

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

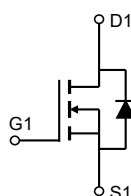
Parameters	Value	Unit
V_{DSS}	40	V
$V_{GS(th)_{Typ}}$	1.3	V
$I_D(@V_{GS}=10V)$	30	A
$R_{DS(ON)_{Typ}}(@V_{GS}=10V)$	13.6	mΩ
$R_{DS(ON)_{Typ}}(@V_{GS}=4.5V)$	15.2	mΩ

P-Channel

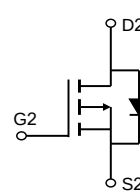
Parameters	Value	Unit
V_{DSS}	-40	V
$V_{GS(th)_{Typ}}$	-1.6	V
$I_D(@V_{GS}=-10V)$	-10	A
$R_{DS(ON)_{Typ}}(@V_{GS}=-10V)$	30	mΩ
$R_{DS(ON)_{Typ}}(@V_{GS}=-4.5V)$	37	mΩ



SOP8 Top View



N-channel



P-channel

Ordering Information

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK4030DS	4030D	SOP8	Reel	N/A	N/A	4000

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	°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 $T_J = 25^{\circ}\text{C}$, $V_{DD} = -20V$, $V_{GS} = -10V$, $R_G = 25\Omega$, $L = 0.5mH$, $I_{AS} = -10.5A$

