

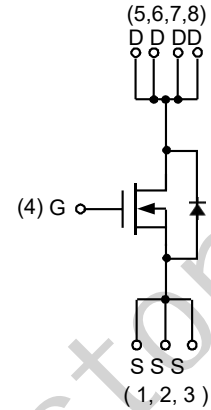
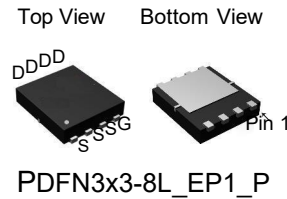
Features

- 30V/40A,
 $R_{DS(ON)} = 7m\Omega(Typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 9m\Omega(Typ.) @ V_{GS} = 4.5VR$
- Avalanche Rated
- reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

Applications

- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.

Pin Description



N-Channel MOSFET

Absolute Maximum Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter	Rating	Unit	
Common Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage	30	V	
V_{GSS}	Gate-Source Voltage	± 20		
T_J	Maximum Junction Temperature	150	$^\circ C$	
T_{STG}	Storage Temperature Range	-55 to 150		
I_S	Diode Continuous Forward Current	$T_C = 25^\circ C$	A	
I_D	Continuous Drain Current	$T_C = 25^\circ C$		40 ^a
		$T_C = 100^\circ C$	25	
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	24	W
		$T_C = 100^\circ C$	9.6	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	4.2	$^\circ C/W$
I_D	Continuous Drain Current	$T_A = 25^\circ C$	12	A
		$T_A = 70^\circ C$	9.5	
I_{DM}	Pulsed Drain Current	$T_A = 25^\circ C$	40 ^b	
P_D	Maximum Power Dissipation	$T_A = 25^\circ C$	2	W
		$T_A = 70^\circ C$	1.3	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	$t \leq 10s$	42	$^\circ C/W$
		Steady State	62	
I_{AS}^c	Avalanche Current, Single pulse (L=0.1mH)	24	A	
E_{AS}^c	Avalanche Energy, Single pulse (L=0.2mH)	28.8	mJ	

Note a: Package is limited to 40A.

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

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

Electrical Characteristics (Cont.) ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

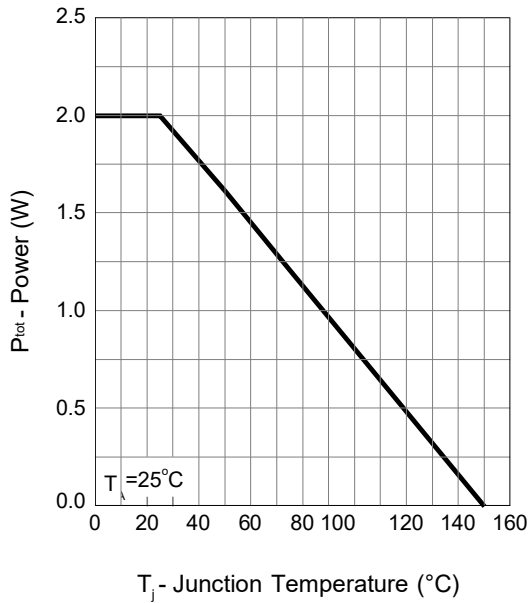
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=24V, V_{GS}=0V$	-	-	1	μA
		$T_J=85^\circ C$	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1.5	1.8	2.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
$R_{DS(ON)}^d$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=12A$	-	7.0	9.5	m Ω
		$V_{GS}=4.5V, I_{DS}=9A$	-	9	13	
Diode Characteristics						
V_{SD}^d	Diode Forward Voltage	$I_{SD}=2A, V_{GS}=0V$	-	0.75	1.1	V
t_{rr}^e	Reverse Recovery Time	$I_{SD}=12A, di_{SD}/dt=100A/\mu s$	-	6.6	-	ns
t_a	Charge Time		-	3.9	-	
t_b	Discharge Time		-	2.6	-	
Q_{rr}^e	Reverse Recovery Charge		-	2	-	
Dynamic Characteristics ^e						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	-	2.5	-	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz$	592	740	888	pF
C_{oss}	Output Capacitance		133	190	247	
C_{riss}	Reverse Transfer Capacitance		44	74	104	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=15V, R_L=15\Omega, I_{DS}=1A, V_{GEN}=10V, R_G=6\Omega$	-	9	17	ns
t_r	Turn-on Rise Time		-	12	23	
$t_{d(OFF)}$	Turn-off Delay Time		-	23	42	
t_f	Turn-off Fall Time		-	6	12	
Gate Charge Characteristics ^e						
Q_g	Total Gate Charge	$V_{DS}=15V, V_{GS}=10V, I_{DS}=12A$	-	14.5	21	nC
Q_g	Total Gate Charge	$V_{DS}=15V, V_{GS}=4.5V, I_{DS}=12A$	-	6.8	9.5	
Q_{gth}	Threshold Gate Charge		-	1.1	1.5	
Q_{gs}	Gate-Source Charge		-	2.4	3.3	
Q_{gd}	Gate-Drain Charge	-	3.9	5.4		

Note d: Pulse test ; pulse width $\leq 300 \mu s$, duty cycle $\leq 2\%$.

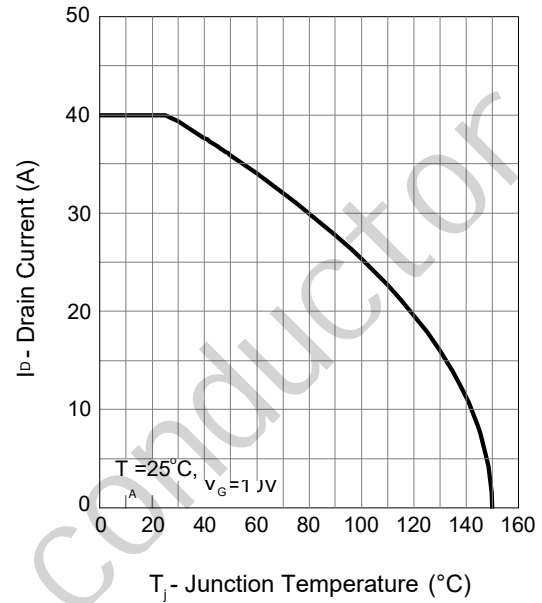
Note e: Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

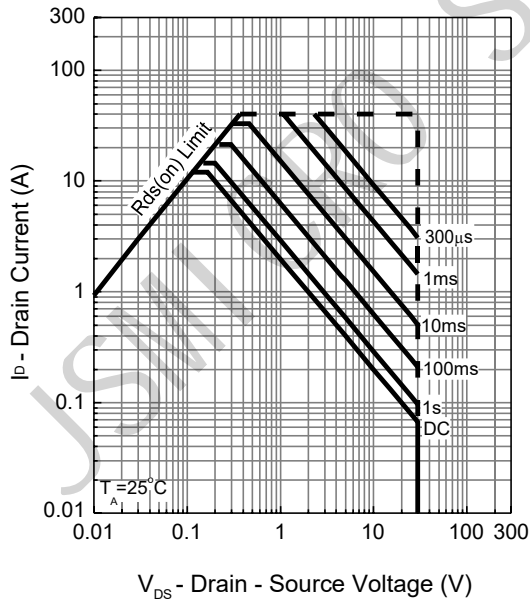
Power Dissipation



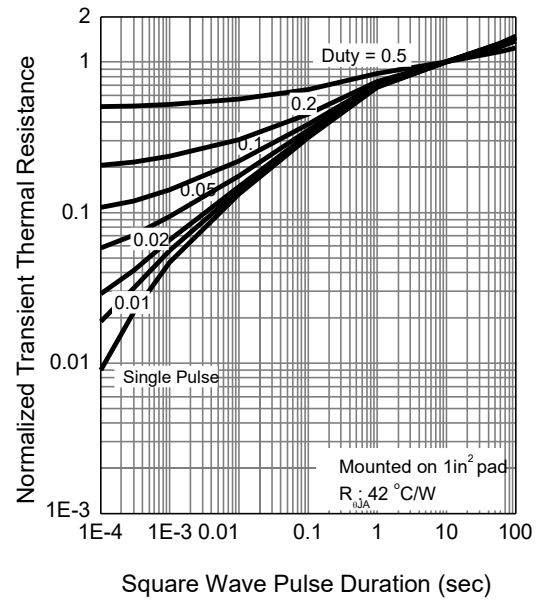
Drain Current



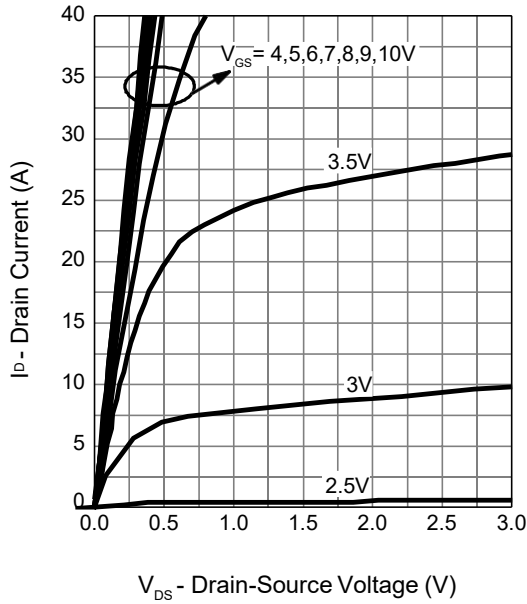
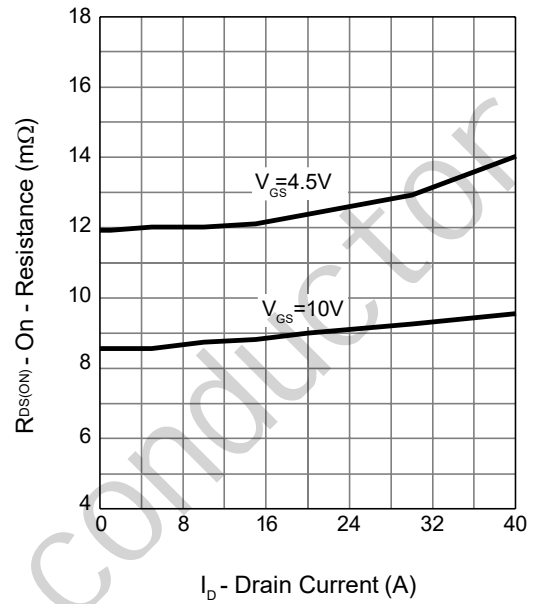
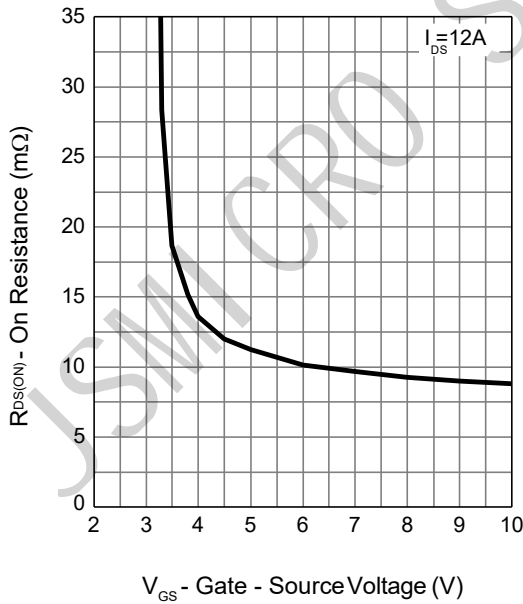
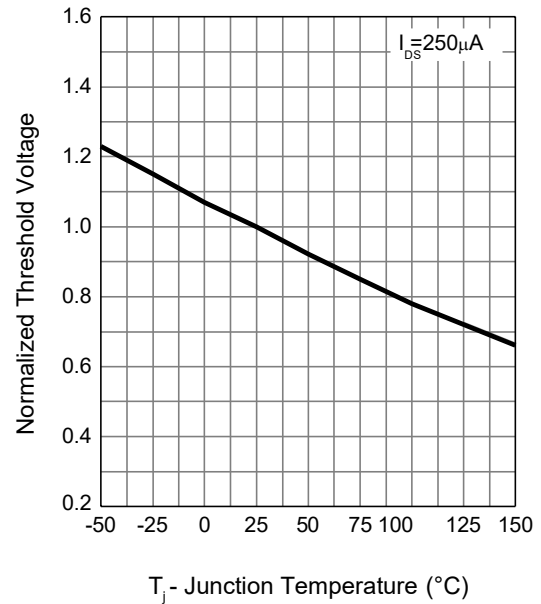
Safe Operation Area



Thermal Transient Impedance

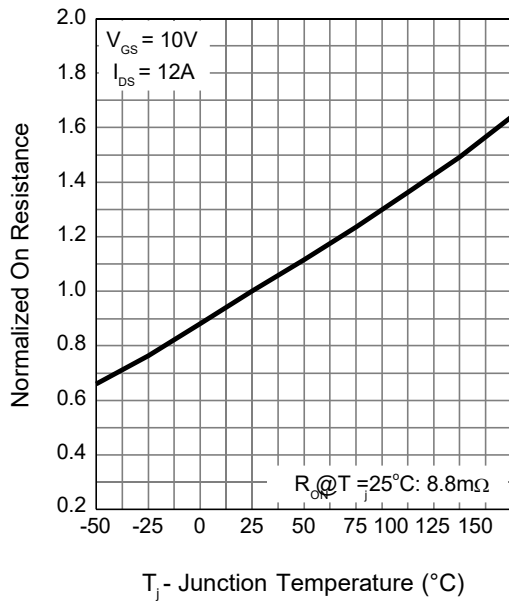


Typical Operating Characteristics (Cont.)

