

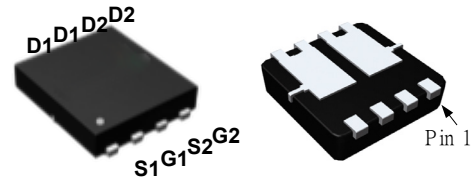
Features

- N Channel (Integrated Schottky Diode)**
 30V/8A,
 $R_{DS(ON)} = 18m\Omega$ (typ.) @ $V_{GS} = 10V$
 $R_{DS(ON)} = 24m\Omega$ (typ.) @ $V_{GS} = 4.5V$
- P Channel**
 -30V/-7A,
 $R_{DS(ON)} = 38m\Omega$ (typ.) @ $V_{GS} = -10V$
 $R_{DS(ON)} = 52m\Omega$ (typ.) @ $V_{GS} = -4.5V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free Available (RoHS Compliant)

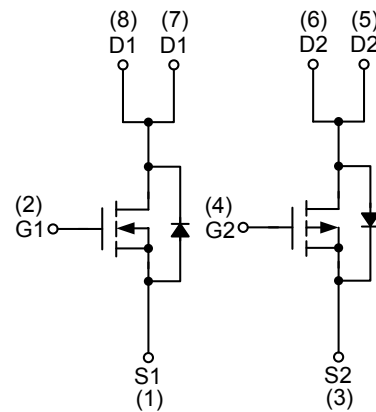
Applications

- Synchronous Rectification.
- Motor Control.
- Fan Application.

Pin Description



PDFN3.3x3.3-8



N-Channel MOSFET

P-Channel MOSFET

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter		N Channel	P Channel	Unit
Common Ratings					
V _{DSS}	Drain-Source Voltage		30	-30	V
V _{GSS}	Gate-Source Voltage		±20	±20	
T _J	Maximum Junction Temperature		150		°C
T _{STG}	Storage Temperature Range		-55 to 150		
I _S	Diode Continuous Forward Current	T _A =25°C	8	-7	A
I _D	Continuous Drain Current	T _A =25°C	8	-7	
I _{DM} ^a	Pulsed Drain Current	T _A =25°C	24	-21	
P _D	Power Dissipation	T _A =25°C	2 ^d	2 ^d	W
		T _A =70°C	1.3 ^d	1.3 ^d	
R _{θJA}	Thermal Resistance-Junction to Ambient	t ≤ 10s	60	60	°C/W
		Steady State ^b	90	90	
I _{AS} ^c	Avalanche Current, Single pulse	L=0.1mH	13	16	A
E _{AS} ^c	Avalanche Energy, Single pulse	L=0.1mH	8	13	mJ

Note a : Pulse width limited by max. junction temperature.

Note b : $R_{\theta JA}$ steady state $t=100\text{s}$. $R_{\theta JA}$ is measured with the device mounted on 1in^2 · FR-4 board with 2oz. Copper.

Note c : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_J=25^\circ\text{C}$).

Note d : $t < 10\text{s}$.

N Channel Electrical Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	N Channel			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V	-	-	50	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.2	1.7	2.2	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^e	Drain-Source On-state Resistance	V _{GS} = 10V, I _{DS} =4A	-	18	25	mΩ
		V _{GS} =4.5V, I _{DS} =4A	-	24	40	
Diode Characteristics						
V _{SD} ^e	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	-	0.41	0.6	V
t _{rr}	Reverse Recovery Time	I _{SD} =4A, dI _{SD} /dt=100A/μs	-	9.8	-	ns
Q _{rr}	Reverse Recovery Charge		-	3	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz	-	2.7	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	-	405	-	pF
C _{oss}	Output Capacitance		-	105	-	
C _{rss}	Reverse Transfer Capacitance		-	45	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} = 15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	5.2	-	ns
t _r	Turn-on Rise Time		-	10.2	-	
t _{d(OFF)}	Turn-off Delay Time		-	15.2	-	
t _f	Turn-off Fall Time		-	3.6	-	
Gate Charge Characteristics ^f						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _{DS} =4A	-	4.2	-	nC
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _{DS} =4A	-	8.82	-	
Q _{gs}	Gate-Source Charge		-	1.69	-	
Q _{gd}	Gate-Drain Charge		-	1.56	-	
Q _{gth}	Threshold Gate Charge		-	0.78	-	

Note e Pulse test ; pulse width≤300μs, duty cycle≤2%.

Note f : Guaranteed by design, not subject to production testing.

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P Channel Electrical Characteristics (T_A = 25°C unless otherwise noted)

