

**Features**

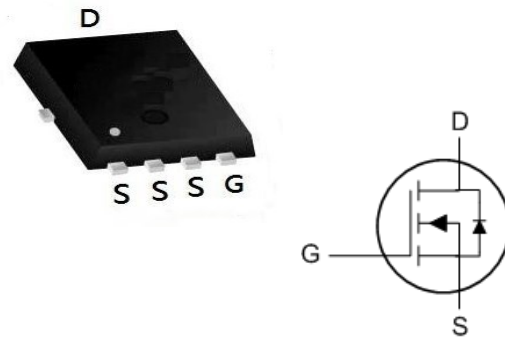
- ★ Split Gate Trench MOS Technology
- ★ 100% EAS Guaranteed
- ★ Fast Switching Speed
- ★ Green Device Available


**Product Summary**

BVDSS	RDSON	ID
40V	1.65mΩ	140A

**Applications**

- ★ High Frequency Switching and Synchronous Rectification.
- ★ DC/DC Converter.

**PDFN5060-8L Pin Configuration**

**■ Absolute Maximum Ratings (T<sub>J</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-source Voltage	V <sub>DS</sub>	40	V
Gate-source Voltage	V <sub>GS</sub>	±20	V
Drain Current <sup>A</sup> T <sub>C</sub> =25°C	I <sub>D</sub>	140	A
Pulsed Drain Current <sup>B</sup>	I <sub>DM</sub>	560	A
Avalanche energy <sup>C</sup>	E <sub>AS</sub>	200	mJ
Total Power Dissipation <sup>D</sup>	P <sub>D</sub>	83	W
Thermal Resistance Junction-to-Case	R <sub>θJC</sub>	1.5	°C/W
Thermal Resistance Junction-to-Ambient <sup>E</sup>	R <sub>θJA</sub>	20	
Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55~+150	°C

