COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

Product Summary

Device	BV_{DSS}	$R_{DS(ON)}$ 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
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DIODES™ DMC62D2SVQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

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:

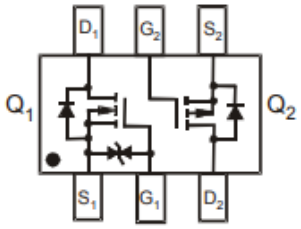
- General-purpose interfacing switches
- Power management functions
- Analog switches

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

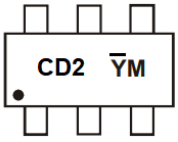


Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMC62D2SVQ-7	SOT563	3,000	Tape & Reel
DMC62D2SVQ-13	SOT563	10,000	Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/

Marking Information



CD2 = Product Type Marking Code
$\overline{Y}$M = Date Code Marking
$\overline{Y}$ = Year (ex: K = 2023)
M = Month (ex: 9 = September)

Date Code Key

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	J	K	L	M	N	O	P	R	S	T	U	V

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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	$R_{\theta JA}$	261	°C/W
Total Power Dissipation (Note 5)		P_D	0.8	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	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	I_F = 1A, dI/dt = 100A/μs
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	I_F = -1A, dI/dt = 100A/μs
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

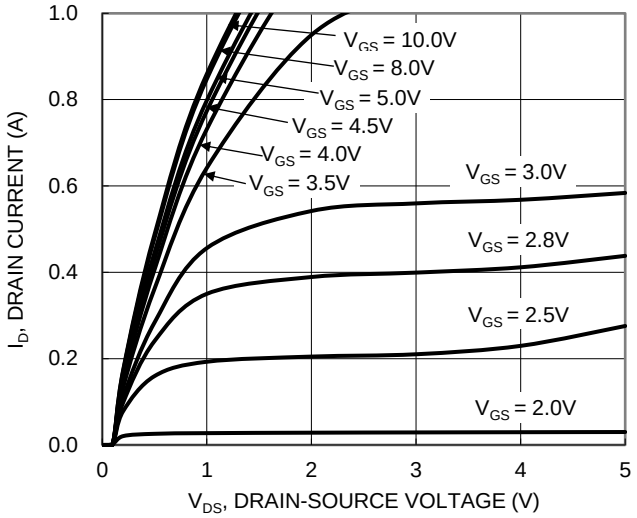


Figure 1. Typical Output Characteristic

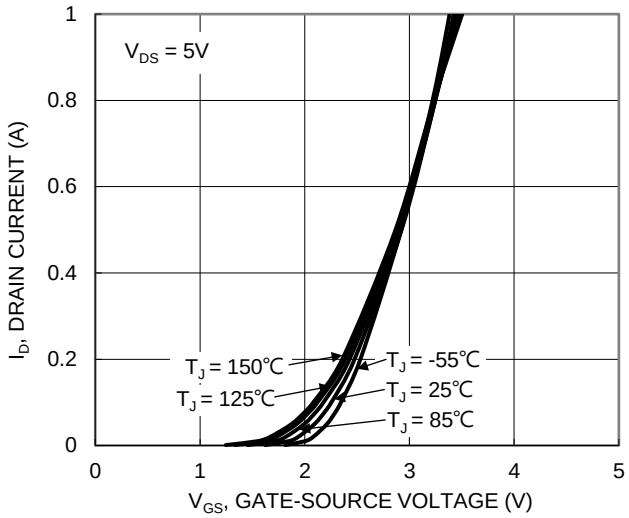


Figure 2. Typical Transfer Characteristic

