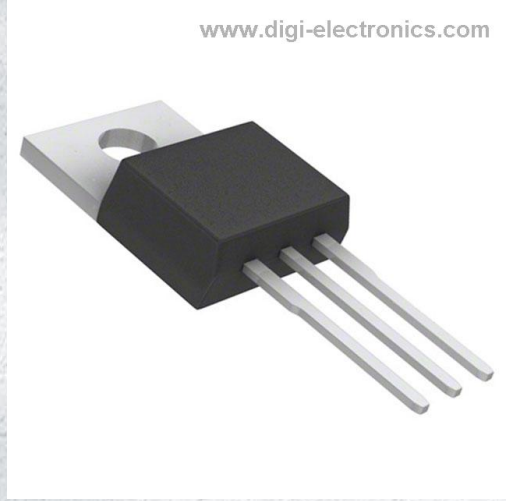
IRF530A Datasheet



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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 TO-220-3

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
IRF530A	onsemi
Series:	Product Status:
-	Obsolete
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
100 V	14A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
10V	110mOhm @ 7A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
4V @ 250µA	36 nC @ 10 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±20V	790 pF @ 25 V
FET Feature:	Power Dissipation (Max):
-	55W (Tc)
Operating Temperature:	Mounting Type:
-55°C ~ 175°C (TJ)	Through Hole
Supplier Device Package:	Package / Case:
TO-220-3	TO-220-3
Base Product Number:	
IRF530	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	Not Applicable
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

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www.onsemi.com

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Advanced Power MOSFET

IRF530A

FEATURES

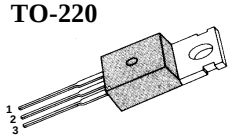
- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
- Extended Safe Operating Area
- 175℃ Operating Temperature
- Lower Leakage Current : 10 μA (Max.) @ V_{DS} = 100V
- Lower $R_{DS(ON)}$: 0.092 Ω(Typ.)

BV_{DSS} = 100 V

$R_{DS(on)}$ = 0.11Ω

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℃)	14	A
	Continuous Drain Current (T_C=100℃)	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℃)	55	W
	Linear Derating Factor	0.36	W/℃
T_J , T_{STG}	Operating Junction and Storage Temperature Range	- 55 to +175	℃
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	℃/W
$R_{\theta CS}$	Case-to-Sink	0.5	--	
$R_{\theta JA}$	Junction-to-Ambient	--	62.5	

FAIRCHILD SEMICONDUCTOR™

IRF530A

N-CHANNEL POWER MOSFET

Electrical Characteristics (T_C=25℃ unless otherwise specified)

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
BV_{DSS}	Drain-Source Breakdown Voltage	100	--	--	V	V_{GS}=0V,I_D=250μA
$\Delta BV/\Delta T_J$	Breakdown Voltage Temp. Coeff.	--	0.11	--	V/℃	I_D=250 μA ***See Fig 7***
$V_{GS(th)}$	Gate Threshold Voltage	2.0	--	4.0	V	V_{DS}=5V,I_D=250μA
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℃
$R_{DS(on)}$	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 =1MHz ***See Fig 5***
C_{oss}	Output Capacitance	--	150	175		
C_{rss}	Reverse Transfer Capacitance	--	62	72		
$t_{d(on)}$	Turn-On Delay Time	--	13	40	ns	V_{DD}=50V,I_D=14A, R_G=12Ω ***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℃,I_S=14A,V_{GS}=0V
t_{rr}	Reverse Recovery Time	--	109	--	ns	T_J=25℃,I_F=14A
Q_{rr}	Reverse Recovery Charge	--	0.41	--	¥ìC	di_F/dt=100A/μs ④

Notes ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=2mH, I_{AS}=14A, V_{DD}=25V, R_G=27Ω, Starting T_J=25°C

③ I_{SD} ≤ 14A, di/dt≤ 350A/μs, V_{DD}≤ BV_{DSS} , Starting T_J=25°C

④ Pulse Test : Pulse Width = 250 μs, Duty Cycle ≤2%

⑤ Essentially Independent of Operating Temperature

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N-CHANNEL
POWER MOSFET

IRF530A

Fig 1. Output Characteristics

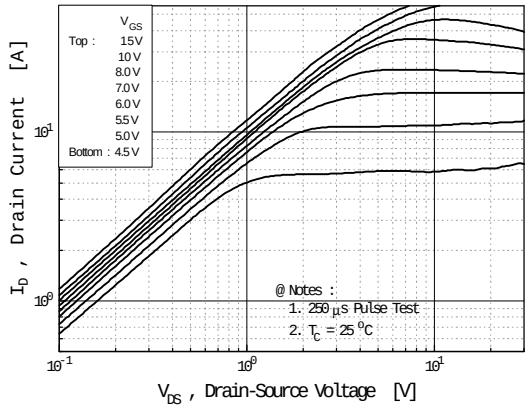

Fig 2. Transfer Characteristics

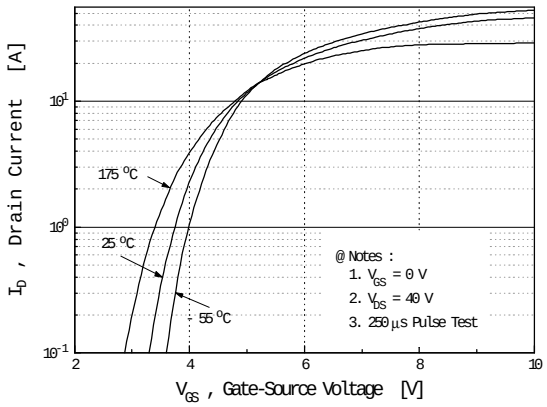

Fig 3. On-Resistance vs. Drain Current

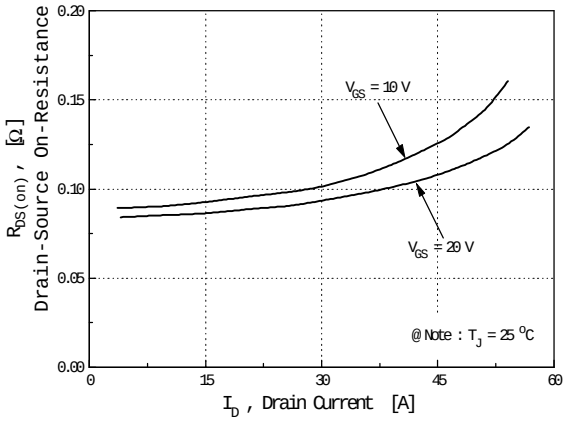

Fig 4. Source-Drain Diode Forward Voltage

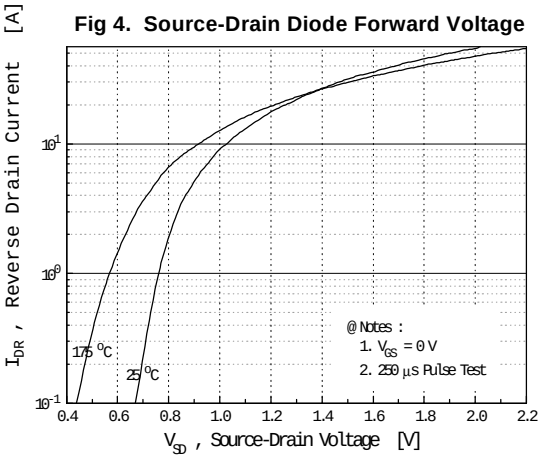

Fig 5. Capacitance vs. Drain-Source Voltage

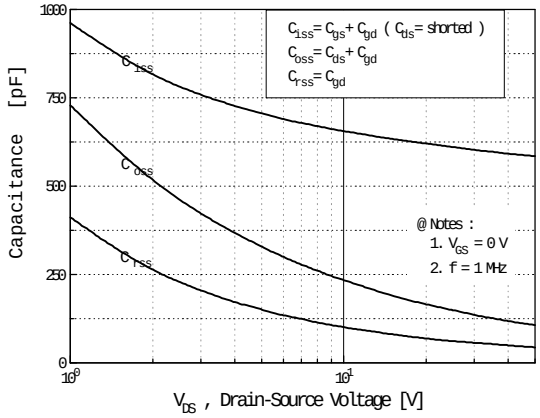

Fig 6. Gate Charge vs. Gate-Source Voltage

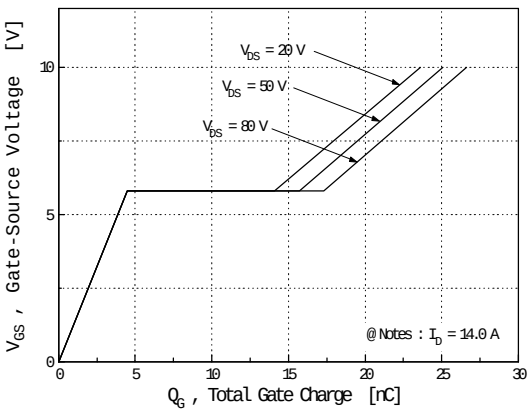

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Fig 7. Breakdown Voltage vs. Temperature

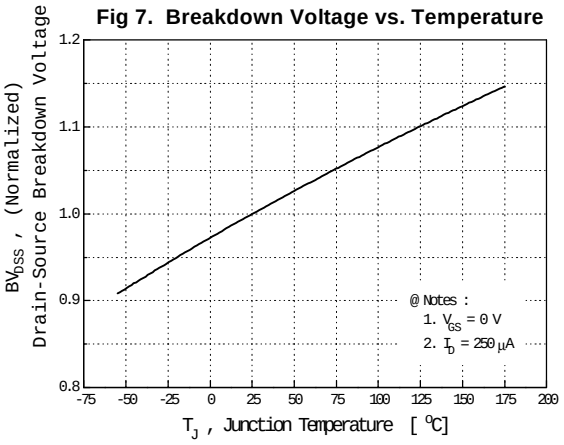


Fig 8. On-Resistance vs. Temperature

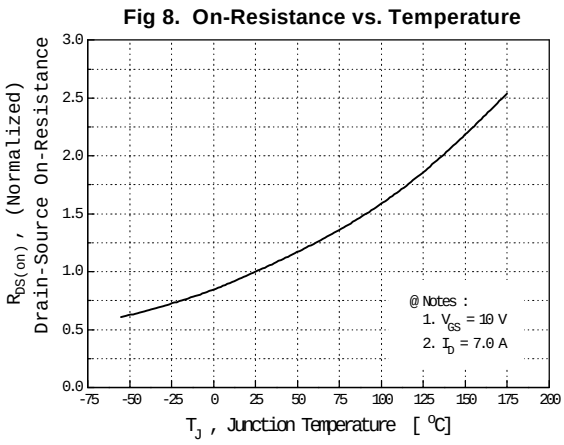


Fig 9. Max. Safe Operating Area

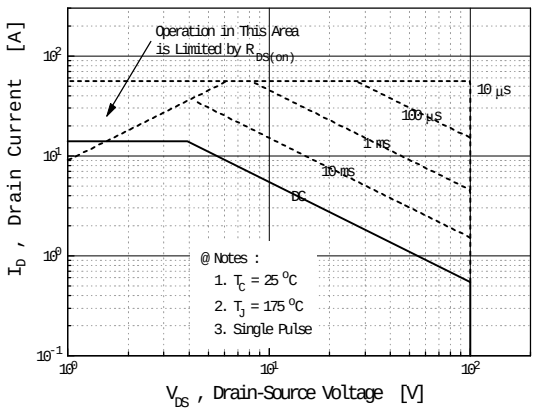


Fig 10. Max. Drain Current vs. Case Temperature

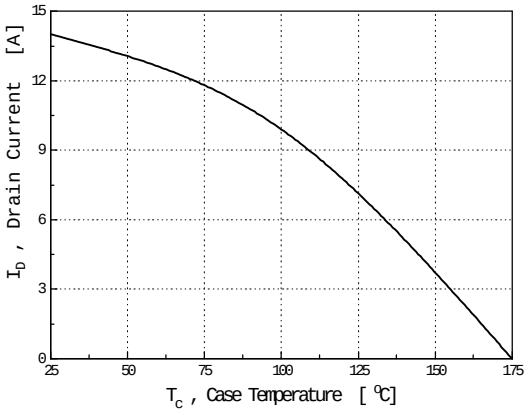


Fig 11. Thermal Response

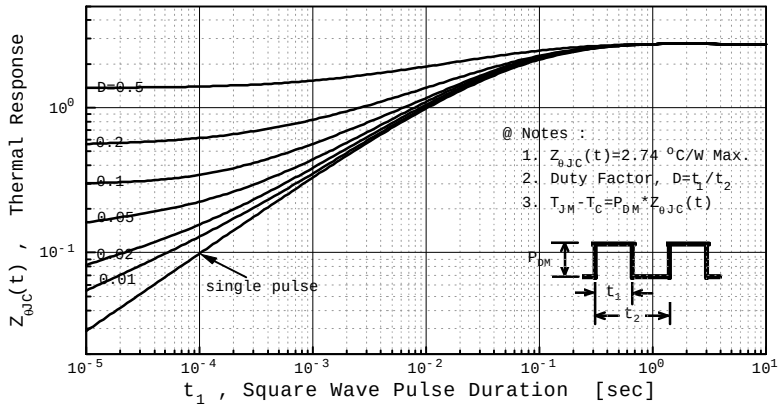
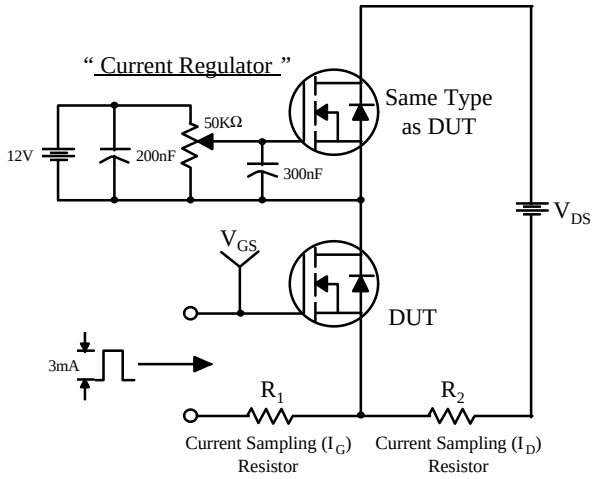


Fig 12. Gate Charge Test Circuit & Waveform



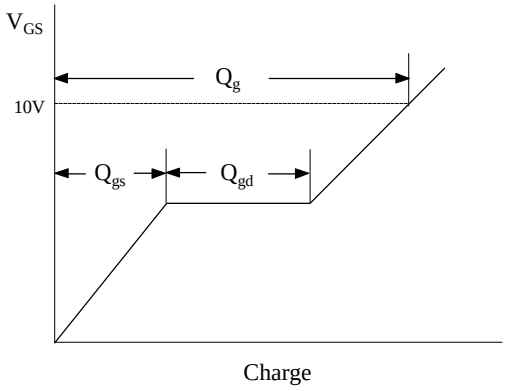
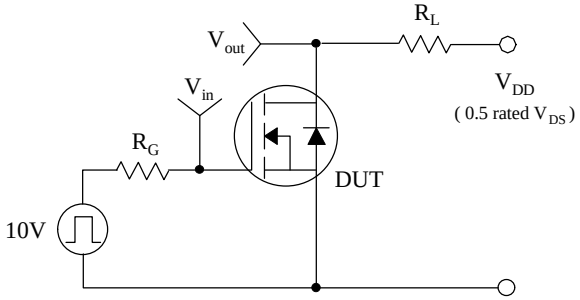


Fig 13. Resistive Switching Test Circuit & Waveforms



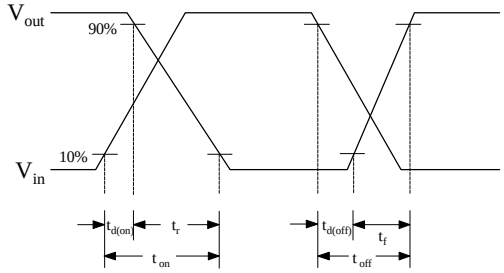
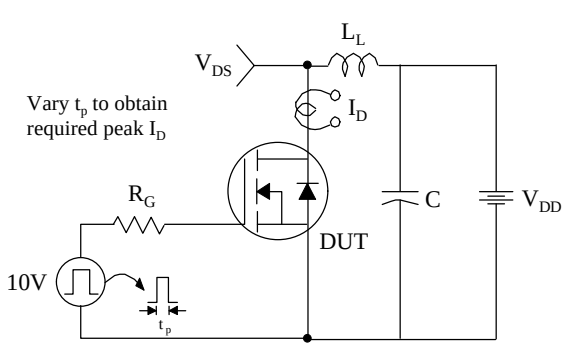


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms



$$E_{AS} = \frac{1}{2} L_L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

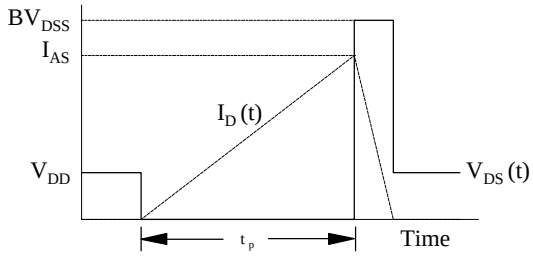
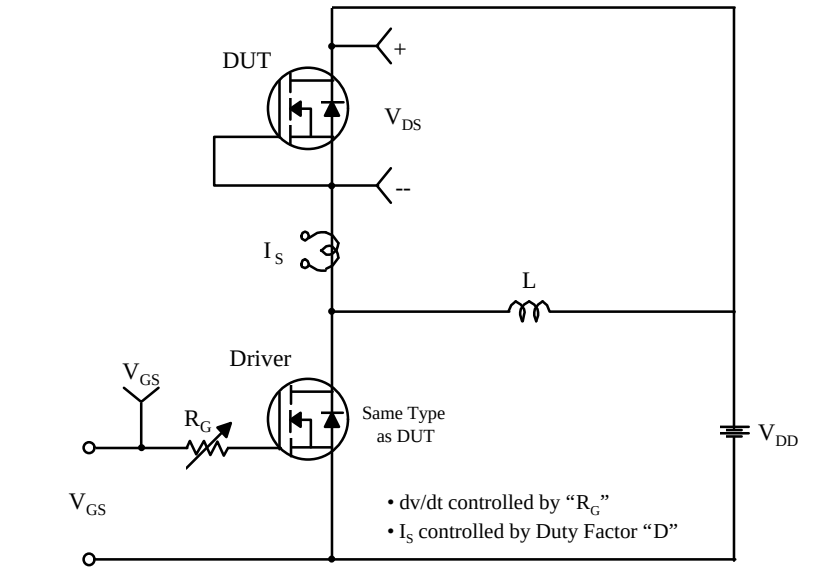
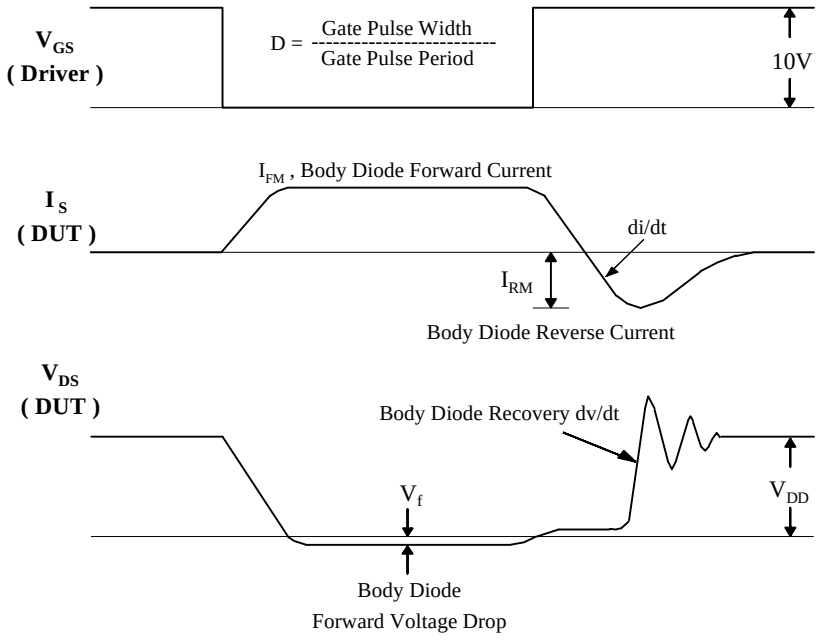


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms





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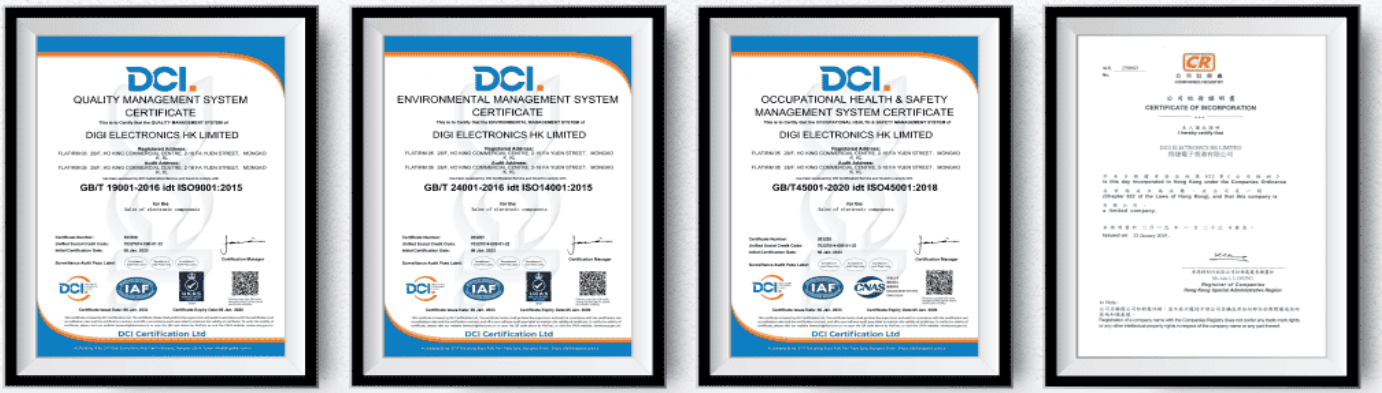

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