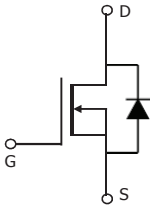
N-Channel MOSFET

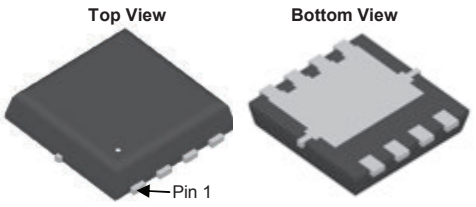
2KK5086DFN

■ Features

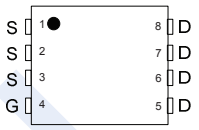
- V_{DS} = 30 V
- I_D (at V_{GS}=10V) = 50 A
- $R_{DS(ON)}$ (at V_{GS} = 10 V) < 2.8 mΩ
- $R_{DS(ON)}$ (at V_{GS} = 4.5 V) < 5.0 mΩ
- 100% UIS Tested
- 100% R_g Tested



PDFN3.3x3.3-8



Top View



■ Absolute Maximum Ratings (T_A = 25℃ unless otherwise noted)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current	T_C = 25℃	I_D	50	A
	T_C = 100℃		39	
Pulsed Drain Current (Note 2)		I_{DM}	220	
Continuous Drain Current	T_A = 25℃	I_{DSM}	28	
	T_A = 70℃		23	
Avalanche Current (Note 2)		I_{AS}	50	A
Avalanche Energy L = 0.1mH (Note 2)		E_{AS}	125	mJ
Thermal Resistance, Junction- to-Ambient (Note 5)		$R_{\theta JA}$	60	℃/W
Thermal Resistance, Junction- to-Case		$R_{\theta JC}$	3	
Power Dissipation (Note 4)	T_C = 25℃	P_D	42	W
	T_C = 100℃		17	
Power Dissipation (Note 5)	T_A = 25℃	P_{DSM}	4.2	
	T_A = 70℃		2.7	
Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{stg}	-55 to 150	

Notes:

1. The maximum current rating is package limited.
2. Single pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
3. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.
4. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
5. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ t≤ 10s and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

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■ Electrical Characteristics (T_J = 25℃ unless othewise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 250 μA, V_{GS} = 0V	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V			1	μA
		V_{DS} = 30 V, V_{GS} = 0 V, T_J=55℃			5	
Gate to Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Gate to Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = 250μA	1.0		2.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 20 A			2.8	mΩ
		V_{GS} = 10 V, I_D = 20 A, T_J=125℃			4.6	
		V_{GS} = 4.5 V, I_D = 20 A			5.0	
Forward Transconductance	g_{FS}	V_{DS} = 5 V, I_D = 20 A		100		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 15 V, f = 1 MHz		2820		pF
Output Capacitance	C_{oss}			410		
Reverse Transfer Capacitance	C_{rss}			280		
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, f = 1MHz	1.7	3.5	5	Ω
Switching Characteristics						
Total Gate Charge (10V)	Q_g	V_{GS} = 10V, V_{DS} = 15 V, I_D = 20 A		54	75	nC
Total Gate Charge (4.5V)				25	35	
Gate Source Charge	Q_{gs}			6.5		
Gate Drain Charge	Q_{gd}			12.5		
Turn-On DelayTime	$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 15 V, R_L = 0.75 Ω, R_{GEN} = 3 Ω		7		ns
Turn-On Rise Time	t_r			10		
Turn-Off DelayTime	$t_{d(off)}$			58		
Turn-Off Fall Time	t_f			20		
Drain-Source Diode Characteristics						
Body Diode Reverse Recovery Time	t_{rr}	I_F = 20A, di/dt = 500 A/μs		15.5		ns
Body Diode Reverse Recovery Charge	Q_{rr}			31.5		nC
Maximum Body-Diode Continuous Current	I_S	(Note 1)			50	A
Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 1 A		0.7	1	V

Notes:

6. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.
7. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C. The SOA curve provides a single pulse rating.
8. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.

