Lonten N-channel 650V, 7A Power MOSFET

Description

The Power MOSFET is fabricated using the advanced planar VDMOS technology. The resulting device has low conduction resistance, superior switching performance and high avalance energy.

Features

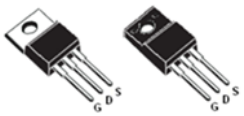
- Low $R_{DS(on)}$
- Low gate charge (typ. Q_g =20.7nC)
- 100% UIS tested
- RoHS compliant

Applications

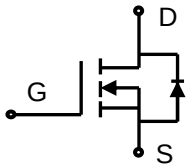
- Power faction correction.
- Switched mode power supplies.
- LED driver.

Product Summary

V_{DSS}	650V
I_D	7A
$R_{DS(on),max}$	1.4Ω
$Q_{g,typ}$	20.7nC



TO-220 **TO-220F**



N-Channel MOSFET

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	650	V
Continuous drain current (T_C = 25°C)	I_D	7	A
(T_C = 100°C)		4.3	A
Pulsed drain current [1]	I_{DM}	28	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse [2]	E_{AS}	352	mJ
Peak diode recovery dv/dt [3]	dv/dt	5	V/ns
Power Dissipation TO-220F (T_C = 25°C)	P_D	39	W
Derate above 25°C		0.31	W/°C
Power Dissipation TO-220 (T_C = 25°C)		100	W
Derate above 25°C		0.8	W/°C
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +150	°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	
Thermal resistance, Junction-to-case	$R_{\theta JC}$	3.2	1.25	°C/W
Thermal resistance, Junction-to-ambient	$R_{\theta JA}$	62.5	110	°C/W

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Tube	Units/Real
LNC7N65	TO-220	LNC7N65	50	
LND7N65	TO-220F	LND7N65	50	

Electrical Characteristics

T_c = 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=250 uA	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250 uA	2	-	4	V
Drain cut-off current	I_{DSS}	V_{DS}=650 V, V_{GS}=0 V, T_j = 25°C T_j = 125°C	 - -	 -	 1 100	 μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=30 V, V_{DS}=0 V	-	-	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-30 V, V_{DS}=0 V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=3.5 A	-	1.2	1.4	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V,	-	1090	-	
Output capacitance	C_{oss}	f = 1 MHz	-	111	-	pF
Reverse transfer capacitance	C_{rss}		-	6.1	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 325 V, I_D = 7 A	-	12.2	-	
Rise time	t_r	R_G = 10 Ω, V_{GS}=15 V	-	33.4	-	ns
Turn-off delay time	$t_{d(off)}$		-	53.6	-	
Fall time	t_f		-	15	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=520 V, I_D=7 A,	-	5.7	-	
Gate to drain charge	Q_{gd}	V_{GS}=0 to 10 V	-	7.2	-	nC
Gate charge total	Q_g		-	20.7	-	
Gate plateau voltage	$V_{plateau}$		-	5	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=7 A	-	0.85	1.5	V
Reverse recovery time	t_{rr}	V_R=325 V, I_F=7 A,	-	373.2	-	ns
Reverse recovery charge	Q_{rr}	dI_F/dt=100 A/μs	-	2.1	-	μC
Peak reverse recovery current	I_{rrm}		-	15.7	-	A

Notes:

1. Pulse width limited by maximum junction temperature.
2. L=10mH, I_{AS} = 8.4A, Starting T_j= 25°C.
3. I_{SD} = 7A, di/dt≤100A/us, V_{DD}≤BV_{DS}, Starting T_j= 25°C.

