

## Product Summary

Device	BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>A</sub> = +25°C
Q1	25V	6mΩ @ V <sub>GS</sub> = 10V	11.6A
		7.5mΩ @ V <sub>GS</sub> = 4.5V	10.4A
Q2	25V	2.0mΩ @ V <sub>GS</sub> = 10V	20.1A
		3.1mΩ @ V <sub>GS</sub> = 4.5V	16.1A

## Description

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

## Applications

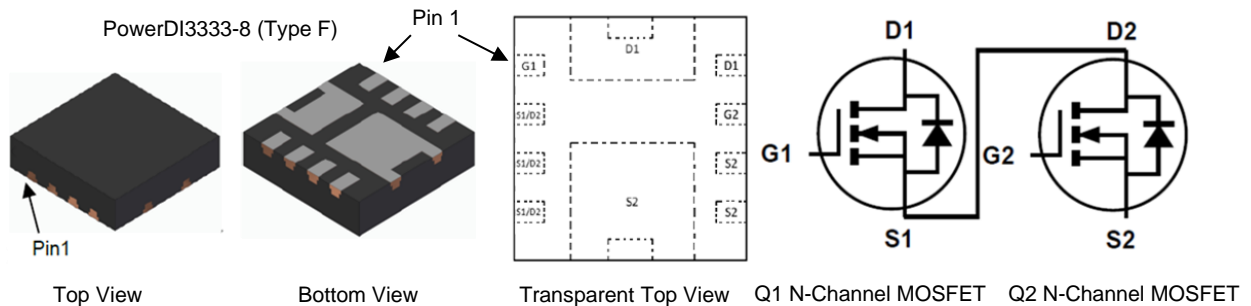
- Power-management functions

## Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Lead-Free Finish; 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-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

- Package: PowerDI<sup>®</sup>3333-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections Indicator: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 <sup>(e3)</sup>
- Weight: 0.072 grams (Approximate)

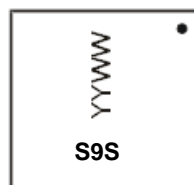


## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMT26M0LDG-7	PowerDI3333-8 (Type F)	2000	Tape & Reel
DMT26M0LDG-13	PowerDI3333-8 (Type F)	3000	Tape & Reel

- Notes:
- EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  - 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.
  - 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



S9S = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 24 = 2024)  
 WW = Week Code (01 to 53)

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

Characteristic			Symbol	Q1 N-CHANNEL	Q2 N-CHANNEL	Unit
Drain-Source Voltage			V <sub>DSS</sub>	25	25	V
Gate-Source Voltage			V <sub>GSS</sub>	±12	±12	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	11.6	20.1	A
		T <sub>A</sub> = +85°C		8.4	14.5	
Continuous Drain Current (Note 5) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	10.4	16.1	A
		T <sub>C</sub> = +25°C		33.8	52.6	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	77	116	A
Avalanche Current (Note 6) L = 1mH			I <sub>AS</sub>	6.5	16.5	A
Avalanche Energy (Note 6) L = 1mH			E <sub>AS</sub>	21	136	mJ

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	1.24	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	103	°C/W
Thermal Resistance, Junction to Case (Note 7)	R <sub>θJC</sub>	9.7	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
  6. I<sub>AS</sub> and E<sub>AS</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  7. Thermal resistance from junction to soldering point (on the exposed drain pad).

**Electrical Characteristics N-CHANNEL – Q1** (@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>	25	—	—	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>	—	—	1.0	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	100	nA	V <sub>GS</sub> = 12V, V <sub>DS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	-100	nA	V <sub>GS</sub> = -8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.8	—	2.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	3.9	6	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 13A
		—	5.0	7.5		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 12A
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	—	0.7	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	1010	—	pF	V <sub>DS</sub> = 13V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	732	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	47	—	pF	
Gate Resistance	R <sub>g</sub>	—	0.65	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	7.2	—	nC	V <sub>DS</sub> = 13V, I <sub>D</sub> = 13A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	15.9	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	2.6	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	1.5	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	5.6	—	ns	V <sub>DS</sub> = 13V R <sub>g</sub> = 6Ω, I <sub>D</sub> = 13A
Turn-On Rise Time	t <sub>r</sub>	—	31.7	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	19.9	—	ns	
Turn-Off Fall Time	t <sub>f</sub>	—	21.4	—	ns	

**Electrical Characteristics N-CHANNEL – Q2** (@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>	25	—	—	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>	—	—	100	nA	V <sub>GS</sub> = 12V, V <sub>DS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	-100	nA	V <sub>GS</sub> = -8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.1	—	2.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	1.1	2.0	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 27A
		—	1.5	3.1		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 24A
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	—	0.7	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	4016	—	pF	V <sub>DS</sub> = 13V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	2624	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	135	—	pF	
Gate Resistance	R <sub>g</sub>	—	0.49	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	26.7	—	nC	V <sub>DS</sub> = 13V, I <sub>D</sub> = 27A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	57.4	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	8.6	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	6.9	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	12.4	—	ns	V <sub>DS</sub> = 13V R <sub>G</sub> = 6Ω, I <sub>D</sub> = 27A
Turn-On Rise Time	t <sub>r</sub>	—	37.2	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	62.7	—	ns	
Turn-Off Fall Time	t <sub>f</sub>	—	30.8	—	ns	