■ Marking

Marking	K5086 KC***

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■ Typical Electrical And Thermal Characteristics

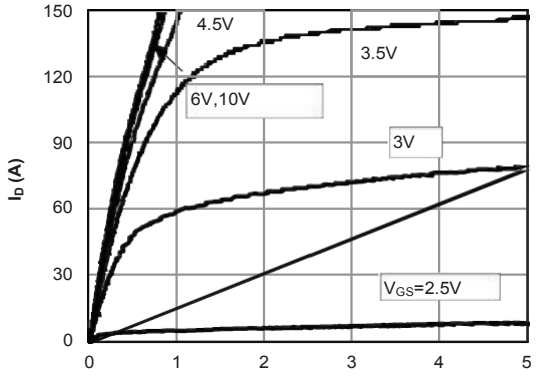

Fig 1: On-Region Characteristics (Note 6)

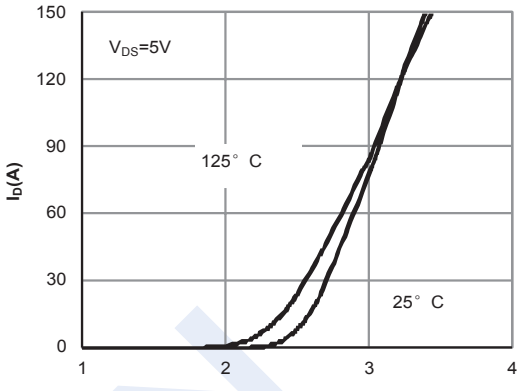

Figure 2: Transfer Characteristics (Note 6)

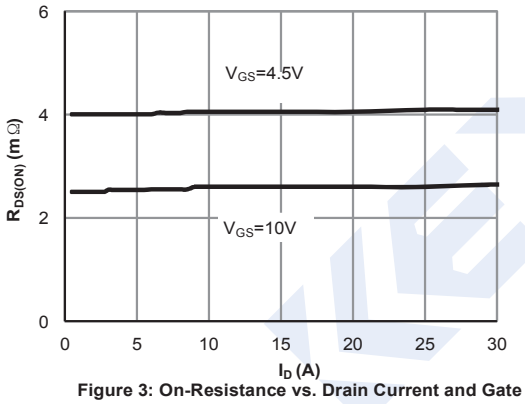

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note 6)

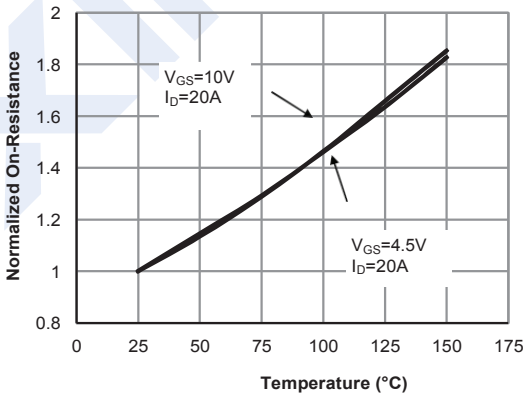

Figure 4: On-Resistance vs. Junction Temperature (Note 6)

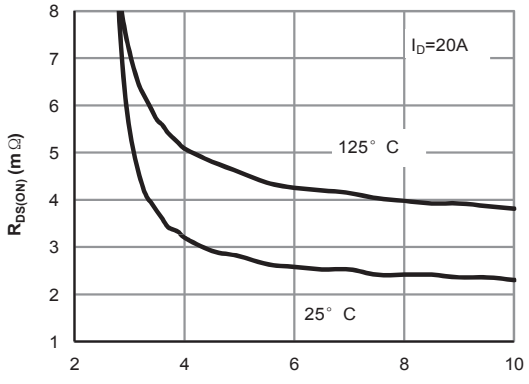

Figure 5: On-Resistance vs. Gate-Source Voltage (Note 6)

