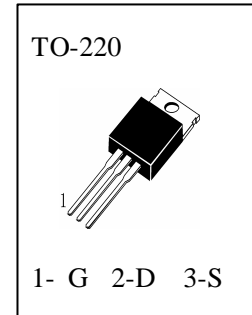




N-Channel Enhancement Mode Field Effect Transistor

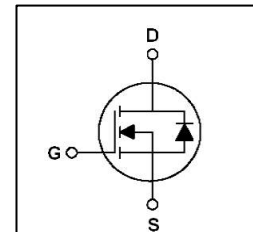
General Description

This Power MOSFET is produced using advanced planar stripe, DMOS technology. This latest technology has been especially designed to minimize on-state resistance, have a low gate charge with superior switching performance, and rugged avalanche characteristics. This devices is well suited for synchronous DC-DC Converters and Power Management in portable and battery operated products.



Features

- 30A, 60V, $R_{DS(on)} < 0.04\Omega$ @ $V_{GS} = 10V$
- Low gate charge
- 100% avalanche tested
- Improved dv/dt capability
- Equivalent Type:FQP30N06



Maximum Ratings ($T_a=25^\circ\text{C}$ unless otherwise specified)

T_{stg}	—Storage Temperature	-----	-55~175
T_j	—Operating Junction Temperature	-----	175
V_{DSS}	— Drain-Source Voltage	-----	60V
I_D	— Drain Current (Continuous)($T_c=25^\circ\text{C}$)	-----	30A
	Drain Current (Continuous)($T_c=100^\circ\text{C}$)	-----	21.2A
I_{DM}	— Drain Current Pulse	-----	120A
V_{GSS}	— Gate-Source Voltage	-----	$\pm 20V$
P_D	— Maximum Power Dissipation ($T_c=25^\circ\text{C}$)	-----	79W
E_{AS}	— Single Pulse Avalanche Energy		
	(starting $T_j = 25^\circ\text{C}$, $I_D = I_{AR}$, $V_{DD} = 50V$)	-----	430 mJ
dv/dt	— Reak Diode Recovery dv/dt		
	(ISD 30A,di/dt 300A/us,Vdd BVdss,Duty Cycle 2%)	-----	7.0V/ns

Thermal Characteristics

Symbol	Items	TO-220	Unit
Rthj-case	Thermal Resistance Junction-case	Max 1.9	/W
Rthj-amb	Thermal Resistance Junction-ambient	Max 62.5	/W
Rth c-s	Thermal Resistance Case-sink	Typ 0.5	/W

**Electrical Characteristics** ($T_a=25$ unless otherwise specified)

Symbol	Items	Min.	Typ.	Max.	Unit	Conditions
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	60			V	$I_D=250\mu A, V_{GS}=0V$
I_{DSS}	Zero Gate Voltage Drain Current			1	μA	$V_{DS}=60V, V_{GS}=0V$
				10	μA	$V_{DS}=48V, V_{GS}=0V, T_j=150$
I_{GSS}	Gate – Body Leakage			± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	2.0		4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
$R_{DS(on)}$	Static Drain-Source On-Resistance			0.04	?	$V_{GS}=10V, I_D=15A$
Dynamic Characteristics and Switching Characteristics						
C_{iss}	Input Capacitance			1210	pF	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$
C_{oss}	Output Capacitance			380	pF	
C_{rss}	Reverse Transfer Capacitance			100	pF	
$t_{d(on)}$	Turn - On Delay Time			40	nS	$V_{DD}=30V, I_D=15A_{pk}$ $R_G=50\Omega$ (Note 1,2)
t_r	Rise Time			60	nS	
$t_{d(off)}$	Turn - Off Delay Time			130	nS	
t_f	Fall Time			90	nS	
Q_g	Total Gate Charge			35	nC	$V_{DS}=0.8V_{DSS}, I_D=30A,$ $V_{GS}=10V$ (Note 1,2)
Q_{gs}	Gate–Source Charge		6.2		nC	
Q_{gd}	Gate–Drain Charge		11.1		nC	
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Continuous Source–Drain Diode Forward Current			30	A	
I_{SM}	Pulsed Drain-Source Diode Forward Current			120	A	
V_{SD}	Source–Drain Diode Forward On–Voltage			1.5	V	$I_S=30A, V_{GS}=0$

Notes:

1. Pulse Test: Pulse width 300 μS , Duty cycle 2%
2. Essentially independent of operating temperature



Typical Characteristics

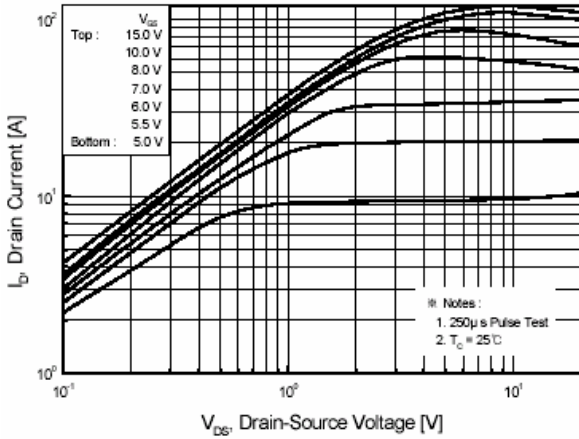


Fig 1. On-State Characteristics

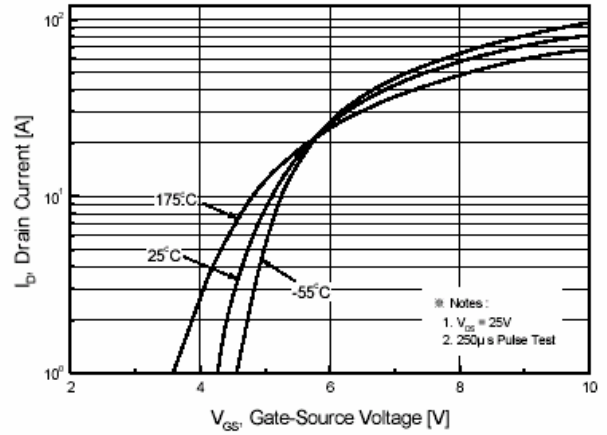


Fig 2. Transfer Characteristics

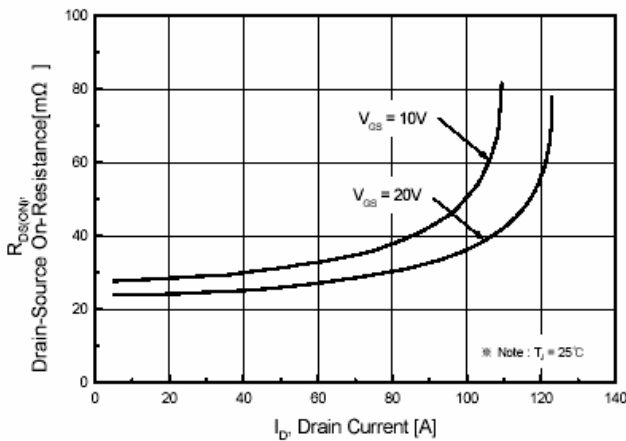


Fig 3. On Resistance Variation vs. Drain Current and Gate Voltage

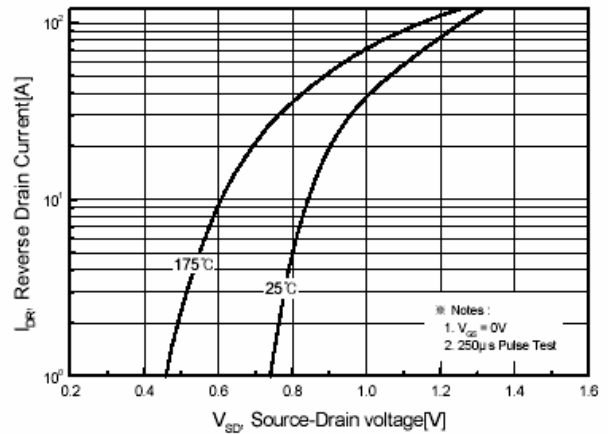


Fig 4. On State Current vs. Allowable Case Temperature

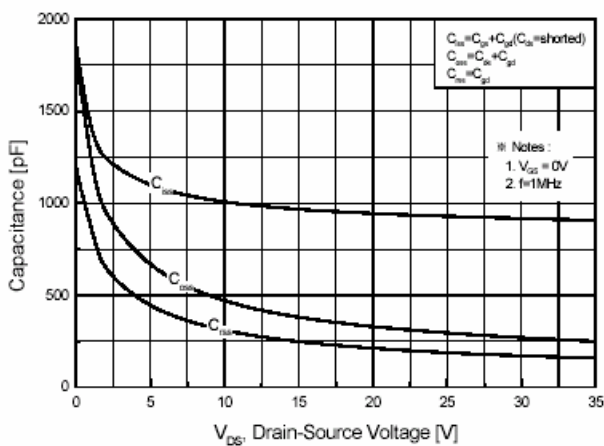


Fig 5. Capacitance Characteristics

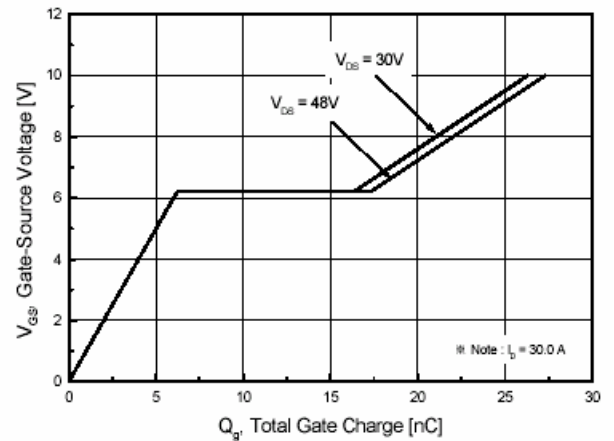


