

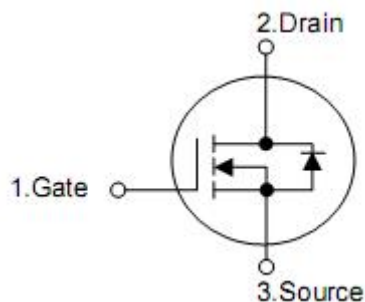
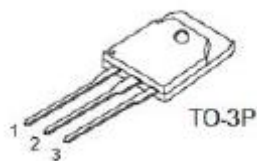
## 1. General Features

- n Advanced Planar Process
- n  $R_{DS(ON),typ.}=150m\Omega@V_{GS}=10V$
- n Low Gate Charge Minimize Switching Loss
- n Rugged Poly silicon Gate Structure

## 2. Applications

- n BLDC Motor Driver
- n Electric Welder
- n High Efficiency SMPS

## 3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source

#### 4. Absolute maximum ratings

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

Symbol	Parameter	KNH8150A	Unit
V <sub>DSS</sub>	Drain-to-Source Voltage	500	V
V <sub>GSS</sub>	Gate-to-Source Voltage	±30	
I <sub>D</sub>	Continuous Drain Current	30	A
	Continuous Drain Current@ T <sub>c</sub> =100 °C	18	
I <sub>DM</sub>	Pulsed Drain Current at V <sub>GS</sub> =10V <sup>[2,4]</sup>	120	
E <sub>AS</sub>	Single Pulse Avalanche Energy	2000	mJ
dv /dt	Peak Diode Recovery dv/dt <sup>[3]</sup>	5.0	V/ns
P <sub>D</sub>	Power Dissipation	333	W
	Derating Factor above 25 °C	2.63	W/ °C
T <sub>L</sub> T <sub>PAK</sub>	Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds	300 260	°C
T <sub>J</sub> &T <sub>STG</sub>	Operating and Storage Temperature Range	-55 to 150	

#### 5. Thermal characteristics

Symbol	Parameter	KNH8150A	Unit
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	0.38	°C /W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient	50	

Note:

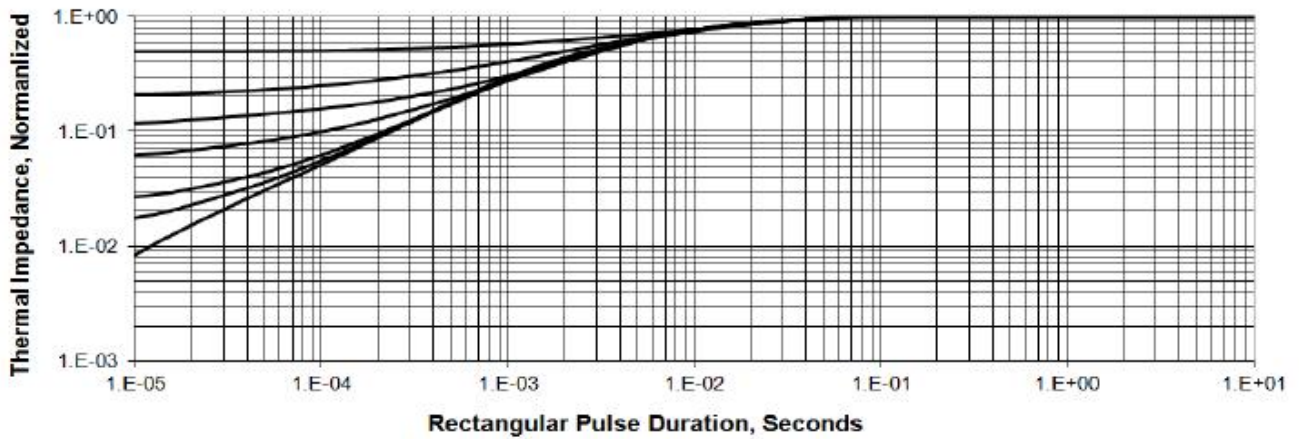
- 1.T<sub>J</sub>=+25°C to +150°C
- 2.Silicon limited current only.
- 3.Package limited current
- 4.Repetitive rating; pulse width by maximum junction temperature
- 5.Pulse width≤380µs; duty cycle≤2%

## 6. Electrical characteristics

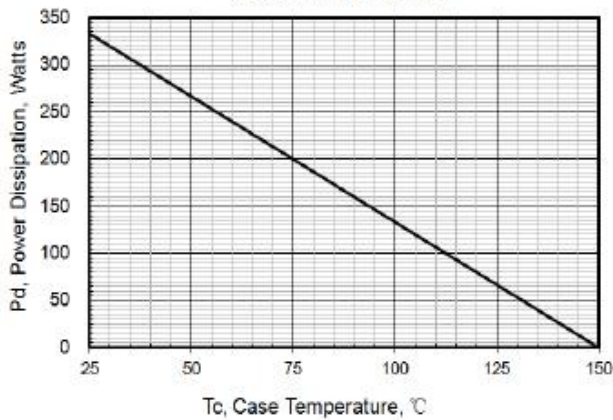
OFF Characteristics		(T <sub>J</sub> =25°C, unless otherwise specified)				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-to-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	500	--	--	V
I <sub>DSS</sub>	Drain-to-Source Leakage Current	V <sub>DS</sub> =500V, V <sub>GS</sub> =0V	--	--	5	uA
		V <sub>DS</sub> =400V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	--	--	100	
I <sub>GSS</sub>	Gate-to-Source Leakage Current	V <sub>GS</sub> =+30V, V <sub>DS</sub> =0 V	--	--	100	nA
		V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V	--	--	-100	
ON Characteristics		(T <sub>J</sub> =25°C, unless otherwise specified)				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R <sub>DS(ON)</sub>	Static Drain-to-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =15A	--	150	200	mΩ
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2.5	--	4.5	V
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =25V, I <sub>D</sub> =15A	--	38	--	S
Dynamic Characteristics		Essentially independent of operating temperature				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V,	--	4150	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	V <sub>DS</sub> =25V,	--	82	--	
C <sub>oss</sub>	Output Capacitance	f=1.0MHZ	--	500	--	
Q <sub>g</sub>	Total Gate Charge	V <sub>DD</sub> =250V,	--	108	--	nC
Q <sub>gs</sub>	Gate-to-Source Charge	I <sub>D</sub> =30A,	--	21	--	
Q <sub>gd</sub>	Gate-to-Drain (Miller) Charge	V <sub>GS</sub> =0 to 10V	--	44	--	
Resistive Switching Characteristics		Essentially independent of operating temperature				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =250V,	--	34	--	nS
t <sub>rise</sub>	Rise Time	I <sub>D</sub> =30A,	--	114	--	
t <sub>d(OFF)</sub>	Turn-Off Delay Time	V <sub>GS</sub> = 10V	--	108	--	
t <sub>fall</sub>	Fall Time	R <sub>G</sub> =10Ω	--	72	--	
Source-Drain Body Diode Characteristics		(T <sub>J</sub> =25°C, unless otherwise specified)				
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Unit
I <sub>SD</sub>	Continuous Source Current <sup>[2]</sup>	Integral PN-diode in	--	--	30	A
I <sub>SM</sub>	Pulsed Source Current[2]	MOSFET	--	--	120	
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =30A, V <sub>GS</sub> =0V	--	0.88	1.5	V
t <sub>rr</sub>	Reverse recovery time	V <sub>GS</sub> =0V, I <sub>F</sub> =30A,	--	900	--	ns
Q <sub>rr</sub>	Reverse recovery charge	diF/dt=100A/μs	--	2.1	--	uC

