

Lonten N-channel 550V, 15A, 0.29Ω LonFET™ Power MOSFET

Description

LonFET™ Power MOSFET is fabricated using advanced super junction technology. The resulting device has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency.

Features

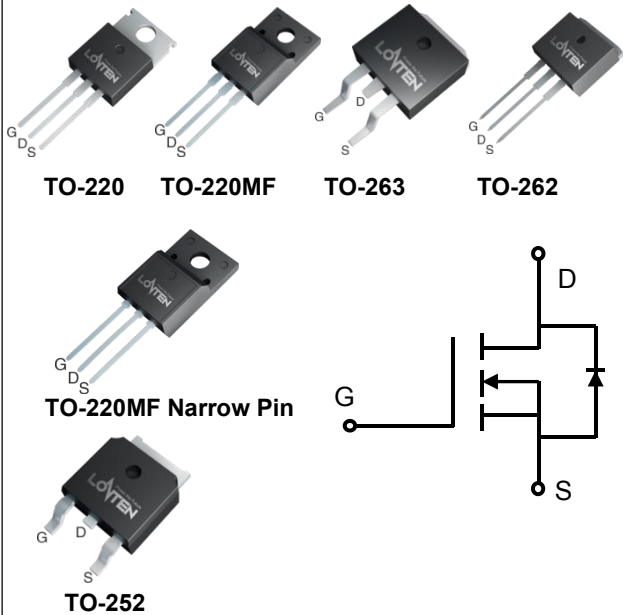
- ◆ Ultra low $R_{DS(on)}$
- ◆ Ultra low gate charge (typ. $Q_g = 23nC$)
- ◆ 100% UIS tested
- ◆ RoHS compliant

Applications

- ◆ Power factor correction (PFC).
- ◆ Switched mode power supplies (SMPS).
- ◆ Uninterruptible power supply (UPS).

Product Summary

$V_{DS} @ T_{j,max}$	600V
$R_{DS(on),max}$	0.29Ω
I_{DM}	45A
$Q_{g,typ}$	23nC



N-Channel MOSFET



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	550	V
Continuous drain current ($T_C = 25^\circ C$)	I_D	15	A
($T_C = 100^\circ C$)		9.5	A
Pulsed drain current ¹⁾	I_{DM}	45	A
Gate-Source voltage	V_{GSS}	± 30	V
Avalanche energy, single pulse ²⁾	E_{AS}	270	mJ
Avalanche energy, repetitive ³⁾	E_{AR}	0.5	mJ
Avalanche current, repetitive ³⁾	I_{AR}	11	A
Power Dissipation TO-220MF /TO-220MF Narrow Pin ($T_C = 25^\circ C$)	P_D	33	W
- Derate above $25^\circ C$		0.26	W/ $^\circ C$
Power Dissipation TO-262/TO-252/TO-263/TO-220 ($T_C = 25^\circ C$)		125	W
- Derate above $25^\circ C$		1	W/ $^\circ C$
Mounting torque To-262 (M3 and M3.5 screws)		60	Ncm
Mounting torque To-220MF (M2.5 screws)		50	Ncm

Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	15	A
Diode pulse current	$I_{S,pulse}$	45	A

Thermal Characteristics TO-262/TO-252/TO-263/ TO-220

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	°C/W
Soldering temperature, wavesoldering only allowed at leads. (1.6mm from case for 10s)	T_{solder}	260	°C

Thermal Characteristics TO-220MF/TO-220MF Narrow Pin

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.8	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	80	°C/W
Soldering temperature, wavesoldering only allowed at leads. (1.6mm from case for 10s)	T_{solder}	260	°C

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Tube	Units/Reel
LSC55R290GT	TO-220	LSC55R290GT	50	
LSD55R290GT	TO-220MF	LSD55R290GT	50	
LSE55R290GT	TO-263-2L	LSE55R290GT		800
LSF55R290GT	TO-262	LSF55R290GT	50	
LSG55R290GT	TO-252	LSG55R290GT		2500
LSDN55R290GT	TO-220MF Narrow Pin	LSDN55R290GT	50	

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0\text{ V}, I_D=0.25\text{ mA}$	550	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=0.25\text{ mA}$	2.5	3.5	4.5	V
Drain cut-off current	I_{DSS}	$V_{DS}=650\text{ V}, V_{GS}=0\text{ V},$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	- -	- 10	1 -	μA
Gate leakage current, Forward	I_{GSSF}	$V_{GS}=30\text{ V}, V_{DS}=0\text{ V}$	-	-	100	nA
Gate leakage current, Reverse	I_{GSSR}	$V_{GS}=-30\text{ V}, V_{DS}=0\text{ V}$	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=7.5\text{ A}$ $T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$	- - -	0.25 0.78	0.29 -	Ω
Gate resistance	R_G	$f=1\text{ MHz}, \text{open drain}$	-	4.6	-	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V},$	-	818	-	

