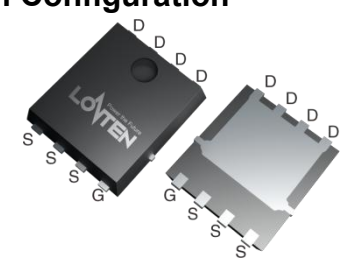
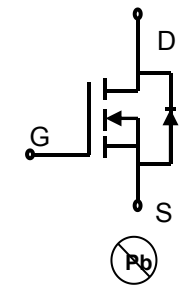


## Lonten N-channel 40V, 80A, 5.0mΩ Power MOSFET

<p><b>Description</b></p> <p>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.</p> <p><b>Features</b></p> <ul style="list-style-type: none"> <li>◆ 40V,80A,<math>R_{DS(ON),max}=5.0m\Omega@V_{GS}=10V</math></li> <li>◆ Improved dv/dt capability</li> <li>◆ Fast switching</li> <li>◆ 100% EAS Guaranteed</li> <li>◆ Green device available</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>◆ Motor Drives</li> <li>◆ UPS</li> <li>◆ DC-DC Converter</li> </ul>	<p><b>Product Summary</b></p> <table style="width: 100%; border: none;"> <tr> <td style="padding: 2px;"><math>V_{DSS}</math></td> <td style="padding: 2px;">40V</td> </tr> <tr> <td style="padding: 2px;"><math>R_{DS(on),max}@V_{GS}=10V</math></td> <td style="padding: 2px;">5.0mΩ</td> </tr> <tr> <td style="padding: 2px;"><math>I_D</math></td> <td style="padding: 2px;">80A</td> </tr> </table> <p><b>Pin Configuration</b></p> <div style="text-align: center;">  <p><b>DFN5×6</b></p> </div> <div style="text-align: right;">  <p style="text-align: center;">N-Channel MOSFET</p> </div>	$V_{DSS}$	40V	$R_{DS(on),max}@V_{GS}=10V$	5.0mΩ	$I_D$	80A
$V_{DSS}$	40V						
$R_{DS(on),max}@V_{GS}=10V$	5.0mΩ						
$I_D$	80A						

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	40	V
Continuous drain current ( $T_C = 25^\circ C$ )	$I_D$	80	A
Continuous drain current ( $T_C = 100^\circ C$ )		51	A
Pulsed drain current <sup>1)</sup>	$I_{DM}$	320	A
Gate-Source voltage	$V_{GSS}$	$\pm 20$	V
Avalanche energy <sup>2)</sup>	$E_{AS}$	156	mJ
Power Dissipation ( $T_C = 25^\circ C$ )	$P_D$	54	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	$R_{\theta JC}$	2.3	$^\circ C/W$

**Package Marking and Ordering Information**

Device	Device Package	Marking
LNN04R050	DFN5×6	LNN04R050

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static characteristics</b>						
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS}=0\text{ V}, I_D=250\mu\text{A}$	40	---	---	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0	---	2.0	V
Drain-source leakage current	$I_{DSS}$	$V_{DS}=40\text{ V}, V_{GS}=0\text{ V}, T_J = 25^\circ\text{C}$	---	---	1	$\mu\text{A}$
		$V_{DS}=32\text{ V}, V_{GS}=0\text{ V}, T_J = 125^\circ\text{C}$	---	---	30	$\mu\text{A}$
Gate leakage current, Forward	$I_{GSSF}$	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	---	---	100	nA
Gate leakage current, Reverse	$I_{GSSR}$	$V_{GS}=-20\text{ V}, V_{DS}=0\text{ V}$	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=20\text{ A}$	---	3.8	5	m $\Omega$
		$V_{GS}=4.5\text{ V}, I_D=10\text{ A}$	---	4.7	6.2	m $\Omega$
Forward transconductance	$g_{fs}$	$V_{DS}=5\text{ V}, I_D=30\text{ A}$	---	79	---	S
<b>Dynamic characteristics</b>						
Input capacitance	$C_{iss}$	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V},$ $F = 1\text{MHz}$	---	4023.6	---	pF
Output capacitance	$C_{oss}$		---	410.4	---	
Reverse transfer capacitance	$C_{rss}$		---	338.5	---	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30\text{V}, V_{GS}=15\text{V}, I_D = 30\text{ A}$	---	231.6	---	ns
Rise time	$t_r$		---	213.6	---	
Turn-off delay time	$t_{d(off)}$		---	219.2	---	
Fall time	$t_f$		---	74	---	
Gate resistance	$R_g$	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, F=1\text{MHz}$	---	2.4	---	$\Omega$
<b>Gate charge characteristics</b>						
Gate to source charge	$Q_{gs}$	$V_{DS}=30\text{ V}, I_D=30\text{A},$ $V_{GS}=10\text{V}$	---	11	---	nC
Gate to drain charge	$Q_{gd}$		---	16.7	---	
Gate charge total	$Q_g$		---	66.7	---	
<b>Drain-Source diode characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$		---	---	80	A
Pulsed Source Current <sup>3)</sup>	$I_{SM}$		---	---	320	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0\text{V}, I_S=40\text{A}, T_J=25^\circ\text{C}$	---	---	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_S=20\text{A}, di/dt=100\text{A}/\mu\text{s}, T_J=25^\circ\text{C}$	---	41.4	---	ns
Reverse Recovery Charge	$Q_{rr}$		---	29	---	nC

**Notes:**

1: Repetitive Rating: Pulse width limited by maximum junction temperature.

 2:  $V_{DD}=25\text{V}, V_{GS}=10\text{V}, L=0.5\text{mH}, I_{AS}=25\text{A}, R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .

 3: Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

**Electrical Characteristics Diagrams**

Figure 1. Typ. Output Characteristics

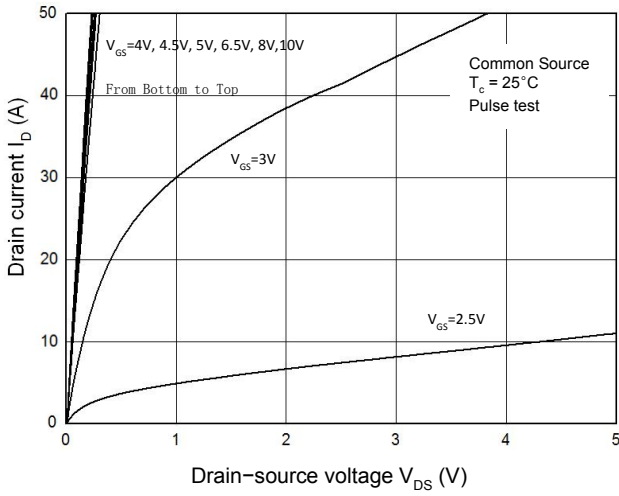


Figure 2. Transfer Characteristics

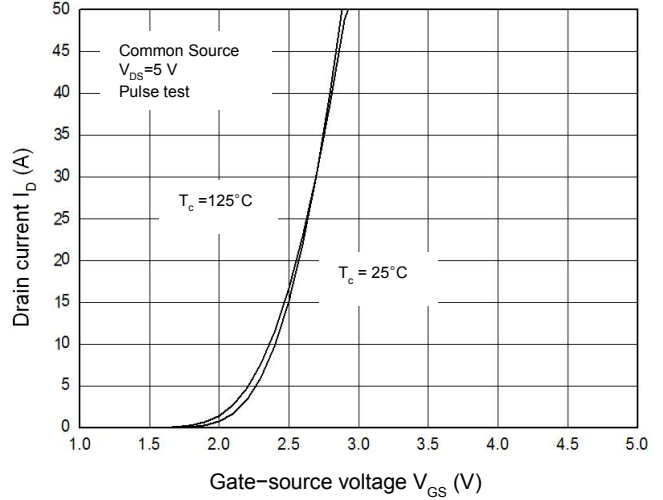


Figure 3. Capacitance Characteristics

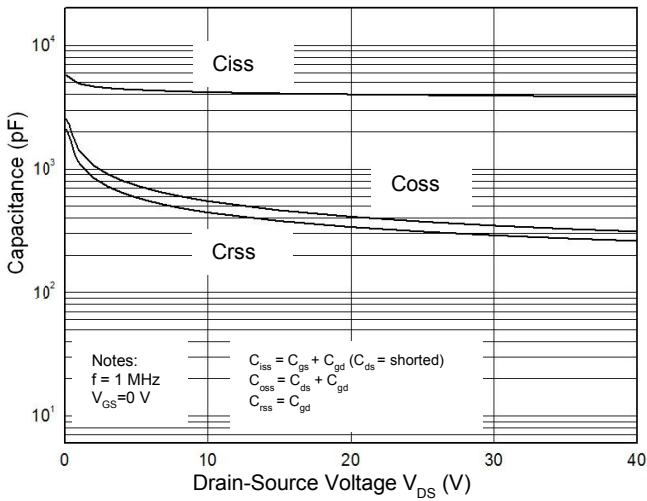


Figure 4. Gate Charge Waveform

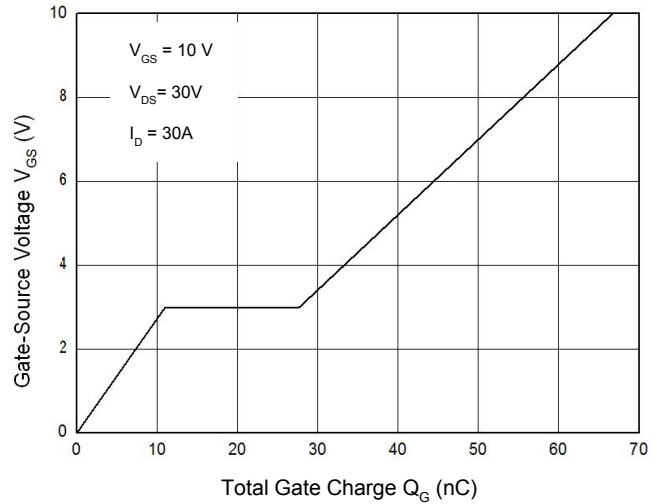


Figure 5. Body-Diode Characteristics

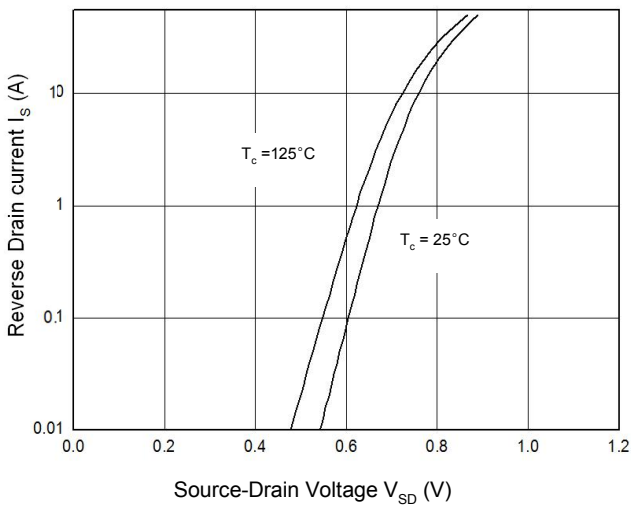


Figure 6. Rds(on)-Drain Current

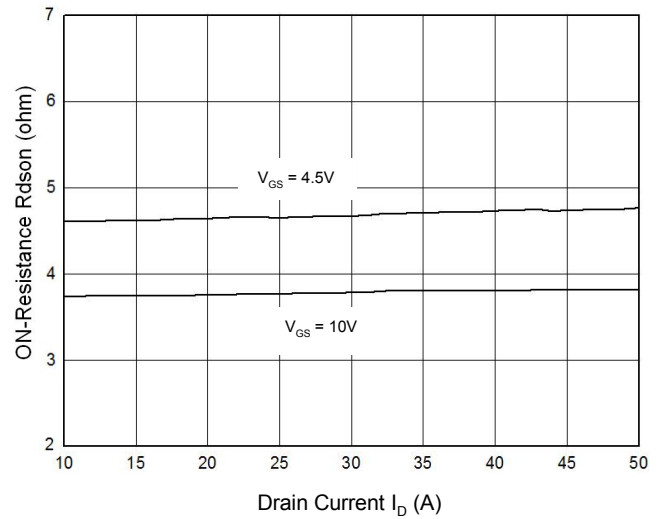


Figure 7. Rdson-Junction Temperature(°C)

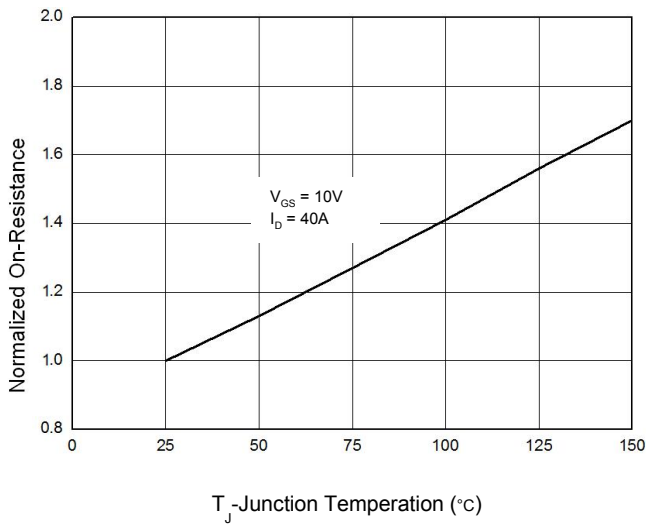


Figure 8. Maximum Safe Operating Area

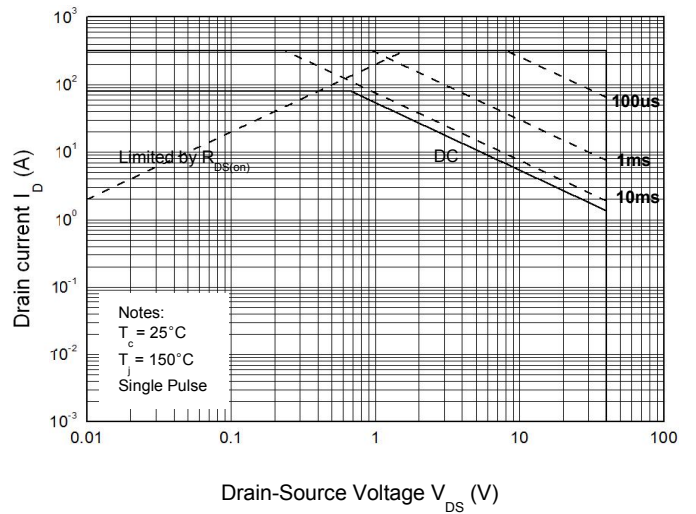
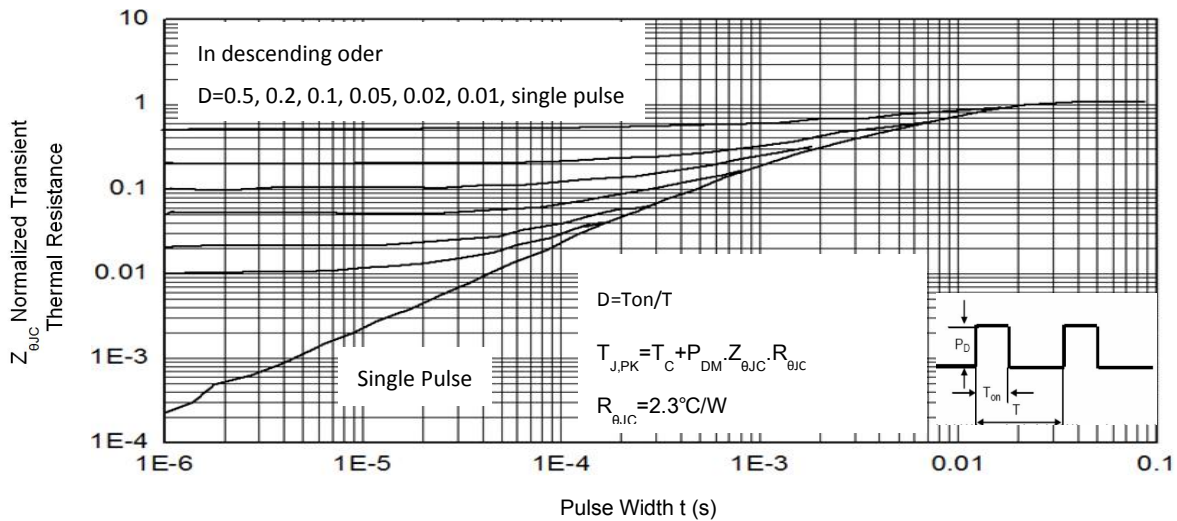


Figure 9. Normalized Maximum Transient Thermal Impedance (RthJC)



**Test Circuit & Waveform**

Figure 8. Gate Charge Test Circuit & Waveform

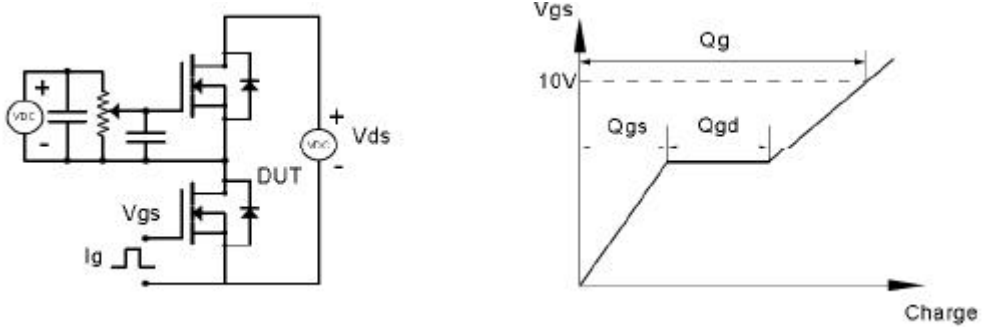


Figure 9. Resistive Switching Test Circuit & Waveforms

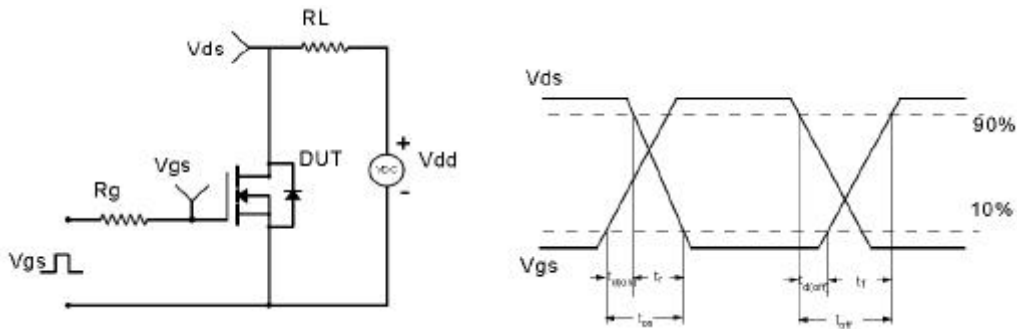


Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

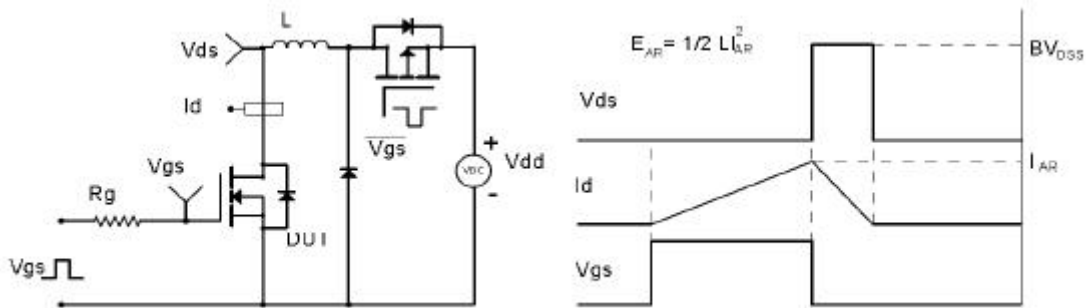
