

### Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) \max}$	$I_D \max$ $T_A = 25^\circ C$
30V	23m $\Omega$ @ $V_{GS} = 10V$	7.5A
	33m $\Omega$ @ $V_{GS} = 4.5V$	6.3 A

### Features and Benefits

- 100% Unclamped Inductive Switch (UIS) test in production
- Low  $R_{DS(ON)}$  – ensures on state losses are minimized
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- **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**

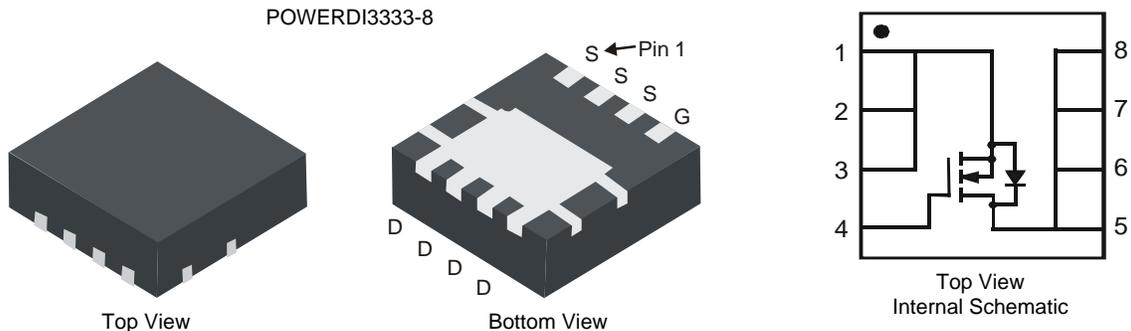
### Description and Applications

This 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.

- Backlighting
- Power Management Functions
- DC-DC Converters

### Mechanical Data

- Case: POWERDI3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram  
Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)

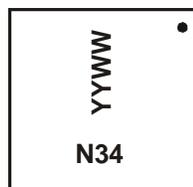


### Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3024SFG-7	POWERDI3333-8	2000/Tape & Reel
DMN3024SFG-13	POWERDI3333-8	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



N34 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last digit of year (ex: 11 = 2011)  
 WW = Week code (01 ~ 53)

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	30	V
Gate-Source Voltage			$V_{GSS}$	$\pm 25$	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	$I_D$	7.5 6.0	A
	$t < 10\text{s}$	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	$I_D$	10.5 8.5	A
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	$I_D$	6.3 5.0	A
	$t < 10\text{s}$	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$	$I_D$	8.5 7.6	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)			$I_{DM}$	60	A
Avalanche Current (Note 7)			$I_{AS}$	9	A
Repetitive Avalanche Energy (Note 7)			$E_{AS}$	12	mJ

**Thermal Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

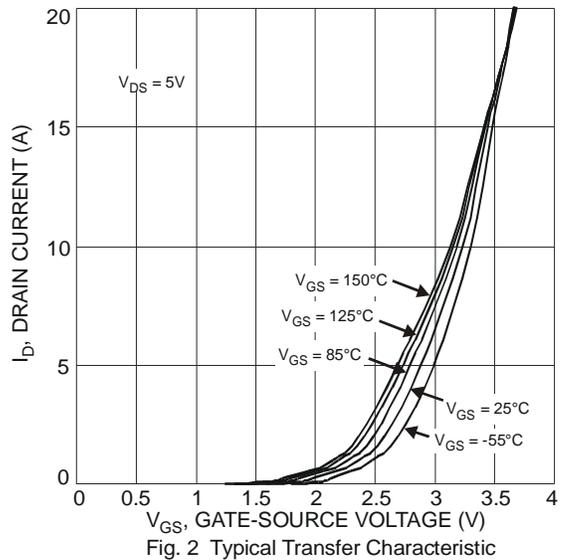
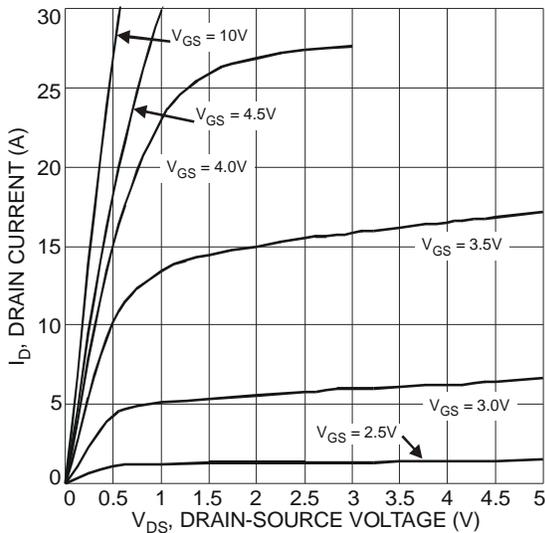
Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = 25^\circ\text{C}$	$P_D$	0.9	W
	$T_A = 70^\circ\text{C}$		0.5	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	$R_{\theta JA}$	145	$^\circ\text{C/W}$
	$t < 10\text{s}$		74	
Total Power Dissipation (Note 6)	$T_A = 25^\circ\text{C}$	$P_D$	2.2	W
	$T_A = 70^\circ\text{C}$		1.4	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	$R_{\theta JA}$	58	$^\circ\text{C/W}$
	$t < 10\text{s}$		31	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	11	$^\circ\text{C}$
Operating and Storage Temperature Range		$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  7. UIS in production with  $L = 0.3\text{mH}$ ,  $T_J = 25^\circ\text{C}$

