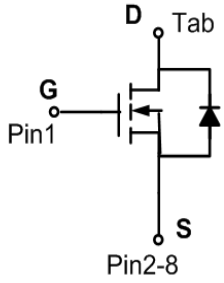
WLE018R10

100V N-Channel Power Trench MOSFET

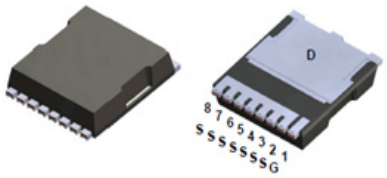
Description

These N-Channel enhancement mode power field effect transistors are using shielded gate 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.



Product Summary

V_{DSS}	100V
$R_{DS(on).max}$@ V_{GS}=10V	1.85mΩ
I_D	340A



Applications

- Motor Drives
- UPS
- DC-DC Converter
- Energy Storage

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	100	V
Continuous drain current (T_C = 25°C) (T_C = 100°C)	I_D	340 215	A A
Pulsed drain current [1]	I_{DM}	900	A
Gate-Source voltage	V_{GSS}	±20	V
Avalanche energy [2]	E_{AS}	2025	mJ
Power Dissipation	P_D	379	W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C
Thermal Characteristics			
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.33	°C/W
Thermal Resistance, Junction-to-Ambient [3]	$R_{\theta JA}$	49	°C/W

Package Marking and Ordering Information

Device	Device Package	Marking
WLE018R10	TOLL	WLE018R10

Electrical Characteristics

T_J = 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=250uA	100	---	---	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2.6	---	3.8	V
Drain-source leakage current	I_{DSS}	V_{DS}=100 V, V_{GS}=0 V, T_J = 25°C	---	---	1	μA
		V_{DS}=100 V, V_{GS}=0 V, T_J = 150°C	---	---	10	mA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=20 V, V_{DS}=0 V	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-20V, V_{DS}=0 V	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=90 A, T_J = 25°C T_J = 150°C	--- ---	1.6 2.8	1.85 ---	mΩ
Forward transconductance	g_{fs}	V_{DS} =5V , I_D=50A	---	105.7	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 50V, V_{GS} = 0 V, f = 250kHz	---	14187	---	pF
Output capacitance	C_{oss}		---	2227	---	
Reverse transfer capacitance	C_{rss}		---	33.2	---	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 50V,V_{GS}=10V, I_D =50 A	---	136	---	ns
Rise time	t_r		---	138	---	
Turn-off delay time	$t_{d(off)}$		---	220	---	
Fall time	t_f		---	127	---	
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz	---	1.63	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DS}=50 V, I_D=50A, V_{GS}= 10 V	---	65.4	---	nC
Gate to drain charge	Q_{gd}		---	76.4	---	
Gate charge total	Q_g		---	245	---	
Gate plateau voltage	$V_{plateau}$		---	4.9	---	V
Output Charge	Q_{oss}	V_{DS}=50 V,V_{GS}= 0V	---	286	---	nC
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	340	A
Pulsed Source Current	I_{SM}		---	---	900	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=50A, T_J=25℃	---	---	1.1	V
Reverse Recovery Time	t_{rr}	I_S=50A, di/dt=200A/us, T_J=25℃	---	69.6	---	ns
Reverse Recovery Charge	Q_{rr}		---	289	---	nC

Notes:

1: Repetitive Rating: Pulse width limited by maximum junction temperature.

2: V_{DD}=50V, V_{GS}=10V, L=0.5mH, I_{AS}=90A, R_G=25Ω, Starting T_J=25℃.

