

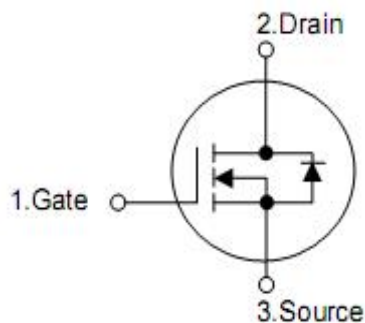
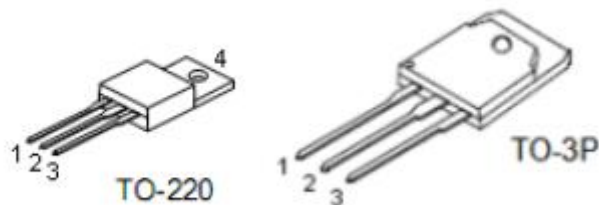
1. General Features

- n Proprietary New Planar Technology
- n $R_{DS(ON),typ.}=100m\Omega@V_{GS}=10V$
- n Low Gate Charge Minimize Switching Loss
- n Fast Recovery Body Diode

2. Applications

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

3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Ordering Information

Part Number	Package	Brand
KNP9130A	TO-220	KIA
KNH9130A	TO-3P	KIA

5. Absolute maximum ratings

(Tc= 25 °C , unless otherwise specified)

Symbol	Parameter	Rating		Unit
		TO-220	TO-3P	
V _{DSS}	Drain-to-Source Voltage ^[1]	300		V
V _{GSS}	Gate-to-Source Voltage	±20		
I _D	Continuous Drain Current	40		A
	Continuous Drain Current@ Tc=100 °C	Figure3		
I _{DM}	Pulsed Drain Current at V _{GS} =10V ^[2]	Figure6		
E _{AS}	Single Pulse Avalanche Energy	1250		mJ
dv /dt	Peak Diode Recovery dv/dt ^[3]	5.0		V/ns
P _D	Power Dissipation	125	150	W
	Derating Factor above 25 °C	1.0	1.2	W/ °C
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		°C
T _J &T _{STG}	Operating and Storage Temperature Range	-55 to 150		

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
		TO-220	TO-3P	
R _{θJC}	Thermal Resistance, Junction-to-Case	1.0	0.83	°C /W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	62		

6. Electrical characteristics

OFF Characteristics		(T _J =25°C, unless otherwise specified)				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
B _V DSS	Drain-to-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	300	--	--	V
I _{DSS}	Drain-to-Source Leakage Current	V _{DS} =250V, V _{GS} =0V	--	--	1	uA
		V _{DS} =200V, 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		(T _J =25°C, unless otherwise specified)				
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R _{DS(ON)}	Static Drain-to-Source On-Resistance ^[4]	V _{GS} =10V, I _D =20A	--	100	150	mΩ
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	2.0	--	4.0	V
g _{FS}	Forward Transconductance ^[4]	V _{DS} =15V, I _D =20A	--	60	--	S
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	--	3100	--	pF
C _{oss}	Output Capacitance		--	250	--	
C _{rss}	Reverse Transfer Capacitance		--	80	--	
Q _g	Total Gate Charge	V _{DD} =100V, I _D =20A, V _{GS} =0 to 10V	--	95	--	nC
Q _{gs}	Gate-to-Source Charge		--	15	--	
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} =100V, I _D =20A, V _{GS} = 10V, R _G =3.9Ω	--	20	--	nS
t _{rise}	Rise Time		--	32	--	
t _{d(OFF)}	Turn-Off Delay Time		--	64	--	
t _{fall}	Fall Time		--	26	--	
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 ^[4]	Integral PN-diode in MOSFET	--	--	40	A
I _{SM}	Pulsed Source Current ^[4]		--	--	160	
V _{SD}	Diode Forward Voltage	I _S =40A, V _{GS} =0V	--	--	1.5	V
t _{rr}	Reverse recovery time	V _{GS} =0V, I _F =20A, diF/dt=100A/μs	--	255	--	ns
Q _{rr}	Reverse recovery charge		--	400	--	uC

Note:

1. T_J=+25°C to +150°C
2. Repetitive rating; pulse width limited by maximum junction temperature.
3. I_{SD}=20A di/dt<100A/μs, V_{DD}<B_VDSS, T_J=+150°C.
4. Pulse width≤380μs; duty cycle≤2%.

