

## Lonten N-channel 60V, 80A, 6.2mΩ Power MOSFET

### Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

### Features

- ◆ 60V, 80A,  $R_{DS(on).max}=6.2m\Omega@V_{GS}=10V$
- ◆ Improved dv/dt capability
- ◆ Fast switching
- ◆ 100% EAS Guaranteed
- ◆ Green device available

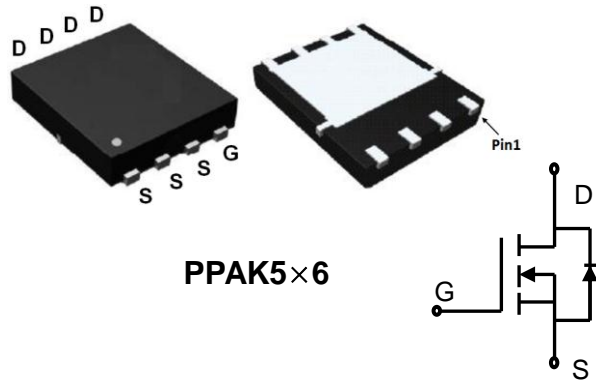
### Applications

- ◆ Motor Drives
- ◆ UPS
- ◆ DC-DC Converter

### Product Summary

$V_{DSS}$	60V
$R_{DS(on).max}@V_{GS}=10V$	6.2mΩ
$I_D$	80A

### Pin Configuration



### Absolute Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	60	V
Continuous drain current ( $T_C = 25^\circ C$ ) <sup>1)</sup>	$I_D$	80	A
Continuous drain current ( $T_C = 100^\circ C$ ) <sup>1)</sup>		58	A
Pulsed drain current <sup>2)</sup>	$I_{DM}$	280	A
Gate-Source voltage	$V_{GSS}$	$\pm 20$	V
Avalanche energy <sup>3)</sup>	$E_{AS}$	259	mJ
Power Dissipation ( $T_C = 25^\circ C$ )	$P_D$	96	W
Storage Temperature Range	$T_{STG}$	-55 to +150	$^\circ C$
Operating Junction Temperature Range	$T_J$	-55 to +150	$^\circ C$

### Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.3	$^\circ C/W$

**Package Marking and Ordering Information**

Device	Device Package	Marking
LNN06R062	PPAK5×6	LNN06R062

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0 V, I <sub>D</sub> =250uA	60	---	---	V
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.0	---	3.0	V
Drain-source leakage current	I <sub>DSS</sub>	V <sub>DS</sub> =60 V, V <sub>GS</sub> =0 V, T <sub>J</sub> = 25°C	---	---	1	μA
		V <sub>DS</sub> =60 V, V <sub>GS</sub> =0 V, T <sub>J</sub> = 125°C	---	---	5	μA
Gate leakage current, Forward	I <sub>GSSF</sub>	V <sub>GS</sub> =20 V, V <sub>DS</sub> =0 V	---	---	100	nA
Gate leakage current, Reverse	I <sub>GSSR</sub>	V <sub>GS</sub> =-20 V, V <sub>DS</sub> =0 V	---	---	-100	nA
Drain-source on-state resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10 V, I <sub>D</sub> =20 A	---	4.9	6.2	mΩ
		V <sub>GS</sub> =4.5 V, I <sub>D</sub> =10 A	---	7.2	10	mΩ
Forward transconductance	g <sub>fs</sub>	V <sub>DS</sub> =5 V , I <sub>D</sub> =50A	---	56	---	S
Dynamic characteristics						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V, F = 1MHz	---	6080	---	pF
Output capacitance	C <sub>oss</sub>		---	393	---	
Reverse transfer capacitance	C <sub>rss</sub>		---	192	---	
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 30V,V <sub>GS</sub> =10V, I <sub>D</sub> = 10A	---	15	---	ns
Rise time	t <sub>r</sub>		---	13	---	
Turn-off delay time	t <sub>d(off)</sub>		---	50	---	
Fall time	t <sub>f</sub>		---	36	---	
Gate resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	2.44	---	Ω
Gate charge characteristics						
Gate to source charge	Q <sub>gs</sub>	V <sub>DS</sub> =30 V, I <sub>D</sub> =40A, V <sub>GS</sub> = 10 V	---	26.6	---	nC
Gate to drain charge	Q <sub>gd</sub>		---	37.9	---	
Gate charge total	Q <sub>g</sub>		---	130	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I <sub>S</sub>		---	---	80	A
Pulsed Source Current <sup>4)</sup>	I <sub>SM</sub>		---	---	280	A
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =40A, T <sub>J</sub> =25°C	---	0.95	1.4	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>S</sub> =40A, di/dt=100A/us, T <sub>J</sub> =25°C	---	50	---	ns
Reverse Recovery Charge	Q <sub>rr</sub>		---	80	---	nC

