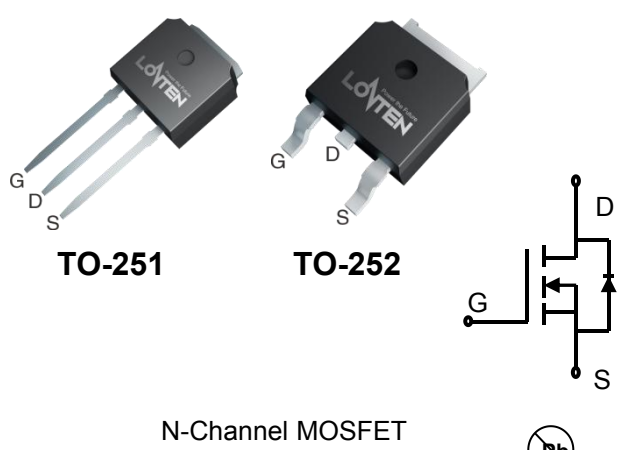


Lonten N-channel 50V, 40A, 15.5mΩ Power MOSFET

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 ◆ 50V,40A,$R_{DS(ON),max}=15.5m\Omega@V_{GS}=10V$ ◆ Improved dv/dt capability ◆ Fast switching ◆ 100% EAS Guaranteed ◆ Green device available Applications ◆ Motor Drives ◆ UPS ◆ DC-DC Converter	Product Summary <table> <tr> <td>V_{DSS}</td><td>50V</td></tr> <tr> <td>$R_{DS(on),max}@V_{GS}=10V$</td><td>15.5mΩ</td></tr> <tr> <td>I_D</td><td>40A</td></tr> </table> Pin Configuration  TO-251 TO-252 N-Channel MOSFET	V_{DSS}	50V	$R_{DS(on),max}@V_{GS}=10V$	15.5mΩ	I_D	40A
V_{DSS}	50V						
$R_{DS(on),max}@V_{GS}=10V$	15.5mΩ						
I_D	40A						

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	50	V
Continuous drain current ($T_C = 25^\circ C$)	I_D	40	A
Continuous drain current ($T_C = 100^\circ C$)		25	A
Pulsed drain current ¹⁾	I_{DM}	160	A
Gate-Source voltage	V_{GSS}	± 20	V
Avalanche energy ²⁾	E_{AS}	42.3	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
LNH05R155	TO-251	LNH05R155
LNG05R155	TO-252	LNG05R155

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 _{DSS}	V _{GS} =0 V, I _D =250uA	50	---	---	V
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0	---	2.0	V
Drain-source leakage current	I _{DSS}	V _{DS} =50 V, V _{GS} =0 V, T _J = 25°C	---	---	1	μA
		V _{DS} =40 V, V _{GS} =0 V, T _J = 125°C	---	---	10	μA
Gate leakage current, Forward	I _{GSSF}	V _{GS} =20 V, V _{DS} =0 V	---	---	100	nA
Gate leakage current, Reverse	I _{GSSR}	V _{GS} =-20 V, V _{DS} =0 V	---	---	-100	nA
Drain-source on-state resistance	R _{DS(on)}	V _{GS} =10 V, I _D =20 A	---	12	15.5	mΩ
		V _{GS} =4.5 V, I _D =10 A	---	14	19	mΩ
Forward transconductance	g _{fs}	V _{DS} =5 V , I _D =20A	---	60	---	S
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} = 25 V, V _{GS} = 0 V, F = 1MHz	---	1470	---	pF
Output capacitance	C _{Oss}		---	119	---	
Reverse transfer capacitance	C _{rss}		---	100	---	
Turn-on delay time	t _{d(on)}	V _{DD} = 25V,V _{GS} =10V, I _D =20 A	---	15	---	ns
Rise time	t _r		---	21	---	
Turn-off delay time	t _{d(off)}		---	75	---	
Fall time	t _f		---	23	---	
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	2.8	---	Ω
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DS} =25 V, I _D =20A, V _{GS} = 10 V	---	7.8	---	nC
Gate to drain charge	Q _{gd}		---	6.4	---	
Gate charge total	Q _g		---	32.5	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I _S		---	---	40	A
Pulsed Source Current ⁽³⁾	I _{SM}		---	---	160	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =20A, T _J =25°C	---	---	1.2	V
Reverse Recovery Time	t _{rr}	I _S =20A,di/dt=100A/us, T _J =25°C	---	31	---	ns
Reverse Recovery Charge	Q _{rr}		---	14.7	---	nC

