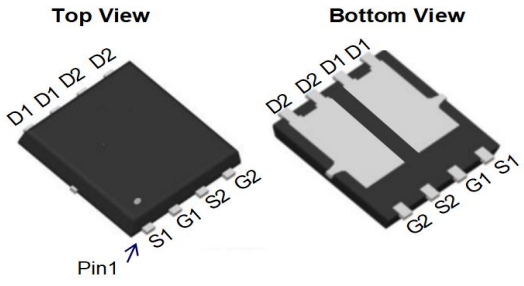
Features

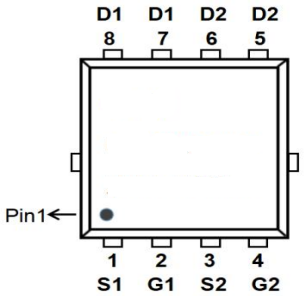
- 30V, 47A
  $R_{DS(ON)}$ Typ = 5.0mΩ @ V_{GS} = 10V
  $R_{DS(ON)}$ Typ = 7.9mΩ @ V_{GS} = 4.5V
- -30V, -39A
  $R_{DS(ON)}$ Typ = 7.4mΩ @ V_{GS} = -10V
  $R_{DS(ON)}$ Typ = 11.4mΩ @ V_{GS} = -4.5V
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS TESTED!
- 100% ΔVds TESTED!



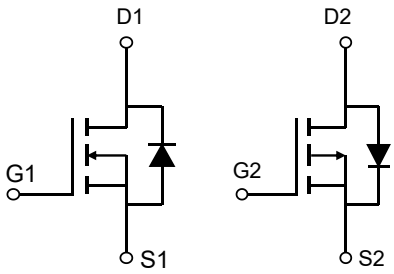
PDFN5x6-8L-D

Application

- Load Switch
- PWM Application
- Power Management



Pin Assignment



Schematic Diagram

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

Symbol	Parameter		N Value	P Value	Units
V_{DS}	Drain-to-Source Voltage		30	-30	V
V_{GS}	Gate-to-Source Voltage		±20	±20	V
I_D	Continuous Drain Current	T_C = 25°C	47	-39	A
		T_C = 100°C	28	-23	A
I_{DM}	Pulsed Drain Current (1)		188	-156	A
E_{AS}	Single Pulsed Avalanche Energy (2)		225	162	mJ
P_D	Power Dissipation	T_C = 25°C	22.7	22.7	W
$R_{\theta JC}$	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 (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	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	1.4	2.2	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = 10V, I_D = 20A	-	5.0	6.5	mΩ
		V_{GS} = 4.5V, I_D = 15A	-	7.9	9.5	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz	-	2214	-	pF
C_{oss}	Output Capacitance		-	323	-	pF
C_{rss}	Reverse Transfer Capacitance		-	260	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V, V_{DS} = 15V, I_D = 30A	-	37	-	nC
Q_{gs}	Gate Source Charge		-	7.4	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	8.6	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 15V, I_D= 30A, R_{GEN} = 3Ω	-	8.4	-	ns
t_r	Turn-On Rise Time		-	20	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	32	-	ns
t_f	Turn-Off Fall Time		-	9	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	47	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	188	A
V_{SD}	Drain to Source 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	-	10.2	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	2.75	-	nC

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	-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	-1.6	-2.2	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = -10V, I_D = -20A	-	7.4	9.5	mΩ
		V_{GS} = -4.5V, I_D = -15A	-	11.4	15.5	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = -15V, f = 1MHz	-	1759	-	pF
C_{oss}	Output Capacitance		-	220	-	pF
C_{rss}	Reverse Transfer Capacitance		-	180	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to -10V, V_{DS} = -15V, I_D = -30A	-	30	-	nC
Q_{gs}	Gate Source Charge		-	5	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	7.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = -10V, V_{DD} = -15V, I_D= -30A, R_{GEN} = 3Ω	-	14.1	-	ns
t_r	Turn-On Rise Time		-	20	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	94	-	ns
t_f	Turn-Off Fall Time		-	65	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-39	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-156	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = -30A	-	-	-1.2	V
trr	Body Diode Reverse Recovery Time	I_F = -30A, di/dt = 100A/us	-	19	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	9	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25°C, V_{DD}=15V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=30A

   E_{AS} condition: Starting T_J=25°C, V_{DD}=-15V, V_G=-10V, R_G=25ohm, L=0.5mH, I_{AS}=-25.5A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Performance Characteristics（N）

