N-Channel Enhancement Mode Power MOSFET

Description

The HKTQ30N03 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

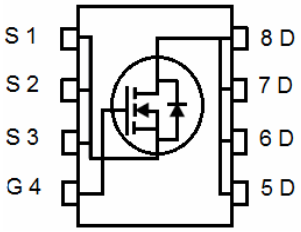
V_{DSS}	$R_{DS(ON)}$ Typ	I_D Max
30V	5.3mΩ @ 10V	30A
	9.8mΩ @ 4.5V	

General Features

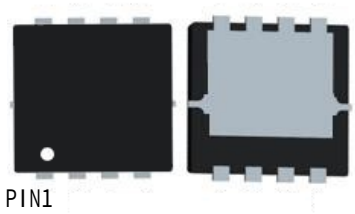
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

- High current load applications
- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic Diagram



Top View **Bottom View**

PDFN3*3

Package Marking and Ordering Information

Part ID	Package	Marking	Packing
HKTQ30N03	PDFN3*3	Q30N03	5000PCS/Reel

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	30	A
Drain Current-Continuous(T_C=100℃)	I_D (100)℃	21	A
Pulsed Drain Current (Note 1)	I_{DM}	115	A
Maximum Power Dissipation	P_D	21	W
Single pulse avalanche energy (Note 5)	E_{AS}	112	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-50 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 2)	$R_{\theta JC}$	7.1	℃/W

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Electrical Characteristics (TC=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1	1.5	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=15A		5.3	8.0	mΩ
		V_{GS}=4.5V, I_D=15A	-	9.8	14.0	
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=20A	-	20	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=15V,V_{GS}=0V, F=1.0MHz	-	1015	-	PF
Output Capacitance	C_{oss}		-	200	-	PF
Reverse Transfer Capacitance	C_{rss}		-	160	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=20V,I_D=2A V_{GS}=10V,R_{GEN}=3Ω	-	7	-	nS
Turn-on Rise Time	t_r		-	19	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	24	-	nS
Turn-Off Fall Time	t_f		-	24	-	nS
Total Gate Charge	Q_g	V_{DS}=15V,I_D=20A, V_{GS}=10V	-	23	-	nC
Gate-Source Charge	Q_{gs}		-	3.9	-	nC
Gate-Drain Charge	Q_{gd}		-	7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=15A	-	0.82	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	30	A
Reverse Recovery Time	t_{rr}	V_{GS}=0V, I_{SD}= 15A di/dt =100A/ μs (Note3)	-	5	-	nS
Reverse Recovery Charge	Qrr		-	0.2	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

A. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.

B. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.