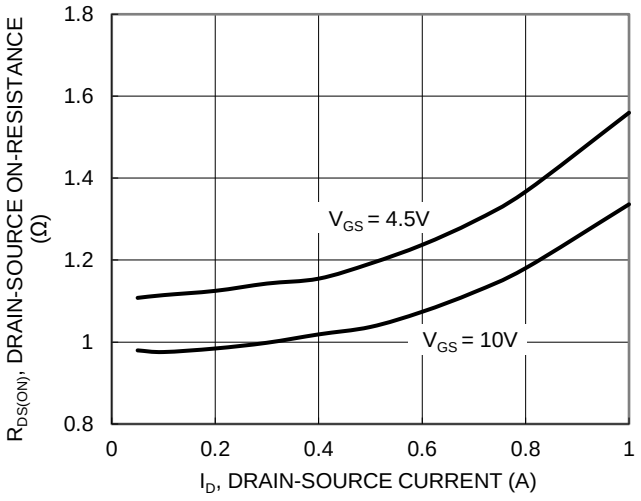


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

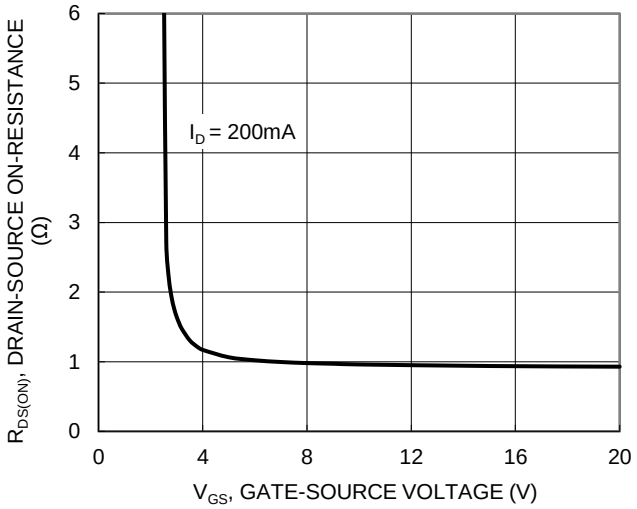


Figure 4. Typical Transfer Characteristic

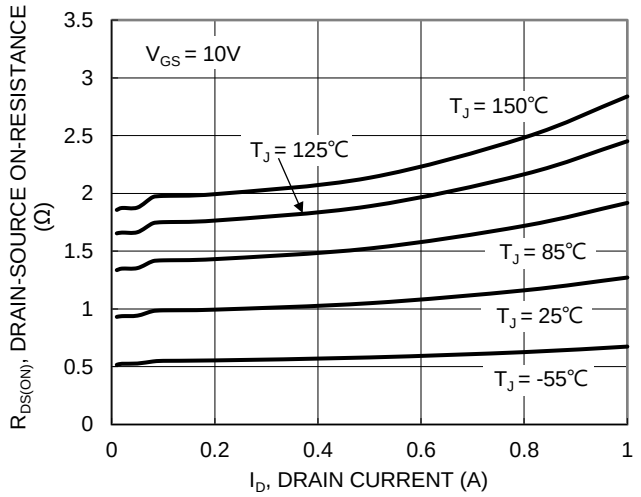


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

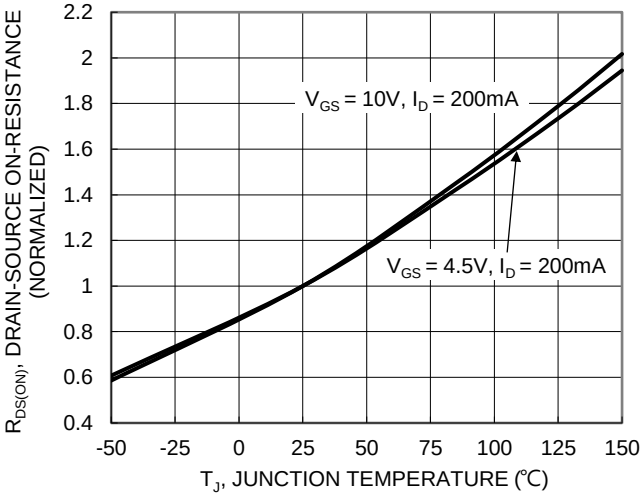


Figure 6. On-Resistance Variation with Junction Temperature

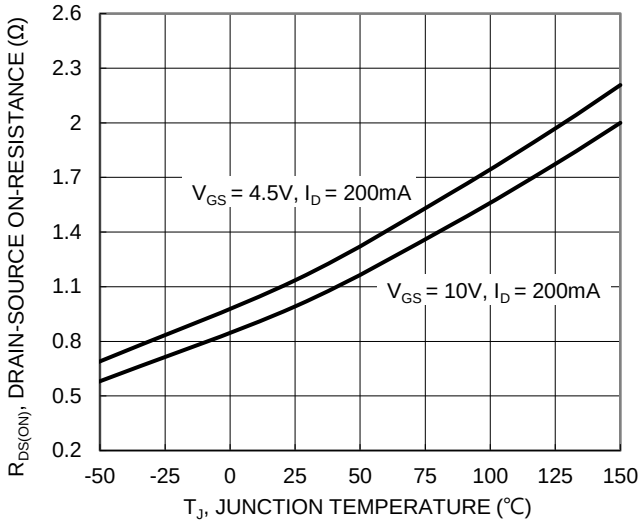


Figure 7. On-Resistance Variation with Junction Temperature

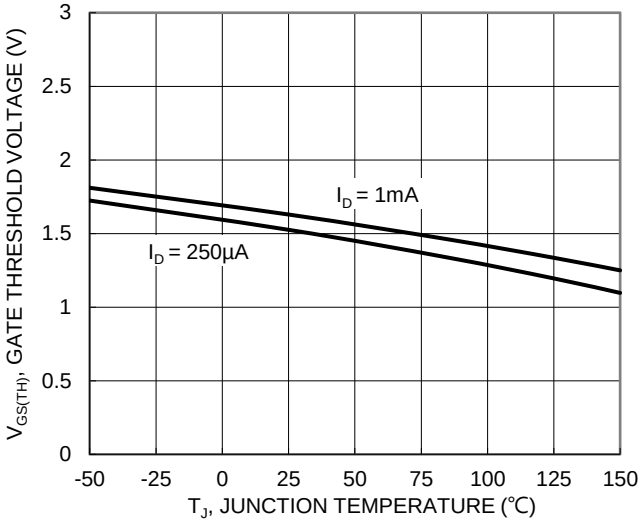


