

Product Summary

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

Description

This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$), 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**
- **PPAP Capable (Note 4)**

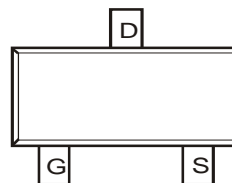
Mechanical Data

- 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
- Lead Free Plating - Matte Tin Finish Annealed over Alloy 42 Leadframe). Ⓔ3
- Weight: 0.006 grams (Approximate)

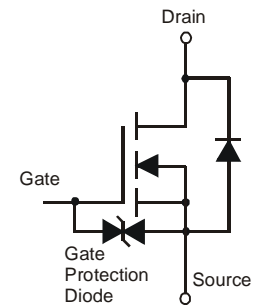
SOT23



Top View



Top View
Pin Configuration



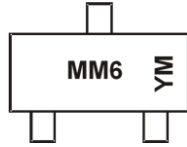
Equivalent Circuit

Ordering Information (Note 5)

Part Number	Case	Packaging
DMN65D8LQ-7	SOT23	3,000/Tape & Reel
DMN65D8LQ-13	SOT23	10,000/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. 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_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

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	2015	2016	2017	2018	2019	2020	2021	2022	2023
Code	Y	C	D	E	F	G	H	I	J	K

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 7) V _{GS} = 10V	I _D	Steady State T _A = +25°C	310
		T _A = +70°C	240
Continuous Drain Current (Note 7) V _{GS} = 5V	I _D	Steady State T _A = +25°C	270
		T _A = +70°C	210
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I _{DM}	800	mA
Maximum Body Diode Continuous Current (Note 6)	I _S	500	mA