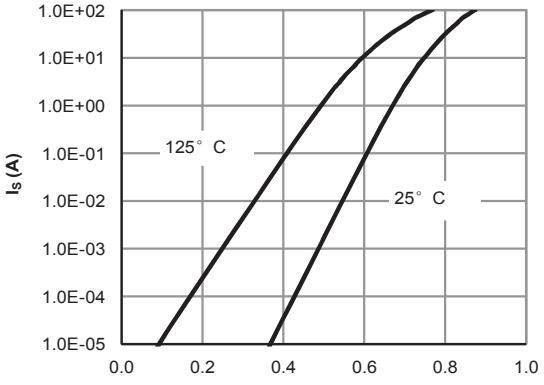

Figure 6: Body-Diode Characteristics (Note 6)

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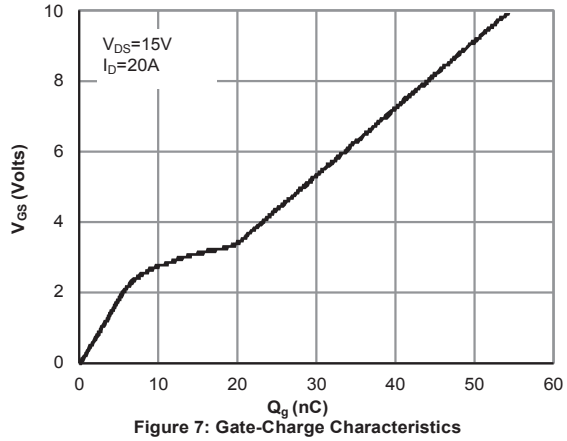

Figure 7: Gate-Charge Characteristics

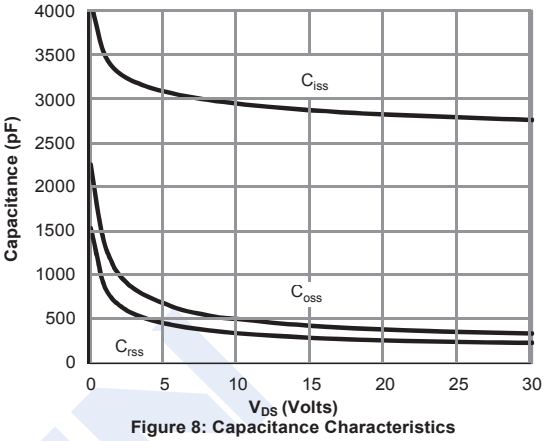

Figure 8: Capacitance Characteristics

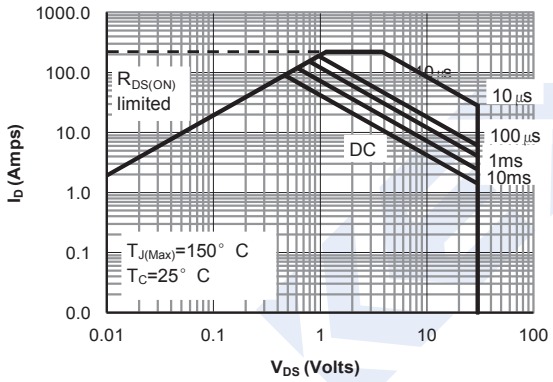

Figure 9: Maximum Forward Biased Safe Operating Area (Note 7)

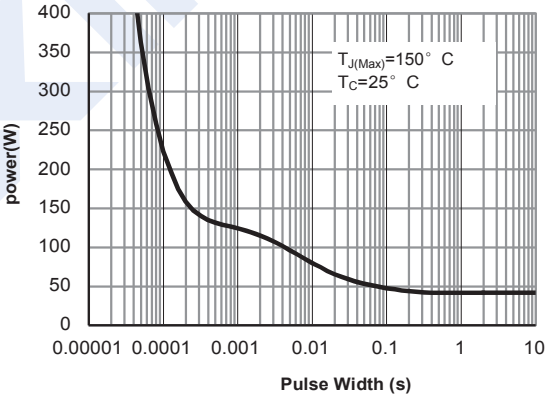

Figure 10: Single Pulse Power Rating Junction-to-Case (Note 7)

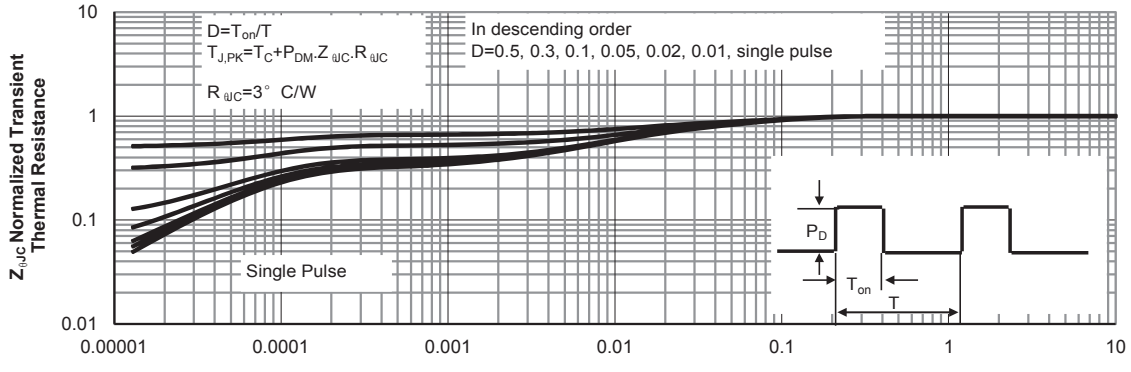

Figure 11: Normalized Maximum Transient Thermal Impedance (Note 7)

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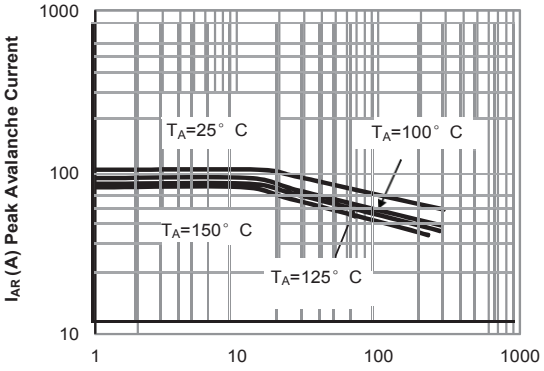

Figure 12: Single Pulse Avalanche capability

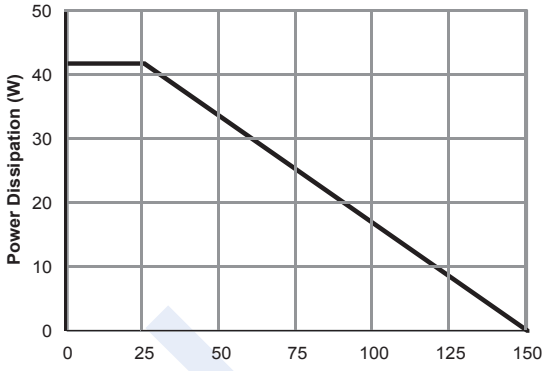

Figure 13: Power De-rating (Note 7)

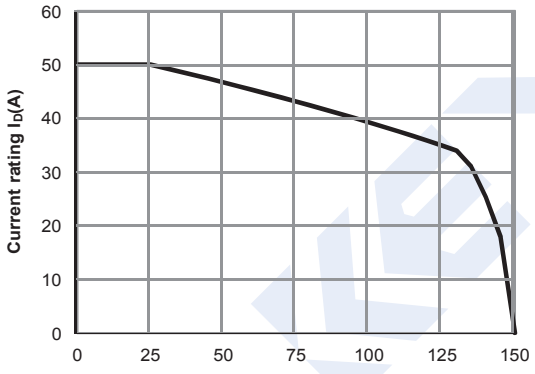

Figure 14: Current De-rating (Note 7)

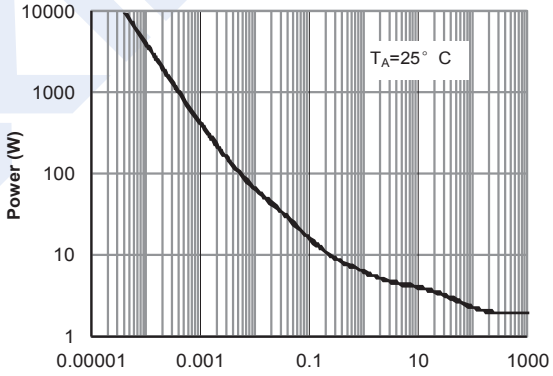

Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note 8)

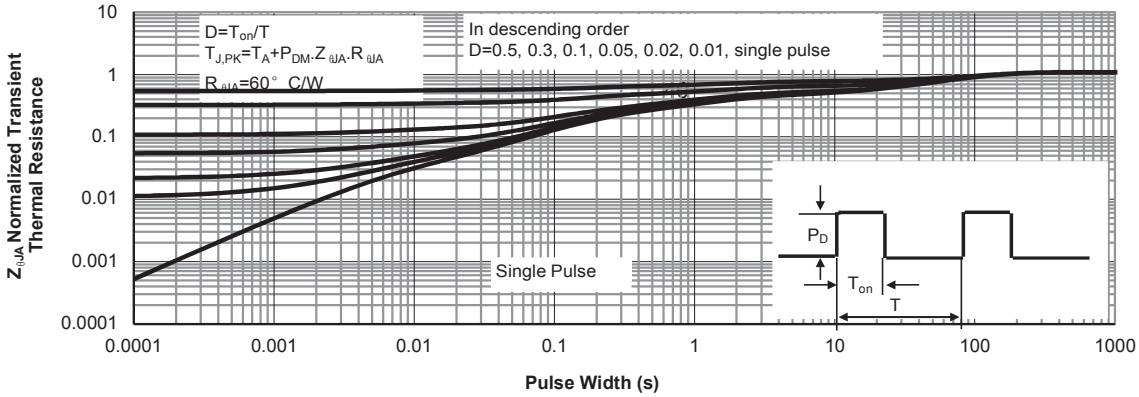

Figure 16: Normalized Maximum Transient Thermal Impedance (Note 8)

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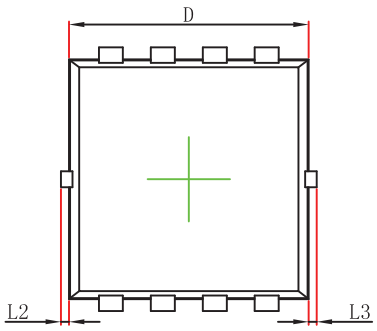
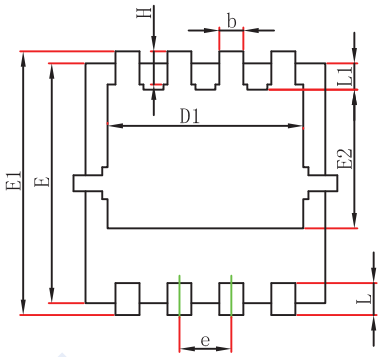
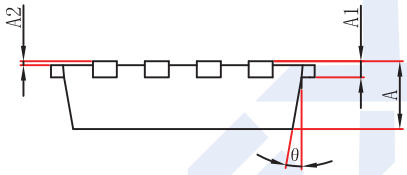
■ **PDFN3.3x3.3-8 Package Outline Dimensions**



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	3.050	3.250	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°