Lonten N-channel 100V, 80A, 8mΩ Power MOSFET

Description

These N-Channel enhancement mode power field effect transistors are using split gate 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

- 100V,80A,$R_{DS(ON).max}$=8mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

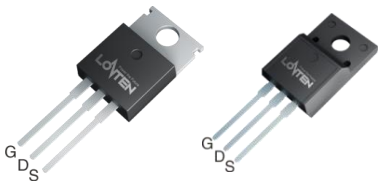
Applications

- Motor Drives
- UPS
- DC-DC Converter

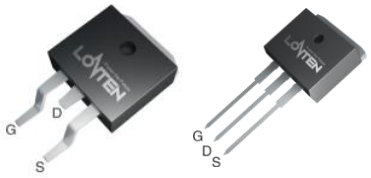
Product Summary

V_{DSS}	100V
$R_{DS(on).max}$@ V_{GS}=10V	8mΩ
I_D	80A

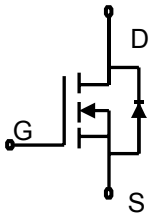
Pin Configuration



TO-220FB TO-220MF



TO-263 TO-262



N-Channel MOSFET

Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	100	V
Continuous drain current (T_C = 25°C)	I_D	80	A
Continuous drain current (T_C = 100°C)		60	A
Pulsed drain current (note 1)	I_{DM}	320	A
Gate-Source voltage	V_{GSS}	±20	V
Avalanche energy, single pulse (note 2)	E_{AS}	110	mJ
Power Dissipation (T_C = 25°C) TO-220FB/TO-263-2L	P_D	150	W
Power Dissipation (T_C = 25°C) TO-220MF	P_D	48	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 TO-220FB/TO-263-2L	$R_{\theta JC}$	0.83	°C/W
Thermal Resistance, Junction-to-Case TO-220MF		2.6	°C/W
Thermal Resistance, Junction-to-Ambient TO-220FB/TO-263-2L	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case TO-220MF		80	°C/W

Package Marking and Ordering Information

Device	Device Package	Marking
LSGC10R080W3	TO-220FB	LSGC10R080W3
LSGD10R080W3	TO-220MF	LSGD10R080W3
LSGE10R080W3	TO-263	LSGE10R080W3
LSGF10R080W3	TO-262	LSGF10R080W3

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	100	---	---	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	1.4	1.8	2.2	V
Drain-source leakage current	I_{DSS}	V_{DS}=100V, V_{GS}=0V, T_J = 25°C	---	---	1	μA
		V_{DS}=80V, V_{GS}=0V, 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 (note 3)	$R_{DS(on)}$	V_{GS}=10 V, I_D=50 A	---	6.8	8	mΩ
Drain-source on-state resistance (note 3)		V_{GS}=4.5 V, I_D=40 A	---	8.3	10	mΩ
Forward transconductance	g_{fs}	V_{DS} =5V , I_D=50A	---	112	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 50 V, V_{GS} = 0 V, F = 1MHz	---	2630	---	pF
Output capacitance	C_{oss}		---	453	---	
Reverse transfer capacitance	C_{rss}		---	36	---	
Turn-on delay time (note 3,4)	$t_{d(on)}$	V_{DD} = 50V,V_{GS}=10V, I_D = 50A	---	10.5	---	ns
Rise time (note 3,4)	t_r		---	63	---	
Turn-off delay time (note 3,4)	$t_{d(off)}$		---	30	---	
Fall time (note 3,4)	t_f		---	96	---	
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	1.1	---	Ω
Gate charge characteristics						
Gate to source charge (note 3,4)	Q_{gs}	V_{DS}=50 V, I_D=50A, V_{GS}= 10 V	---	10.2	---	nC
Gate to drain charge (note 3,4)	Q_{gd}		---	6.6	---	
Gate charge total (note 3,4)	Q_g		---	45	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0 V, Force Current	---	---	80	A
Pulsed Source Current (note 3)	I_{SM}		---	---	320	A
Diode Forward Voltage (note 3)	V_{SD}	V_{GS}=0V, I_S=50A, T_J=25℃	---	0.95	1.3	V
Reverse Recovery Time	t_{rr}	I_S=50A, di/dt=100A/us, T_J=25℃	---	65	---	ns
Reverse Recovery Charge	Q_{rr}		---	104	---	nC

Notes:

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

2: V_{DD}=50V, V_{GS}=10V, L=0.5mH, I_{AS}=21A, R_G=25Ω, Starting T_J=25℃.

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

4: Essentially independent of operating temperature.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

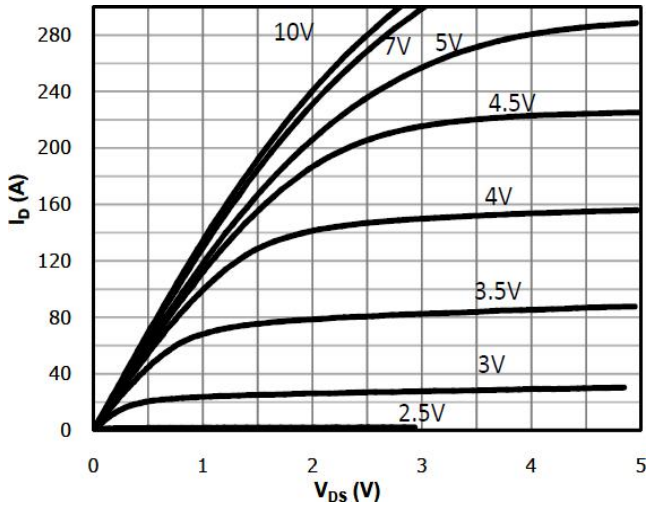


Figure 2. Transfer Characteristics

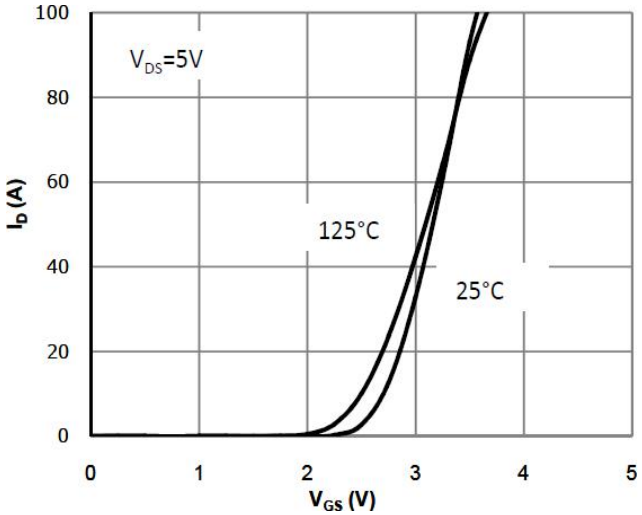


Figure 3. Capacitance Characteristics

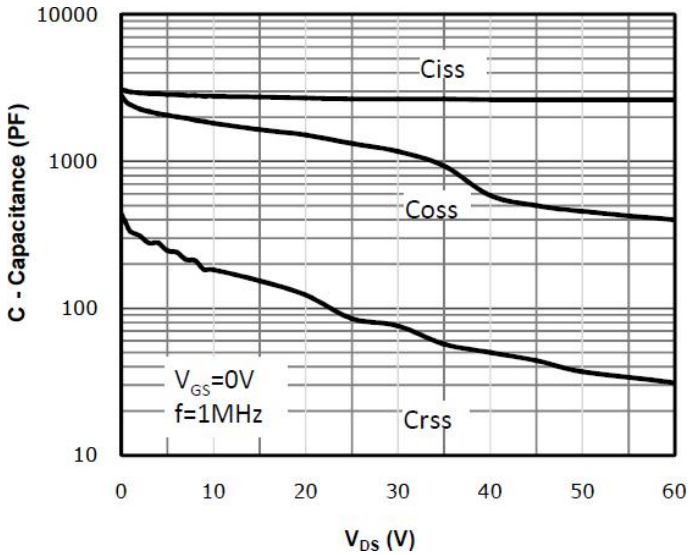


Figure 4. Gate Charge Waveform

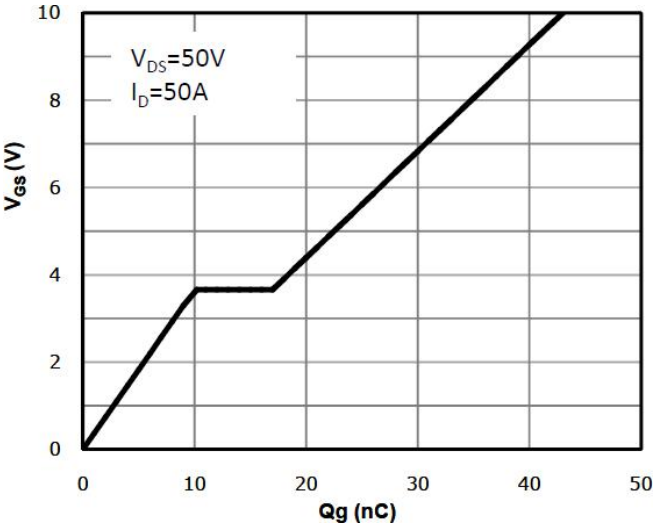


Figure 5. Body-Diode Characteristics

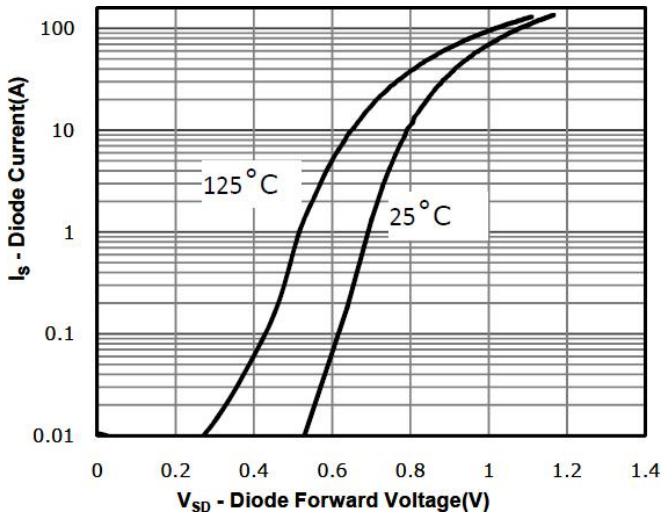


Figure 6. Rdson-Drain Current

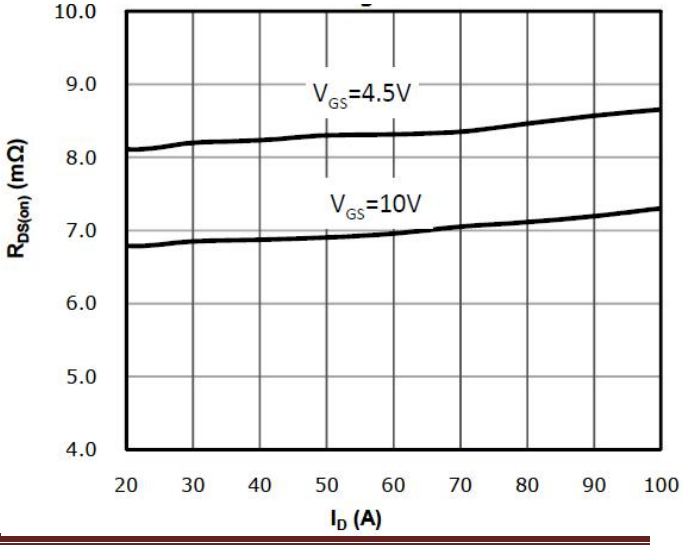


Figure 7. Rdson-Junction Temperature(℃)