**Notes:**

- 1: The maximum junction current rating is package limited.
- 2: Repetitive Rating: Pulse width limited by maximum junction temperature.
- 3:  $V_{DD}=50\text{ V}, V_{GS}=10\text{ V}, L=0.1\text{ mH}, I_{AS}=72\text{ A}, R_G=25\Omega$ , Starting  $T_J=25^{\circ}\text{C}$ .
- 4: Pulse Test: Pulse Width  $\leq 300\mu\text{ s}$ , Duty Cycle  $\leq 2\%$ .

## Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

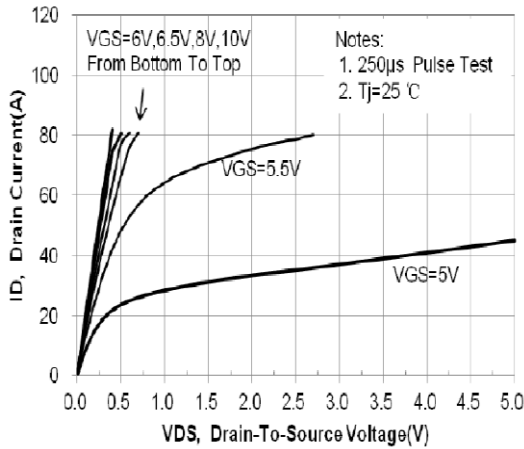


Figure 2. Transfer Characteristics

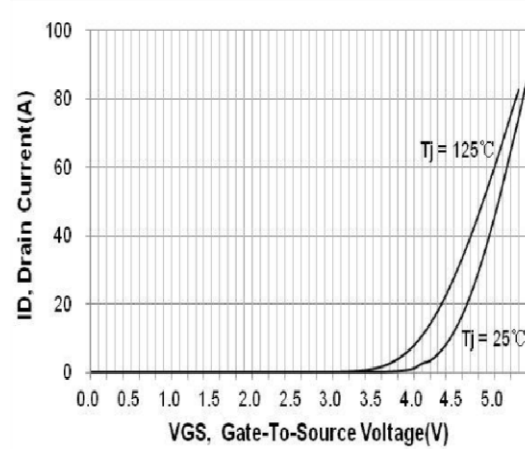


Figure 3. Capacitance Characteristics

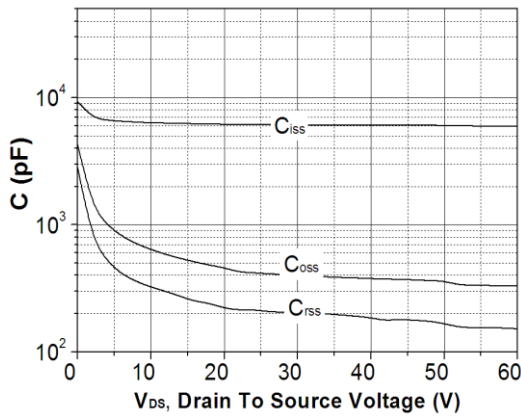


Figure 4. Gate Charge Waveform

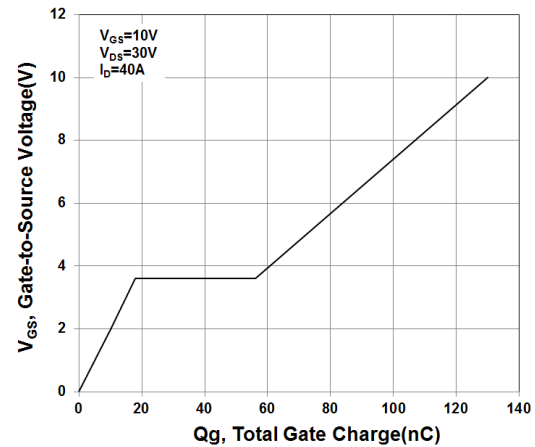


Figure 5. Body-Diode Characteristics

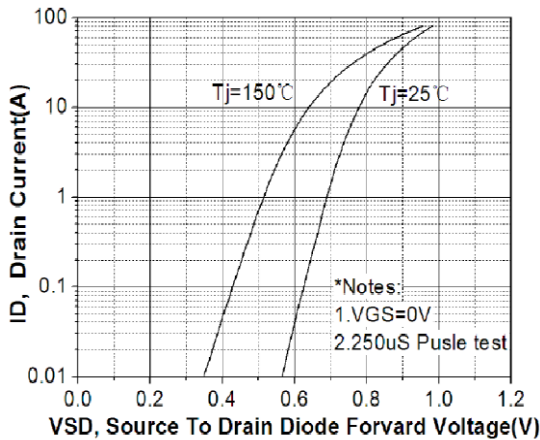
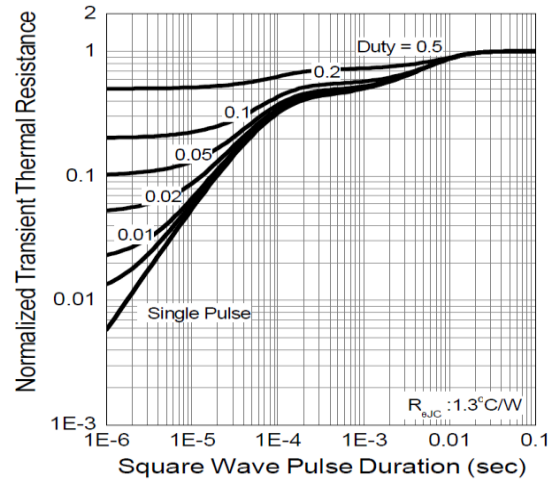