Fig 6. Gate Charge Characteristics



Typical Characteristics

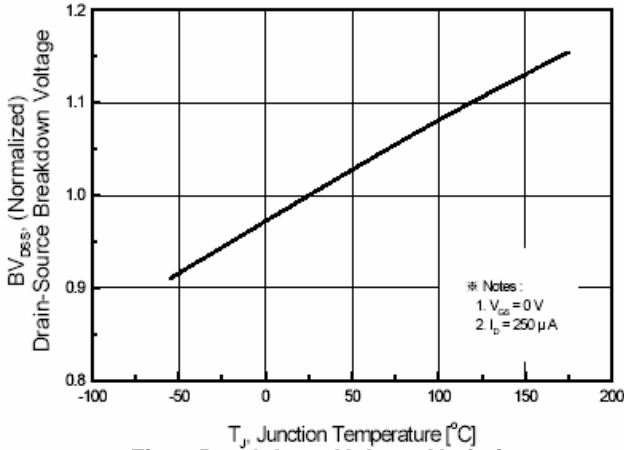


Fig 7. Breakdown Voltage Variation vs. Junction Temperature

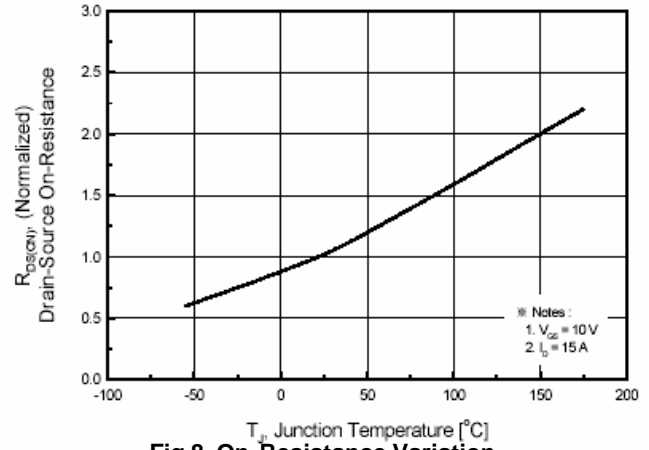


Fig 8. On-Resistance Variation vs. Junction Temperature

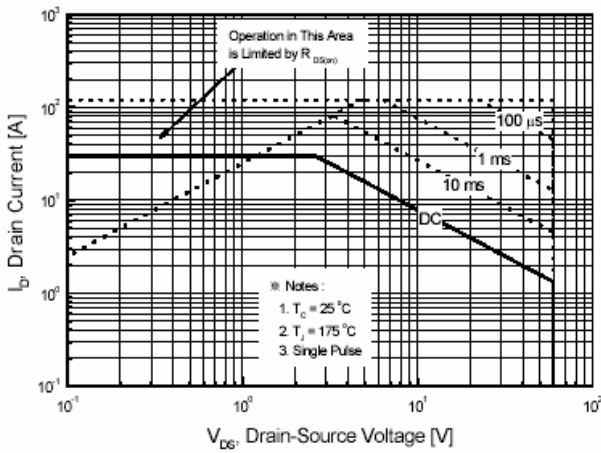


Fig 9. Maximum Safe Operating Area

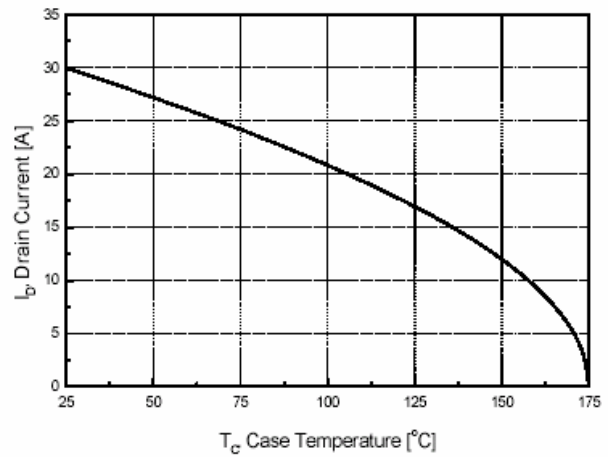


Fig 10. Maximum Drain Current vs. Case Temperature

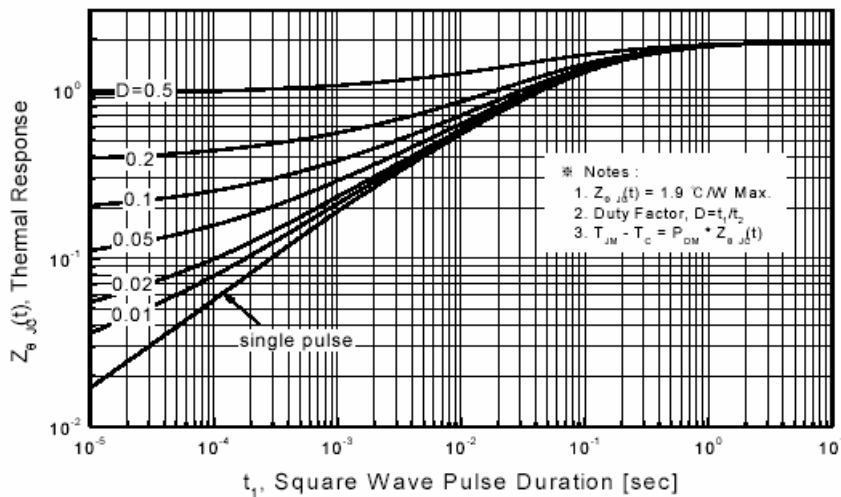


Fig 11. Transient Thermal Response Curve



Typical Characteristics

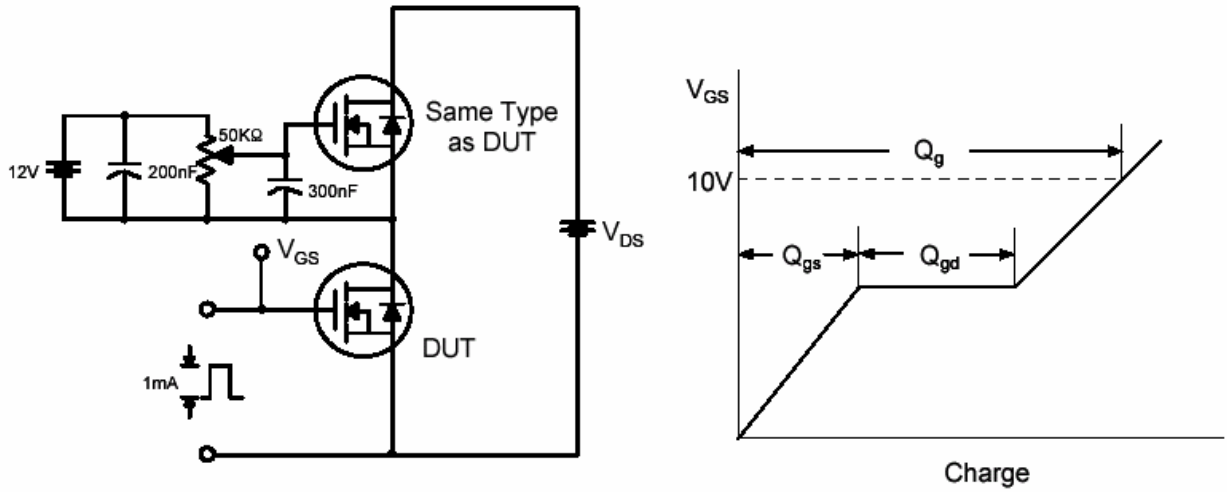


Fig. 12. Gate Charge Test Circuit & Waveforms

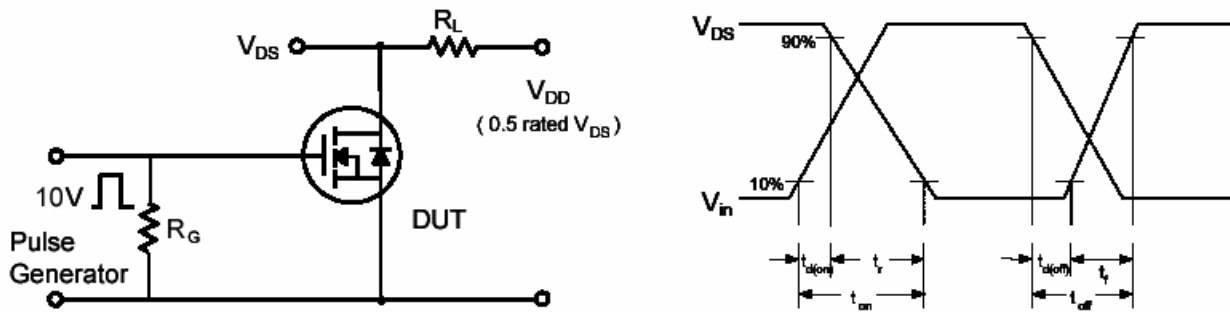


Fig. 13. Switching Time Test Circuit & Waveforms

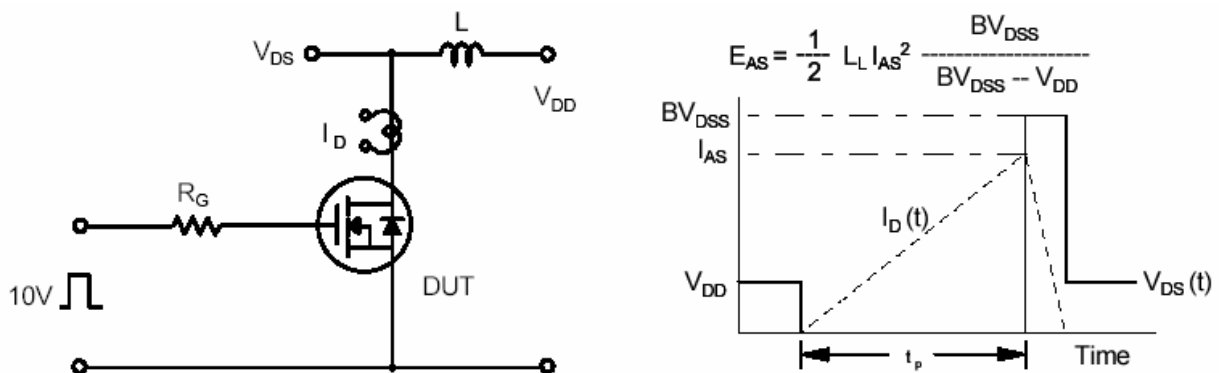


Fig. 14. Unclamped Inductive Switching Test Circuit & Waveforms



Typical Characteristics

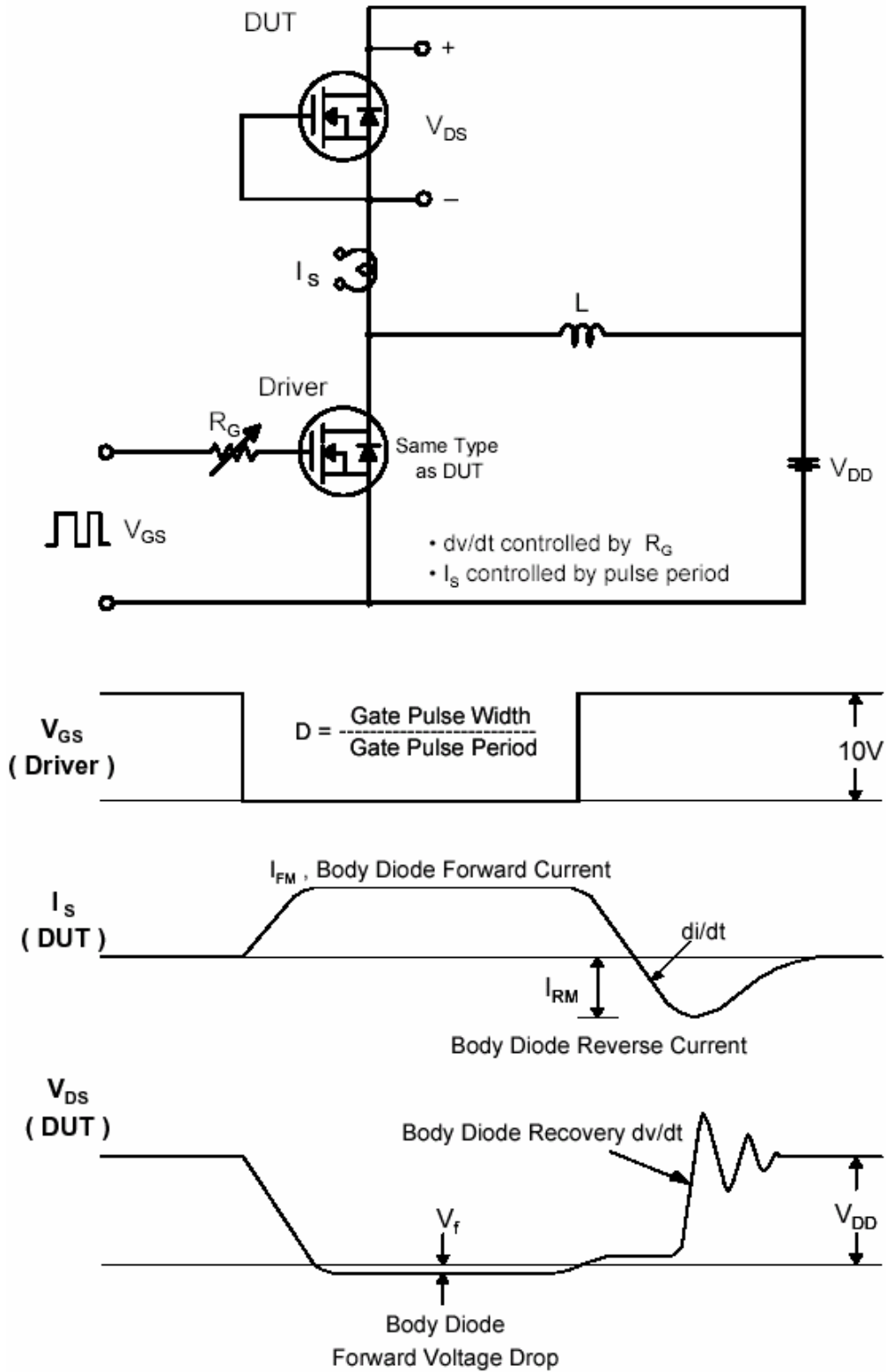


Fig. 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms