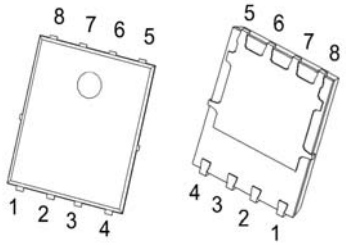
N-Channel MOSFET

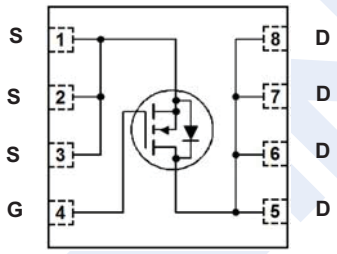
2SK4002

DFN5x6-8(PDFNWB5x6-8L)



■ Features

- $V_{DS\ (V)}$ = 150V
- Max $r_{DS(on)}$ = 56 mΩ at V_{GS} = 10 V, I_D = 4.4 A
- Max $r_{DS(on)}$ = 71 mΩ at V_{GS} = 6 V, I_D = 3.8 A
- Max $r_{DS(on)}$ = 75 mΩ at V_{GS} = 4.5 V, I_D = 3.7 A
- Advanced package and silicon combination for low $r_{DS(on)}$ and high efficiency
- Next generation enhanced body diode technology, engineered for soft recovery



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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current (Note 1)		I_D	4.4	A
Pulsed Drain Current (Note 3)		I_{DM}	30	
Single Pulse Avalanche Energy (Note 2)		E_{AS}	73	mJ
Power Dissipation	T_C=25℃	P_D	50	W
	T_A=25℃ (Note 1)		2.5	
Thermal Resistance.Junction- to-Ambient (Note 1)		R_{thJA}	50	℃/W
Thermal Resistance.Junction- to-Case		R_{thJC}	2.5	
Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{stg}	-55 to 150	

Notes:

1. $R_{\theta JA}$ is determined with the device mounted on a 1 in^2 pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR-4 material. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.
2. E_{AS} of 73 mJ is based on Starting T_J = 25 °C, L = 3 mH, I_{AS} = 7 A, V_{DD} = 150 V, V_{GS} = 10 V.
3. Pulsed Id limited by junction temperature, td<=100 μS, please refer to SOA curve for more details.

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■ Electrical Characteristics (T_J = 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	150			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 120 V, V_{GS} = 0 V			1	μA
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		3	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 4.4 A			56	mΩ
		V_{GS} = 6 V, I_D =3.8 A			71	
		V_{GS} = 4.5 V, I_D = 3.7 A			75	
		V_{GS} = 10 V, I_D = 4.4 A, T_J = 125 °C			110	
Forward Transconductance	g_{FS}	V_{DS} = 5 V, I_D = 4.4 A		21		S
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 75 V, f = 1 MHz		952	1335	pF
Output Capacitance	C_{oss}			74	105	
Reverse Transfer Capacitance	C_{rss}			3	5	
Gate Resistance	R_g		0.1	0.6	1.8	Ω
Turn-On DelayTime	$t_{d(on)}$	V_{DD} = 75 V, I_D = 4.4 A, V_{GS} = 10V, R_{GEN} = 6 Ω		6.8	14	ns
Turn-On Rise Time	t_r			1.4	10	
Turn-Off DelayTime	$t_{d(off)}$			19	34	
Turn-Off Fall Time	t_f			2.9	10	
Total Gate Charge	Q_g	V_{GS} = 0 V to 10 V; V_{DD} = 75 V, I_D = 4.4 A		15	21	nC
Total Gate Charge	Q_g	V_{GS} = 0 V to 4.5 V; V_{DD} = 75 V, I_D = 4.4 A		7.6	11	
Gate Source Charge	Q_{gs}	V_{DD} = 75 V, I_D = 4.4 A		2.1		
Gate Drain Charge	Q_{gd}	V_{DD} = 75 V, I_D = 4.4 A		2.3		
Body Diode Reverse Recovery Time	t_{rr}	I_F = 4.4 A, dI/dt = 100 A/μs		53	85	ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = 4.4 A, dI/dt = 100 A/μs		51	82	nC
Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 1.9 A (Note 4)			1.2	V
		V_{GS} = 0 V, I_S = 4.4 A (Note 4)			1.3	

Notes: 4. Pulse Test: Pulse Width < 300 μs, Duty cycle < 2.0%.

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■ Typical Characterisitics TJ = 25℃ unless othewise specified

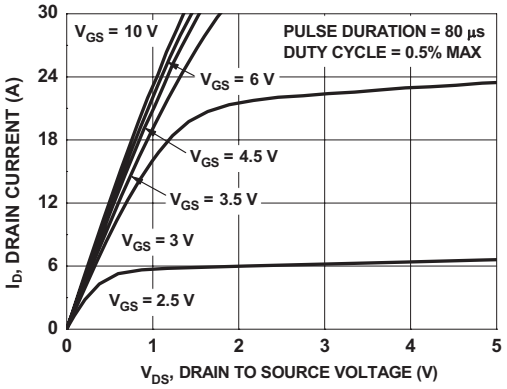

Figure 1. On Region Characteristics

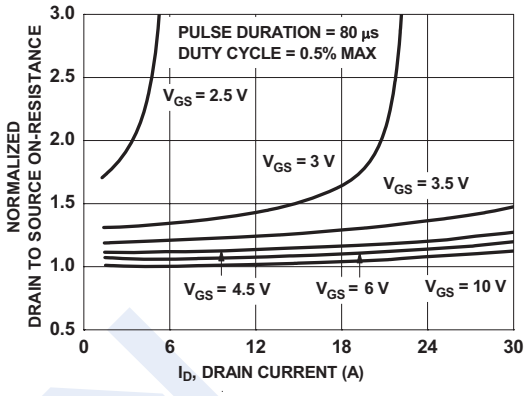

Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

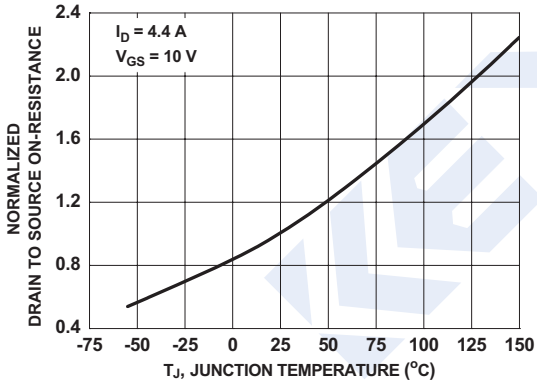

Figure 3. Normalized On Resistance vs Junction Temperature

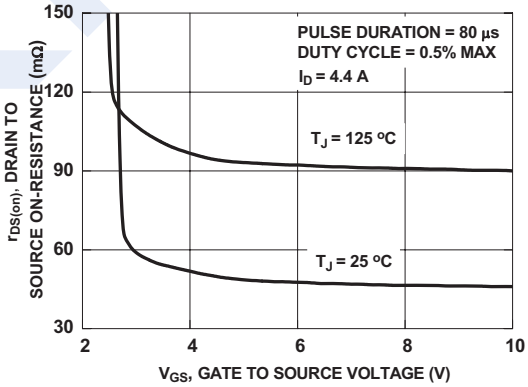

Figure 4. On-Resistance vs Gate to Source Voltage

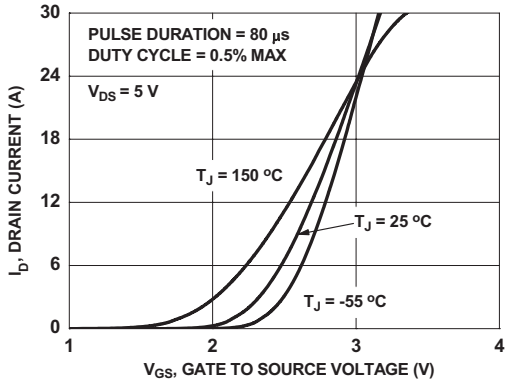

Figure 5. Transfer Characteristics

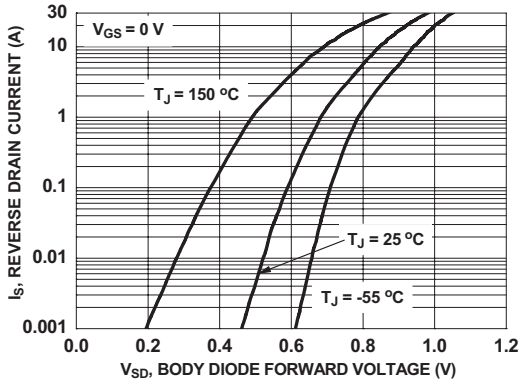

Figure 6. Source to Drain Diode Forward Voltage vs Source Current

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■ Typical Characterisitics TJ = 25℃ unless othewise specified

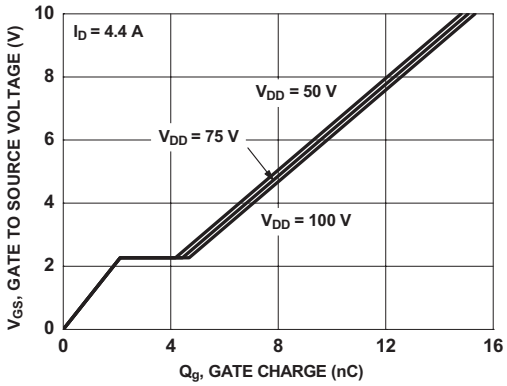

Figure 7. Gate Charge Characteristics

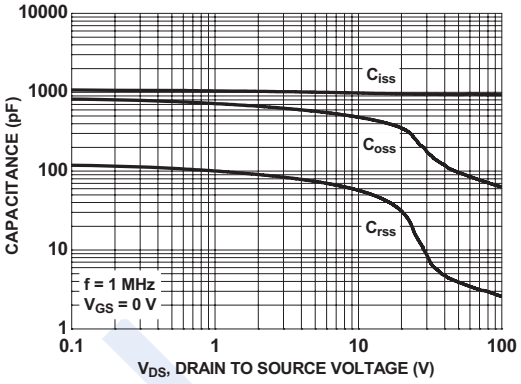

Figure 8. Capacitance vs Drain to Source Voltage

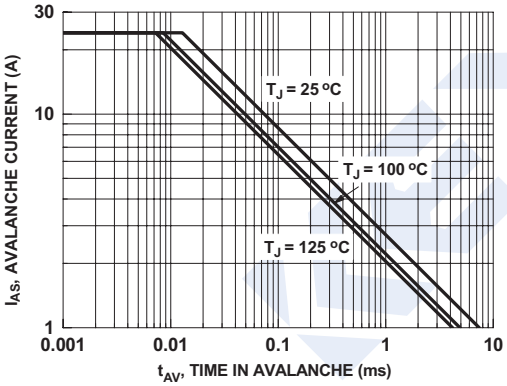

Figure 9. Unclamped Inductive Switching Capability

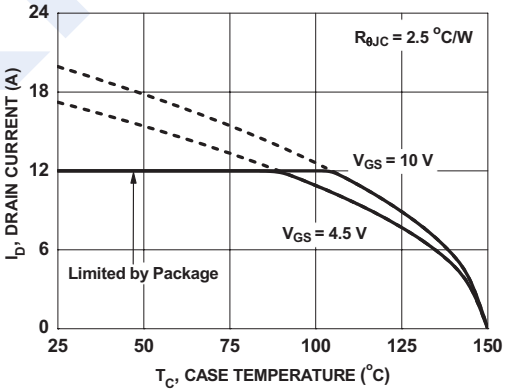

Figure 10. Maximum Continuous Drain Current vs Case Temperature

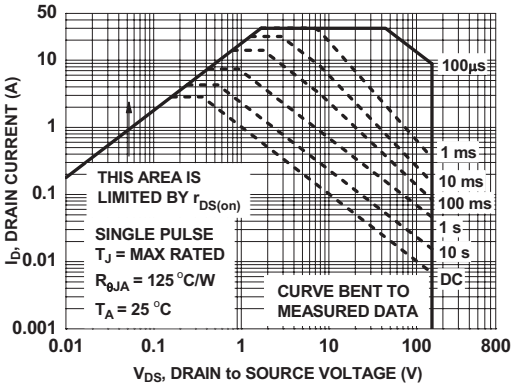

Figure 11. Forward Bias Safe Operating Area

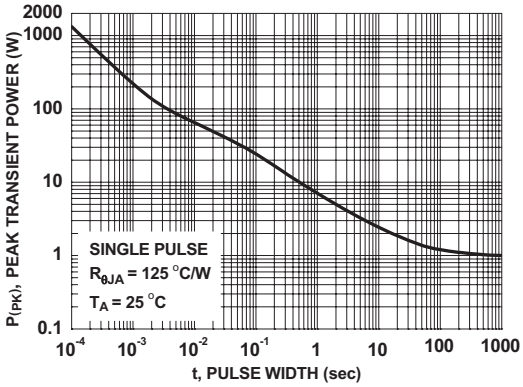

Figure 12. Single Pulse Maximum Power Dissipation

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■ Typical Characterisitics TJ = 25℃ unless othewise specified

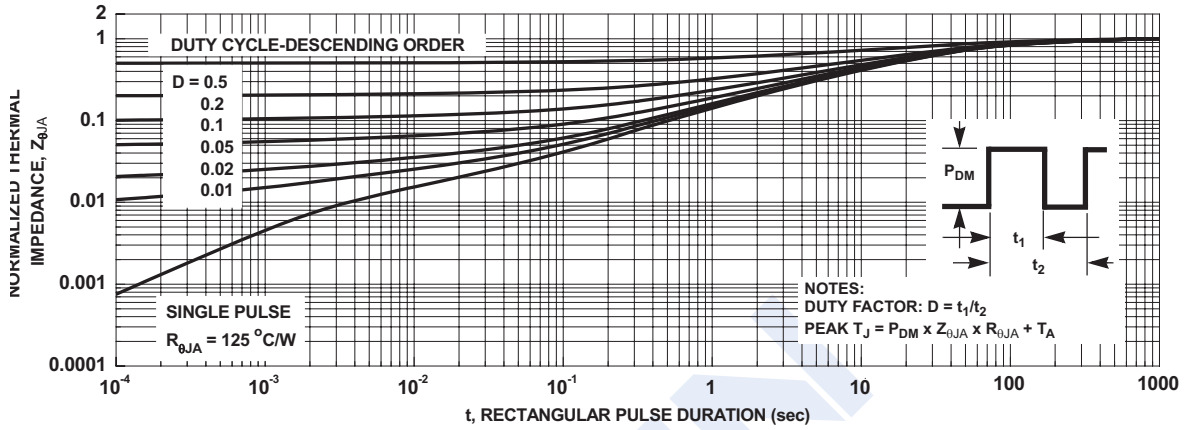

Figure 13. Junction-to-Ambient Transient Thermal Response Curve

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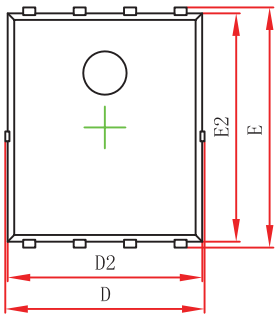
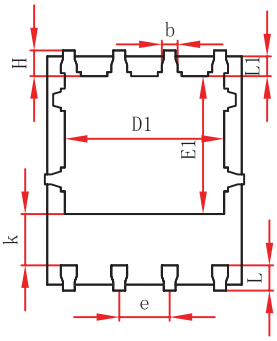
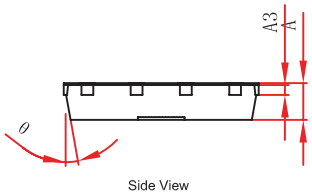
■ DFN5x6-8(PDFNWB5x6-8L) Package Outline Dimensions



Top View



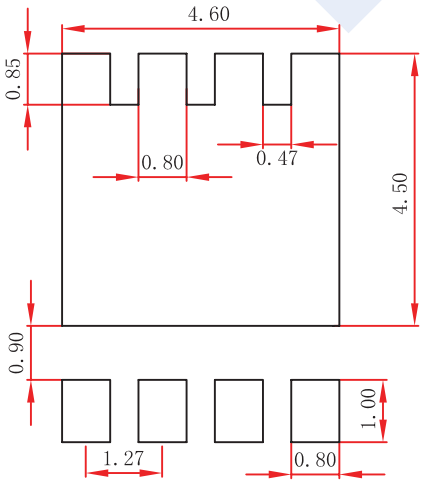
Bottom View



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°

■ DFN5x6-8(PDFNWB5x6-8L) Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.05mm.
3.The pad layout is for reference purposes only.