Notes:

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

2: $V_{DD}=25\text{ V}, V_{GS}=10\text{ V}, L=0.5\text{ mH}, I_{AS}=13\text{ A}, R_G=25\Omega$, 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

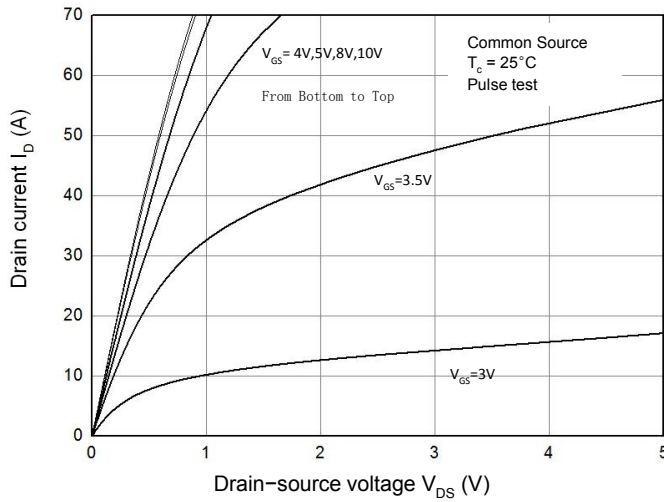


Figure 2. Transfer Characteristics

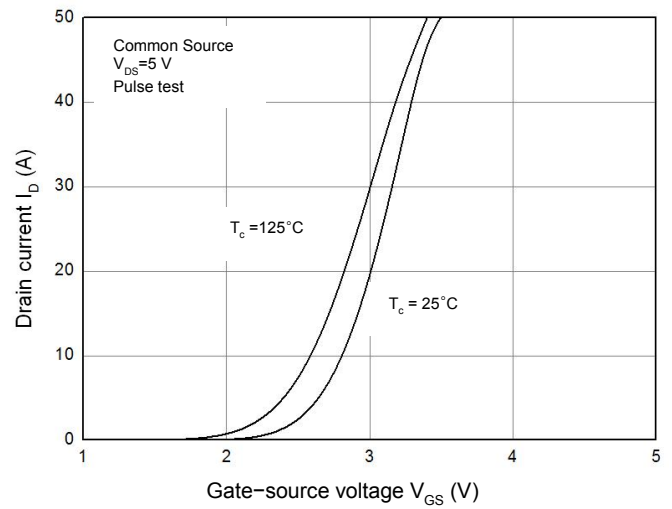


Figure 3. Capacitance Characteristics