**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	$BV_{DSS}$	30	-	-	V	$V_{GS} = 0V, I_D = 250 \mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	1	$\mu A$	$V_{DS} = 30V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS} = \pm 25V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	1.3	2.4	V	$V_{DS} = V_{GS}, I_D = 250 \mu A$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	15	23	m $\Omega$	$V_{GS} = 10V, I_D = 10A$
		-	24	33		$V_{GS} = 4.5V, I_D = 7.5A$
Forward Transfer Admittance	$ Y_{fs} $	-	11	-	S	$V_{DS} = 5V, I_D = 10.0A$
Diode Forward Voltage	$V_{SD}$	-	0.69	1	V	$V_{GS} = 0V, I_S = 1A$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	-	479	-	pF	$V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz$
Output Capacitance	$C_{oss}$	-	97	-	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	61	-	pF	
Gate Resistance	$R_g$	0.4	1.1	1.6	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge $V_{GS} = 4.5V$	$Q_g$	-	5.0	-	nC	$V_{DS} = 15V, I_D = 10A$
Total Gate Charge $V_{GS} = 10V$	$Q_g$	-	10.5	-	nC	
Gate-Source Charge	$Q_{gs}$	-	1.8	-	nC	
Gate-Drain Charge	$Q_{gd}$	-	1.6	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	2.9	-	ns	$V_{GS} = 10V, V_{DS} = 15V, R_G = 3\Omega, R_L = 1.5\Omega,$
Turn-On Rise Time	$t_r$	-	7.9	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	14.6	-	ns	
Turn-Off Fall Time	$t_f$	-	3.1	-	ns	

Notes: 8. Short duration pulse test used to minimize self-heating effect.  
 9. Guaranteed by design. Not subject to product testing.



