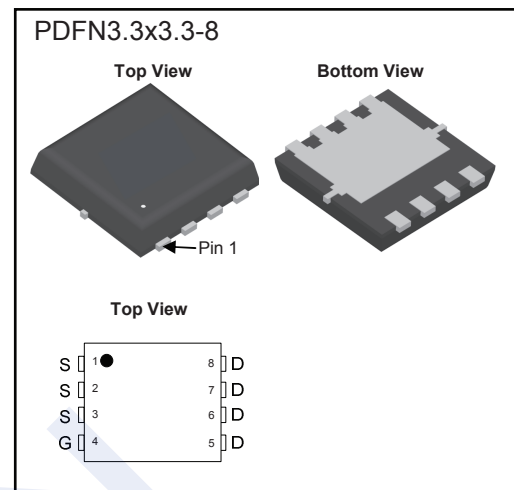
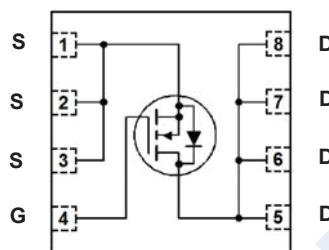


N-Channel MOSFET

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■ Features

- $V_{DS} (V) = 30V, I_D = 9A$
- $R_{DS(ON)} = 15m\Omega @ V_{GS}=10V (Typ.)$
- $R_{DS(ON)} = 19m\Omega @ V_{GS}=4.5V (Typ.)$

■ Absolute Maximum Ratings ($T_C = 25^\circ C$ Unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage ($V_{GS} = 0$)	30	V
V_{GS}	Gate-source voltage	± 22	V
$I_D^{(1)}$	Drain current (continuous) at $T_C = 25^\circ C$	9	A
$I_D^{(1)}$	Drain current (continuous) at $T_C=100^\circ C$	6	A
$I_{DM}^{(2)}$	Drain current (pulsed)	36	A
$I_{AV}^{(3)}$	Not-repetitive avalanche current	7.5	A
$E_{AS}^{(4)}$	Thermal resistance junction-pcb	150	mJ
$R_{thj-case}$	Thermal resistance junction-case	2.5	$^\circ C/W$
$R_{thj-pcb}^{(5)}$	Thermal resistance junction-pcb	42.8	$^\circ C/W$
$R_{thj-pcb}^{(5)}$	Thermal resistance junction-pcb (steady state)	62.5	$^\circ C/W$
P_{TOT}	Total dissipation at $T_C = 25^\circ C$	50	W
	Derating factor	0.4	$W/^\circ C$
$P_{TOT}^{(1)}$	Total dissipation at $T_{pcb} = 25^\circ C$	2	W
	Derating factor	0.02	$W/^\circ C$
T_J	Operating junction temperature	-55 to 150	$^\circ C$
T_{stg}	storage temperature		

1. The value is rated according $R_{thj-pcb}$
2. Pulse width limited by safe operating area.
3. Pulse width limited by T_{Jmax} .
4. Starting $T_J = 25^\circ C, I_D=I_{AV}, V_{DD} = 21 V$
5. When mounted on FR-4 board of $1inch^2, 2oz Cu, t < 10sec$

