


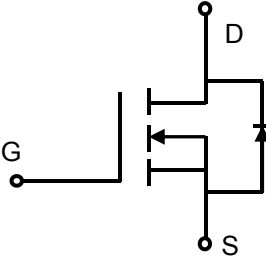



Lonten N-channel 600V, 4A, 950mΩ LonFET™ Power MOSFET

<p>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.</p> <p>Features</p> <ul style="list-style-type: none"> ◆ Ultra low $R_{DS(on)}$ ◆ Ultra low gate charge (typ. $Q_g = 7.6nC$) ◆ 100% UIS tested ◆ RoHS compliant <p>Applications</p> <ul style="list-style-type: none"> ◆ Power factor correction (PFC). ◆ Switched mode power supplies (SMPS). ◆ Uninterruptible power supply (UPS). 	<p>Product Summary</p> <table border="0"> <tr> <td>$V_{DS} @ T_{j,max}$</td> <td>650V</td> </tr> <tr> <td>$R_{DS(on),max}$</td> <td>950mΩ</td> </tr> <tr> <td>I_{DM}</td> <td>12A</td> </tr> <tr> <td>$Q_{g,typ}$</td> <td>7.6nC</td> </tr> </table> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  TO-251 </div> <div style="text-align: center;">  TO-252 </div> <div style="text-align: center;">  TO-220FT </div> </div> <div style="text-align: center; margin-top: 20px;">  N-Channel MOSFET </div> <div style="text-align: right; margin-top: 10px;">  </div>	$V_{DS} @ T_{j,max}$	650V	$R_{DS(on),max}$	950mΩ	I_{DM}	12A	$Q_{g,typ}$	7.6nC
$V_{DS} @ T_{j,max}$	650V								
$R_{DS(on),max}$	950mΩ								
I_{DM}	12A								
$Q_{g,typ}$	7.6nC								

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	600	V
Continuous drain current ($T_C = 25^\circ C$) ($T_C = 100^\circ C$)	I_D	4	A
		2.5	A
Pulsed drain current ¹⁾	I_{DM}	12	A
Gate-Source voltage	V_{GSS}	± 30	V
Avalanche energy, single pulse ²⁾	E_{AS}	120	mJ
Avalanche energy, repetitive ³⁾	E_{AR}	0.6	mJ
Avalanche current, repetitive ³⁾	I_{AR}	4	A
Power Dissipation TO-220FT ($T_C = 25^\circ C$) - Derate above 25°C	P_D	25	W
		0.20	W/°C
Power Dissipation TO-251/ TO-252 ($T_C = 25^\circ C$) - Derate above 25°C	P_D	40	W
		0.32	W/°C
Mounting torque To-220FT (M2.5 screws)		50	Ncm
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	4	A
Diode pulse current	$I_{S,pulse}$	12	A

Thermal Characteristics TO-251/TO-252

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.13	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	160	$^{\circ}\text{C}/\text{W}$
Soldering temperature, wavesoldering only allowed at leads. (1.6mm from case for 10s)	T_{sold}	260	$^{\circ}\text{C}$

Thermal Characteristics TO-220FT

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	5.0	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	105	$^{\circ}\text{C}/\text{W}$
Soldering temperature, wavesoldering only allowed at leads. (1.6mm from case for 10s)	T_{sold}	260	$^{\circ}\text{C}$

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Tube	Units/Reel
LSDN60R950HT	TO-220FT	LSDN60R950HT	50	
LSG60R950HT	TO-252	LSG60R950HT	72	2500
LSH60R950HT	TO-251	LSH60R950HT	72	4680

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}	$V_{GS}=0\text{ V}, I_D=0.25\text{ mA}$	600	-	-	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}	$V_{DS}=600\text{ V}, V_{GS}=0\text{ V},$ $T_j = 25^{\circ}\text{C}$ $T_j = 125^{\circ}\text{C}$	-	-	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	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=2\text{ A}$ $T_j = 25^{\circ}\text{C}$ $T_j = 150^{\circ}\text{C}$	-	0.86	0.95	Ω
Gate resistance	R_G	$f=1\text{ MHz}, \text{open drain}$	-	8	-	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V},$ $f = 250\text{ kHz}$	-	317	-	pF
Output capacitance	C_{oss}		-	14.1	-	
Reverse transfer capacitance	C_{rss}		-	1.36	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 400\text{ V}, I_D = 2\text{ A}$ $R_G = 10\Omega, V_{GS}=15\text{ V}$	-	16.1	-	ns
Rise time	t_r		-	27	-	
Turn-off delay time	$t_{d(off)}$		-	46	-	
Fall time	t_f		-	36.4	-	

Gate charge characteristics						
Gate to source charge	Q_{gs}	$V_{DD}=480\text{ V}$, $I_D=2\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$	-	2.5	-	nC
Gate to drain charge	Q_{gd}		-	2.6	-	
Gate charge total	Q_g		-	7.6	-	
	$V_{plateau}$		-	6	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}$, $I_F=2\text{ A}$	-	1.0	-	V
Reverse recovery time	t_{rr}	$V_R=400\text{ V}$, $I_F=2\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$	-	153	-	ns
Reverse recovery charge	Q_{rr}		-	0.8	-	μC
Peak reverse recovery current	I_{rrm}		-	10.5	-	A

Notes:

1. Limited by maximum junction temperature, maximum duty cycle is 0.75.
2. $I_{AS} = 2\text{ A}$, $V_{DD} = 60\text{ V}$, Starting $T_j = 25^\circ\text{C}$.
3. Repetitive Rating: Pulse width limited by maximum junction temperature.

Electrical Characteristics Diagrams

Figure 1. On-Region Characteristics

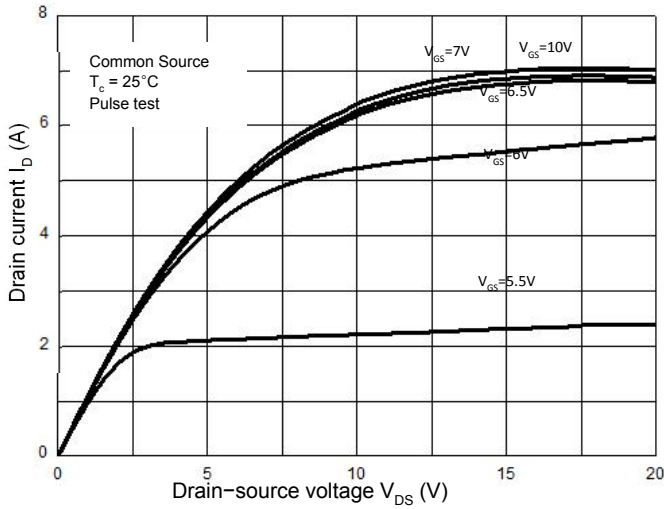


Figure 2. Transfer Characteristics

