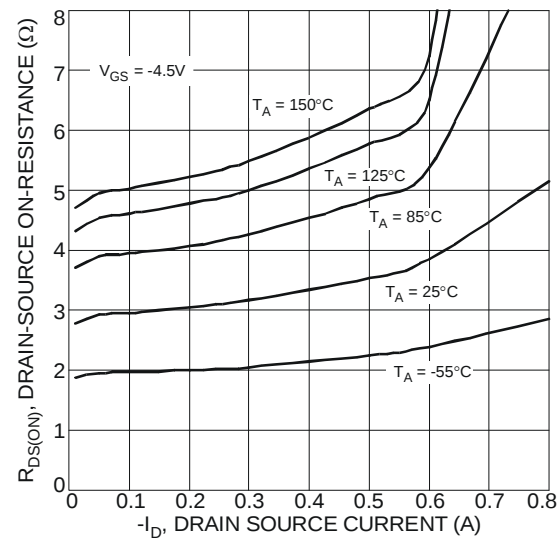


Fig. 13 Typical On-Resistance vs. Drain Current and Temperature

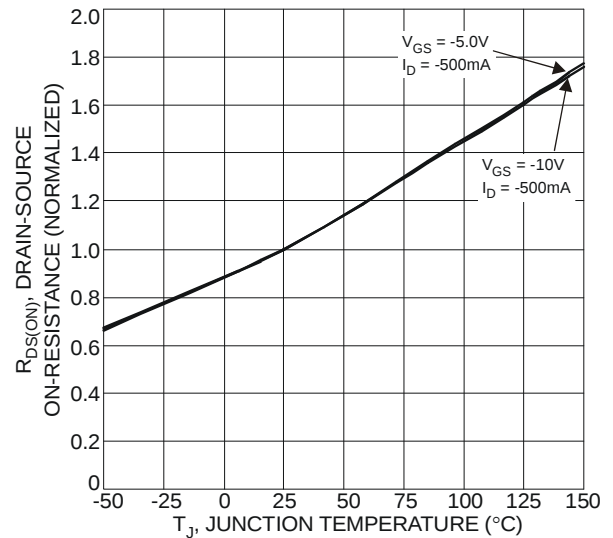


Fig. 14 On-Resistance Variation with Temperature

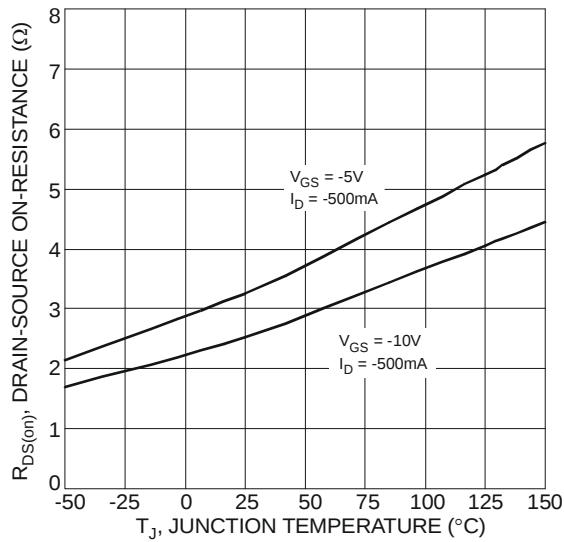


Fig. 15 On-Resistance Variation with Temperature

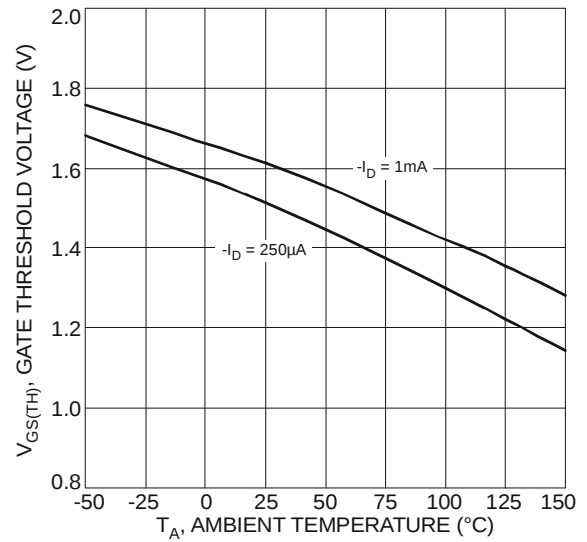


Fig. 16 Gate Threshold Variation vs. Ambient Temperature

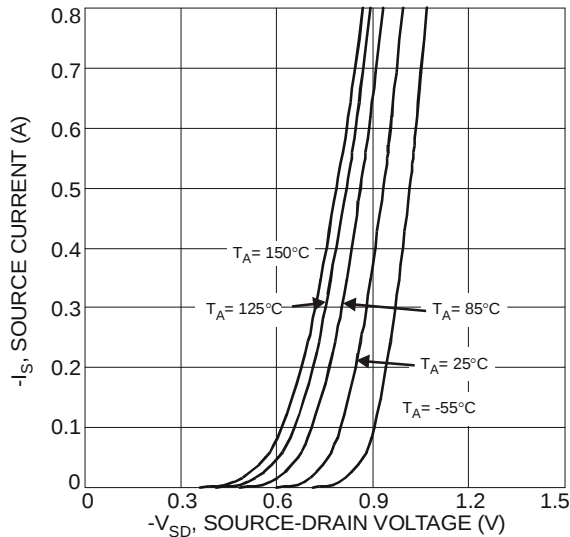


Fig. 17 Diode Forward Voltage vs. Current

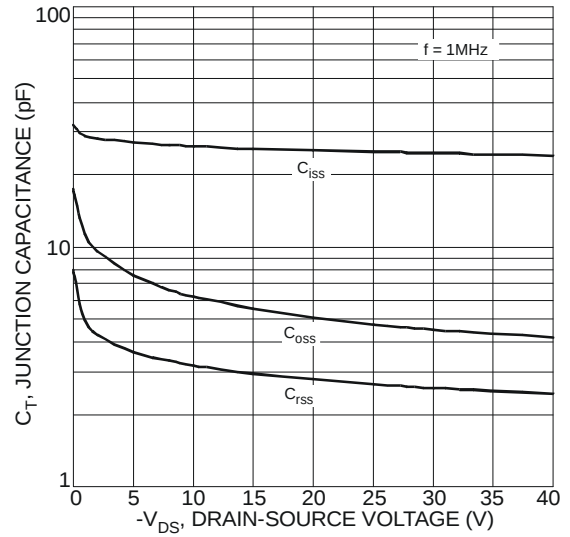


Fig. 18 Typical Junction Capacitance

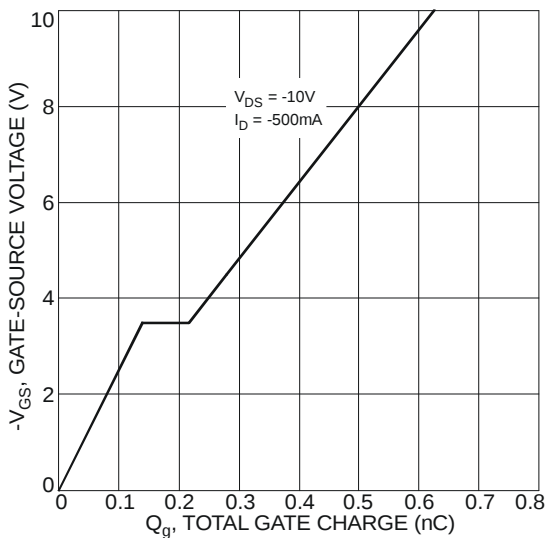
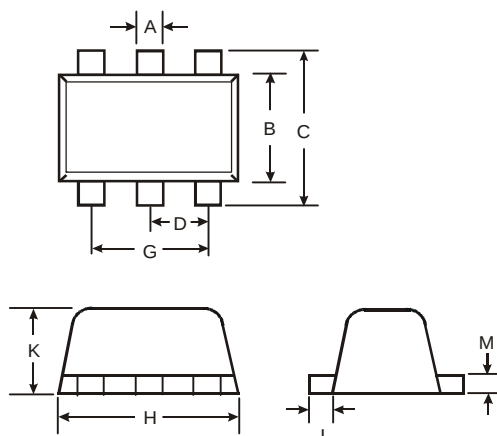


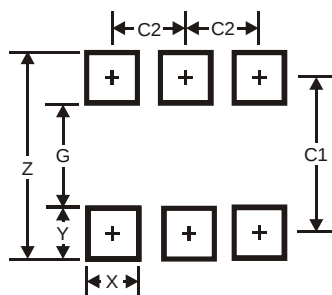
Fig. 19 Gate-Charge Characteristics

Package Outline Dimensions



SOT563			
Dim	Min	Max	Typ
A	0.15	0.30	0.20
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	-	-	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.55	0.60	0.60
L	0.10	0.30	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.2
G	1.2
X	0.375
Y	0.5
C1	1.7
C2	0.5

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