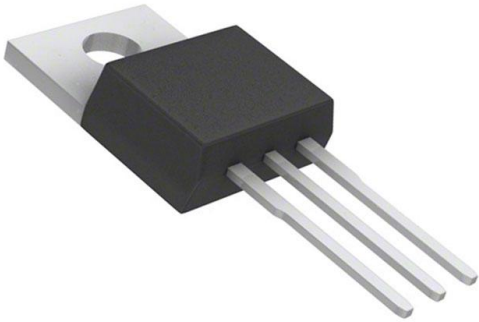


IRF530A Datasheet

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<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	IRF530A-DG
Manufacturer	onsemi
Manufacturer Product Number	IRF530A
Description	MOSFET N-CH 100V 14A TO220-3
Detailed Description	N-Channel 100 V 14A (Tc) 55W (Tc) Through Hole T O-220-3



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Purchase and inquiry

Manufacturer Product Number:

IRF530A

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

100 V

Drive Voltage (Max Rds On, Min Rds On):

10V

Vgs(th) (Max) @ Id:

4V @ 250µA

Vgs (Max):

±20V

FET Feature:

-

Operating Temperature:

-55°C ~ 175°C (Tj)

Supplier Device Package:

TO-220-3

Base Product Number:

IRF530

Manufacturer:

onsemi

Product Status:

Obsolete

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

14A (Tc)

Rds On (Max) @ Id, Vgs:

110mOhm @ 7A, 10V

Gate Charge (Qg) (Max) @ Vgs:

36 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

790 pF @ 25 V

Power Dissipation (Max):

55W (Tc)

Mounting Type:

Through Hole

Package / Case:

TO-220-3

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

Not Applicable

ECCN:

EAR99



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Advanced Power MOSFET

IRF530A

FEATURES

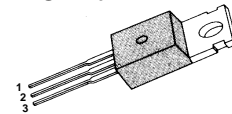
- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
- Extended Safe Operating Area
- 175°C Operating Temperature
- Lower Leakage Current : 10 μ A (Max.) @ $V_{DS} = 100V$
- Lower $R_{DS(ON)}$: 0.092 Ω (Typ.)

$$BV_{DSS} = 100 V$$

$$R_{DS(on)} = 0.11 \Omega$$

$$I_D = 14 A$$

TO-220



1.Gate 2. Drain 3. Source

Absolute Maximum Ratings

Symbol	Characteristic	Value	Units
V_{DSS}	Drain-to-Source Voltage	100	V
I_D	Continuous Drain Current ($T_C=25^\circ C$)	14	A
	Continuous Drain Current ($T_C=100^\circ C$)	9.9	
I_{DM}	Drain Current-Pulsed ①	56	A
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy ②	261	mJ
I_{AR}	Avalanche Current ①	14	A
E_{AR}	Repetitive Avalanche Energy ①	5.5	mJ
dv/dt	Peak Diode Recovery dv/dt ③	6.5	V/ns
P_D	Total Power Dissipation ($T_C=25^\circ C$)	55	W
	Linear Derating Factor	0.36	
T_J, T_{STG}	Operating Junction and Storage Temperature Range	- 55 to +175	$^\circ C$
T_L	Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5-seconds	300	

Thermal Resistance

Symbol	Characteristic	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	2.74	$^\circ C/W$
$R_{\theta CS}$	Case-to-Sink	0.5	--	
$R_{\theta JA}$	Junction-to-Ambient	--	62.5	