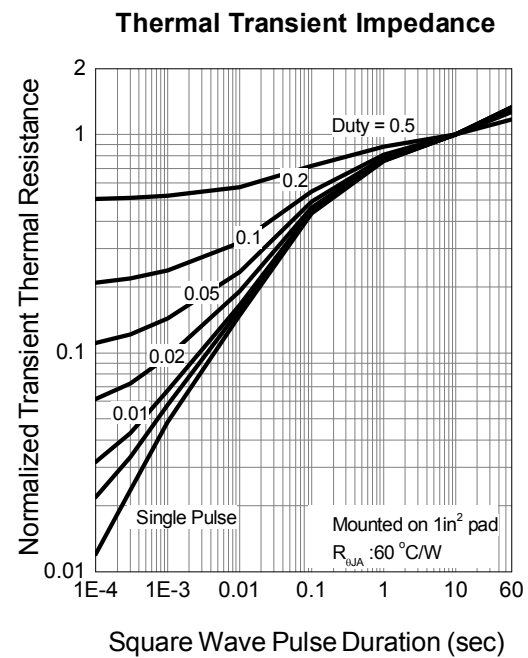
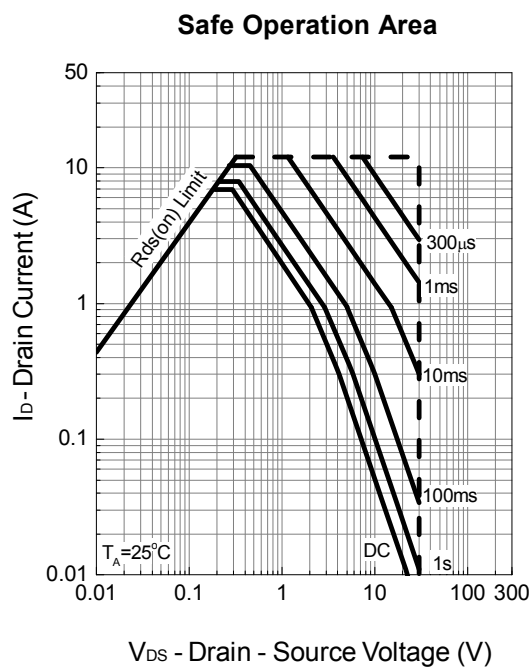
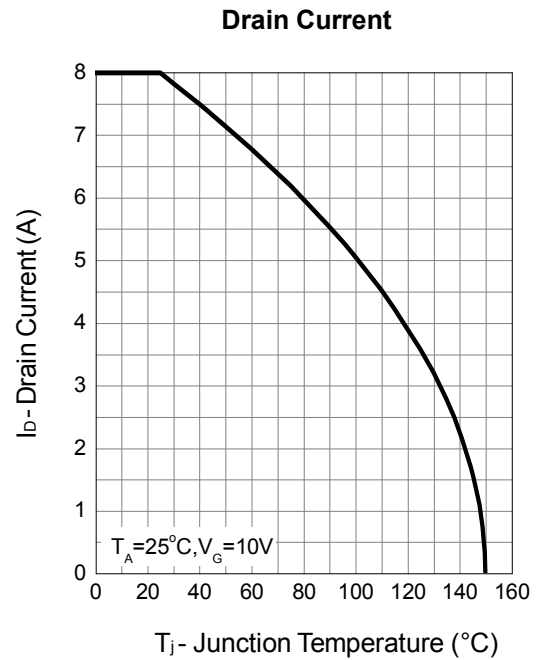
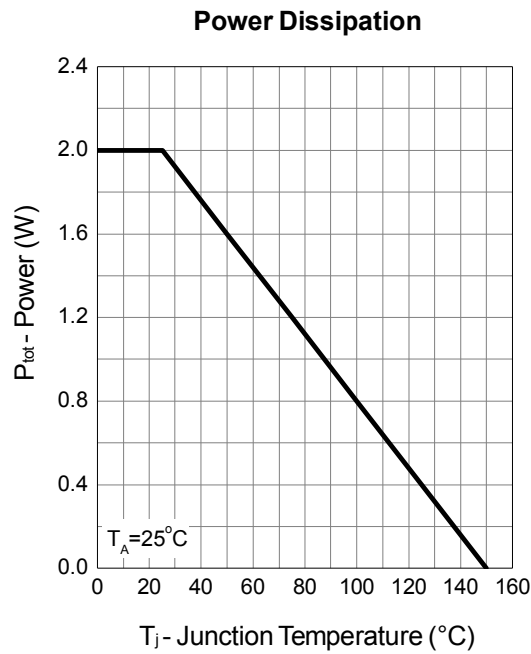
Symbol	Parameter	Test Conditions	P Channel			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-24V, V _{GS} =0V T _J =85°C	-	-	-1 -30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250μA	-1.2	-1.7	-2.2	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^e	Drain-Source On-state Resistance	V _{GS} =-10V, I _{DS} =-4A	-	38	48	mΩ
		V _{GS} =-4.5V, I _{DS} =-3A	-	52	60	
Diode Characteristics						
V _{SD} ^e	Diode Forward Voltage	I _{DS} =-1.2A, V _{GS} =0V	-	-0.8	-1	V
t _{rr}	Reverse Recovery Time	I _{SD} =-4A, dI _{SD} /dt=100A/μs	-	14	-	ns
Q _{rr}	Reverse Recovery Charge		-	8	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	3.4	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, Frequency=1.0MHz	-	580	-	pF
C _{oss}	Output Capacitance		-	105	-	
C _{rss}	Reverse Transfer Capacitance		-	80	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-15V, R _L =15Ω, I _{DS} =-1A, V _{GEN} =-4.5V, R _G =1Ω	-	9	-	ns
t _r	Turn-on Rise Time		-	11	-	
t _{d(OFF)}	Turn-off Delay Time		-	23	-	
t _f	Turn-off Fall Time		-	11	-	
Gate Charge Characteristics ^f						
Q _g	Total Gate Charge	V _{DS} =-15V, V _{GS} =-4.5V, I _{DS} =-4A	-	6.7	-	nC
Q _g	Total Gate Charge	V _{DS} =-15V, V _{GS} =-10V, I _{DS} =-4A	-	13.5	-	
Q _{gs}	Gate-Source Charge		-	2	-	
Q _{gd}	Gate-Drain Charge		-	2.9	-	
Q _{gth}	Threshold Gate Charge		-	1	-	

Note e Pulse test; pulse width≤300μs, duty cycle≤2%.

