

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	-30	V
Gate-Source Voltage			V <sub>GSS</sub>	±25	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = -10V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	-11.5 -9.4	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	-15.2 -12.1	A
Maximum Continuous Body Diode Forward Current (Note 5)			I <sub>S</sub>	-3.0	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	-80	A
Avalanche Current (Note 7) L = 1mH			I <sub>AR</sub>	-14	A
Repetitive Avalanche Energy (Note 7) L = 1mH			E <sub>AR</sub>	104	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	0.94	W
	T <sub>A</sub> = +70°C		0.6	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	137	°C/W
	t < 10s		82	°C/W
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	2.2	W
	T <sub>A</sub> = +70°C		1.3	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	60	°C/W
	t < 10s		36	°C/W
Thermal Resistance, Junction to Case (Note 6)		R <sub>θJC</sub>	3.0	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

NOT RECOMMENDED FOR NEW DESIGN

**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>	-30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1	μA	V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10	μA	V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-1.0	—	-3.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	8.5	10	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -11.5A
		—	15	18		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -8.5A
Forward Transfer Admittance	Y <sub>fs</sub>	—	24	—	S	V <sub>DS</sub> = -5V, I <sub>D</sub> = -11.5A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iSS</sub>	—	2246	—	pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	352	—	pF	
Reverse Transfer Capacitance	C <sub>rSS</sub>	—	294	—	pF	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Gate Resistance	R <sub>g</sub>	—	5.1	12	Ω	
Total Gate Charge (V <sub>GS</sub> = -5V)	Q <sub>g</sub>	—	20.5	—	nC	V <sub>DS</sub> = -15V, I <sub>D</sub> = -11.5A
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>g</sub>	—	41	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	7.6	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	8.0	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	7.5	—	ns	V <sub>DD</sub> = -15V, V <sub>GS</sub> = -10V, R <sub>G</sub> = 6Ω, I <sub>D</sub> = -11.5A
Turn-On Rise Time	t <sub>R</sub>	—	15.4	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	45.6	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	36.8	—	ns	
<b>BODY DIODE CHARACTERISTICS</b>						
Diode Forward Voltage	V <sub>SD</sub>	—	-0.7	—	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A
Reverse Recovery Time (Note 9)	t <sub>RR</sub>	—	20	—	ns	I <sub>S</sub> = -11.5A, dI/dt = 100A/μs
Reverse Recovery Charge (Note 9)	Q <sub>RR</sub>	—	9.5	—	nC	

- 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. I<sub>AR</sub> and E<sub>AR</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.  
8. Short duration pulse test used to minimize self-heating effect.  
9. Guaranteed by design. Not subject to product testing.