Rev. B

IRF530A

N-CHANNEL POWER MOSFET

Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
BV_{DSS}	Drain-Source Breakdown Voltage	100	--	--	V	$V_{GS}=0V, I_D=250\mu A$
$\Delta BV/\Delta T_J$	Breakdown Voltage Temp. Coeff.	--	0.11	--	V/ $^\circ\text{C}$	$I_D=250\mu A$ See Fig 7
$V_{GS(th)}$	Gate Threshold Voltage	2.0	--	4.0	V	$V_{DS}=5V, I_D=250\mu A$
I_{GSS}	Gate-Source Leakage, Forward	--	--	100	nA	$V_{GS}=20V$
	Gate-Source Leakage, Reverse	--	--	-100		$V_{GS}=-20V$
I_{DSS}	Drain-to-Source Leakage Current	--	--	10	μA	$V_{DS}=100V$
		--	--	100		$V_{DS}=80V, T_C=150^\circ\text{C}$
$R_{DS(on)}$	Static Drain-Source On-State Resistance	--	--	0.11	Ω	$V_{GS}=10V, I_D=7A$ ④
g_{fs}	Forward Transconductance	--	10.25	--	Ω	$V_{DS}=40V, I_D=7A$ ④
C_{iss}	Input Capacitance	--	610	790	pF	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$ See Fig 5
C_{oss}	Output Capacitance	--	150	175		
C_{riss}	Reverse Transfer Capacitance	--	62	72		
$t_{d(on)}$	Turn-On Delay Time	--	13	40	ns	$V_{DD}=50V, I_D=14A,$ $R_G=12\Omega$ See Fig 13 ④⑤
t_r	Rise Time	--	14	40		
$t_{d(off)}$	Turn-Off Delay Time	--	55	110		
t_f	Fall Time	--	36	80		
Q_g	Total Gate Charge	--	27	36	nC	$V_{DS}=80V, V_{GS}=10V,$ $I_D=14A$ See Fig 6 & Fig 12 ④⑤
Q_{gs}	Gate-Source Charge	--	4.5	--		
Q_{gd}	Gate-Drain("Miller") Charge	--	12.8	--		

Source-Drain Diode Ratings and Characteristics

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
I_S	Continuous Source Current	--	--	14	A	Integral reverse pn-diode in the MOSFET
I_{SM}	Pulsed-Source Current ①	--	--	56		
V_{SD}	Diode Forward Voltage ④	--	--	1.5	V	$T_J=25^\circ\text{C}, I_S=14A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	--	109	--	ns	$T_J=25^\circ\text{C}, I_F=14A$
Q_{rr}	Reverse Recovery Charge	--	0.41	--	μC	$di_F/dt=100A/\mu\text{s}$ ④

Notes ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② $L=2\text{mH}, I_{AS}=14A, V_{DD}=25V, R_G=27\Omega$, Starting $T_J=25^\circ\text{C}$
- ③ $I_{SD} \leq 14A, di/dt \leq 350A/\mu\text{s}, V_{DD} \leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$
- ④ Pulse Test : Pulse Width = 250 μs , Duty Cycle $\leq 2\%$
- ⑤ Essentially Independent of Operating Temperature

