

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	$I_D$ Max $T_A = +25^\circ\text{C}$
60V	8Ω @ $V_{GS} = 5V$	170mA
	6Ω @ $V_{GS} = 10V$	200mA

## Features and Benefits

- Dual N-Channel MOSFET
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- ESD Protected Gate, 1KV (HBM)
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMN65D8LDWQ](#))**

## Description and Applications

This new generation MOSFET is 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.

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

## Mechanical Data

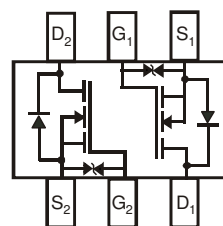
- Case: SOT363 (Standard)
- Case Material: Molded Plastic; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Solderable per MIL-STD-202, Method 208 <sup>(e3)</sup>
- Lead Free Plating (Matte Tin Finish Annealed over Alloy 42 Lead-Frame).
- Terminal Connections: See Diagram
- Weight: 0.006 grams (Approximate)



SOT363 (Standard)



Top View



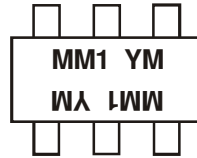
Top View  
Internal Schematic

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN65D8LDW-7	SOT363 (Standard)	3,000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



MM1= Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: 1 = 2021)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

### Date Code Key

Year	2007	.....	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	U	.....	I	J	K	L	M	N	O	P	R	S

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				$V_{DSS}$	60	V
Gate-Source Voltage				$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 5)	$V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	180 140	mA
Continuous Drain Current (Note 5)	$V_{GS} = 5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	150 120	mA
Continuous Drain Current (Note 6)	$V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	200 160	mA
Continuous Drain Current (Note 6)	$V_{GS} = 5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	170 140	mA
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)				$I_{DM}$	800	mA

## Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	$P_D$	300	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	435	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$P_D$	400	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	330	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	139	$^\circ\text{C/W}$
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 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	60	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1.0 5.0	$\mu A$	$T_J = +25^\circ\text{C}$ $T_J = +125^\circ\text{C}$ (Note 8) $V_{DS} = 60V, V_{GS} = 0V$
Gate-Body Leakage	$I_{GSS}$	—	—	$\pm 5.0$	$\mu A$	$V_{GS} = \pm 20V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	2.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	2.2	8	$\Omega$	$V_{GS} = 5V, I_D = 0.115A$
		—	2.0	6	$\Omega$	$V_{GS} = 10V, I_D = 0.115A$
Forward Transconductance	$g_{FS}$	80	—	—	mS	$V_{DS} = 10V, I_D = 0.115A$
Diode Forward Voltage	$V_{SD}$	—	0.8	1.2	V	$V_{GS} = 0V, I_S = 115mA$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
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	—	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$
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	—	nS	$V_{DD} = 30V, I_D = 0.115A, V_{GEN} = 10V,$ $R_{GEN} = 25\Omega$
Turn-On Delay Time	$t_{D(on)}$	—	3.3	—		
Turn-On Rise Time	$t_r$	—	3.2	—		
Turn-Off Delay Time	$t_{D(off)}$	—	12.0	—		
Turn-Off Fall Time	$t_f$	—	6.3	—		

