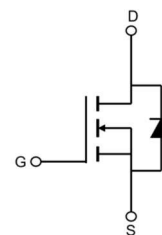


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N-Channel Power MOSFET

Features

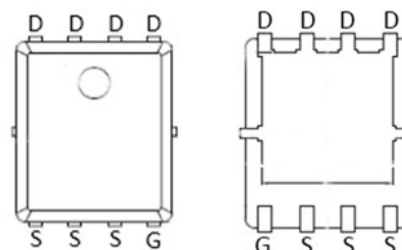
- 40V,65A
 $R_{DS(ON)} < 5.9m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 10m\Omega @ V_{GS} = 4.5V$
- Lead free and Green Device Available
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired



Schematic Diagram

Application

- Load Switch
- PWM Application
- Power management



PDFN5X6-8L

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Max.	Units
V_{DSS}	Drain-Source Voltage	40	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	65
		$T_C = 100^\circ\text{C}$	41
I_{DM}	Pulsed Drain Current ^{note1}	260	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}	145	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	48
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.6	$^\circ\text{C/W}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$

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Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=40V, V_{GS}=0V,$	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=10V, I_D=30A$	-	5.0	5.9	m Ω
		$V_{GS}=4.5V, I_D=20A$	-	7.5	10	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=20V, V_{GS}=0V,$ $f=1.0\text{MHz}$	-	2448	-	pF
C_{oss}	Output Capacitance		-	396	-	pF
C_{rss}	Reverse Transfer Capacitance		-	200	-	pF
Q_g	Total Gate Charge	$V_{DS}=30V, I_D=20A,$ $V_{GS}=4.5V$	-	56	-	nC
Q_{gs}	Gate-Source Charge		-	5	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	13.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=20V, I_D=20A,$ $R_L=1\Omega, R_{GEN}=3\Omega,$ $V_{GS}=10V$	-	13	-	ns
t_r	Turn-on Rise Time		-	11	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	41	-	ns
t_f	Turn-off Fall Time		-	14	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	65	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	260	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=30A$	-	-	1.2	V

- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
 2. EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=20V$, $R_G=25\Omega$, $L=0.1\text{mH}$
 3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$

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Typical Operating Characteristics

Figure 1: Power Dissipation

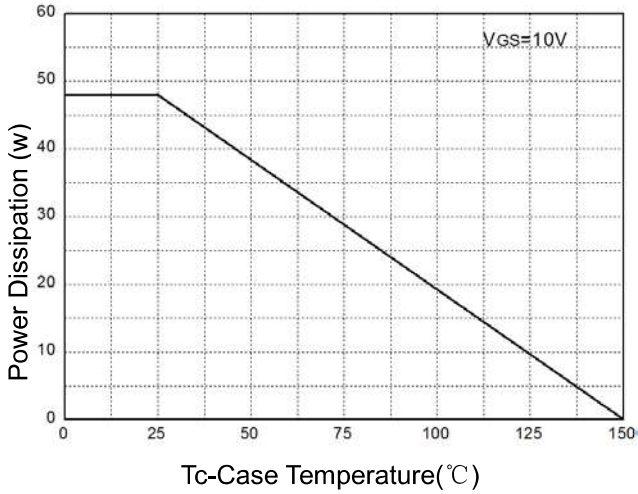


Figure 2: Drain Current

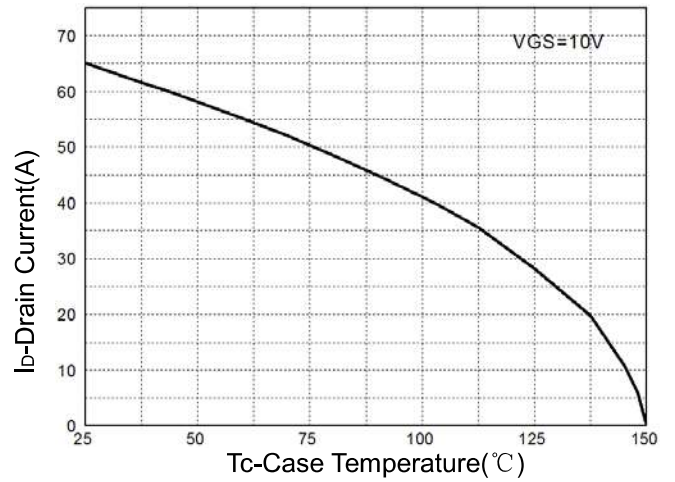


Figure 3: Safe Operation Area

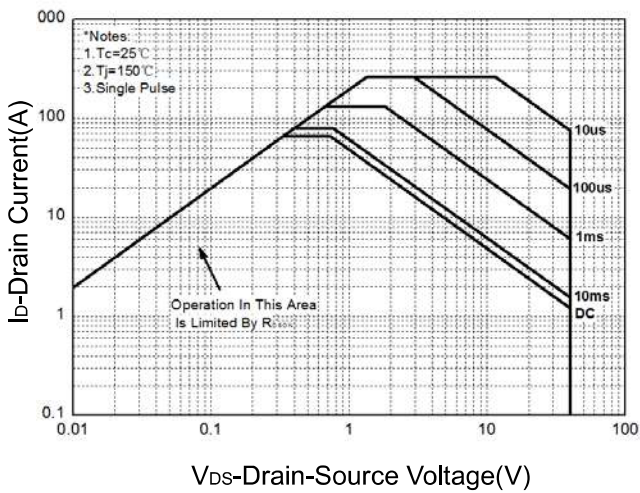


