

N-channel Enhancement Mode Power MOSFET

Features

- Ultra-low $R_{DS(ON)}$
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant
- Split-Gate Trench
- 100% UIS TESTED!, 100% R_g TESTED!

Product Summary

Parameters	Value	Unit
V_{DSS}	30	V
$V_{GS(th_Typ)}$	1.79	V
$I_D(@V_{GS}=10V)$	180	A
$R_{DS(ON_Typ)}(@V_{GS}=10V)$	1.37	m Ω
$R_{DS(ON_Typ)}(@V_{GS}=4.5V)$	2.05	m Ω

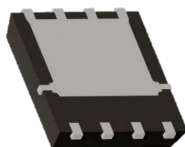
Applications

- Power Management in Computing, CE, IE 4.0, Communications
- Current Switching in DC/DC & AC/DC Sub-systems
- Moto Driving, Quick/Wireless Charging

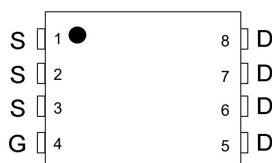
Top View



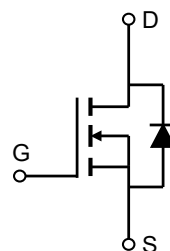
Bottom View



PDFN3x3-8L



Marking



Schematic Diagram

Ordering Information

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK30G180Q	30G180	PDFN3x3	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	180	A
	$T_C = 100^{\circ}\text{C}$		112	
Pulsed Drain Current		I_{DM}	485	A
Single Pulsed Avalanche Energy		E_{AS}	101	mJ
Power Dissipation		P_D	78	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	68	$^{\circ}\text{C/W}$
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	1.2	1.79	2.2	V
Static drain-source on-sate resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		1.37	1.44	mΩ
		V _{GS} =4.5V, I _D =15A		2.05	2.19	mΩ
Dynamic characteristics ④ ⑤						
Input capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V f =1MHz		2950		pF
Output capacitance	C _{oss}			2620		
Reverse transfer capacitance	C _{rss}			110		
Gate Resistance	R _g	f =1MHz		1.2		Ω
Switching characteristics ④ ⑤						
Total gate charge	Q _g	V _{GS} =0 to 10V V _{DS} =15V, I _D =20A		39		nC
Gate-source charge	Q _{gs}			8.6		
Gate-drain charge	Q _{gd}			5.0		
Turn-on delay time	t _{d(on)}	V _{DS} =15V, R _L =0.75Ω V _{GS} =10V, R _{GEN} =3Ω		6.0		ns
Turn-on rise time	t _r			9.0		
Turn-off delay time	t _{d(off)}			26		
Turn-off fall time	t _f			10.0		
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℃			80	A
Reverse recovery time	trr	di/dt = 100A/μs, I _F = 20A		51		ns
Reverse recovery charge	Qrr			57		nC

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under $T_{J_Max} = 150^\circ C$.
3. This single-pulse measurement was taken under the following condition [$L = 100\mu H, V_{DS} = 10V, V_{GS} = 30V$] while its value is limited by $T_{J_Max} = 150^\circ C$.
4. The power dissipation P_0 is based on $T_{J_Max} = 150^\circ C$.
5. This value is guaranteed by design hence it is not included in the production test.

