

Product Summary

Device	BV _{DSS}	R _{D(S)} Max	I _D Max T _A = +25°C
Q1	60V	1.7Ω @ V _{GS} = 10V	571mA
		3Ω @ V _{GS} = 4.5V	430mA
Q2	-50V	6Ω @ V _{GS} = -10V	-304mA
		8Ω @ V _{GS} = -5V	-263mA

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:

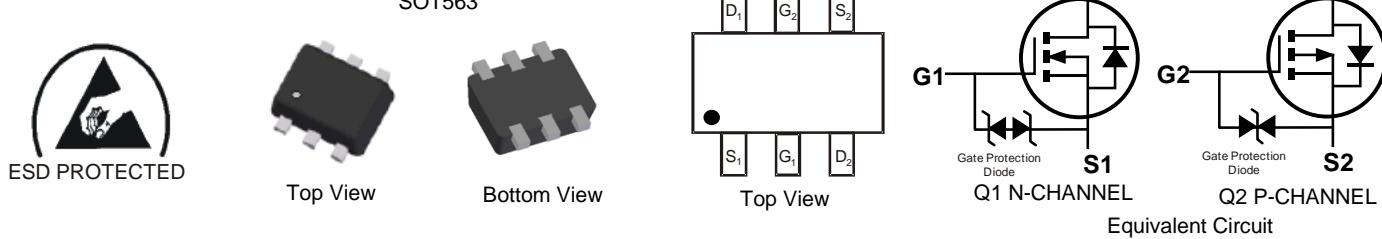
- Power Management Functions
- DC-DC Converters
- Battery

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- ESD Protected Gate
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

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: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ^③
- Weight: 0.003 grams (Approximate)



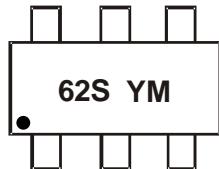
Ordering Information (Note 5)

Part Number	Case	Packaging
DMC62D0SVQ-7	SOT563	3,000/Tape & Reel
DMC62D0SVQ-13	SOT563	10,000/Tape & Reel

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/product-compliance-definitions/>.
5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



62S = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: E = 2017)
 M = Month (ex: 9 = September)

Date Code Key

Year	2016	2017	2018	2019	2020	2021	2022					
Code	D	E	F	G	H	I	J					
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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Q1_Value	Q2_Value	Unit
Drain-Source Voltage	V_{DSS}	60	-50	V
Gate-Source Voltage	V_{GSS}	± 20	± 20	V
Continuous Drain Current (Note 7) N-Channel: $V_{GS} = 10\text{V}$ P-Channel: $V_{GS} = -10\text{V}$	Steady State $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D 571 457	-304 -243	mA
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	1,200	-800	mA
Maximum Body Diode Continuous Current (Note 7)	I_S	500	-300	mA

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P_D	0.51	W
Thermal Resistance, Junction to Ambient (Note 6)	R_{JJA}	250	°C/W
Total Power Dissipation (Note 7)	P_D	0.84	W
Thermal Resistance, Junction to Ambient (Note 7)	R_{JJA}	150	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

Electrical Characteristics - Q1 N-CHANNEL (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$\text{V}_{\text{DS}} = 60\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 10	μA	$\text{V}_{\text{GS}} = \pm 20\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$\text{V}_{\text{GS}(\text{TH})}$	1.0	—	2.5	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$, $\text{I}_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS}(\text{ON})}$	—	—	1.7	Ω	$\text{V}_{\text{GS}} = 10\text{V}$, $\text{I}_D = 500\text{mA}$
		—	—	3		$\text{V}_{\text{GS}} = 4.5\text{V}$, $\text{I}_D = 200\text{mA}$
Diode Forward Voltage	V_{SD}	—	—	1.4	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_S = 115\text{mA}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	30	—	pF	$\text{V}_{\text{DS}} = 25\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	4.2	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	2.9	—	pF	
Total Gate Charge	Q_g	—	0.4	—	nC	$\text{V}_{\text{GS}} = 4.5\text{V}$, $\text{V}_{\text{DS}} = 10\text{V}$, $\text{I}_D = 250\text{mA}$
Gate-Source Charge	Q_{gs}	—	0.15	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.09	—	nC	
Turn-On Delay Time	$\text{t}_{\text{D}(\text{ON})}$	—	4.3	—	ns	$\text{V}_{\text{DD}} = 30\text{V}$, $\text{V}_{\text{GS}} = 10\text{V}$, $\text{R}_g = 25\Omega$, $\text{I}_D = 200\text{mA}$
Turn-On Rise Time	t_R	—	2.7	—	ns	
Turn-Off Delay Time	$\text{t}_{\text{D}(\text{OFF})}$	—	15.1	—	ns	
Turn-Off Fall Time	t_F	—	6.5	—	ns	