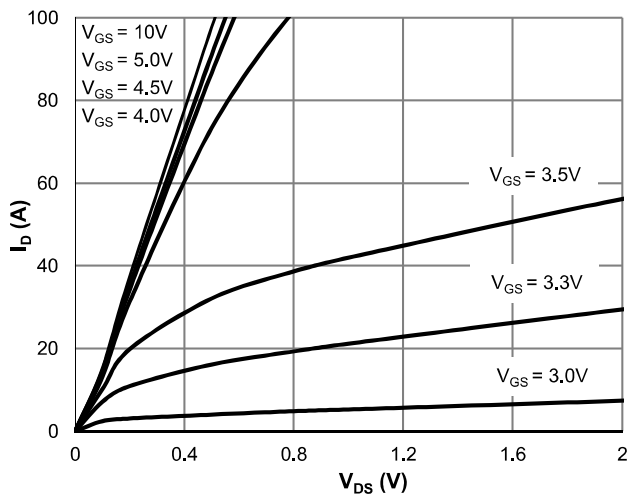


Figure 1: Saturation Characteristics

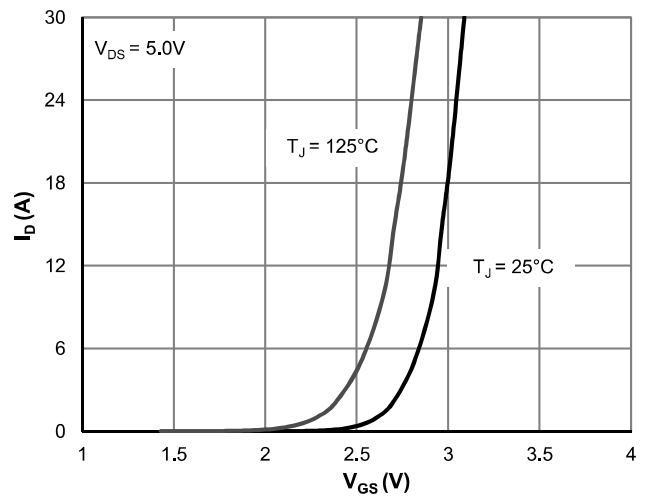


Figure 2: Transfer Characteristics

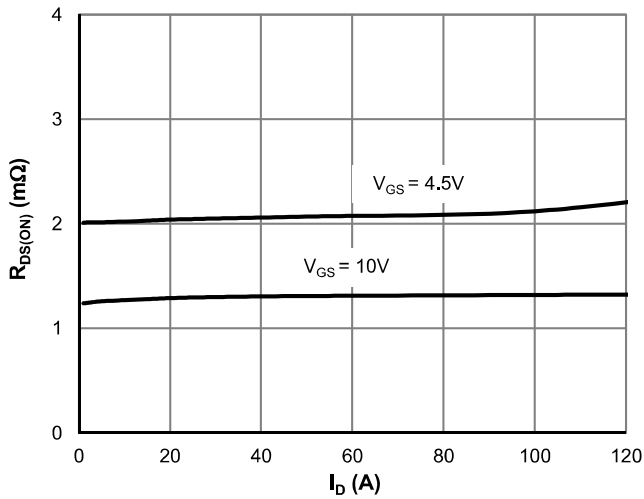


Figure 3: $R_{DS(ON)}$ vs. Drain Current

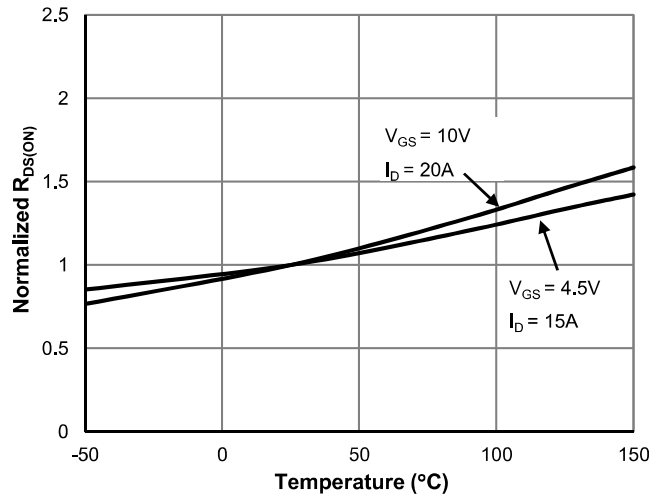


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

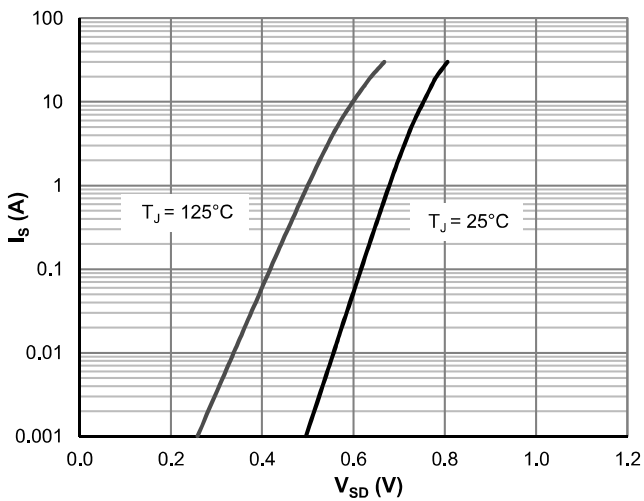


Figure 5: Body-Diode Characteristics

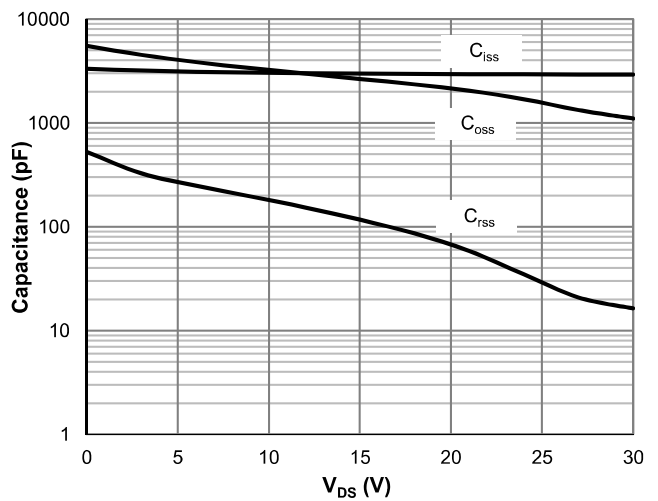


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

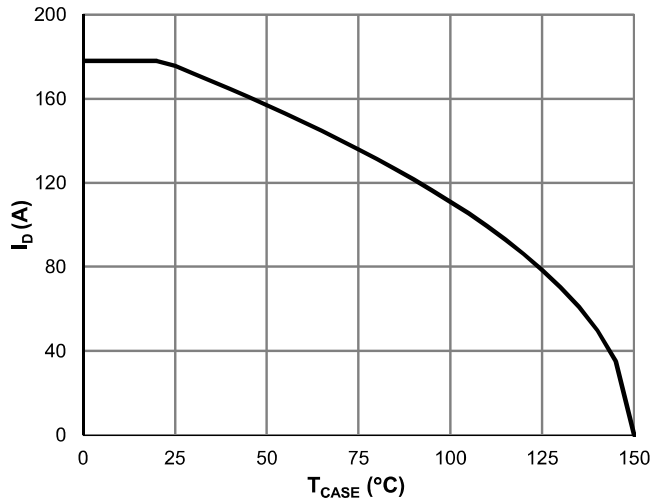


Figure 7: Current De-rating

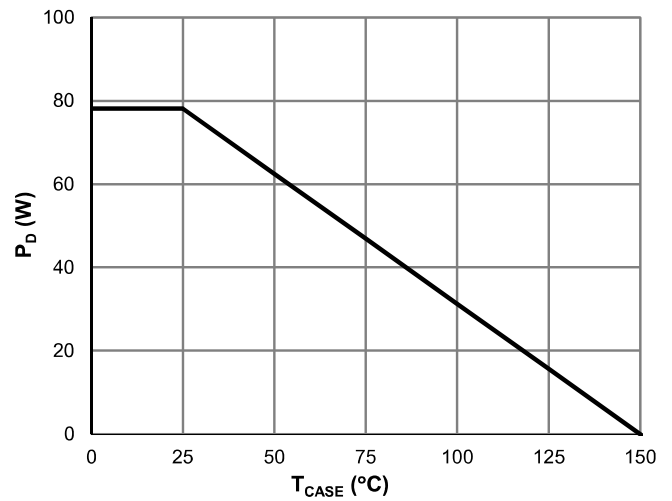


Figure 8: Power De-rating

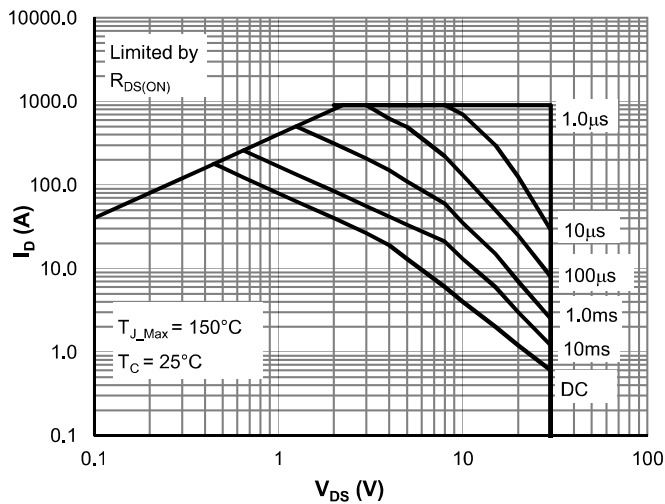


