

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!

Applications

- PWM Application
- Load Switch
- Power Management

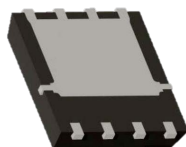
Product Summary

Parameters	Value	Unit
V_{DSS}	30	V
$V_{GS(th_Typ)}$	1.5	V
$I_D(@V_{GS}=10V)$	140	A
$R_{DS(ON)_Typ}(@V_{GS}=10V)$	1.66	m Ω
$R_{DS(ON)_Typ}(@V_{GS}=4.5V)$	2.35	m Ω

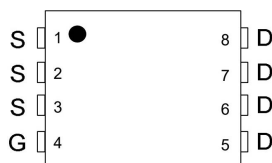
Top View



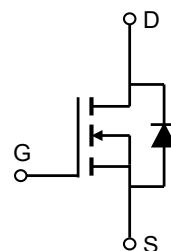
Bottom View



PDFN3x3-8L



Marking



Schematic Diagram

Ordering Information

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK30N140Q	30N140	DFN3x3	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}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^{\circ}\text{C}$	I_D	140	A
	$T_C = 100^{\circ}\text{C}$		82	
Pulsed Drain Current		I_{DM}	360	A
Single Pulsed Avalanche Energy		E_{AS}	480	mJ
Power Dissipation		P_D	55	W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	2.3	$^{\circ}\text{C/W}$
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	30			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 30V, 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 =250uA	1.0	1.5	2.2	V
Static drain-source on-sate resistance	R _{DS(on)}	V _{GS} =10V, I _D =15A		1.66	2.3	mΩ
		V _{GS} =4.5V, I _D =15A		2.0	3.2	mΩ
Dynamic characteristics ④ ⑤						
Input capacitance	C _{iss}	V _{DS} =15V,V _{GS} =0V f =1MHz		5700		pF
Output capacitance	C _{oss}			528		
Reverse transfer capacitance	C _{rss}			502		
Switching characteristics ④ ⑤						
Total gate charge	Q _g	V _{GS} =0 to 10V V _{DS} =15V, I _D =40A		110		nC
Gate-source charge	Q _{gs}			21		
Gate-drain charge	Q _{gd}			25		
Turn-on delay time	t _{d(on)}	V _{DS} =15V,I _D =30A V _{GS} =10V,R _{GEN} =3.3Ω		10		ns
Turn-on rise time	t _r			11		
Turn-off delay time	t _{d(off)}			76		
Turn-off fall time	t _f			28		
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	T _C =25 C			140	A
Reverse recovery time	t _{rr}	di/dt = 100A/μs, I _F = 20A		22		ns
Reverse recovery charge	Q _{rr}			13		nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J = 25^\circ\text{C}$, $V_{DD} = 20V$, $V_G = 10V$, $R_G = 25\Omega$, $L = 0.5mH$,
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

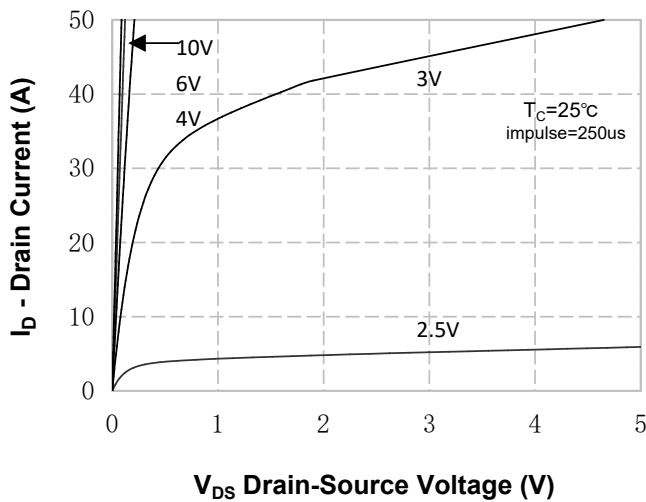


Figure 1. On-Region Characteristics

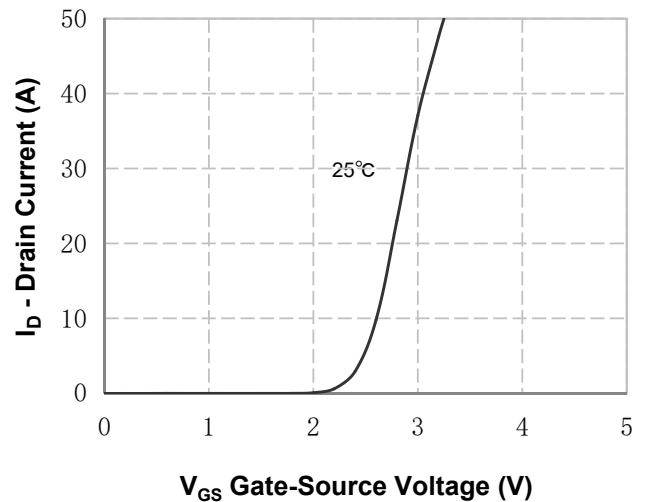


Figure 2. Transfer Characteristics

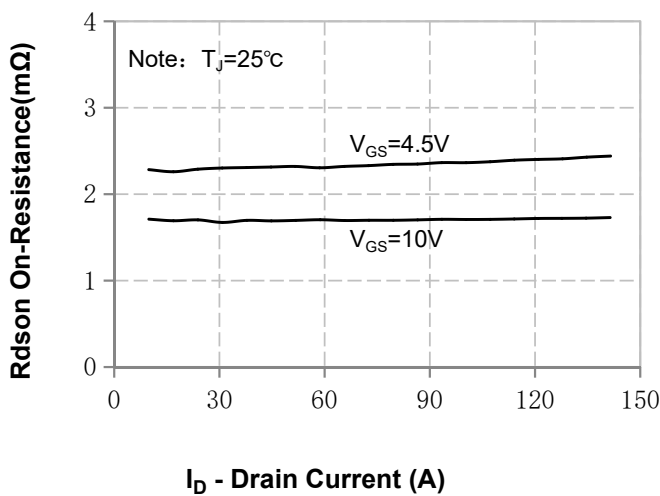


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

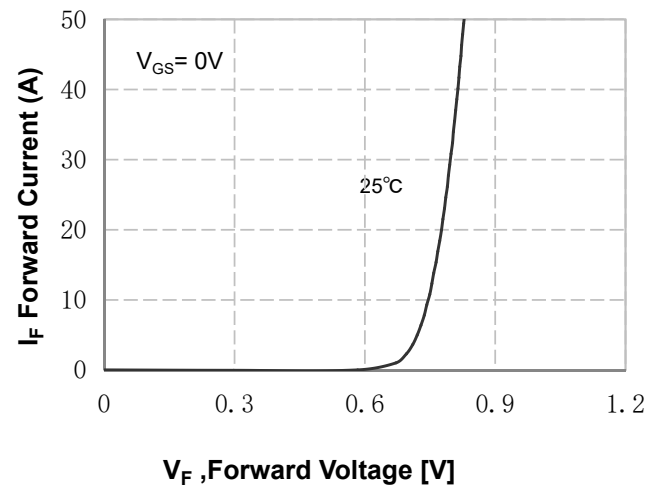


Figure 4. Body Diode Forward Voltage Variation vs Source Current

