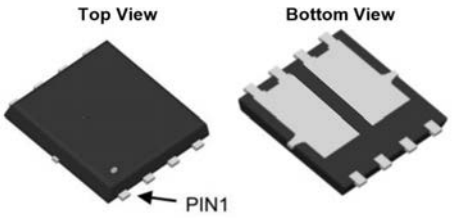
Features

- N-channel:40V, 22A
  $R_{DS(ON)}$***TYP***= 16mΩ @ V_{GS} = 10V
  $R_{DS(ON)}$***TYP***= 22mΩ @ V_{GS} = 4.5V
- P-channel: -40V, -15A
  $R_{DS(ON)}$***TYP***= 34mΩ @ V_{GS} = -10V
  $R_{DS(ON)}$***TYP***= 44mΩ @ V_{GS} =- 4.5V
- Excellent Gate Charge x $R_{DS(ON)}$ Product(FOM)
- Very Low On-resistance $R_{DS(ON)}$
- Fast Switching Speed

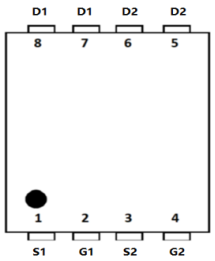


PDFN3x3-8L-D

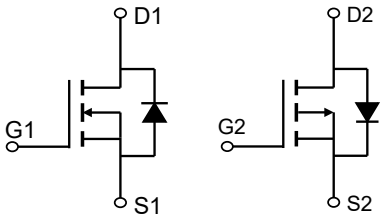
Applications

- Battery Protection
- Load Switch
- Power Management

100% UIS TESTED!
100% ΔVds TESTED!



Pin Assignment



Schematic Diagram

Absolute Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Symbol	Parameter		Value-N-channel	Value-P-channel	Units
V_{DS}	Drain-to-Source Voltage		40	-40	V
V_{GS}	Gate-to-Source Voltage		±20		V
I_D	Continuous Drain Current	T_C = 25°C	22	-15	A
		T_C = 100°C	14	-9	
I_{DM}	Pulsed Drain Current (1)		88	-60	A
E_{AS}	Single Pulsed Avalanche Energy (2)		42	49	mJ
P_D	Power Dissipation	T_C = 25°C	17.8		W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient(3)		64		°C/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		7		
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150		°C

N-channel Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 40V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.6	2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(4)	V_{GS} = 10V, I_D = 5A	-	16	22	mΩ
		V_{GS} = 4.5V, I_D = 3A	-	22	30	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz	-	791	-	pF
C_{oss}	Output Capacitance		-	54	-	pF
C_{rss}	Reverse Transfer Capacitance		-	48	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DD} = 20V, I_D = 8A	-	12	-	nC
Q_{gs}	Gate Source Charge		-	3.2	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	3.1	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 20V I_D= 8A, R_{GEN} = 3Ω	-	4	-	ns
t_r	Turn-On Rise Time		-	3	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	15	-	ns
t_f	Turn-Off Fall Time		-	2	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	22	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	88	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 4A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F= 8A,di/dt=100A/μs	-	7.8	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	3.9	-	nC

P-channel Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = -250μA, V_{GS} = 0V	-40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -40V, V_{GS} = 0V	-	-	-1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-1.1	-1.5	-2.3	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(4)	V_{GS} = -10V, I_D = -5A	-	34	44	mΩ
		V_{GS} = -4.5V, I_D = -3A	-	44	59	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = -20V, f = 1MHz	-	715	-	pF
C_{oss}	Output Capacitance		-	67	-	pF
C_{rss}	Reverse Transfer Capacitance		-	53	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to -10V, V_{DD} = -20V, I_D = -2A	-	15	-	nC
Q_{gs}	Gate Source Charge		-	3	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	3.3	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = -10V, V_{DD} = -20V, I_D= -2A, R_{GEN} = 3Ω	-	7	-	ns
t_r	Turn-On Rise Time		-	13	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	21	-	ns
t_f	Turn-Off Fall Time		-	7	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-15	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-60	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = -3A	-	-	-1.2	V
trr	Body Diode Reverse Recovery Time	I_F=-3A,di/dt=100A/μs	-	25	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	18	-	nC