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■ Electrical Characteristics (T_c = 25°C Unless otherwise noted)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-source breakdown voltage (V _{GS} = 0)	I _D = 250 μA	30			V
I _{DSS}	Zero gate voltage drain current (V _{GS} = 0)	V _{DS} = 30 V, V _{DS} = 30 V, T _C = 125 °C			1 10	μA μA
I _{GSS}	Gate body leakage current (V _{DS} = 0)	V _{GS} = ± 22 V			±100	nA
V _{GS(th)}	Gate threshold voltage	V _{DS} = V _{GS} , I _D = 250 μA	1		2.5	V
R _{DS(on)}	Static drain-source on resistance	V _{GS} = 10 V, I _D = 4.5 A V _{GS} = 4.5 V, I _D = 4.5 A		15 19	19 22	mΩ mΩ
C _{iss}	Input capacitance	V _{DS} = 25 V, f = 1 MHz, V _{GS} = 0	-	724	900 ⁽¹⁾	pF
C _{oss}	Output capacitance			132	165 ⁽¹⁾	pF
C _{rss}	Reverse transfer capacitance			20	25 ⁽¹⁾	pF
Q _g	Total gate charge	V _{DD} = 15 V, I _D = 9 A	-	5	6 ⁽¹⁾	nC
Q _{gs}	Gate-source charge	V _{GS} = 4.5 V		2	2.5 ⁽¹⁾	nC
Q _{gd}	Gate-drain charge			2	2.5 ⁽¹⁾	nC
R _G	Gate input resistance	f = 1 MHz Gate DC Bias = 0 Test signal level = 20 mV Open drain	-		3.3	Ω
t _{d(on)}	Turn-on delay time	V _{DD} = 15 V, I _D = 4.5 A, R _G = 4.7 Ω, V _{GS} = 10 V	-	4	5	ns
t _r	Rise time			4.2	5.2	ns
t _{d(off)}	Turn-off delay time			21	26	ns
t _f	Fall time			3.5	4.25	ns
I _{SD}	Source-drain current		-		9	A
I _{SDM} ⁽²⁾	Source-drain current (pulsed)		-		36	A
V _{SD} ⁽³⁾	Forward on voltage	I _{SD} = 9 A, V _{GS} = 0	-		1.1	V
t _{rr}	Reverse recovery time	I _{SD} = 9 A, di/dt = 100 A/μs, V _{DD} = 20 V, T _j = 150 °C	-	21		ns
Q _{rr}	Reverse recovery charge			10		nC
I _{RRM}	Reverse recovery current			1		A

1. Max values not tested
2. Pulse width limited by safe operating area.
3. Pulsed: pulse duration = 300 μs, duty cycle 1.5 %

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■ Typical Characteristics (T_J = 25 °C unless otherwise noted)

Figure 2. Safe operating area

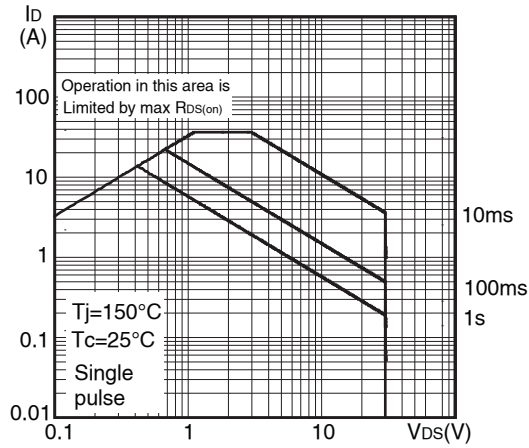


Figure 3. Thermal impedance

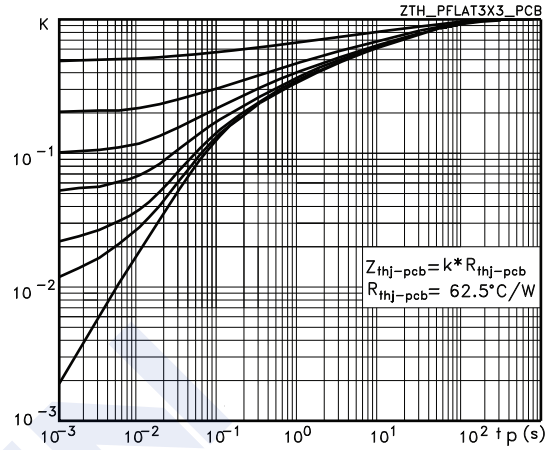


Figure 4. Output characteristics

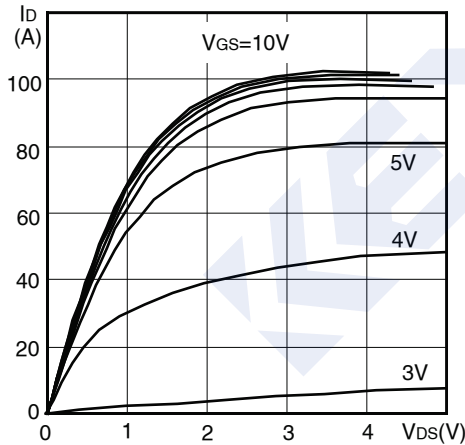


Figure 5. Transfer characteristics

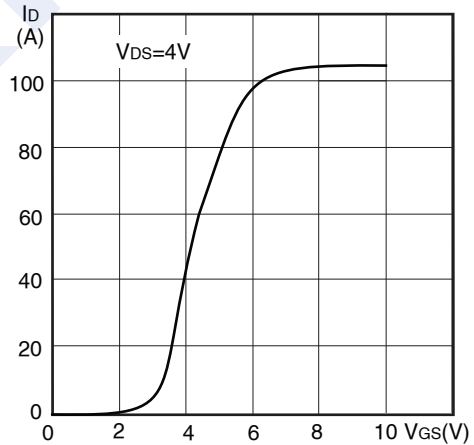


Figure 6. Normalized B_{VDS} vs temperature

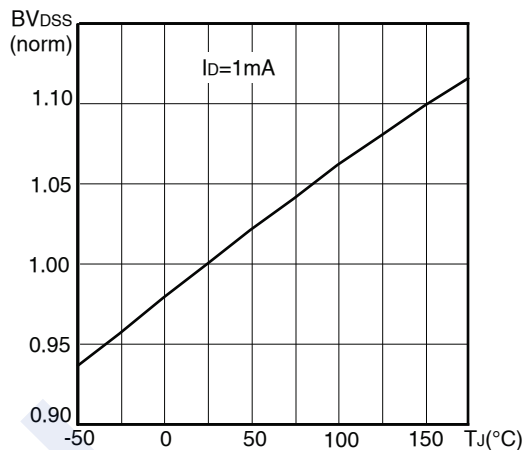
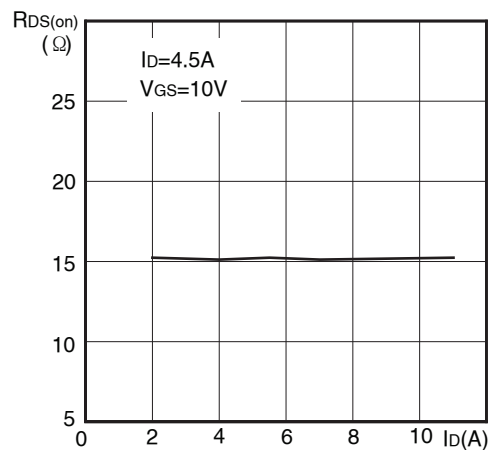


Figure 7. Static drain-source on resistance



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Figure 8. Gate charge vs gate-source voltage Figure 9. Capacitance variations

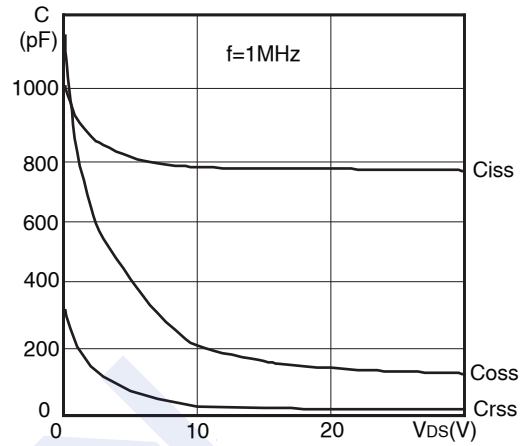
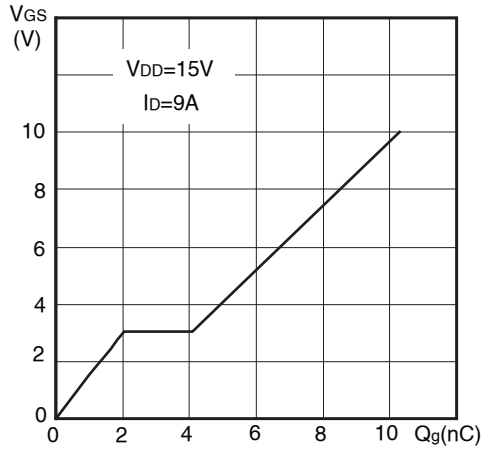


Figure 10. Normalized gate threshold voltage vs temperature Figure 11. Normalized on resistance vs temperature