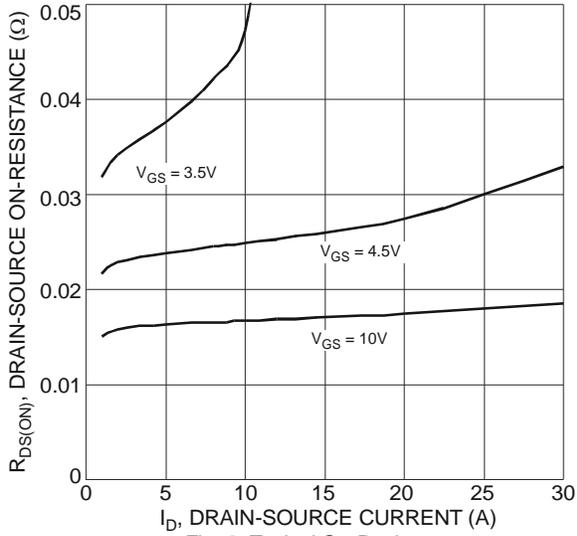


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

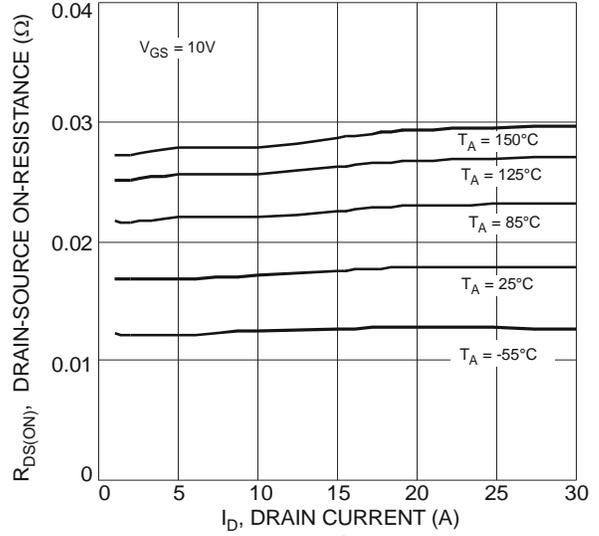


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

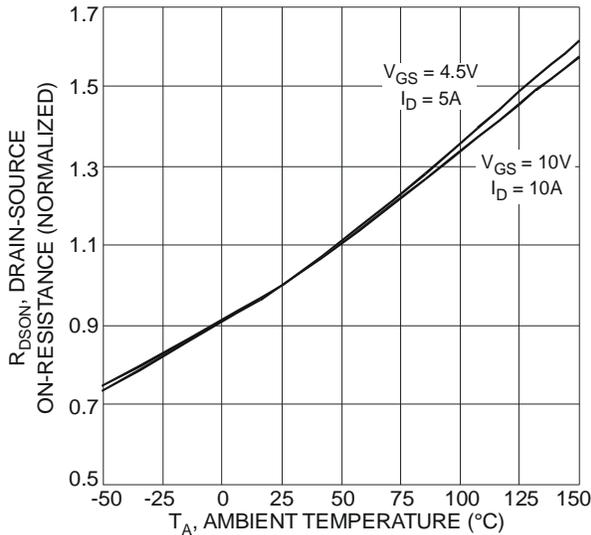


Fig. 5 On-Resistance Variation with Temperature

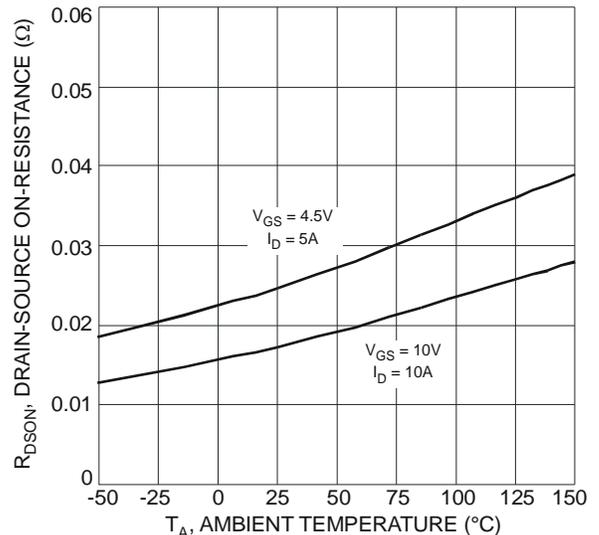


Fig. 6 On-Resistance Variation with Temperature

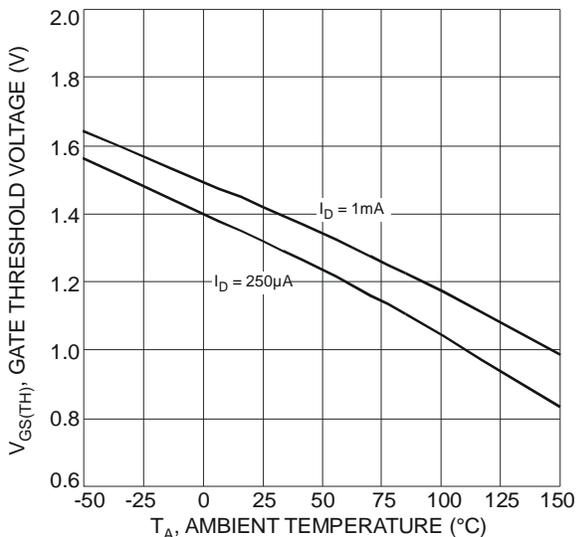


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

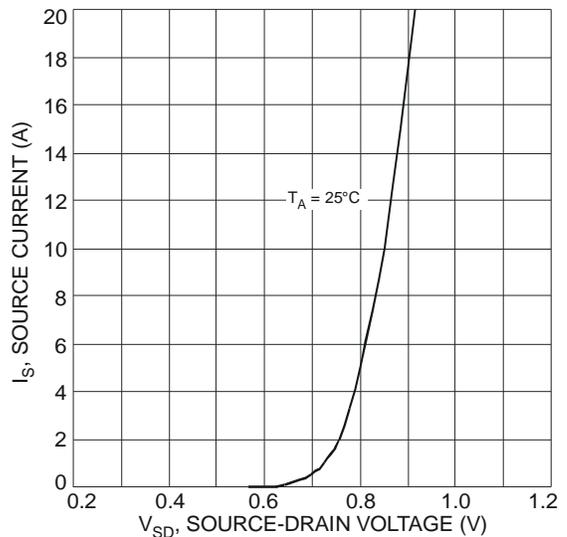


Fig. 8 Diode Forward Voltage vs. Current

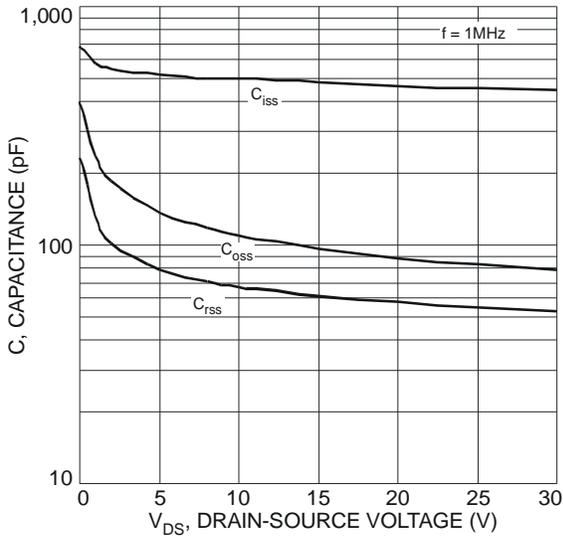


Fig. 9 Typical Total Capacitance

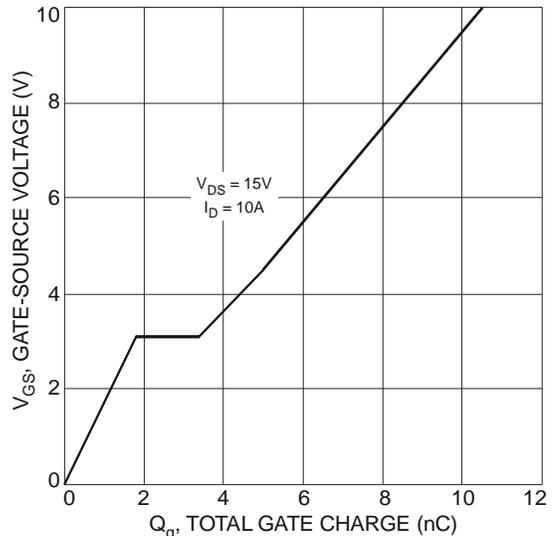


Fig. 10 Gate-Charge Characteristics

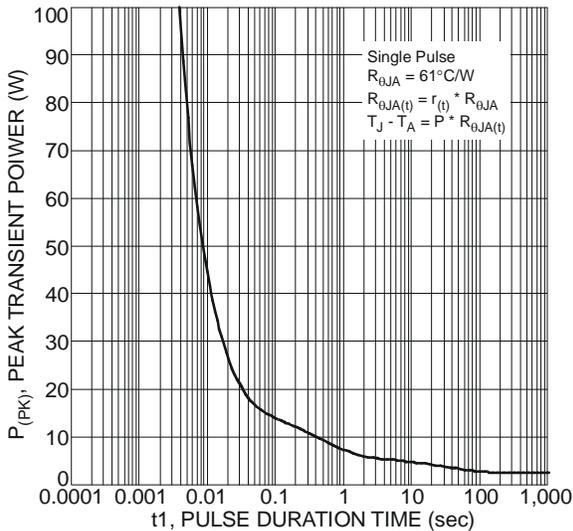


Fig. 11 Single Pulse Maximum Power Dissipation

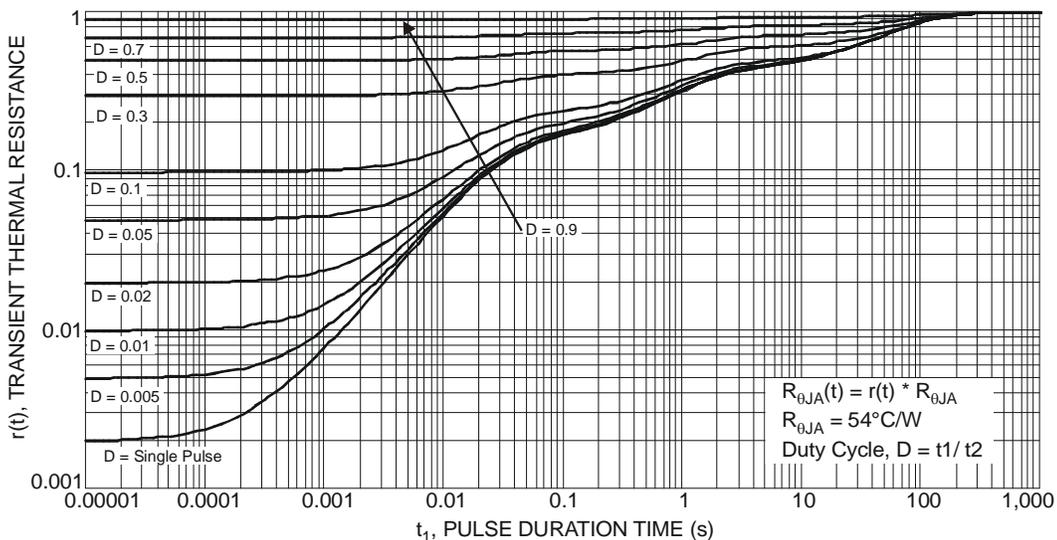
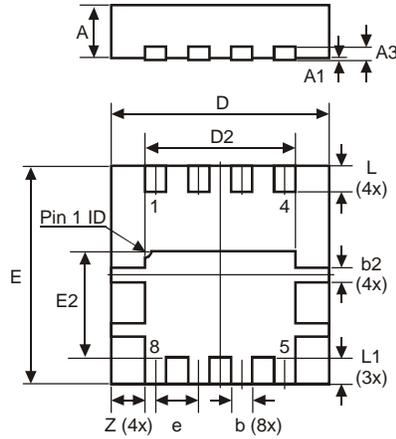


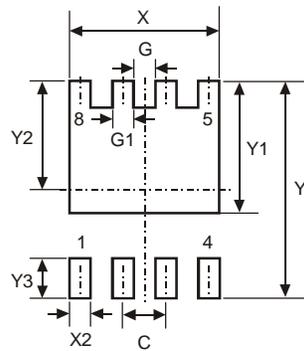
Fig. 12 Transient Thermal Response

**Package Outline Dimensions**



POWERDI3333-8			
Dim	Min	Max	Typ
D	3.25	3.35	3.30
E	3.25	3.35	3.30
D2	2.22	2.32	2.27
E2	1.56	1.66	1.61
A	0.75	0.85	0.80
A1	0	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	-	-	0.20
L	0.35	0.45	0.40
L1	-	-	0.39
e	-	-	0.65
Z	-	-	0.515
All Dimensions in mm			

**Suggested Pad Layout**



Dimensions	Value (in mm)
C	0.650
G	0.230
G1	0.420
Y	3.700
Y1	2.250
Y2	1.850
Y3	0.700
X	2.370
X2	0.420

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