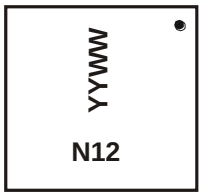
Marking Information



N12 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 18 = 2018)
WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	12 9.5	A
	t < 10s	T_A = +25°C T_A = +70°C	I_D	16.0 12.7	A
Continuous Drain Current (Note 6) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	9.5 7.5	A
	t < 10s	T_A = +25°C T_A = +70°C	I_D	13.0 10.3	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	90	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	3.5	A
Avalanche Current (Note 7) L = 0.1mH			I_{AS}	17	A
Avalanche Energy (Note 7) L = 0.1mH			E_{AS}	43	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	0.89	W
	T_A = +70°C		0.55	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	145	°C/W
	t < 10s		74	
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	2.2	W
	T_A = +70°C		1.3	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	58	°C/W
	t < 10s		31	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	11	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°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. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.

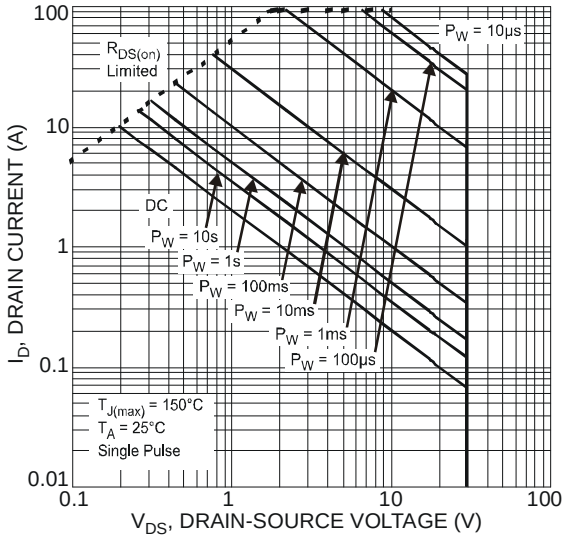


Fig. 1 SOA, Safe Operation Area

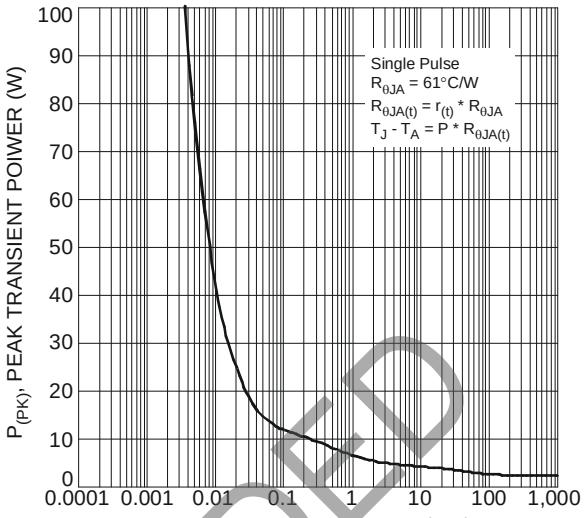


Fig. 2 Single Pulse Maximum Power Dissipation

