

## 1. Features

- Proprietary New Planar Technology
- $R_{DS(ON)}=45m\Omega(\text{typ.})@V_{GS}=10V$
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

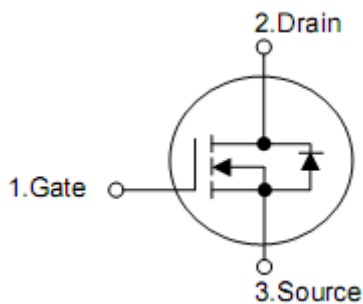
## 2. Applications

- DC-DC Converters
- DC-AC Inverters for UPS
- SMPS and Motor controls

## 3. Pin configuration



TO-3P



Pin	Function
1	Gate
2	Drain
3	Source

## 4. Ordering Information

Part Number	Package	Brand
KNH3625A	TO-3P	KIA

## 5. Absolute maximum ratings

(T<sub>c</sub>= 25 °C , unless otherwise specified)

Parameter	Symbol	Ratings	Unit	
Drain-to-Source Voltage <sup>1)</sup>	V <sub>DSS</sub>	250	V	
Gate-to-Source Voltage	V <sub>GSS</sub>	±20	V	
Continuous Drain Current	T <sub>c</sub> =25 °C	I <sub>D</sub>	60	A
	T <sub>c</sub> =100 °C	I <sub>D</sub>	30	A
Pulsed Drain Current at V <sub>GS</sub> =10V <sup>2)</sup>	I <sub>DM</sub>	200	A	
Single Pulse Avalanche Energy	EAS	1250	mJ	
Peak Diode Recovery dv/dt <sup>3)</sup>	dv/dt	5.0	V/ns	
Power Dissipation	P <sub>D</sub>	278	W	
Derating Factor above 25°C	P <sub>D</sub>	1.0	W/°C	
Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds	T <sub>L</sub> T <sub>PAK</sub>	300 260	°C	
Operating and Storage Temperature Range	T <sub>J</sub> &T <sub>STG</sub>	-55 to 150	°C	

Caution: Stresses greater than those listed 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 <sub>θJC</sub>	0.45	°C/W
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	50	°C/W

## 7. Electrical characteristics

 (T<sub>J</sub>=25°C, unless otherwise specified)