Electrical Characteristics Diagrams

Figure 1. Typical Output Characteristics

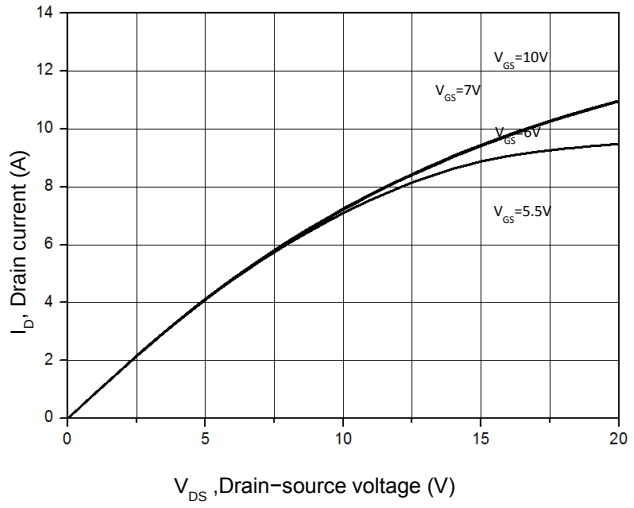


Figure 2. Transfer Characteristics

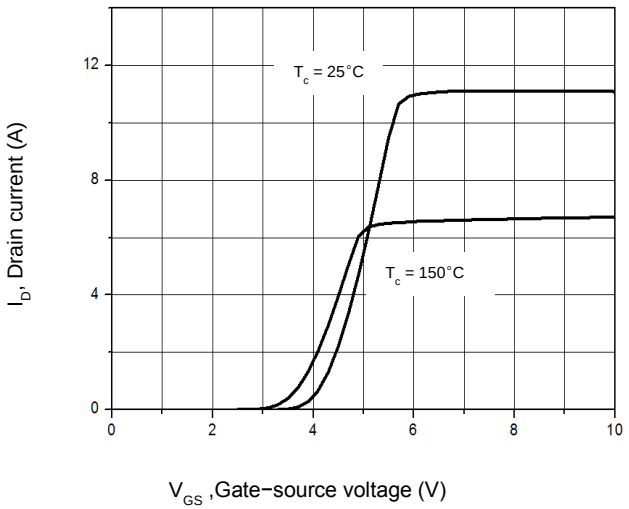


Figure 3. On-Resistance Variation vs. Drain Current

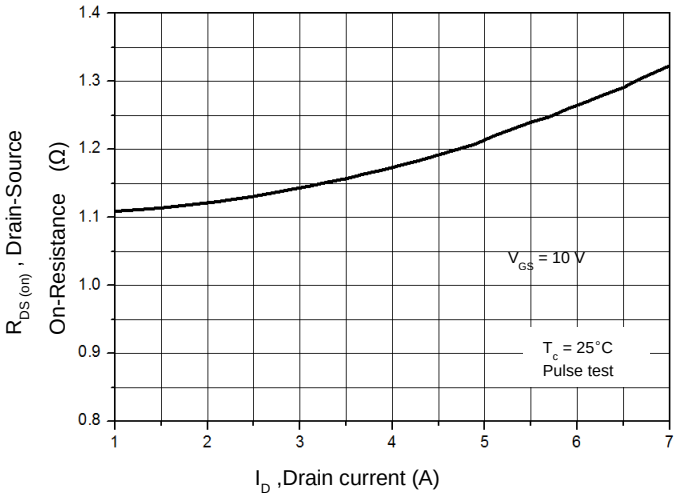


Figure 4. Threshold Voltage vs. Temperature

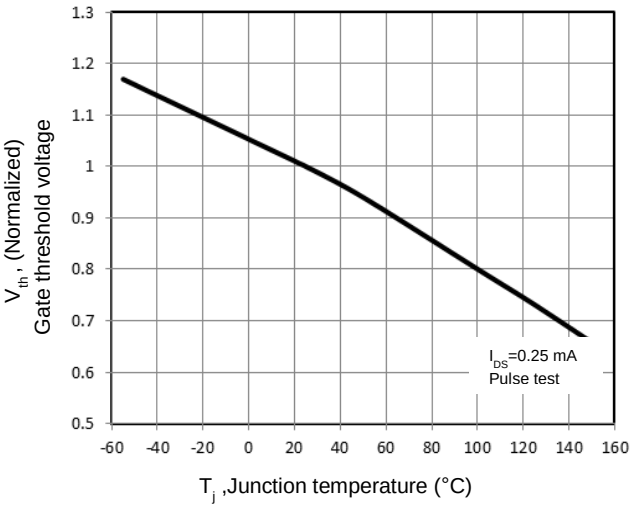


Figure 5. Breakdown Voltage vs. Temperature

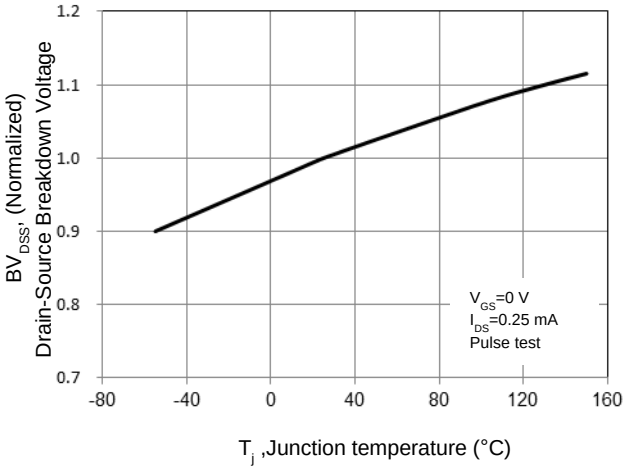


Figure 6. On-Resistance vs. Temperature

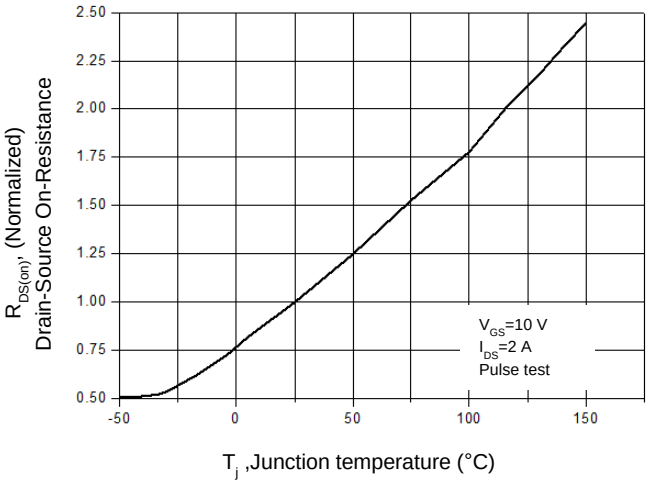


Figure 7. Capacitance Characteristics