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

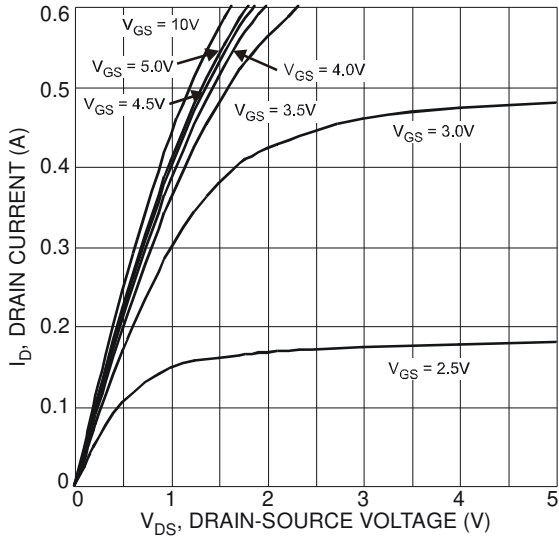


Fig.1 Typical Output Characteristic

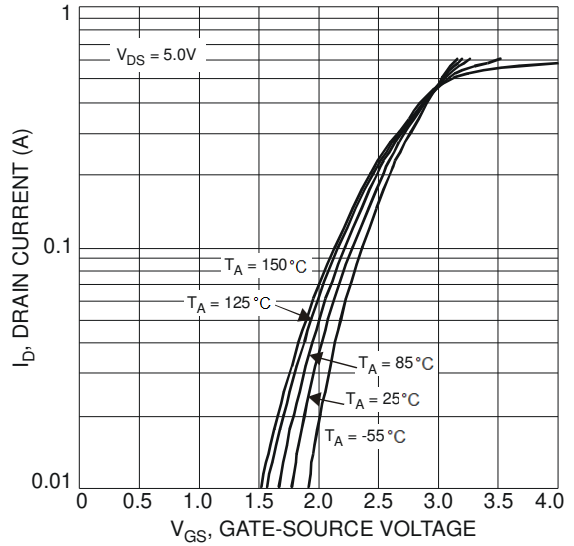


Fig.2 Typical Transfer Characteristics

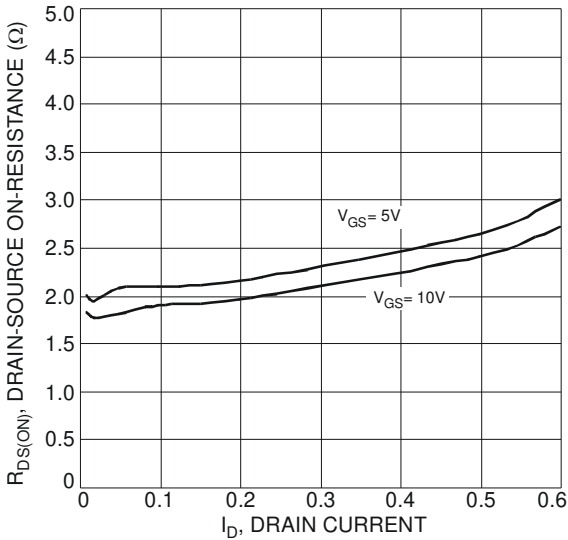


Fig. 3 Typical On-Resistance vs. Drain Current and Temperature

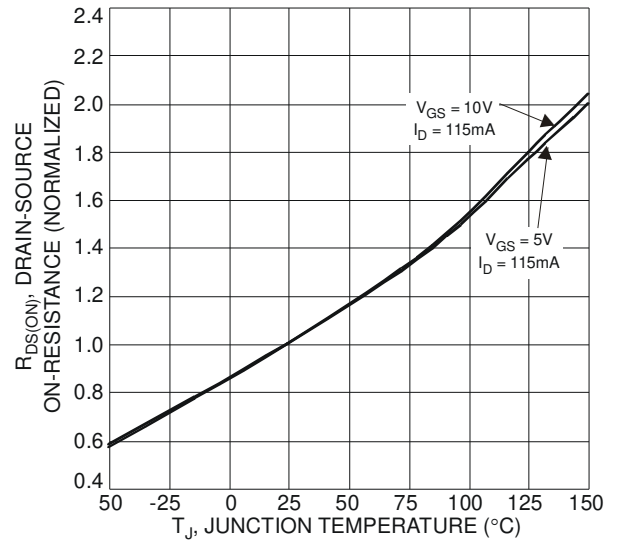


Fig. 4 On-Resistance Variation with Temperature

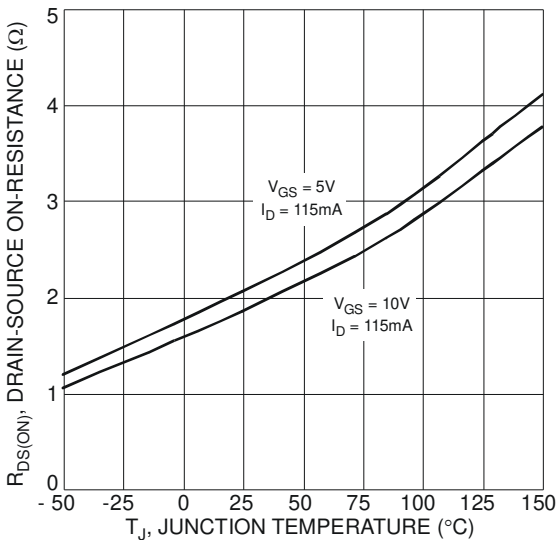


Fig. 5 On-Resistance Variation with Temperature

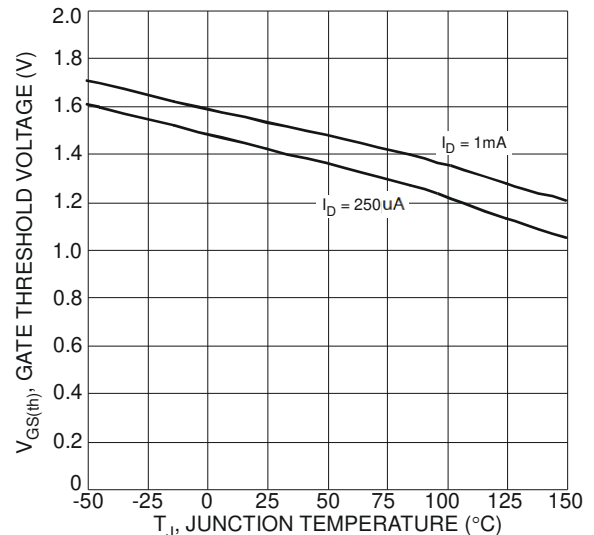


Fig. 6 Gate Threshold Variation vs. Ambient Temperature

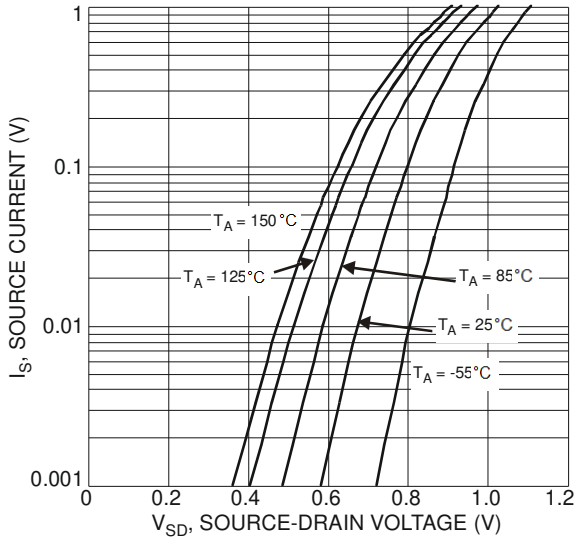


Fig. 7 Diode Forward Voltage vs. Current

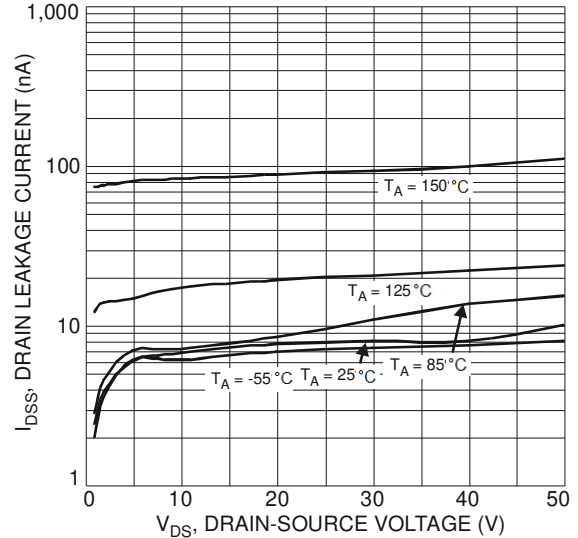


Fig. 8 Typical Drain-Source Leakage Current vs. Voltage

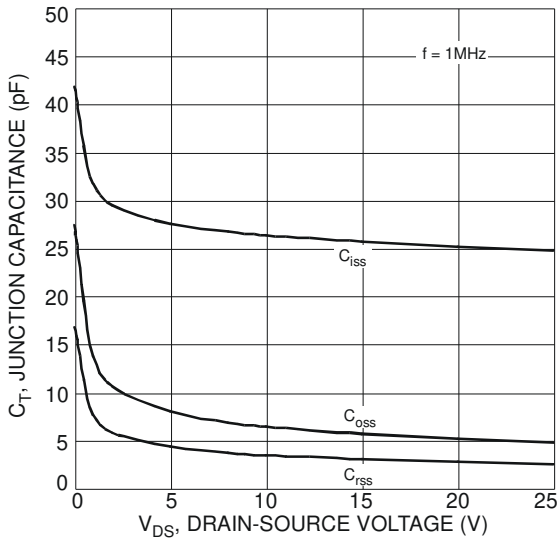


Fig. 9 Typical Junction Capacitance

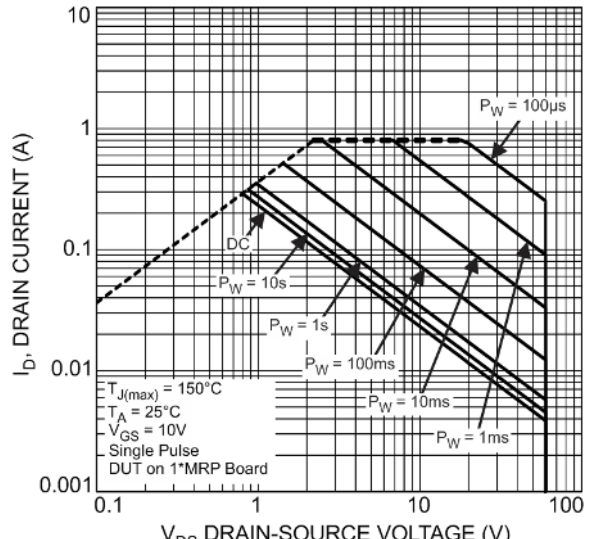


Fig. 10 SOA, Safe Operation Area

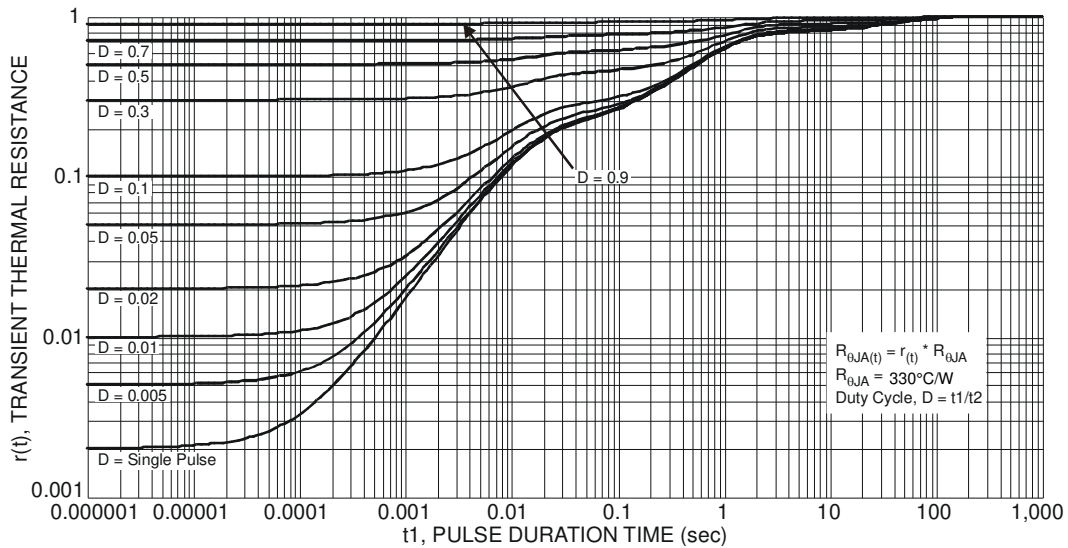


Fig. 11 Transient Thermal Resistance

$$R_{\theta JA(t)} = r(t) * R_{\theta JA}$$

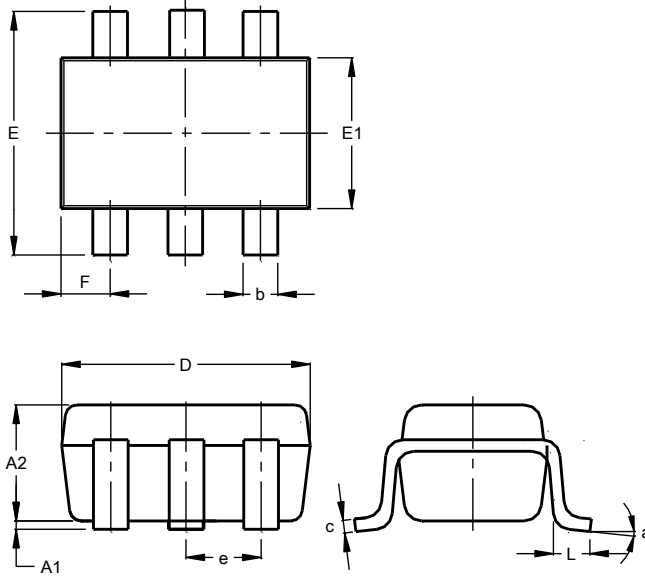
$$R_{\theta JA} = 330^{\circ}\text{C/W}$$

$$\text{Duty Cycle, } D = t1/t2$$

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT363 (Standard)**

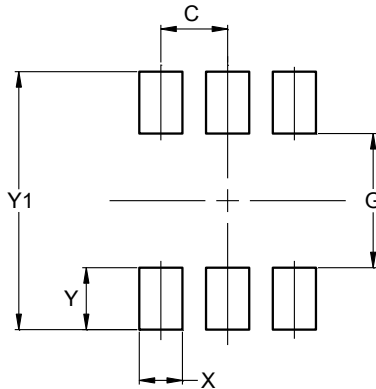


SOT363 (Standard)			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.80	1.00	0.90
b	0.10	0.35	0.225
c	0.08	0.22	0.15
D	1.80	2.20	2.00
E	2.00	2.45	2.225
E1	1.15	1.35	1.25
e	--	--	0.65
F	0.25	0.45	0.35
L	0.25	0.46	0.355
a	0°	8°	--
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT363 (Standard)**



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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