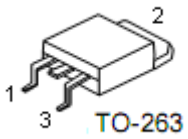
1. General Features

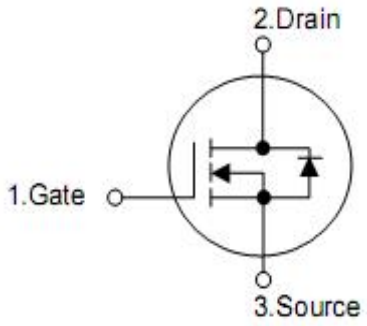
- Proprietary New Trench Technology
- $R_{DS(ON),typ.}$=4.5 mΩ@V_{GS}=10V
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

2. Applications

- High efficiency DC/DC converters
- Synchronous Rectification
- UPS Inverter

3. Pin configuration





Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KNB2710A	TO-263	KIA

5. Absolute maximum ratings

(T_C= 25 ºC , unless otherwise specified)

Symbol	Parameter	Rating	Unit
V_{DSS}	Drain-to-Source Voltage[1]	100	V
V_{GSS}	Gate-to-Source Voltage	±20	
I_D	Continuous Drain Current[2]	160	A
	Continuous Drain Current[3]	80	
	Continuous Drain Current@T_C=100 ºC [2]	120	
I_{DM}	Pulsed Drain Current at V_{GS}=10V[2,4]	640	
E_{AS}	Single Pulse Avalanche Energy	1200	mJ
dv /dt	Peak Diode Recovery dv/dt[3]	5.0	V/ns
P_D	Power Dissipation	333	W
	Derating Factor above 25 ºC	2.22	W/ ºC
T_L T_{PAK}	Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds	300 260	ºC
T_J&T_{STG}	Operating and Storage Temperature Range	-55 to 175	

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

6. Thermal characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.45	ºC /W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	

6. Electrical characteristics

OFF Characteristics		(TJ=25°C,unless otherwise specified)				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-to-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	100	--	--	V
I_{DSS}	Drain-to-Source Leakage Current	V_{DS}=100V, V_{GS}=0V	--	--	5	uA
		V_{DS}=80V,V_{GS}=0V, T_J=125°C	--	--	100	
I_{GSS}	Gate-to-Source Leakage Current	V_{GS}=+20V,V_{DS}=0V	--	--	+100	nA
		V_{GS}=-20V, V_{DS}=0V	--	--	-100	
ON Characteristics		(TJ=25°C,unless otherwise specified)				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	V_{GS}=10V, I_D=25A[5]	--	4.5	5.0	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	2.0	--	4.0	V
Dynamic Characteristics		Essentially independent of operating temperature				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1.0MHZ	--	8000	--	pF
C_{rss}	Reverse Transfer Capacitance		--	950	--	
C_{oss}	Output Capacitance		--	760	--	
R_g	Gate Series Resistance	f=1.0MHZ	--	2.0	--	Ω
Q_g	Total Gate Charge	V_{DD}=50V, I_D=80A, V_{GS}=0 to 10V	--	120	--	nC
Q_{gs}	Gate-to-Source Charge		--	50	--	
Q_{gd}	Gate-to-Drain (Miller) Charge		--	40	--	
Resistive Switching Characteristics		Essentially independent of operating temperature				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=50V, I_D=40A, V_{GS}= 10V R_G=10Ω	--	60	--	nS
t_{rise}	Rise Time		--	132	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	170	--	
t_{fall}	Fall Time		--	85	--	
Source-Drain Body Diode Characteristics		(T_J=25°C,unless otherwise specified)				
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Unit
I_{SD}	Continuous Source Current[2]	Integral PN-diode in MOSFET	--	--	160	A
I_{SM}	Pulsed Source Current[2]		--	--	640	
V_{SD}	Diode Forward Voltage	I_S=25A, V_{GS}=0V	--	--	1.4	V
t_{rr}	Reverse recovery time	V_{GS}=0V ,I_F=80A, diF/dt=100A/μs	--	100	--	ns
Q_{rr}	Reverse recovery charge		--	335	--	uC

Note:
[1] T_J =+25 ºC to +175 ºC.
[2] Silicon limited current only.
[3] Package limited current .
[4] Repetitive rating; pulse width limited by maximum junction temperature.
[5] Pulse width≤380μs; duty cycle≤2%.

7. Test circuits and waveforms

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

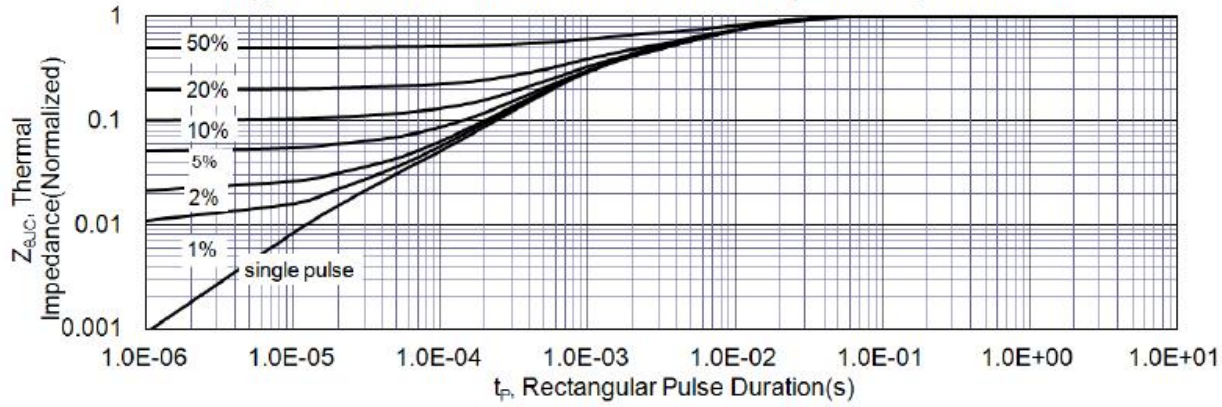


Figure 2. Maximum Power Dissipation vs. Case Temperature

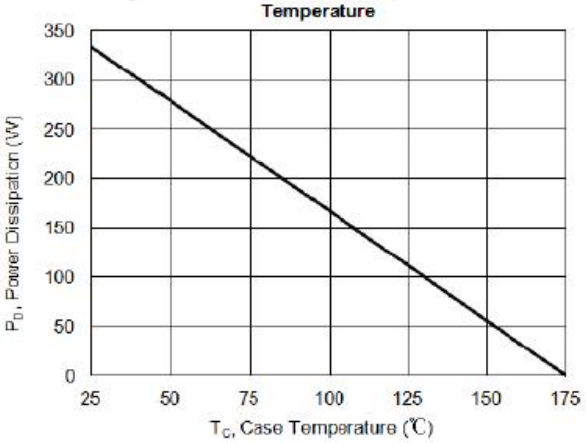


Figure 3 .Maximum Continuous Drain Current vs Case Temperature

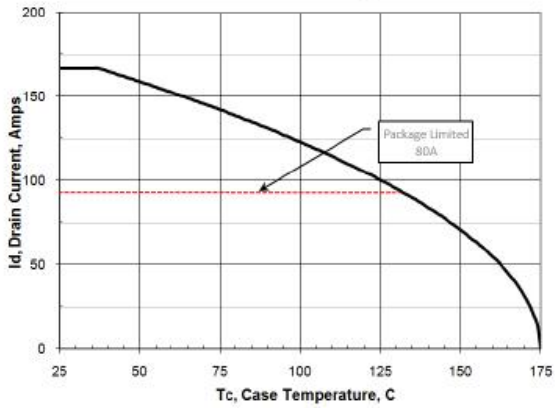


Figure 4. Typical Output Characteristics