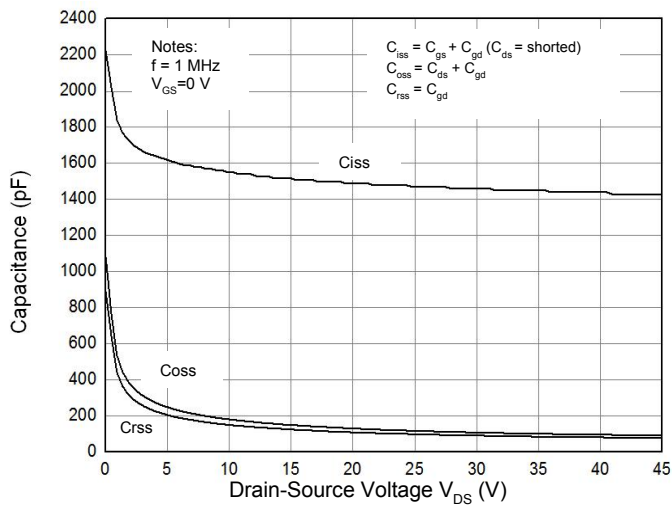


Figure 4. Gate Charge Waveform

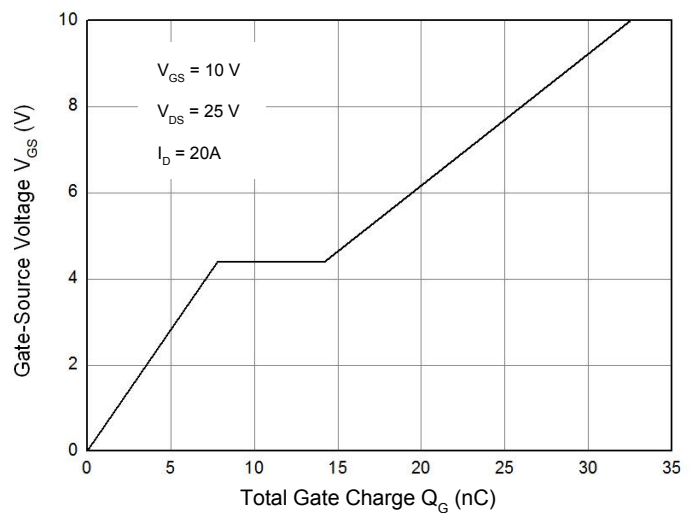


Figure 5. Body-Diode Characteristics

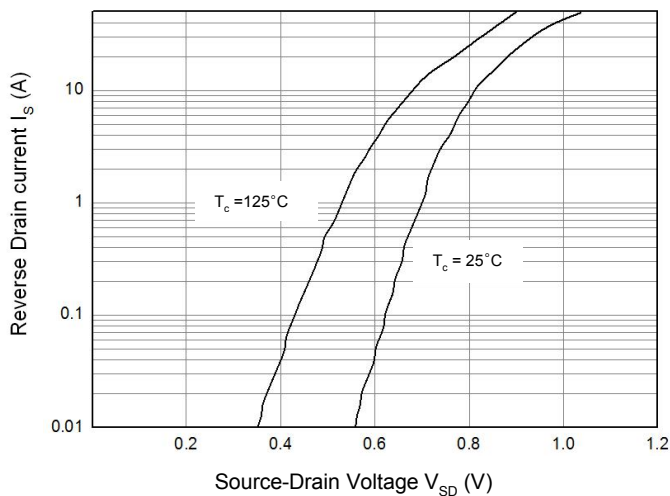


Figure 6. Rdson-Drain Current

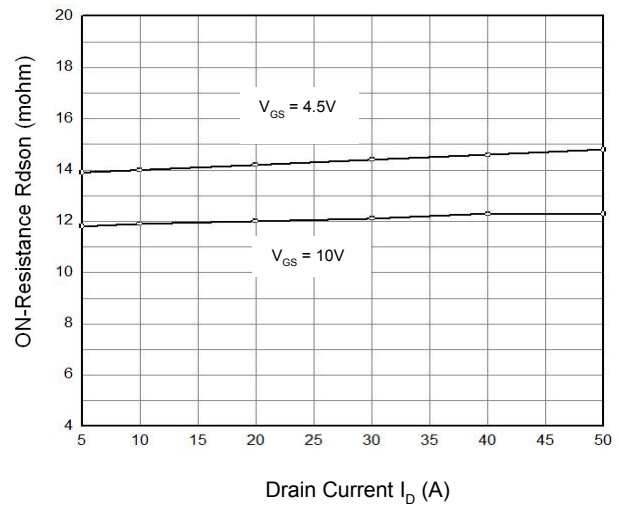


Figure 7. $R_{DS(on)}$ -Junction Temperature($^{\circ}\text{C}$)

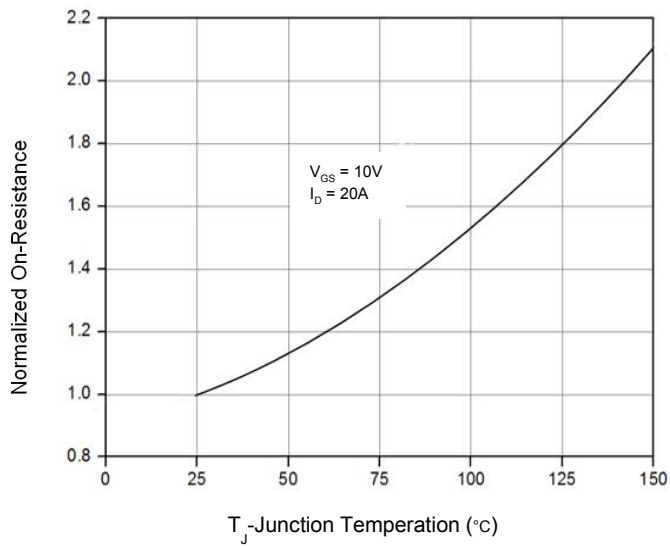


Figure 8. Maximum Safe Operating Area

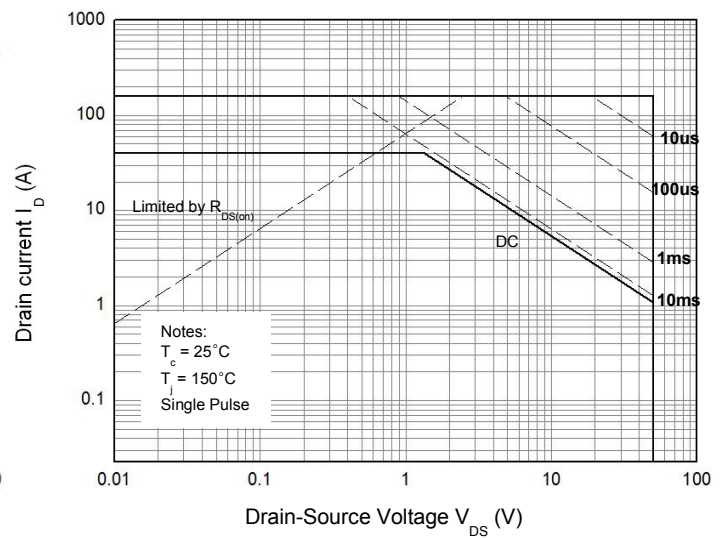
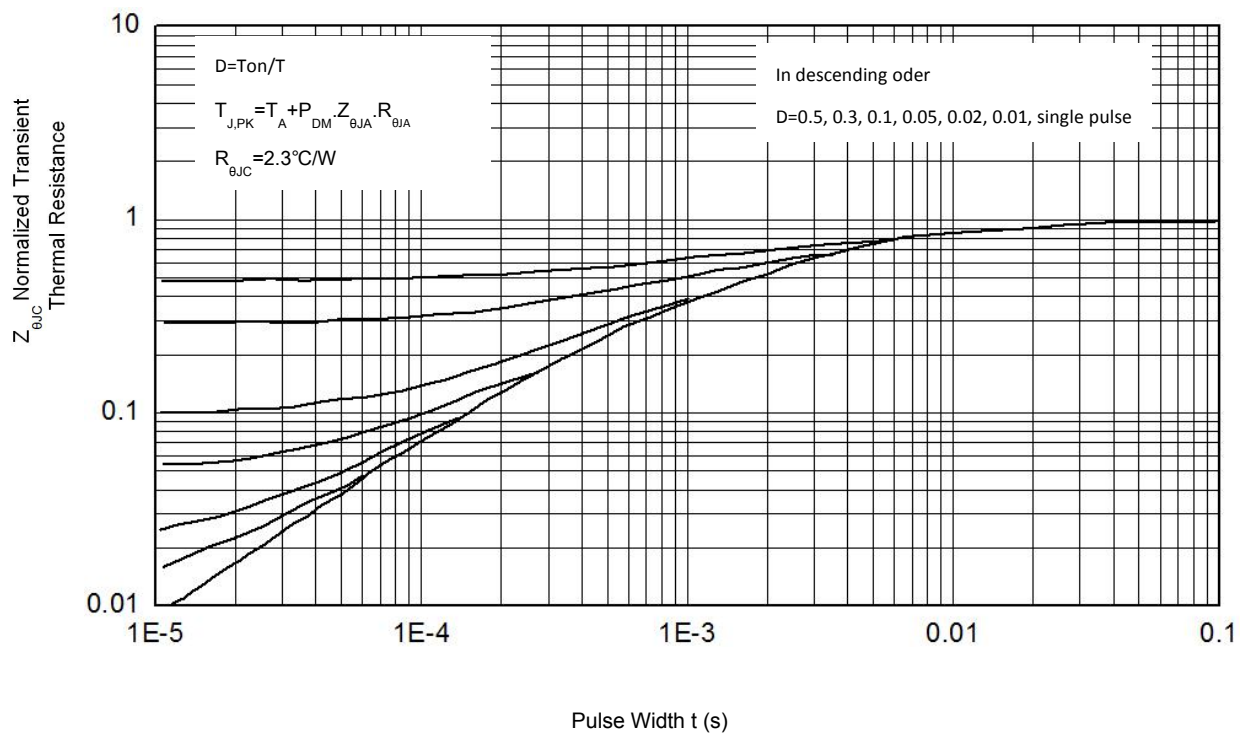


