

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) MAX}$	Package	$I_D$ $T_A = +25^\circ C$
-20V	38m $\Omega$ @ $V_{GS} = -10V$	SOT23	-4.3A
	43m $\Omega$ @ $V_{GS} = -4.5V$		-4.0A
	75m $\Omega$ @ $V_{GS} = -2.5V$		-2.8A

## 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

- Load Switch
- Power Management Functions

## Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected Up To 3kV**
- **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**

## Mechanical Data

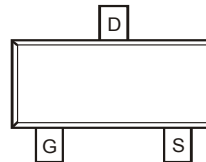
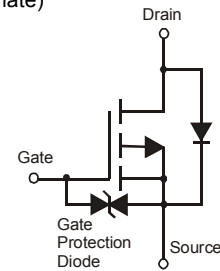
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe.
- Solderable per MIL-STD-202, Method 208
- Terminals Connections: See Diagram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



SOT23



Top View


 Top View  
Internal Schematic


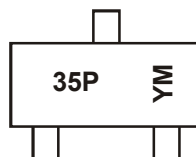
Equivalent Circuit

## Ordering Information (Note 4 & 5)

Part Number	Compliance	Case	Packaging
DMP2100U-7	Standard	SOT23	3,000/Tape & Reel
DMP2100UQ-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](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>.
  5. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_grade\\_definitions/](http://www.diodes.com/quality/product_grade_definitions/).

## Marking Information



35P = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: V = 2008)  
 M = Month (ex: 9 = September)

### Date Code Key

Year Code	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	V	W	X	Y	Z	A	B	C	D	E	F

Month Code	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	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	Unit	
Drain-Source Voltage	$V_{DSS}$	-20	V	
Gate-Source Voltage (Note 6)	$V_{GSS}$	$\pm 10$	V	
Continuous Drain Current (Note 8) $V_{GS} = -10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	-4.3	A
		$T_A = +70^\circ\text{C}$	-3.4	A
	$t < 5\text{s}$	$T_A = +25^\circ\text{C}$	-5.5	A
		$T_A = +70^\circ\text{C}$	-4.3	A
Maximum Continuous Body Diodes Forward Current (Note 8)	$I_S$	-2	A	
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	-30	A	

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 7)	$P_D$	$T_A = +25^\circ\text{C}$	0.8	W
		$T_A = +70^\circ\text{C}$	0.5	
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	Steady State	161	$^\circ\text{C/W}$
		$t < 5\text{s}$	96	
Total Power Dissipation (Note 8)	$P_D$	$T_A = +25^\circ\text{C}$	1.3	W
		$T_A = +70^\circ\text{C}$	0.8	
Thermal Resistance, Junction to Ambient (Note 8)	$R_{\theta JA}$	Steady State	99	$^\circ\text{C/W}$
		$t < 5\text{s}$	60	
Thermal Resistance, Junction to Case (Note 8)	$R_{\theta JC}$	15	$^\circ\text{C/W}$	
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
<b>OFF CHARACTERISTICS (Note 9)</b>						
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	$\mu\text{A}$	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 9)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	-0.3	—	-1.4	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	25	38	m $\Omega$	$V_{GS} = -10\text{V}, I_D = -3.5\text{A}$
		—	29	43		$V_{GS} = -4.5\text{V}, I_D = -3\text{A}$
		—	37	75		$V_{GS} = -2.5\text{V}, I_D = -1\text{A}$
		—	47	—		$V_{GS} = -1.8\text{V}, I_D = -0.5\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	3	—	S	$V_{DS} = -5\text{V}, I_D = -4\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	$C_{iss}$	—	216	—	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	90	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	24	—	pF	
Gate Resistor	$R_g$	—	250	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
<b>SWITCHING CHARACTERISTICS (Note 10)</b>						
Total Gate Charge	$Q_g$	—	9.1	—	nC	$V_{GS} = -4.5\text{V}, V_{DS} = -10\text{V}$ $I_D = -4\text{A}$
Gate-Source Charge	$Q_{gs}$	—	1.6	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	2.0	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	80	—	ns	$V_{DS} = -10\text{V}, V_{GS} = -4.5\text{V},$ $R_D = 2.5\Omega, R_G = 3.0\Omega$
Turn-On Rise Time	$t_r$	—	155	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	688	—	ns	
Turn-Off Fall Time	$t_f$	—	423	—	ns	

- Notes:
- AEC-Q101  $V_{GS}$  maximum is  $\pm 9.6\text{V}$
  - Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

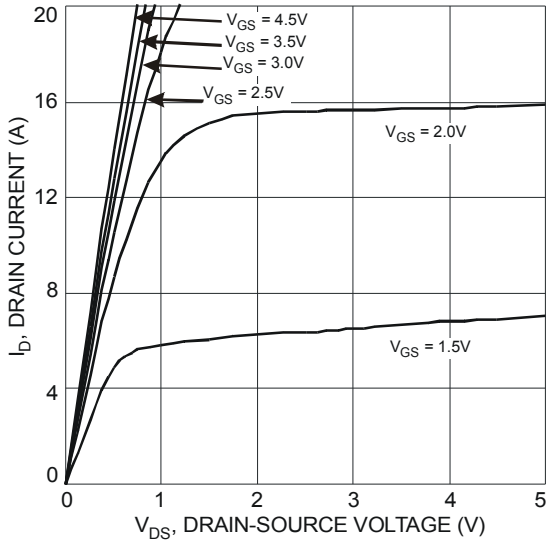


Fig. 1 Typical Output Characteristic

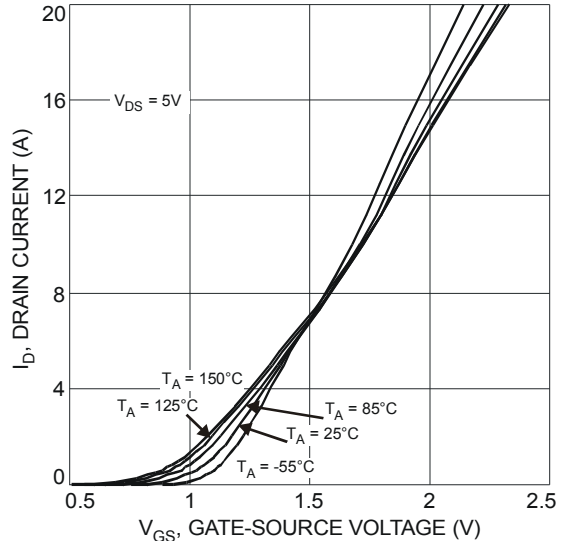


Fig. 2 Typical Transfer Characteristic

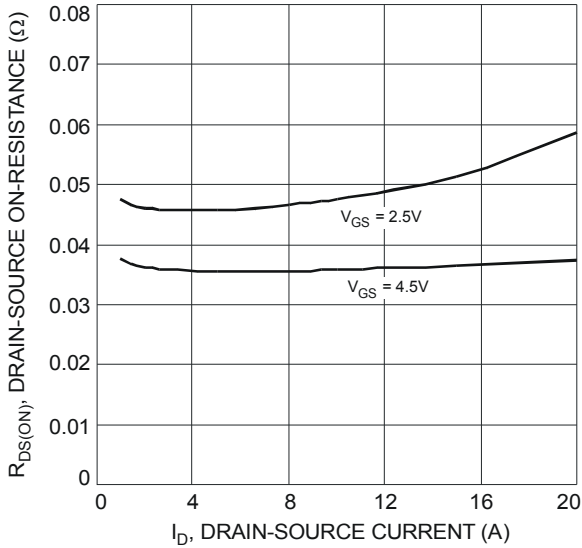


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

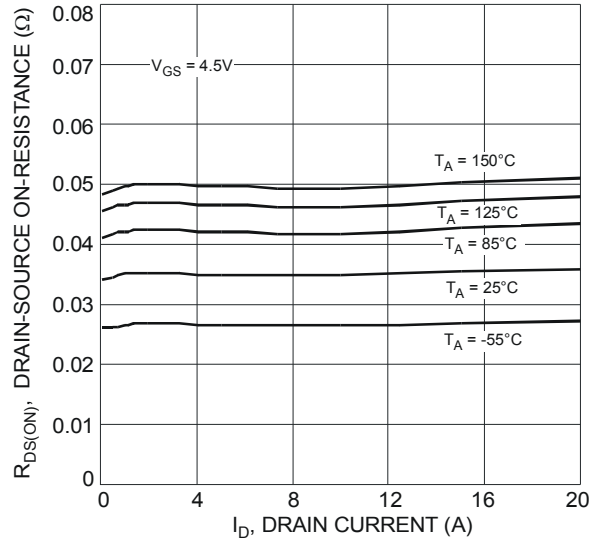


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

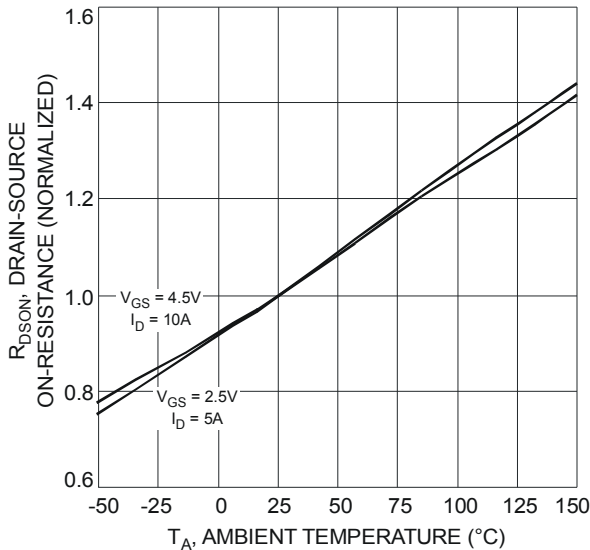


Fig. 5 On-Resistance Variation with Temperature

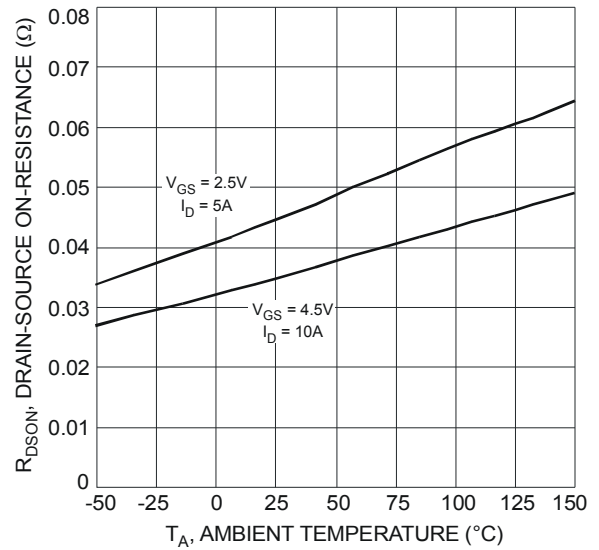


Fig. 6 On-Resistance Variation with Temperature

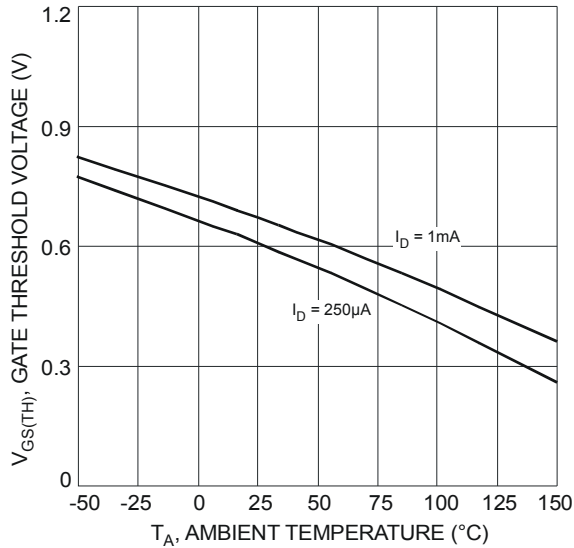


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

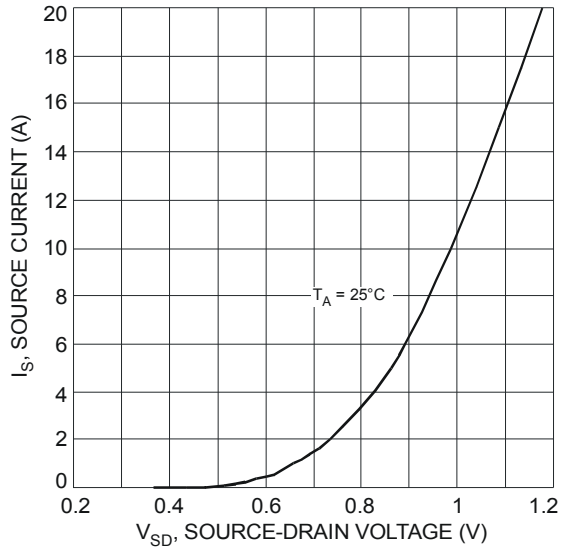


Fig. 8 Diode Forward Voltage vs. Current

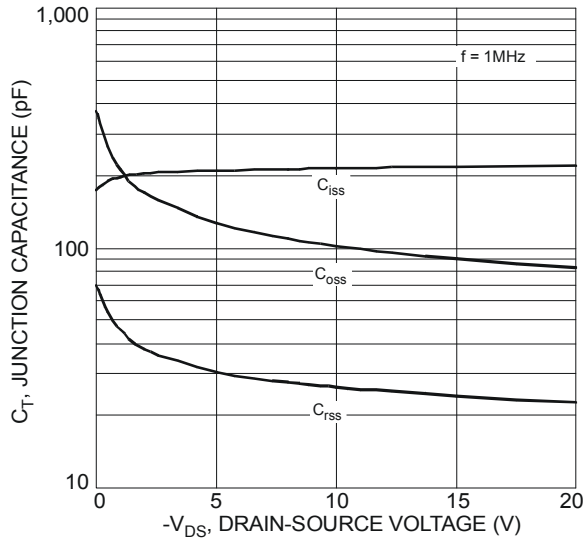


Fig. 9 Typical Junction Capacitance

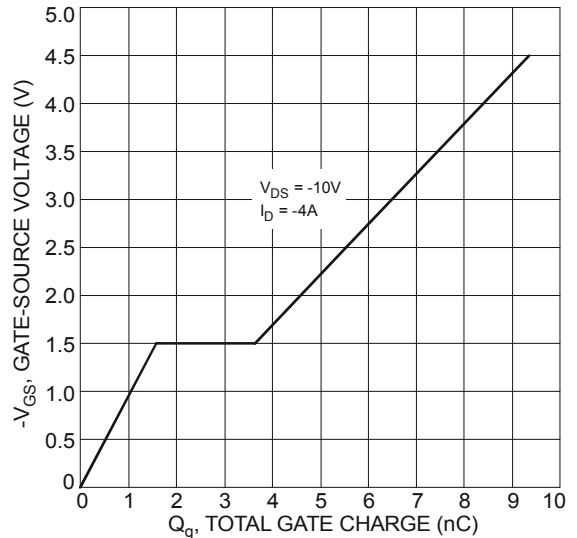


Fig. 10 Gate-Charge Characteristics

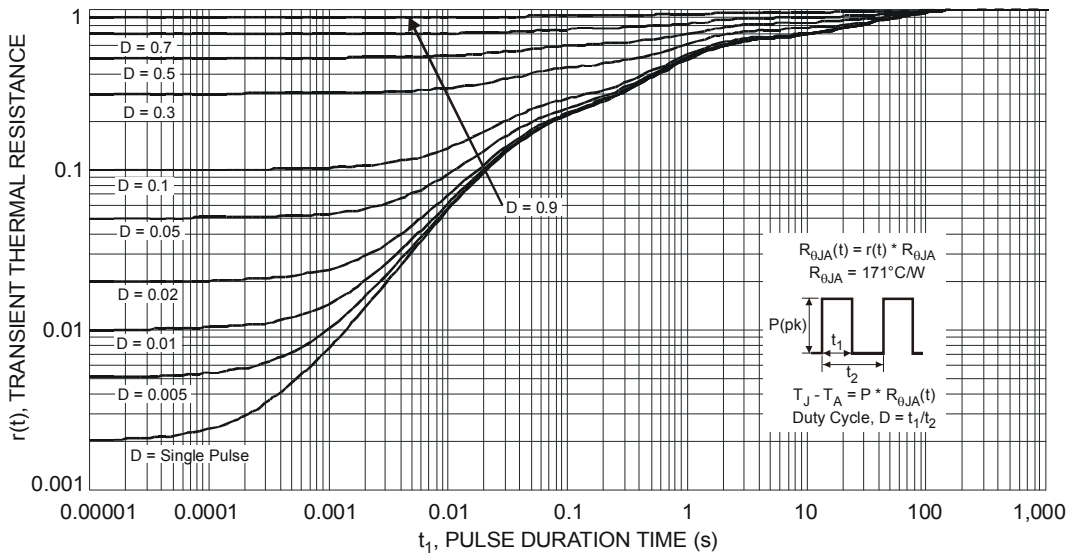
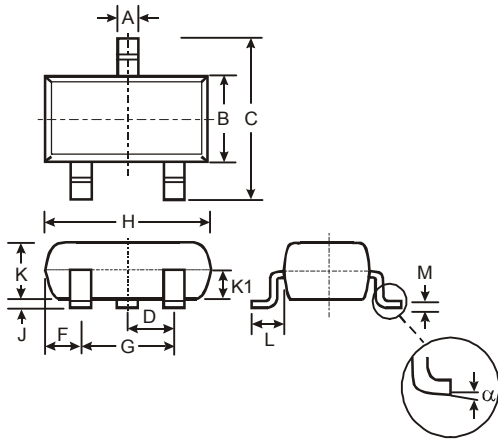


Fig. 11 Transient Thermal Response

**Package Outline Dimensions**

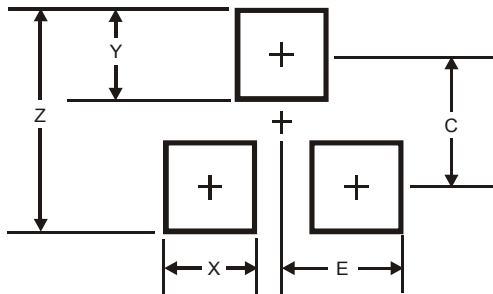
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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
□	0°	8°	-
All Dimensions in mm			

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.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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