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. E_{AS} condition: Starting T_J=25C, V_{DD}=20V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=13A

Starting T_J=25C, V_{DD}=-20V, V_G=-10V, R_G=25ohm, L=0.5mH, I_{AS}=-14A

3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB

4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Test Circuit-N

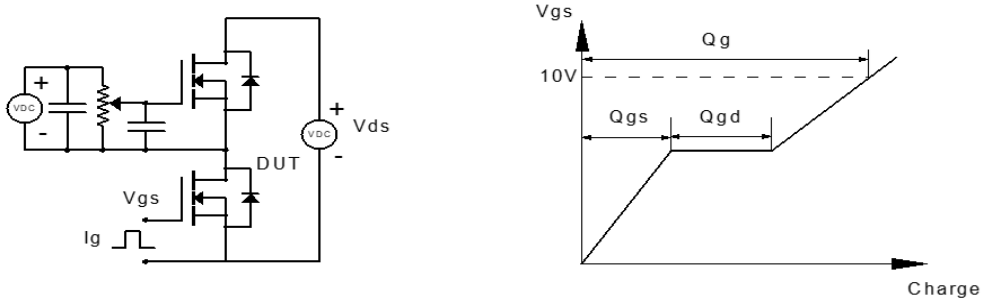


Figure 1: Gate Charge Test Circuit & Waveform

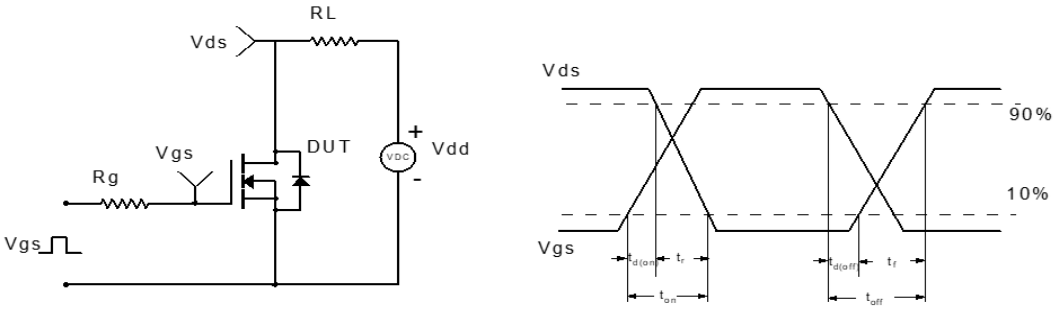


Figure 2: Resistive Switching Test Circuit & Waveform

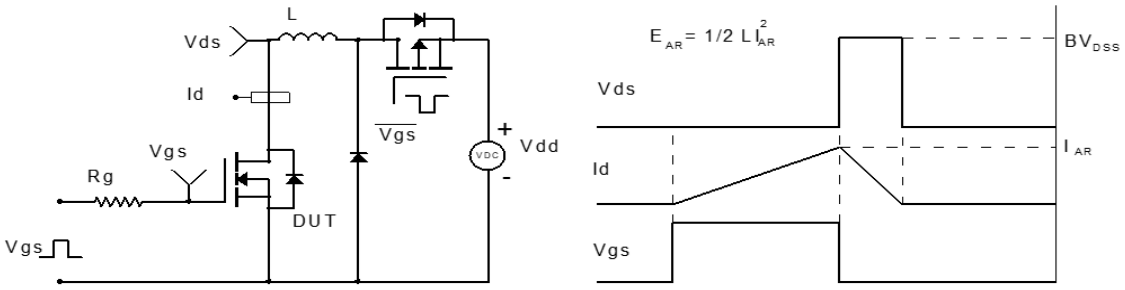