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

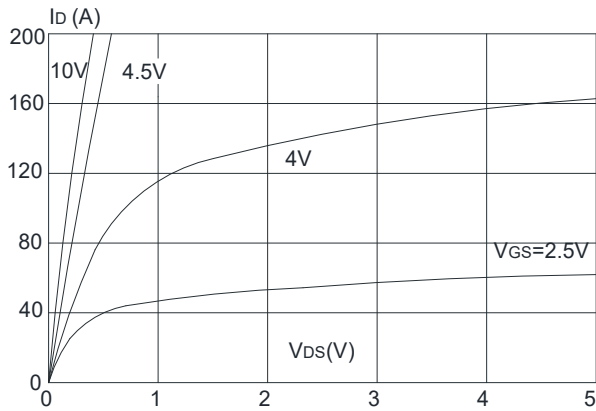
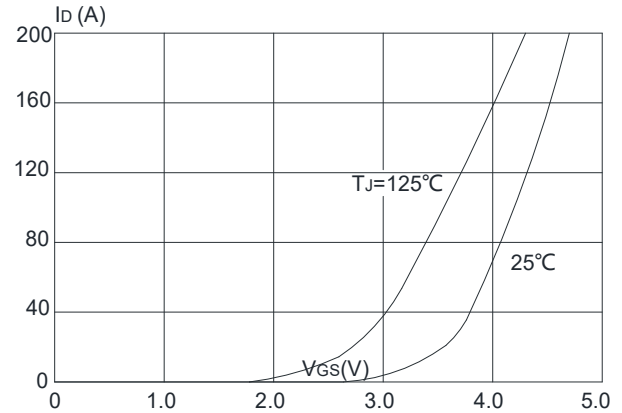
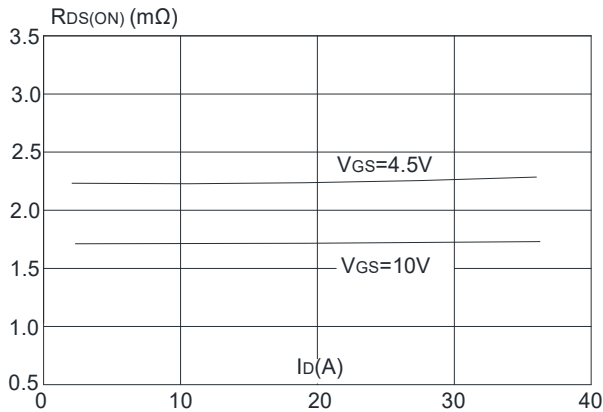
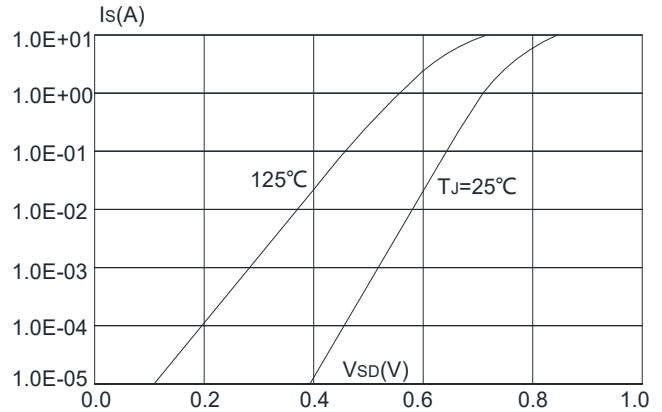
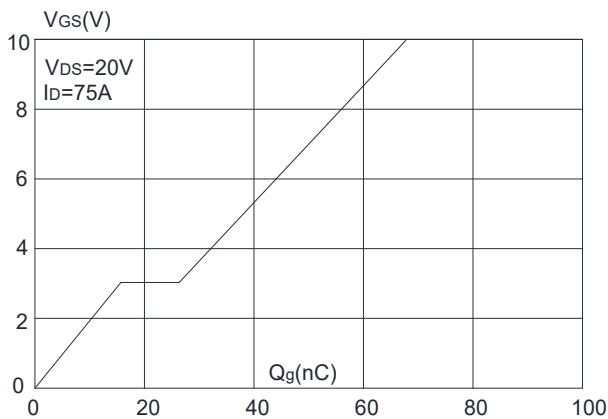
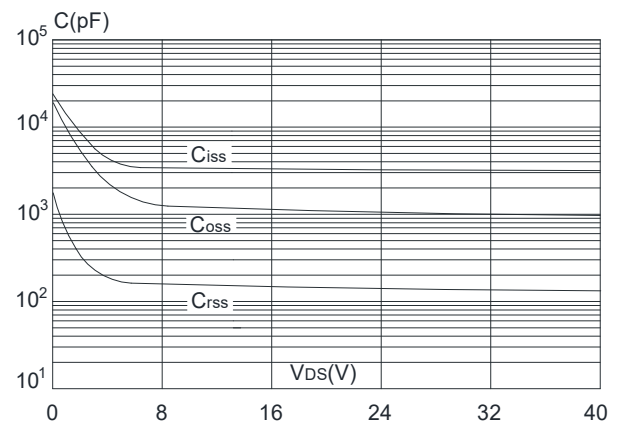
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=40V, V_{GS}=0V,$	-	-	1.0	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}= \pm 20V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	-	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=10V, I_D=20A$	-	1.65	2.3	m $\Omega$
		$V_{GS}=4.5V, I_D=20A$	-	2.45	3.2	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$	-	3830	-	pF
$C_{oss}$	Output Capacitance		-	2794	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	474	-	pF
$Q_g$	Total Gate Charge	$V_{DD}=32V, I_D=10A,$	-	66	-	nC
$Q_{gs}$	Gate-Source Charge		-	13.6	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	12.6	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=20V,$ $R_D=0.5\Omega, R_G=10\Omega$	-	892.8	-	ns
$t_r$	Turn-on Rise Time		-	21.4	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	72.28	-	ns
$t_f$	Turn-off Fall Time		-	34.52	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	140	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	560	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=20A$	-	-	0.78	V
$t_{rr}$	Body Diode Reverse Recovery Time	$T_J=25^\circ\text{C},$ $I_F=I_S, dI/dt=100A/\mu s$	-	31	-	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge		-	110	-	nC

