Features

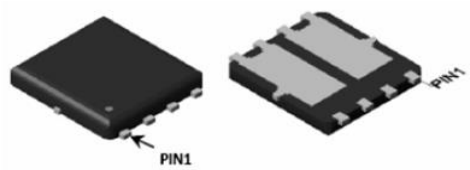
- N-Channel: 30V, 20A

  $R_{DS(ON)}$ Typ= 8.8mΩ @ V_{GS} = 10V
  $R_{DS(ON)}$ Typ= 13mΩ @ V_{GS} = 4.5V

- P-Channel: -30V, -20A

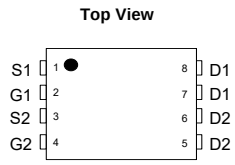
  $R_{DS(ON)}$ Typ= 13.6mΩ @ V_{GS} = -10V
  $R_{DS(ON)}$ Typ= 18.5mΩ @ V_{GS} = -4.5V

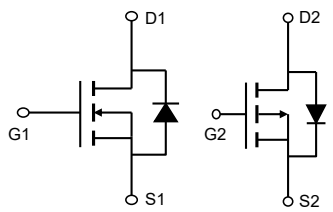
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge



Top View Bottom View

PDFN5x6-8L-D





Applications

- Battery Protection
- Load Switch
- Power Management

Absolute Maximum Ratings (T_C=25℃ unless otherwise specified)

Symbol	Parameter		Max. N-Channel	Max. P-Channel	Units
V_{DSS}	Drain-Source Voltage		30	-30	V
V_{GSS}	Gate-Source Voltage		±20	±20	V
I_D	Continuous Drain Current	T_C = 25℃	20	-20	A
		T_C = 100℃	13	-12	A
I_{DM}	Pulsed Drain Current note1		80	-50	A
E_{AS}	Single Pulsed Avalanche Energy note2		42	36	mJ
P_D	Power Dissipation	T_C = 25℃	25	25	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		5	5	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150		℃

N-Channel Electrical Characteristics (T_J=25℃ 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	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 30V, 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	2.2	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(4)	V_{GS} = 10V, I_D = 10A	-	8.8	12.2	mΩ
		V_{GS} = 4.5V, I_D = 5A	-	13.0	20.5	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz	-	810	-	pF
C_{oss}	Output Capacitance		-	101	-	pF
C_{rss}	Reverse Transfer Capacitance		-	87	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V, V_{DS} = 15V, I_D = 15A	-	16	-	nC
Q_{gs}	Gate Source Charge		-	3.6	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	3.4	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 15V, I_D= 15A, R_{GEN} = 3Ω	-	6	-	ns
t_r	Turn-On Rise Time		-	15	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	17	-	ns
t_f	Turn-Off Fall Time		-	5	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	20	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	80	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 20A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 13A, di/dt = 100A/us	-	9.4	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	3.3	-	nC

Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25C, V_{DD}=15V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=10A
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%.

P-Channel Electrical Characteristics (T_J=25℃ 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	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =-30V, 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 =-10A	-	13.6	23.0	mΩ
		V_{GS} =-4.5V, I_D =-5A	-	18.5	34.0	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = -15V, f = 1MHz	-	1136	-	pF
C_{oss}	Output Capacitance		-	164	-	pF
C_{rss}	Reverse Transfer Capacitance		-	135	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to -10V V_{DS} = -15V, I_D = -5A	-	23	-	nC
Q_{gs}	Gate Source Charge		-	4.0	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	5.0	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = -10V, V_{DD} = -15V I_D= -5A, R_{GEN} = 3Ω	-	4	-	ns
t_r	Turn-On Rise Time		-	3	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	60	-	ns
t_f	Turn-Off Fall Time		-	50	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-20	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-50	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S =-12A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F = -5A, di/dt = 100A/us	-	12	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	4	-	nC

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

2.EAS condition: Starting T_J=25C, V_{DD}=-15V, V_G=-10V, R_G=25ohm, L=0.5mH, I_{AS}=-8A