7. Test circuits and waveforms

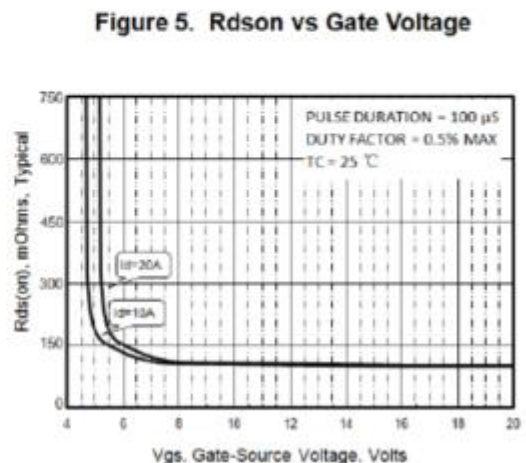
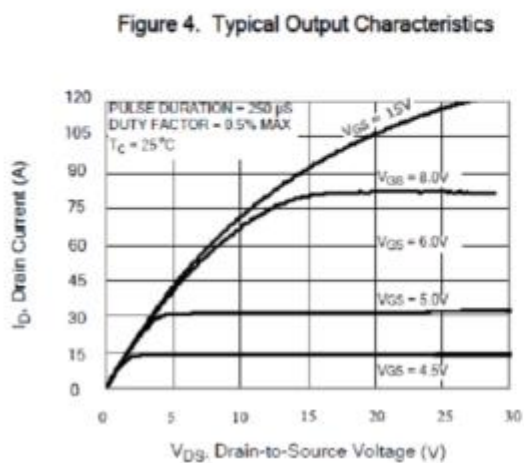
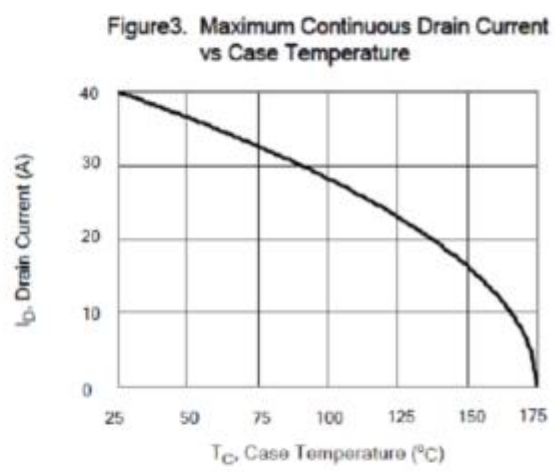
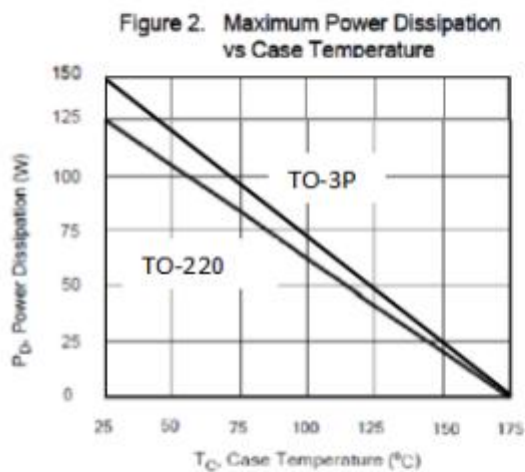
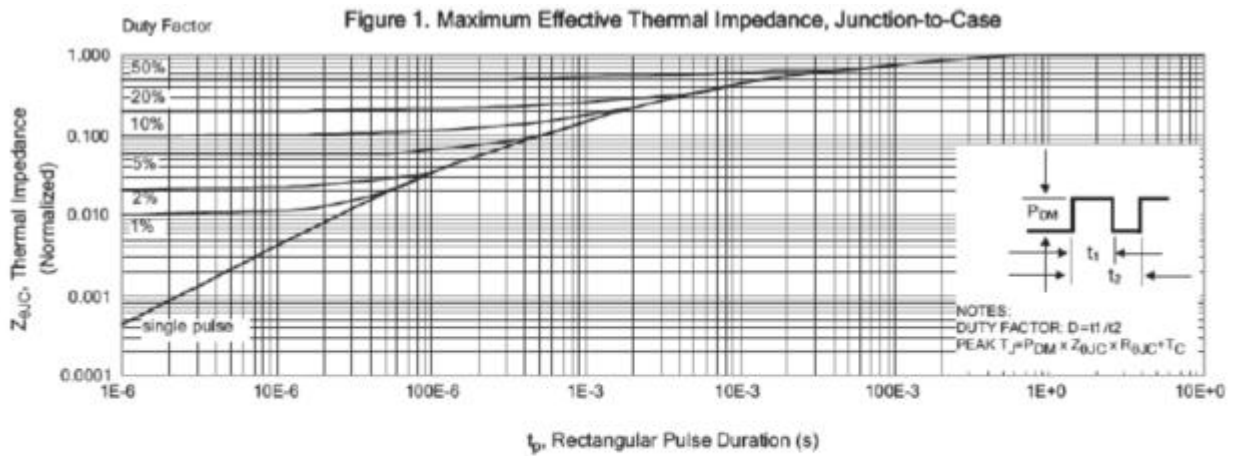