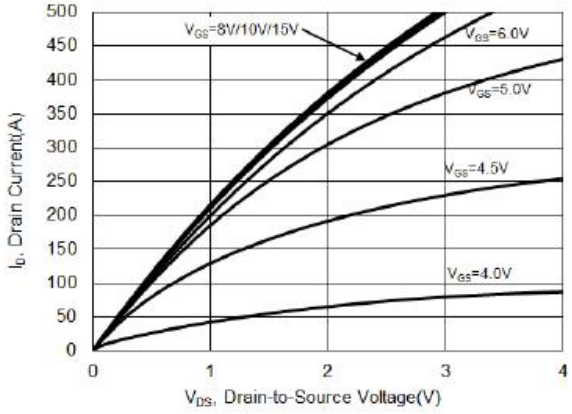


Figure 5. Typical Drain-to-Source ON Resistance vs. Gate Voltage

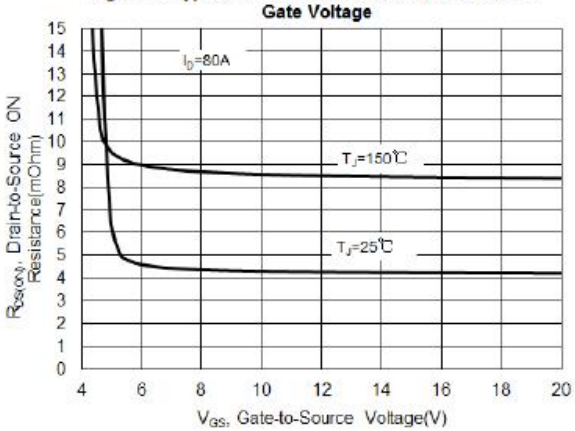


Figure 6. Maximum Peak Current Capability

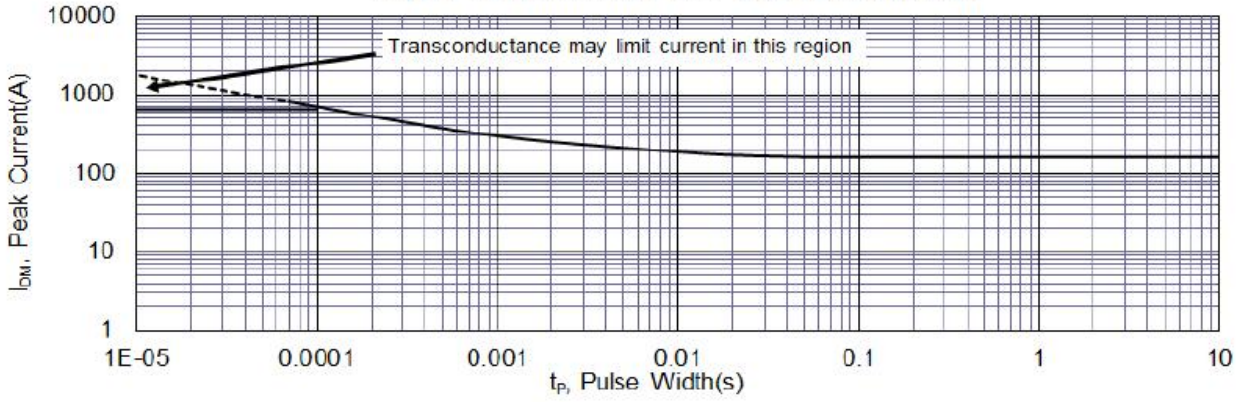


Figure 7. Typical Transfer Characteristics

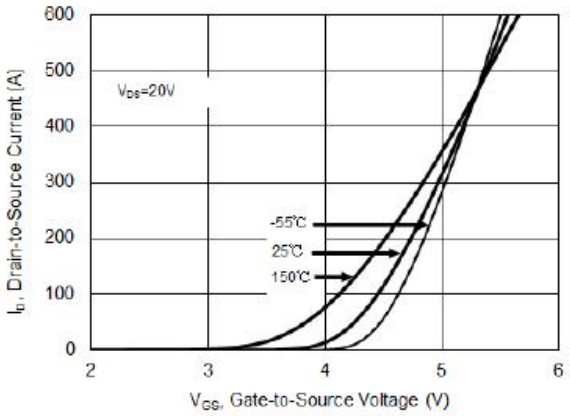


Figure 8. Unclamped Inductive Switching Capability

