

1. Features

- Advanced SGT technology
- $R_{DS(ON)}=1.0m\Omega(typ.)@V_{GS}=10V$
- Fast switching capability
- Very low on-resistance $R_{DS(on)}$

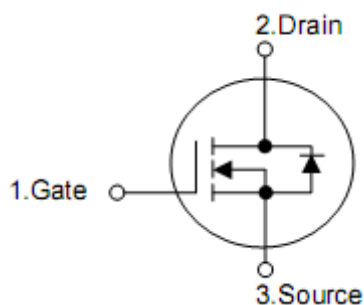
2. Applications

- Synchronous Rectification
- Power management
- DC-DC Converters

3. Pin configuration



DFN5*6



Pin	Function
4	Gate
5,6,7,8	Drain
1,2,3	Source

4. Ordering Information

Part Number	Package	Brand
KCY1704B	DFN5*6	KIA

5. Absolute maximum ratings

(T_c= 25 °C, unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Drain-to-Source Voltage ¹⁾		V _{DSS}	40	V
Gate-to-Source Voltage		V _{GSS}	±20	V
Continuous Drain Current	T _c =25°C	I _D	260	A
	T _c =100°C	I _D	167	A
Pulsed Drain Current at V _{GS} =10V		I _{DM}	780	A
Single Pulse Avalanche Energy L=1mH		EAS	750	mJ
Power Dissipation		P _D	147	W
Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds		T _L T _{PAK}	300 260	°C
Operating and Storage Temperature Range		T _J &T _{STG}	-55 to 150	°C

Caution: Stresses greater than those in the “Absolute Maximum Ratings” may cause permanent damage to the device.

6. Thermal characteristics

Parameter	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Case	R _{θJC}	0.85	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	50	°C/W

7. Electrical characteristics

(T_C=25°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	40	-	-	V
Drain-to-Source Leakage Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	-	1	uA
		V _{DS} =32V, V _{GS} =0V T _J =125°C	-	-	100	uA
Gate-to-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Drain-to-Source ON Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =50A	-	1.0	1.25	mΩ
		V _{GS} =4.5V, I _D =50A	-	1.4	1.7	mΩ
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250uA	1.0	-	2.5	V
Gate Series Resistance	R _G	f=1.0MHz	-	2.75	-	Ω
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1.0MHZ	-	6100	-	pF
Reverse Transfer Capacitance	C _{oss}		-	2650	-	
Output Capacitance	C _{rss}		-	175	-	
Total Gate Charge	Q _g	V _{DD} =20V, I _D =50A, V _{GS} =0 to 10V	-	81	-	nC
Gate-to-Source Charge	Q _{gs}		-	15	-	
Gate-to-Drain (Miller) Charge	Q _{gd}		-	12	-	
Turn-on Delay Time	t _{d(ON)}	V _{DD} =20V, I _D =50A, R _G =2.5Ω, V _{GS} =10V	-	14	-	nS
Rise Time	t _{rise}		-	35	-	
Turn-Off Delay Time	t _{d(OFF)}		-	80	-	
Fall Time	t _{fall}		-	28	-	
Continuous Source Current	I _{SD}	Integral PN-diode in MOSFET	-	-	260	A
Pulsed Source Current	I _{SM}		-	-	780	A
Forward Voltage	V _{SD}	I _S =50A, V _{GS} =0V	-	-	1.2	V
Reverse recovery time	t _{rr}	I _F =50A, diF/dt=100A/μs,	-	102	-	ns
Reverse recovery charge	Q _{rr}		-	63	-	nC

Note:

- 1) T_J=+25°C to +150.
- 2) Repetitive rating; pulse width limited by maximum junction temperature.
- 3) Pulse width≤380us; duty cycle≤2%.

8. Typical Characteristics

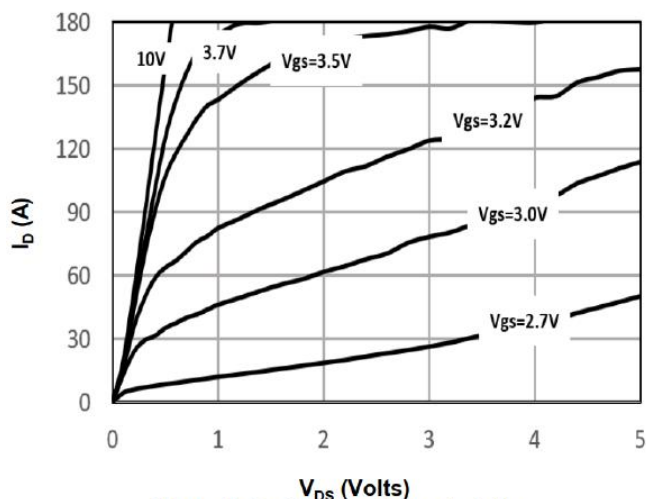


Figure 1: On-Region Characteristics

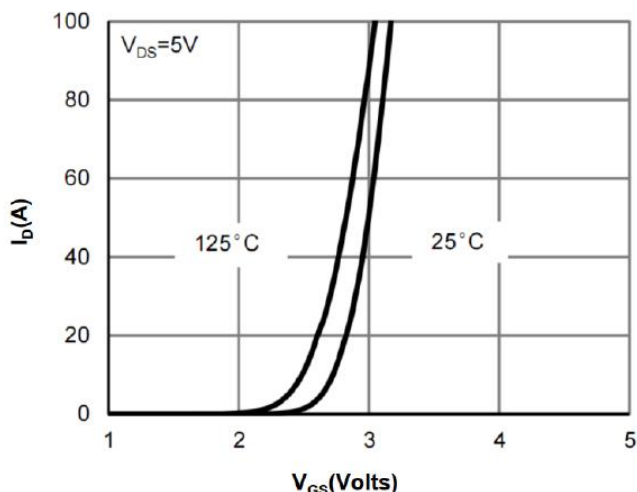


Figure 2: Transfer Characteristics

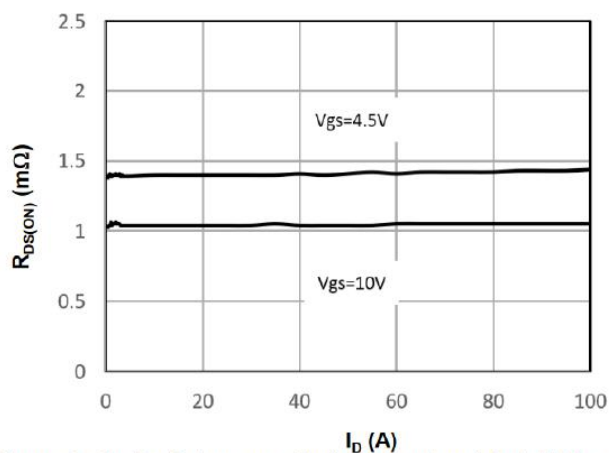


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

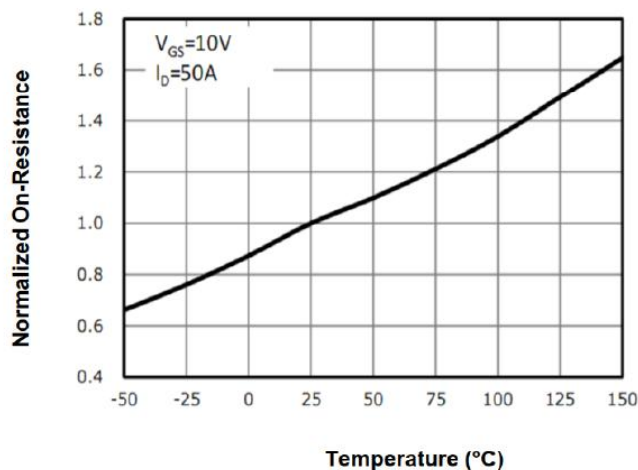


Figure 4: On-Resistance vs. Junction Temperature

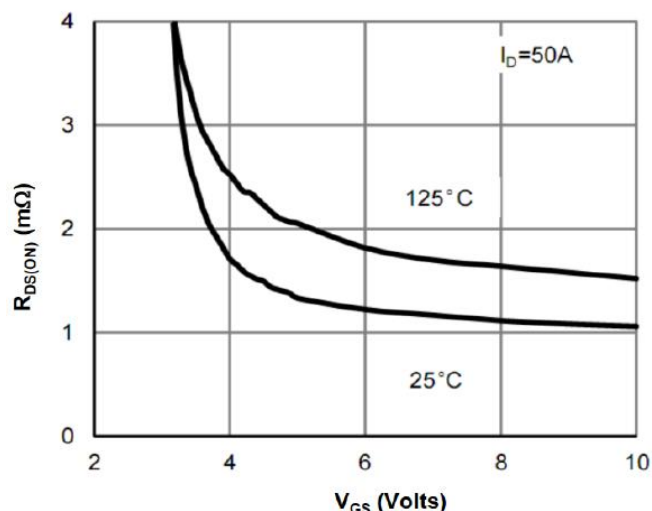


Figure 5: On-Resistance vs. Gate-Source Voltage

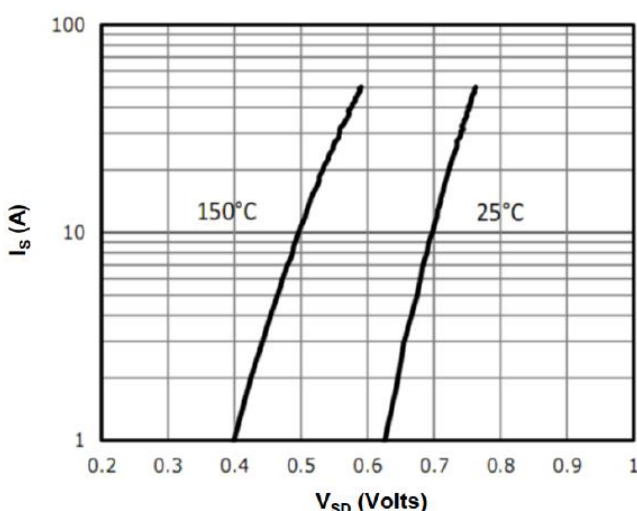
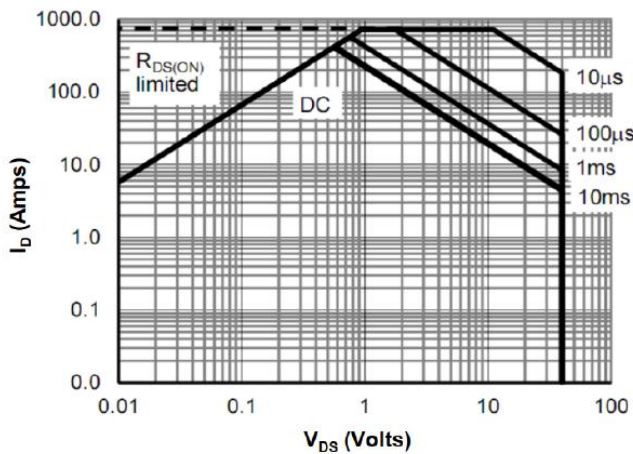
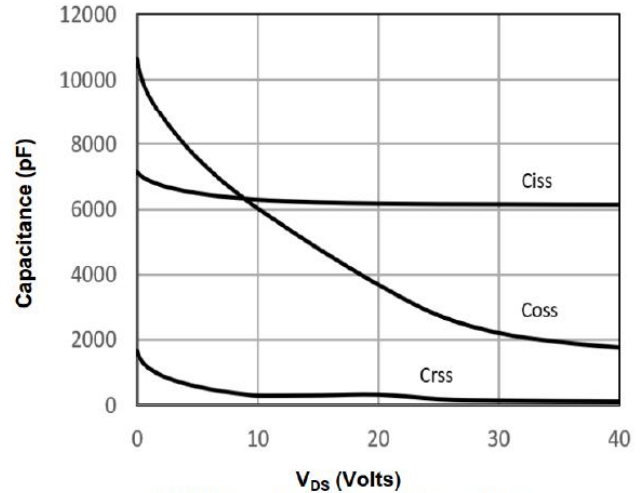
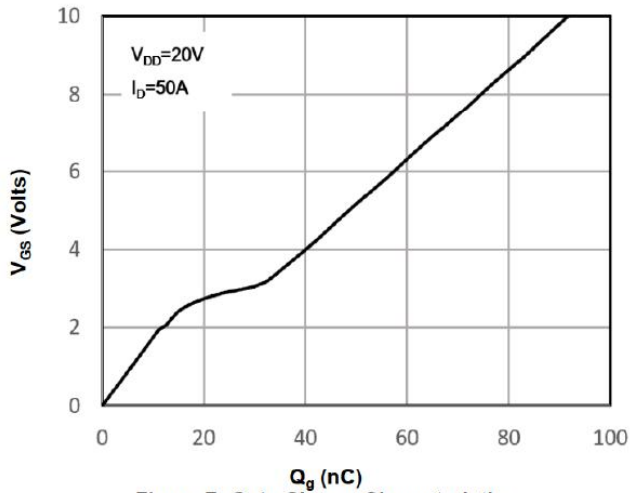


