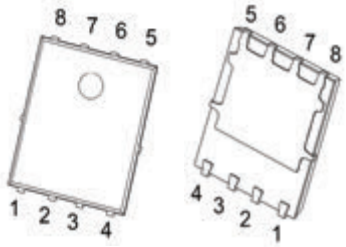
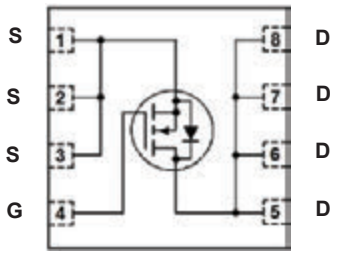
N-Channel MOSFET
RCK5074DFN

■ Features

- V_{DS} = 40 V
- I_D = 150 A
- $R_{DS(ON)}$ < 2.4 mΩ @ V_{GS}=10V
- $R_{DS(ON)}$ < 3.5 mΩ @ V_{GS}=4.5V
- 100% UIS Tested
- 100% Rg Tested

PDFN5x6-8





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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current (Note 1)	T_C = 25℃	I_D	150	A
Pulsed Drain Current (Note 2)		I_{DM}	450	
Avalanche Energy (Note 2)	L = 0.3mH	E_{AS}	163	mJ
Power Dissipation (Note 3)	T_C = 25℃	P_D	78	W
	T_C = 100℃		31	
Thermal Resistance, Junction- to-Ambient		$R_{\theta JA}$	50	℃/W
Thermal Resistance, Junction- to-Case		$R_{\theta JC}$	1.6	
Junction and Storage Temperature Range		T_{stg}	-55 to 150	℃

Notes:

1. The maximum current rating is package limited.
2. .Repetitive rating; pulse width limited by max. junction temperature.
3. P_d is based on max. junction temperature, using junction-case thermal resistance.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 250 μA, V_{GS} = 0V	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0 V			1	μA
		V_{DS} = 40 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		2.4	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 20 A		1.6	2.4	mΩ
		V_{GS} = 4.5 V, I_D = 20 A			3.5	
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=20A		100		S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 20 V, f = 1MHz		1760		pF
Output Capacitance	C_{oss}			675		
Reverse Transfer Capacitance	C_{rss}			60		
Gate Resistance	R_g	f=1MHz, Open drain	0.3	0.7	1.1	Ω
Switching Parameters						
Total Gate Charge	Q_g	V_{GS} = 10V, V_{DS} = 20 V, I_D = 20 A		50	70	nC
Gate Source Charge	Q_{gs}			11.5		
Gate Drain Charge	Q_{gd}			4		
Turn-On DelayTime	$t_{d(on)}$	V_{GS} = 10V, V_{DD} = 20 V, R_L=1.0 Ω, R_{GEN} = 3.0 Ω		11		ns
Turn-On Rise Time	t_r			3.5		
Turn-Off DelayTime	$t_{d(off)}$			36		
Turn-Off Fall Time	t_f			3		
Drain-Source Diode Characteristics						
Reverse Recovery Chrage	Q_{rr}	I_F=20A, di/dt=500A/μs		45		nC
Reverse Recovery Time	t_{rr}			17		ns
Maximum Body-Diode Continuous Current	I_S				130	A
Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 20 A			1.3	V

Notes:

4. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.
5. 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.
6. 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	K5074 *****

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■ Typical Electrical and Thermal Characteristics

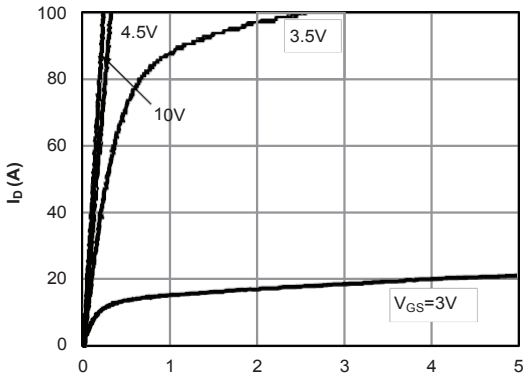

Figure 1: On-Region Characteristics (NOTE 4)

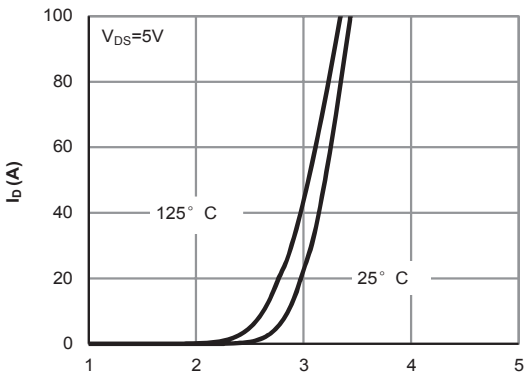

Figure 2: Transfer Characteristics (NOTE 4)

