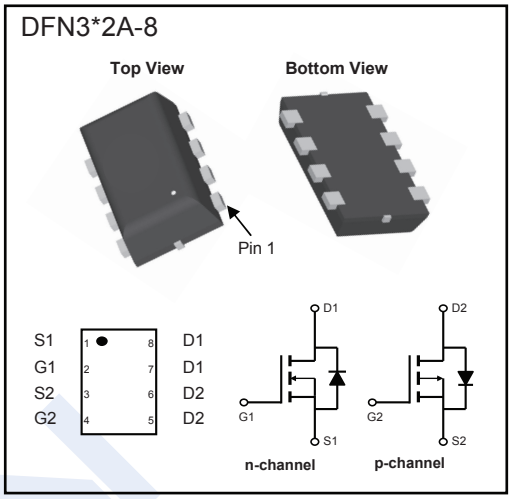
Complementary MOSFET

KON4605



■ Features

- N-Channel: V_{DS}=30V I_D=4.3A
  $R_{DS(ON)}$ < 50mΩ (V_{GS} = 10V)
  $R_{DS(ON)}$ < 70mΩ (V_{GS} = 4.5V)
- P-Channel: V_{DS}=-30V I_D=-3.4A
  $R_{DS(ON)}$ < 110mΩ (V_{GS} =-10V)
  $R_{DS(ON)}$ < 180mΩ (V_{GS} =-4.5V)

■ Absolute Maximum Ratings T_A = 25℃ unless otherwise noted

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	
Continuous Drain Current	T_A = 25℃	I_D	4.3	-3.4	A
	T_A = 70℃		3.4	-2.7	
Pulsed Drain Current [C]		I_{DM}	18	-13	
Power Dissipation [B]	T_A = 25℃	P_D	1.9	1.9	W
	T_A = 70℃		1.2	1.2	
Thermal Resistance.Junction- to-Ambient [A]	t ≤ 10s	R_{thJA}	65		℃/W
Thermal Resistance.Junction- to-Ambient [A D]	Steady-State		100		
Thermal Resistance.Junction- to-Lead	Steady-State	R_{thJC}	50		
Junction Temperature		T_J	150		℃
Storage Temperature Range		T_{stg}	-55 to 150		

Complementary MOSFET

KON4605

■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Type	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	N-CH	30			V
		I_D=-250μA, V_{GS}=0V	P-CH	-30			
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	N-CH			1	μA
		V_{DS}=30V, V_{GS}=0V, T_J = 55℃				5	
		V_{DS}=-30V, V_{GS}=0V	P-CH			-1	
		V_{DS}=-30V, V_{GS}=0V, T_J = 55℃				-5	
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	N-CH			±100	nA
		V_{DS}=0V, V_{GS}=±20V	P-CH			±100	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} , I_D=250μA	N-CH	1.5		2.5	V
		V_{DS}=V_{GS}, I_D=-250μA	P-CH	-1.4		-2.4	
On state drain current	$I_{D(ON)}$	V_{GS}=10V, V_{DS}=5V	N-CH	18			A
		V_{GS}=-10V, V_{DS}=-5V	P-CH	-13			A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=4.3A	N-CH			50	mΩ
		V_{GS}=10V, I_D=4.3A, T_J=125℃				80	
		V_{GS}=4.5V, I_D=2.5A				70	
		V_{GS}=-10V, I_D=-4.3A	P-CH			110	
		V_{GS}=-10V, I_D=-4.3A T_J=125℃				140	
		V_{GS}=-4.5V, I_D=-2A				180	
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=4.5A	N-CH		11		S
		V_{DS}=-5V, I_D=-3.4A	P-CH		6		
Input Capacitance	C_{iss}	N-Channel: V_{GS}=0V, V_{DS}=15V, f=1MHz P-Channel: V_{GS}=0V, V_{DS}=-15V, f=1MHz	N-CH		170	210	pF
			P-CH		197	240	
Output Capacitance	C_{oss}		N-CH		35		
			P-CH		42		
Reverse Transfer Capacitance	C_{rss}		N-CH		23		
			P-CH		26	37	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz	N-CH	1.7		5.3	Ω
			P-CH	3.5		11	
Total Gate Charge	Q_g(10V)	N-Channel: V_{GS}=10V, V_{DS}=15V, I_D=4.3A P-Channel: V_{GS}=-10V, V_{DS}=-15V, I_D=-3.4A	N-CH		4.05	5	nC
			P-CH		4.3	5.2	
	Q_g(4.5V)		N-CH		2	3	
			P-CH		2.2	3	
Gate Source Charge	Q_{gs}		N-CH		0.55		
			P-CH		0.7		
Gate Drain Charge	Q_{gd}		N-CH		1		
			P-CH		1.1		