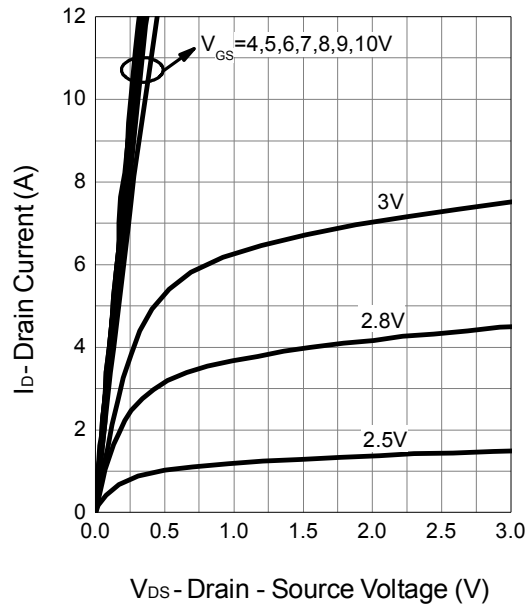
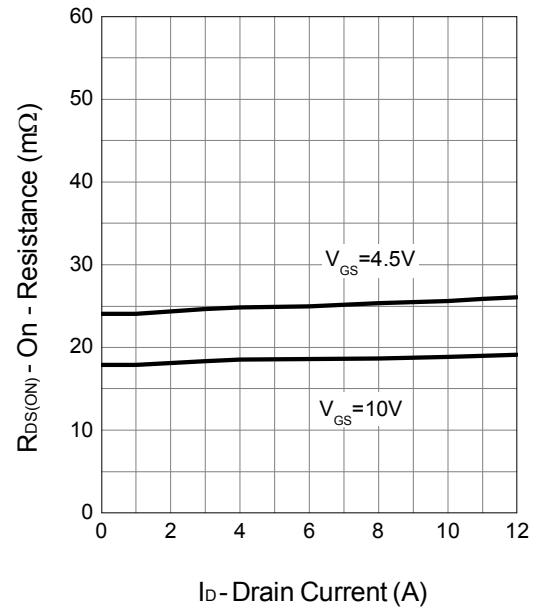
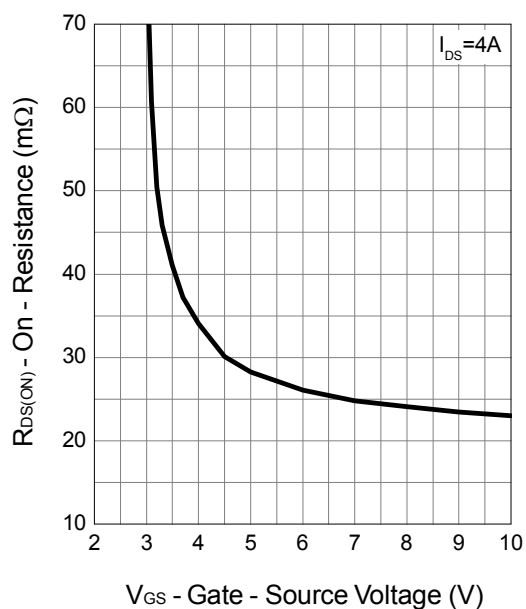
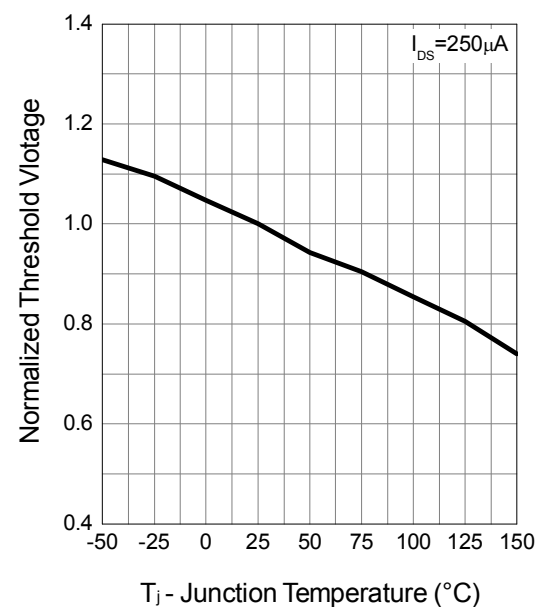
Note f : Guaranteed by design, not subject to production testing.

