

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = +25^\circ C$
30V	38m Ω @ $V_{GS} = -10V$	5.8A
	64m Ω @ $V_{GS} = -4.5V$	4.5A

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
- DC-DC Converters
- Power Management Functions

Features and Benefits

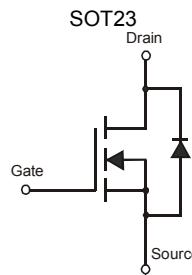
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

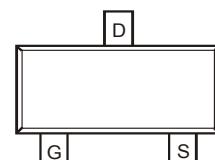
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram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



Top View



Equivalent Circuit



Top View

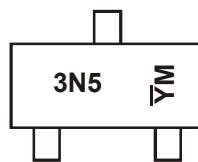
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3051L-7	SOT23	3000/Tape & Reel

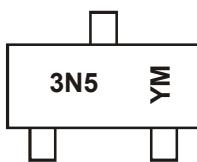
Notes:

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



Chengdu A/T Site



Shanghai A/T Site

3N5 = Product Type Marking Code
 YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)
 YM = Date Code Marking for CAT (Chengdu Assembly/ Test site)
 Y or YM = Year (ex: A = 2013)
 M = Month (ex: 9 = September)

Date Code Key

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
Code	U	V	W	X	Y	Z	A	B	C	D	E	
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}	30	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	4.5 3.5	A
	$t < 5\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	5.8 4.9	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	20	A
Maximum Body Diode Forward Current (Note 6)			I_S	2	A

Thermal Characteristics

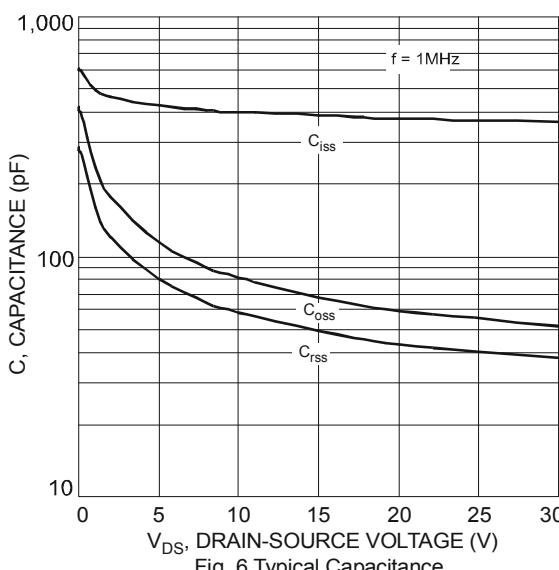
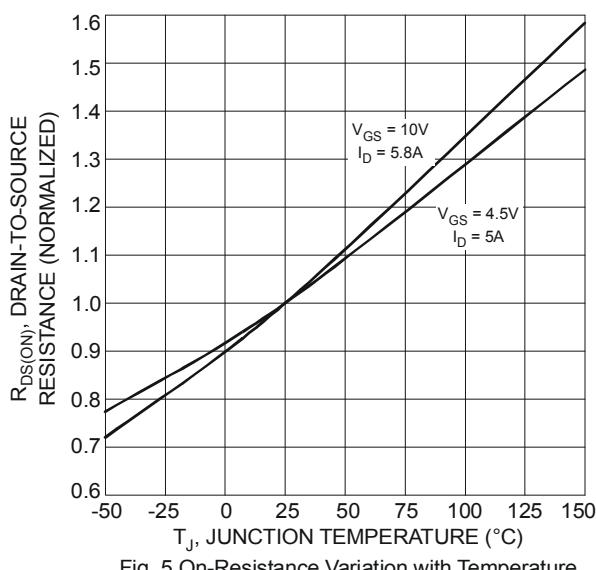
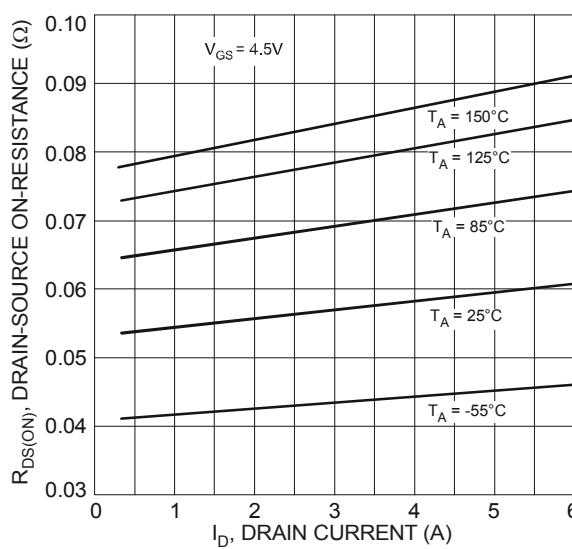
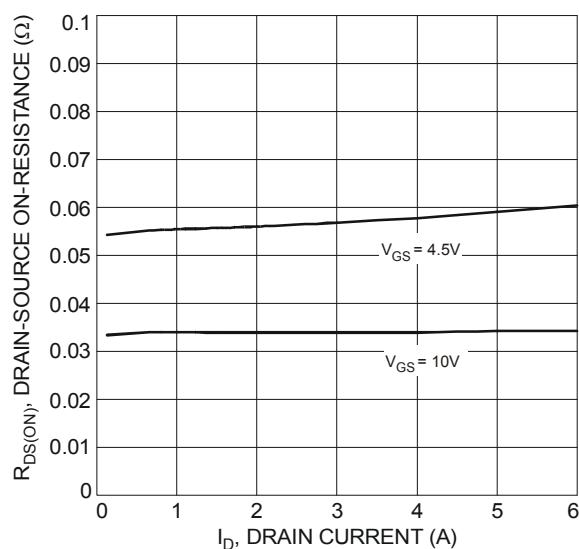
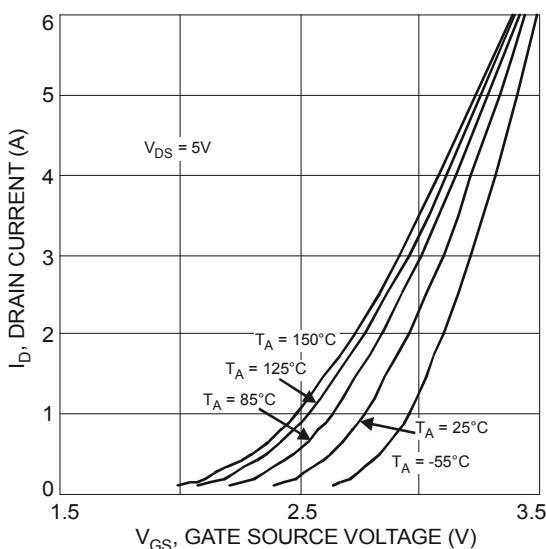
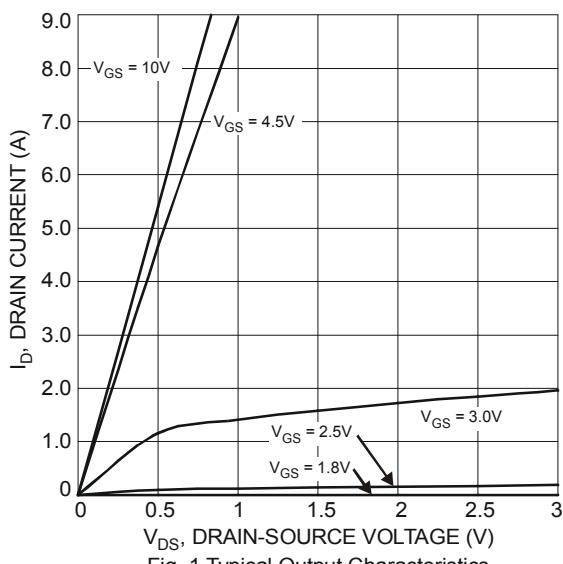
Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	0.7	W
	$T_A = +70^\circ\text{C}$		0.44	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	$R_{\theta JA}$	182	$^\circ\text{C}/\text{W}$
	$t < 5\text{s}$		109	
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	1.4	W
	$T_A = +70^\circ\text{C}$		0.85	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	$R_{\theta JA}$	94	$^\circ\text{C}/\text{W}$
	$t < 5\text{s}$		56	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	25	
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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	800	nA	$V_{DS} = 28\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}	—	—	± 80 ± 800	nA	$V_{GS} = \pm 12\text{V}, V_{DS} = 0\text{V}$ $V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(\text{th})}$	1.3	1.9	2.2	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	— —	33 54	38 64	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 5.8\text{A}$ $V_{GS} = 4.5\text{V}, I_D = 5.0\text{A}$
Forward Transconductance	$ Y_{fs} $	—	5	—	S	$V_{DS} = 5\text{V}, I_D = 3.1\text{A}$
Source-Drain Diode Forward Voltage	V_{SD}	—	0.78	1.16	V	$V_{GS} = 0\text{V}, I_S = 2.0\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	424	—	pF	$V_{DS} = 5\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	115	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	81	—	pF	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Gate Resistance	R_g	—	1.51	—	Ω	
Total Gate Charge	Q_g	—	9.0	—	nC	$V_{GS} = 10\text{V}, V_{DS} = 15\text{V}, I_D = 5.8\text{A}$
Gate-Source Charge	Q_{gs}	—	1.3	—	nC	
Gate-Drain Charge	Q_{gd}	—	1.3	—	nC	$V_{DD} = 15\text{V}, V_{GS} = 10\text{V},$ $R_L = 2.6\Omega, R_G = 3\Omega$
Turn-On Delay Time	$t_{D(\text{on})}$	—	3.4	—	ns	
Turn-On Rise Time	t_r	—	6.2	—	ns	
Turn-Off Delay Time	$t_{D(\text{off})}$	—	13.9	—	ns	
Turn-Off Fall Time	t_f	—	2.8	—	ns	

Notes:

5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2 oz. Copper, single sided.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.



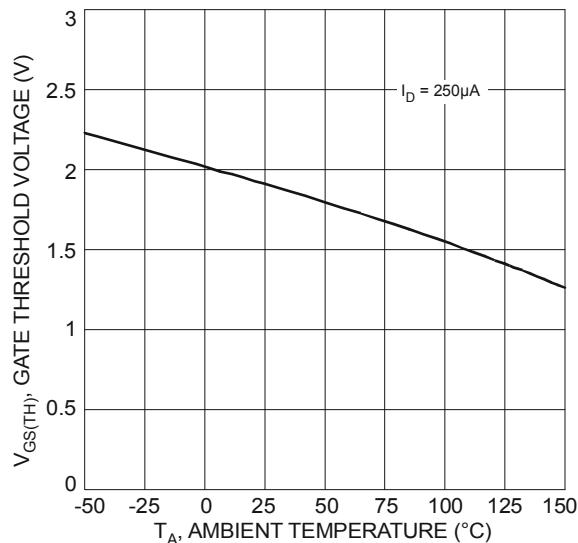


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

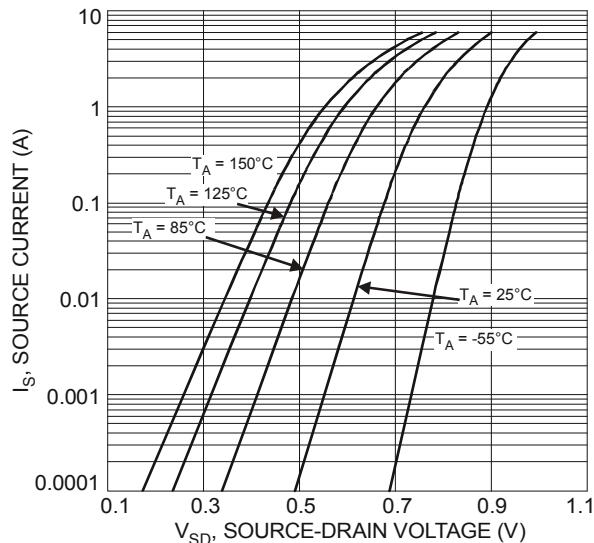


Fig. 8 Diode Forward Voltage vs. Current

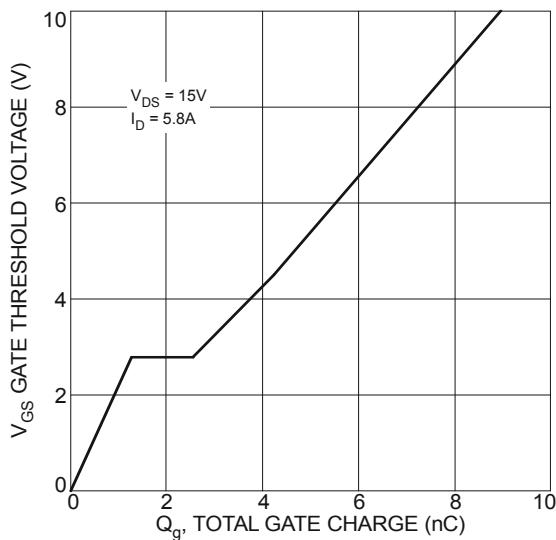


Fig. 9 Gate Charge

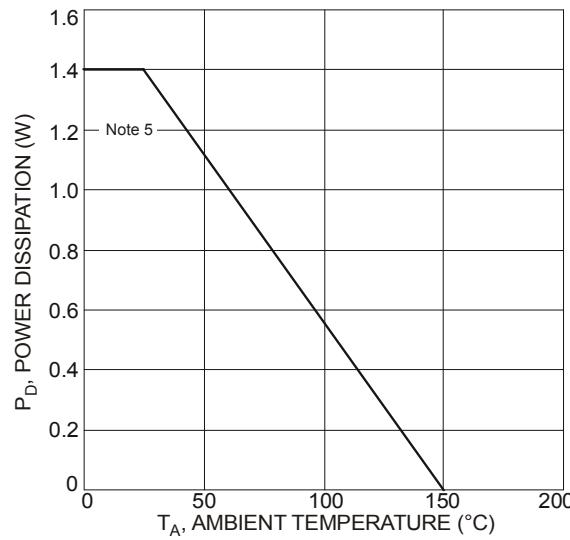


Fig. 10 Power Derating

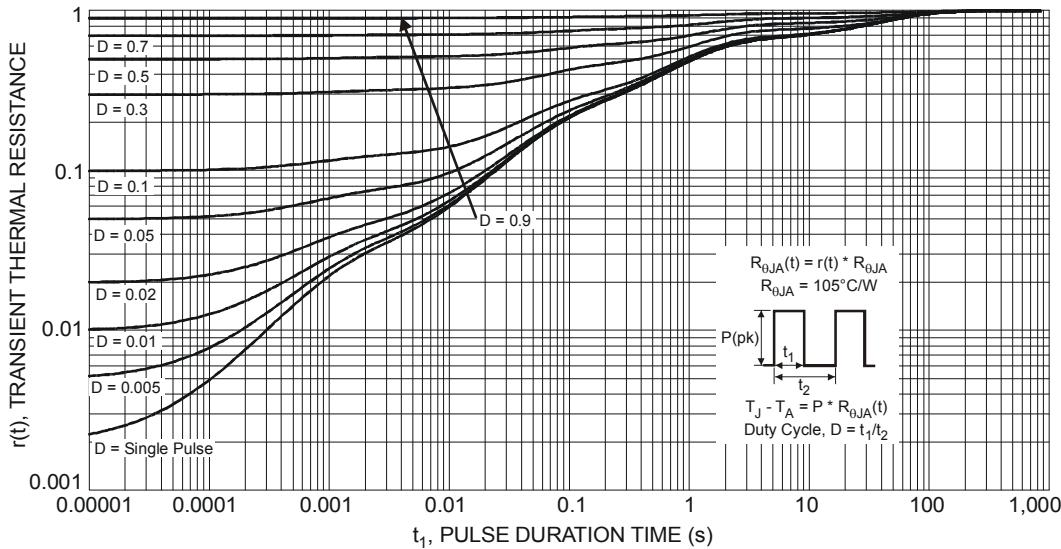
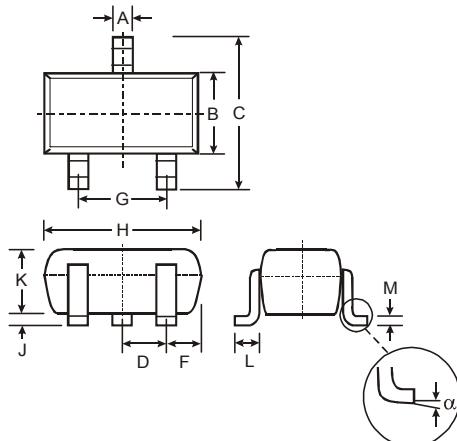


Fig. 11 Transient Thermal Response

Package Outline Dimensions

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

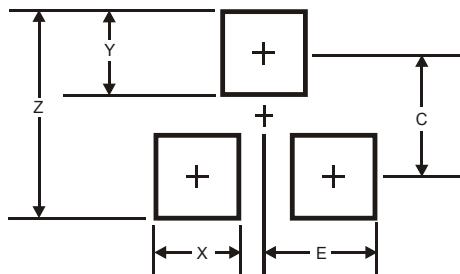


SOT23		
Dim	Min	Max
A	0.37	0.51
B	1.20	1.40
C	2.30	2.50
D	0.89	1.03
F	0.45	0.60
G	1.78	2.05
H	2.80	3.00
J	0.013	0.10
K	0.903	1.10
L	0.45	0.61
M	0.085	0.180
α	0°	8°

All Dimensions in mm

Suggested Pad Layout

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