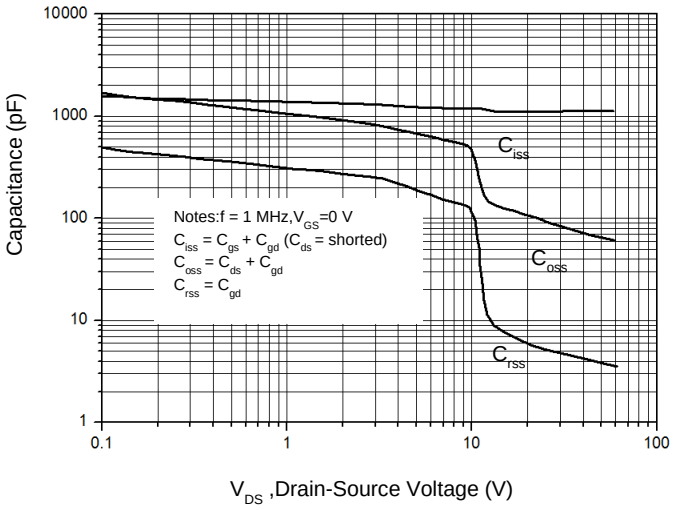


Figure 8. Gate Charge Characterist

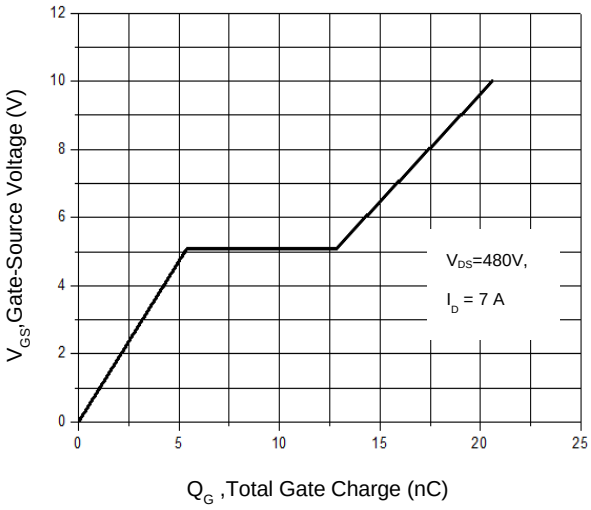


Figure 9. Maximum Safe Operating Area

TO-220F

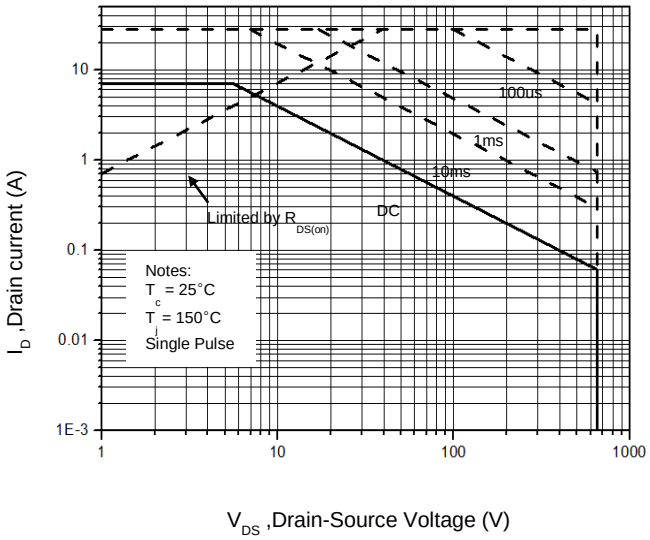


Figure 10. Maximum Safe Operating Area

TO-220

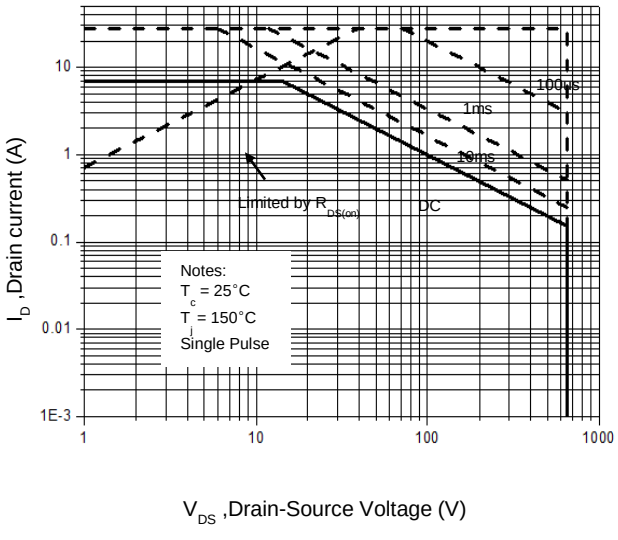


Figure 11. Power Dissipation vs. Temperature

TO-220F

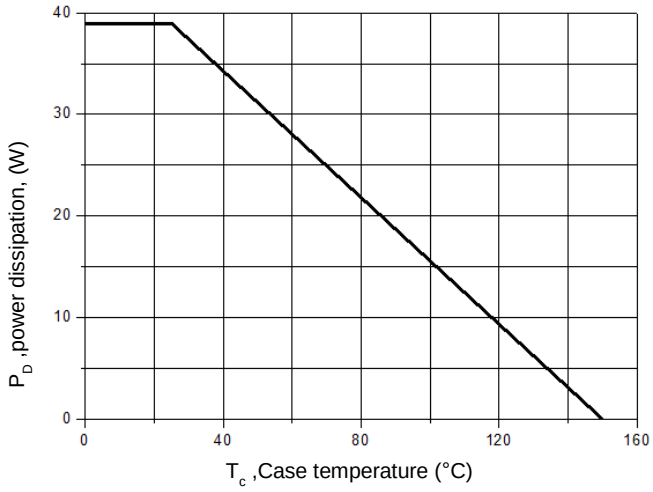


Figure 12. Power Dissipation vs. Temperature

TO-220

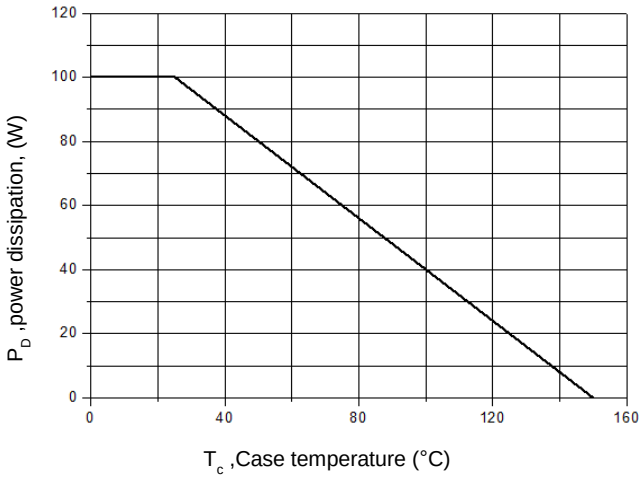


Figure 13. Continuous Drain Current vs. Temperature

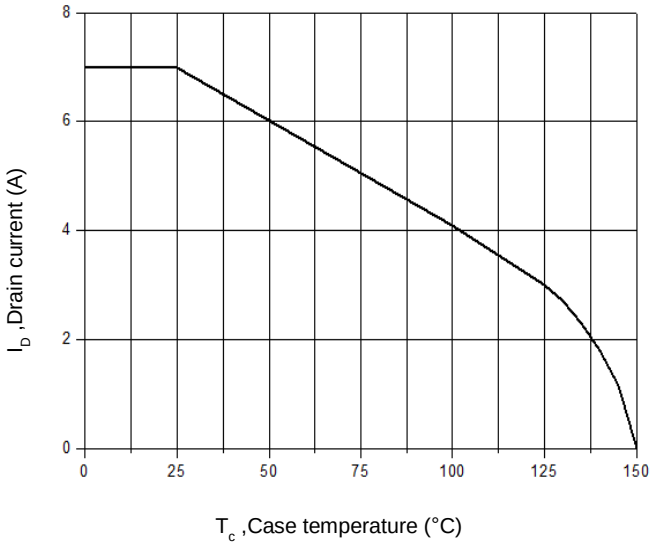


Figure 14. Body Diode Transfer Characteristics

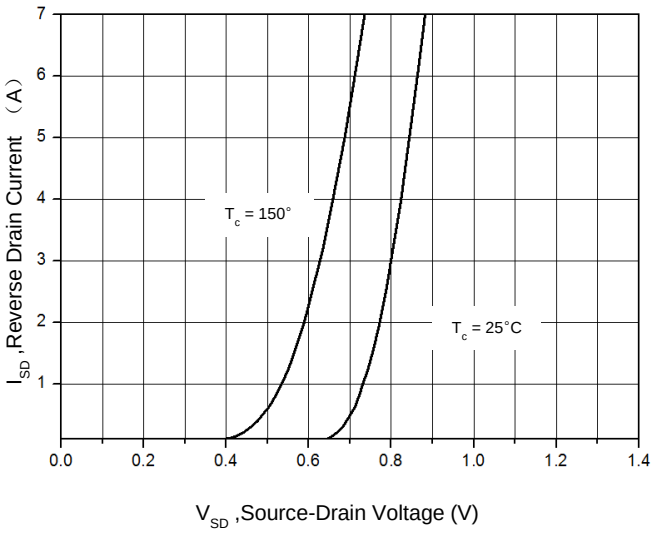


Figure 15 Transient Thermal Impendance,Junction to Case, TO-220F

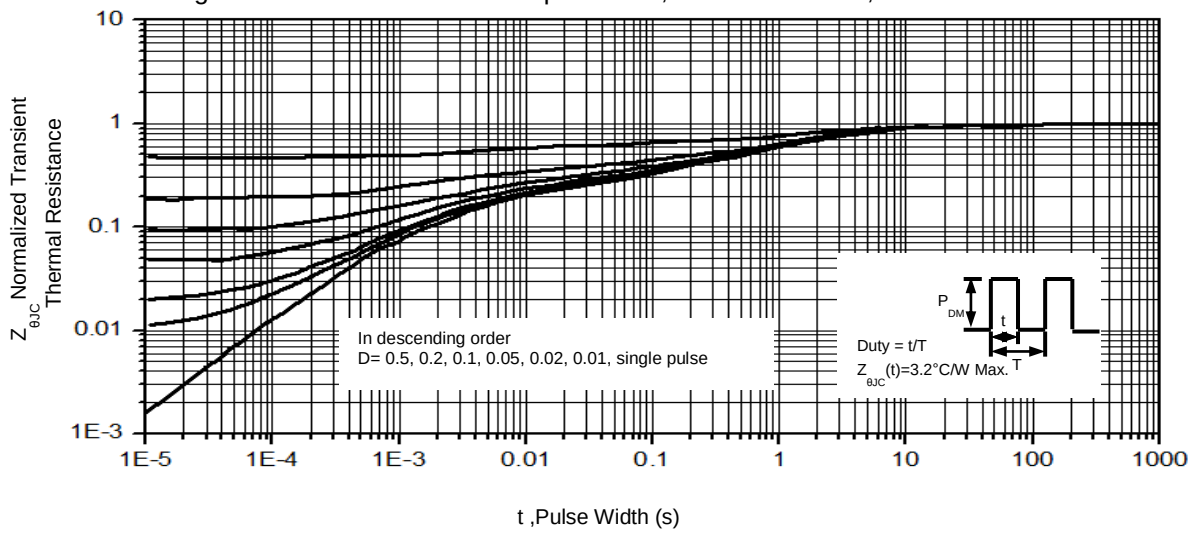
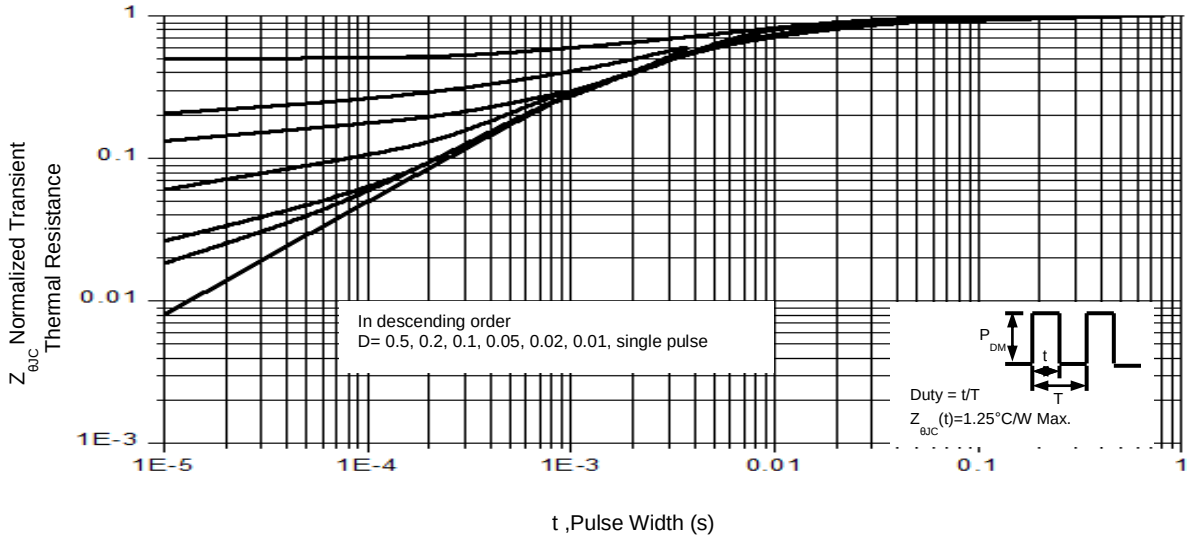
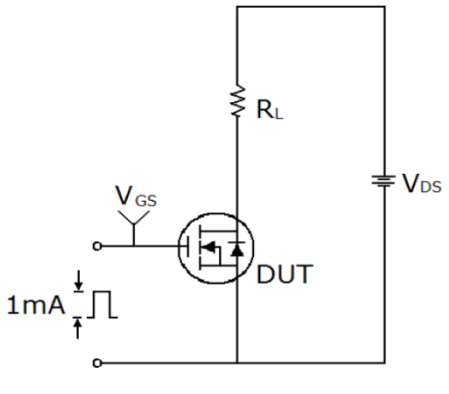
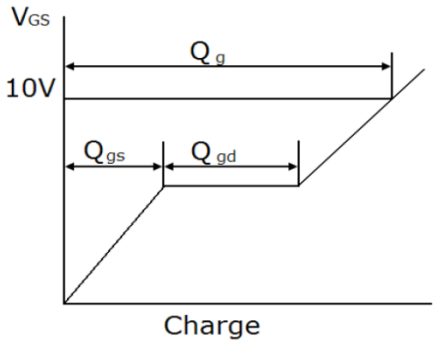