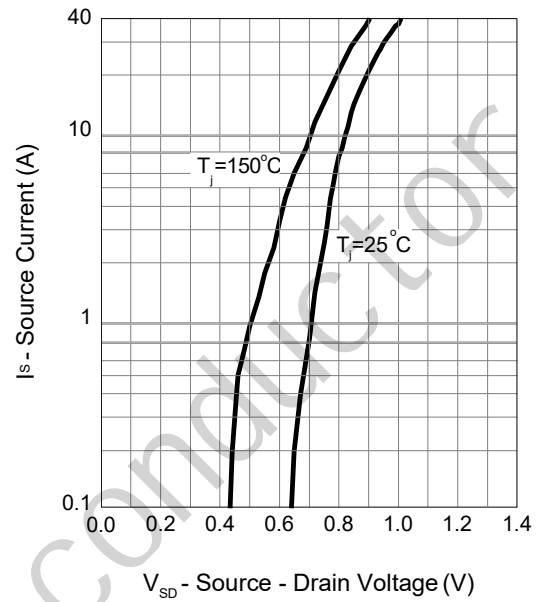
Output Characteristics

Drain-Source On Resistance

Gate-Source On Resistance

Gate Threshold Voltage


Typical Operating Characteristics (Cont.)

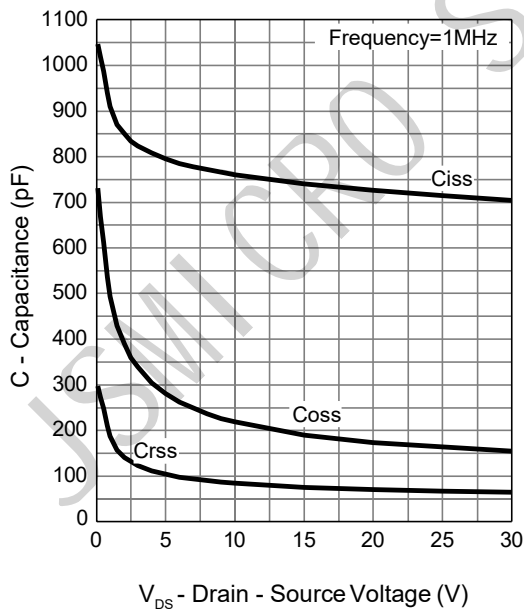
Drain-Source On Resistance



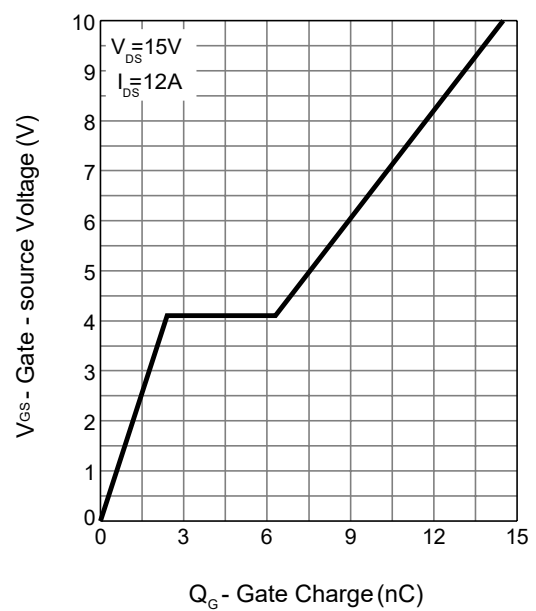
Source-Drain Diode Forward



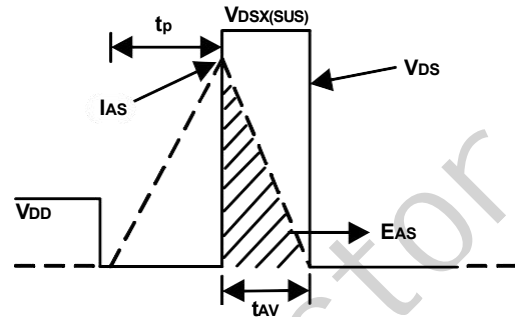
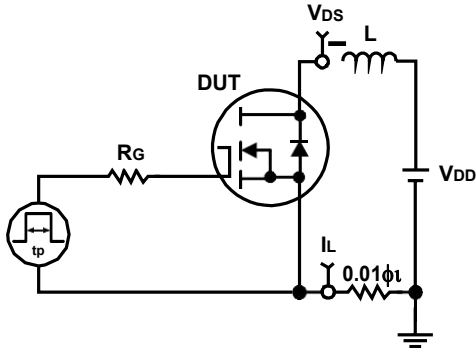
Capacitance



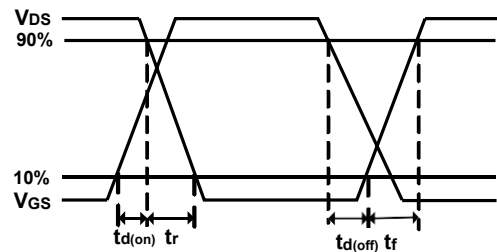
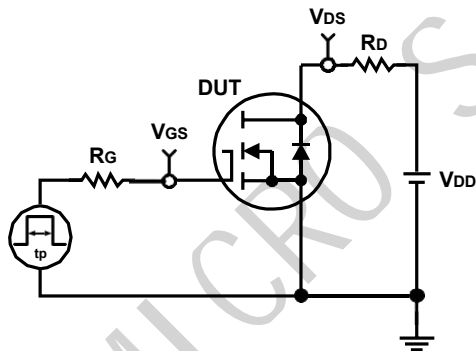
Gate Charge



Avalanche Test Circuit and Waveforms

