COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

NEW PRODUCT

Features

- Low On-Resistance
- Low Gate Threshold Voltage $V_{GS(th)}$ <1V
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Complementary Pair MOSFET
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 2)**
- **ESD Protected Gate to 2.5kV HBM**
- **"Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

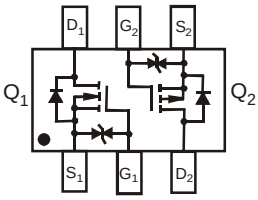
- Case: SOT-563
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 7
- Ordering Information: See Page 7
- Weight: 0.006 grams (approximate)

SOT-563

ESD PROTECTED TO 2.5kV HBM

TOP VIEW

BOTTOM VIEW



TOP VIEW
Internal Schematic

Maximum Ratings N-CHANNEL – Q_1 @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Drain Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±6	V
Drain Current (Note 1)	T_A = 25°C T_A = 85°C	I_D	870 630	mA

Maximum Ratings P-CHANNEL – Q_2 @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Drain Source Voltage		V_{DSS}	-20	V
Gate-Source Voltage		V_{GSS}	±6	V
Drain Current (Note 1)	T_A = 25°C T_A = 85°C	I_D	-640 -460	mA

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 1)	P_D	530	mW
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	235	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes:
1. Device mounted on FR-4 PCB.
2. No purposefully added lead.
3. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.

NEW PRODUCT

Electrical Characteristics N-CHANNEL – Q_1 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 4)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	100	nA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	± 1.0	μA	V_{GS} = ±4.5V, V_{DS} = 0V
ON CHARACTERISTICS (Note 4)						
Gate Threshold Voltage	$V_{GS(th)}$	0.5	—	1.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	— — —	0.3 0.4 0.5	0.4 0.5 0.7	Ω	V_{GS} = 4.5V, I_D = 600mA V_{GS} = 2.5V, I_D = 500mA V_{GS} = 1.8V, I_D = 350mA
Forward Transfer Admittance	$\|Y_{fs}\|$	—	1.4	—	S	V_{DS} =10V, I_D = 400mA
Diode Forward Voltage (Note 4)	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 150mA
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	—	60.67	—	pF	V_{DS} = 16V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	9.68	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	5.37	—	pF	
Total Gate Charge	Q_g	—	736.6	—	pC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 250mA
Gate-Source Charge	Q_{gs}	—	93.6	—		
Gate-Drain Charge	Q_{gd}	—	116.6	—		
Turn-On Delay Time	$t_{d(on)}$	—	5.1	—	ns	V_{DD} = 10V, V_{GS} = 4.5V, R_L = 47Ω, R_G = 10Ω, I_D = 200mA
Turn-On Rise Time	t_r	—	7.4	—		
Turn-Off Delay Time	$t_{d(off)}$	—	26.7	—		
Turn-Off Fall Time	t_f	—	12.3	—		

Electrical Characteristics P-CHANNEL – Q_2 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 4)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	V_{GS} = 0V, I_D = -250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-100	nA	V_{DS} = -20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	± 2.0	μA	V_{GS} = ±4.5V, V_{DS} = 0V
ON CHARACTERISTICS (Note 4)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	—	-1.0	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	0.5 0.7 1.0	0.7 0.9 1.3	Ω	V_{GS} = -4.5V, I_D = -430mA V_{GS} = -2.5V, I_D = -300mA V_{GS} = -1.8V, I_D = -150mA
Forward Transfer Admittance	$\|Y_{fs}\|$	—	-0.9	—	S	V_{DS} =10V, I_D = -250mA
Diode Forward Voltage (Note 4)	V_{SD}	—	-0.8	-1.2	V	V_{GS} = 0V, I_S = -150mA
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	—	59.76	—	pF	V_{DS} = -16V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	12.07	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	6.36	—	pF	
Total Gate Charge	Q_g	—	622.4	—	pC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -250mA
Gate-Source Charge	Q_{gs}	—	100.3	—		
Gate-Drain Charge	Q_{gd}	—	132.2	—		
Turn-On Delay Time	$t_{d(on)}$	—	5.1	—	ns	V_{DD} = -10V, V_{GS} = -4.5V, R_L = 47Ω, R_G = 10Ω, I_D = -200mA
Turn-On Rise Time	t_r	—	8.1	—		
Turn-Off Delay Time	$t_{d(off)}$	—	28.4	—		
Turn-Off Fall Time	t_f	—	20.7	—		

Notes: 4. Short duration pulse test used to minimize self-heating effect.