 Electrical Characteristics - Q2 P-CHANNEL (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	-50	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$\text{V}_{\text{DS}} = -50\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 10	μA	$\text{V}_{\text{GS}} = \pm 16\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$\text{V}_{\text{GS}(\text{TH})}$	-1	—	-2.5	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$, $\text{I}_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS}(\text{ON})}$	—	—	6	Ω	$\text{V}_{\text{GS}} = -10\text{V}$, $\text{I}_D = -500\text{mA}$
		—	—	8		$\text{V}_{\text{GS}} = -5\text{V}$, $\text{I}_D = -200\text{mA}$
Diode Forward Voltage	V_{SD}	—	—	-1.4	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_S = -115\text{mA}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	26	—	pF	$\text{V}_{\text{DS}} = -25\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	4.2	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	2.4	—	pF	
Total Gate Charge	Q_g	—	0.3	—	nC	$\text{V}_{\text{GS}} = -4.5\text{V}$, $\text{V}_{\text{DS}} = -10\text{V}$, $\text{I}_D = -500\text{mA}$
Gate-Source Charge	Q_{gs}	—	0.14	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.12	—	nC	
Turn-On Delay Time	$\text{t}_{\text{D}(\text{ON})}$	—	4.1	—	ns	$\text{V}_{\text{DD}} = -30\text{V}$, $\text{V}_{\text{GS}} = -10\text{V}$, $\text{R}_g = 50\Omega$, $\text{I}_D = -270\text{mA}$
Turn-On Rise Time	t_R	—	2.8	—	ns	
Turn-Off Delay Time	$\text{t}_{\text{D}(\text{OFF})}$	—	20.2	—	ns	
Turn-Off Fall Time	t_F	—	9.15	—	ns	

Notes: 8. Short duration pulse test used to minimize self-heating effect.

