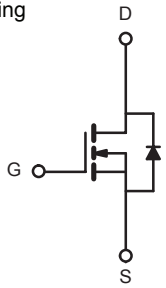
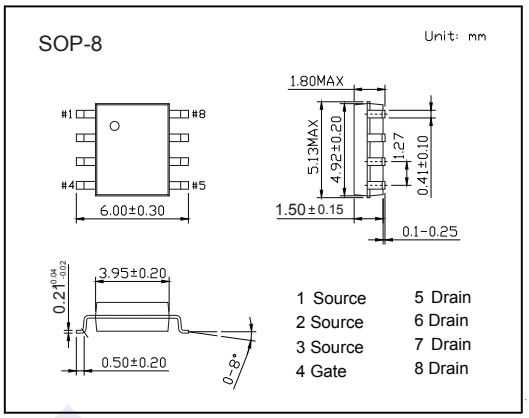
N-Channel MOSFET

2KK5141

■ Features

- V_{DS} = 100 V
- I_D (at V_{GS} = 10 V) = 12 A
- $R_{DS(ON)}$ (at V_{GS} = 10 V) < 15 mΩ
- $R_{DS(ON)}$ (at V_{GS} = 4.5 V) < 22.5 mΩ
- Optimized for high-speed smooth switching
- Excellent Gate Charge × R_{DSON} (FOM)
- Very low on-resistance





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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current	T_A=25℃	I_D	12	A
	T_A=70℃		9.5	
Pulsed Drain Current [C]		I_{DM}	48	
Avalanche Current [C]		I_{AS}	12.6	
Avalanche Energy, L = 0.1 mH [C]		E_{AS}	8	mJ
Power Dissipation [B]	T_A=25℃	P_D	3.1	W
	T_A=70℃		2.0	
Thermal Resistance, Junction- to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	40	℃/W
Thermal Resistance, Junction- to-Ambient [A D]	Steady-State		75	
Thermal Resistance, Junction- to-Lead	Steady-State	$R_{\theta JL}$	24	
Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{stg}	-55 to 150	

Notes:

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using ≤10s junction-to-case thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and duty cycles to keep initial T_J=25°C

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and case to ambient.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 250 μA, V_{GS} = 0V	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100 V, V_{GS} = 0 V			1	μA
		V_{DS} = 100 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	1.4	2	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 12 A		12.5	15	mΩ
		V_{GS} = 4.5 V, I_D = 10 A		15.6	22.5	
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 50 V, f = 1 MHz		1441		pF
Output Capacitance	C_{oss}			391		
Reverse Transfer Capacitance	C_{rss}			15		
Switching Parameters						
Total Gate Charge	Q_g	V_{GS} = 10V, V_{DS} = 50 V, I_D = 10 A		22		nC
Gate Source Charge	Q_{gs}			5		
Gate Drain Charge	Q_{gd}			4		
Turn-On DelayTime	$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 50 V, ID = 10 A , R_{GEN} = 10 Ω		7		ns
Turn-On Rise Time	t_r			26		
Turn-Off DelayTime	$t_{d(off)}$			30		
Turn-Off Fall Time	t_f			12		
Drain-Source Diode Characteristics						
Body Diode Reverse Recovery Time	t_{rr}	I_F = 10 A, dI/dt = 100 A/μs		38		ns
Body Diode Reverse Recovery Charge	Q_{rr}			39		nC
Maximum Body-Diode Continuous Current	I_S				12	A
Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 10 A		0.89		V

■ Marking

Marking	K5141 KC***

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■ Electrical Characteristics Diagrams