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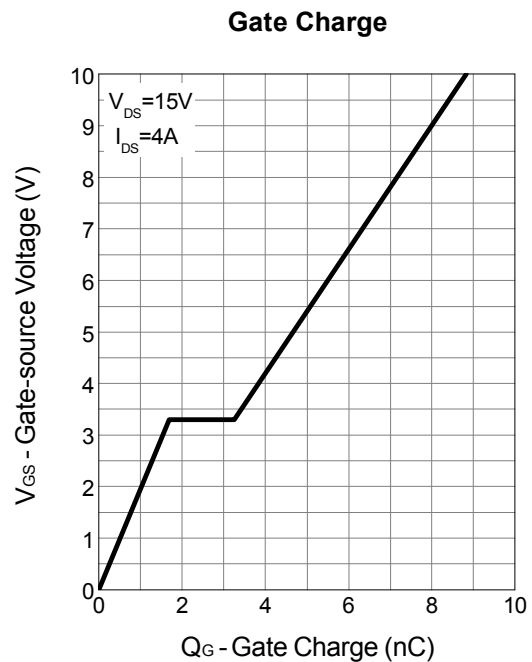
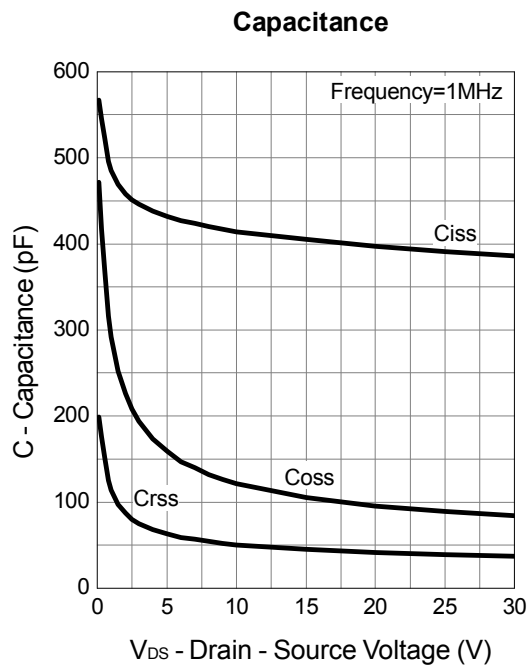
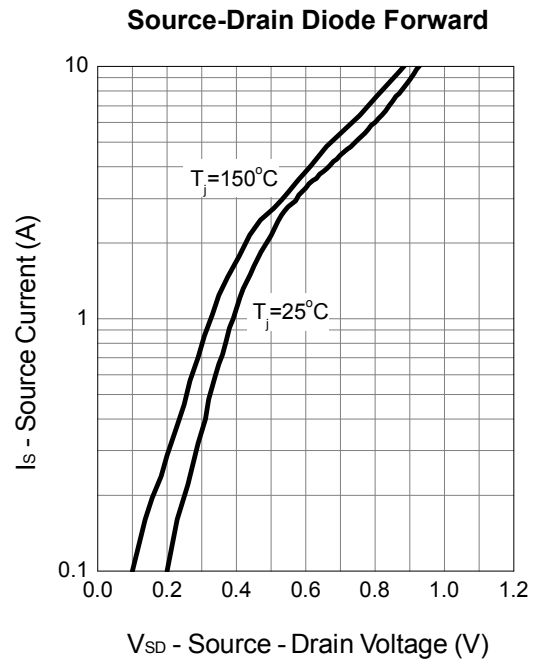
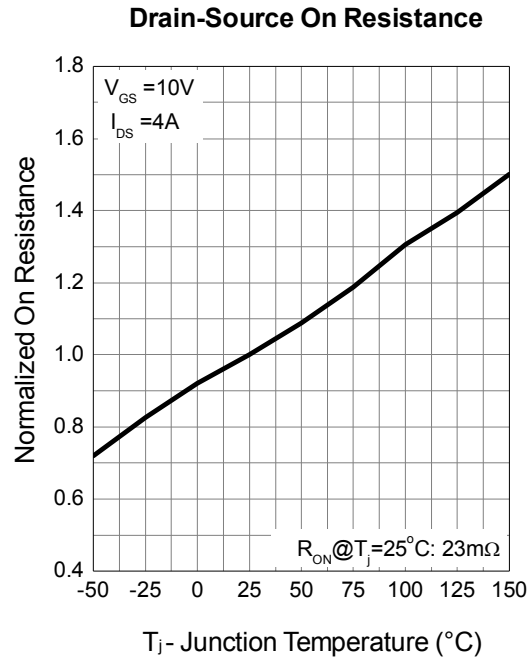
N Channel Typical Operating Characteristics



