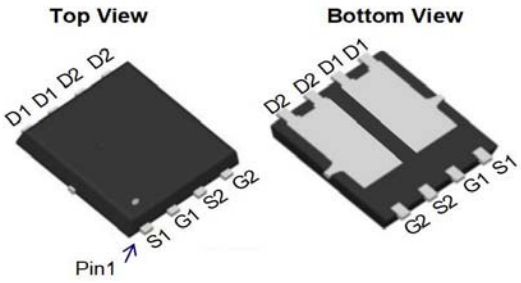
Product Summary

- V_{DSS}=20V, I_D=41A
- $R_{DS(ON)_Typ}$=5.9mΩ@V_{GS}=4.5V
- $R_{DS(ON)_Typ}$=8.6mΩ@V_{GS}=2.5V
- V_{DSS}=-20V, I_D=-31A
- $R_{DS(ON)_Typ}$=10.4mΩ@V_{GS}=-4.5V
- $R_{DS(ON)_Typ}$=14mΩ@V_{GS}=-2.5V



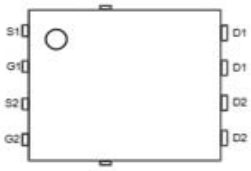
PDFN5X6-8L-D

Features

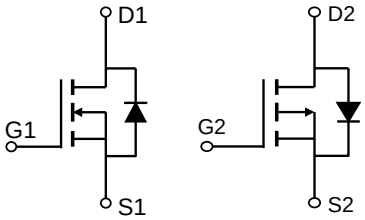
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS Tested
- 100% ΔVds Tested
- Halogen-free; RoHS-compliant

Applications

- Load Switch
- PWM Application
- Power Management



Pin Assignment



Schematic Diagram

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

Symbol	Parameter		Value-N	Value-P	Unit
V_{DS}	Drain-to-Source Voltage		20	-20	V
V_{GS}	Gate-to-Source Voltage		±12		V
I_D	Continuous Drain Current	T_C = 25°C	41	-31	A
		T_C = 100°C	25	-19	
I_{DM}	Pulsed Drain Current [1]		164	-124	A
E_{AS}	Single Pulsed Avalanche Energy [2]		110	110	mJ
P_D	Power Dissipation	T_C = 25°C	22.7	22.7	W
$R_{θJC}$	Thermal Resistance, Junction to Case		5.5	5.5	°C/W
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150		°C

Electrical Characteristics-N(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	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 20V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±12V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	0.4	0.65	1.0	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(4)	V_{GS} = 4.5V, I_D = 20A	-	5.9	8.0	mΩ
		V_{GS} = 2.5V, I_D = 15A	-	8.6	12.0	mΩ
Dynamic Characteristics						
R_g	Gate Resistance	f = 1MHz	-	1.8	-	Ω
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 10V, f = 1MHz	-	1302	-	pF
C_{oss}	Output Capacitance		-	232	-	pF
C_{rss}	Reverse Transfer Capacitance		-	213	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 4.5V, V_{DS} = 10V, I_D = 20A	-	16	-	nC
Q_{gs}	Gate Source Charge		-	3.0	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	3.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 4.5V, V_{DD} = 10V, I_D= 20A, R_{GEN} = 3Ω	-	10	-	ns
t_r	Turn-On Rise Time		-	30	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	40	-	ns
t_f	Turn-Off Fall Time		-	16	-	ns
Body Diode Characteristics						
I_S	Maximum Continuous Body Diode Forward Current		-	-	41	A
I_{SM}	Maximum Pulsed Body Diode Forward Current		-	-	164	A
V_{SD}	Body Diode Forward Voltage	V_{GS} = 0V, I_S = 10A	-		1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 20A, di/dt = 100A/us	-	7.5	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	1.6	-	nC

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

2. E_{AS} condition: Starting T_J=25C, V_{DD}=10V, V_{GS}=10V, R_G=25ohm, L=0.5mH, I_{AS}=21.0A, V_{DD}=0V during time in avalanche.

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%.

