

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% ΔV_{ds} TESTED!

Product Summary

Parameters	Value	Unit
V_{DSS}	40	V
$V_{GS(th)_{Typ}}$	1.6	V
$I_D(@V_{GS}=10V)$	60	A
$R_{DS(ON)_{Typ}}(@V_{GS}=10V)$	10.5	m Ω

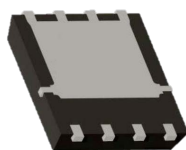
Applications

- Load Switch
- PWM Application
- Power Management

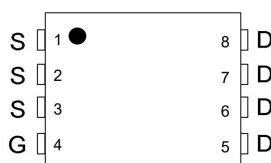
Top View



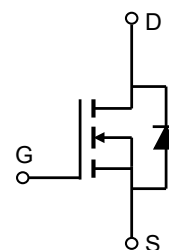
Bottom View



PDFN5x6-8L



Marking



Schematic Diagram

Ordering Information

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK40N60G	40N60	DFN5x6	Reel	N/A	N/A	5000

MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^{\circ}\text{C}$	I_D	60	A
	$T_C = 100^{\circ}\text{C}$		28	
Pulsed Drain Current		I_{DM}	100	A
Single Pulsed Avalanche Energy		E_{AS}	20	mJ
Power Dissipation		P_D	46	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	62	$^{\circ}\text{C/W}$
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	$^{\circ}\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS

$T_a = 25^\circ\text{C}$ 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 = 1mA	40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 32V, V _{GS} =0V			1.0	μA
Gate-body leakage current	I _{GSS}	V _{DS} = 0V, V _{GS} =±20V			±100	nA
On characteristics ④						
Gate-threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =110uA	1.0	1.6	2.5	V
Static drain-source on-sate resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		10.5	13.5	mΩ
		V _{GS} =4.5V, I _D =10A		13.5	16.5	mΩ
Dynamic characteristics ④ ⑤						
Input capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V f =1MHz		1314		pF
Output capacitance	C _{oss}			120		
Reverse transfer capacitance	C _{rss}			88		
Switching characteristics ④ ⑤						
Total gate charge	Q _g	V _{GS} =0 to 4.5V V _{DS} =20V, I _D =12A		10.7		nC
Gate-source charge	Q _{gs}			3.3		
Gate-drain charge	Q _{gd}			4.2		
Turn-on delay time	t _{d(on)}	V _{DD} =12V, I _D =6A V _{GS} =10V, R _{GEN} =3.3Ω		8.6		ns
Turn-on rise time	t _r			3.4		
Turn-off delay time	t _{d(off)}			25		
Turn-off fall time	t _f			2.2		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V _{SD} ④	V _{GS} =0V, I _S =1A			1.2	V
Continuous drain-source diode forward current	I _S ①				46	A
Pulsed Source Current	I _{SM}				100	A
Reverse recovery time	t _{rr}	di/dt = 100A/μs, I _F = 50A		56		ns
Reverse recovery charge	Q _{rr}			73		nC

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
2. The data tested by pulsed, pulse width 300 μs , duty cycle 2%
3. The EAS data shows Max. rating. The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.1mH, I_{AS} = 20A$
4. The power dissipation is limited by 150 junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

