

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	Package	I_D $T_A = +25^\circ\text{C}$
60V	3Ω @ $V_{GS} = 10\text{V}$	SOT23	310mA
	4Ω @ $V_{GS} = 5\text{V}$		270mA

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

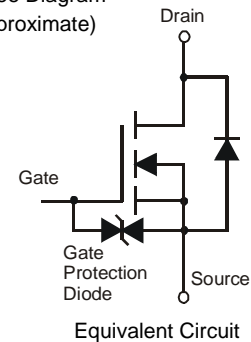
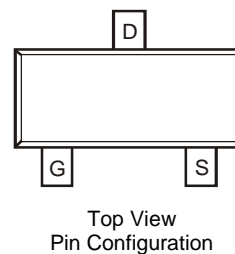
- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc

Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- ESD Protected Gate
- **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. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Solderable per MIL-STD-202, Method 208 ^{Ⓔ3}
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)



Ordering Information (Note 4)

Part Number	Case	Packaging
DMN65D8L-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> 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>.

Marking Information



MM6 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: Y = 2011)
 M = Month (ex: 9 = September)

Date Code Key

Year	2011	2012	2013	2014	2015	2016	2017
Code	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°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	60	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State	T _A = +25°C	I _D	310	mA
		T _A = +70°C		240	
Continuous Drain Current (Note 6) V _{GS} = 5V	Steady State	T _A = +25°C	I _D	270	mA
		T _A = +70°C		210	
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I _{DM}	800	mA
Maximum Body Diode Continuous Current (Note 5)			I _S	500	mA

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation	(Note 6)	P _D	370	mW
	(Note 5)		540	
Thermal Resistance, Junction to Ambient	(Note 6)	R _{θJA}	348	°C/W
	(Note 5)		241	
Thermal Resistance, Junction to Case	(Note 5)	R _{θJC}	91	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1.0	µA	V _{DS} = 60V, V _{GS} = 0V
Gate-Body Leakage	I _{GSS}	—	—	±5	µA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	1.2	—	2.0	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(on)}	—	2	3	Ω	V _{GS} = 10V, I _D = 0.115A
		—	2.5	4	Ω	V _{GS} = 5V, I _D = 0.115A
Forward Transconductance	g _{FS}	80	290	—	mS	V _{DS} = 10V, I _D = 0.115A
Diode Forward Voltage	V _{SD}	—	0.8	1.2	V	V _{GS} = 0V, I _S = 115mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iSS}	—	22.0	—	pF	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oSS}	—	3.2	—		
Reverse Transfer Capacitance	C _{rSS}	—	2.0	—		
Gate Resistance	R _G	—	79.9	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge V _{GS} = 10V	Q _g	—	0.87	—	nC	V _{GS} = 10V, V _{DS} = 30V, I _D = 150mA
Total Gate Charge V _{GS} = 4.5V	Q _g	—	0.43	—		
Gate-Source Charge	Q _{gs}	—	0.11	—		
Gate-Drain Charge	Q _{gd}	—	0.11	—		
Turn-On Delay Time	t _{D(on)}	—	2.7	—	nS	V _{DD} = 30V, I _D = 0.115A, V _{GEN} = 10V, R _{GEN} = 25Ω
Turn-On Rise Time	t _r	—	2.8	—		
Turn-Off Delay Time	t _{D(off)}	—	12.6	—		
Turn-Off Fall Time	t _f	—	7.3	—		

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout
 - Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing

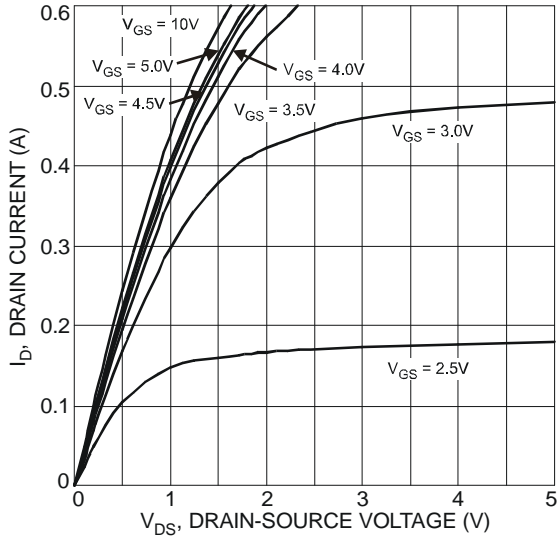


Figure 1. Typical Output Characteristic

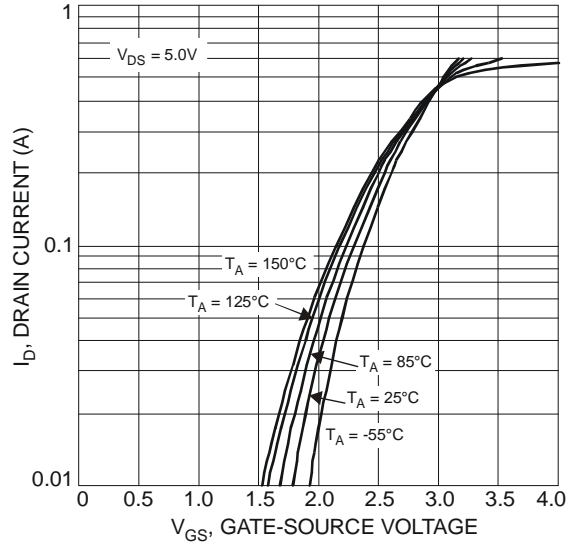


Figure 2. Typical Transfer Characteristics

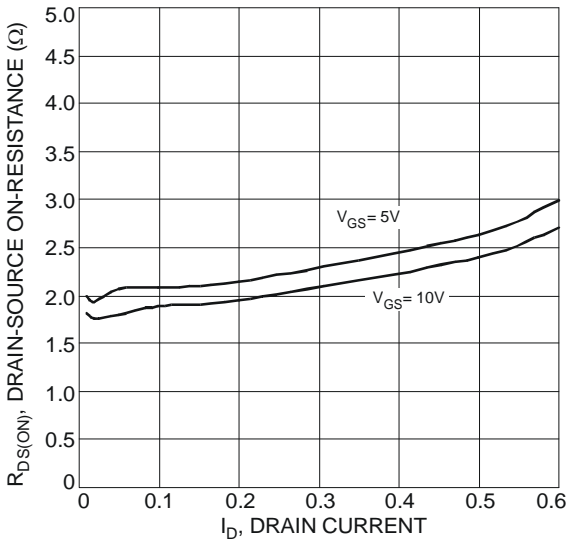


Figure 3. Typical On-Resistance vs. Drain Current and Temperature

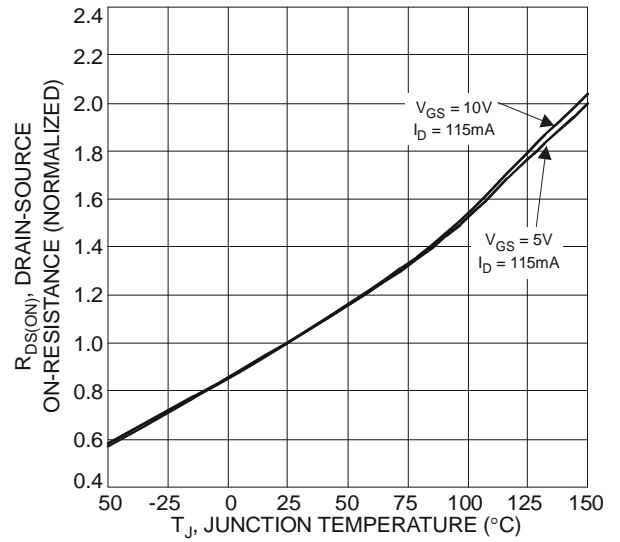


Figure 4. On-Resistance Variation with Temperature

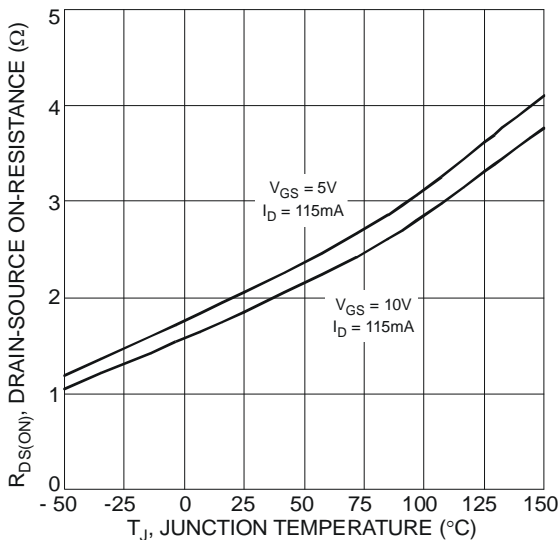


Figure 5. On-Resistance Variation with Temperature

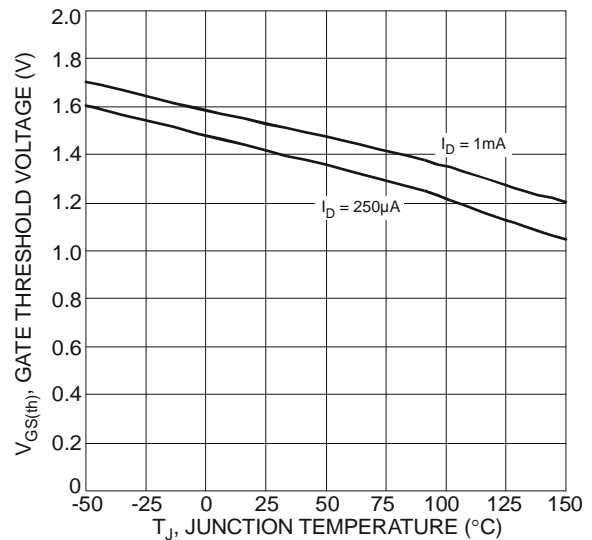


Figure 6. Gate Threshold Variation vs. Ambient Temperature