Figure 1: Output Characteristics

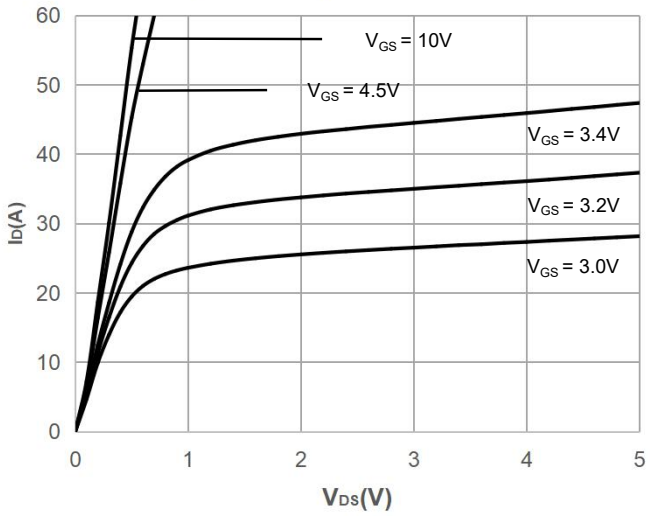


Figure 2: Typical Transfer Characteristics

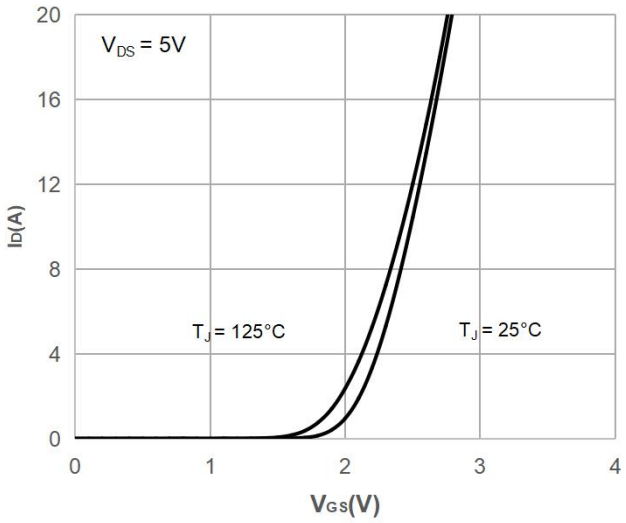


Figure 3: On-resistance vs. Drain Current

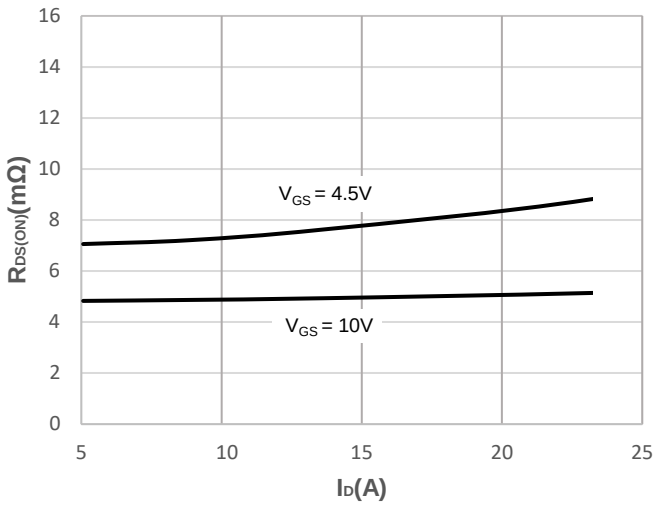


Figure 4: Body Diode Characteristics

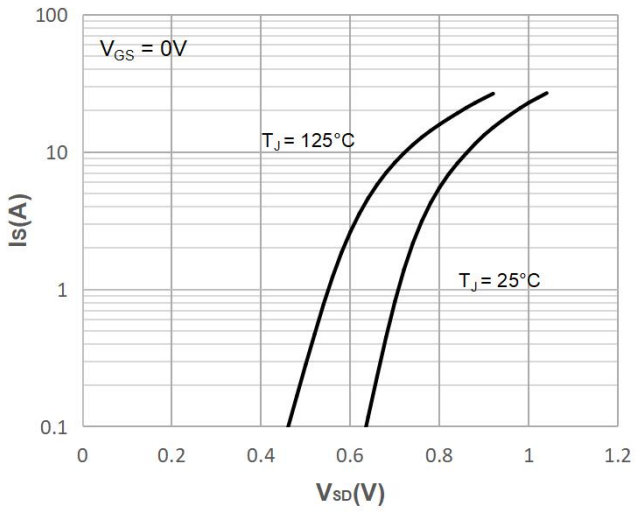


Figure 5: Gate Charge Characteristics

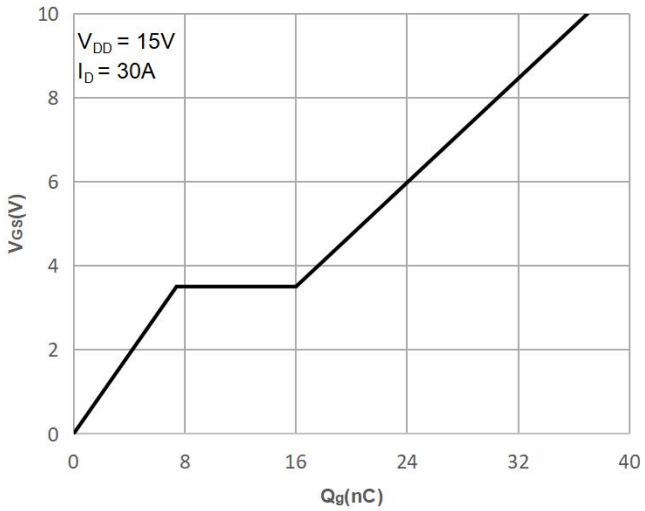
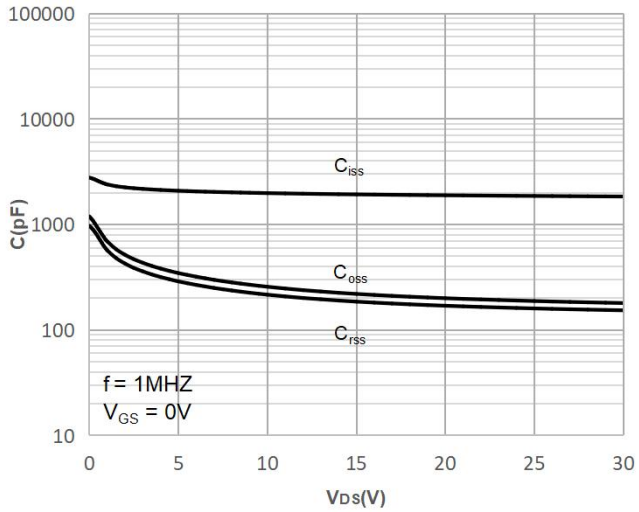


