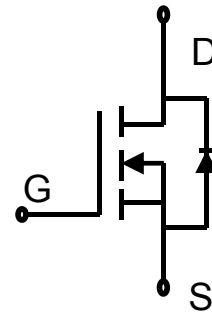




Description

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



N-Channel MOSFET

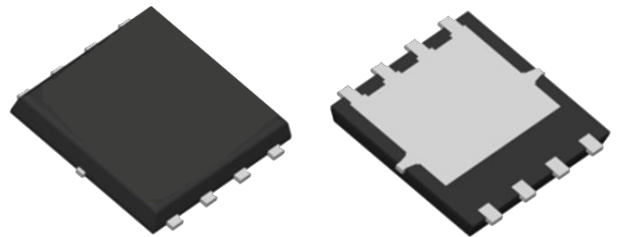
Features

- ◆ 40V, 100A, $R_{DS(on),max} = 1.8m\Omega @ V_{GS} = 10V$
- ◆ Improved dv/dt capability
- ◆ Fast switching
- ◆ 100% EAS Guaranteed
- ◆ Green device available

Applications

- ◆ Motor Drives
- ◆ UPS
- ◆ DC-DC Converter

Pin Configuration



DFN5×6

Product Summary

V_{DSS}	40V
$R_{DS(on),max} @ V_{GS}=10V$	1.8mΩ
I_D	100A

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 ($T_c = 25^\circ C$) ($T_c = 100^\circ C$)	I_D	100	A
		89	A
Pulsed drain current ¹⁾	I_{DM}	300	A
Gate-Source voltage	V_{GSS}	± 20	V
Avalanche energy ²⁾	E_{AS}	210	mJ
Power Dissipation	P_D	57	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	$R_{\theta JC}$	2.2	$^\circ C/W$
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	50	$^\circ C/W$

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Reel
WLQ018R04	DFN5X6	WLQ018R04	5000



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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.2	1.7	2.5	V
Drain-source leakage current	I_{DSS}	$V_{DS}=40\text{ V}, V_{GS}=0\text{ V}$	---	---	1	μA
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	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=20\text{ A}$	---	1.5	1.8	mΩ
		$V_{GS}=4.5\text{ V}, I_D=20\text{ A}$	---	2.1	2.6	mΩ
Forward transconductance	g_{fs}	$V_{DS}=5\text{ V}, I_D=20\text{ A}$	---	55	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS}=20\text{ V}, V_{GS}=0\text{ V},$ $F=1\text{ MHz}$	---	3975	---	pF
Output capacitance	C_{oss}		---	1123	---	
Reverse transfer capacitance	C_{rss}		---	84	---	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=15\text{ V}, V_{GS}=10\text{ V}, I_D=20\text{ A}$ $R_G=3.3\Omega$	---	18.7	---	ns
Rise time	t_r		---	9.3	---	
Turn-off delay time	$t_{d(off)}$		---	58.1	---	
Fall time	t_f		---	32.5	---	
Gate resistance	R_g	$V_{GS}=0\text{ V}, V_{DS}=0\text{ V}, F=1\text{ MHz}$	---	1.1	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	$V_{DS}=15\text{ V}, I_D=20\text{ A},$ $V_{GS}=10\text{ V}$	---	12.3	---	nC
Gate to drain charge	Q_{gd}		---	18.2	---	
Gate charge total	Q_g		---	56	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	47.5	A
Pulsed Source Current ³⁾	I_{SM}		---	---	142.5	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

Notes:

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

2: $V_{DD}=35\text{ V}, V_{GS}=10\text{ V}, L=0.5\text{ mH}, I_{AS}=29\text{ A}$, Starting $T_J=25^\circ\text{C}$.

3: Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$.



Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

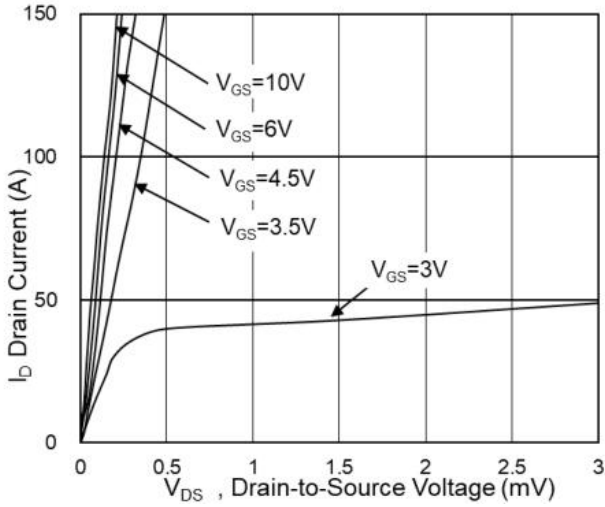


Figure 2. Transfer Characteristics

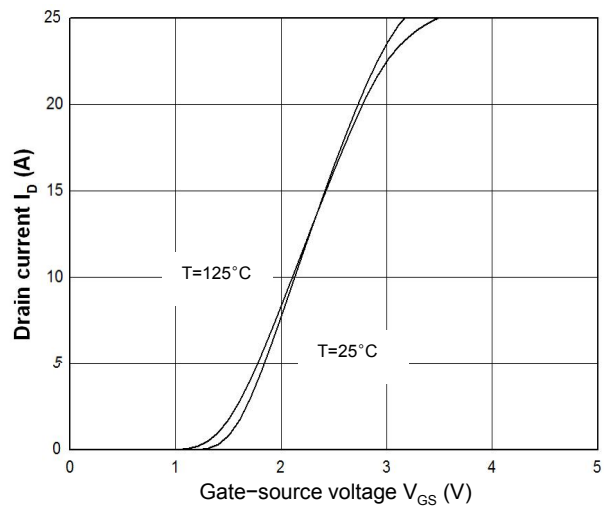


Figure 3. Capacitance Characteristics

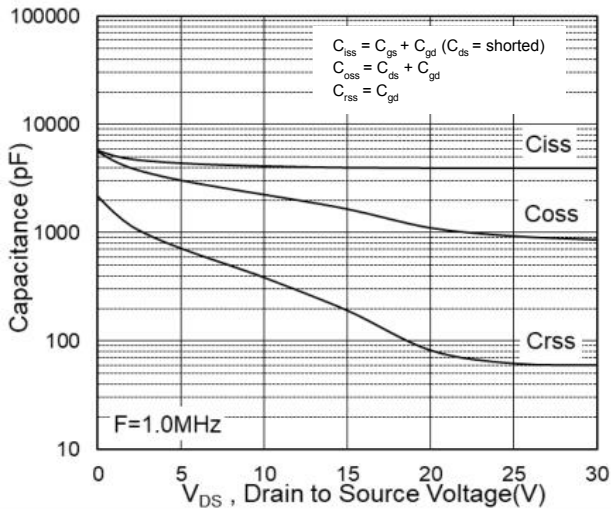


Figure 4. Gate Charge Waveform

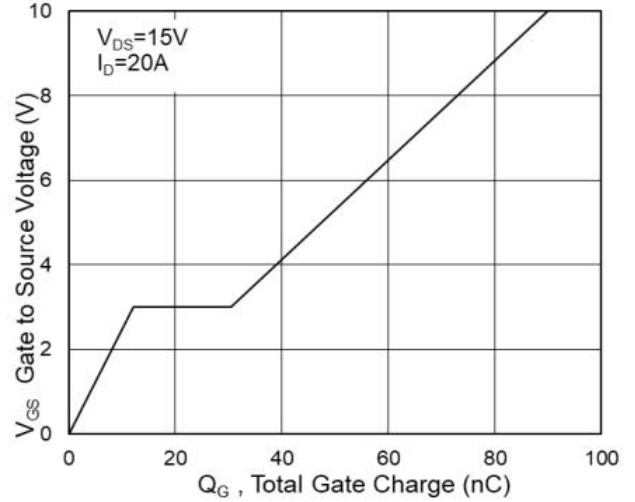


Figure 5. Body-Diode Characteristics

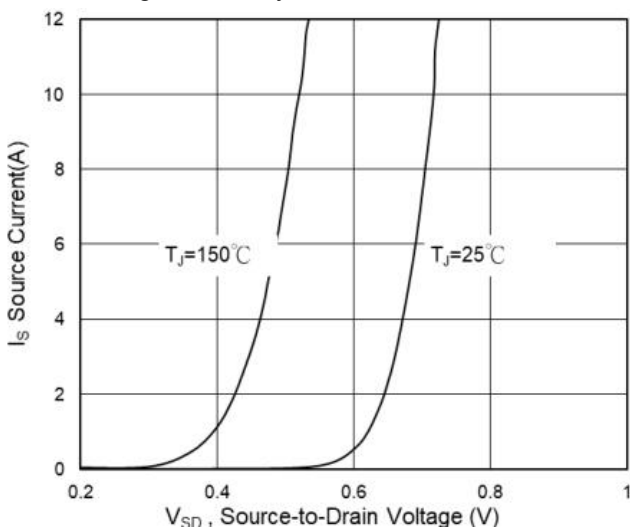


Figure 6. Rdson-Drain Current

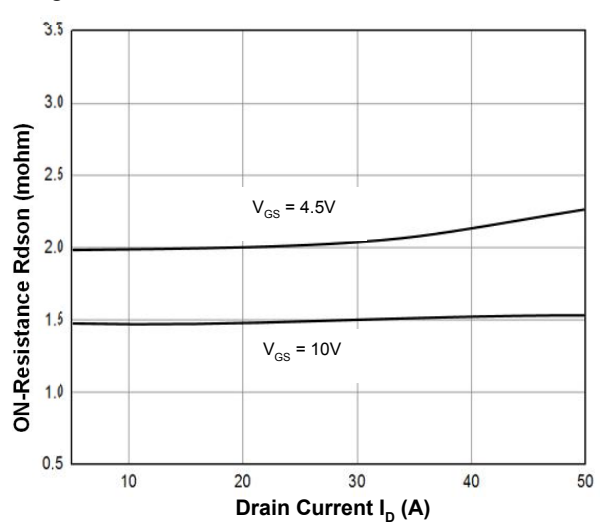




Figure 7. R_{ds(on)}-Junction Temperature

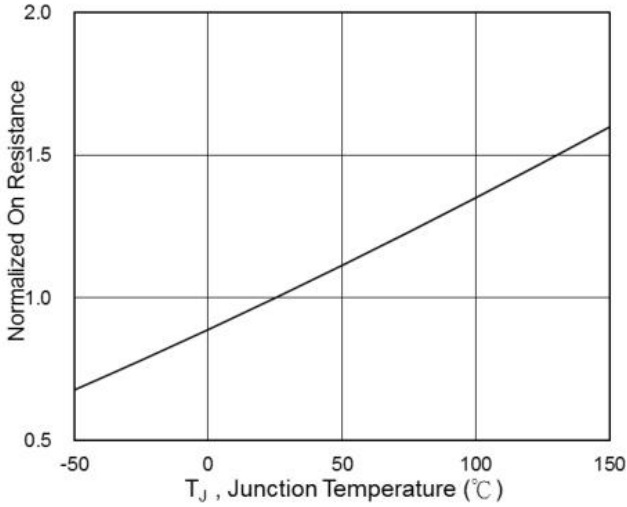


Figure 8. V_{GS(th)}-Junction Temperature

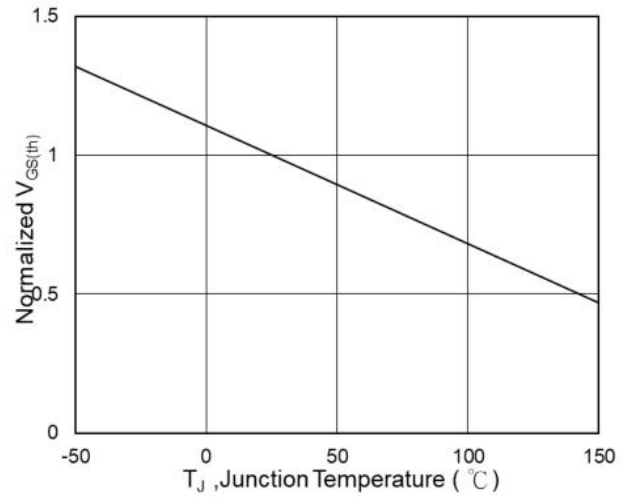


Figure 9. On-Resistance vs. Gate-to-Source voltage

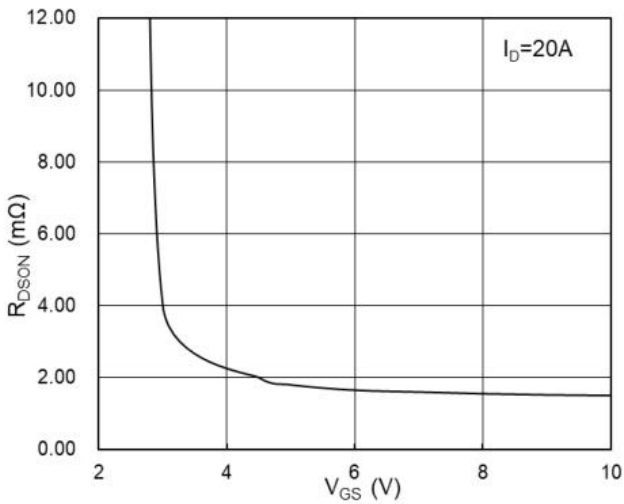