Figure 8. Gate Threshold Variation vs. Junction Temperature

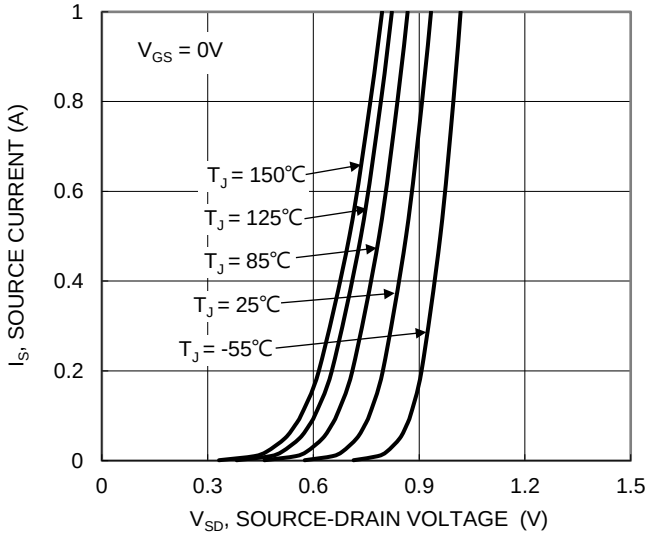


Figure 9. Diode Forward Voltage vs. Current

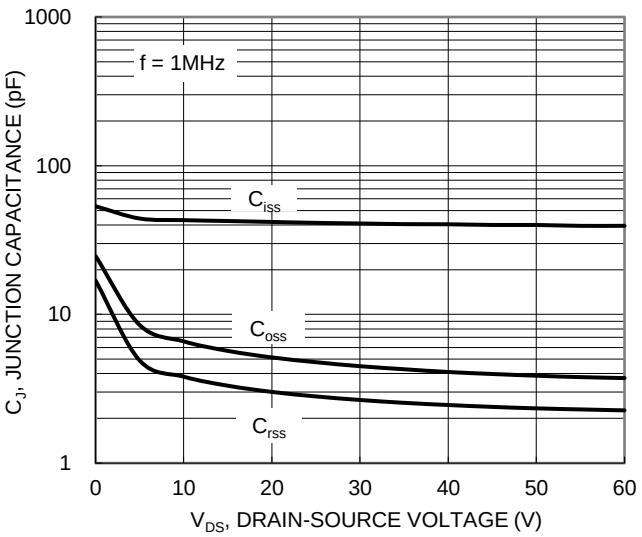


Figure 10. Typical Junction Capacitance

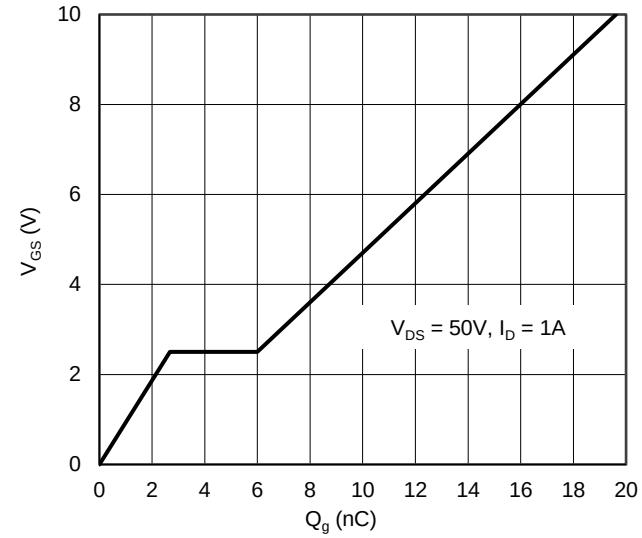


Figure 11. Gate Charge

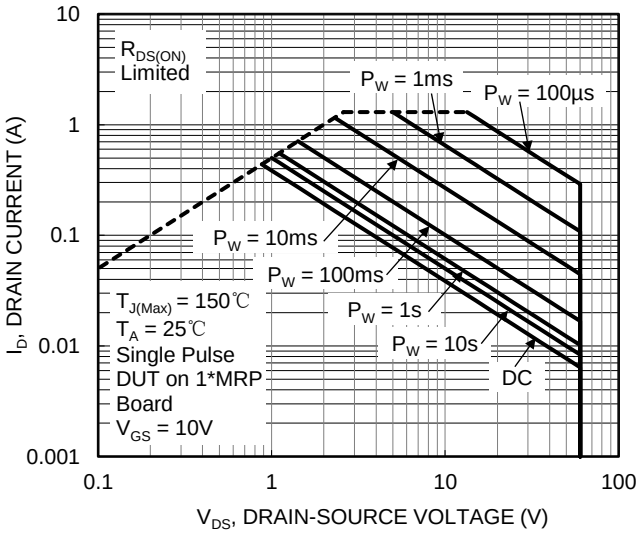


Figure 12. SOA, Safe Operation Area

P-CHANNEL – Q2

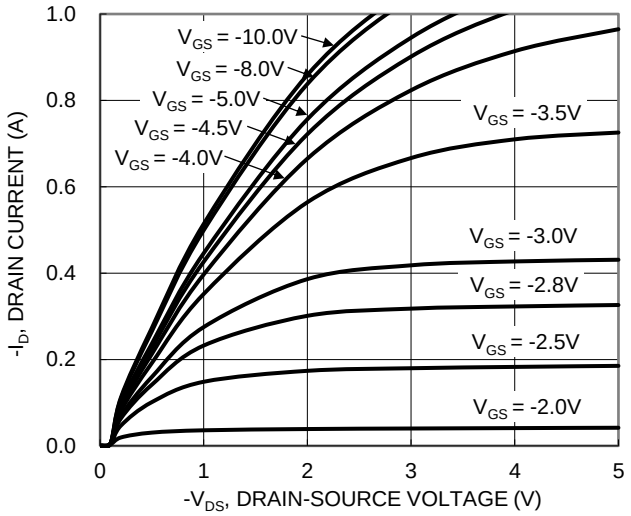


Figure 13. Typical Output Characteristic

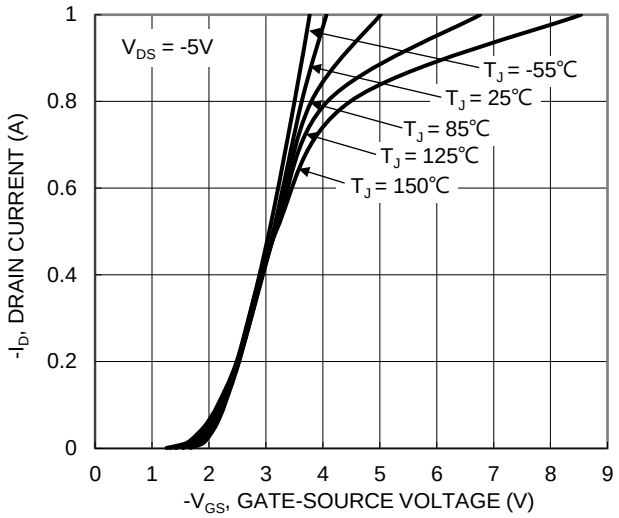


