

N and P-channel Enhancement Mode Power MOSFET

Features

- Advanced
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant
- 100% UIS TESTED!, 100% Rg TESTED!

Applications

- Load Switch
- PWM Application
- Power Management

N-Channel

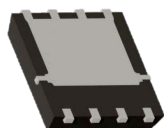
Parameters	Value	Unit
V_{DSS}	40	V
$V_{GS(th_Typ)}$	1.3	V
$I_D(@V_{GS}=10V)$	30	A
$R_{DS(ON_Typ)}(@V_{GS}=10V)$	13.6	mΩ
$R_{DS(ON_Typ)}(@V_{GS}=4.5V)$	15.2	mΩ

P-Channel

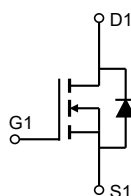
Parameters	Value	Unit
V_{DSS}	-40	V
$V_{GS(th_Typ)}$	-1.6	V
$I_D(@V_{GS}=-10V)$	-10	A
$R_{DS(ON_Typ)}(@V_{GS}=-10V)$	30	mΩ
$R_{DS(ON_Typ)}(@V_{GS}=-4.5V)$	37	mΩ

Top View

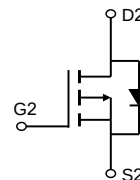
Bottom View



PDFN5x6-8L



N-channel



P-channel

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK4030DG	4030D	DFN5x6	Reel	N/A	N/A	5000

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

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	40	-40	V
Gate-Source Voltage		V_{GS}	± 20	± 20	V
Continuous Drain Current	$T_C = 25^{\circ}\text{C}$	I_D	30	-10	A
	$T_C = 70^{\circ}\text{C}$		24	-7	
Pulsed Drain Current ^(Note 1)		I_{DM}	60	-20	A
Maximum Power Dissipation	$T_A=25^{\circ}\text{C}$	P_D	25	31.3	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 To 150	-55 To 150	$^{\circ}\text{C}$

N-CH 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 = 250uA	40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 40V, V _{GS} =0V			100	nA
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	0.8	1.3	2.0	V
Static drain-source on-sate resistance	R _{DS(on)}	V _{GS} =10V, I _D =15A		13.6	22.5	mΩ
		V _{GS} =4.5V, I _D =10A		15.2	30	mΩ
Dynamic characteristics ④ ⑤						
Input capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V f =1MHz		1215		pF
Output capacitance	C _{oss}			84		
Reverse transfer capacitance	C _{rss}			66		
Gate Resistance	R _g	V _{DS} =0V, V _{GS} =0V f =1MHz		1.83		Ω
Switching characteristics ④ ⑤						
Total gate charge	Q _g	V _{GS} =0 to 10V V _{DS} =20V, I _D =15A		10		nC
Gate-source charge	Q _{gs}			2.5		
Gate-drain charge	Q _{gd}			4.8		
Turn-on delay time	t _{d(on)}	V _{DS} =20V, R _L =0.75Ω V _{GS} =10V, R _{GEN} =3Ω		2.8		ns
Turn-on rise time	t _r			12.8		
Turn-off delay time	t _{d(off)}			21.2		
Turn-off fall time	t _f			6.4		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V _{SD} ④	V _{GS} =0V, I _S =1A		0.68	1.2	V
Continuous drain-source diode forward current	I _S ①	T _C =25℃			40	A
Reverse recovery time	trr	di/dt = 100A/μs, I _F = 20A		10		ns
Reverse recovery charge	Qrr			3.5		nC

Notes:

1. This characteristics assumes the die are assembled in TO-252 packages. Actual performance may degrade when assembled. JieJie does not guarantee device performance after assembly.
2. TPulse Width $t_p \leq 300\mu s$, Duty Cycle $< 0.5\%$.
3. Exclusion zone is 3mm from the wafer edge. CP yield do not guarantee from 3mm wafer edge.
4. EAS condition: Starting $T_J = 25^{\circ}\text{C}$, $V_{DD} = 20V$, $V_{GS} = 10V$, $R_G = 25\Omega$, $L = 0.5mH$, $I_{AS} = 10.15A$