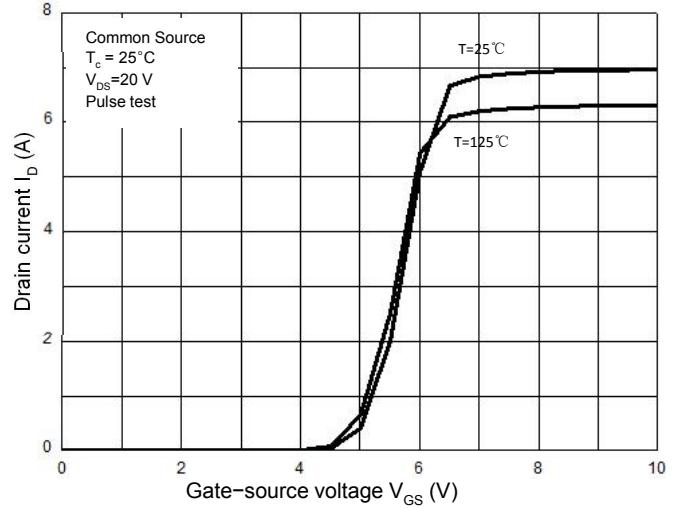


Figure 3. On-Resistance Variation vs. Drain Current

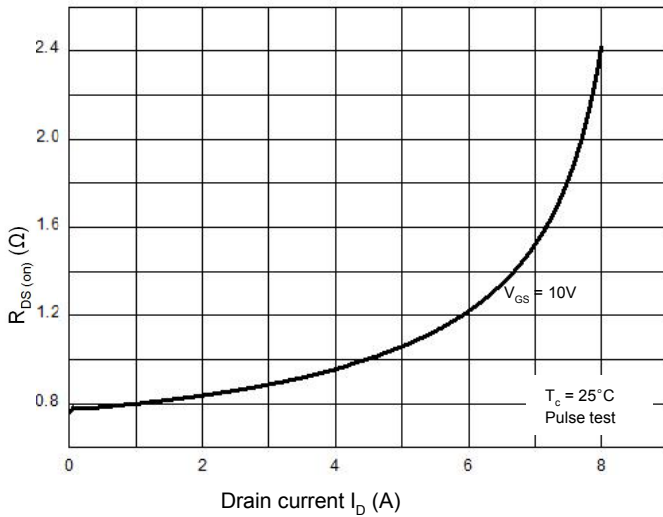


Figure 4. Threshold Voltage vs. Temperature

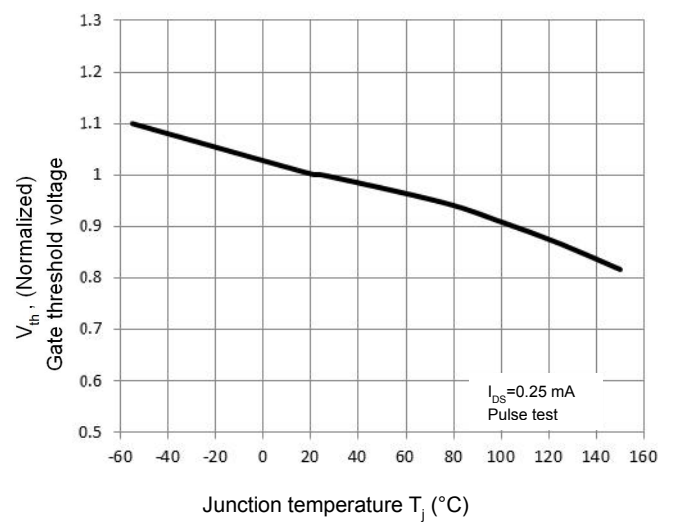


Figure 5. Breakdown Voltage vs. Temperature

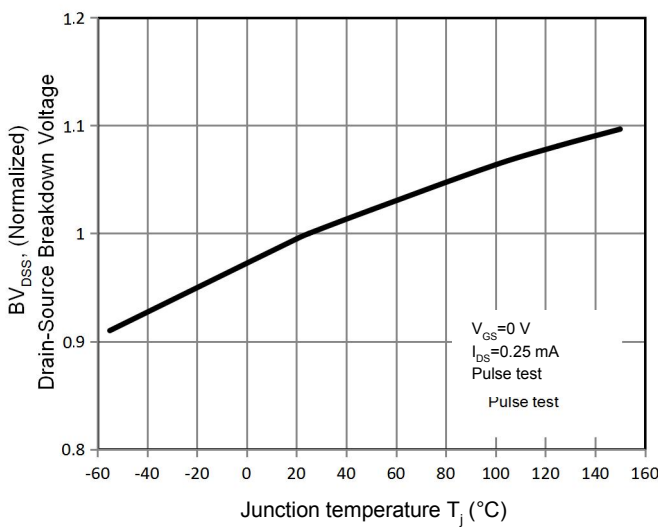


Figure 6. On-Resistance vs. Temperature

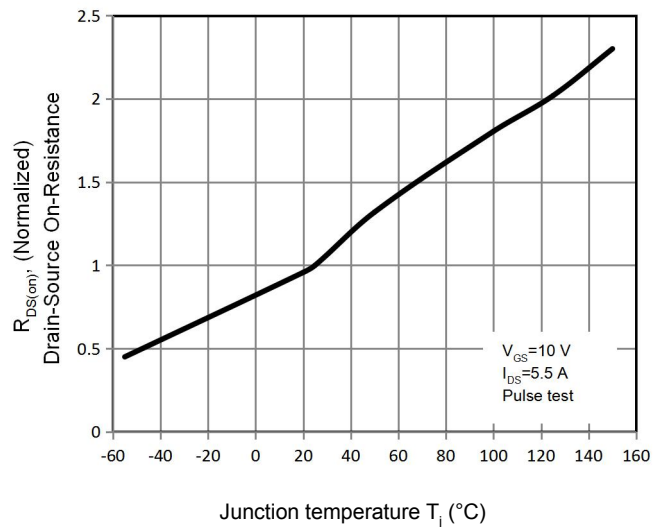


Figure 7. Capacitance Characteristics

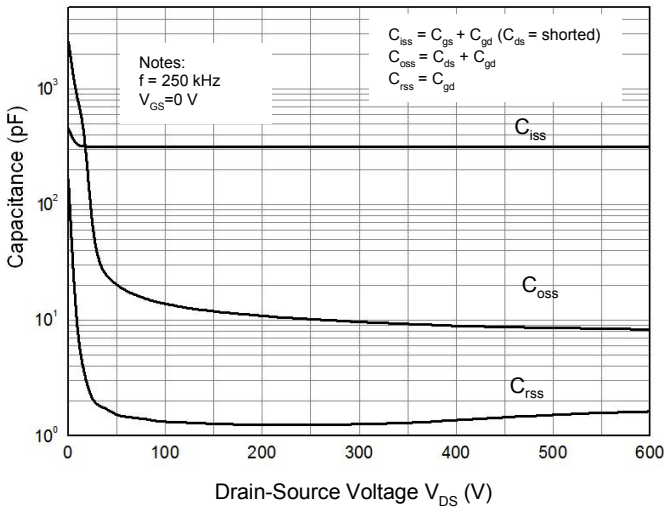