9. Guaranteed by design. Not subject to product testing.

Typical Characteristics - N-CHANNEL

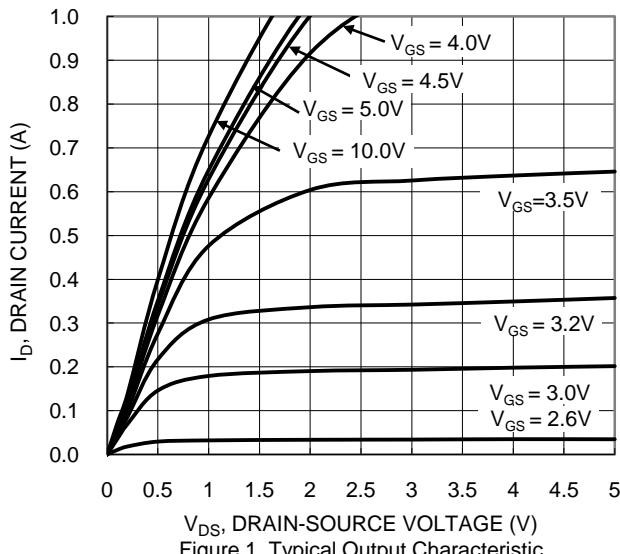


Figure 1. Typical Output Characteristic

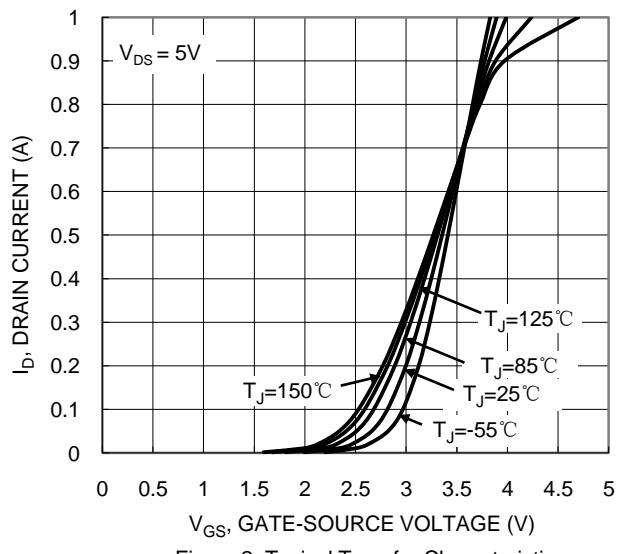


Figure 2. Typical Transfer Characteristic