Figure 6: Capacitance Characteristics



Typical Performance Characteristics （N）

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

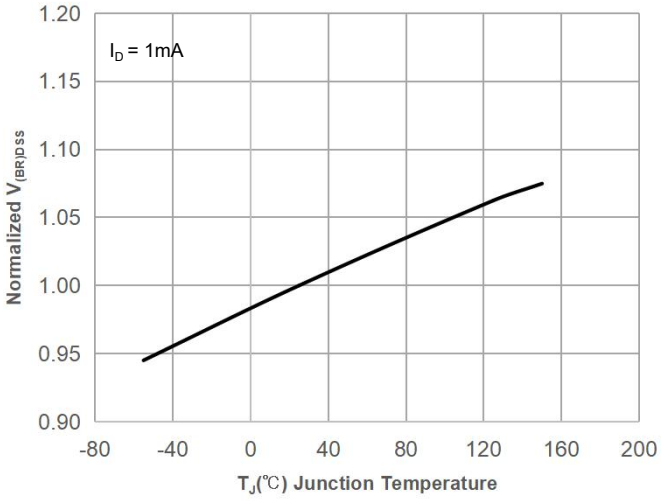


Figure 8: Normalized on Resistance vs. Junction Temperature

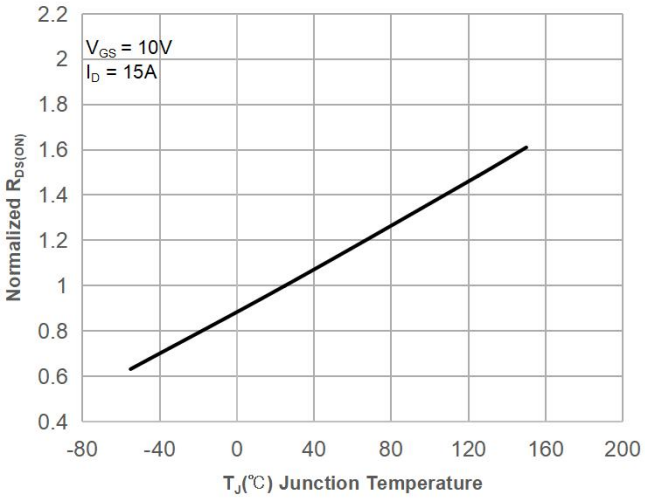