Complementary MOSFET

KON4605

■ Electrical Characteristics Ta = 25℃ (Continue)

Parameter	Symbol	Test Conditions	Type	Min	Typ	Max	Unit
Turn-On DelayTime	$t_{d(on)}$	N-Channel: V_{GS}=10V, V_{DS}=15V,R_L=3.4Ω, R_{GEN}=3Ω P-Channel: V_{GS}=-10V, V_{DS}=-15V,R_L=4.4Ω, R_{GEN}=3Ω	N-CH		4.5		ns
			P-CH		7.5		
Turn-On Rise Time	t_r		N-CH		1.5		
			P-CH		4.1		
Turn-Off DelayTime	$t_{d(off)}$		N-CH		18.5		
			P-CH		11.8		
Turn-Off Fall Time	t_f		N-CH		15.5		
			P-CH		3.8		
Body Diode Reverse Recovery Time	t_{rr}	I_F=4.3A, dI/dt=100A/μs	N-CH		7.5	10	
		I_F=-3.4A, dI/dt=100A/μs	P-CH		11.3	14	
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=4.3A, dI/dt=100A/μs	N-CH		2.5		nC
		I_F=-3.4A, dI/dt=100A/μs	P-CH		4.4		
Maximum Body-Diode Continuous Current	I_S		N-CH			2.5	A
			P-CH			-2.5	
Diode Forward Voltage	V_{SD}	I_S=1A,V_{GS}=0V	N-CH			1	V
		I_S=-1A,V_{GS}=0V	P-CH			-1	

A. The value of R_{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-ambient 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 initialT_J=25°C.

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

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

F. These curves are based on the junction-to-ambient thermal impedence which is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C. The SOA curve provides a single pulse rating.

Complementary MOSFET

KON4605

■ N-Channel: Typical Characterisitics and Thermal Characterisitics

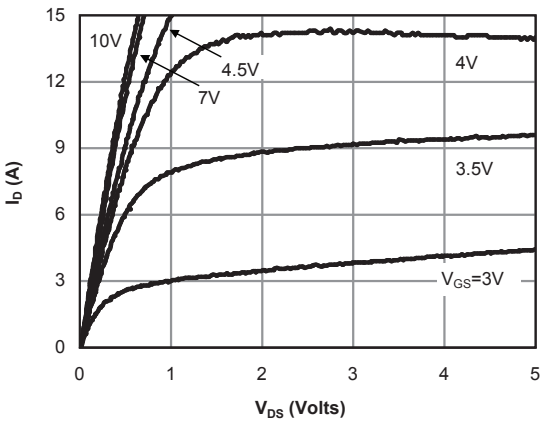


Fig 1: On-Region Characteristics (Note E)

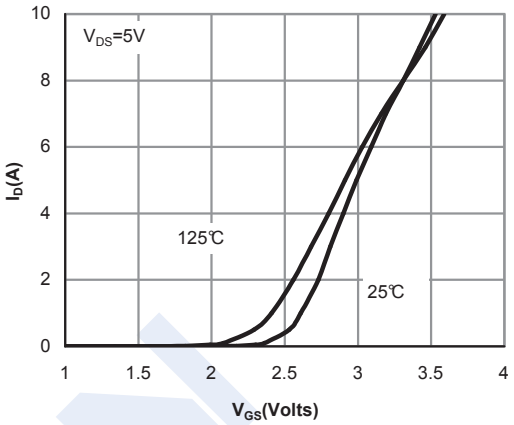


Figure 2: Transfer Characteristics (Note E)

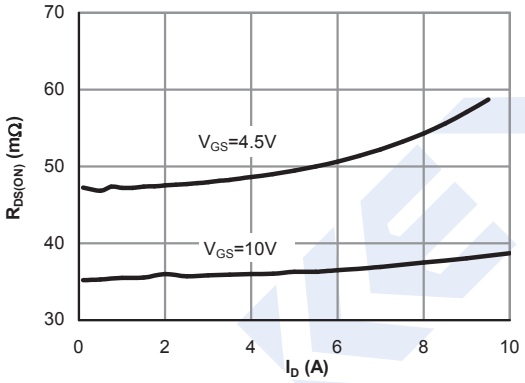


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

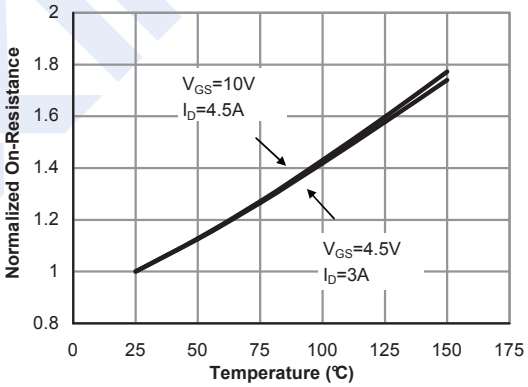


Figure 4: On-Resistance vs. Junction Temperature (Note E)