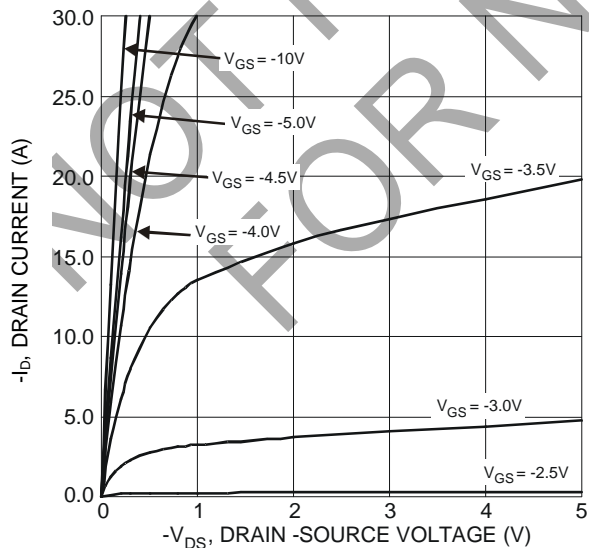


Figure 1 Typical Output Characteristics

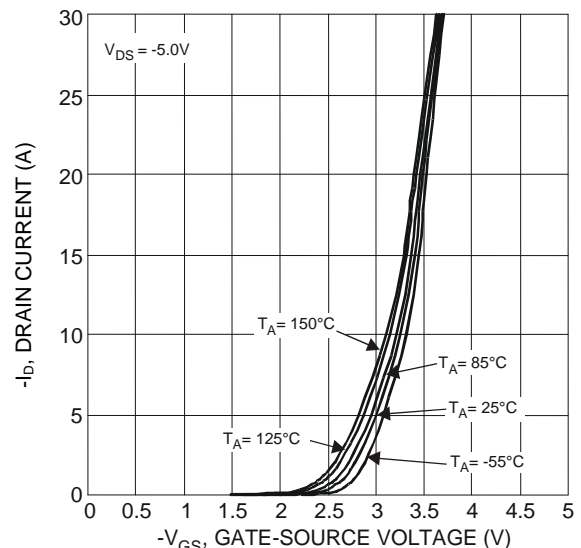


Figure 2 Typical Transfer Characteristics

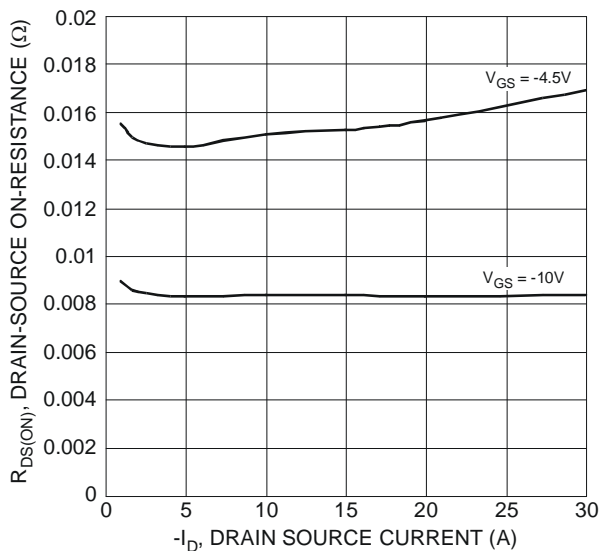


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

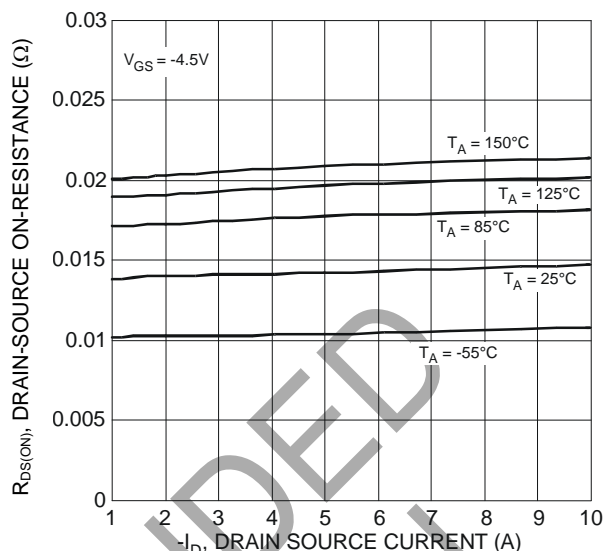


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

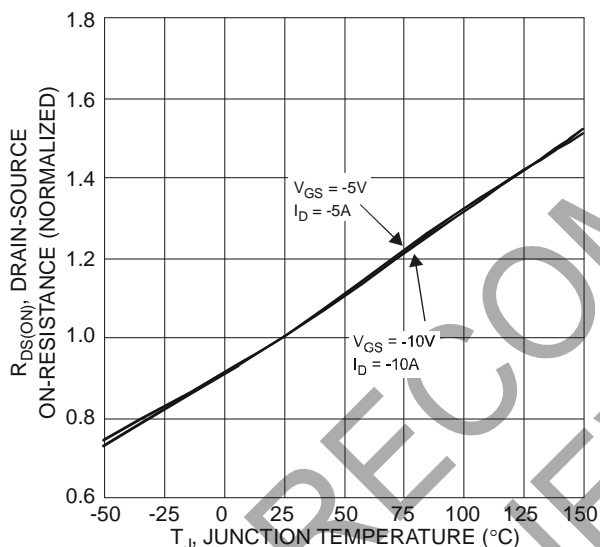


Figure 5 On-Resistance Variation with Temperature

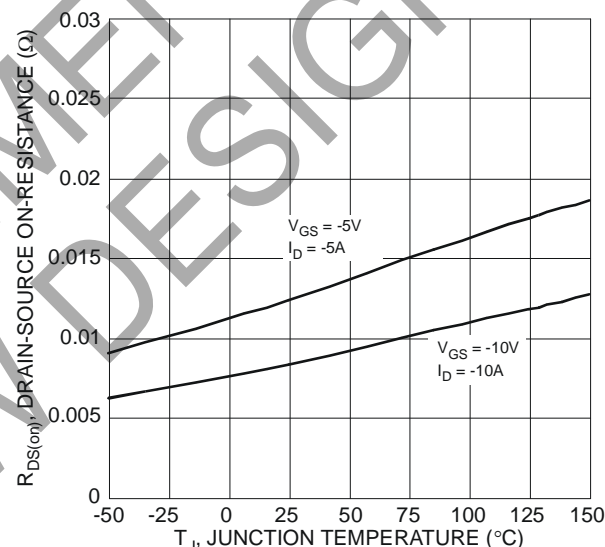


Figure 6 On-Resistance Variation with Temperature

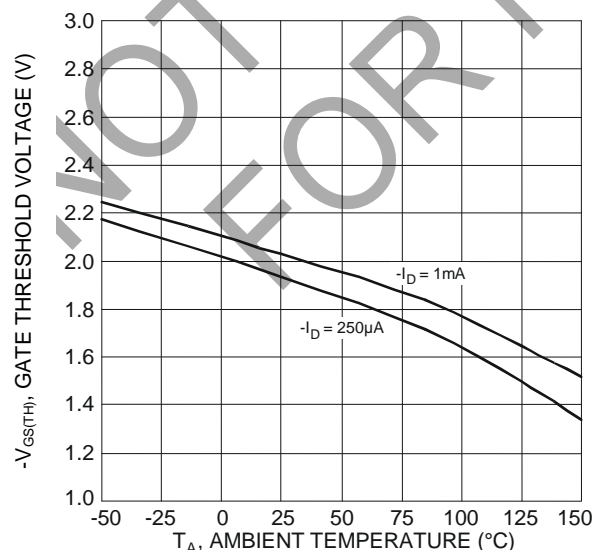


Figure 7 Gate Threshold Variation vs. Ambient Temperature

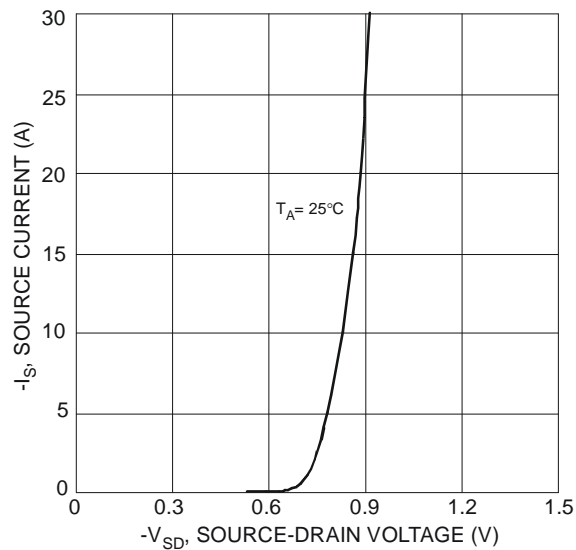


Figure 8 Diode Forward Voltage vs. Current

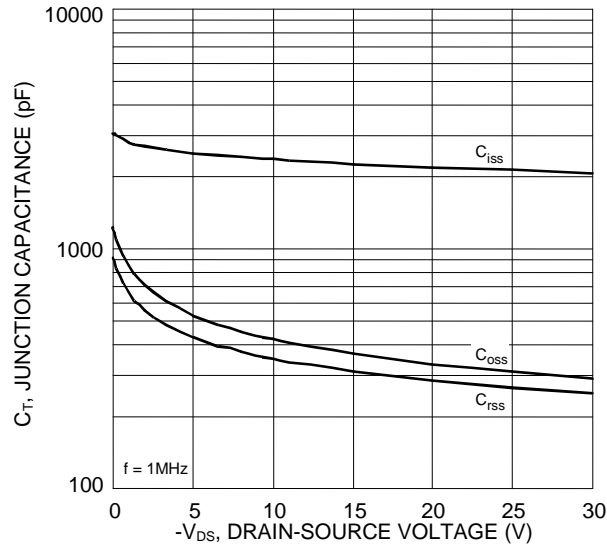


Figure 9 Typical Junction Capacitance

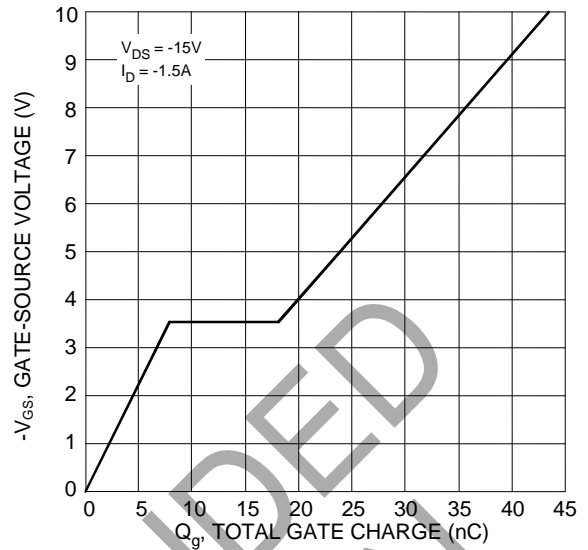


Figure 10 Gate Charge

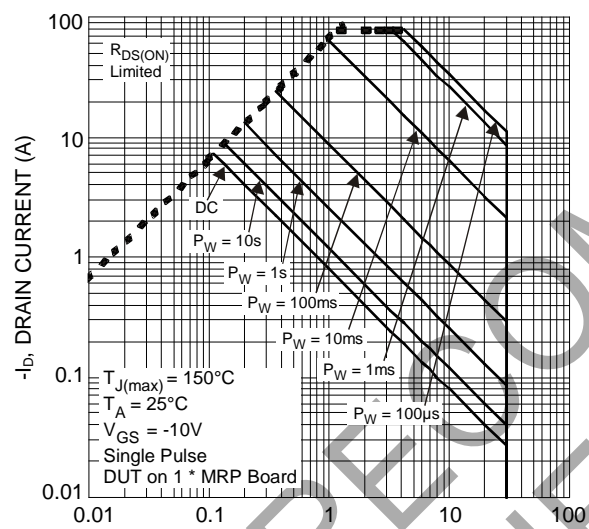


Figure 11 SOA, Safe Operation Area

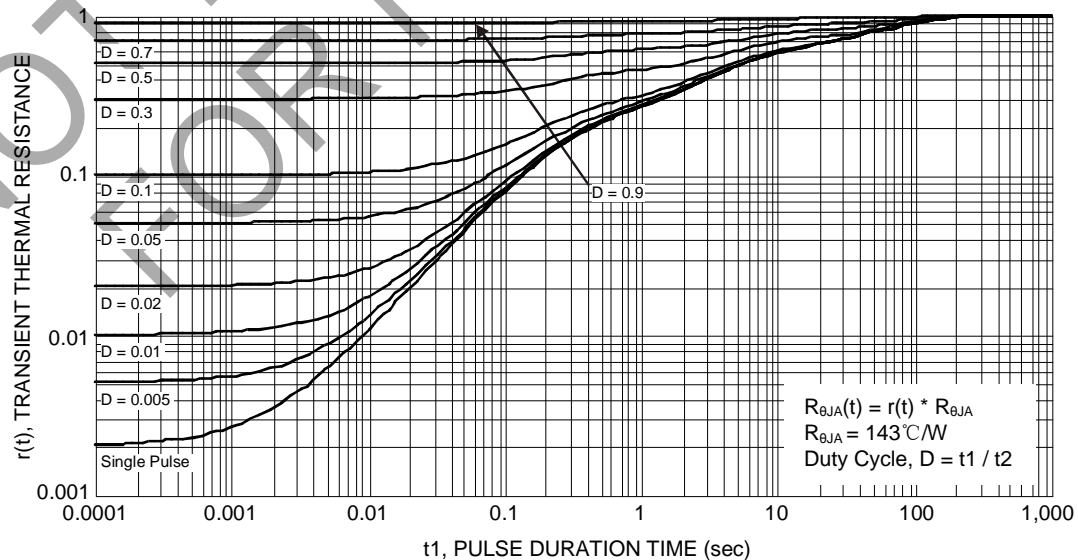
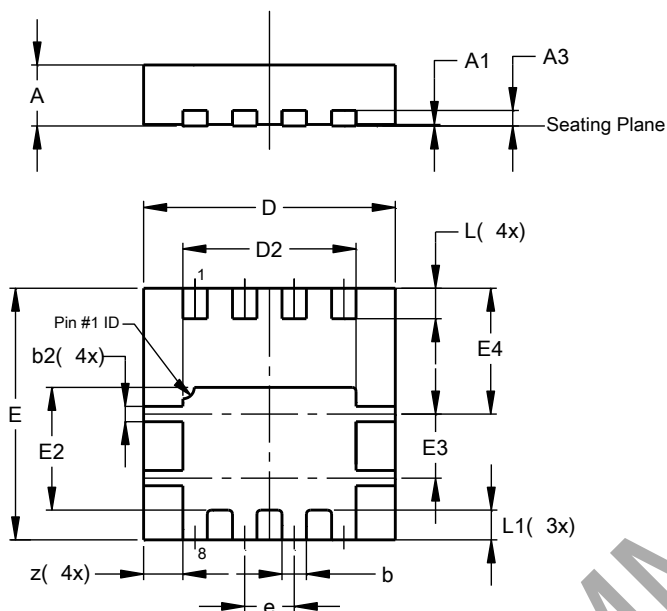


Figure 12 Transient Thermal Resistance

## Package Outline Dimensions

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

**PowerDI3333-8**

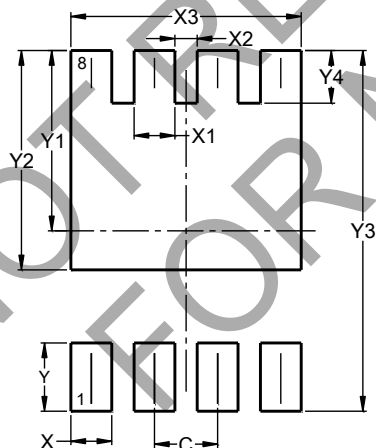


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	-	-	0.65
L	0.35	0.45	0.40
L1	-	-	0.39
z	-	-	0.515
All Dimensions in mm			

## Suggested Pad Layout

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

**PowerDI3333-8**



Dimensions	Value (in mm)
C	0.650
X	0.420
X1	0.420
X2	0.230
X3	2.370
Y	0.700
Y1	1.850
Y2	2.250
Y3	3.700
Y4	0.540

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