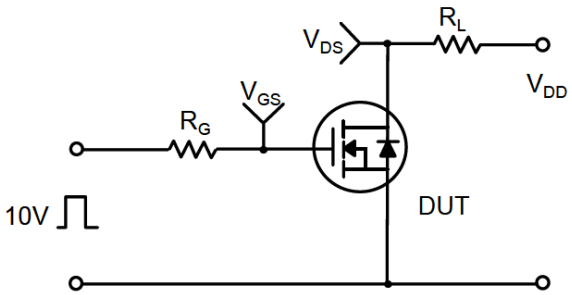
Figure 16. Transient Thermal Impendance,Junction to Case, TO-220

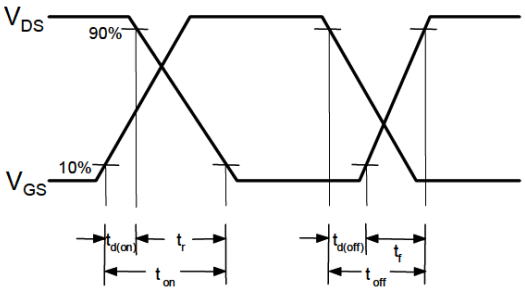


Gate Charge Test Circuit & Waveform

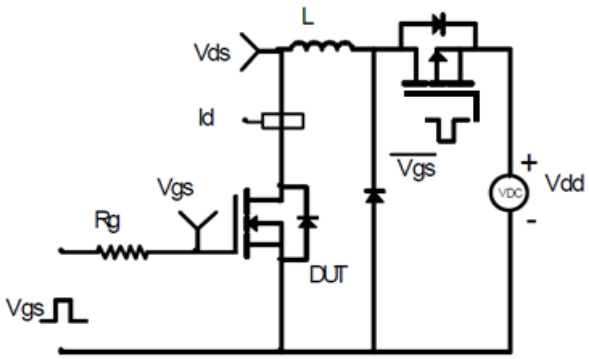


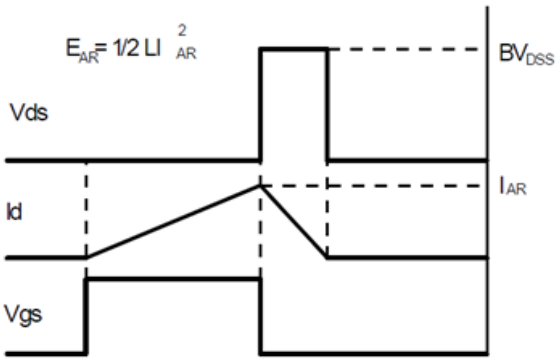




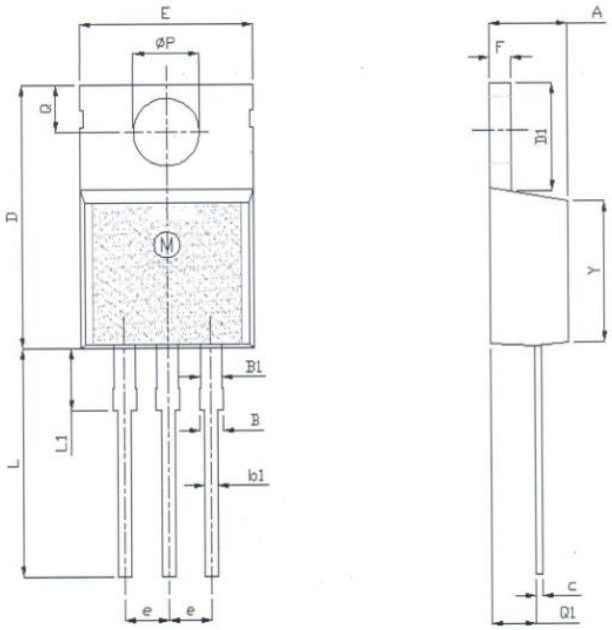


Unclamped Inductive Switching Test Circuit & Waveforms





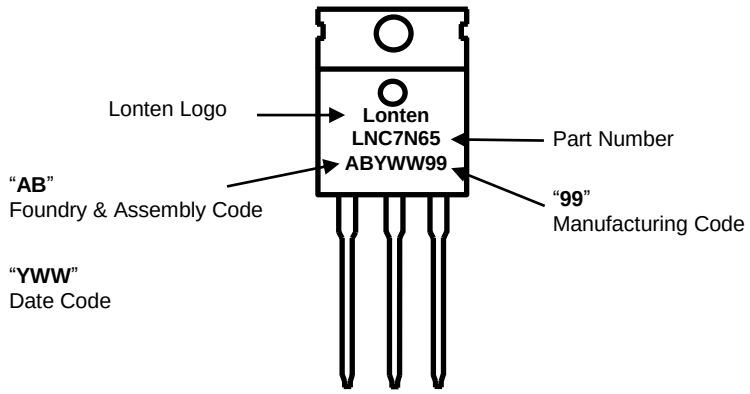
Mechanical Dimensions for TO-220



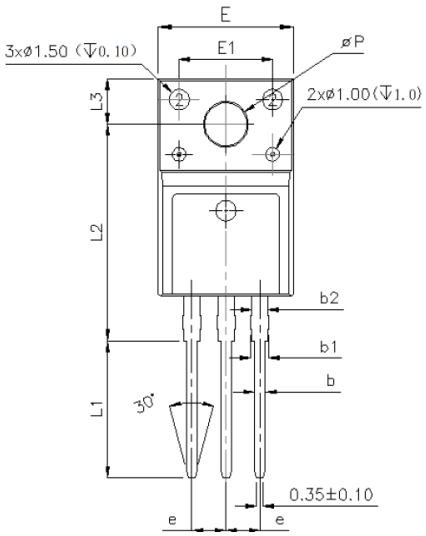
UNIT: mm

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

TO-220 Part Marking Information



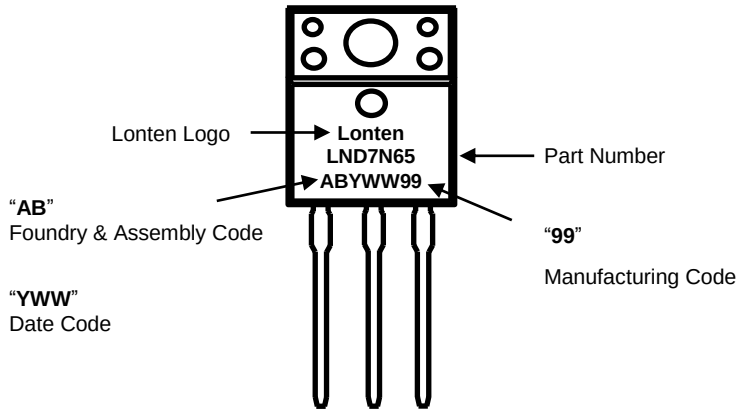
Mechanical Dimensions for TO-220F



UNIT: mm

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

TO-220F 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.

Dec. 2018 Revision 1.1