Electrical Characteristics-P (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	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -20V, V_{GS} = 0V	-	-	-1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±12V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-0.4	-0.6	-1.0	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(5)	V_{GS} = -10V, I_D = -15A	-	10.4	14.0	mΩ
		V_{GS} = -4.5V, I_D = -10A	-	14.0	18.5	mΩ
Dynamic Characteristics						
R_g	Gate Resistance	f = 1MHz	-	10	-	Ω
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = -10V, f = 1MHz	-	1722	-	pF
C_{oss}	Output Capacitance		-	219	-	pF
C_{rss}	Reverse Transfer Capacitance		-	191	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to -4.5V, V_{DS} = -10V, I_D = -15A	-	15.5	-	nC
Q_{gs}	Gate Source Charge		-	2.5	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	4.2	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = -4.5V, V_{DD} = -10V, I_D= -15A, R_{GEN} = 3Ω	-	13	-	ns
t_r	Turn-On Rise Time		-	40	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	39	-	ns
t_f	Turn-Off Fall Time		-	33	-	ns
Body Diode Characteristics						
I_S	Maximum Continuous Body Diode Forward Current		-	-	-31	A
I_{SM}	Maximum Pulsed Body Diode Forward Current		-	-	-124	A
V_{SD}	Body Diode Forward Voltage	V_{GS} = 0V, I_S = -15A	-		-1.2	V
trr	Body Diode Reverse Recovery Time	I_F = -15A, di/dt = -100A/us	-	10	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	3	-	nC

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

2. E_{AS} condition: Starting T_J=25C, V_{DD}=-10V, V_{GS}=-10V, R_G=25ohm, L=0.5mH, I_{AS}=-21A, V_{DD}=0V during time in avalanche.