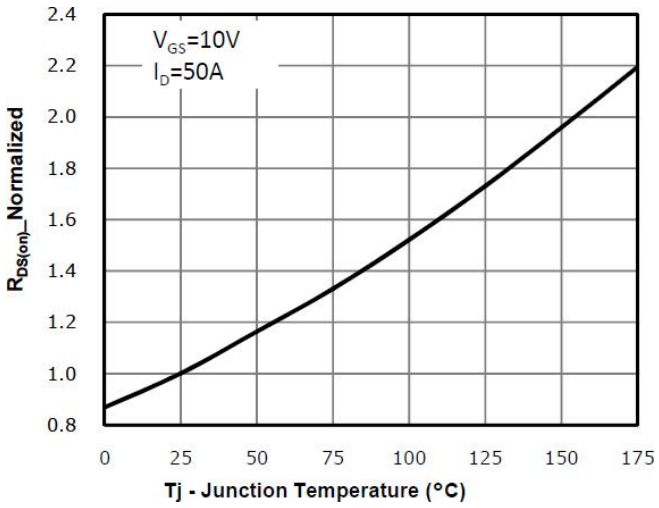


Figure 8. Maximum Safe Operating Area

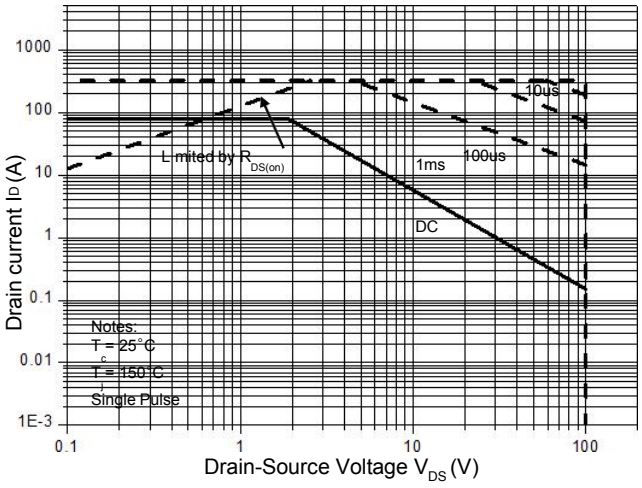
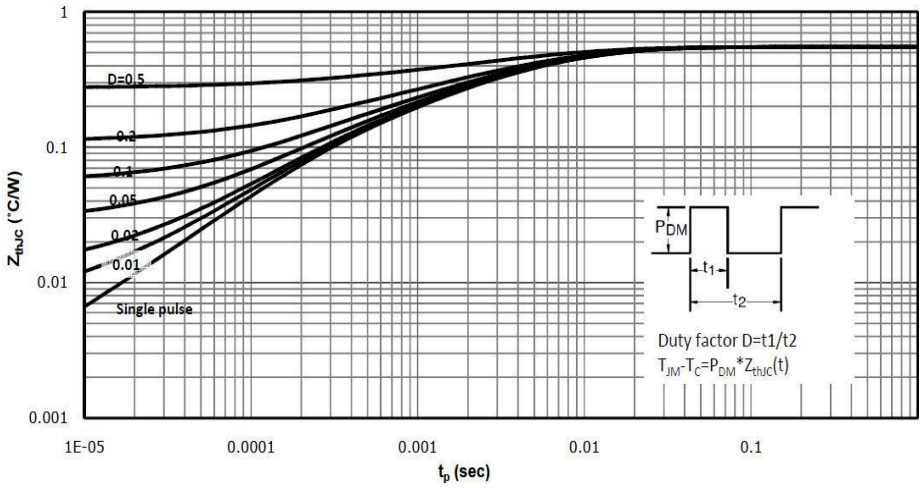


Figure 9. Normalized Maximum Transient Thermal Impedance (RthJC)



Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

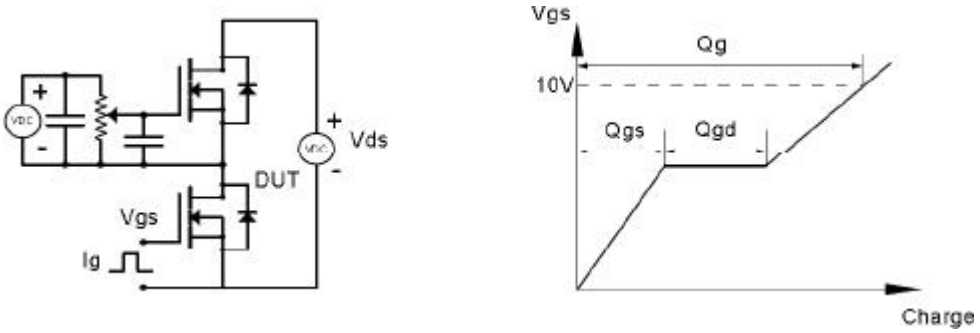


Figure 9. Resistive Switching Test Circuit & Waveforms

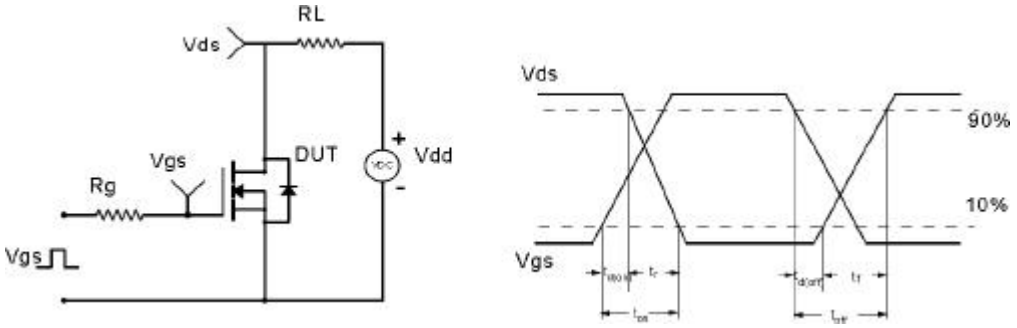


Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

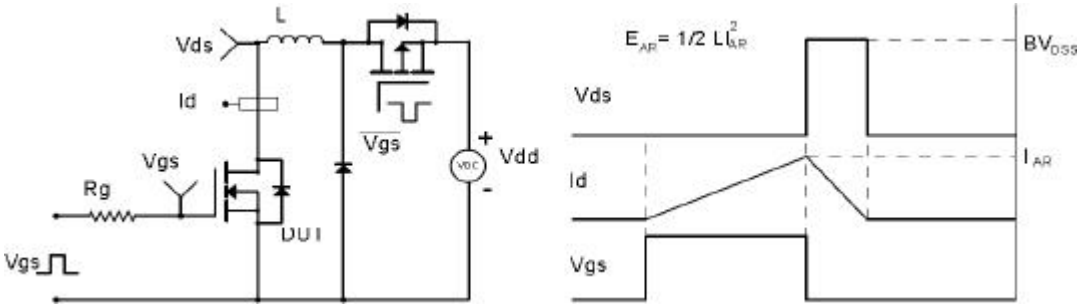
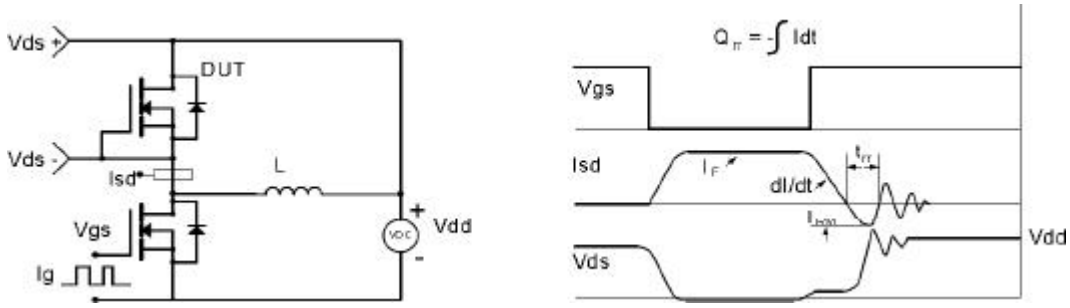
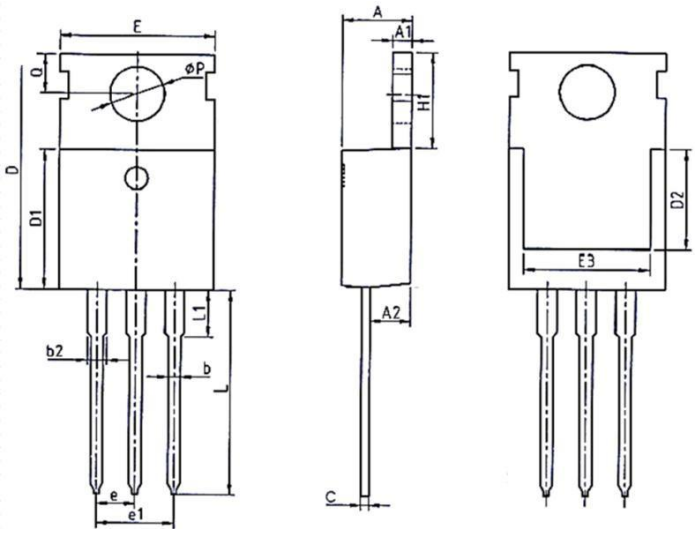


Figure 11. Diode Recovery Circuit & Waveform

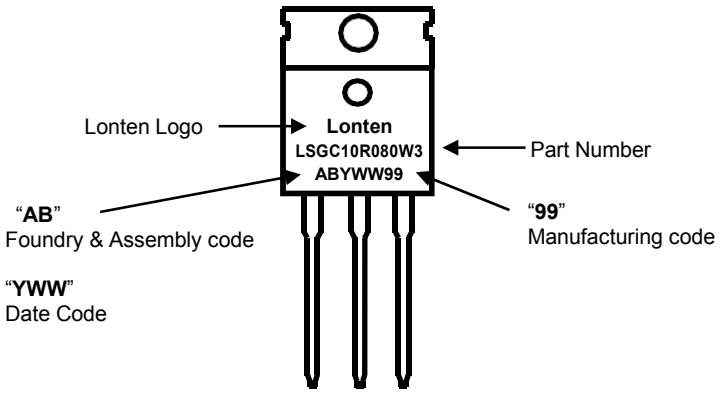