Thermal Characteristics

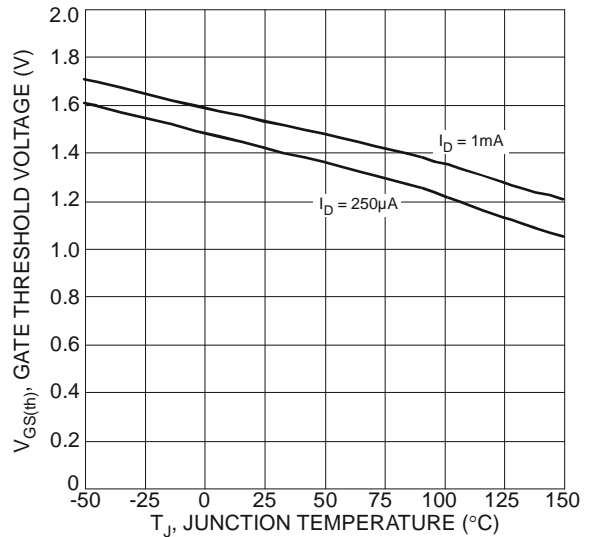
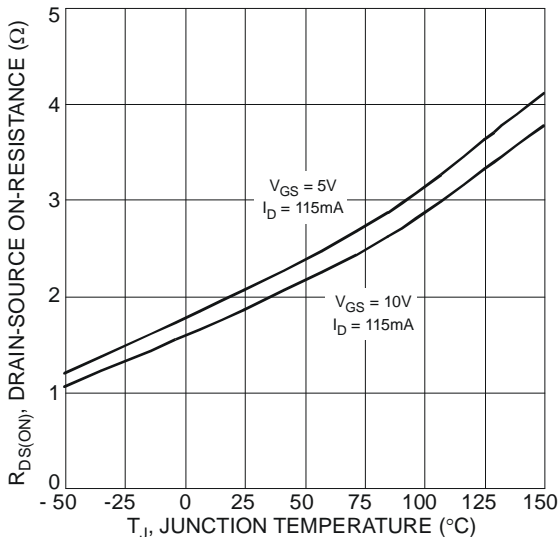
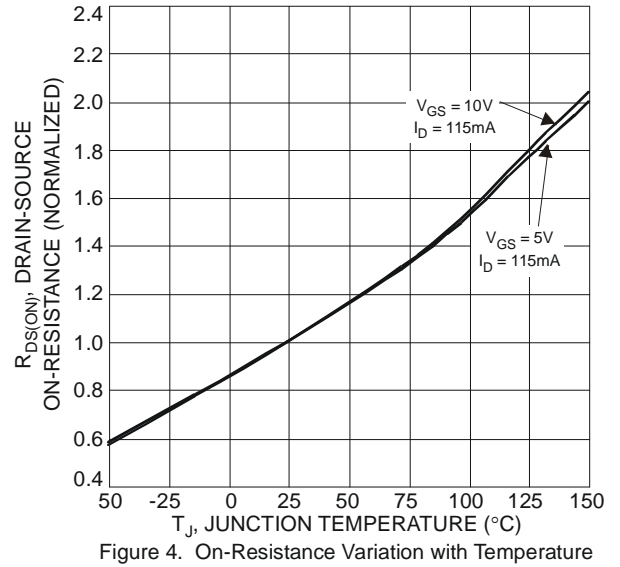
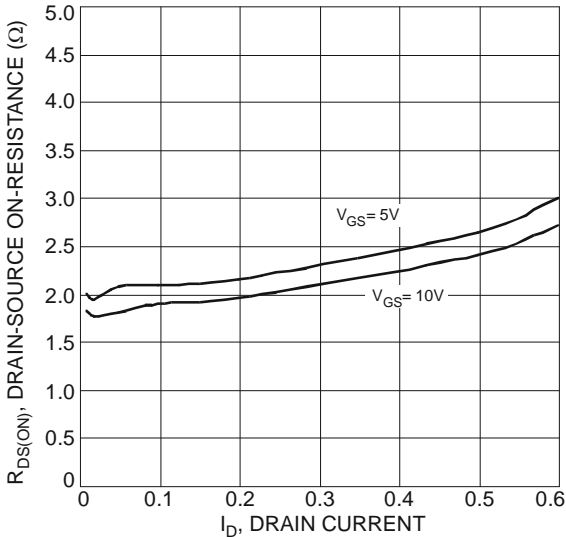
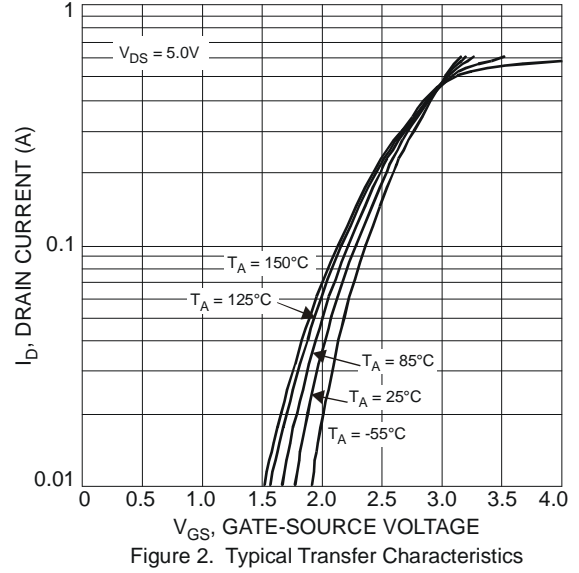
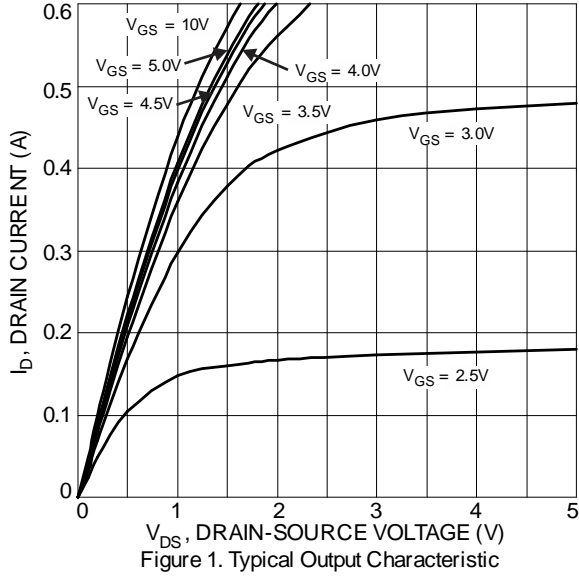
Characteristic	Symbol	Value	Units
Total Power Dissipation	P _D	(Note 7)	370
		(Note 6)	540
Thermal Resistance, Junction to Ambient	R _{θJA}	(Note 7)	348
		(Note 6)	241
Thermal Resistance, Junction to Case	R _{θJC}	91	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
 7. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
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 8)						
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 9)						
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: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.



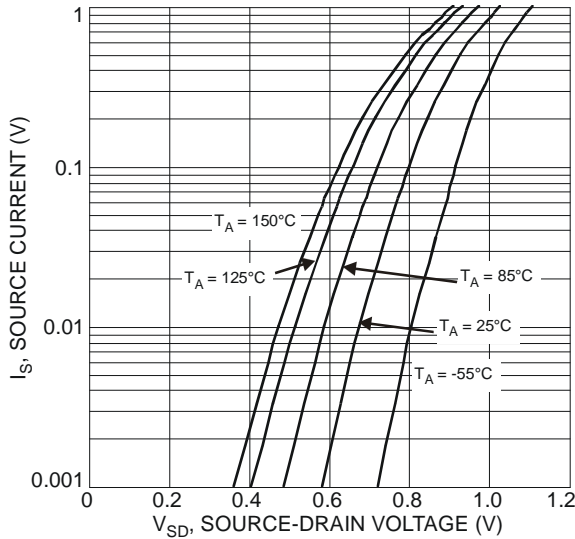


Figure 7. Diode Forward Voltage vs. Current

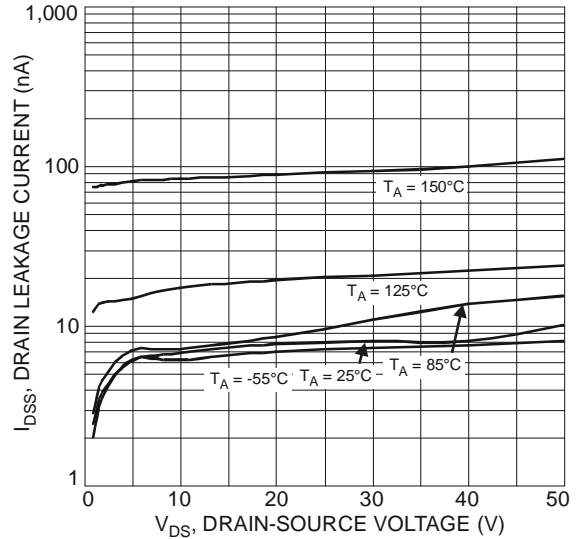


Figure 8. Typical Drain-Source Leakage Current vs. Voltage

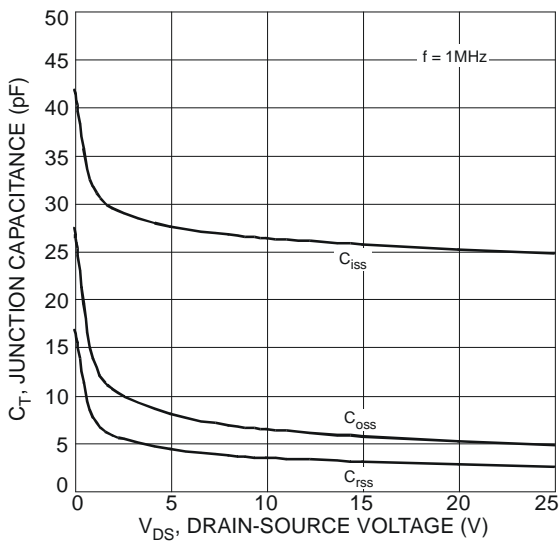


Figure 9. Typical Junction Capacitance

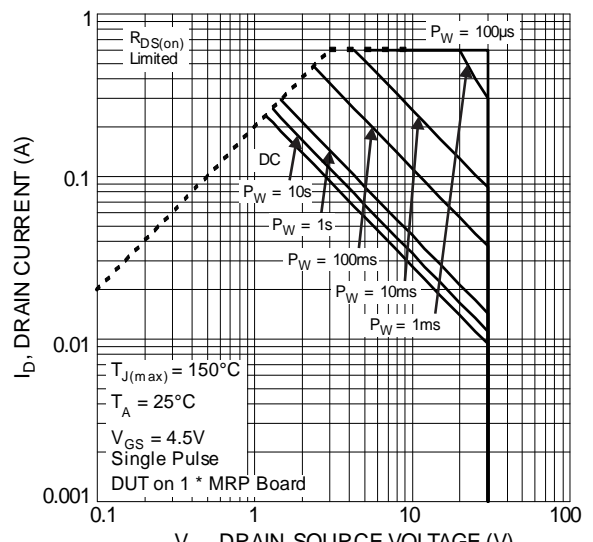
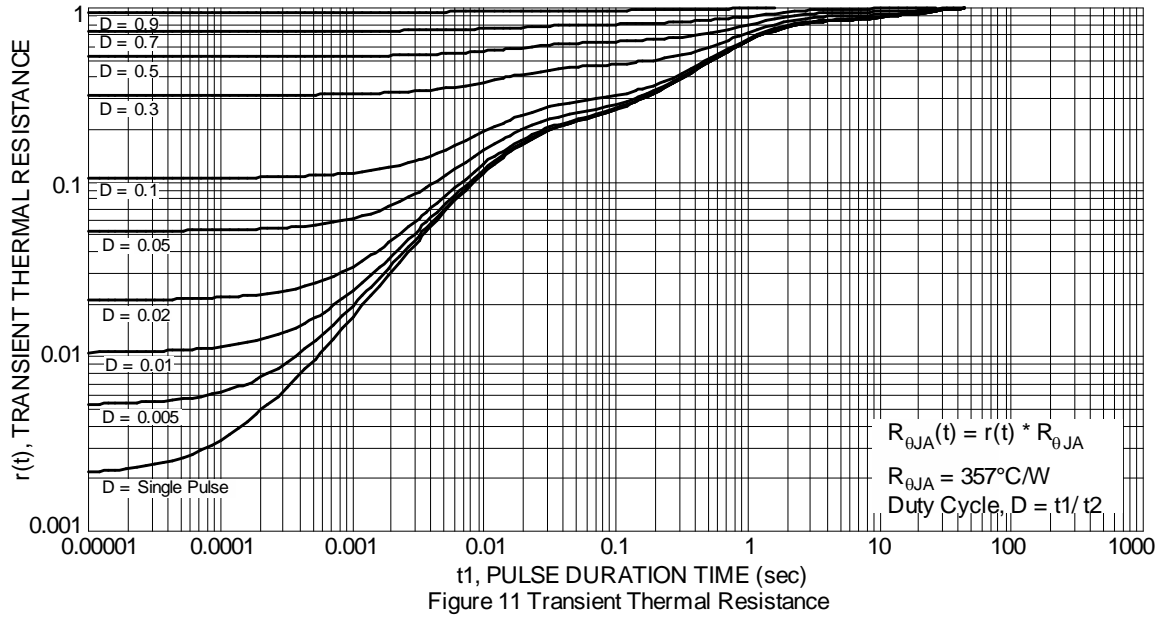


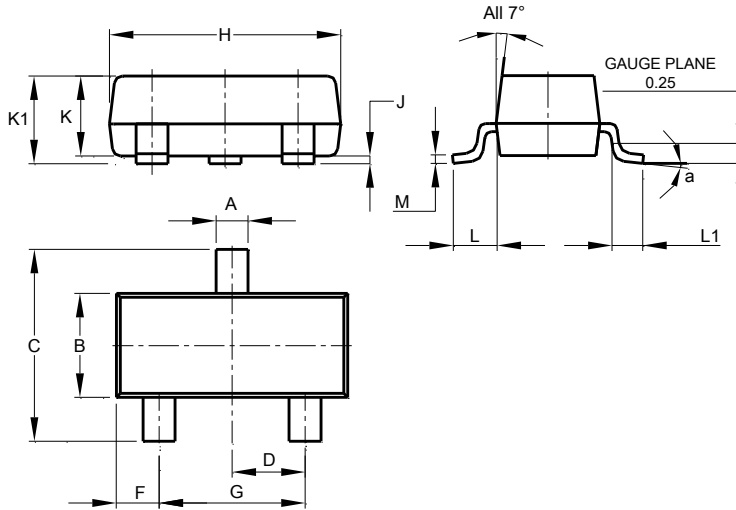
Figure 10 SOA, Safe Operation Area



Package Outline Dimensions

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

SOT23

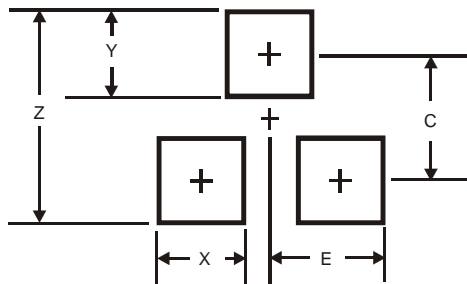


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

Suggested Pad Layout

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

SOT23



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

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