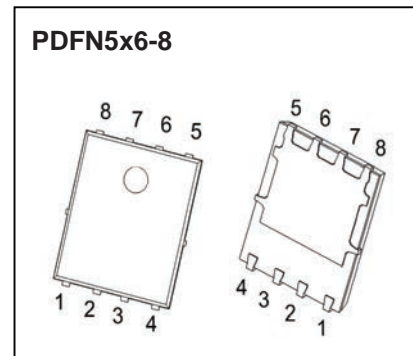
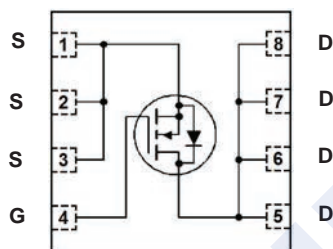


## N-Channel MOSFET

## 2KK5120DFN

## ■ Features

- $V_{DS} (V) = 40 V$
- $I_D = 150 A$
- $R_{DS(ON)}$  (at  $V_{GS} = 10 V$ )  $< 1.8 m\Omega$

■ Absolute Maximum Ratings ( $T_c = 25^\circ C$  unless otherwise noted)

Parameter	Symbol	Rating	Unit	
Drain-Source Voltage	$V_{DS}$	40	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current	$I_D$	$T_c = 25^\circ C$	150	A
		$T_c = 100^\circ C$	100	
Pulsed Drain Current (Note 1)	$I_{DM}$	560		
Power Dissipation	$P_D$	92.6	W	
Power Dissipation – Derate above $25^\circ C$		0.74	W/ $^\circ C$	
Single Pulse Avalanche Energy (Note 2)	EAS	450	mJ	
Single Pulse Avalanche Current (Note 2)	IAS	30	A	
Thermal Resistance, Junction- to-Ambient	$R_{\theta JA}$	62	$^\circ C/W$	
Thermal Resistance, Junction- to-Case	$R_{\theta JC}$	1.35		
Junction Temperature	$T_J$	150	$^\circ C$	
Storage Temperature Range	$T_{stg}$	-55 to 150		

## Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. EAS condition :  $T_J=25^\circ C, V_{DD}=25V, V_G=10V, L=1mH, I_{AS}=30A$

## N-Channel MOSFET

## 2KK5120DFN

■ Electrical Characteristics (T<sub>c</sub> = 25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0V	40			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 40 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 32 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125°C			10	
Gate to Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V			±100	nA
On Characteristics (Note 1)						
Gate to Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1.0		2.0	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 50 A			1.8	mΩ
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 25 A			2.4	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 50 A		120		S
Dynamic Characteristics (Note 1)						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 20 V, f = 1 MHz		2500		pF
Output Capacitance	C <sub>oss</sub>			230		
Reverse Transfer Capacitance	C <sub>rss</sub>			3.2		
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz		2.0	4.8	Ω
Switching Characteristics (Note 1)						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 20 V, I <sub>D</sub> = 50 A		75		nC
Gate Source Charge	Q <sub>gs</sub>			24		
Gate Drain Charge	Q <sub>gd</sub>			19		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 20 V, I <sub>D</sub> = 50A, R <sub>G</sub> = 3 Ω		20		ns
Turn-On Rise Time	t <sub>r</sub>			32		
Turn-Off Delay Time	t <sub>d(off)</sub>			98		
Turn-Off Fall Time	t <sub>f</sub>			32		
Drain-Source Diode Characteristics						
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>S</sub> = 50A, di/dt = 100 A/μs		64		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			98		nC
Maximum Body-Diode Continuous Current	I <sub>S</sub>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current			200	A
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 1 A			1	V

Notes:

1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

## ■ Marking

Marking	K5120 KC***
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## N-Channel MOSFET

### 2KK5120DFN

■ Typical Electrical Characteristics

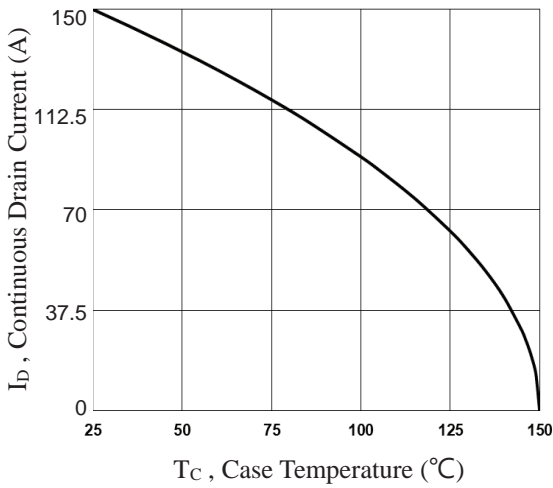


Fig.1 Continuous Drain Current vs.  $T_C$

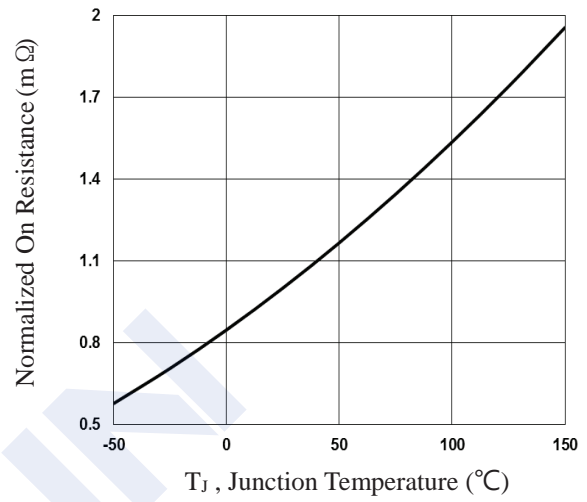


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$

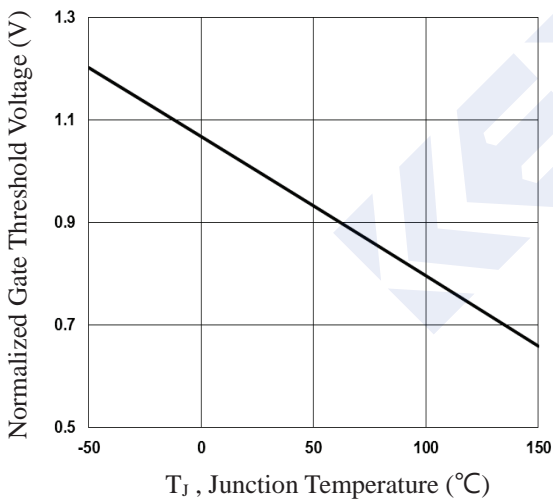


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

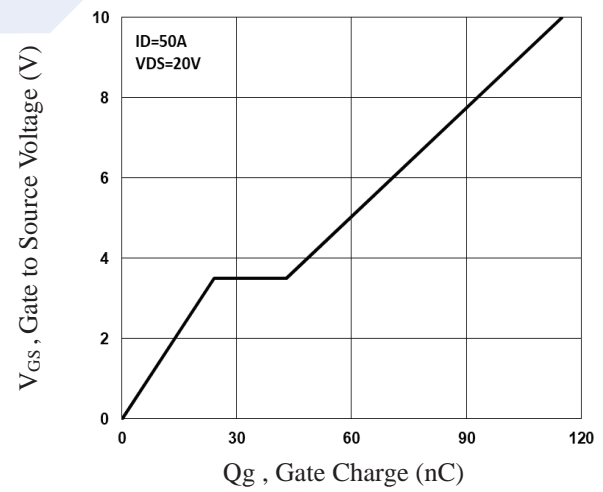


Fig.4 Gate Charge Characteristics

### N-Channel MOSFET

### 2KK5120DFN

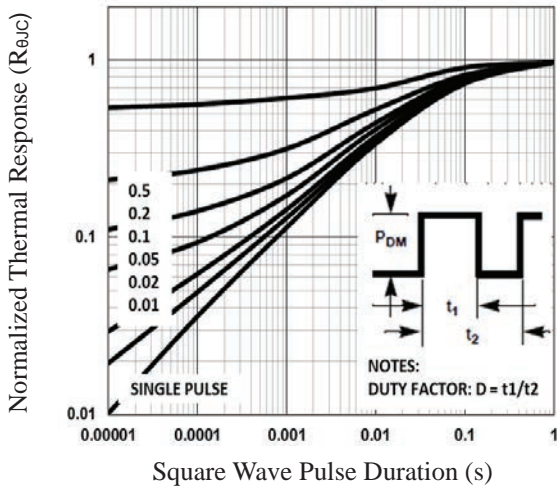


Fig.5 Normalized Transient Impedance

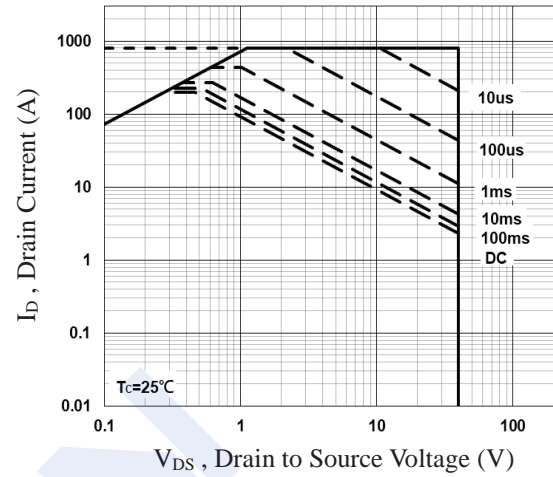


Fig.6 Maximum Safe Operation Area

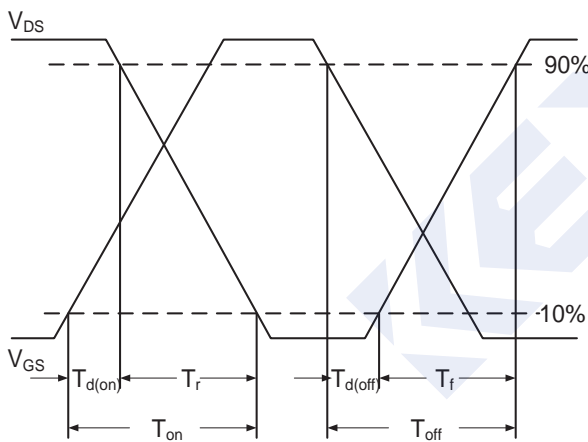


Fig.7 Switching Time Waveform

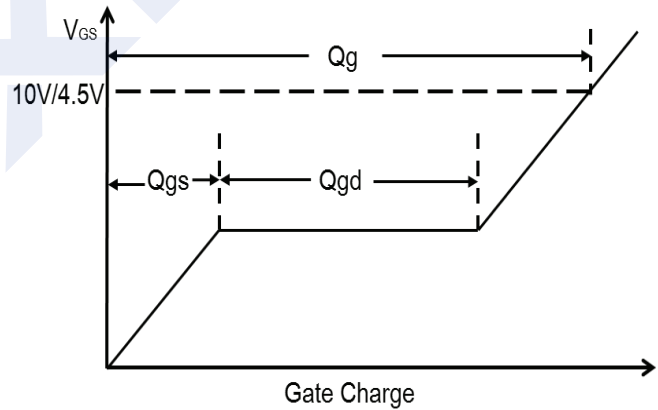
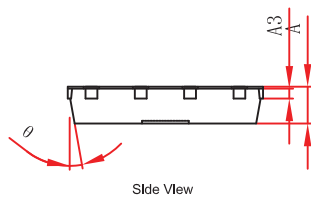
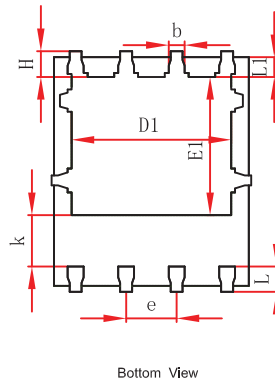
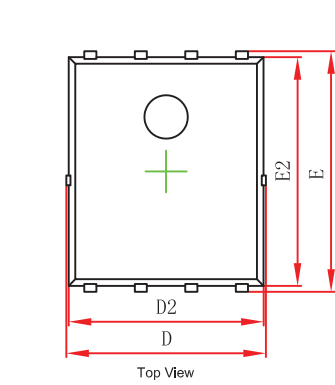


Fig.8 Gate Charge Waveform

## N-Channel MOSFET

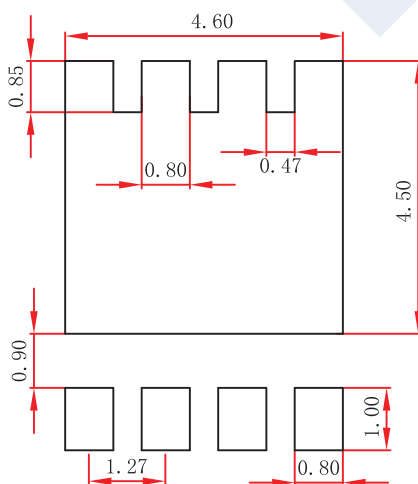
### 2KK5120DFN

#### PDFN5x6-8 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

#### PDFN5x6-8 Suggested Pad Layout



- Note:
1. Controlling dimension: in millimeters.
  2. General tolerance:  $\pm 0.05\text{mm}$ .
  3. The pad layout is for reference purposes only.