

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) max}$	Package	I_D $T_A = +25^\circ C$
-20V	0.9Ω @ $V_{GS} = -4.5V$	SOT23	-430mA
	2.0Ω @ $V_{GS} = -1.8V$		-150mA

Description

This new generation 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.

Applications

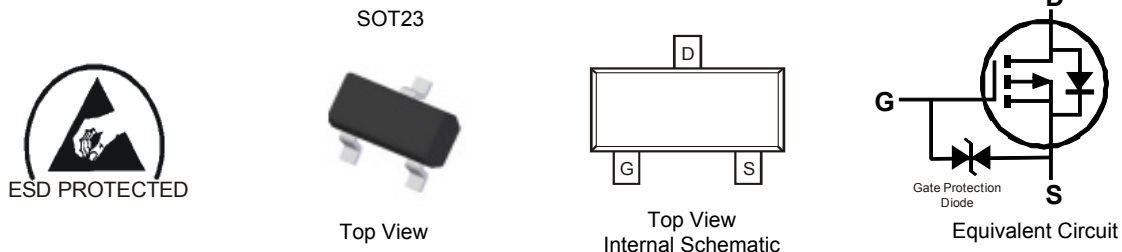
- DC-DC Converters
- Power Management Functions

Features

- Low On-Resistance
- Very Low Gate Threshold Voltage $V_{GS(TH)} < 1V$
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- ESD Protected Gate
- Qualified to AEC-Q101 standards for High Reliability

Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding
- Compound: UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe.
- Solderable per MIL-STD-202, Method 208 ③
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)

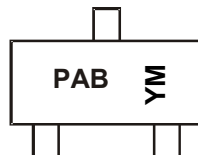


Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMP2004K-7	Standard	SOT23	3,000/Tape & Reel
DMP2004KQ-7	Automotive	SOT23	3,000/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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



PAB = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: B = 2014)
 M = Month (ex: 9 = September)

Date Code Key

Year	2008	2009	2010	2011	2012	2013	2014	2015
Code	V	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

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

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	-20	V
Gate-Source Voltage	V_{GSS}	± 8	V
Continuous Drain Current (Note 5) $V_{GS} = -4.5\text{V}$	I_D	-600	mA
Pulsed Drain Current	I_{DM}	-1.9	A

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	550	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	227	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 1.0	μA	$V_{GS} = \pm 4.5\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	—	-1.0	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	0.7	0.9	Ω	$V_{GS} = -4.5\text{V}, I_D = -430\text{mA}$
		—	1.1	1.4		$V_{GS} = -2.5\text{V}, I_D = -300\text{mA}$
		—	1.7	2.0		$V_{GS} = -1.8\text{V}, I_D = -150\text{mA}$
Forward Transfer Admittance	$ Y_{fs} $	200	—	—	mS	$V_{DS} = -10\text{V}, I_D = -0.2\text{A}$
Diode Forward Voltage (Note 6)	V_{SD}	-0.5	—	-1.2	V	$V_{GS} = 0\text{V}, I_S = -115\text{mA}$
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{ISS}	—	—	175	pF	$V_{DS} = -16\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{OSS}	—	—	30	pF	
Reverse Transfer Capacitance	C_{RSS}	—	—	20	pF	
Turn-On Delay Time	$t_{D(on)}$	—	8.5	—	ns	$V_{DD} = -3\text{V}, V_{GS} = -2.5\text{V},$ $R_L = 300\Omega, R_G = 25\Omega,$ $I_D = -100\text{mA}$
Turn-On Rise Time	t_r	—	4.3	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	20.2	—	ns	
Turn-Off Fall Time	t_f	—	19.2	—	ns	

- Notes:
5. Device mounted on FR-4 PCB.
 6. Short duration pulse test used to minimize self-heating effect.
 7. Guaranteed by design. Not subject to product testing.

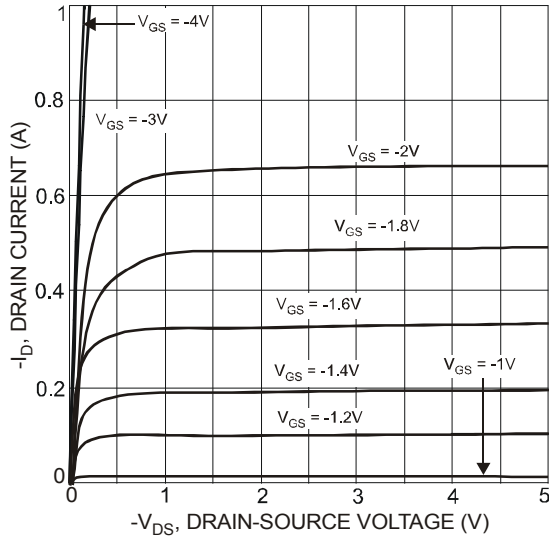


Figure 1 Typical Output Characteristics

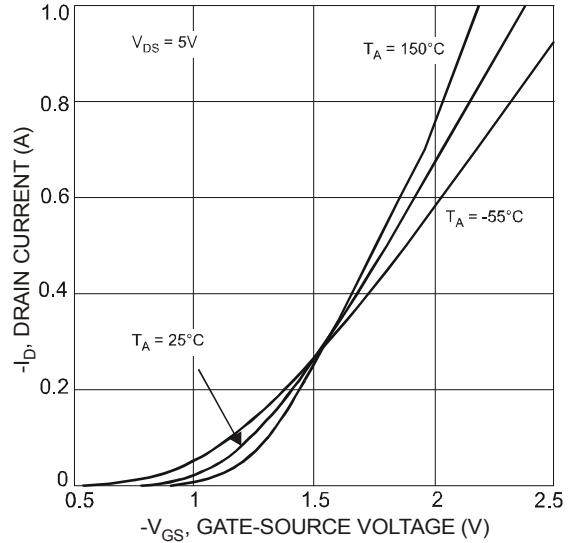


Figure 2 Typical Transfer Characteristics

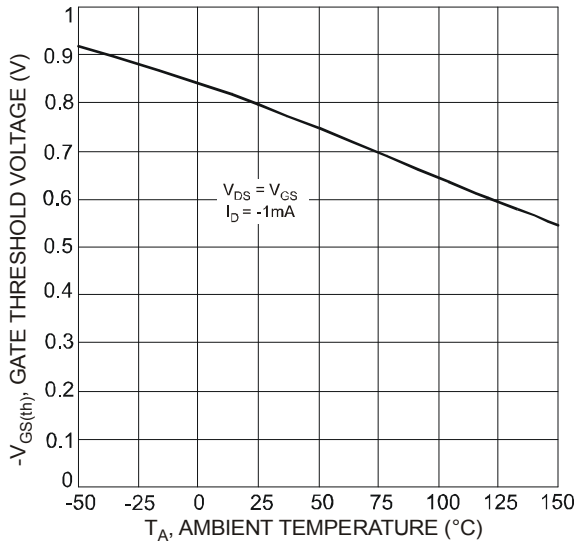


Figure 3 Gate Threshold Voltage vs. Ambient Temperature

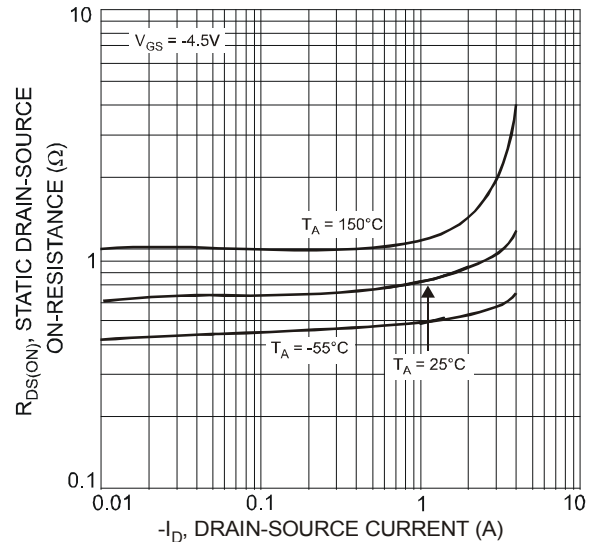


Figure 4 Static Drain-Source On-Resistance vs. Drain Current

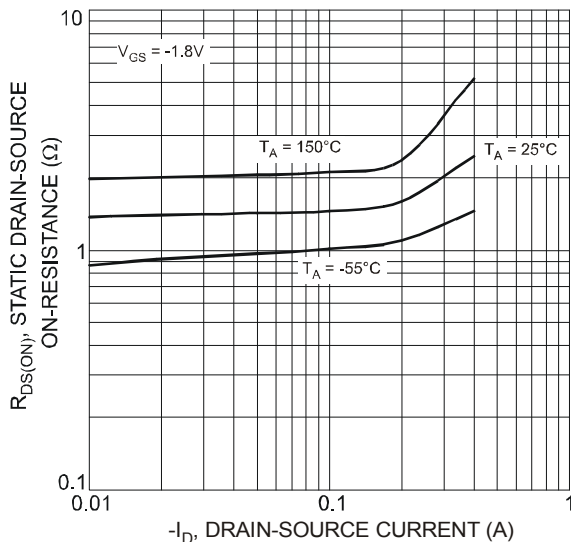


Figure 5 Static Drain-Source On-Resistance vs. Drain Current

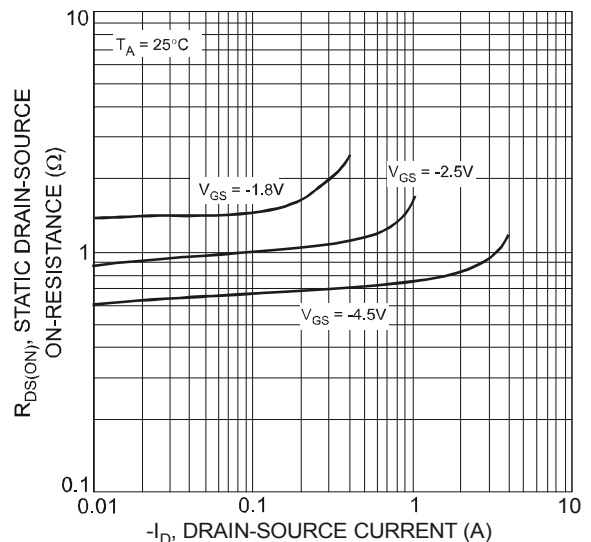


Figure 6 Static Drain-Source On-Resistance vs. Drain-Source Current

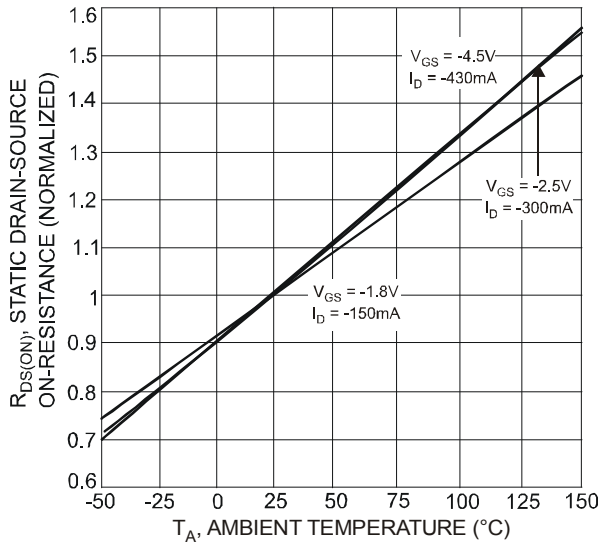


Figure 7 Static Drain-Source On-State Resistance vs. Ambient Temperature

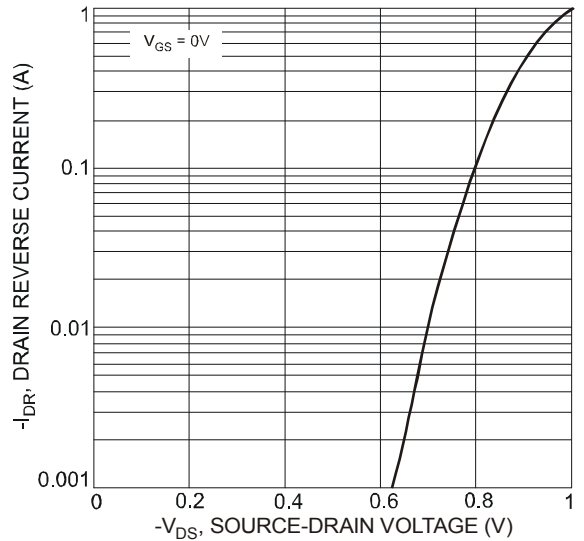


Figure 8 Reverse Drain Current vs. Source-Drain Voltage

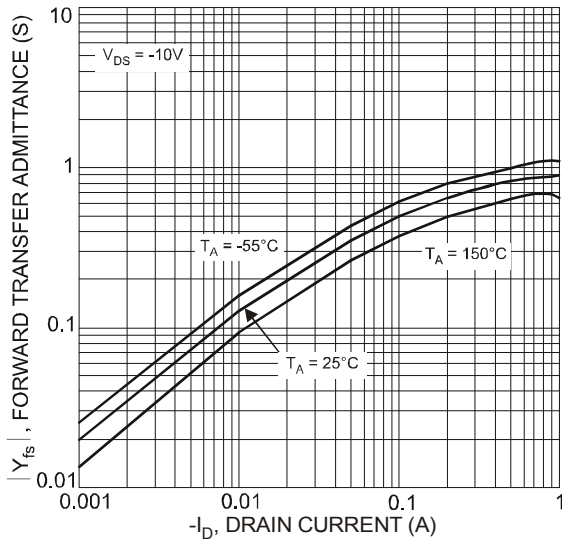


Figure 9 Forward Transfer Admittance vs. Drain Current

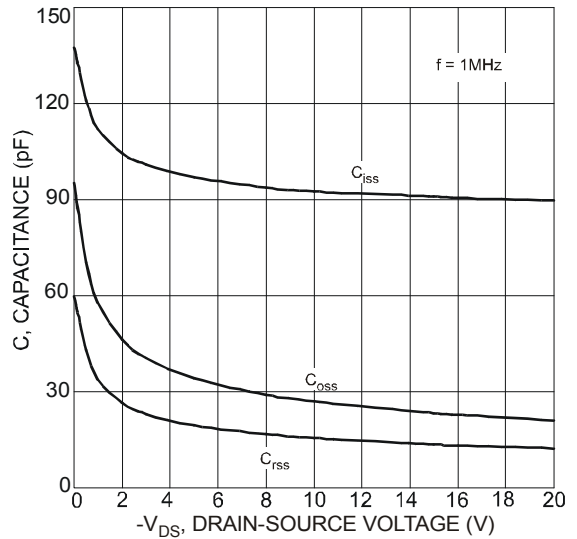
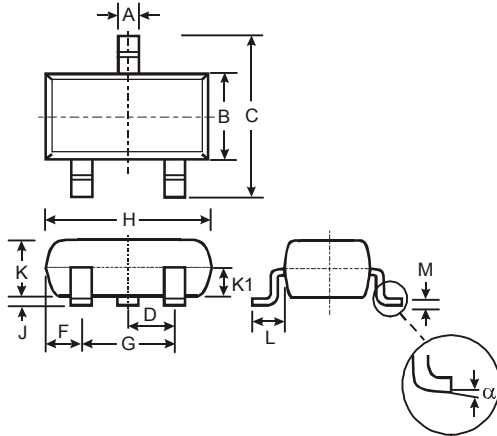


Figure 10 Typical Capacitance

Package Outline Dimensions

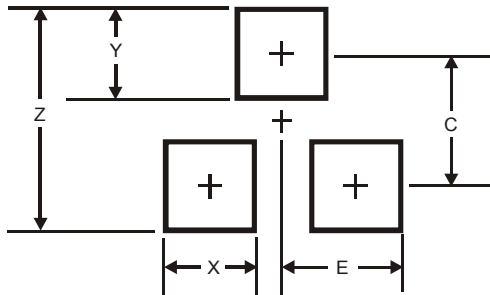
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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