

## Product Summary

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

## Description and Applications

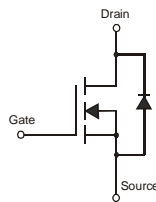
This new generation MOSFET has been designed to minimize the on-state resistance ( $R_{DS(on)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Load Switch
- DC-DC Converters
- Power management functions

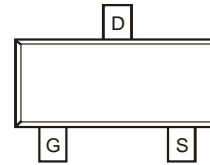
SOT23



Top View



Equivalent Circuit



Top View

## Features and Benefits

- Low On-Resistance:
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Lead-Free Finish; RoHS compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

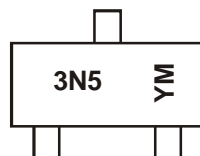
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram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

## Ordering Information (Note 3)

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

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. No purposely added lead. Halogen and Antimony free
  2. Diodes Inc.'s "Green" policy can be found on our website at <http://www.diodes.com>.
  3. For packaging details, go to our website at <http://www.diodes.com>.

## Marking Information



3N5 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: U = 2007)  
 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<sub>A</sub> = 25°C unless otherwise specified

Characteristic		Symbol	Value	Units	
Drain-Source Voltage		V <sub>DSS</sub>	30	V	
Gate-Source Voltage		V <sub>GSS</sub>	±20	V	
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	Steady State	I <sub>D</sub>	T <sub>A</sub> = 25°C T <sub>A</sub> = 70°C	4.5 3.5	A
	t < 5s		T <sub>A</sub> = 25°C T <sub>A</sub> = 70°C	5.8 4.9	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)		I <sub>DM</sub>	20	A	
Maximum Body Diode Forward Current (Note 5)		I <sub>S</sub>	2	A	

**Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 4)	T <sub>A</sub> = 25°C	P <sub>D</sub>	0.7	W
	T <sub>A</sub> = 70°C		0.44	
Thermal Resistance, Junction to Ambient (Note 4)	Steady state	R <sub>θJA</sub>	182	°C/W
	t < 5s		109	
Total Power Dissipation (Note 5)	T <sub>A</sub> = 25°C	P <sub>D</sub>	1.4	W
	T <sub>A</sub> = 70°C		0.85	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R <sub>θJA</sub>	94	°C/W
	t < 5s		56	
Thermal Resistance, Junction to Case (Note 5)		R <sub>θJC</sub>	25	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 6)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	800	nA	V <sub>DS</sub> = 28V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	±80 ±800	nA	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 6)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.3	1.9	2.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	33	38	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 5.8A V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5.0A
		—	54	64		
Forward Transconductance	Y <sub>fs</sub>	—	5	—	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 3.1A
Source-Drain Diode Forward Voltage	V <sub>SD</sub>	—	0.78	1.16	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 2.0A
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	C <sub>iss</sub>	—	424	—	pF	V <sub>DS</sub> = 5V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	115	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	81	—	pF	
Gate Resistance	R <sub>g</sub>	-	1.51	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>g</sub>	-	9.0	-	nC	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 15V, I <sub>D</sub> = 5.8A  V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>L</sub> = 2.6Ω, R <sub>G</sub> = 3Ω
Gate-Source Charge	Q <sub>gs</sub>	-	1.3	-	nC	
Gate-Drain Charge	Q <sub>gd</sub>	-	1.3	-	nC	
Turn-On Delay Time	t <sub>D(on)</sub>	-	3.4	-	ns	
Turn-On Rise Time	t <sub>r</sub>	-	6.2	-	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	13.9	-	ns	
Turn-Off Fall Time	t <sub>f</sub>	-	2.8	-	ns	