Output capacitance	C _{oss}	f = 250 kHz	-	41.5	-	pF
Reverse transfer capacitance	C _{rss}		-	1.85	-	
Turn-on delay time	t _{d(on)}	V _{DD} = 300V, I _D = 7.5A R _G = 10Ω, V _{GS} =10V	-	15	-	ns
Rise time	t _r		-	27	-	
Turn-off delay time	t _{d(off)}		-	69	-	
Fall time	t _f		-	11	-	
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DD} =440 V, I _D =7.5A, V _{GS} =0 to 10 V	-	6.2	-	nC
Gate to drain charge	Q _{gd}		-	8.5	-	
Gate charge total	Q _g		-	22.8	-	
	V _{plateau}		-	5.5	-	V
Reverse diode characteristics						
Diode forward voltage	V _{SD}	V _{GS} =0 V, I _F =7.5A	-	1.0	-	V
Reverse recovery time	t _{rr}	V _R =400 V, I _F =11A, dI _F /dt=100 A/μs	-	345	-	ns
Reverse recovery charge	Q _{rr}		-	3.8	-	μC
Peak reverse recovery current	I _{rrm}		-	22	-	A

Notes:

- Limited by maximum junction temperature, maximum duty cycle is 0.75.
- $I_{AS} = 3A, V_{DD} = 60V$, Starting $T_J = 25^\circ\text{C}$.
- Repetitive Rating: Pulse width limited by maximum junction temperature.