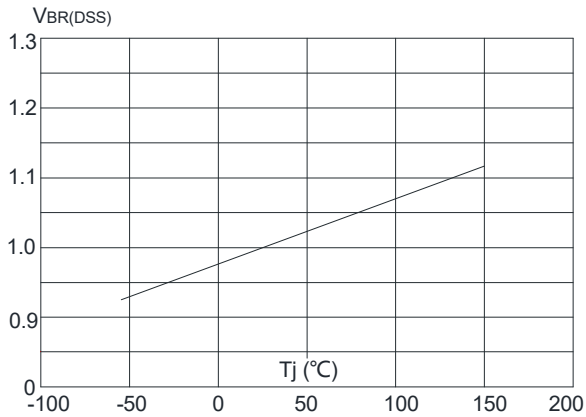
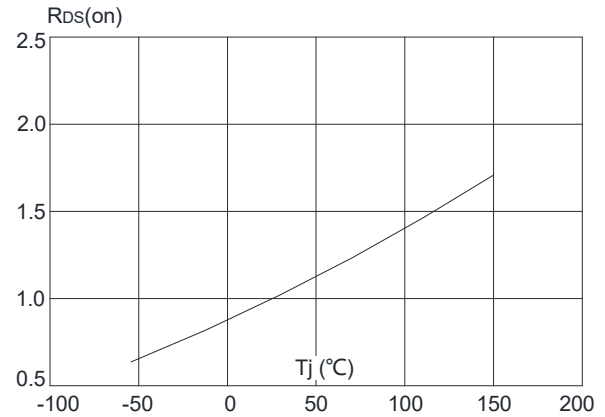
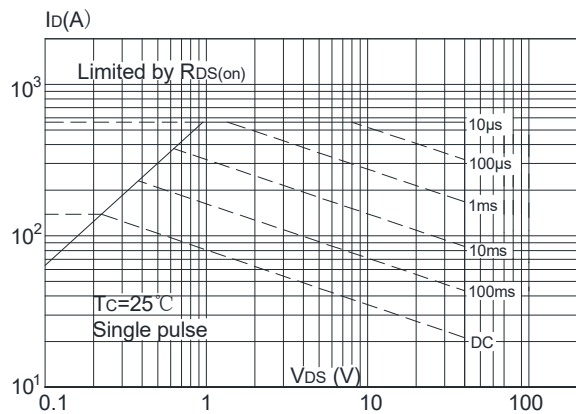
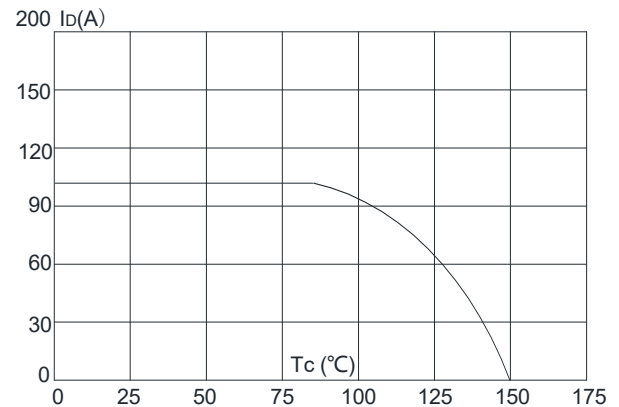
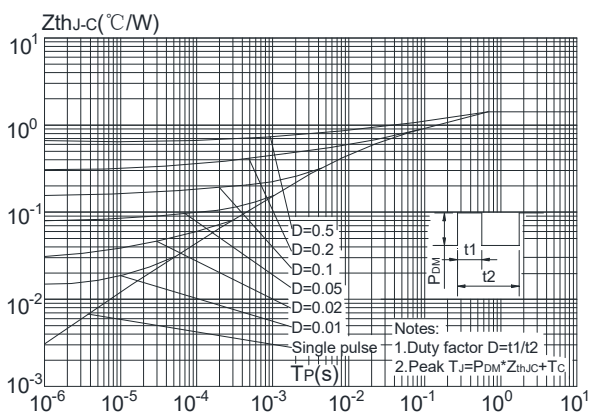
Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition:  $T_J=25^\circ\text{C}, V_D=32V, L=0.5mH$