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-MOS

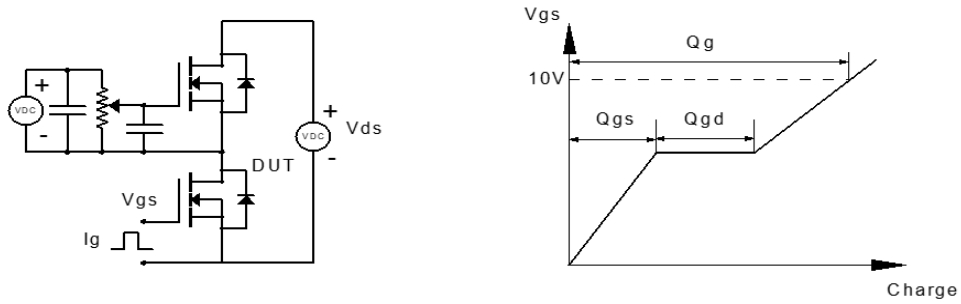


Figure 1: Gate Charge Test Circuit & Waveform

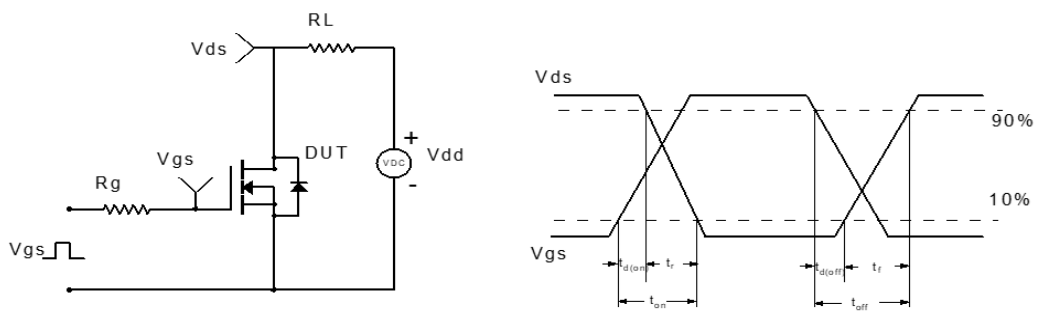


Figure 2: Resistive Switching Test Circuit & Waveform

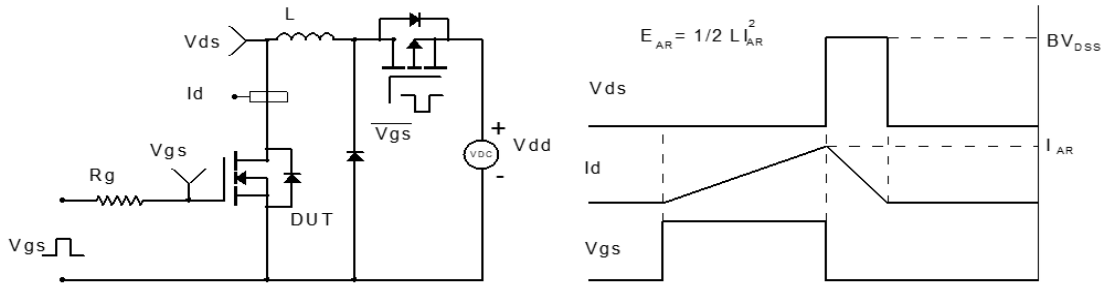


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

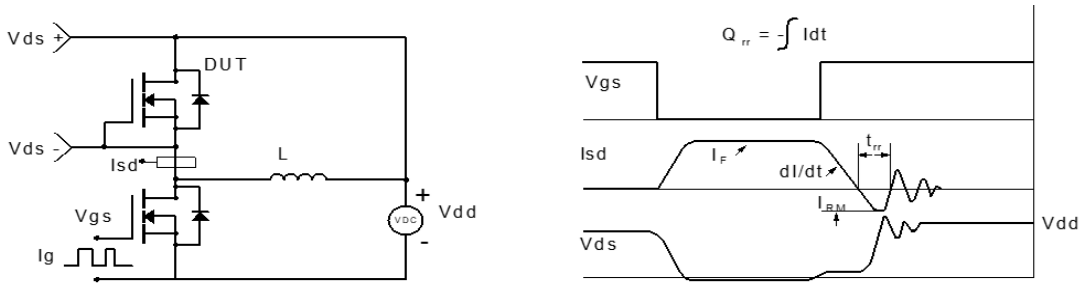


Figure 4: Diode Recovery Test Circuit & Waveform

Test Circuit P-MOS

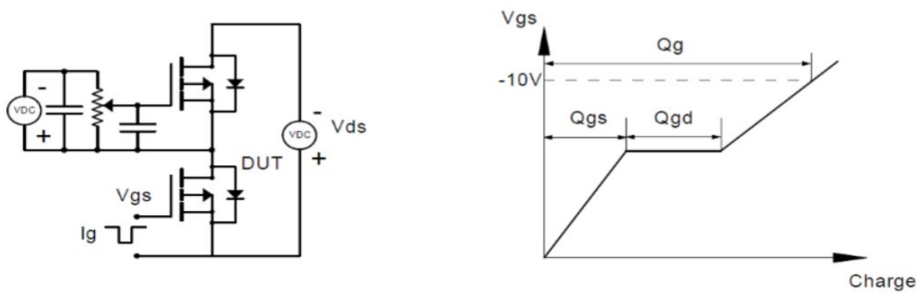


Figure 1: Gate Charge Test Circuit & Waveform