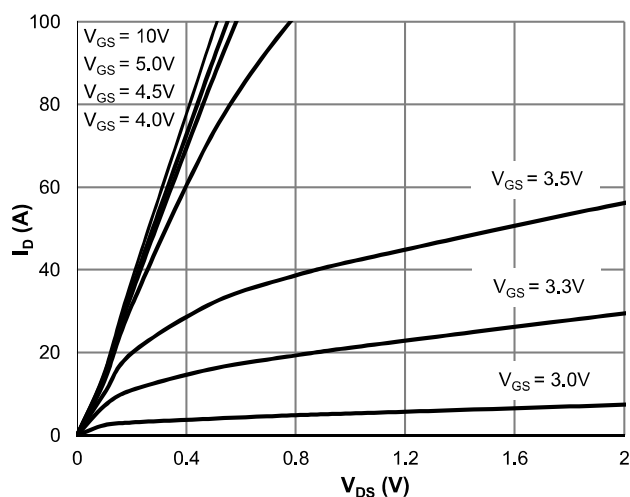


Figure 1: Saturation Characteristics

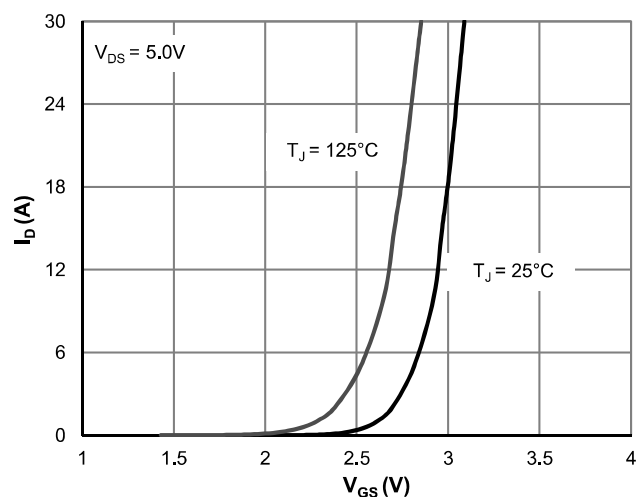


Figure 2: Transfer Characteristics

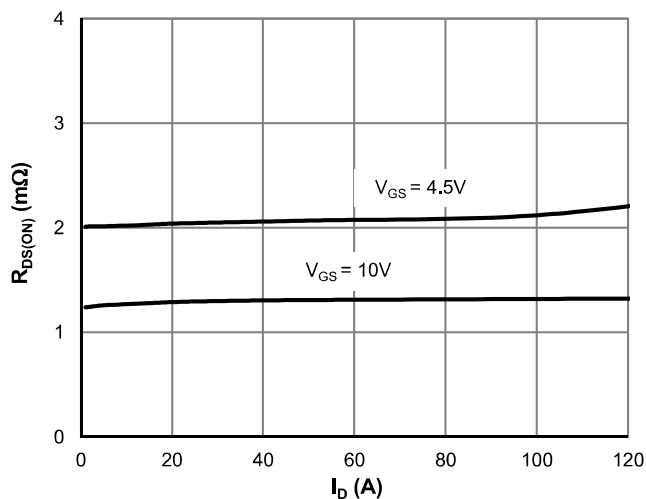


Figure 3: $R_{DS(ON)}$ vs. Drain Current

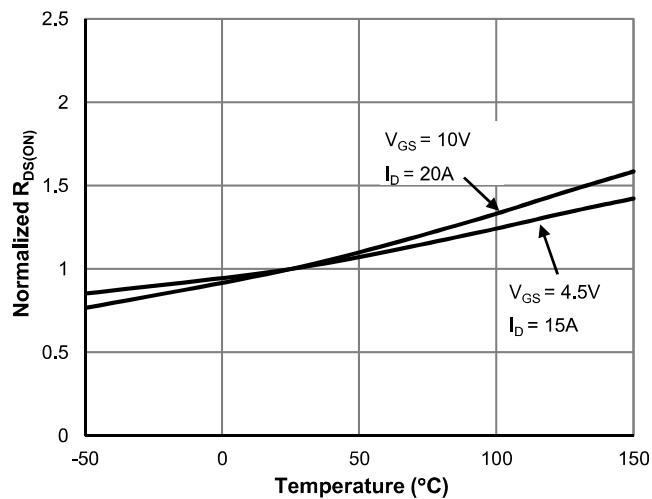


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

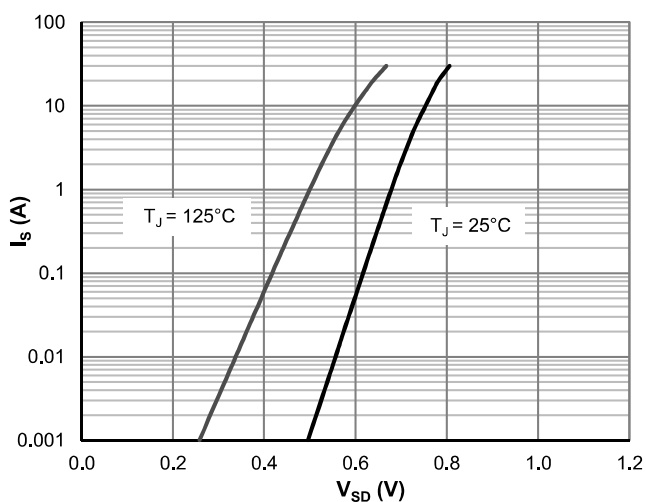


Figure 5: Body-Diode Characteristics

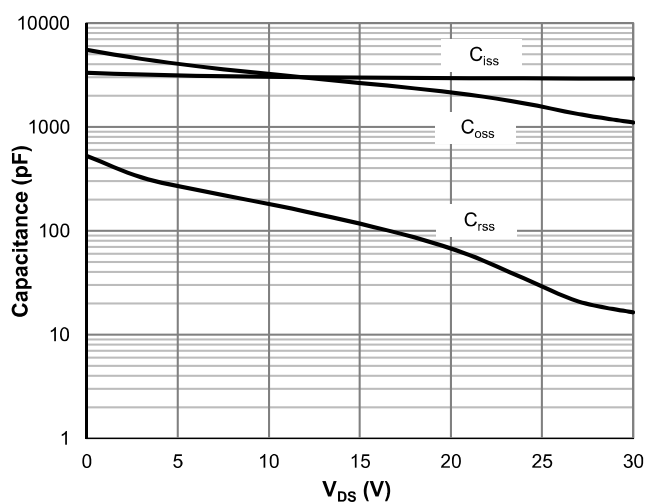


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

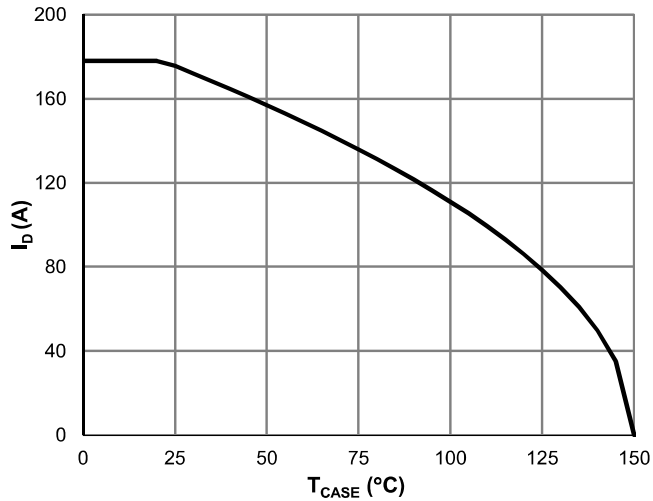


Figure 7: Current De-rating

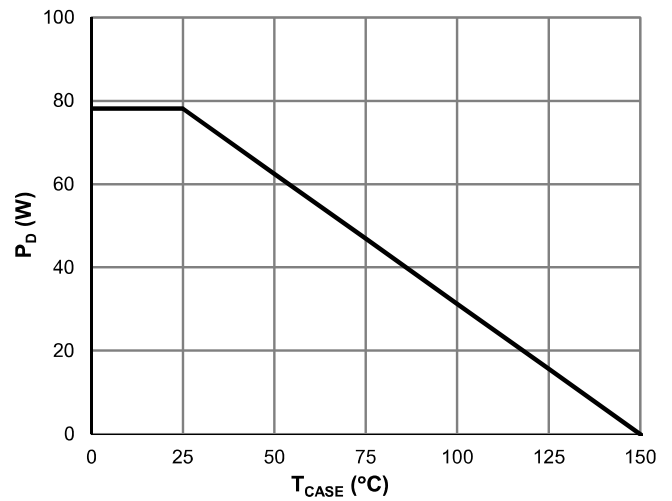


Figure 8: Power De-rating

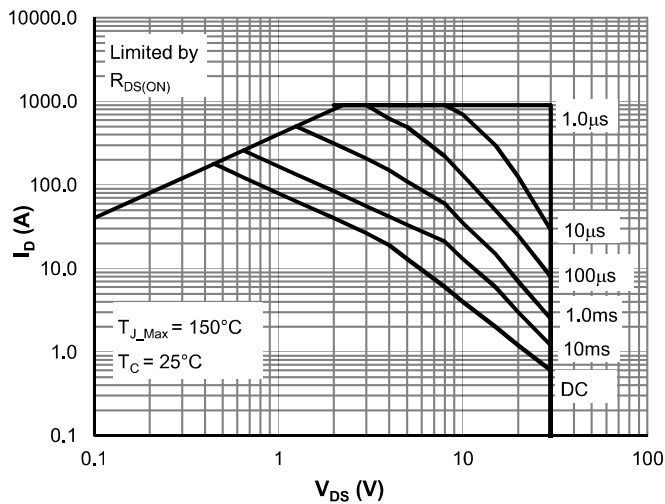


Figure 9: Maximum Safe Operating Area

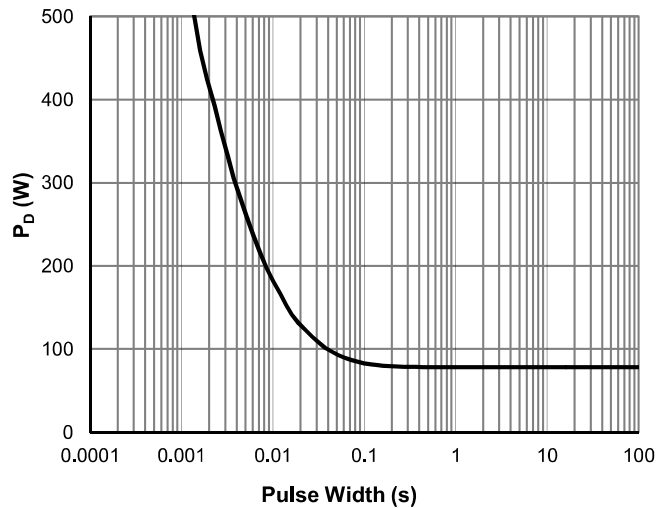


Figure 10: Single Pulse Power Rating, Junction-to-Case

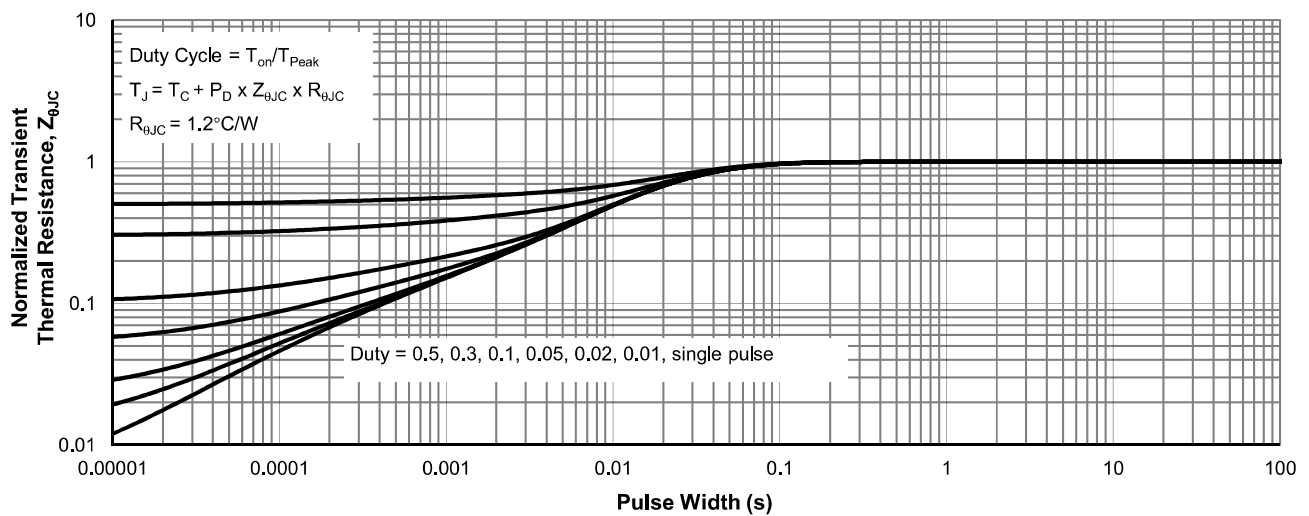
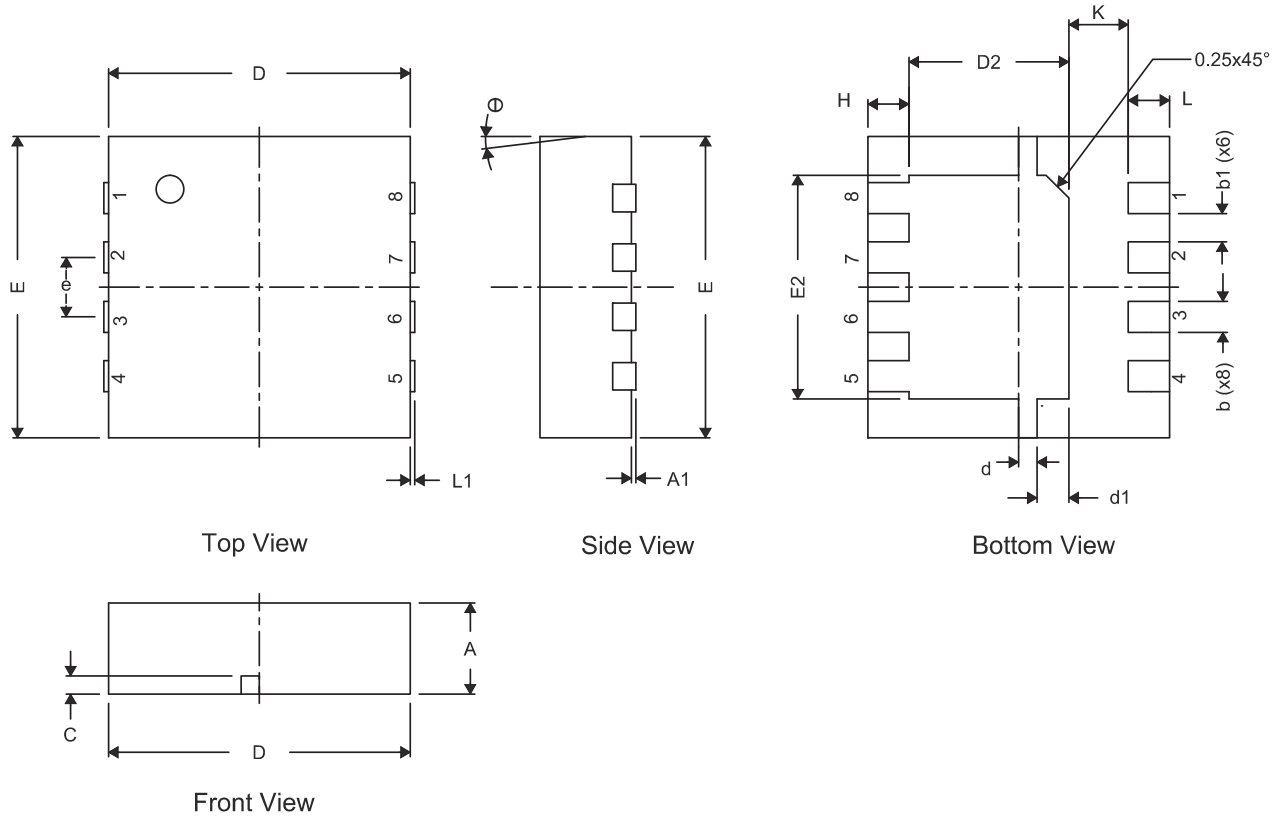


Figure 11: Normalized Maximum Transient Thermal Impedance

PDFN3x3-8L Package Information



DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.950	1.000	1.100	0.037	0.039	0.043
A1	0.000	0.000	0.050	0.000	0.000	0.002
b	0.280	0.340	0.400	0.011	0.013	0.016
b1	0.310 NOM			0.012 NOM		
c	0.150	0.200	0.250	0.006	0.008	0.010
D	3.200	3.300	3.400	0.126	0.130	0.134
D2	1.650	1.750	1.800	0.065	0.069	0.071
d	0.150	0.200	0.250	0.006	0.008	0.010
d1	0.300	0.350	0.400	0.012	0.014	0.016
E	3.200	3.300	3.400	0.126	0.130	0.134
E2	2.350	2.450	2.550	0.093	0.096	0.100
e	0.650 TYP			0.026 TYP		
H	0.35	0.450	0.550	0.014	0.018	0.022
K	0.650 TYP			0.026 TYP		
L	0.35	0.450	0.550	0.014	0.018	0.022
L1	0	—	0	0	—	0
θ	0	—	0	0	—	0