

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	20	V
Gate-Source Voltage			V <sub>GSS</sub>	±12	V
Continuous Drain Current (Notes 6 & 9) V <sub>GS</sub> = 4.5V	Steady State	T <sub>C</sub> = +25°C	I <sub>D</sub>	50	A
		T <sub>C</sub> = +70°C		40	
		T <sub>A</sub> = +25°C	I <sub>D</sub>	18	A
		T <sub>A</sub> = +70°C		14	
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	130	A
Maximum Continuous Body Diode Forward Current (Note 6)			I <sub>S</sub>	2.6	A
Avalanche Current , L = 0.2mH			I <sub>AS</sub>	23.9	A
Repetitive Avalanche Energy, L = 0.2mH			E <sub>AS</sub>	58.4	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>	1.05	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	120	°C/W
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	2.27	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	55	°C/W
Thermal Resistance, Junction to Case (Note 6)		R <sub>θJC</sub>	4.2	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.  
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</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>	—	—	10	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
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.4	0.7	1.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	4	4.6	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 13.5A
		—	4.9	8.7		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 13.5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.8	1.1	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 27A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	6,495	—	pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	546	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	477	—	pF	
Gate Resistance	R <sub>g</sub>	—	0.7	—	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>	—	68.8	—	nC	V <sub>DS</sub> = 16V, I <sub>D</sub> = 27A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	164	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	10.4	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	17.4	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	12.4	—	ns	V <sub>GS</sub> = 5V, V <sub>DS</sub> = 10V, R <sub>G</sub> = 4.7Ω, I <sub>D</sub> = 13.5A
Turn-On Rise Time	t <sub>R</sub>	—	25.7	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	114	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	38	—	ns	
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	16.1	—	ns	I <sub>F</sub> = 13.5A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	8.5	—	nC	I <sub>F</sub> = 13.5A, di/dt = 100A/μs

Notes: 7. Short duration pulse test used to minimize self-heating effect.  
 8. Guaranteed by design. Not subject to product testing.  
 9. Limited by package.

