

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	$I_D$ max $T_A = +25^\circ\text{C}$
20V	20mΩ @ $V_{GS} = 10\text{V}$	6.8A
	22mΩ @ $V_{GS} = 4.5\text{V}$	6.5A
	26mΩ @ $V_{GS} = 2.5\text{V}$	6.1A
	36mΩ @ $V_{GS} = 1.8\text{V}$	5.2A

## 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

- Power management functions
- Load Switch

## Features

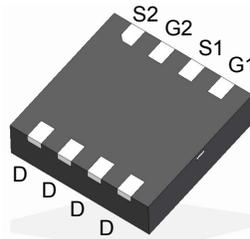
- Low On-Resistance
- Low Input Capacitance
- **ESD Protected Up To 2kV**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

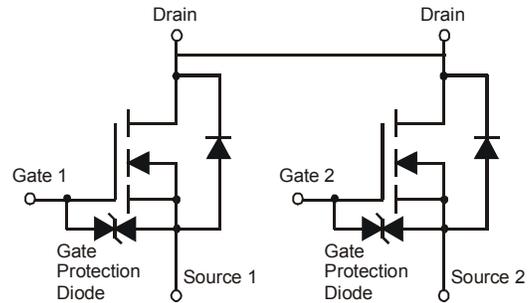
- Case: POWERDI3030-8
- Case Material: Molded Plastic, "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Weight: 0.0072 grams (approximate)



POWERDI3030-8



Bottom View



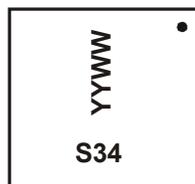
Internal Schematic

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2028UFDH-7	POWERDI3030-8	3,000/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> 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



S34 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Digit of Year (ex: 13 = 2013)  
 WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	20	V
Gate-Source Voltage (Note 5)			V <sub>GSS</sub>	±12	V
Continuous Drain Current (Note 7) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	6.8 5.8	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	8.8 7.0	A
Maximum Body Diode Forward Current (Note 7)			I <sub>S</sub>	2	A
Pulsed Drain Current (10μs pulse, Duty cycle = 1%)			I <sub>DM</sub>	40	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 6)			P <sub>D</sub>	1.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady state		R <sub>θJA</sub>	118	°C/W
	t < 10s			72	
Total Power Dissipation (Note 7)			P <sub>D</sub>	1.5	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady state		R <sub>θJA</sub>	82	°C/W
	t < 10s			50	
Thermal Resistance, Junction to Case (Note 7)			R <sub>θJC</sub>	14	
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 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10	μA	V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.5	—	1	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	16	20	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4A
			17	22		
			19	26		
			24	36		
Forward Transfer Admittance	Y <sub>fs</sub>	—	8	—	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 12A
Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 5A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	151	—	pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	91	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	32	—	pF	
Gate Resistance	R <sub>g</sub>	—	200	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>g</sub>	—	8.5	—	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 6.5A
Gate-Source Charge	Q <sub>gs</sub>	—	1.6	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	2.8	—	nC	
Turn-On Delay Time	t <sub>D(on)</sub>	—	53	—	ns	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 4.5V, R <sub>G</sub> = 6Ω, R <sub>L</sub> = 1.0Ω, I <sub>D</sub> = 1A
Turn-On Rise Time	t <sub>r</sub>	—	77	—	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	—	561	—	ns	
Turn-Off Fall Time	t <sub>f</sub>	—	234	—	ns	

- Notes:
- AEC-Q101 V<sub>GS</sub> maximum is ±9.6V.
  - Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

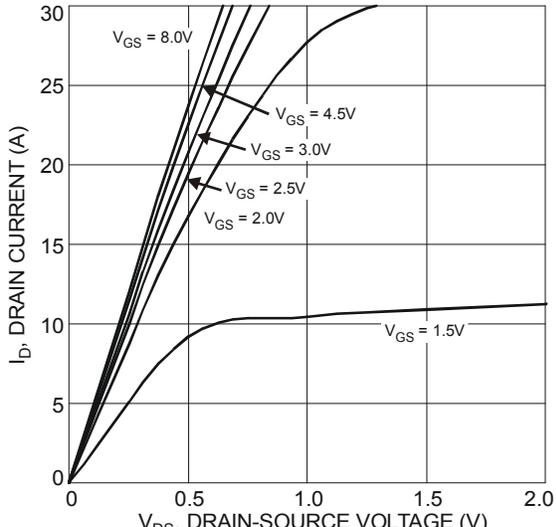


Figure 1 Typical Output Characteristic

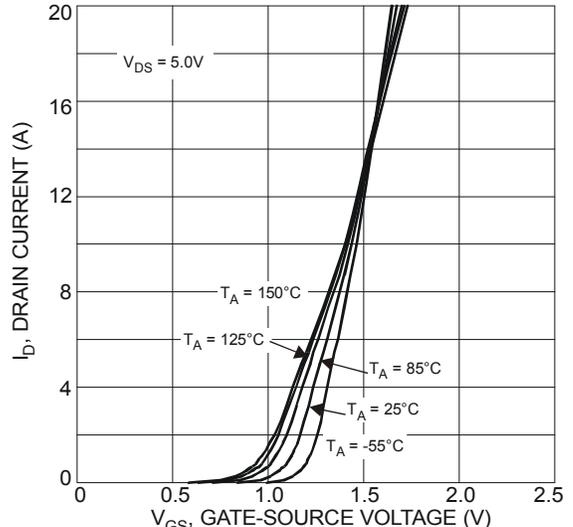


Figure 2 Typical Transfer Characteristics

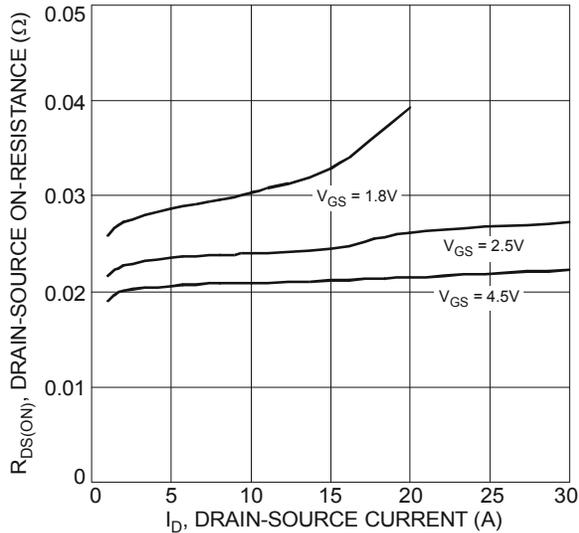


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

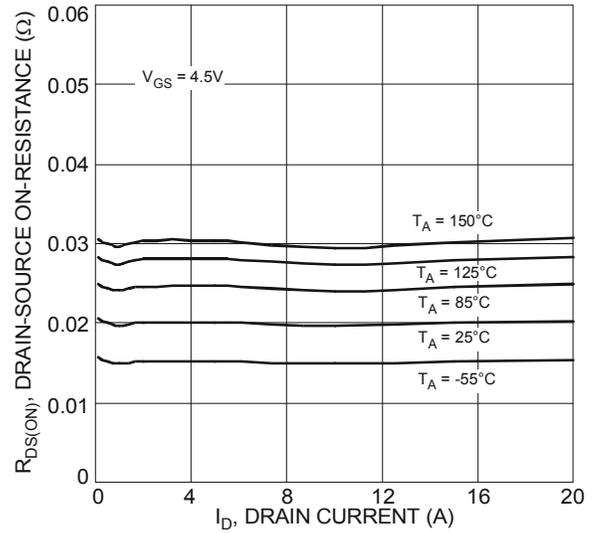


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

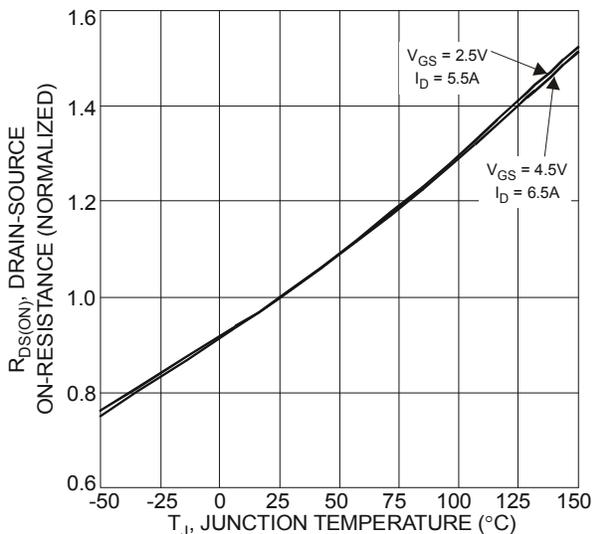


Figure 5 On-Resistance Variation with Temperature

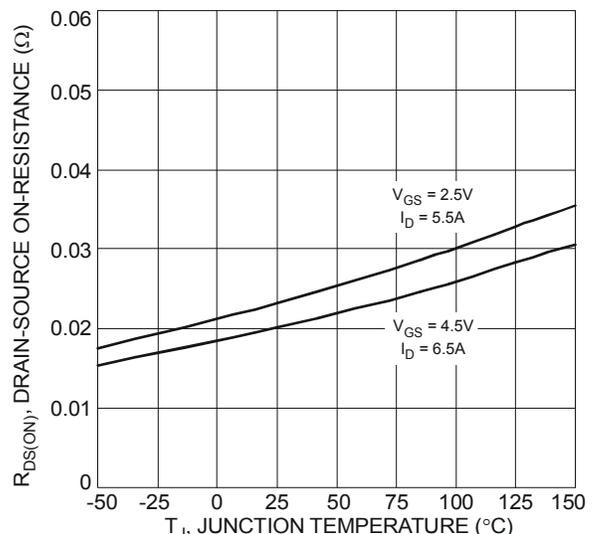


Figure 6 On-Resistance Variation with Temperature

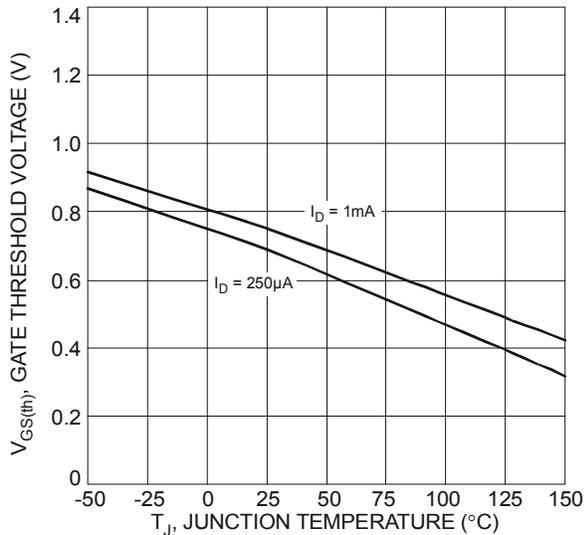


Figure 7 Gate Threshold Variation vs. Ambient Temperature

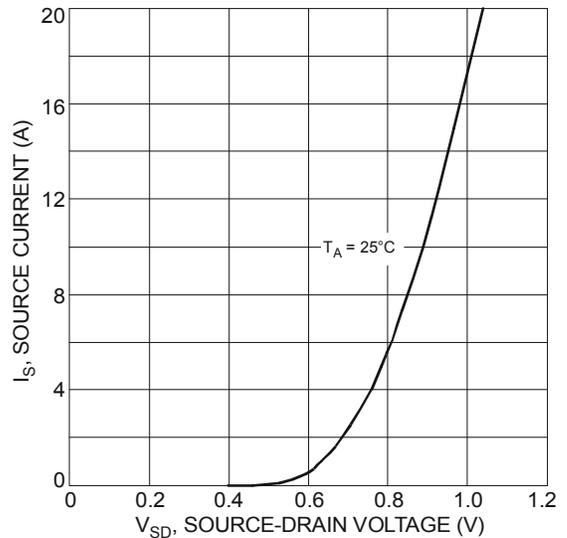


Figure 8 Diode Forward Voltage vs. Current

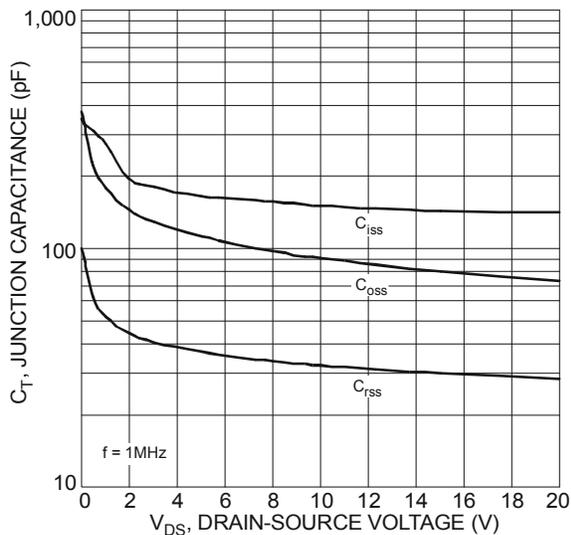


Figure 9 Typical Junction Capacitance

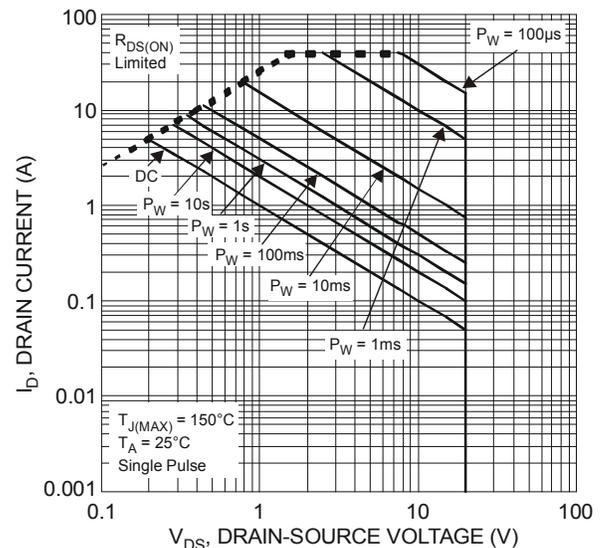


Figure 10 SOA, Safe Operation Area

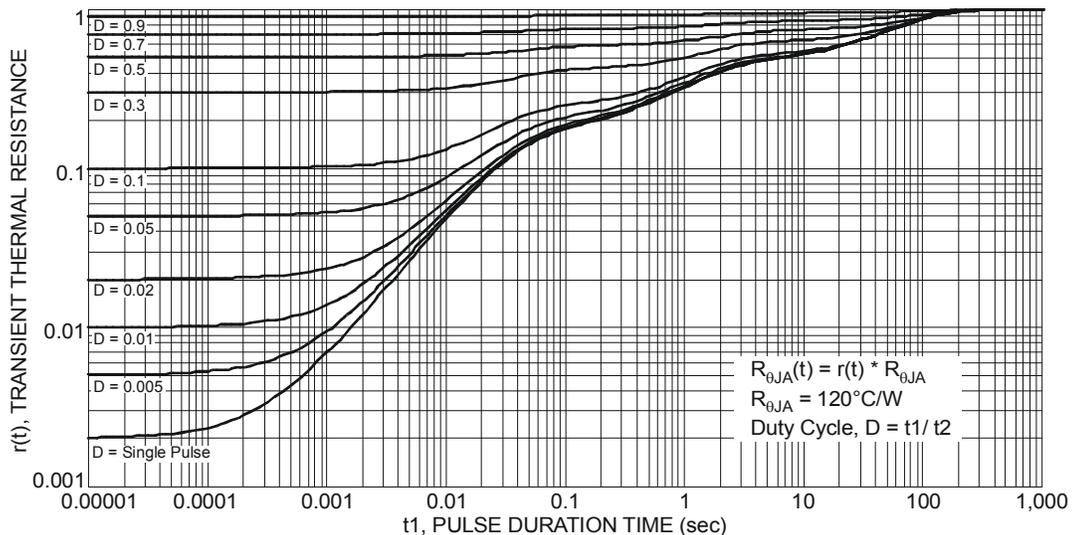
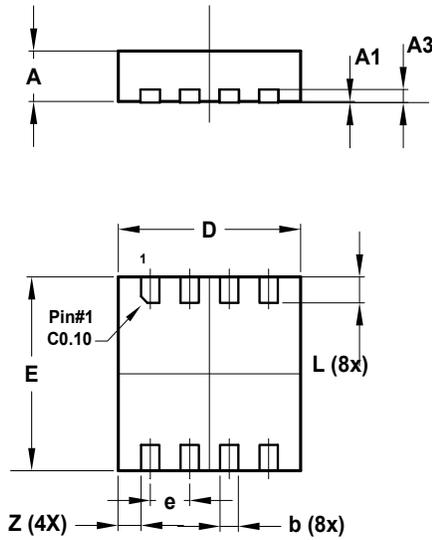


Figure 11 Transient Thermal Resistance

$R_{\theta JA}(t) = r(t) * R_{\theta JA}$   
 $R_{\theta JA} = 120^{\circ}\text{C/W}$   
 Duty Cycle,  $D = t_1 / t_2$

**Package Outline Dimensions**

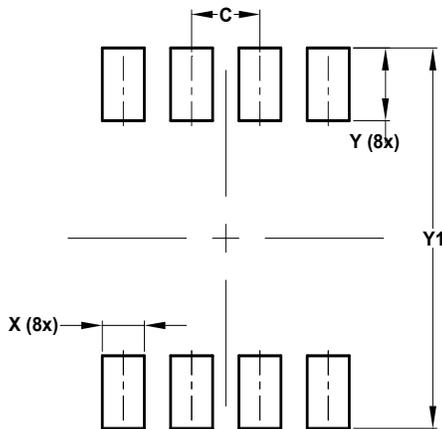
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



POWERDI3030-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0	0.05	0.02
A3	-	-	0.203
b	0.25	0.35	0.30
D	2.95	3.05	3.00
E	2.95	3.05	3.00
e	-	-	0.65
L	0.55	0.65	0.60
Z	-	-	0.375
All Dimensions in mm			

**Suggested Pad Layout**

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



Dimensions	Value (in mm)
C	0.650
X	0.400
Y	0.850
Y1	3.400

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