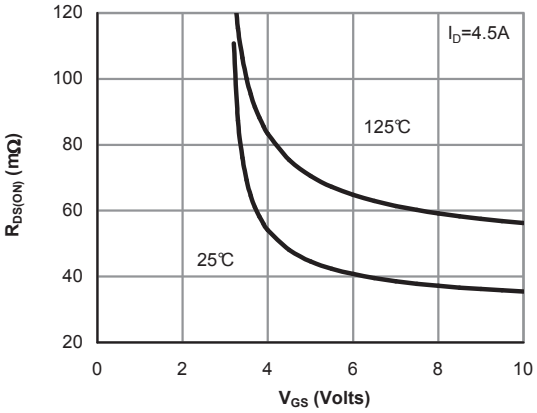


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

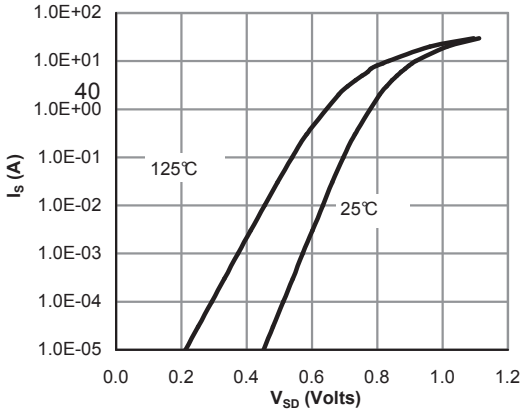


Figure 6: Body-Diode Characteristics (Note E)