Figure 9: Maximum Safe Operating Area

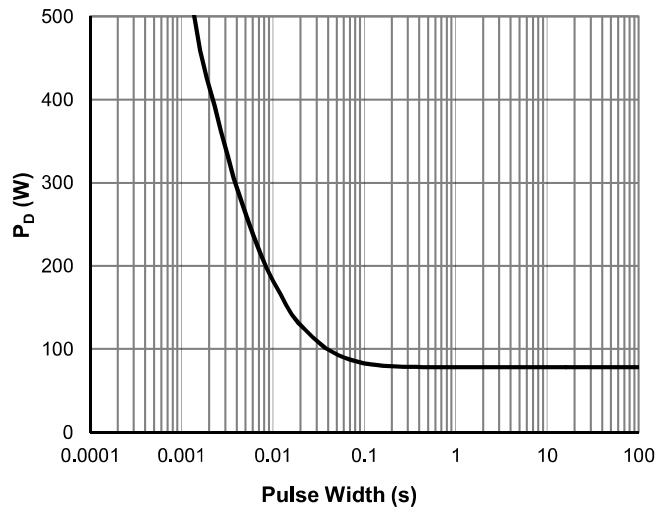


Figure 10: Single Pulse Power Rating, Junction-to-Case

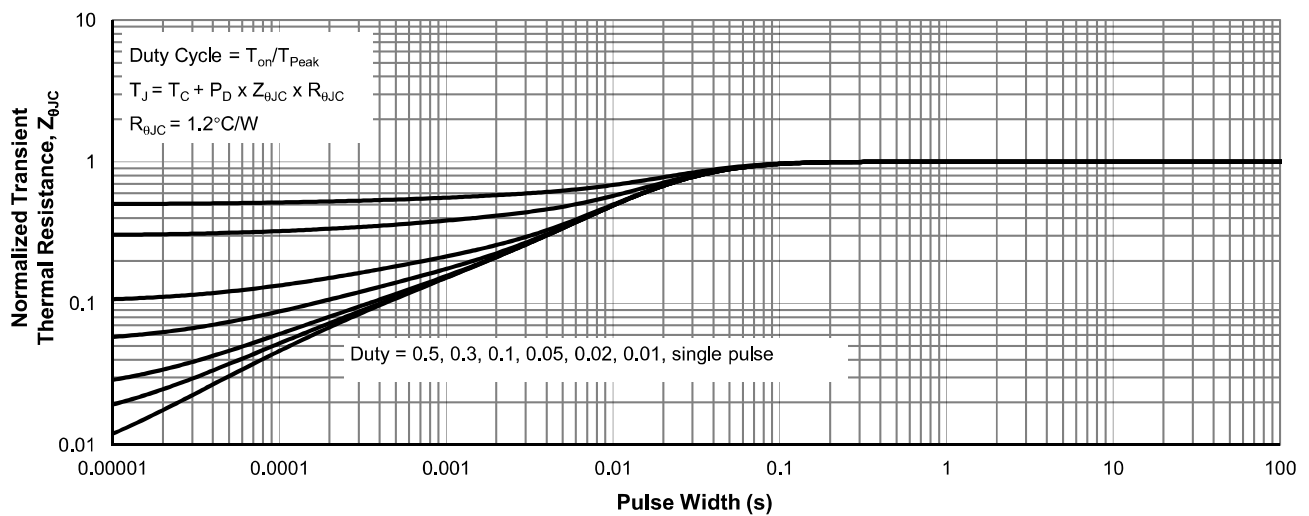
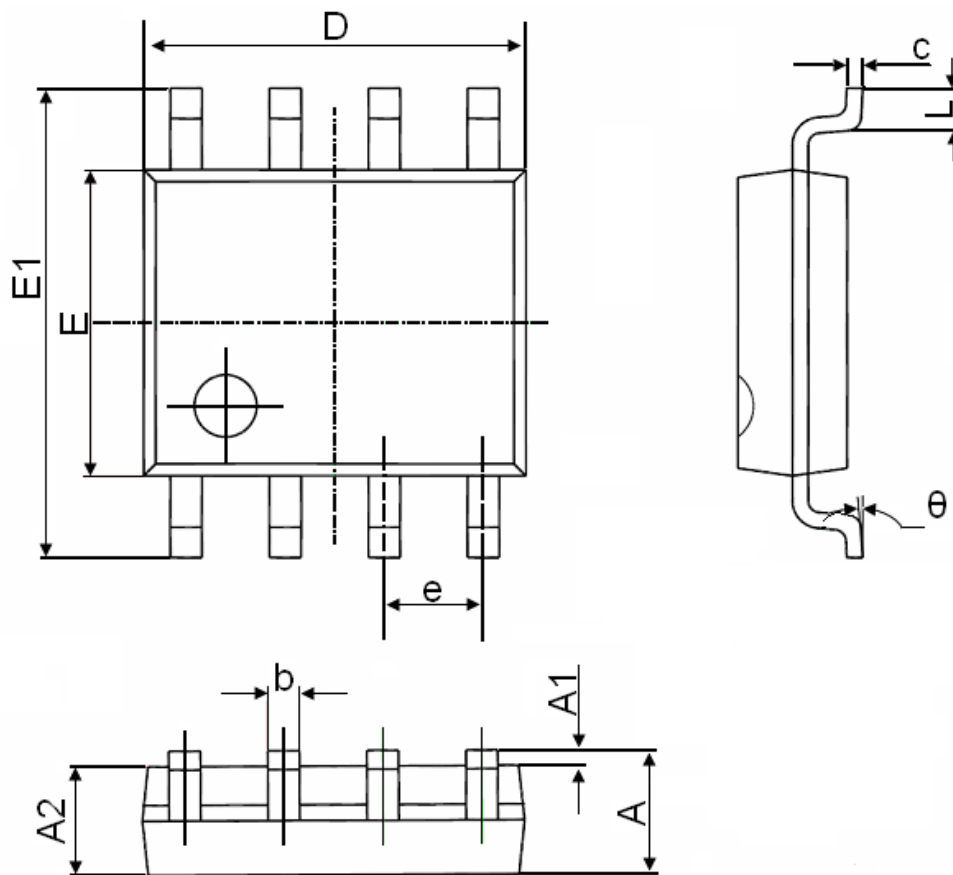


Figure 11: Normalized Maximum Transient Thermal Impedance



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°