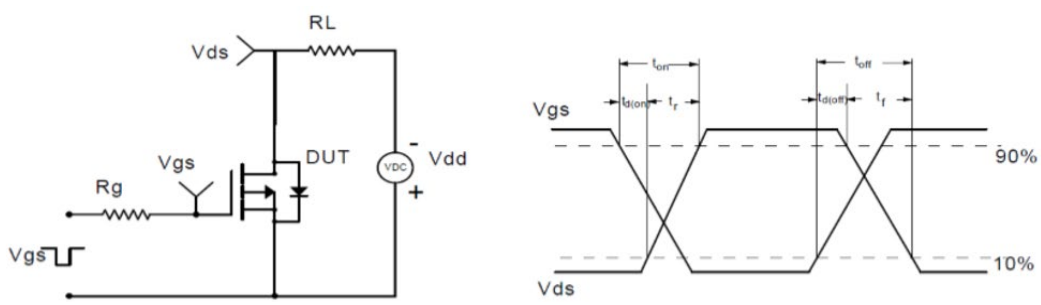


Figure 2: Resistive Switching Test Circuit & Waveform

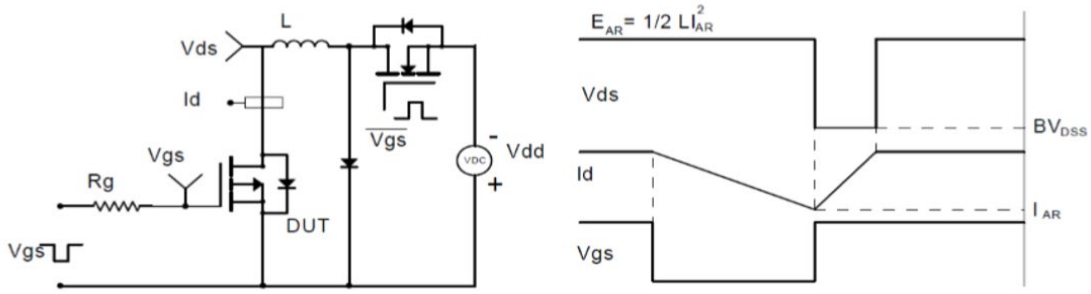


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

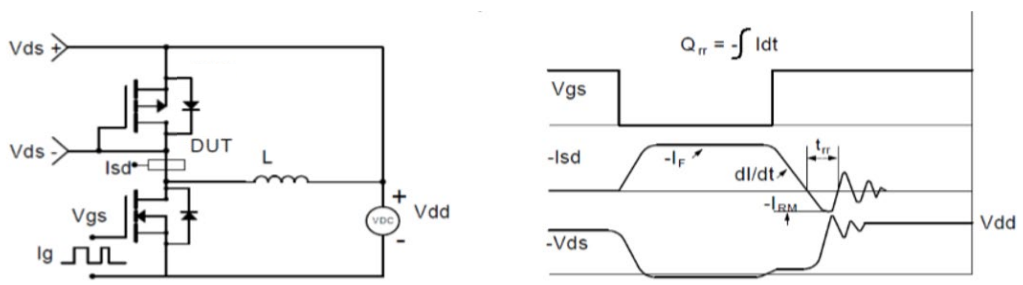
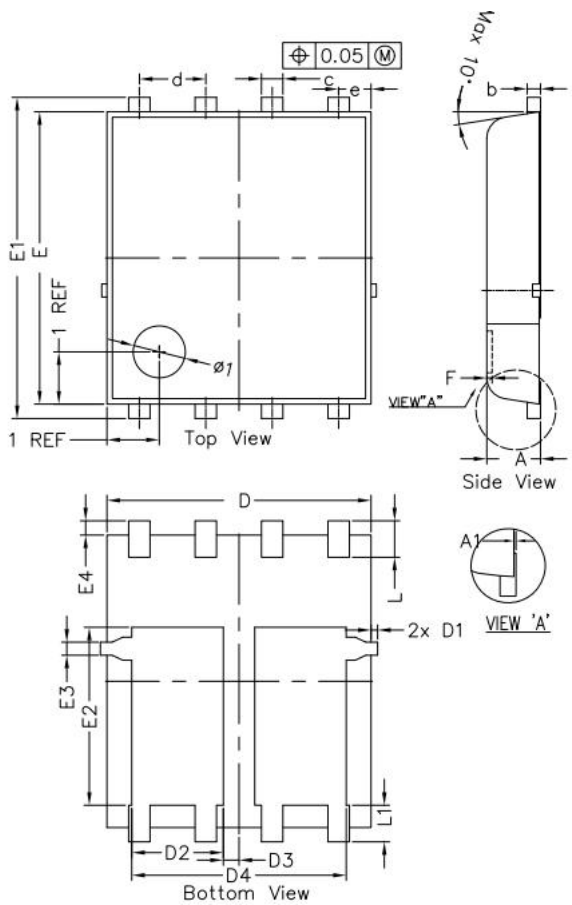


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data- PDFN5x6-8L-D



	SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
		MIN	NOM	MAX	MIN	NOM	MAX
	* A	0.900	1.000	1.100	0.035	0.039	0.043
	A1	0.000	---	0.050	0.000	----	0.002
	b	0.246	0.254	0.312	0.010	0.010	0.012
	* c	0.310	0.410	0.510	0.012	0.016	0.020
	d	1.27 BSC			0.050 BSC		
	* D	4.950	5.050	5.150	0.195	0.199	0.203
4	*D1	---	---	0.125	---	---	0.005
	*D2	1.650	1.750	1.850	0.065	0.069	0.073
	D3	0.200	0.300	0.400	0.008	0.012	0.016
	D4	4.000	4.100	4.200	0.157	0.161	0.165
	e	0.62 BSC			0.024 BSC		
	* E	5.500	5.600	5.700	0.217	0.220	0.224
	* E1	6.050	6.150	6.250	0.238	0.242	0.246
	E2	3.310	3.410	3.510	0.130	0.134	0.138
	E3	0.150	0.250	0.350	0.006	0.010	0.014
	* E4	0.175	0.275	0.375	0.007	0.011	0.015
	F	-	-	0.100	-	-	0.004
4	* L	0.500	0.600	0.700	0.02	0.02	0.03
	L1	0.600	0.700	0.800	0.02	0.03	0.03