Complementary MOSFET

KON4605

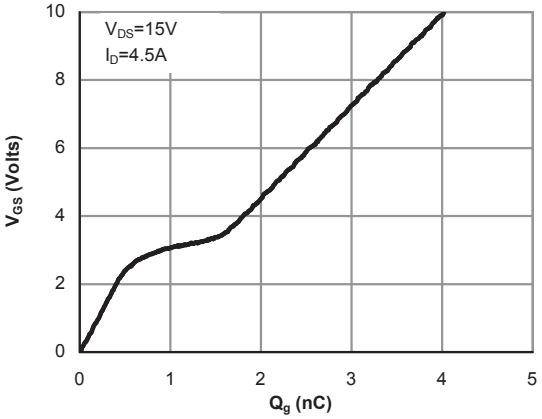


Figure 7: Gate-Charge Characteristics

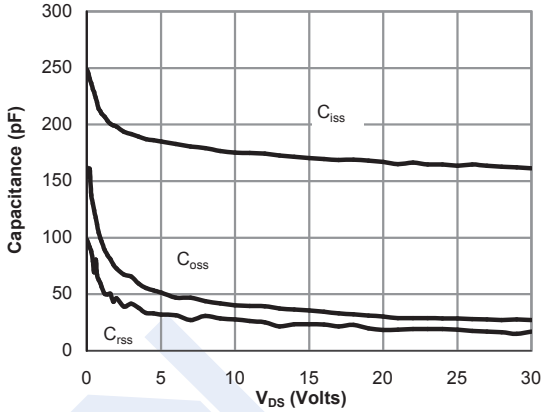


Figure 8: Capacitance Characteristics

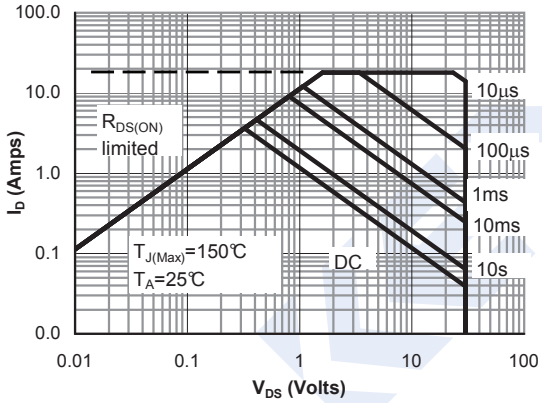


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

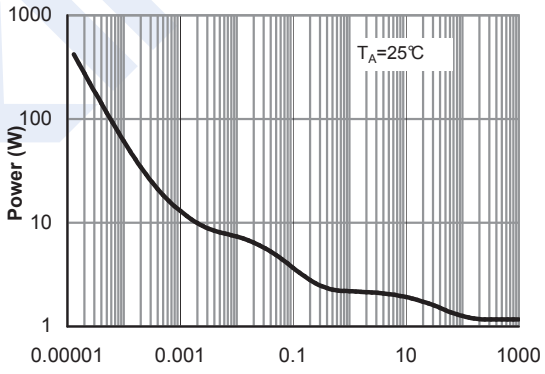


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

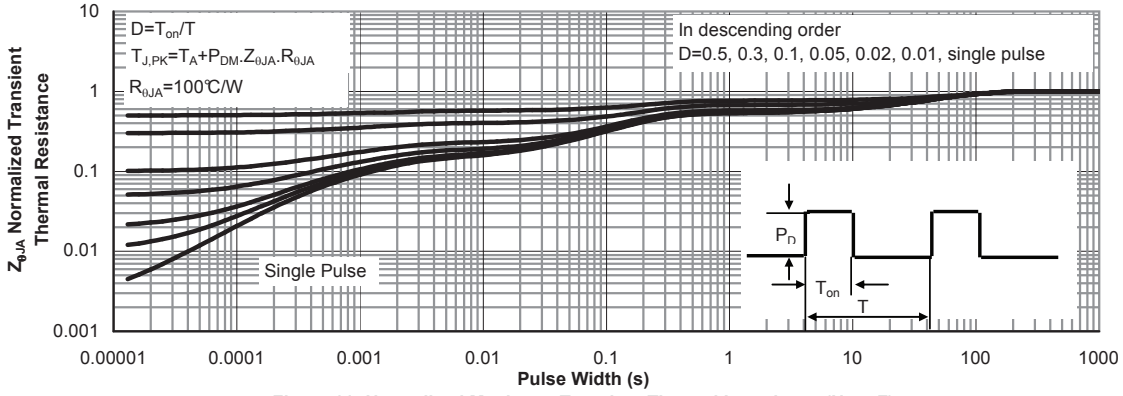
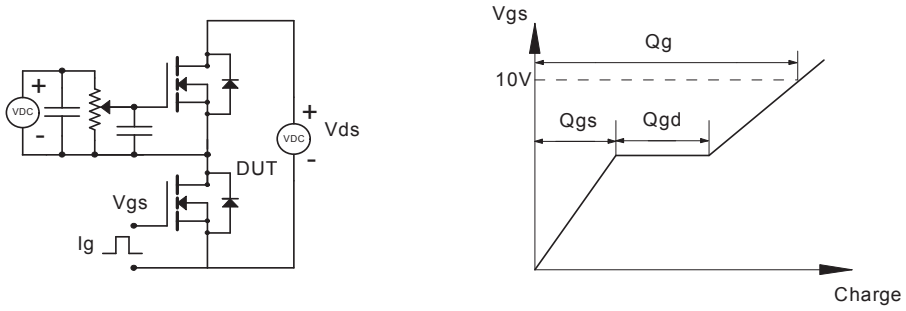


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

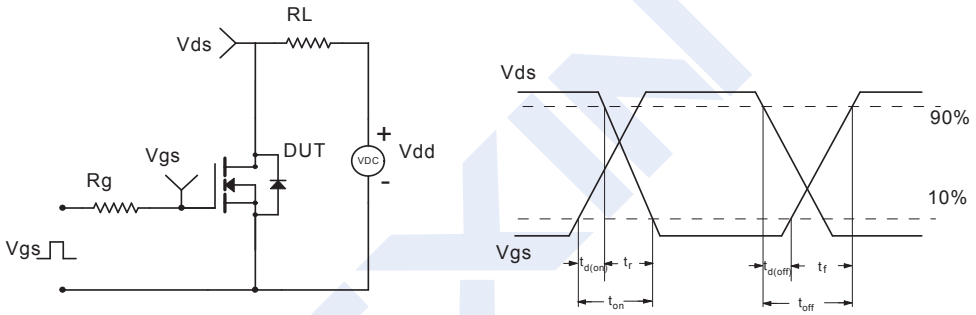
Complementary MOSFET

KON4605

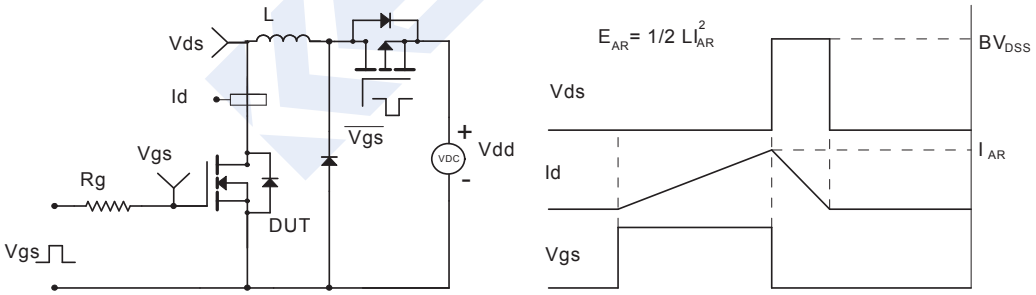
Gate Charge Test Circuit & Waveform



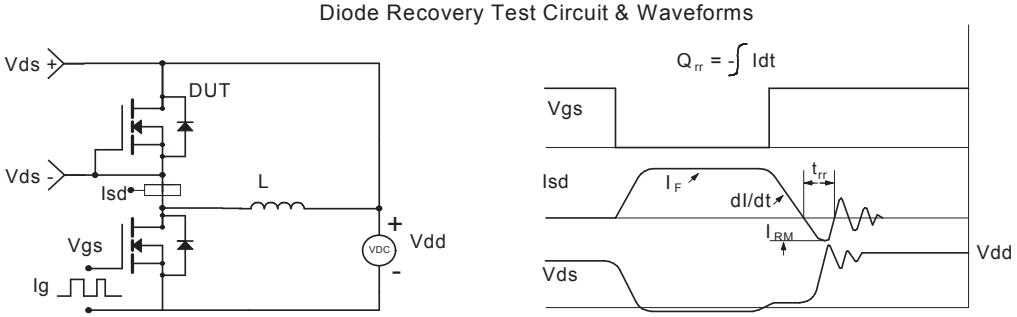
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Complementary MOSFET

KON4605

■ P-Channel: Typical Characterisitics and Thermal Characterisitics

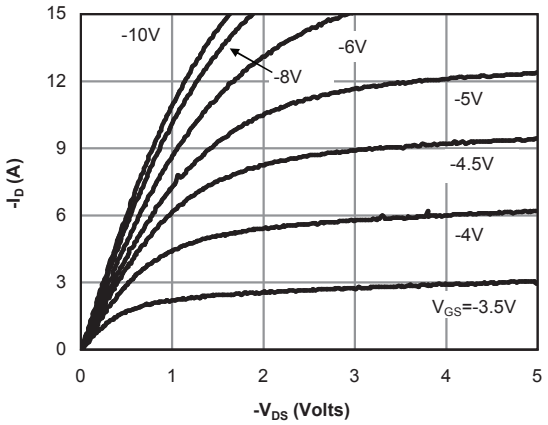


Fig 1: On-Region Characteristics (Note E)

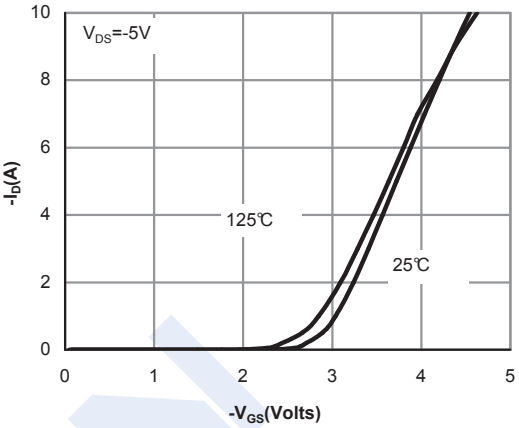


Figure 2: Transfer Characteristics (Note E)

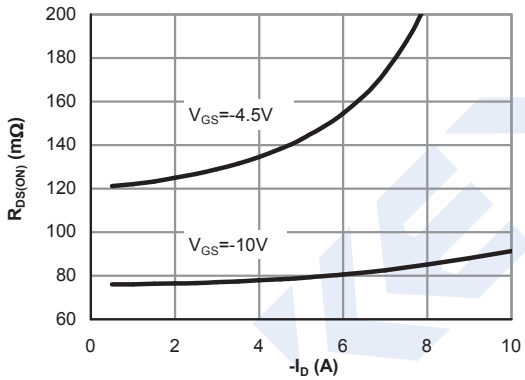


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

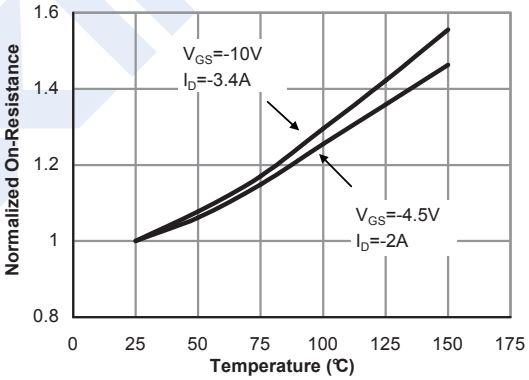


Figure 4: On-Resistance vs. Junction Temperature (Note E)

