1. Features

- Advanced SGT technology
- $R_{DS(ON)}$=0.78mΩ(typ.) @ V_{GS}=10V
- Fast switching capability
- Very low on-resistance $R_{DS(on)}$

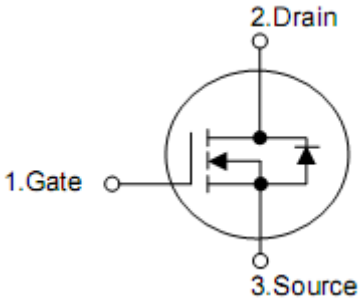
2. Applications

- Synchronous Rectification
- Power management
- DC-DC Converters

3. Pin configuration



TOLL-8



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

4. Ordering Information

Part Number	Package	Brand
KCT1704B	TOLL-8	KIA

5. Absolute maximum ratings

(T_C= 25 ºC, 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}	1520	A
Single Pulse Avalanche Energy L=1mH		EAS	950	mJ
Power Dissipation		P_D	227	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	ºC
Operating and Storage Temperature Range		T_J&T_{STG}	-55 to 150	ºC

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	$R_{\theta JC}$	0.55	ºC/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	40	ºC/W

7. Electrical characteristics

(T_J=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	-	0.78	0.95	mΩ
		V_{GS}=4.5V, I_D=30A	-	1.1	1.4	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}		-	-	1520	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

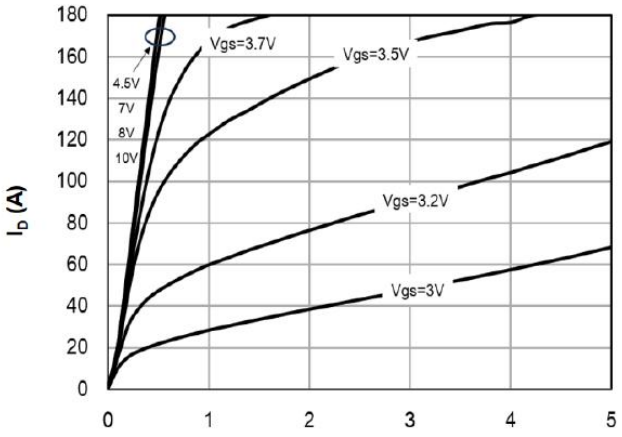


Figure 1: On-Region Characteristics

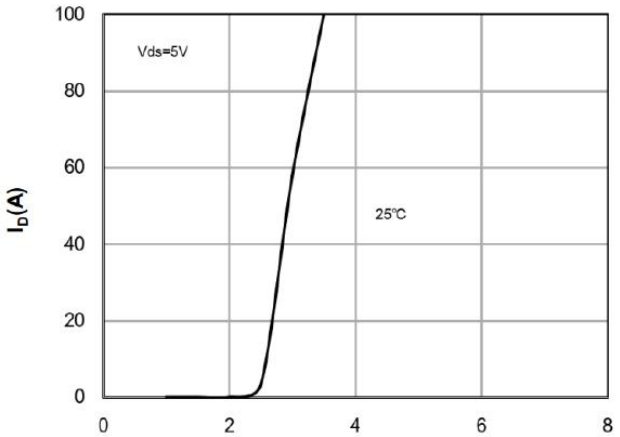


Figure 2: Transfer Characteristics

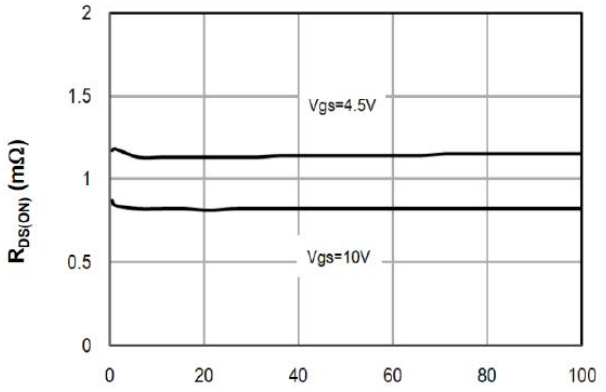


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

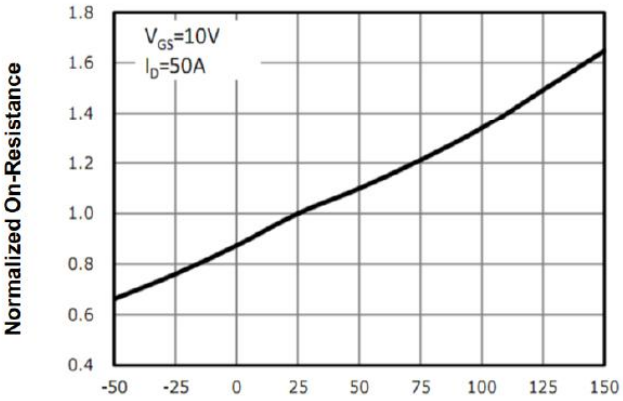


Figure 4: On-Resistance vs. Junction Temperature

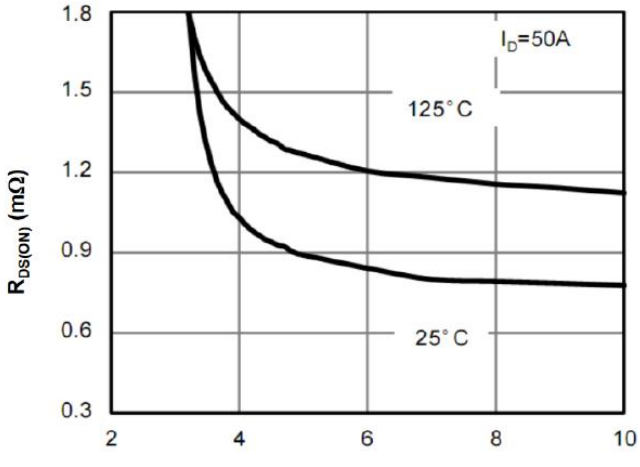


Figure 5: On-Resistance vs. Gate-Source Voltage

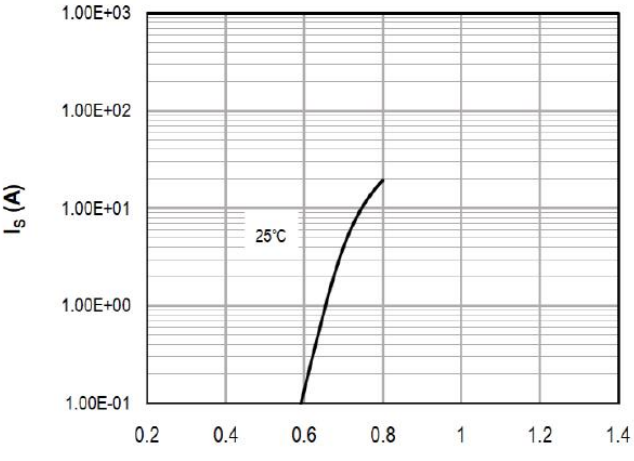


Figure 6: Body-Diode Characteristics

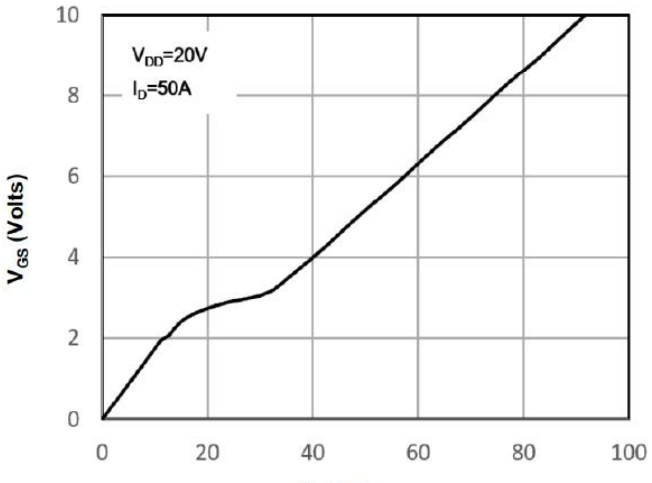


Figure 7: Gate-Charge Characteristics

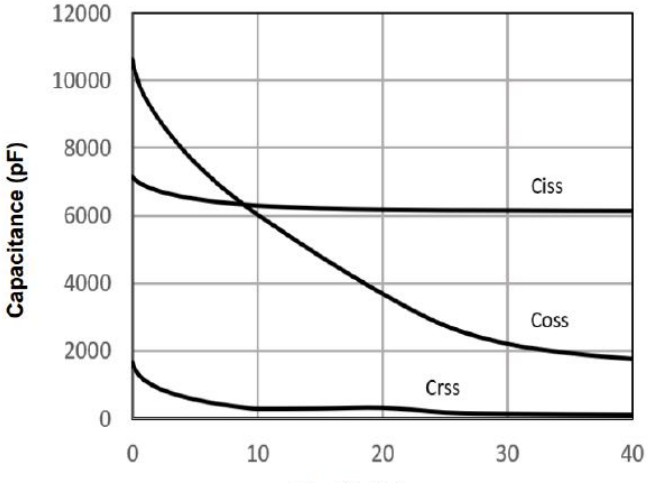


Figure 8: Capacitance Characteristics

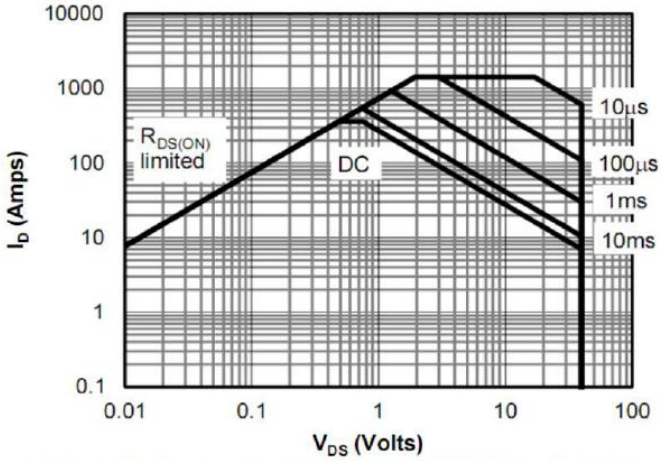


Figure 9: Maximum Forward Biased Safe Operating Area

9. Test Circuits and Waveforms

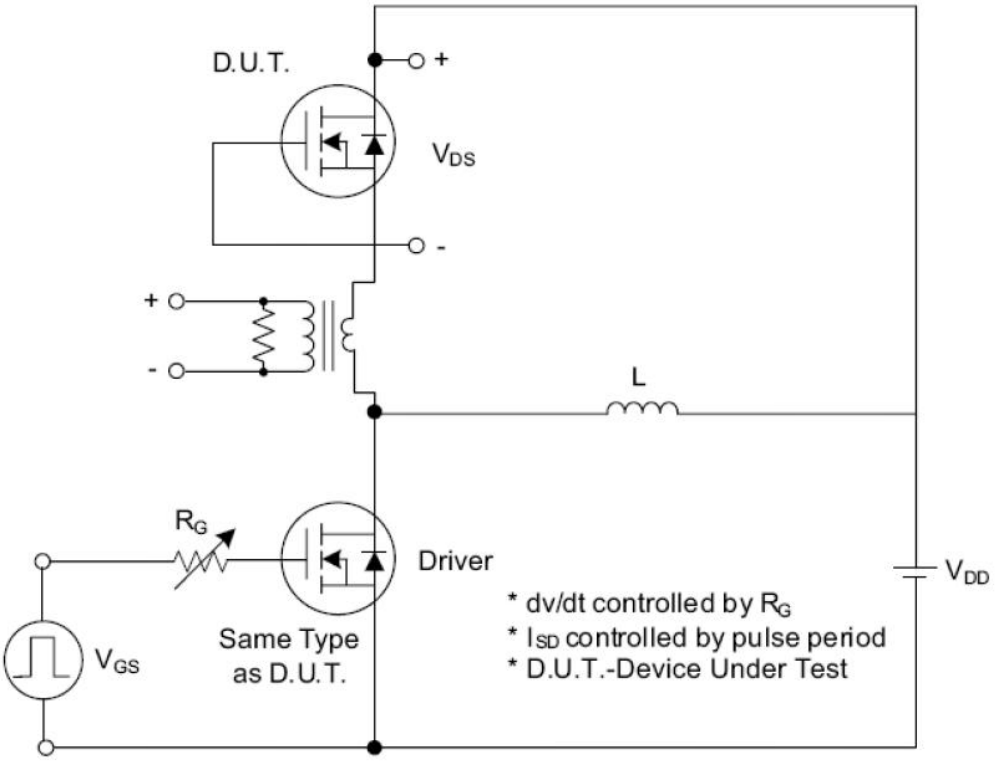


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

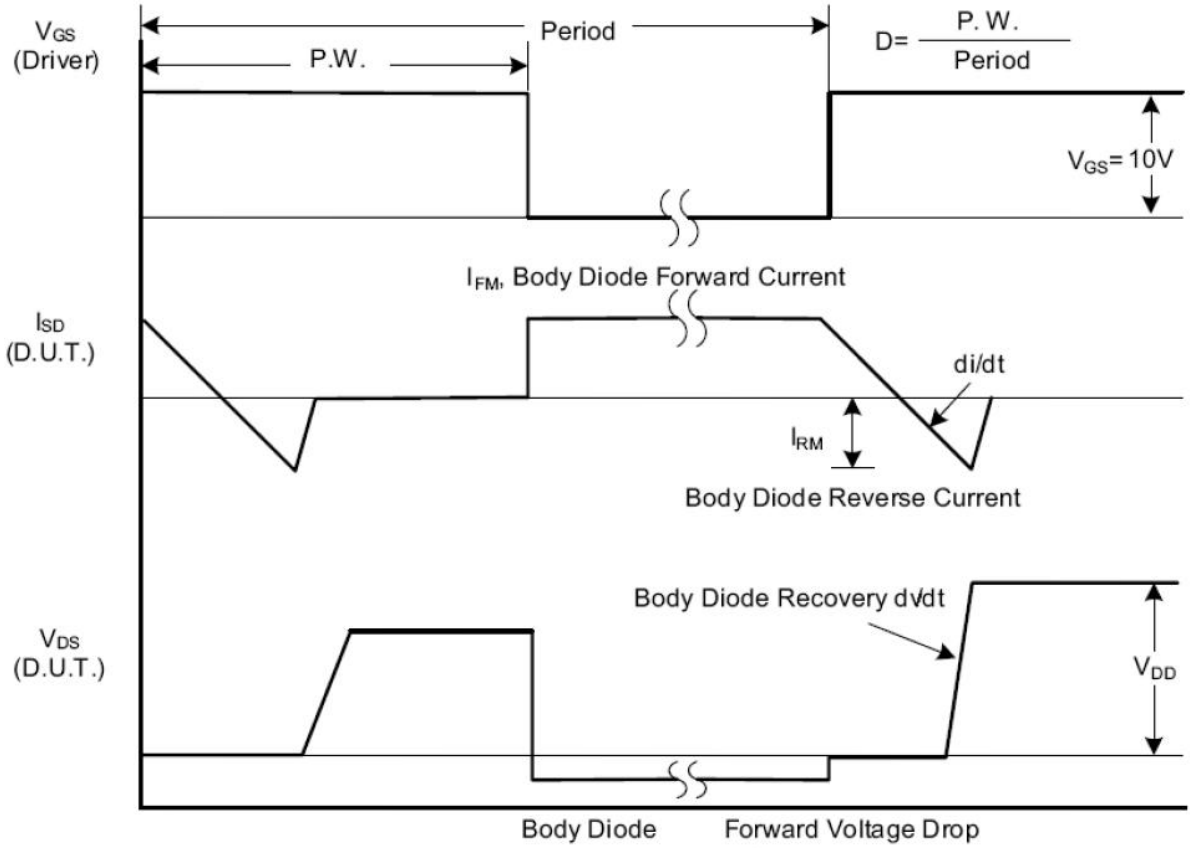


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

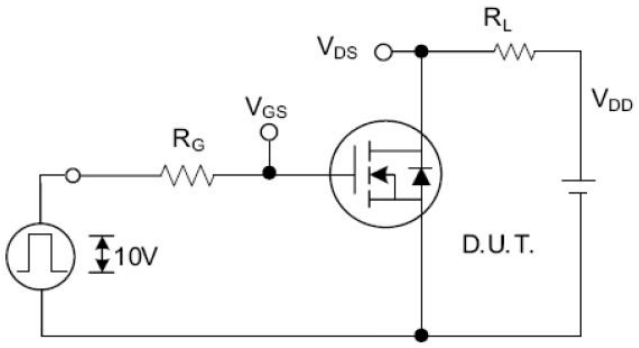


Fig. 2.1 Switching Test Circuit

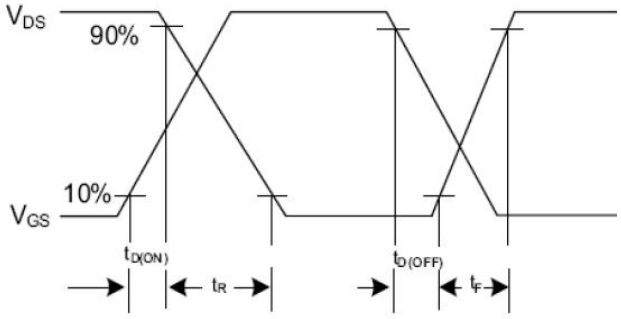


Fig. 2.2 Switching Waveforms

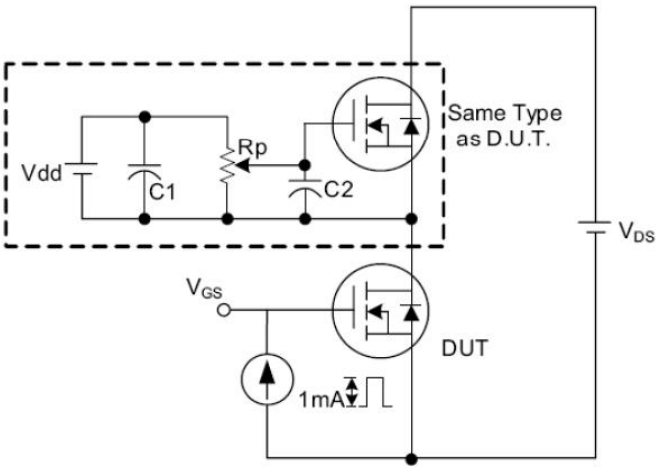


Fig. 3 . 1 Gate Charge Test Circuit

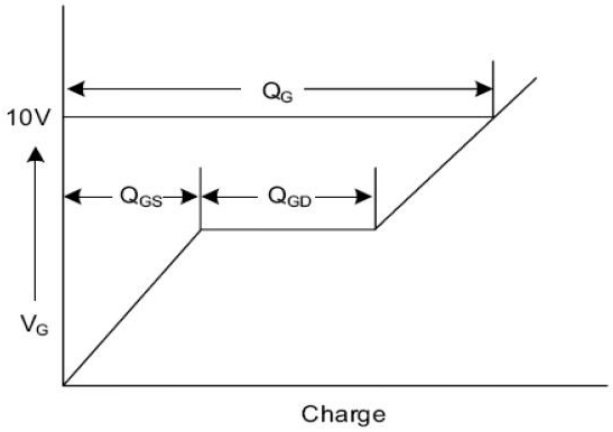


Fig. 3 . 2 Gate Charge Waveform

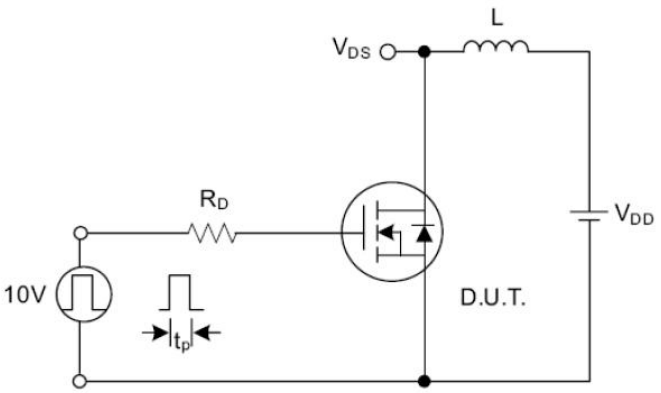


Fig. 4.1 Unclamped Inductive Switching Test Circuit

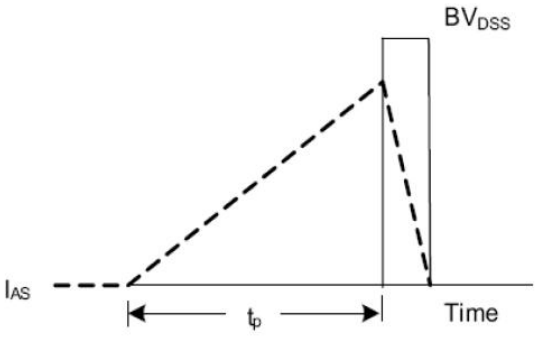


Fig. 4.2 Unclamped Inductive Switching Waveforms