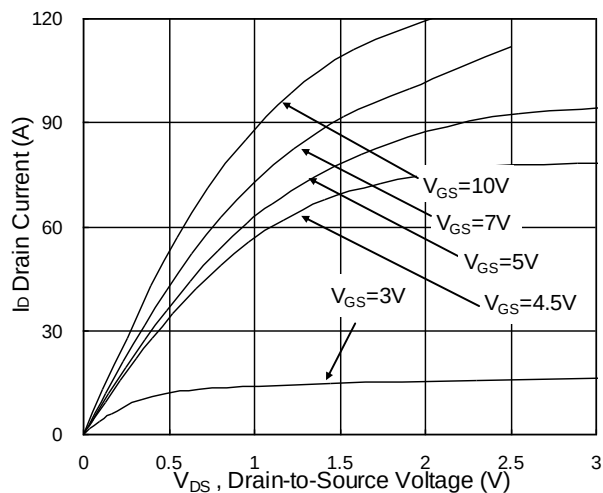


Fig.1 Typical Output Characteristics

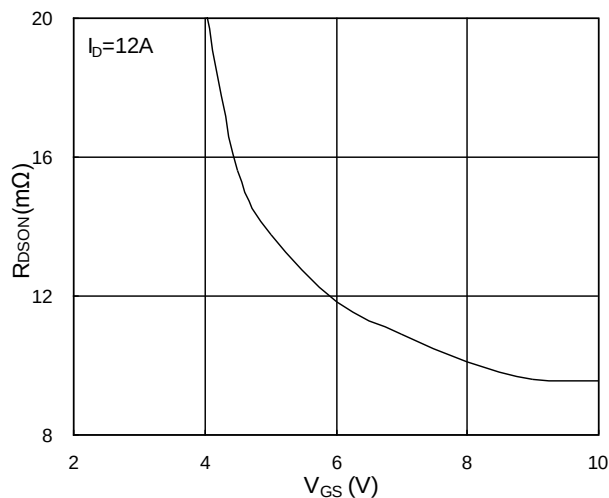


Fig.2 On-Resistance vs. G-S Voltage

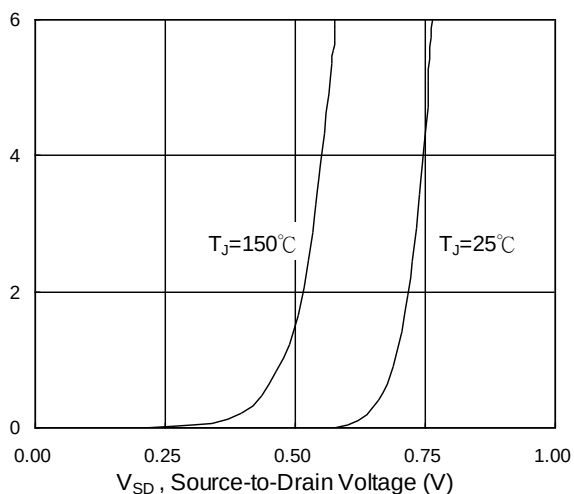


Fig.3 Forward Characteristics of Reverse

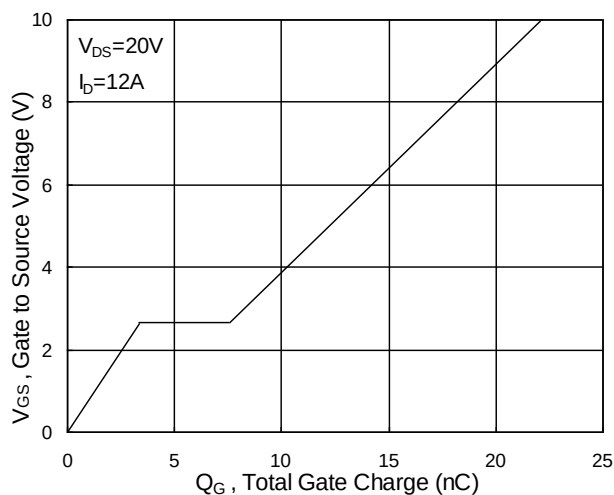
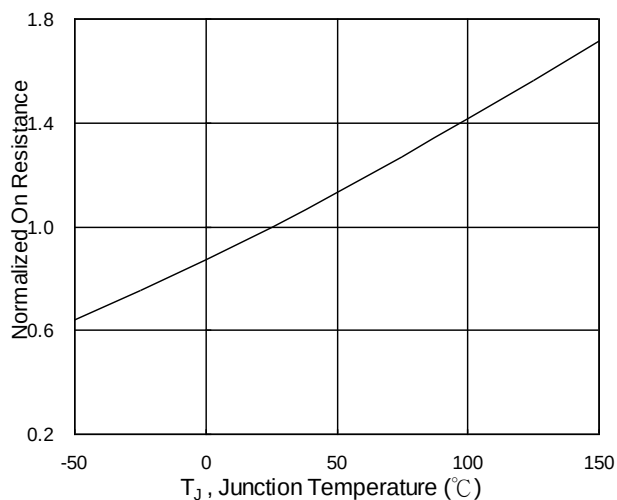
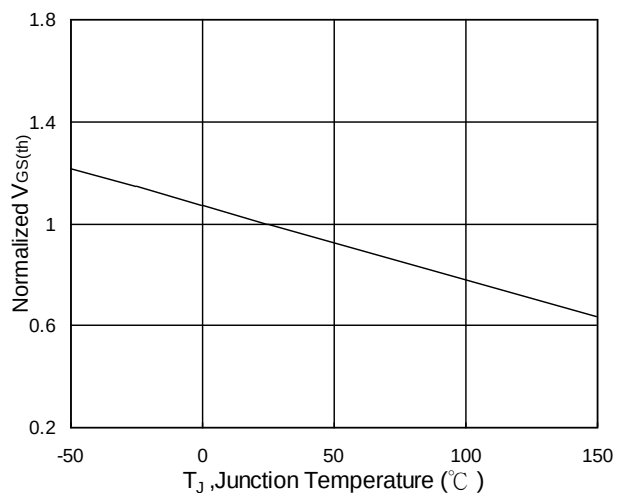


Fig.4 Gate-Charge Characteristics



Typical Characteristics

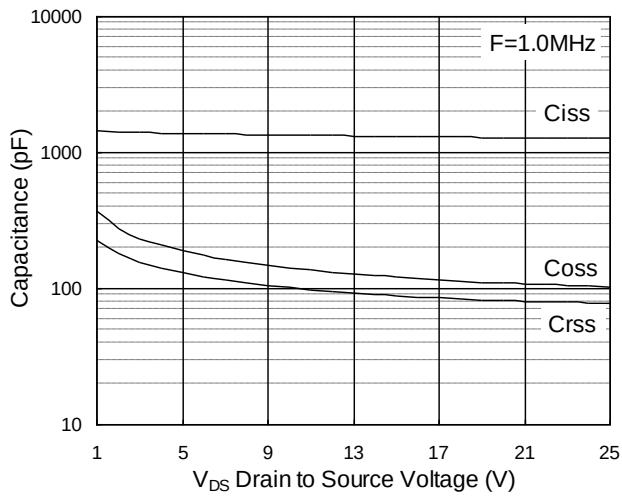


Fig.7 Capacitance

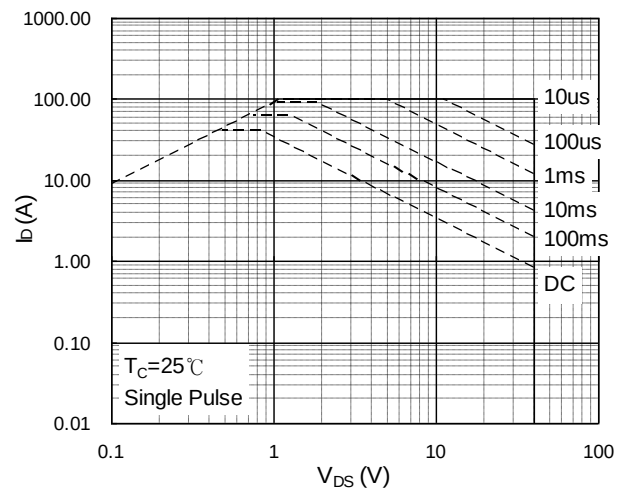


Fig.8 Safe Operating Area

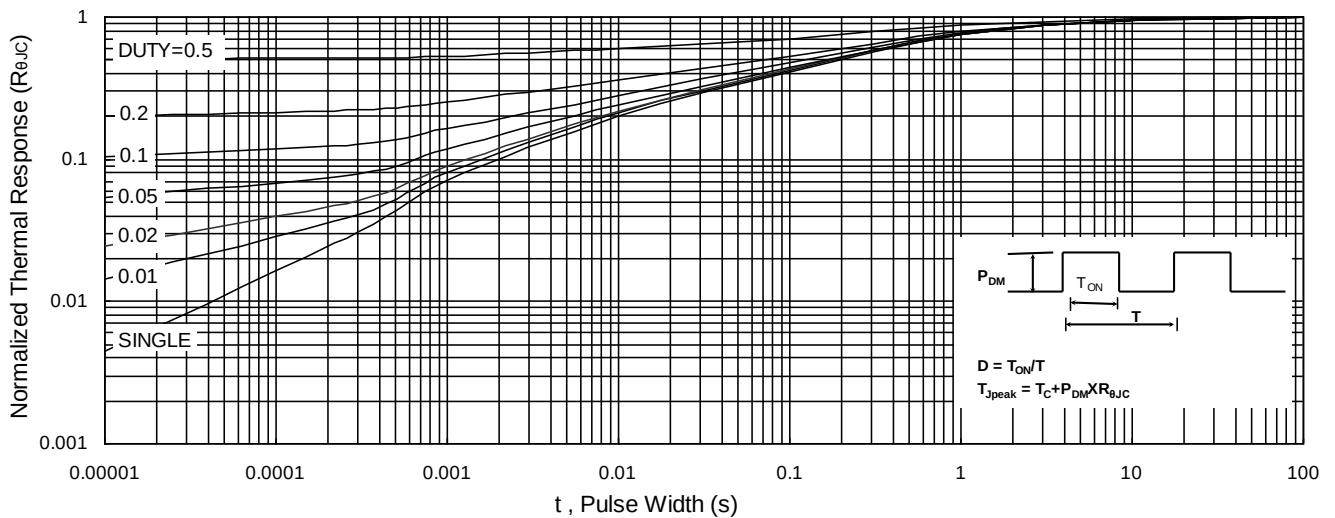


Fig.9 Normalized Maximum Transient Thermal Impedance

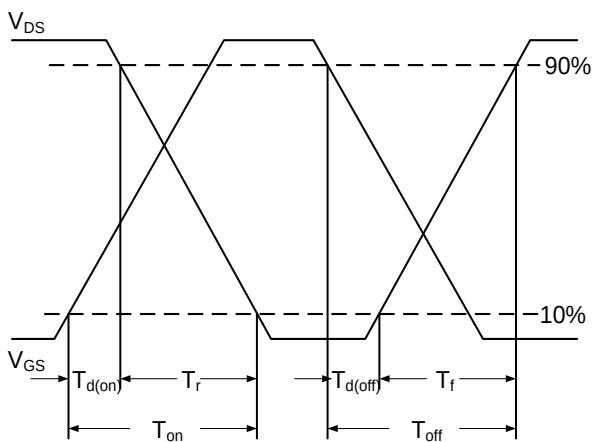


Fig.10 Switching Time Waveform

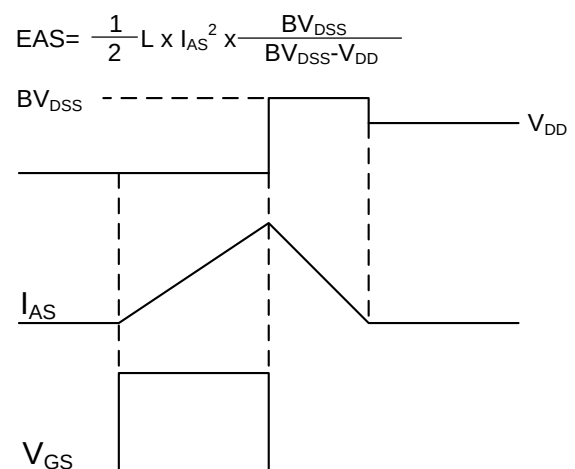
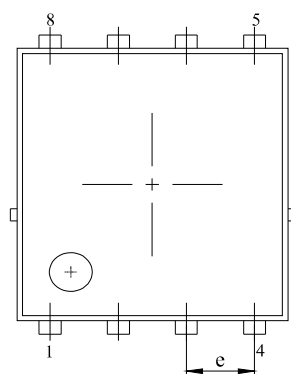
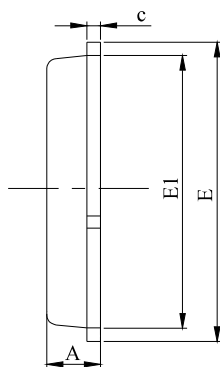


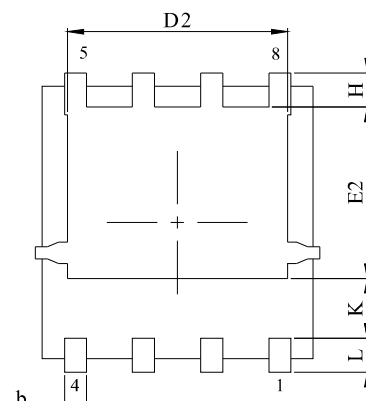
Fig.11 Unclamped Inductive Switching Waveform



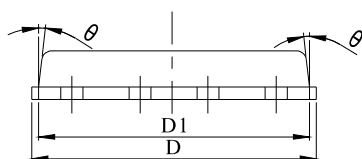
Top View



Side View



Bottom View



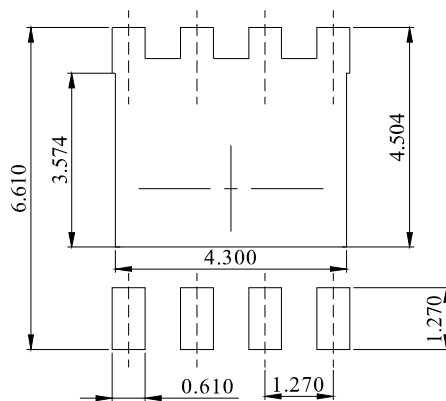
Front View

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