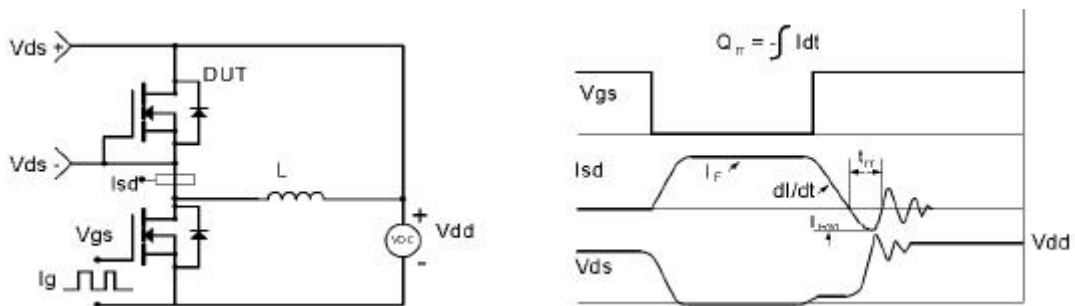
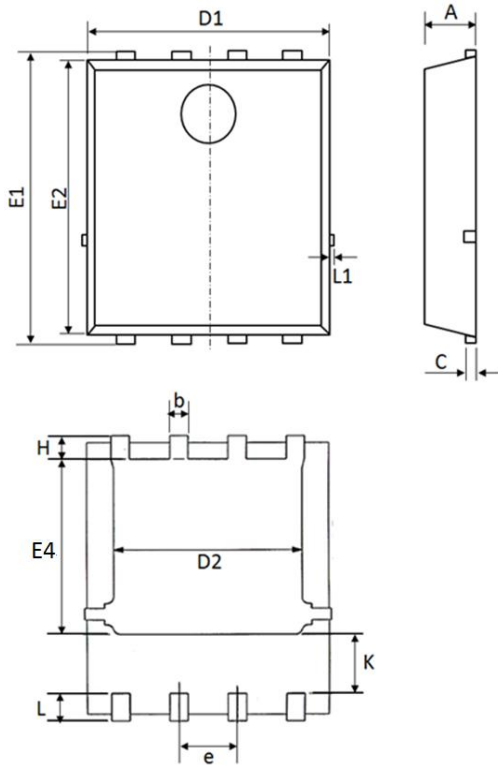


Figure 11. Diode Recovery Circuit & Waveform

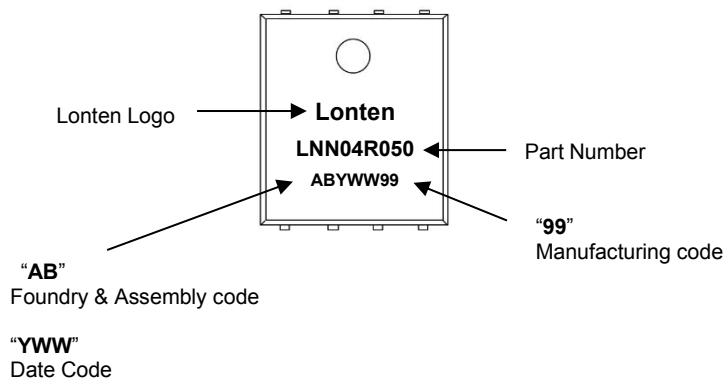


**Mechanical Dimensions for DFN5×6**



COMMON DIMENSIONS						
SYMBOL	MILLIMETERS			INCHS		
	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

**DFN5×6 Part Marking Information**



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