P-CH 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 = -250uA	-40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -40V, V _{GS} =0V			-1	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	-1.6	-2.5	V
Static drain-source on-sate resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-8A		30	37.5	mΩ
		V _{GS} =-4.5V, I _D =-5A		37	46	mΩ
Dynamic characteristics ④ ⑤						
Input capacitance	C _{iss}	V _{DS} =-20V,V _{GS} =0V f =1MHz		1243		pF
Output capacitance	C _{oss}			97		
Reverse transfer capacitance	C _{rss}			80		
Gate Resistance	R _g	V _{DS} =0V,V _{GS} =0V f =1MHz		11		Ω
Switching characteristics ④ ⑤						
Total gate charge	Q _g	V _{GS} =0 to -10V V _{DS} =-20V, I _D =-10A		10		nC
Gate-source charge	Q _{gs}			2.54		
Gate-drain charge	Q _{gd}			3.1		
Turn-on delay time	t _{d(on)}	V _{DS} =-20V,R _L =0.75Ω V _{GS} =-10V,R _{GEN} =3Ω		19.2		ns
Turn-on rise time	t _r			12.8		
Turn-off delay time	t _{d(off)}			48.6		
Turn-off fall time	t _f			4.6		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V _{SD} ④	V _{GS} =0V, I _S =-1A		-0.68	-1.0	V
Continuous drain-source diode forward current	I _S ①	T _C =25℃			-20	A
Reverse recovery time	trr	di/dt = 100A/μs, I _F = -20A		10		ns
Reverse recovery charge	Qrr			3.5		nC

Notes:

1. This characteristics assumes the die are assembled in TO-252 packages. Actual performance may degrade when assembled. JieJie does not guarantee device performance after assembly.
2. (Pulse Width $t_p \leq 300\mu s$, Duty Cycle $< 2\%$).
3. Exclusion zone is 3mm from the wafer edge. CP yield do not guarantee from 3mm wafer edge.
4. EAS condition: Starting $T_J = 25^{\circ}\text{C}$, $V_{DD} = -20V$, $V_{GS} = -10V$, $R_G = 25\Omega$, $L = 0.5mH$, $I_{AS} = -10.5A$

