

N-Channel Enhancement Mode MOSFET

1. Product Information

Features

Advanced trench technology
Excellent $R_{DS(ON)}$
Low gate charge

Applications

Battery protection
Load switch
Power management

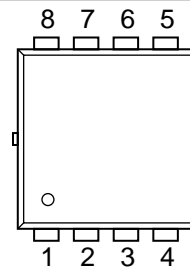
Quick reference

$V_{DS} = 30\text{ V}$
 $I_D = 90\text{ A}$
 $R_{DS(ON)} < 4.2\text{ m}\Omega$ @ $V_{GS} = 10\text{ V}$ (Type: 3.6 m Ω)
 $R_{DS(ON)} < 7.0\text{ m}\Omega$ @ $V_{GS} = 4.5\text{ V}$ (Type: 5.2 m Ω)

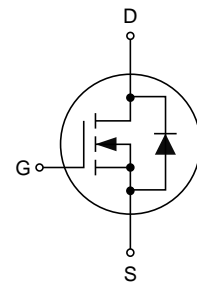
Pin Description

Pin	Description
1,2,3	Source(S)
4	Gate(G)
5,6,7,8	Drain(D)

Simplified Outline



Symbol



Package Marking and Ordering Information

Product Name	Package	Marking	Reel size	Tape width	Quantity
KJ0403Q	PDFN3.3x3.3-8L	0403 XXXXYY	13"	12 mm	5000

2. Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_A=25^\circ\text{C}$	30	-	V
V_{GS}	Gate-Source Voltage	$T_A=25^\circ\text{C}$	-	± 20	V
I_D	Drain Current (DC)	$T_A=25^\circ\text{C}, V_{GS}=10\text{ V}$	-	90	A
		$T_A=100^\circ\text{C}, V_{GS}=10\text{ V}$	-	53	A
I_{DM}	Drain Current (Pulsed) ^[1]	$T_A=25^\circ\text{C}, V_{GS}=10\text{ V}$	-	330	A
P_{tot}	Total Power Dissipation	$T_A=25^\circ\text{C}$	-	46	W
E_{AS}	Single Pulsed Avalanche Energy ^[2]		-	240	mJ
T_J, T_{stg}	Operating Junction and Storage Temperature Range		-55	150	°C
$R_{\theta JC}$	Thermal Resistance-Junction to Case		-	2.5	°C/W

3. Electrical Characteristics (T_a=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _{DS} =250 μA	30	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 μA	1	1.5	2.5	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30 V, V _{GS} =0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{DS} =0 V, V _{GS} =±20 V	-	-	±100	nA
R _{DS(ON)} [4]	On-State Resistance	V _{GS} =10 V, I _{DS} =30 A	-	3.6	4.2	mΩ
		V _{GS} =4.5 V, I _{DS} =20 A	-	5.2	7.0	
Diode Characteristics						
V _{SD} [4]	Diode Forward Voltage	I _S =1 A, V _{GS} =0 V	-	-	1.2	V
I _S	Continuous Diode Forward Current		-	-	90	A
Dynamic Characteristics [5]						
C _{iss}	Input Capacitance	V _{GS} =0 V, V _{DS} =15 V, Frequency=1.0 MHz	-	1950	-	pF
C _{oss}	Output Capacitance		-	320	-	
C _{rss}	Reverse Transfer Capacitance		-	240	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =15 V, V _{GEN} =10 V, R _G =3 Ω, I _{DS} =30 A	-	13	-	ns
t _r	Turn-on Rise Time		-	36	-	
t _{d(off)}	Turn-off Delay Time		-	43	-	
t _f	Turn-off Fall Time		-	16	-	
Gate Charge Characteristics [5]						
Q _g	Total Gate Charge	V _{DS} =15 V, V _{GS} =10 V, I _{DS} =30 A	-	42	-	nC
Q _{gs}	Gate-Source Charge		-	3.9	-	
Q _{gd}	Gate-Drain Charge		-	14	-	

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature.
2. E_{AS} Condition: T_J=25°C, V_{DD}=15V, R_G=25 Ω, L=0.5 mH.
3. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

4. Typical Characteristics

Figure 1: Output Characteristics

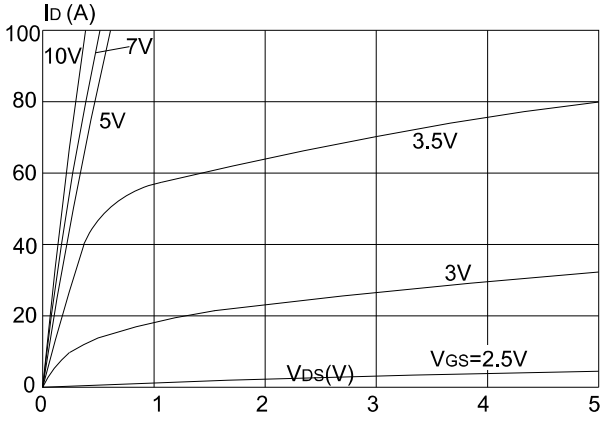


Figure 2: Typical Transfer Characteristics

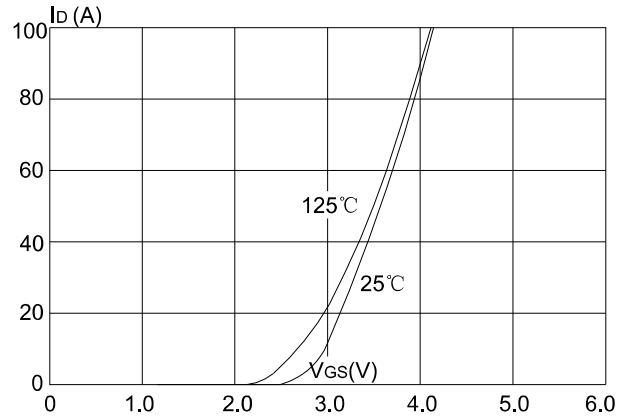


Figure 3: On-resistance vs. Drain Current

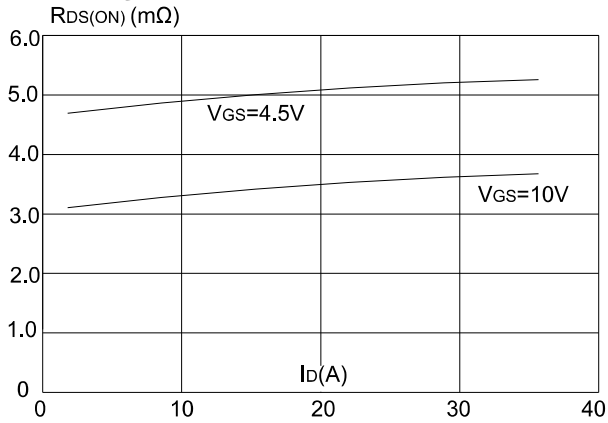


Figure 4: Body Diode Characteristics

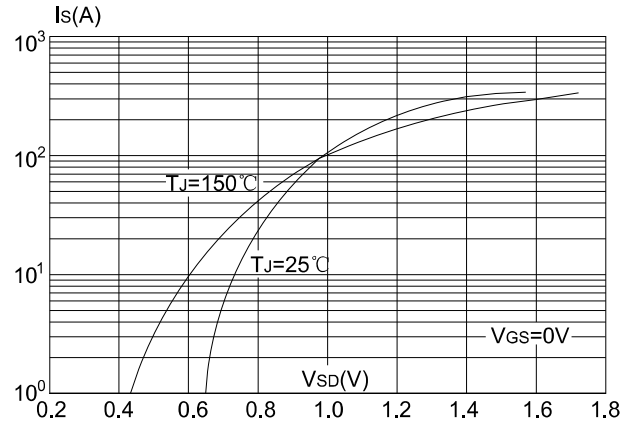


Figure 5: Gate Charge Characteristics

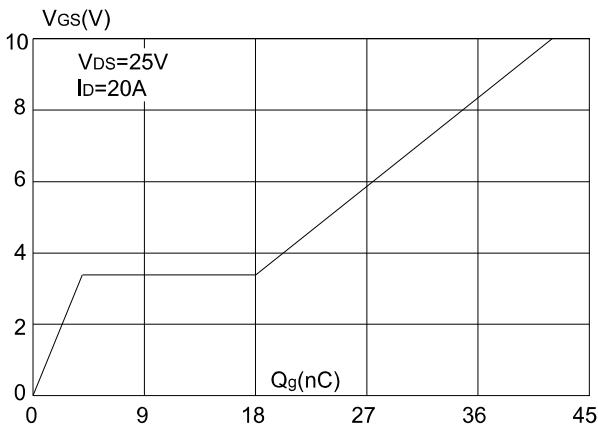


Figure 6: Capacitance Characteristics

