

## Product Summary

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

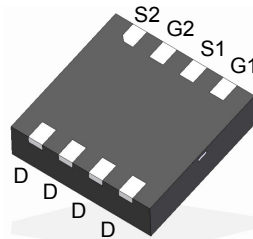
- Low On-Resistance
- Low Input Capacitance
- ESD Protected Up To 2kV**
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

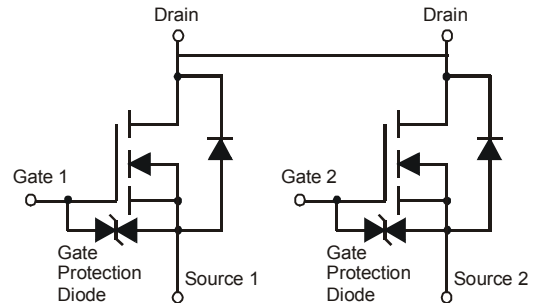
- Case: POWERDI3030-8
- Case Material: Molded Plastic, "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Weight: 0.0072 grams (approximate)



POWERDI3030-8



Bottom View



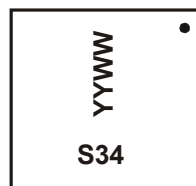
Internal Schematic

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2028UFDH-7	POWERDI3030-8	3,000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  - See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - 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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	20	V
Gate-Source Voltage (Note 5)			$V_{GSS}$	$\pm 12$	V
Continuous Drain Current (Note 7) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	6.8 5.8	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	8.8 7.0	A
Maximum Body Diode Forward Current (Note 7)			$I_S$	2	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, Duty cycle = 1%)			$I_{DM}$	40	A

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 6)			$P_D$	1.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady state		$R_{\theta JA}$	118	$^\circ\text{C/W}$
	$t < 10\text{s}$			72	
Total Power Dissipation (Note 7)			$P_D$	1.5	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady state		$R_{\theta JA}$	82	$^\circ\text{C/W}$
	$t < 10\text{s}$			50	
Thermal Resistance, Junction to Case (Note 7)			$R_{\theta JC}$	14	
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 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 10\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	0.5	—	1	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	16	20	m $\Omega$	$V_{GS} = 10\text{V}, I_D = 4\text{A}$
			17	22		$V_{GS} = 4.5\text{V}, I_D = 4\text{A}$
			19	26		$V_{GS} = 2.5\text{V}, I_D = 4\text{A}$
			24	36		$V_{GS} = 1.8\text{V}, I_D = 4\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	8	—	S	$V_{DS} = 5\text{V}, I_D = 12\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.7	1.0	V	$V_{GS} = 0\text{V}, I_S = 5\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	—	151	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	91	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	32	—	pF	
Gate Resistance	$R_g$	—	200	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge	$Q_g$	—	8.5	—	nC	$V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V},$ $I_D = 6.5\text{A}$
Gate-Source Charge	$Q_{gs}$	—	1.6	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	2.8	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	53	—	ns	$V_{GS} = 10\text{V}, V_{DS} = 4.5\text{V},$ $R_G = 6\Omega, R_L = 1.0\Omega, I_D = 1\text{A}$
Turn-On Rise Time	$t_r$	—	77	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	561	—	ns	
Turn-Off Fall Time	$t_f$	—	234	—	ns	

- Notes:
- AEC-Q101  $V_{GS}$  maximum is  $\pm 9.6\text{V}$ .
  - 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.

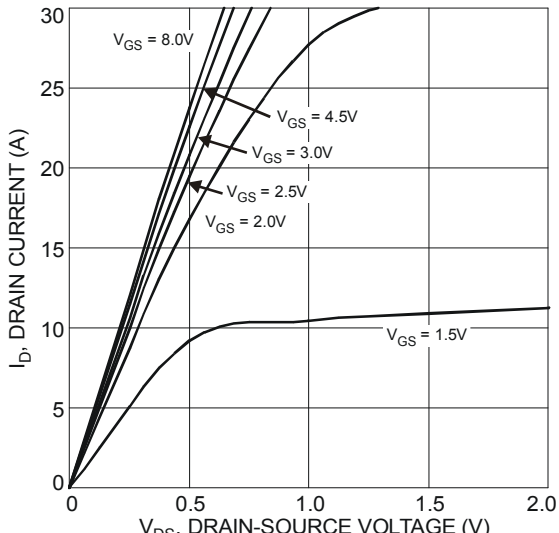


Figure 1 Typical Output Characteristic

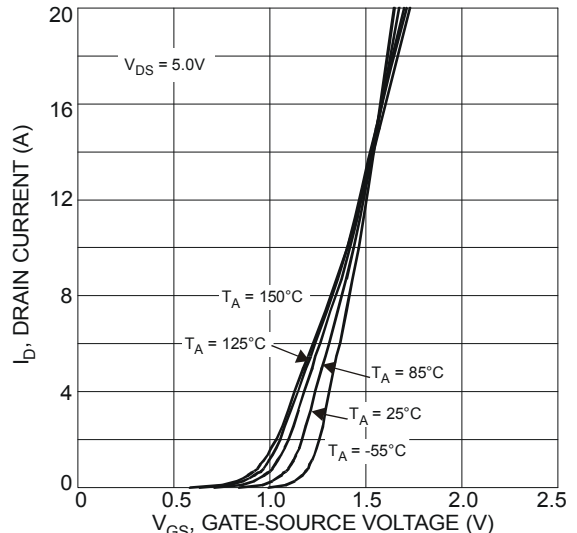


Figure 2 Typical Transfer Characteristics

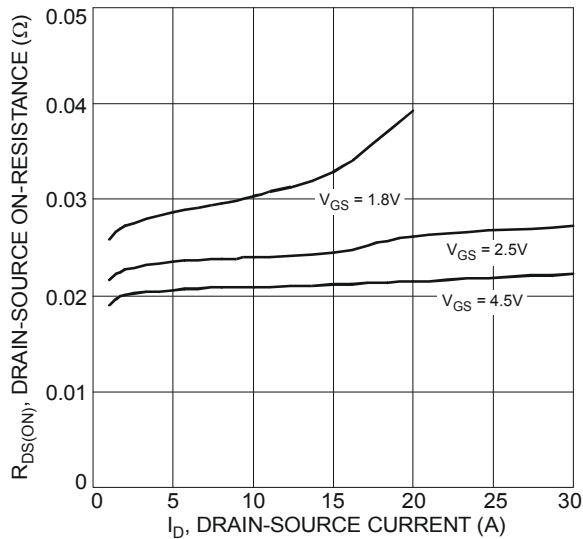


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

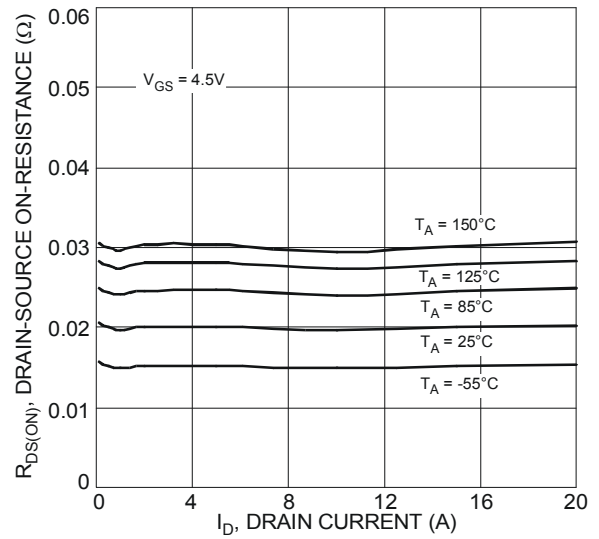


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

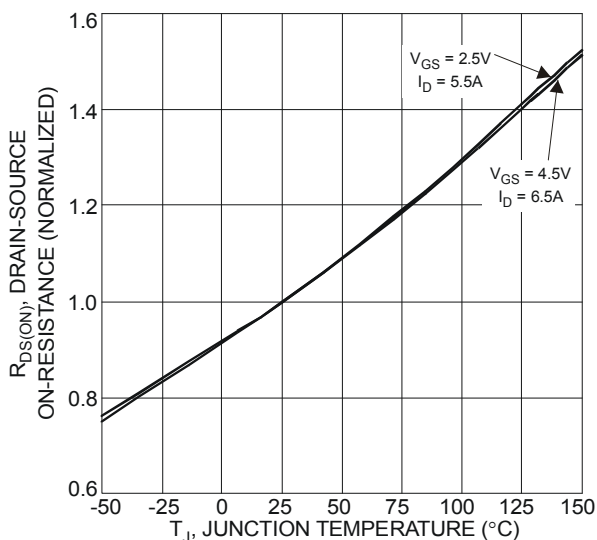


Figure 5 On-Resistance Variation with Temperature

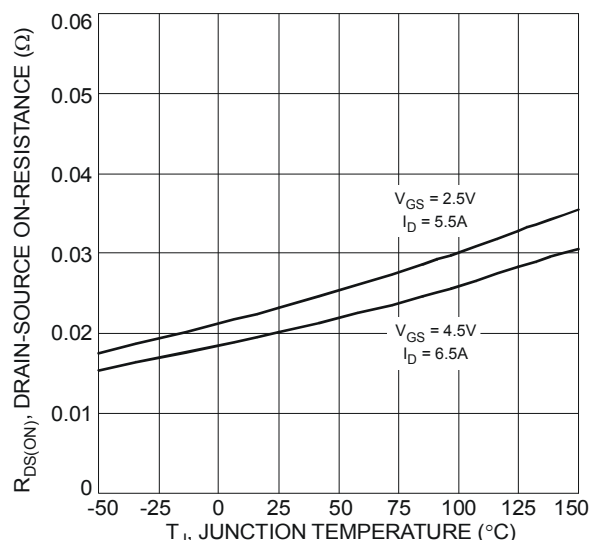


Figure 6 On-Resistance Variation with Temperature

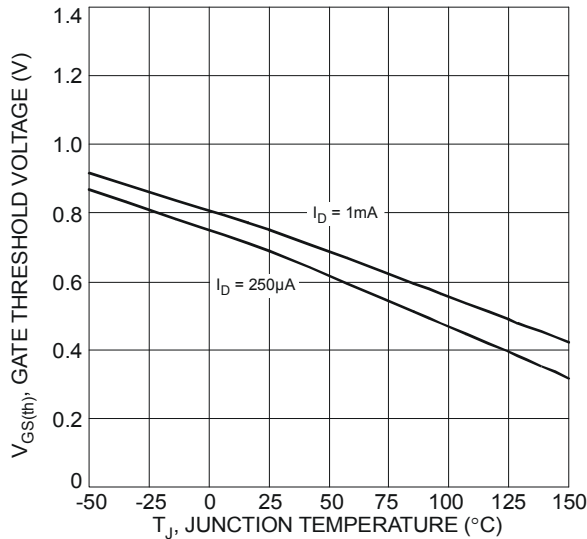


Figure 7 Gate Threshold Variation vs. Ambient Temperature

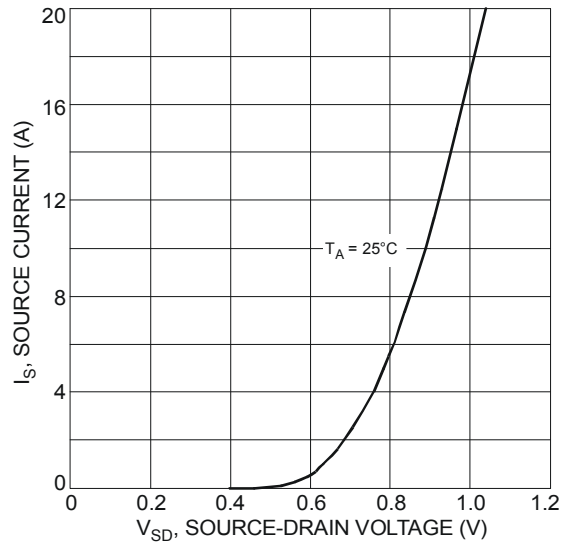


Figure 8 Diode Forward Voltage vs. Current

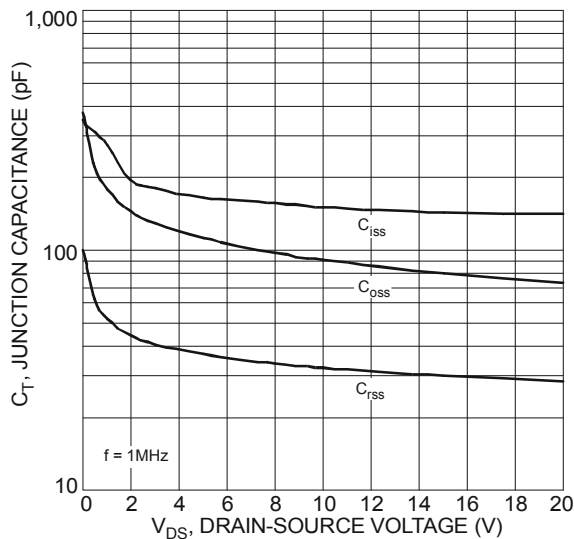


Figure 9 Typical Junction Capacitance

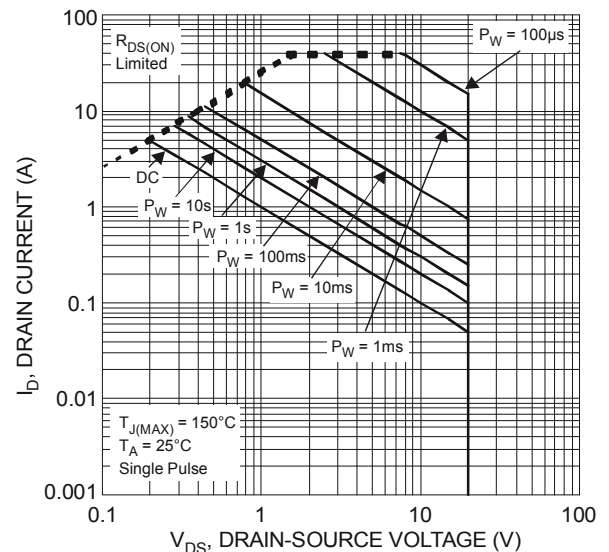


Figure 10 SOA, Safe Operation Area

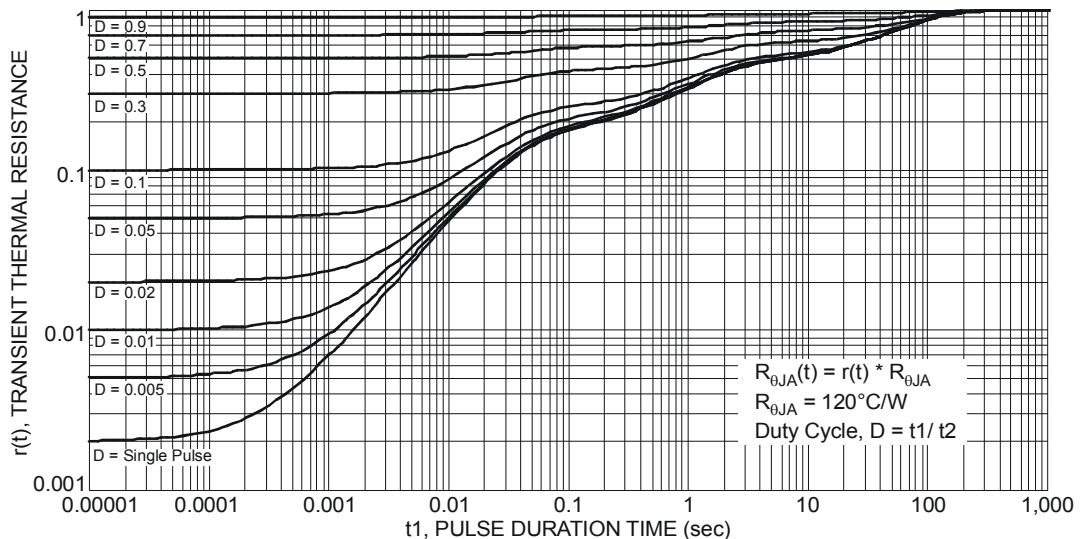
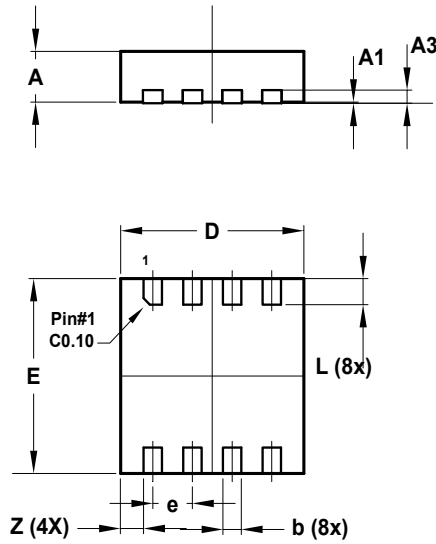


Figure 11 Transient Thermal Resistance

**Package Outline Dimensions**

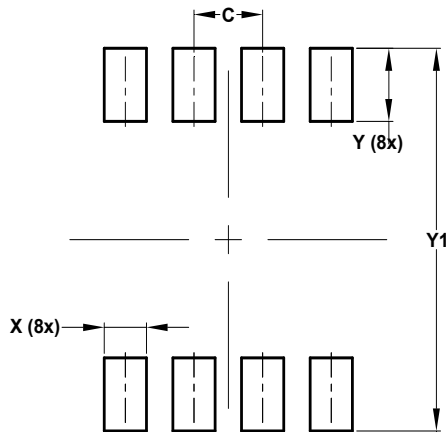
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А