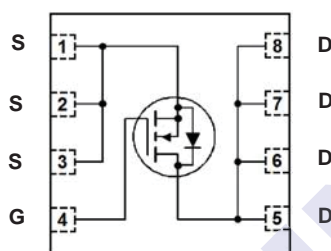


## N-Channel MOSFET

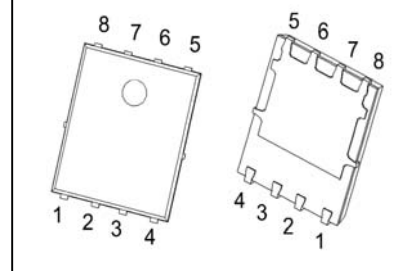
## 2KK5050DFN

## ■ Features

- $V_{DS} (V) = 40 V$
- $I_D = 110 A$
- $R_{DS(ON)} = 2.4 m\Omega$  (typ.) @  $V_{GS}=10V$
- $R_{DS(ON)} = 3.3 m\Omega$  (typ.) @  $V_{GS}=4.5V$



DFN5x6-8(PDFNWB5x6-8L)

■ 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	$I_D$	$T_c = 25^\circ C$	110
		$T_c = 100^\circ C$	77.8
Pulsed Drain Current (Note 1)	$I_{DM}$	340	A
Power Dissipation	$P_D$	75	W
Power Dissipation – Derate above $25^\circ C$		0.6	W/ $^\circ C$
Single Pulse Avalanche Energy (Note 2)	EAS	500	mJ
Thermal Resistance, Junction- to-Case (Note 3)	$R_{\theta JC}$	1.67	$^\circ C/W$
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 :  $T_J=25^\circ C, V_{DD}=20V, V_G=10V, L=0.5mH, R_g=25\Omega$
3. Surface Mounted on FR4 Board,  $t \leq 10$  sec.

## N-Channel MOSFET

## 2KK5050DFN

## ■ Electrical Characteristics (Tc = 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	1.2	1.7	2.2	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 55 A		2.4	2.8	mΩ
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 55 A		3.3	3.9	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 5 V, I <sub>D</sub> = 55 A		60		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		3510		pF
Output Capacitance	C <sub>oss</sub>			860		
Reverse Transfer Capacitance	C <sub>rss</sub>			60		
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> = 55 A		60		nC
Gate Source Charge	Q <sub>gs</sub>			9.9		
Gate Drain Charge	Q <sub>gd</sub>			5.5		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 20 V, I <sub>D</sub> = 55A, R <sub>G</sub> = 1.6 Ω		10.5		ns
Turn-On Rise Time	t <sub>r</sub>			4		
Turn-Off Delay Time	t <sub>d(off)</sub>			35		
Turn-Off Fall Time	t <sub>f</sub>			5		
Drain-Source Diode Characteristics						
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>S</sub> = 55A, di/dt = 100 A/μs		24		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			68		nC
Maximum Body-Diode Continuous Current	I <sub>S</sub>				110	A
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 55 A			1.2	V

Notes:

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

## ■ Marking

Marking	K5050 KC***
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## N-Channel MOSFET

### 2KK5050DFN

■ Typical Electrical Characteristics

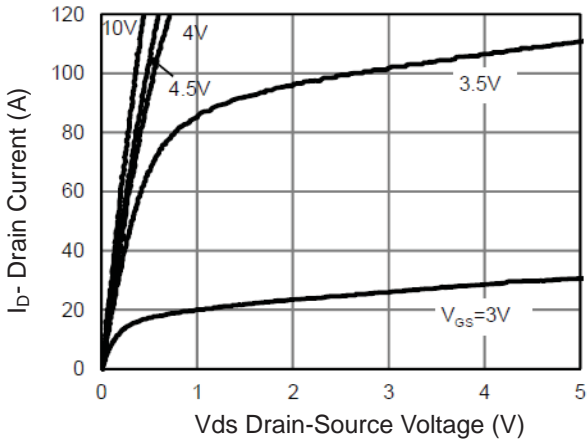


Figure 1 Output Characteristics

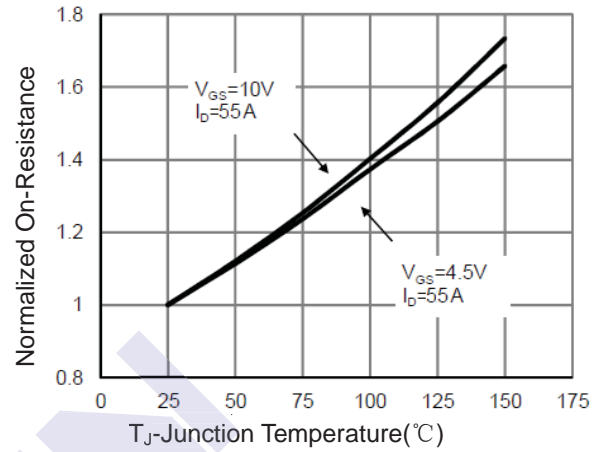


Figure 4  $R_{ds(on)}$ -Junction Temperature

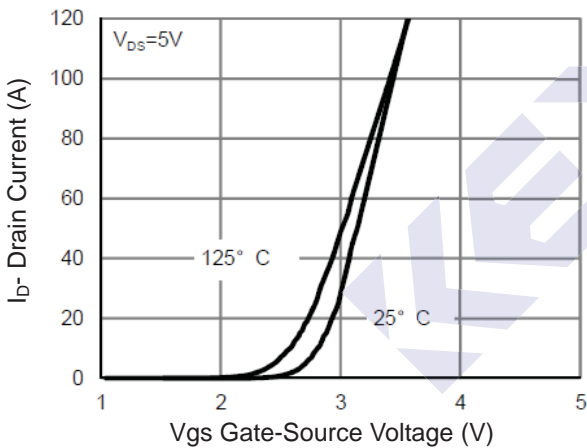


Figure 2 Transfer Characteristics

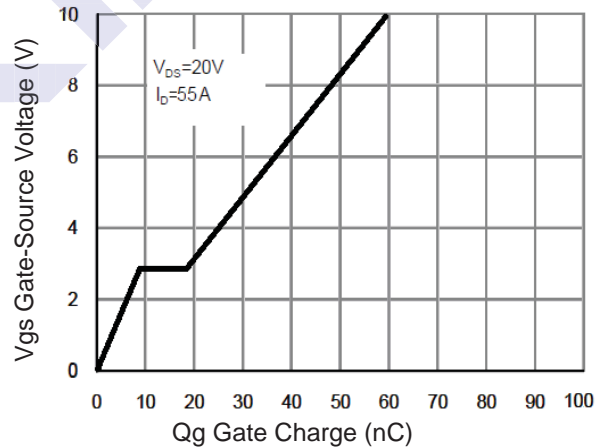


Figure 5 Gate Charge

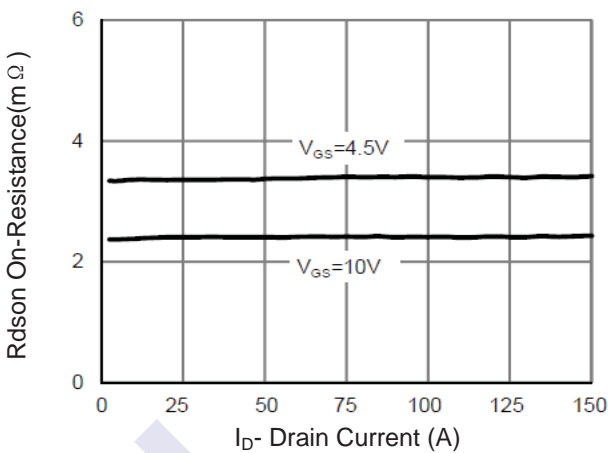


Figure 3  $R_{ds(on)}$ - Drain Current