■ Typical Performance Characteristics

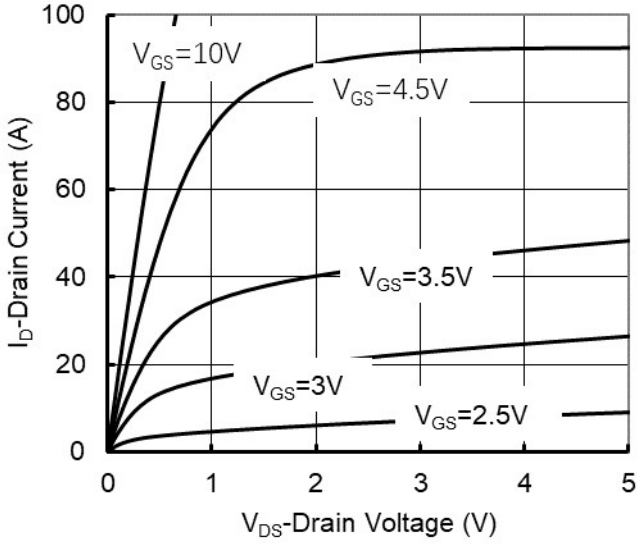

Figure1. Output Characteristics

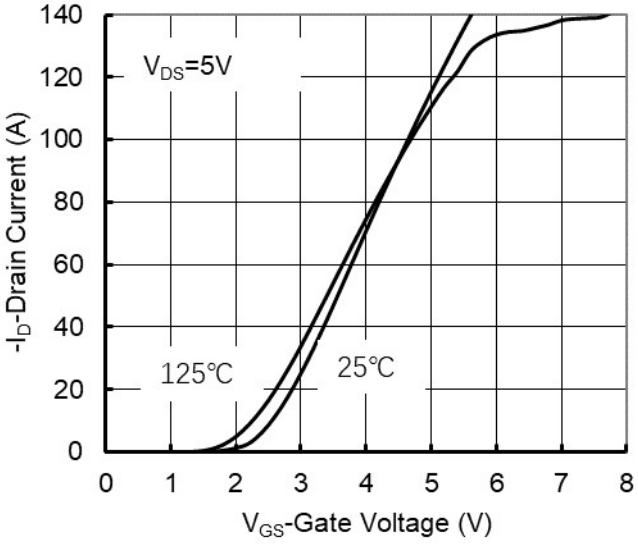

Figure2. Transfer Characteristics

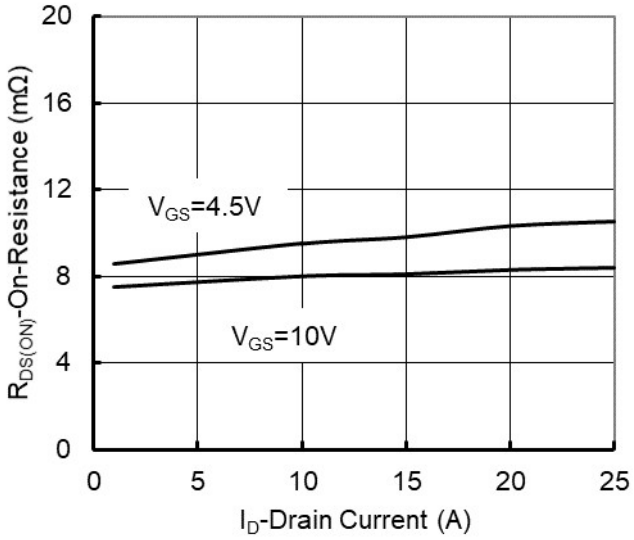

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

