Lonten N-channel 80V, 60A, 16mΩ 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

- 80V,60A,$R_{DS(on).max}$=16mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

Applications

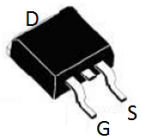
- Motor Drives
- UPS
- DC-DC Converter

Product Summary

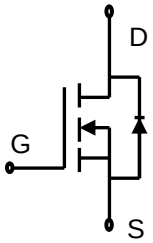
V_{DSS}	80V
$R_{DS(on).max}$@ V_{GS}=10V	16mΩ
I_D	60A

Pin Configuration

TO-220



TO-263



N-Channel MOSFET

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	80	V
Continuous drain current (T_C = 25°C)	I_D	60	A
Continuous drain current (T_C = 100°C)		39	A
Pulsed drain current[1)]	I_{DM}	240	A
Gate-Source voltage	V_{GSS}	±20	V
Avalanche energy[2)]	E_{AS}	132	mJ
Power Dissipation (T_C = 25°C)	P_D	110	W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.88	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W

Package Marking and Ordering Information

Device	Device Package	Marking
LNC08R160	TO-220	LNC08R160
LNE08R160	TO-263	LNE08R160

Electrical Characteristics

T_J = 25°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	80	---	---	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	1.0	1.6	2.5	V
Drain-source leakage current	I_{DSS}	V_{DS}=80V, V_{GS}=0V, T_J = 25°C	---	---	1	μA
		V_{DS}=64V, V_{GS}=0V, T_J = 125°C	---	---	30	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= 30 A	---	12.5	16	mΩ
		V_{GS}=4.5 V, I_D=20 A	---	16.5	21	mΩ
Forward transconductance	g_{fs}	V_{DS} =10V , I_D=30A	---	52	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, F = 1MHz	---	3116	---	pF
Output capacitance	C_{oss}		---	196	---	
Reverse transfer capacitance	C_{rss}		---	140	---	
Turn-on delay time	$t_{d(on)}$	V_{DD} =40V,V_{GS}=10V, I_D = 30A	---	10.7	---	ns
Rise time	t_r		---	17.7	---	
Turn-off delay time	$t_{d(off)}$		---	139.7	---	
Fall time	t_f		---	28.3	---	
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	1.5	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DS}=40 V, I_D=30A, V_{GS}= 10 V	---	13.6	---	nC
Gate to drain charge	Q_{gd}		---	11.7	---	
Gate charge tota	Q_g		---	58	---	
Drain-Source diode characteristics and Maximum Ratings						
Diode Forward Voltage[3]	V_{SD}	V_{GS}=0V, I_S=30A, T_J=25℃	---	0.85	1.3	V
Reverse Recovery Time	t_{rr}	I_S=30A, di/dt=100A/us, T_J=25℃	---	27.7	---	ns
Reverse Recovery Charge	Q_{rr}		---	41	---	nC

Notes:

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

2: V_{DD}=50V, V_{GS}=10V, L=0.5mH, I_{AS}=23A, R_G=25Ω, Starting T_J=25℃.

3: Pulse Test：Pulse Width ≤300μs, Duty Cycle≤2%.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