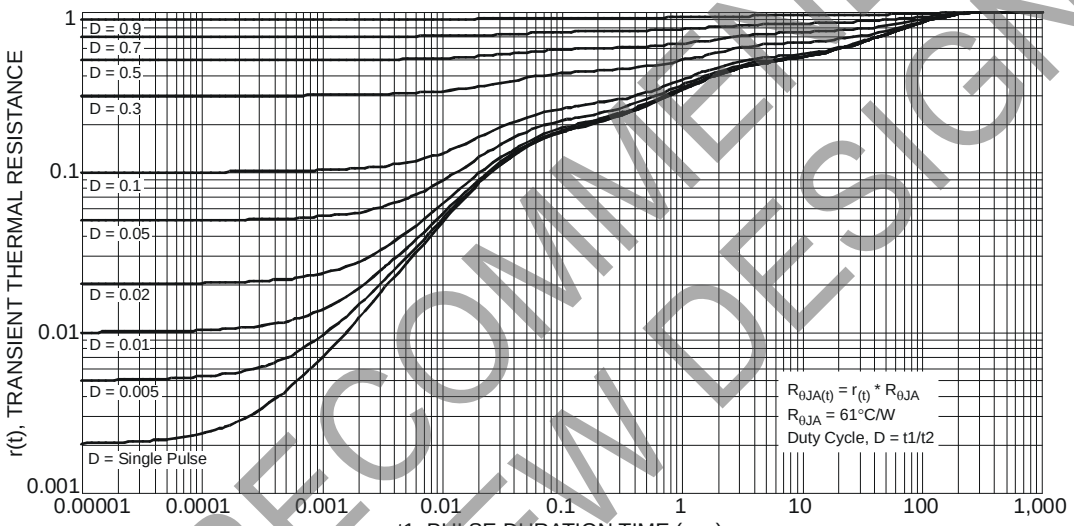


Fig. 3 Transient Thermal Resistance

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	100	μA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	1.5	2.5	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	7.3	10	mΩ	V_{GS} = 10V, I_D = 13.5A
		—	10	15		V_{GS} = 4.5V, I_D = 11A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	30	—	S	V_{DS} = 5V, I_D = 10.0A
Diode Forward Voltage	V_{SD}	—	0.45	0.55	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	1296	4310	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	415	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	204	—	pF	
Gate Resistance	R_g	0.26	1.6	2.6	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge V_{GS} = 4.5V	Q_g	—	14.7	—	nC	V_{DS} = 15V, V_{GS} = 10V, I_D = 13.5A
Total Gate Charge V_{GS} = 10V	Q_g	—	31.6	—	nC	
Gate-Source Charge	Q_{gs}	—	3.5	—	nC	
Gate-Drain Charge	Q_{gd}	—	5.0	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	15.8	—	ns	V_{GS} = 10V, V_{DS} = 15V, R_g = 3Ω, I_D = 8.8A
Turn-On Rise Time	t_r	—	27.8	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	29.7	—	ns	
Turn-Off Fall Time	t_f	—	13.6	—	ns	
Reverse Recovery Time	t_{rr}	—	13.1	—	ns	I_F = 13.5A, di/dt = 100A/μs
Reverse Recovery Charge	Q_{rr}	—	4.3	—	nC	I_F = 13.5A, di/dt = 100A/μs