Figure 6. Normalized Maximum Transient Thermal Impedance (R_{thJC})



Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

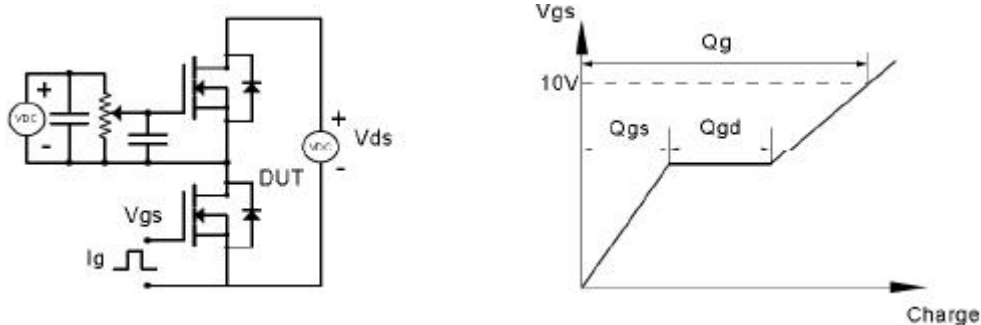


Figure 9. Resistive Switching Test Circuit & Waveforms

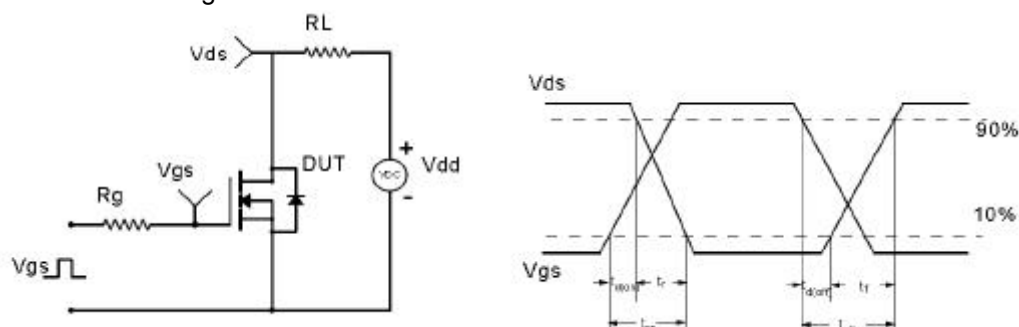


Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

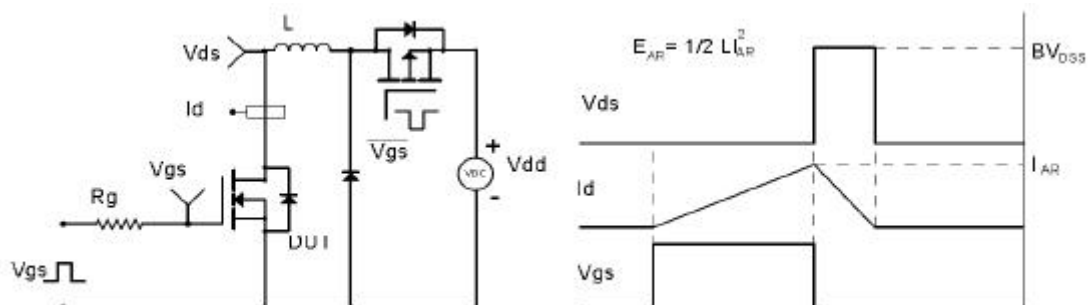
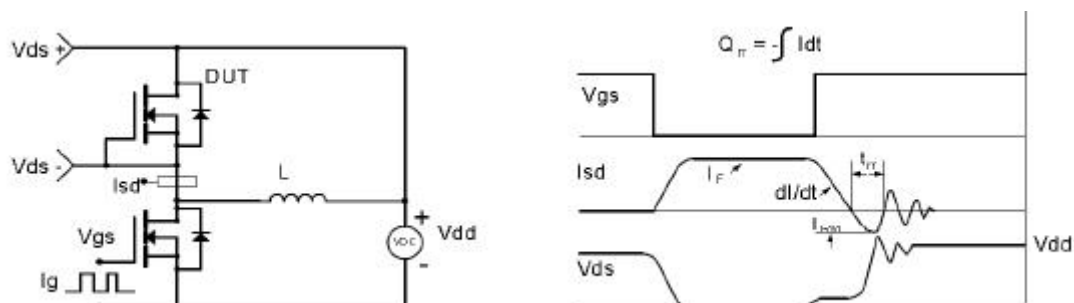
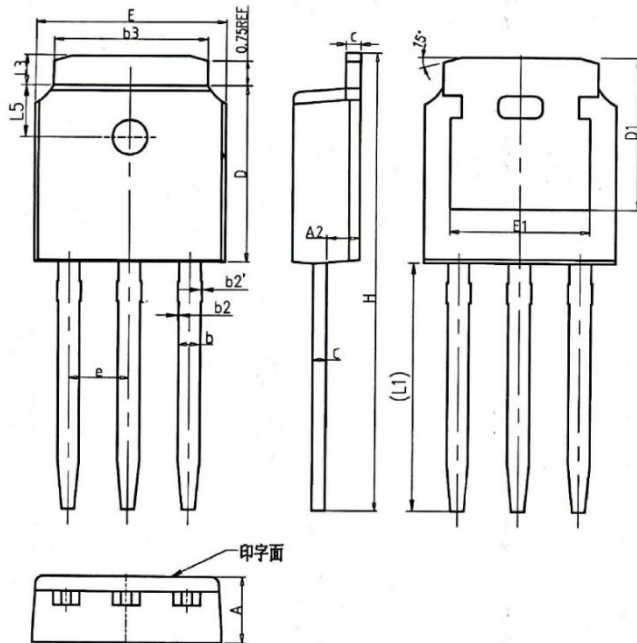