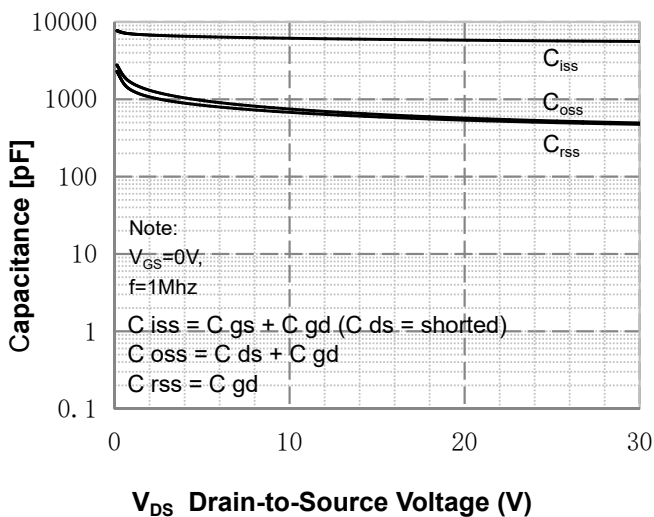


Figure 5. Capacitance Characteristics

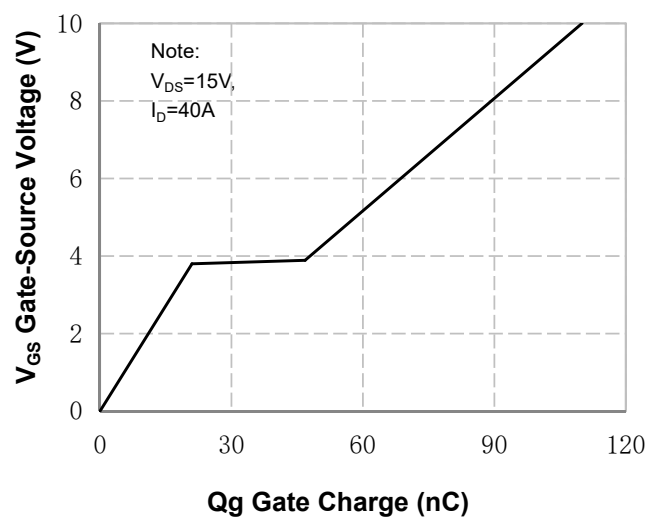


Figure 6. Gate Charge Characteristics

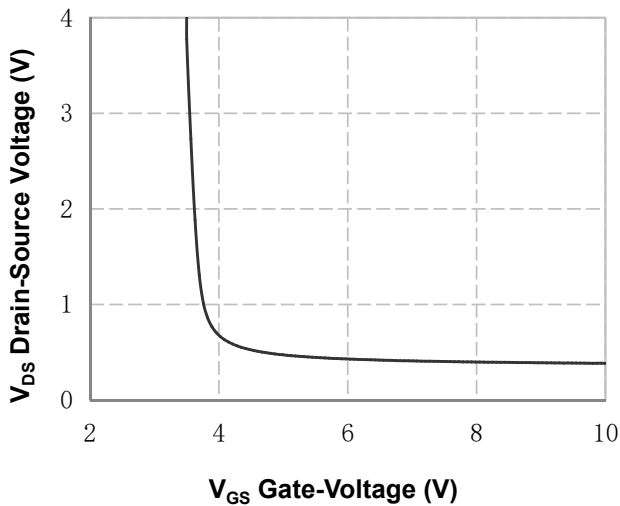


Figure 7. Vds Drain-Source Voltage vs Gate Voltage

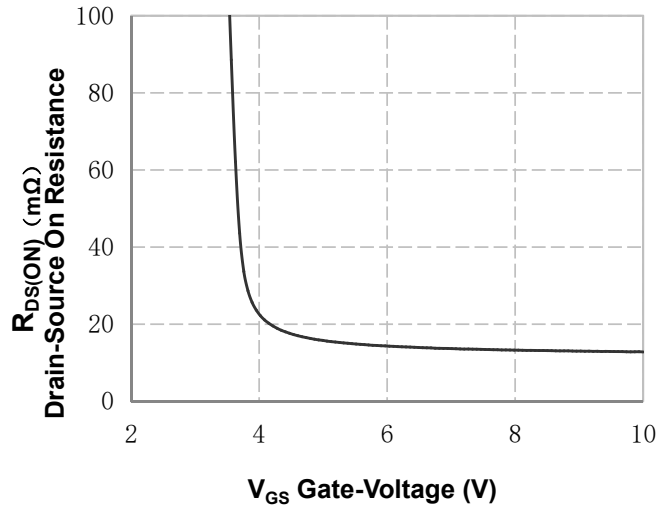


Figure 8. On-Resistance vs Gate Voltage

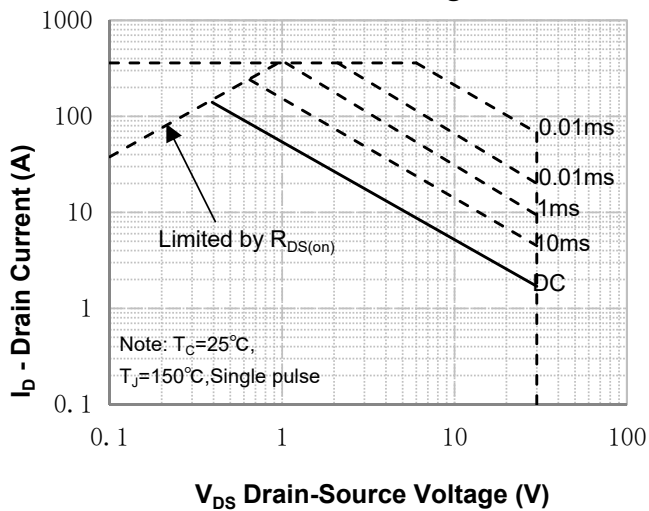


Figure 9. Maximum Safe Operating Area

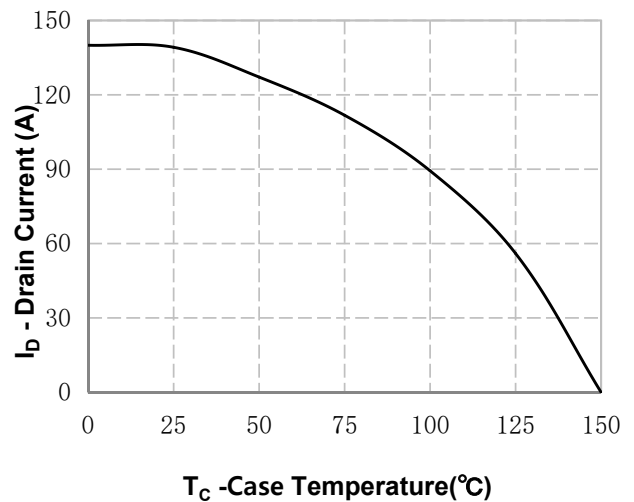


Figure 10. Maximum Continuous Drain Current vs Case Temperature

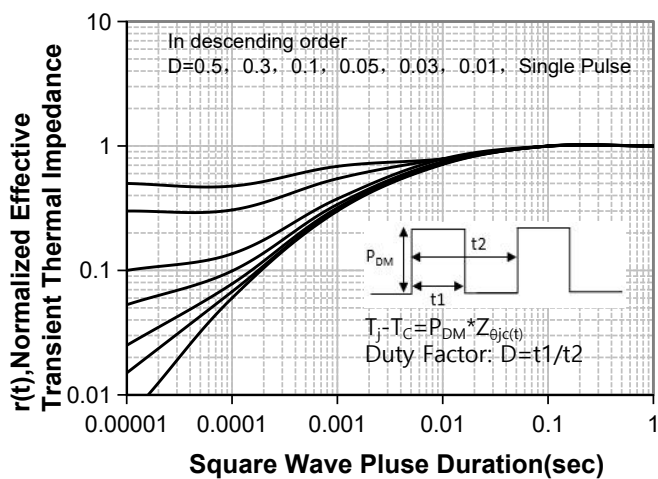
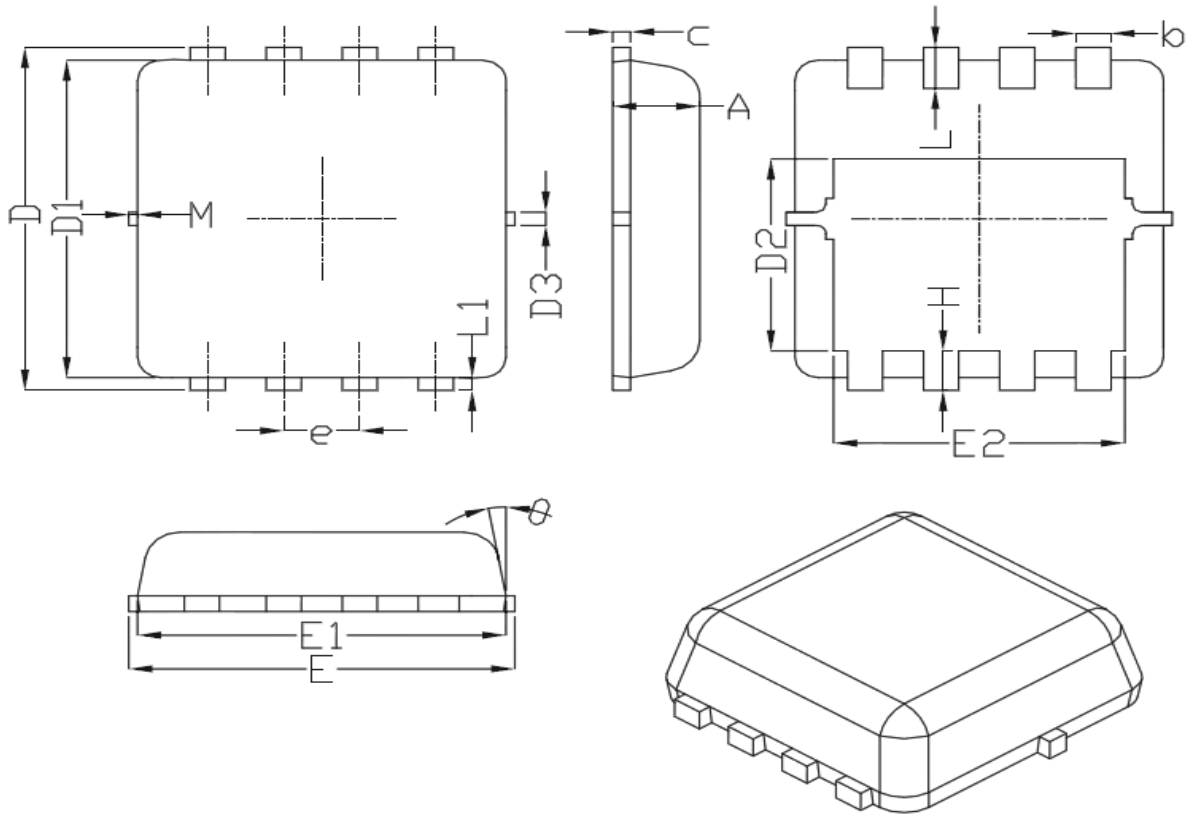


Figure 11. Transient Thermal Response Curve



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.70	0.75	0.80	b	0.25	0.30	0.35
C	0.10	0.15	0.25	D	3.25	3.35	3.45
D1	3.00	3.10	3.20	D2	1.78	1.88	1.98
D3	--	0.13	--	E	3.20	3.30	3.40
E1	3.00	3.15	3.20	E2	2.39	2.49	2.59
e	0.65BSC			H	0.30	0.39	0.50
L	0.30	0.40	0.50	L1	--	0.13	--
θ	--	10°	12°	M	*	*	0.15
*Not specified							