Mechanical Dimensions for TO-220

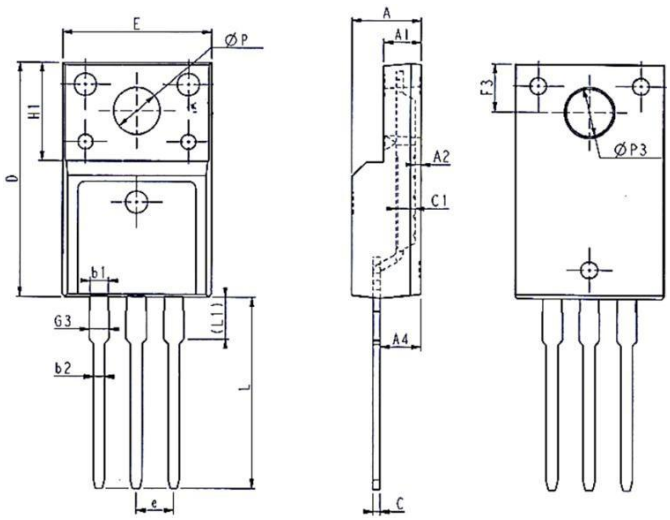


COMMON DIMENSIONS						
SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.37	4.57	4.70	0.172	0.180	0.185
A1	1.25	1.30	1.40	0.049	0.051	0.055
A2	2.20	2.40	2.60	0.087	0.094	0.102
b	0.70	0.80	0.95	0.028	0.031	0.037
b2	1.17	1.27	1.47	0.046	0.050	0.058
c	0.45	0.50	0.60	0.018	0.020	0.024
D	15.10	15.60	16.10	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