Figure 9: Maximum Safe Operating Area

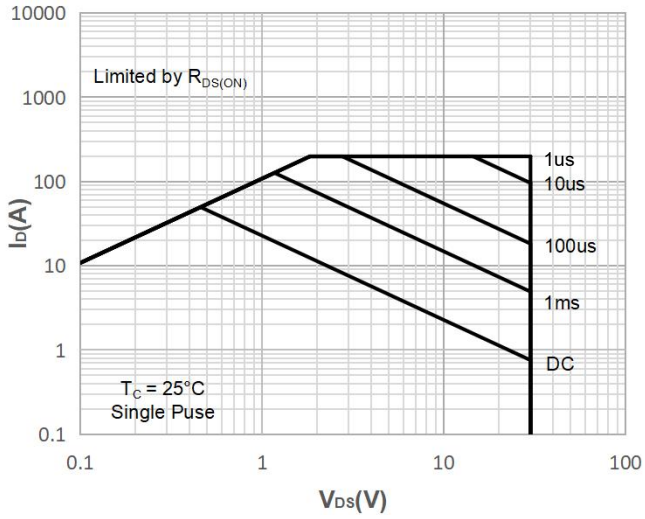


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

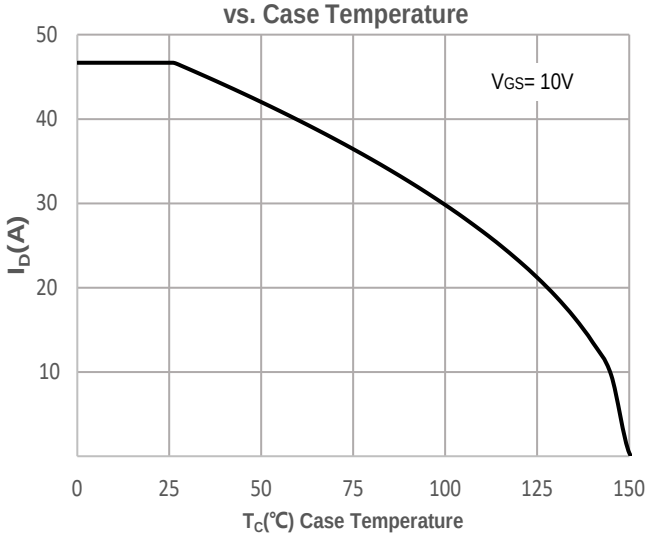


Figure 11: Normalized Maximum Transient Thermal Impedance

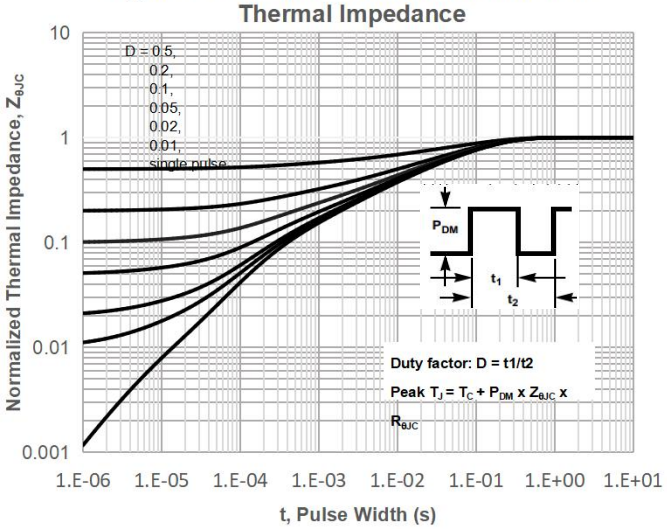
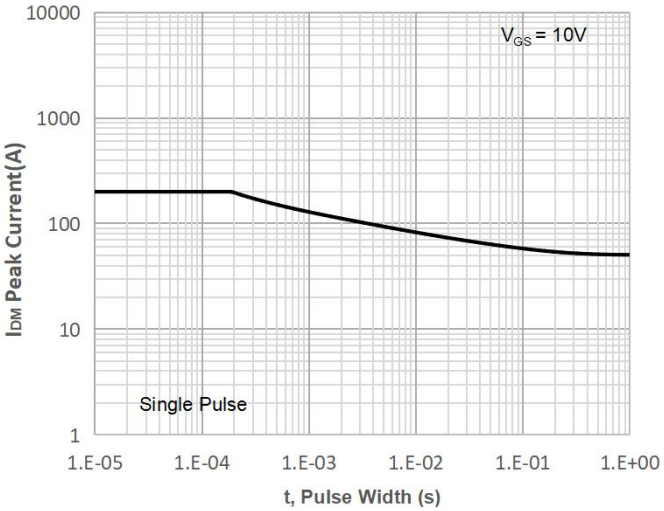