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

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

Test Circuit

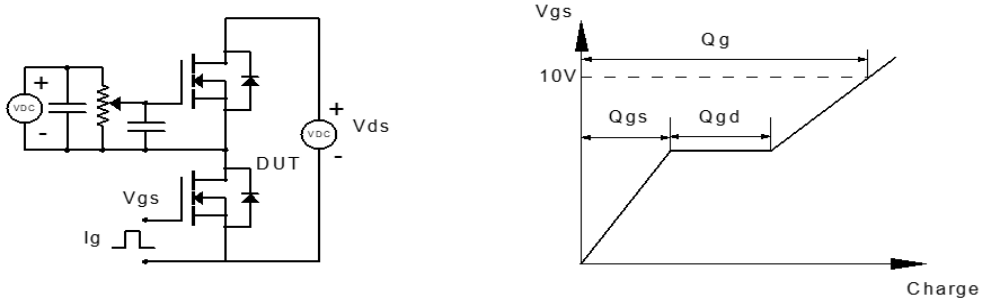


Figure 1: Gate Charge Test Circuit & Waveform

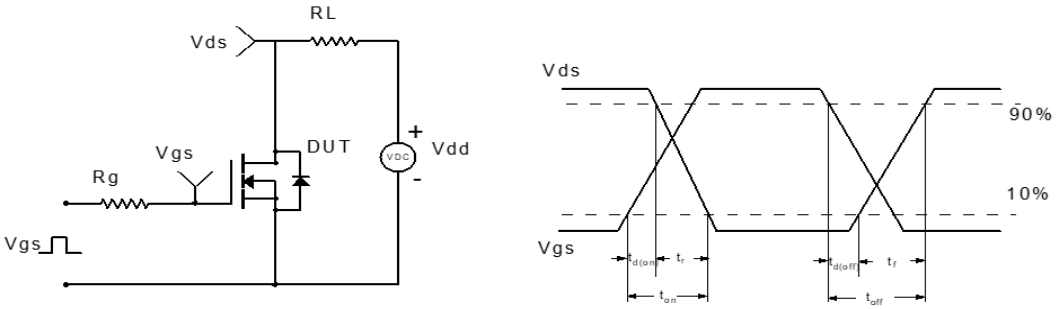


Figure 2: Resistive Switching Test Circuit & Waveform

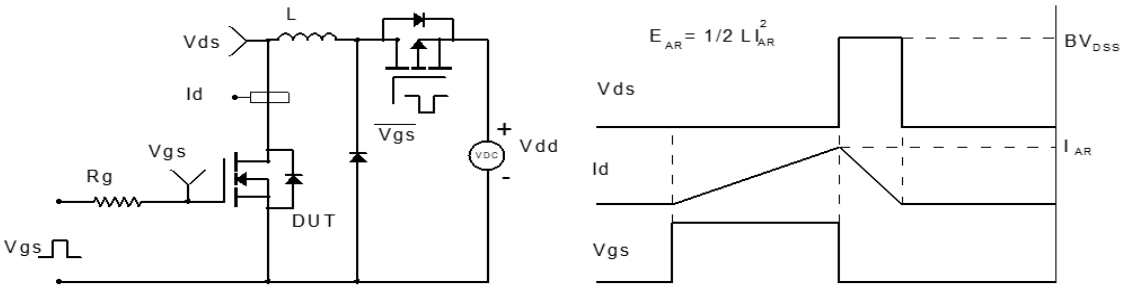


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

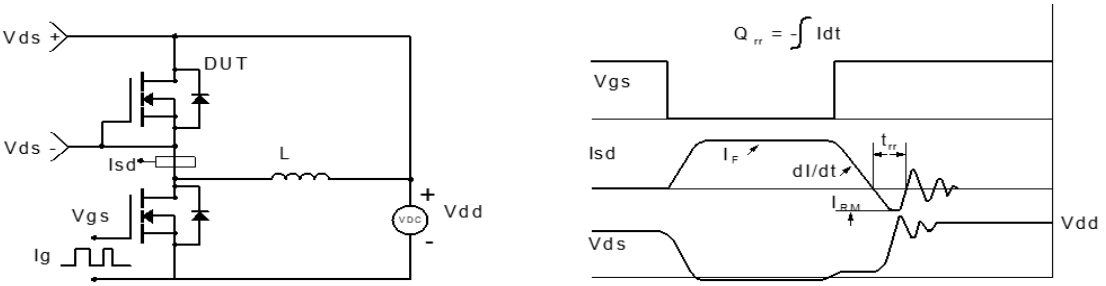


Figure 4: Diode Recovery Test Circuit & Waveform

Test Circuit

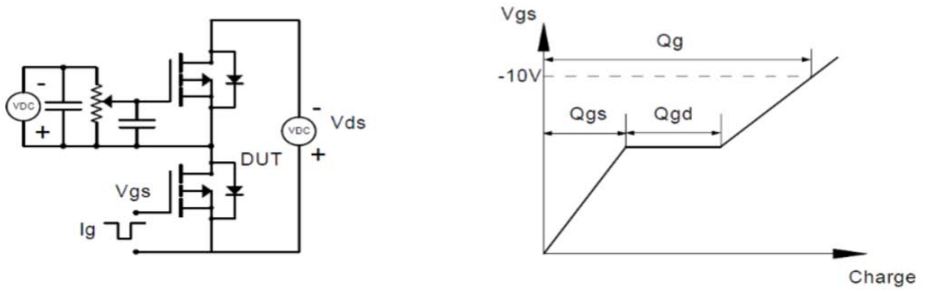


Figure 1: Gate Charge Test Circuit & Waveform

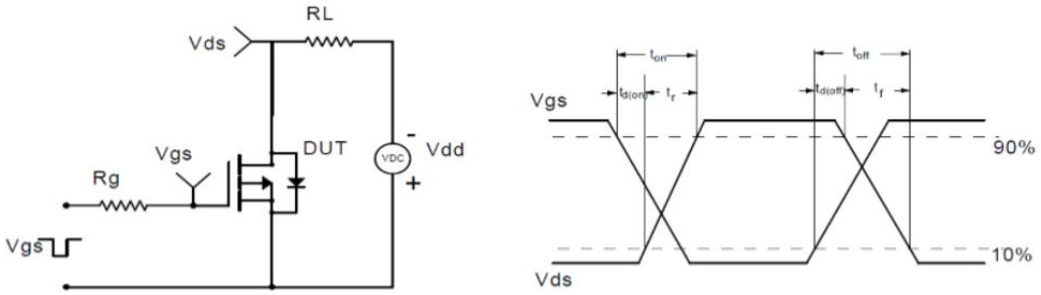


Figure 2: Resistive Switching Test Circuit & Waveform

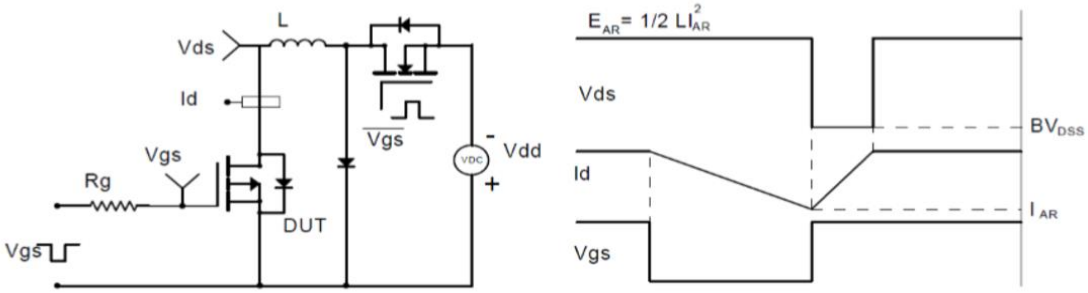


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

