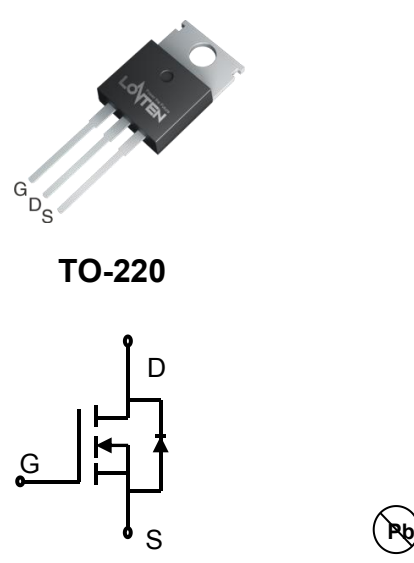


Lonten N-channel 40V, 60A, 7.5mΩ Power MOSFET

<p>Description</p> <p>These N-Channel enhancement mode power field effect transistors are using 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.</p> <p>Features</p> <ul style="list-style-type: none"> ◆ 40V,60A,$R_{DS(ON),max}=7.5m\Omega@V_{GS}=10V$ ◆ Improved dv/dt capability ◆ Fast switching ◆ 100% EAS Guaranteed ◆ Green device available <p>Applications</p> <ul style="list-style-type: none"> ◆ Motor Drives ◆ UPS ◆ DC-DC Converter 	<p>Product Summary</p> <table style="width: 100%; border: none;"> <tr> <td style="padding: 2px;">V_{DSS}</td> <td style="padding: 2px;">40V</td> </tr> <tr> <td style="padding: 2px;">$R_{DS(on),max}@V_{GS}=10V$</td> <td style="padding: 2px;">7.5mΩ</td> </tr> <tr> <td style="padding: 2px;">I_D</td> <td style="padding: 2px;">60A</td> </tr> </table> <p>Pin Configuration</p> <div style="text-align: center;">  <p>TO-220</p> <p>N-Channel MOSFET</p> </div>	V_{DSS}	40V	$R_{DS(on),max}@V_{GS}=10V$	7.5mΩ	I_D	60A
V_{DSS}	40V						
$R_{DS(on),max}@V_{GS}=10V$	7.5mΩ						
I_D	60A						

Absolute Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	40	V
Continuous drain current ($T_C = 25^\circ C$)	I_D	60	A
Continuous drain current ($T_C = 100^\circ C$)		43	A
Pulsed drain current ¹⁾	I_{DM}	240	A
Gate-Source voltage	V_{GSS}	± 20	V
Avalanche energy ²⁾	E_{AS}	144	mJ
Power Dissipation ($T_C = 25^\circ C$)	P_D	59.5	W
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ C$
Operating Junction Temperature Range	T_J	-55 to +150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.1	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient ³⁾	$R_{\theta JA}$	70	$^\circ C/W$

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Tube
LNC04R075	TO-220	LNC04R075	50

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0\text{ V}, I_D=250\mu\text{A}$	40	---	---	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0	---	2.0	V
Drain-source leakage current	I_{DSS}	$V_{DS}=40\text{ V}, V_{GS}=0\text{ V}, T_J = 25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=40\text{ V}, V_{GS}=0\text{ V}, T_J = 150^\circ\text{C}$	---	---	10	mA
Gate leakage current, Forward	I_{GSSF}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	$V_{GS}=-20\text{ V}, V_{DS}=0\text{ V}$	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=20\text{ A}$ $T_J = 25^\circ\text{C}$	---	5.6	7.5	m Ω
		$T_J = 150^\circ\text{C}$	---	9.5	---	
Forward transconductance	g_{fs}	$V_{DS} = 5\text{ V}, I_D=20\text{ A}$	---	63	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{MHz}$	---	2370	---	pF
Output capacitance	C_{oss}		---	316	---	
Reverse transfer capacitance	C_{rss}		---	212	---	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 32\text{V}, V_{GS}=10\text{V}, I_D = 20\text{ A}$	---	6.6	---	ns
Rise time	t_r		---	110.6	---	
Turn-off delay time	$t_{d(off)}$		---	285.4	---	
Fall time	t_f		---	121.1	---	
Gate resistance	R_g	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	---	1.7	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	$V_{DS}=32\text{ V}, I_D=20\text{A},$ $V_{GS}= 10\text{ V}$	---	9.2	---	nC
Gate to drain charge	Q_{gd}		---	9.6	---	
Gate charge total	Q_g		---	51.2	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	50	A
Pulsed Source Current	I_{SM}		---	---	200	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0\text{V}, I_S=20\text{A}, T_J=25^\circ\text{C}$	---	---	1.2	V
Reverse Recovery Time	t_{rr}	$I_S=20\text{A}, di/dt=100\text{A}/\mu\text{s}, T_J=25^\circ\text{C}$	---	22.4	---	ns
Reverse Recovery Charge	Q_{rr}		---	10.5	---	nC

Notes:

- 1: Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2: $V_{DD}=20\text{V}, V_{GS}=10\text{V}, L=0.5\text{mH}, I_{AS}=24\text{A}, R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.
- 3: The value of R_{thJA} is measured by placing the device in a still air box which is one cubic foot.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

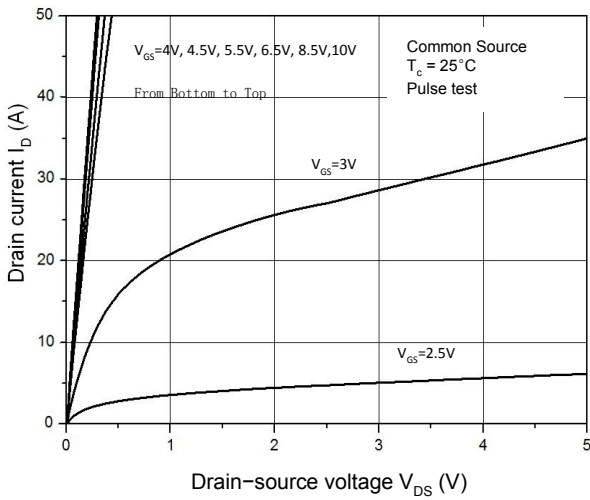


Figure 2. Transfer Characteristics

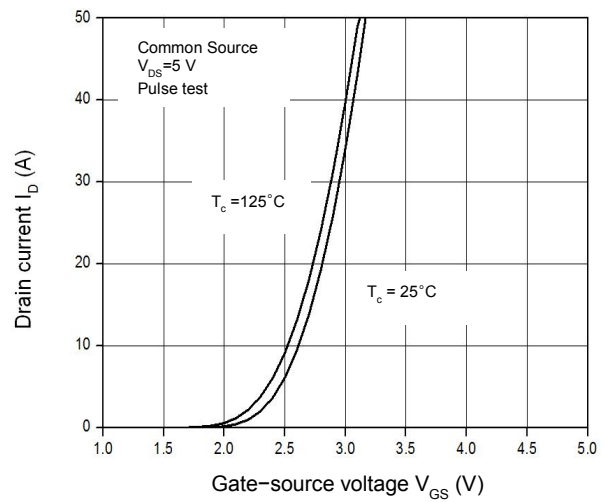


Figure 3. Capacitance Characteristics

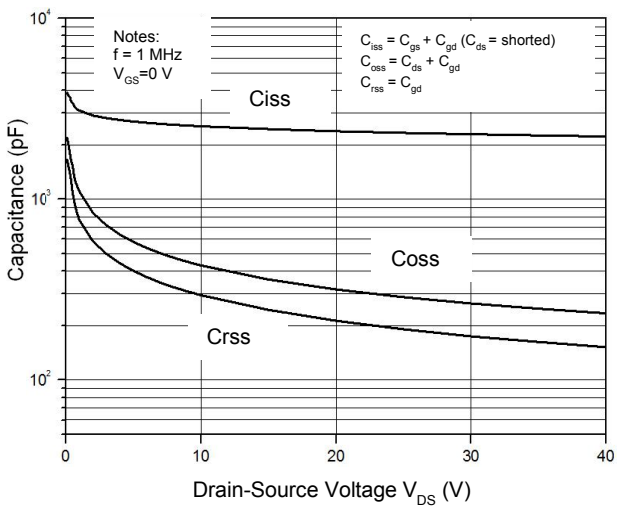


Figure 4. Gate Charge Waveform