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

**N-CHANNEL – Q1**

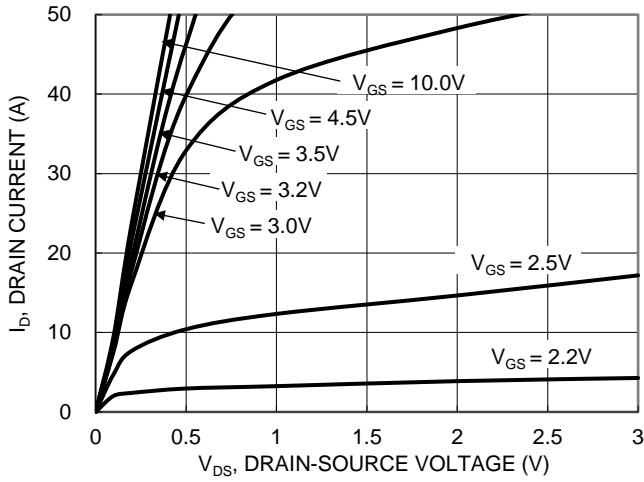


Figure 1. Typical Output Characteristic

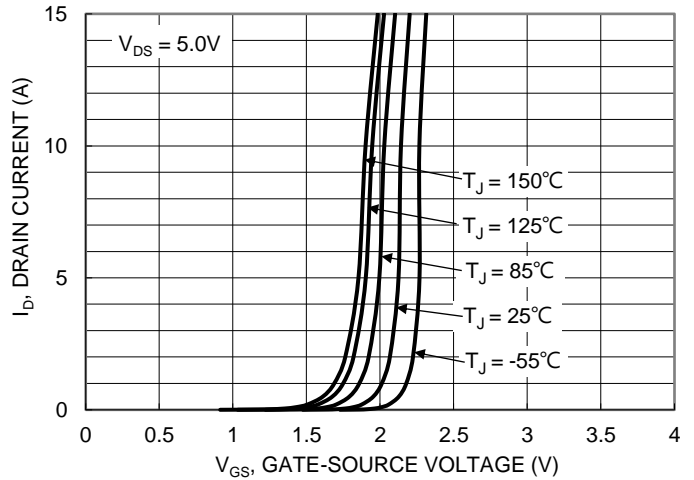


Figure 2. Typical Transfer Characteristic

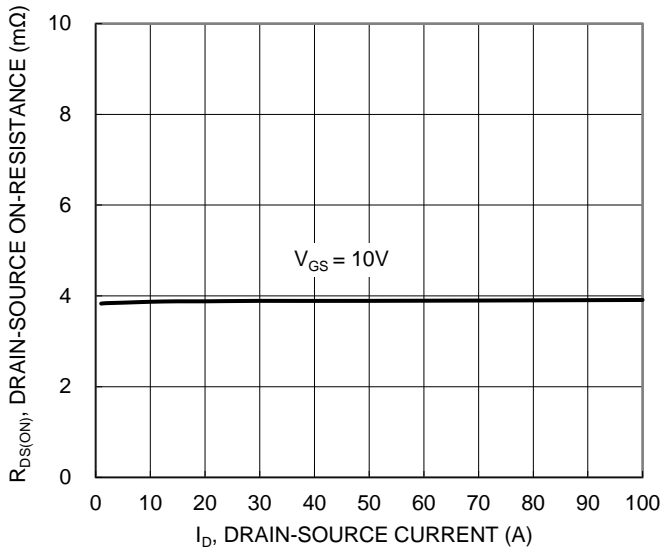


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

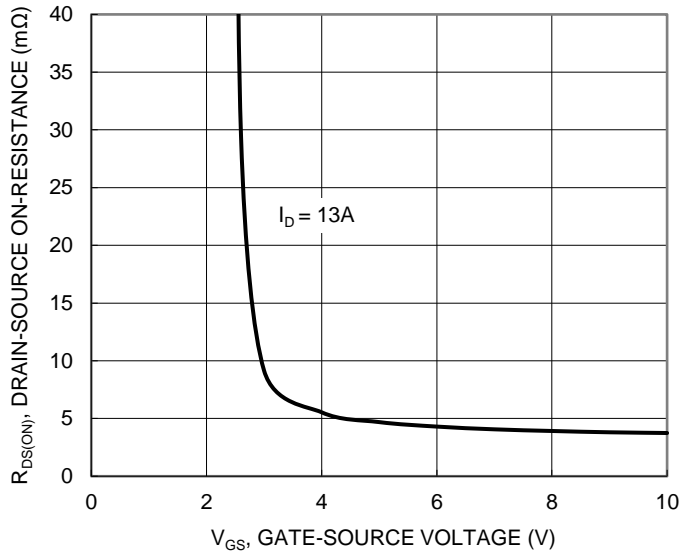


Figure 4. Typical Transfer Characteristic

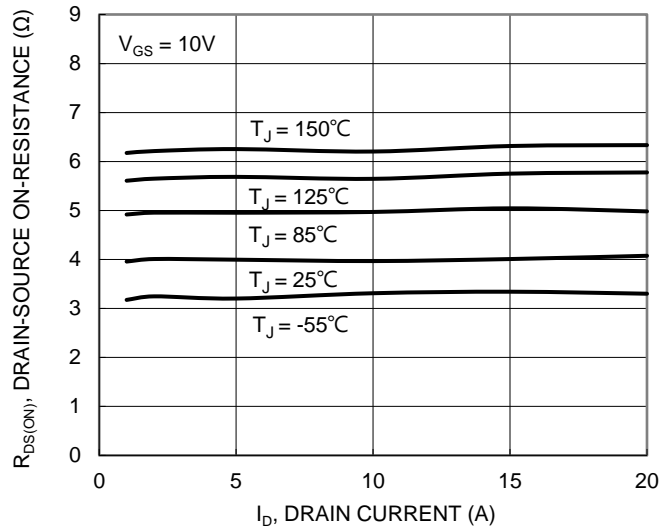


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

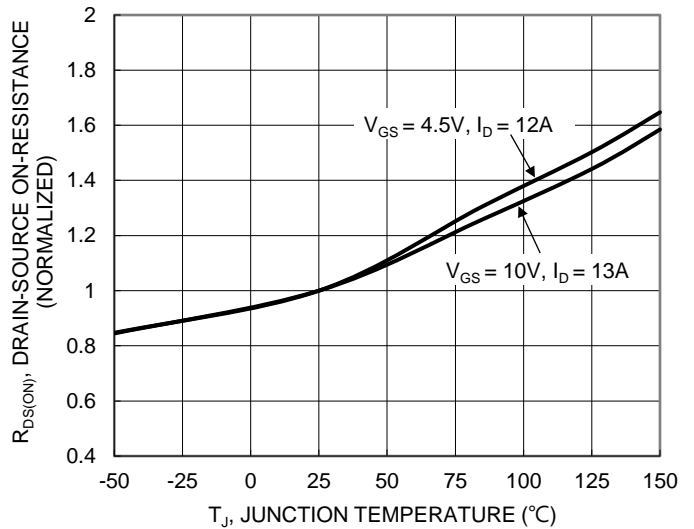


Figure 6. On-Resistance Variation with Temperature

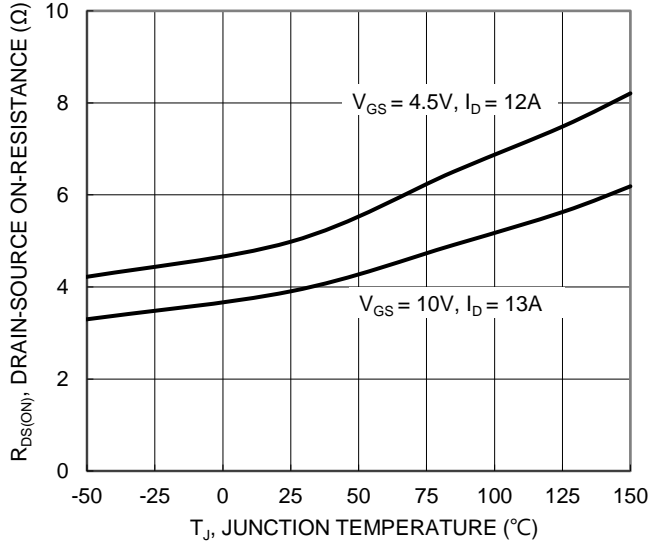


Figure 7. On-Resistance Variation with Temperature

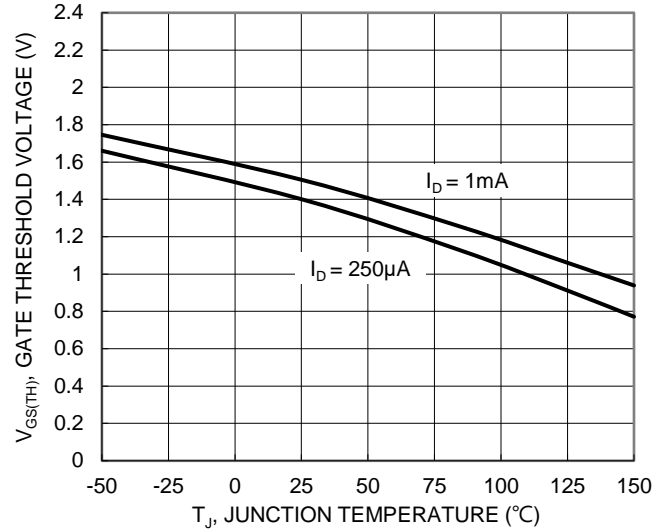


Figure 8. Gate Threshold Variation vs. Junction Temperature

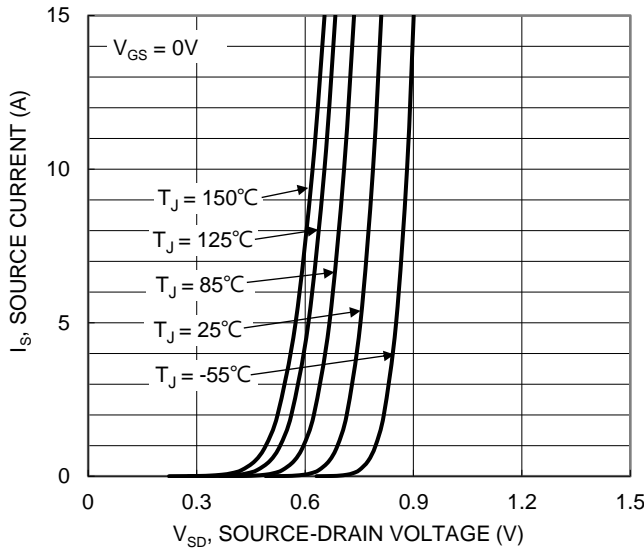


Figure 9. Diode Forward Voltage vs. Current

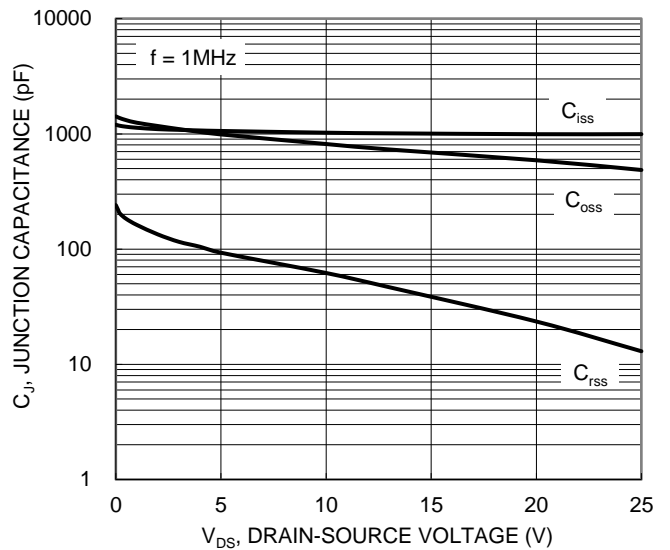


Figure 10. Typical Junction Capacitance

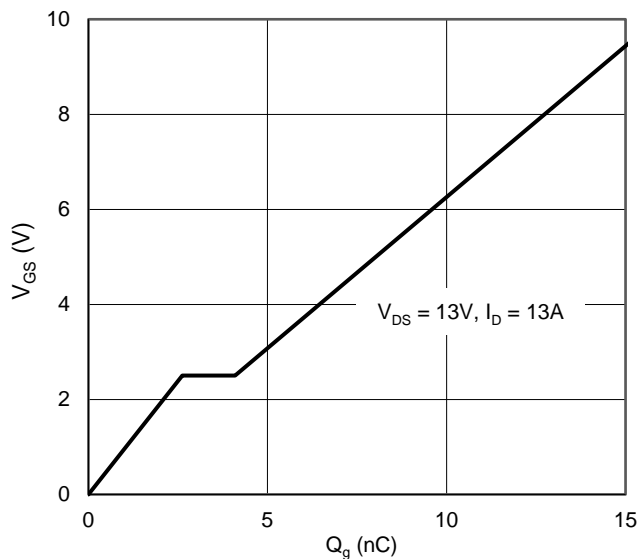


Figure 11. Gate Charge

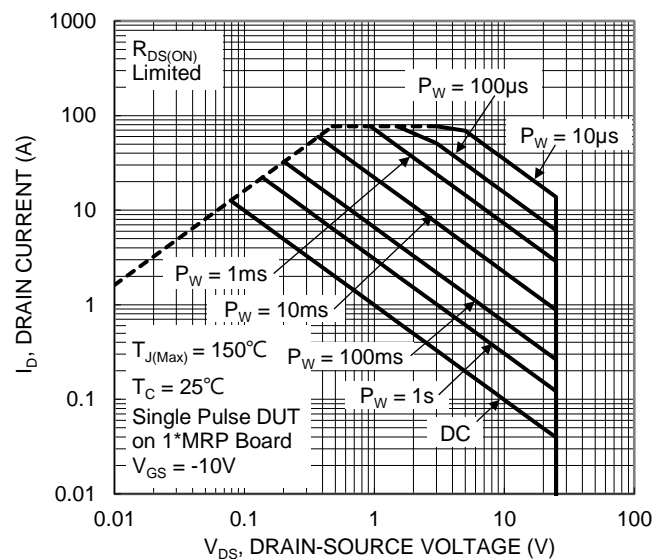


Figure 12. SOA, Safe Operation Area

**N-CHANNEL – Q2**

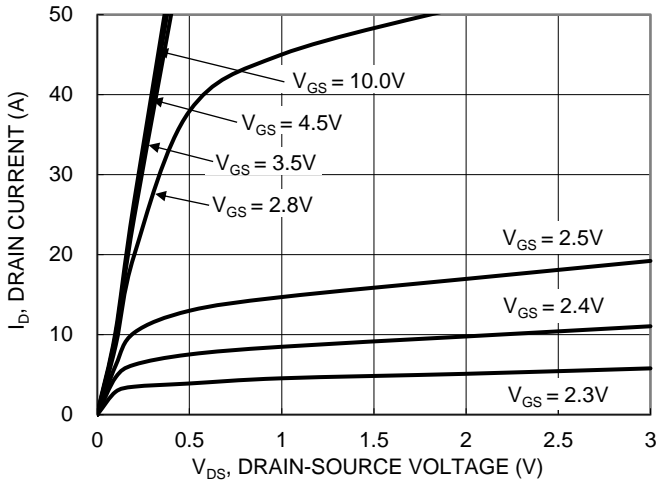


Figure 13. Typical Output Characteristic

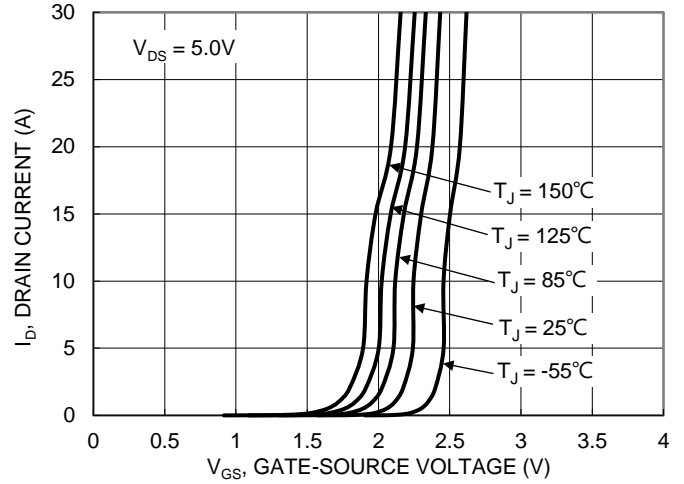


Figure 14. Typical Transfer Characteristic

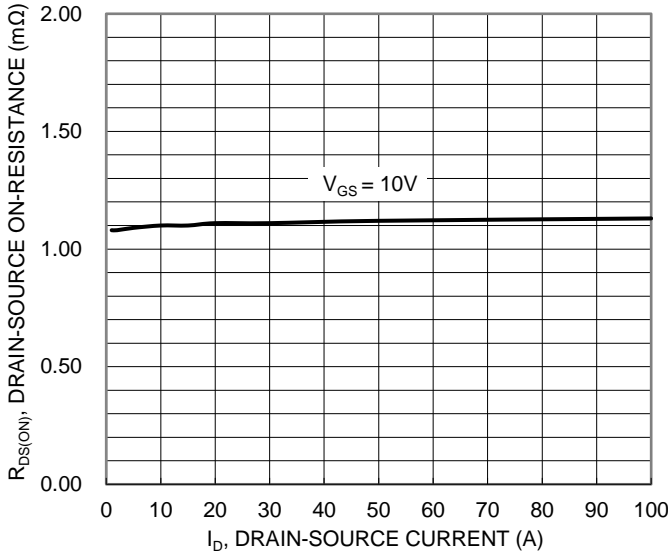


Figure 15. Typical On-Resistance vs. Drain Current and Gate Voltage

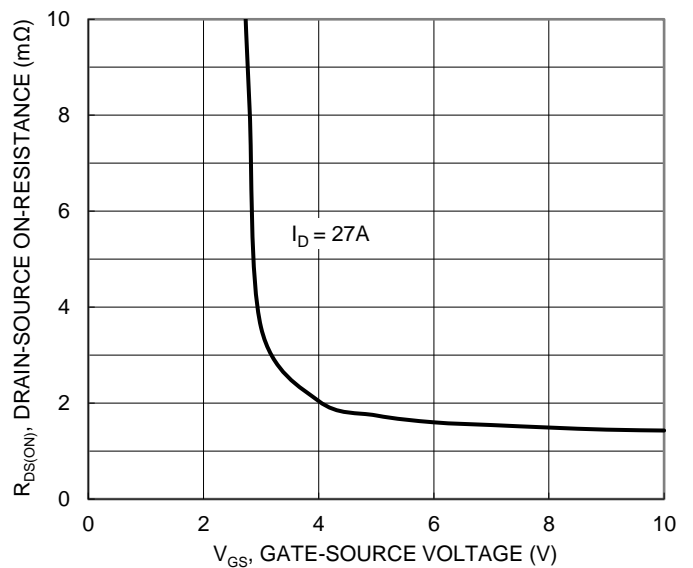


Figure 16. Typical Transfer Characteristic

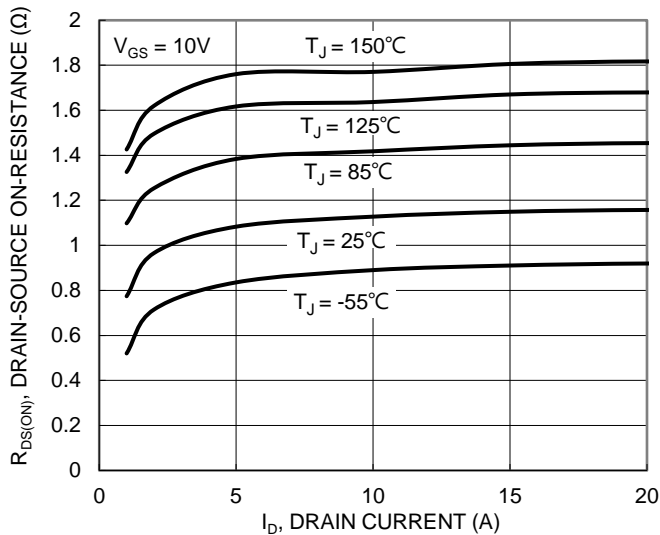


Figure 17. Typical On-Resistance vs. Drain Current and Temperature

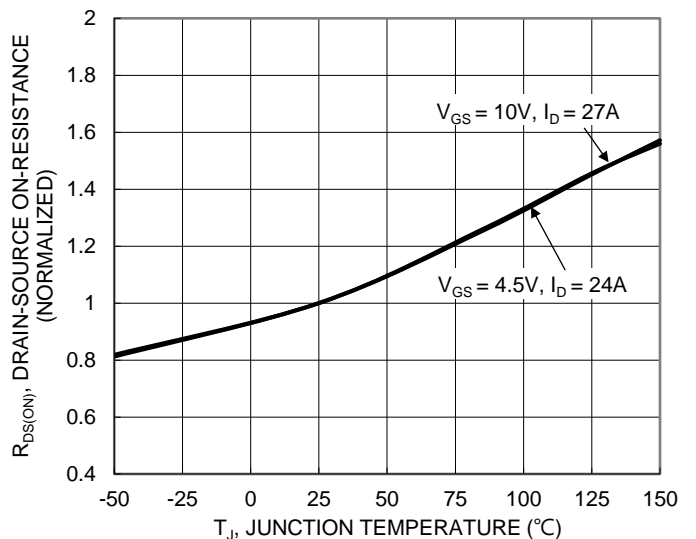


Figure 18. On-Resistance Variation with Temperature

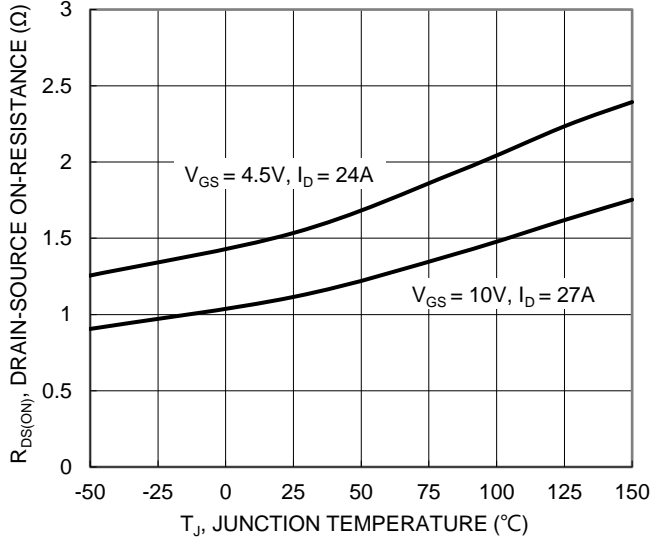


Figure 19. On-Resistance Variation with Temperature

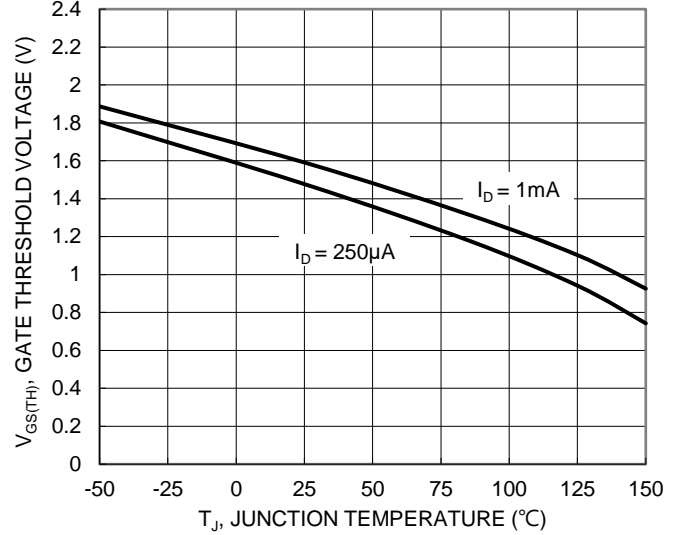


Figure 20. Gate Threshold Variation vs. Junction Temperature

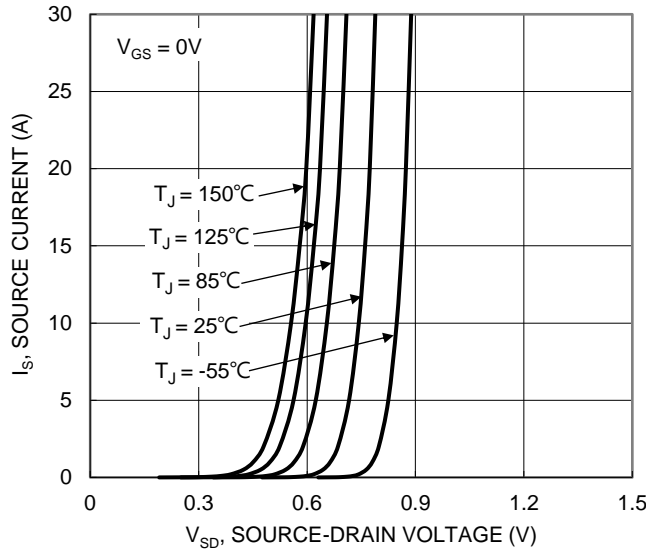


Figure 21. Diode Forward Voltage vs. Current

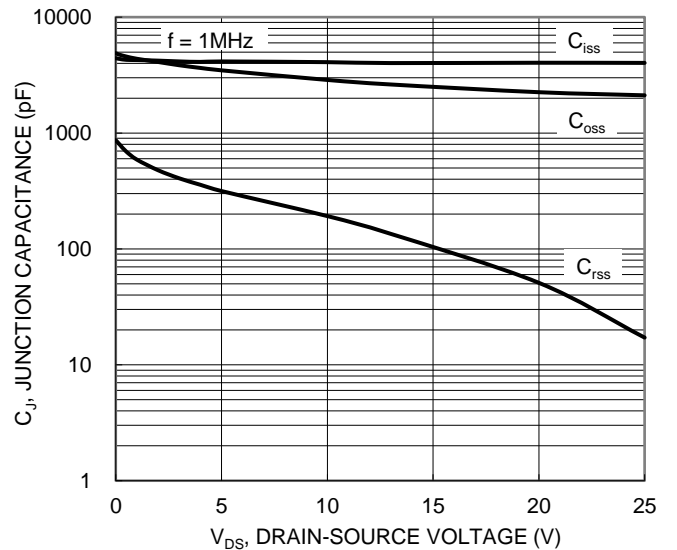


Figure 22. Typical Junction Capacitance

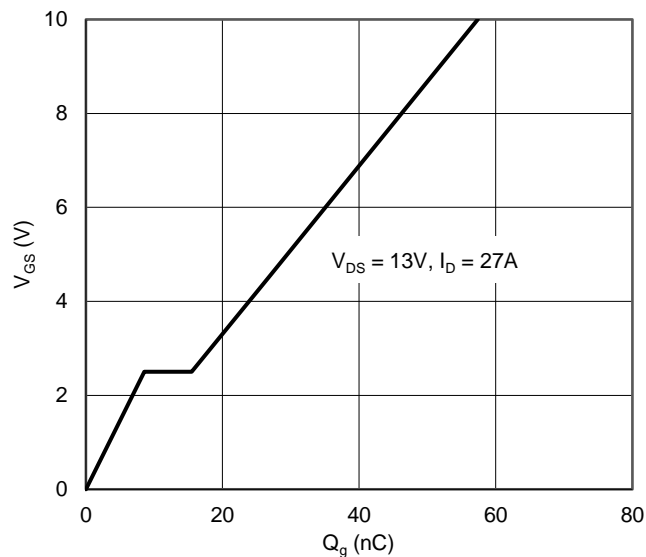


Figure 23. Gate Charge

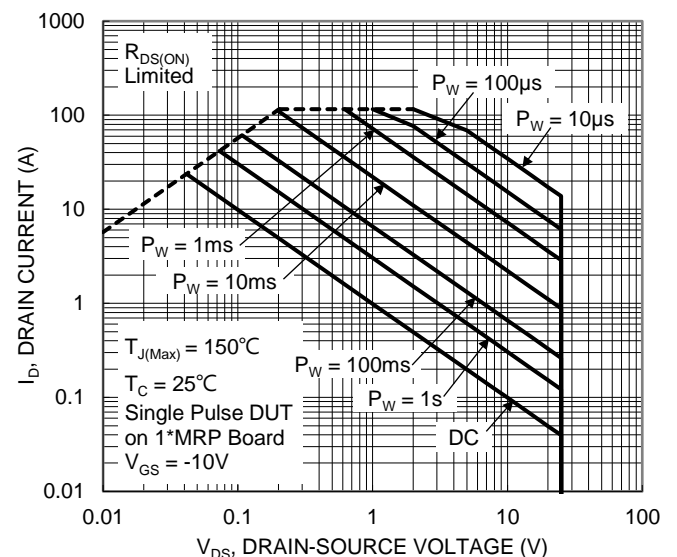


Figure 24. SOA, Safe Operation Area

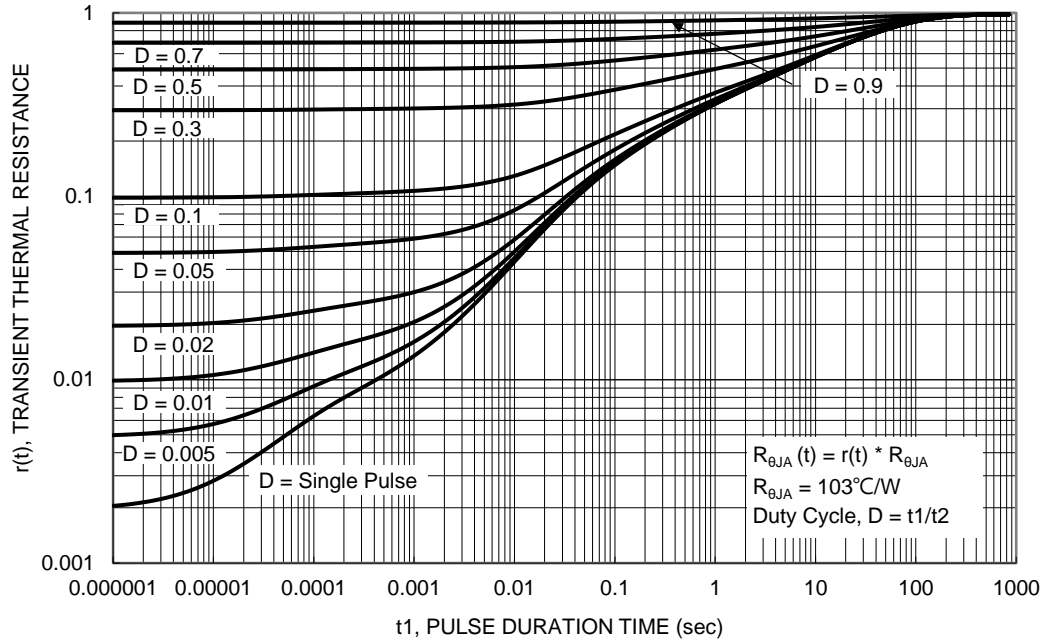


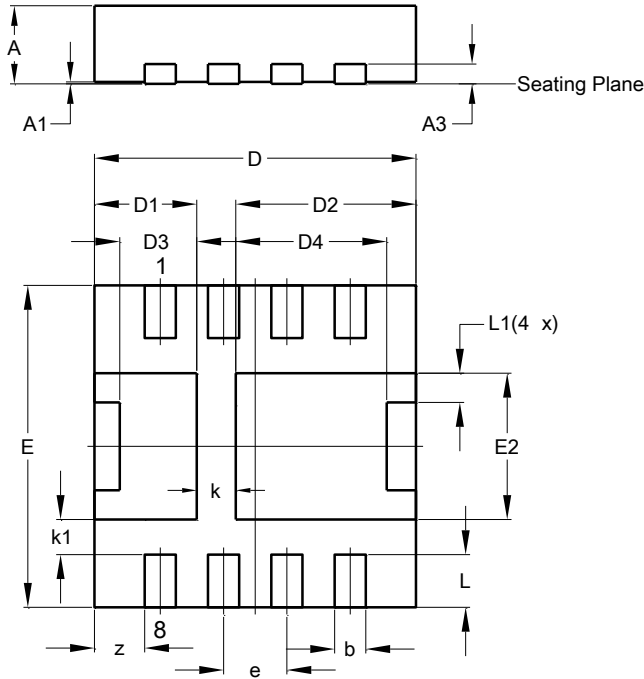
Figure 25. Transient Thermal Resistance



## Package Outline Dimensions

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

**PowerDI3333-8 (Type F)**

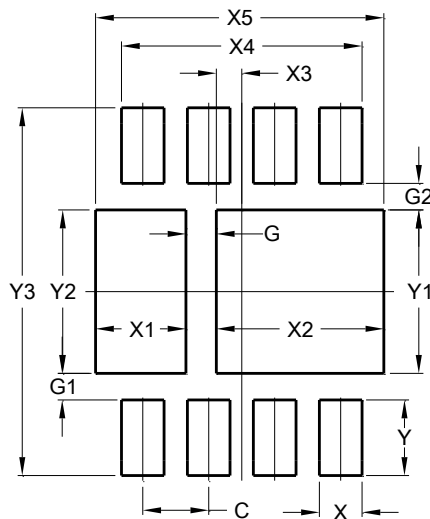


PowerDI3333-8 (Type F)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	--	--	0.203
b	0.27	0.37	0.32
D	3.25	3.35	3.30
D1	0.95	1.15	1.05
D2	1.75	1.95	1.85
D3	0.69	0.89	0.79
D4	1.45	1.65	1.55
E	3.25	3.35	3.30
E2	1.40	1.60	1.50
e	0.65BSC		
L	0.49	0.59	0.54
L1	0.20	0.40	0.30
z	--	--	0.515
k	--	--	0.40
k1	--	--	0.36
All Dimensions in mm			

## Suggested Pad Layout

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

**PowerDI3333-8 (Type F)**



Dimensions	Value (in mm)
C	0.650
G	0.300
G1	0.260
G2	0.260
X	0.420
X1	0.890
X2	1.650
X3	0.250
X4	2.370
X5	2.840
Y	0.740
Y1	1.600
Y2	1.600
Y3	3.600

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