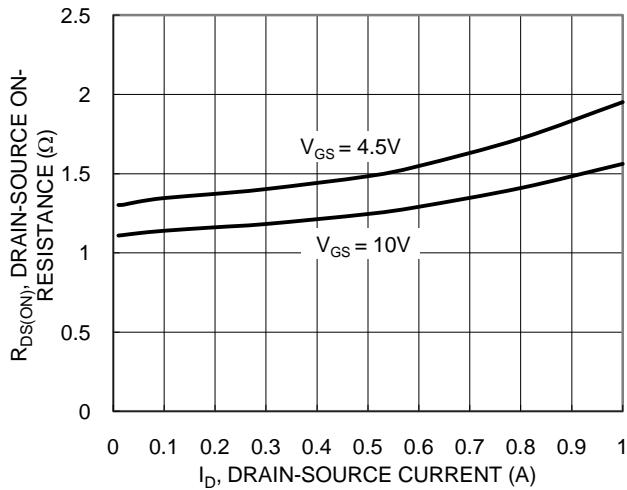


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

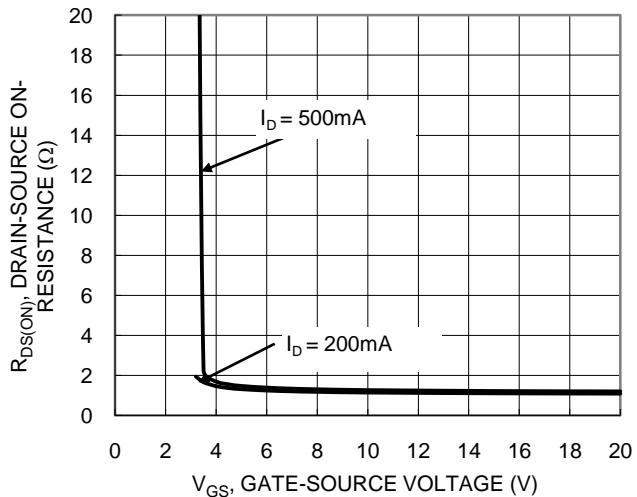


Figure 4. Typical Transfer Characteristic

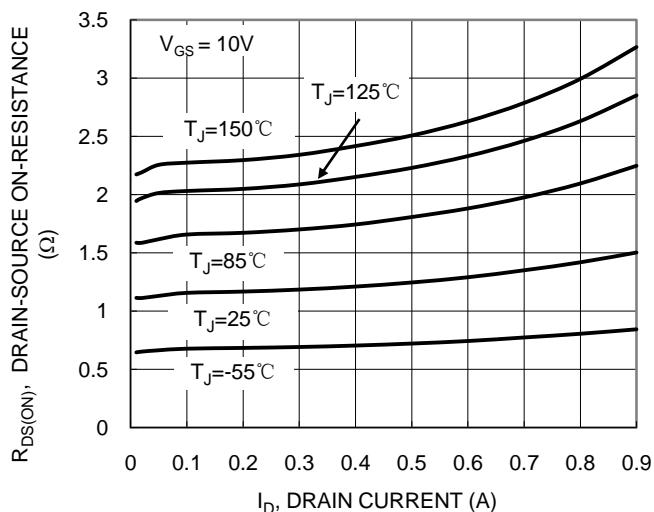


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