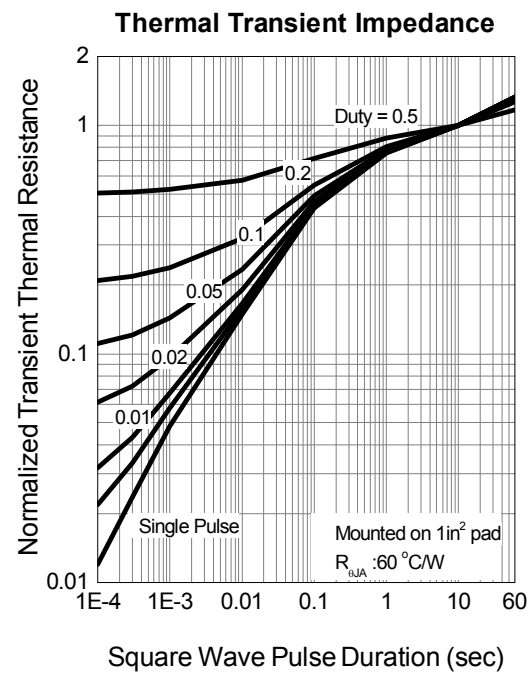
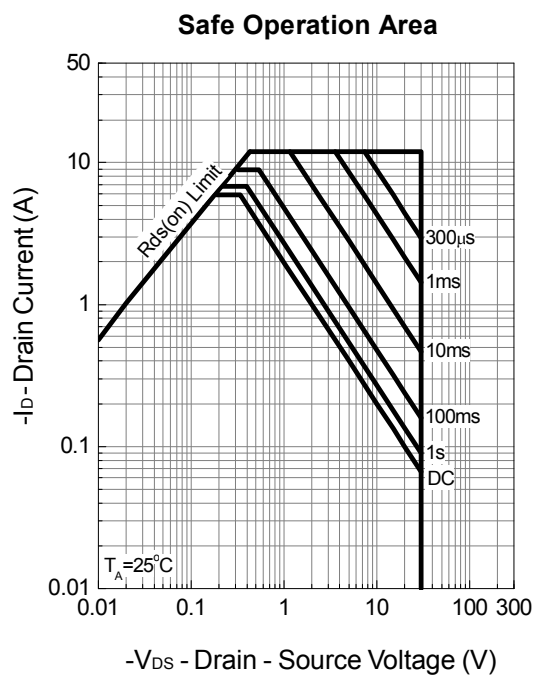
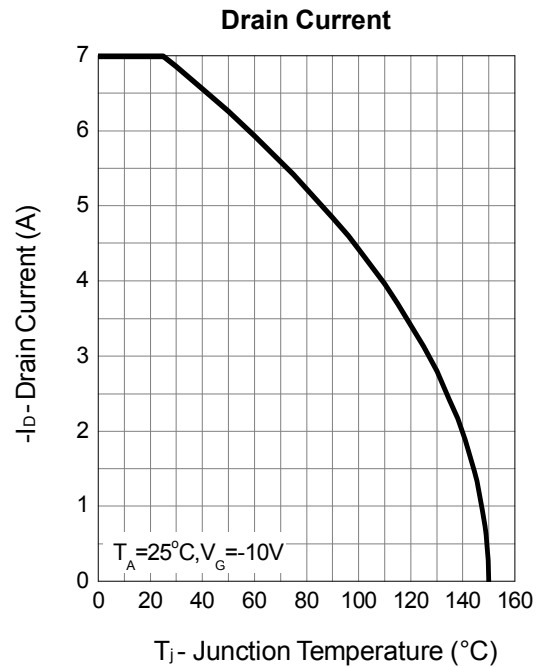
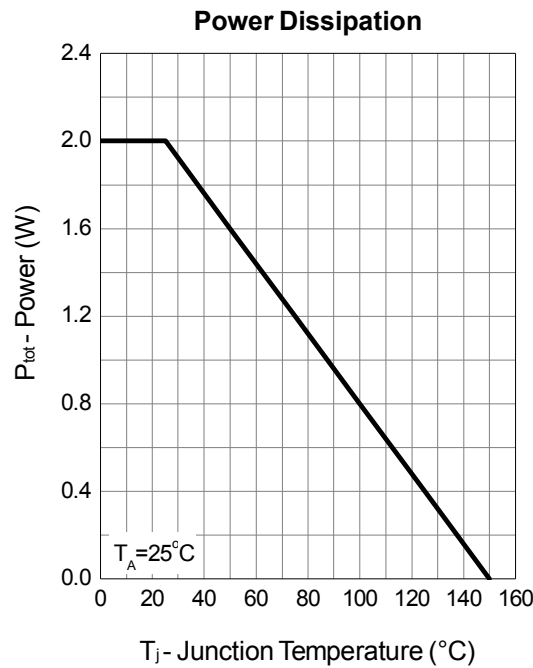
N Channel Typical Operating Characteristics (Cont.)