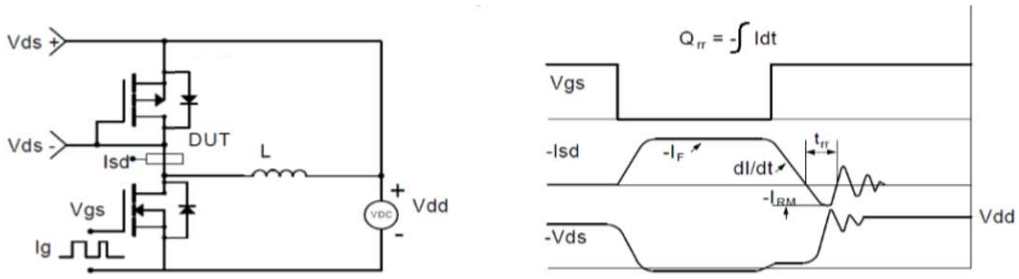
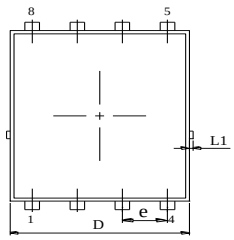


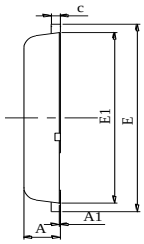
Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(PDFN5X6-8L-D)

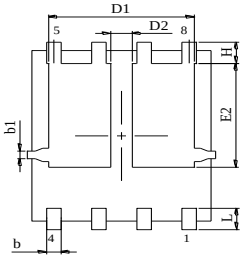
Package Outline



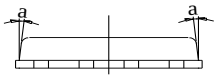
Top View



Side View



Bottom View

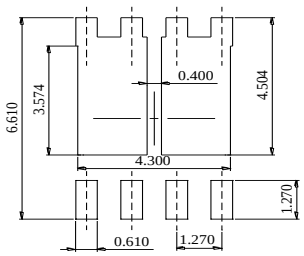


Front View

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. ALL DIMNESIONS IN MILLIMETER (ANNGLE IN DEGREE).
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0.00	-	0.10
b	0.31	0.41	0.51
b1	0.15	0.25	0.35
c	0.23	-	0.33
D	4.95	5.05	5.15
D1	4.00	4.10	4.20
D2	0.50	0.60	0.70
E	6.05	6.15	6.25
E1	5.50	5.60	5.70
E2	3.31	3.41	3.51
e		1.27BSC	
H	0.60	0.70	0.80
L	0.50	0.70	0.80
L1	-	-	0.125
a	-	-	12 °

Recommended Soldering Footprint



DIMENSIONS:MILLIMETERS