Figure 6. Thermal Transient Impedance



## Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

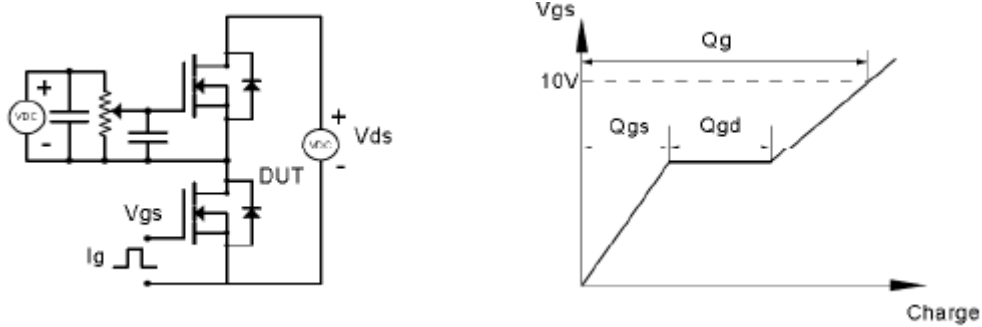


Figure 9. Resistive Switching Test Circuit & Waveforms

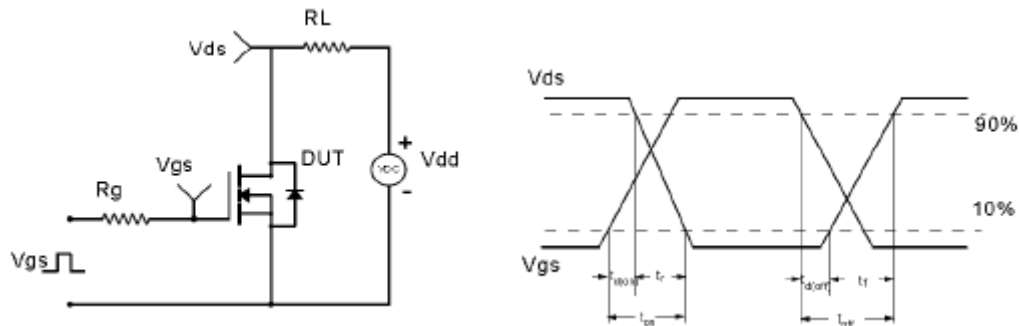


Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

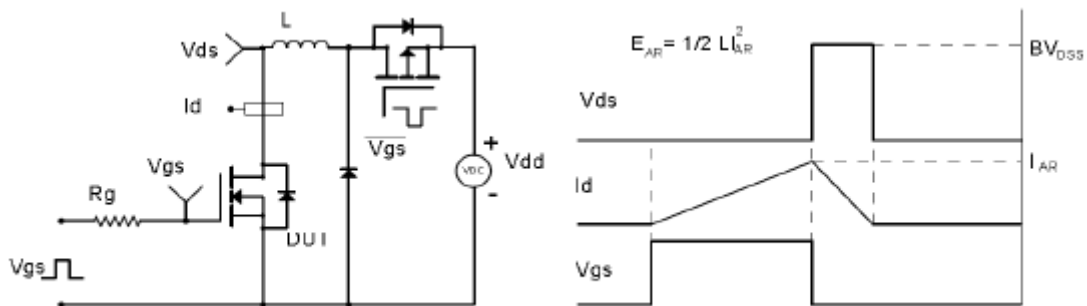
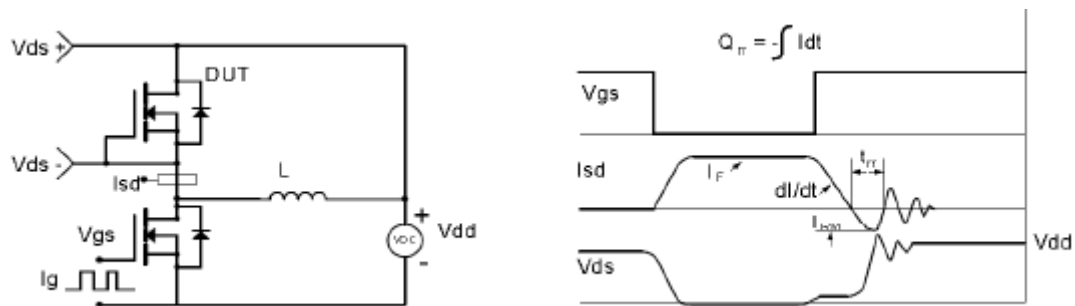
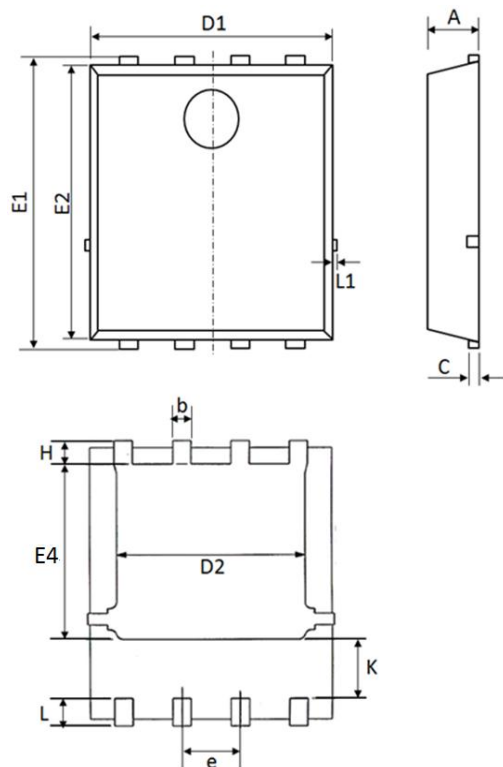


Figure 11. Diode Recovery Circuit & Waveform

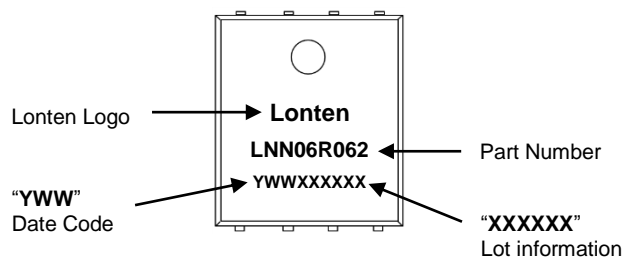


## Mechanical Dimensions for PPAK5×6



COMMON DIMENSIONS						
SYMBOL	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1	1.1	1.2	0.039	0.043	0.047
b	0.3	0.4	0.5	0.012	0.016	0.020
C	0.154	0.254	0.354	0.006	0.010	0.014
D1	5	5.2	5.4	0.197	0.205	0.213
D2	3.8	4.1	4.25	0.150	0.161	0.167
E1	5.95	6.15	6.35	0.234	0.242	0.250
E2	5.66	5.86	6.06	0.223	0.231	0.239
E4	3.52	3.72	3.92	0.139	0.146	0.154
e	1.27 BSC			0.050 BSC		
H	0.4	0.5	0.6	0.016	0.020	0.024
L	0.5	0.6	0.7	0.020	0.024	0.028
L1	-	-	0.12	-	-	0.005
K	1.14	1.29	1.44	0.045	0.051	0.057

## PPAK5x6 Part Marking Information



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