Figure 6. Maximum Peak Current Capability

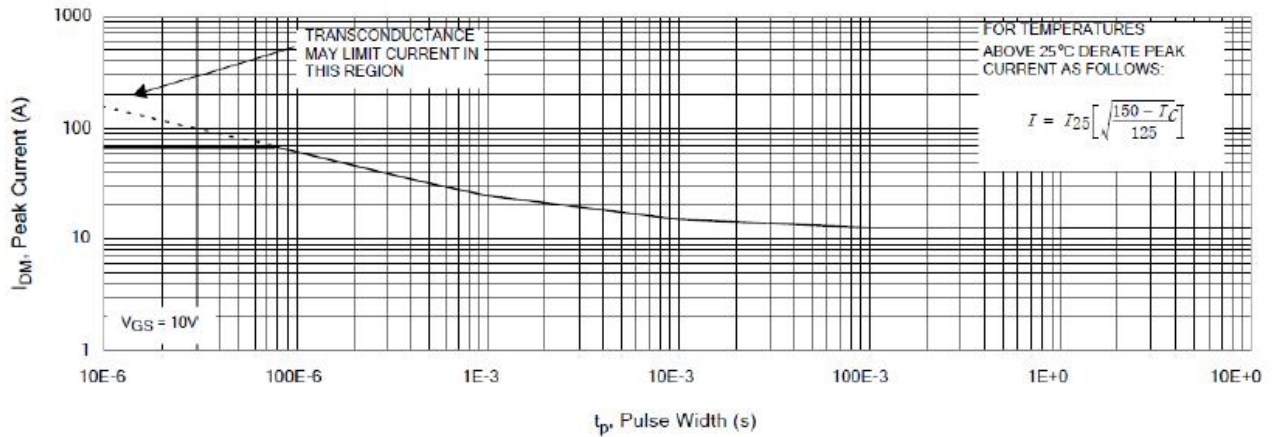


Figure 7. Typical Transfer Characteristics

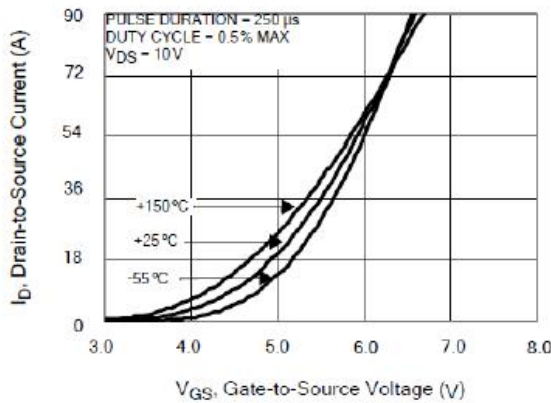


Figure 8. Unclamped Inductive Switching Capability

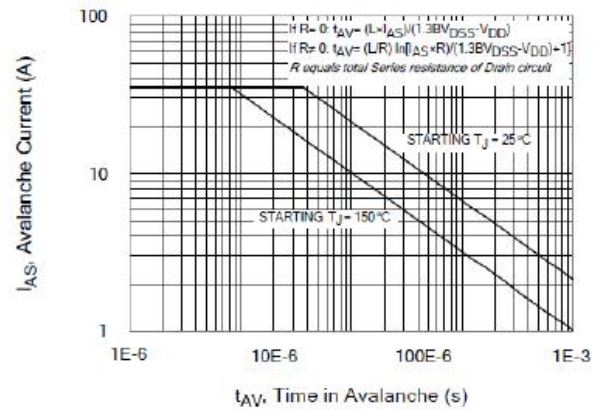


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

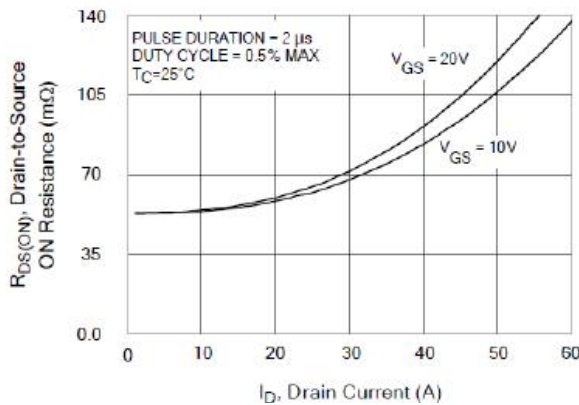


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

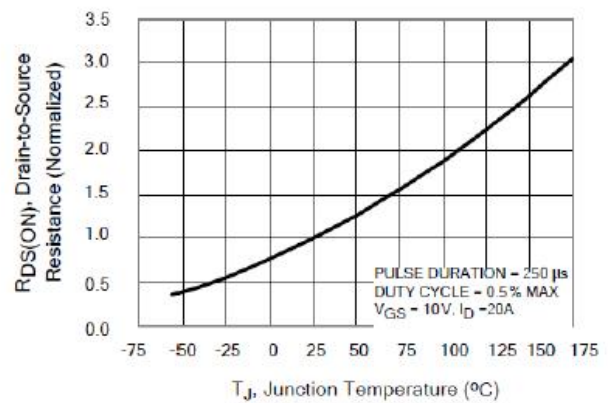


Figure 11. Typical Breakdown Voltage vs Junction Temperature

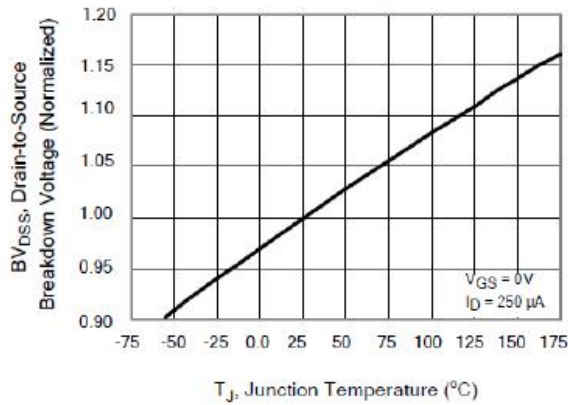


Figure 12. Typical Threshold Voltage vs Junction Temperature

