Truesemi®

TSA82N30M/TSK82N30M

300V N-Channel MOSFET

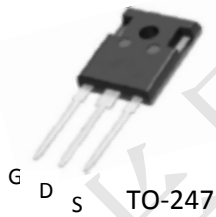
General Description

This Power MOSFET is produced using Truesemi'sadvanced planar stripe DMOS technology.This advanced technology has been especially tailored tominimize on-state resistance, provide superior switchingperformance, and withstand high energy pulse in theavalanche and commutation mode. These devices are well suited foHigh power inverter, cutting machine.

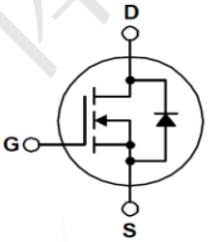
Features

•82A,300V,Max.RDS(on)=46mΩ @ VGS =10V
• Low gate charge: Qg=140nC (Typ.)
• 100% avalanche tested
• RoHS compliant device

TO-3P



TO-247



Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter		Value	Units
V_{DSS}	Drain-Source Voltage		300	V
V_{GS}	Gate-Source Voltage		± 20	V
I_D	Drain Current	T_C = 25℃	82	A
		T_C = 100℃	52	A
I_{DM}	Pulsed Drain Current	(Note 1)	328	A
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	3675	mJ
I_{AS}	Repetitive avalanche current	(Note 2)	35	A
E_{AR}	Repetitive Avalanche Energy	(Note 1)	19.80	mJ
P_D	Power Dissipation (T_C = 25℃)		198	W
T_J	Junction temperature		150	℃
T_{stg}	Storage temperature range		-55~150	℃

Thermal Resistance Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case	--	0.63	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient	--	62.50	℃/W

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Electrical Characteristics T_C=25 ℃ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	3.0	--	5.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 41 A	--	39.7	46.0	mΩ
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	300	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =300V, V_{GS} = 0 V	--	--	25	uA
		V_{DS} = 300 V, T_C = 125℃	--	--	100	uA
I_{GSS}	Gate leakage current	V_{GS} =±20V, V_{DS} = 0 V	--	--	±100	nA
Rg	Internal gate resistance	Open drain, f=1MHz	--	1	--	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	6869	--	pF
C_{oss}	Output Capacitance		--	737	--	pF
C_{rss}	Reverse Transfer Capacitance		--	86	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Time	V_{DD}=150V, I_D=82A, R_G=25Ω (Note 3,4)	--	110	--	ns
t_r	Turn-On Rise Time		--	55	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	274	--	ns
t_f	Turn-Off Fall Time		--	52	--	ns
Q_g	Total Gate Charge	V_{DS}=300V, V_{GS}=10V, I_D=82A (Note 3,4)	--	140	--	nC
Q_{gs}	Gate-Source Charge		--	40	--	nC
Q_{gd}	Gate-Drain Charge		--	56	--	nC

Source-Drain Diode Ratings and Characteristics (TC=25°C unless otherwise noted)

I_S	Continuous Source-Drain Diode Forward Current		--	--	82	A
I_{SM}	Pulsed Source-Drain Diode Forward Current		--	--	328	
V_{SD}	Source-Drain Diode Forward Voltage	I_S = 82A, V_{GS} = 0 V	--	--	1.5	V
t_{rr}	Reverse recovery time (Note 3,4)	I_S = 82A, V_{GS} = 0 V di_F/dt = -100 A/μs	--	416	--	ns
Q_{rr}	Reverse recovery charge (Note 3,4)		--	5.2	--	uC

Note:

1. Repeated rating: Pulse width limited by safe operating area
2. L=5mH, I_{AS}=35A, V_{DD}=50V, R_G=25 , Starting TJ=25 C
3. Pulse test: Pulse width≤300us, Duty cycle≤2%
4. Essentially independent of operating temperature typical characteristics

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Typical Characteristics Curve

Fig. 1 I_D - V_{DS}

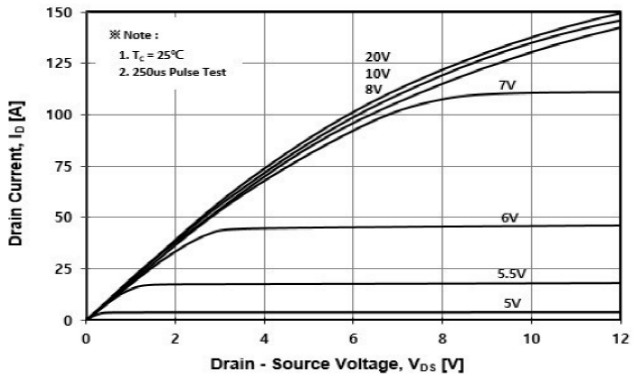


Fig. 2 I_D - V_{GS}

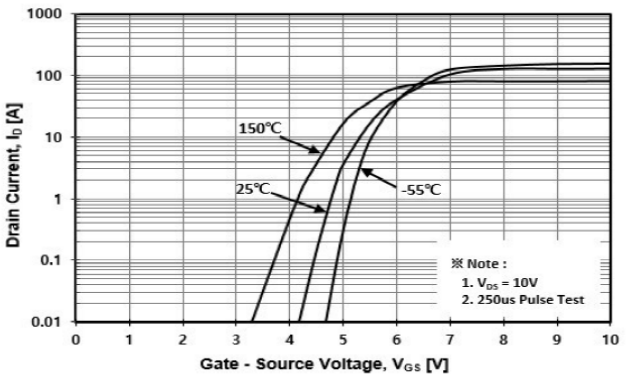


Fig. 3 $R_{DS(ON)}$ - I_D

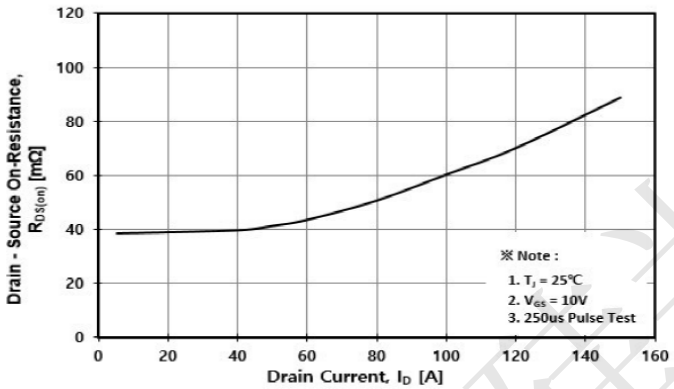


Fig. 4 I_S - V_{SD}

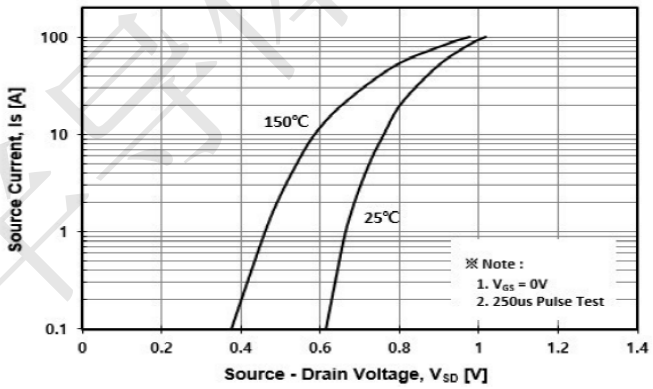


Fig. 5 Capacitance - V_{DS}

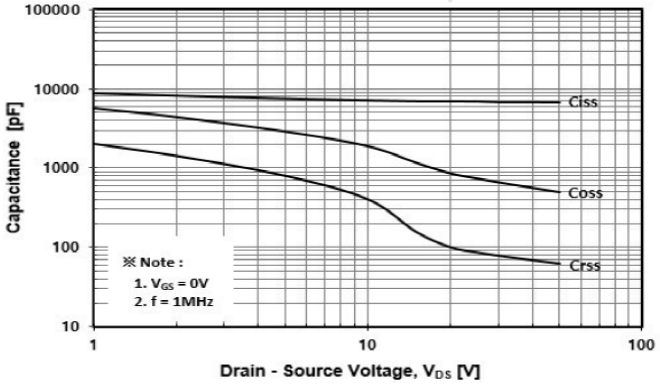
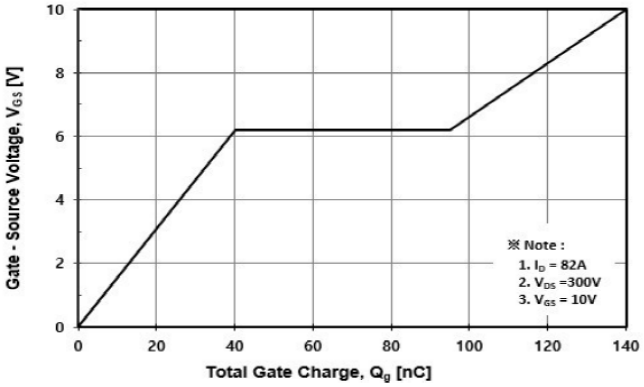


Fig. 6 V_{GS} - Q_G



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Typical Characteristics Curve (Continue)

Fig. 7 BV_{DSS} - T_J

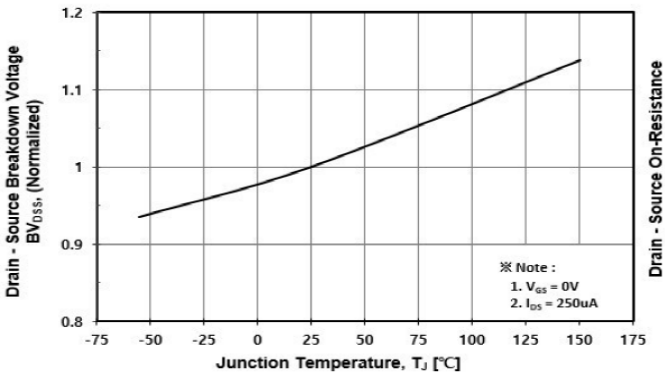

Fig. 8 $R_{DS(ON)}$ - T_J

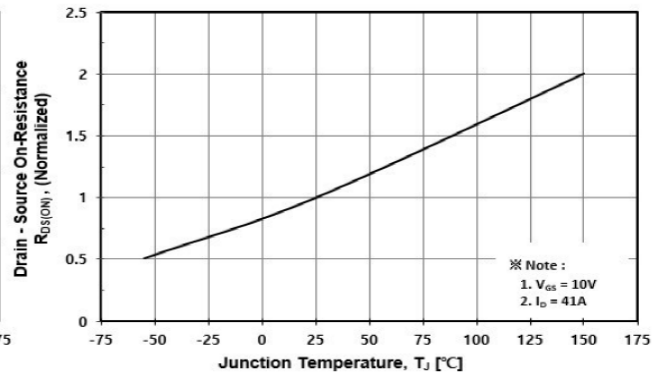

Fig. 9 I_D - T_C

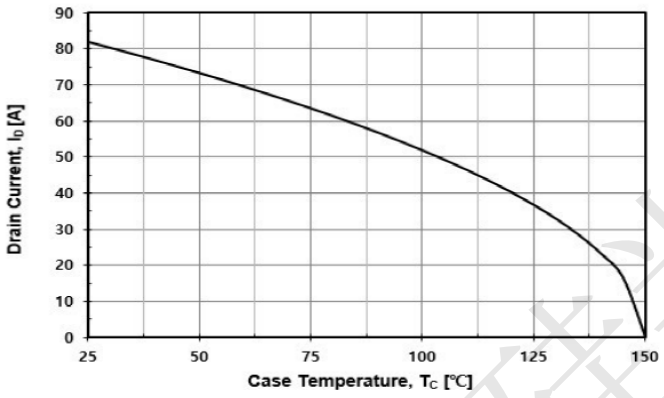

Fig. 10 Safe Operating Area

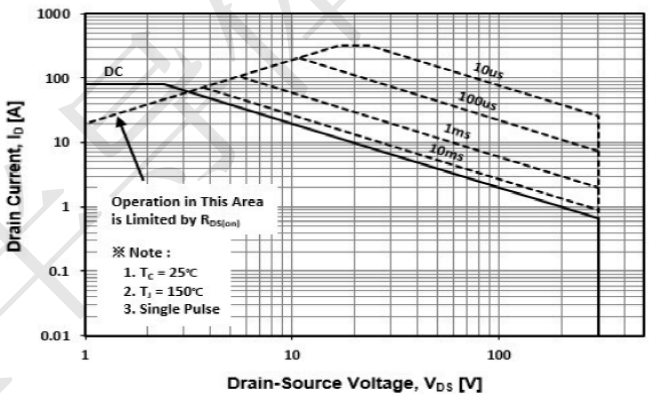

Fig. 11 Transient Thermal Impedance

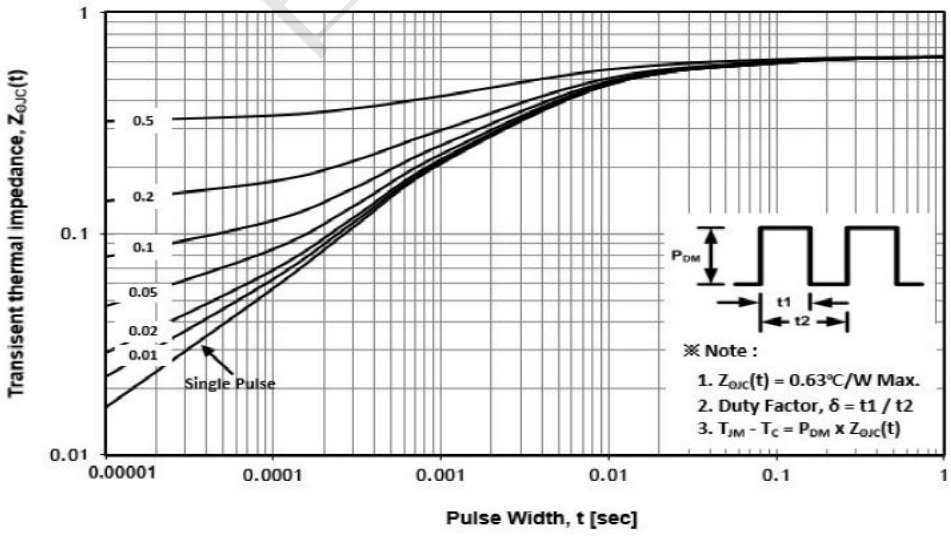

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Fig. 12 Gate Charge Test Circuit & Waveform

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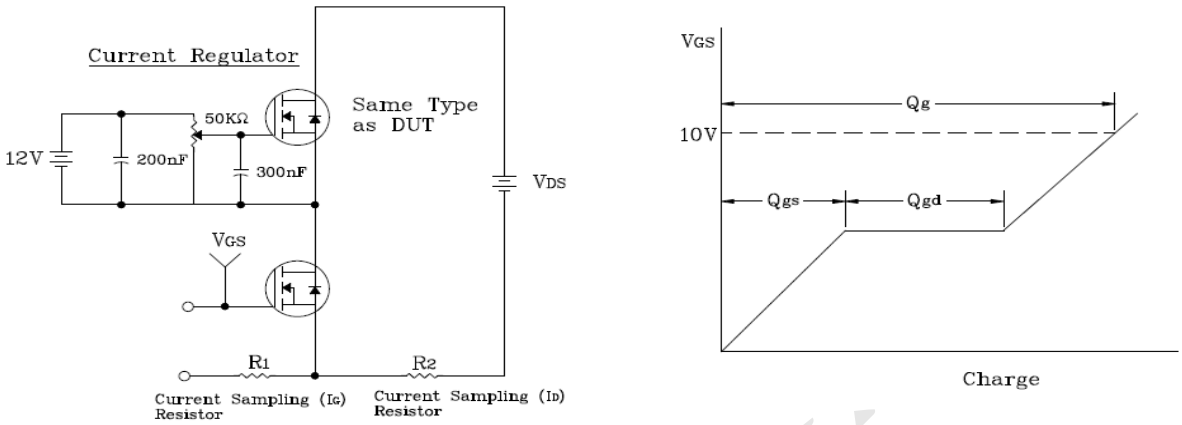

Fig. 13 Resistive Switching Test Circuit & Waveform

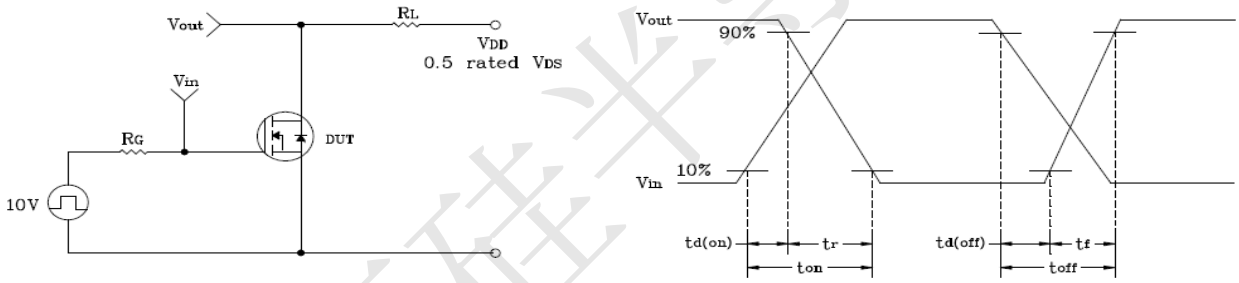

Fig. 14 E_{AS} Test Circuit & Waveform

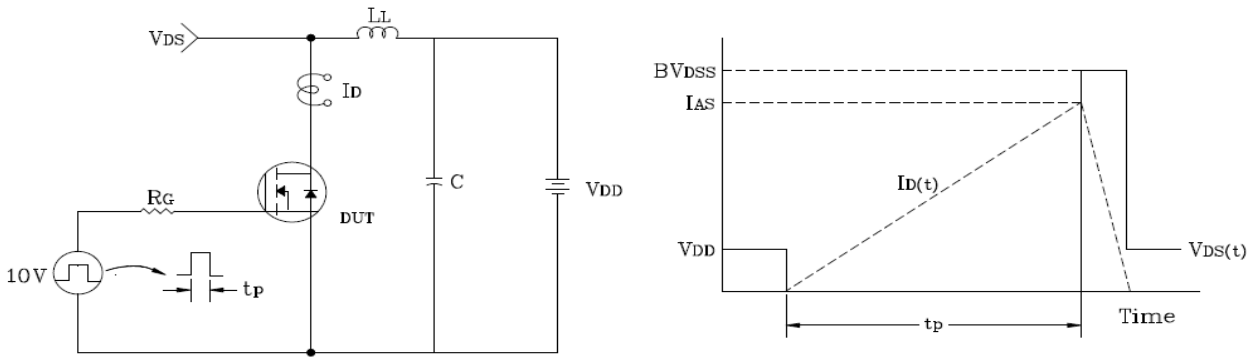

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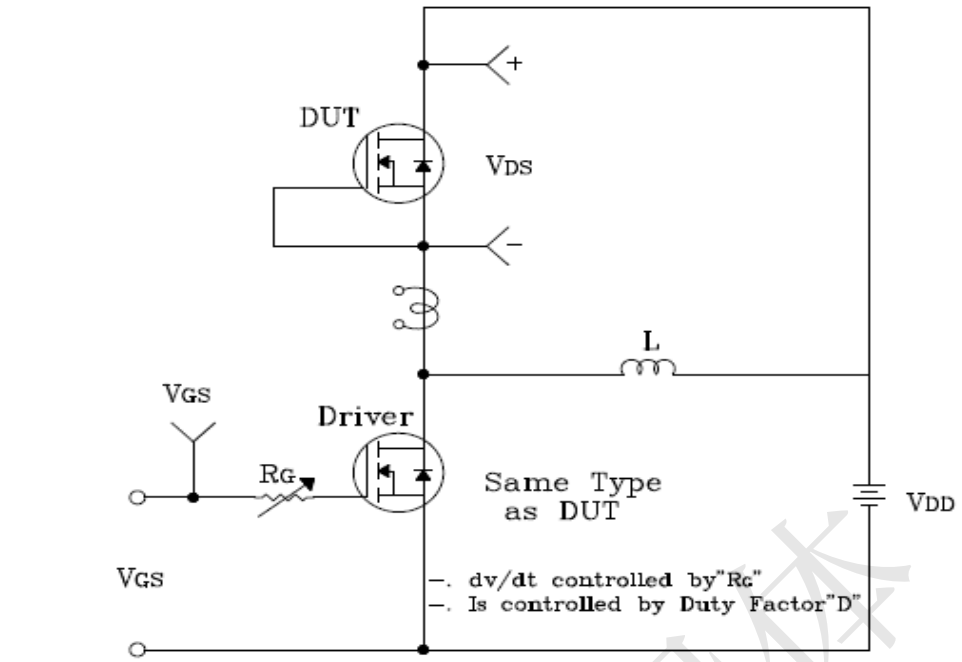
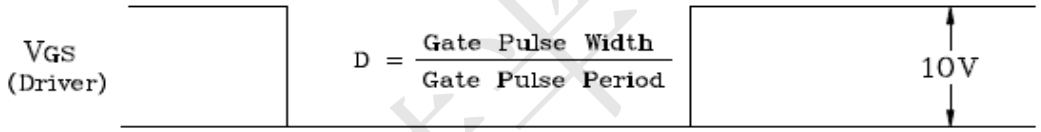
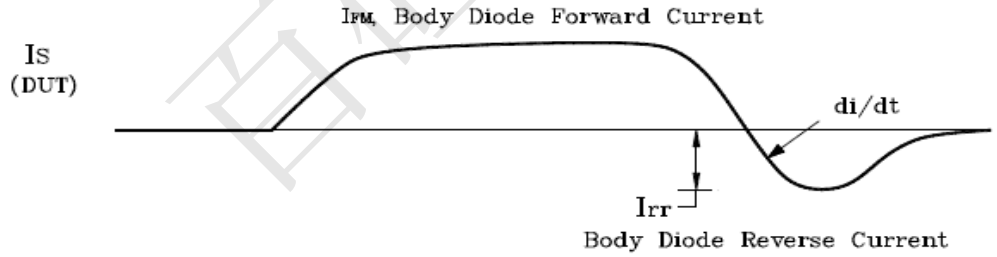
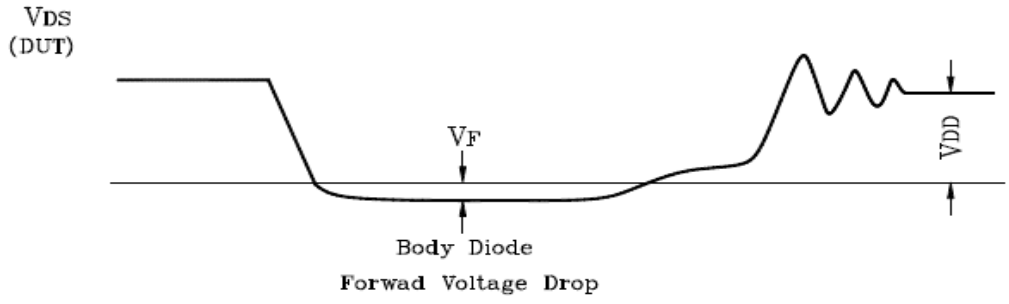
Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform









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