



130A, 40V N-CHANNEL POWER MOSFET

PDFN5060-8L(Prefix :L)

**Description**

This model is an n-channel enhanced MOS power field effect transistor manufactured by silicon epitaxial process. This model has excellent switching characteristics, extremely low on impedance, low gate charge and other characteristics.

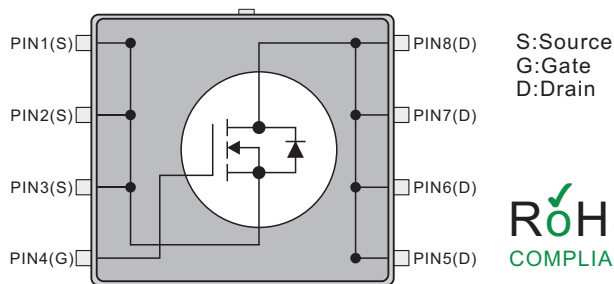
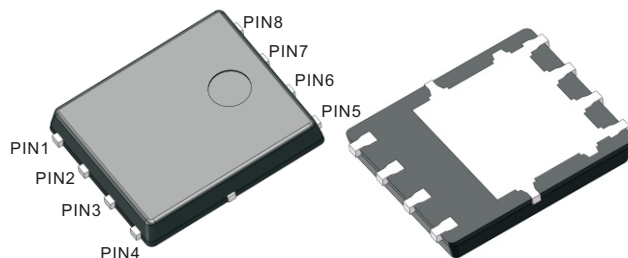
**Features**

- Hireliability application and automotive grade AEC-Q101 qualified
- Moisture sensitivity level 1
- $R_{DS(ON)} < 2.6 \text{ m}\Omega @ V_{GS}=10V, I_D=50A$
- Extremely low on impedance
- Low gate charge
- Superior switching characteristics
- 100% Avalanche tested
- 100%  $\Delta V_{DS}$  tested

**Mechanical data**

- Case: PDFN5060-8L
- Approx. Weight:0.093g ( 0.0032oz)
- Lead free finish, RoHS compliant
- Case Material: "Green" molding compound, UL flammability classification 94V-0, "Halogen-free".

**Packing Marking And Ordering Information**



Device Package	Device	Marking	Packing Type	QTY Per Reel	Inner box	Per Carton
PDFN5060-8L	L2R0NS40S	L2R0NS40S	Reel	5,000 Pcs	10,000 Pcs	50,000 Pcs

**Absolute Maximum Ratings (Ta=25°C, Unless Otherwise Specified)**

Parameter	Symbols	Ratings	Units
Drain-Source Voltage	$V_{DSS}$	40	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current $V_{GS}=10V, T_c=25^\circ C$	$I_D$	130	A
Pulsed Drain Current $T_c=25^\circ C$	$I_{DM}$	520	A
Avalanche energy, single pulse(Note1)	$E_{AS}$	264	mJ
Power dissipation $T_c=25^\circ C$	$P_{tot}$	100	W
Operating junction and storage temperature	$T_j, T_{stg}$	-55 ~ +175	$^\circ C$

**Thermal Characteristics**

Parameter	Symbols	Ratings	Units
Device on PCB cooling area (Note2)	$R_{thJA}$	50	$^\circ C/W$
Thermal resistance, junction - case	Bottom	1.5	$^\circ C/W$
	Top	18	

NOTE:

- 1.L = 0.5mH,  $I_D=32.5A, R_G = 25 \Omega$ , Starting  $T_J = 25^\circ C$
- 2.Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR-4 with 6 cm<sup>2</sup> (one layer, 70  $\mu m$  thick) copper area for drain connection. PCB is vertical in still air.



Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)

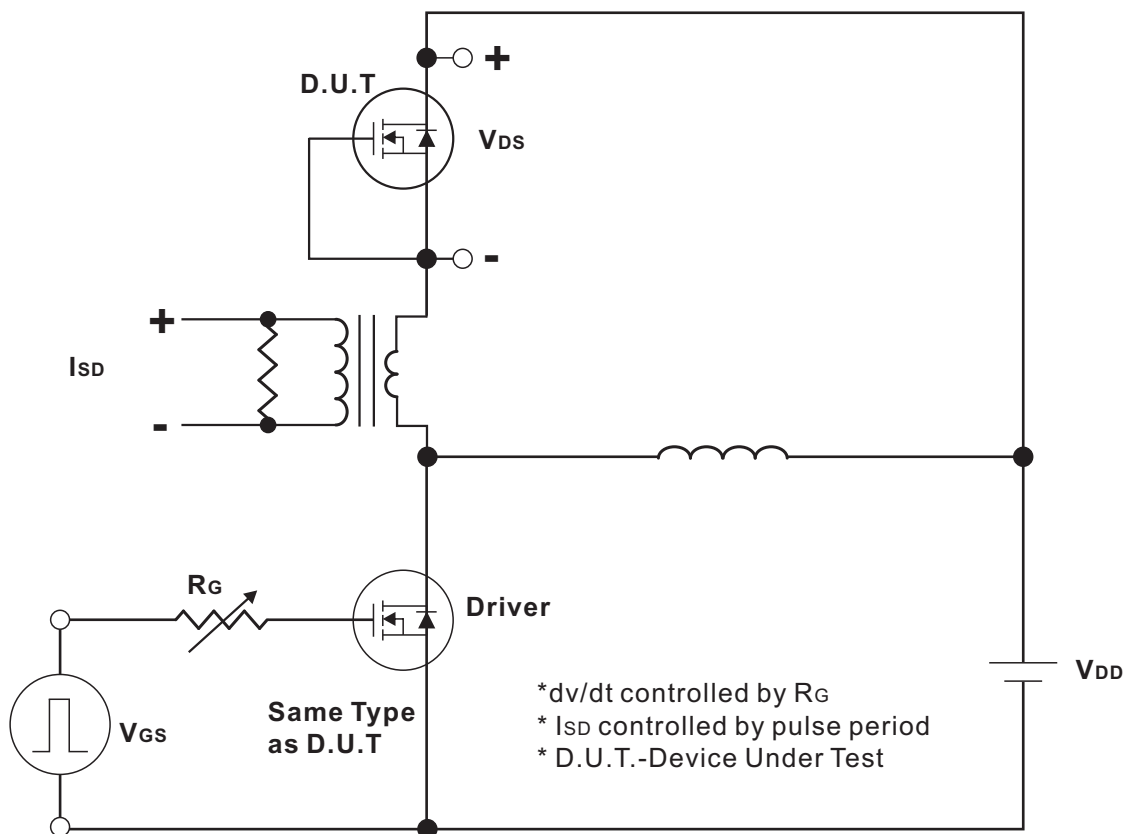
Parameter	Symbols	Test Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	40			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$		0.1	1.0	$\mu A$
Gate- Source Leakage Current	$I_{GSS}$	$V_{GS}=20V, V_{DS}=0V$		10	100	nA
<b>On Characteristics</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.4		2.4	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=50A$		2.9	4.0	m $\Omega$
		$V_{GS}=10V, I_D=50A$		2.0	2.6	
Transconductance	$g_{fs}$	$V_{DS}=15V, I_D=50A$		116		S
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=25V,$		3033		pF
Output Capacitance	$C_{OSS}$	$V_{GS}=0V,$		753		pF
Reverse Transfer Capacitance	$C_{RSS}$	$f=1.0MHz$		21		pF
<b>Switching Characteristics</b>						
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=4.5V, V_{GS}=10V,$ $I_D=50A(NOTE1,2)$		23		nC
Gate-Source Charge	$Q_{GS}$			9.8		nC
Gate-Drain Charge	$Q_{GD}$			6.7		nC
Gate charge at threshold	$Q_{g(th)}$			5.0		nC
Gate plateau voltage	$Q_{plateau}$			3.1		V
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=32V, V_{GS}=4.5V,$ $R_G=1.0\Omega, I_D=50A$ (NOTE1,2)		12		ns
Turn-On Rise Time	$t_R$			8.3		ns
Turn-Off Delay Time	$t_{D(OFF)}$			28		ns
Turn-Off Fall Time	$t_F$			9.4		ns
<b>Drain-source Diode Characteristics And Maximum Ratings Description</b>						
Drain-Source Diode Forward Voltage (Note 1)	$V_{SD}$	$I_{SD}=50A, V_{GS}=0V$			1.4	V
Diode continuous forward current	$I_S$	$T_C=25^\circ C$			130	A
Reverse Recovery time	$t_{rr}$	$V_{GS}=0V, I_{SD}=50A$ $di/dt=100A/\mu s$		46		nS
Reverse Recovery Charge	$Q_{rr}$			40		nC