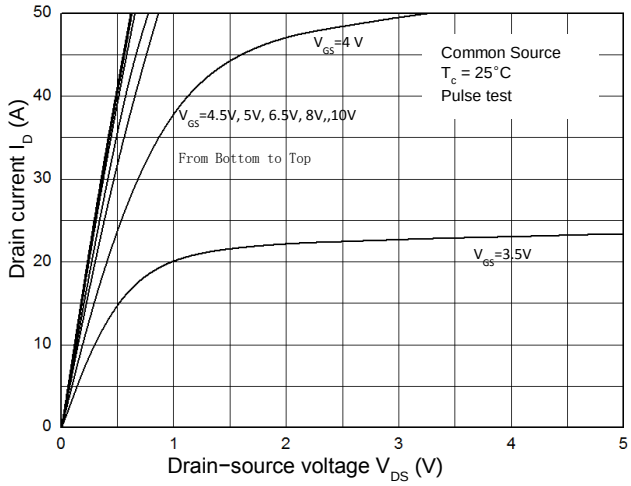


Figure 2. Transfer Characteristics

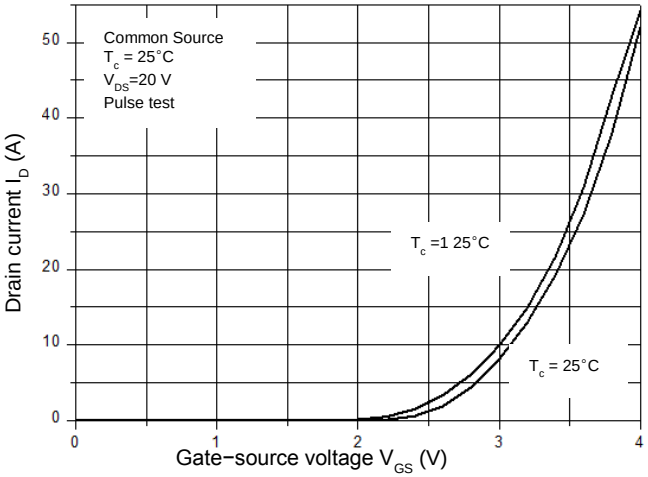


Figure 3. Capacitance Characteristics

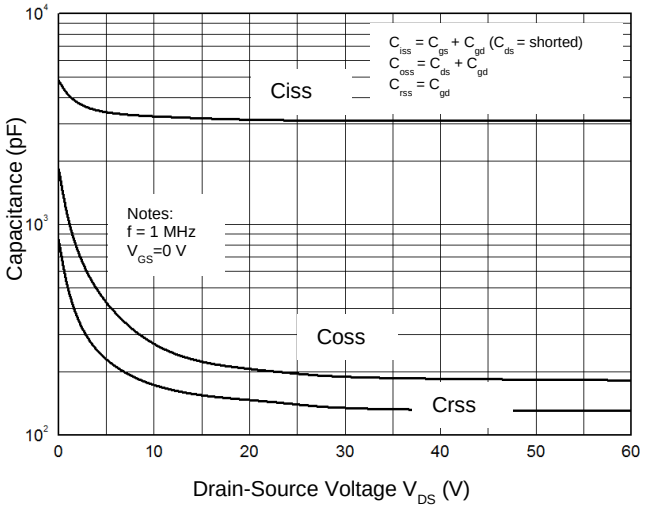


Figure 4. Gate Charge Waveform