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

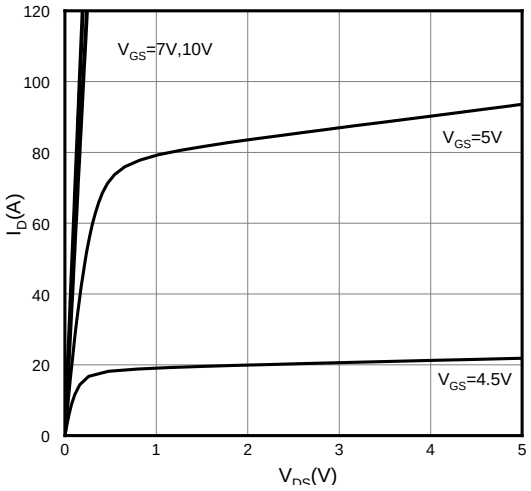


Figure 2. Transfer Characteristics

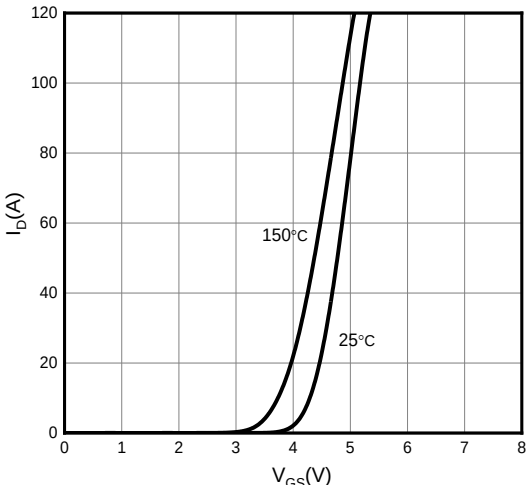


Figure 3. On-Resistance vs.Drain Current

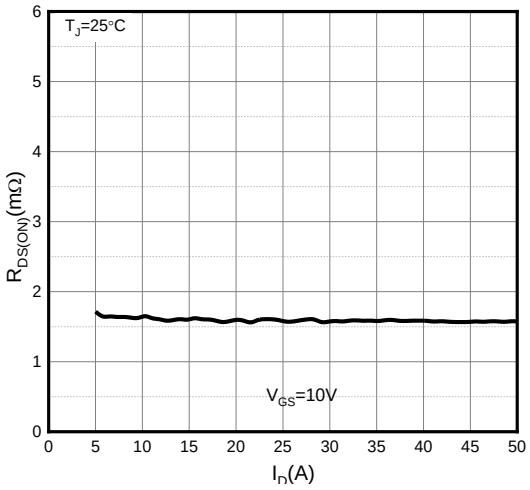


Figure 4.On-Resistance vs.Temperature

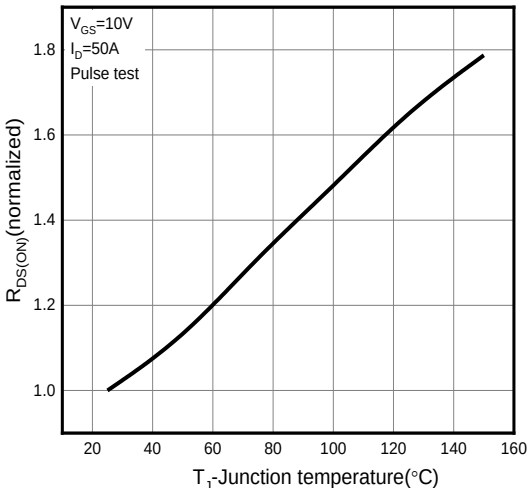


Figure 5.Breakdown Voltage vs.Temperature

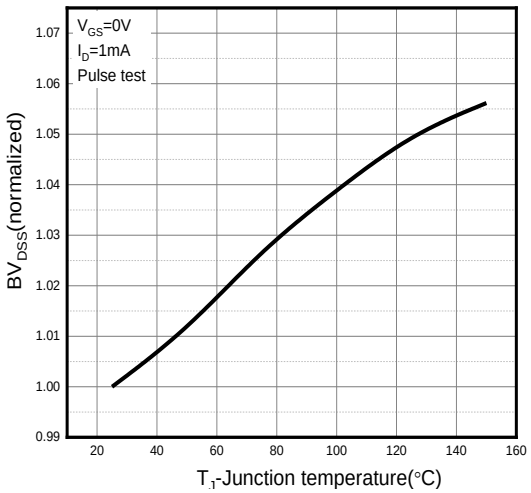


Figure 6.Threshold Voltage vs.Temperature

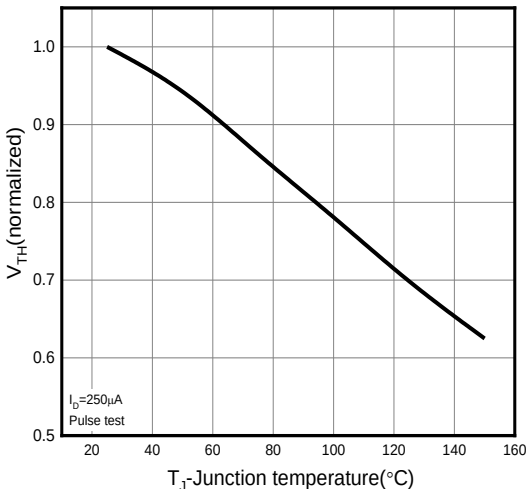


Figure 7.Rds(on) vs. Gate Voltage

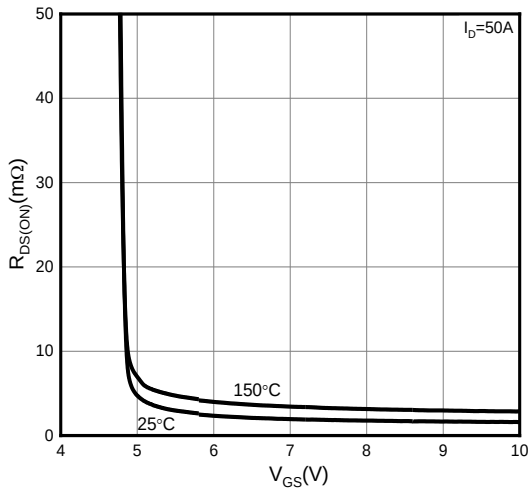


Figure 8.Body-Diode Characteristics

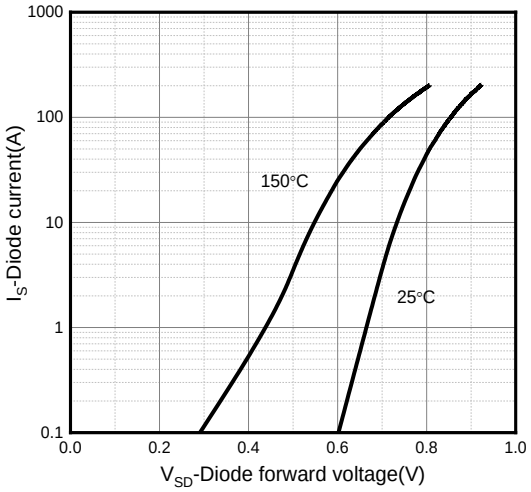


Figure 9.Capacitance Characteristics

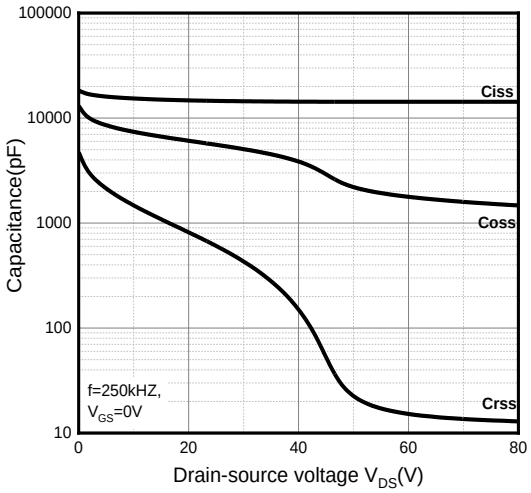


Figure 10.Gate Charge Characteristics

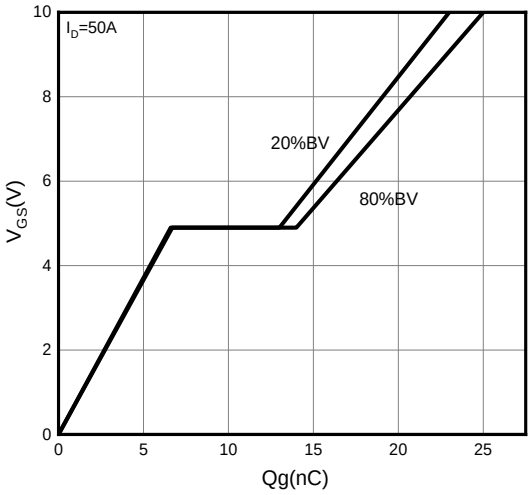


Figure 11.Drain Current Derating

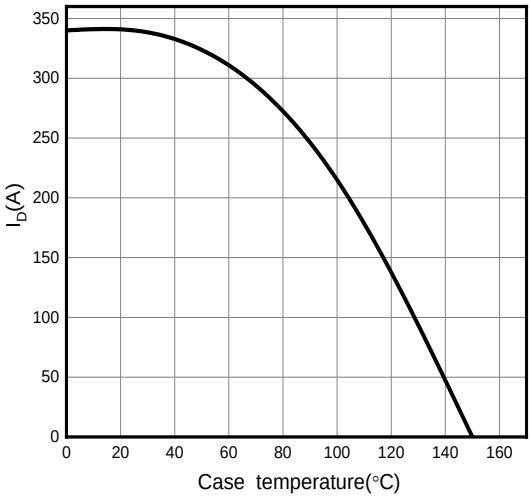