Figure 14. Typical Transfer Characteristic

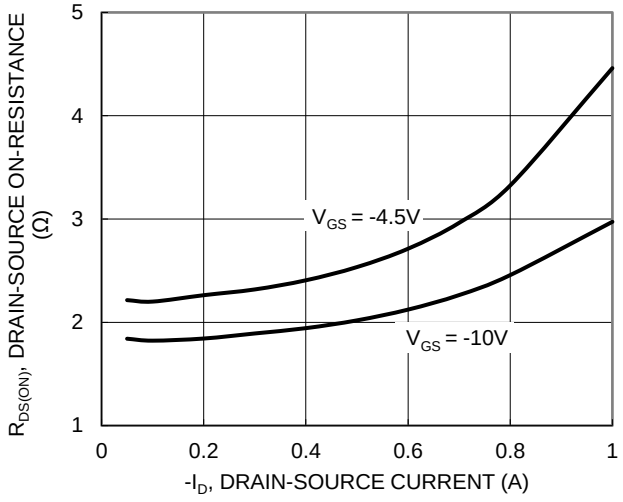


Figure 15. Typical On-Resistance vs. Drain Current and Gate Voltage

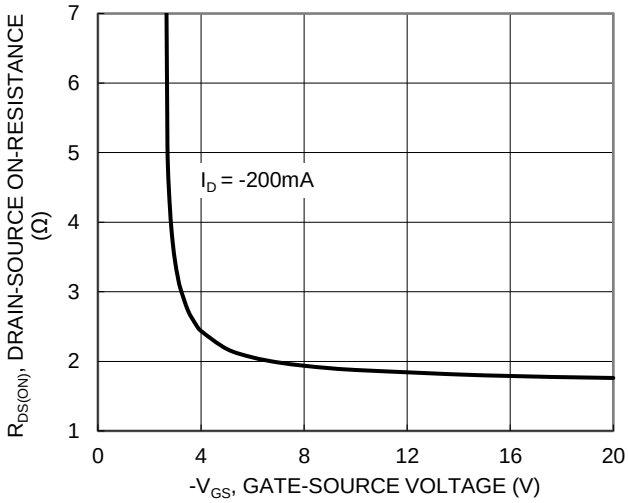


Figure 16. Typical Transfer Characteristic

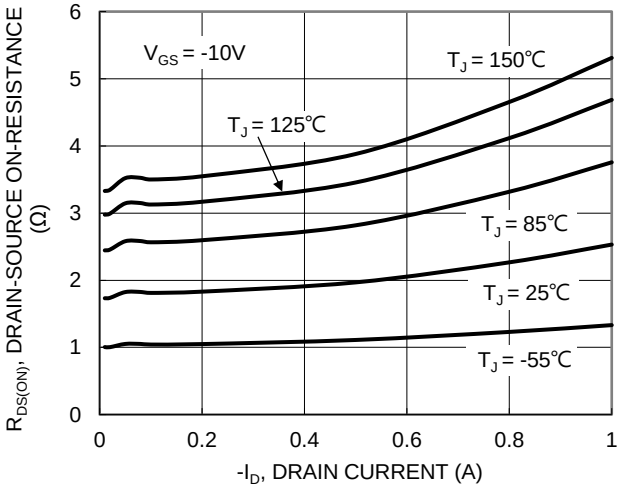


Figure 17. Typical On-Resistance vs. Drain Current and Junction Temperature

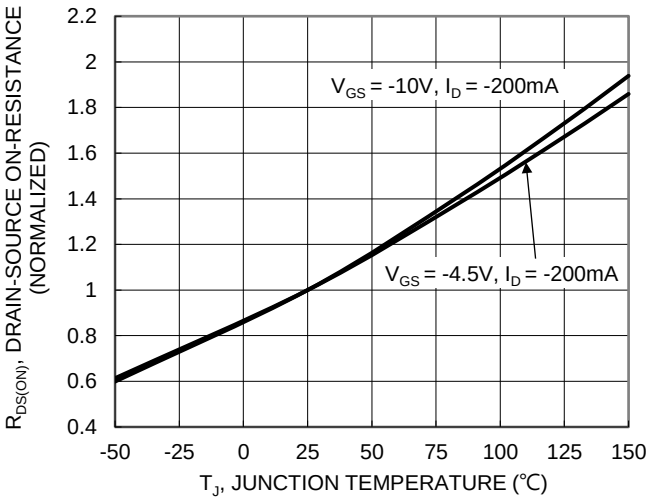


Figure 18. On-Resistance Variation with Junction Temperature

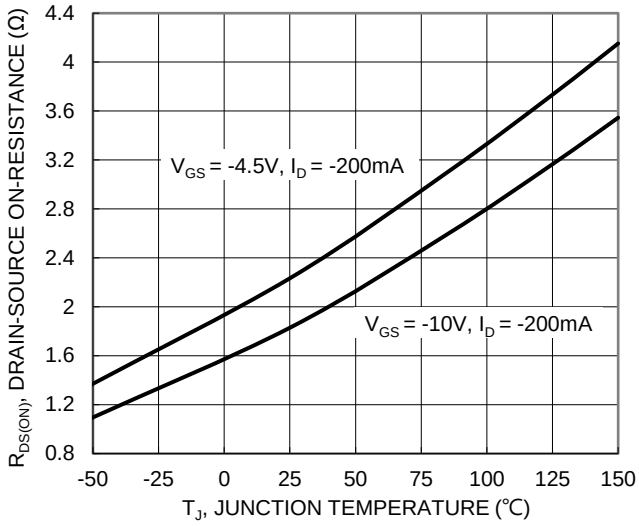


Figure 19. On-Resistance Variation with Junction Temperature

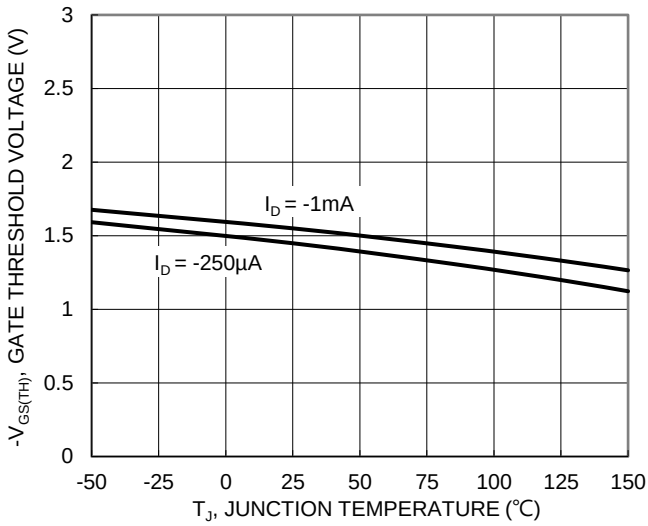


Figure 20. Gate Threshold Variation vs. Junction Temperature

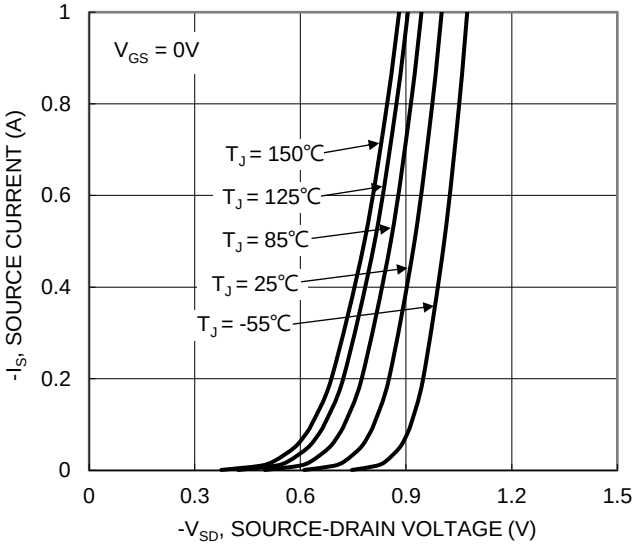


Figure 21. Diode Forward Voltage vs. Current

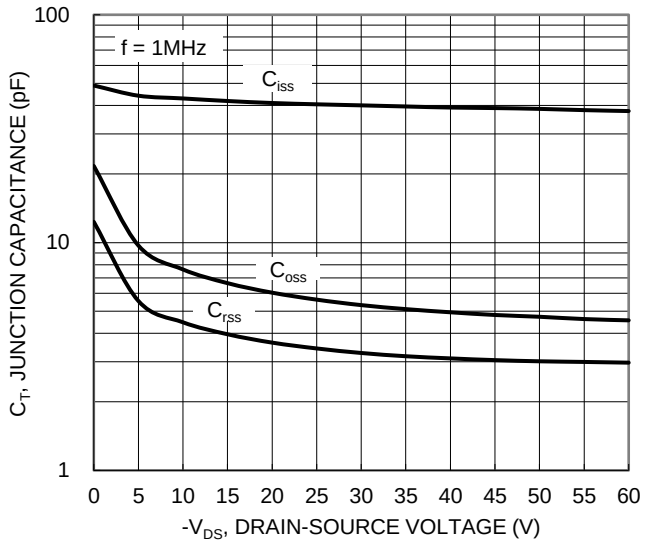


Figure 22. Typical Junction Capacitance

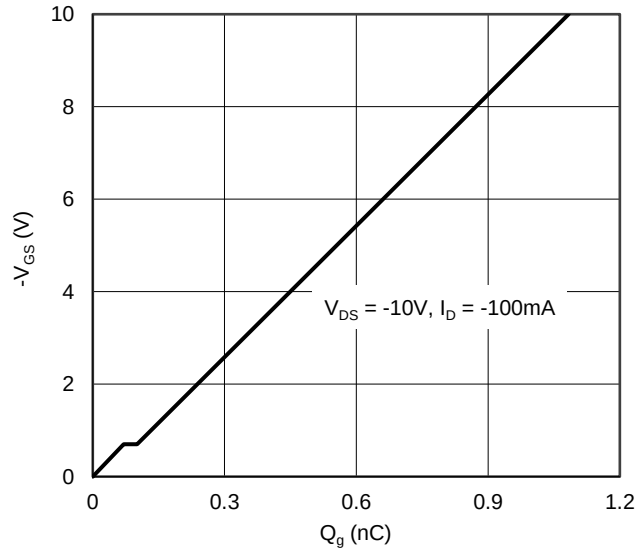


Figure 23. Gate Charge

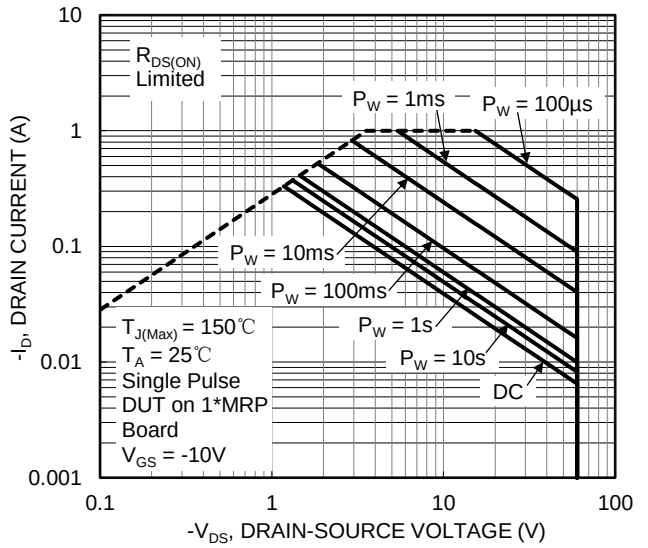


Figure 24. SOA, Safe Operation Area

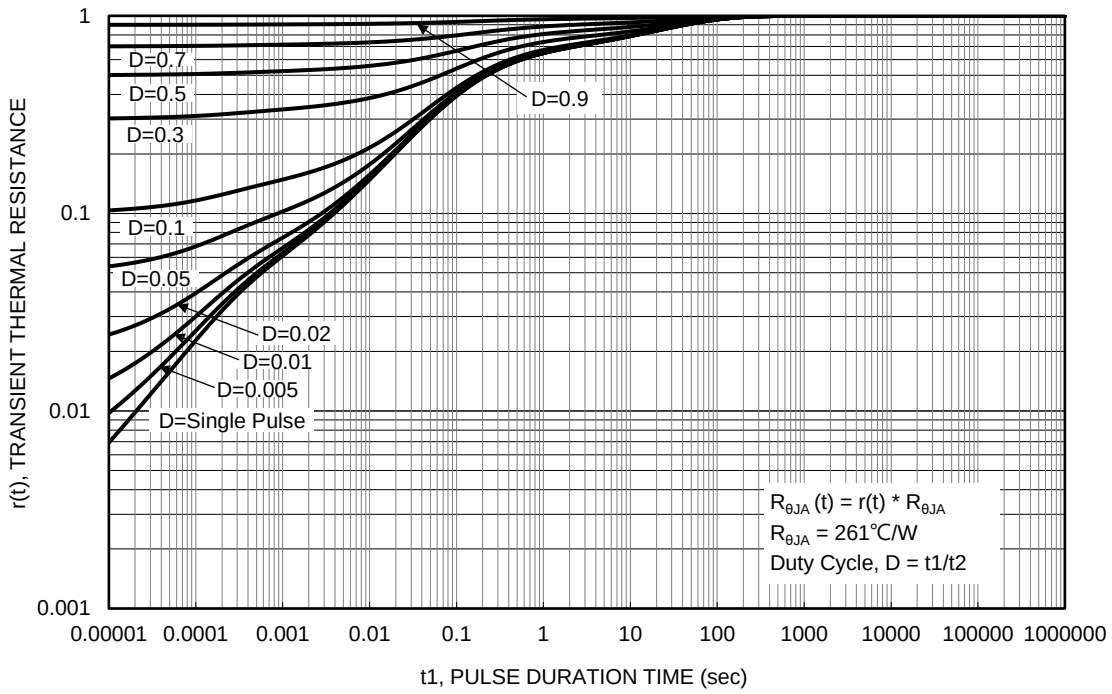
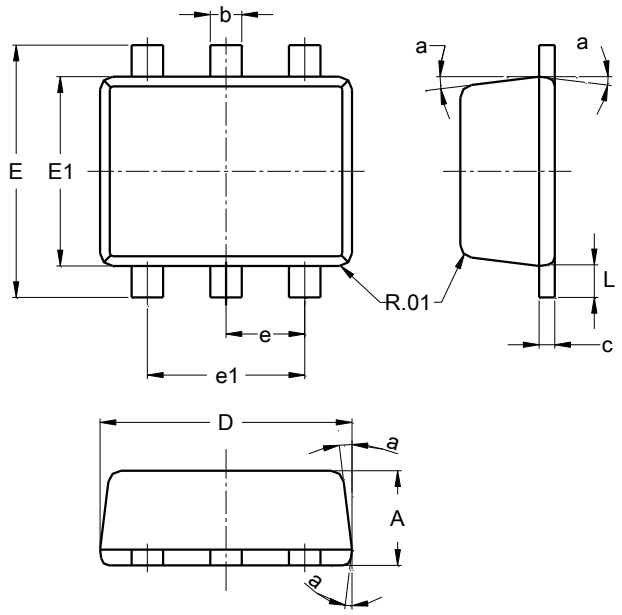


Figure 25. Transient Thermal Resistance

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT563

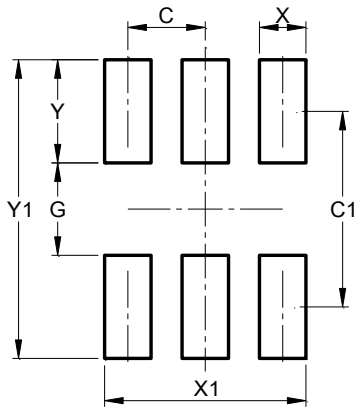


SOT563			
Dim	**Min**	**Max**	**Typ**
A	0.55	0.60	--
b	0.15	0.30	0.20
c	0.10	0.18	0.11
D	1.50	1.70	1.60
E	1.55	1.70	1.60
E1	1.10	1.25	1.20
e	--	--	0.50
e1	0.90	1.10	1.00
L	0.10	0.30	0.20
a	8°	9°	7°
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

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

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