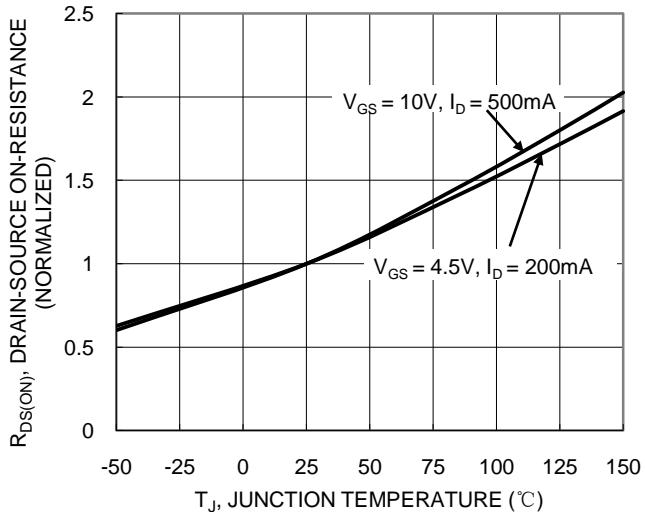
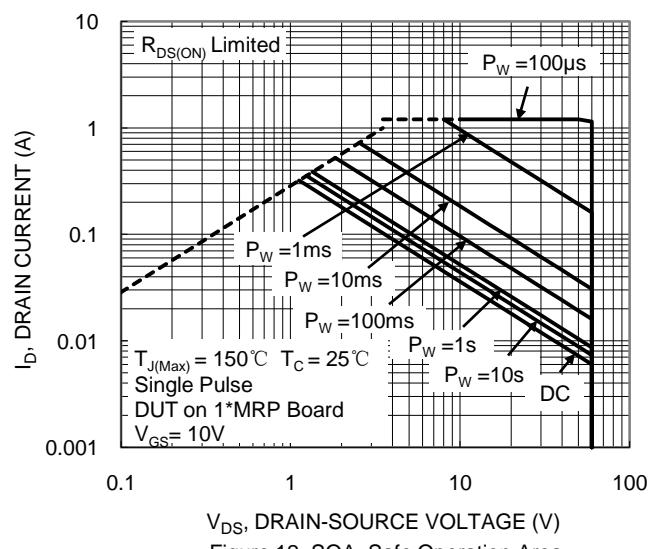
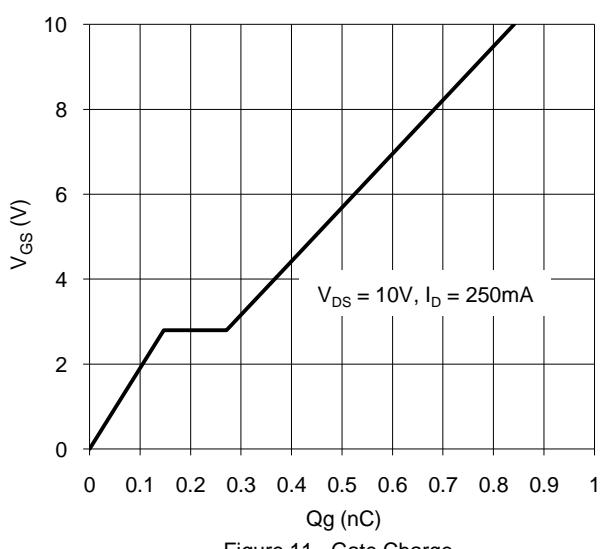
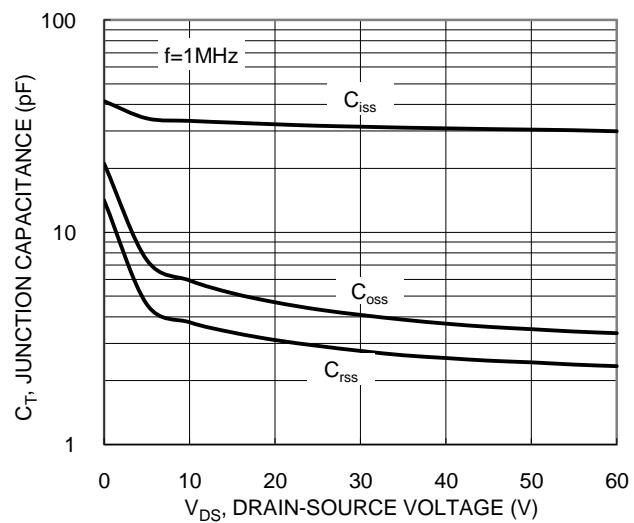
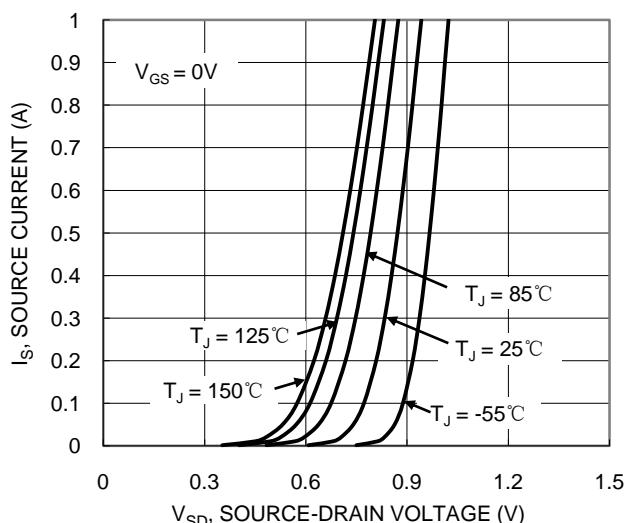
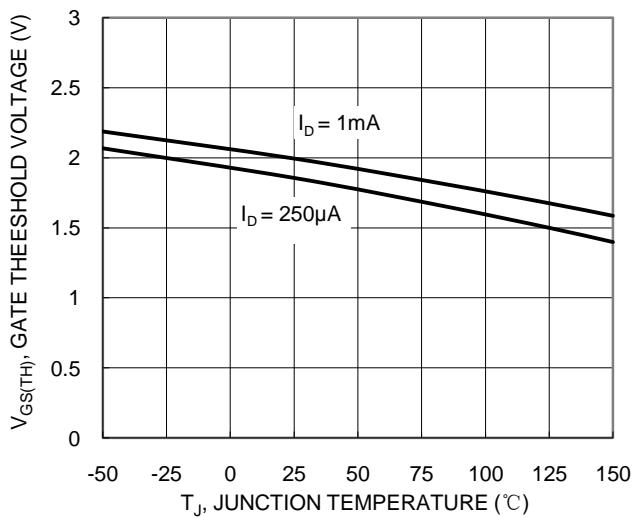
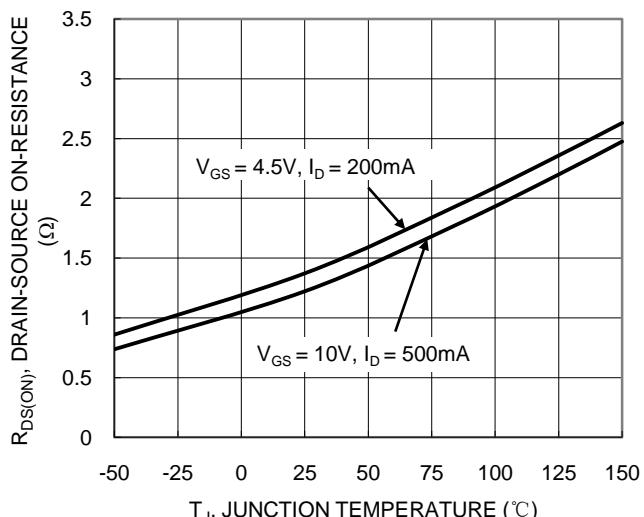