Electrical Characteristics Diagrams

Figure 1. On-Region Characteristics

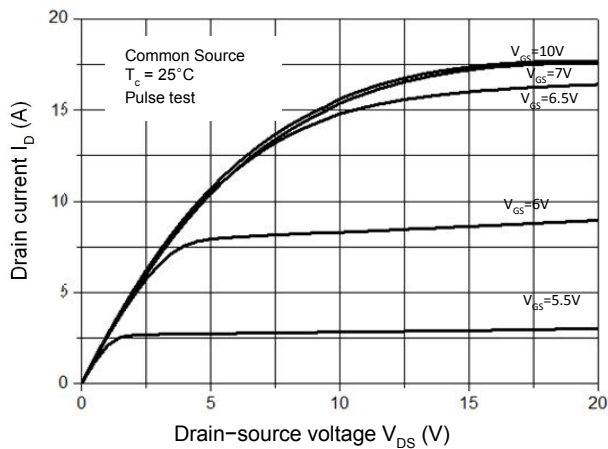


Figure 2. Transfer Characteristics

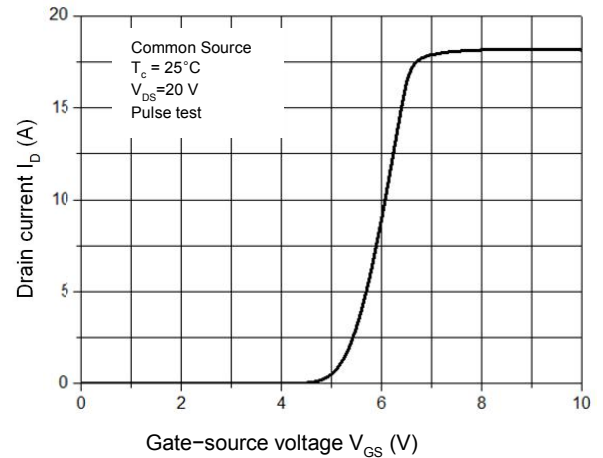


Figure 3. On-Resistance Variation vs. Drain Current

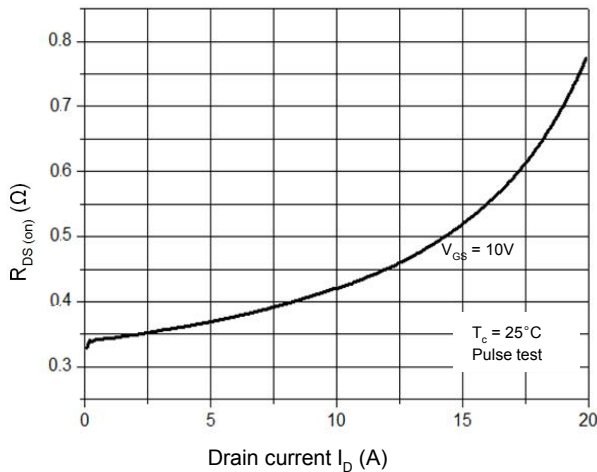


Figure 4. Threshold Voltage vs. Temperature

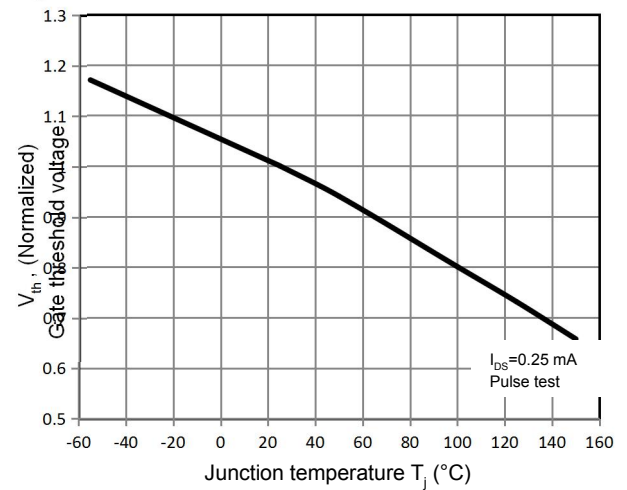


Figure 5. Breakdown Voltage vs. Temperature

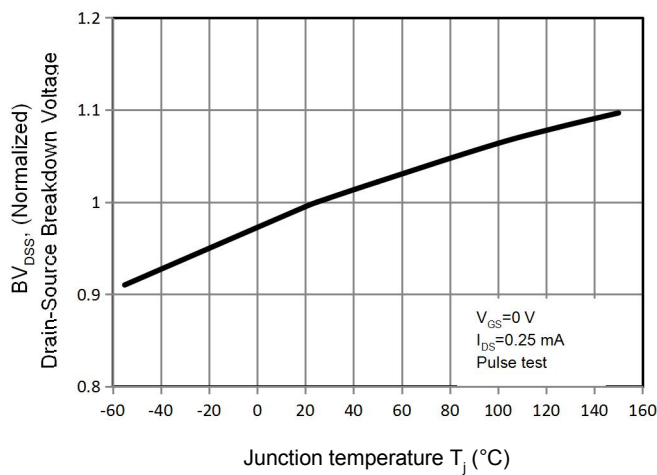


Figure 6. On-Resistance vs. Temperature

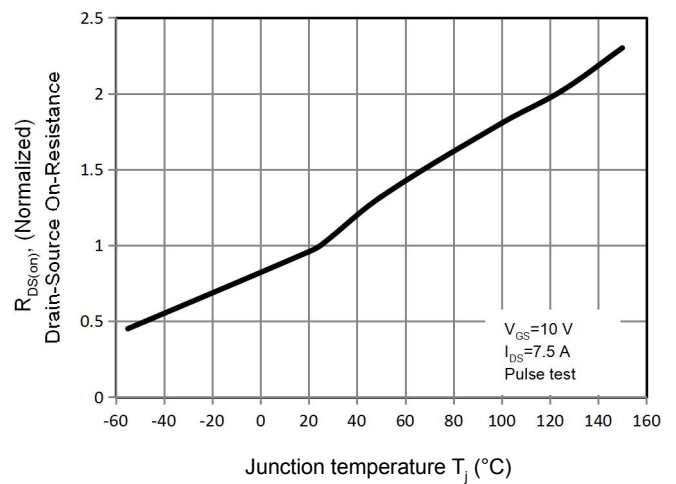


Figure 7. Capacitance Characteristics

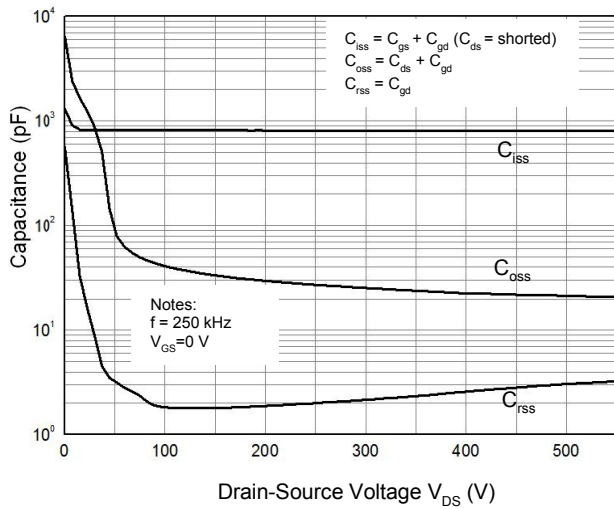


Figure 8. Gate Charge Characterist

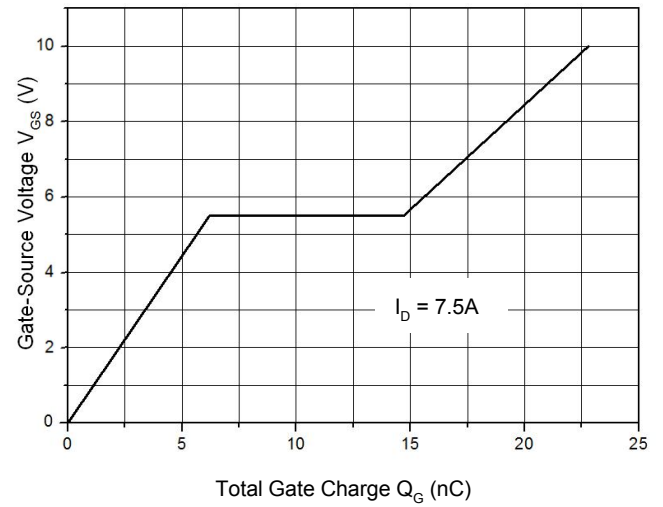


Figure 9.1 Maximum Safe Operating Area
TO-220MF/TO-220MF Narrow Pin

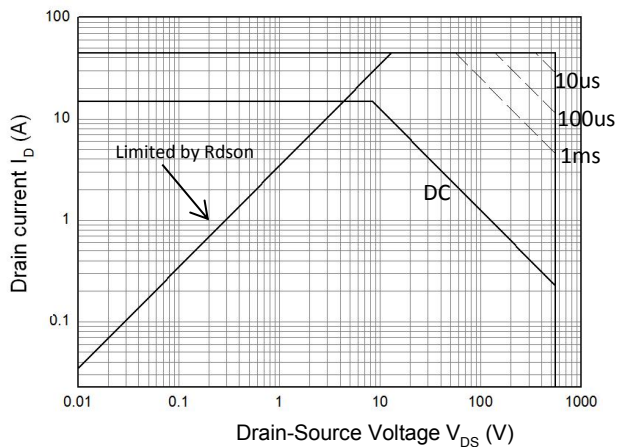


Figure 9.2 Maximum Safe Operating Area
TO-263-2L/TO-262/TO-252/TO-220

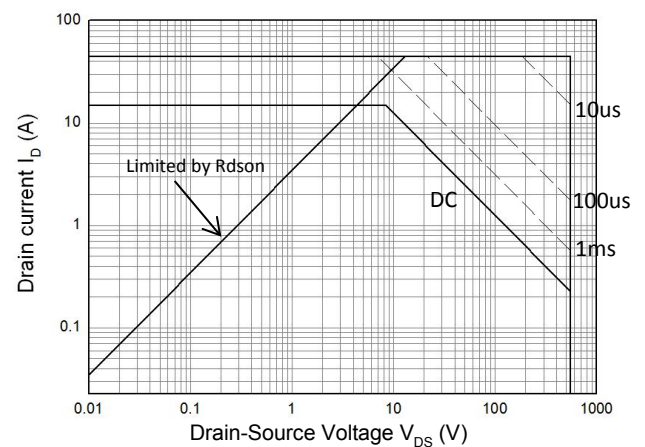


Figure 10.1 Power Dissipation vs. Temperature
TO-220MF/TO-220MF Narrow Pin

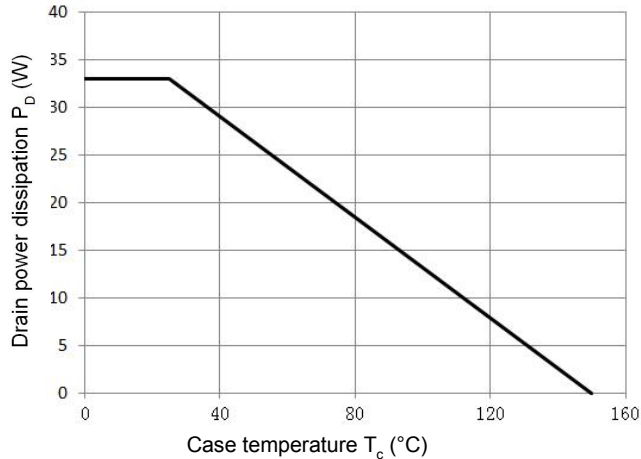


Figure 10.2 Power Dissipation vs. Temperature
TO-263-2L/TO-262/TO-252/TO-220

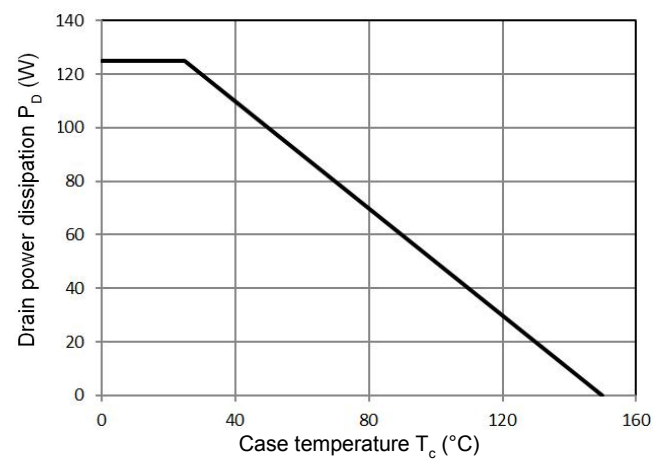


Figure 11.1 Transient Thermal Response Curve

TO-220MF/TO-220MF Narrow Pin

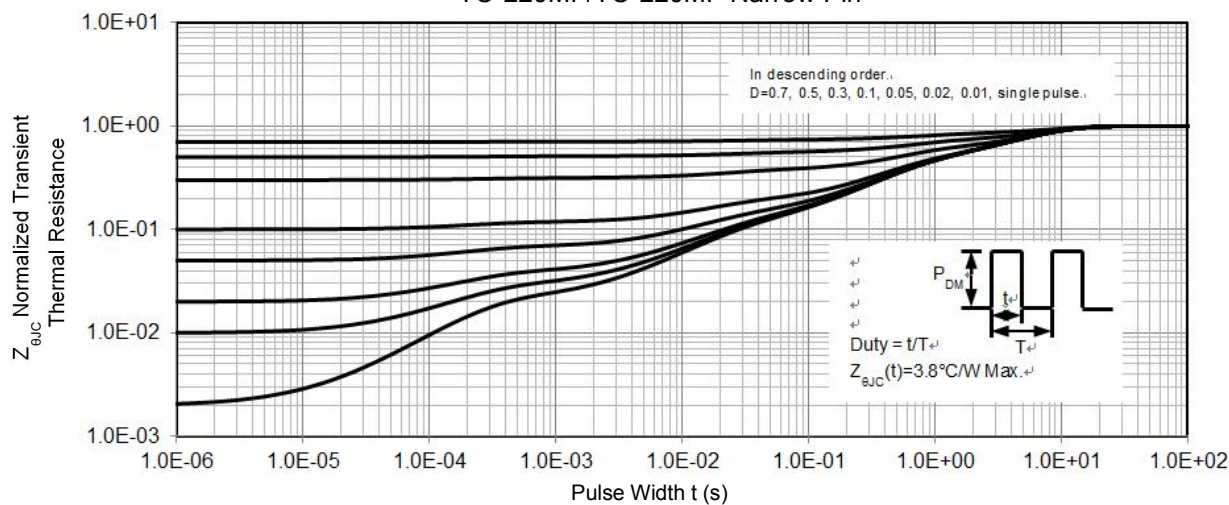
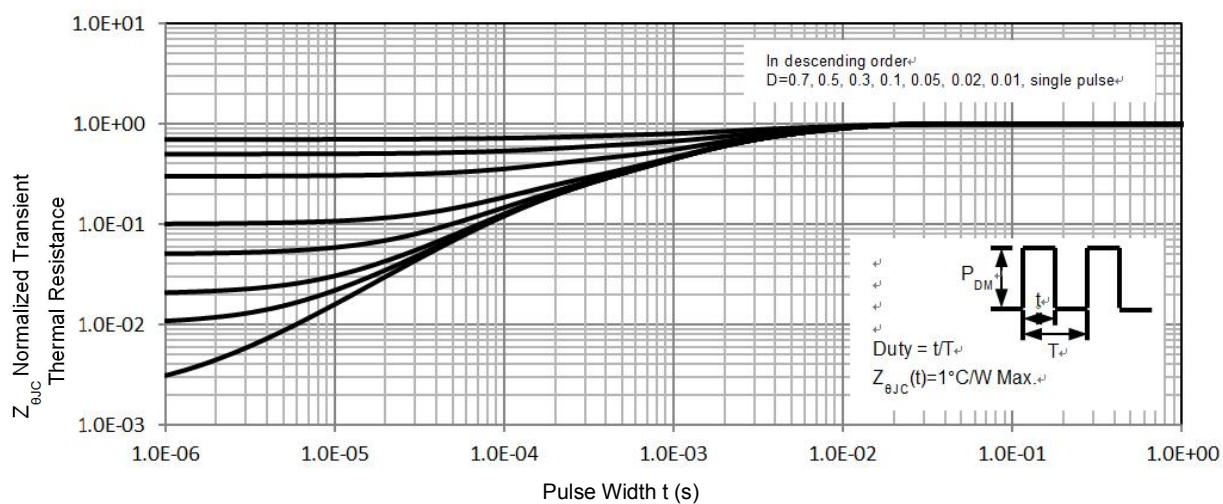
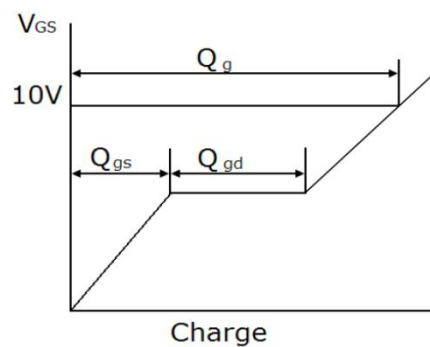
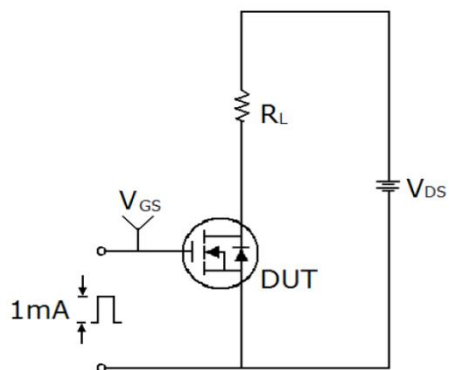


Figure 11.1 Transient Thermal Response Curve

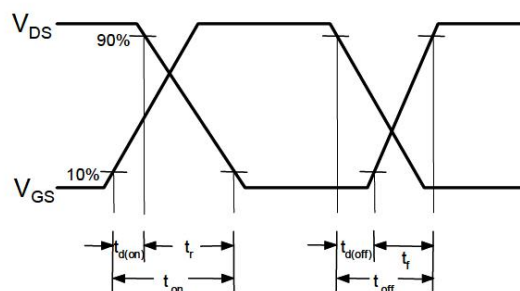
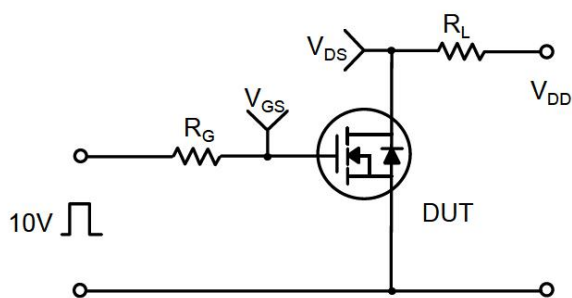
TO-263-2L/TO-262/TO-252 TO-220



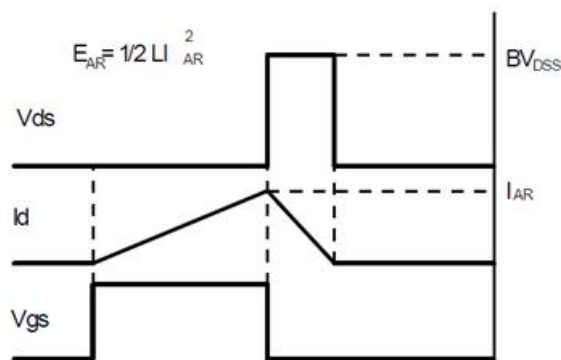
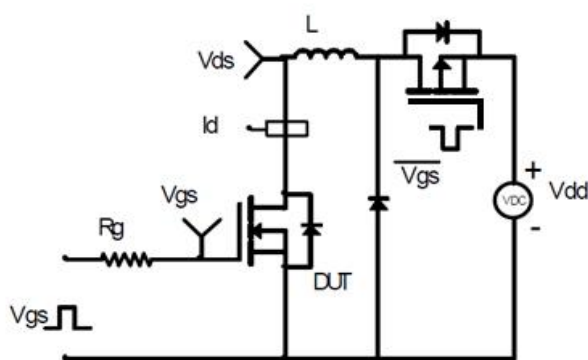
Gate Charge Test Circuit & Waveform



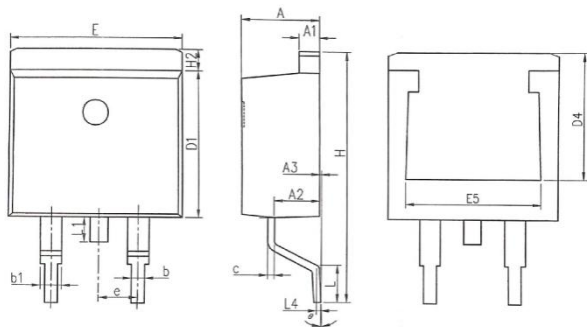
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

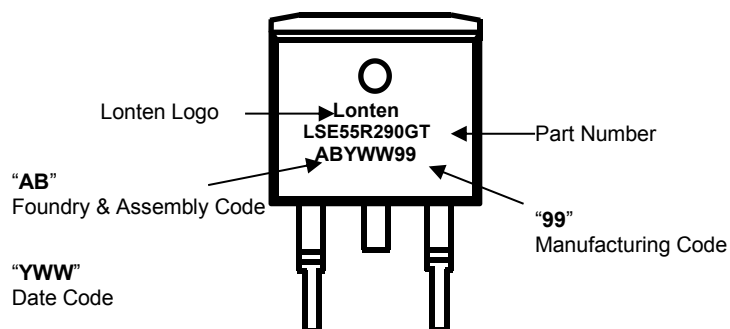


Mechanical Dimensions for TO-263

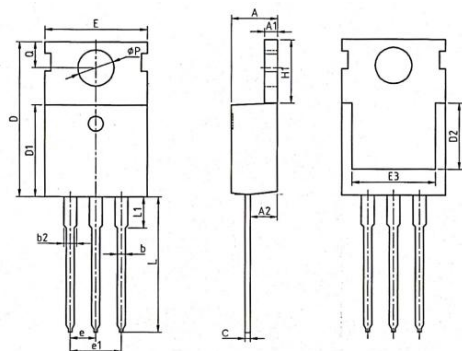


SYMBOL	COMMON DIMENSIONS					
	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.37	4.57	4.77	0.172	0.180	0.188
A1	1.22	1.27	1.42	0.048	0.050	0.056
A2	2.49	2.89	2.89	0.098	0.114	0.114
A3	0.00	0.13	0.25	0.000	0.005	0.010
b	0.70	0.81	0.96	0.028	0.032	0.034
b1	1.17	1.27	1.47	0.046	0.050	0.058
c	0.30	0.38	0.53	0.012	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	0.389	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°	0.197°	0.354°

TO-263 Part Marking Information

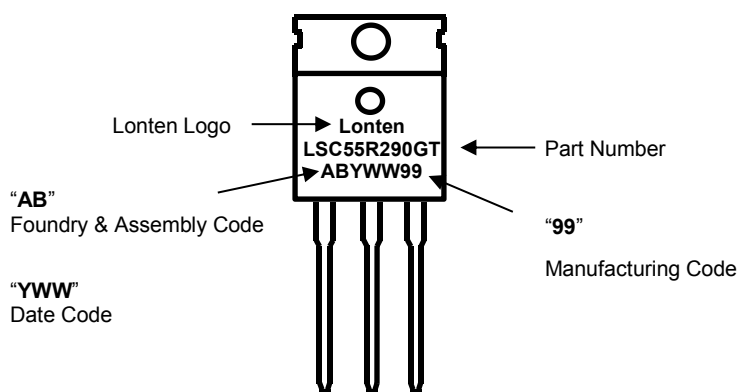


Mechanical Dimensions for TO-220

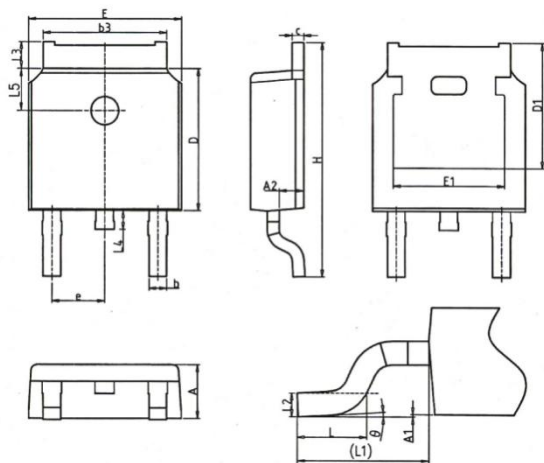


COMMON DIMENSIONS						
SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.37	4.57	4.70	0.172	0.180	0.185
A1	1.25	1.30	1.40	0.049	0.051	0.055
A2	2.20	2.40	2.60	0.087	0.094	0.102
b	0.70	0.80	0.95	0.028	0.031	0.037
b2	1.17	1.27	1.47	0.046	0.050	0.058
c	0.45	0.50	0.60	0.018	0.020	0.024
D	15.10	15.60	16.10	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	2.54BSC			0.1BSC		
e1	5.08BSC			0.2BSC		
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

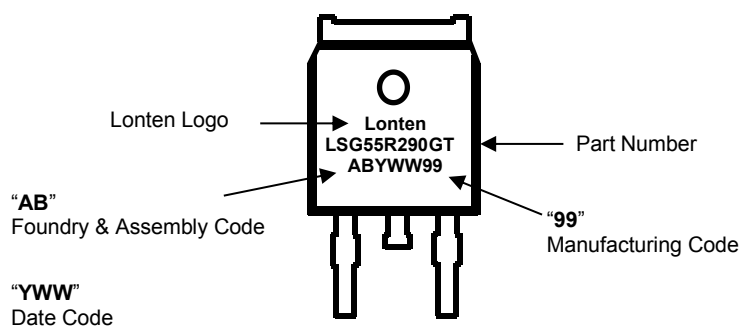


Mechanical Dimensions for TO-252

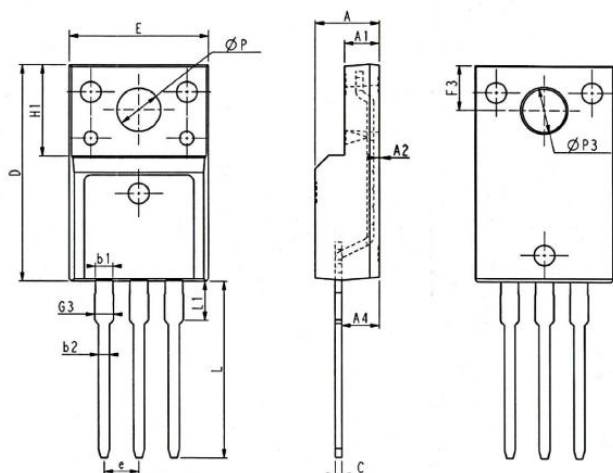


SYMBOL	COMMON DIMENSIONS		
	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	—	0.20
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.73
E1	4.63	—	—
e	2.286BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88	—	1.28
L4	0.50	—	1.00
L5	1.65	1.80	1.95
θ	0°	—	8°

TO-252 Part Marking Information

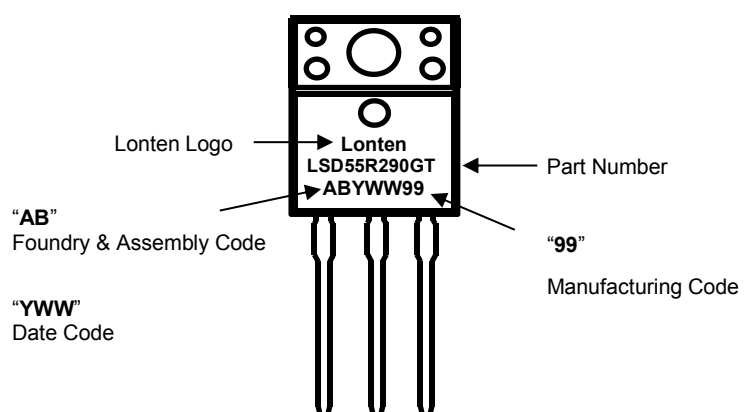


Mechanical Dimensions for TO-220MF

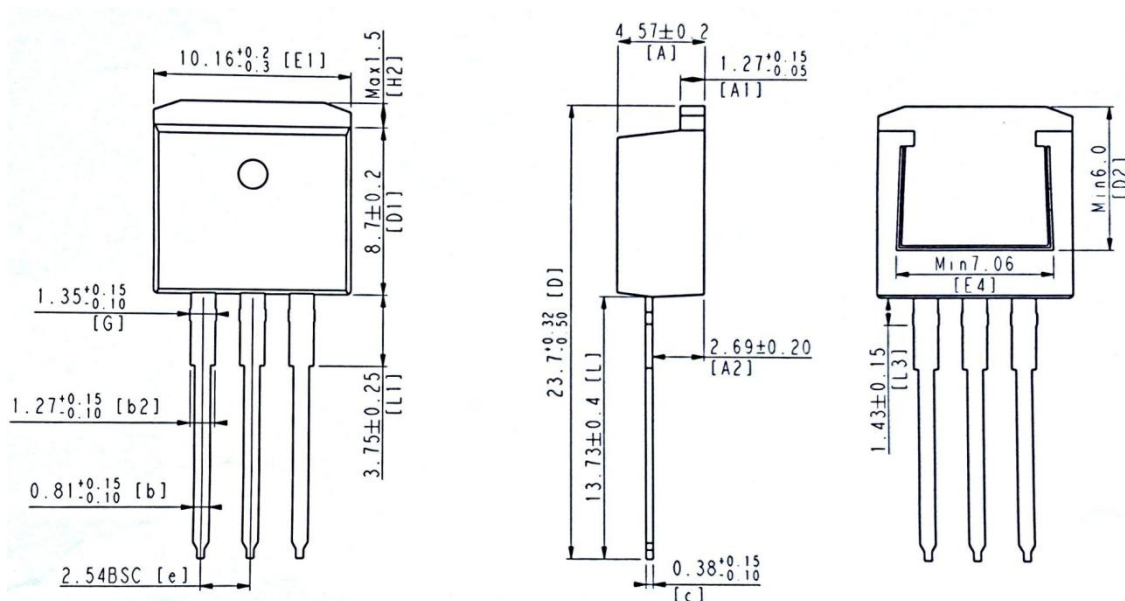


COMMON DIMENSIONS						
SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
E	9.96	10.16	10.36	0.392	0.400	0.408
A	4.50	4.70	4.90	0.177	0.185	0.193
A1	2.34	2.54	2.74	0.092	0.100	0.108
A2	0.30	0.45	0.60	0.012	0.002	0.024
A4	2.65	2.76	2.96	0.104	0.109	0.117
C	0.40	0.50	0.65	0.016	0.020	0.026
D	15.57	15.87	16.17	0.613	0.625	0.637
H1	6.70REF			0.264REF		
e	2.54BSC			0.1BSC		
ØP	3.03	3.18	3.38	0.119	0.125	0.133
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
ØP3	3.15REF			0.124REF		
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

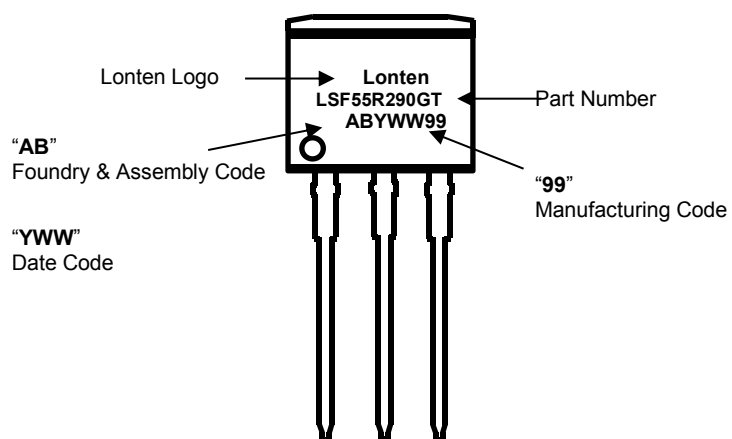
TO-220MF Part Marking Information



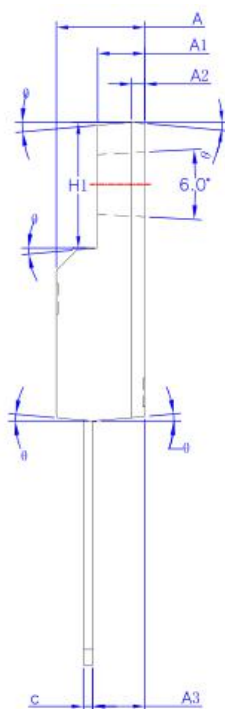
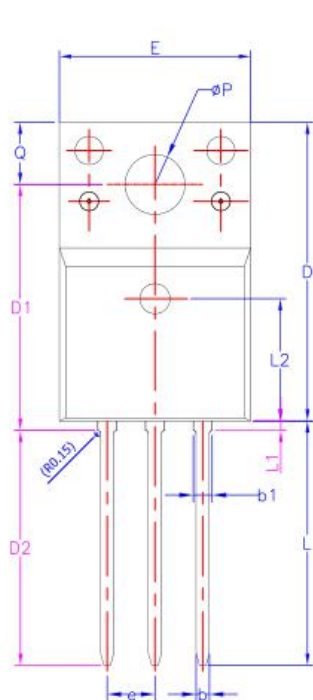
Mechanical Dimensions for TO-262



TO-262 Part Marking Information



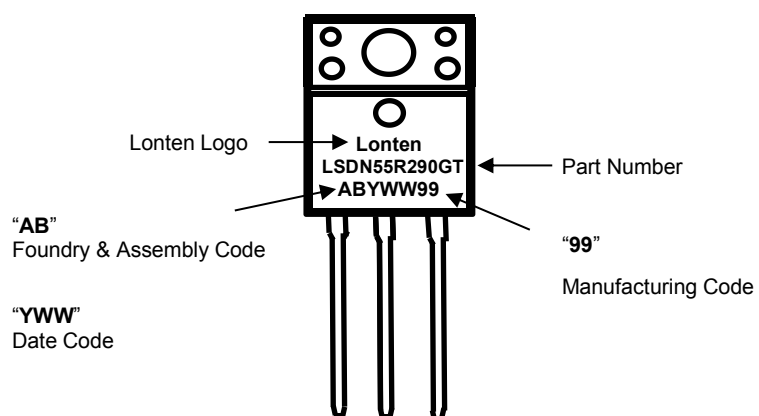
Mechanical Dimensions for TO-220MF Narrow Pin



(UNITS:mm)

SYMBOL	MIN	NOM	MAX
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2	0.70 REF		
A3	2.56	2.76	2.93
b	0.60	—	0.80
b1	0.90	—	1.10
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	12.87	13.07	13.27
D2	12.28	12.48	12.68
E	9.96	10.16	10.36
e	2.54BSC		
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	—	—	0.85
L2	6.50REF		
øP	3.08	3.18	3.28
Q	3.20	—	3.40
θ 1	1°	3°	5°

TO-220MF Narrow Pin Part Marking Information



Disclaimer

The content specified herein is for the purpose of introducing LONTEN's products (hereinafter "Products"). The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

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[IPS70R2K0CEAKMA1](#) [RJK60S3DPP-E0#T2](#) [RJK60S5DPK-M0#T0](#) [APT5010JVFR](#) [APT12031JFLL](#) [APT12040JVR](#) [DMN3404LQ-7](#)
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