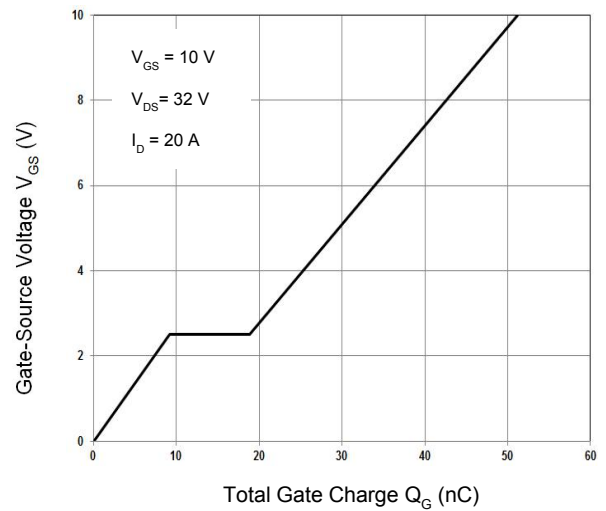


Figure 5. Body-Diode Characteristics

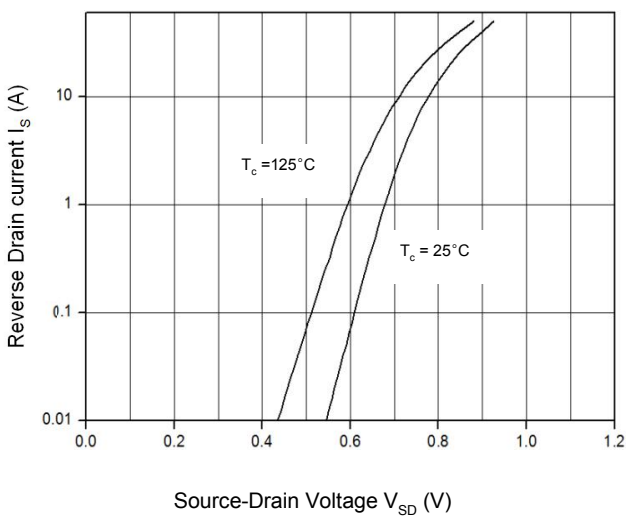


Figure 6. R_{DS(on)}-Drain Current

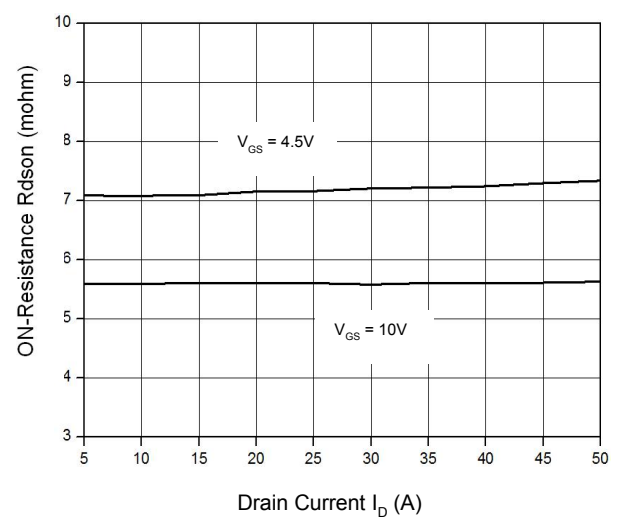


Figure 7. Rds(on)-Junction Temperature

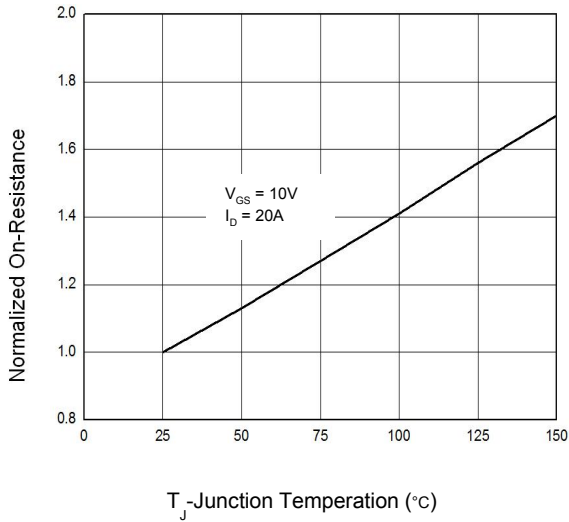


Figure 8. Drain Current Derating

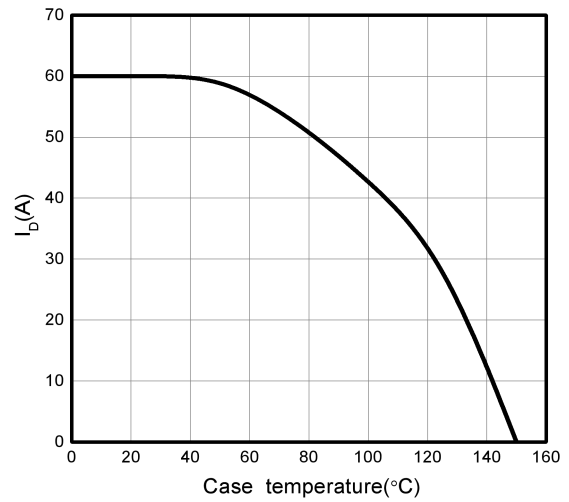


Figure 9. Power Dissipation vs. Temperature

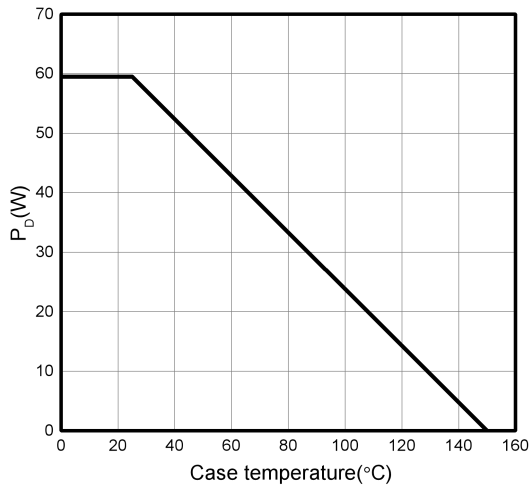


Figure 10: Safe Operating Area

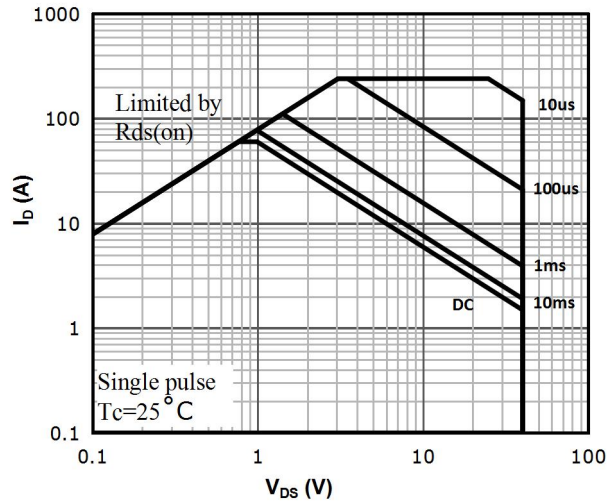
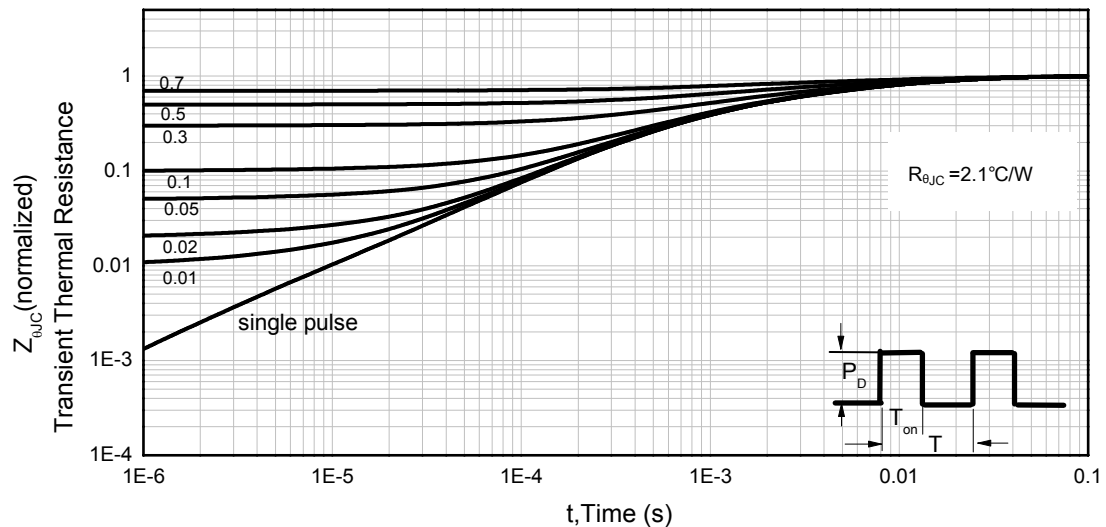
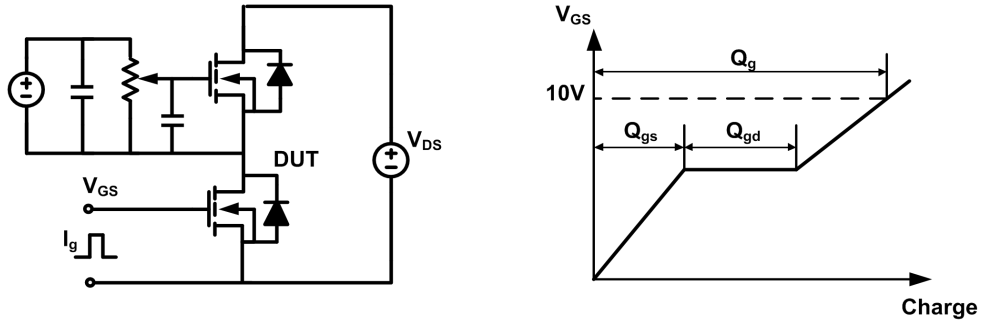


Figure 11. Normalized Maximum Transient Thermal Impedance

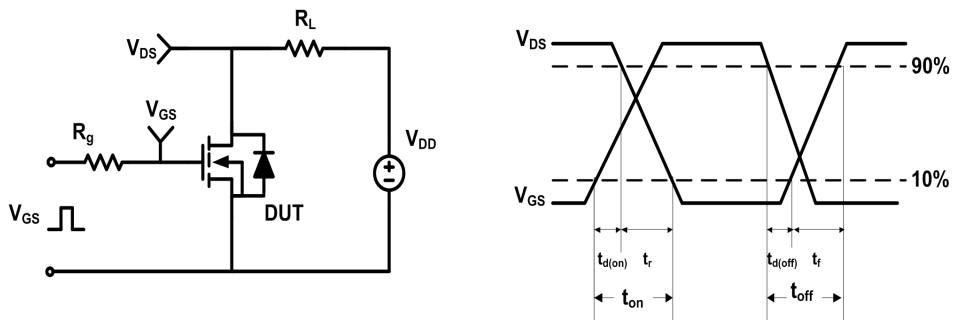


Test Circuit & Waveforms

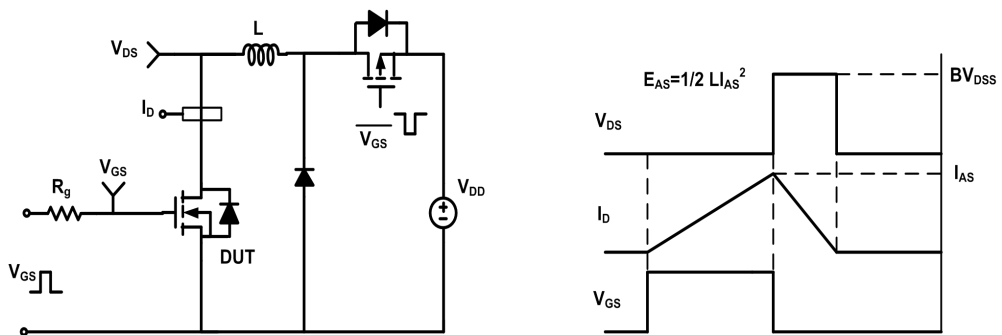
Gate Charge Test Circuit & Waveform



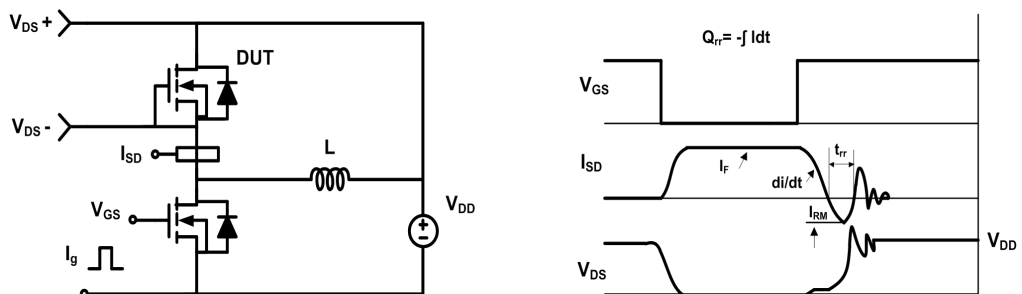
Resistive Switching Test Circuit & Waveform



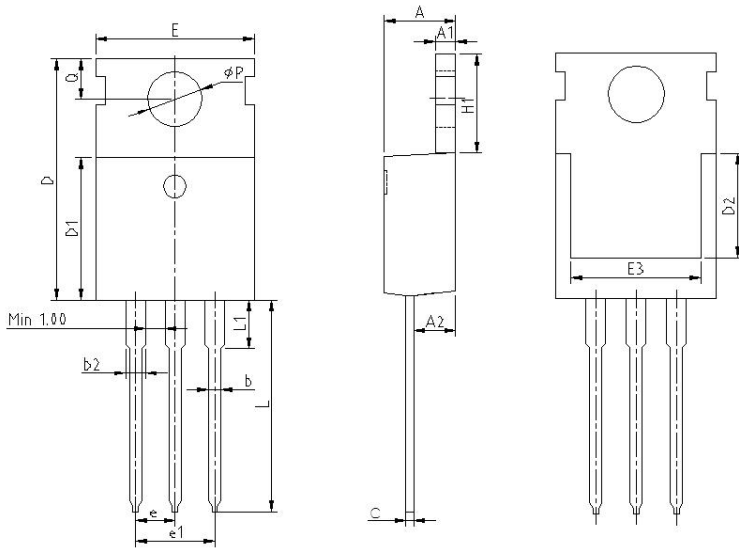
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



Mechanical Dimensions for TO-220



DIMENSIONS IN MILLIMETERS		
SYMBOL	MIN	MAX
A	4.25	4.7
A1	1.2	1.4
A2	2.2	2.92
b	0.7	0.97
b2	1.14	1.78
c	0.4	0.61
D	14.32	16.1
D1	8.39	9.4
D2	5.5	7
E	9.7	10.36
E3	7	8.78
e	2.54BSC	
e1	5.08BSC	
H1	6.25	6.85
L	12.75	14.4
L1	-	4.05
ΦP	3.4	3.8
Q	2.54	3

Revision History

LNC04R075

Revision:2021-06-11 ,Rev 0.1

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