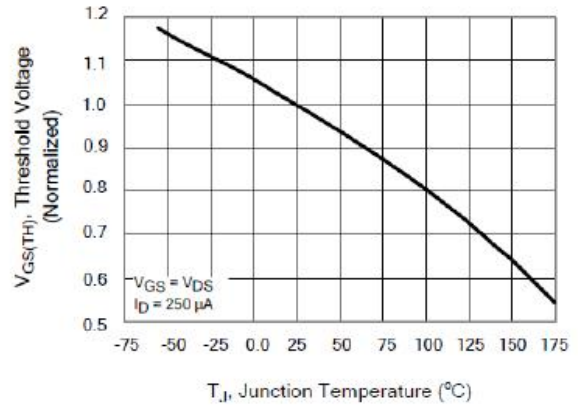


Figure 13. Maximum Safe Operating Area

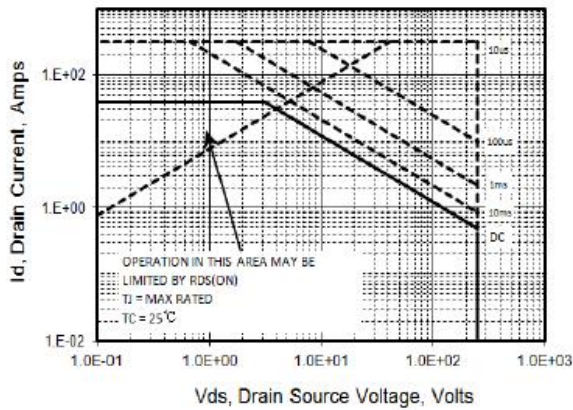


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

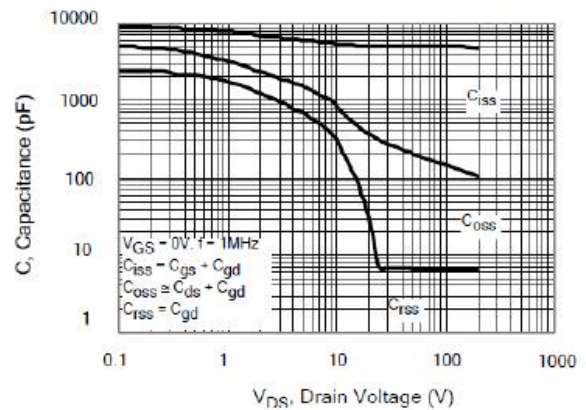


Figure 15. Typical Gate Charge

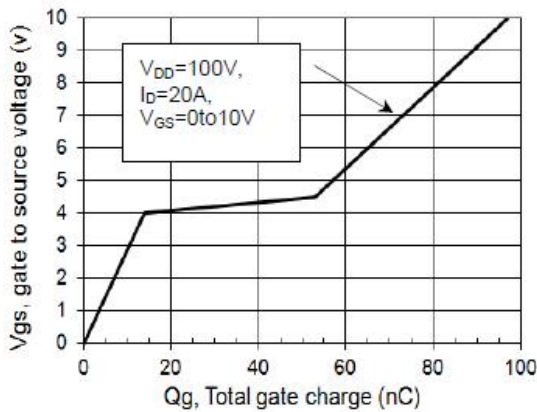
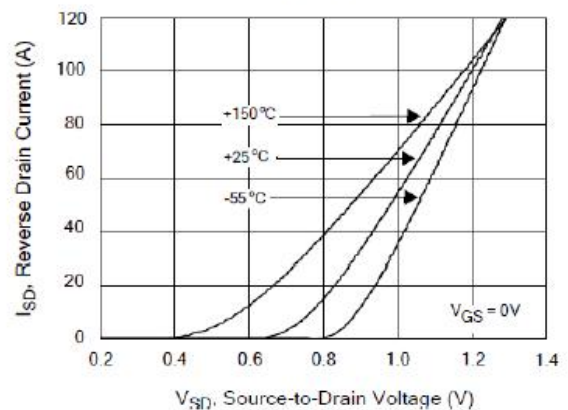