**N-CHANNEL
POWER MOSFET**

IRF530A

Fig 1. Output Characteristics

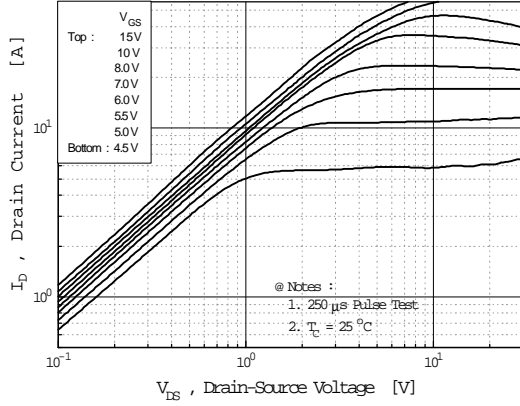


Fig 2. Transfer Characteristics

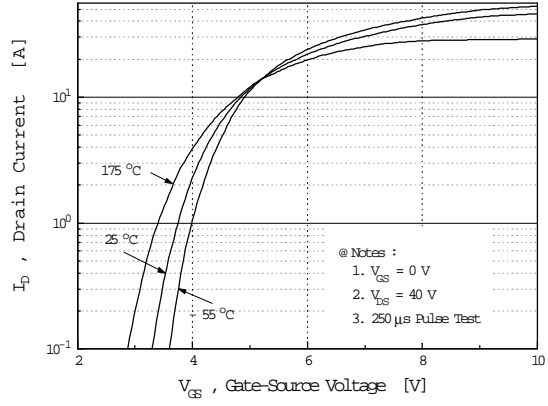


Fig 3. On-Resistance vs. Drain Current

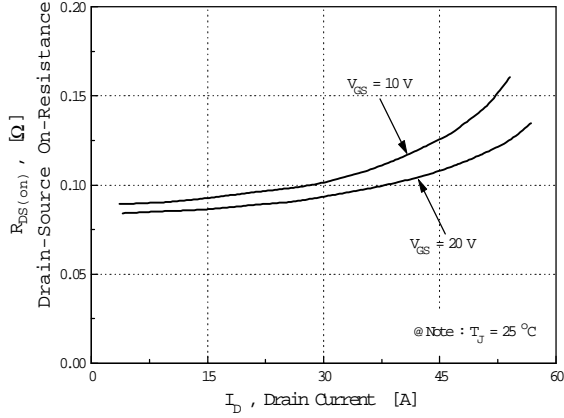


Fig 4. Source-Drain Diode Forward Voltage

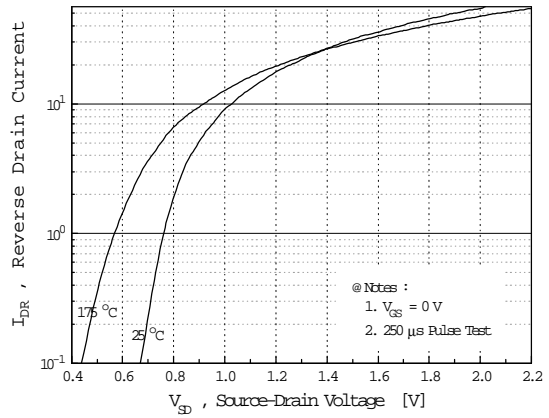


Fig 5. Capacitance vs. Drain-Source Voltage

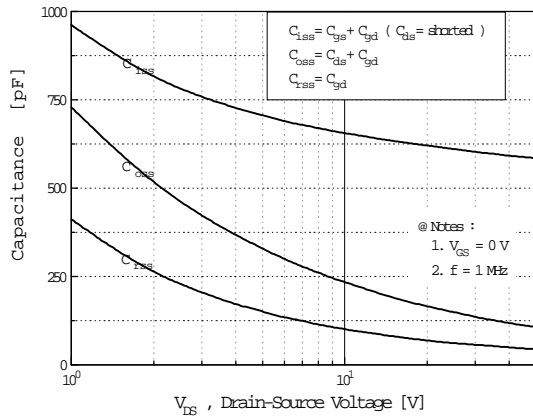
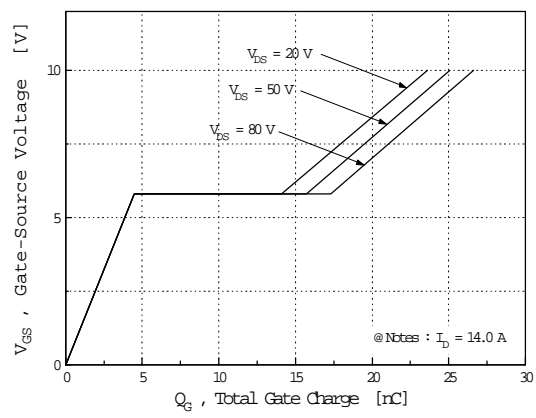
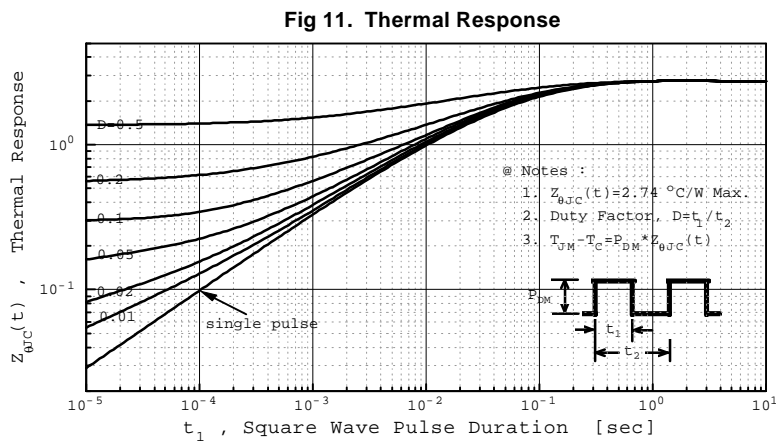
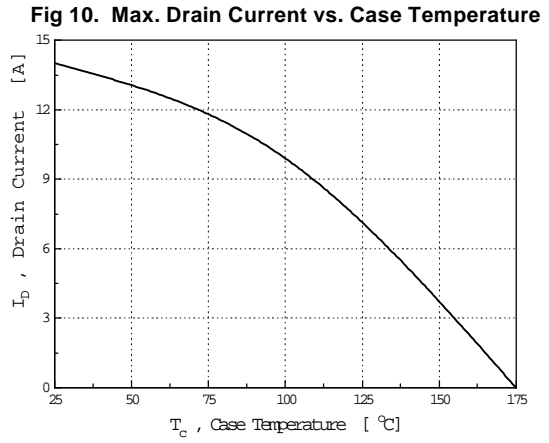
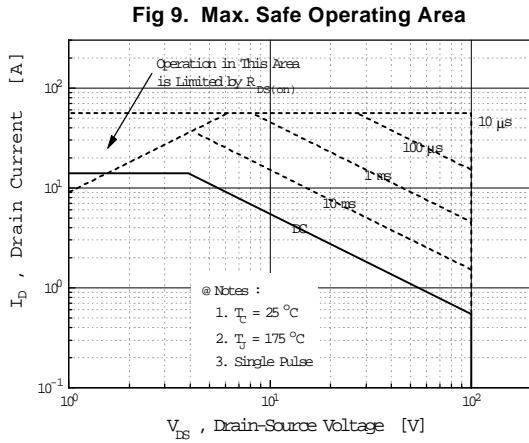
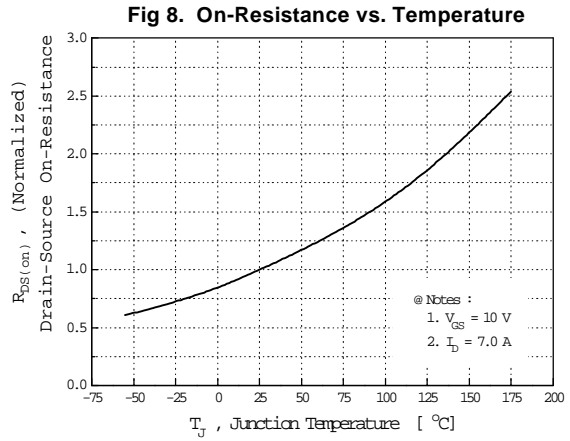
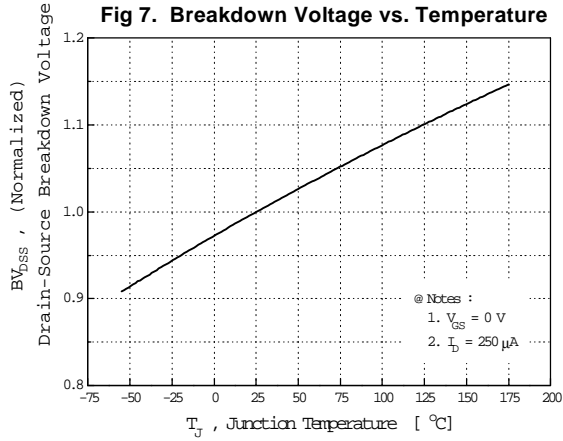


Fig 6. Gate Charge vs. Gate-Source Voltage



IRF530A

N-CHANNEL POWER MOSFET



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Fig 12. Gate Charge Test Circuit & Waveform

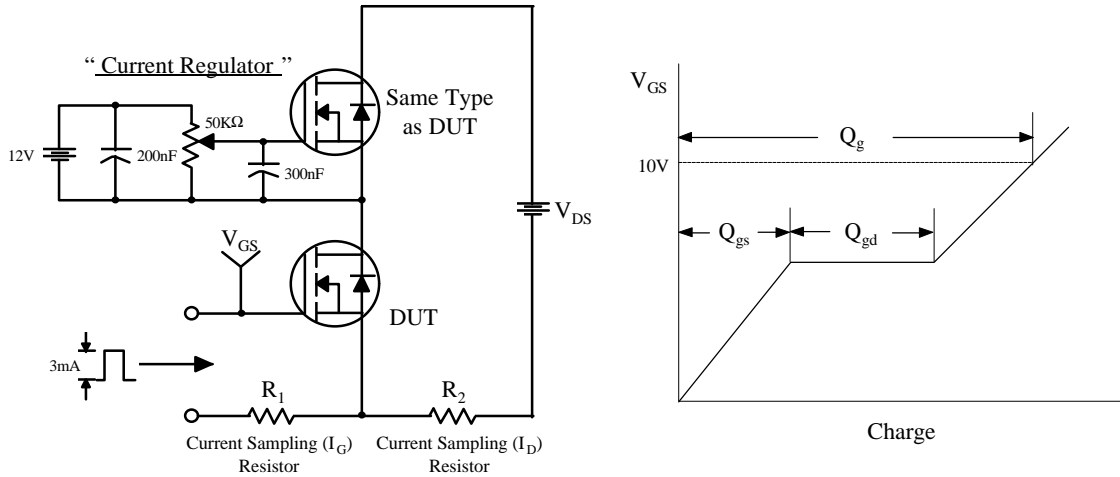


Fig 13. Resistive Switching Test Circuit & Waveforms

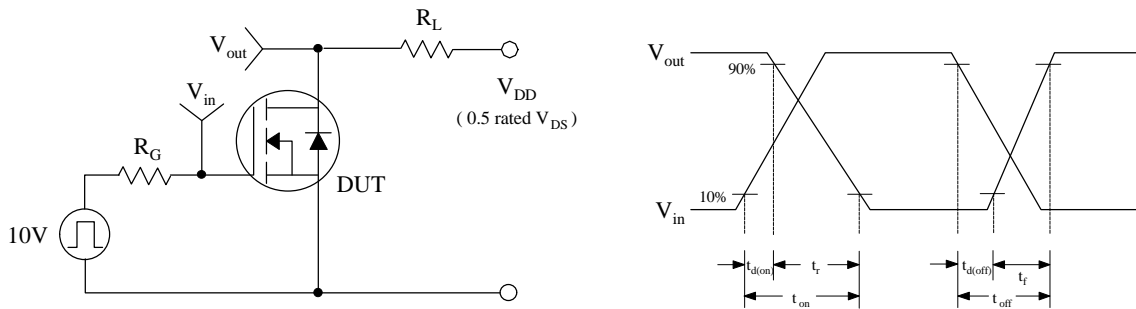
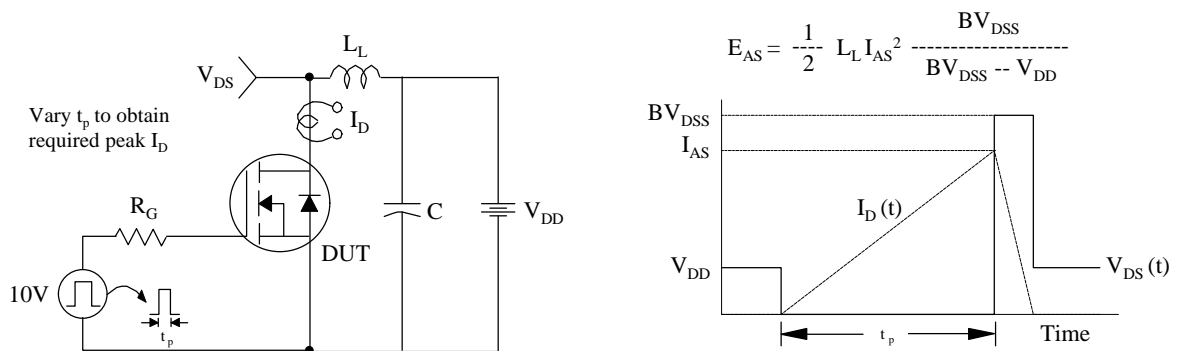


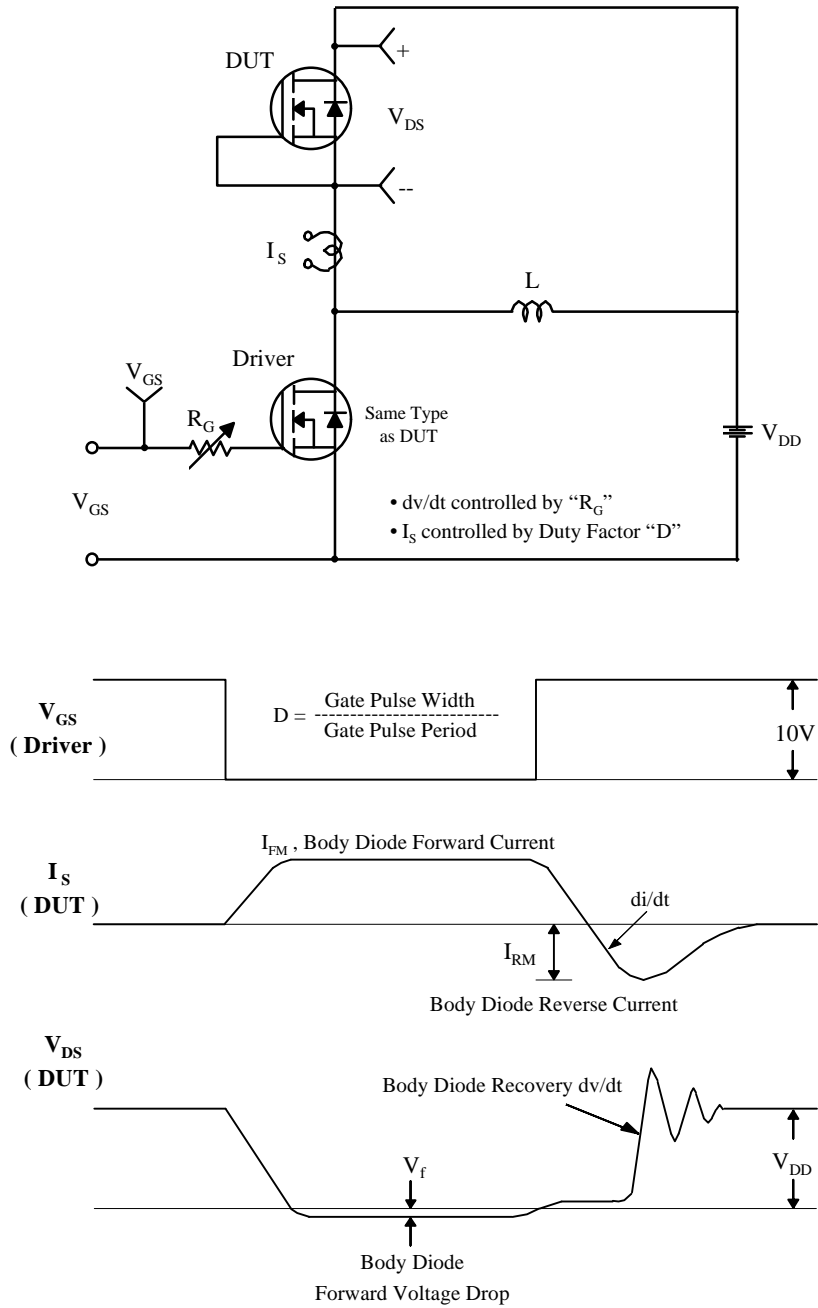
Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms



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N-CHANNEL POWER MOSFET

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



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