Figure 12: Peak Current Capacity



Typical Performance Characteristics（P）

Figure 1: Output Characteristics

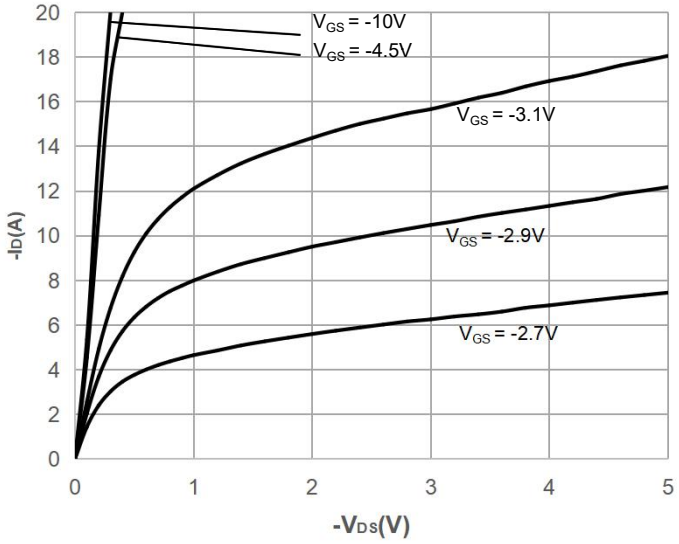


Figure 2: Typical Transfer Characteristics

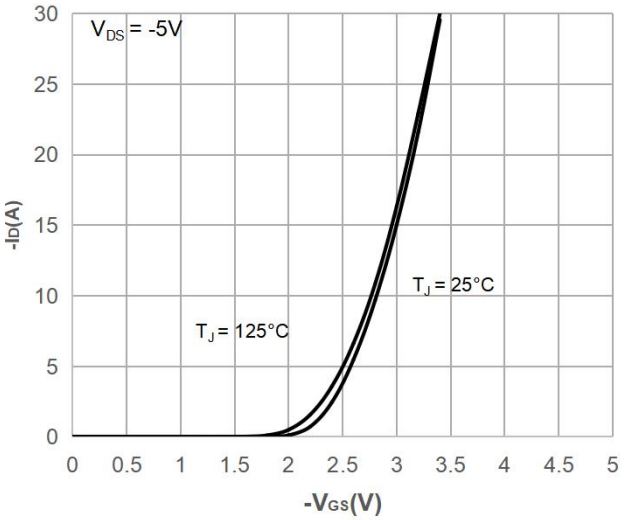


Figure 3: On-resistance vs. Drain Current

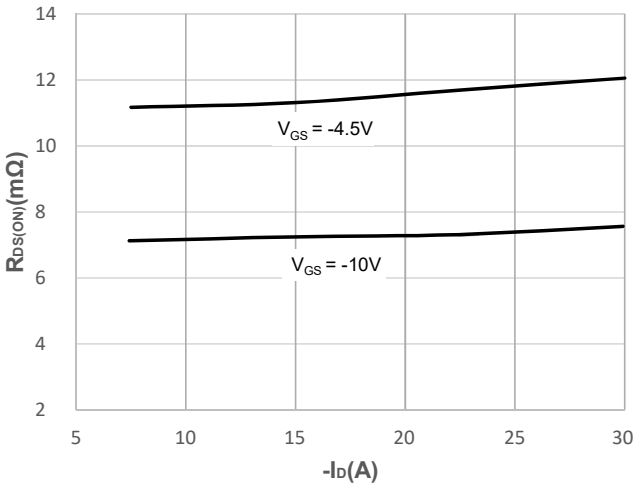


Figure 4: Body Diode Characteristics

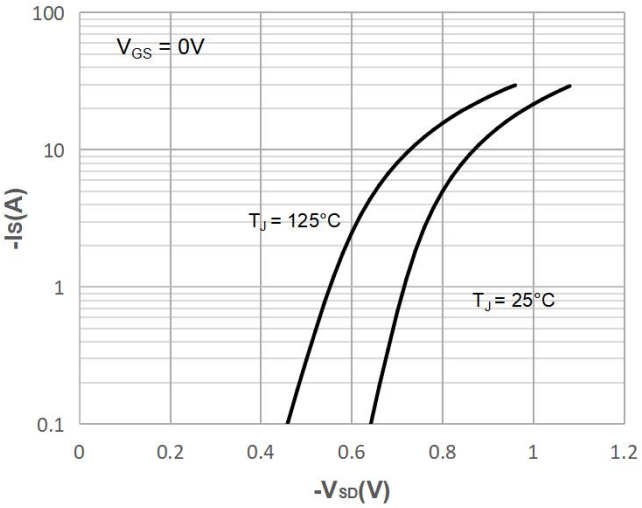


Figure 5: Gate Charge Characteristics

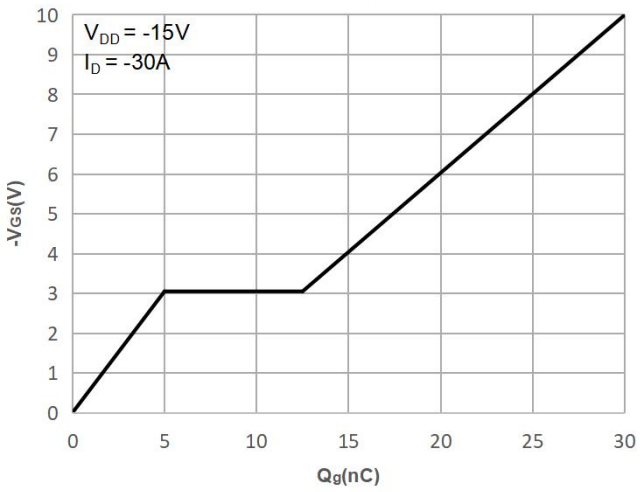
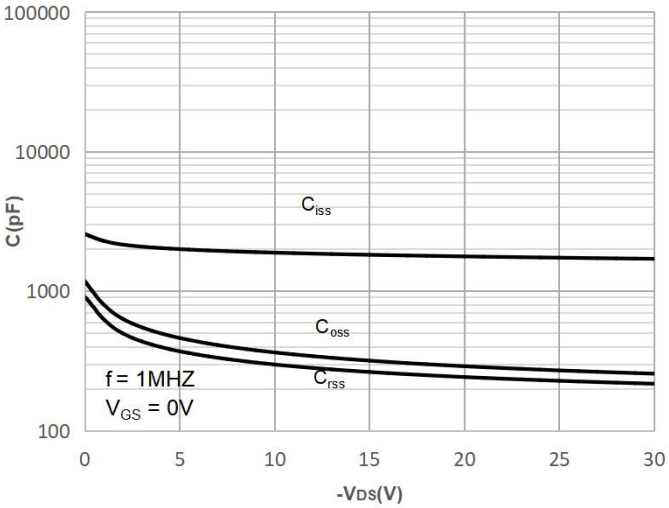