NEW PRODUCT

N-CHANNEL – Q_1

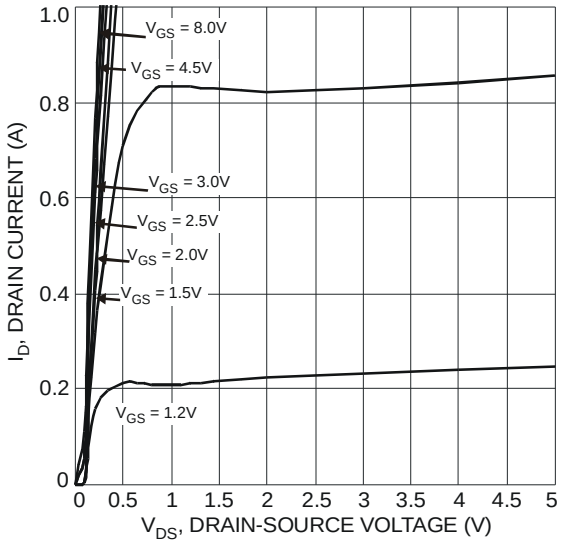


Fig. 1 Typical Output Characteristic

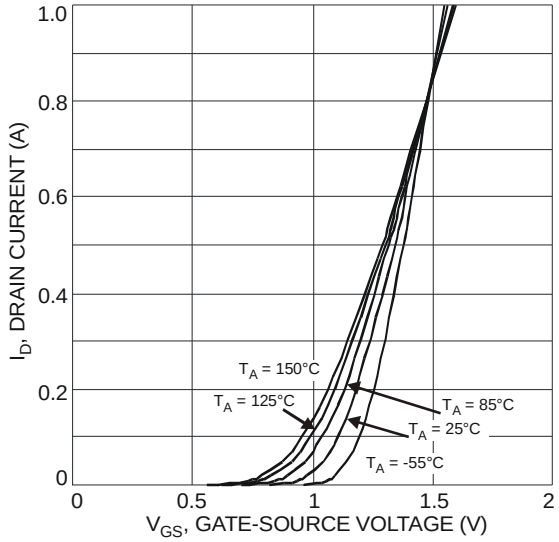


Fig. 2 Typical Transfer Characteristic

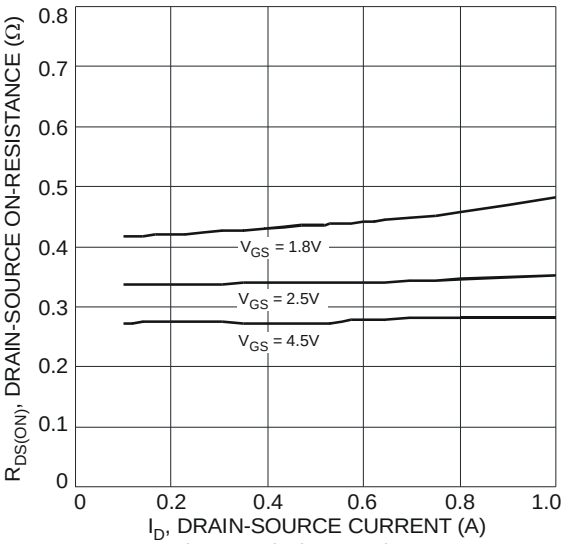


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