Figure 6. On-Resistance Variation with Temperature

Typical Characteristics - N-CHANNEL (Cont.)



Typical Characteristics - P-CHANNEL

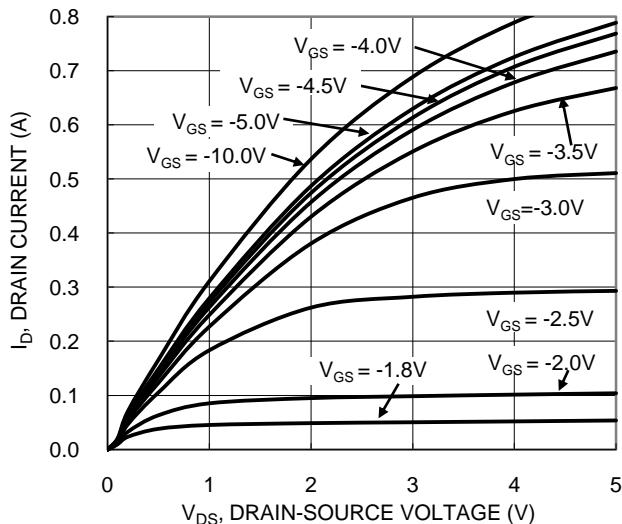


Figure 13. Typical Output Characteristic

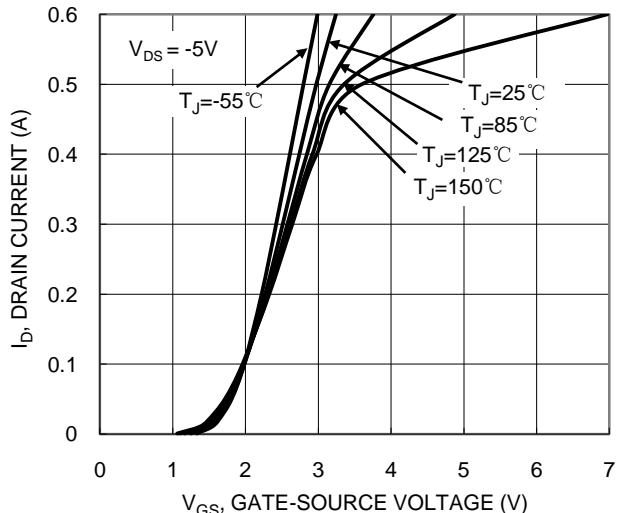


Figure 14. Typical Transfer Characteristic

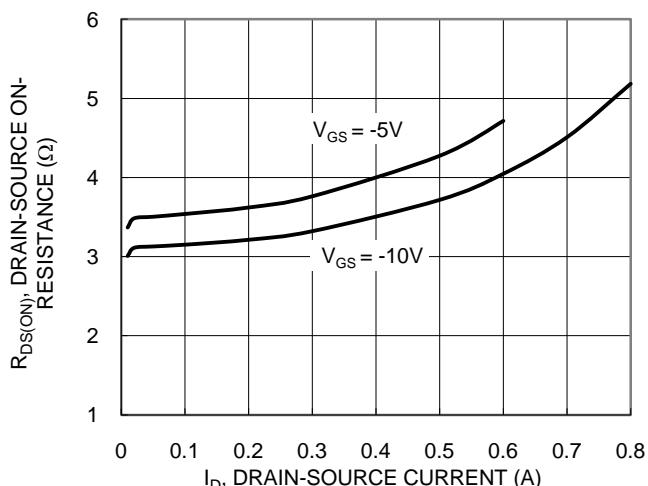


Figure 15. Typical On-Resistance vs. Drain Current and Gate Voltage

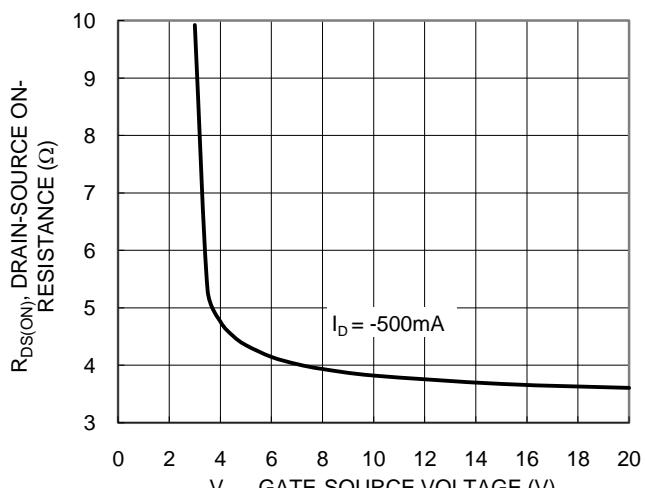


Figure 16. Typical Transfer Characteristic

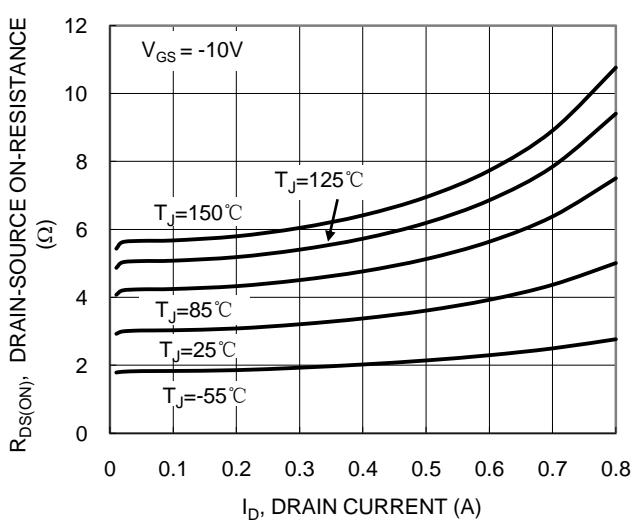


Figure 17. Typical On-Resistance vs. Drain Current and Temperature

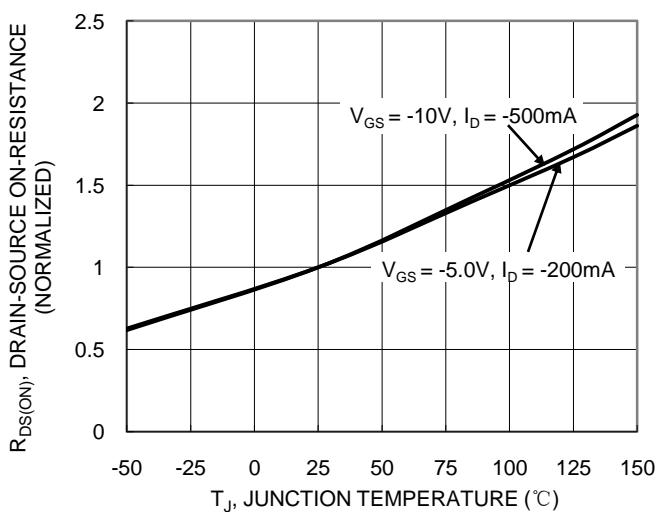


Figure 18. On-Resistance Variation with Temperature

Typical Characteristics - P-CHANNEL (Cont.)