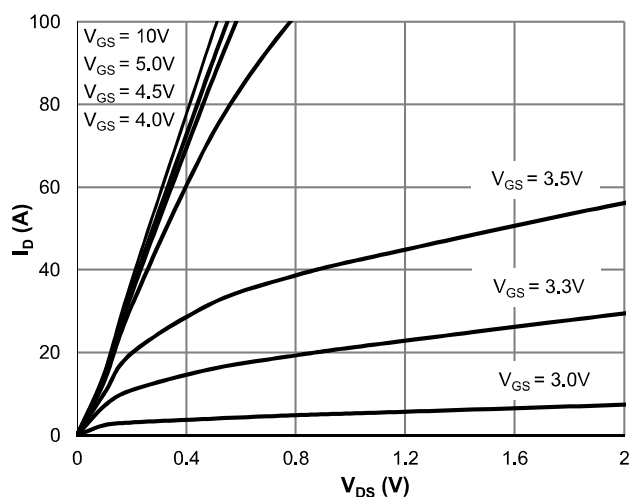


Figure 1: Saturation Characteristics

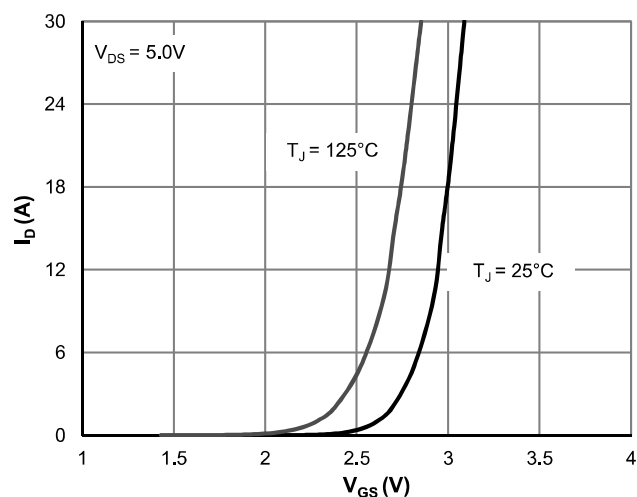


Figure 2: Transfer Characteristics

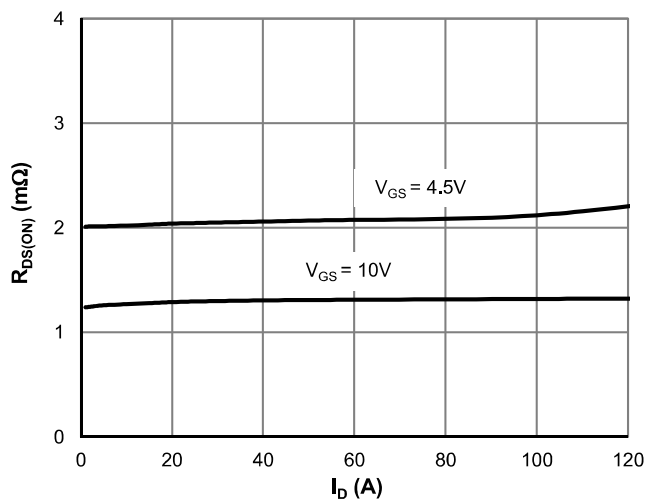


Figure 3: $R_{DS(ON)}$ vs. Drain Current

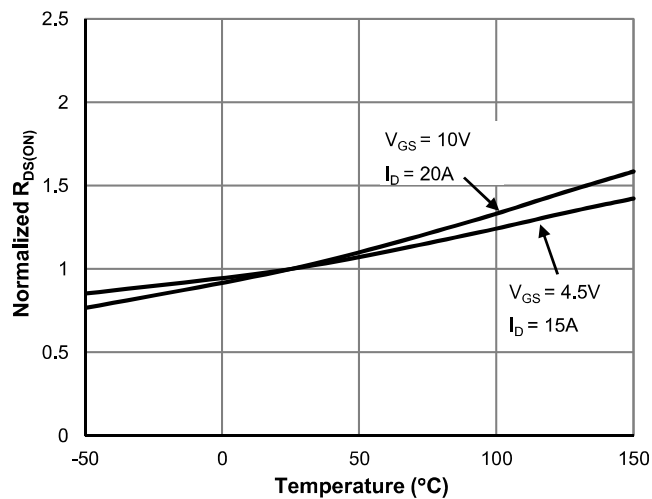


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

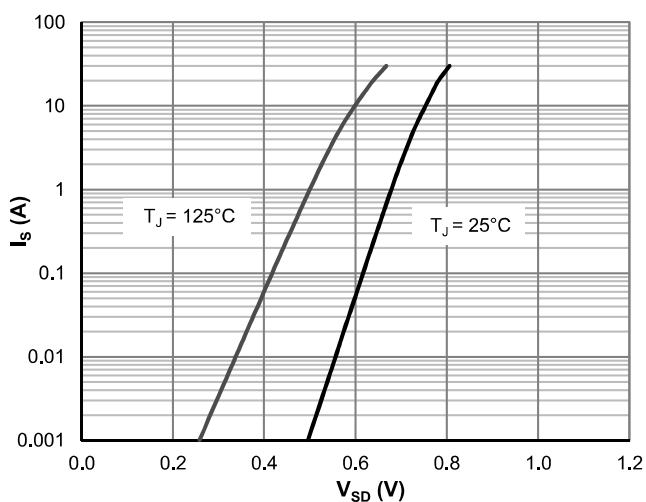


Figure 5: Body-Diode Characteristics