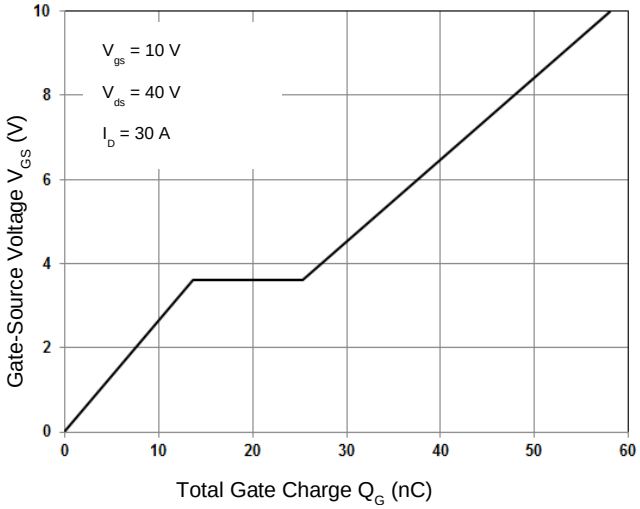


Figure 5. Body-Diode Characteristics

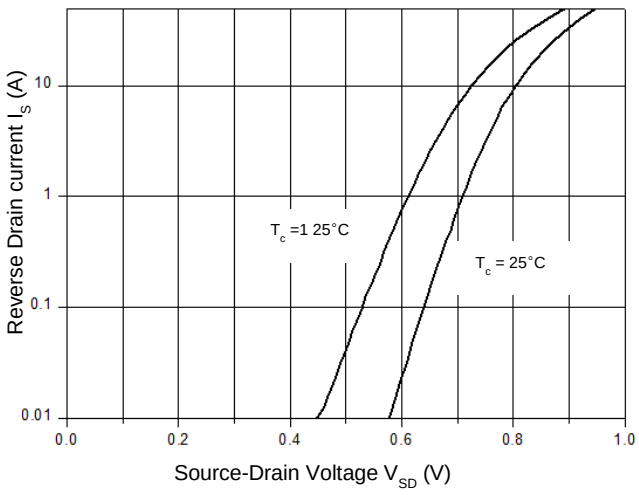


Figure 6. Rdson-Drain Current

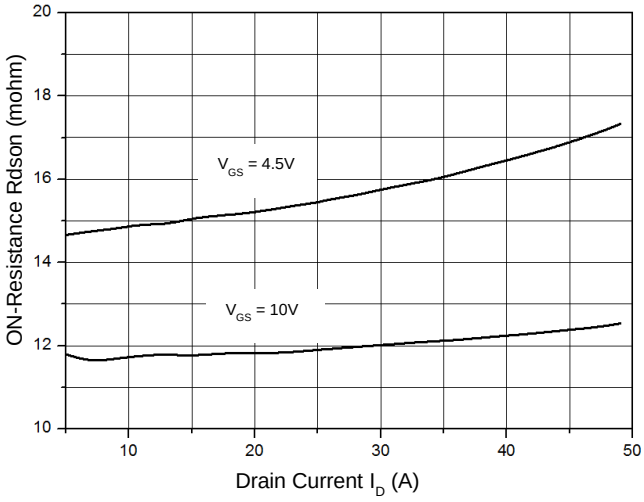


Figure 7. Rdson-Junction Temperature(℃)

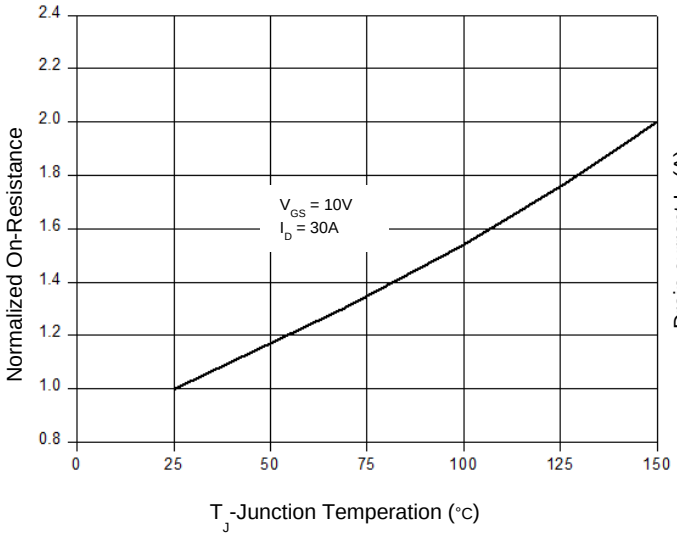


Figure 8. Maximum Safe Operating Area

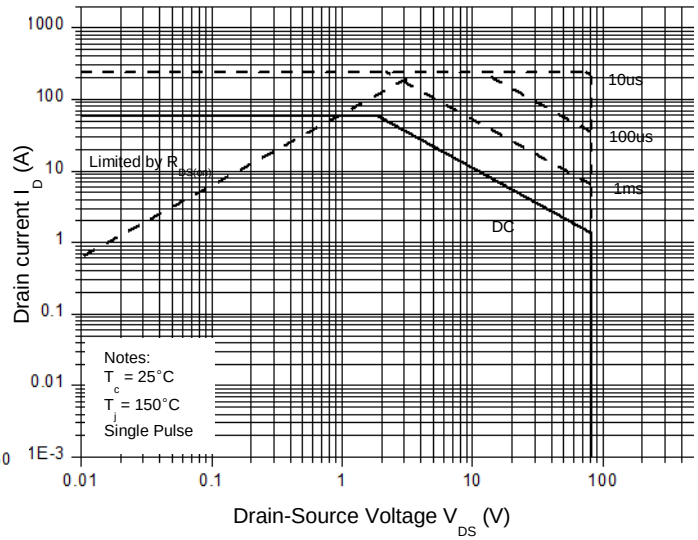


Figure 6. Normalized Maximum Transient Thermal Impedance (RthJC)

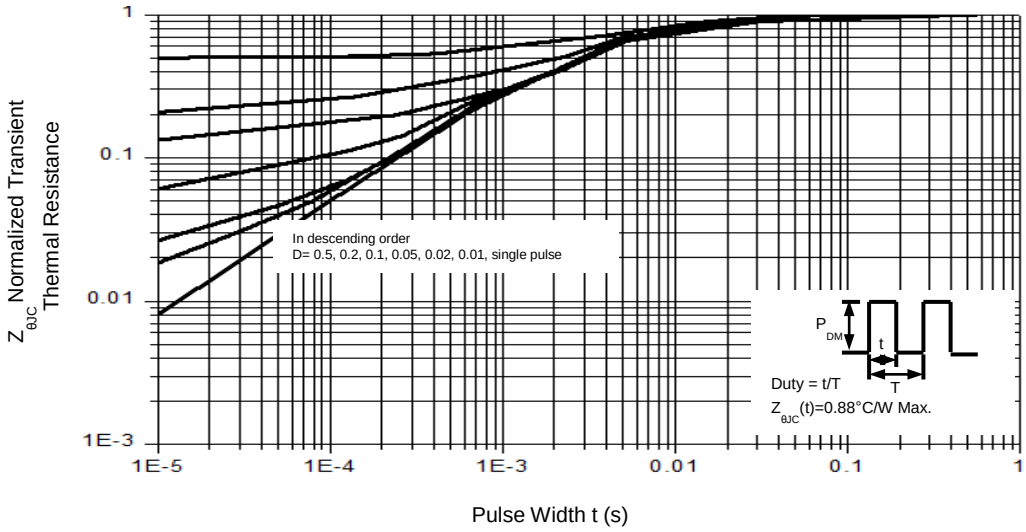
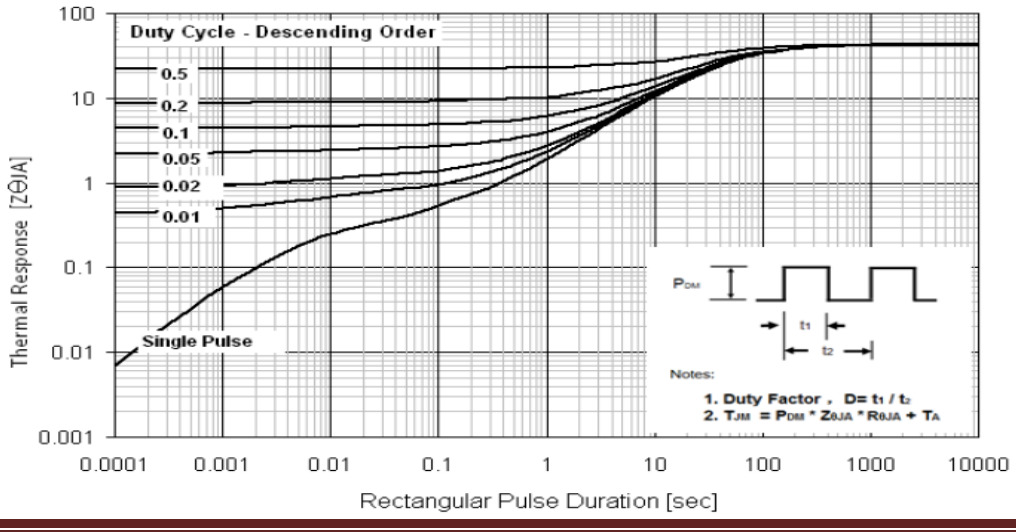