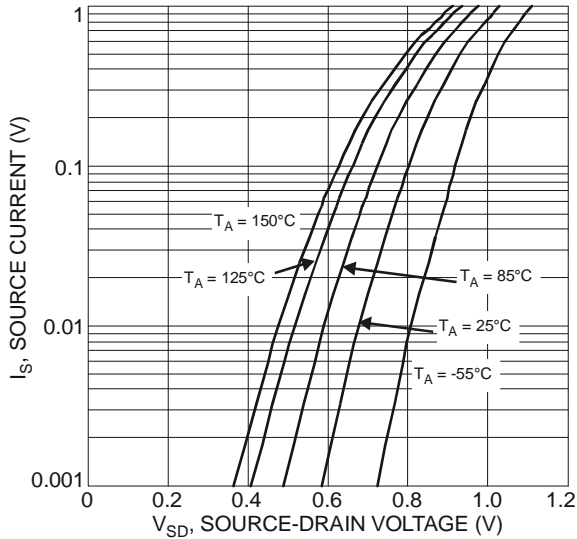


Figure 7. Diode Forward Voltage vs. Current

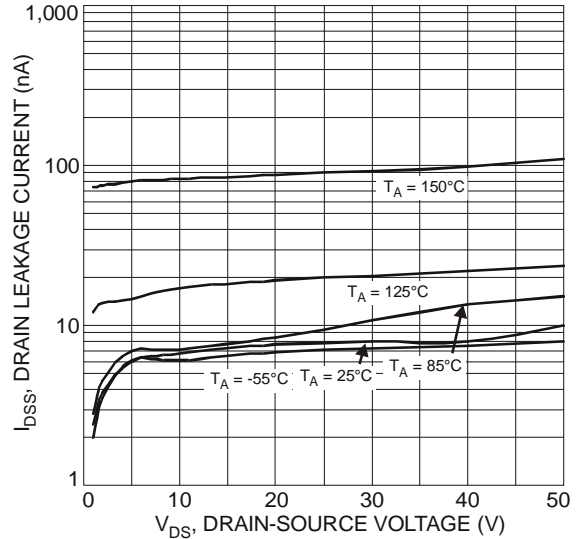


Figure 8. Typical Drain-Source Leakage Current vs. Voltage

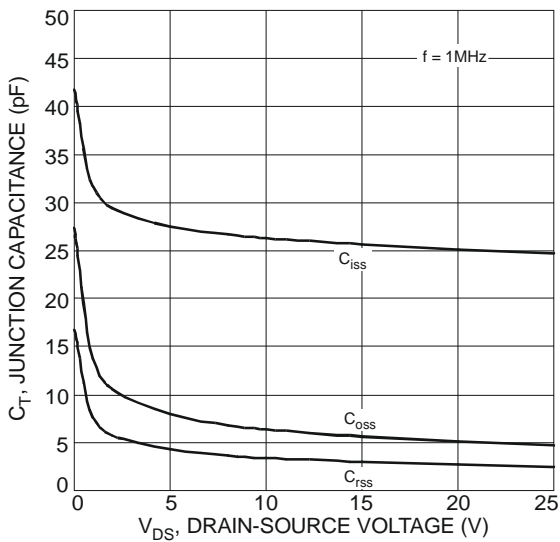
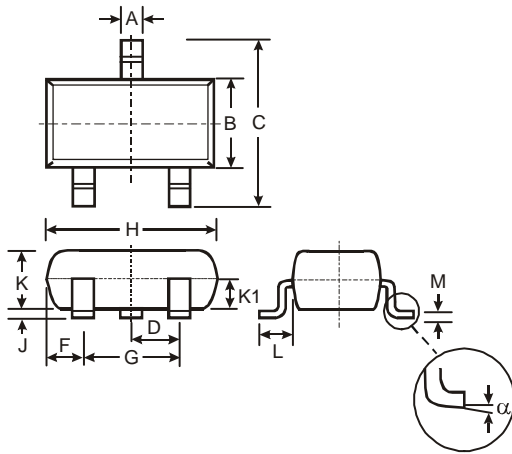


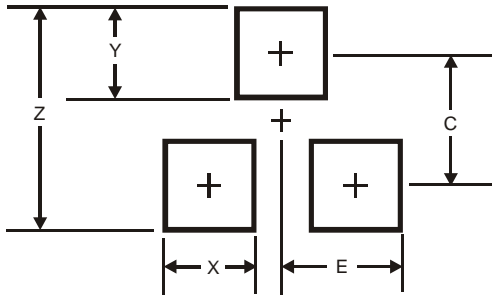
Figure 9. Typical Junction Capacitance

Package Outline Dimensions



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



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

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