Notes:

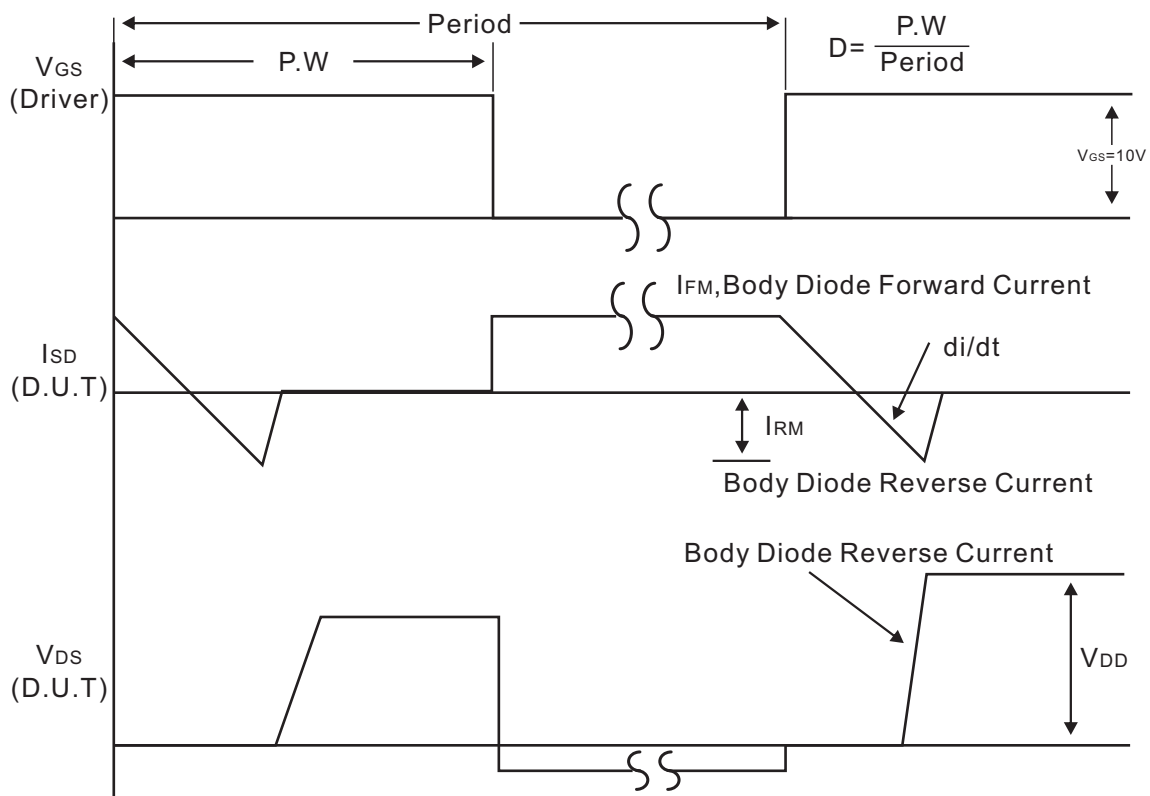
1. Pulse Test: Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .
2. Essentially independent of operating temperature.