Figure 16. Typical Body Diode Transfer Characteristics



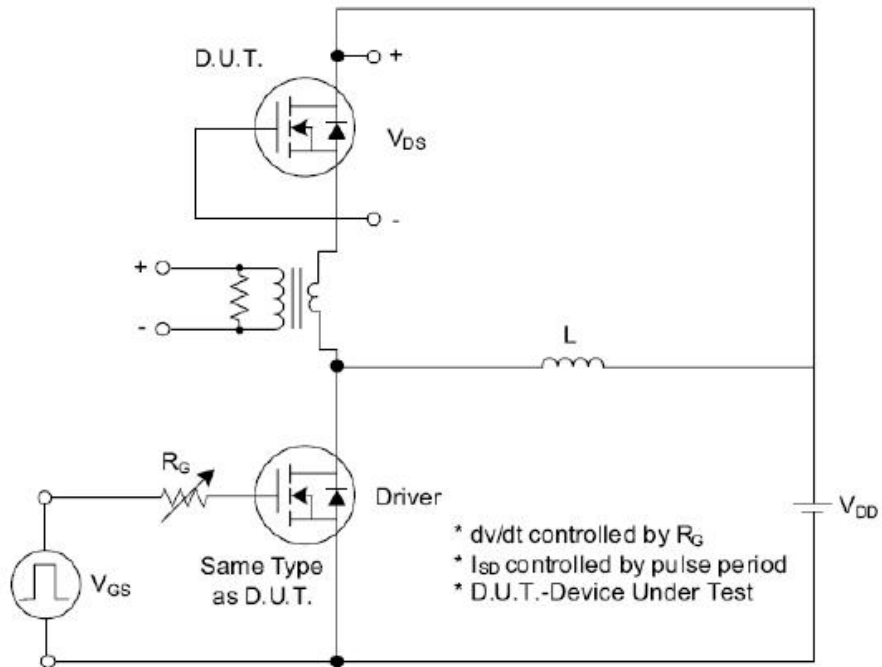


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

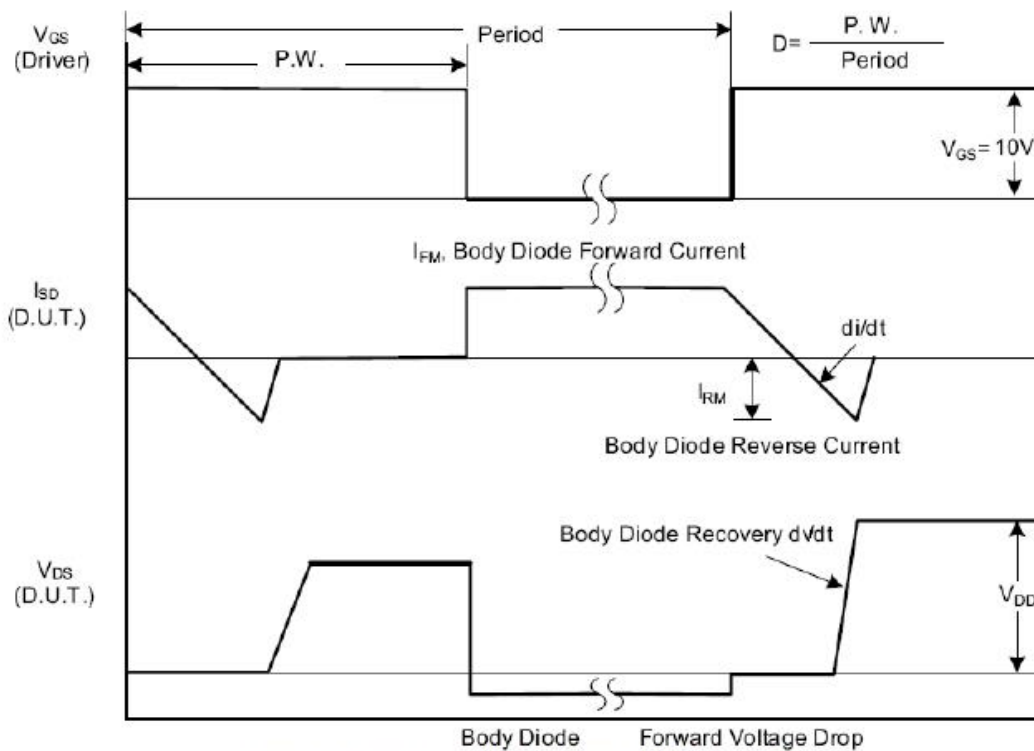


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms