Lonten N-channel 500V, 21A 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 avalanche energy.

Features

- Low $R_{DS(on)}$
- Low gate charge (typ. Q_g =59.6nC)
- 100% UIS tested
- RoHS compliant

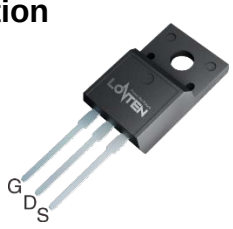
Applications

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

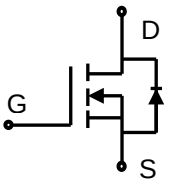
Product Summary

V_{DSS}	500V
I_D	21A
$R_{DS(on),max}$	0.28Ω
$Q_{g,typ}$	59.6nC

Pin Configuration



TO-220F



N-Channel MOSFET

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	500	V
Continuous drain current [1] (T_C = 25°C)	I_D	21	A
(T_C = 100°C)		13.5	A
Pulsed drain current [2]	I_{DM}	84	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse [3]	E_{AS}	810	mJ
Power Dissipation	P_D	38	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	21	A
Diode pulse current	$I_{S,pulse}$	84	A

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.3	°C/W
Thermal Resistance, Junction-to-Ambient [4]	$R_{\theta JA}$	62	°C/W
Soldering temperature, wave soldering only allowed at leads. (1.6mm from case for 10s)	T_{sold}	260	°C

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Tube
LND18N50	TO-220F	LND18N50	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}=0V, I_D=0.25mA	500	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=0.25mA	2.0	-	4.0	V
Drain cut-off current	I_{DSS}	V_{DS}=500V, V_{GS}=0 V,T_j = 25°C	-	-	1	μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=30V, V_{DS}=0V	-	-	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-30V, V_{DS}=0V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=9A T_j = 25°C T_j = 150°C	 - -	 0.24 0.6	 0.28	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 25V, V_{GS} = 0 V, f = 250kHz	-	3115	-	pF
Output capacitance	C_{oss}		-	284.4	-	
Reverse transfer capacitance	C_{rss}		-	15.8	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 250V, I_D = 18A R_G = 10Ω, V_{GS}= 10V	-	33.6	-	ns
Rise time	t_r		-	65.3	-	
Turn-off delay time	$t_{d(off)}$		-	67.3	-	
Fall time	t_f		-	12.4	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}= 400V, I_D=18A V_{GS}=0 to 10V	-	13	-	nC
Gate to drain charge	Q_{gd}		-	19.8	-	
Gate charge total	Q_g		-	59.6	-	
Gate plateau voltage	$V_{plateau}$		-	4.5	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}= 0V, I_F= 18A	-	-	1.3	V
Reverse recovery time	t_{rr}	V_R= 400V, I_F=18A, dI_F/dt=100 A/μs	-	397.5	-	ns
Reverse recovery charge	Q_{rr}		-	5.3	-	μC
Peak reverse recovery current	I_{rrm}		-	20.52	-	A

Notes:

1. Drain current limited by maximum junction temperature, TO-220 equivalent.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. I_{AS}=18A, L=5mH, V_{DD}=60V, Starting T_j= 25° C.
4. 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