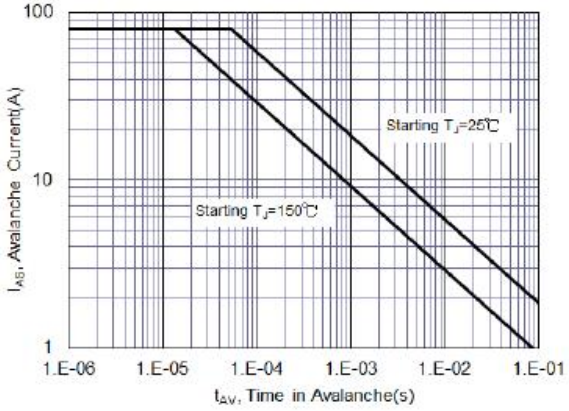


Figure 9. Typical Drain-to-Source ON Resistance

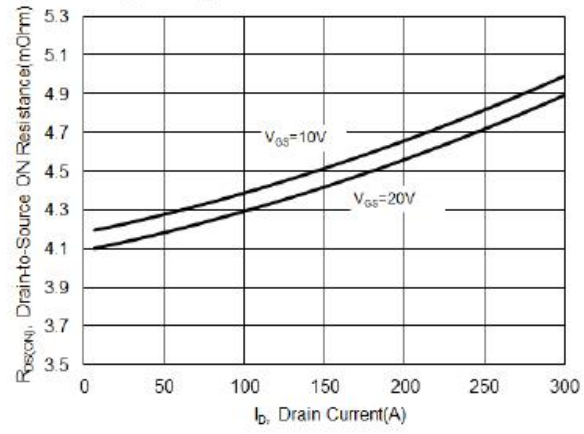


Figure 10. Typical Drain-to-Source On Resistance vs. Junction Temperature

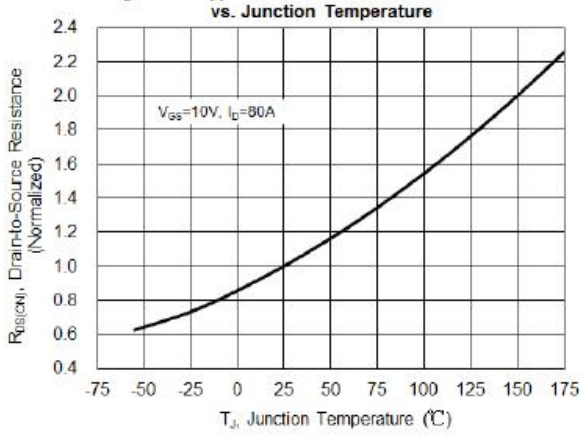


Figure 11.Typical Breakdown Voltage vs. Junction Temperature

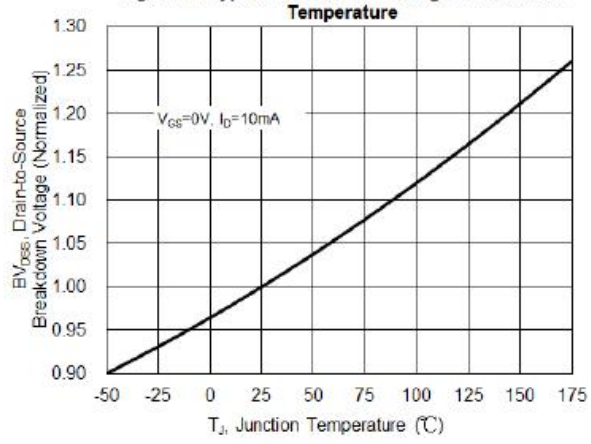


Figure 12.Typical Threshold Voltage vs. Junction Temperature

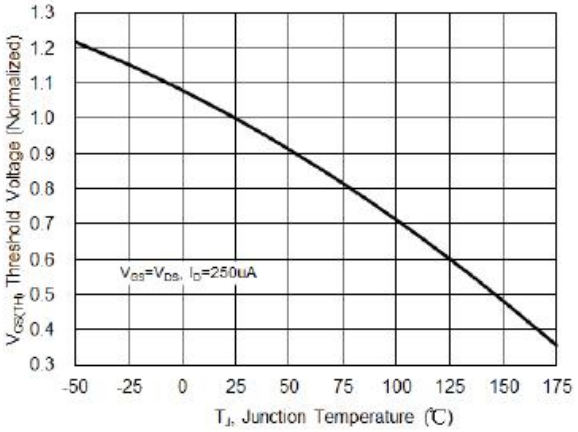


Figure 13. Maximum Forward Safe Operation Area

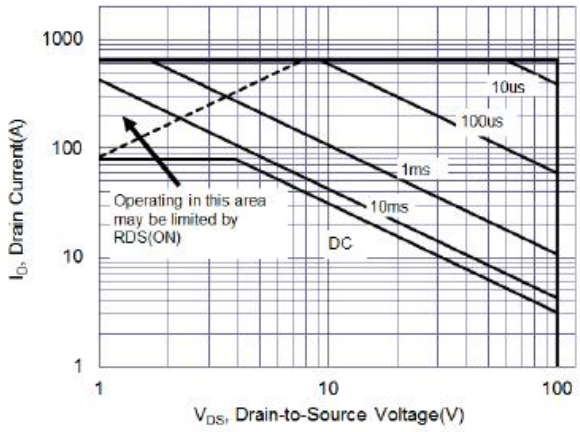


Figure 14. Capacitance vs Vds

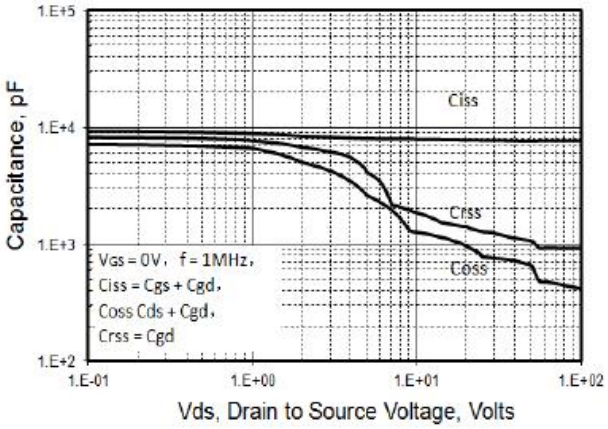


Figure 15. Typical Gate Charge vs. Gate-to-Source Voltage

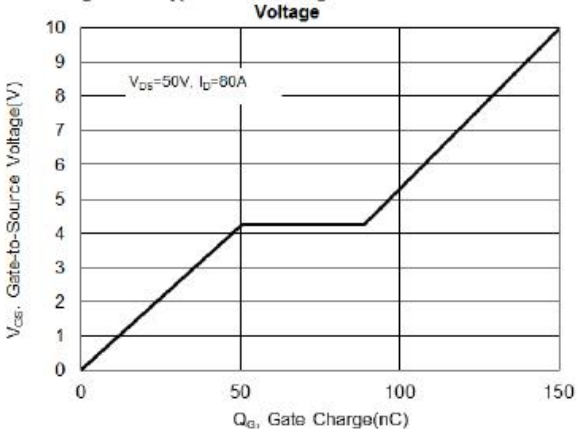
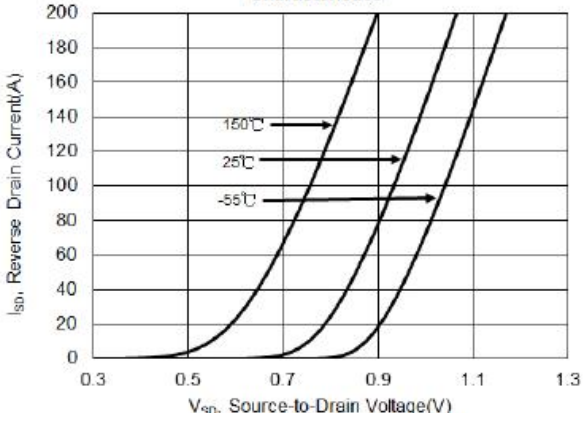


Figure 16. Typical Body Diode Transfer Characteristics



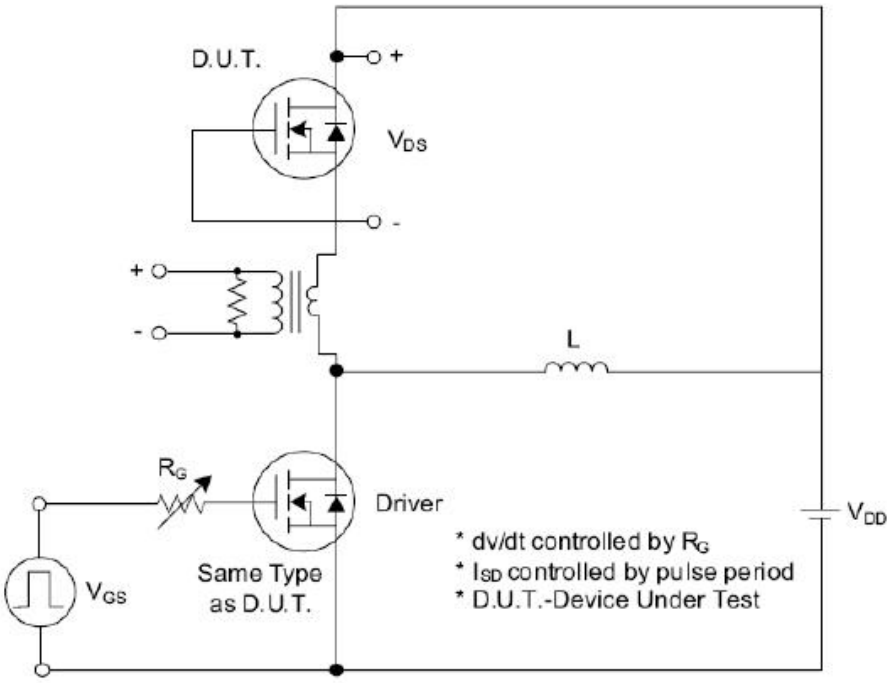


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

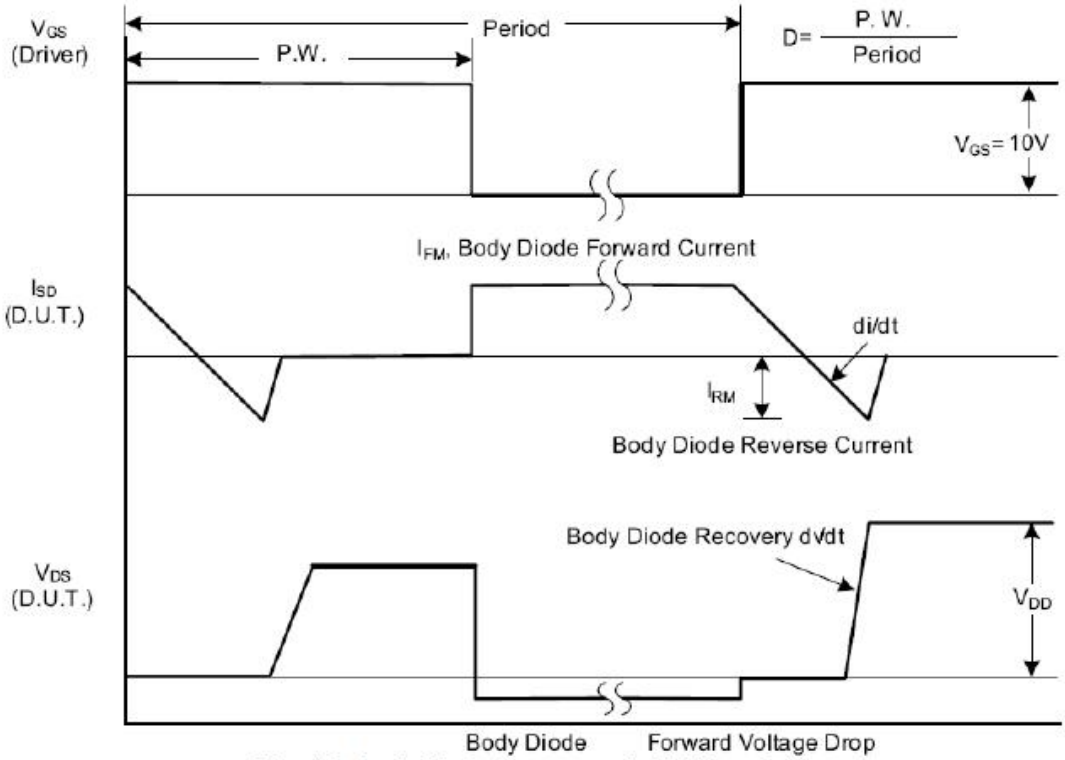


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

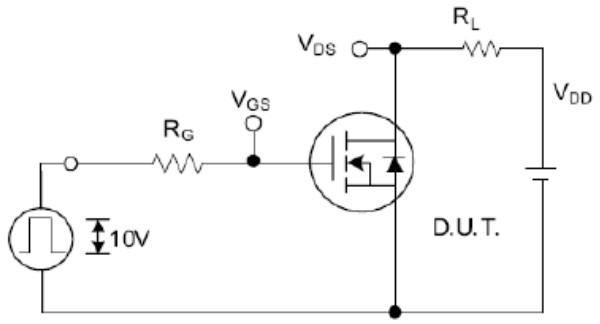


Fig. 2.1 Switching Test Circuit

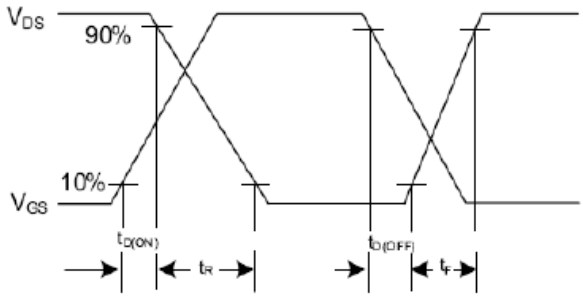


Fig. 2.2 Switching Waveforms