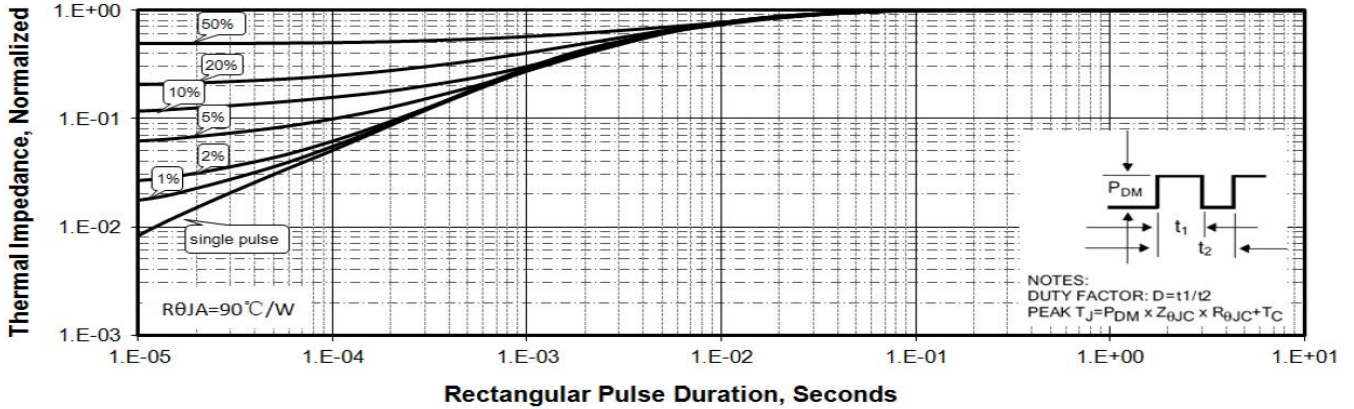
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-to-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	250	-	-	V
Drain-to-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =250V, V <sub>GS</sub> =0V	-	-	1	uA
		V <sub>DS</sub> =200V, T <sub>J</sub> =125°C	-	-	100	uA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Drain-to-Source ON Resistance <sup>4)</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =25A	-	45	60	mΩ
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2.0	-	4.0	V
Forward Transconductance <sup>4)</sup>	g <sub>fs</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =20A	-	65	-	S
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHZ	-	4020	-	pF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	254	-	
Output Capacitance	C <sub>oss</sub>		-	506	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DD</sub> =100V, I <sub>D</sub> =20A, V <sub>GS</sub> =0~10V	-	78	-	nC
Gate-to-Source Charge	Q <sub>gs</sub>		-	27	-	
Gate-to-Drain (Miller) Charge	Q <sub>gd</sub>		-	22	-	
Turn-on Delay Time	t <sub>d(ON)</sub>	V <sub>DD</sub> =100V, I <sub>D</sub> =20A, R <sub>G</sub> =3.9Ω, V <sub>GS</sub> = 10V	-	22	-	nS
Rise Time	t <sub>rise</sub>		-	32	-	
Turn-Off Delay Time	t <sub>d(OFF)</sub>		-	68	-	
Fall Time	t <sub>fall</sub>		-	26	-	
Continuous Source Current <sup>4)</sup>	I <sub>SD</sub>	Integral PN-diode in MOSFET	-	-	50	A
Pulsed Source Current <sup>4)</sup>	I <sub>SM</sub>		-	-	200	A
Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =40A, V <sub>GS</sub> =0V	-	-	1.5	V
Reverse recovery time	t <sub>rr</sub>	V <sub>GS</sub> =0V, I <sub>F</sub> =20A, diF/dt=100A/μs	-	180	-	ns
Reverse recovery charge	Q <sub>rr</sub>		-	400	-	uC

Note:

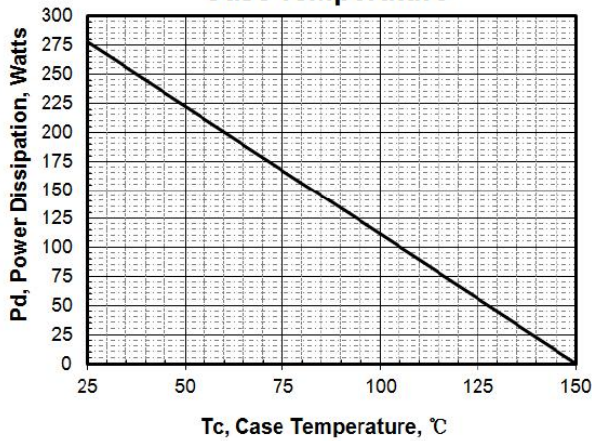
- 1) T<sub>J</sub>=+25°C to +150°C
- 2) Repetitive rating; pulse width limited by maximum junction temperature.
- 3) I<sub>SD</sub>=20A, di/dt<100 A/μs, V<sub>DD</sub><BV<sub>DSS</sub>, T<sub>J</sub>=+150°C.
- 4) Pulse width≤380μs; duty cycle≤2%.

**8. Test circuits and waveforms**

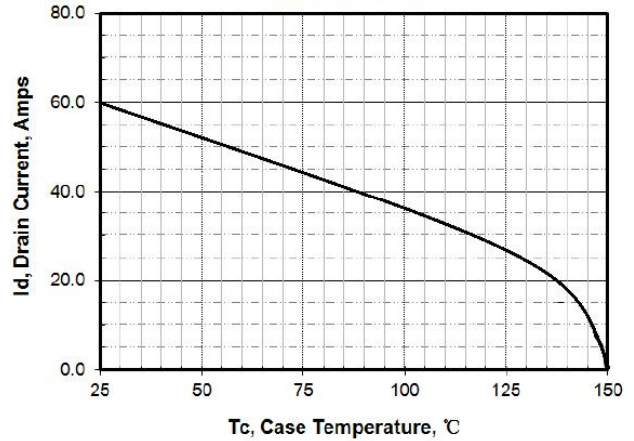
**Figure 1. Maximum Transient Thermal Impedance**