Figure 6: Body-Diode Characteristics



9. Test Circuits and Waveforms

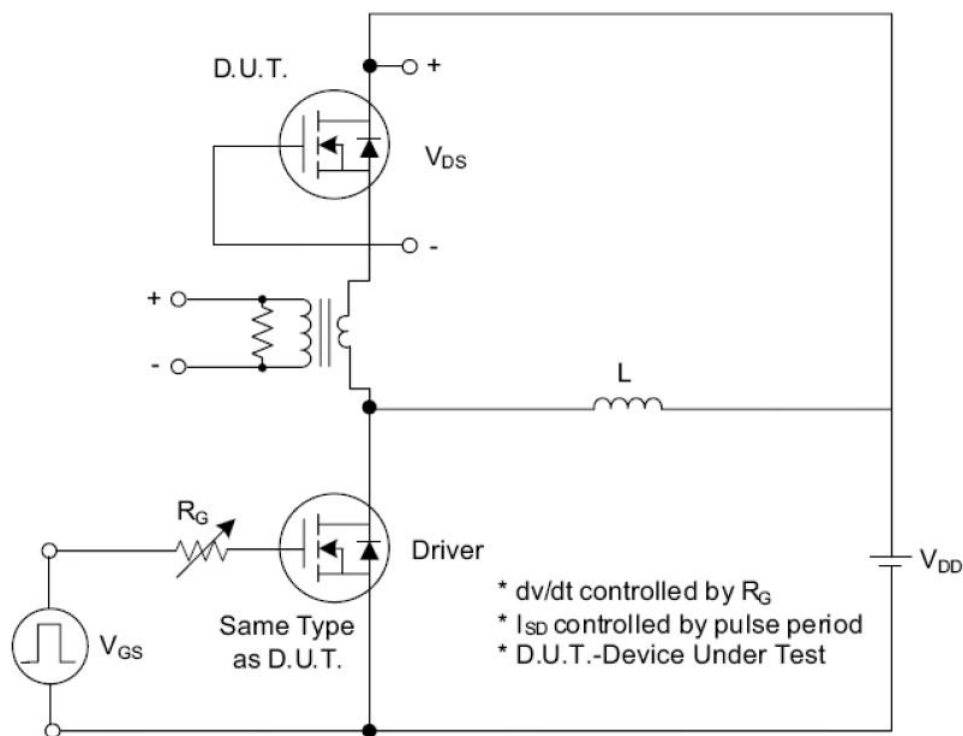


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

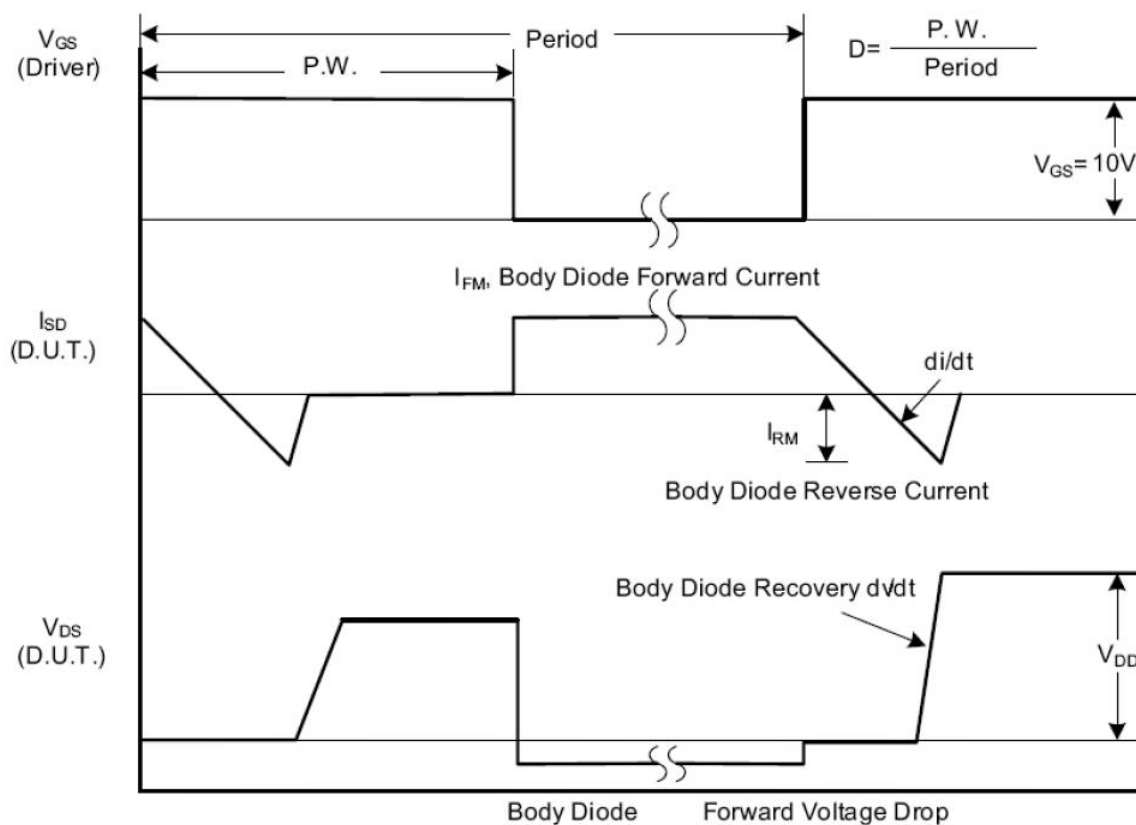


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

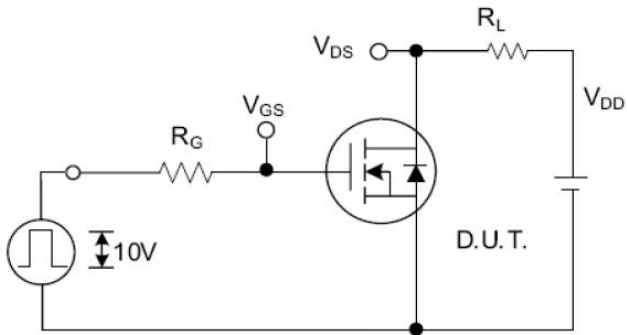


Fig. 2.1 Switching Test Circuit

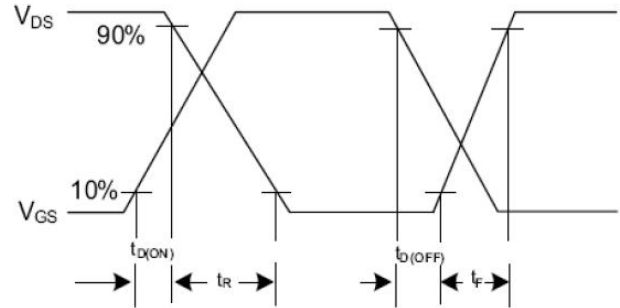


Fig. 2.2 Switching Waveforms

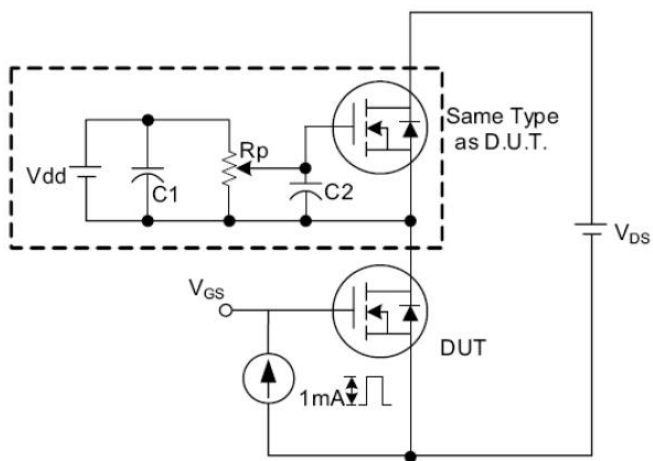


Fig. 3.1 Gate Charge Test Circuit

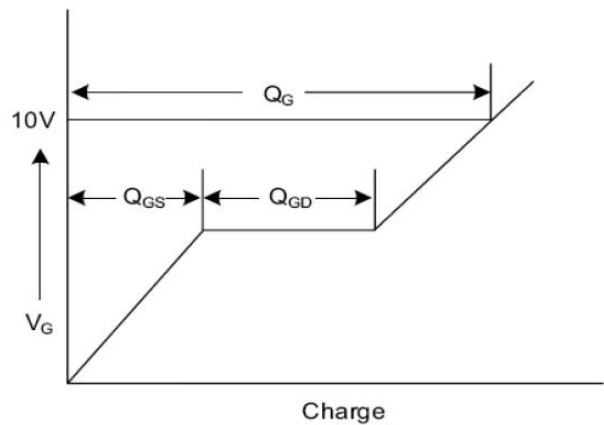


Fig. 3.2 Gate Charge Waveform

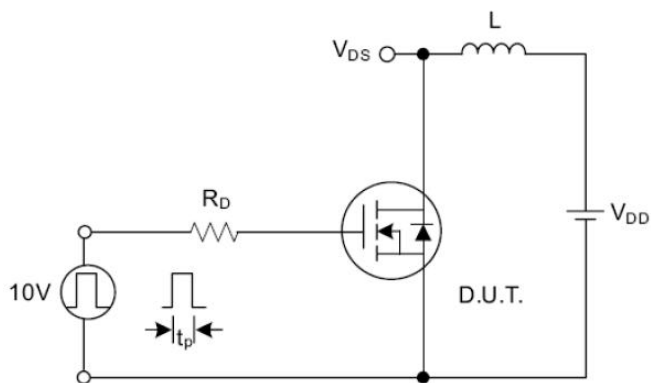


Fig. 4.1 Unclamped Inductive Switching Test Circuit

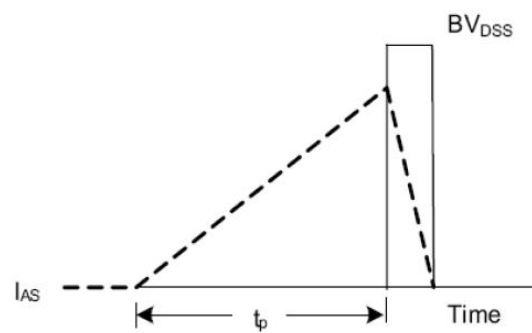


Fig. 4.2 Unclamped Inductive Switching Waveforms