Output Characteristics

Drain-Source On Resistance

Gate-Source On Resistance

Gate Threshold Voltage


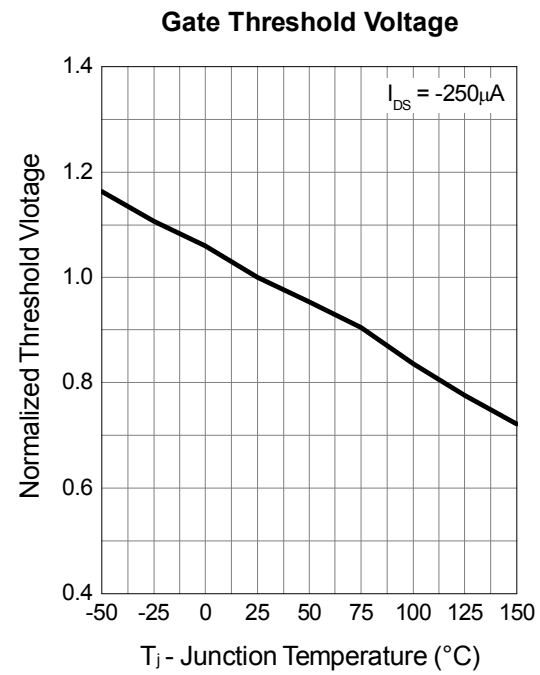
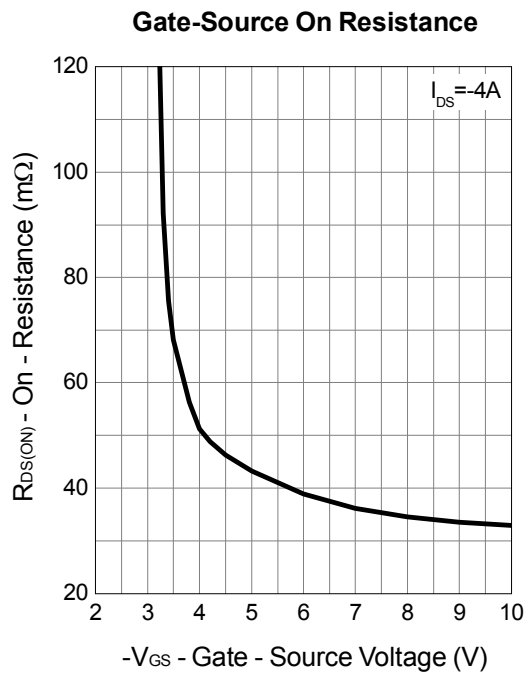
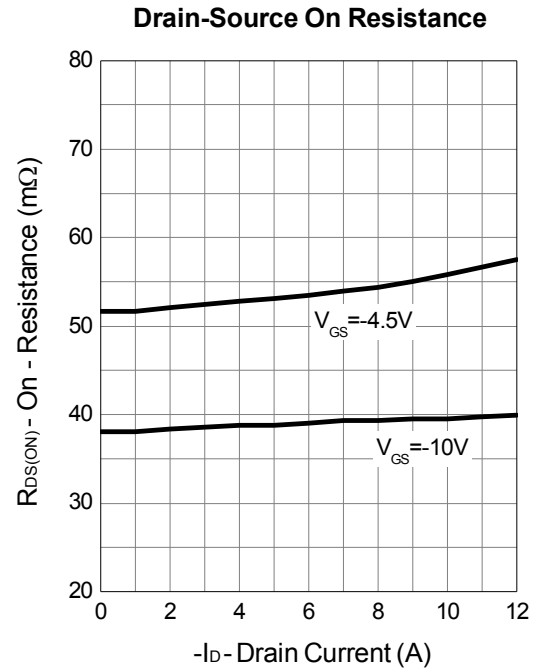
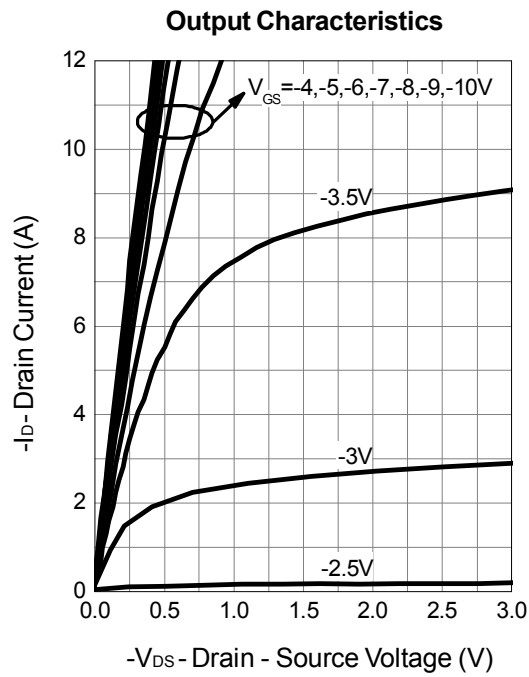
N Channel Typical Operating Characteristics (Cont.)



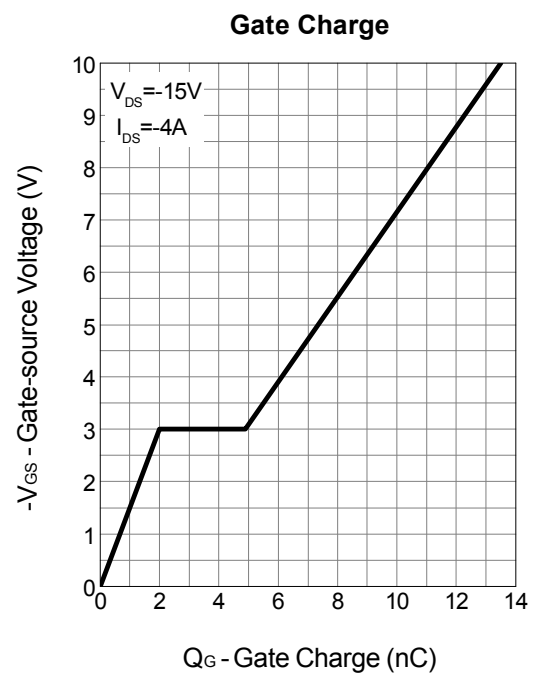
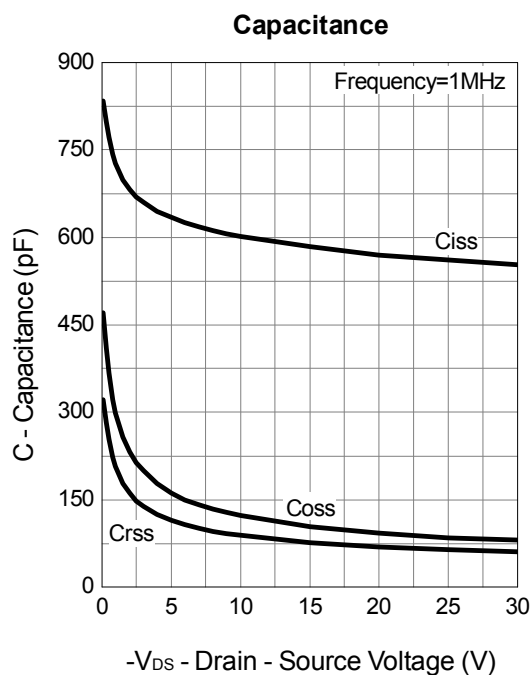
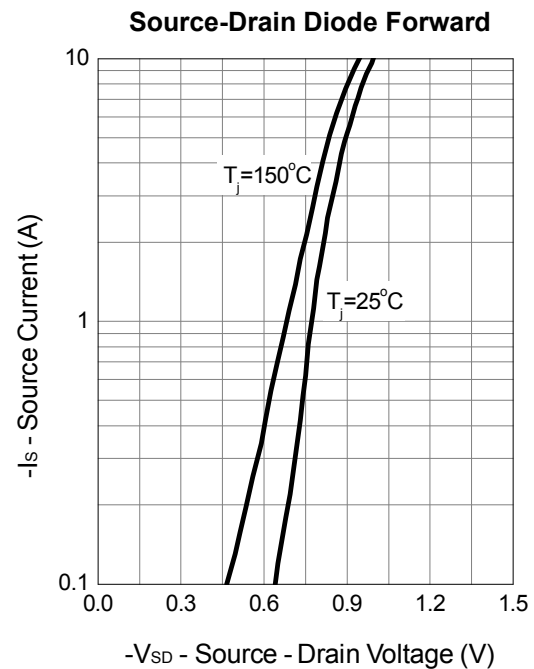
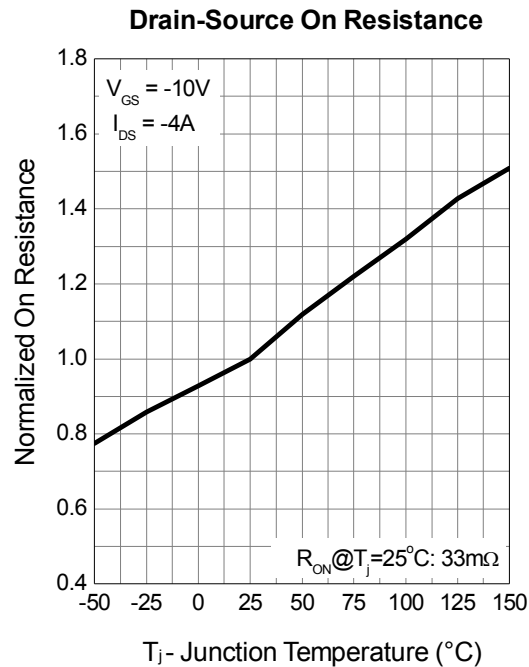
P Channel Typical Operating Characteristics



P Channel Typical Operating Characteristics (Cont.)

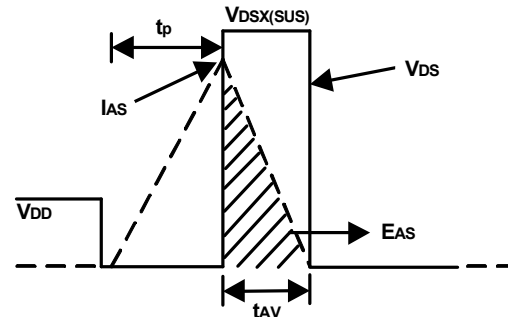
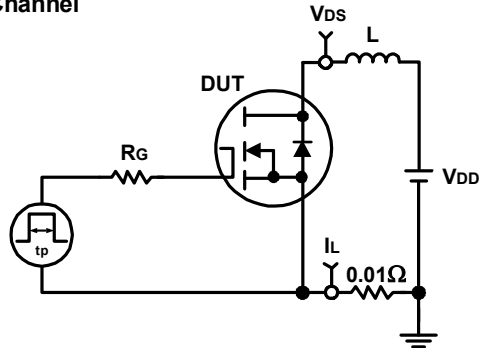


P Channel Typical Operating Characteristics (Cont.)

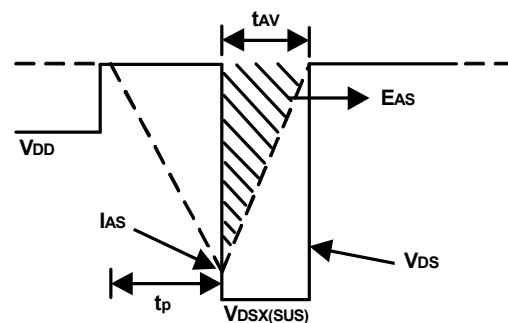
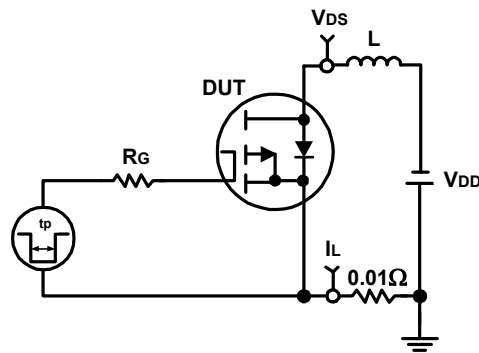