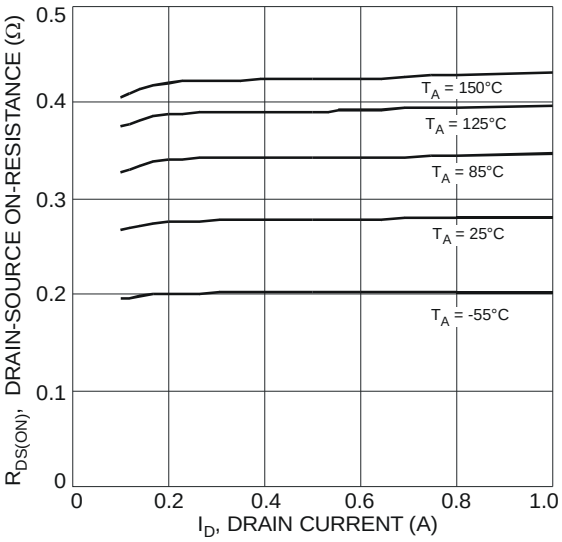


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

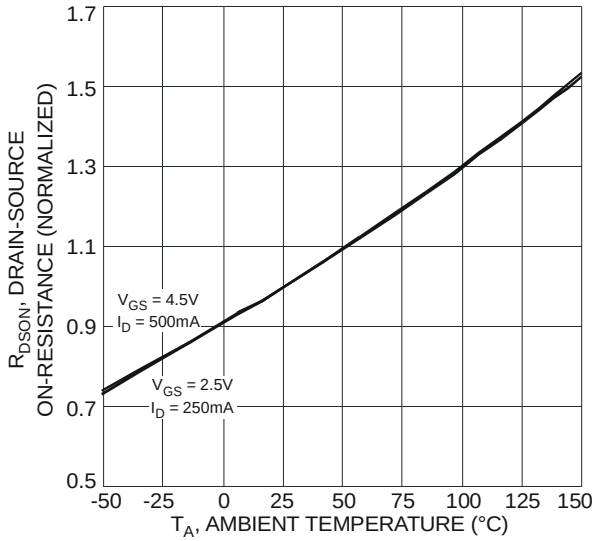


Fig. 5 On-Resistance Variation with Temperature

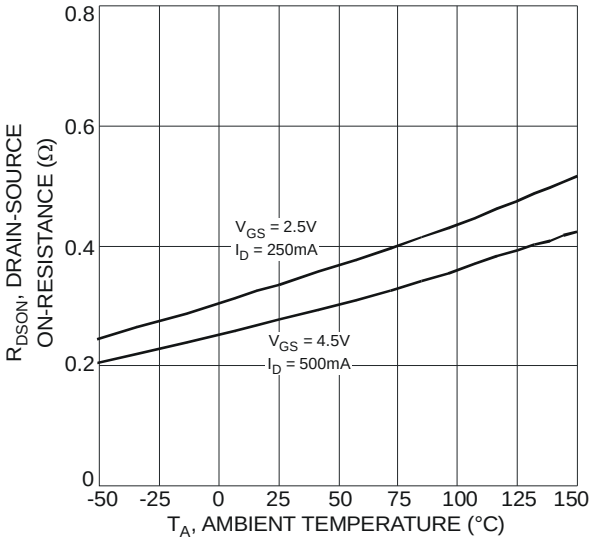


Fig. 6 On-Resistance Variation with Temperature

NEW PRODUCT

N-CHANNEL – Q_1 (continued)