Figure 8. Gate Charge Characterist

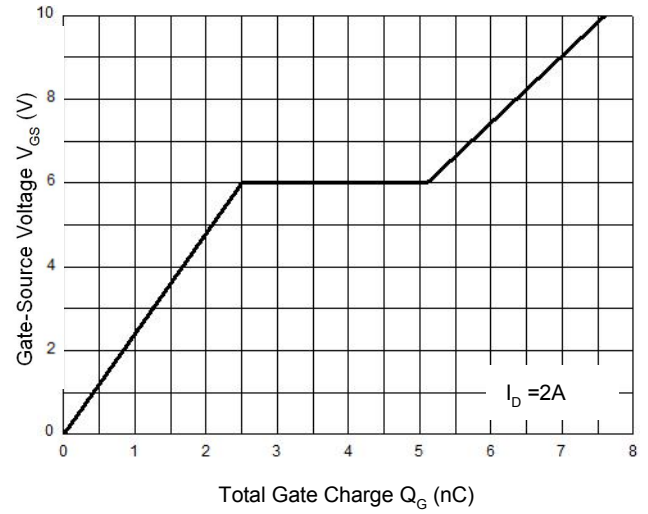


Figure 9.1 Maximum Safe Operating Area TO-220FT

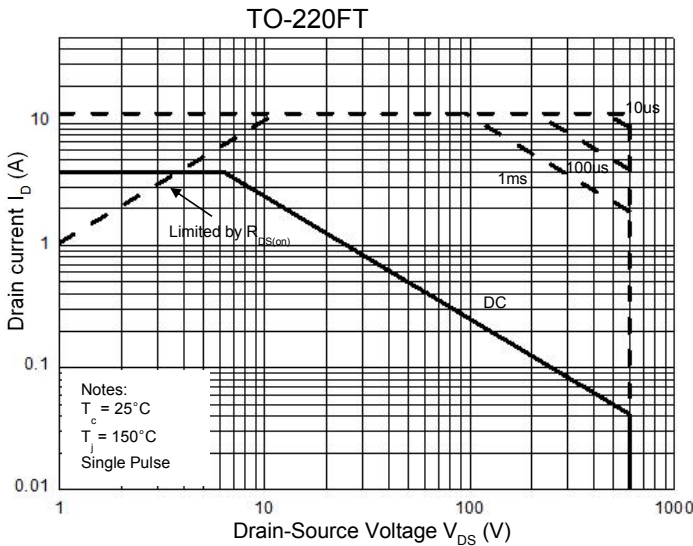


Figure 9.2 Maximum Safe Operating Area TO-251/TO-252

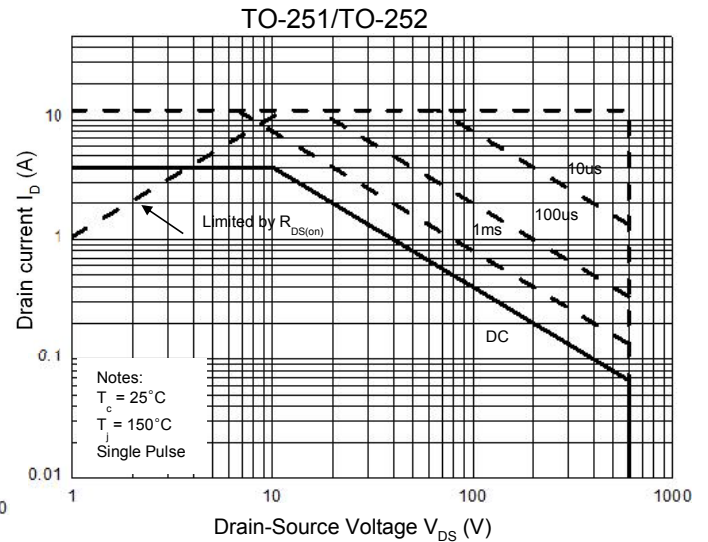


Figure 10.1 Power Dissipation vs. Temperature TO-220FT

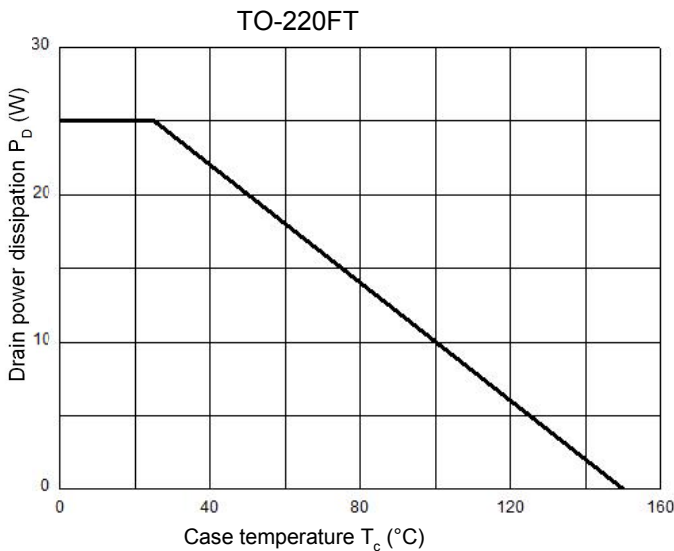
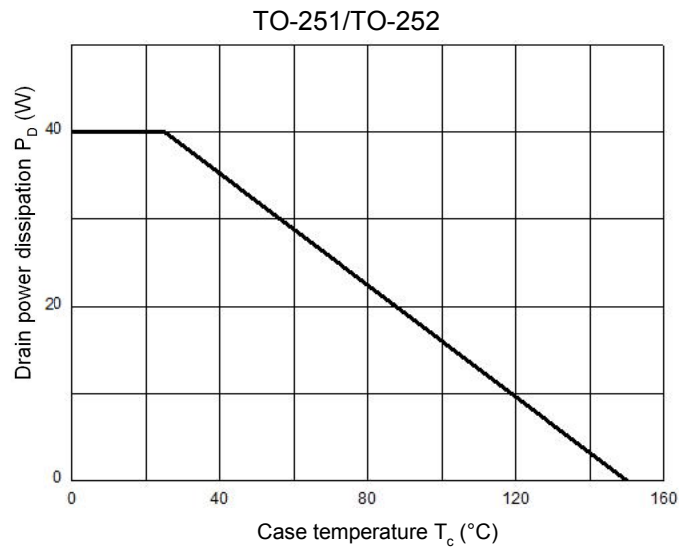
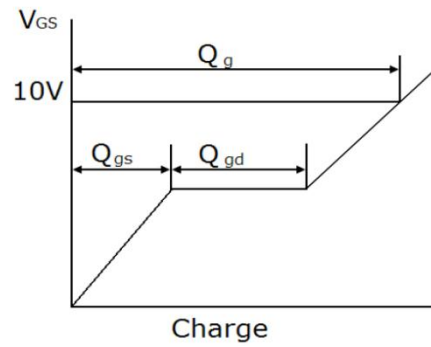
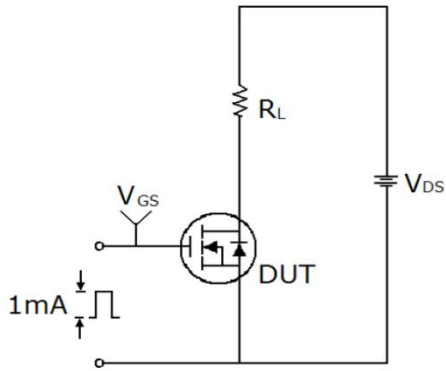


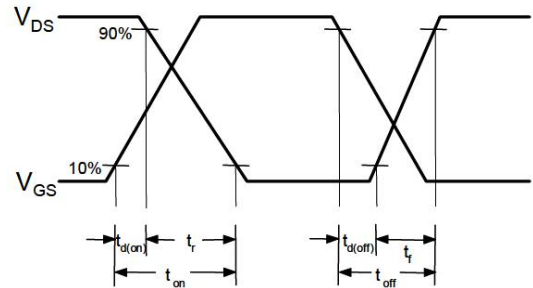
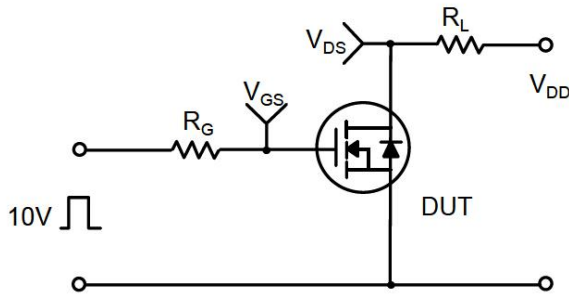
Figure 10.2 Power Dissipation vs. Temperature TO-251/TO-252



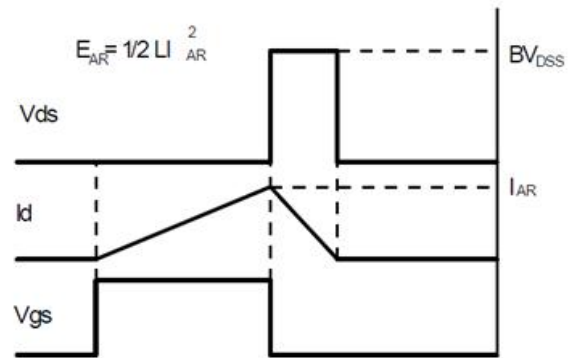
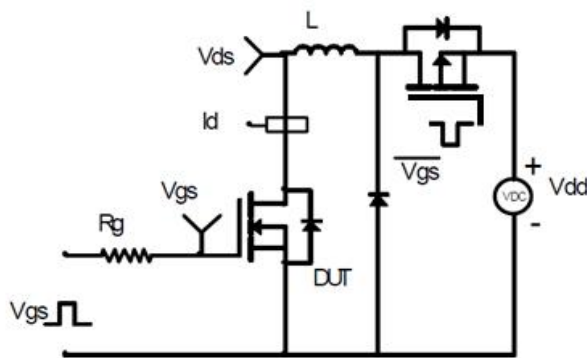
Gate Charge Test Circuit & Waveform



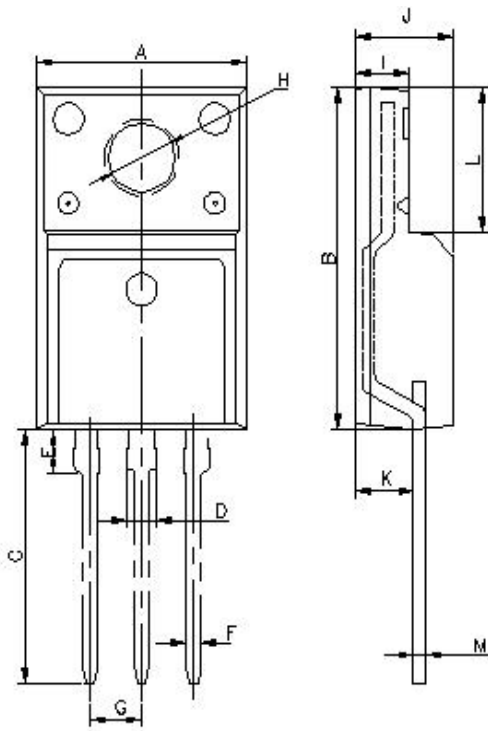
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

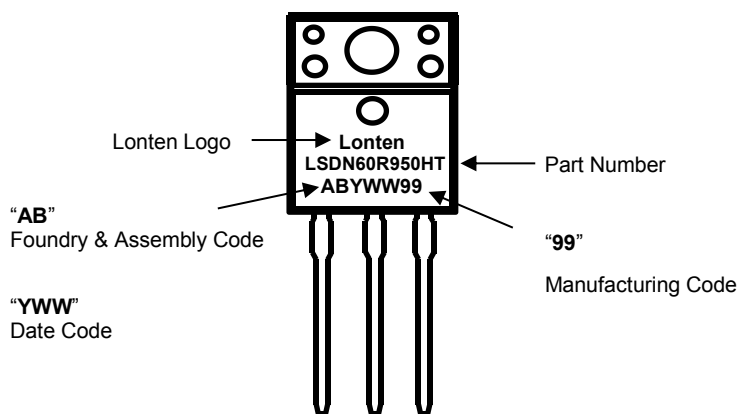


Mechanical Dimensions for TO-220FT

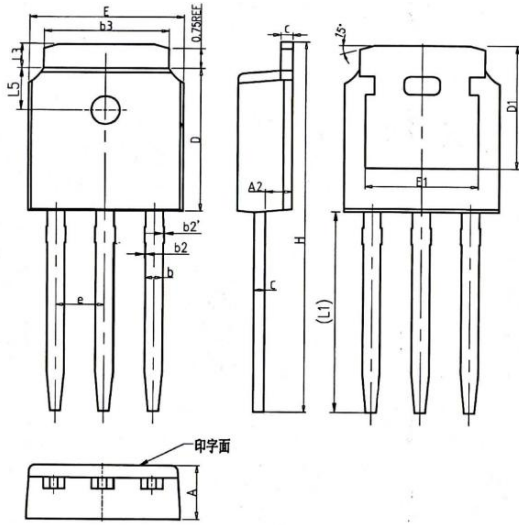


Dim.	mm		
	min.	typ.	max.
A	9.96	10.16	10.36
B	15.67	15.87	16.07
C	12.70	13.00	13.30
D	1.07	1.22	1.37
E	1.85	2.00	2.15
F	0.46	0.69	0.79
G		2.54	
H	3.08	3.18	3.28
I	2.34	2.54	2.74
J	4.50	4.70	4.90
K	2.61	2.76	2.91
L	6.50	6.70	6.90
M	0.40	0.50	0.60

TO-220FT Part Marking Information

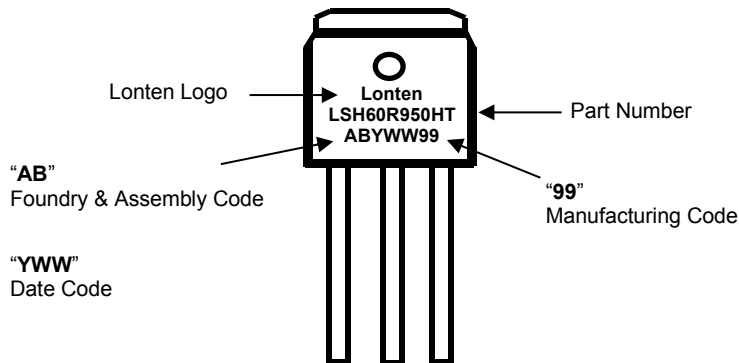


Mechanical Dimensions for TO-251

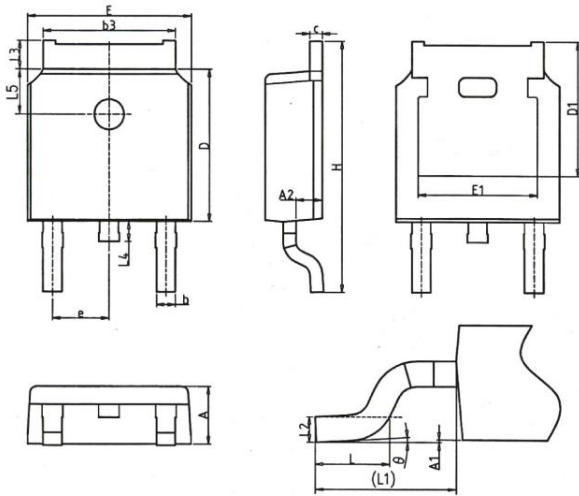


SYMBOL	COMMON DIMENSIONS		
	MM		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b2	0.00	0.04	0.10
b2'	0.00	0.04	0.10
b3	5.20	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.73
E1	4.63	—	—
e	2.286BSC		
H	16.22	16.52	16.82
L1	9.15	9.40	9.65
L3	0.88	1.02	1.28
L5	1.65	1.80	1.95

TO-251 Part Marking Information

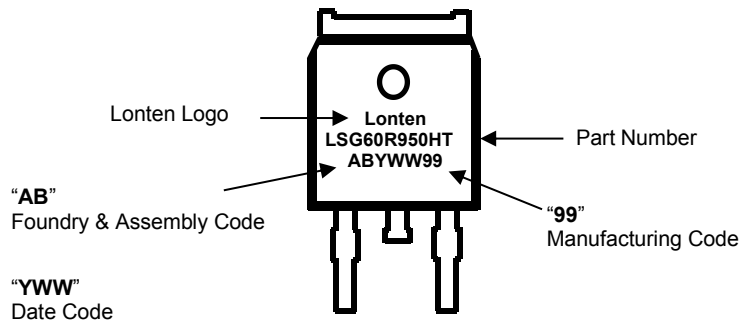


Mechanical Dimensions for TO-252



COMMON DIMENSIONS			
SYMBOL	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



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.

LONTEN does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of the Products or technical information described in this document.

The Products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). LONTEN shall bear no responsibility in any way for use of any of the Products for the above special purposes.

Although LONTEN endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a LONTEN product.

The content specified herein is subject to change for improvement without notice. When using a LONTEN product, be sure to obtain the latest specifications.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [MOSFET](#) category:

Click to view products by [LONTEN](#) manufacturer:

Other Similar products are found below :

[614233C](#) [648584F](#) [MCH3443-TL-E](#) [MCH6422-TL-E](#) [FDPF9N50NZ](#) [FW216A-TL-2W](#) [FW231A-TL-E](#) [APT5010JVR](#) [NTNS3A92PZT5G](#)
[IRF100S201](#) [JANTX2N5237](#) [2SK2464-TL-E](#) [2SK3818-DL-E](#) [FCA20N60_F109](#) [FDZ595PZ](#) [STD6600NT4G](#) [FSS804-TL-E](#) [2SJ277-DL-E](#)
[2SK1691-DL-E](#) [2SK2545\(Q,T\)](#) [D2294UK](#) [405094E](#) [423220D](#) [MCH6646-TL-E](#) [TPCC8103,L1Q\(CM](#) [367-8430-0972-503](#) [VN1206L](#)
[424134F](#) [026935X](#) [051075F](#) [SBVS138LT1G](#) [614234A](#) [715780A](#) [NTNS3166NZT5G](#) [751625C](#) [873612G](#) [IRF7380TRHR](#)
[IPS70R2K0CEAKMA1](#) [RJK60S3DPP-E0#T2](#) [RJK60S5DPK-M0#T0](#) [APT5010JVFR](#) [APT12031JFLL](#) [APT12040JVR](#) [DMN3404LQ-7](#)
[NTE6400](#) [JANTX2N6796U](#) [JANTX2N6784U](#) [JANTXV2N5416U4](#) [SQM110N05-06L-GE3](#) [SIHF35N60E-GE3](#)