

N-Channel Enhancement Mode Field Effect Transistor

Product Summary

- V_{DS} 40V
- I_D 130A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<1.5m\Omega$
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) $<2.3m\Omega$

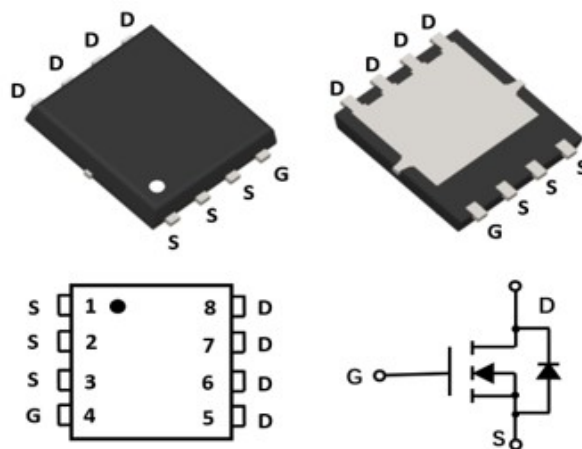
General Description

- Split gate trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Applications

- Consumer electronic power supply
- Motor control
- Synchronous- rectification
- Invertors

PDFN 5X6



PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape width	QUANTITY(pcs)
FNKG04N015E	FNKG04N015E	DFN5X6			

■ Absolute 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
Drain Current	$T_c=25^\circ\text{C}$	I_D	130	A
	$T_c=100^\circ\text{C}$		82	
Pulsed Drain Current ^A		I_{DM}	390	A
Avalanche energy ^B		E_{AS}	720	mJ
Total Power Dissipation ^C	$T_c=25^\circ\text{C}$	P_D	115	W
	$T_c=100^\circ\text{C}$		46	
Junction and Storage Temperature Range		T_J, T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

■ Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient ^D	$t \leq 10S$	$R_{\theta JA}$	15	20	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Ambient ^D	Steady-State		40	50	
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	0.9	1.09	

■ Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	40			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V,V _{GS} =0V			1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ± 20V, V _{DS} =0V			± 100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	1.0	1.8	2.5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A		1.35	1.5	mΩ
		V _{GS} =4.5V, I _D =20A		1.85	2.3	mΩ
Diode Forward Voltage	V _{SD}	I _S =20A,V _{GS} =0V			1.3	V
Maximum Body-Diode Continuous Current	I _S				130	A
Gate resistance	R _G	f=1MHz, Open drain		2.6		Ω
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =25V,V _{GS} =0V,f=500KHZ		7100		pF
Output Capacitance	C _{oss}			1900		
Reverse Transfer Capacitance	C _{rss}			130		
Switching Parameters						
Total Gate Charge	Q _{g(10V)}	V _{GS} =10V,V _{DS} =20V,I _D =20A		134.71		nC
Gate-Source Charge	Q _{gs}			26.71		
Gate-Drain Charge	Q _{gd}			24.48		
Reverse Recovery Chrage	Q _{rr}	I _F =20A, di/dt=100A/us		65.7		ns
Reverse Recovery Time	t _{rr}			59		
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V,V _{DD} =20V,I _D =20A R _{GEN} =2.2Ω		22.5		
Turn-on Rise Time	t _r			86.1		
Turn-off Delay Time	t _{D(off)}			114.2		
Turn-off fall Time	t _f			97.2		

A. Repetitive rating; pulse width limited by max. junction temperature.

B. V_{DD}=25V, R_G=25Ω, L=3mH, I_{AS}=32A.

C. P_d is based on max. junction temperature, using junction-case thermal resistance.

D. The value of R_{θJA} is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The Power dissipation PDSM is based on R_{θJA} ≤ 10s and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design.

■ Typical Performance Characteristics

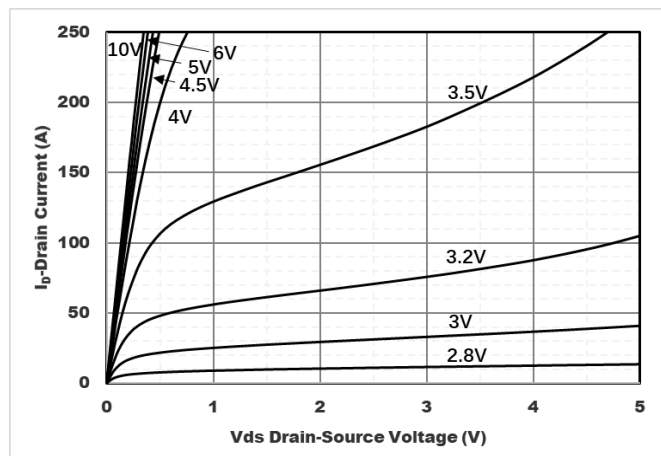


Figure1. Output Characteristics

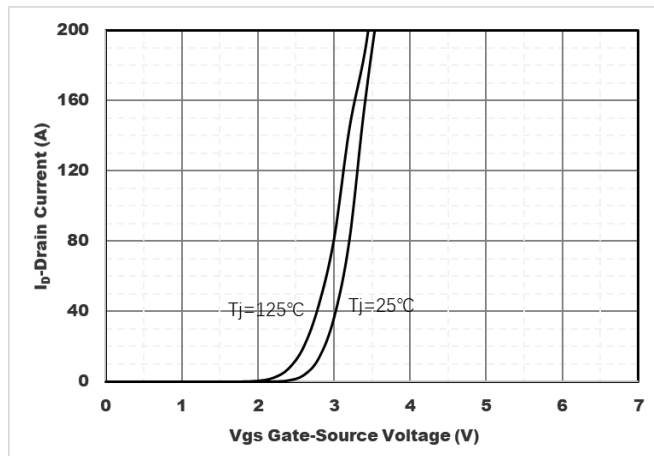


Figure2. Transfer Characteristics

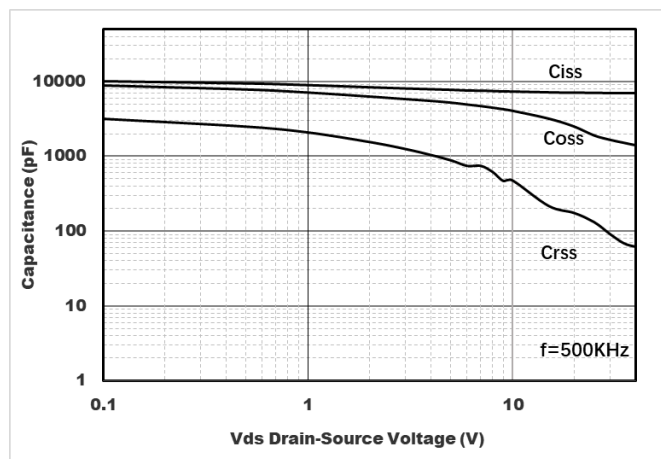


Figure3. Capacitance Characteristics

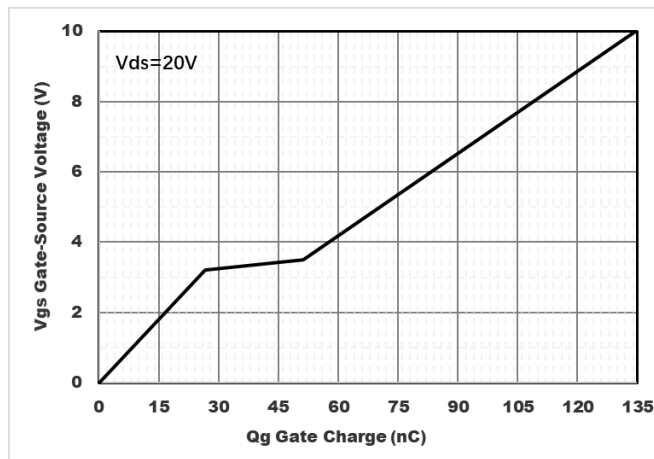


Figure4. Gate Charge

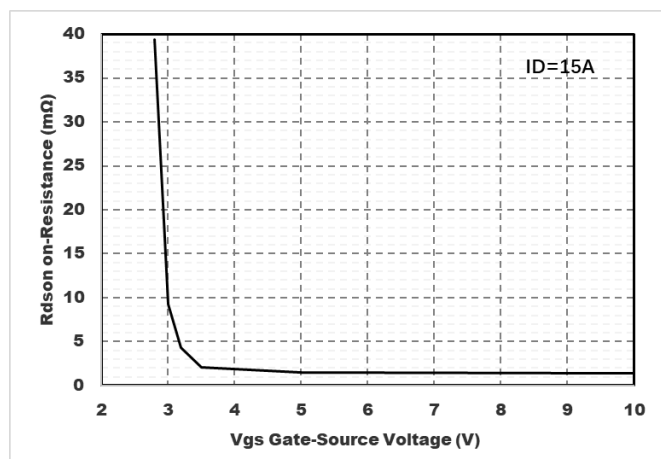


Figure5. : On-Resistance vs. Drain Current and Gate Voltage

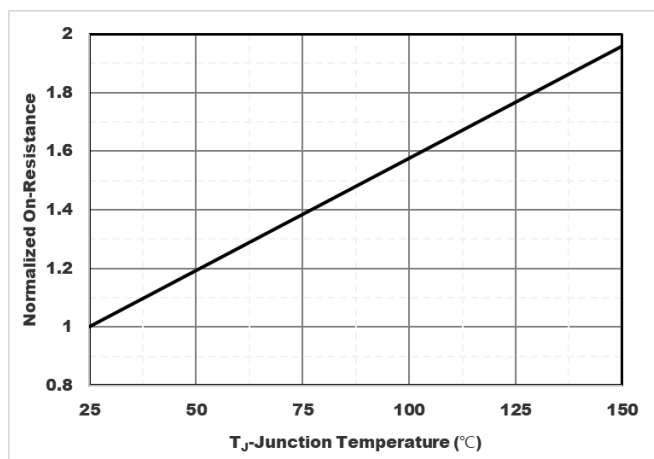


Figure6. Normalized On-Resistance

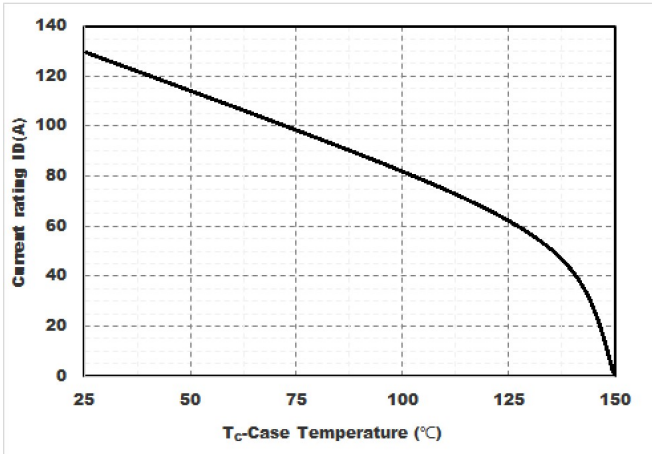


Figure7. Drain current

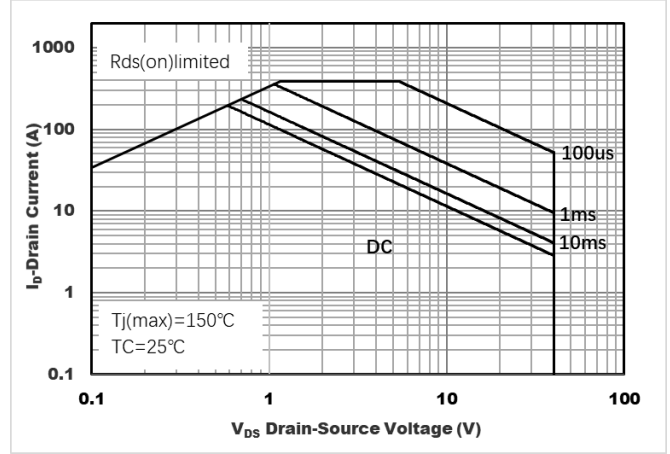


Figure8.Safe Operation Area

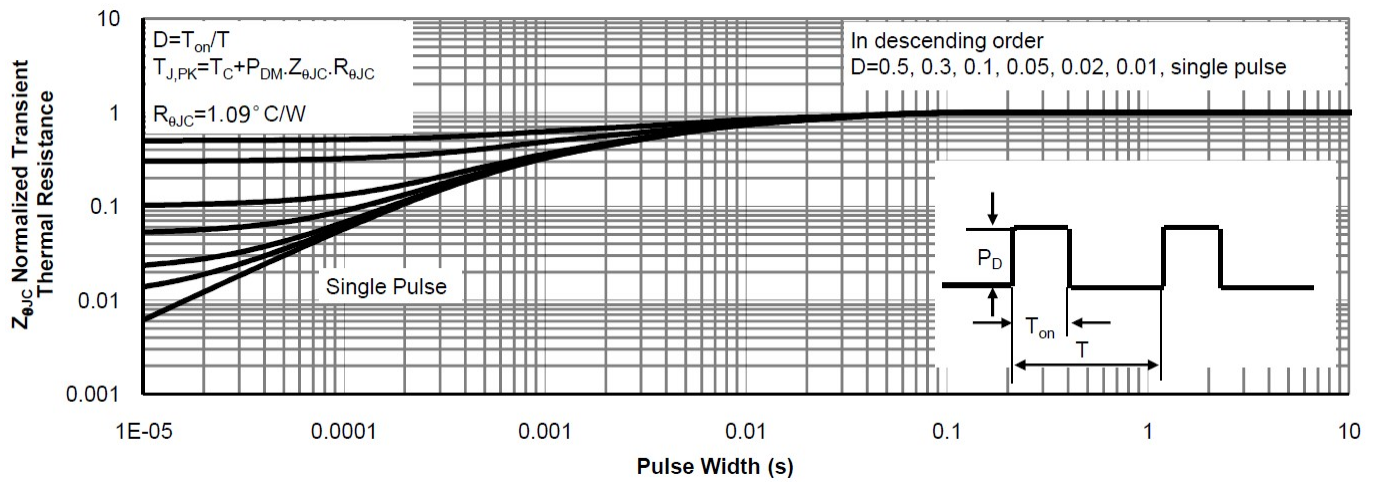
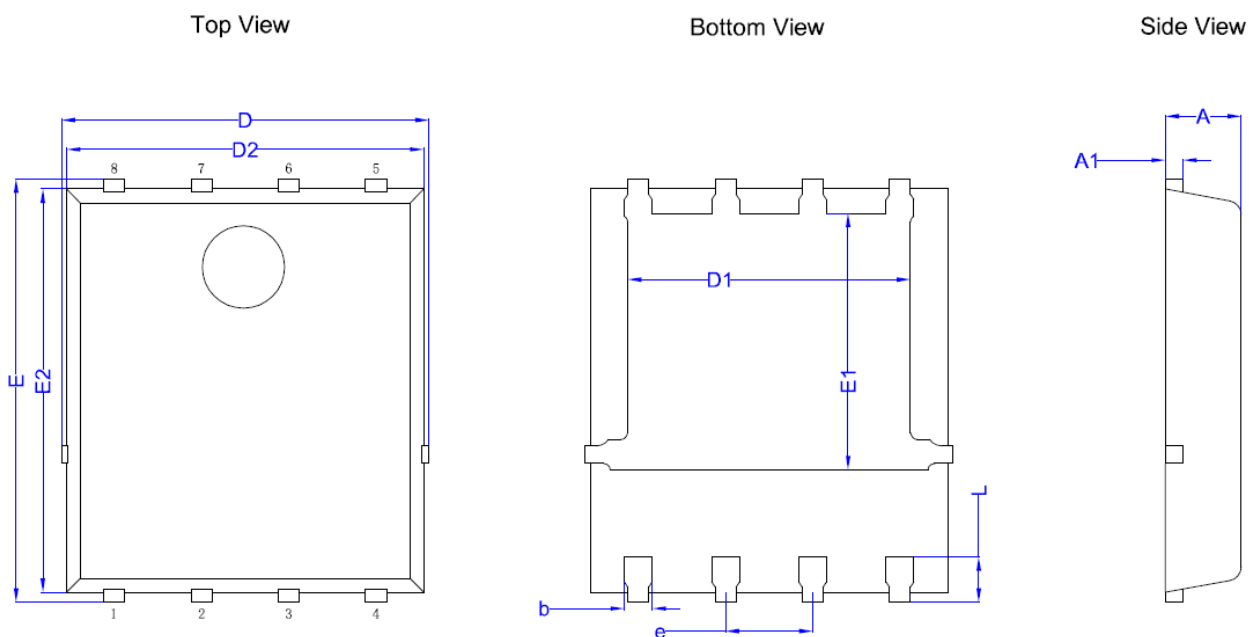


Figure9.Normalized Maximum Transient thermal impedance

■ PDFN5x6 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	1.00	1.10	1.20
A1	0.254 BSC		
D	5.15	5.35	5.55
E	5.95	6.15	6.35
D1	3.92	4.12	4.32
E1	3.52	3.72	3.92
D2	5.00	5.20	5.40
E2	5.66	5.86	6.06
e	1.27BSC		
b	0.31	0.41	0.51
L	0.56	0.66	0.76

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