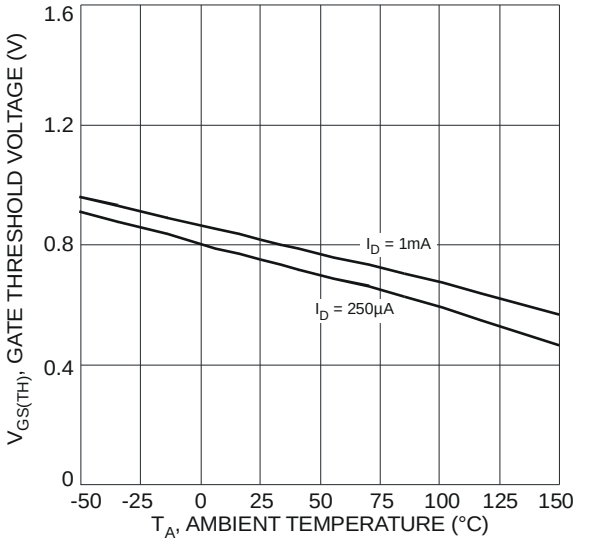


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

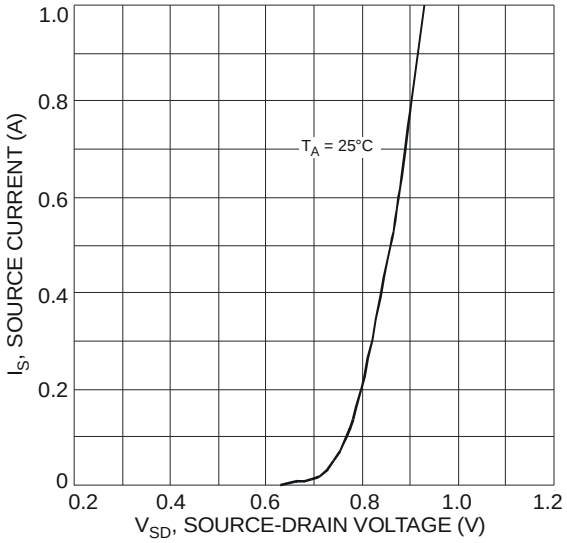


Fig. 8 Diode Forward Voltage vs. Current

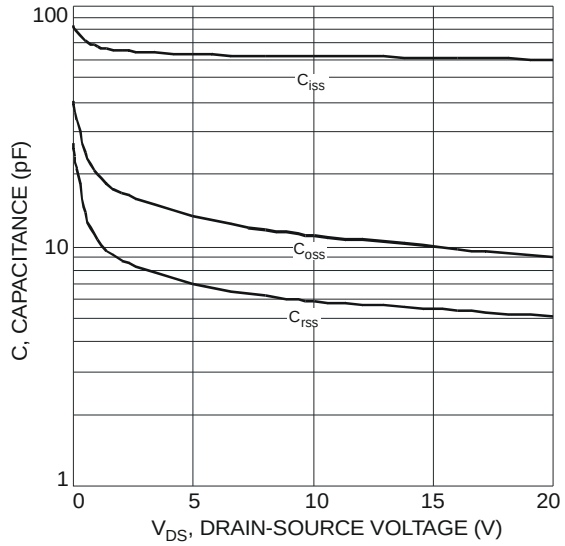


Fig. 9 Typical Total Capacitance

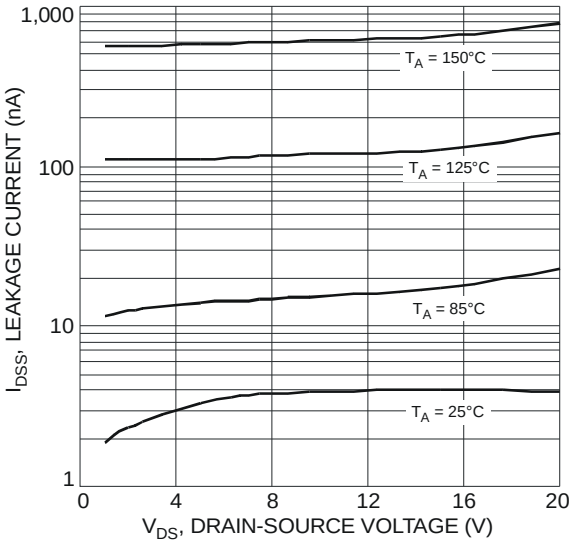


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