Figure 7. Normalized Maximum Transient Thermal Impedance (RthJA)



Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

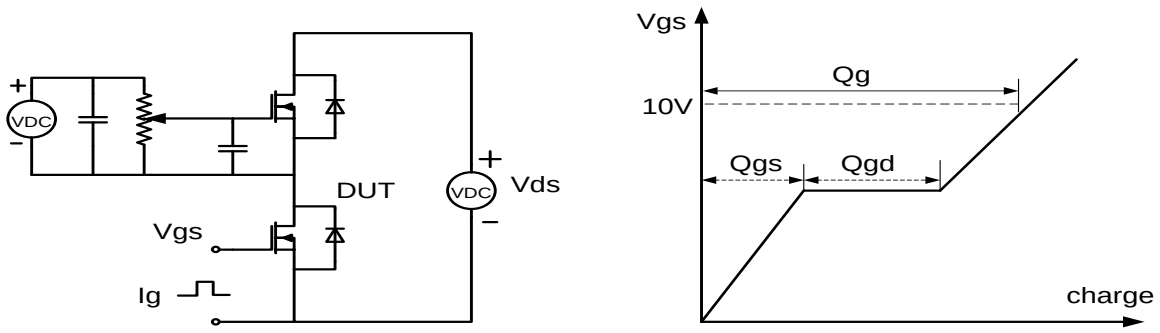


Figure 9. Resistive Switching Test Circuit & Waveforms