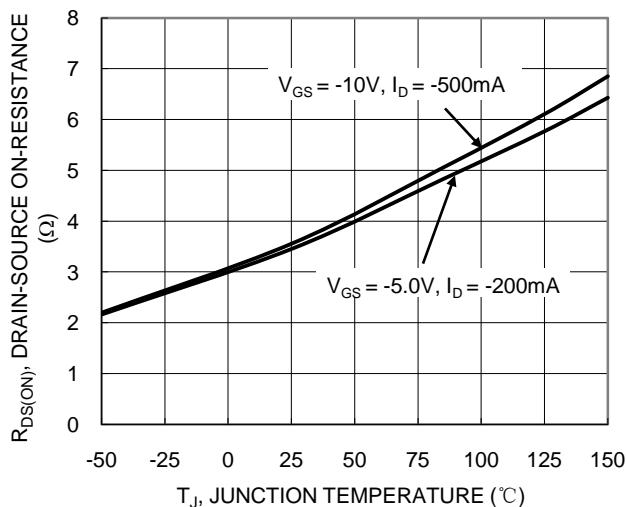


Figure 19. On-Resistance Variation with Temperature

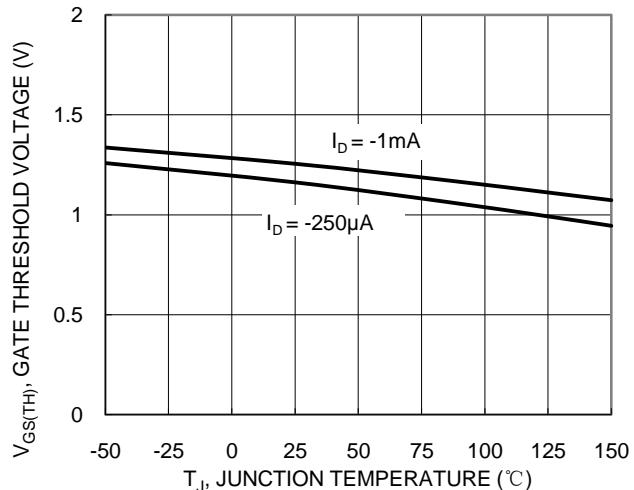


Figure 20. Gate Threshold Variation vs. Junction Temperature

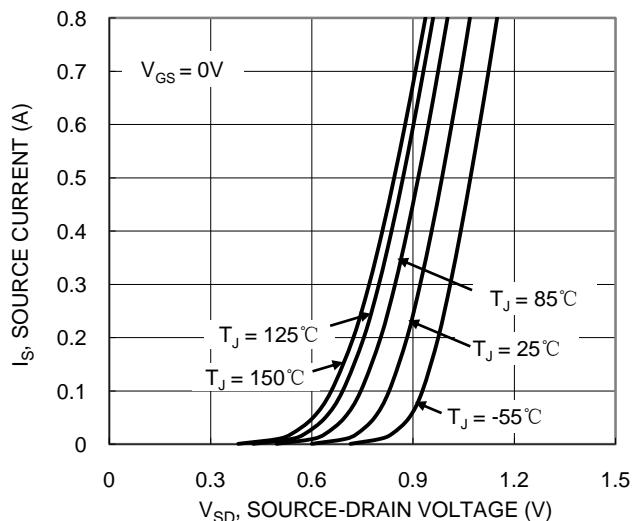


Figure 21. Diode Forward Voltage vs. Current

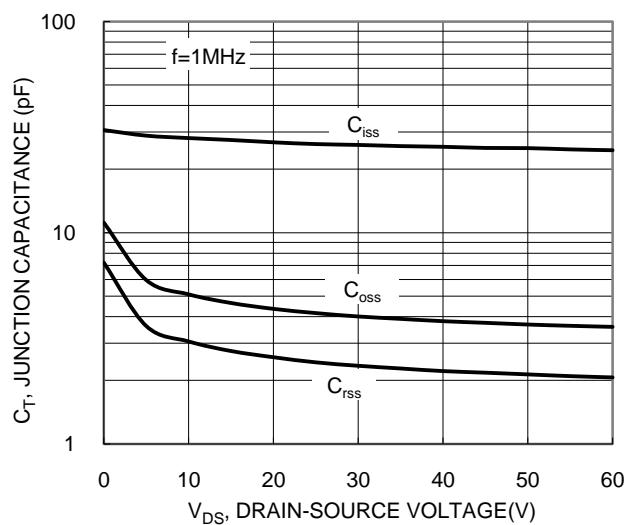


Figure 22. Typical Junction Capacitance

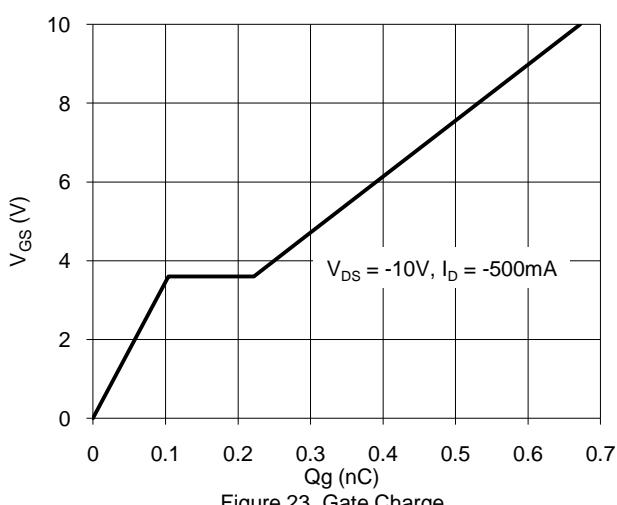


Figure 23. Gate Charge

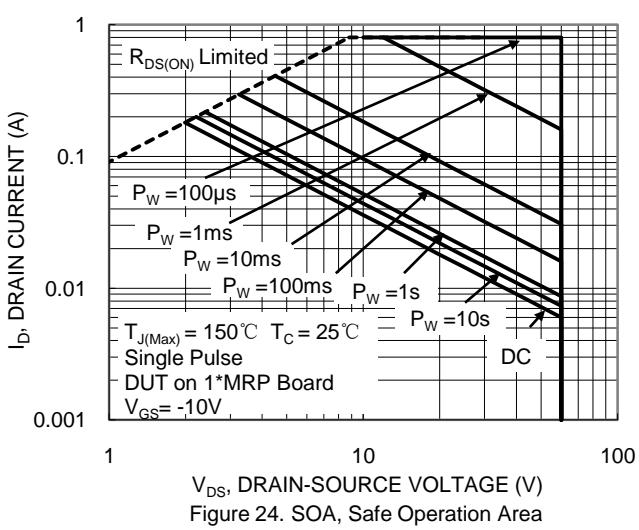


Figure 24. SOA, Safe Operation Area

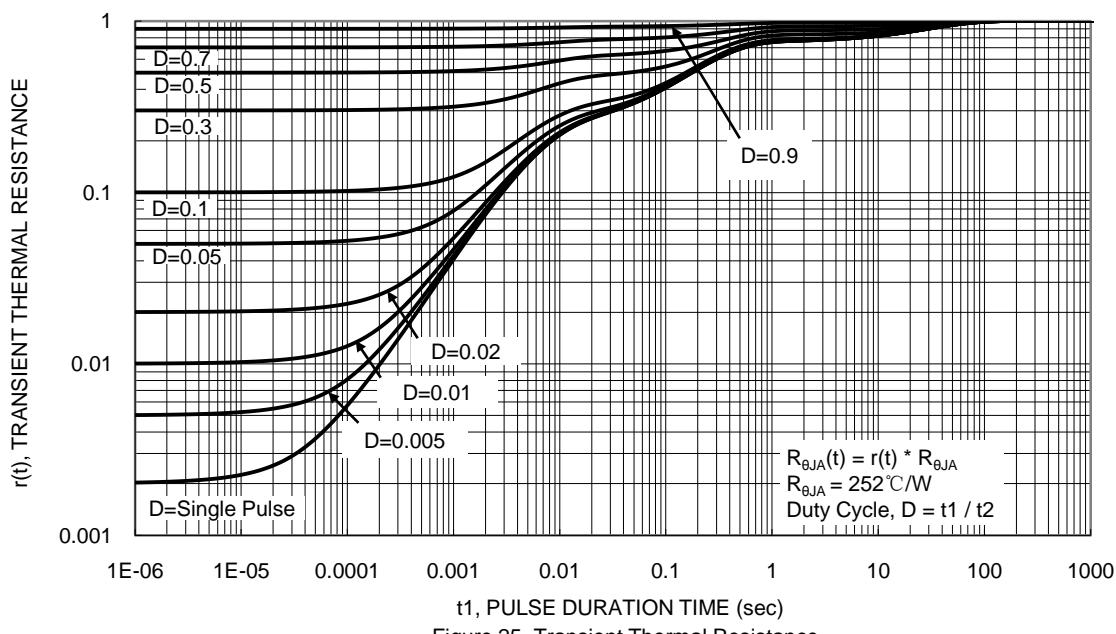
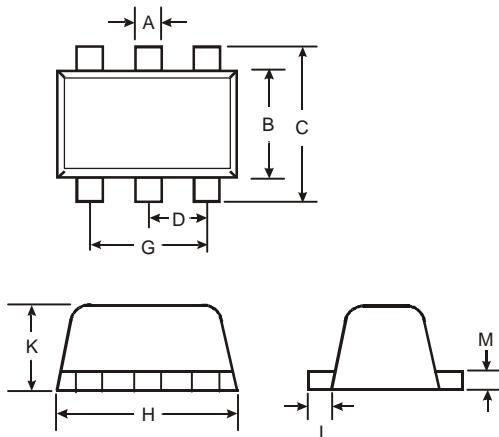


Figure 25. Transient Thermal Resistance

Package Outline Dimensions

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

SOT563



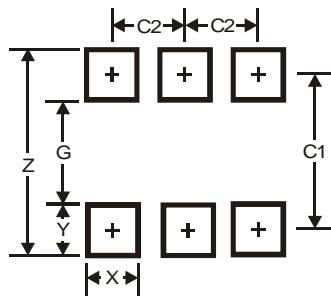
SOT563			
Dim	Min	Max	Typ
A	0.15	0.30	0.20
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	-	-	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.55	0.60	0.60
L	0.10	0.30	0.20
M	0.10	0.18	0.11

All Dimensions in mm

Suggested Pad Layout

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

SOT563



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

IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2017, Diodes Incorporated

www.diodes.com