3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$

## Typical Performance Characteristics

**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**


**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 Drain Current vs. Case Temperature**

**Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case**


### Test Circuit

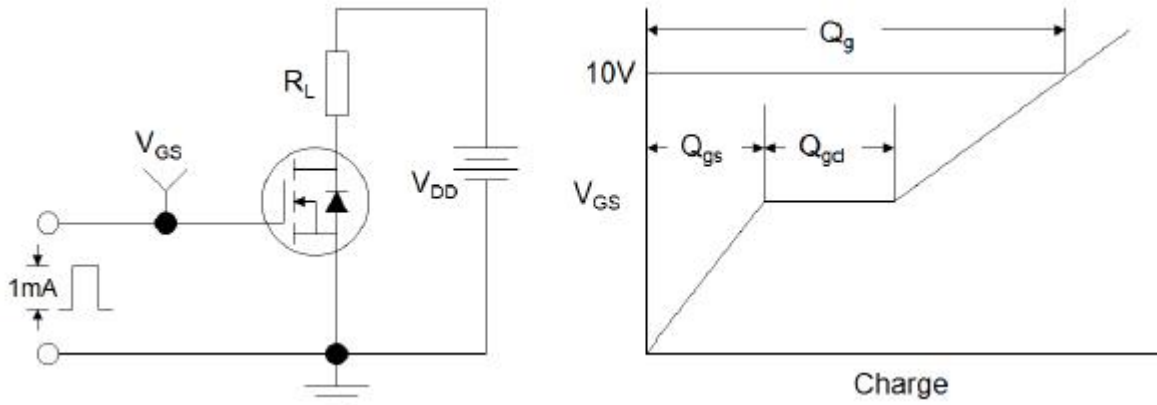


Figure1:Gate Charge Test Circuit & Waveform