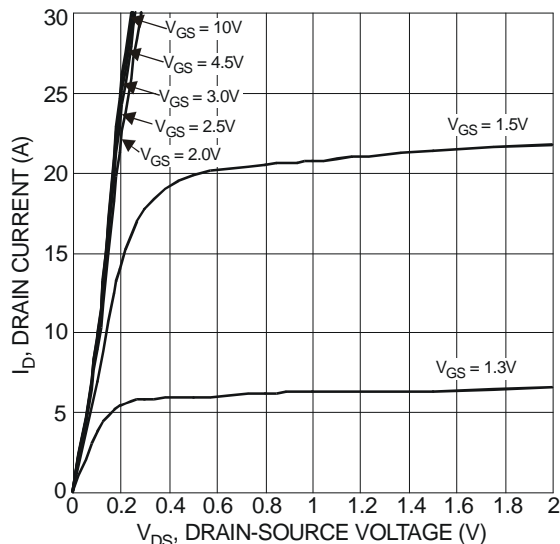


Figure 1 Typical Output Characteristics

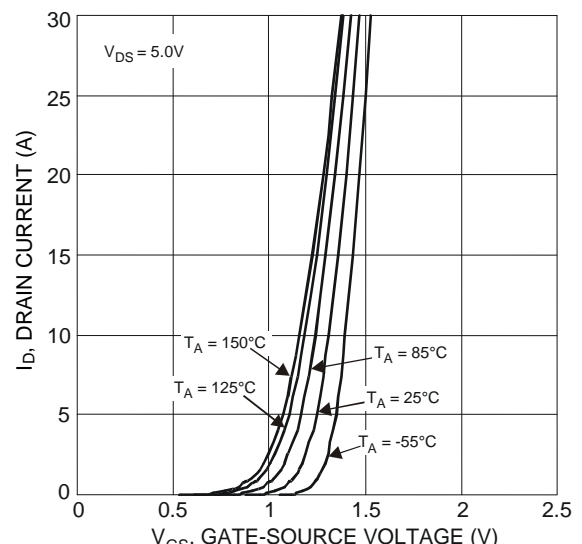


Figure 2 Typical Transfer Characteristics

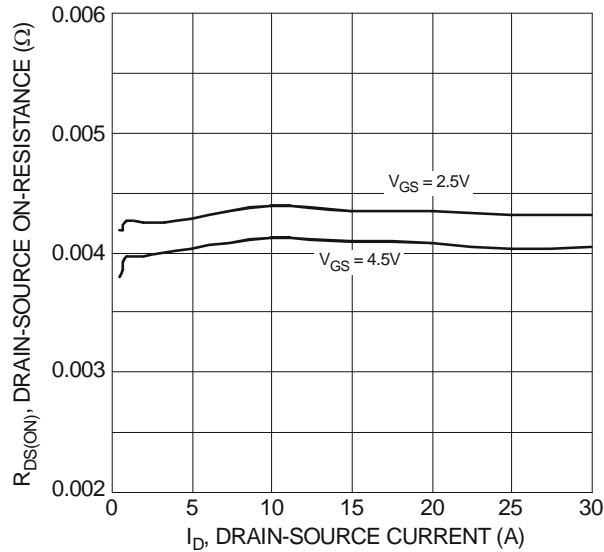


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

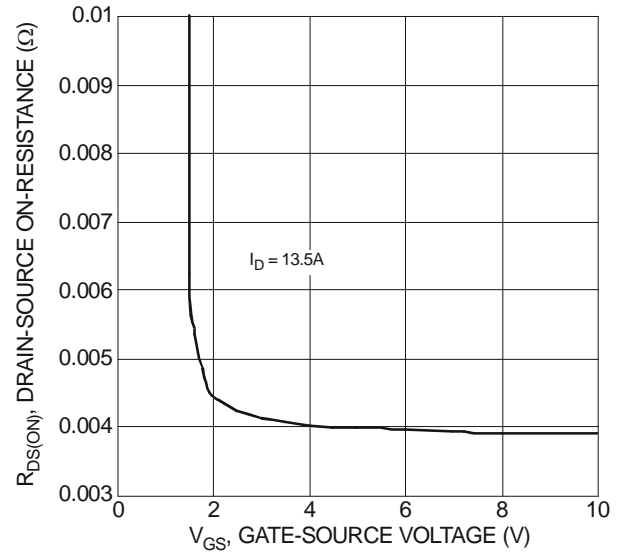


Figure 4 Typical Transfer Characteristic

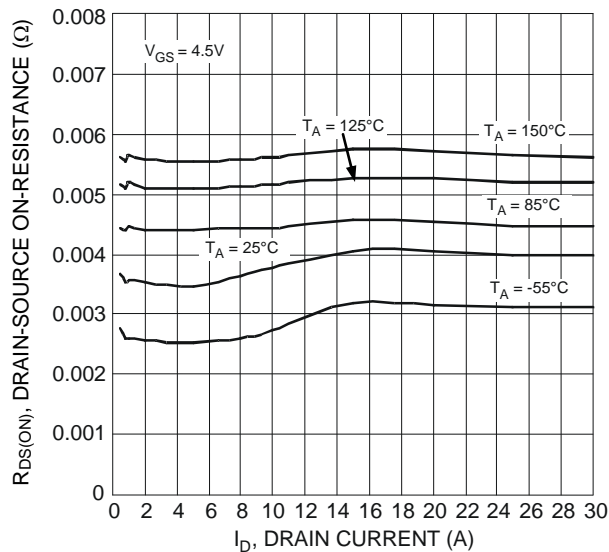