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

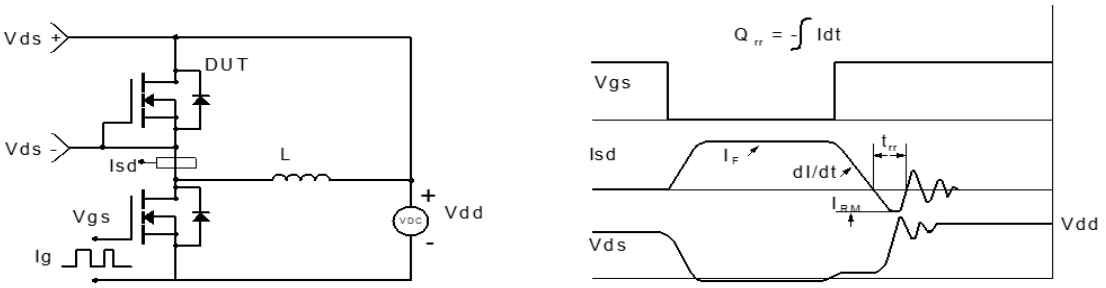


Figure 4: Diode Recovery Test Circuit & Waveform

Test Circuit-P

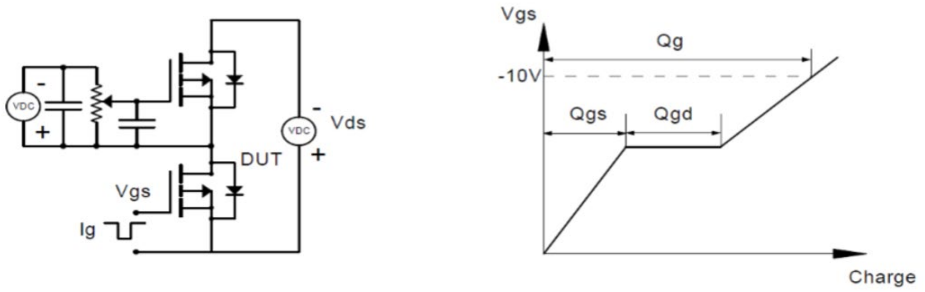


Figure 1: Gate Charge Test Circuit & Waveform

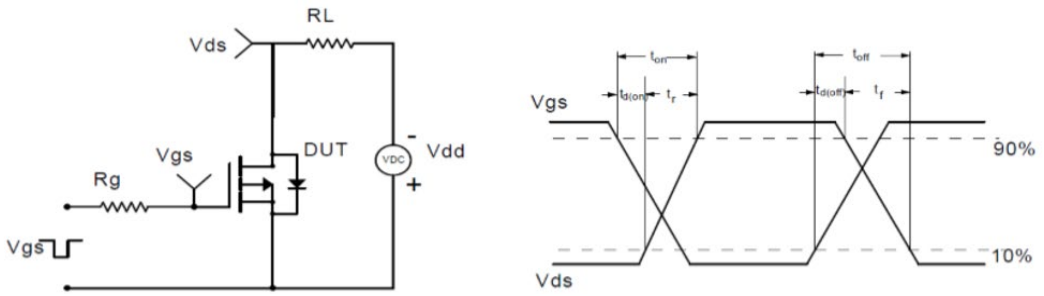


Figure 2: Resistive Switching Test Circuit & Waveform

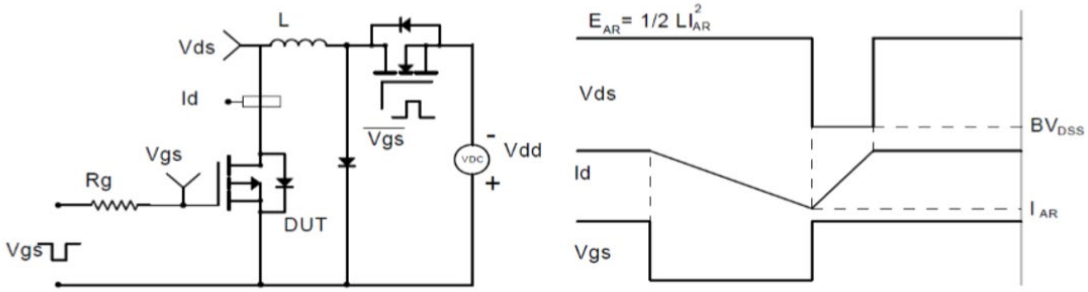


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

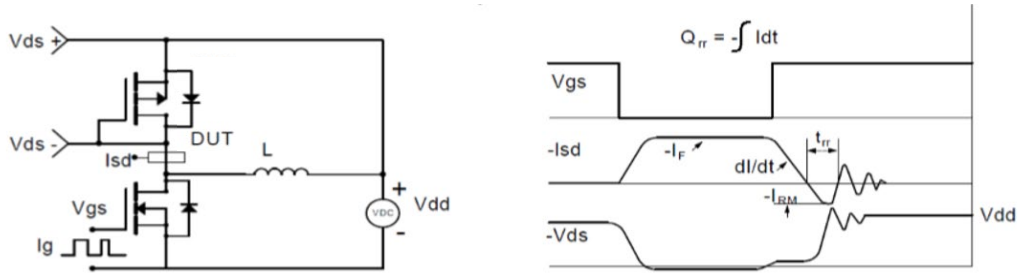
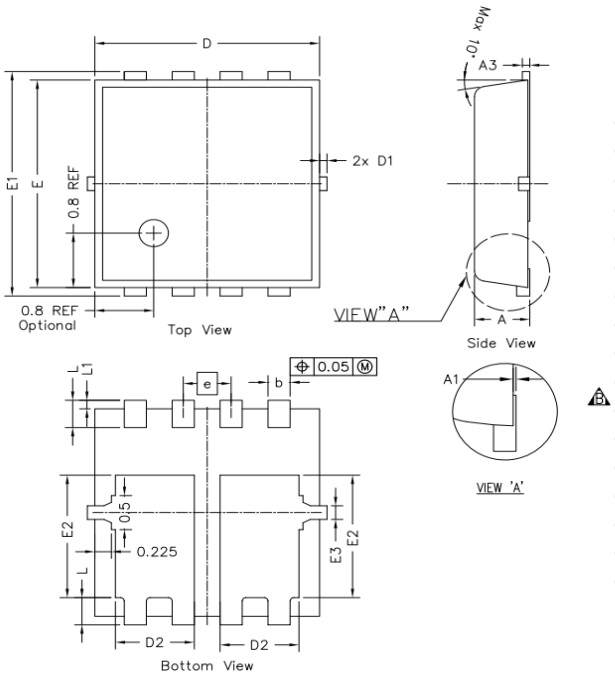


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(PDFN3x3-8L-D)



SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.750	0.800	0.028	0.030	0.031
A1	---	---	0.050	----	----	0.002
A3	0.144	0.152	0.202	0.006	0.006	0.008
b	0.250	0.300	0.350	0.010	0.012	0.014
e	0.65 BSC			0.026 BSC		
D	2.950	3.050	3.150	0.116	0.120	0.124
E	2.950	3.050	3.150	0.116	0.120	0.124
D1	---	---	0.125	----	----	0.005
E1	3.200	3.300	3.400	0.126	0.130	0.134
D2	0.970	1.070	1.170	0.038	0.042	0.046
E2	1.700	1.800	1.900	0.067	0.071	0.075
E3	0.150	0.200	0.250	0.006	0.008	0.010
L	0.300	0.400	0.500	0.012	0.016	0.020
L1	0.075	0.125	0.175	0.003	0.005	0.007