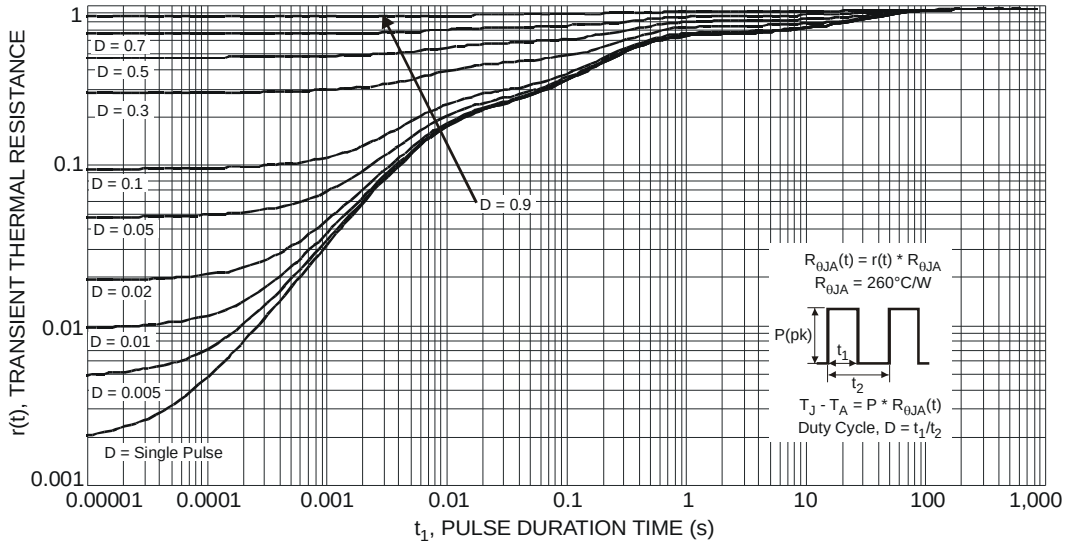


Fig. 11 Transient Thermal Response

NEW PRODUCT

P-CHANNEL – Q_2

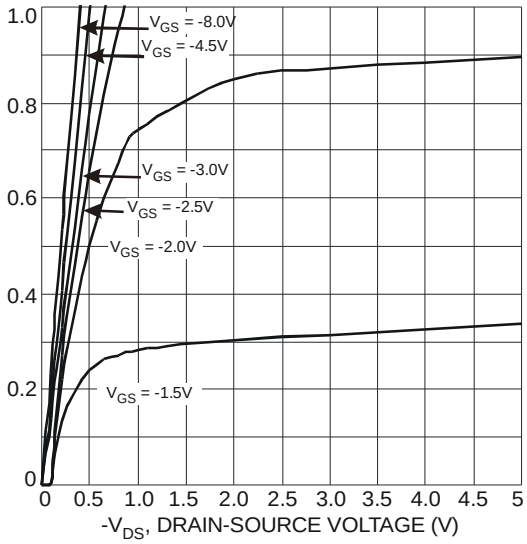


Fig. 12 Typical Output Characteristic

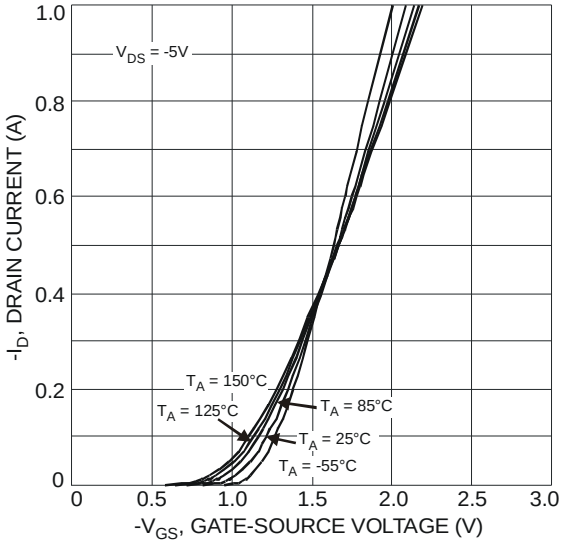


Fig. 13 Typical Transfer Characteristic

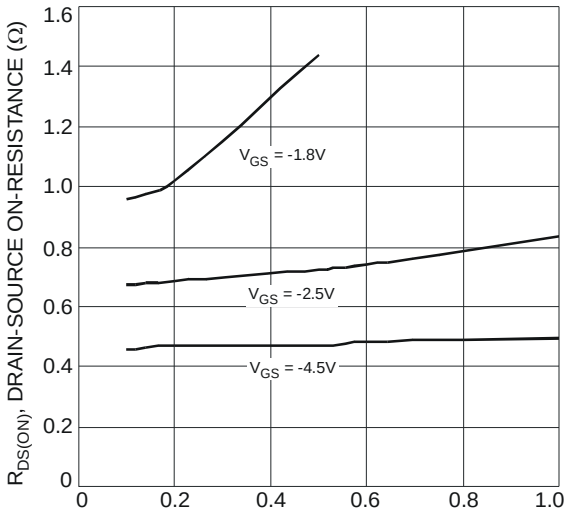


Fig. 14 Typical On-Resistance