Figure 6: Capacitance Characteristics



Typical Performance Characteristics （P）

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

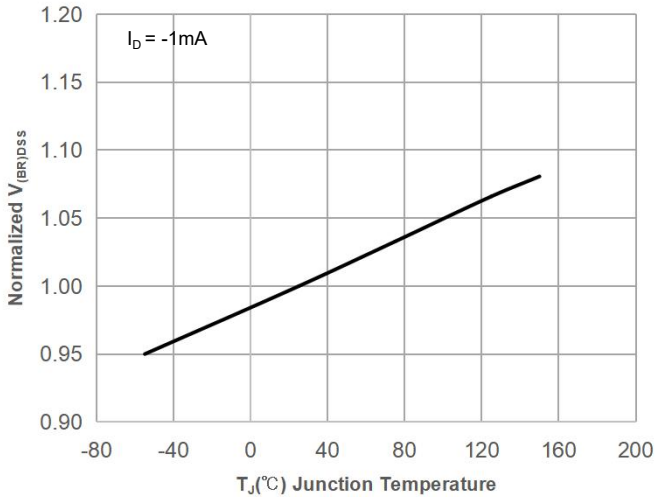


Figure 8: Normalized on Resistance vs. Junction Temperature

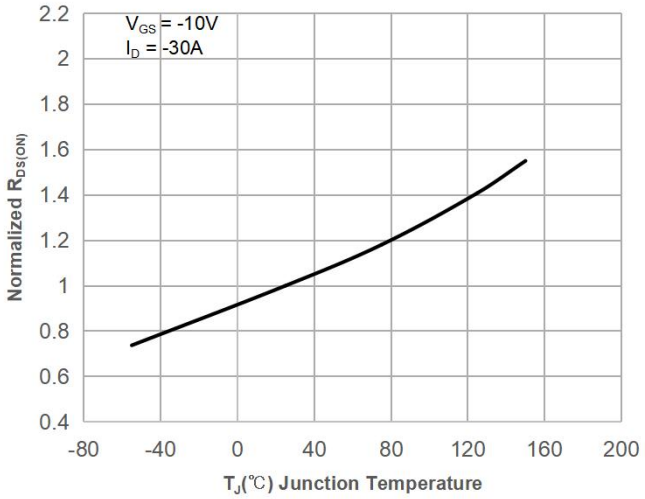


Figure 9: Maximum Safe Operating Area

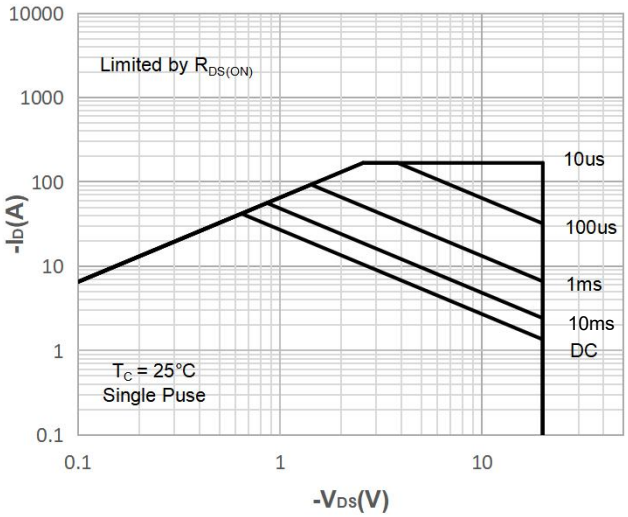


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

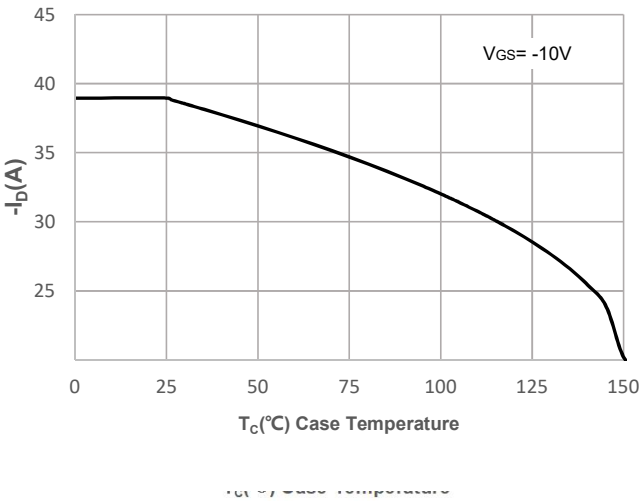


Figure 11: Normalized Maximum Transient Thermal Impedance

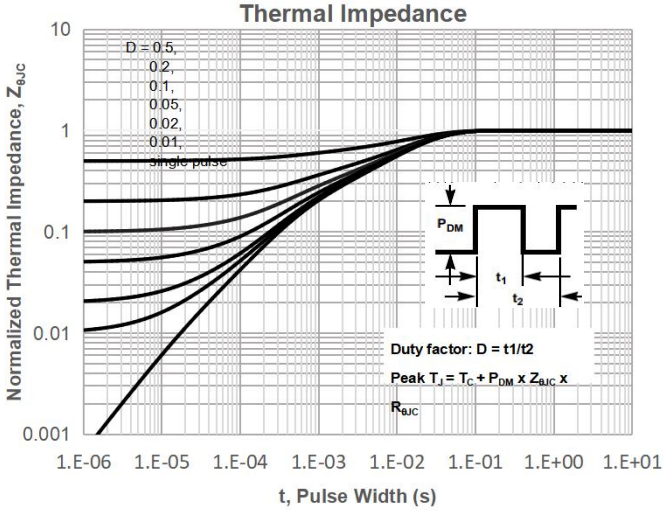
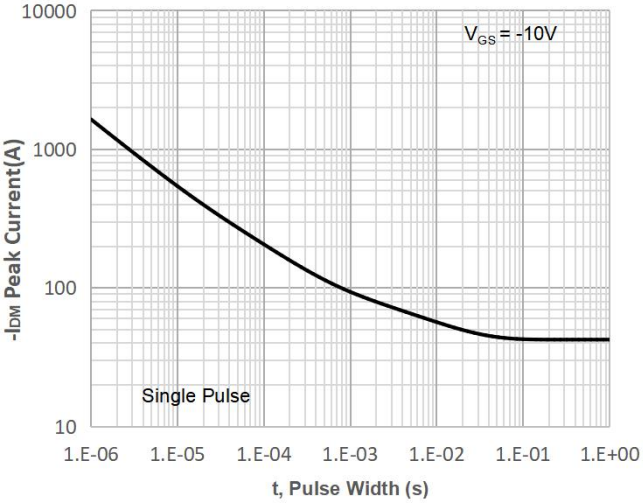


Figure 12: Peak Current Capacity



Test Circuit

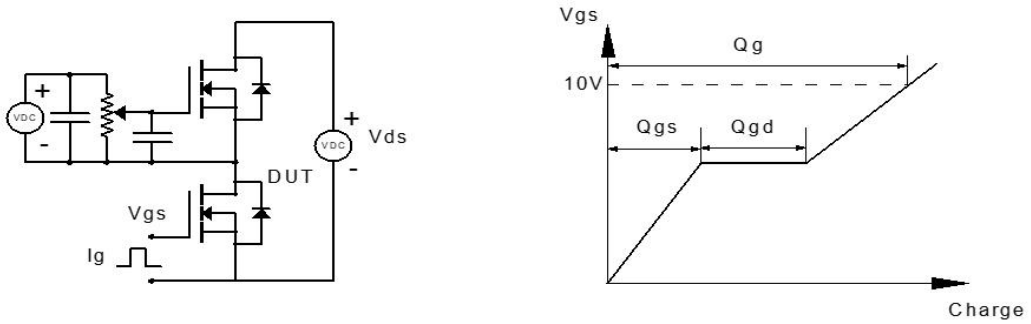


Figure 1: Gate Charge Test Circuit & Waveform

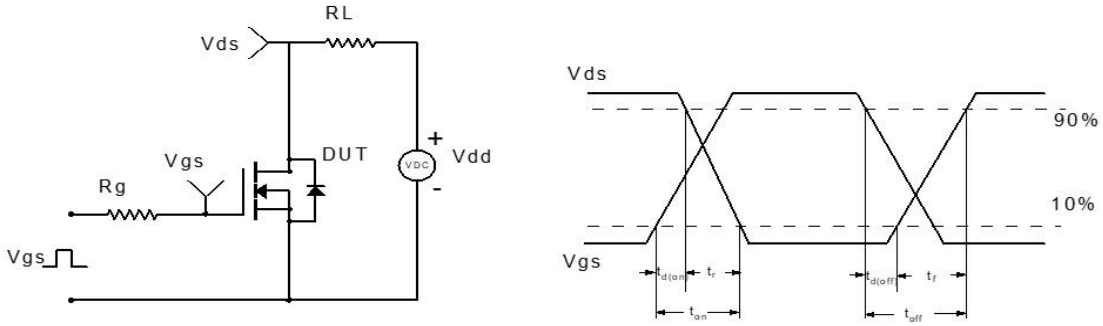


Figure 2: Resistive Switching Test Circuit & Waveform

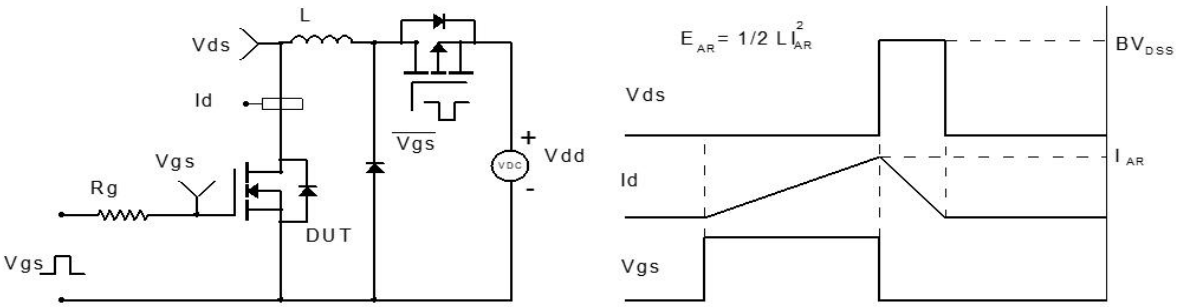


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

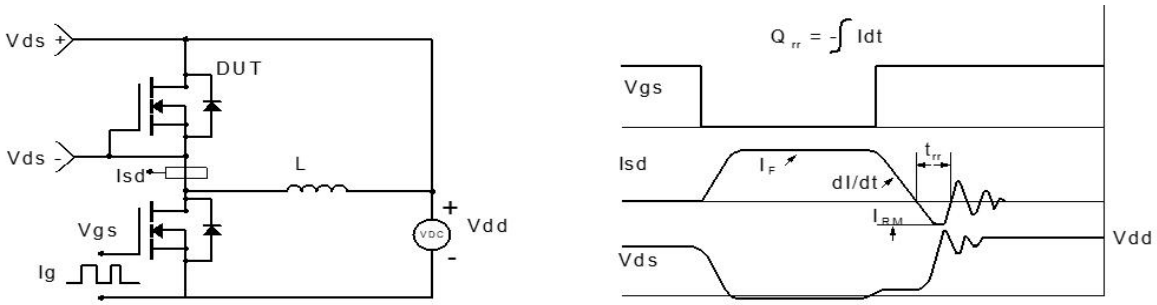
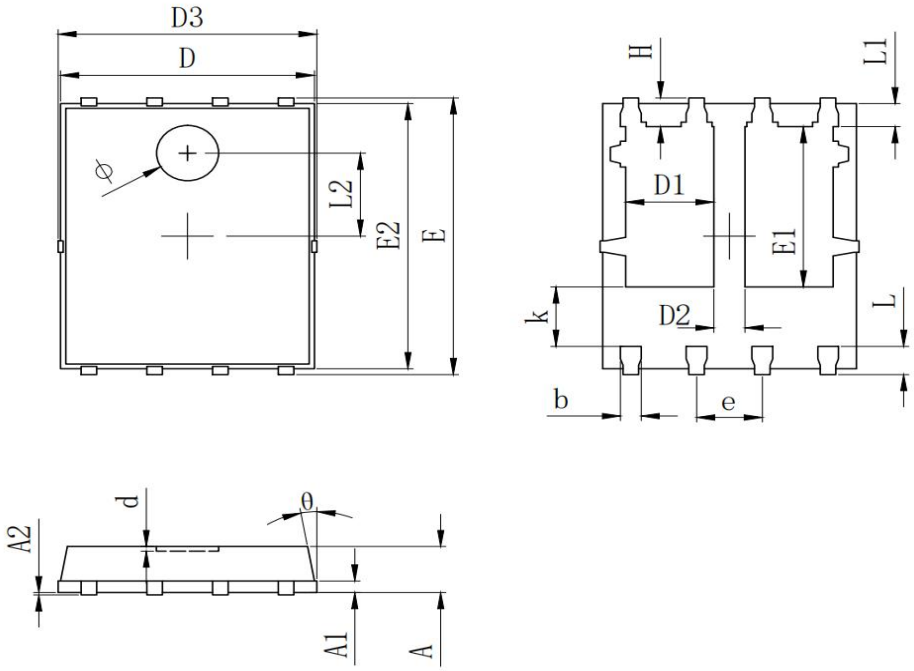


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(PDFN5x6-8L-D)



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.900	1.000	1.100
A1	0.254 REF.		
A2	0~0.05		
D	4.824	4.900	4.976
D1	1.605	1.705	1.805
D2	0.500	0.600	0.700
D3	4.924	5.000	5.076
E	5.924	6.000	6.076
E1	3.375	3.475	3.575
E2	5.674	5.750	5.826
b	0.350	0.400	0.450
e	1.270 TYP.		
L	0.534	0.610	0.686
L1	0.424	0.500	0.576
L2	1.800 REF.		
k	1.190	1.290	1.390
H	0.549	0.625	0.701
θ	8°	10°	12°
Φ	1.100	1.200	1.300
d			0.100