Figure 12.Power Dissipation vs.Temperature

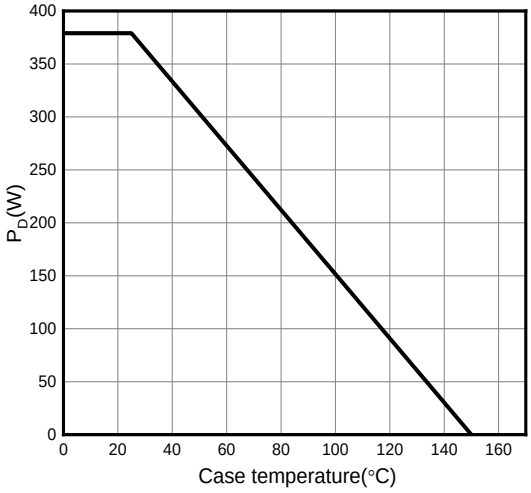


Figure 13. Safe Operating Area

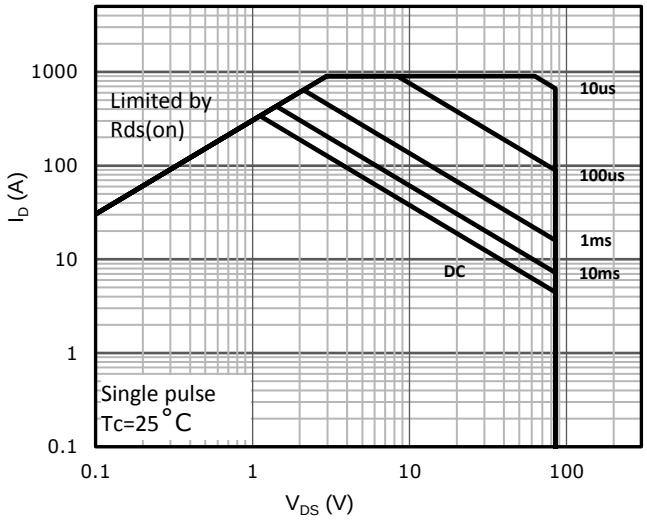
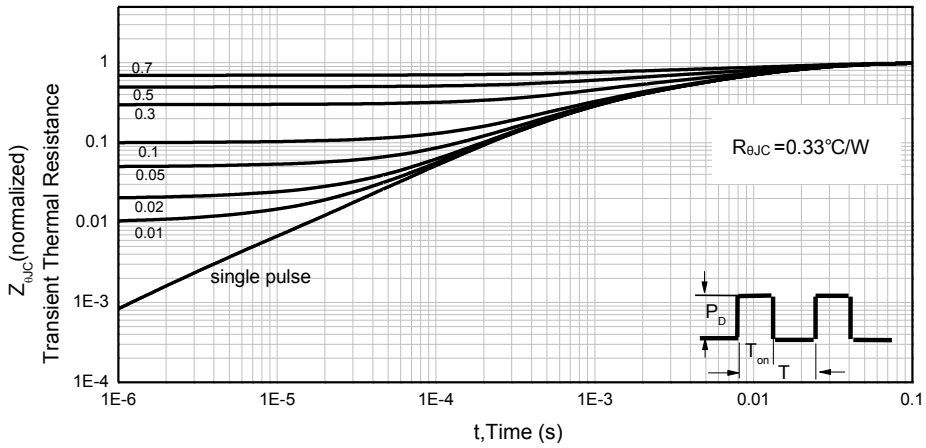
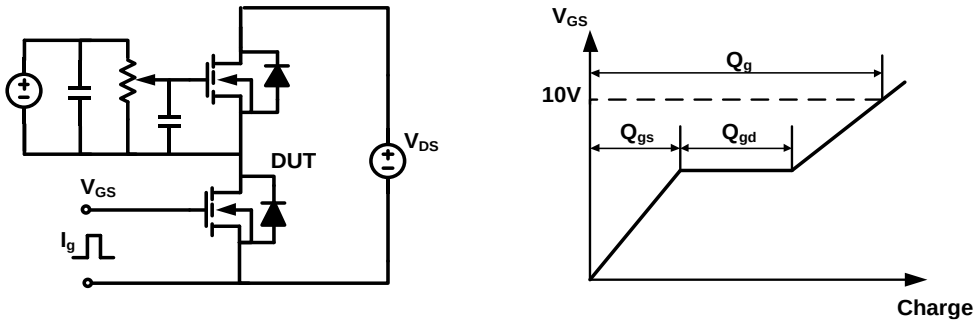


Figure 14. Normalized Maximum Transient Thermal Impedance (RthJC)

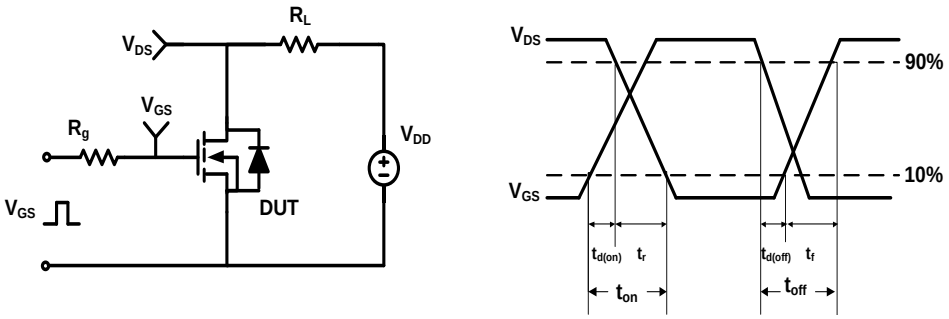


Test Circuit & Waveforms

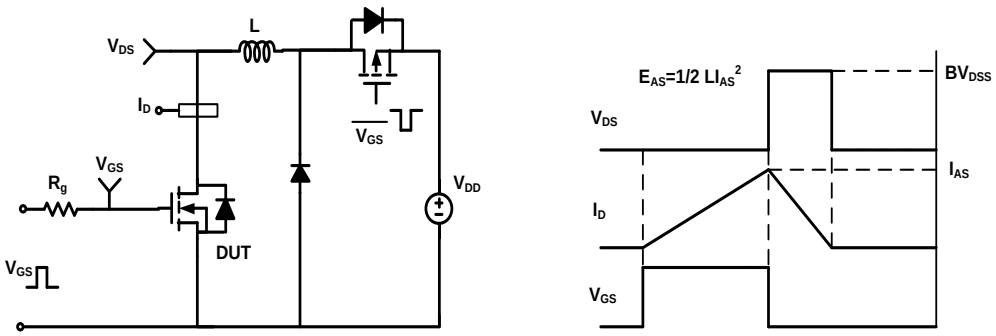
Gate Charge Test Circuit & Waveform



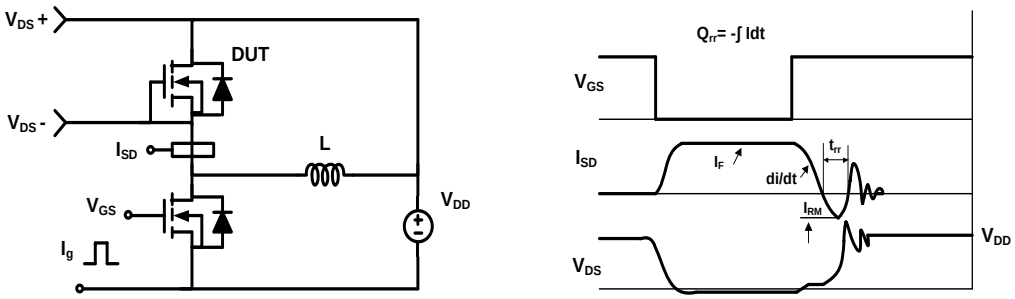
Resistive Switching Test Circuit & Waveform



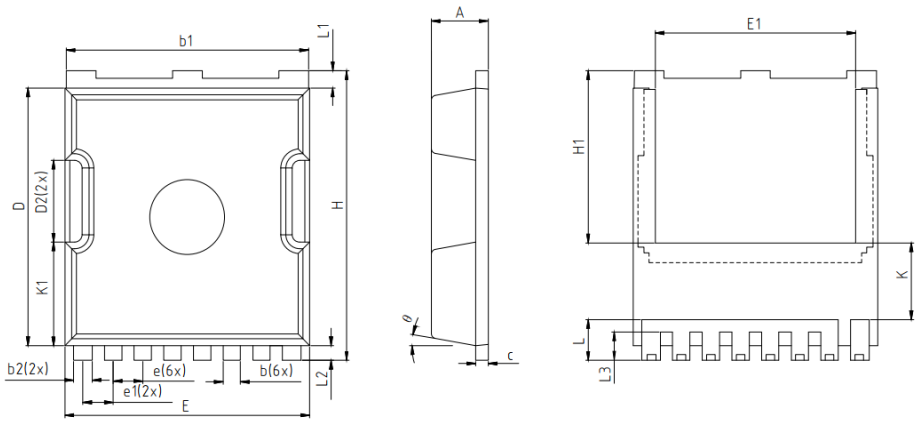
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



Mechanical Dimensions for TOLL



DIMENSIONS IN MILLITMETERS		
SYMBOL	MIN	MAX
A	2.20	2.40
b	0.60	0.80
b1	9.70	9.90
b2	0.65	0.85
c	0.40	0.60
D	10.28	10.58
D2	3.15	3.45
E	9.70	10.10
E1	7.90	8.30
e	1.20 BSC	
e1	1.225 BSC	
H	11.48	11.88
H1	6.95 BSC	
K	3.10 BSC	
K1	4.08	4.28
L	1.40	1.80
L1	0.60	0.80
L2	0.50	0.70
L3	1.00	1.30
θ	10° REF	

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