vs. Drain Current and Gate Voltage

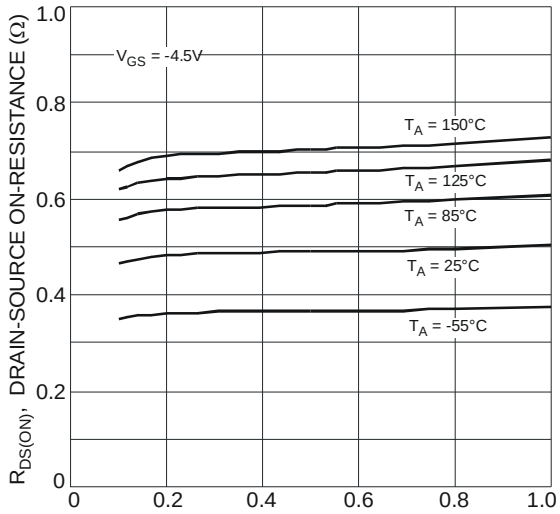


Fig. 15 Typical On-Resistance
vs. Drain Current and Temperature

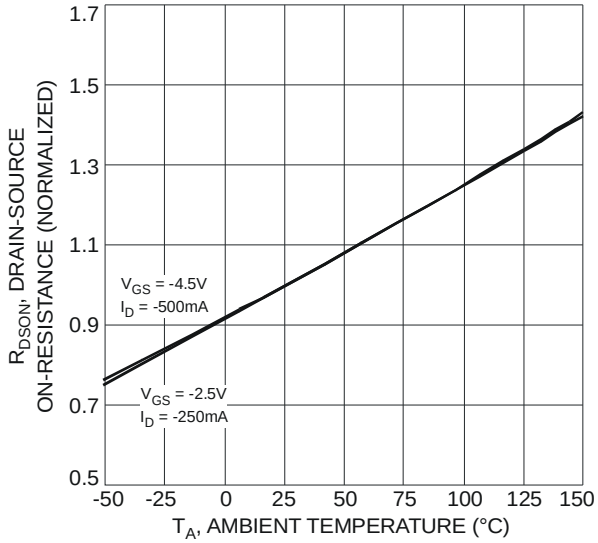


Fig. 16 On-Resistance Variation with Temperature

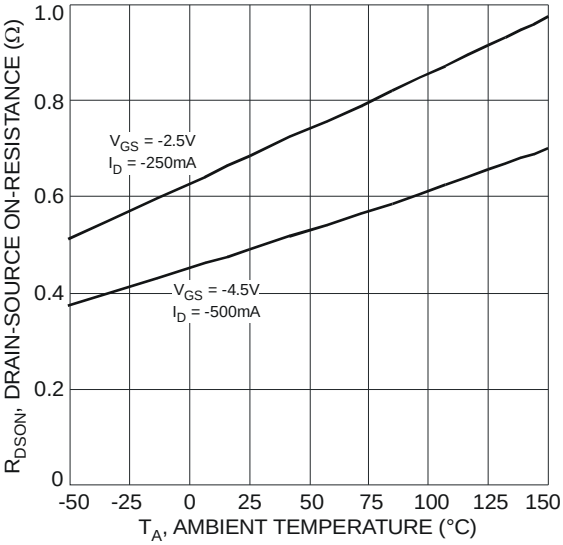


Fig. 17 On-Resistance Variation with Temperature

NEW PRODUCT

P-CHANNEL – Q_2 (continued)

