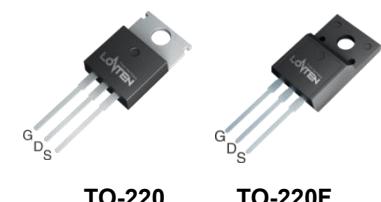
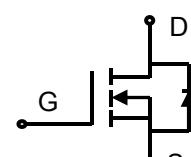


Lonten N-channel 600V, 7A Power MOSFET

Description	Product Summary
<p>The Power MOSFET is fabricated using the advanced planar VDMOS technology. The resulting device has low conduction resistance, superior switching performance and high avalanche energy.</p>	<p>V_{DSS} 600V I_D 7A $R_{DS(on),max}$ 1.3Ω $Q_{g,typ}$ 20.6nC</p>
Features	
<ul style="list-style-type: none"> ◆ Low $R_{DS(on)}$ ◆ Low gate charge (typ. $Q_g = 20.6\text{nC}$) ◆ 100% UIS tested ◆ RoHS compliant 	 <p>TO-220 TO-220F</p>
Applications	
<ul style="list-style-type: none"> ◆ Power factor correction. ◆ Switched mode power supplies. ◆ LED driver. 	 <p>N-Channel MOSFET</p>

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	600	V
Continuous drain current ($T_c = 25^\circ\text{C}$) ($T_c = 100^\circ\text{C}$)	I_D	7 4.2	A A
Pulsed drain current ¹⁾	I_{DM}	28	A
Gate-Source voltage	V_{GSS}	± 30	V
Avalanche energy, single pulse ²⁾	E_{AS}	405	mJ
Peak diode recovery dv/dt ³⁾	dv/dt	5	V/ns
Power Dissipation TO-220F ($T_c = 25^\circ\text{C}$) Derate above 25°C	P_D	39	W
		0.31	$\text{W}/^\circ\text{C}$
Power Dissipation TO-220\ TO-251\ TO-252 ($T_c = 25^\circ\text{C}$) Derate above 25°C		100	W
		0.8	$\text{W}/^\circ\text{C}$
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$
Continuous diode forward current	I_S	7	A
Diode pulse current	$I_{S,pulse}$	28	A

Thermal Characteristics

Parameter	Symbol	Value	Unit	
		TO-220F	TO-220\ TO-251\ TO-252	
Thermal resistance, Junction-to-case	$R_{\theta JC}$	3.2	1.25	$^\circ\text{C}/\text{W}$
Thermal resistance, Junction-to-ambient	$R_{\theta JA}$	62.5	110	$^\circ\text{C}/\text{W}$

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Tube	Units/Real
LNC7N60	TO-220	LNC7N60	50	
LND7N60	TO-220F	LND7N60	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}	$\text{V}_{\text{GS}}=0 \text{ V}, \text{I}_D=250 \mu\text{A}$	600	-	-	V
Gate threshold voltage	$\text{V}_{\text{GS(th)}}$	$\text{V}_{\text{DS}}=\text{V}_{\text{GS}}, \text{I}_D=250 \mu\text{A}$	2	-	4	V
Drain cut-off current	I_{DSS}	$\text{V}_{\text{DS}}=600 \text{ V}, \text{V}_{\text{GS}}=0 \text{ V},$ $\text{T}_j = 25^\circ\text{C}$ $\text{T}_j = 125^\circ\text{C}$	-	-	1	μA
Gate leakage current, Forward	I_{GSSF}	$\text{V}_{\text{GS}}=30 \text{ V}, \text{V}_{\text{DS}}=0 \text{ V}$	-	-	100	nA
Gate leakage current, Reverse	I_{GSSR}	$\text{V}_{\text{GS}}=-30 \text{ V}, \text{V}_{\text{DS}}=0 \text{ V}$	-	-	-100	nA
Drain-source on-state resistance	$\text{R}_{\text{DS(on)}}$	$\text{V}_{\text{GS}}=10 \text{ V}, \text{I}_D=3.5 \text{ A}$	-	1.0	1.3	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	$\text{V}_{\text{DS}} = 25 \text{ V}, \text{V}_{\text{GS}} = 0 \text{ V},$ $f = 1 \text{ MHz}$	-	1112	-	pF
Output capacitance	C_{oss}		-	90	-	
Reverse transfer capacitance	C_{rss}		-	5	-	
Turn-on delay time	$t_{\text{d(on)}}$	$\text{V}_{\text{DD}} = 300 \text{ V}, \text{I}_D = 7 \text{ A}$ $\text{R}_G = 10 \Omega, \text{V}_{\text{GS}}=15 \text{ V}$	-	12	-	ns
Rise time	t_r		-	30	-	
Turn-off delay time	$t_{\text{d(off)}}$		-	52	-	
Fall time	t_f		-	12	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	$\text{V}_{\text{DD}}=480 \text{ V}, \text{I}_D=7 \text{ A},$ $\text{V}_{\text{GS}}=0 \text{ to } 10 \text{ V}$	-	5.4	-	nC
Gate to drain charge	Q_{gd}		-	7.4	-	
Gate charge total	Q_{g}		-	20.6	-	
Gate plateau voltage	$\text{V}_{\text{plateau}}$		-	5.1	-	
Reverse diode characteristics						
Diode forward voltage	V_{SD}	$\text{V}_{\text{GS}}=0 \text{ V}, \text{I}_F=7 \text{ A}$	-	-	1.5	V
Reverse recovery time	t_{rr}	$\text{V}_R=300 \text{ V}, \text{I}_F=7 \text{ A},$ $d\text{I}_F/dt=100 \text{ A}/\mu\text{s}$	-	306	-	ns
Reverse recovery charge	Q_{rr}		-	2.1	-	μC
Peak reverse recovery current	I_{rrm}		-	13.7	-	A

Notes:

1. Pulse width limited by maximum junction temperature.
2. $L=10\text{mH}, \text{I}_{\text{AS}} = 9\text{A}, \text{V}_{\text{DD}} = 60\text{V}$, Starting $\text{T}_j = 25^\circ\text{C}$.
3. $\text{I}_{\text{SD}} = 7\text{A}, d\text{I}/dt \leq 100\text{A}/\mu\text{s}, \text{V}_{\text{DD}} \leq \text{BV}_{\text{DS}}$, Starting $\text{T}_j = 25^\circ\text{C}$.

Electrical Characteristics Diagrams

Figure 1. Typical Output Characteristics

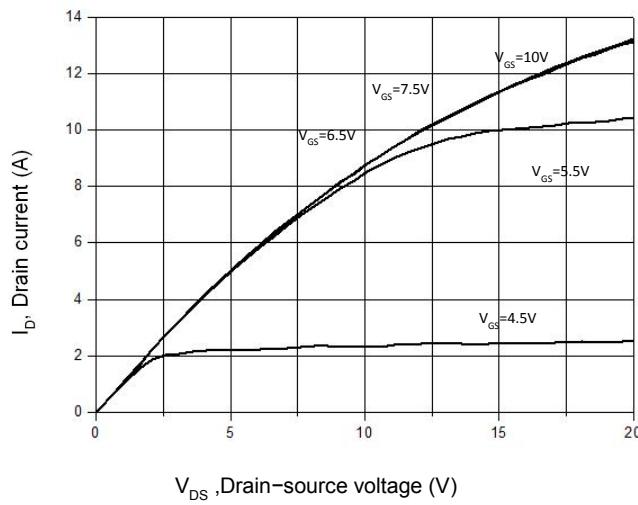


Figure 2. Transfer Characteristics

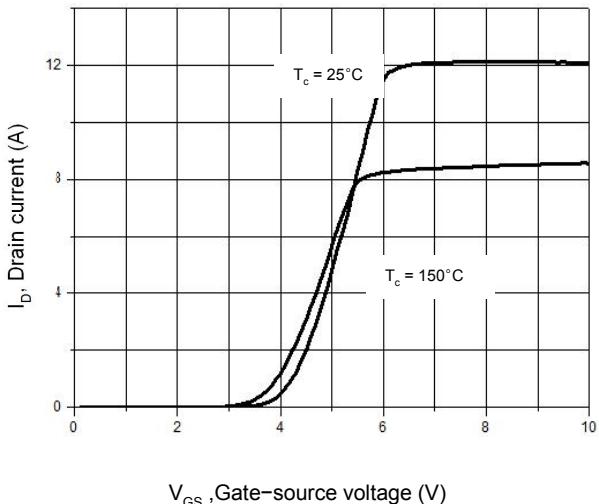


Figure 3. On-Resistance Variation vs. Drain Current

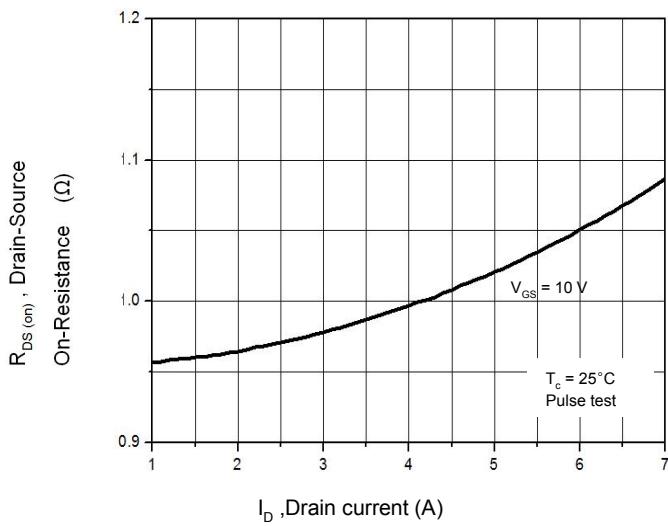


Figure 4. Threshold Voltage vs. Temperature

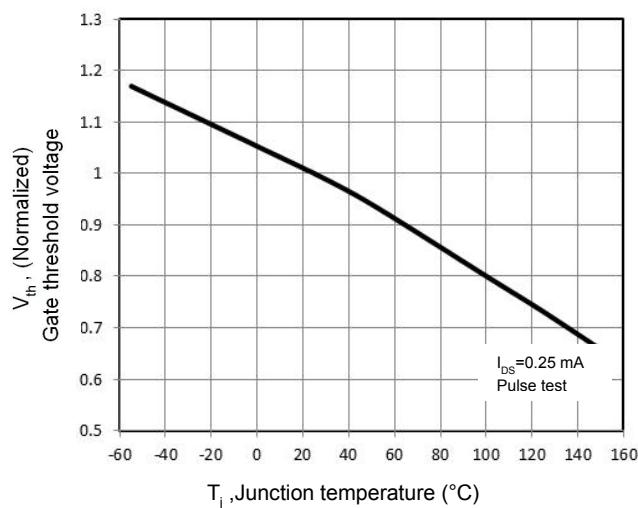


Figure 5. Breakdown Voltage vs. Temperature

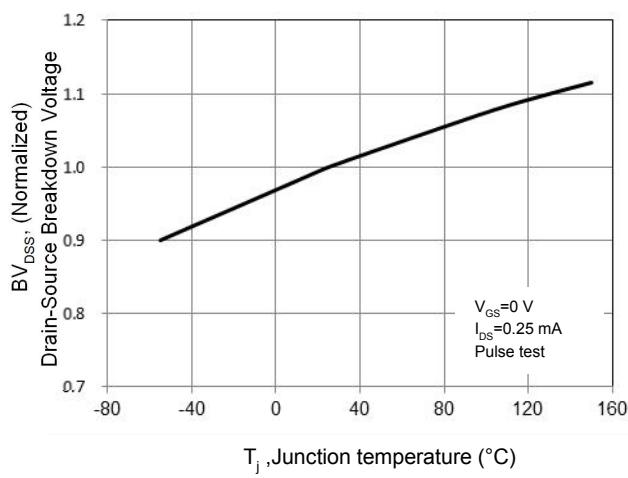


Figure 6. On-Resistance vs. Temperature

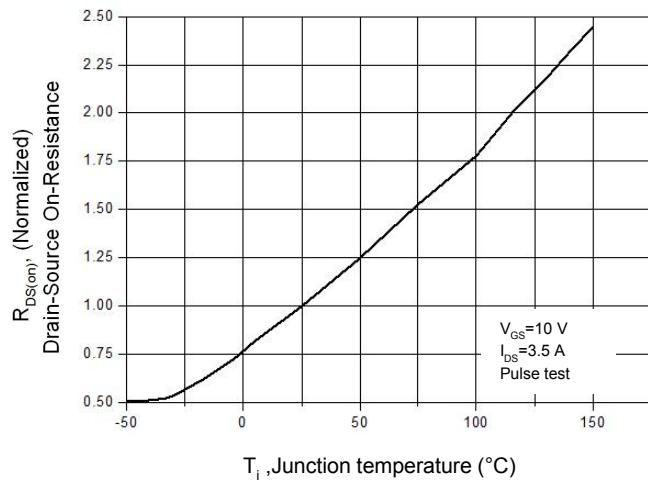


Figure 7. Capacitance Characteristics

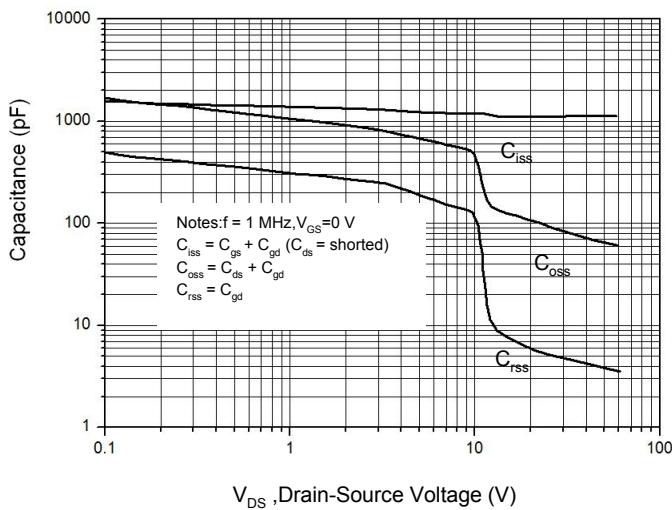


Figure 9. Maximum Safe Operating Area

TO-220F

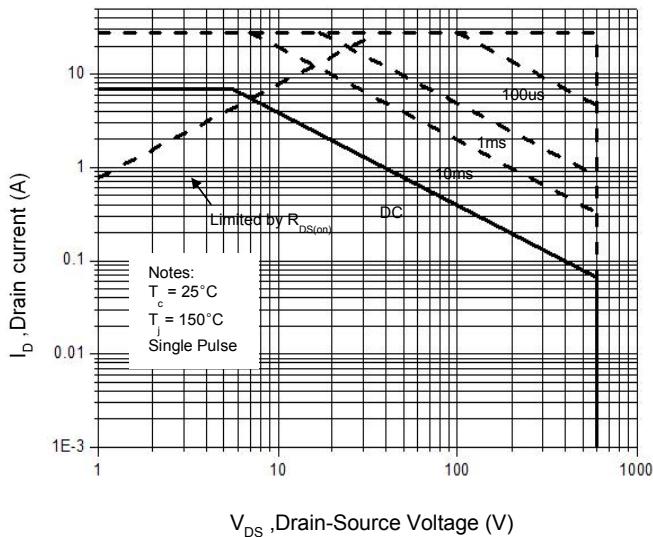


Figure 11. Power Dissipation vs. Temperature

TO-220F

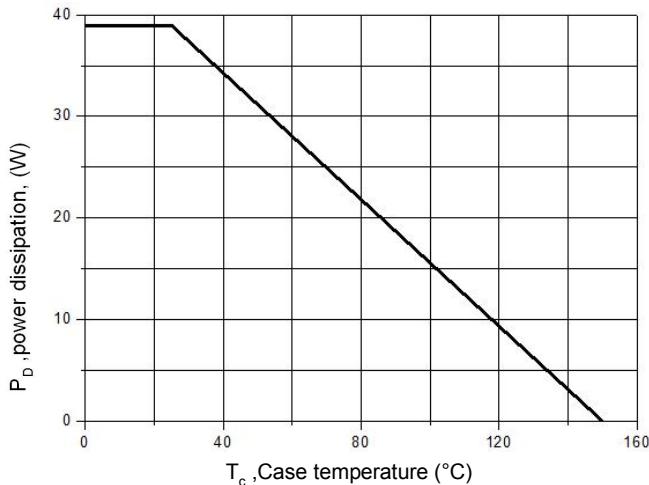


Figure 8. Gate Charge Characterist

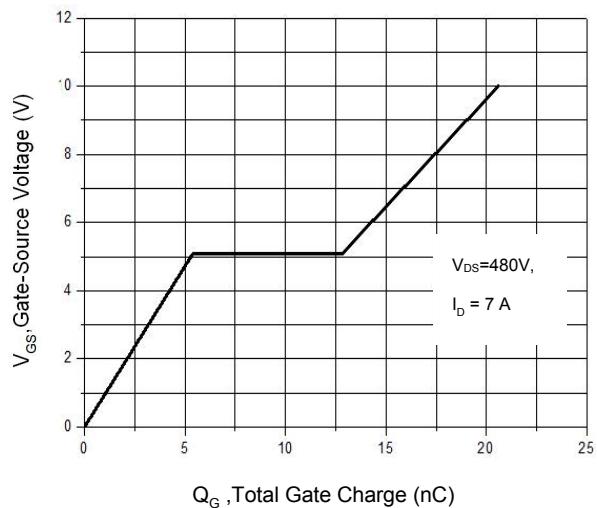


Figure 10. Maximum Safe Operating Area

TO-220/ TO-251/TO-252

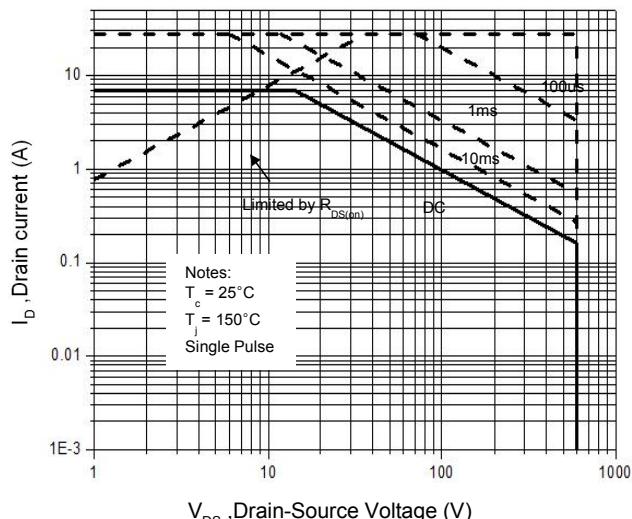


Figure 12. Power Dissipation vs. Temperature

TO-220/ TO-251/TO-252

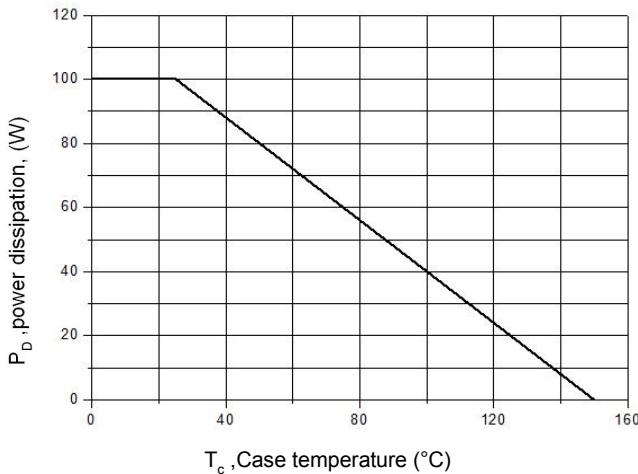


Figure 13. Continuous Drain Current vs. Temperature

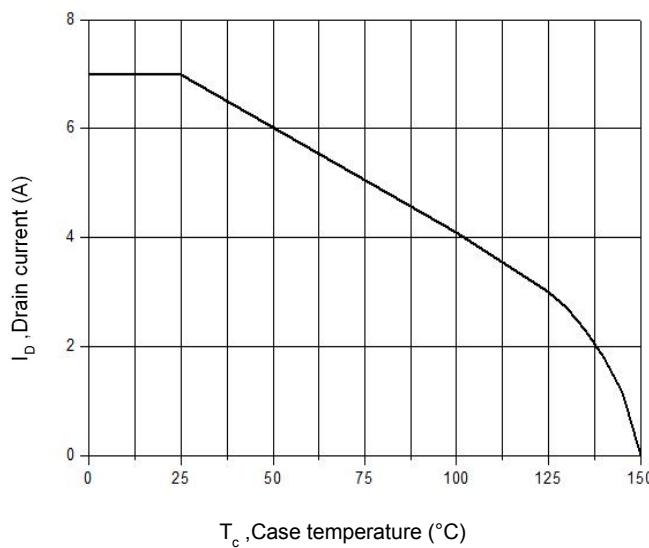


Figure 14. Body Diode Transfer Characteristics

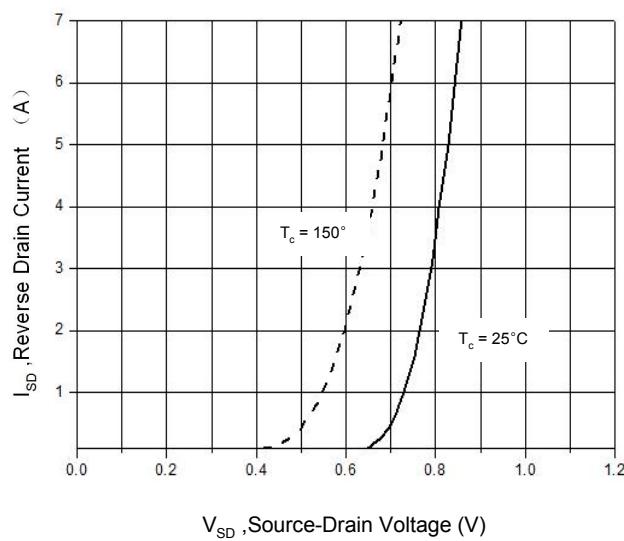


Figure 15 Transient Thermal Impedance, Junction to Case, TO-220F

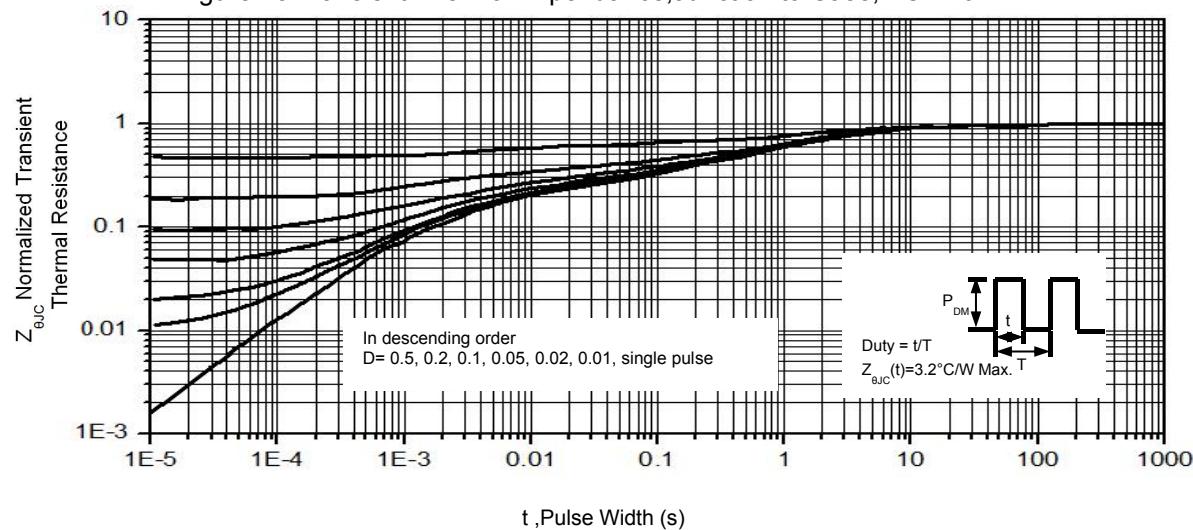
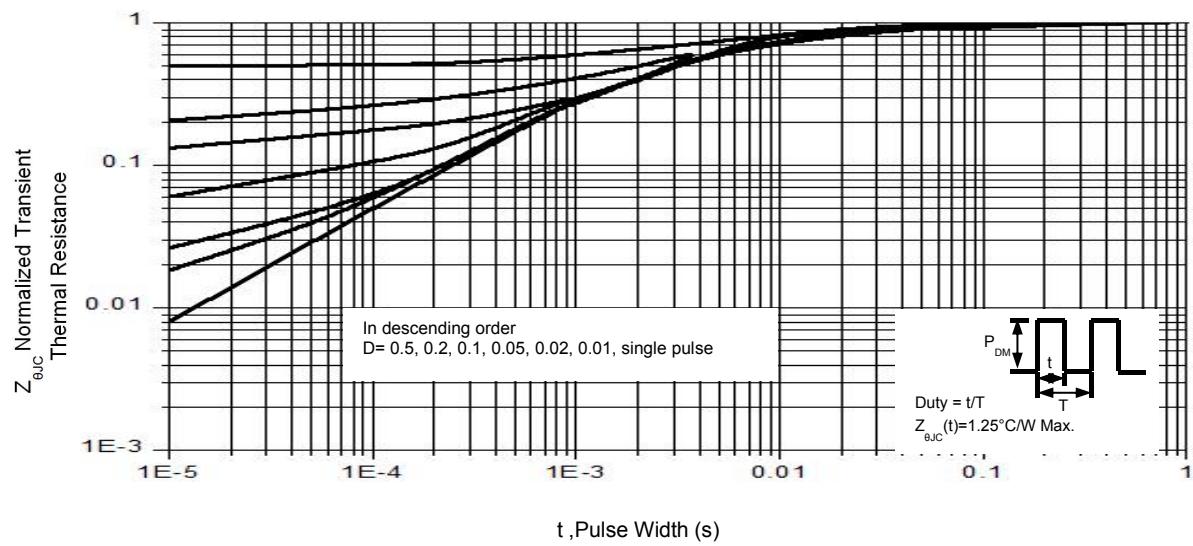
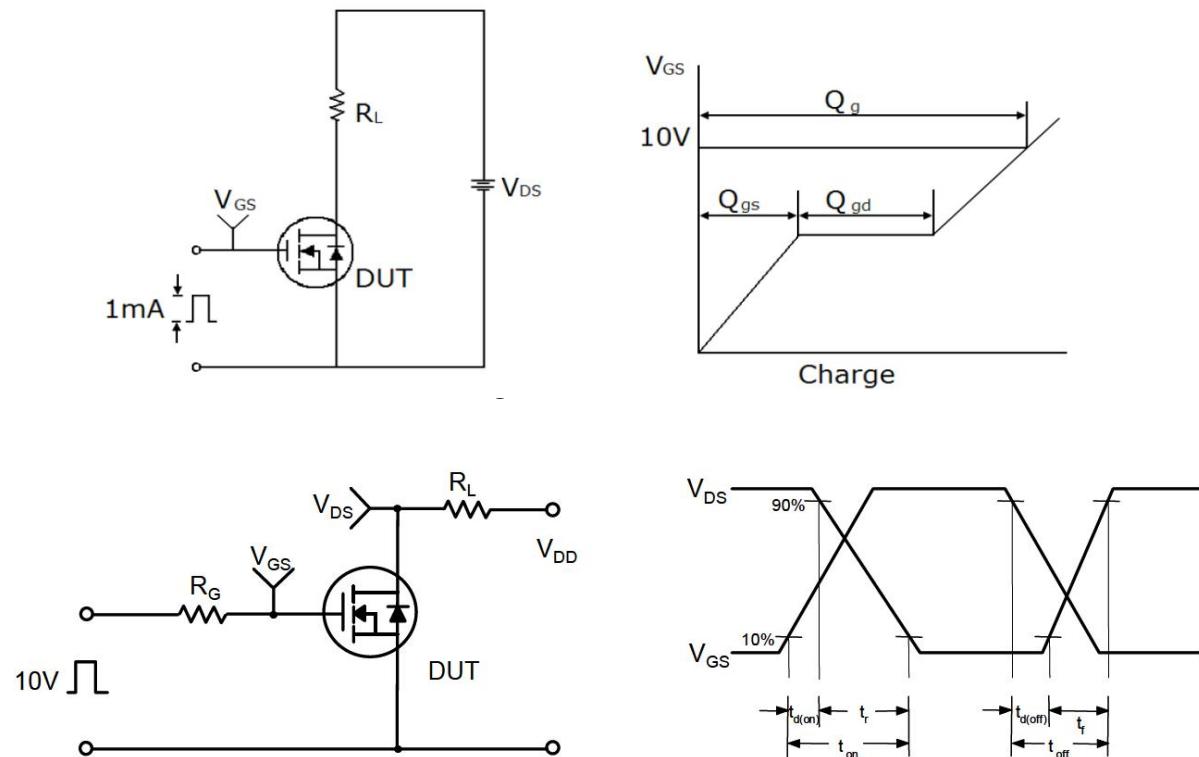


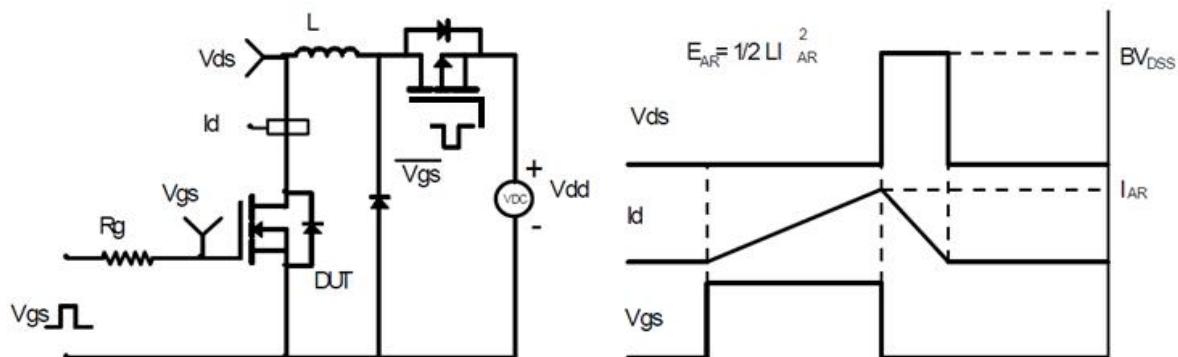
Figure 16. Transient Thermal Impedance, Junction to Case, TO-220/ TO-251/TO-252



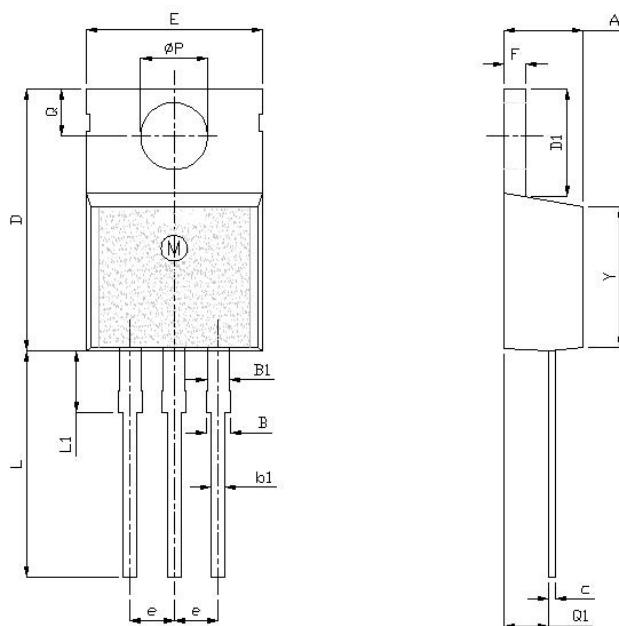
Gate Charge Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveforms



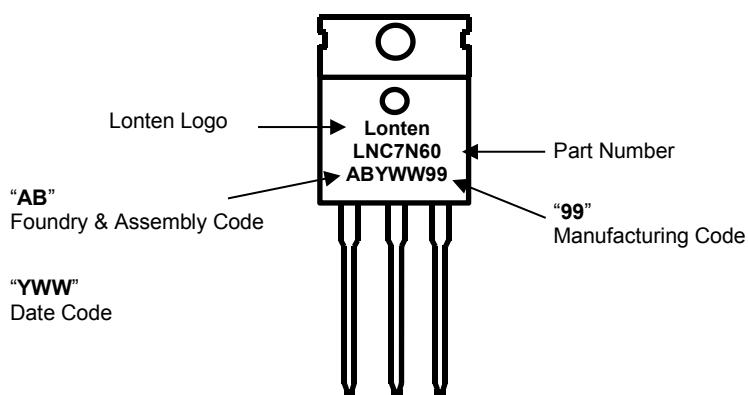
Mechanical Dimensions for TO-220



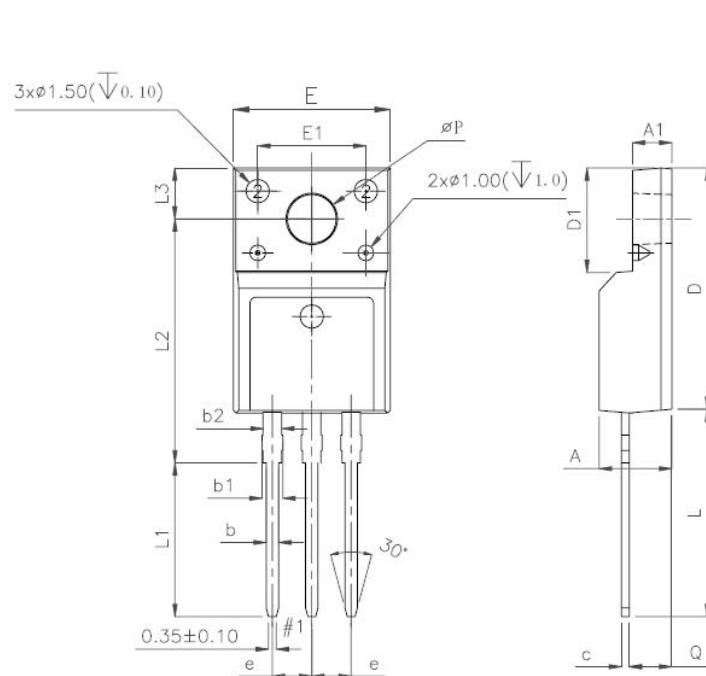
UNIT: mm

SYMBOL	MIN	NOM	MAX
A	4		4.8
B	1.2		1.4
B1	1		1.4
b1	0.75		0.95
c	0.4		0.55
D	15		16.5
D1	5.9		6.9
E	9.9		10.7
e	2.44	2.54	2.64
F	1.1		1.4
L	12.5		14.5
L1	3	3.5	4
ΦP	3.7	3.8	3.9
Q	2.5		3
Q1	2		2.9
Y	8.02	8.12	8.22

TO-220 Part Marking Information

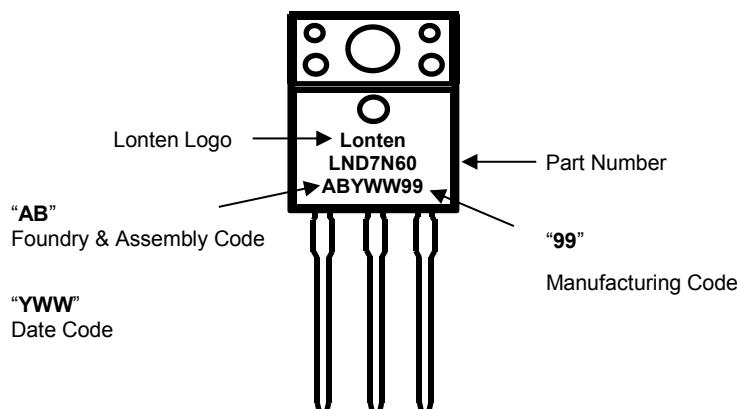


Mechanical Dimensions for TO-220F



UNIT: mm			
SYMBOL	MIN	NOM	MAX
A	4.5		4.9
A1	2.3		2.9
b	0.65		0.9
b1	1.1		1.7
b2	1.2		1.4
c	0.35		0.65
D	14.5		16.5
D1	6.1		6.9
E	9.6		10.3
E1	6.5	7	7.5
e	2.44	2.54	2.64
L	12.5		14.3
L1	9.45		10.05
L2	15		16
L3	3.2		4.4
ΦP	3		3.3
Q	2.5		2.9

TO-220F Part Marking Information



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