**7. Test circuits and waveforms**

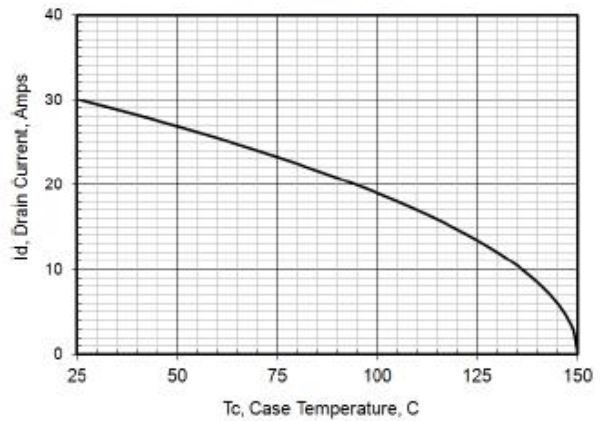
**Figure 1. Maximum Transient Thermal Impedance**



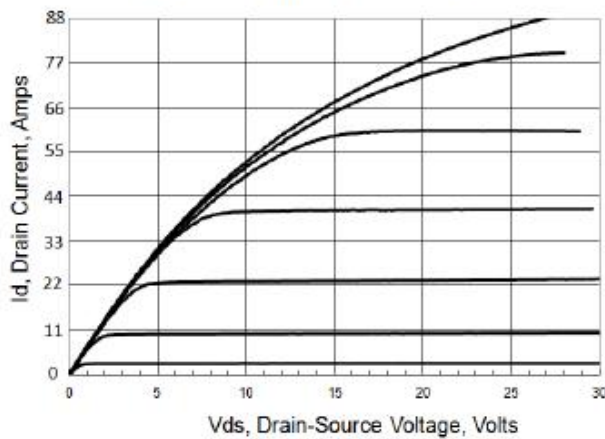
**Figure 2 . Max. Power Dissipation vs Case Temperature**



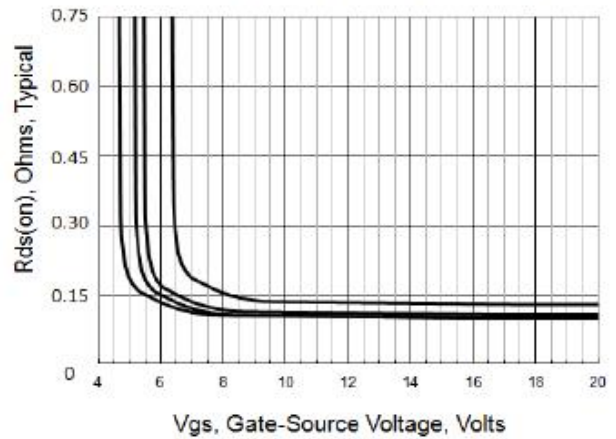
**Figure 3 .Maximum Continuous Drain Current vs Tc**



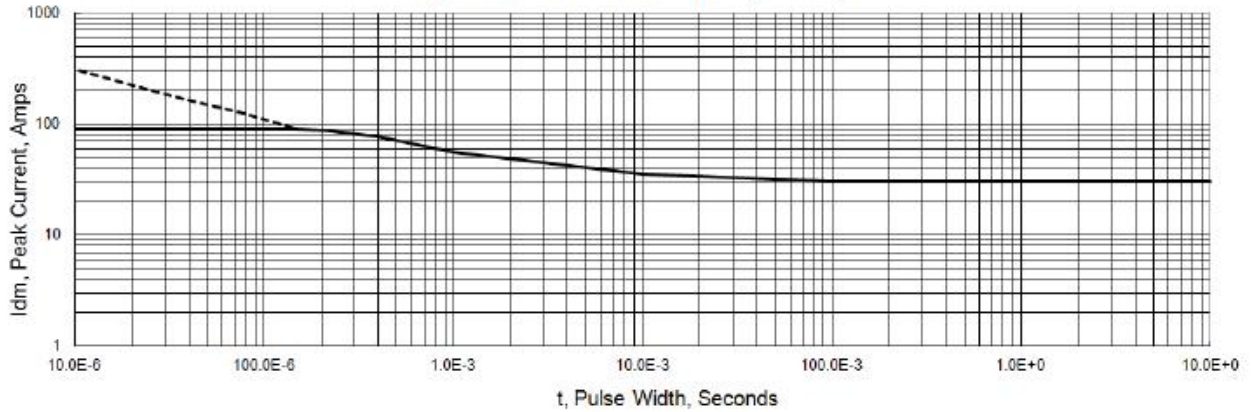
**Figure 4. Output Characteristics**



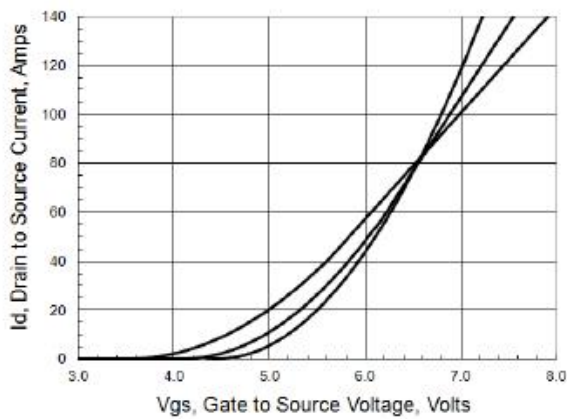
**Figure 5. Rds(on) vs Gate Voltage**



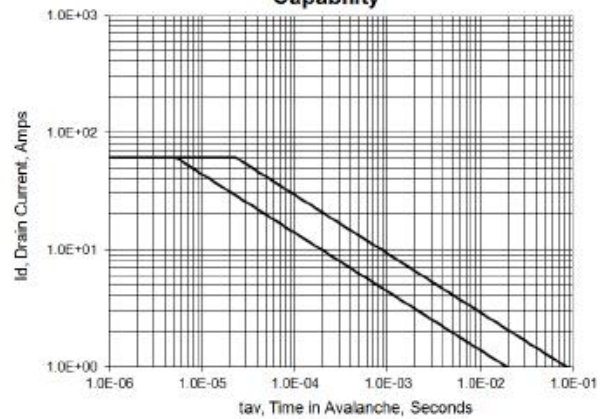
**Figure 6. Peak Current Capability**



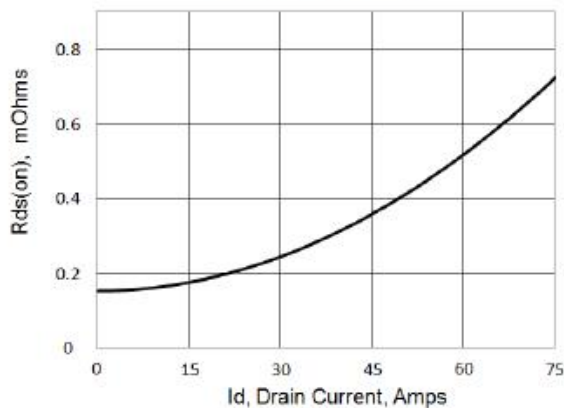
**Figure 7. Transfer Characteristics**



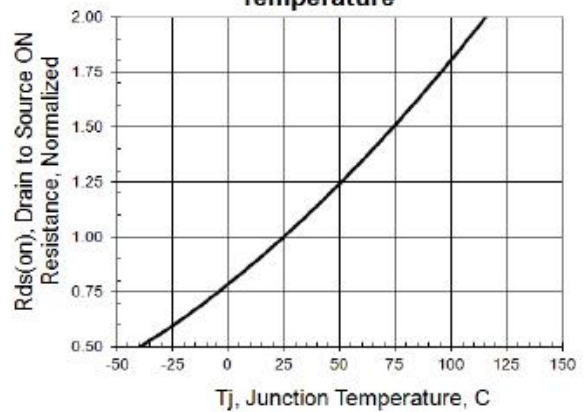
**Figure 8. Unclamped Inductive Switching Capability**



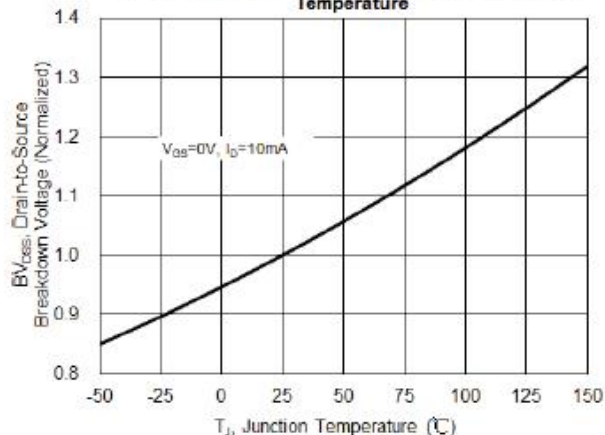
**Figure 9. Drain to Source ON Resistance vs Drain Current**



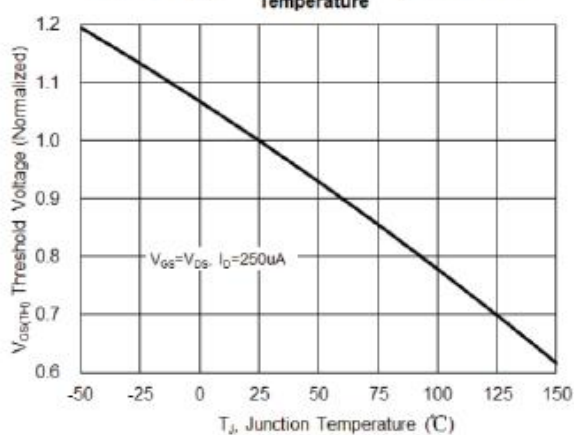
**Figure 10. Rds(on) vs Junction Temperature**



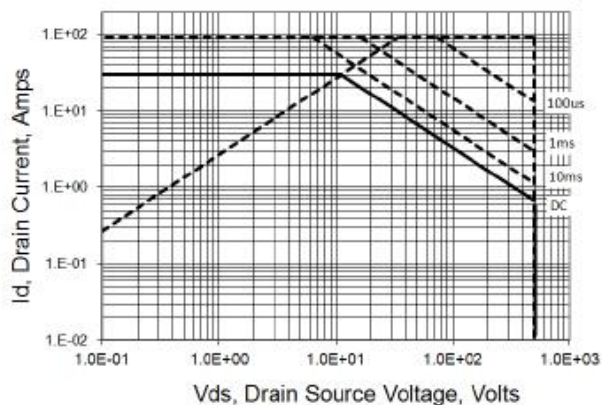
**Figure 11. Typical Breakdown Voltage vs. Junction Temperature**



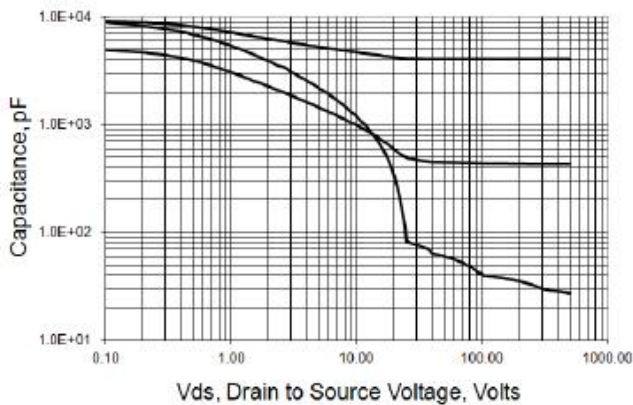
**Figure 12. Typical Threshold Voltage vs. Junction Temperature**