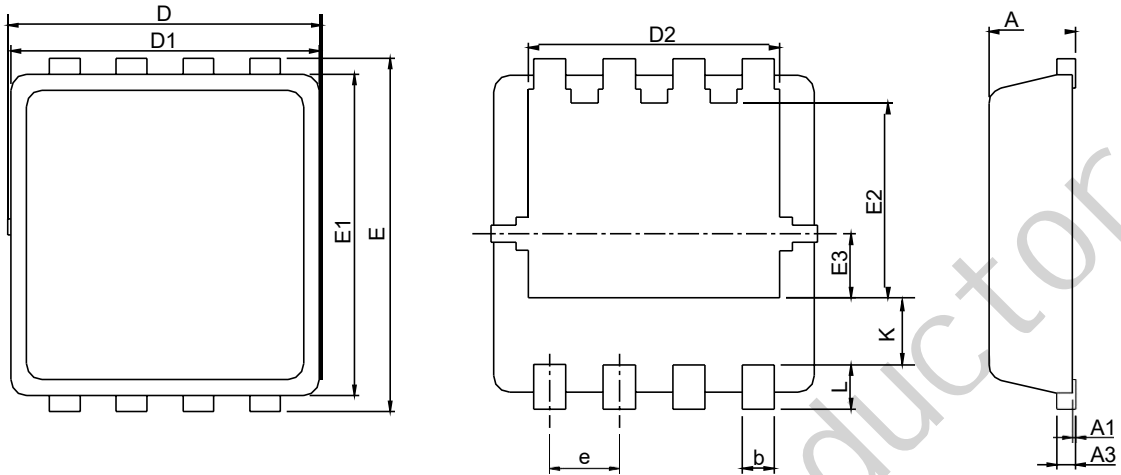


Switching Time Test Circuit and Waveforms



Package Information

PDFN3x3-8L_EP1_P



SYMBOL	PDFN3x3-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.80	1.00	0.031	0.039
A1	0.00	0.05	0.000	0.002
A3	0.10	0.25	0.004	0.010
b	0.24	0.35	0.009	0.014
D	2.90	3.30	0.114	0.130
D1	2.90	3.10	0.114	0.122
D2	2.25	2.45	0.089	0.096
E	3.10	3.30	0.122	0.130
E1	2.90	3.10	0.114	0.122
E2	1.65	1.85	0.065	0.073
E3	0.56	0.58	0.022	0.023
e	0.65 BSC		0.026 BSC	
K	0.475	0.775	0.019	0.031
L	0.30	0.50	0.012	0.020

RECOMMENDED LAND PATTERN