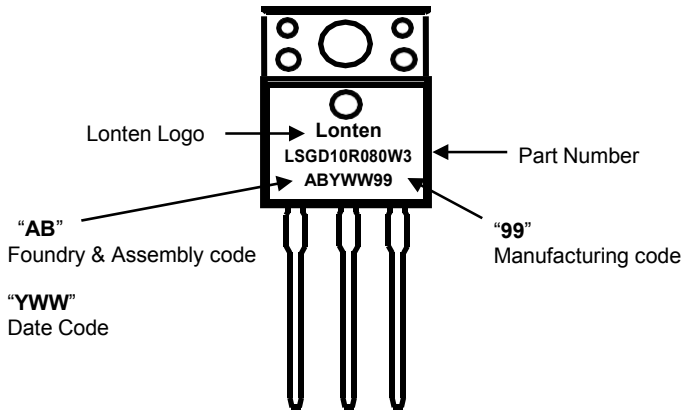


Mechanical Dimensions for TO-220MF

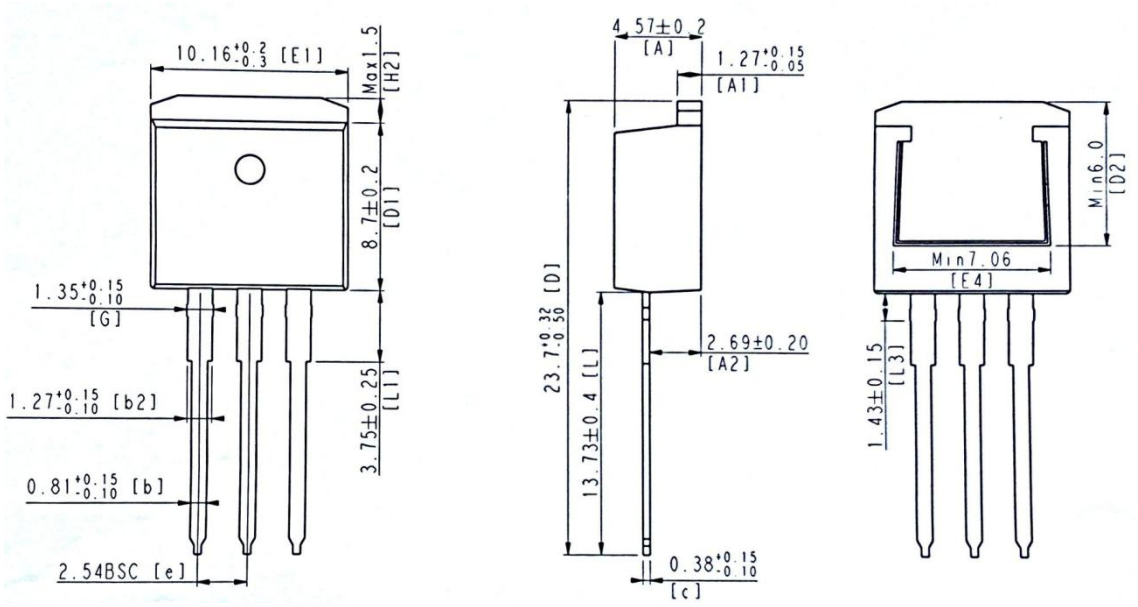


COMMON DIMENSIONS						
SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
E	9.96	10.16	10.36	0.392	0.400	0.408
A	4.50	4.70	4.90	0.177	0.185	0.193
A1	2.34	2.54	2.74	0.092	0.100	0.108
A2	0.30	0.45	0.60	0.012	0.018	0.024
A4	2.56	2.76	2.96	0.101	0.109	0.117
c	0.40	0.50	0.65	0.016	0.020	0.026
c1	1.20	1.30	1.35	0.047	0.051	0.053
D	15.57	15.87	16.17	0.613	0.625	0.637
H1	6.70REF			0.264REF		
e	2.54BSC			0.1BSC		
L	12.68	12.98	13.28	0.499	0.511	0.523
L1	2.88	3.03	3.18	0.113	0.119	0.125
ØP	3.03	3.18	3.38	0.119	0.125	0.133
ØP3	3.15	3.45	3.65	0.124	0.136	0.144
F3	3.15	3.30	3.45	0.124	0.130	0.136
G3	1.25	1.35	1.55	0.049	0.053	0.061
b1	1.18	1.28	1.43	0.046	0.050	0.056
b2	0.70	0.80	0.95	0.028	0.031	0.037

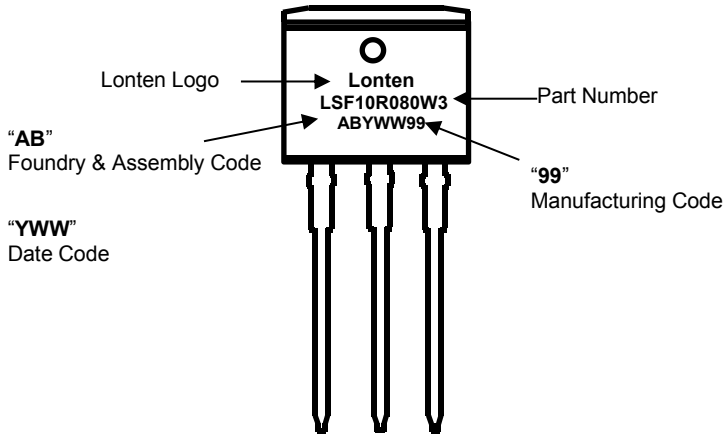
TO-220MF Part Marking Information



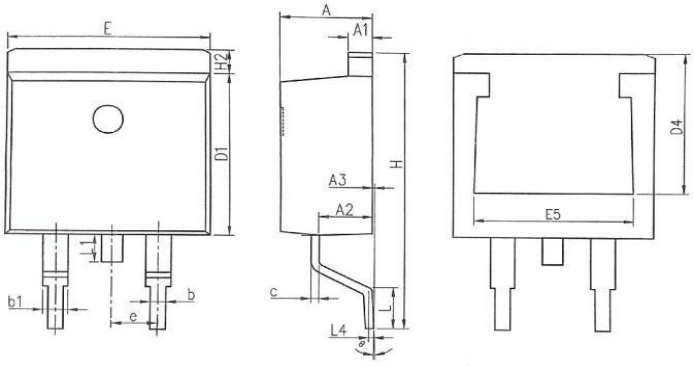
Mechanical Dimensions for TO-262



TO-262 Part Marking Information

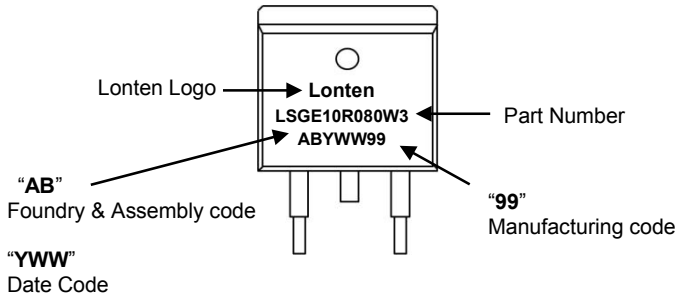


TO-263 PACKAGE INFORMATION



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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