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

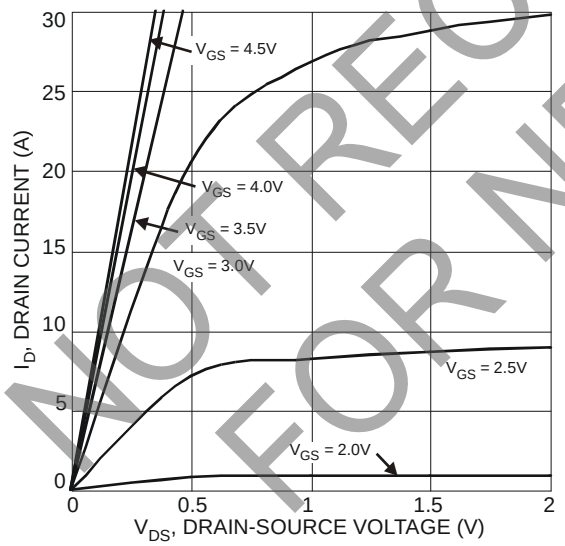


Fig. 4 Typical Output Characteristic

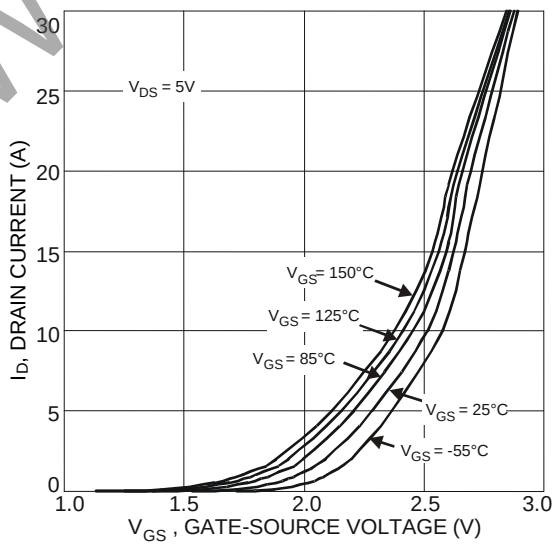


Fig. 5 Typical Transfer Characteristic

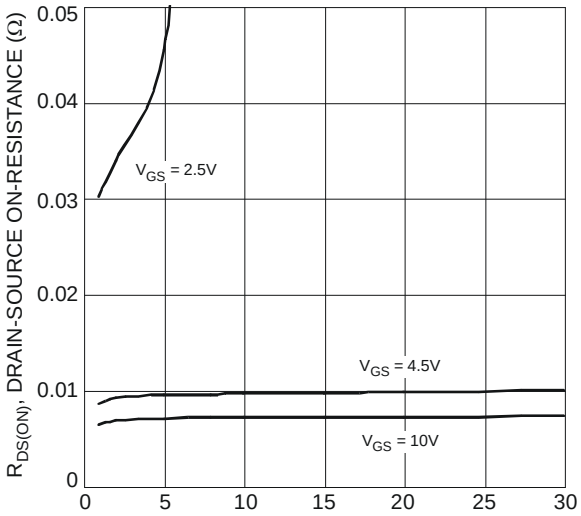


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

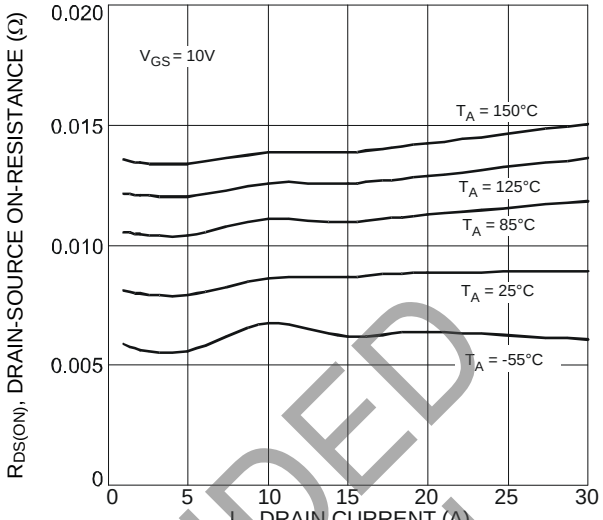


Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

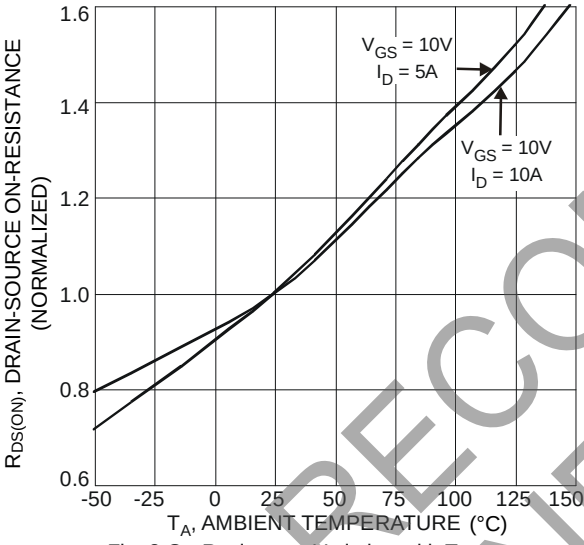


Fig. 8 On-Resistance Variation with Temperature

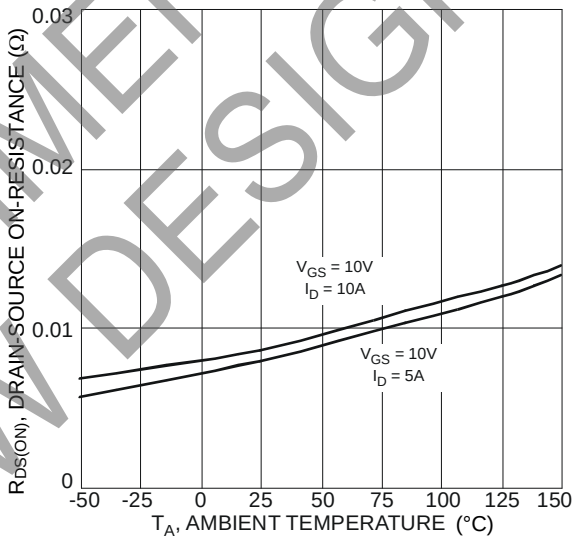


Fig. 9 On-Resistance Variation with Temperature

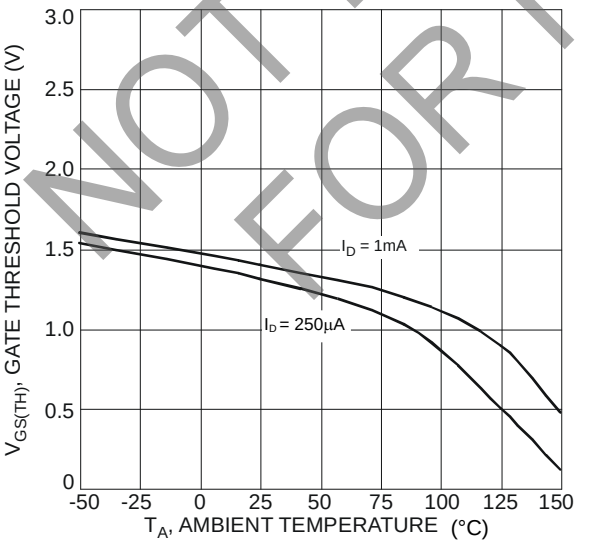


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

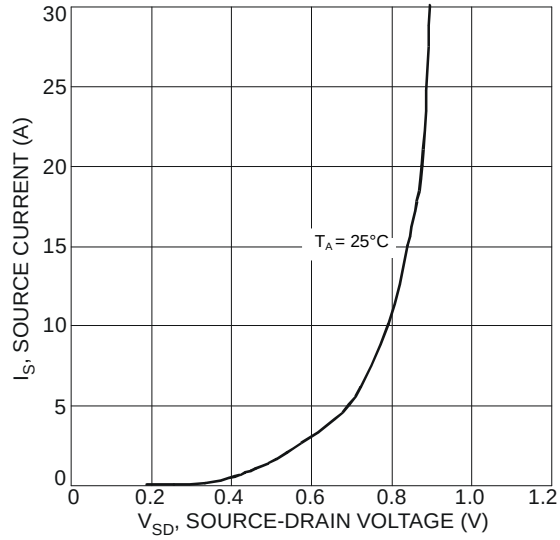


Fig. 11 Diode Forward Voltage vs. Current

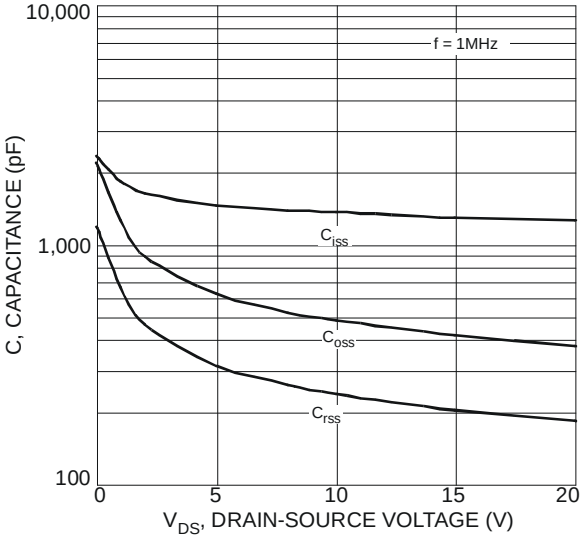


Fig. 12 Typical Total Capacitance

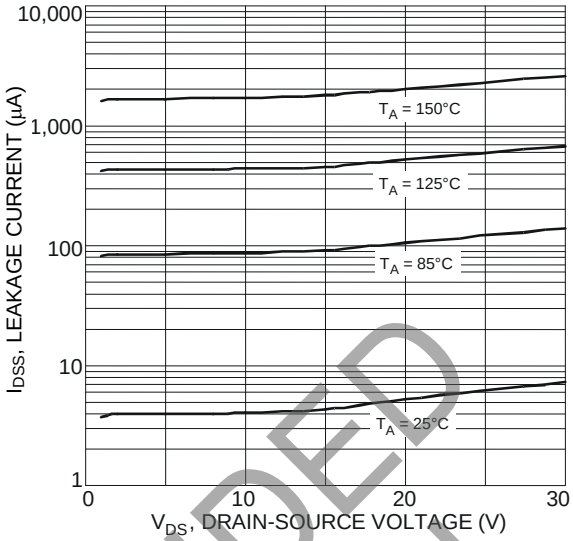


Fig. 13 Typical Leakage Current vs. Drain-Source Voltage

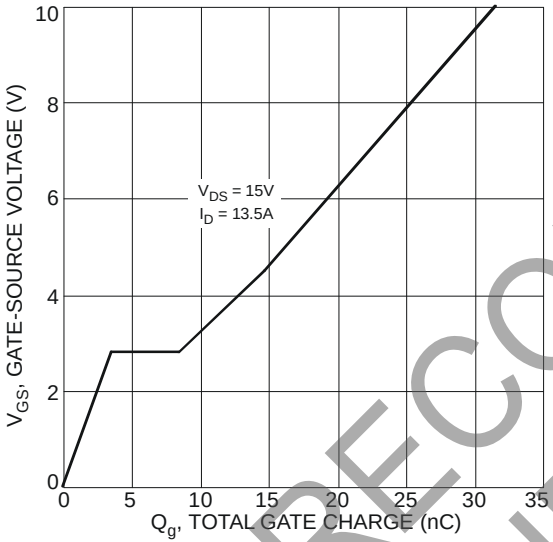
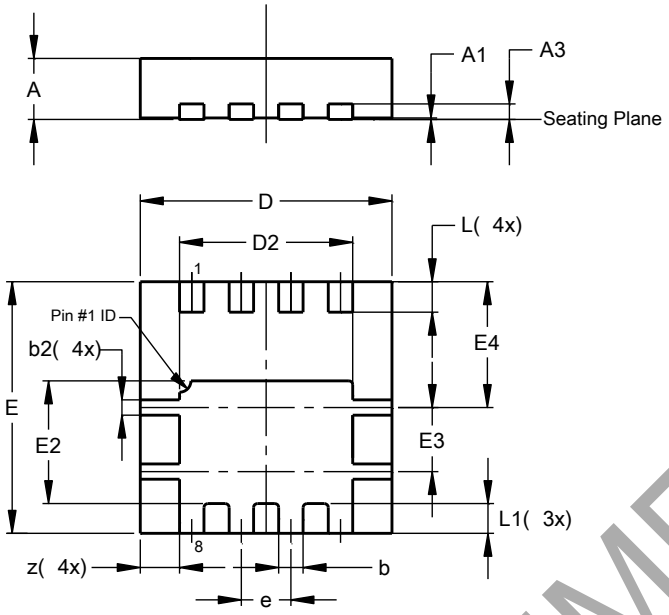


Fig. 14 Gate-Source Voltage vs. Total Gate Charge

Package Outline Dimensions

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

PowerDI3333-8

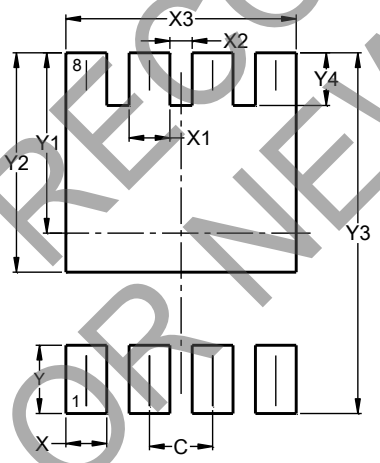


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	–	–	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	–	–	0.65
L	0.35	0.45	0.40
L1	–	–	0.39
z	–	–	0.515
All Dimensions in mm			

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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