Figure 10: Safe Operating Area

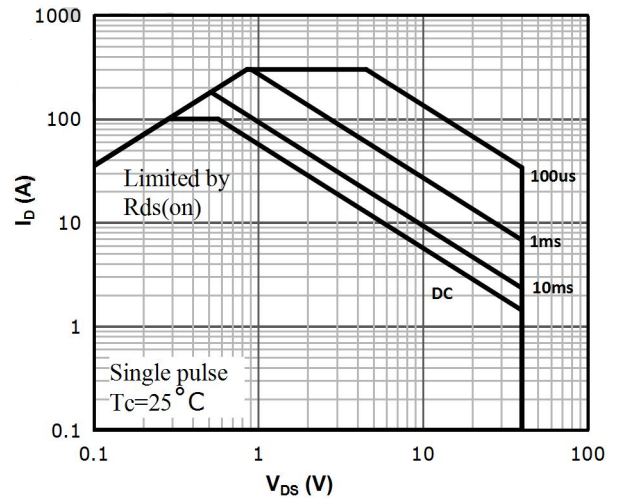
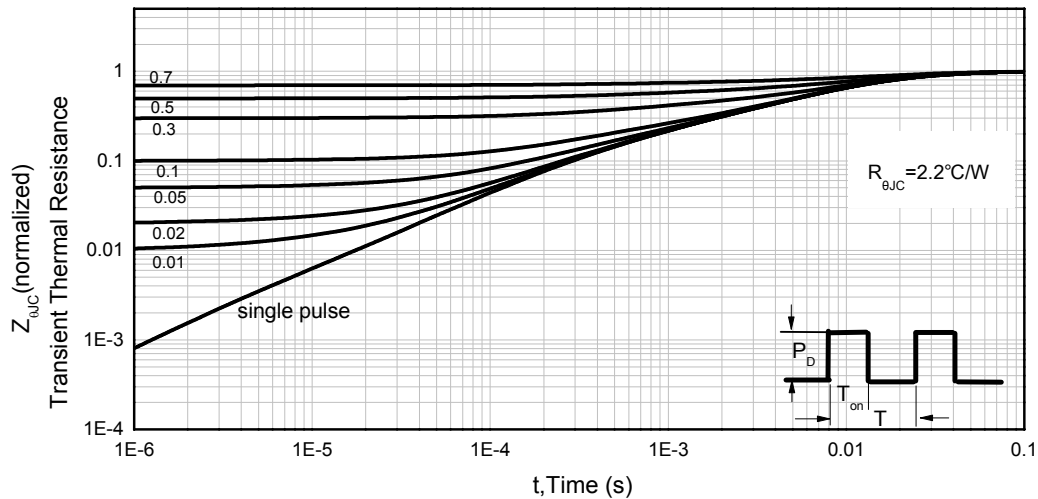


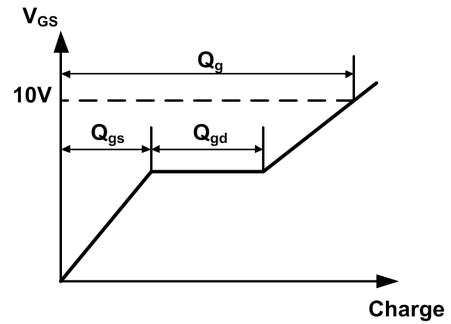
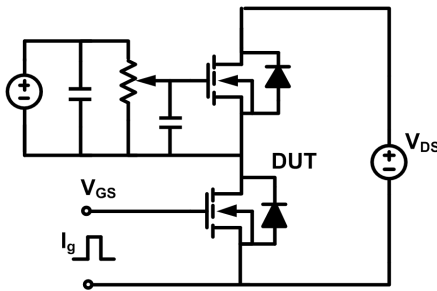
Figure 11. Normalized Maximum Transient Thermal Impedance (R_{thJC})



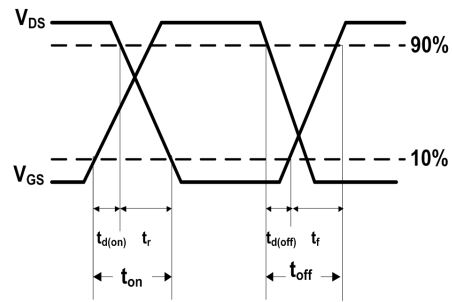
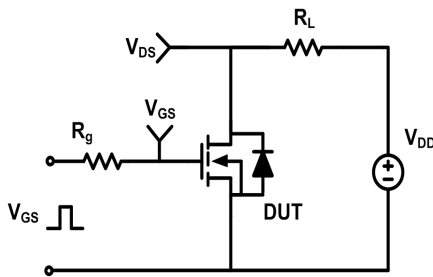


Test Circuit & Waveforms

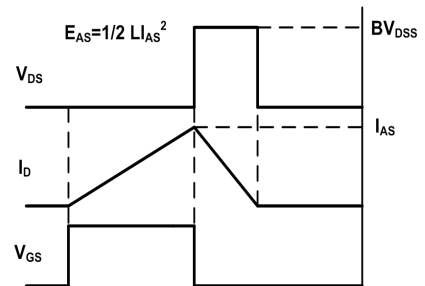
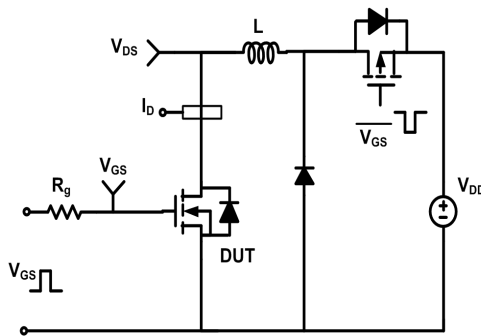
Gate Charge Test Circuit & Waveform



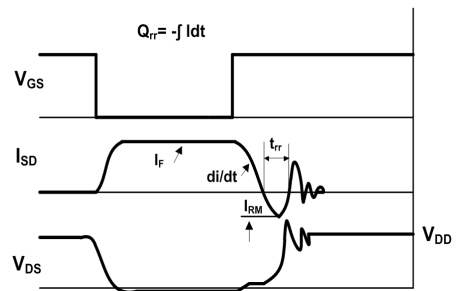
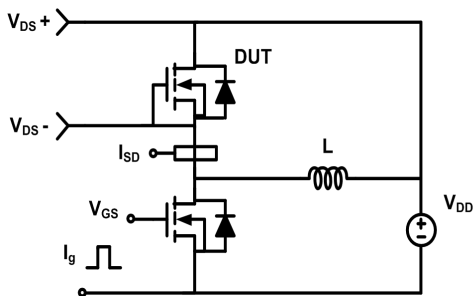
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveform

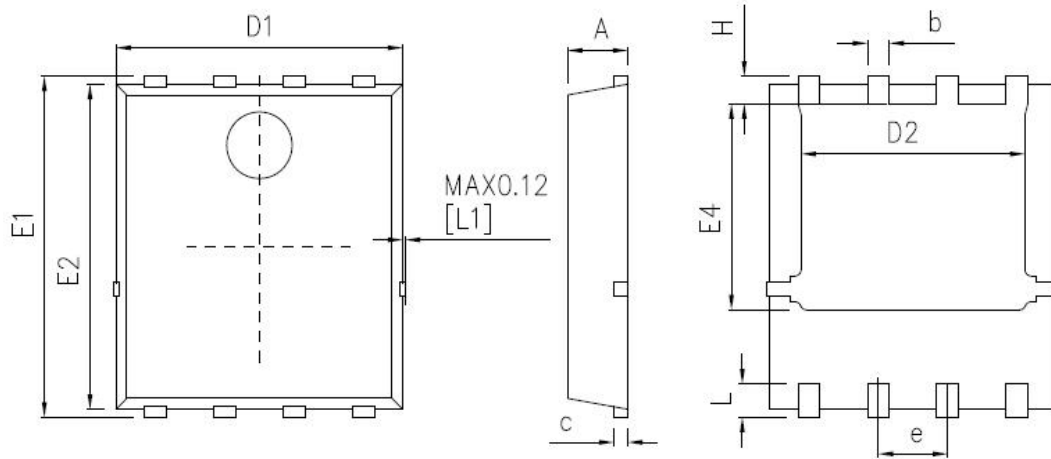


Diode Recovery Test Circuit & Waveform





Mechanical Dimensions for DFN5×6



DIMENSIONS IN MILLIMETERS		
SYMBOL	MIN	MAX
A	0.85	1.20
b	0.30	0.51
c	0.15	0.35
D1	4.80	5.40
D2	3.70	4.55
E1	5.95	6.35
E2	5.45	6.06
E4	3.30	3.92
e	1.27BSC	
L	0.3	0.71
H	0.38	0.71



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