Avalanche Test Circuit and Waveforms

N Channel

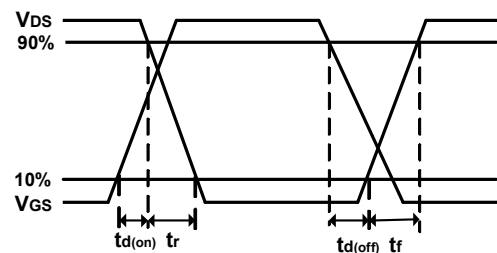
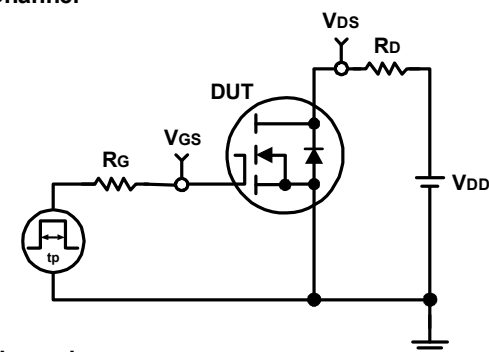


P Channel

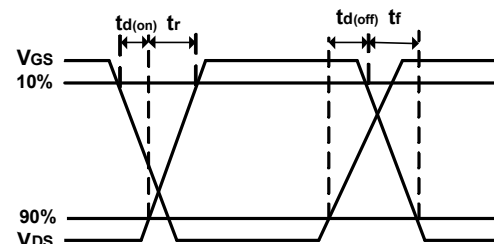
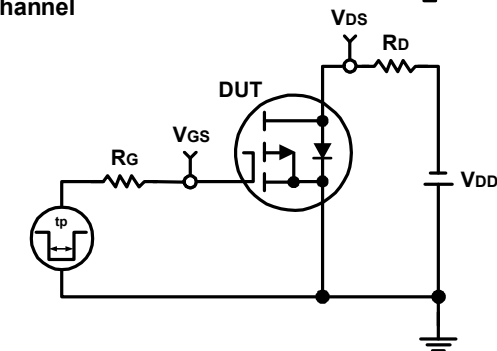


Switching Time Test Circuit and Waveforms

N Channel

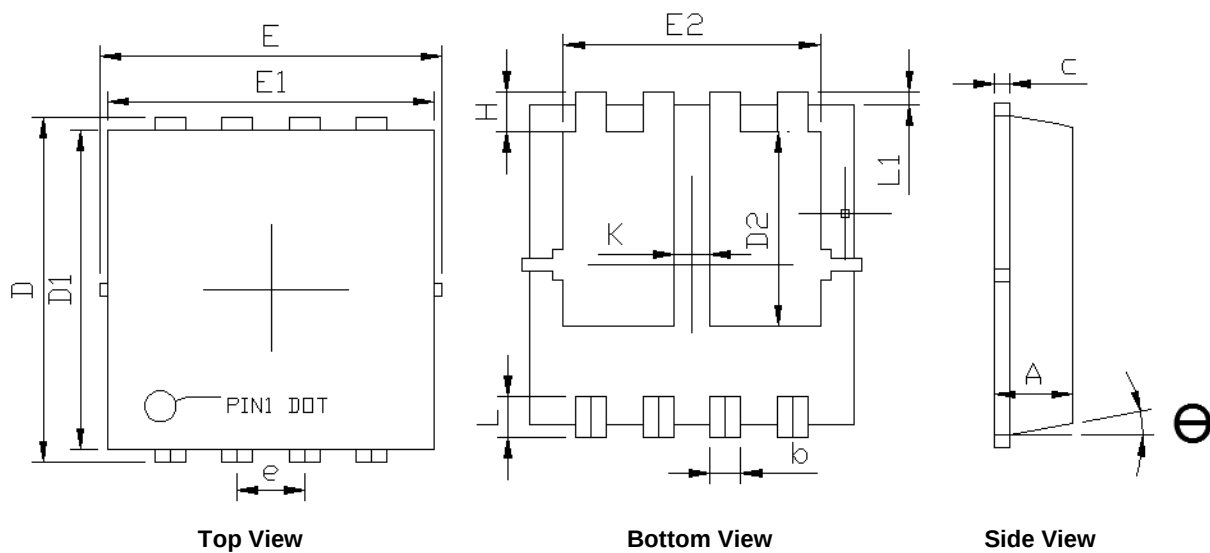


P Channel



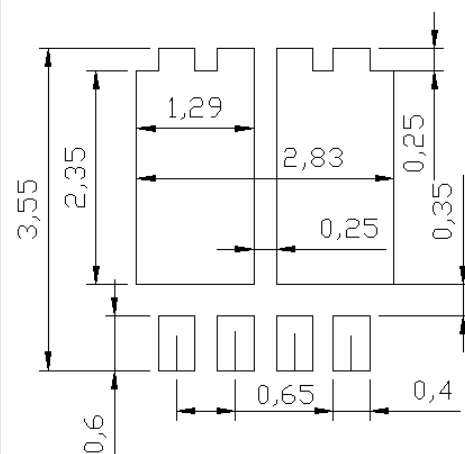
Package Information

PDFN3.3x3.3-8



SYMBOLS	RECOMMENDED LAND PATTERN			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	0.80	0.028	0.031
b	0.25	0.35	0.010	0.014
c	0.10	0.25	0.004	0.010
D	3.25	3.45	0.128	0.136
D1	3.00	3.20	0.118	0.126
D2	1.78	1.98	0.070	0.078
E	3.00	3.40	0.118	0.134
E1	3.00	3.20	0.118	0.126
E2	2.39	2.59	0.094	0.102
e	0.65BSC		0.026 BSC	
H	0.30	0.50	0.012	0.020
L	0.30	0.50	0.012	0.020
L1	0.13 REF		0.005 REF	
K	0.30	-	0.012	-
θ	-	12°	-	12°

RECOMMENDED LAND PATTERN



UNIT: mm