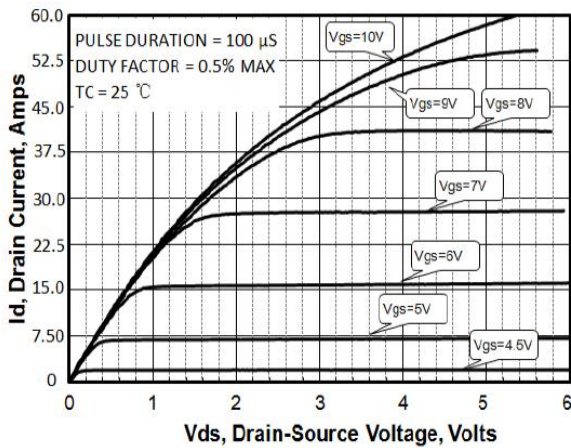
**Figure 2 . Max. Power Dissipation vs Case Temperature**



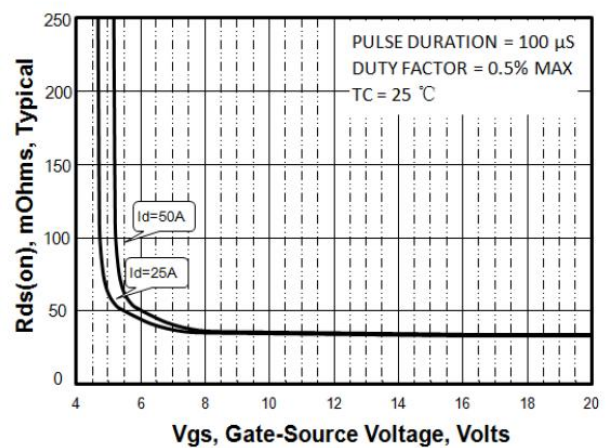
**Figure 3 .Maximum Continuous Drain Current vs Tc**



**Figure 4. Output Characteristics**

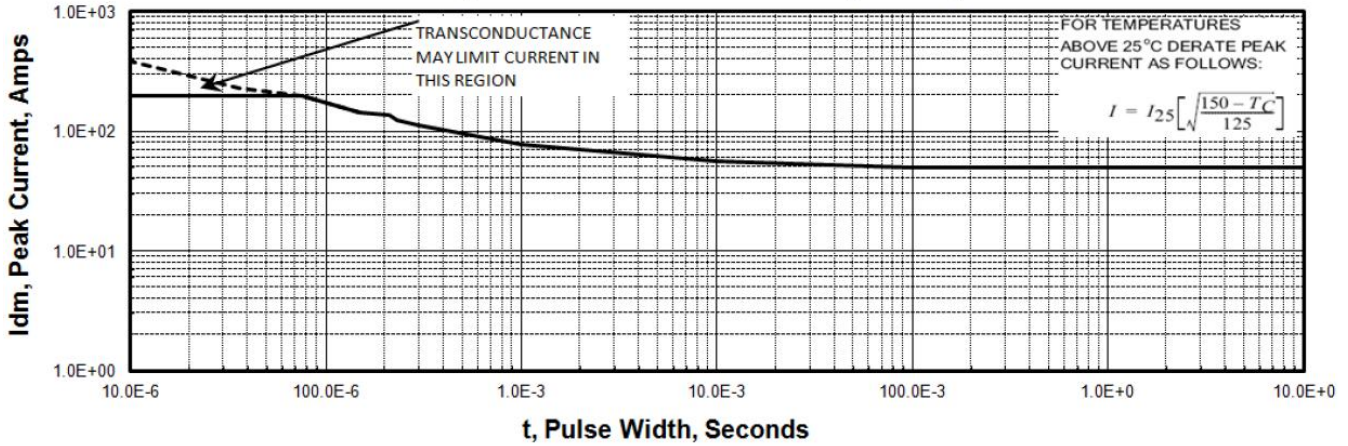


**Figure 5. Rds(on) vs Gate Voltage**

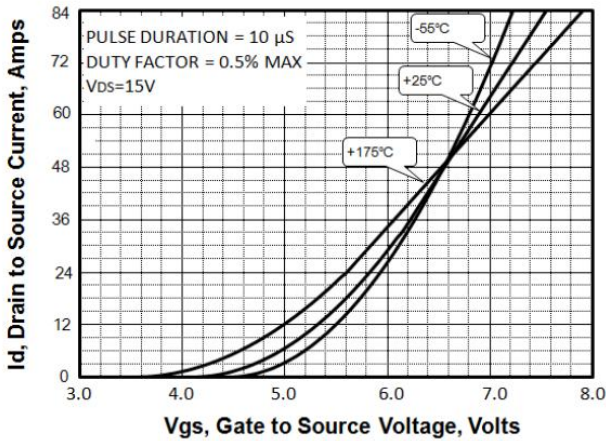




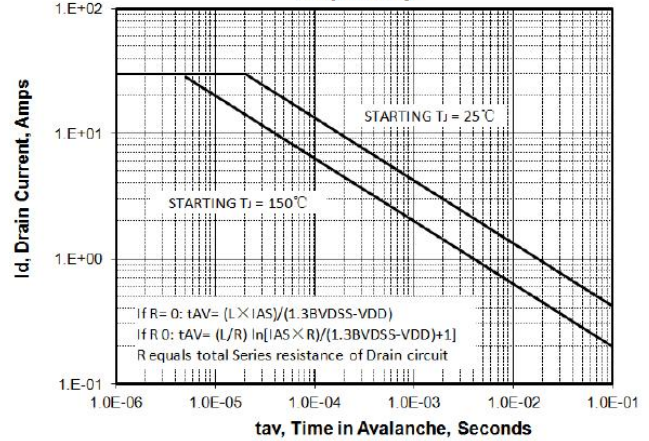
**Figure 6. Peak Current Capability**



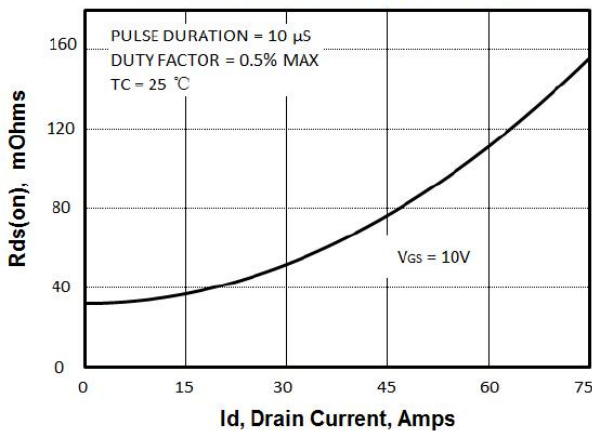
**Figure 7. Transfer Characteristics**



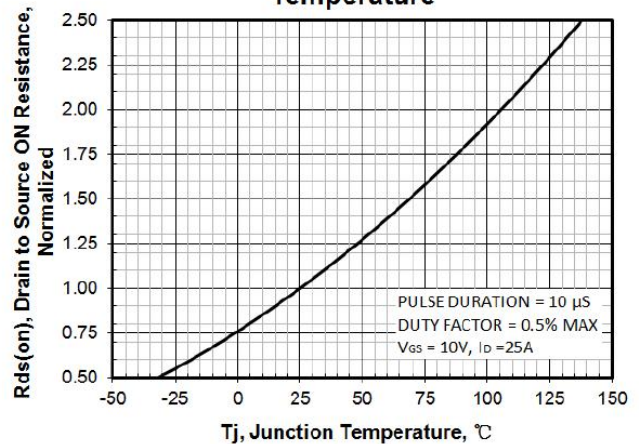
**Figure 8. Unclamped Inductive Switching Capability**



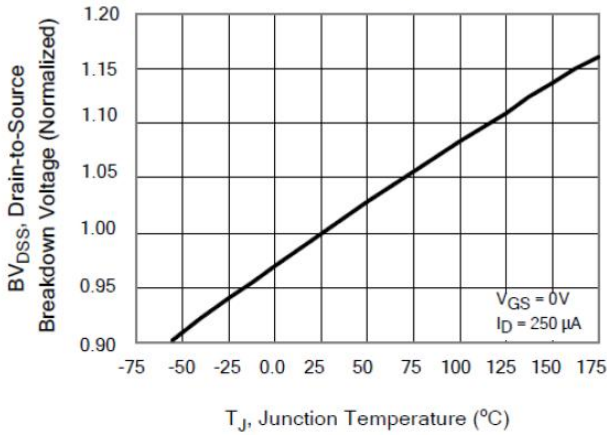
**Figure 9. Drain to Source ON Resistance vs Drain Current**



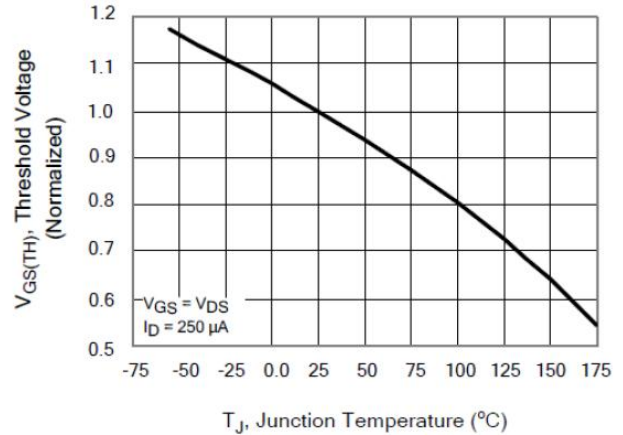
**Figure 10. Rds(on) vs Junction Temperature**



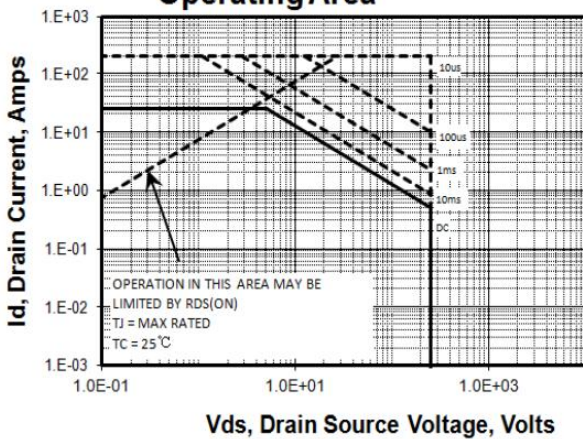
**Figure 11. Typical Breakdown Voltage vs Junction Temperature**



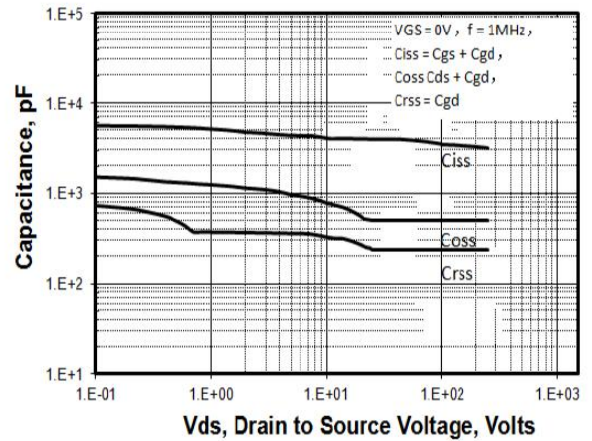
**Figure 12. Typical Threshold Voltage vs Junction Temperature**



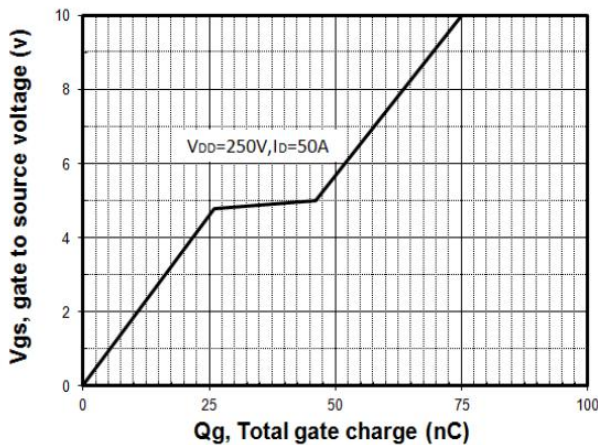
**Figure 13 . Maximum Safe Operating Area**



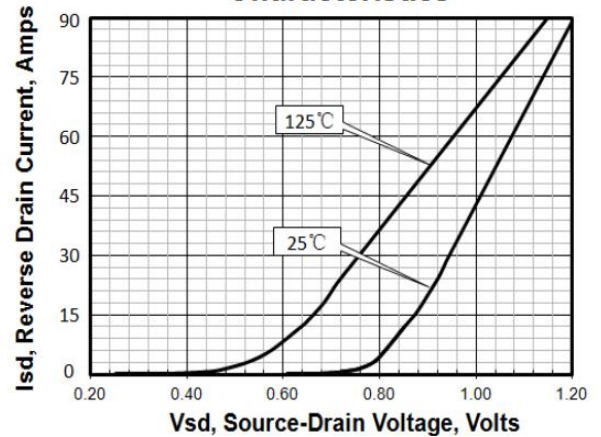
**Figure 14. Capacitance vs Vds**



**Figure 15 . Typical Gate Charge**



**Figure 16. Body Diode Transfer Characteristics**



**9. Test Circuits and Waveforms**

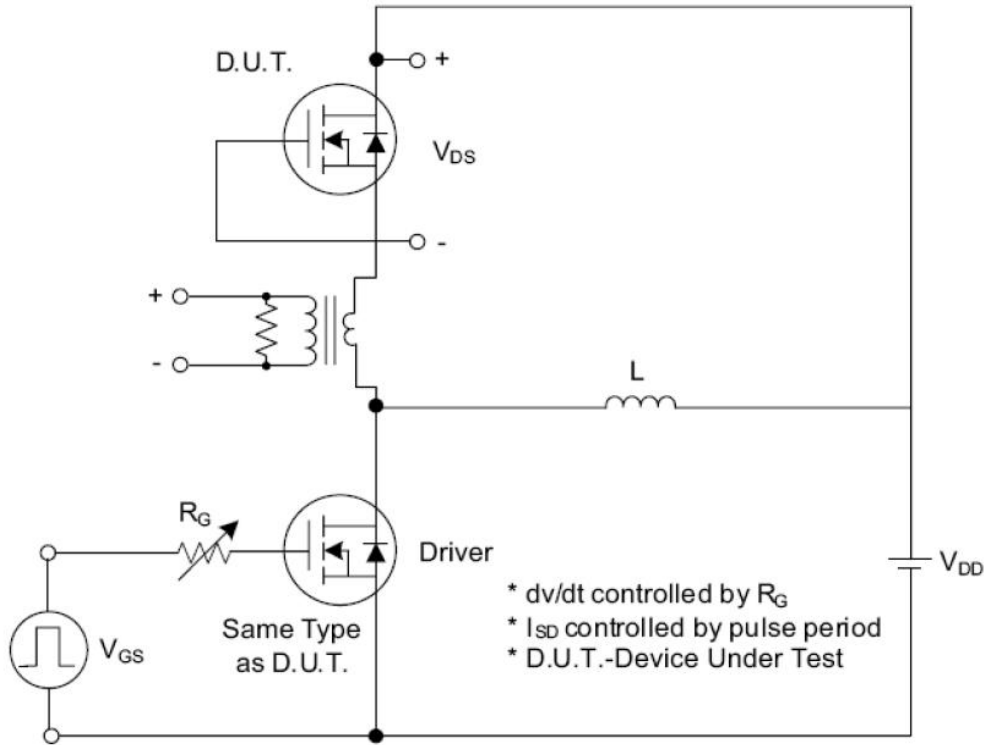


Fig. 1.1 Peak Diode Recovery  $dv/dt$  Test Circuit

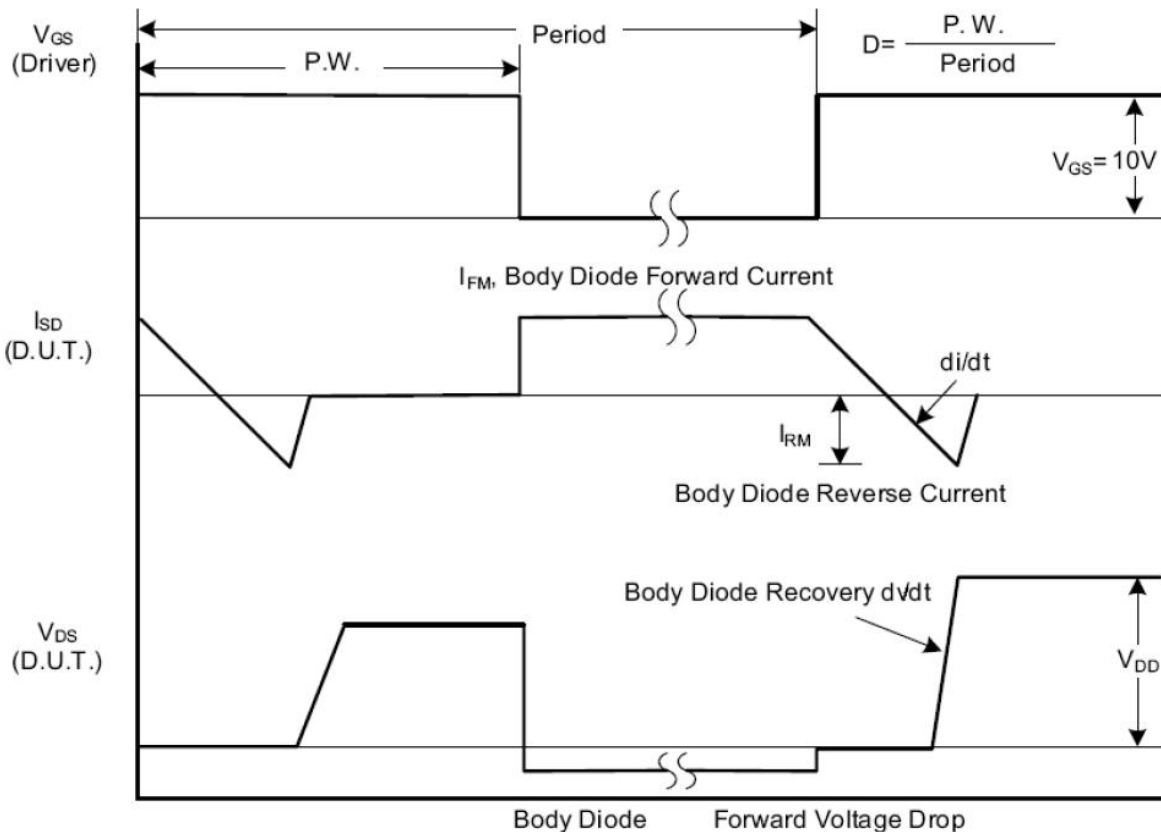


Fig. 1.2 Peak Diode Recovery  $dv/dt$  Waveforms



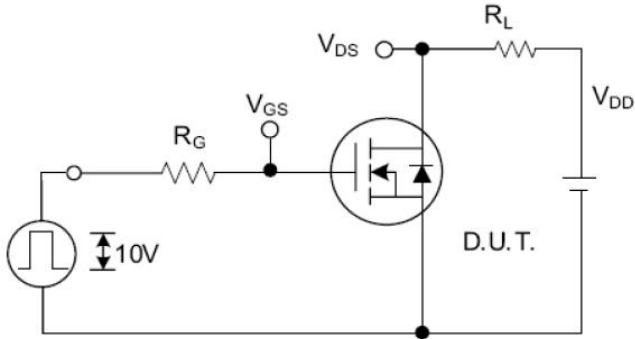


Fig. 2.1 Switching Test Circuit

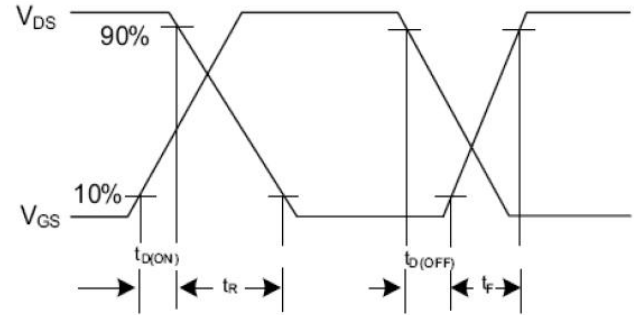


Fig. 2.2 Switching Waveforms

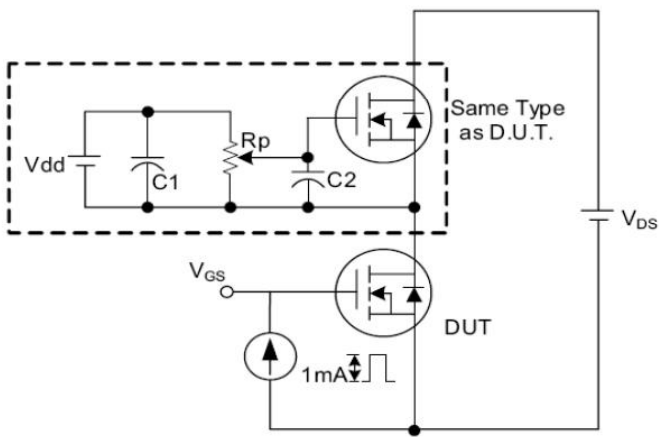


Fig. 3. 1 Gate Charge Test Circuit

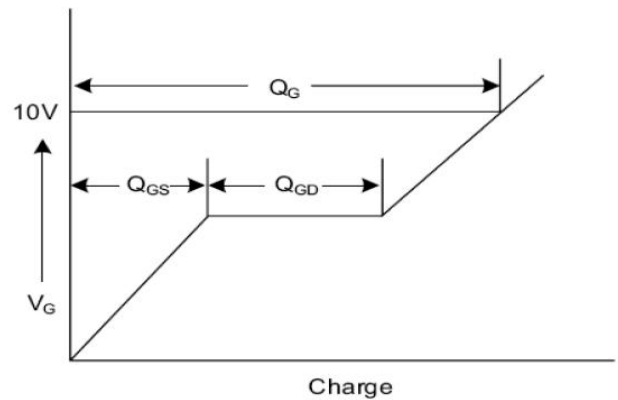


Fig. 3. 2 Gate Charge Waveform

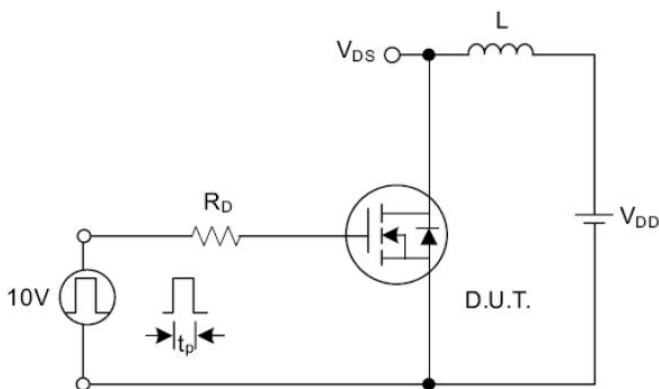


Fig. 4.1 Unclamped Inductive Switching Test Circuit

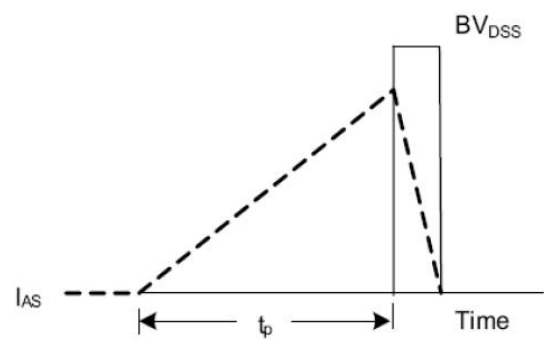


Fig. 4.2 Unclamped Inductive Switching Waveforms