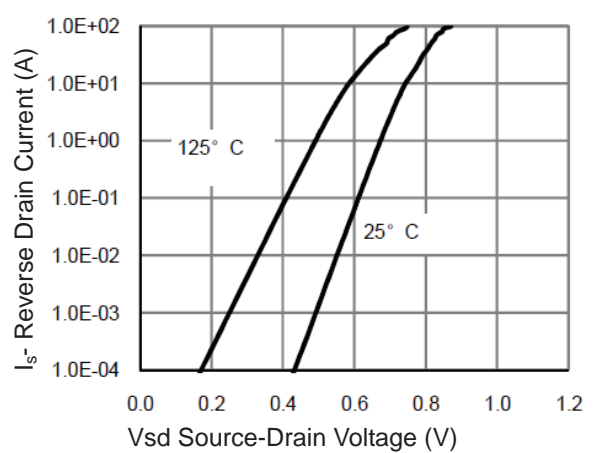


Figure 6 Source- Drain Diode Forward

### N-Channel MOSFET

### 2KK5050DFN

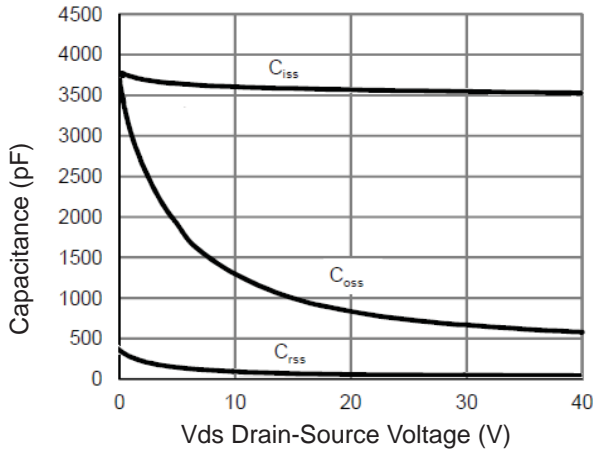


Figure 7 Capacitance vs Vds

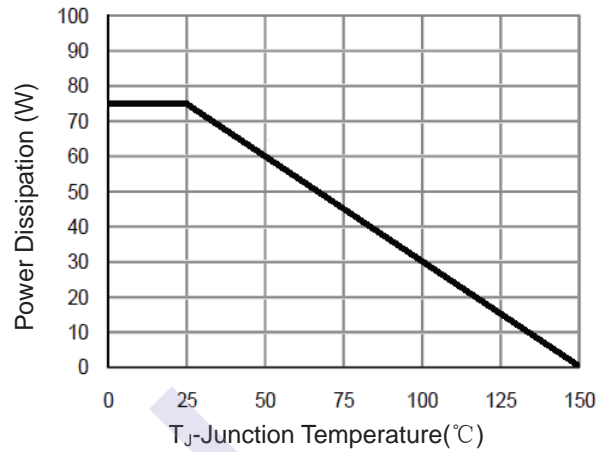


Figure 9 Power De-rating

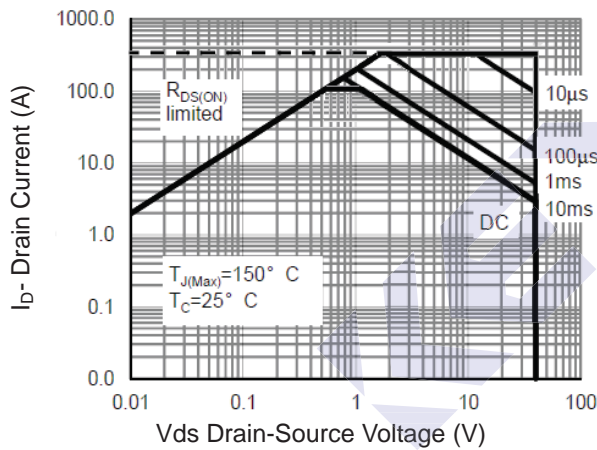


Figure 8 Safe Operation Area

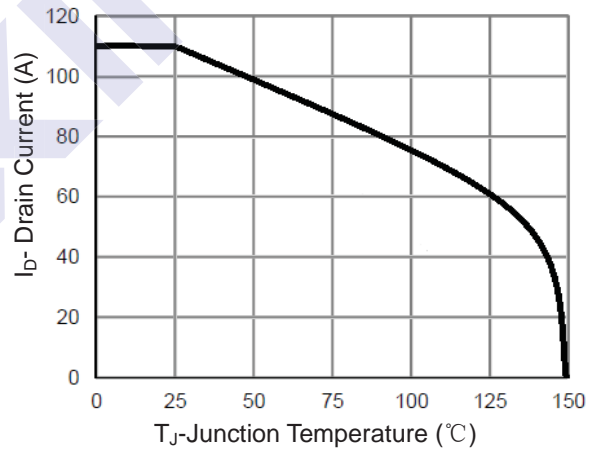


Figure 10 Current De-rating

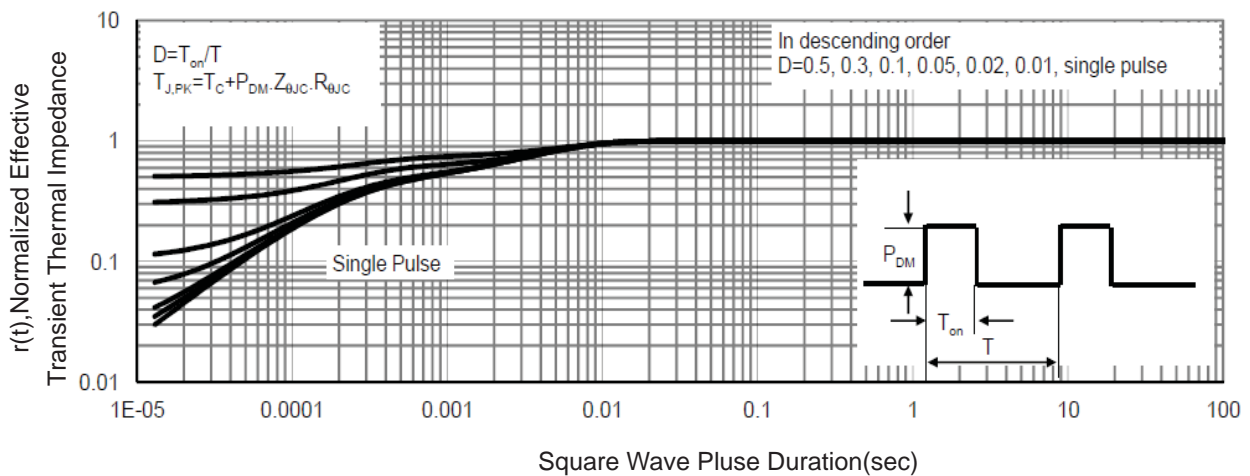
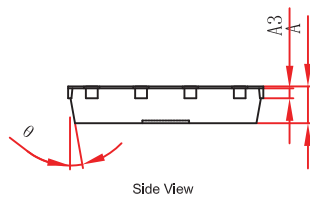
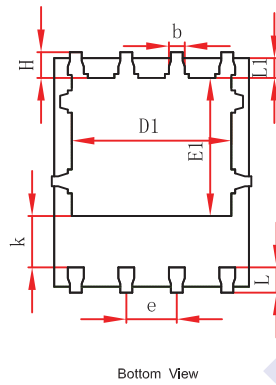
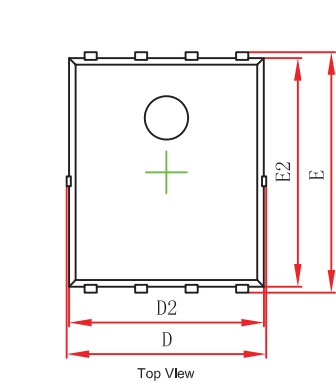


Figure 11 Normalized Maximum Transient Thermal Impedance

## N-Channel MOSFET

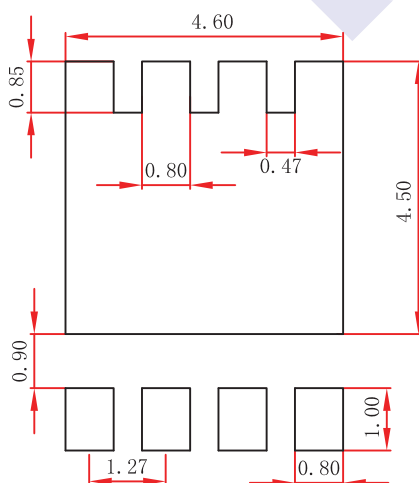
### 2KK5050DFN

#### DFN5x6-8(PDFNWB5x6-8L) 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°

#### DFN5x6-8(PDFNWB5x6-8L) 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.