Test Circuits and waveforms



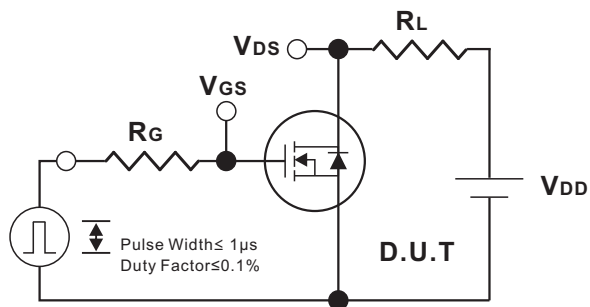
Peak Diode Recovery dv/dt Test Circuit



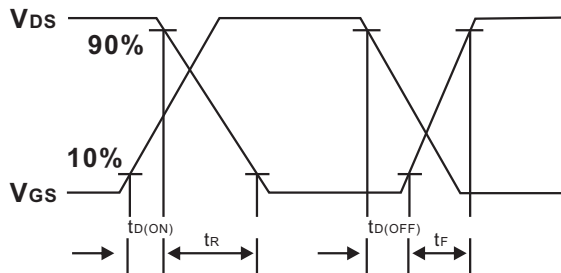
Peak Diode Recovery dv/dt Waveforms



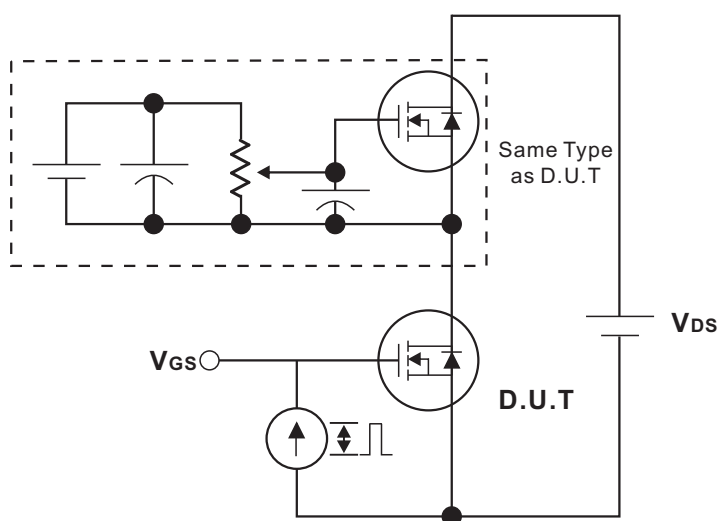
### Test Circuits and waveforms



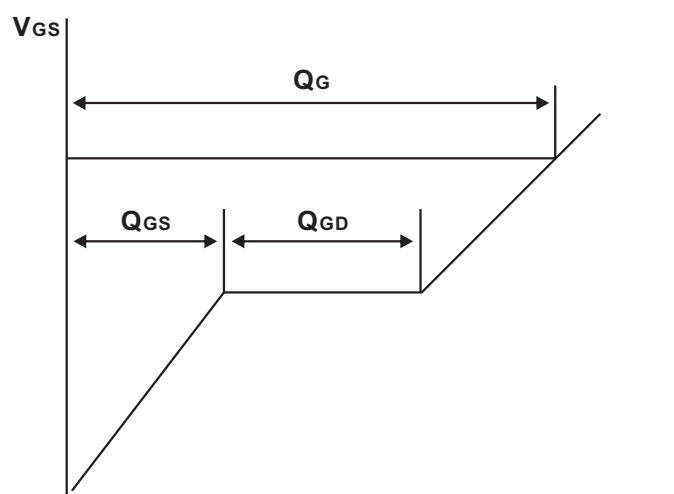
Switching Test Circuit



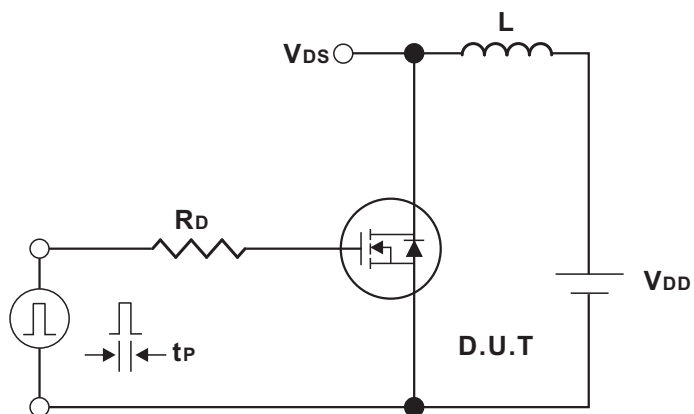
Switching Waveforms



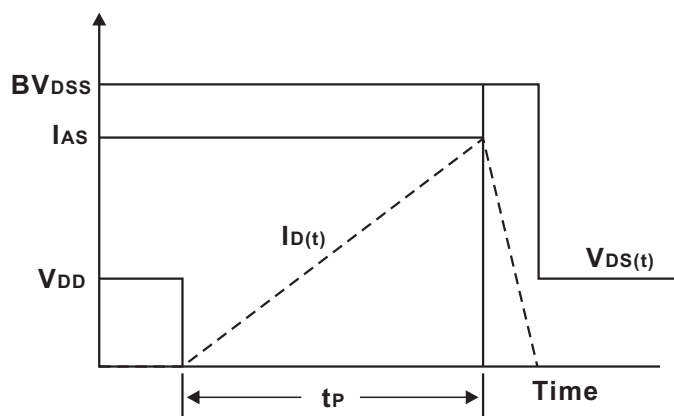
Gate Charge Test Circuit



Charge Gate Charge Waveform



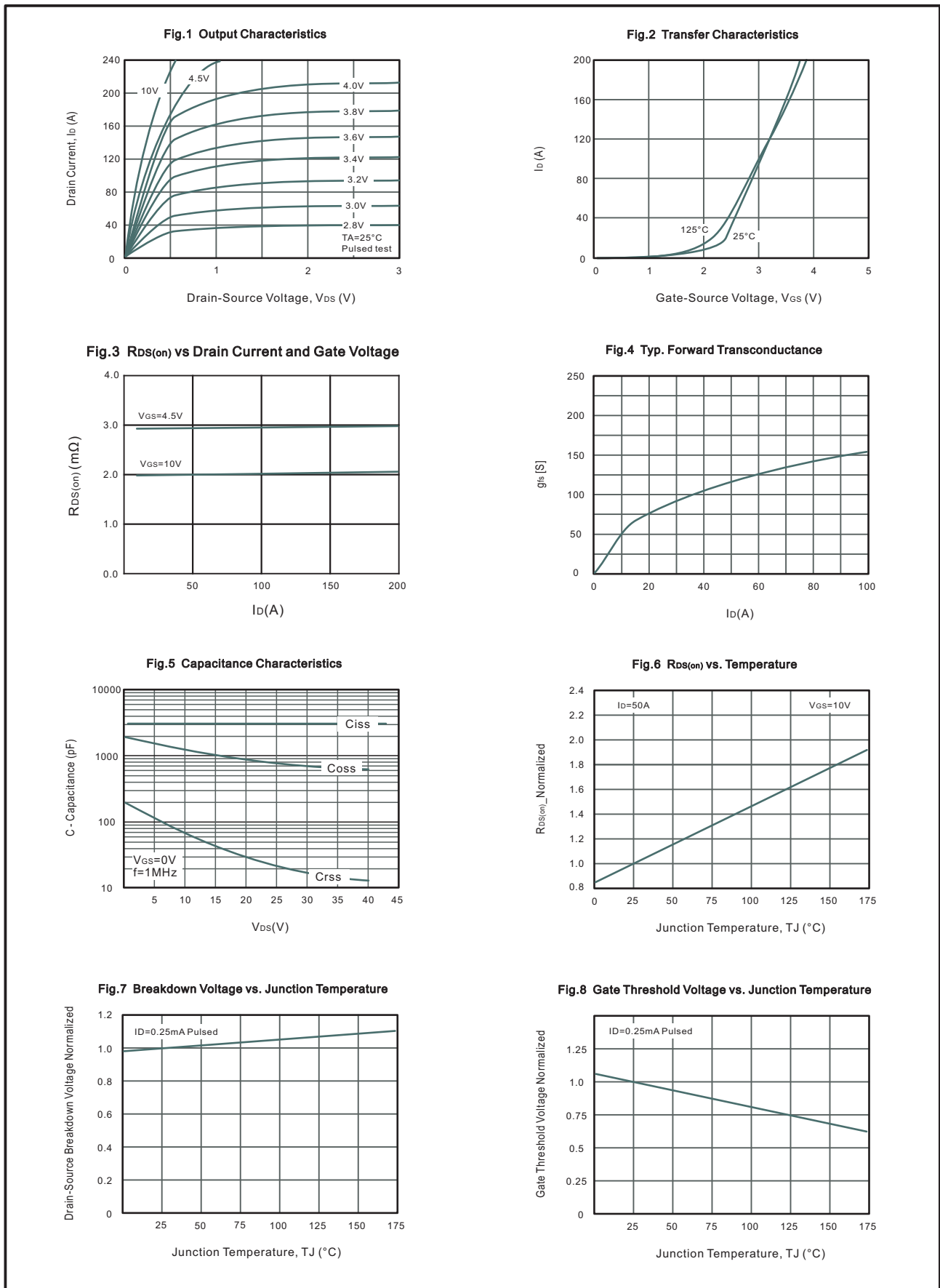
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



### Typical Characteristics





### Typical Characteristics

Fig.9 Power Dissipation

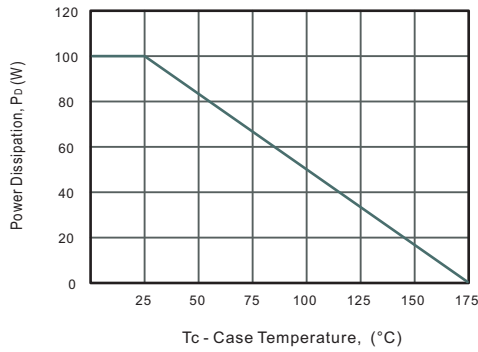


Fig.10 Drain Current Derating

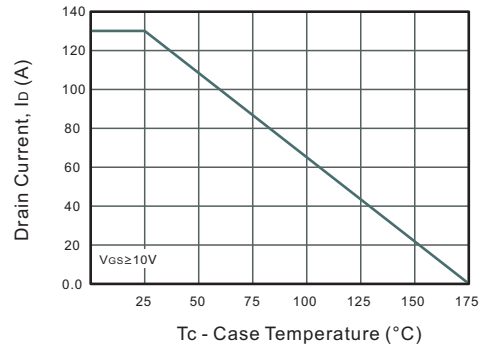


Fig.11 Safe Operating Area

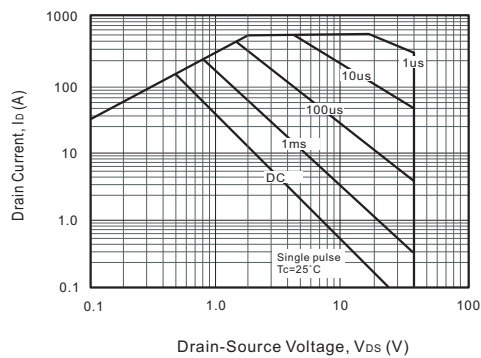


Fig.12 Body-diode Forward Characteristics

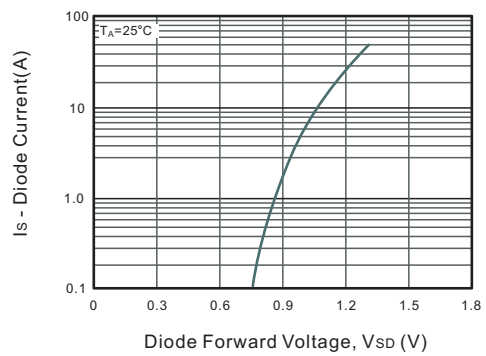


Fig.13 Gate Charge Characteristics

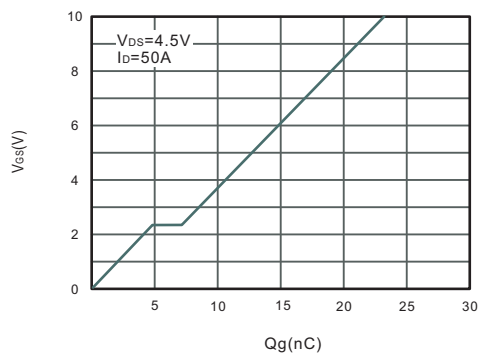
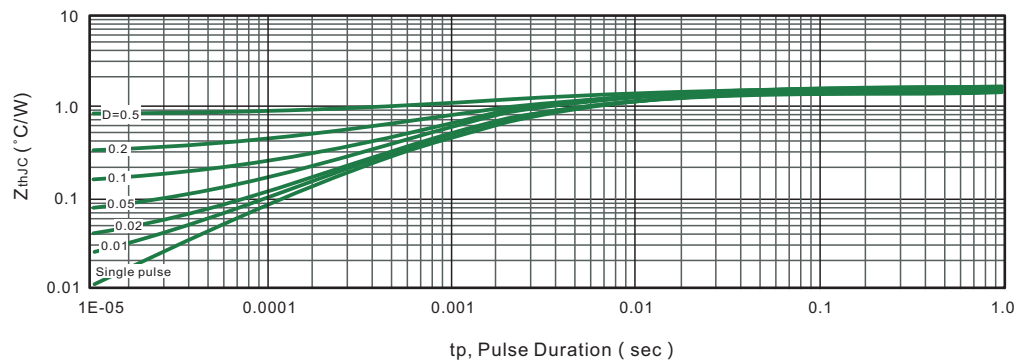


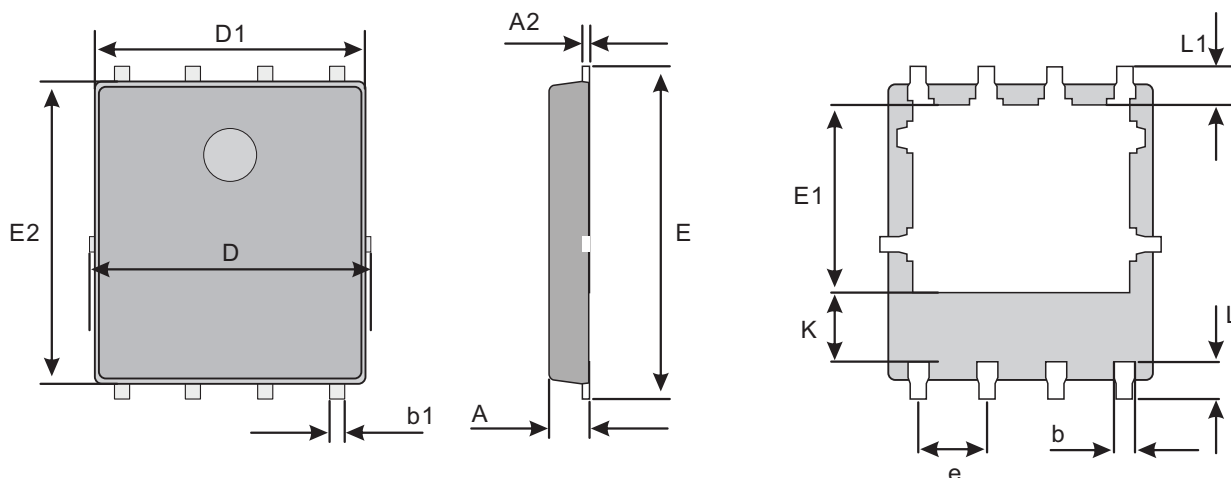
Fig.14 Max. Transient Thermal Impedance





Package Outline  
Plastic surface mounted package;8 leads

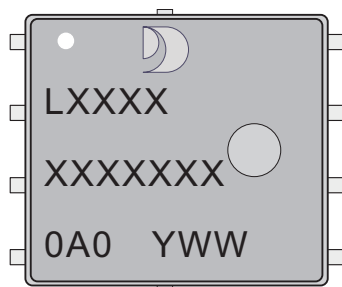
PDFN5060-8L



Mechanical data

UNIT		A	A2	b	b1	D	D1	E	E1	E2	e	K	L	L1
mm	max	1.1	0.304	0.4 ref.	0.4	5.3	5.24	6.35	3.675	6.09	1.27 typ.	1.29 typ.	0.785	0.7 typ.
	typ	1.0	0.254		0.3	5.15	5.04	6.15	3.475	5.89			0.685	
	min	0.9	0.204		0.2	5.0	4.84	5.95	3.275	5.69			0.585	
mil	max	43	12	16 ref.	16	209	206	250	145	240	50 typ.	51 typ.	31	28 typ.
	typ	39	10		12	203	198	242	137	232			27	
	min	35	8		8	197	191	234	129	224			23	

Marking Diagram



- Jingdao Logo
- Unmarkable Surfacea
- Pin1 Mark
- LXXXX XXXXXXXX: Marking code
- 0A0: Traceability code
- YWW: Y: Years(0~9)
- WW: Week



### Important Notice and Disclaimer

Jingdao Microelectronics reserves the right to make changes to this document and its products and specifications at any time without notice. Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.

Jingdao Microelectronics makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, not does Jingdao Microelectronics assume any liability for application assistance or customer product design.

Jingdao Microelectronics does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application.

No license is granted by implication or otherwise under any intellectual property rights of Jingdao Microelectronics.

Jingdao Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of Jingdao Microelectronics.