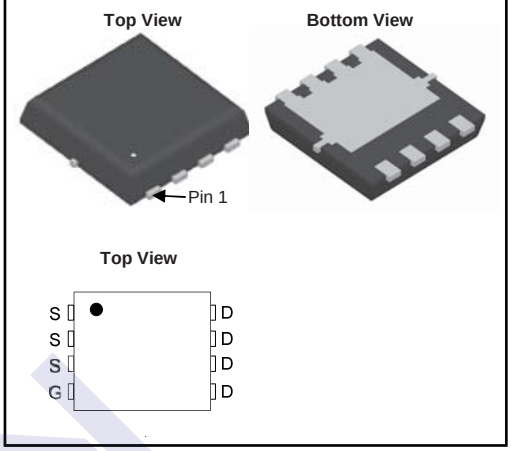
N-Channel MOSFET

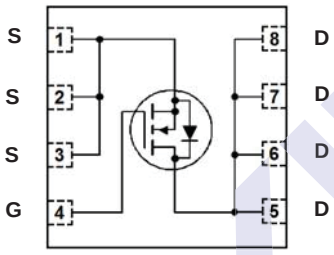
2KK5039DFN

PDFN3.3x3.3-8



■ Features

- $V_{DS\ (V)}$ = 20 V
- I_{DMAX} = 60 A
- $R_{DS(ON)}$ (at V_{GS} = 4.5 V) < 5.5 mΩ
- $R_{DS(ON)}$ (at V_{GS} = 2.5 V) < 9 mΩ
- High Power and current handing capability



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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	
Continuous Drain Current (Note 1)	Tc=25℃	I_D	60	A
	Tc=100℃		38	
Pulsed Drain Current (Note 2)		I_{DM}	220	
Power Dissipation	Tc=25℃	P_D	42	W
Thermal Resistance, Junction- to-Case		$R_{\theta JC}$	3	℃/W
Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{stg}	-55 to 150	

Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 250 μA, V_{GS} = 0V	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0 V			1	μA
Gate to Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±12 V			±100	nA
Gate to Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = 250μA	0.5		1.1	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 20 A			5.5	mΩ
		V_{GS} = 2.5 V, I_D = 15 A			9	
Forward Transconductance	g_{FS}	V_{DS} = 5 V, I_D = 15 A		40		S
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 15 V, f = 1 MHz		2800		pF
Output Capacitance	C_{oss}			353		
Reverse Transfer Capacitance	C_{rss}			265		
Gate Resistance	R_g	V_{GS} = 0 V, V_{DS} = 0 V, f = 1 MHz		1.1		Ω
Total Gate Charge	Q_g	V_{GS} = 4.5V, V_{DS} = 10 V, I_D = 12 A		32		nC
Gate Source Charge	Q_{gs}			3		
Gate Drain Charge	Q_{gd}			11		
Turn-On DelayTime	$t_{d(on)}$	V_{GS} = 4.5 V, V_{DS} = 15 V, R_L = 0.75 Ω, R_{GEN} = 3 Ω,		17		ns
Turn-On Rise Time	t_r			49		
Turn-Off DelayTime	$t_{d(off)}$			74		
Turn-Off Fall Time	t_f			26		
Body Diode Reverse Recovery Time	t_{rr}	I_F = 20 A, dI/dt = 100 A/μs		23		
Body Diode Reverse Recovery Charge	Q_{rr}			10		nC
Maximum Body-Diode Continuous Current	I_{SD}				85	A
Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 20 A			1.2	V

■ Marking

Marking	K5039 KC***

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■ Typical Characterisitics

Figure 1. Output Characteristics

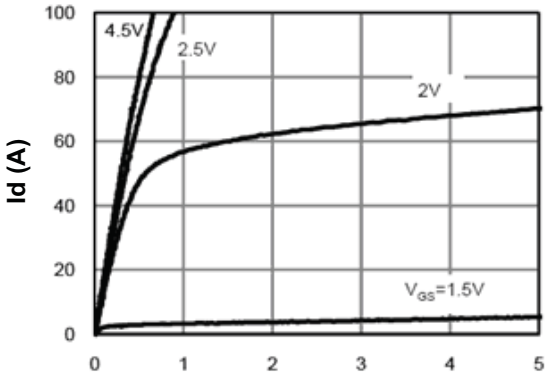

Figure 2. Transfer Characteristics

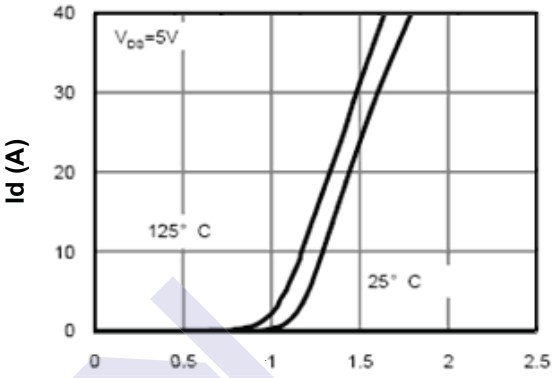

Figure 3. Max BV_{DSS} vs Junction Temperature

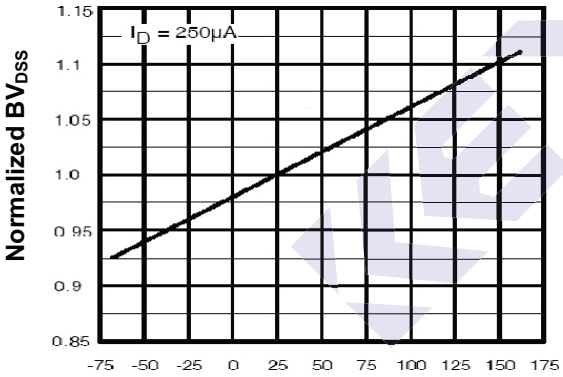

Figure 4. Drain Current

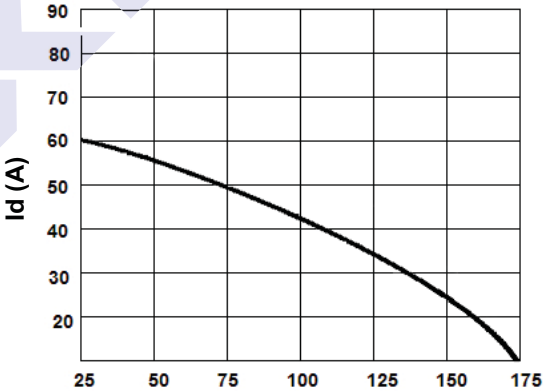

Figure 5. $V_{GS(th)}$ vs Junction Temperature

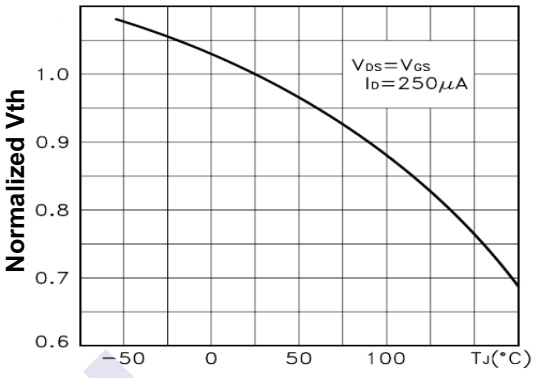

Figure 6. $R_{DS(ON)}$ vs Junction Temperature

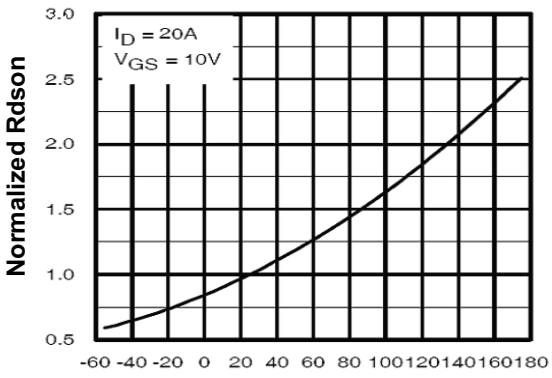

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Figure 7. Gate Charge Waveforms

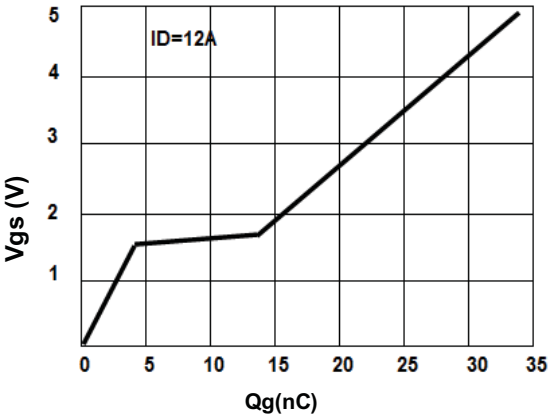


Figure 8. Capacitance

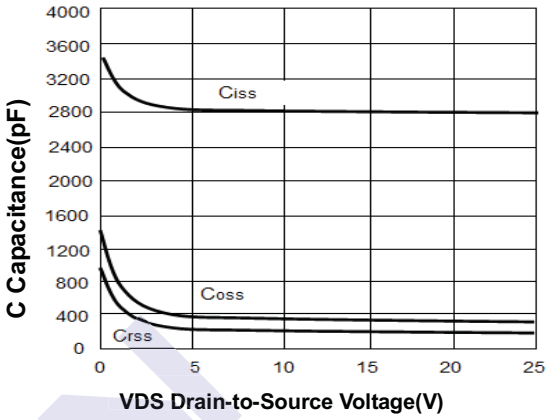


Figure 9. Body-Diode Characteristics

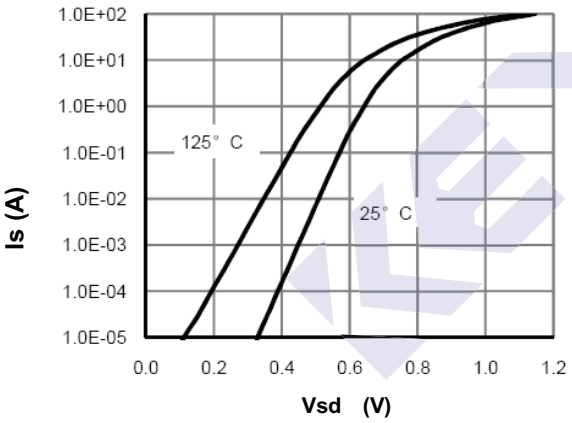


Figure 10. Maximum Safe Operating Area

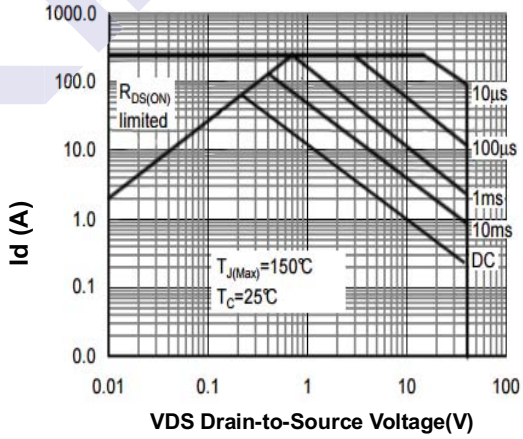
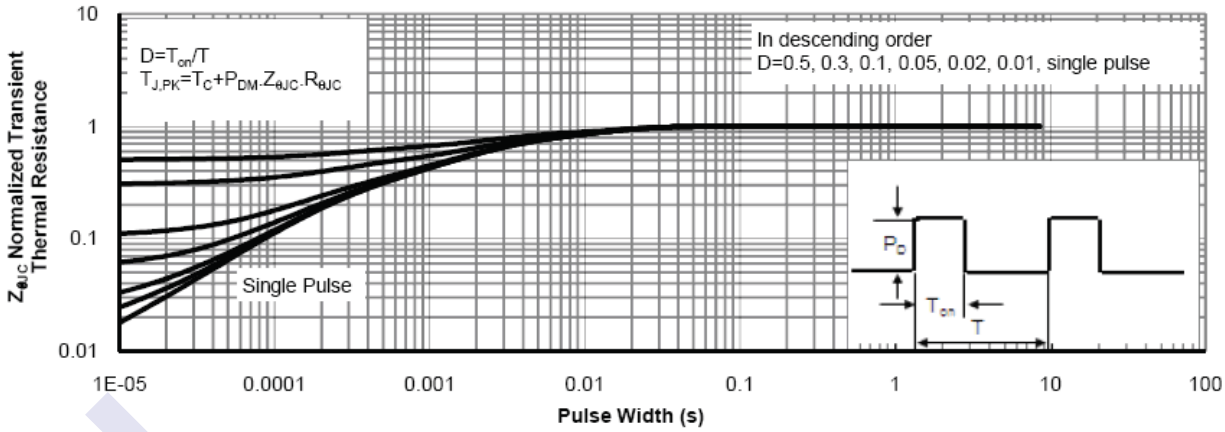


Figure 11. Normalized Maximum Transient Thermal Impedance



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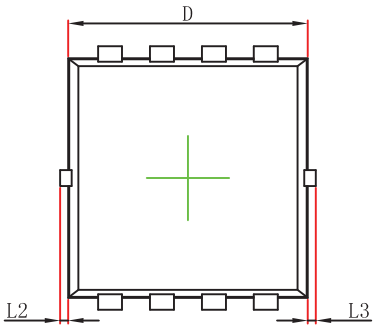
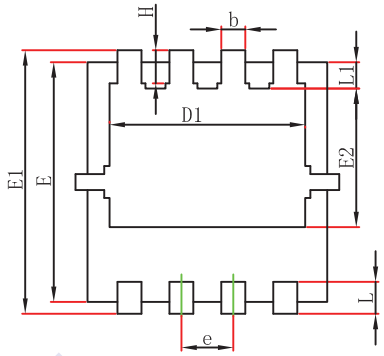
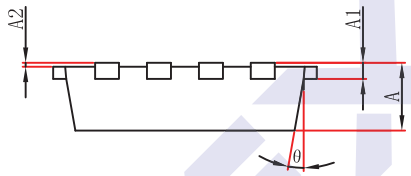
■ **PDFN3.3x3.3-8 Package Outline Dimensions**



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	2.900	3.100	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°