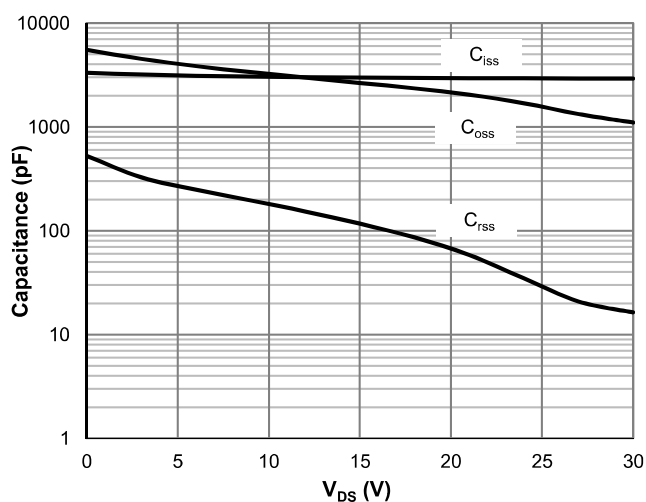


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

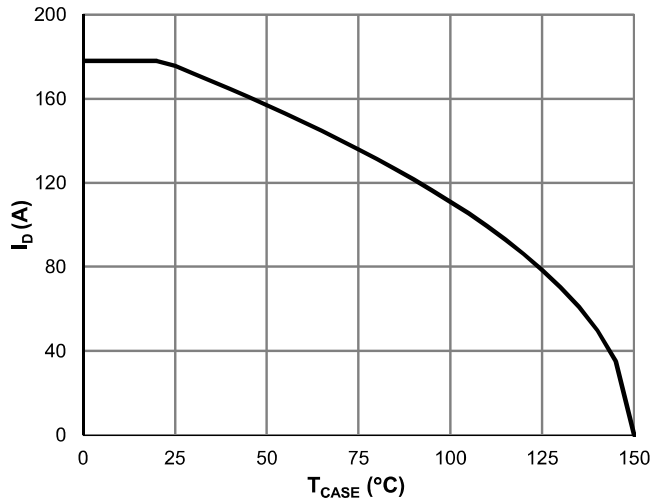


Figure 7: Current De-rating

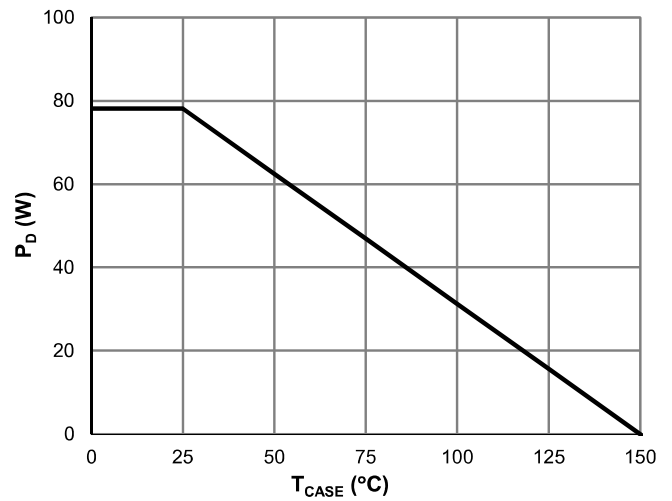


Figure 8: Power De-rating

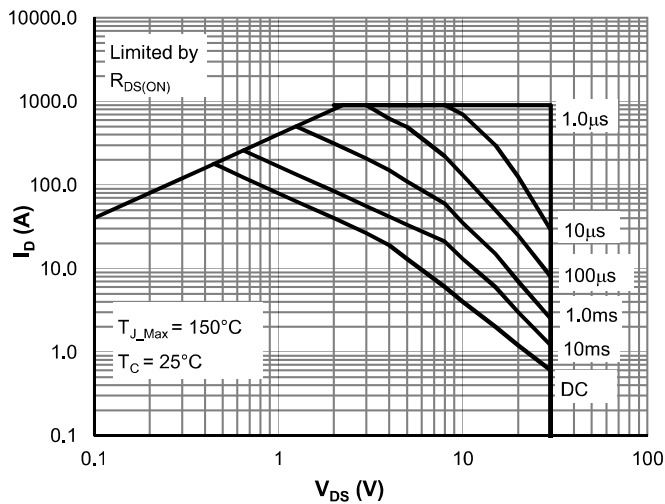


Figure 9: Maximum Safe Operating Area

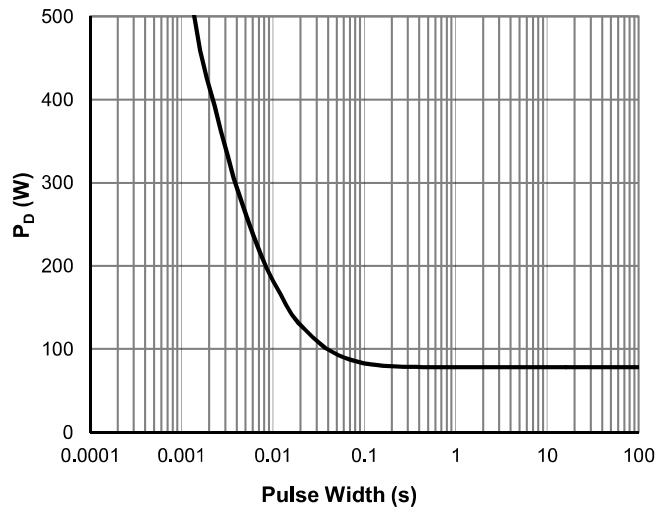


Figure 10: Single Pulse Power Rating, Junction-to-Case

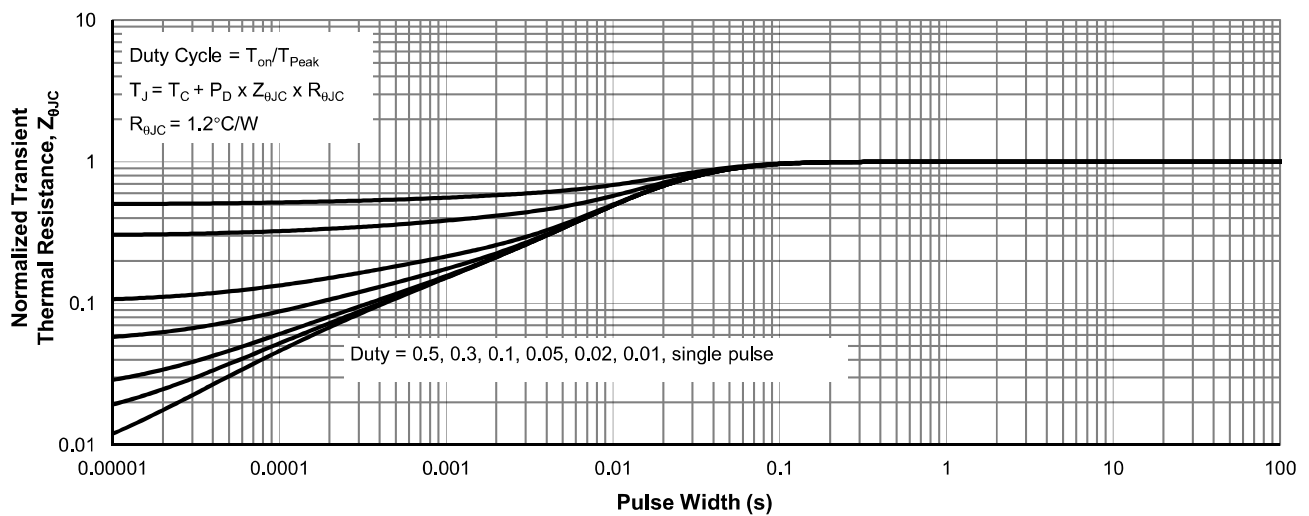
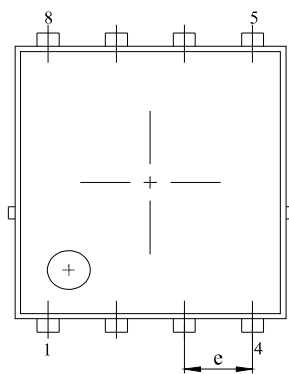
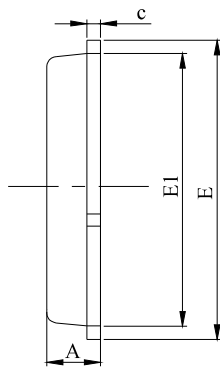


Figure 11: Normalized Maximum Transient Thermal Impedance

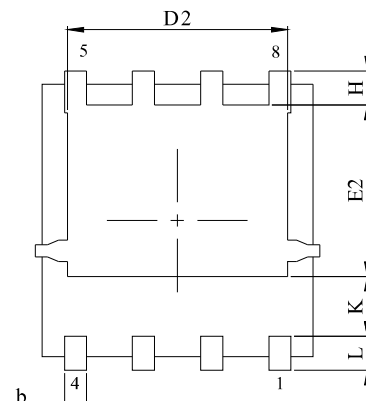
PDFN5x6-8L Package Information



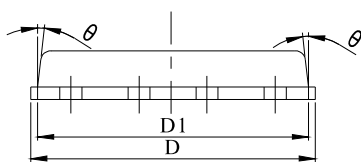
Top View



Side View



Bottom View



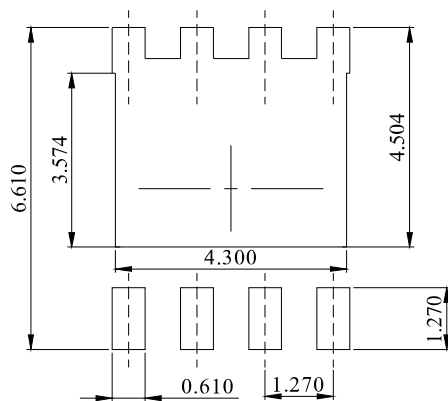
Front View

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