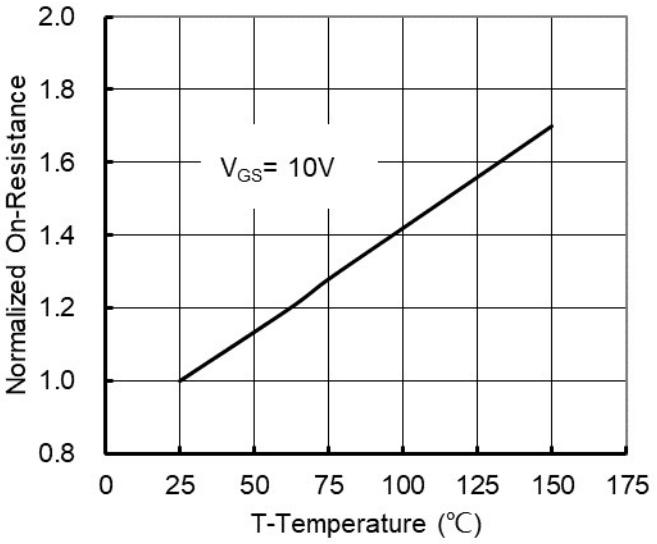

Figure 4: On-Resistance vs. Junction Temperature

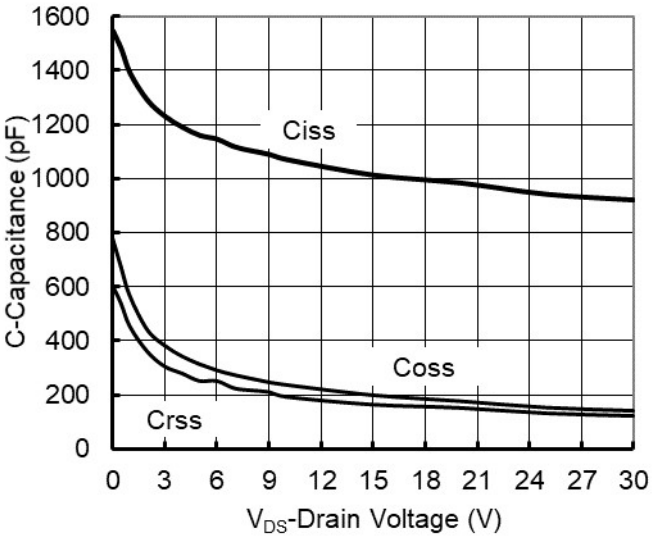

Figure5. Capacitance Characteristics

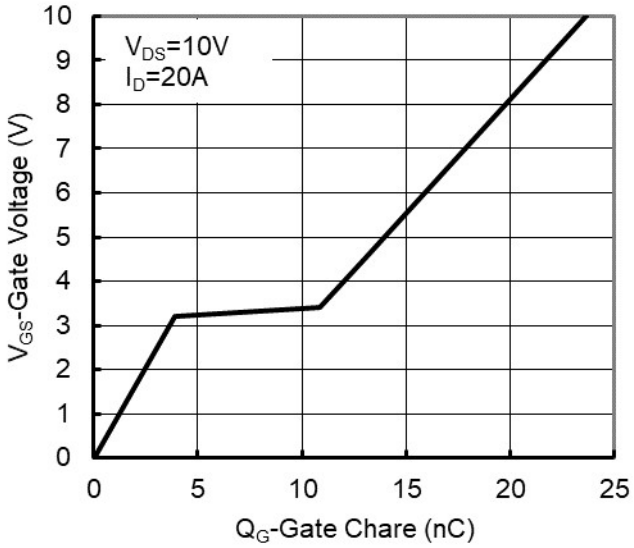

Figure6. Gate Charge

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Figure7. Safe Operation Area

Figure8. Maximum Continuous Drain Current vs Case Temperature

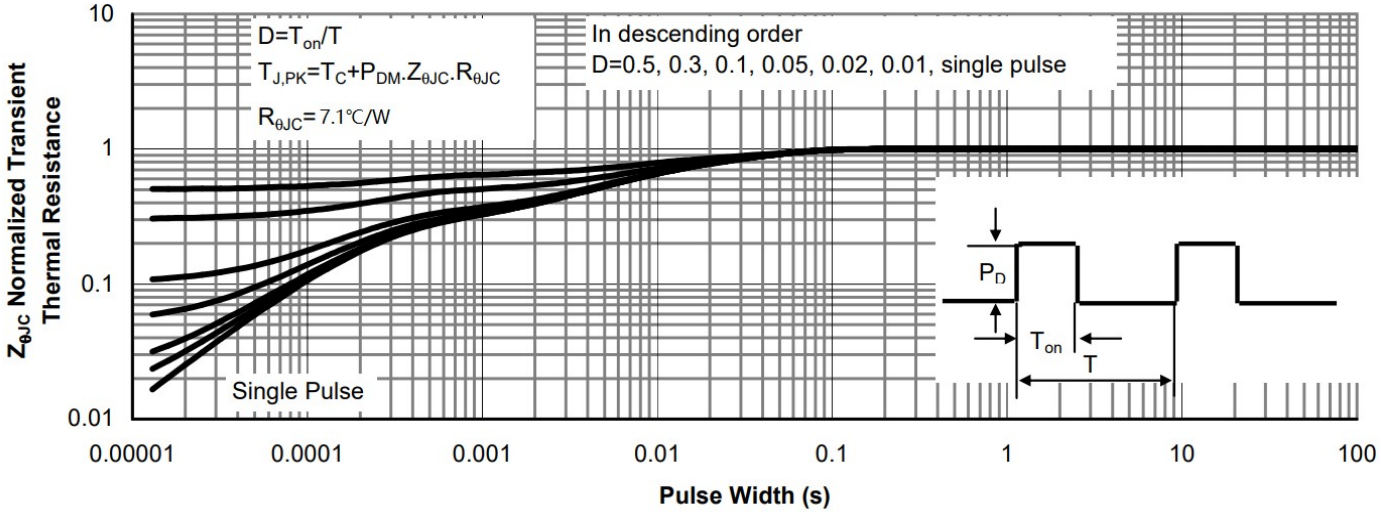

Figure9.Normalized Maximum Transient Thermal Impedance

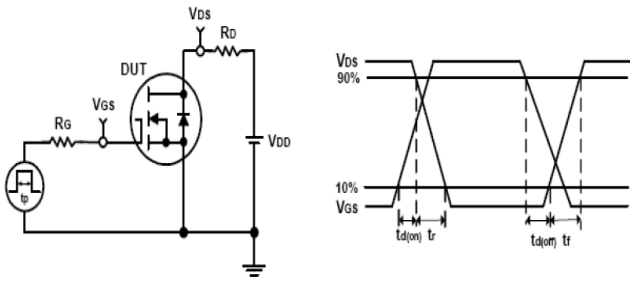

Fig10. Switching Time Test Circuit and waveforms

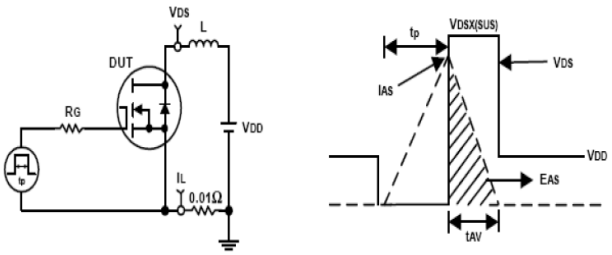

Fig11. Unclamped Inductive Test Circuit and waveforms

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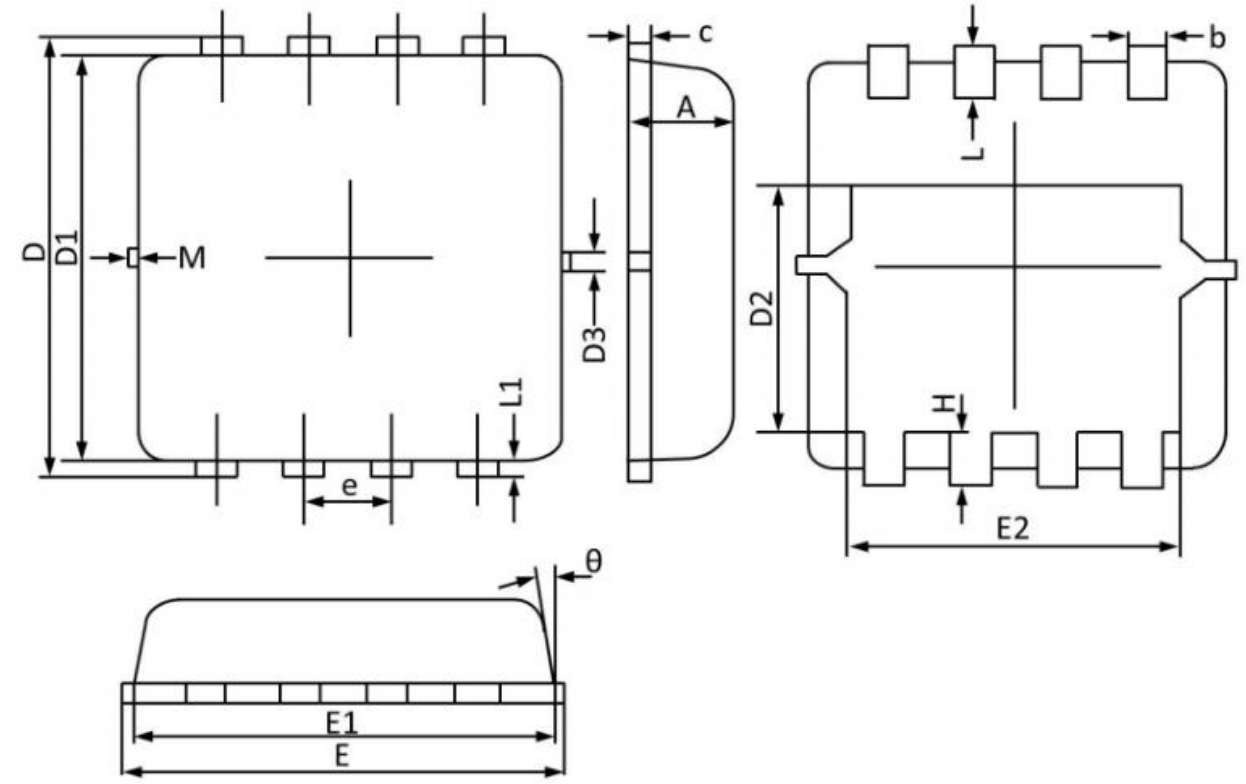
PDFN3*3 Package Information



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