Figure 11. Diode Recovery Circuit & Waveform

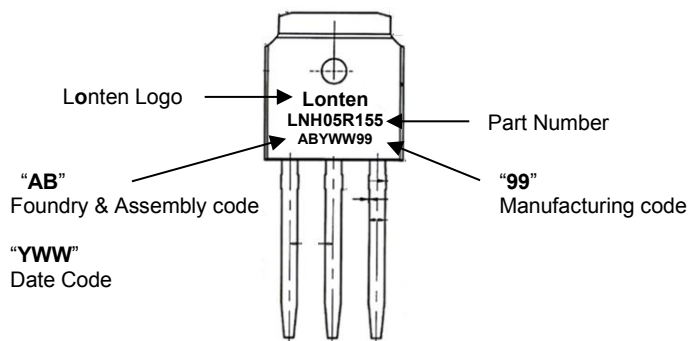


Mechanical Dimensions for TO-251

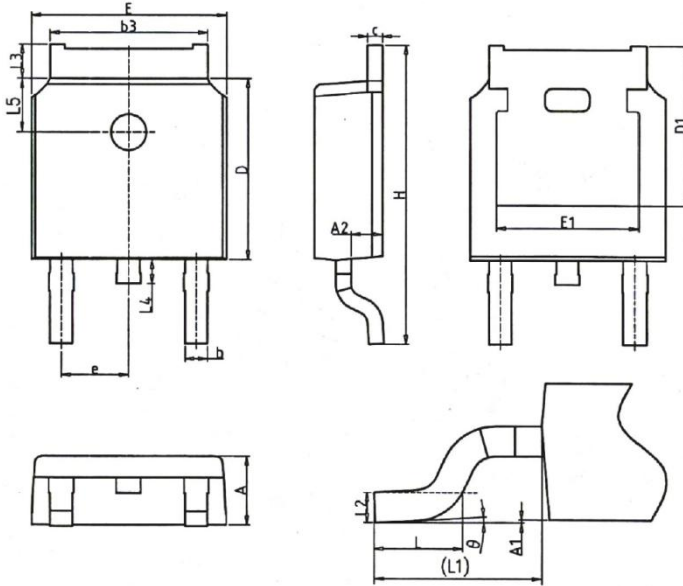


SYMBOL	COMMON DIMENSIONS					
	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.20	2.30	2.38	0.087	0.091	0.094
A2	0.97	1.07	1.17	0.038	0.042	0.046
b	0.68	0.78	0.90	0.027	0.031	0.035
b2	0.00	0.04	0.10	0.000	0.002	0.004
b2'	0.00	0.04	0.10	0.000	0.002	0.004
b3	5.20	5.33	5.46	0.205	0.210	0.215
c	0.43	0.53	0.61	0.017	0.021	0.024
D	5.98	6.10	6.22	0.235	0.240	0.245
D1	5.30REF			0.209REF		
E	6.40	6.60	6.73	0.252	0.260	0.265
E1	4.63	-	-	0.182	-	-
e	2.286BSC			0.090BSC		
H	16.22	16.52	16.82	0.639	0.650	0.662
L1	9.15	9.40	9.65	0.360	0.370	0.380
L3	0.88	1.02	1.28	0.035	0.040	0.050
L5	1.65	1.80	1.95	0.065	0.071	0.077

TO-251 Part Marking Information

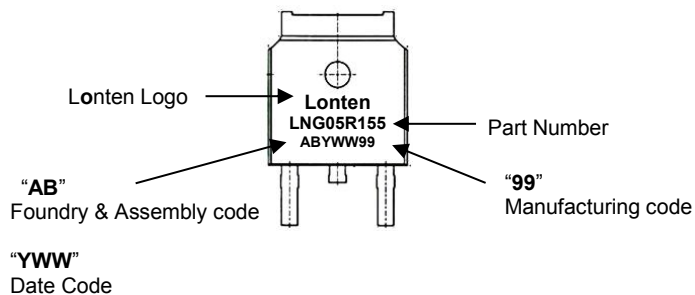


Mechanical Dimensions for TO-252



SYMBOL	COMMON DIMENSIONS					
	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.20	2.30	2.38	0.087	0.091	0.094
A1	0.00	-	0.20	0.000	-	0.008
A2	0.97	1.07	1.17	0.038	0.042	0.046
b	0.68	0.78	0.90	0.027	0.031	0.035
b3	5.20	5.33	5.46	0.205	0.210	0.215
c	0.43	0.53	0.61	0.017	0.021	0.024
D	5.98	6.10	6.22	0.235	0.240	0.245
D1	5.30REF			0.209REF		
E	6.40	6.60	6.73	0.252	0.260	0.265
E1	4.63	-	-	0.182	-	-
e	2.286BSC			0.090BSC		
H	9.40	10.10	10.50	0.370	0.398	0.413
L	1.38	1.50	1.75	0.054	0.059	0.069
L1	2.90REF			0.114REF		
L2	0.51BSC			0.020BSC		
L3	0.88	-	1.28	0.035	-	0.050
L4	0.50	-	1.00	0.020	-	0.039
L5	1.65	1.80	1.95	0.065	0.071	0.077
θ	0°	-	8°	0°	-	8°

TO-252 Part Marking Information



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