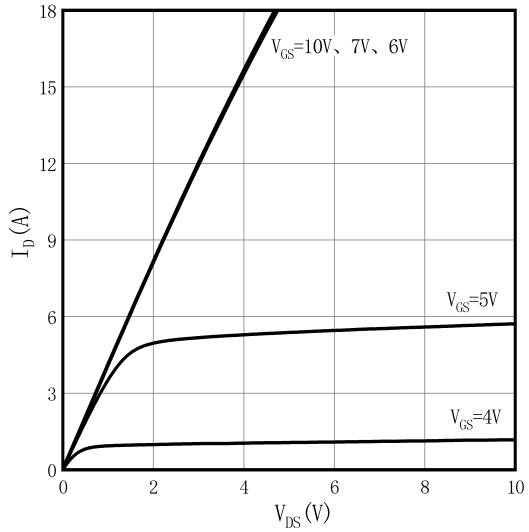


Figure 2. Transfer Characteristics

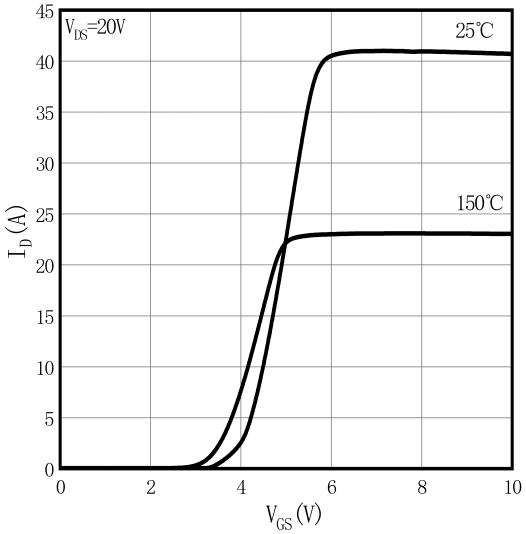


Figure 3. On-Resistance vs. Drain Current

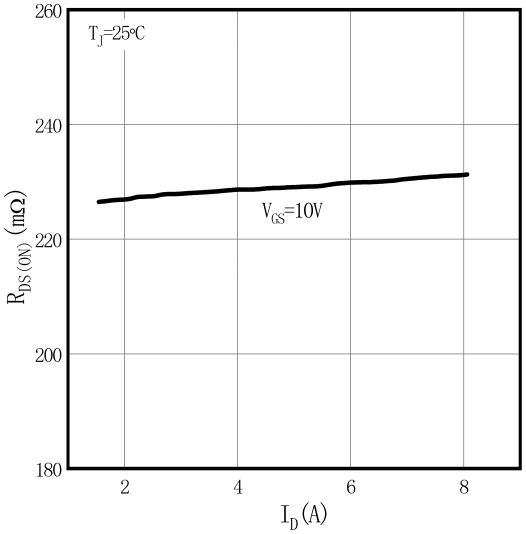


Figure 4.On-Resistance vs.Temperature

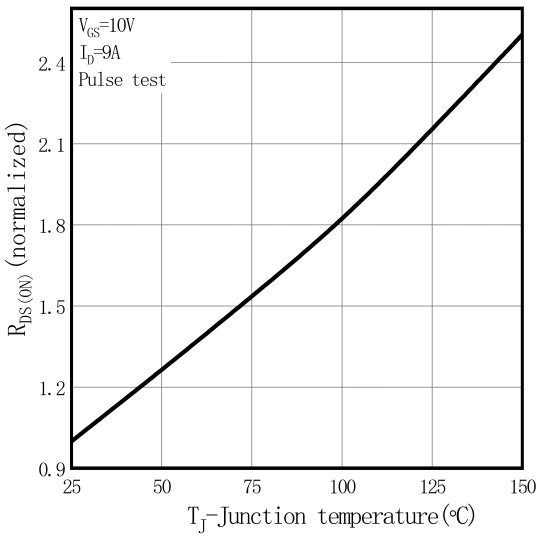


Figure 5.Breakdown Voltage vs.Temperature

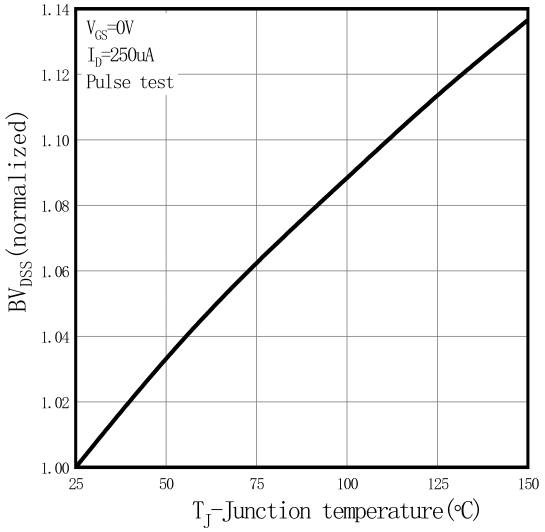


Figure 6.Threshold Voltage vs.Temperature

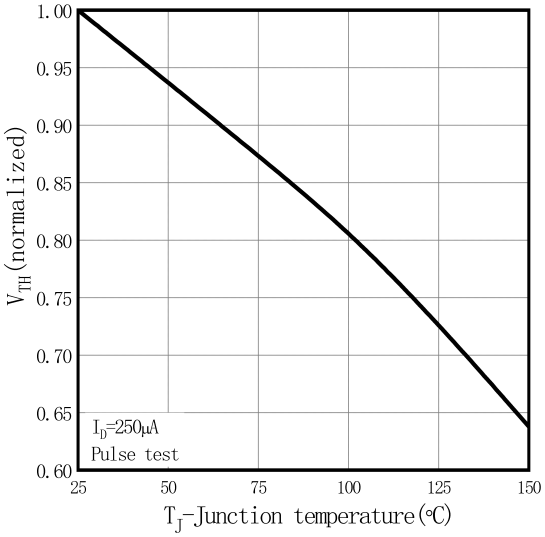


Figure 7.Body-Diode Characteristics

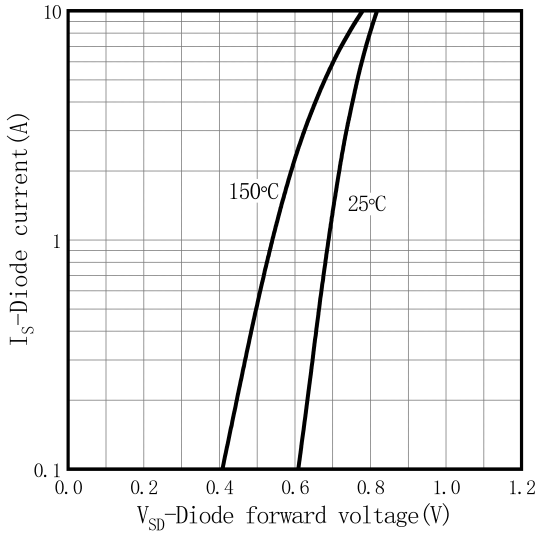


Figure 8.Capacitance Characteristics

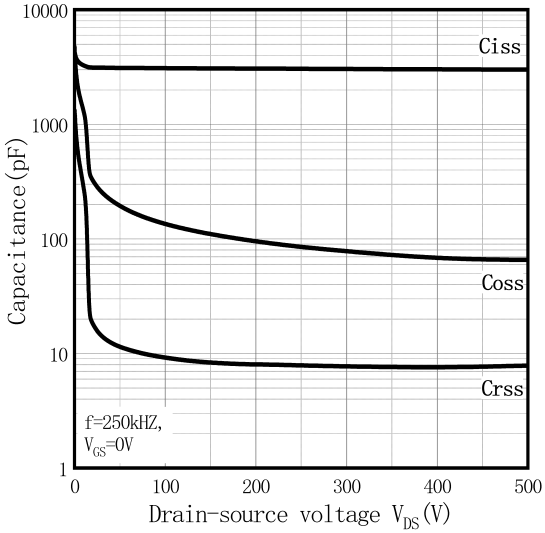


Figure 9.Gate Charge Characteristics

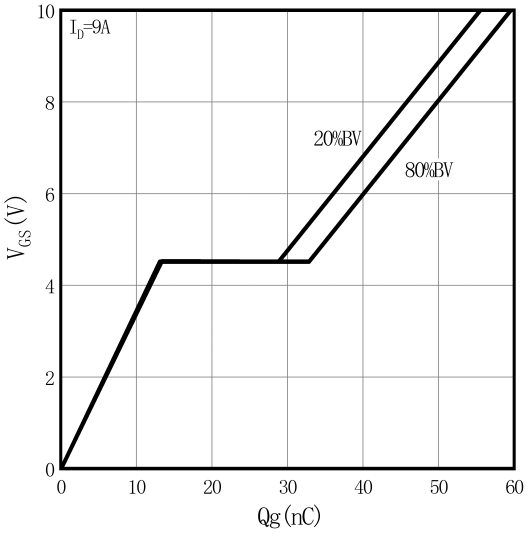


Figure 10.Drain Current Derating

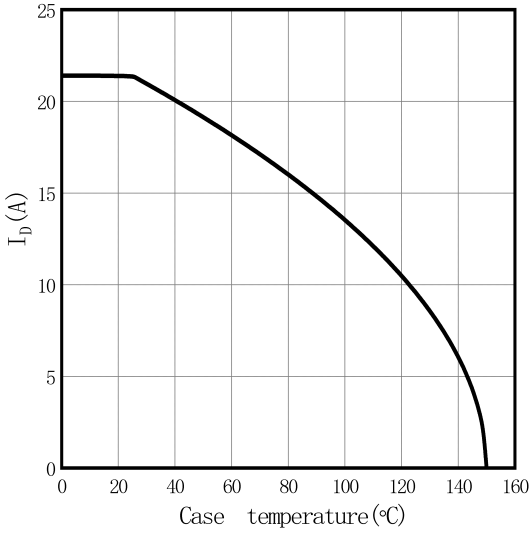


Figure 11.Power Dissipation vs.Temperature

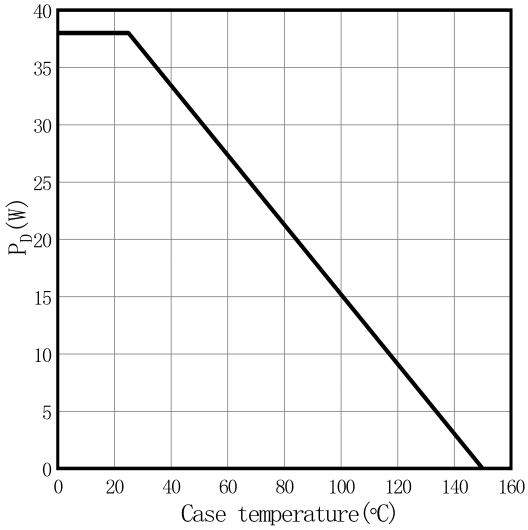


Figure 12. Safe Operating Area

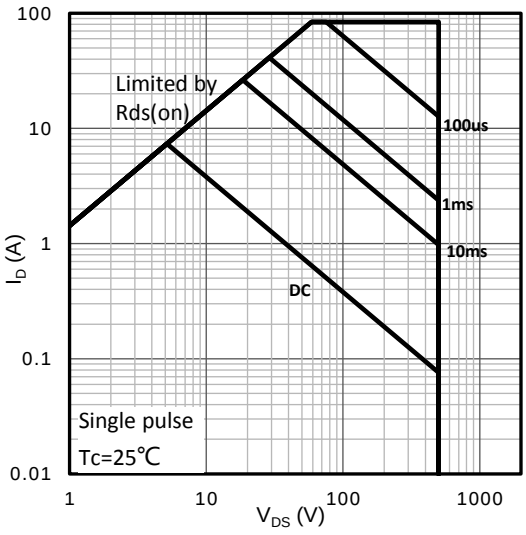
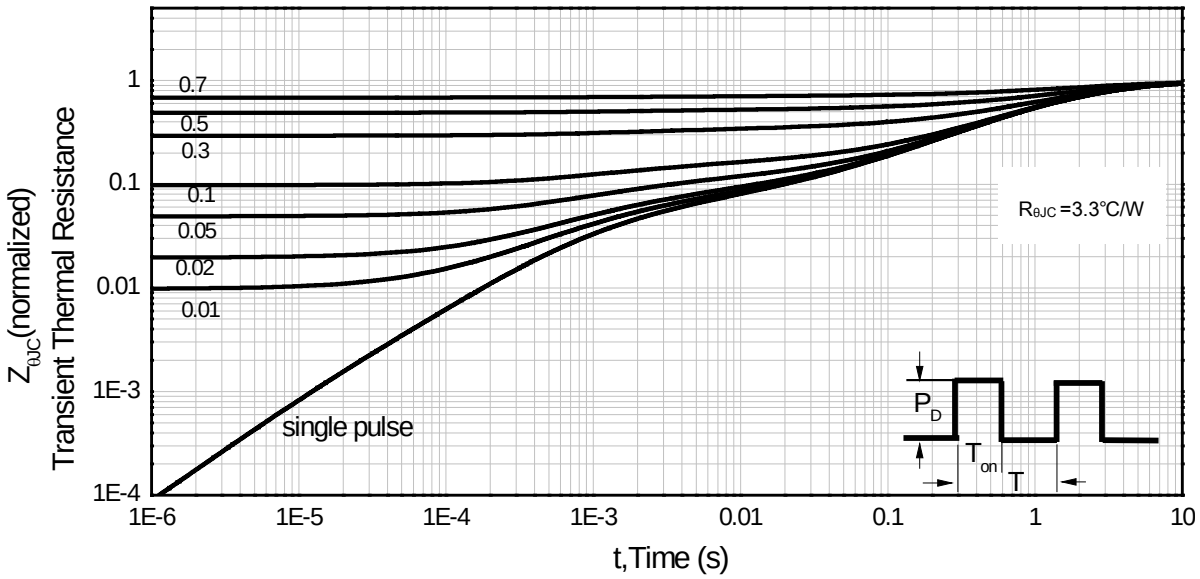
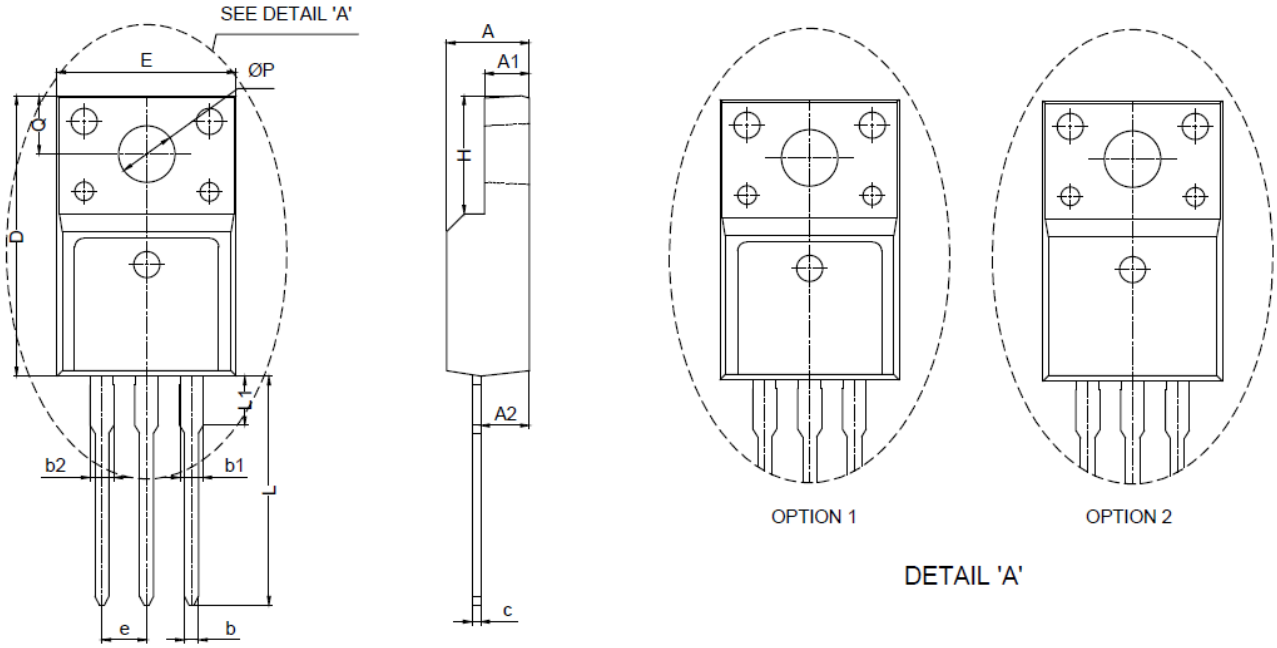
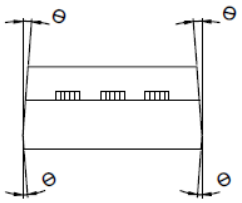


Figure 13. Normalized Maximum Transient Thermal Impedance (R_{thJC})



Mechanical Dimensions for TO-220F

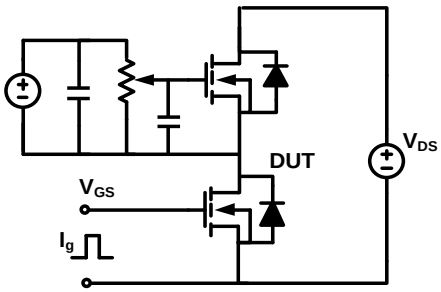


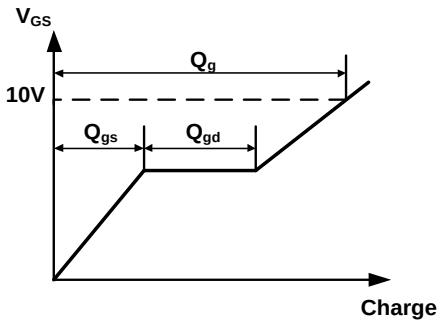


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.40	4.90	0.173	0.193
A1	2.34	2.74	0.092	0.108
A2	2.50	2.96	0.098	0.117
b	0.70	1.00	0.028	0.039
b1	1.18	1.43	0.046	0.056
b2	1.15	1.58	0.045	0.062
c	0.40	0.70	0.016	0.028
D	15.57	16.40	0.613	0.646
E	9.96	10.40	0.392	0.409
e	2.54 BSC		0.100 BSC	
H	6.48	7.25	0.255	0.285
L	12.64	14.20	0.498	0.559
L1	2.90	3.60	0.114	0.142
ØP	3.00	3.38	0.118	0.133
Q	3.10	3.50	0.122	0.138
Θ	1°	5°	1°	5°

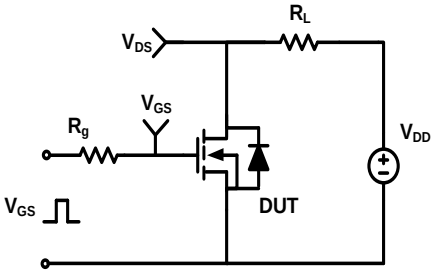
Test Circuit & Waveforms

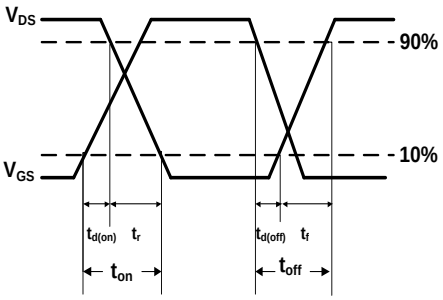
Gate Charge Test Circuit & Waveform



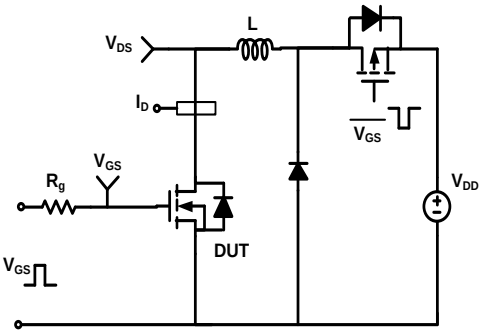


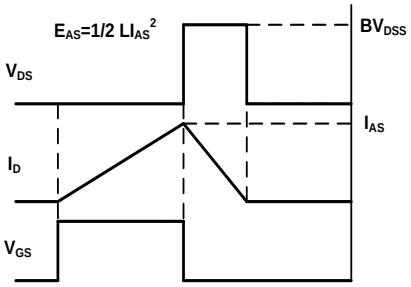
Resistive Switching Test Circuit & Waveform



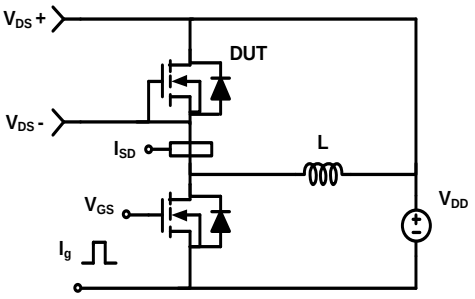


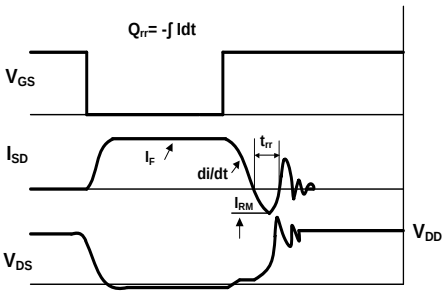
Unclamped Inductive Switching (UIS) Test Circuit & Waveform





Diode Recovery Test Circuit & Waveform





Version Information

LND18N50
Revision 1.5

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