Figure 4: Thermal Transient Impedance

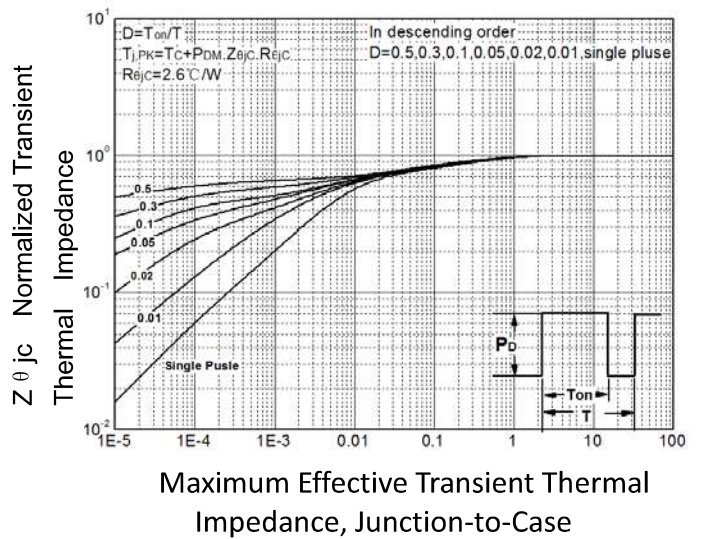


Figure 5: Output Characteristics

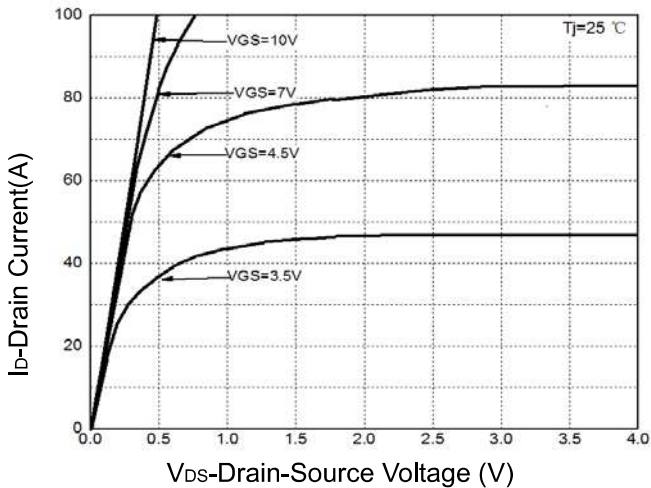
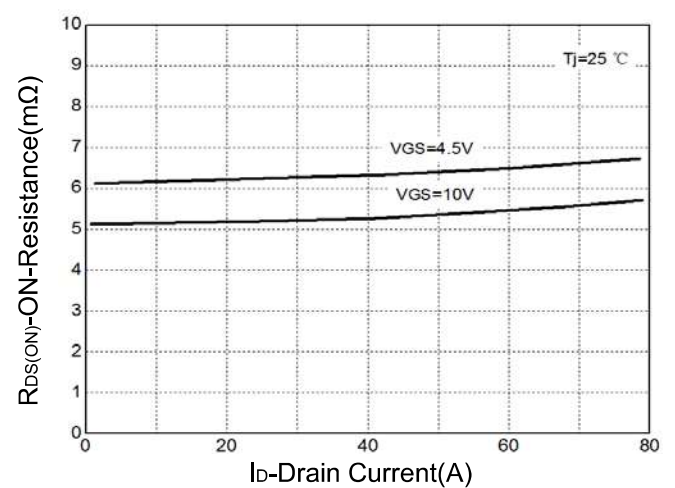


Figure 6: Drain-Source On Resistance



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Figure 7: On-Resistance vs. Temperature

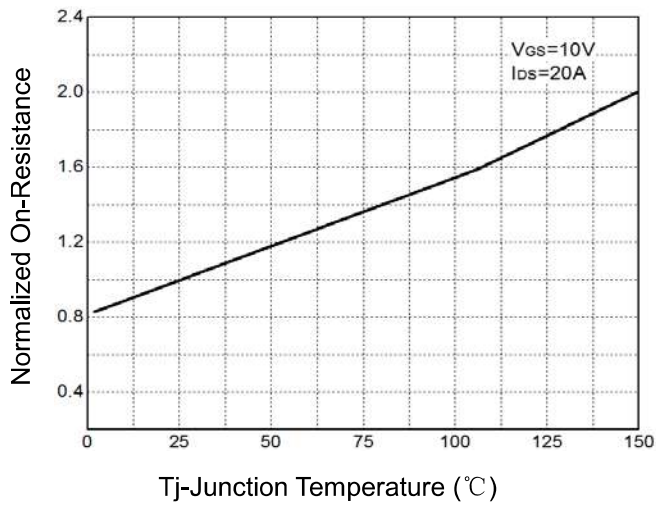


Figure 8: Source-Drain Diode Forward

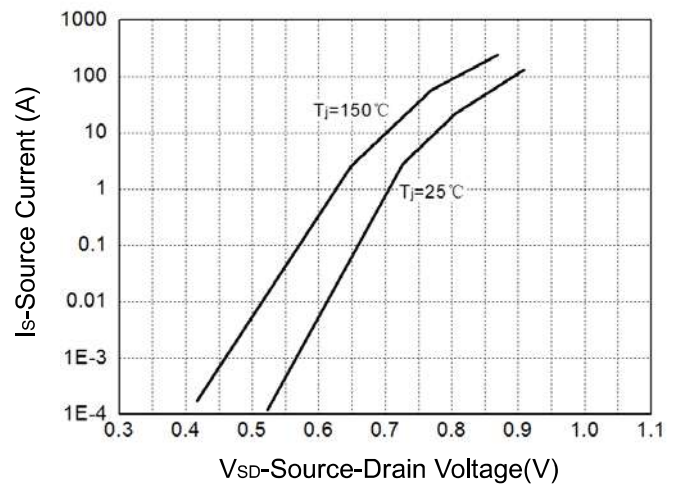


Figure 9: Capacitance Characteristics

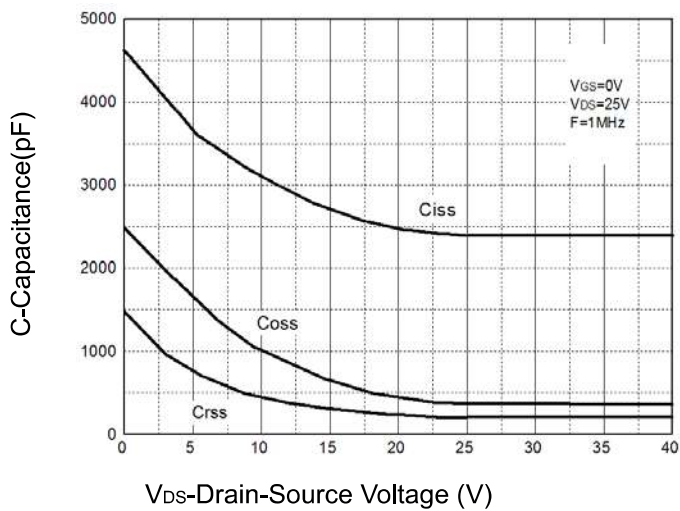
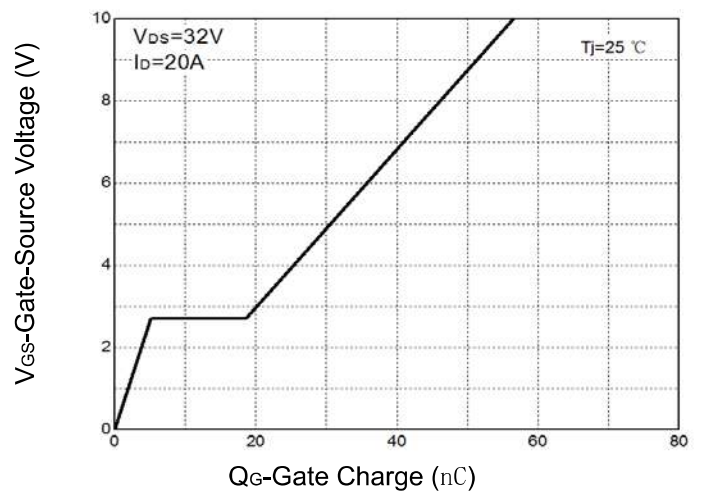


Figure 10: Gate Charge Characteristics



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Test Circuit

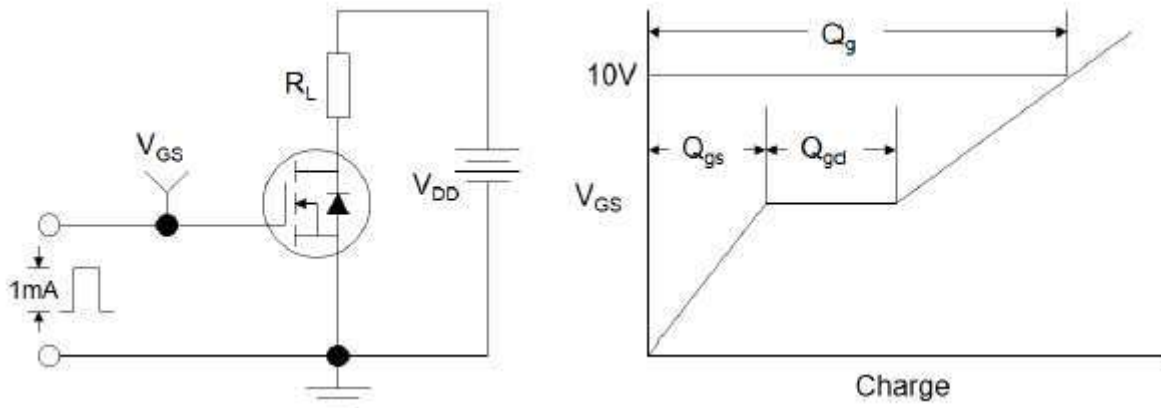


Figure 1: Gate Charge Test Circuit & Waveform

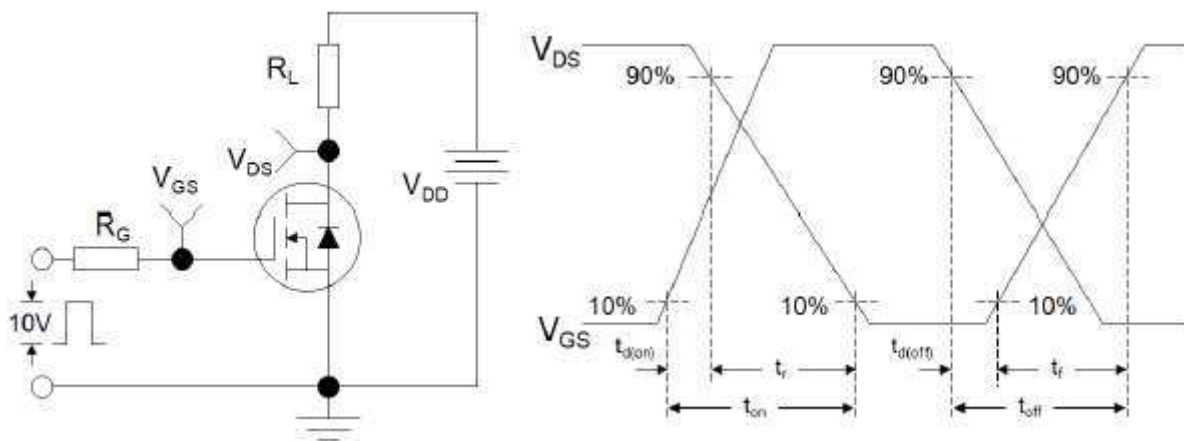


Figure 2: Resistive Switching Test Circuit & Waveforms

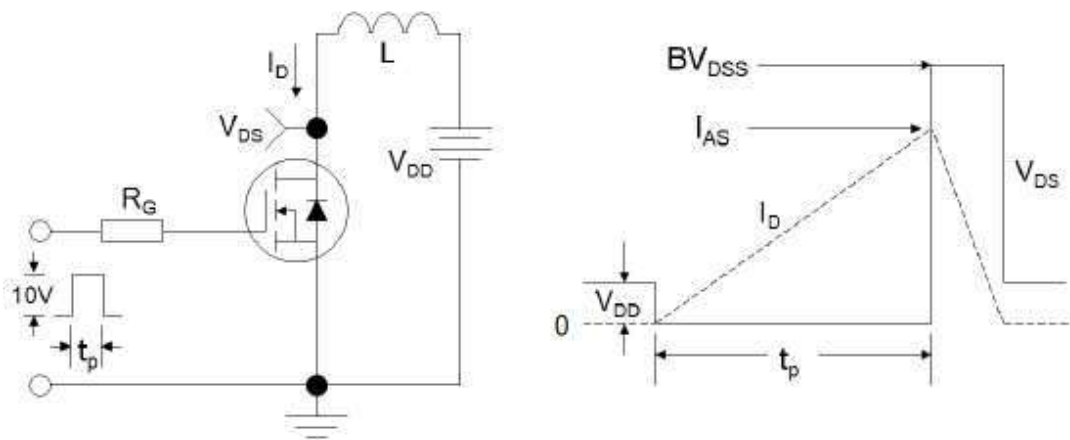
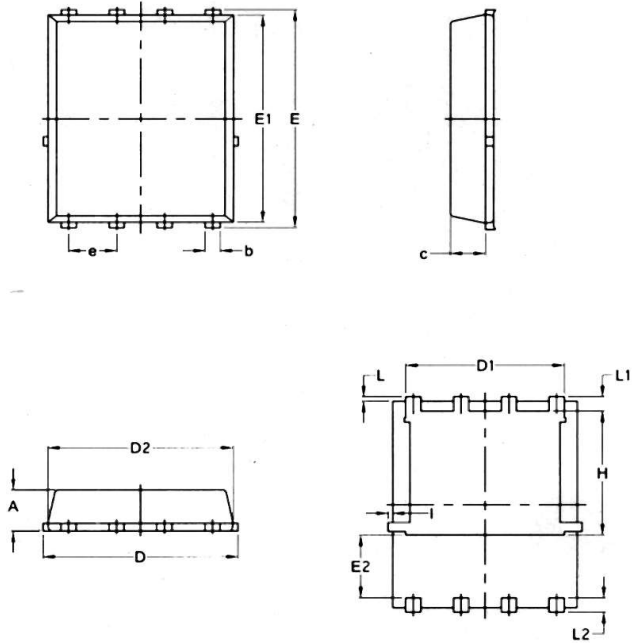


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms

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Package Mechanical Data


PDFN5X6-8L

SYMBOL	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.970	0.0324	0.0382
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	—	0.0630	—
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	—	0.18	—	0.0070

AP85N04G**N-Channel Power MOSFET**

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