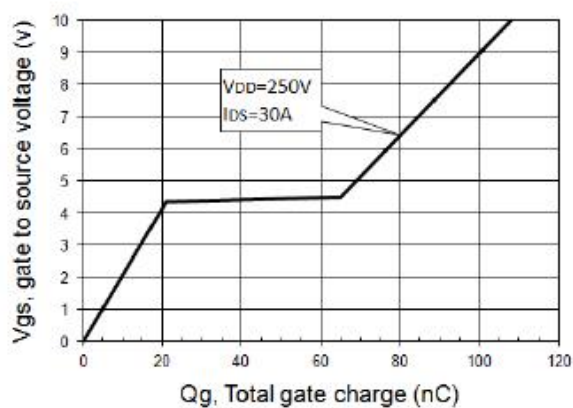
**Figure 13. Maximum Safe Operating Area**



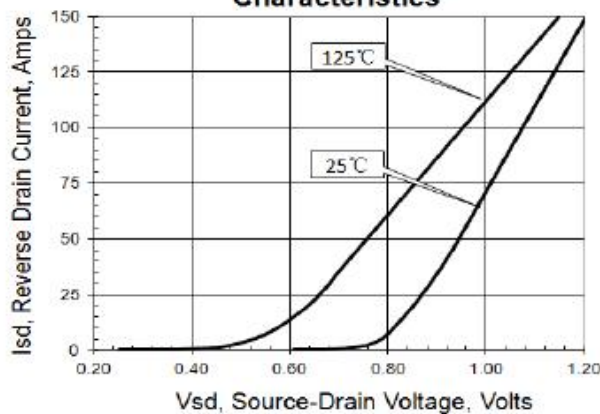
**Figure 14. Capacitance vs Vds**



**Figure 15. Typical Gate Charge**



**Figure 16. Body Diode Transfer Characteristics**



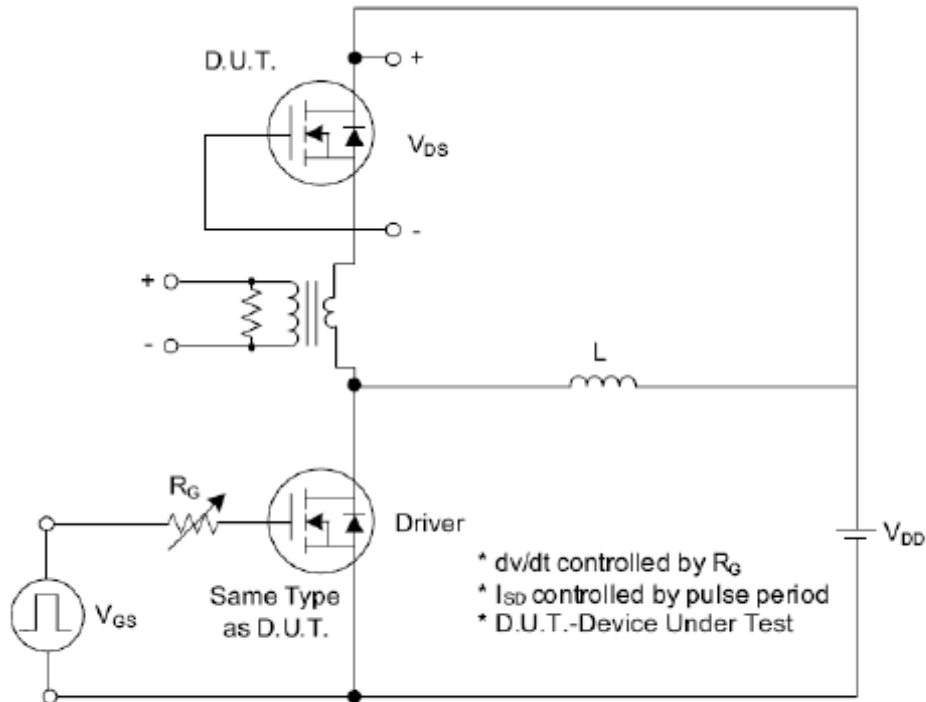


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

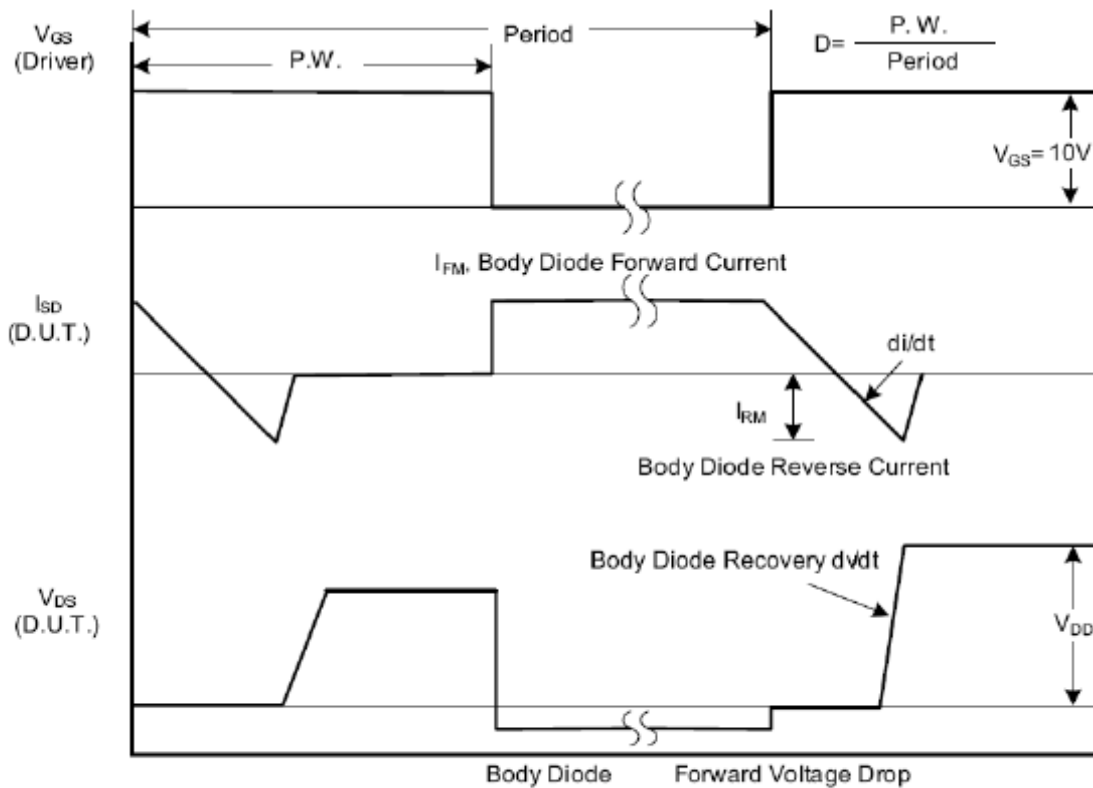


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

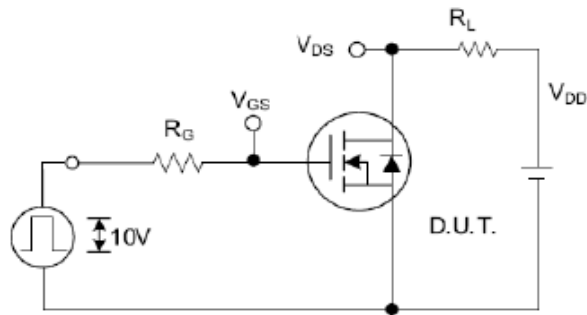


Fig. 2.1 Switching Test Circuit

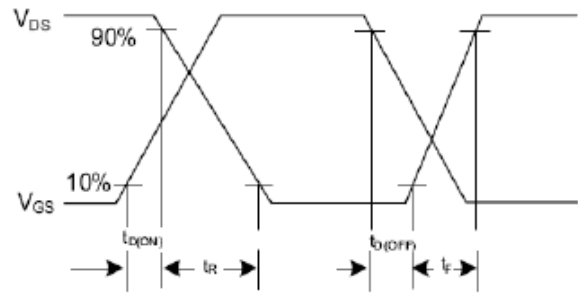


Fig. 2.2 Switching Waveforms

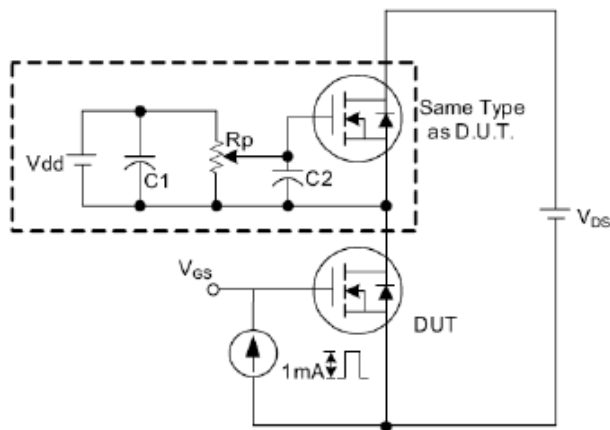


Fig. 3.1 Gate Charge Test Circuit

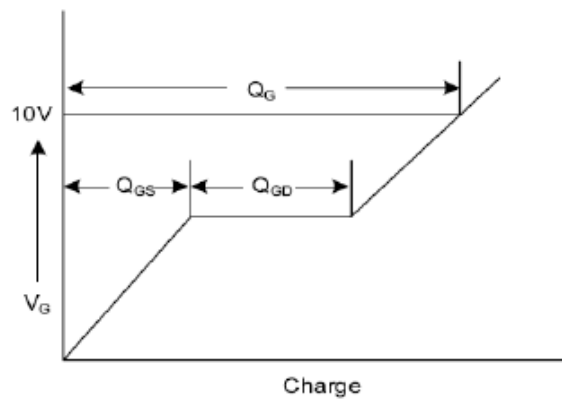


Fig. 3.2 Gate Charge Waveform

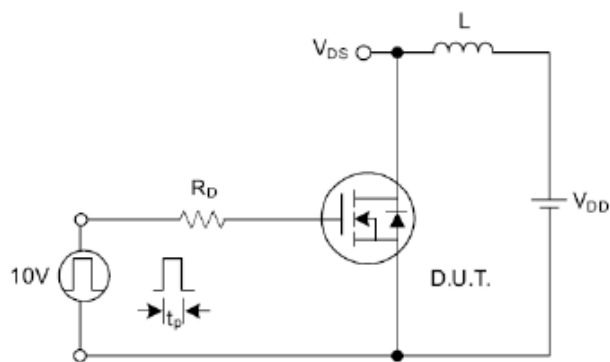


Fig. 4.1 Unclamped Inductive Switching Test Circuit

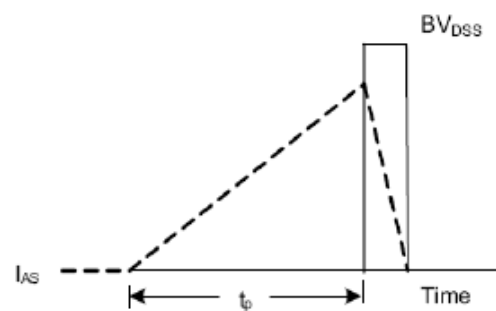


Fig. 4.2 Unclamped Inductive Switching Waveforms