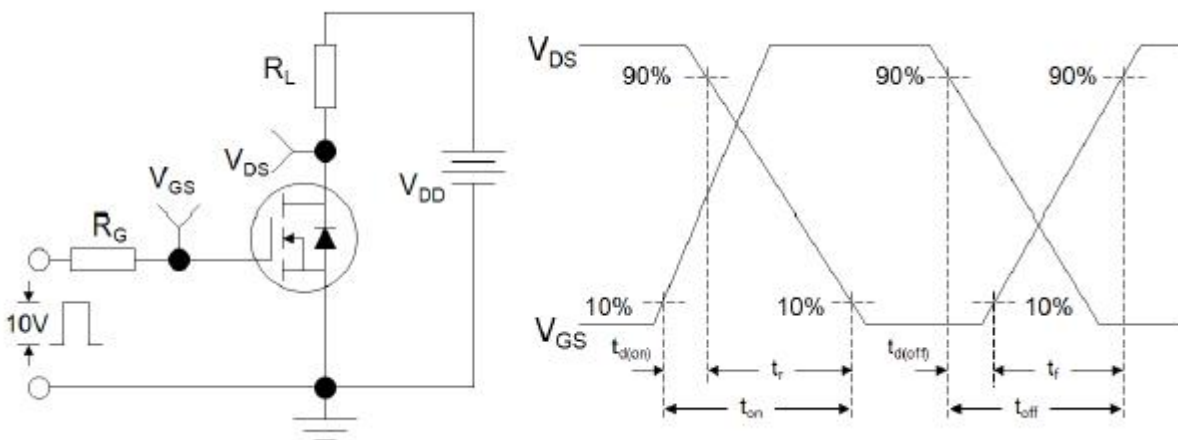


Figure 2: Resistive Switching Test Circuit & Waveforms

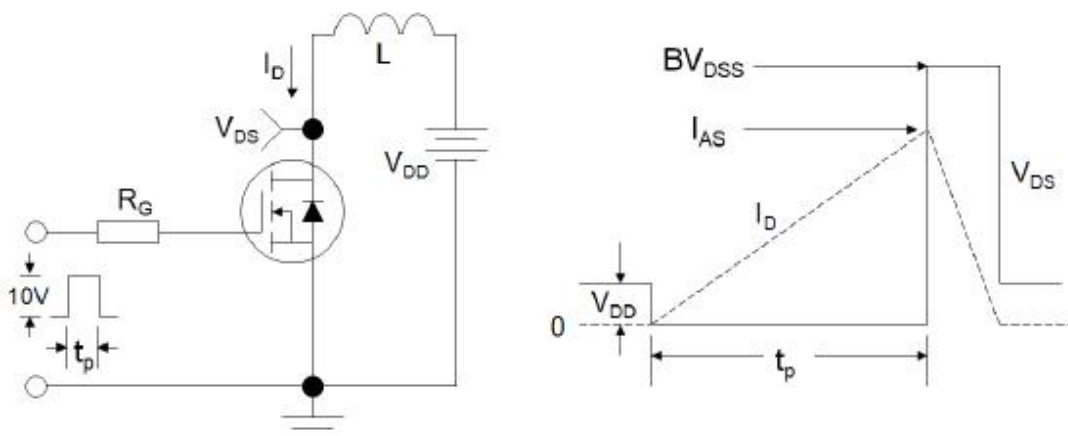
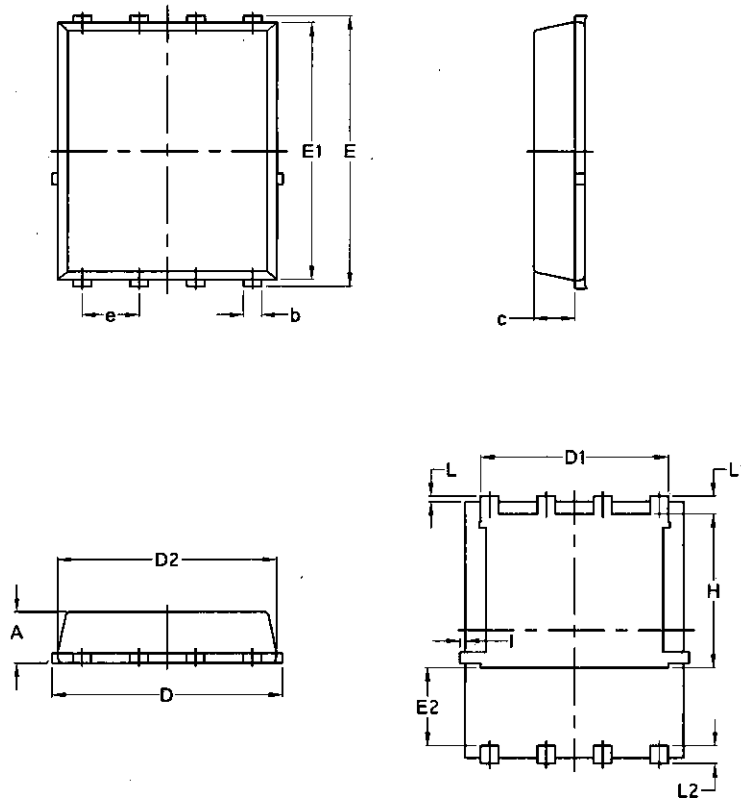


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

**Package Mechanical Data-PDFN5060-8L- Single**


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	0.0970	0.0324	0.082
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