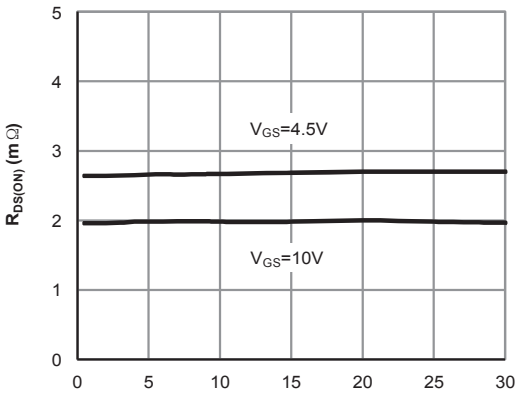

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (NOTE 4)

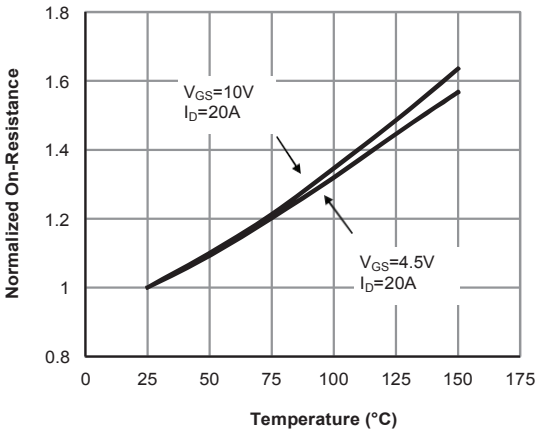

Figure 4: On-Resistance vs. Junction Temperature (NOTE 4)

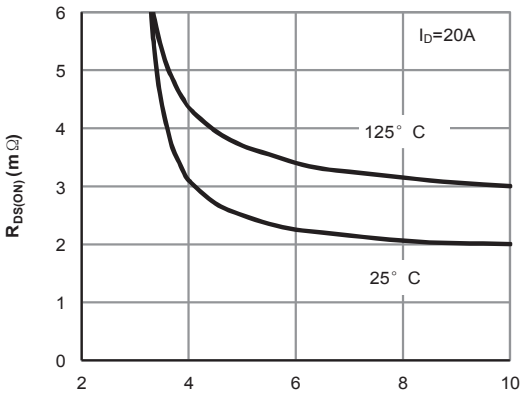

Figure 5: On-Resistance vs. Gate-Source Voltage (NOTE 4)

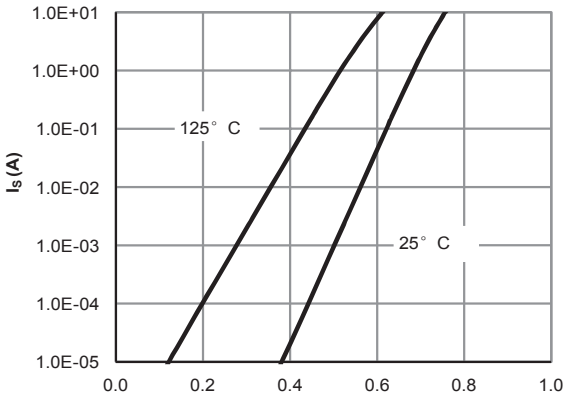

Figure 6: Body-Diode Characteristics (NOTE 4)

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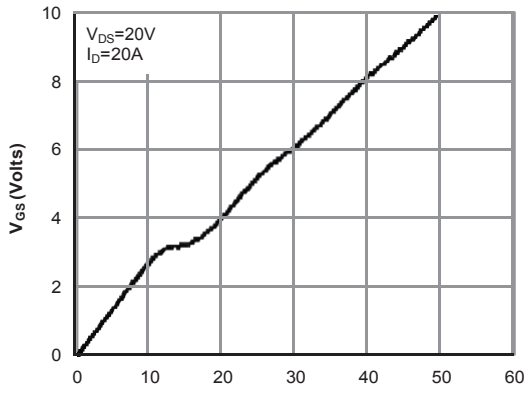

Figure 7: Gate-Charge Characteristics

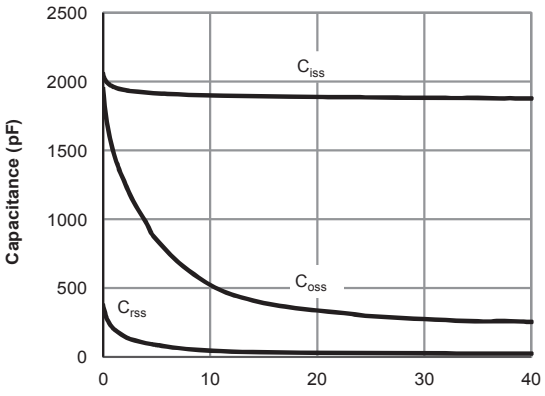

Figure 8: Capacitance Characteristics

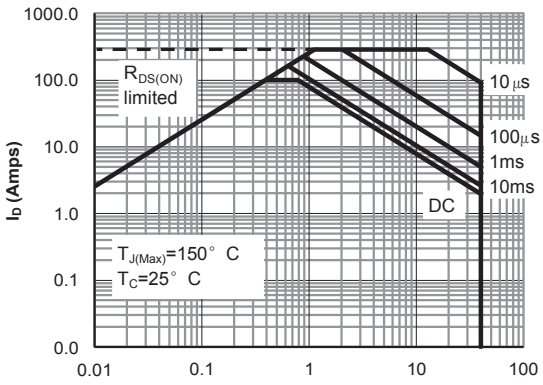

Figure 9: Maximum Forward Biased Safe Operating Area (NOTE 5)

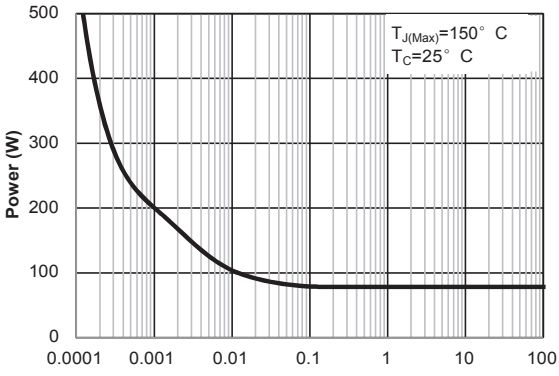

Figure 10: Single Pulse Power Rating Junction-to-Case (Note 5)

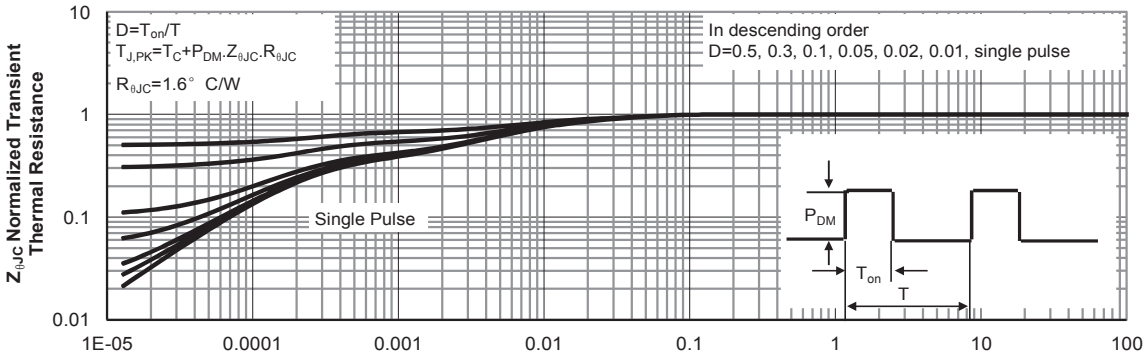

Figure 11: Normalized Maximum Transient Thermal Impedance (NOTE 5)

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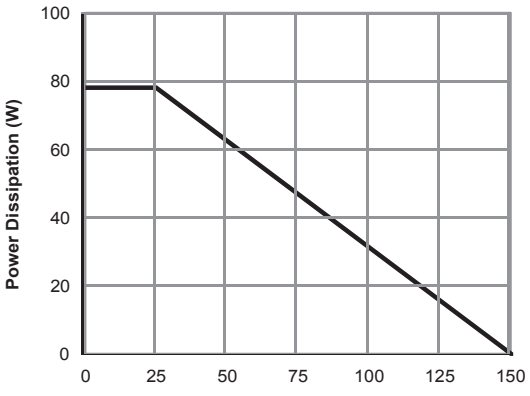

Figure 12: Power De-rating (NOTE 5)

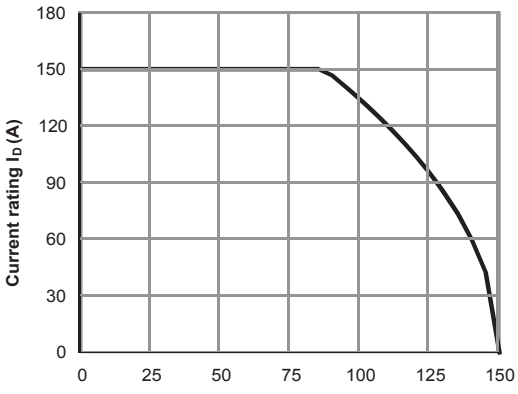

Figure 13: Current De-rating (NOTE 5)

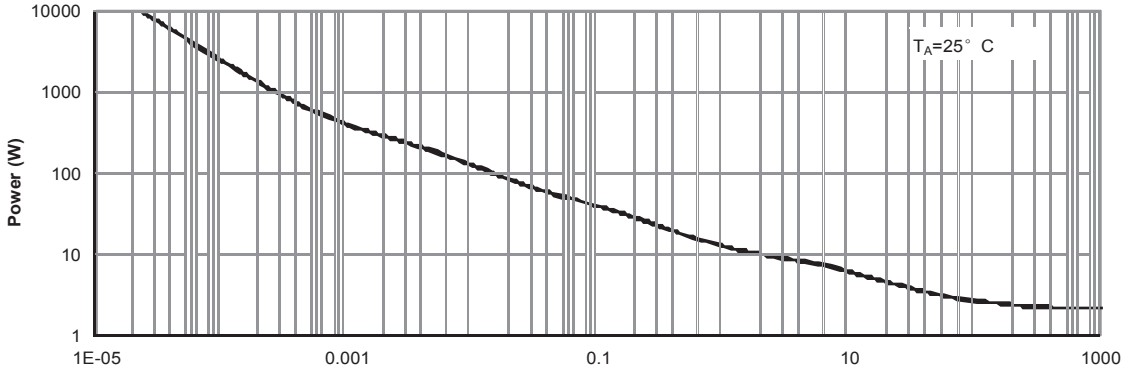

Figure 14: Single Pulse Power Rating Junction-to-Ambient (NOTE 6)

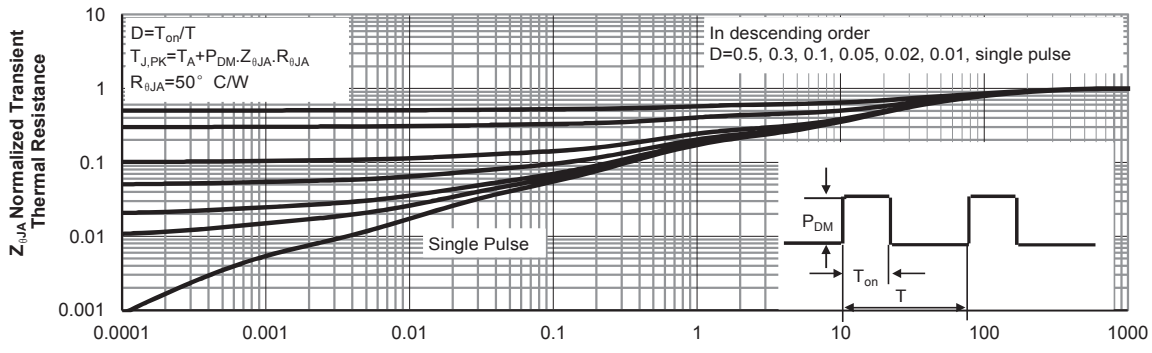

Figure 15: Normalized Maximum Transient Thermal Impedance (NOTE 6)

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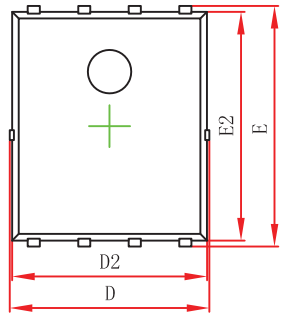
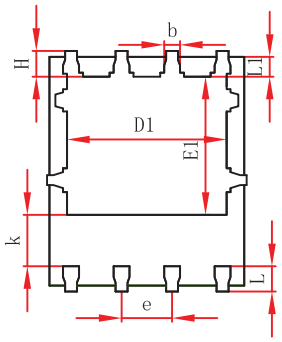
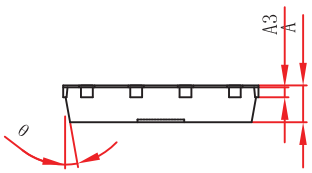
■ PDFN5x6-8 Package Outline Dimensions



Top View



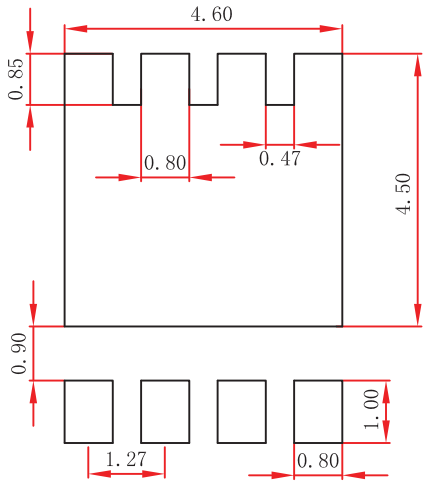
Bottom View



Side View

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:±0.05mm.
3.The pad layout is for reference purposes only.