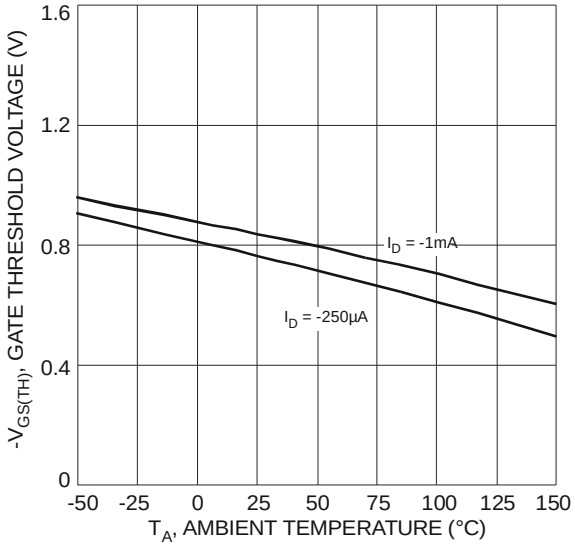


Fig. 18 Gate Threshold Variation vs. Ambient Temperature

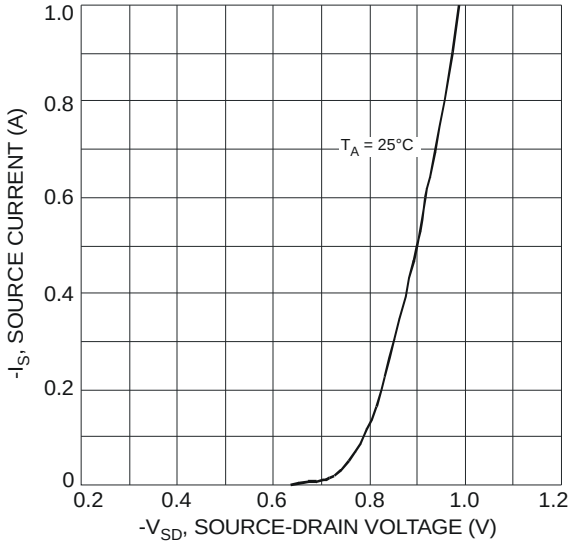


Fig. 19 Diode Forward Voltage vs. Current

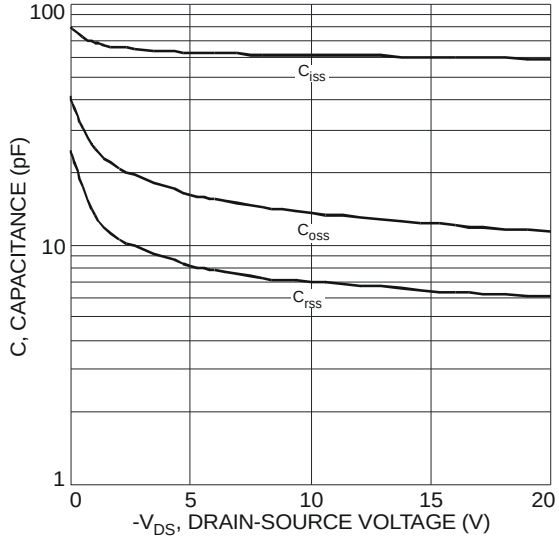


Fig. 20 Typical Total Capacitance

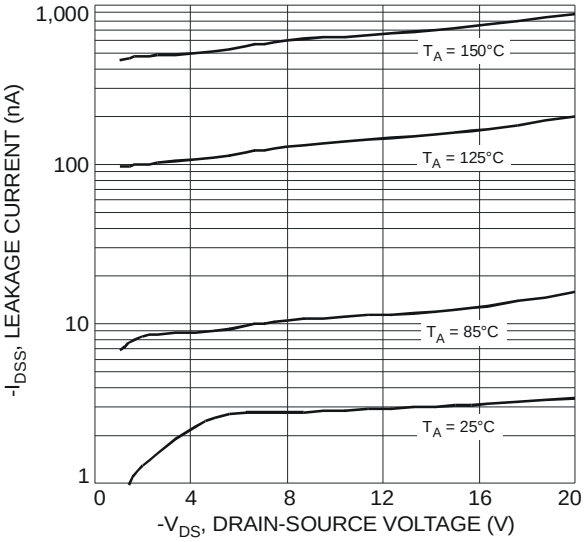


Fig. 21 Typical Leakage Current vs. Drain-Source Voltage

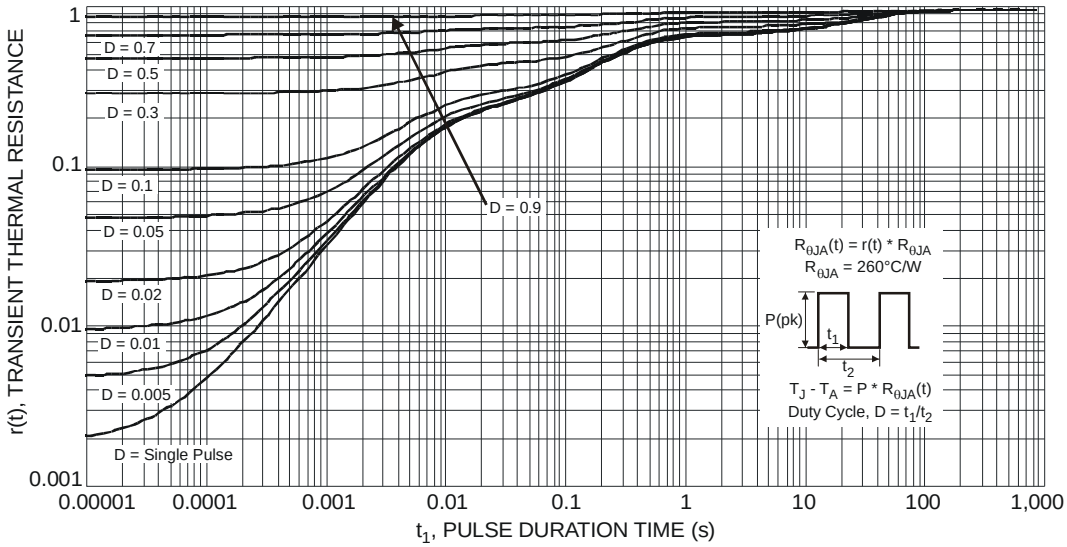


Fig. 22 Transient Thermal Response

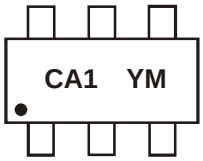
NEW PRODUCT

Ordering Information (Note 5)

Part Number	Case	Packaging
DMG1016V-7	SOT-563	3000/Tape & Reel

Notes: 5. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information



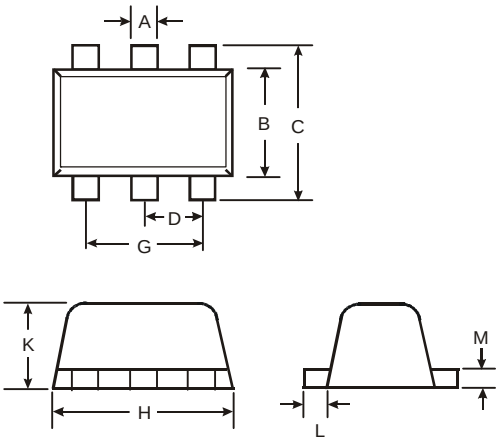
CA1 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: W = 2009)
M = Month (ex: 9 = September)

Date Code Key

Year	2009	2010	2011	2012	2013	2014	2015
Code	W	X	Y	Z	A	B	C

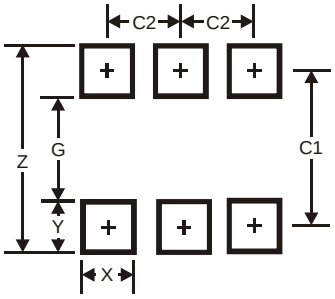
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Package Outline Dimensions



SOT-563			
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

NEW PRODUCT

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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.

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