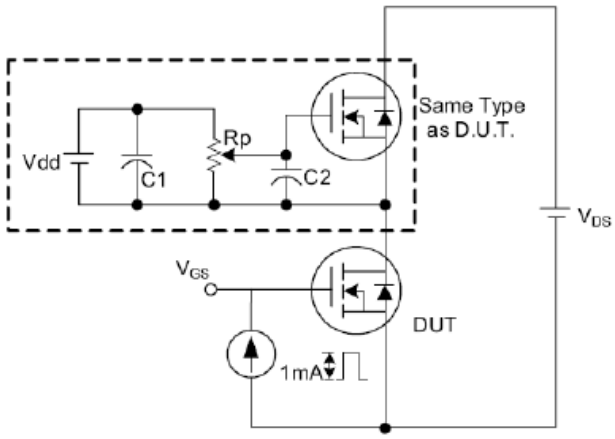


Fig. 3 . 1 Gate Charge Test Circuit

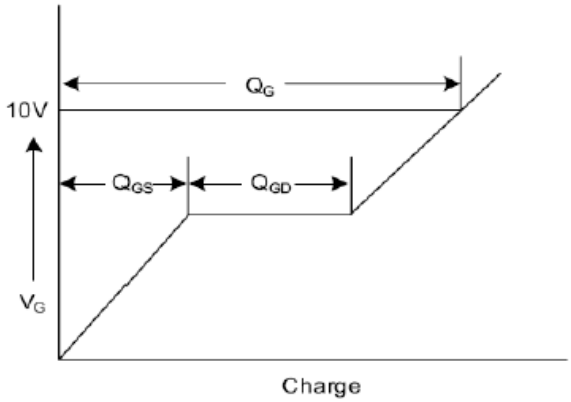


Fig. 3 . 2 Gate Charge Waveform

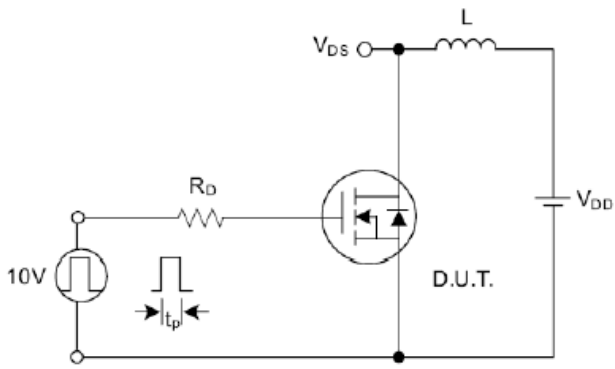


Fig. 4.1 Unclamped Inductive Switching Test Circuit

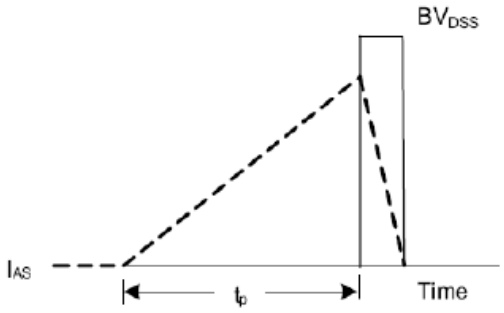


Fig. 4.2 Unclamped Inductive Switching Waveforms

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