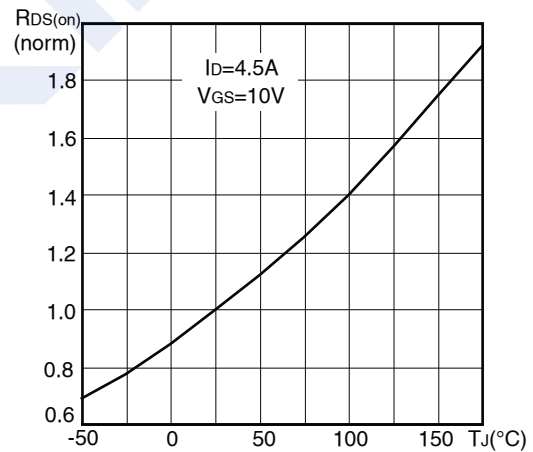
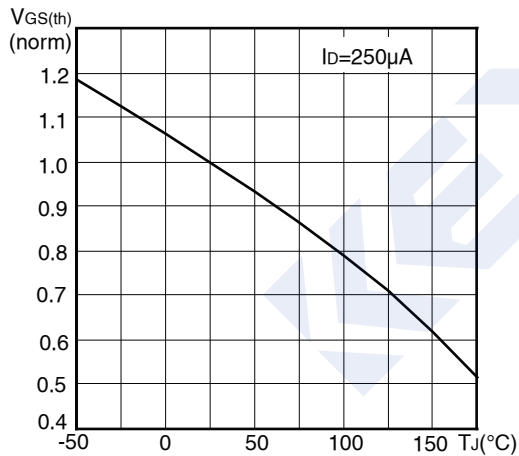
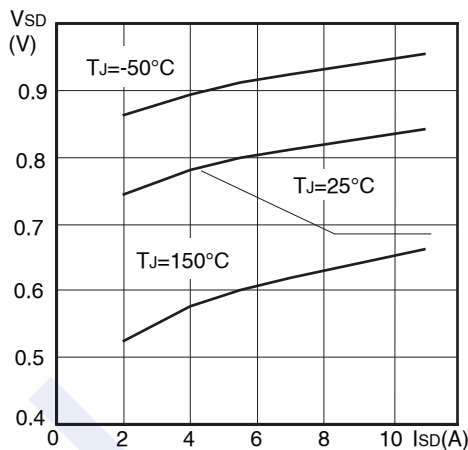


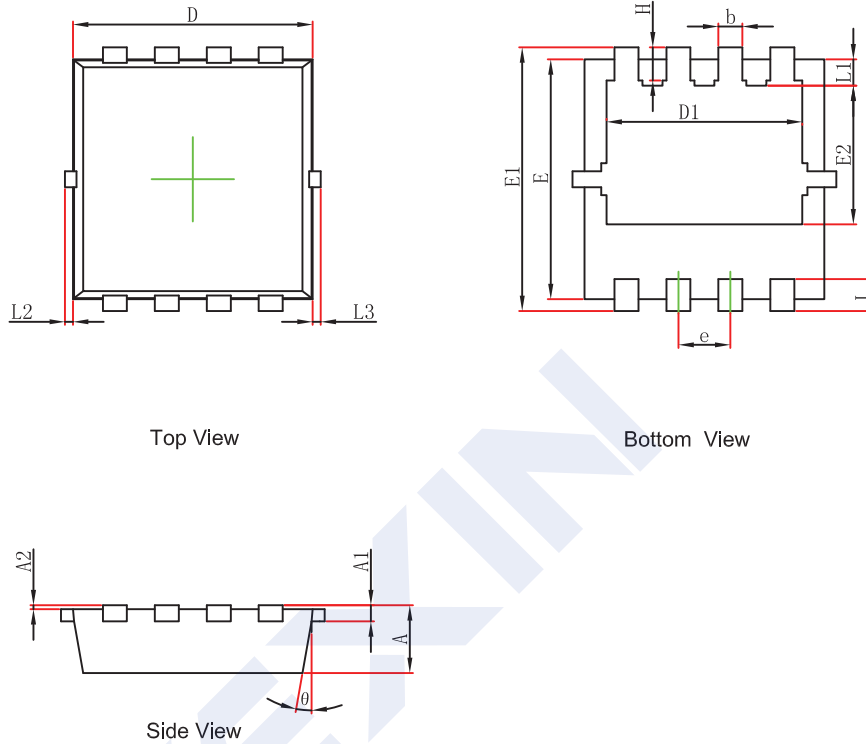
Figure 12. Source-drain diode forward characteristics



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■ PDFN3.3x3.3-8 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°