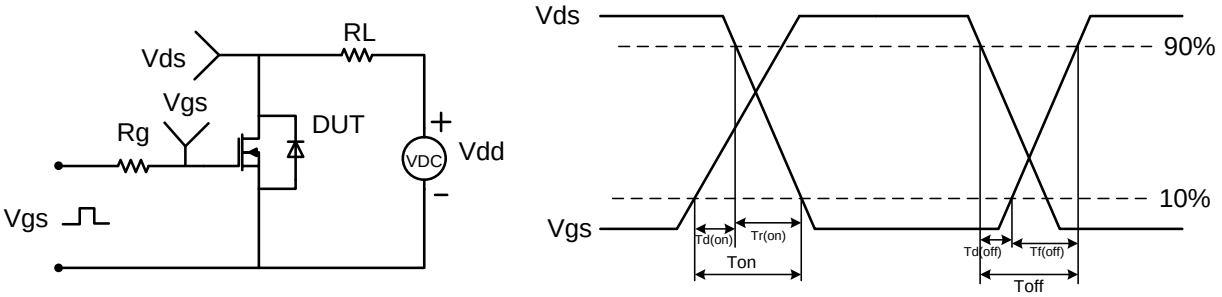


Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

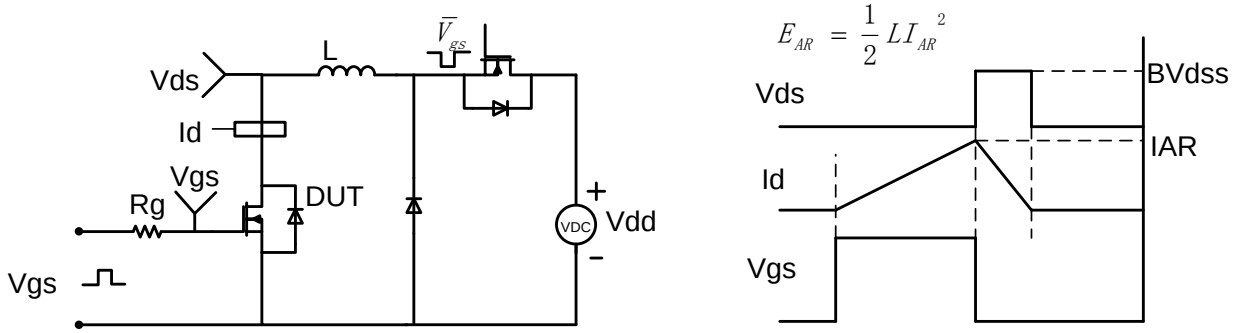
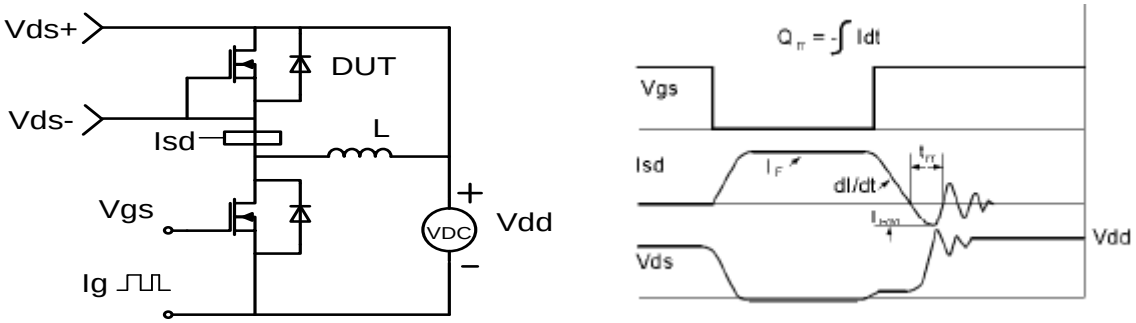
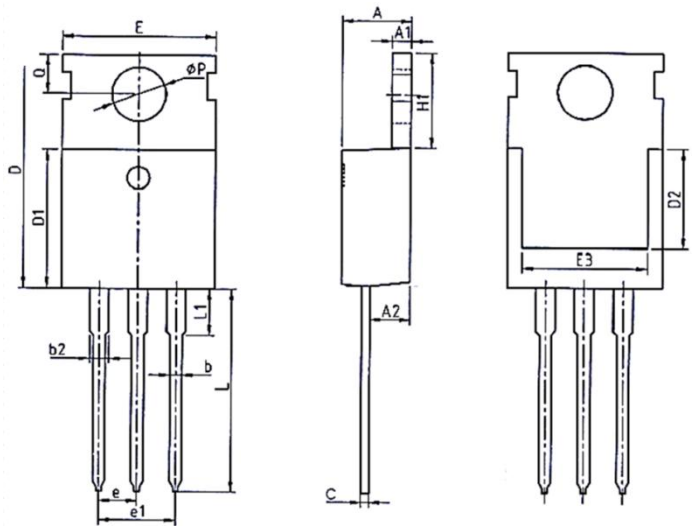