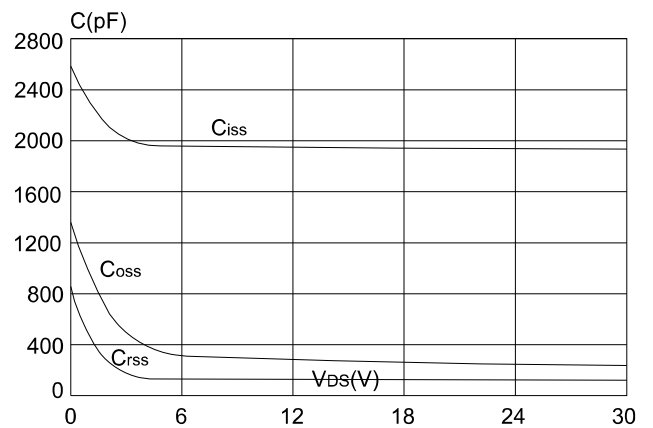


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

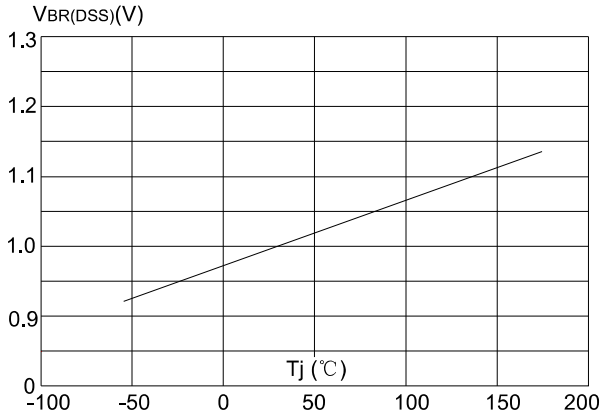


Figure 8: Normalized on Resistance vs. Junction Temperature

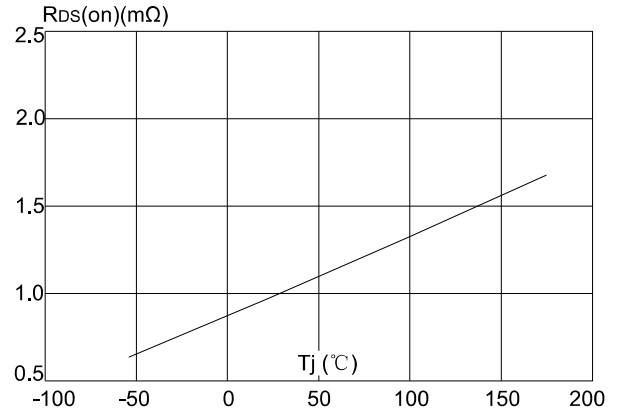


Figure 9: Maximum Safe Operating Area

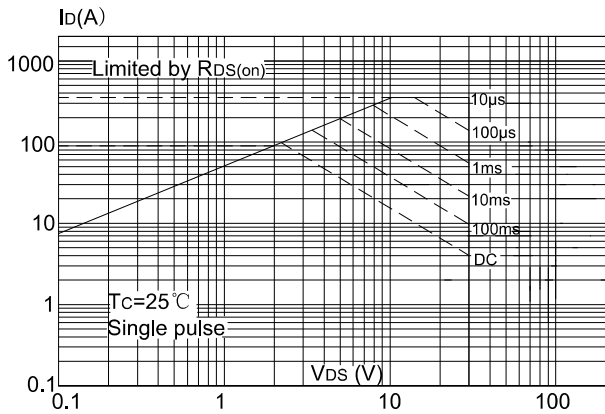


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

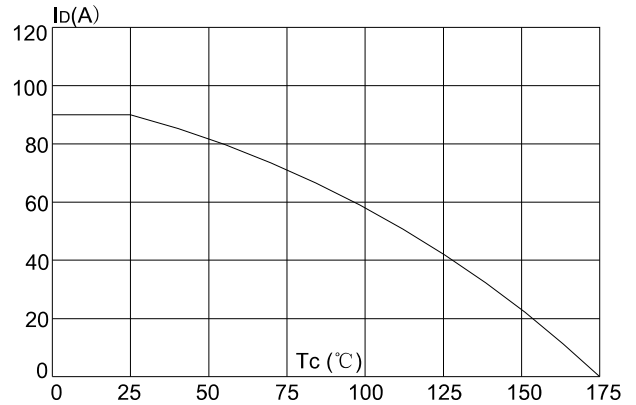
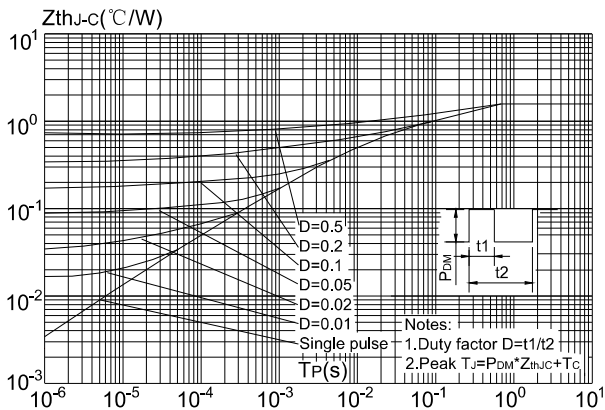
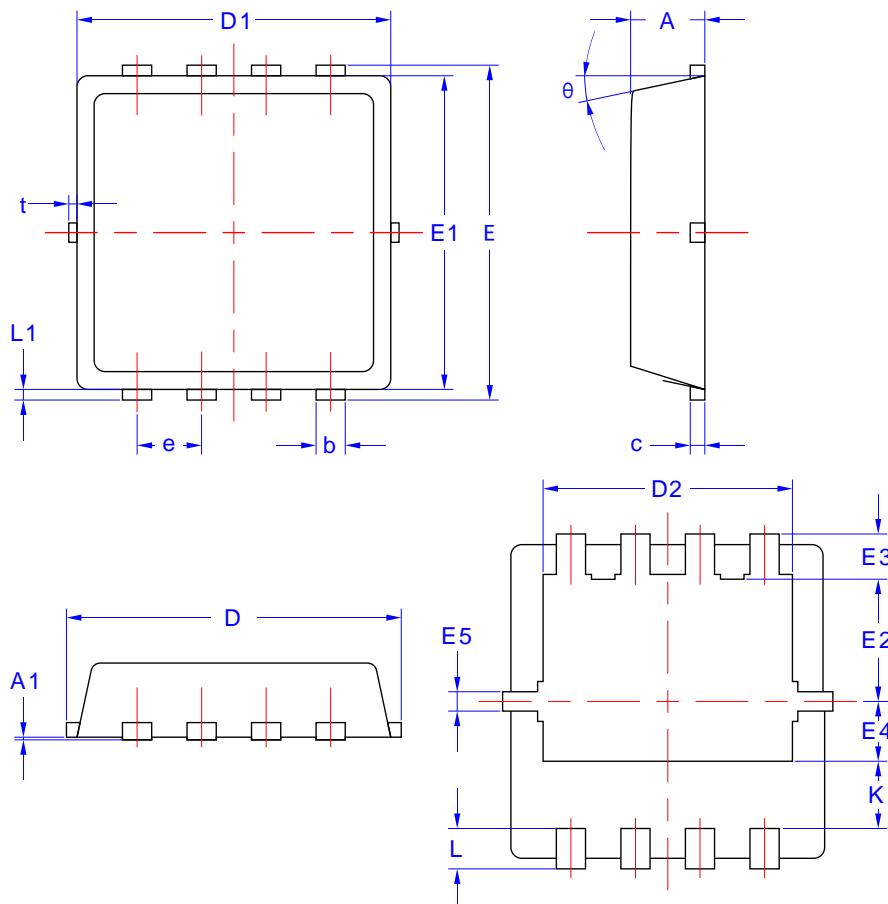


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-252)



5. Package Mechanical Data

PDFN 3.3x3.3-8L Package



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.70	0.85
A1	/	0.05
b	0.20	0.40
c	0.10	0.25
D	3.15	3.45
D1	3.00	3.25
D2	2.29	2.65
E	3.15	3.45
E1	2.90	3.20
E2	1.54	1.94
E3	0.28	0.68
E4	0.37	0.77
E5	0.10	0.30
e	0.60	0.70
K	0.59	0.89
L	0.30	0.50
L1	0.06	0.20
t	0.00	0.13
θ	/	12°