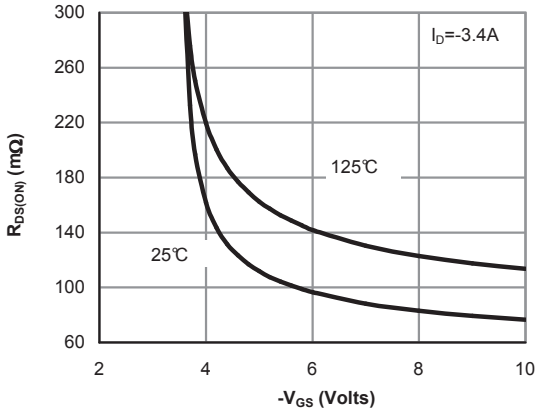


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

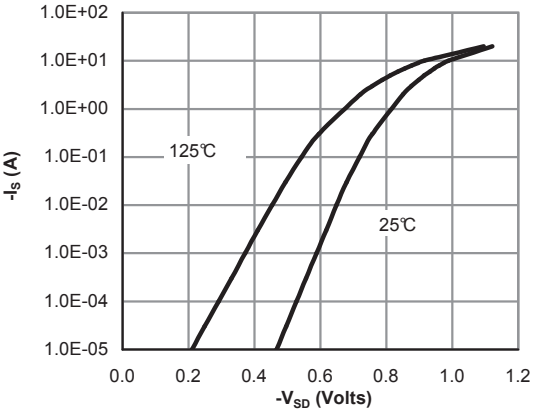


Figure 6: Body-Diode Characteristics (Note E)

Complementary MOSFET

KON4605

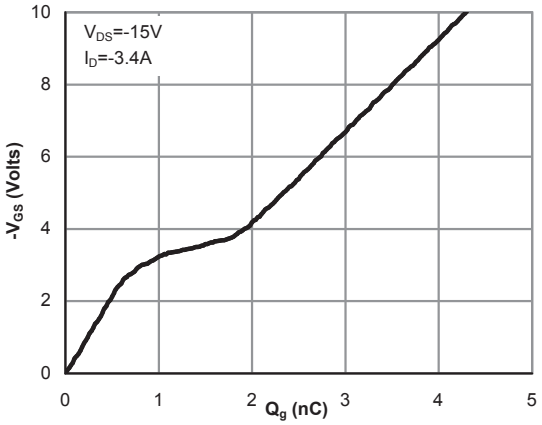


Figure 7: Gate-Charge Characteristics

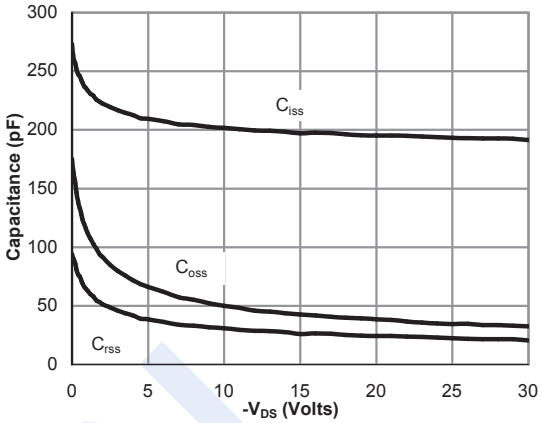


Figure 8: Capacitance Characteristics

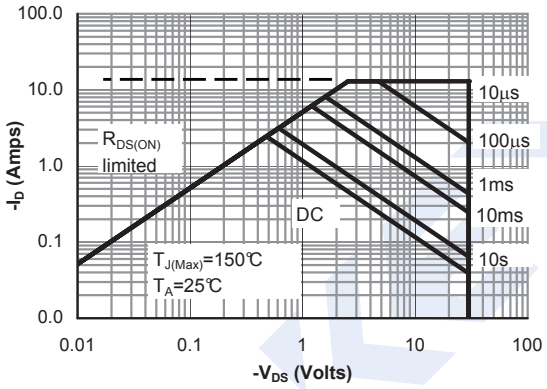


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

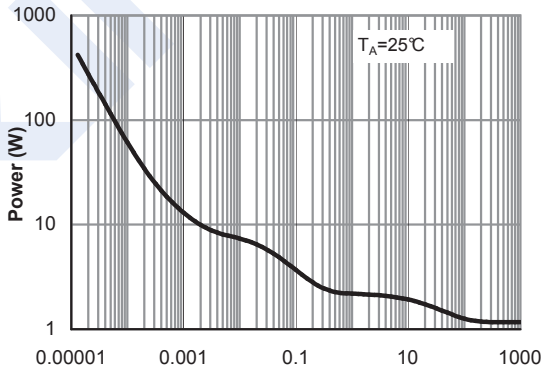


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

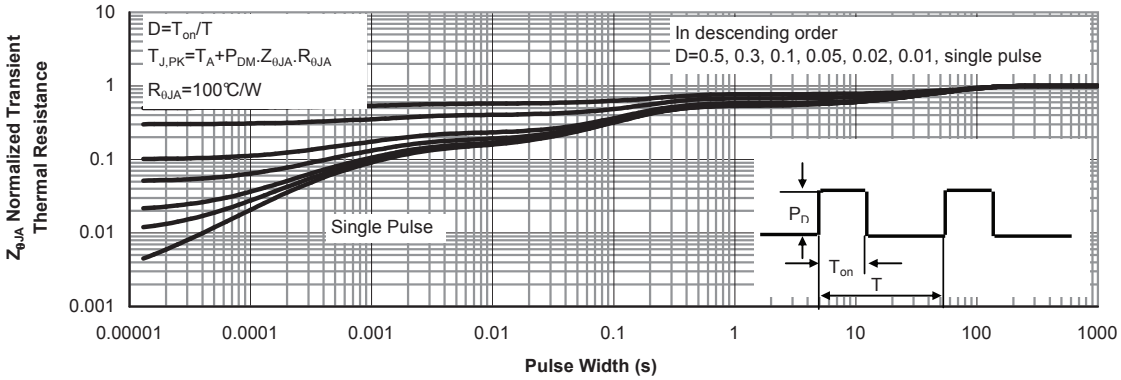
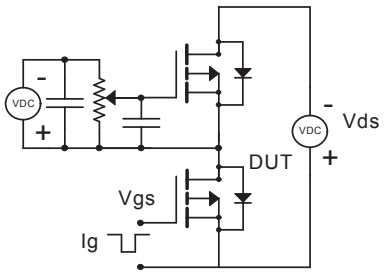


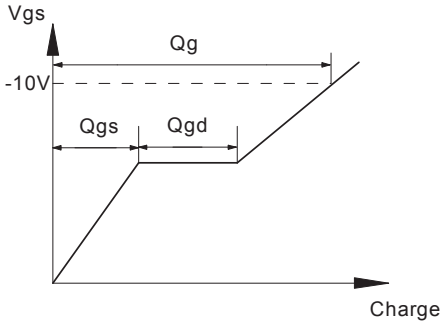
Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Complementary MOSFET

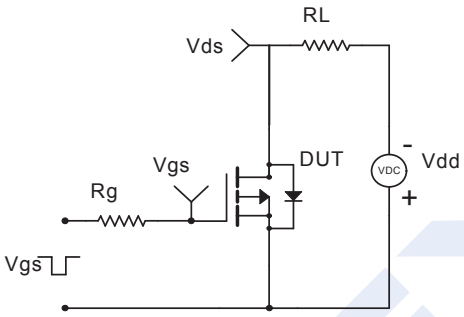
KON4605

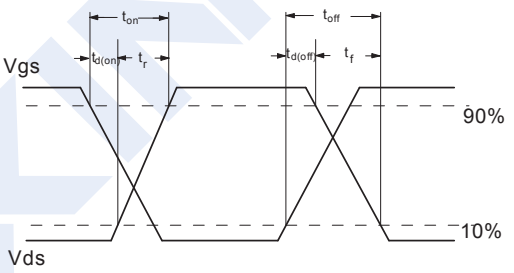
Gate Charge Test Circuit & Waveform



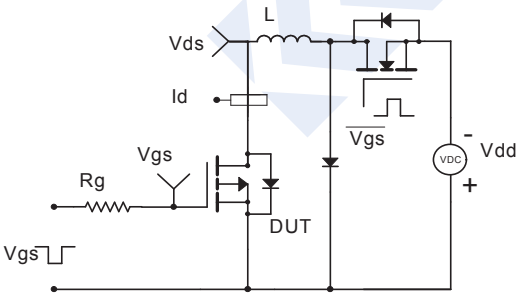


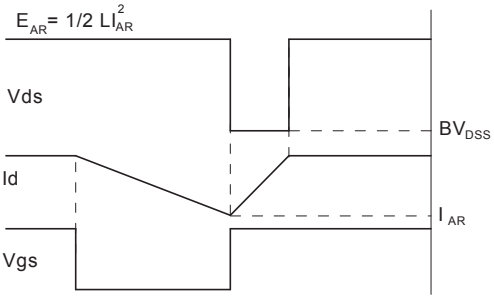
Resistive Switching Test Circuit & Waveforms



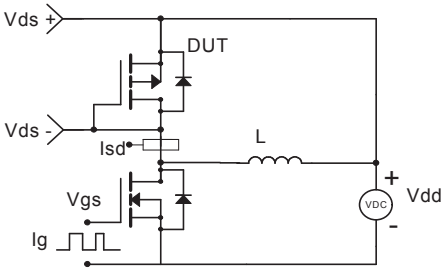


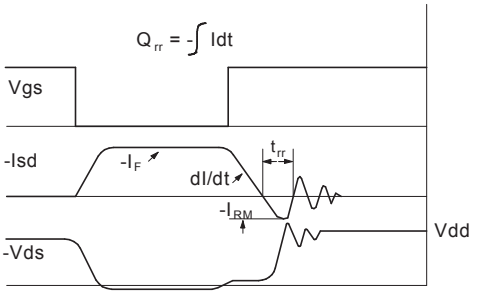
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms

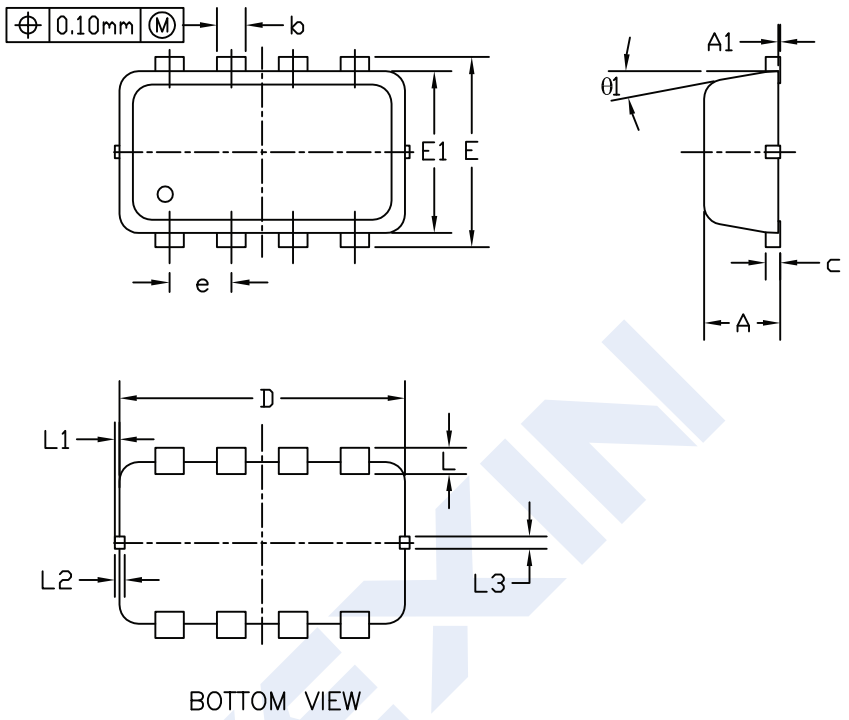




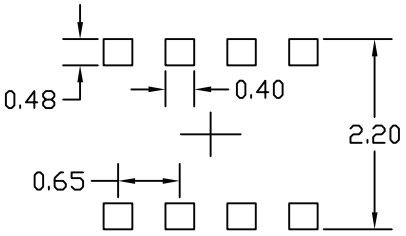
Complementary MOSFET

KON4605

■ DFN3*2A-8 Package Outline Dimensions



RECOMMENDED LAND PATTERN



UNIT: mm

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.80	0.90	0.028	0.031	0.035
A1	0.00	—	0.05	0.000	—	0.002
b	0.24	0.30	0.35	0.009	0.012	0.014
c	0.08	0.15	0.25	0.003	0.006	0.010
D	3.00 BSC			0.118 BSC		
E	2.00 BSC			0.079 BSC		
E1	1.70 BSC			0.067 BSC		
e	0.65 BSC			0.026 BSC		
L	0.20	0.28	0.40	0.008	0.011	0.016
L1	0	—	0.10	0	—	0.004
L2	0.055	0.105	0.155	0.002	0.004	0.006
L3	0.08	0.130	0.180	0.003	0.005	0.007
θ1	0°	10°	12°	0°	10°	12°

NOTE
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
   MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MIL EACH.
2. CONTROLLING DIMENSION IS MILLIMETER.
   CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
3. TIE BARS ARE CONNECTED TO DRAIN LEADS.