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

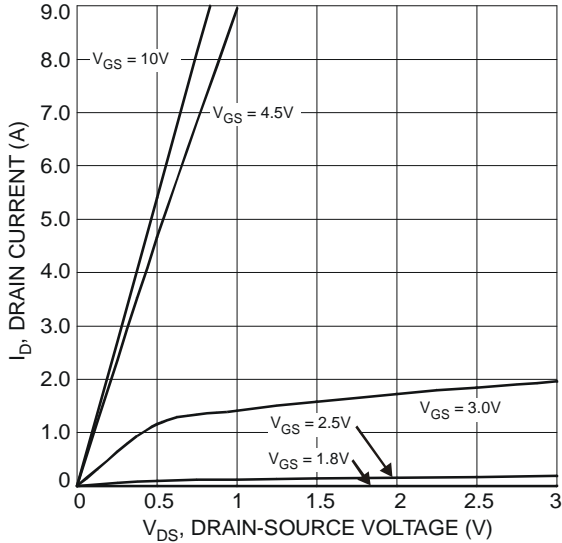


Fig. 1 Typical Output Characteristics

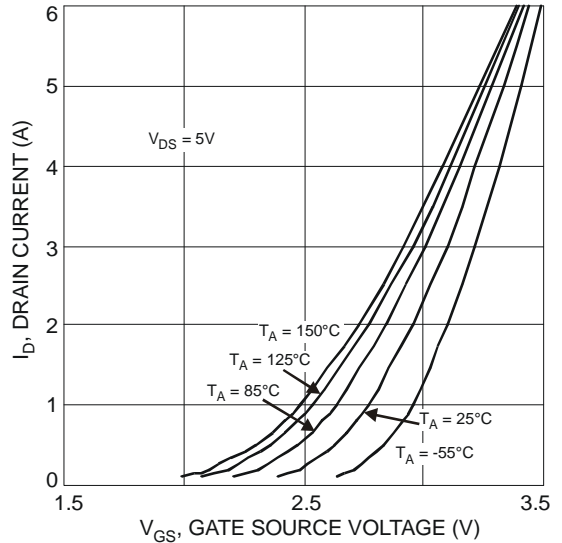


Fig. 2 Typical Transfer Characteristics

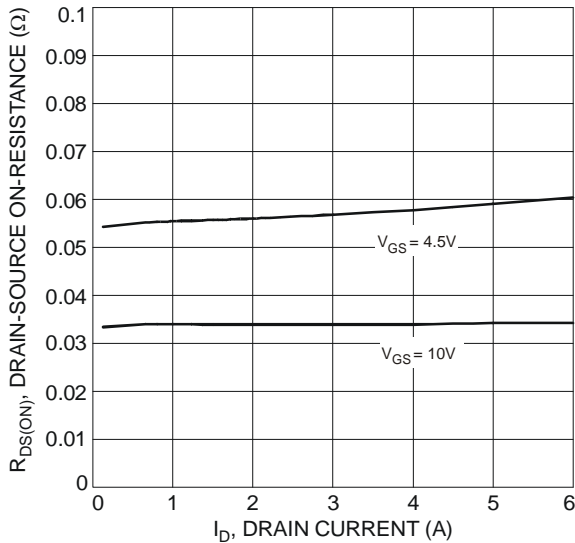


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

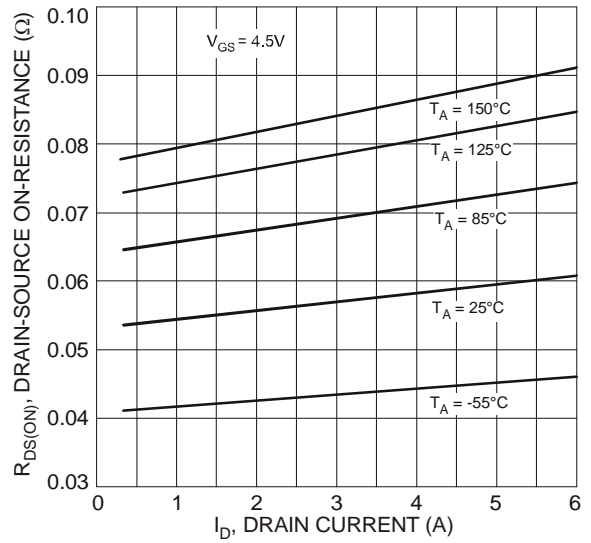


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

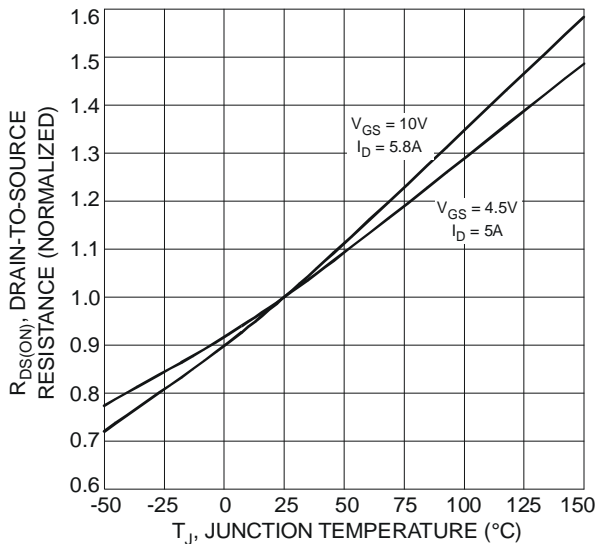


Fig. 5 On-Resistance Variation with Temperature

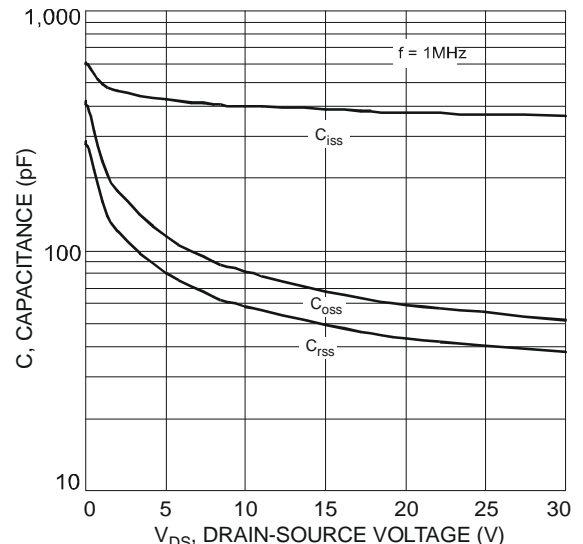


Fig. 6 Typical Capacitance

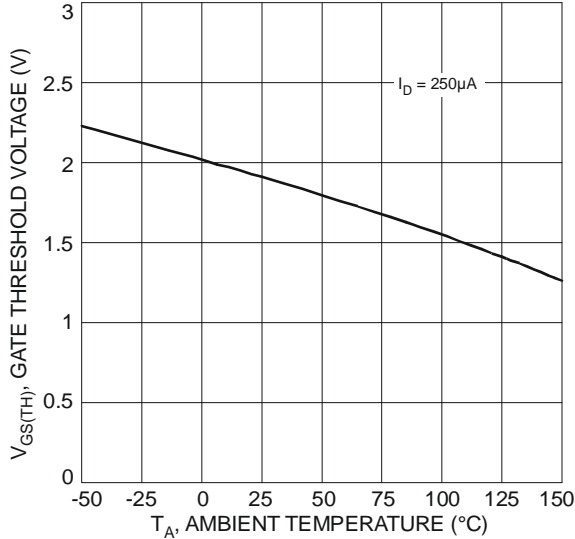


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

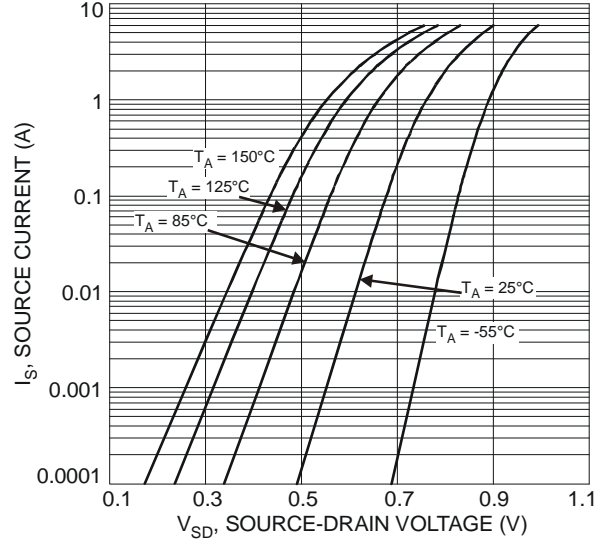


Fig. 8 Diode Forward Voltage vs. Current

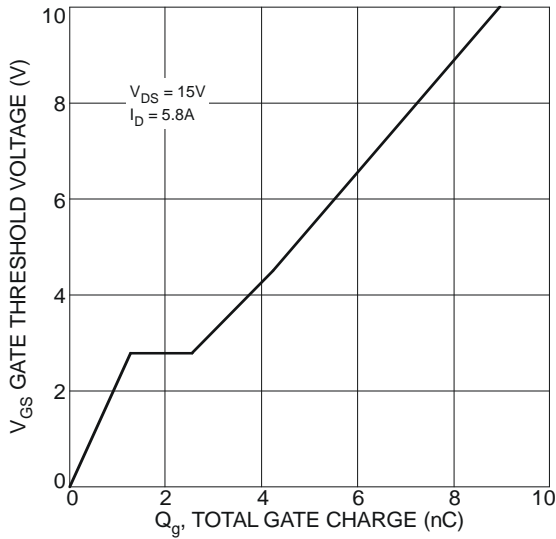


Fig. 9 Gate Charge

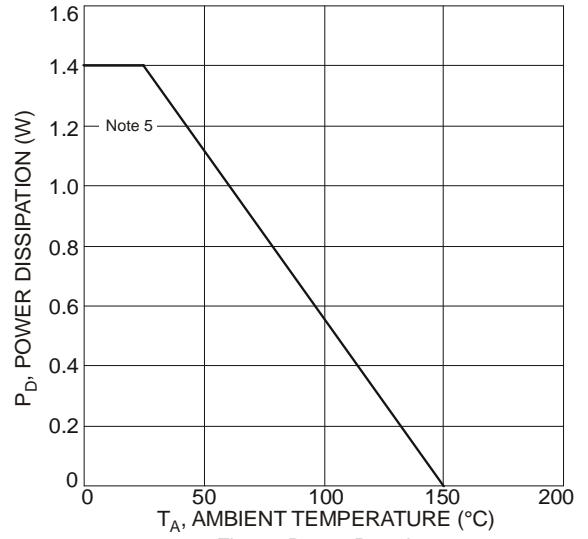


Fig. 10 Power Derating

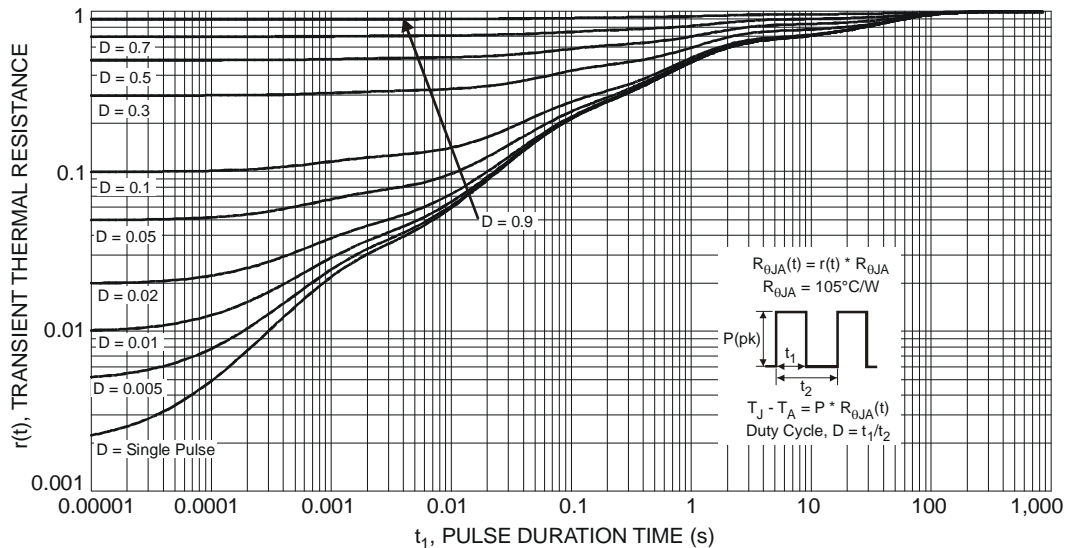
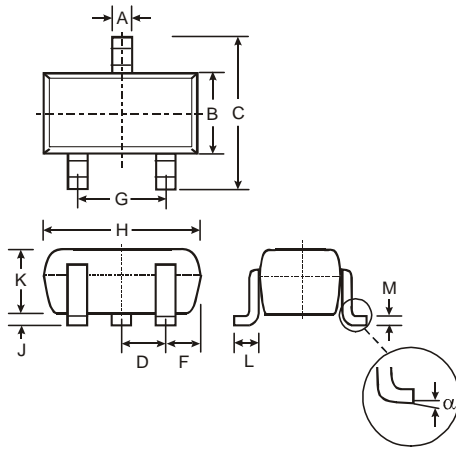


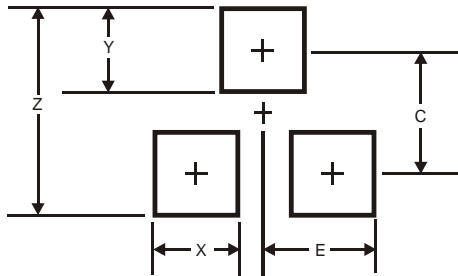
Fig. 11 Transient Thermal Response

**Package Outline Dimensions**



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
$\alpha$	0°	8°
All Dimensions in mm		

**Suggested Pad Layout**



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

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