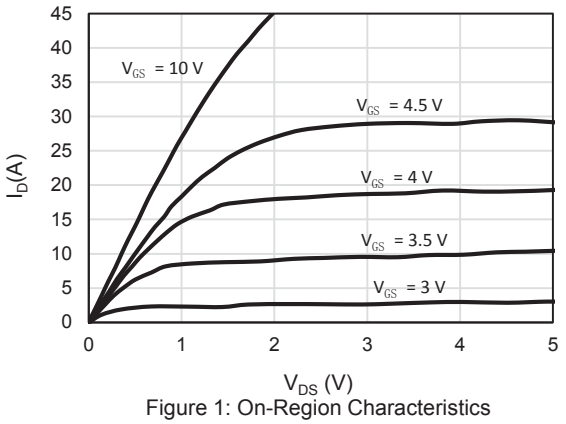

Figure 1: On-Region Characteristics

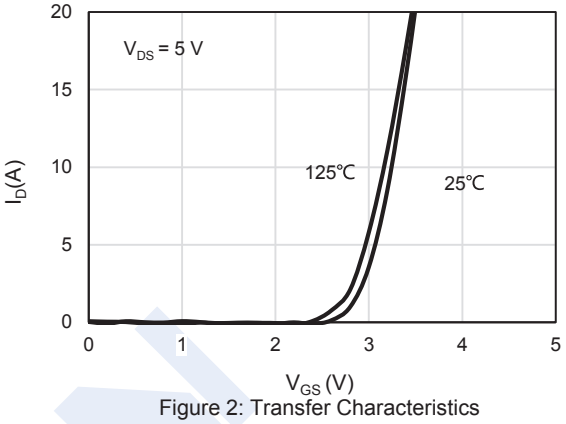

Figure 2: Transfer Characteristics

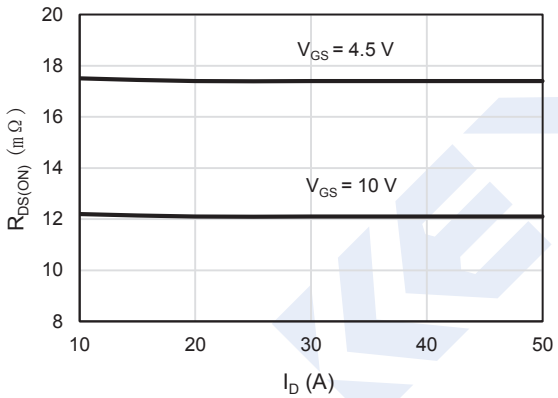

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

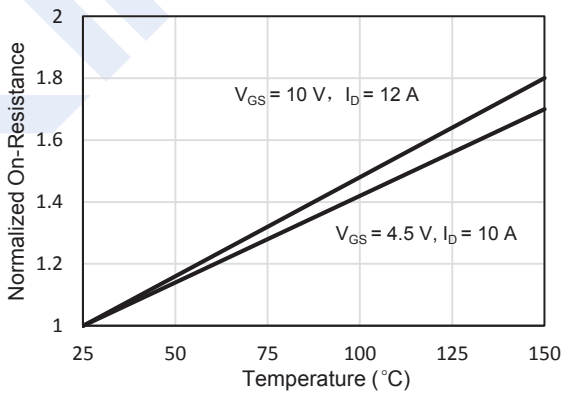

Figure 4: On-Resistance vs. Junction Temperature

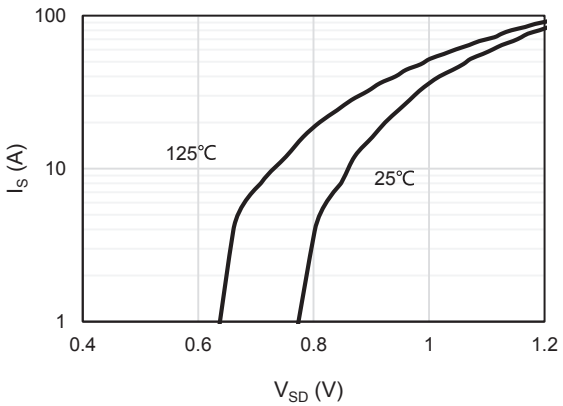

Figure 5: Body-Diode Characteristics

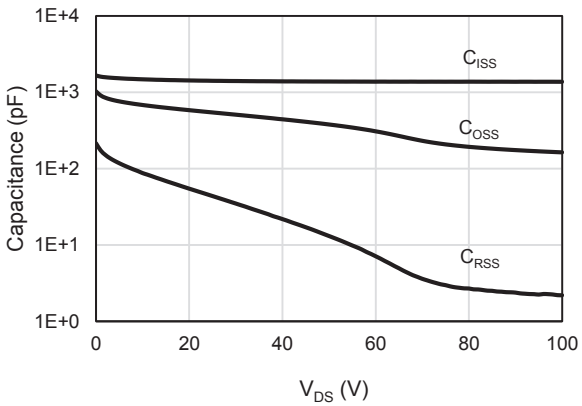

Figure 6: Capacitance Characteristics

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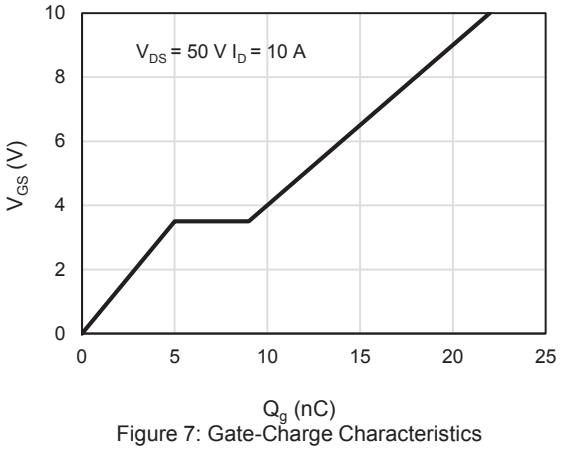

Figure 7: Gate-Charge Characteristics

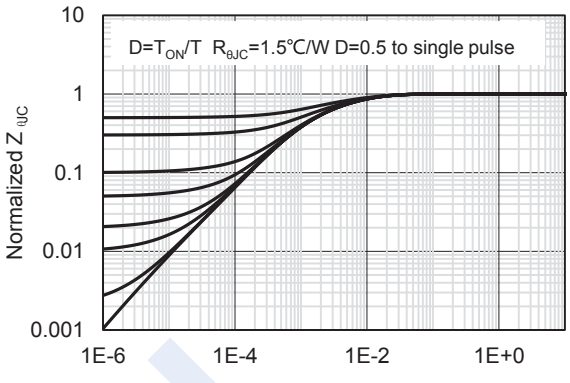

Figure 8: Normalized Maximum Transient

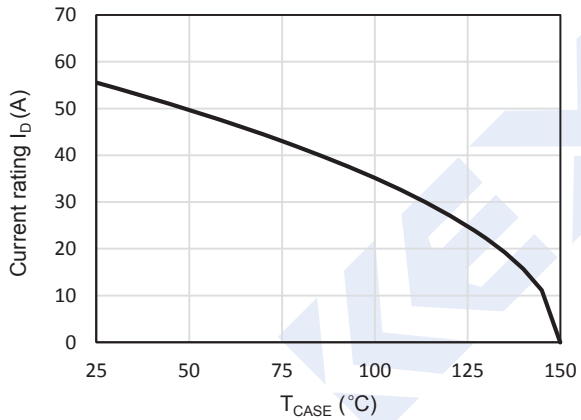

Figure 9: Current De-rating

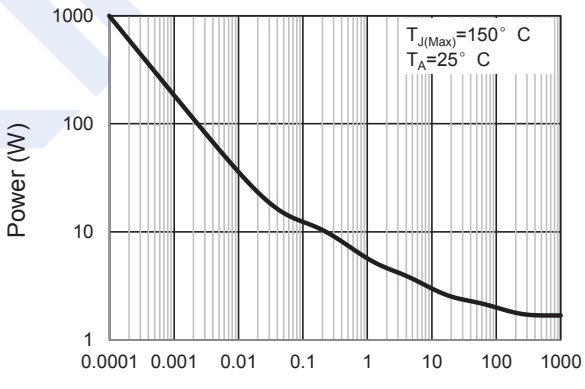

Figure 10: Single Pulse Power Rating Junction-to-Ambient

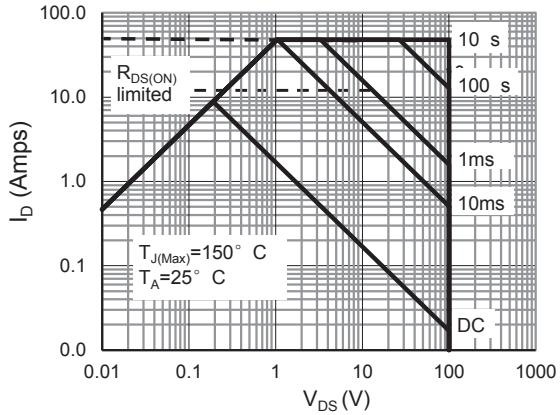

Figure 12: Maximum Forward Biased Safe Operating Area

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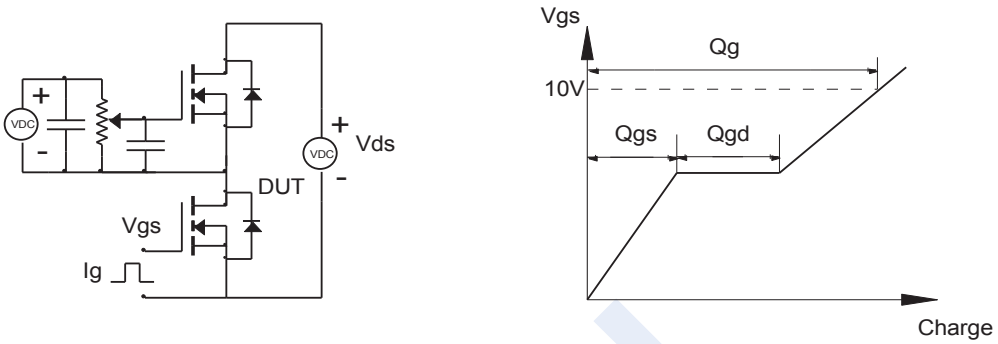
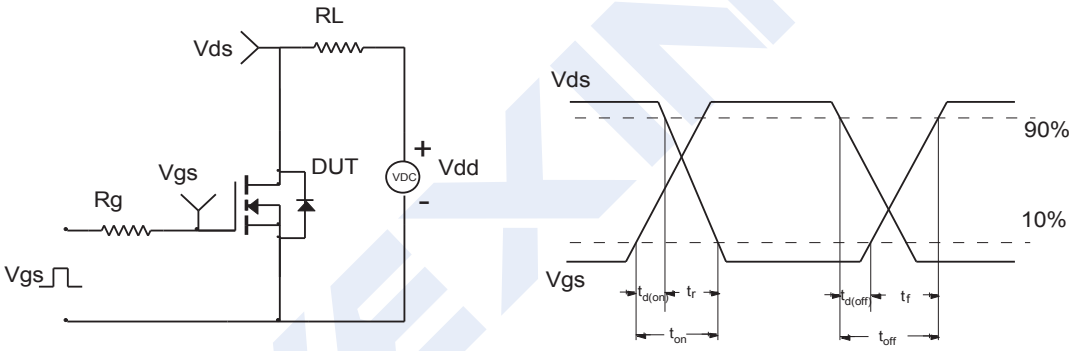
■ Test Circuit and Waveform

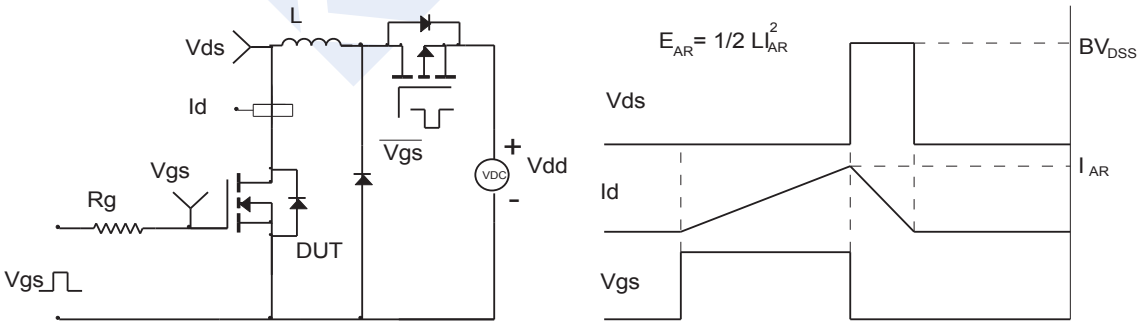
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms