ZK40N190G

N-channel Enhancement Mode Power MOSFET

Features

- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired
- 100% UIS TESTED!
- 100% ΔVds TESTED!

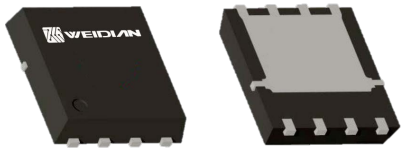
Product Summary

Parameters	Value	Unit
V_{DSS}	40	V
$V_{GS(th)_Typ}$	3.0	V
I_D(@V_{GS}=10V)	190	A
$R_{DS(ON)_Typ}$(@V_{GS}=10V	2.8	mΩ
$R_{DS(ON)_Typ}$(@V_{GS}=4.5V	3.6	mΩ

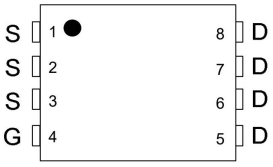
Applications

- Load Switch
- PWM Application
- Power Management

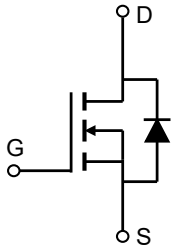
Top View **Bottom View**



PDFN5x6-8L



Marking



Schematic Diagram

Ordering Information

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK40N190G	40N190	DFN5x6	Reel	N/A	N/A	5000

MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±25	V
Continuous Drain Current	T_C = 25°C	I_D	190	A
	T_C = 100°C		150	
Pulsed Drain Current		I_{DM}	720	A
Single Pulsed Avalanche Energy		E_{AS}	289	mJ
Power Dissipation		P_D	96	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	27	℃/W
Operating Junction and Storage Temperature Range		T_J ,T_{stg}	-55 to 175	℃

MOSFET ELECTRICAL CHARACTERISTICS

T_a=25℃ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)\,DSS}$	V_{GS} = 0V, I_D = 250uA	40			V
Zero gate voltage drain current	I_{DSS}	V_{DS} = 40V, V_{GS} =0V			1.0	μA
Gate-body leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} =±25V			±100	nA
On characteristics ④						
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250uA	2.0	3.0	4.0	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =30A		2.8	3.5	mΩ
		V_{GS} =4.5V, I_D =20A		3.6	4.2	mΩ
Dynamic characteristics ④⑤						
Input capacitance	C_{iss}	V_{DS} =20V,V_{GS} =0V f =1MHz		6335		pF
Output capacitance	C_{oss}			501		
Reverse transfer capacitance	C_{rss}			284		
Reverse transfer capacitance	C_{rss}	f =1MHz		1.6		Ω
Switching characteristics ④⑤						
Total gate charge	Q_g	V_{GS}=0 to 10V V_{DS}=15V, I_D=30A		97		nC
Gate-source charge	Q_{gs}			20		
Gate-drain charge	Q_{gd}			23		
Turn-on delay time	$t_{d(on)}$	V_{DD}=15V,I_D=30A V_{GS}=10V,R_{GEN}=3Ω		16		ns
Turn-on rise time	t_r			30		
Turn-off delay time	$t_{d(off)}$			54		
Turn-off fall time	t_f			19		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V_{SD} ④	V_{GS} =0V, I_S=30A			1.2	V
Continuous drain-source diode forward current	I_S ①				180	A
Pulsed drain-source diode forward current	I_{SM} ②				720	A
Reverse recovery time	trr	di/dt = 100A/μs, I_F = 30A		23		ns
Reverse recovery charge	Qrr			14		nC

Notes:

1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2.EAS condition: Starting TJ=25° C, VDD=20V, VGS=10V, RG=25Ω, L=0.5mH, IAS=34A.

3.Exclusion zone is 3mm from the wafer edge. CP yield do not guarantee from 3mm wafer edge.

4.Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Characteristics

Figure 1: Output Characteristics

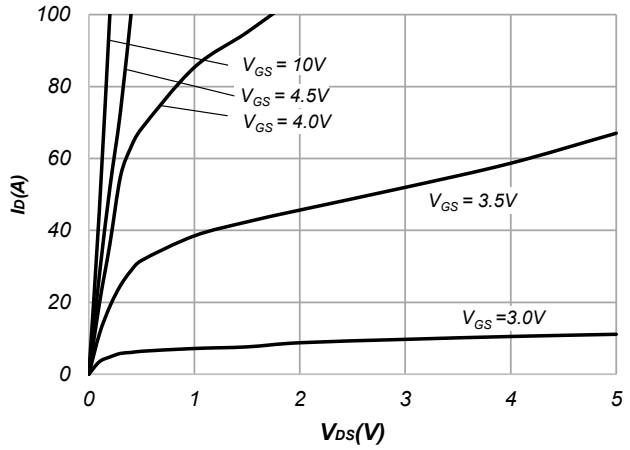


Figure 2: Typical Transfer Characteristics

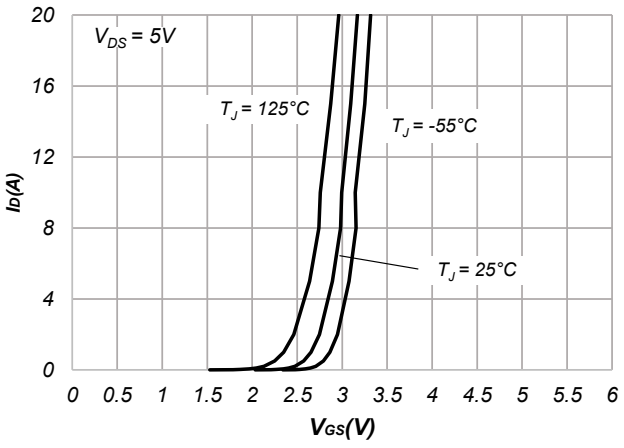


Figure 3: On-resistance vs. Drain Current

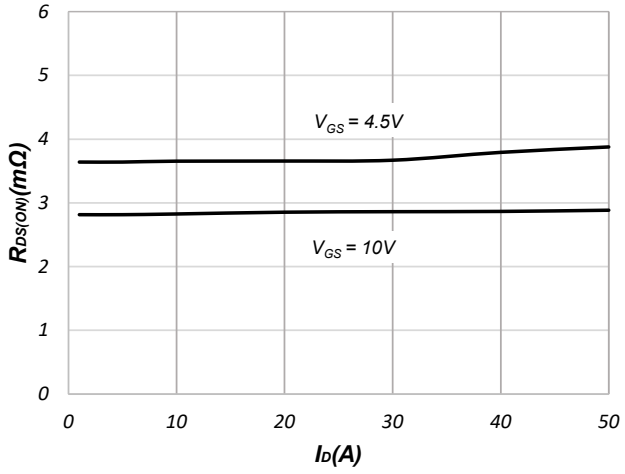


Figure 4: Body Diode Characteristics

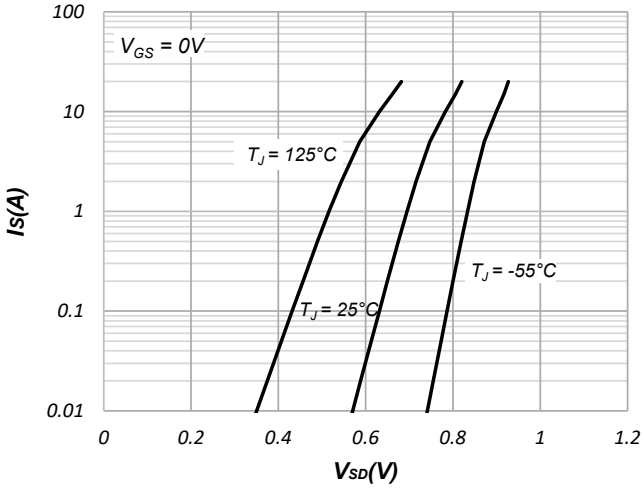


Figure 5: Gate Charge Characteristics

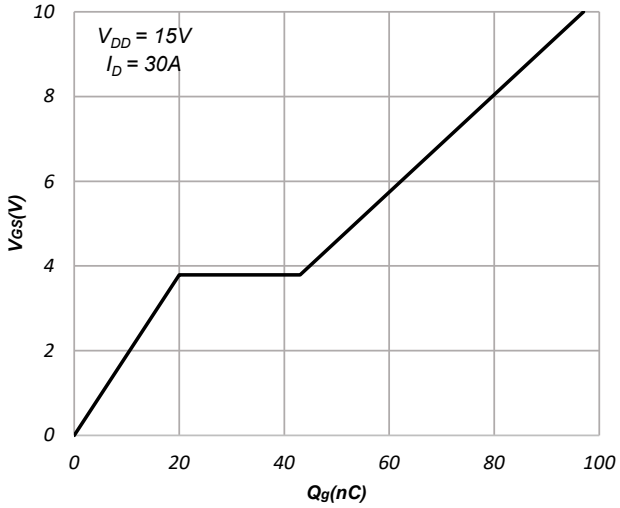
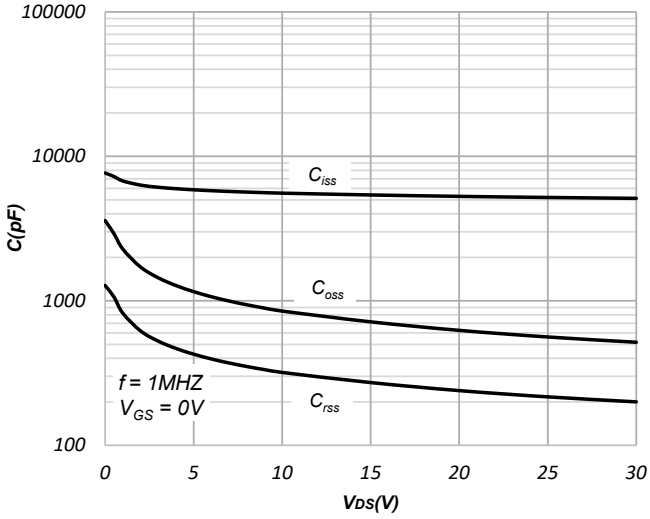


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

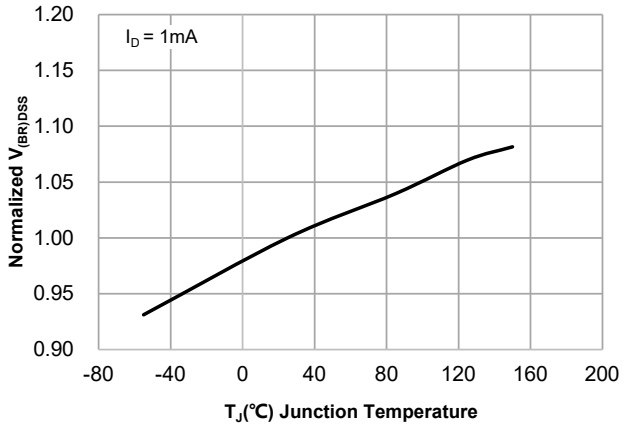


Figure 8: Normalized on Resistance vs. Junction Temperature

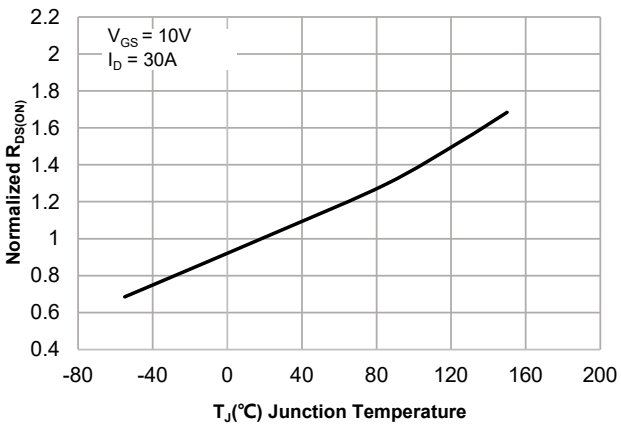


Figure 9: Maximum Safe Operating Area

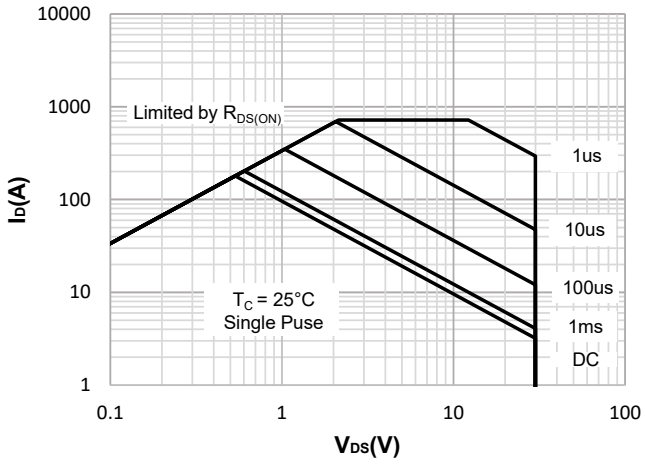


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

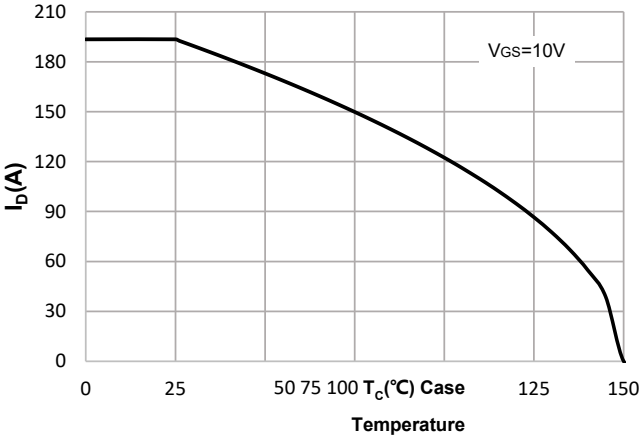


Figure 11: Normalized Maximum Transient Thermal Impedance

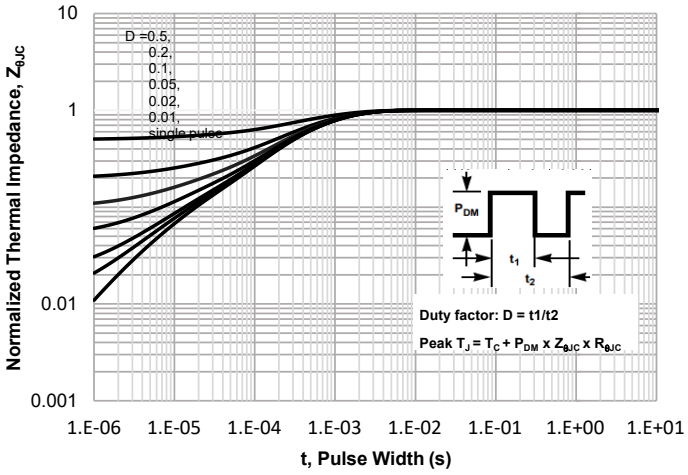
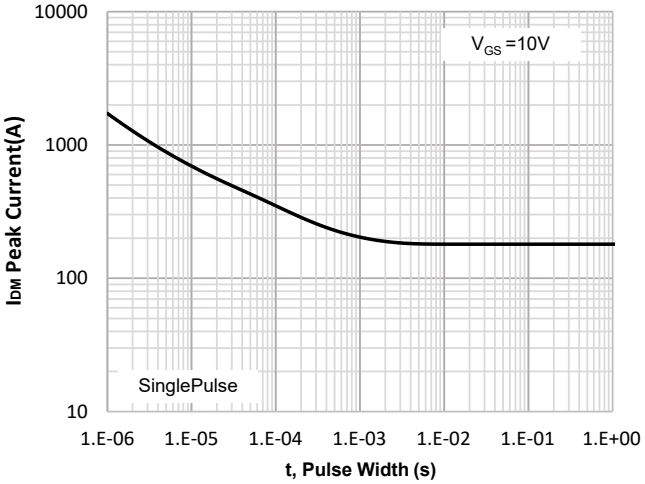


Figure 12: Peak Current Capacity



Test Circuit

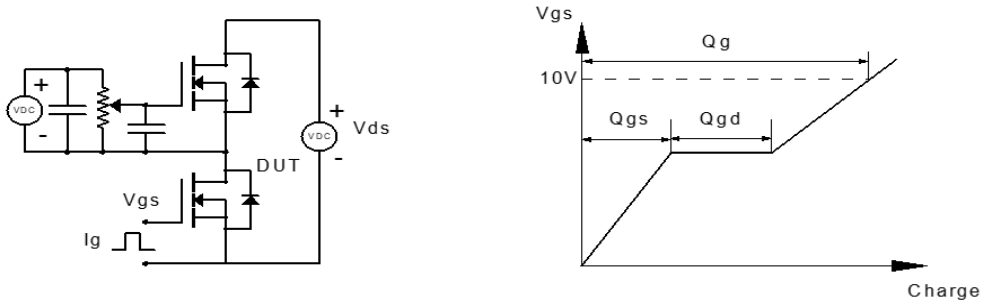


Figure 1: Gate Charge Test Circuit & Waveform

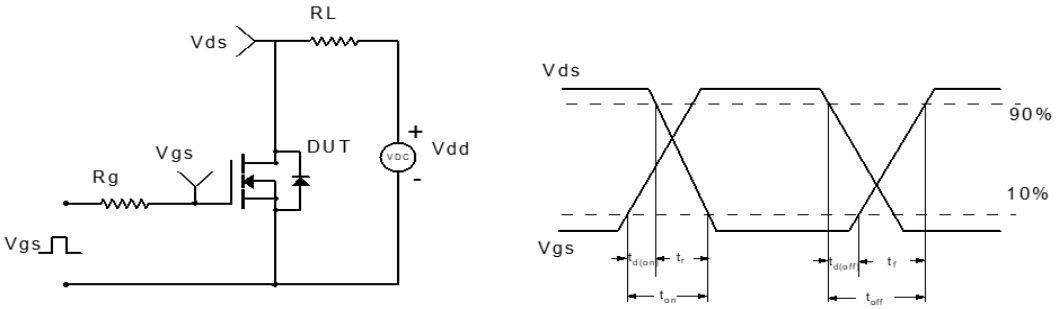


Figure 2: Resistive Switching Test Circuit & Waveform

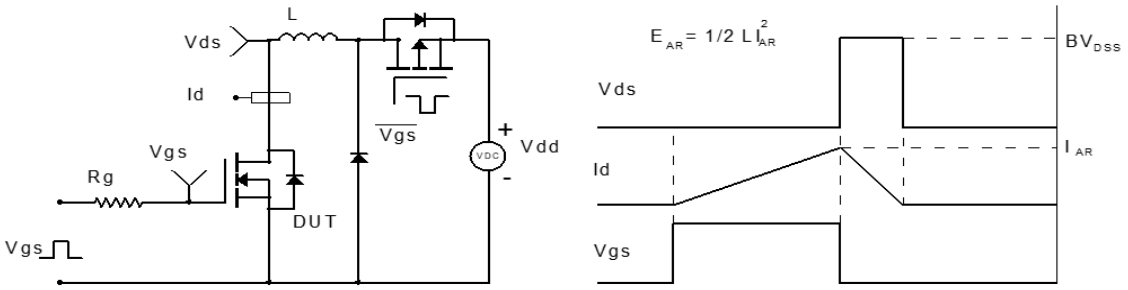


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

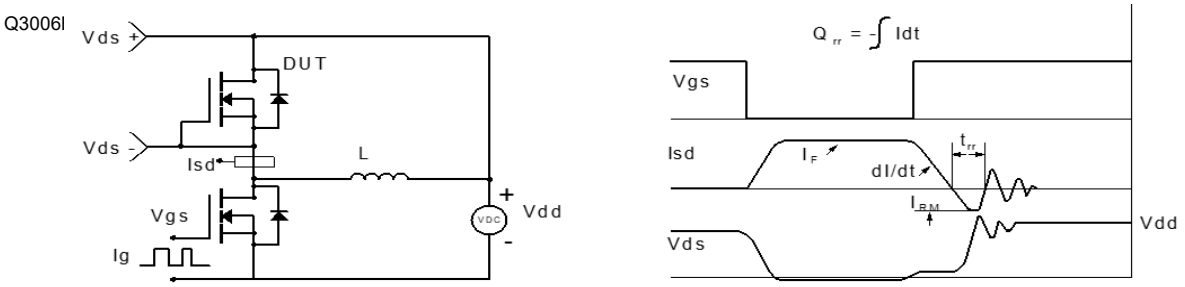
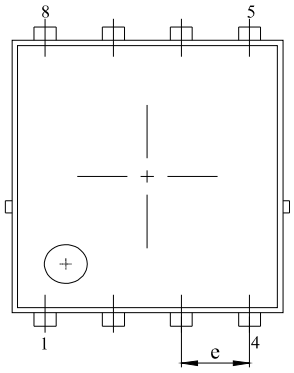
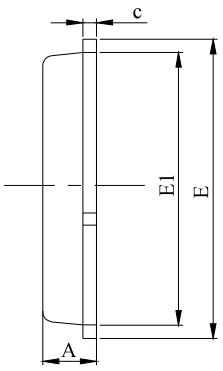


Figure 4: Diode Recovery Test Circuit & Waveform

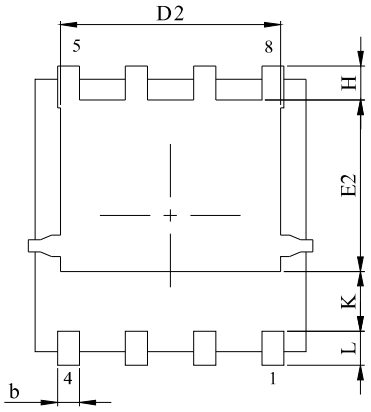
Package Mechanical Data(PDFN5x6-8L)



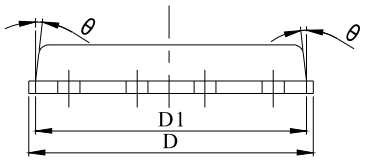
Top View



Side View



Bottom View



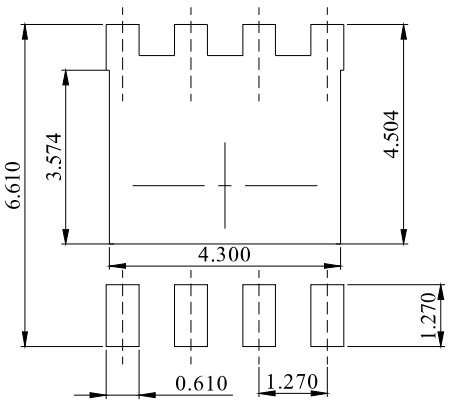
Front View

NOTES:

1. Dimension and tolerance per ASME Y14.5M, 1994.
2. All dimensions in millimeter (angle in degree).
3. Dimensions D1 and E1 do not include mold flash protrusions or gate burrs.

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
b	0.31	0.41	0.51
c	0.20	0.25	0.30
D	5.00	5.20	5.40
D1	4.95	5.05	5.15
D2	4.00	4.10	4.20
E	6.05	6.15	6.25
E1	5.50	5.60	5.70
E2	3.42	3.53	3.63
e	1.27BSC		
H	0.60	0.70	0.80
L	0.50	0.70	0.80
K	1.23 REF		
θ	-	-	10°

Recommended Soldering Footprint



DIMENSIONS:MILLIMETERS