Figure 11. Diode Recovery Circuit & Waveform

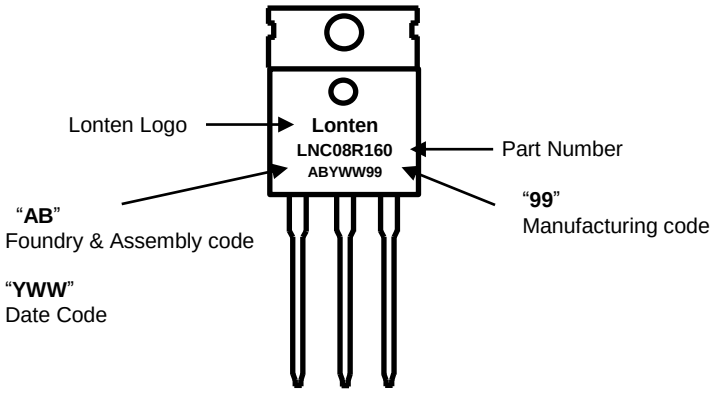


TO-220 PACKAGE INFORMATION



COMMON DIMENSIONS						
SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.37	4.57	4.70	0.172	0.180	0.185
A1	1.25	1.30	1.40	0.049	0.051	0.055
A2	2.20	2.40	2.60	0.087	0.094	0.102
b	0.70	0.80	0.95	0.028	0.031	0.037
b2	1.17	1.27	1.47	0.046	0.050	0.058
c	0.45	0.50	0.60	0.018	0.020	0.024
D	15.10	15.60	16.10	0.594	0.614	0.634
D1	8.80	9.10	9.40	0.346	0.358	0.370
D2	5.50	-	-	0.217	-	-
E	9.70	10.00	10.30	0.382	0.394	0.406
E3	7.00	-	-	0.276	-	-
e	2.54BCS			0.1BSC		
e1	5.08BCS			0.2REF		
H1	6.25	6.50	6.85	0.246	0.256	0.270
L	12.75	13.50	13.80	0.502	0.531	0.543
L1	-	3.10	3.40	-	0.122	0.134
ØP	3.40	3.60	3.80	0.134	0.142	0.150
Q	2.60	2.80	3.00	0.102	0.110	0.118

TO-220 Part Marking Information



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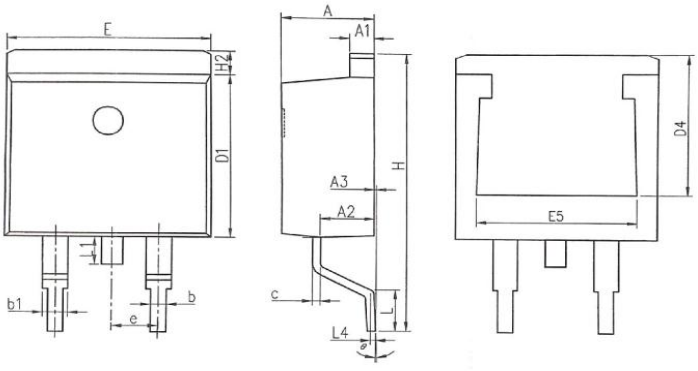
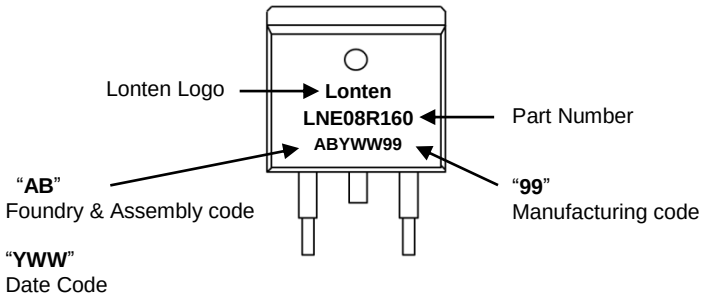


COMMON DIMENSIONS						
SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.37	4.57	4.77	0.172	0.180	0.188
A1	1.22	1.27	1.42	0.048	0.050	0.056
A2	2.49	2.69	2.89	0.098	0.106	0.114
A3	0.00	0.13	0.25	0.000	0.005	0.010
b	0.70	0.81	0.96	0.028	0.032	0.038
b1	1.17	1.27	1.47	0.046	0.050	0.058
c	0.30	0.38	0.53	0.012	0.015	0.021
D1	8.50	8.70	8.90	0.335	0.343	0.350
D4	6.60	—	—	0.260	—	—
E	9.86	10.16	10.36	0.388	0.400	0.408
E5	7.06	—	—	0.278	—	—
e	2.54 BSC			0.100 BSC		
H	14.70	15.10	15.50	0.579	0.594	0.610
H2	1.07	1.27	1.47	0.042	0.050	0.058
L	2.00	2.30	2.60	0.079	0.091	0.102
L1	1.40	1.55	1.70	0.055	0.061	0.067
L4	0.25 BSC			0.010 BSC		
θ	0°	5°	9°	0°	5°	9°

TO-263 Part Marking Information



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