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

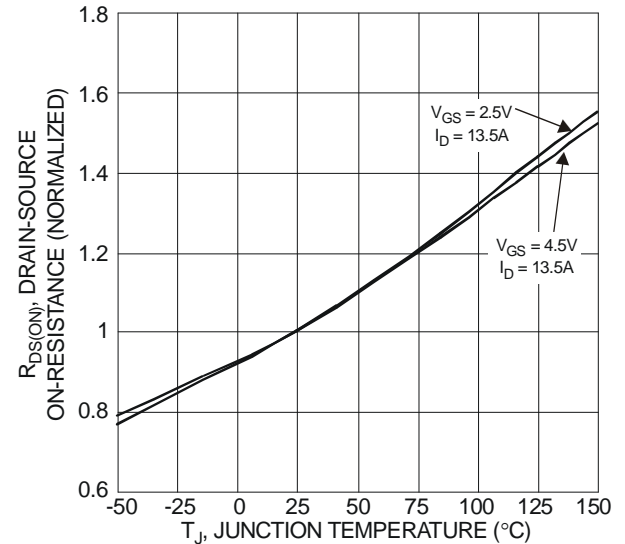


Figure 6 On-Resistance Variation with Temperature

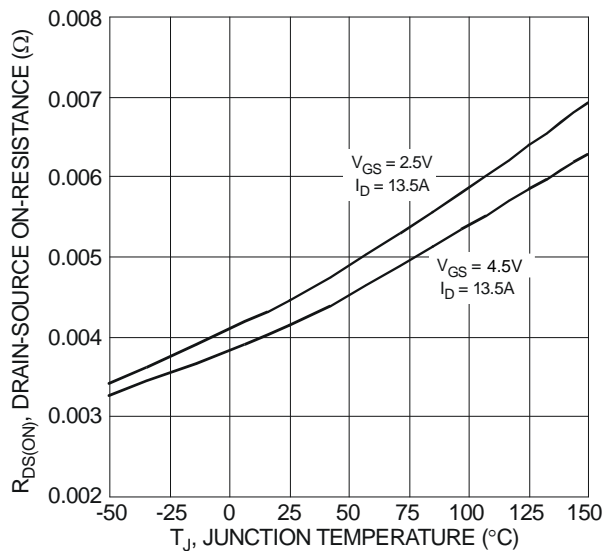


Figure 7 On-Resistance Variation with Temperature

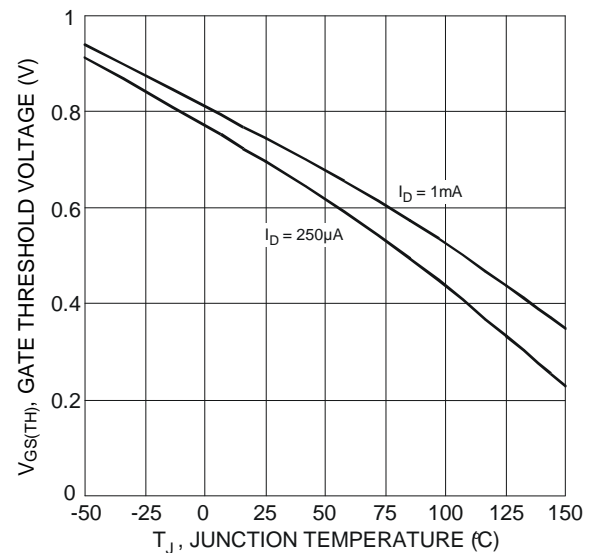


Figure 8 Gate Threshold Variation vs. Junction Temperature

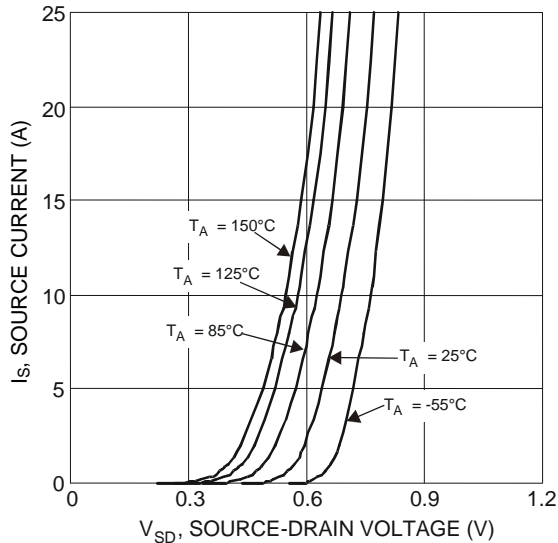


Figure 9 Diode Forward Voltage vs. Current

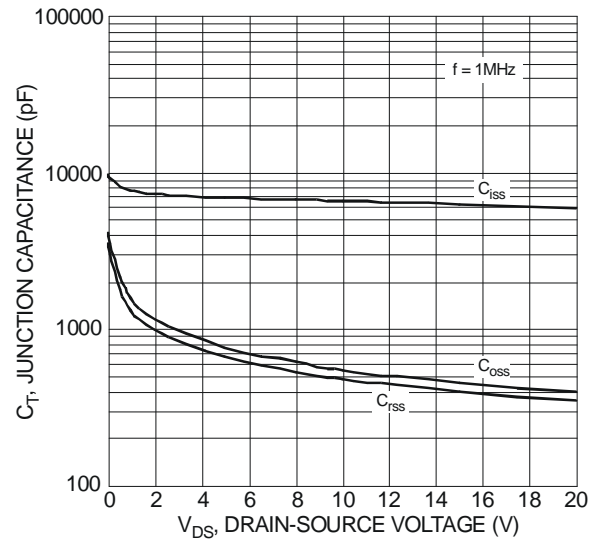


Figure 10 Typical Junction Capacitance

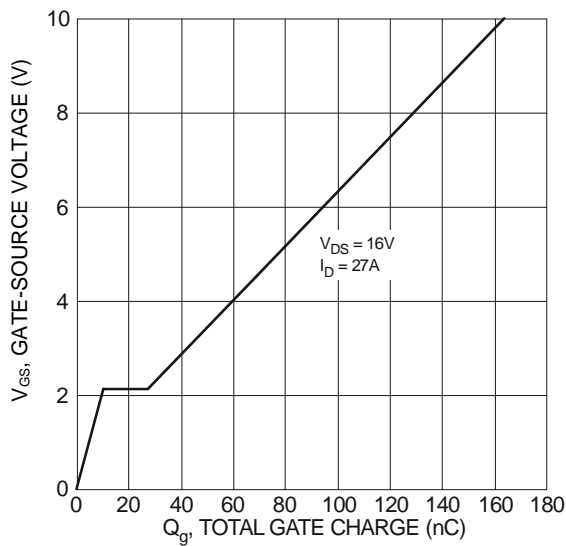


Figure 11 Gate Charge

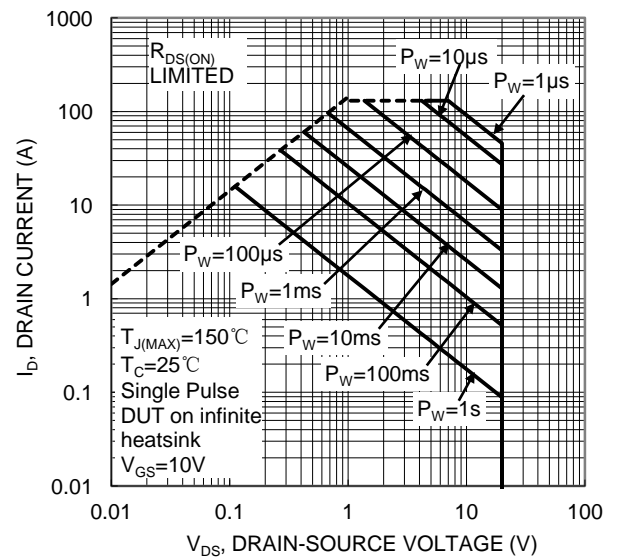


Figure 12. SOA, Safe Operation Area

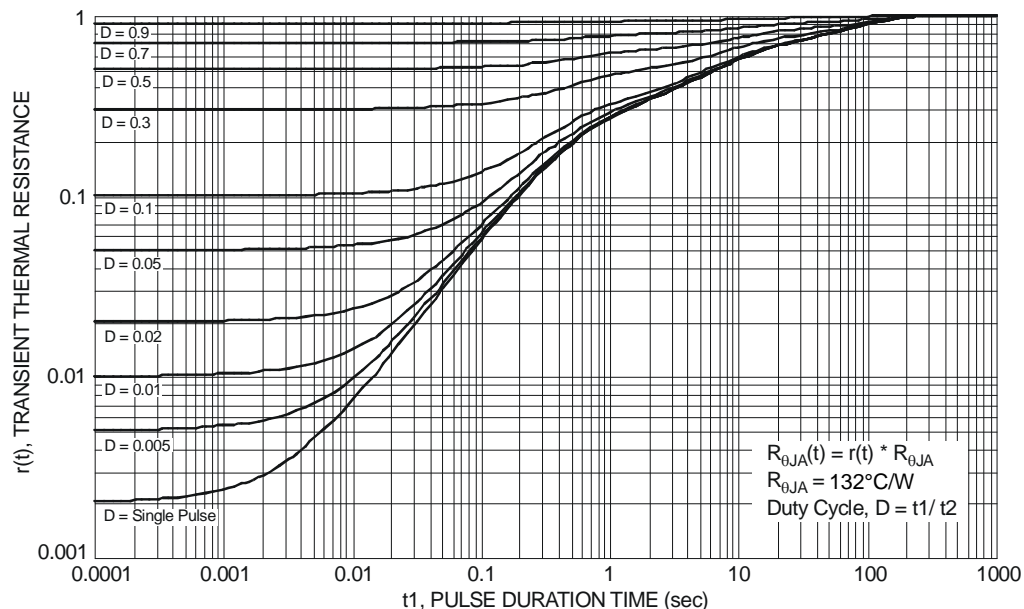
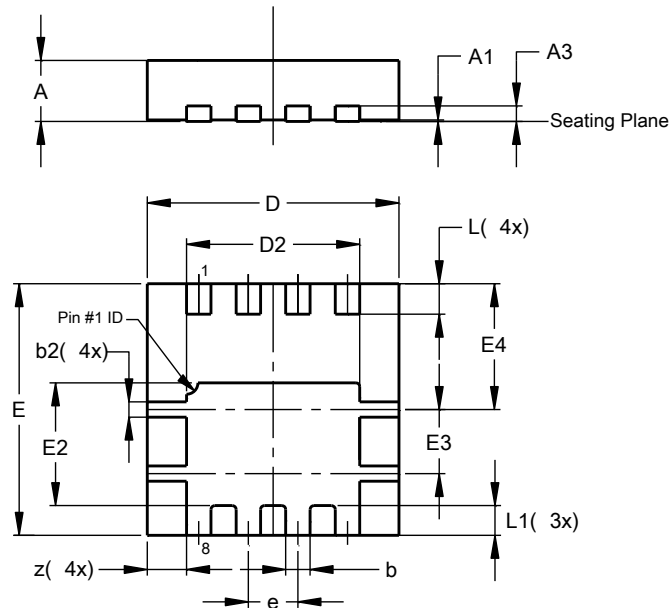


Figure 13 Transient Thermal Resistance

## Package Outline Dimensions

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

**PowerDI3333-8**

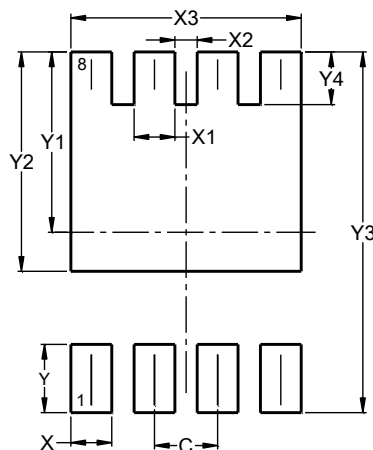


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	—	—	0.65
L	0.35	0.45	0.40
L1	—	—	0.39
z	—	—	0.515
All Dimensions in mm			

## 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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